BAE SYSTEMS

TO: All Loop Resistance Tester (PN 906-10247-2, -3) Users

REF: GETM D6-82567 (ACS 16122), Revision 14, dated September 1, 2004
906-10282, Revision C, Calibration Certification Procedure for the Loop Resistance Tester
ADCN-1 (Adds Coverage for 906-10247-3) for 906-10282, Revision C

SUBJECT: Loop Resistance Tester (LRT) GETM, ID CE 194459

DATE: March 24, 2006

BAE SYSTEMS has no technical objections to maintaining LRT part numbers 906-10247-2 and 906-10247-3 using the following documents:

- Loop Resistance Tester GETM D6-82567 (ACS 16122), Revision 14, dated September 1, 2004
- 906-10282, Revision C, Calibration Certification Procedure for the Loop Resistance Tester
- ADCN-1 (Adds Coverage for 906-10247-3) for 906-10282, Revision C

This NTO will expire when GETM D6-82567 is updated to include this information.

Thank you,
Steve Reynolds

Controls Inc

2013.01.08 10:37:00 -05'00'

DESIGN GROUP 6-E214

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BOEING

ADCN

ADVANCE DRAWING CHANGE NOTICE

THE DRAWING WILL BE CHANGED TO INCLUDE THIS ADCN

DRAWN J.G.CHEATHAM	DATE 3-10-04	DWG QUAL	DATE	
CHECKED/PHONE Katie Sage	3/11/04	STRUCT/STRESS NSSR	3/12/04	
ENGINEER Don Revall	3/11/04	MATL & PRCS NBMT	3/12/04	
		DWG PROCESSING		
C/W J.GONDER	3/10/04	REL C. Zimmerman 3-24-04		CODE
PROJECT APPROVAL	3/11/04	CHNG EFF		PROD INFO AIRPLANES/ PARTS SATISFACTORY

REASON: ADD COVERAGE FOR 906-10247-3 & INCORRECT PARAGRAPH NUMBERS

▲ = ADCN REF	
MODEL	737
PIN/ITEM/WBS NO.	2850-1300
CHNG NO.	PRR95000
REQUESTED	DES REQ
CI/PEI	

DWG TITLE
CALIBRATION CERTIFICATION PROCEDURE FOR THE LOOP RESISTANCE TESTER

SEQ	ADCN	DRAWING NO.	SH	REV
	1	906-10282	1	C

▲ PAGE 6: ADD NOTE SECTION

▲ 11 POST CALIBRATION DATA SHEET

NOTES

1) ALL REFERENCES TO 906-10247-2 ALSO APPLY TO 906-10247-3.

▲ **LIST OF FIGURES**

▲ REVISE AS SHOWN

▲ PAGE 68

▲ Para
6.11.10 ~~1.1.1~~
6.11.10 ~~1.1.1~~

▲ PAGE 69

▲ Para
6.11.14 ~~1.1.1~~
6.11.14 ~~1.1.1~~

CAD DATASET UPDATE AT NEXT DCN

M PLANNING TO INCORPORATE IN SEQUENCE. Edward T. Castaneto, TR72, D574, EXT. (972) 659-2789 3/11/04

D1 5007 3940 REV. 7/91

APPLICATION	
NEXT ASSY	USED ON
906-10247	ALL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES:
ANGLES ± DECIMALS ±

T H ∅.247-.260 TOOL HOLE WHERE SHOWN.
USE IS A MANUFACTURING OPTION.

CAD DRAWING
DATABASE: EDCARS
DATASET: 906-10282-C0000S01.DOC
906-10282-C0000S01.PDF

THIS IS AN ELECTRONIC RELEASE

PIN 2850-1300

UNAUTHORIZED REPAIR OF THIS EQUIPMENT VOIDS UL913 CERTIFICATION.

Original Signature By:

DRAWN: 425-342-8171 John F. Gonder	12/18/03	BOEING® CORPORATE OFFICES SEATTLE, WA 98124
CHECKED:		
ENG: 425-342-8171 John F. Gonder	12/18/03	
MFG: NA		TITLE
GROUP:		**CALIBRATION CERTIFICATION PROCEDURE FOR THE LOOP RESISTANCE TESTER**
PROJ:		
DQA:		

RELEASE:		SIZE A	CAGE CODE 81205	DWG NO 906-10282		
USED ON 737	SECT NO					
CHG. NO CAS-33057 (PRR38393)	GROUP ORG 6-E214		SCALE NONE	SHEET 1	PAGE 1	REV C

LIST OF ACTIVE PAGES

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
NEW	Original Release		
	P AIRPLANES/PARTS SATISFACTORY		
	M PLANNING TO INCORPORATE IN SEQUENCE		
	CAD DATASET REVISED		
	THIS DATA IS STORED IN EDCARS.		
	D906-10282.DOC (CASPUBS Ref.)		

BOEING	SIZE	CAGE CODE	DWG NO		
CORPORATE OFFICES SEATTLE, WA 98124	A	81205	906-10282		
			SHEET 1	PAGE 3	REV -

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
A	**PRR 94000** **Reason:** Bring Drawing Up To Date This drawing has been completely retyped, reformatted, and repaginated per current BDS standards **CAS-33057 (PRR 38393)** **Reason:** Incorporate Committed Change Added pages 32 thru 70. CAD DATASET REVISED **THIS IS PERMANENTLY STORED IN EDCARS**	4/4/02 4/4/02 4/5/02 4/4/02 4/5/02 04/08/02	6-E214 DRAWN: R. Wade 425-717-5845 CHECKED: T. Dyke 425-342-3370 MFG: R. L. Hart 6-E312 425-342-6673 APPROVED: H. Allen 425-717-6230 DQA: L. Piontek 425-342-1381 RELEASE: F. Johnson

REVISIONS

REV	DESCRIPTION	DATE	APPROVAL
B	**CAS-33057 (PRR 38393)**		6-E214
	Reason: Incorporate Committed Change.		
	Corrected the document number on pg 6 to end of document.	06/14/02	DRAWN: W.C. Jones 425-717-5571
	Revised page 1, 2, and added this page for revision description.		
	Revised the text in section 3.3	06/26/02	CHECKED: T. Dyke 425-342-3370
	Changed the title of section 3.7 to read "… Battery Charge".		
	Revised paragraph 3.20.	06/25/02	ENGINEERED: W. Jones
	Added the requirement for a digital thermometer in section 4.4.	06/27/02	NSRR: R. Nye
	Revised section 6.4.1, 6.4.4, 6.5.1, 6.5.4, 6.6.1, 6.6.4, 6.7.1, 6.7.4, 6.8.1, 6.8.3, 6.9.1, 6.9.3, 6.10.1, 6.10.2, 6.10.3, 6.10.4, 6.11.1, 6.11.2, 6.11.3, 6.11.4, 6.11.5, and 6.11.6.	06/27/02	NBMT: R. Nye
	Revised section 7.2, 7.3, 7.4, 7.5, 7.7.1, 7.8.1, 7.9.1, 7.9.6, 7.10.1, 7.10.6 and 7.11.	06/27/02	MFG: R.A. Cummings 342-0336/6-E312
	Revised section 9 and 11 to include ambient temperature information.		
	CAD DATASET REVISED	06/26/02	APPROVED: H. Allen 425-717-6230
	THIS DATA IS PERMANENTLY STORED IN EDCARS	06/27/02	DQA: K. Heyman 266-4942
		07/03/02	RELEASE: C. Zimmerman

REVISIONS

REV	DESCRIPTION	DATE	APPROVAL
C	**CAS-33079 (PRR 95000)**		6-E214
	Reason: Updated document to reflect changes to the Calibration Kit Numbering (906-10272-5). This release references the complete Kit, instead of individual standards, for testing and calibration. Revised list of active pages, pg 2. Added this page for revision description. Updated the table of contents.	01/22/04	DRAWN: John Gonder 425-342-8171
	** "REFER TO DDS OR PDM FOR RELEASE SIGNATURE AND DATE"	01/23/04	CHECKED: Ed D'Souza
	CAD DATASET REVISED	01/22/04	ENGINEERED: John Gonder 425-342-8171
	P AIRPLANES/PARTS SATISFACTORY		
	M PLANNING TO INCORPORATE IN SEQUENCE	01/23/04	NSRR: M. Adams
	THIS DATA IS PERMANENTLY STORED IN EDCARS	01/23/04	NBMT: M. Adams
		01/23/04	MFG: M. Larkin 425-717-6516 6-E215
		01/23/04	APPROVED: L. Smith
		01/23/04	DQA: K. Heyman 425-342-1316
			RELEASE: **

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LIST OF FIGURES

1 INTRODUCTION

1.1 General

The Boeing Loop Resistance Tester (LRT) is used to measure the resistance of cable shielding on aircraft and other systems. The LRT is certified to UL913 specifications for use in Division I, Class 1, Group D, and hazardous locations.

1.2 Scope

The purpose of this drawing is to provide a procedure for calibrating the Loop Resistance Tester, 906-10247-2. Also included in this procedure are steps required to maintain the password, which is used to enable the calibration sequence.

1.3 The Approach of the Test Procedure

This procedure is broken into two main parts. The first part is the process used to calibrate or adjust the LRT. The second part validates the calibration or adjustment process by comparing the LRT measurements in normal operation with the resistance of certified loop and joint standards. This is referred to as post calibration.

The calibration or adjustment process uses a software algorithm in the LRT and a set of certified loop and shunt standards. The algorithm compares the un-calibrated measurement of a standard with the actual resistance of that standard and determines an adjustment factor that is stored in non-volatile memory. This process is repeated for every operating mode, measurement range, and coupler orientation of the LRT. Once the calibration process in completed the adjustment factors are used in normal operation to correct the LRT measurements.

The post calibration process is used to verify the LRT was calibrated or adjusted properly. The process uses the LRT in normal operating mode to measurer the loop and joint standards. The resulting measurements are compared with the known value of the loop and joint standards to determine if the LRT is operating within the required limits.

1.4 Key Words

Loop Resistance Tester (LRT)

Functional Test Kernel (FTK)

Sense Coupler

Drive Coupler

Joint Probe

Loop Standard

Shunt Standard

Ground Equipment Technical Manual (GETM)

Printed Wiring Assembly (PWA)

2 REFERENCES

906-10272	STANDARD ASSY – LRT
906-10271	ACCESSORY ASSY - LRT
906-10247	LOOP RESISTANCE TESTER ASSY
906-10248	PANEL, DISPLAY ASSY - ELECTRICAL
906-10250	PWA ASSY
906-10270	DRAWING TREE – LOOP RESISTANCE TESTER
906-10267	FUNCTIONAL TEST OF LOOP RESISTANCE TESTER 906-10247-1 AND 906-10247-2
626T1000	Component Functional Test Index, Sheet 1
BAC5485	Handling of Static Sensitive Hardware
D6-82009	Ground Equipment Technical Manual (GETM) for –1 LRT
D6-82567	Ground Equipment Technical Manual (GETM) for –2 LRT
D1-8005	Calibration Procedures – Boeing Primary Standards Laboratory

3 GENERAL INFORMATION

3.1 Special Handling Required for UL913

NOTE: UNAUTHORIZED REPAIR OF THIS EQUIPMENT VOIDS UL913 CERTIFICATION.

The LRT contains static sensitive components. If the unit is opened for maintenance, it must be handled in accordance with BAC5485.

3.2 Coupler Operation

The couplers must be completely closed when making a measurement. The metal pole pieces must make deliberate and complete connection with each other. Do not remove the couplers while the LRT is making a measurement. A loop measurement requires several seconds. When using wires and shunt standards the couplers should not be positioned over a shunt. When using the loop standards (i.e. 906-10273-2) with the LRT one coupler goes around one opening in the standard and the other coupler goes around the opposite opening.

In this test procedure, the phrase “flip the drive coupler” or “flip the sense coupler” is directing the reader to install the coupler so that the loop passes through the coupler in the opposite direction. The required action by the reader is to remove the coupler from the loop under test and rotate the coupler 180 degrees and reinstall it on the loop so the loop under test passes through the opening in the coupler in the opposite direction. This is done to invert the phase of the signal from the coupler.

3.3 Joint Probe Operation

The construction of the shunt is such that the outer most fasteners are large bolts that are used to conduct relatively large amounts of current. The smaller inboard screws are sense terminal screws that are used to sense the voltage across the resistive element of the shunt. The center portion of the shunt is the resistive element.

To connect the joint probes to a shunt press the joint probe tips onto the center of the sense terminal screws with one probe on each sense terminal screw, so that the probes sense the voltage across the resistive element through the sense terminal screws. Ensure the sense terminal screws are screwed down tight before connecting the probes to the shunt. The weight of the operator’s hand is more than enough pressure to ensure connection between the probe tips and the shunt.

Do not remove the probes while the LRT is making a measurement. A joint measurement requires several seconds. Once the LRT displays a joint measurement the probes may be removed from the shunt.

In this test procedure, the phrase “reverse the locations of the joint probes” is directing the operator to retest the shunt by interchanging the location of the two joint probes. This is done to invert the phase of the signal from the joint probe.

3.4 Tolerance for 906-10247-2, LRT in Normal Operation

The following criteria apply to the 906-10247-2, LRT.

The LRT is considered calibrated if an intact calibration sticker is attached AND the sign-on message after the LRT is turned on does not include the message “`Warning Bad Cal`”. All measurement tolerances for a calibrated LRT are +/- 5% or +/- 0.2 mΩ whichever is greater, unless otherwise noted in this procedure. Additionally, for the calibrated LRT to operate properly the serial numbers of the drive and sense couplers must match the serial numbers listed on the face of the LRT.

The LRT is considered non-calibrated if a calibration sticker is not attached OR the sign-on message after the LRT is turned on includes the message “`Warning Bad Cal`”. All measurement tolerances for a non-calibrated LRT are +/- 10% or +/- 0.5 mΩ whichever is greater, unless otherwise noted in this procedure.

3.5 Tolerance for 906-10247-2, LRT for the Loop Value in Joint Mode

The following criteria apply to the 906-10247-2, LRT.

The value of the loop reading in joint mode must be within +/-5% of the loop value in loop mode. This applies to both a calibrated and non-calibrated LRT.

3.6 Tolerance for 906-10247-2, LRT During Post Calibration Testing

The following criteria apply to the 906-10247-2, LRT.

The tolerance for all readings in loop and joint mode is +/-3.5%.

3.7 LRT Will Not Operate During a Battery Charge

The LRT is designed to not operate with the battery charger connected. Therefore, the battery charger must be disconnected before running any test unless otherwise noted.

3.8 Automatic Shutdown

The LRT will shut off after approximately 10 minutes of inactivity unless otherwise noted. This feature is inhibited during calibration.

3.9 Equivalence of Ohms and Milliohms

Loop standards and shunts may be marked in milliohms or ohms. The conversion is 1000 milliohms per ohm. Also, the symbol “Ω” represents ohms and “mΩ” represents milliohms. The ~ symbol means the value is approximate.

3.10 Some Conventions in this Procedure

In this test procedure the text “<CR>” is directing the reader to press the enter key on the keyboard or enter a carriage return. In this procedure the phrase “ `XXXXXX` “ represents a character string or a number that may include a decimal point. The number of X’s is not an indication of the actual number of characters or digits.

3.11 Portrayal of the LRT Display

The LRT display is two rows of eight characters and in this procedure the displayed text will be portrayed in courier new font similar to the following:

```
Press
Start
```

Additionally, the displayed text may also be portrayed within the text of a paragraph. An example would be to place the displayed text such as “`Press Start`” inline with the paragraph text.

3.12 Purpose of Blinking Display Characters

Depending on the version of software, the first letter of each line of the display may blink during a measurement. This indicates the low gain amplifier stage is used to make the measurement. As an example in loop mode if the “L” is blinking the low gain amplifier stage is being used for the measurement. This feature is available in normal operation only, but not during calibration.

3.13 Keypad Operation

The function of the LRT keypad may change from one procedure step to the next, however in general the keys or switches function as follows:

ON/OFF	This switch controls power to the LRT.
MENU	This switch is used to toggle between menus and normal operation.
↑	This switch is used to move through the menu entries or as directed by this procedure.
↓	This switch is used to move through the menu entries or as directed by this procedure.
NO	This switch is used to answer displayed questions and as directed by this procedure.
YES	This switch is used to answer displayed questions and as directed by this procedure. This switch also performs the same function as the start switch on the coupler cables.

During calibration the keypad is also used for data entry such as entering the value of a loop or joint standard, or entering the password. During data entry the ↓ and ↑ switches are used to modify the value of a digit on the display. Blinking normally highlights the digit that’s selected for change. After the desired digit is modified, it is accepted by pressing the YES switch, which also causes the blinking cursor to move to the next digit. After all digits are initialized, the display may change to “`ACCEPT? XXXXXX` “, where `XXXXXX` is the modified number or character string. The modified digits are accepted by pressing the YES switch. However, if the value is incorrect pressing the NO switch enables the data entry process to start again.

3.14 LRT Power Control

LRT power is turned on by first putting the RUN – OFF/CHARGE switch in the RUN position and pressing the ON/OFF switch for a few seconds or until the display becomes active. Pressing the ON/Off switch a second time will turn the LRT off, but only after the “`Press Start`” message is initially displayed. The LRT cannot be turned off via the ON/OFF switch until after the initial “`Press Start`” message is displayed. The RUN – OFF/CHARGE switch will always turn the LRT off regardless of the displayed message.

3.15 Operation of LOOP-JOINT Switch

The LOOP-JOINT switch controls the mode of the LRT. This switch is also referred to as the mode switch. When this switch is in the LOOP position the LRT is in loop mode and when the switch is in the JOINT position the LRT is in joint mode.

3.16 Actual Value of Loop and Joint Standards

This procedure refers to loop and joint standards by part number or nominal value. The actual value is marked on or attached to the standard and is the value used with tolerance requirements to calculate low and high limits, etc. This is also referred to as the certified value of the standard.

3.17 Rounding the Actual Value of Loop and Joint Standards

During calibration, it may be necessary to round off or round up the actual value of the loop or joint standard if the actual value has more or less digits than required by the calibration algorithm.

As an example if the actual value of a loop or joint standard has more significant digits than the calibration algorithm requires, than the unnecessary digits may be disregarded. The value of the least significant digit used by the algorithm must be adjusted according to the next digit to the right, which is the most significant unused digit. If the most significant unused digit is equal to or greater than 5, than the value of least significant digit used by the algorithm must be incremented.

To further illustrate this point, if the standard value is 2.08562 mΩ, but the calibration algorithm only allows entry of 4 digits after the decimal point than the reader should enter the value 2.0856 and omit the final digit of 2. If however, the actual value of the loop standard is 2.08565 than the reader should enter the value 2.0857.

It is also allowable to round up the actual value of the loop or joint standard. If the actual value of the standard is 2.08 mΩ, but the calibration algorithm requires the entry of 4 digits after the decimal point than the reader may pad the entry with zeros. The value entered should be 2.0800.

3.18 Torque Limitations for Shunts

Do not over tighten the bolts on the shunt standards. Over tightening the bolts may damage the shunts. These bolts only need to be snug to make a proper connection. The recommended torque is 10 to 25 inch-pounds.

3.19 Condition of LRT

The LRT must be fully operational before starting the calibration procedure. If the operation of the LRT is impaired or degraded, it must be repaired at a UL bench and retested with the functional test procedure, 906-10267. Additionally, it is recommended the LRT battery be fully charged to at least 85%. Note that the battery charge condition is displayed by the LRT during the power on sequence.

3.20 Calibration Environment

Ensure the LRT assembly and all calibration loop and shunt standards have been stored in a temperature-controlled environment of 23 +/- 2 degrees C for no less than 8 hours prior to calibration. The temperature of the loop standards must be in a stable draft free environment. During the calibration process the temperature must be monitored to +/- 0.1 degree C. Apply temperature correction to the certified resistance of each loop standard according to the following equation. The shunt standards do not require this adjustment.

temperature corrected resistance =
(100% + (temp. coefficient of resistance)(ambient temp. - certification temp.)) x
(certified resistance value)

Where:
the temperature corrected resistance is the certified resistance modified by ambient temperature,
the temperature coefficient of resistance is marked on the loop standard,
the ambient temperature as measured during the cal-cert procedure,
the certification temperature is marked on the loop standard,
and the certified resistance value is marked on the loop standard.

Example:

The certification resistance value = 14.0297 milliohms as marked on the loop standard.
The temperature coefficient of resistance = +.4%/degrees C as marked on the loop standard.
The temperature during loop standard certification = 23.5 degrees C as marked on the loop standard.
The ambient temperature = 22 degrees C as measured by a thermometer.

corrected shunt value = (100% + (+.4%/degrees C)(22C - 23.5C)) (14.0297 milliohms)

corrected shunt value = (100% + (+.4%/degrees C)(-1.5C)) (14.0297 milliohms)

corrected shunt value = (100% + (-.6%)) (14.0297 milliohms)

13.945522 milliohms = (99.4%) (14.0297 milliohms)

The 13.945522 milliohms is the loop value corrected for temperature that must be used for cal-cert steps involving the 14.0297 milliohm standard.

3.21 The Default Password

The default password for calibration is "`SWRULES!`". This password is set during software loading. The password may be modified if desired by using a procedure described elsewhere in this document. It is the responsibility of the calibrating organization the keep track of the new password.

3.22 Other Messages During Calibration

In most cases if the wrong switch is press the LRT display will show "`Switch Inactive`".

If the software can't validate the password the LRT display will show "`PSWD CHK FAILED`".

If the drive coupler is open, "`DRV Coup Is Open`" will be displayed on the LRT.

If the sense coupler is open, "`SNS Coup Is Open`" will be displayed on the LRT.

If the wrong standard is connected, "`Loop Too Big`" may be displayed on the LRT.

During calibration if the value of a standard as measured by the LRT is more then 30% off the expected value the LRT may display "`STD CHK FAILED`" for approximately two seconds and then returns to the original display. This message will also appear if the LRT measures a braided wire loop greater than 1.5mΩ.

If the coupler wasn't properly flipped, "`Drv Cplr Not Flip`" may be displayed on the LRT.

If the joint probes weren't properly swapped, "`FlipSwap Error`" may be displayed on the LRT.

If the mode switch is not in JOINT before starting calibration, "`Inhibit LJ Switch`" may be displayed on the LRT.

The display "`RedoLoop  J xxxxxx`" means the loop value in joint mode is more than 5% different than the value of the loop in loop mode. The joint value in the bottom line of the display is still the correct value for the joint.

The display "`Reset Inhibit`" means the jumper wasn't detected during password reset.

The display "`  COP POP  `" means the couplers are out of phase and the joint probes are out of phase.

The display "`  CIP PIP  `" means the couplers are in phase and the joint probes are in phase.

The display "`  COP PIP  `" means the couplers are out of phase and the joint probes are in phase.

The display “ `CIP POP` ” means the couplers in phase and the joint probes are out of phase.

The display “ `XXXXXXXE+X` ” is a general form for a number. The number may include a decimal point.

4 TEST EQUIPMENT

4.1 Loop Standards and Shunts

For 906-10247-2 LRT use loop and shunt standards contained in part number 906-10272-5, STANDARD ASSY – LRT.

4.2 Test Leads

Braided cables are required for low resistance tests. These are included in the 906-10272-5.

4.3 Multimeter

A digital multi-meter or equivalent, that is capable of measuring resistance with a minimum accurately of +/-1.0% and voltage with a minimum accurately of +/-0.5%.

4.4 Other Support Equipment

A battery charger from the ACCESSORY ASSY – LRT, 906-10271 may be required.

A digital thermometer with accuracy of +/- 0.1 degrees Celsius is required.

5 LABEL TO IDENTIFY THE DRIVE AND SENSE COUPLER

Operation of a calibrated LRT is valid only when it is used with the appropriate drive and sense couplers. The serial numbers of the drive and sense couplers must match the serial numbers identified on the face of the LRT.

If not already installed, a label must be added to the face of the LRT that identifies the drive and sense couplers used to calibrate the LRT. The label should have a general format as follows.

```
--------------------------------------------------------------------------------
| DRIVE COUPLER S/N___________________________________                        |
|                                                                              |
| SENSE COUPLER S/N___________________________________                        |
|                                                                              |
|                                                                              |
|            ( other data required by the metrology lab )                      |
|                                                                              |
|                                                                              |
--------------------------------------------------------------------------------
```

This label should be located just below the connectors marked DRIVE COUPLER and SENSE COUPLER. There is a space on the face of the LRT below these two connectors provided for this purpose. The label should be applied to the face of the LRT in such a manner that guaranties the label will be readable and permanent enough to last until the next calibration.

6 CALIBRATION PROCEDURE

6.1 Calibration Setup

6.1.1 Calibration Environment

Ensure the LRT assembly and all calibration hardware has been stored in an environment as specified in section 3.

6.1.2 PWA Faying Surface Test

Open the LRT. The latches that hold the case together must be turned and then unhooked.

Set the multimeter to read resistance. Attach a multimeter probe to pin 1 of the RS232 connector and the other multimeter probe to the shell of the JOINT PROBE connector on the LRT. Probe polarity is not important.

Verify the resistance of the PWA faying surface is less than 1 Ohm. Record the actual resistance in the data sheets. Disconnect multimeter from the LRT.

6.1.3

Open the panel in the case top by pushing on and turning the thumbscrews. In the case top should be the sense/drive couplers, 906-10260, and the joint probes, 906-10261. Remove these from the case top and connect them to the LRT. The sense and drive couplers have different colored sleeves. The couplers should be installed so that the sleeve color of the coupler cable matches the color around the base of the connectors marked SENSE COUPLER and DRIVE COUPLER. Connect the joint probes, 906-10261 to the connector marked JOINT PROBE.

6.2 Turn On the LRT and Determine the Calibration Level

6.2.1

Put the LRT in loop mode by switching the mode switch to LOOP. Turn the LRT on by moving the OFF/CHARGE – RUN switch to RUN, and pressing the orange ON/OFF switch until the green power lamps remains on. After a few seconds the display will become active and will display messages such as, “`Testing Hardware`”, a test pattern will appear, battery %, and a software version number.

If the display stops with a

```
Press
Start
```

This indicates the LRT <u>is calibrated</u>. Note that a current calibration sticker must be attached to the LRT and the use of the correct sense and drive couplers as identified by serial numbers listed on the face of the LRT.

Continue with paragraph 6.2.3.

6.2.2

If however the display shows

```
Warning
Bad Cal
```

followed by

```
Display
Faults ?
```

then press the NO switch and when the following display appears

```
UseUnCa-
Libratd?
```

press the YES switch. The display should now show

```
Press
Start
```

This sequence indicates the LRT is not calibrated. If a calibration sticker is attached, it should be removed. Continue with paragraph 6.2.3.

6.2.3

Record in the Calibration Data Sheet that the LRT is calibrated or not calibrated.

Record the serial numbers of both the drive and sense coupler.

6.3 Enter the Password for Calibration

6.3.1 Setup

Put the mode switch in JOINT. This switch must remain in joint mode for the duration of calibration.

Press the MENU switch until the LRT displays "%`Battery Charge ?`".

Press the YES switch and record the percentage of battery charge.

It is recommended that the battery charge be at least 85% before starting calibration.

6.3.2 Entering The Calibration Function

Press the ↓ or ↑ switch until the LRT displays "`Calibrt  LRT  ?`" and press the YES switch. The LRT may display "`ReTrving Password`" for a few seconds. The LRT well display "`EDITPSWD XXXXXXXX`".

6.3.3 Entering The Password

The password may now be entered by using the ↓ or ↑ switch to select the desired letter and then pressing the YES switch to move to the next character. Repeat this process for all eight characters of the password. The LRT will now display "`ACCEPT? password`", where "`password`" is the password entered by the reader. If the displayed password is correct then press the YES switch. If a character is incorrectly selected then press the NO switch. This will allow reentry of the password.

See section 8 for instructions on how to change the password. If the current password is unknown see section 9 for instructions on how to reset the password to the default character string.

6.3.4 Starting The Calibration

The LRT should now display "`2.0mΩStd HookUp` ?". The LRT is now ready to start the calibration sequence.

6.4 Loop Calibration, 2mΩ

6.4.1 Setup

The LRT display shows "`2.0mΩStd HookUp` ?".

Connect the LRT couplers to the 906-10273-7 loop standard. This standard has a nominal value of 2mΩ.

Record the certified value of the loop standard in the Calibration Data Sheet

6.4.2 First Loop Measurement

Press the YES switch to answer the question on the LRT display.

The display will change to "`Test In Progress`". Do not move the couplers until the LRT displays "`Display LoopRes?`". This step will take approximately 30 seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXX    mΩ`" for 5 seconds followed by either "`Couplers In Phase`" or "`Couplers OutPhase`" for another 3 seconds. Record the resistance value and whether the couplers are in phase or out of phase. The Yes switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.4.3 Second Loop Measurement

The LRT display now shows "`Drv Cplr Flipped?`".

Flip the drive coupler.

Press the YES switch to answer the question on the LRT display.

The display will change to "`Test In Progress`". Do not move the couplers until the LRT displays "`Display LoopRes?`". This step will take approximately 30 seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXX    mΩ`   " for 5 seconds followed by either "`Couplers In Phase`" or "`Couplers OutPhase`" for another 3 seconds. Record the resistance value and whether the couplers are in phase or out of phase. The Yes switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.4.4 Enter Loop Standard Value

The LRT display now shows "`2 mΩStd 2.0000`   ". The 2.0000 value must be changed to agree with the temperature corrected value of the loop standard. See section 3.20 for details on adjusting the calibrated loop value for affects of temperature.

Use the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to "`ACCEPT? XXXXXXXX`". If the value is correct press the YES switch. If the value is incorrect press the NO switch and reinitialize the value to match the certified value of the standard.

6.5 Loop Calibration, 8.5mΩ

6.5.1 Setup

The LRT display shows "`8.5mΩStd HookUp` ?".

Connect the LRT couplers to the 906-10273-8 loop standard. This standard has a nominal value of 8.5mΩ.

Record the certified value of the loop standard in the Calibration Data Sheet

6.5.2 First Loop Measurement

Press the YES switch to answer the question on the LRT display.

The display will change to "`Test In Progress`". Do not move the couplers until the LRT displays "`Display LoopRes?`". This step will take approximately 30 seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXX    mΩ    `" for 5 seconds followed by either "`Couplers In Phase`" or "`Couplers OutPhase`" for another 3 seconds. Record the resistance value and whether the couplers are in phase or out of phase. The Yes switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.5.3 Second Loop Measurement

The LRT display now shows "`Drv Cplr Flipped?`".

Flip the drive coupler.

Press the YES switch to answer the question on the LRT display.

The display will change to "`Test In Progress`". Do not move the couplers until the LRT displays "`Display LoopRes?`". This step will take approximately 30 seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXX    mΩ    `" for 5 seconds followed by either "`Couplers In Phase`" or "`Couplers OutPhase`" for another 3 seconds. Record the resistance value and whether the couplers are in phase or out of phase. The Yes switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.5.4 Enter Loop Standard Value

The LRT display now shows "` 8 mΩStd 8.5000  `". The 8.5000 value must be changed to agree with the temperature corrected value of the loop standard. See section 3.20 for details on adjusting the calibrated loop value for affects of temperature.

Use the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to "`ACCEPT? XXXXXXXX`". If the value is correct press the YES switch. If the value is incorrect press the NO switch and reinitialize the value to match the certified value of the standard.

6.6 Loop Calibration, 14mΩ

6.6.1 Setup

The LRT display shows “ `14mΩStd HookUp` ?“.

Connect the LRT couplers to the 906-10273-2 loop standard. This standard has a nominal value of 14mΩ.

Record the certified value of the loop standard in the Calibration Data Sheet

6.6.2 First Loop Measurement

Press the YES switch to answer the question on the LRT display.

The display will change to “`Test In Progress`”. Do not move the couplers until the LRT displays “`Display LoopRes?`”. This step will take approximately 30 seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to “`XXXXXXXX mΩ` “ for 5 seconds followed by either “`Couplers In Phase`” or “`Couplers OutPhase`” for another 3 seconds. Record the resistance value and whether the couplers are in phase or out of phase. The Yes switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.6.3 Second Loop Measurement

The LRT display now shows “`Drv Cplr Flipped?`“.

Flip the drive coupler.

Press the YES switch to answer the question on the LRT display.

The display will change to “`Test In Progress`”. Do not move the couplers until the LRT displays “`Display LoopRes?`”. This step will take approximately 30 seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to “`XXXXXXXX mΩ` “ for 5 seconds followed by either “`Couplers In Phase`” or “`Couplers OutPhase`” for another 3 seconds. Record the resistance value and whether the couplers are in phase or out of phase. The Yes switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.6.4 Enter Loop Standard Value

The LRT display now shows "`14 mΩStd 14.000   `". The 14.000 value must be changed to agree with the temperature corrected value of the loop standard. See section 3.20 for details on adjusting the calibrated loop value for affects of temperature.

Use the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to "`ACCEPT? XXXXXXXX`". If the value is correct press the YES switch. If the value is incorrect press the NO switch and reinitialize the value to match the certified value of the standard.

6.7 Loop Calibration, 3600mΩ

6.7.1 Setup

The LRT display shows "`3.6ΩStd HookUp ?`".

Connect the LRT couplers to the 906-10273-6 loop standard. This standard has a nominal value of 3600mΩ.

Record the certified value of the loop standard in the Calibration Data Sheet

6.7.2 First Loop Measurement

Press the YES switch to answer the question on the LRT display.

The display will change to "`Test In Progress`". Do not move the couplers until the LRT displays "`Display LoopRes?`". This step will take approximately 30 seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXX    mΩ    `" for 5 seconds followed by either "`Couplers In Phase`" or "`Couplers OutPhase`" for another 3 seconds. Record the resistance value and whether the couplers are in phase or out of phase. The Yes switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.7.3 Second Loop Measurement

The LRT display now shows "`Drv Cplr Flipped?`".

Flip the drive coupler.

Press the YES switch to answer the question on the LRT display.

The display will change to "`Test In Progress`". Do not move the couplers until the LRT displays "`Display LoopRes?`". This step will take approximately 30 seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXX     mΩ`   " for 5 seconds followed by either "`Couplers In Phase`" or "`Couplers OutPhase`" for another 3 seconds. Record the resistance value and whether the couplers are in phase or out of phase. The Yes switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.7.4 Enter Loop Standard Value

The LRT display now shows "`3.6 ΩStd 3600.00`". The 3600.00 value must be changed to agree with the temperature corrected value of the loop standard. See section 3.20 for details on adjusting the calibrated loop value for affects of temperature.

Use the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to "`ACCEPT? XXXXXXXX`". If the value is correct press the YES switch. If the value is incorrect press the NO switch and reinitialize the value to match the certified value of the standard.

6.8 Joint Calibration, J1 and J2 Test

6.8.1 Setup for J1

The LRT display now shows "`ConFigJ1 HookUp ?`".

Using braided wire and the specified shunt, assemble the shunt and wire as shown in figure 1, "J1" and connect the couplers to the loop.

Record the certified value of the joint standard in the Calibration Data Sheets. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

Press the YES switch to answer the question on the LRT display.

The display will change to "`Test In Progress`". Do not move the couplers until the LRT displays "`Display LoopRes?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "XXXXXXXX mΩ " for 5 seconds. Record the resistance value in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.8.2 Setup for J2

The LRT display now shows "ConFigJ2 HookUp ?".

Using the same braided wire and shunt used for "J1", assemble the shunt and wire as shown in figure 1, "J2" and connect the couplers to the loop.

6.8.3 Enter Joint Standard Value for J2

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "25 mΩStd 25.000 ". The 25.000 value must be changed to agree with the certified value of the standard.

Use the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to "ACCEPT? XXXXXXXX". If the value is correct press the YES switch. If the value is incorrect press the NO switch and reinitialize the value to match the certified value of the standard.

6.8.4 First Joint Measurement for J2

The LRT display now shows "Connect Probes ".

Connect the joint probes to the shunt standard.

The display will change to "Test In Progress". Do not remove the joint probes until the LRT displays "DisplayI CalcAve?". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to " XXXXXXXXE+X " for five seconds followed by " COP POP ", " CIP PIP ", " COP PIP ", or " CIP POP " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "DisplayI MeasAve?".

Press the YES switch to answer the question on the LRT display.

The display will change to " XXXXXXXXE+X " for five seconds followed by " COP POP ", "CIP PIP ", " COP PIP ", or " CIP POP " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.8.5 Second Joint Measurement for J2

The LRT display now shows "JProbes Swapped?".

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "Connect Probes ".

Swap the joint probes and connect them to the shunt standard.

The display will change to "Test In Progress". Do not remove the joint probes until the LRT displays "DisplayI CalcAve?". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to " XXXXXXXXE+X " for five seconds followed by " COP POP ", "CIP PIP ", " COP PIP ", or " CIP POP " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "DisplayI MeasAve?".

Press the YES switch to answer the question on the LRT display.

The display will change to " XXXXXXXXE+X " for five seconds followed by " COP POP ", "CIP PIP ", " COP PIP ", or " CIP POP " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.8.6 Third Joint Measurement for J2

The LRT display now shows "Drv Cplr Flipped?".

Flip the drive coupler.

Press the YES switch to answer the question on the LRT display.

The LRT display now shows “`Connect Probes  `“.

The display will change to “`Test In Progress`”. Do not remove the joint probes until the LRT displays “`DisplayI CalcAve?`”. This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to “ `XXXXXXXXE+X` ” for five seconds followed by “ `COP POP` ”, “ `CIP PIP` ”, “ `COP PIP` ”, or “ `CIP POP` ” for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows “`DisplayI MeasAve?`”.

Press the YES switch to answer the question on the LRT display.

The display will change to “ `XXXXXXXXE+X` ” for five seconds followed by “ `COP POP` ”, “ `CIP PIP` ”, “ `COP PIP` ”, or “ `CIP POP` ” for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.8.7 Fourth joint Measurement for J2

The LRT display now shows “`JProbes  Swapped?`”.

Press the YES switch to answer the question on the LRT display.

The LRT display now shows “`Connect Probes  `“.

Swap the joint probes and connect them to the shunt standard.

The display will change to “`Test In Progress`”. Do not remove the joint probes until the LRT displays “`DisplayI CalcAve?`”. This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to “ `XXXXXXXXE+X` ” for five seconds followed by “ `COP POP` ”, “ `CIP PIP` ”, “ `COP PIP` ”, or “ `CIP POP` ” for a few seconds. Record both pieces of information of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows “`DisplayI MeasAve?`”.

Press the YES switch to answer the question on the LRT display.

The display will change to “ `XXXXXXXXE+X` ” for five seconds followed by “ `COP POP` ”, “ `CIP PIP` ”, “ `COP PIP` ”, or “ `CIP POP` ” for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.9 Joint Calibration, J3 and J4 Test

6.9.1 Setup for J3

The LRT display now shows “`ConFigJ3 HookUp ?`“.

Using braided wires and the specified shunts, assemble the shunts and wires as shown in figure 1, “J3” and connect the couplers to the loop.

Record the certified value of the 3600mΩ joint standard in the Calibration Data Sheets. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

Press the YES switch to answer the question on the LRT display.

The display will change to “`Test In Progress`”. Do not move the couplers until the LRT displays “`Display LoopRes?`”. This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to “`XXXXXXXX mΩ` “ for 5 seconds. Record the resistance value in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.9.2 Setup for J4

The LRT display now shows “`ConFigJ4 HookUp ?`“.

Using the same braided wires and shunts used for "J3", assemble the shunts and wires as shown in figure 1, "J4" and connect the couplers to the loop. For this test, position the couplers so they are at least 6 inches apart.

6.9.3 Enter Joint Standard Value for J4

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`3.6 ΩStd  3600.00 `". The 3600.00 value must be changed to agree with the certified value of the standard.

Use the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to "`ACCEPT? XXXXXXXX`". If the value is correct press the YES switch. If the value is incorrect press the NO switch and reinitialize the value to match the certified value of the standard.

6.9.4 First Joint Measurement for J4

The LRT display now shows "`Connect Probes  `".

Connect the joint probes to the shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayI CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayI MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.9.5 Second Joint Measurement for J4

The LRT display now shows “`JProbes  Swapped?`”.

Press the YES switch to answer the question on the LRT display.

The LRT display now shows “`Connect Probes  `“.

Swap the joint probes and connect them to the shunt standard.

The display will change to “`Test In Progress`”. Do not remove the joint probes until the LRT displays “`DisplayI CalcAve?`”. This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to “ `XXXXXXXXE+X` ” for five seconds followed by “ `COP POP` ”, “ `CIP PIP` ”, “ `COP PIP` ”, or “ `CIP POP` ” for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows “`DisplayI MeasAve?`”.

Press the YES switch to answer the question on the LRT display.

The display will change to “ `XXXXXXXXE+X` ” for five seconds followed by “ `COP POP` ”, “ `CIP PIP` ”, “ `COP PIP` ”, or “ `CIP POP` ” for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.9.6 Third Joint Measurement for J4

The LRT display now shows “`Drv Cplr Flipped?`”.

Flip the drive coupler.

Press the YES switch to answer the question on the LRT display.

The LRT display now shows “`Connect Probes  `“.

Connect the joint probes to the shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayI CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayI MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.9.7 Fourth joint Measurement for J4

The LRT display now shows "`JProbes  Swapped?`".

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes` ".

Swap the joint probes and connect them to the shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayI CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayI MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to " XXXXXXXXE+X   " for five seconds followed by " COP POP ", "CIP PIP ", " COP PIP ", or " CIP POP " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.10 Joint Calibration, J1, J5, and J6, 5mΩ Test

6.10.1 Setup for J1

The LRT display now shows "ConFigJ1 HookUp ?".

Using braided wire and the specified shunt, assemble the shunt and wire as shown in figure 2, "J1" and connect the couplers to the loop.

Record the certified value of the joint standard in the Calibration Data Sheets. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

Press the YES switch to answer the question on the LRT display.

The display will change to "Test In Progress". Do not move the couplers until the LRT displays "Display LoopRes?". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "XXXXXXXX   mΩ   " for 5 seconds. Record the resistance value in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.10.2 Enter Joint Standard Value for J1, 25mΩ Shunt

The LRT display now shows "25 mΩStd 25.000 ". The 25.000 value must be changed to agree with the certified value of the standard.

Use the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to "ACCEPT? XXXXXXXX". If the value is correct press the YES switch. If the value is incorrect press the NO switch and reinitialize the value to match the certified value of the standard.

6.10.3 Setup for J5

The LRT display now shows "`ConFigJ5 HookUp ?`".

Using braided wire and the specified shunt, assemble the shunt and wire as shown in figure 2, "J5" and connect the couplers to the loop.

Record the certified value of the joint standard in the Calibration Data Sheets. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

Press the YES switch to answer the question on the LRT display.

The display will change to "`Test In Progress`". Do not move the couplers until the LRT displays "`Display LoopRes?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXX    mΩ    `" for 5 seconds. Record the resistance value in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.10.4 Enter Joint Standard Value for J5, 5mΩ Shunt

The LRT display now shows "` 5 mΩStd  5.000 `". The 5.000 value must be changed to agree with the certified value of the standard.

Use the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to "`ACCEPT? XXXXXXXX`". If the value is correct press the YES switch. If the value is incorrect press the NO switch and reinitialize the value to match the certified value of the standard.

6.10.5 Setup for J6

The LRT display now shows "`ConFigJ6 HookUp ?`".

Using the same braided wires and shunts used for "J1" and "J5", assemble the shunts and wires as shown in figure 2, "J6" and connect the couplers to the loop. Note that it is absolutely essential to use the same braided wires and shunts that were used for "J1" and "J5".

6.10.6 First Joint Measurement for J6, 5mΩ Test

Press the YES switch to answer the question on the LRT display.

The display may change to "`Test In Progress`" for a few seconds.

The LRT display now shows “`ProbesOn  5  mΩ ?`“.

Press the YES switch to answer the question on the LRT display.

The LRT display now shows “`Connect Probes  `“.

Connect the joint probes to the 5mΩ shunt standard.

The display will change to “`Test In Progress`”. Do not remove the joint probes until the LRT displays “`DisplayV CalcAve?`”. This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to “ `XXXXXXXXE+X` ” for five seconds followed by “ `COP POP` ”, “ `CIP PIP` ”, “ `COP PIP` ”, or “ `CIP POP` ” for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows “`DisplayV MeasAve?`”.

Press the YES switch to answer the question on the LRT display.

The display will change to “ `XXXXXXXXE+X` ” for five seconds followed by “ `COP POP` ”, “ `CIP PIP` ”, “ `COP PIP` ”, or “ `CIP POP` ” for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.10.7 Second Joint Measurement for J6, 5mΩ Test

The LRT display now shows “`JProbes  Swapped?`”.

Press the YES switch to answer the question on the LRT display.

The LRT display now shows “`Connect Probes  `“.

Swap the joint probes and connect them to the 5mΩ shunt standard.

The display will change to “`Test In Progress`”. Do not remove the joint probes until the LRT displays “`DisplayV CalcAve?`”. This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "   XXXXXXXXE+X   " for five seconds followed by "   COP POP   ", "   CIP PIP   ", "   COP PIP   ", or "   CIP POP   " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "DisplayV MeasAve?".

Press the YES switch to answer the question on the LRT display.

The display will change to "   XXXXXXXXE+X   " for five seconds followed by "   COP POP   ", "   CIP PIP   ", "   COP PIP   ", or "   CIP POP   " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.10.8 Third Joint Measurement for J6, 5mΩ Test

The LRT display now shows "Drv Cplr Flipped?".

Flip the drive coupler.

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "Connect Probes   ".

Connect the joint probes to the 5mΩ shunt standard.

The display will change to "Test In Progress". Do not remove the joint probes until the LRT displays "DisplayV CalcAve?". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "   XXXXXXXXE+X   " for five seconds followed by "   COP POP   ", "   CIP PIP   ", "   COP PIP   ", or "   CIP POP   " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "DisplayV MeasAve?".

Press the YES switch to answer the question on the LRT display.

The display will change to " XXXXXXXXE+X   " for five seconds followed by " COP POP   ", "CIP PIP   ", " COP PIP   ", or " CIP POP   " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.10.9 Fourth joint Measurement for J6, 5mΩ Test

The LRT display now shows "JProbes Swapped?".

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "Connect Probes ".

Swap the joint probes and connect them to the 5mΩ shunt standard.

The display will change to "Test In Progress". Do not remove the joint probes until the LRT displays "DisplayV CalcAve?". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to " XXXXXXXXE+X   " for five seconds followed by " COP POP   ", "CIP PIP   ", " COP PIP   ", or " CIP POP   " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "DisplayV MeasAve?".

Press the YES switch to answer the question on the LRT display.

The display will change to " XXXXXXXXE+X   " for five seconds followed by " COP POP   ", "CIP PIP   ", " COP PIP   ", or " CIP POP   " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.10.10 First Joint Measurement for J6, 25mΩ Test

The LRT display now shows "ProbesOn 25 mΩ ?".

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes  `".

Connect the joint probes to the 25mΩ shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayV CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`   XXXXXXXXE+X    `" for five seconds followed by "`   COP POP   `", "`CIP PIP   `", "`   COP PIP   `", or "`   CIP POP   `" for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayV MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to "`   XXXXXXXXE+X    `" for five seconds followed by "`   COP POP   `", "`CIP PIP   `", "`   COP PIP   `", or "`   CIP POP   `" for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.10.11 Second Joint Measurement for J6, 25 mΩ Test

The LRT display now shows "`JProbes  Swapped?`".

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes  `".

Swap the joint probes and connect them to the 25mΩ shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayV CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`   XXXXXXXXE+X    `" for five seconds followed by "`   COP POP   `", "`CIP PIP   `", "`   COP PIP   `", or "`   CIP POP   `" for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayV MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.10.12 Third Joint Measurement for J6, 25 mΩ Test

The LRT display now shows "`Drv Cplr Flipped?`".

Flip the drive coupler.

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes` ".

Connect the joint probes to the 25mΩ shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayV CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayV MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.10.13 Fourth joint Measurement for J6, 25 mΩ Test

The LRT display now shows “`JProbes  Swapped?`”.

Press the YES switch to answer the question on the LRT display.

The LRT display now shows “`Connect Probes  `“.

Swap the joint probes and connect them to the 25mΩ shunt standard.

The display will change to “`Test In Progress`”. Do not remove the joint probes until the LRT displays “`DisplayV CalcAve?`”. This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to “ `XXXXXXXXE+X` ” for five seconds followed by “ `COP POP` ”, “ `CIP PIP` ”, “ `COP PIP` ”, or “ `CIP POP` ” for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows “`DisplayV MeasAve?`”.

Press the YES switch to answer the question on the LRT display.

The display will change to “ `XXXXXXXXE+X` ” for five seconds followed by “ `COP POP` ”, “ `CIP PIP` ”, “ `COP PIP` ”, or “ `CIP POP` ” for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.11 Joint Calibration, J5, J7, J8, and J9, 5mΩ Test

6.11.1 Setup for J5

The LRT display now shows “`ConFigJ5 HookUp ?`“.

Using braided wire and the specified shunt, assemble the shunt and wire as shown in figure 3, “J5” and connect the couplers to the loop.

Record the certified value of the joint standard in the Calibration Data Sheets. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

Press the YES switch to answer the question on the LRT display.

The display will change to "`Test In Progress`". Do not move the couplers until the LRT displays "`Display LoopRes?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXX     mΩ`   " for 5 seconds. Record the resistance value in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.11.2 Enter Joint Standard Value for J5, 5mΩ Test

The LRT display now shows " `5 mΩStd  5.000` ". The 5.000 value must be changed to agree with the certified value of the standard.

Use the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to "`ACCEPT? XXXXXXXX`". If the value is correct press the YES switch. If the value is incorrect press the NO switch and reinitialize the value to match the certified value of the standard.

6.11.3 Setup for J7

The LRT display now shows "`ConFigJ7 HookUp ?`".

Using braided wire and the specified shunt, assemble the shunt and wire as shown in figure 3, "J7" and connect the couplers to the loop.

Record the certified value of the joint standard in the Calibration Data Sheets. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

Press the YES switch to answer the question on the LRT display.

The display will change to "`Test In Progress`". Do not move the couplers until the LRT displays "`Display LoopRes?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXX     mΩ`   " for 5 seconds. Record the resistance value in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.11.4 Enter Joint Standard Value for J9, 0.5mΩ Test

The LRT display now shows "`0.5mΩStd  0.500 `". The 0.500 value must be changed to agree with the certified value of the standard.

Use the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to "`ACCEPT? XXXXXXXX`". If the value is correct press the YES switch. If the value is incorrect press the NO switch and reinitialize the value to match the certified value of the standard.

6.11.5 Setup for J8

The LRT display now shows "`ConFigJ8 HookUp ?`".

Using braided wire and the specified shunt, assemble the shunt and wire as shown in figure 3, "J8" and connect the couplers to the loop.

Record the certified value of the joint standard in the Calibration Data Sheets. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

Press the YES switch to answer the question on the LRT display.

The display will change to "`Test In Progress`". Do not move the couplers until the LRT displays "`Display LoopRes?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXX    mΩ`   " for 5 seconds. Record the resistance value in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.11.6 Enter Joint Standard Value for J8, 50mΩ Test

The LRT display now shows "`50 mΩStd  50.000 `". The 50.000 value must be changed to agree with the certified value of the standard.

Use the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to "`ACCEPT? XXXXXXXX`". If the value is correct press the YES switch. If the value is incorrect press the NO switch and reinitialize the value to match the certified value of the standard.

6.11.7 Setup for J9

The LRT display now shows "`ConFigJ9 HookUp ?`".

Using the same braided wires and shunts used for "J5, J7, and J8", assemble the shunts and wires as shown in figure 3, "J9" and connect the couplers to the loop. Note that it is absolutely essential to use the same braided wires and shunts that were used for "J5, J7, and J8".

6.11.8 First Joint Measurement for J9, 5mΩ Test

Press the YES switch to answer the question on the LRT display.

The display may change to "`Test In Progress`" for a few seconds.

The LRT display now shows "`ProbesOn  5  mΩ ?`".

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes  `".

Connect the joint probes to the 5mΩ shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayV CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`  XXXXXXXXE+X   `" for five seconds followed by "`  COP POP  `", "`CIP PIP  `", "`  COP PIP  `", or "`  CIP POP  `" for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayV MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.11.9 Second Joint Measurement for J9, 5mΩ Test

The LRT display now shows "`JProbes  Swapped?`".

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes` ".

Swap the joint probes and connect them to the 5mΩ shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayV CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayV MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.11.10 Third Joint Measurement for J9, 5mΩ Test

The LRT display now shows "`Drv Cplr Flipped?`".

Flip the drive coupler.

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes  `".

Connect the joint probes to the 5mΩ shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayV CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`  XXXXXXXXE+X   `" for five seconds followed by "`  COP POP  `", "`CIP PIP  `", "`  COP PIP  `", or "`  CIP POP  `" for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayV MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to "`  XXXXXXXXE+X   `" for five seconds followed by "`  COP POP  `", "`CIP PIP  `", "`  COP PIP  `", or "`  CIP POP  `" for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.11.11 Fourth joint Measurement for J9, 5mΩ Test

The LRT display now shows "`JProbes  Swapped?`".

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes  `".

Swap the joint probes and connect them to the 5mΩ shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayV CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXXE+X`" for five seconds followed by "`COP POP`", "`CIP PIP`", "`COP PIP`", or "`CIP POP`" for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayV MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXXE+X`" for five seconds followed by "`COP POP`", "`CIP PIP`", "`COP PIP`", or "`CIP POP`" for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.11.12 First Joint Measurement for J9, 0.5mΩ Test

The LRT display now shows "`ProbesOn  0.5 mΩ ?`".

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes`".

Connect the joint probes to the 0.5mΩ shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayV CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "`XXXXXXXXE+X`" for five seconds followed by "`COP POP`", "`CIP PIP`", "`COP PIP`", or "`CIP POP`" for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayV MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.11.13 Second Joint Measurement for J9, 0.5mΩ Test

The LRT display now shows "`JProbes  Swapped?`".

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes` ".

Swap the joint probes and connect them to the 0.5mΩ shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayV CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayV MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.11.14 Third Joint Measurement for J9, 0.5mΩ Test

The LRT display now shows "`Drv Cplr Flipped?`".

Flip the drive coupler.

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes  `".

Connect the joint probes to the 0.5mΩ shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayV CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to "` XXXXXXXXE+X `" for five seconds followed by "` COP POP `", "`CIP PIP `", "` COP PIP `", or "` CIP POP `" for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayV MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to "` XXXXXXXXE+X `" for five seconds followed by "` COP POP `", "`CIP PIP `", "` COP PIP `", or "` CIP POP `" for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

6.11.15 Fourth joint Measurement for J9, 0.5mΩ Test

The LRT display now shows "`JProbes  Swapped?`".

Press the YES switch to answer the question on the LRT display.

The LRT display now shows "`Connect Probes  `".

Swap the joint probes and connect them to the 0.5mΩ shunt standard.

The display will change to "`Test In Progress`". Do not remove the joint probes until the LRT displays "`DisplayV CalcAve?`". This step will take several seconds.

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT display now shows "`DisplayV MeasAve?`".

Press the YES switch to answer the question on the LRT display.

The display will change to " `XXXXXXXXE+X` " for five seconds followed by " `COP POP` ", " `CIP PIP` ", " `COP PIP` ", or " `CIP POP` " for a few seconds. Record both pieces of information in the Calibration Data Sheet. The YES switch may be pressed as many times as necessary to record the data.

Press the NO switch after the data is collected.

The LRT will display "`Computng CalFactr`".

6.12 End of Calibration

If the serial numbers of the drive and sense couplers are different than the serial numbers listed on the face of the LRT, than the label that identifies the coupler serial numbers must be corrected to match the coupler serial numbers. If the label does not appear on the face of the LRT than it must be added to the face of the LRT. See section 0 for more information on the label.

Perform section 7 to verify the calibration process was successful.

See section 8 for instructions on how to change the password. If the current password is unknown see section 9 for instructions on how to reset the password to the default character string.

This concludes LRT calibration.

7 POST-CALIBRATION TEST

This part of the procedure is performed after calibration of the LRT and is used to verify the calibration was successful.

Operation of a calibrated LRT is valid only when it is used with the appropriate drive and sense couplers. The serial numbers of the drive and sense couplers must match the serial numbers identified on the face of the LRT.

7.1 LRT Power Control

Put the LRT in loop mode by switching the mode switch to LOOP. Turn the LRT on by moving the OFF/CHARGE – RUN switch to RUN, and pressing the orange ON/OFF switch until the green power lamps remains on. After a few seconds the display will become active and will display messages such as, "`Testing Hardware`", a test pattern will appear, battery %, and a software version number.

If the display stops with a

```
Press
Start
```

This indicates the LRT <u>is calibrated</u>. See paragraph 3.6 for the tolerance of measurements for a calibrated LRT during post calibration test. Continue with paragraph 7.2.

If however the display shows

```
Warning
Bad Cal
```

followed by

```
Display
Faults ?
```

then press the NO switch and when the following display appears

```
UseUnCa-
Libratd?
```

press the YES switch. The display should now show

```
Press
Start
```

This sequence indicates the LRT <u>is not calibrated</u>. See paragraph 3.4 for the tolerance of the measurement for a non-calibrated LRT.

7.2 Loop test, 2 mΩ

Ensure the mode switch is in the LOOP mode.

Connect the sense and drive couplers on the 906-10273-7 loop Standard. This standard has a nominal value of 2mΩ. The couplers are installed by putting one coupler around one opening in the loop standard and the other coupler around the opposite opening.

Record the certified value of the loop standard and the ambient temperature in the Post Calibration Data Sheet.

Calculate the temperature corrected value of the loop standard per section 3.20.

7.2.1 First Loop Measurement, 2 mΩ

Toggle the mode switch by putting it in JOINT mode and then LOOP mode, or press the MENU switch two times to initialize the display. The display will show

```
Press
Start
```

Press one of the coupler START switches or the YES switch. After a few seconds the LRT will display the resistance of the standard, in the following format.

```
LOOPVALU
xxxxxxmΩ
```

The xxxxxx is the value to of the loop resistance. Record the loop resistance in the Post Calibration Data Sheet.

7.2.2 Second Loop Measurement, 2 mΩ

Flip the orientation of the drive coupler.

Measure and record the resistance of the loop standard using the actions described in paragraph 7.2.1.

7.3 Loop test, 8.5 mΩ

Put the couplers on the 906-10273-8 loop standard. This standard has a nominal value of 8.5mΩ.

Record the certified value of the loop standard and the ambient temperature in the Post Calibration Data Sheet.

Calculate the temperature corrected value of the loop standard per section 3.20.

7.3.1 First Loop Measurement, 8.5 mΩ

Measure and record the resistance of the loop standard using the actions described in paragraph 7.2.1.

7.3.2 Second Loop Measurement, 8.5 mΩ

Flip the orientation of the drive coupler.

Measure and record the resistance of the loop standard using the actions described in paragraph 7.2.1.

7.4 Loop test, 14 mΩ

Put the couplers on the 906-10273-2 loop standard. This standard has a nominal value of 14mΩ.

Record the certified value of the loop standard and the ambient temperature in the Post Calibration Data Sheet.

Calculate the temperature corrected value of the loop standard per section 3.20.

7.4.1 First Loop Measurement, 14 mΩ

Measure and record the resistance of the loop standard using the actions described in paragraph 7.2.1.

7.4.2 Second Loop Measurement, 14 mΩ

Flip the orientation of the drive coupler.

Measure and record the resistance of the loop standard using the actions described in paragraph 7.2.1.

7.5 Loop test, 3600 mΩ

Put the couplers on the 906-10273-6 Loop Standard. This standard has a nominal value of 3600mΩ.

Record the certified value of the loop standard and the ambient temperature in the Post Calibration Data Sheet.

Calculate the temperature corrected value of the loop standard per section 3.20.

7.5.1 First Loop Measurement, 3600 mΩ

Measure and record the resistance of the loop standard using the actions described in paragraph 7.2.1.

7.5.2 Second Loop Measurement, 3600 mΩ

Flip the orientation of the drive coupler.

Measure and record the resistance of the loop standard using the actions described in paragraph 7.2.1.

7.6 Setup for Joint Tests

Set the mode switch to JOINT.

7.7 Joint test, J2

7.7.1 Setup for Joint test, J2

Using braided wire and the specified shunt, assemble the shunt and wire as shown in figure 1, “J2” and connect the couplers to the loop.

Record the certified value of the joint standard in the Post Calibration Data Sheet. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

7.7.2 First Joint Measurement, J2

Toggle the mode switch by putting it in LOOP mode and then JOINT mode, or press the MENU switch two times to initialize the display. The display will show

```
Connect
Probes
```

Measure the shunt resistance by placing the joint probe tips on the large areas of metal on either end of the shunt, one probe on each end so the probes sense the voltage across the shunt. After a few seconds the LRT will display the resistance of the standard, in the following format.

```
RedoLoop
J xxxxxx
```

The `J xxxxxx` is the value to of the joint resistance. Record the joint resistance in the Post Calibration Data Sheet.

7.7.3 Second Joint Measurement, J2

Swap the joint probes.

Measure and record the resistance of the joint standard using the actions described in paragraph 7.7.2.

7.7.4 Third Joint Measurement, J2

Flip the orientation of the drive coupler.

Measure and record the resistance of the joint standard using the actions described in paragraph 7.7.2.

7.7.5 Fourth Joint Measurement, J2

Swap the joint probes.

Measure and record the resistance of the joint standard using the actions described in paragraph 7.7.2.

7.8 Joint test, J4

7.8.1 Setup for Joint test, J4

Using braided wires and the specified shunts, assemble the shunts and wires as shown in figure 1, “J4” and connect the couplers to the loop. For this test, position the couplers so they are at least 6 inches apart.

Record the certified value of the 3600mΩ joint standard in the Post Calibration Data Sheet. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

7.8.2 First Joint Measurement, J4

Measure and record the resistance of the joint standard using the actions described in paragraph 7.7.2.

7.8.3 Second Joint Measurement, J4

Swap the joint probes.

Measure and record the resistance of the joint standard using the actions described in paragraph 7.7.2.

7.8.4 Third Joint Measurement, J4

Flip the orientation of the drive coupler.

Measure and record the resistance of the joint standard using the actions described in paragraph 7.7.2.

7.8.5 Fourth Joint Measurement, J4

Swap the joint probes.

Measure and record the resistance of the joint standard using the actions described in paragraph 7.7.2.

7.9 Joint test, J6, 5mΩ and 25mΩ

7.9.1 Setup for Joint test, J6, 5mΩ

Using braided wires and the specified shunts, assemble the shunts and wires as shown in figure 2, "J6" and connect the couplers to the loop.

Record the certified value of the 5mΩ joint standard in the Post Calibration Data Sheet. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

7.9.2 First Joint Measurement, J6, 5mΩ

Measure and record the resistance of the 5mΩ joint standard using the actions described in paragraph 7.7.2.

7.9.3 Second Joint Measurement, J6, 5mΩ

Swap the joint probes.

Measure and record the resistance of the 5mΩ joint standard using the actions described in paragraph 7.7.2.

7.9.4 Third Joint Measurement, J6, 5mΩ

Flip the orientation of the drive coupler.

Measure and record the resistance of the 5mΩ joint standard using the actions described in paragraph 7.7.2.

7.9.5 Fourth Joint Measurement, J6, 5mΩ

Swap the joint probes.

Measure and record the resistance of the 5mΩ joint standard using the actions described in paragraph 7.7.2.

7.9.6 Setup for Joint test, J6, 25mΩ

Record the certified value of the 25mΩ joint standard in the Post Calibration Data Sheet. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

7.9.7 First Joint Measurement, J6, 25mΩ

Measure and record the resistance of the 25mΩ joint standard using the actions described in paragraph 7.7.2.

7.9.8 Second Joint Measurement, J6, 25mΩ

Swap the joint probes.

Measure and record the resistance of the 25mΩ joint standard using the actions described in paragraph 7.7.2.

7.9.9 Third Joint Measurement, J6, 25mΩ

Flip the orientation of the drive coupler.

Measure and record the resistance of the 25mΩ joint standard using the actions described in paragraph 7.7.2.

7.9.10 Fourth Joint Measurement, J6, 25mΩ

Swap the joint probes.

Measure and record the resistance of the 25mΩ joint standard using the actions described in paragraph 7.7.2.

7.10 Joint test, J9, 5mΩ and 0.5mΩ

7.10.1 Setup for Joint test, J9, 5mΩ

Using braided wires and the specified shunts, assemble the shunts and wires as shown in figure 3, "J9" and connect the couplers to the loop.

Record the certified value of the 5mΩ joint standard in the Post Calibration Data Sheet. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

7.10.2 First Joint Measurement, J9, 5mΩ

Measure and record the resistance of the 5mΩ joint standard using the actions described in paragraph 7.7.2.

7.10.3 Second Joint Measurement, J9, 5mΩ

Swap the joint probes.

Measure and record the resistance of the 5mΩ joint standard using the actions described in paragraph 7.7.2.

7.10.4 Third Joint Measurement, J9, 5mΩ

Flip the orientation of the drive coupler.

Measure and record the resistance of the 5mΩ joint standard using the actions described in paragraph 7.7.2.

7.10.5 Fourth Joint Measurement, J9, 5mΩ

Swap the joint probes.

Measure and record the resistance of the 5mΩ joint standard using the actions described in paragraph 7.7.2.

7.10.6 Setup for Joint test, J9, 0.5mΩ

Record the certified value of the 0.5mΩ joint standard in the Post Calibration Data Sheet. This is the value marked on or attached to the standard, which was determined by a metrology lab or other certifying agency.

7.10.7 First Joint Measurement, J9, 0.5mΩ

Measure and record the resistance of the 0.5mΩ joint standard using the actions described in paragraph 7.7.2.

7.10.8 Second Joint Measurement, J9, 0.5mΩ

Swap the joint probes.

Measure and record the resistance of the 0.5mΩ joint standard using the actions described in paragraph 7.7.2.

7.10.9 Third Joint Measurement, J9, 0.5mΩ

Flip the orientation of the drive coupler.

Measure and record the resistance of the 0.5mΩ joint standard using the actions described in paragraph 7.7.2.

7.10.10 Fourth Joint Measurement, J9, 0.5mΩ

Swap the joint probes.

Measure and record the resistance of the 0.5mΩ joint standard using the actions described in paragraph 7.7.2.

7.11 Final Calculations to Ensure the LRT is Calibrated

Calculate the percent error for all the LRT post calibration measurements by using the following equation. Note that the certified value of the standard is marked on or attached to the standard, and was determined by a metrology lab or other certifying agency.

$$\textbf{\% error} = \frac{\text{value of the standard} - \text{LRT measurement}}{\text{value of the standard}} \times 100\%$$

In the preceding equation the "value of the standard" may be either the certified value as marked on the standard or the certified value corrected for the affects of temperature, whichever is appropriate.

The % error must be less than or equal to the value specified in paragraph 3.6. This is the pass/fail criteria for all LRT measurements listed in the Post Calibration Data Sheet.

This concludes post-calibration test.

8 HOW TO CHANGE THE PASSWORD

This procedure explains how to change the password.

8.1 Setup

Turn on the LRT as described elsewhere in this document. Press the MENU switch and use the ↓ and ↑ switches to find the menu selection called “`Change Passwrd?`”

Press the YES switch to answer the question on the LRT display.

The LRT display now shows “`ReTrving Password`”. After a few seconds the display will change to “`Old Pswd ********`“.

8.2 Enter the Old Password

Enter the old password by using the ↓ or ↑ switch to select the desired value for the blinking digit. After the desired digit is displayed, press the YES switch to move to the next digit.

After all digits are initialized, the display will change to “`ACCEPT? XXXXXXXX`“. If the `XXXXXXXX` character string is correct press the YES switch. If the value is incorrect press the NO switch and reenter the old password.

8.3 Load the New Password

The LRT display now shows “`New Pswd ********`“.

Enter the new password using the process described in a previous paragraph.

8.4 Load the New Password a Second Time

The LRT display now shows “`VerfPswd ********`“.

Enter the new password using the process described in a previous paragraph.

8.5 The LRT Loads and Checks the New Password

After a few seconds the LRT will respond with “`PswdRdWr  Passed `“.

After a few more seconds the LRT will respond with “`Change Passwrd?`“.

The password has now been changed. Record the new password a secure place and easy retrieval.

9 HOW TO RESET THE PASSWORD TO THE DEFAULT STRING

This procedure explains how to reset the password to the default character string. See section 3 for the default password. This requires access to the backside of the LRT front panel.

Warning, do not open the cover on the backside of the front panel. The jumper terminals used to reset the password are accessible with the cover in place.

Resetting the password should only be necessary if the current password is lost or forgotten.

9.1 Setup

Remove the front panel assembly from the LRT chassis. Find the access hole in the PWA cover on the backside of the front panel. There are two pins visible through this access hole, which must be shorted together to reset the password. Maintain a short between these two pins throughout the following steps of this procedure.

Turn on the LRT as described elsewhere in this document.

9.2 Resetting the Password

Press the MENU switch and use the ↓ and ↑ switches to find the menu selection called "`Reset Passwrd?`"

Press the YES switch to answer the question on the LRT display.

After several seconds the LRT will display "`ResetCompleted  `".

After a few more seconds the LRT will display "`PswdRdWr Passed `".

After a few more seconds the LRT will display "`Reset  Passwrd?`".

The password has now been reset to the default character string.

If the software doesn't detect the jumper the display will show "`Reset Inhibit`".

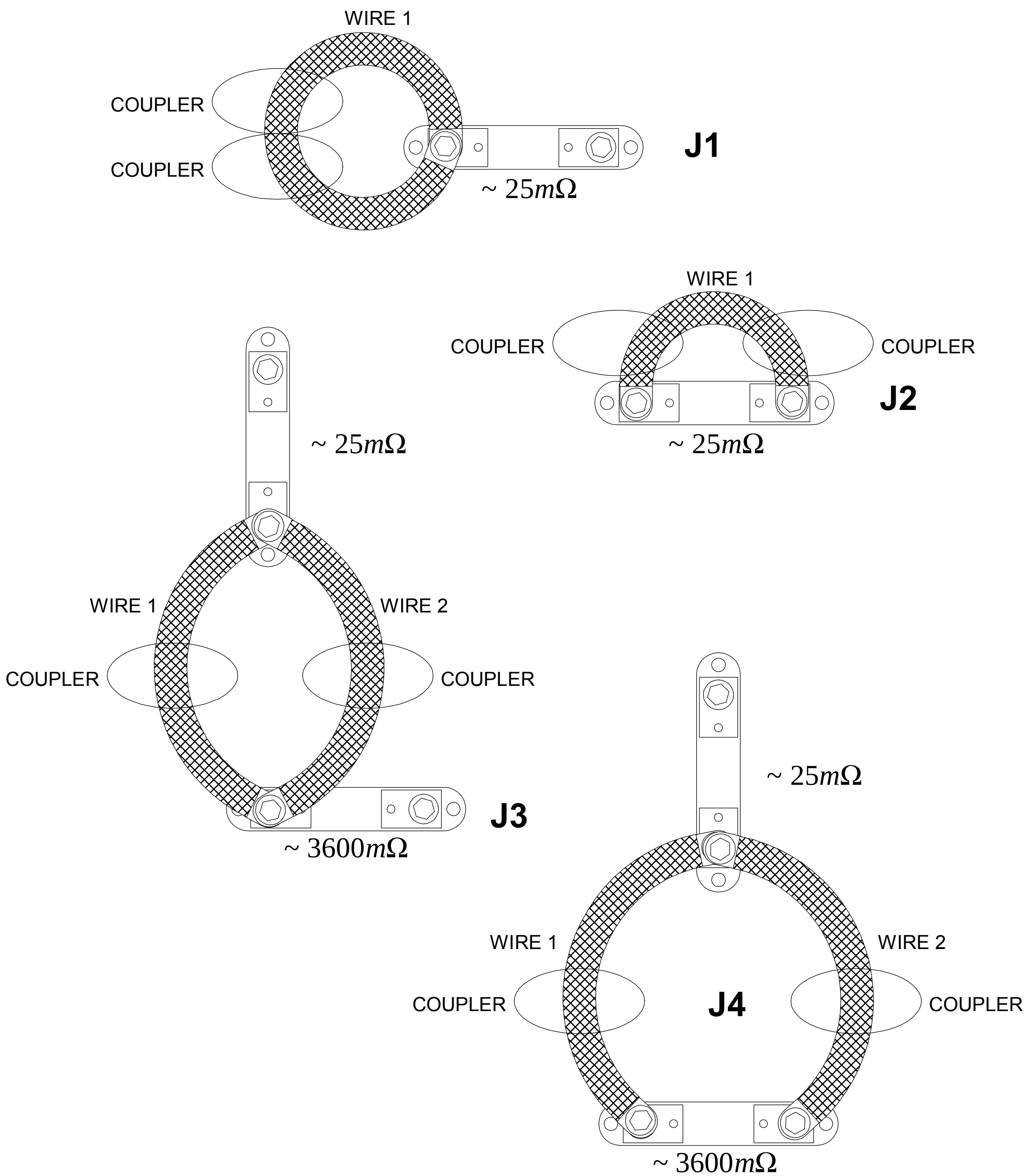

FIGURE 1. JOINT TEST SETUP FOR 906-10247-2 LRT

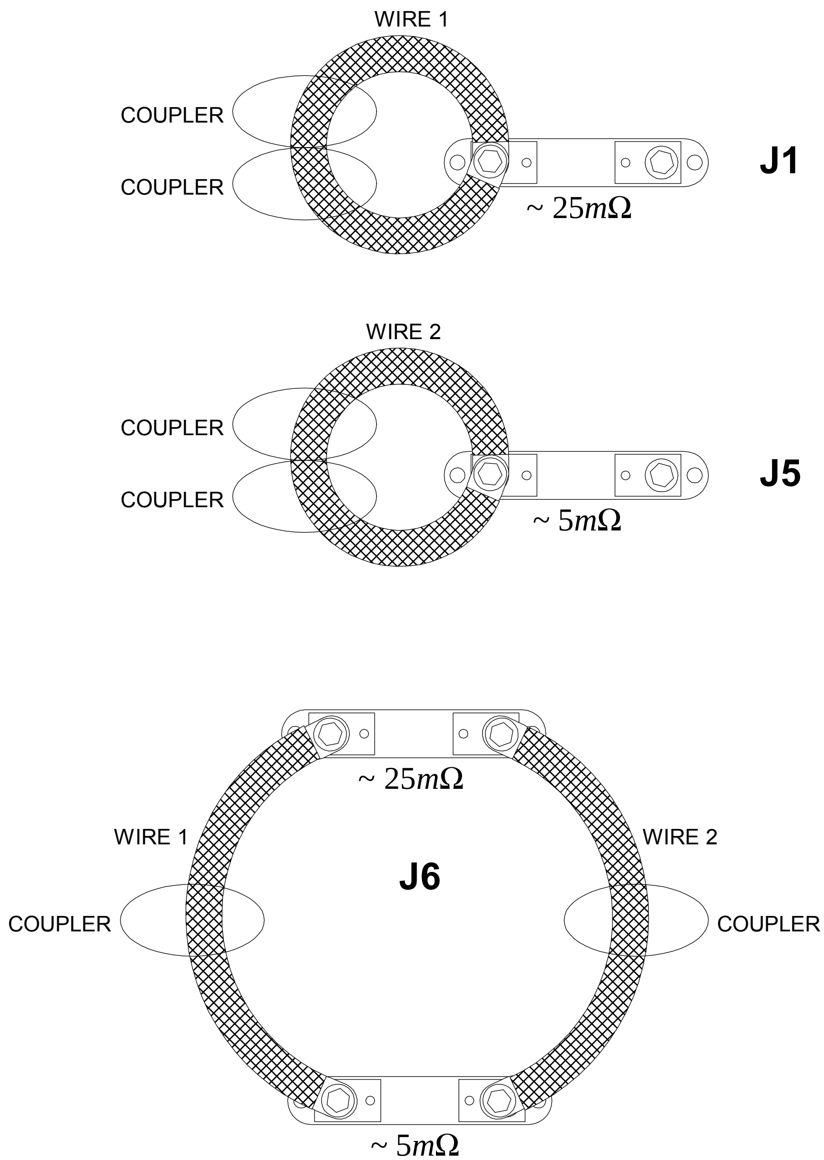

FIGURE 2.   JOINT TEST SETUP FOR 906-10247-2 LRT

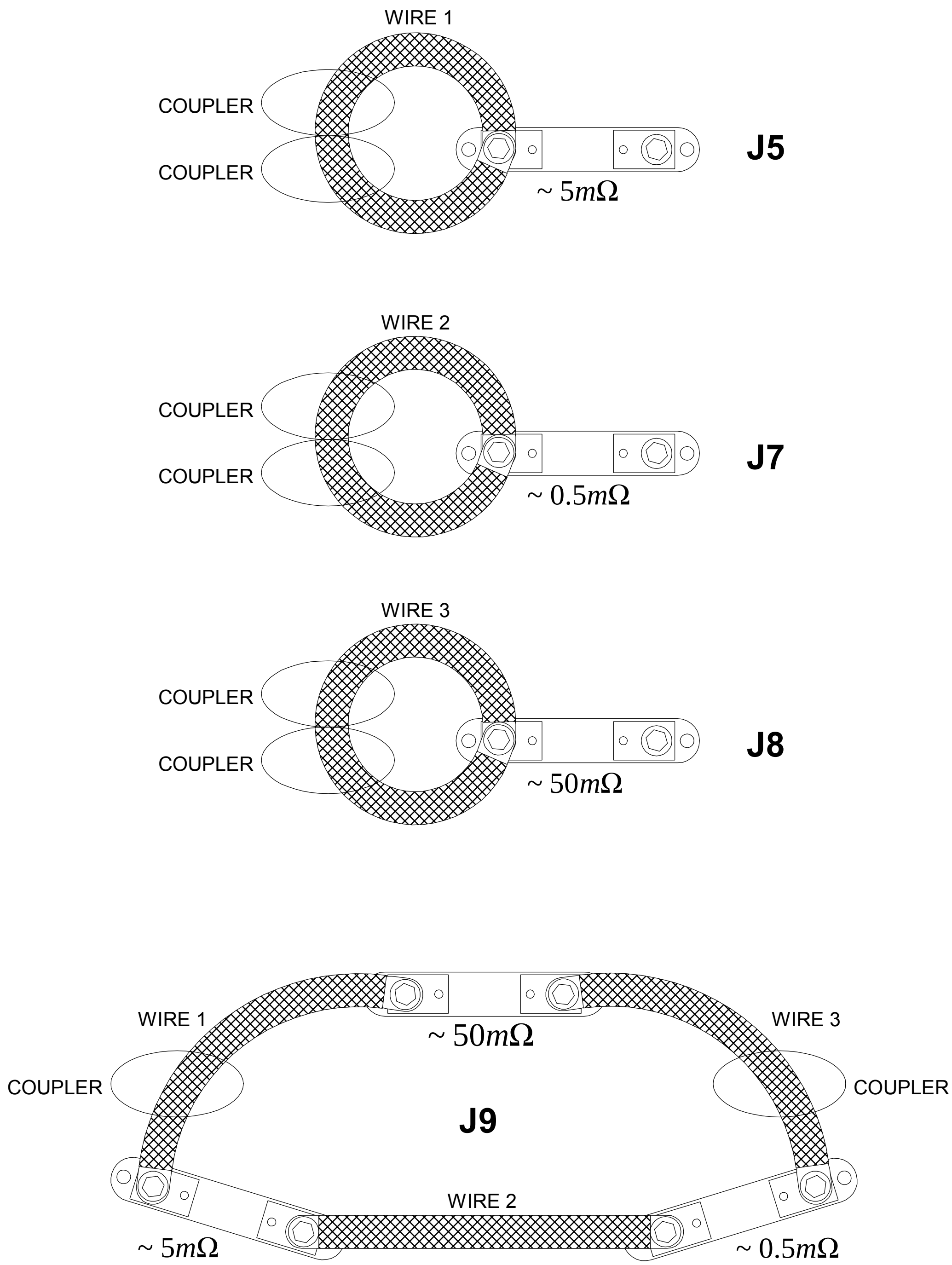

FIGURE 3. JOINT TEST SETUP FOR 906-10247-2 LRT

10 CALIBRATION DATA SHEET

The following Calibration Data Record shall be used to document the results of the calibration procedure. Calibration shall be required on an annual basis, within 12 months from the previous calibration. Calibration data records shall be archived for a minimum of 6 years by the user.

Record the certified value (not the nominal value) of the loop and joint standards.

Manufacturer:	The Boeing Company
Name:	Loop Resistance Tester Assembly
Part Number:	906-10247-2
LRT Serial Number:	S/N ___________________
Drive coupler Serial Number:	S/N ___________________ as marked on face of LRT if applicable
Sense coupler Serial Number:	S/N ___________________ as marked on face of LRT if applicable
Property Number (User Supplied)	______________________
Original password	______________________
New password if different	______________________

CALIBRATION DATA RECORD

Para	Test or Data Type	Result	Notes or Circle Answer	Notes
6.1.2	______________ PWA ground faying resistance	Less than 1Ω	PASS/FAIL	
6.2.3	Record the calibration level and tolerance. This tolerance applies to all subsequent test steps unless otherwise noted.	**Calibrated** or **NOT- Calibrated.**		

Para	Test or Data Type	Result	Notes or Circle Answer	Notes
6.2.3	Record the serial number of the drive coupler	________________ **Serial Number**		
6.2.3	Record the serial number of the sense coupler	________________ **Serial Number**		
6.3.1	Record battery charge	_________%		
6.4.1	Record certified value of the loop standard	______________mΩ	**2mΩ nominal**	See sec. 3.20
6.4.1	Record ambient temperature	_______________°C	**2mΩ nominal**	See sec. 3.20
6.4.1	Record value of loop standard after adjustment for temp.	______________mΩ	**2mΩ nominal**	See sec. 3.20
6.4.2	Record the resistance measured by the LRT	______________mΩ	IN phase OUT of phase	Circle one
6.4.3	Record the resistance measured by the LRT	______________mΩ	IN phase OUT of phase	Circle one
6.5.1	Record certified value of the loop standard	______________mΩ	**8.5mΩ nominal**	See sec. 3.20
6.5.1	Record ambient temperature	_______________°C	**8.5mΩ nominal**	See sec. 3.20
6.5.1	Record value of loop standard after adjustment for temp.	______________mΩ	**8.5mΩ nominal**	See sec. 3.20
6.5.2	Record the resistance measured by the LRT	______________mΩ	IN phase OUT of phase	Circle one
6.5.3	Record the resistance measured by the LRT	______________mΩ	IN phase OUT of phase	Circle one
6.6.1	Record certified value of the loop standard	______________mΩ	**14mΩ nominal**	See sec. 3.20
6.6.1	Record ambient temperature	_______________°C	**14mΩ nominal**	See sec. 3.20
6.6.1	Record value of loop standard after adjustment for temp.	______________mΩ	**14mΩ nominal**	See sec. 3.20
6.6.2	Record the resistance measured by the LRT	______________mΩ	IN phase OUT of phase	Circle one
6.6.3	Record the resistance measured by the LRT	______________mΩ	IN phase OUT of phase	Circle one

Para	Test or Data Type	Result	Notes or Circle Answer	Notes
6.7.1	Record certified value of the loop standard	______________mΩ	**3600mΩ nom.**	See sec. 3.20
6.7.1	Record ambient temperature	_______________°C	**3600mΩ nom.**	See sec. 3.20
6.7.1	Record value of loop standard after adjustment for temp.	______________mΩ	**3600mΩ nom.**	See sec. 3.20
6.7.2	Record the resistance measured by the LRT	______________mΩ	IN phase OUT of phase	Circle one
6.7.3	Record the resistance measured by the LRT	______________mΩ	IN phase OUT of phase	Circle one
6.8.1	Record the certified value of the joint standard	______________mΩ	**25mΩ nominal**	**J1**
6.8.1	Record the value of the wire	______________mΩ	**<1.5mΩ**	**J1**
6.8.4	`DisplayI CalcAve`	______________mΩ	`COP POP` `CIP PIP`	**J2**
6.8.4	`DisplayI MeasAve`	______________mΩ	`COP POP` `CIP PIP`	**J2**
6.8.5	`DisplayI CalcAve`	______________mΩ	`COP POP` `CIP PIP`	**J2**
6.8.5	`DisplayI MeasAve`	______________mΩ	`COP POP` `CIP PIP`	**J2**
6.8.6	`DisplayI CalcAve`	______________mΩ	`COP POP` `CIP PIP`	**J2**
6.8.6	`DisplayI MeasAve`	______________mΩ	`COP POP` `CIP PIP`	**J2**
6.8.7	`DisplayI CalcAve`	______________mΩ	`COP POP` `CIP PIP`	**J2**
6.8.7	`DisplayI MeasAve`	______________mΩ	`COP POP` `CIP PIP`	**J2**
6.9.1	Record the certified value of the joint standard	______________mΩ	**3600mΩ nom.**	**J3**
6.9.1	Record the value of the wire	______________mΩ	**<1.5mΩ**	**J3**
6.9.4	`DisplayI CalcAve`	______________mΩ	`COP POP` `CIP PIP`	**J4**
6.9.4	`DisplayI MeasAve`	______________mΩ	`COP POP` `CIP PIP`	**J4**

Para	Test or Data Type	Result	Notes or Circle Answer	Notes
6.9.5	DisplayI CalcAve	______________mΩ	COP POP CIP PIP	**J4**
6.9.5	DisplayI MeasAve	______________mΩ	COP POP CIP PIP	**J4**
6.9.6	DisplayI CalcAve	______________mΩ	COP POP CIP PIP	**J4**
6.9.6	DisplayI MeasAve	______________mΩ	COP POP CIP PIP	**J4**
6.9.7	DisplayI CalcAve	______________mΩ	COP POP CIP PIP	**J4**
6.9.7	DisplayI MeasAve	______________mΩ	COP POP CIP PIP	**J4**
6.10.1	Record the certified value of the joint standard	______________mΩ	**25mΩ nominal**	**J1**
6.10.1	Record the value of the wire	______________mΩ	**<1.5mΩ**	**J1**
6.10.3	Record the certified value of the joint standard	______________mΩ	**5mΩ nominal**	**J5**
6.10.3	Record the value of the wire	______________mΩ	**<1.5mΩ**	**J5**
6.10.6	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J6, 5mΩ**
6.10.6	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J6, 5mΩ**
6.10.7	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J6, 5mΩ**
6.10.7	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J6, 5mΩ**
6.10.8	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J6, 5mΩ**
6.10.8	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J6, 5mΩ**
6.10.9	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J6, 5mΩ**
6.10.9	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J6, 5mΩ**
6.10.10	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J6, 25mΩ**

Para	Test or Data Type	Result	Notes or Circle Answer	Notes
6.10.10	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J6, 25mΩ**
6.10.11	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J6, 25mΩ**
6.10.11	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J6, 25mΩ**
6.10.12	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J6, 25mΩ**
6.10.12	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J6, 25mΩ**
6.10.13	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J6, 25mΩ**
6.10.13	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J6, 25mΩ**
6.11.1	Record the certified value of the joint standard	______________mΩ	**5mΩ nominal**	**J5**
6.11.1	Record the value of the wire	______________mΩ	**<1.5mΩ**	**J5**
6.11.3	Record the certified value of the joint standard	______________mΩ	**0.5mΩ nominal**	**J7**
6.11.3	Record the value of the wire	______________mΩ	**<1.5mΩ**	**J7**
6.11.5	Record the certified value of the joint standard	______________mΩ	**50mΩ nominal**	**J8**
6.11.5	Record the value of the wire	______________mΩ	**<1.5mΩ**	**J8**
6.11.8	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J9, 5mΩ**
6.11.8	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J9, 5mΩ**
6.11.9	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J9, 5mΩ**
6.11.9	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J9, 5mΩ**
1.1.1	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J9, 5mΩ**
1.1.1	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J9, 5mΩ**

Para	Test or Data Type	Result	Notes or Circle Answer	Notes
6.11.11	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J9, 5mΩ**
6.11.11	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J9, 5mΩ**
6.11.12	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J9, 0.5mΩ**
6.11.12	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J9, 0.5mΩ**
6.11.13	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J9, 0.5mΩ**
6.11.13	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J9, 0.5mΩ**
1.1.1	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J9, 0.5mΩ**
1.1.1	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J9, 0.5mΩ**
6.11.15	DisplayV CalcAve	______________mΩ	COP POP CIP PIP	**J9, 0.5mΩ**
6.11.15	DisplayV MeasAve	______________mΩ	COP POP CIP PIP	**J9, 0.5mΩ**

Calibration Technician ____________________ Date _____________

Certifying Agent ____________________ Date _____________

11 POST CALIBRATION DATA SHEET

The following Calibration Data Record shall be used to document the results of the calibration procedure. Calibration shall be required on an annual basis, within 12 months from the previous calibration. Calibration data records shall be archived for a minimum of 6 years by the user.

Record the certified value (not the nominal value) for all the loop and joint standards.

Manufacturer:	The Boeing Company
Name:	Loop Resistance Tester Assembly
Part Number:	906-10247-2
LRT Serial Number:	S/N ___________________
Drive coupler Serial Number:	S/N ___________________ as marked on face of LRT if applicable
Sense coupler Serial Number:	S/N ___________________ as marked on face of LRT if applicable
Property Number (User Supplied)	______________________

CALIBRATION DATA RECORD

Paragraph	Test Information	LRT Measurement in mΩ or Notes	% error	Pass / Fail
7.2	_______________mΩ	**Certified value for the 2mΩ loop standard**	N/A	N/A
7.2	________________°C	**Ambient temperature**	N/A	N/A
7.2	_______________mΩ	**Loop value corrected for temp. See section 3.20**	N/A	N/A
7.2.1	Use the temperature corrected value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.2.2	Use the temperature corrected value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.3	_______________mΩ	**Certified value for the 8.5mΩ loop standard**	N/A	N/A
7.3	________________°C	**Ambient temperature**	N/A	N/A

Paragraph	Test Information	LRT Measurement in mΩ or Notes	% error	Pass / Fail
7.3	_______________mΩ	**Loop value corrected for temp. See section 3.20**	N/A	N/A
7.3.1	Use the temperature corrected value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.3.2	Use the temperature corrected value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.4	_______________mΩ	**Certified value for the 14mΩ loop standard**	N/A	N/A
7.4	________________°C	**Ambient temperature**	N/A	N/A
7.4	_______________mΩ	**Loop value corrected for temp. See section 3.20**	N/A	N/A
7.4.1	Use the temperature corrected value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.4.2	Use the temperature corrected value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.5	_______________mΩ	**Certified value for the 3600mΩ loop standard**	N/A	N/A
7.5	________________°C	**Ambient temperature**	N/A	N/A
7.5	_______________mΩ	**Loop value corrected for temp. See section 3.20**	N/A	N/A
7.5.1	Use the temperature corrected value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.5.2	Use the temperature corrected value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.7.1	_______________mΩ	**Certified value for J2, 25mΩ nominal shunt**	N/A	N/A
7.7.2	Use the certified value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.7.3	Use the certified value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.7.4	Use the certified value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.7.5	Use the certified value to calculate % error	_______________mΩ	_______%	PASS / FAIL
7.8.1	_______________mΩ	**Certified value for J4, 3600mΩ nominal shunt**	N/A	N/A
7.8.2	Use the certified value to calculate % error	_______________mΩ	_______%	PASS / FAIL

Paragraph	Test Information	LRT Measurement in mΩ or Notes	% error	Pass / Fail
7.8.3	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.8.4	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.8.5	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.9.1	_______________mΩ	**Certified value for J6, 5mΩ nominal shunt**	N/A	N/A
7.9.2	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.9.3	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.9.4	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.9.5	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.9.6	_______________mΩ	**Certified value for J6, 25mΩ nominal shunt**	N/A	N/A
7.9.7	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.9.8	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.9.9	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.9.10	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.10.1	_______________mΩ	**Certified value for J9, 5mΩ nominal shunt**	N/A	N/A
7.10.2	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.10.3	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.10.4	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.10.5	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL
7.10.6	_______________mΩ	**Certified value for J9, 0.5mΩ nominal shunt**	N/A	N/A
7.10.7	Use the certified value to calculate % error	_______________mΩ	________%	PASS / FAIL

Paragraph	Test Information	LRT Measurement in mΩ or Notes	% error	Pass / Fail
7.10.8	Use the certified value to calculate % error	______________mΩ	_______%	PASS / FAIL
7.10.9	Use the certified value to calculate % error	______________mΩ	_______%	PASS / FAIL
7.10.10	Use the certified value to calculate % error	______________mΩ	_______%	PASS / FAIL

Calibration Technician __________________ Date ____________

Certifying Agent __________________ Date ____________

GROUND EQUIPMENT TECHNICAL MANUAL

D6-82567

(906-10247-2 AND 906-10247-3, LOOP RESISTANCE TESTER ASSEMBLIES)

LOOP RESISTANCE TESTER

POINT OF CONTACT
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PUBLISHED BY THE BOEING COMMERCIAL AIRPLANES ERC/CAS, SEATTLE, WASHINGTON, USA
● A DIVISION OF THE BOEING COMPANY ●

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REVISION RECORD

* Retain this record in front of manual. On receipt of revision, insert revised pages in the manual, and enter revision number, date inserted and initial.

REVISION NUMBER	REVISION DATE	DATE FILED	BY

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Ground Equipment Technical Manual
LRT

Boeing Document D6-82567
September 1, 2004

TO: HOLDERS OF LOOP RESISTANCE TESTER GROUND EQUIPMENT TECHNICAL MANUAL

This letter transmits revision 14, to the original release of the Loop Resistance Tester Ground Equipment Technical Manual.

Pages which have been revised are outlined below together with the highlights of each change. Please remove and/or insert affected pages noted below and enter Revision No. and date on the Revision Record.

Chapter/Section and Page No.	Description of Change
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LRT

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BOEING

Ground Equipment Technical Manual
LRT

Boeing Document D6-82567
September 1, 2004

TO: HOLDERS OF LOOP RESISTANCE TESTER GROUND EQUIPMENT TECHNICAL MANUAL

REVISION 14, DATED 1 SEPTEMBER 2004
HIGHLIGHTS

This letter transmits the original release to the Loop Resistance Tester Ground Equipment Technical Manual.

This release of the Loop Resistance Tester Ground Equipment Technical Manual contains operating and maintenance procedures for the LRT. The manual will be revised/changed on a Three-month cycle. The next revision will be Revision 15, December 1/04.

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Ground Equipment Technical Manual
LRT

INTRODUCTION

This manual was prepared by The Boeing Company in accordance with Air Transport Association (ATA) specification 101, Ground Equipment Technical Data.

This covers general operating and maintenance information for the Loop Resistance Tester and associated equipment.

General information on non Boeing-built (or altered) equipment is also supplied. For specific information, refer to vendor documentation.

For operating and maintenance information pertaining to system components, refer to appropriate Chapter, Section.

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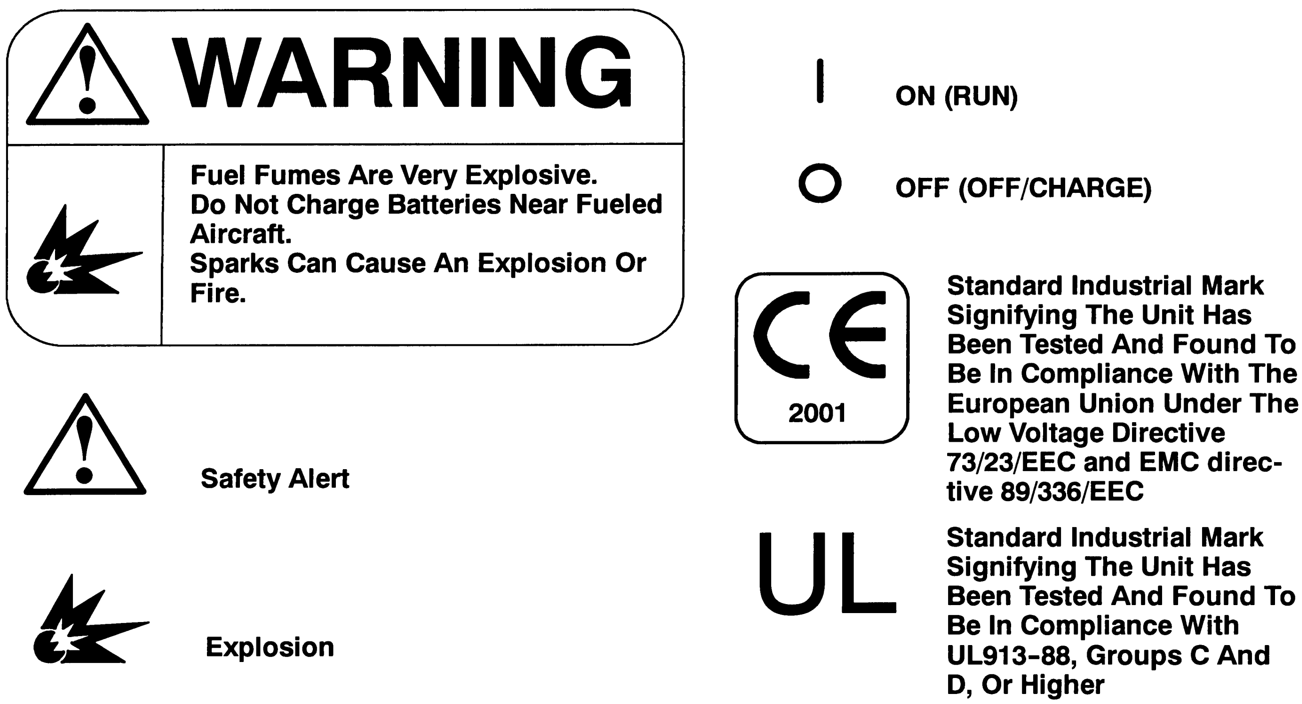
CHAPTER 1 - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 1 - DESCRIPTION

1. General

A. The Boeing Loop Resistance Tester Assembly is a portable electronics unit for measuring the resistance of electronic cable shielding on fly-by-wire cables as installed on the 777 and other aircraft. The LRT has been certified to ANSI/913 specifications for use in Division I, Class 1, Group D, hazardous locations. The Loop Resistance Tester Assembly consists of a Loop Resistance Tester (LRT), Accessory Assembly, and a Calibration Certification Assembly.

B. Explaination of Symbols



Explaination of Symbols
Figure 1

CAUTION: THIS EQUIPMENT IS NOT SPECIFICALLY DESIGNED FOR USE IN INDUSTRIAL LOCATIONS. TEST AND MEASUREMENT INSTRUMENTS WITHIN THE SCOPE OF THE EUROPEAN UNIT UNDER THE EMC DIRECTIVE CAN BE USED IN A WIDE RANGE OF LOCATIONS BY PERSONNEL CAPABLE OF INTERPRETING THE RESULTS OBTAINED. IF RF TRANSMITTERS ARE USED IN CLOSE PROXIMITY THEY MAY DISTURB EQUIPMENT WITHIN THE SCOPE OF THIS STANDARD.

2. Equipment Location and Description

A. Loop Resistance Tester (LRT)

(1) The LRT is comprised of the following elements:

(a) Loop Resistance Tester (LRT) (Figure 2)

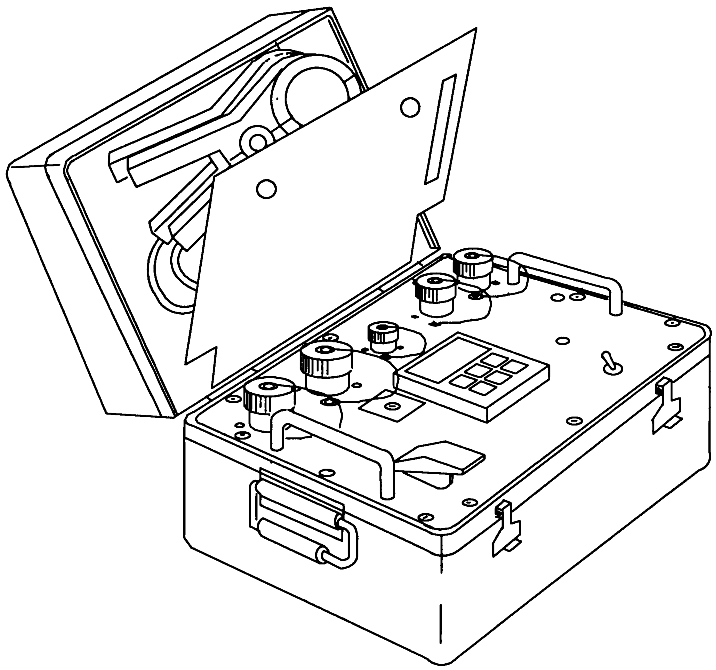
NOTE: The serial numbers of the 906-10260-5 and 906-10260-6 Sense/Drive Couplers are recorded on the Calibration Sticker located on the Front Panel of the LRT after Calibration.
Calibration of the LRT will be determined Invalid if the LRT is used with any Sense/Drive Couplers other then the serial numbers recorded on the Calibration Sticker.

(b) Drive Current Coupler

(c) Sense Current Coupler

(d) Joint Probe Assembly

(e) Joint Probe Extension



Loop Resistance Tester
Figure 2

(2) A low power excitation voltage is sent from the instrument into the drive coupler (essentially a transformer). This induces a smaller voltage around the shielding of the electrical cable under test. This voltage is measured by the drive coupler as well, as long as the cable and the aircraft structure form a continuous low resistance current path, or loop, with the current induced in the loop. This induced loop current is detected by the sense current coupler and is measured by the instrument. The ratio of loop voltage to loop current gives the complex loop impedance from which the loop resistance can be derived. The LRT is accurate to ±10% of the two Loop ranges, 0 mΩ - 9 mΩ, 10 mΩ - 1 ohm, and the two Joint ranges, 0% - 10% of the Loop measurement, 11% - 100% of the Loop measurement.

(3) Figure 3, shows the relative position of the components of the Loop Resistance Tester (LRT).

(4) SENSE COUPLER connector (blue) (1, Figure 3), and DRIVE COUPLER connector (red) (2).

(a) These connectors are utilized with the blue Sense Coupler and red Drive Coupler Cable Assemblies (Figure 4), while performing the Loop Resistance Test (Section 1, Chapter 2, Paragraph 2). These connecters are interchangeable with either the blue Sense Coupler Cable Assembly or the red Drive Coupler Cable Assemblies.

(5) BATTERY CHARGER connector (3, Figure 3).

(a) This connector is only utilized with the Battery Charger Assembly (Figure 8) to re-charge the internal battery of the LRT. (Refer to the Battery Charging Procedures Chapter 1, Section 2, Paragraph 3).

(6) RS232 connector (4, Figure 3).

(a) The RS232 connector is a bi-directional port used with the RS232 Cable Assembly when performing Operational Software Download and testing the LRT.

(7) JOINT PROBE connector (5, Figure 3).

(a) This connector is only used with the Joint Probe Assembly (Figure 5), while performing the Joint Resistance Test portion of the Loop Resistance Test (Section 1, Chapter 2, Paragraph 2).

(8) RUN - OFF/CHARGE switch (6, Figure 3).

(a) This is a guarded two position toggle switch. The RUN position is the power on position, providing stored power from the LRT's internal battery for use in normal operation. The OFF/CHARGE position is the power off position, which is also utilized while performing the Battery Charging Procedures (Chapter 1, Section 2, Paragraph 3).

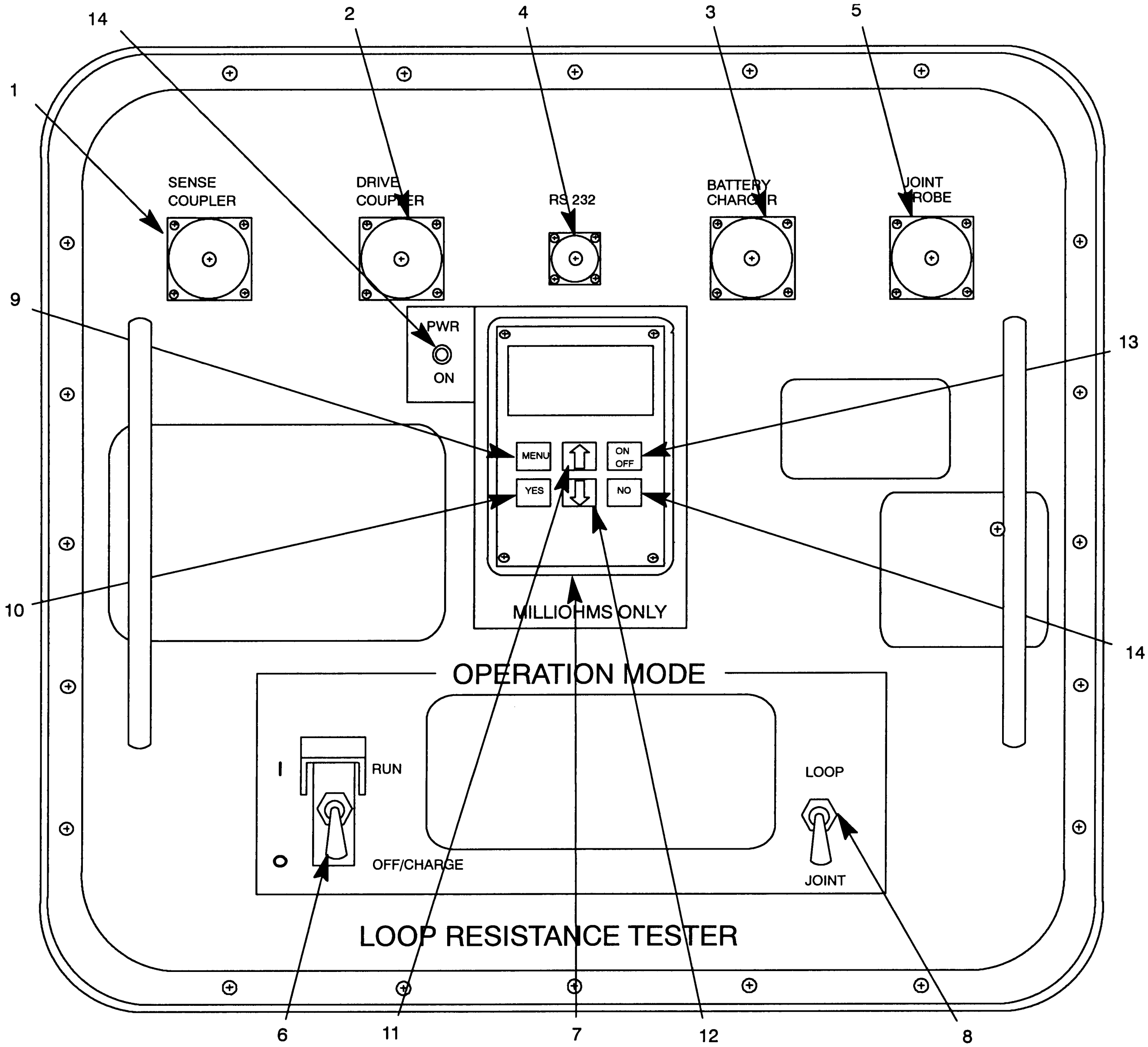
(9) BITE CONTROL MODULE Assembly (7, Figure 3).

(a) This has a LED display with two rows of eight alphanumeric characters each, and six pushbuttons:
The MENU Pushbutton (9, Figure 3).
The YES Pushbutton (10, Figure 3).
The up-arrow Pushbutton (11, Figure 3).
The down-arrow Pushbutton (12, Figure 3).
The ON/OFF Pushbutton (13, Figure 3).
The NO Pushbutton (14, Figure 3).

(10) MODE Selector Toggle Switch (8, Figure 3).

(a) This is a two position toggle switch. The LOOP position, is used for the Loop Measurement Test portion of the Loop Resistance Test (Section 1, Chapter 2, Paragraph 2). The JOINT position, is used for the Joint Resistance Test portion of the Loop Resistance Test (Section 1, Chapter 2, Paragraph 2).

(11) LRT Power ON LED (14, Figure 3).

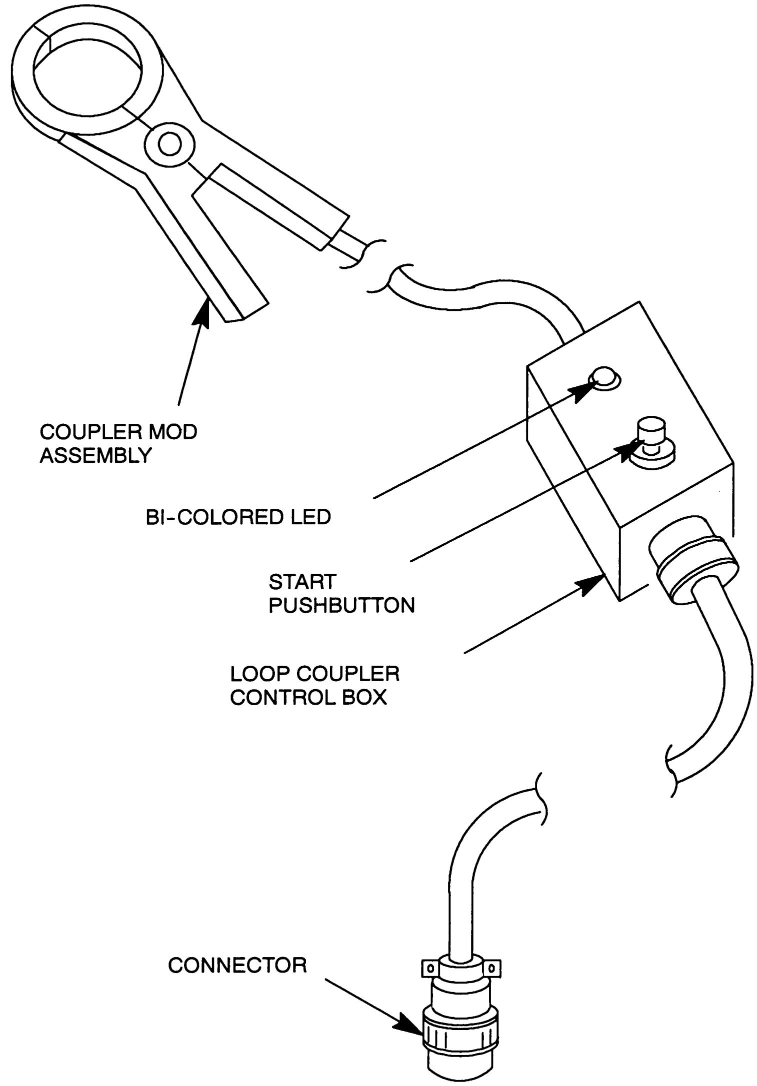


LRT Component Location
Figure 3

NOTE: The serial numbers of the 906-10260-5 and 906-10260-6 Sense/Drive Couplers are recorded on the Calibration Sticker located on the Front Panel of the LRT after Calibration.
Calibration of the LRT will be determined Invalid if the LRT is used with any Sense/Drive Couplers other then the serial numbers recorded on the Calibration Sticker.

(12) Sense/Drive Coupler Assemblies (quantity 2) (Figure 4).

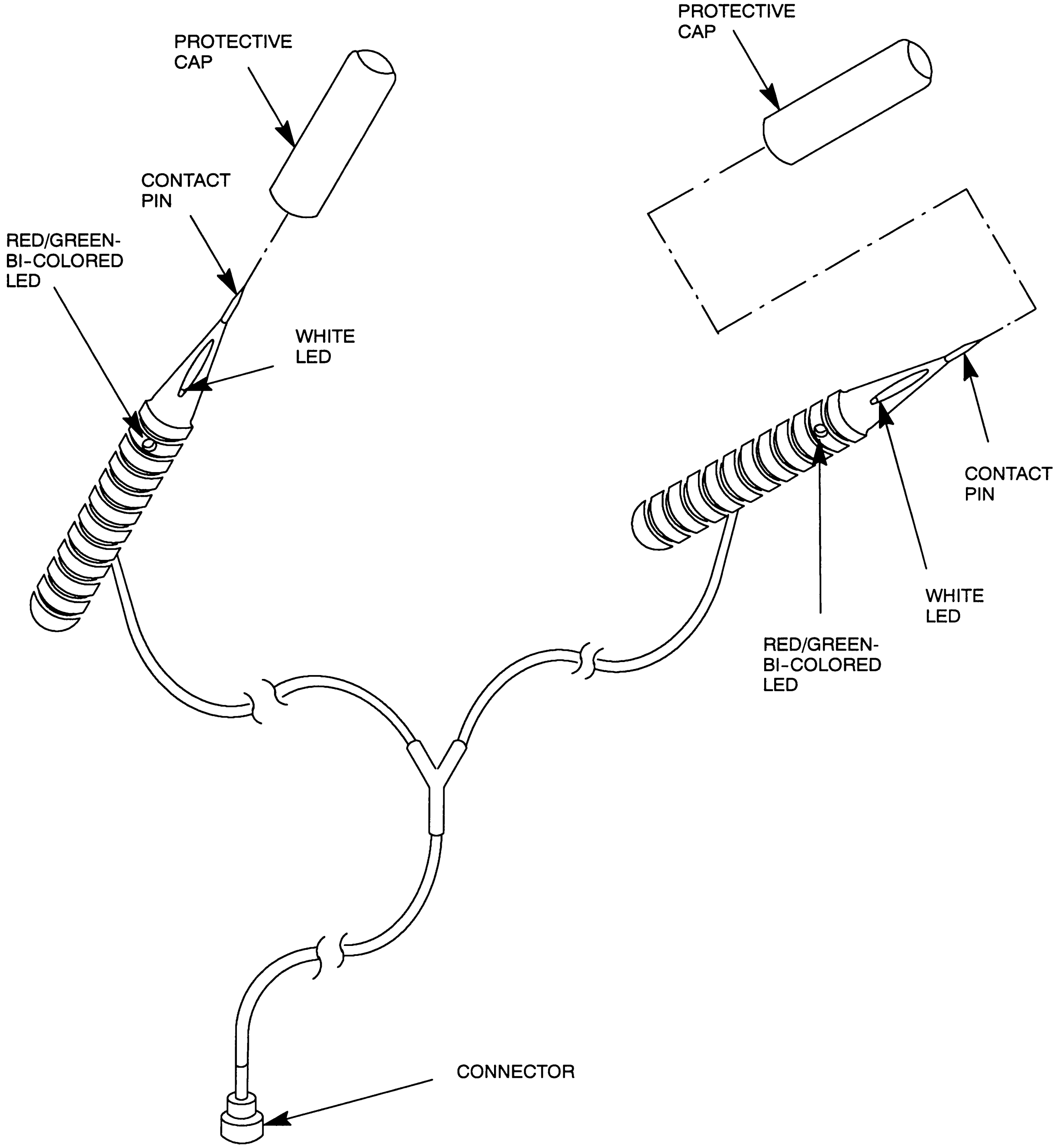
(a) The Sense/Drive Coupler Assemblies are approximately 12 feet in length, and consists of a Coupler Mod Assembly, a Loop Coupler Control Box with a Bi-Colored LED (red or green) and a START pushbutton mounted on it, and a connector. The Inductive Sense/Drive Coupler Assemblies are connected to the blue SENSE COUPLER and the red DRIVE COUPLER connectors (1 and 2, Figure 3) while performing the Loop Resistance Test (Section 1, Chapter 2, Paragraph 2).



Sense/Drive Coupler Assembly
Figure 4

(13) Joint Probe Assembly (Figure 5).

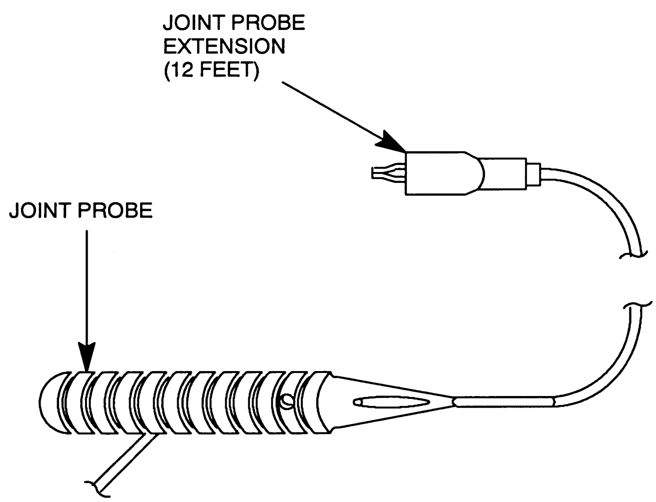
(a) The Joint Probe Assembly is approximately 12 feet in length and consists of two plastic probes with contact pin, with two LEDs mounted to each probe, joined to a single cable and connector. The Joint Probe Assembly connects to the JOINT PROBE connector (5, Figure 3) on the LRT while performing the Loop Resistance Test (Section 1, Chapter 2, Paragraph 2).



Joint Probe Assembly
Figure 5

(14) Joint Probe Extension (quantity 2) (Figure 6).

(a) The Joint Probe Extensions are inserted into the tip of the Joint Probes in place of the Joint Probe Contact Pins. The Extensions can then be attached to hard to reach connections for the Joint test.



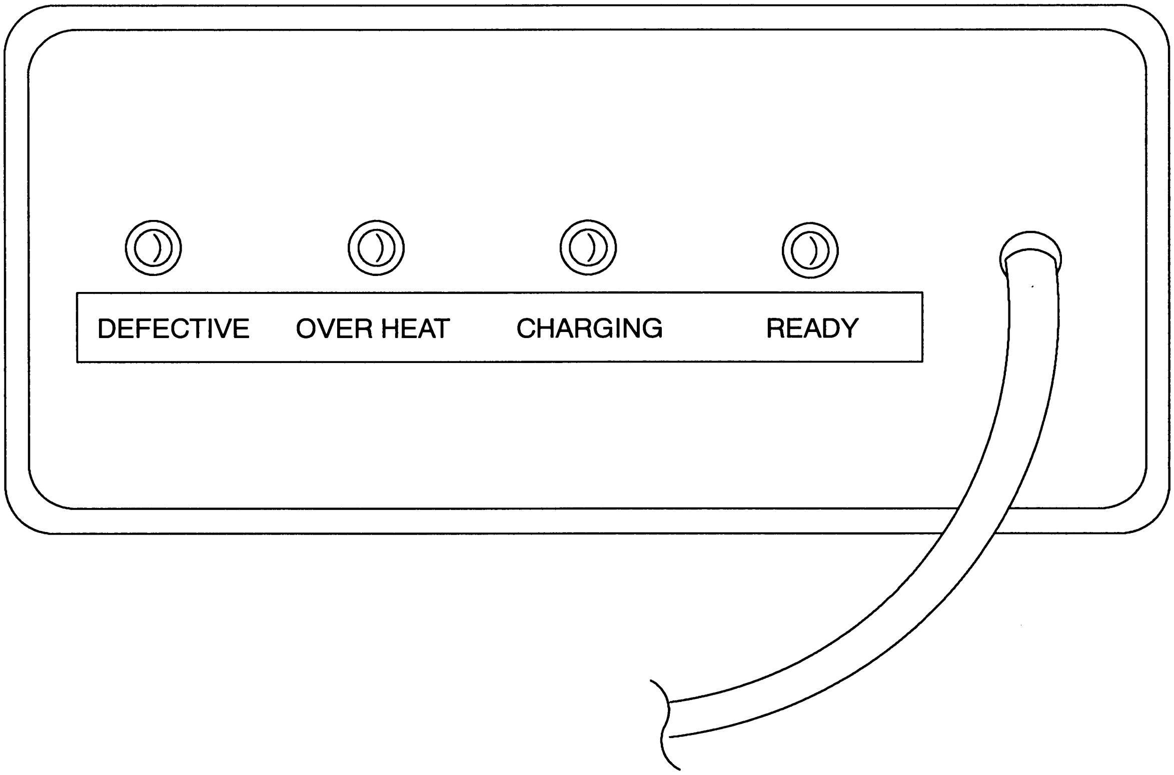
Joint Probe Extension
Figure 6

B. Accessory Assembly

(1) The Accessory Assembly consists of a Battery Charger Assembly, RS232 Cable Assembly, five extra fuses for the Battery Charger, five extra contact pins for the Joint Probe, and a case. One of two possible Battery Charger Assemblies are available. The 103486-1 (Sage) Battery Charger Assembly or the CS800-1 (AVT) the Prefered Battery Charger Assembly.

(2) Battery Charger Assembly (103486-1, Sage) (Figure 7).

(a) The Battery Charger Assembly can be configured for either 120 VAC, 60 Hz or 250 VAC, 50 Hz. This consists of an AC power cord and dual pole switch (on rear of Battery Charger), cable and connector to interface with the BATTERY CHARGE connector (3, Figure 3) on the LRT, and battery charger with the following four indicators:
READY - Green
CHARGING - Yellow
OVER HEAT - Orange
DEFECTIVE - Red



Battery Charger Assembly (103486-1, Sage)
Figure 7

(b) The Battery Charger Assembly utilizes a four-stage charge sequence that automatically provides a complete recharge without overcharging. The charge sequence is as follows:

1 Soft Charge:
The Soft Charge eases the battery to be charged into the Fast Charge stage by gradually increasing the current to the Fast charge rate. The increase in current alleviates the voltage peak. During the Soft Charge, only positive current pulses are applied to the battery. The yellow CHARGING indicator blinks during the Soft Charging stage.

2 Fast Charge:
In the Fast Charge stage, the charging current is applied in a series of charge and discharge pulses. This consists of a positive current charging pulse followed by high current, short duration discharge pulses. This cycle repeats every second until the battery is fully charged. The yellow CHARGING indicator blinks during the Fast Charging stage.

3 Topping Charge:
The Topping Charge applies current at a low enough rate to prevent cell heating, but high enough to ensure a full charge. The green READY indicator blinks at about one second intervals and the yellow CHARGING indicator blinks every 10 seconds during the Topping Charge.

4 Maintenance Charge:
The Maintenance Charge offsets the natural self-discharge of the batteries by keeping the cells primed at peak charge. The Maintenance Charge will continue as long as the Battery Charger is connected to the LRT. The green READY indicator blinks at about a one second interval and the yellow CHARGING indicator blinks at a 40 second interval during the Maintenance Charge.

(c) The Battery Charger Assembly also automatically provides four charge termination methods, they are as follows:

1 Voltage Slope Termination:
The Voltage Slope Termination calculates the point of full charge and terminates the applied current as the battery reaches that point.

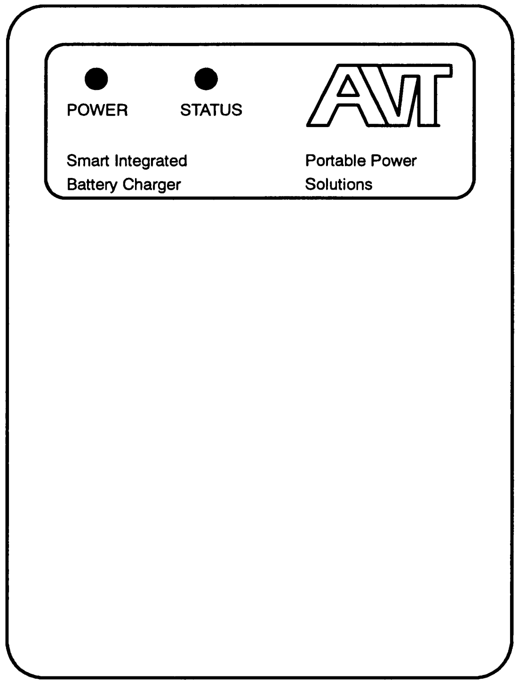
2 Maximum Temperature Termination:
The Maximum Temperature Termination provides an internal voltage threshold that determines when the battery temperature has exceeded 45 degrees Celsius, at which point the OVER HEAT indicator is lighted and the charge is stopped. Once the battery temperature has decreased sufficiently, the charger will continue in the Topping Charge mode.

3 Start-up Termination:
Upon start-up, any excess charge from filter capacitors at the charging system terminals is removed with a series of discharge pulses. The Battery Charger Assembly then applies a charge pulse to determine if the battery is good. If the battery is determined to be good, the Fast Charge stage begins immediately. If the battery is determined to be bad, the red DEFECTIVE indicator is lighted. The charge pulse will repeat for 10 seconds. If the fault is cleared within the 10 seconds, the red DEFECTIVE indicator will shut off, and the Soft Charge stage will begin. If the fault is not cleared within 20 seconds, the red DEFECTIVE indicator remains lighted and the Battery Charger Assembly shuts down.

4 Fault Detection/Cold Battery Termination:
The Battery Charger Assembly also provides a Battery Fault Detection, which will light the red DEFECTIVE indicator and shut down the Battery Charger Assembly if an open circuit occurs in the current path anytime after Fast Charge has been initiated. The Battery Charger Assembly also provides a Cold Battery Detection feature that will not let the Battery Charger Assembly start if the battery temperature is below 0degrees Celsius. The Battery Charger Assembly will automatically start-up when the battery temperature warms-up.

(3) Preferred Battery Charger Assembly (CS800-1, AVT) (Figure 8).

(a) The Battery Charger has a working voltage of 100 - 230 VAC ±15% VAC at a frequency of 47 to 63 Hz. This consists of an AC power cord, cable and connector to interface with the BATTERY CHARGE connector (3, Figure 3) on the LRT.
Indicators:
Green - CHARGE COMPLETE and AC POWER ON
Solid Yellow - FAST CHARGING
Flashing Yellow - CHARGE PENDING



Preferred Battery Charger Assembly (CS800-1, AVT)
Figure 8

(b) The Battery Charger Assembly utilizes two charging modes: Fast Charge and Trickle Charge that automatically provide a complete recharge without overcharging.

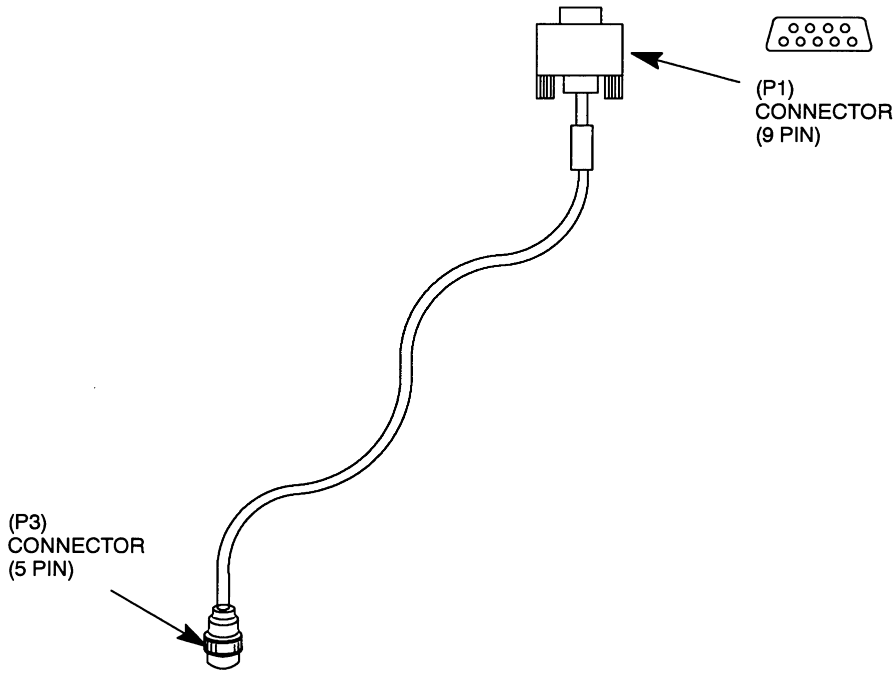
1 The Charger starts off on the Fast Charge mode at 1250mA with a maximum output of 35 watts.

2 The Fast Charge Termination will kick in when the charging voltage is less then 10 mV per cell, and/or after six hours off charging. This is accoumplished by a circuit timer.

3 When the Fast Charge is Terminated, and the Trickle Charge kickes in, this is equal to the rated battery capacity (7000 mA) devided by 32 (7000 mA/32 = 218.75 mA).

(4) RS232 Cable Assembly (Figure 9).

(a) The RS232 Cable Assembly is utilized to perform software download, and testing and troubleshooting of the LRT.



RS232 Cable Assembly
Figure 9

(5) Joint Probe Tips (quantity 5).

C. Calibration Certification Assembly

(1) The Calibration Certification Assembly consists of four Certification Standards (Figure 10), four Joint Test Shunt Standards (Figure 11), and a case. These Standards are utilized every 12 months to perform the LRT Calibration Certification (Performed by the Calibration Lab) Functional Test (performed by the Operator) Calibration ensures the LRT is performing resistance measurements within specified tolerances that meet certification requirements. The measurements for each of the Standards is then recorded on a data sheet. The Standards also provide the operator with a functional test to ensure the LRT is operating correctly.

CALIBRATION STANDARD	NOMINAL VALUE
906-10273-2	14 milliohms
906-10273-6	3600 milliohms
906-10273-7	2 milliohms
906-10273-8	8.5 milliohms

Certification Standards
Figure 10

JOINT TEST SHUNT STANDARD	NOMINAL VALUE
HA-2-50	25.0 milliohms
HA-10-50	5.0 milliohms
HA-1-50	50.0 milliohms
HA-100-50	0.50 milliohms
906-10273-9	3600.00 milliohms

Joint Test Shunt Standards
Figure 11

SECTION 2 - OPERATION

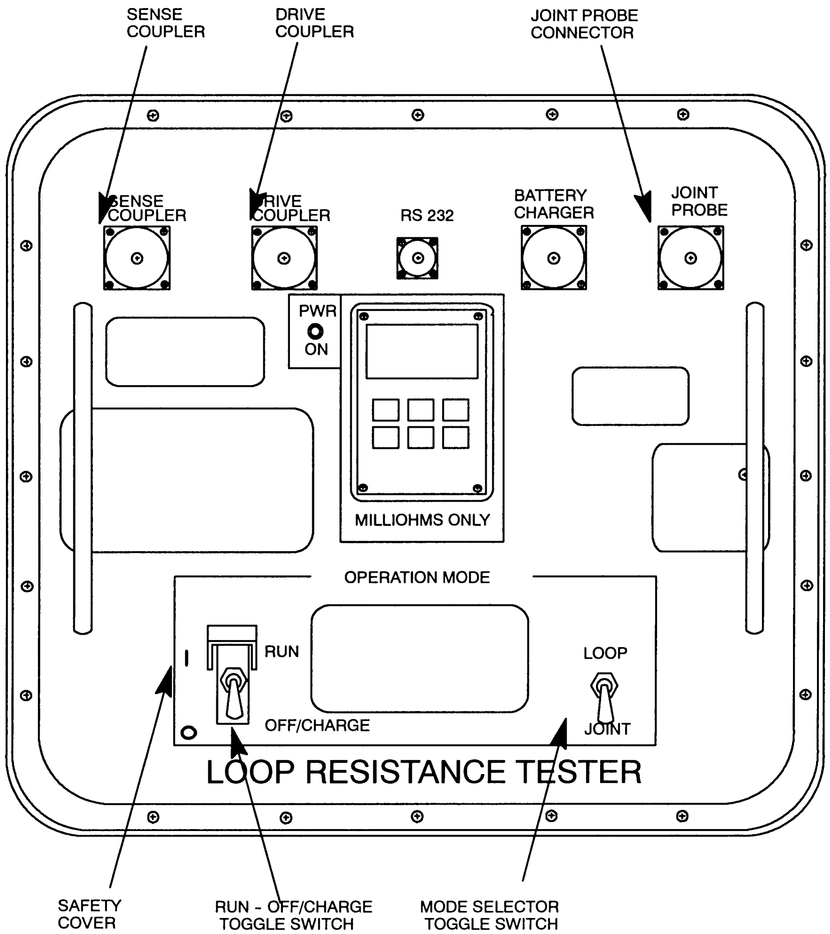
1. General

CAUTION: THIS EQUIPMENT IS NOT SPECIFICALLY DESIGNED FOR USE IN INDUSTRIAL LOCATIONS. TEST AND MEASUREMENT INSTRUMENTS WITHIN THE SCOPE OF THE EUROPEAN UNIT UNDER THE LOW VOLTAGE DIRECTIVE CAN BE USED IN A WIDE RANGE OF LOCATIONS BY PERSONNEL CAPABLE OF INTERPRETING THE RESULTS OBTAINED. IF RF TRANSMITTERS ARE USED IN CLOSE PROXIMITY THEY MAY DISTURB EQUIPMENT WITHIN THE SCOPE OF THIS STANDARD.

A. The Loop Resistance Tester (LRT) has two primary modes of operation which are selected by the Mode Selector Toggle Switch (Figure 12), they are Loop and Joint, and are explained as follows:

(1) Loop Mode - The LRT provides a measurement of loop resistance by supplying a 200Hz sinusoidal signal with the drive coupler, and simultaneously sampling the waveform of the current in the sense coupler, which measures the loop current, and the waveform of a sense winding in the drive coupler, to measure loop voltage.

(2) Joint Mode - In the Joint Mode of operation, the drive coupler is used to force current around the loop (which is measured by the sense coupler) while the resulting voltage drop across a connector interface in the loop is measured with a pair of Joint Probes. These probes make physical and electrical contact with the loop. This probing technique is usually used to identify faulty connectors, backshells, and bracket joints.



LRT Front Panel
Figure 12

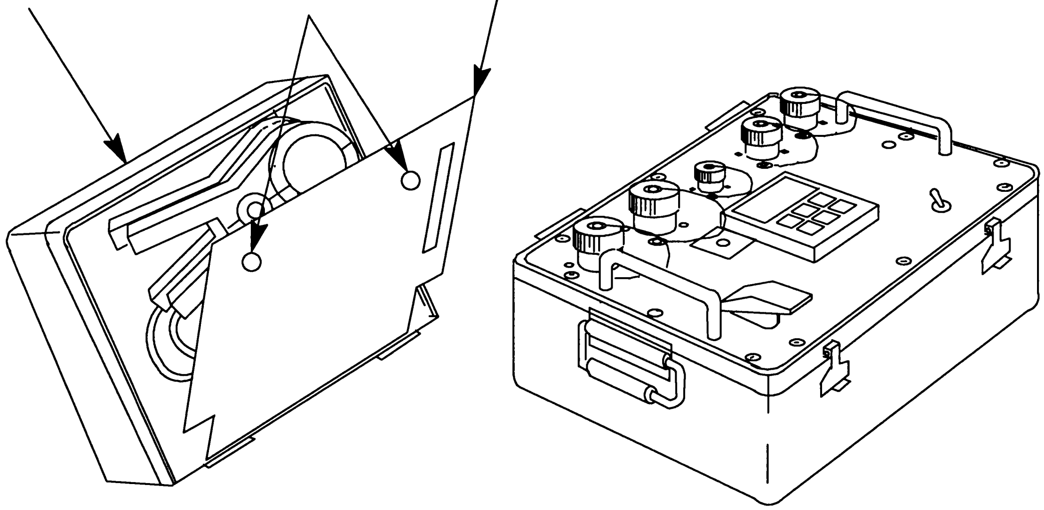
2. <u>Loop Resistance Test</u>

A. Loop Measurement Test

(1) Open the Loop Resistance Tester Assembly. While holding the base stationary, slide the lid assembly to the side to disengage the lid assembly from the base (Figure 13).

(2) On the lid assembly, turn the 2 cam-lock fasteners and open the storage lid. Remove both of the Sense/Drive Couplers and the Joint Probe assembly (Figure 13).

<u>NOTE</u>: The serial numbers of the 906-10260-5 and 906-10260-6 Sense/Drive Couplers are recorded on the Calibration Sticker located on the Front Panel of the LRT after Calibration.
Calibration of the LRT will be determined Invalid if the LRT is used with any Sense/Drive Couplers other then the serial numbers recorded on the Calibration Sticker.



LRT Assembly
Figure 13

(3) Connect the Sense/Drive Couplers, to the blue Sense Coupler connector and the red Drive Coupler connector, then connect the Joint Probe assembly to the Joint Probe connector on the front panel of the LRT (Figure 12).

NOTE: To conserve the battery charge, the power will automatically shutdown after ten minutes of inactivity.

(4) Lift the safety cover and position the RUN, OFF/CHARGE switch to the RUN position (Figure 12).

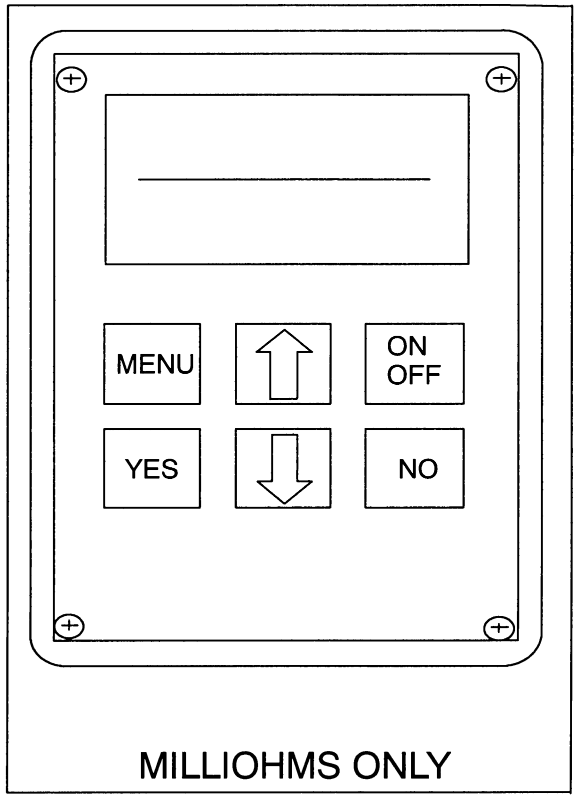
(5) Position the Mode Selector Toggle Switch to the Loop position (Figure 12).

(6) For an explanation of the indications shown on the BITE Control Module Assembly refer to (Figure 29).

(7) Push and briefly hold the orange ON/OFF pushbutton on the BITE Control Module Assembly until the "TESTING HARDWARE" indication appears on the display (Figure 14).

NOTE: A four character symbol will move around the display while the hardware test is being performed.

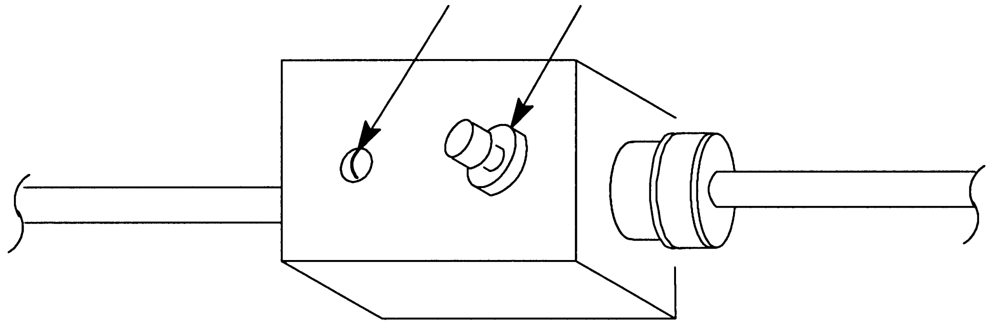
(8) At the completion of the hardware test the display will show a "Battery__%" to indicate the percentage of usable charge remaining on the LRT internal battery. If a "low battery" indication is displayed, the LRT will turn off and the Battery Charging Procedures (Paragraph 3.) will need to be performed.



BITE Control Module Assembly
Figure 14

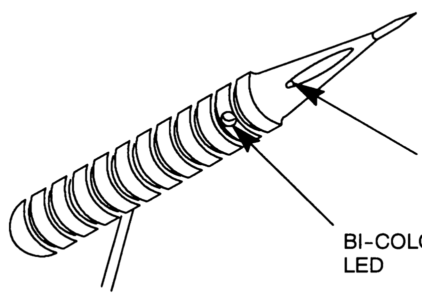
NOTE: The indication "Press Start" will appear on the display after the "Battery__%" has been extinguished. The "Press Start" indicates that the LRT is ready to perform a Loop Resistance Test. If at any time the LRT battery charge becomes too low, the display will show a "Low Battery" indication and the LRT will turn off.

(9) Ensure that the Bi-Colored LED mounted in the Control Box of each of the Sense/Drive Couplers is lighted red (Figure 15).



Sense/Drive Coupler Control Box
Figure 15

(10) Ensure that the LED on the end of each Joint Probe is not lighted (Figure 16).



Joint Probe
Figure 16

(11) Clamp both of the Sense/Drive Couplers to the wire bundle loop to be tested a minimum of four inches apart if possible for best accuracy.

(12) Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 15).

(13) Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green (Figure 15).

(14) If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 15), either a ”DRV coup is open” or a ”SNS coup is open” indication will be Displayed on the BITE Module Assembly (Figure 14). This is an indication of

poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

NOTE: Ensure nothing hinders proper closure of the couplers such as ground wires or other items.

(15) If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the green indication on both of the Sense/Drive Couplers cannot be achieved then the LRT is defective Perform the Loop Resistance Tester Testing/Troubleshooting Procedure (Chapter 2, Section 1).

(16) Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 14).

(17) As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 15) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged. For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

(18) When the "UNSTABLE" indication appears on the BITE Module Assembly, the LRT will test each of the couplers to see if they are properly closed. If a coupler is not properly closed the message "PRESS START" will appear on the BITE Control Module Assembly. This will happen a few seconds after the "UNSTABLE" indication appears. The operator should then press START and then either "DRV coup is open" or "SNS coup is open" will appear on the BITE Control Module Assembly, and the corresponding coupler will have a red LED on its Control Box. Re-clamp that coupler and return to step (12).

(19) Once the "unstable" condition occurs it can only be removed by turning the unit Off then On, by opening one of the couplers until either "DRV Coup Is Open" or "SNS Coup Is Open" or "Press Start" indication occurs, or by switching the MODE Selector Switch to the JOINT position. Switch the MODE Selector Switch to the JOINT position, and when the "CONNECT PROBES" indication appears on the BITE Control Module Assembly the MODE Selector Switch should be returned to the LOOP position. The indication "PRESS START" appears on the BITE Module Assembly, and the operator should then return to step (12).

(20) Record the measurement displayed on the BITE Control Module Assembly.

(21) If the loop has a resistance greater than the range of the LRT, a "TOO BIG" indication will be Displayed on the BITE Module Assembly.

NOTE: .The measurement will be permanently lost if either of the couplers are opened. Therefore, the measurement must be written down before opening either of the couplers

(22) If a Joint Measurement Test is also required, without opening the Sense/Drive Couplers proceed to paragraph B. If testing is complete, turn off the LRT and return the LRT and cables to the stowed configuration.

B. Joint Measurement Test

NOTE: Before a Joint Measurement Test can be performed, a Loop Measurement Test must be completed (paragraph A.).

(1) Without opening the Sense/Drive Couplers, change the Mode Selector Toggle Switch from LOOP position to the JOINT position (Figure 12).

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test (paragraph A.) must be redone in order to clear the "REDO LOOP" message from the Display.

NOTE: If at any time during the Joint Measurement test the "REDO LOOP" message appears on the BITE Control Module Display, the joint that was being tested at the time the LEDs on the Joint Probes started blinking is suspect. The pressure applied to the joint may have changed the resistance of the loop as well as one or more of the other joints. The operator should re-test these and compare the new measurements to the previous measurements.

(2) Ensure that the LEDs on both Joint Probes are lighted red (Figure 16).

(3) Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

NOTE: The Joint Test can measure a single joint from backshell to receptacle, receptacle to plug, backshell to plug, receptacle to bracket, or bracket to structure. This test may also include a string of joints such as backshell to plug, backshell to bracket, backshell to structure, receptacle to bracket, receptacle to structure, or plug to structure.

Several Joint measurements can be made in succession, by holding one of the Joint Probes at one location (such as a backshell) and moving the other Joint Probe to each successive location away from the first Joint Probe.

(4) Apply the Joint Probes to the joint to be tested. A good connection is indicated when the LEDs on the Joint Probes turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green (Figure 16).

(5) The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 14). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

(6) Record the displayed joint test value. As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

3. Battery Charging Procedures (103486-1, Sage)

WARNING: THIS PROCEDURE MUST BE PERFORMED IN A NON-HAZARDOUS LOCATION

NOTE: The Battery Charger can be configured for either 120 VAC, 60 Hz or 250 VAC, 50 Hz.

A. Ensure that the Battery Charger is configured for the appropriate power source (120 VAC, 60 Hz or 250 VAC, 50 Hz) by reading the Input Power indicator on the Input Power Module, on the back of the Battery Charger (Chapter 2, Section 3).

B. If the Battery Charger Input Power configuration is not correct, open the hinged fuse block cover and pull to remove the Fuse Block and Jumper Assembly. Rotate the Fuse Block and Jumper Assembly to the desired voltage configuration and re-install in the Input Module. Close the hinged fuse block cover on the Input Power Module and verify the proper input voltage configuration.

C. Plug the AC power cord into the appropriate outlet.

NOTE: Ensure the guarded RUN - OFF/CHARGE switch is in the OFF/CHARGE position to perform the Battery Charging Procedures. If the RUN - OFF/CHARGE switch is placed in the RUN position, the Battery Charger will stop charging and the red DEFECTIVE light on the battery charger will become lighted. If this occurs the charger can be reset by positioning the RUN - OFF/CHARGE switch in the OFF/CHARGE position and unplugging then re-plugging the battery charger interface cable connector to the BATTERY CHARGE connector on the LRT front panel.

D. Connect the battery charger interface cable connector to the BATTERY CHARGE connector on the LRT front panel (Figure 12).

E. Switch the Battery Charger ON/OFF toggle switch located on the back of the Battery Charger to the ON position.

NOTE: The Battery Charger can be left in the maintenance stage (charging the LRT) indefinitely without doing damage to either the LRT battery or the charger.

F. Observe the battery charger indicator lights. During the Soft Charge and the Fast Charge stages, the yellow CHARGING indicator will blink. During the Topping Charge and the Maintenance Charge stages, the green READY indicator will blink at one second intervals. This indicates that the battery is charged (Figure 17).

G. If the orange OVER HEAT indicator is lighted, the charger will automatically shut down until the LRT battery temperature cools down, then the charging sequence will begin again. A repeated OVER HEAT indication can indicate a faulty LRT battery.

H. If the red DEFECTIVE indicator is lighted, and the yellow CHARGING indicator blinks, the LRT battery is internally shorted and a recovery is being attempted by the charger.

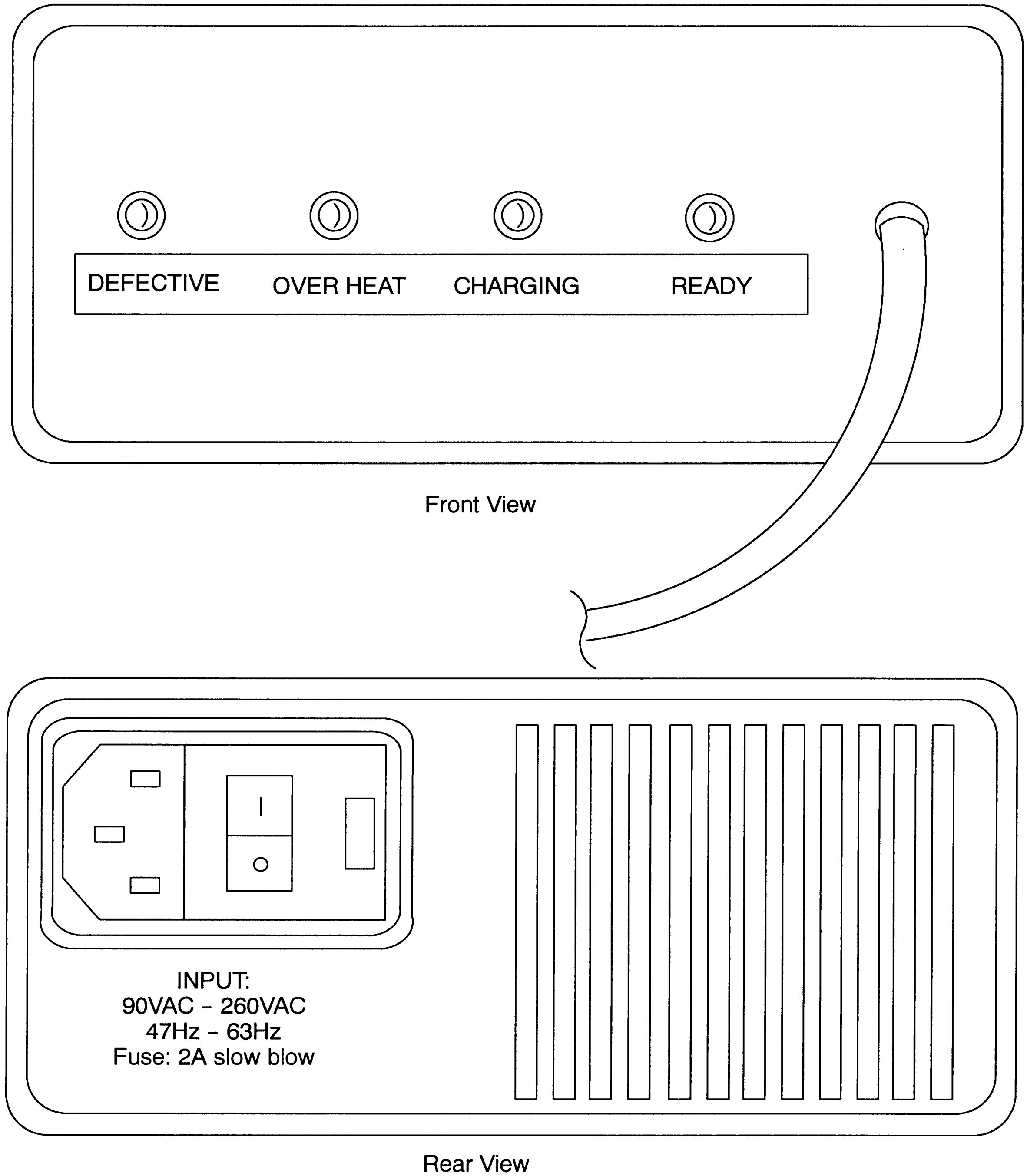
I. If the red DEFECTIVE indicator stays lighted, the LRT battery is either internally shorted, or has a high internal impedance. Unhook the charger from the LRT for approximately 15 seconds and reconnect. If the DEFECTIVE indicator stays lighted after four to five times of trying to charge the battery, the battery is defective and cannot be charged. Refer to Battery Charger Testing/Troubleshooting Procedures (Chapter 2 Section 2).

NOTE: The following steps must be performed only if the battery is new, the LRT has been disconnected from the Battery Charger for more than one week and/or the battery charge has depleted too much to get an indication of charge level on the BITE Module Display. These steps will fully condition, form and completely charge the Battery.

J. Switch the Battery Charger ON/OFF toggle switch located on the back of the Battery Charger to the OFF position and Disconnect the battery charger interface cable connector from the BATTERY CHARGE connector on the LRT front panel (Figure 12).

K. After waiting one minute, perform steps D through I repetitively until the Battery Charger green READY indicator is lighted within one half hour from the start of the charging. The Battery is now fully charged, formed, and conditioned.

L. Refer to Chapter 1, Section 1, for the description of the Battery Charger.



Battery Charger Assembly (103486-1, Sage)
Figure 17

4. Battery Charging Procedures (CS800-1, AVT)

WARNING: THIS PROCEDURE MUST BE PERFORMED IN A NON-HAZARDOUS LOCATION

A. Connect the battery charger interface cable connector to the BATTERY CHARGE connector on the LRT front panel (Figure 12).

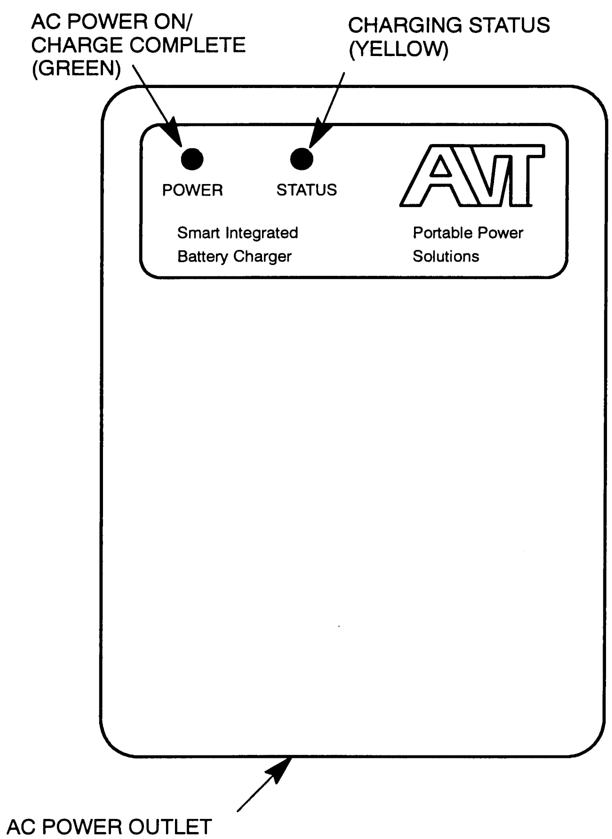
B. Plug the Charger AC power cord into the appropriate outlet.

NOTE: Ensure the guarded RUN - OFF/CHARGE switch is in the OFF/CHARGE position to perform the Battery Charging Procedures. If the RUN - OFF/CHARGE switch is placed in the RUN position, the Battery Charger will stop charging. If this occurs the charger can be reset by positioning the RUN - OFF/CHARGE switch in the OFF/CHARGE position and unplugging then re-plugging the battery charger interface cable connector to the BATTERY CHARGE connector on the LRT front panel.

NOTE: The Battery Charger can be left in the Trickle Charge mode (charging the LRT) indefinitely without doing damage to either the LRT battery or the charger.

C. Observe the battery charger indicator lights. The green indicator will be solid green when AC power is applied. During the Fast Charge stage, the yellow CHARGING indicator will be solid yellow. The yellow CHARGING indicator will start flashing when the trickle charge mode has started. (Figure 18).

D. Refer to Chapter 1, Section 1, for the description of the Battery Charger.



Battery Charger (CS800-1, AVT)
Figure 18

5. Software Download Procedures (RS232)

NOTE: PERFORMANCE OF THIS PROCEDURE WILL BREAK THE UL913 CERTIFICATION. A UL913 CERTIFIED BENCH IS REQUIRED TO PERFORM THIS PROCEDURE ACTION.

A. Open the Loop Resistance Tester Assembly. While holding the base stationary, slide the lid assembly to the side to disengage the lid assembly from the base (Figure 13).

B. Open the Accessory Assembly and remove the RS232 Cable Assembly (Figure 9).

C. Ensure the LRT OFF/CHARGE - RUN switch is in the "OFF/CHARGE" position.

D. On the PC Download Station to be used, Type the following command:
DOWNLOAD

E. The PRODUCT FAMILY MENU pop-up (Figure 19) will appear.

PC DOWNLOAD STATION - BOEING SETUP	
908-30021 V008 THE BOEING COMPANY PCDS-TEST	
PRODUCT FAMILY MENU	SYSTEM FUNCTIONS
A 737 B 747 C 757 D 767 E 777 F OTHER	1 PRINT STATION LOG 2 VIEW STATION LOG 3 VIEW REVISION LOG 4 LRU PN & SN UPDATE 5 6 7 HOST LOADER 8 ABOUT PCDS -QUIT
Thu Sep 11 15:35:45 1997	Make a selection

Product Family Menu
Figure 19

F. The LRT functions are in the OTHER selection, at the prompt type:
F

G. The OTHER LRU MENU pop-up (Figure 20) will appear.

PC DOWNLOAD STATION - BOEING SETUP

908-30021 V008 THE BOEING COMPANY PCDS-TEST

OTHER LRU MENU

A LRT	J	S
B	K	T
C	L	U
D	M	V
E	N	W
F	O	X
G	P	Y
H	Q	Z
I	R	-RETURN TO MAIN MENU

Thu Sep 11 15:35:45 1997	Make a selection

Other LRU Menu
Figure 20

H. Select the LRT functions, from the menu select:
A

I. The LRT LOAD TYPE MENU pop-up (Figure 21) will appear.

PC DOWNLOAD STATION - BOEING SETUP

908-30021 V008 THE BOEING COMPANY PCDS-TEST

LRT LOAD TYPE MENU

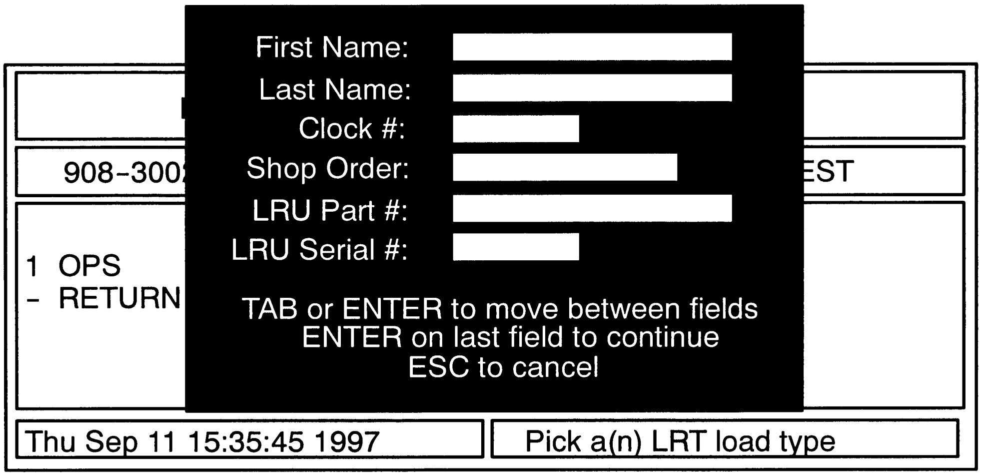
1 OPS
- RETURN TO LAST MENU

Thu Sep 11 15:35:45 1997	Pick a(n) LRT load type

LRT Load Type Menu
Figure 21

J. Select OPS function, from the menu select:
1

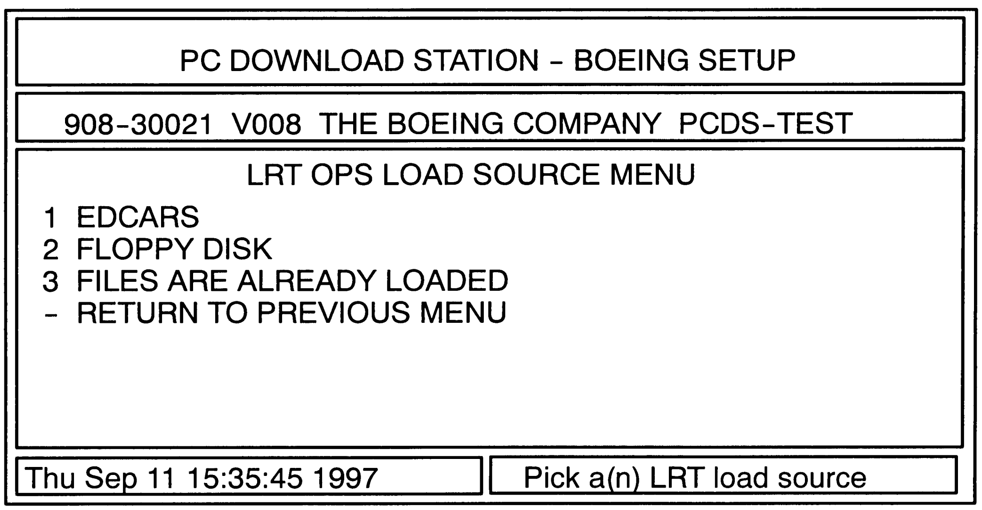
K. A User Information Dialog Box will appear (Figure 22).



User Information Dialog Box
Figure 22

L. Enter applicable data in the User Information Dialog Box, when complete press:
ENTER

M. The LRT OPS Load Source Menu pop-up will appear (Figure 23).



LRT OPS Load Source Menu
Figure 23

N. Select the FLOPPY DISK function. From the menu type:
2

O. The pop-up instructing you to place Diskette #1 in Drive A will appear (Figure 24).

PC DOWNLOAD STATION - BOEING SETUP

908-30021 V008 THE BOEING COMPANY PCDS-TEST

LRT OPS LOAD SOURCE MENU

1 EDCARS
2 FLOPPY
3 FILES A
- RETURN

Place Diskette #1 in Drive a:
then press ENTER or ESC to quit

Thu Sep 11 15:35:45 1997	Starting floppy disk copy process

Diskette Pop-up Menu
Figure 24

P. After placing Diskette #1 in Drive A, press:
ENTER

Q. The EDDS CRC utility will copy the datasets from the floppy disks and perform a CRC validation of the loadable datasets once they have been copied to the local hard disk.

R. The LRT Connection Instructions Prompt will appear (Figure 25).

PC DOWNLOAD STATION - BOEING SETUP

908-30021 V008 THE BOEING COMPANY PCDS-TEST

LRT CONNECTION INSTRUCTIONS

Connect the loading cable as shown in the PCDS
users manual then apply power to the LRT when prompted.

Thu Sep 11 15:35:45 1997	Press any key to continue..

LRT Connection Instructions Prompt
Figure 25

S. Connect the RS232 Cable Assembly connector (P3) to the RS232 connector (J3) on the LRT.

T. Connect either the nine pin connector (P1) or the 25 pin connecter (P2) to the PC Down Load Station to be used.

U. The Power-Up Prompt (Figure 26) will appear.

Full load in Progress...

Enable LRU Initiated
PLEASE POWER UP LRU
Port: 1 Baud Rate: 38400

*Press ESC to ABORT

*Press ESC to ABORT

Power-Up Prompt
Figure 26

V. Switch the OFF/CHARGE - RUN switch to the "RUN" position.

W. On the BITE Module Assembly, press the orange "ON/OFF" pushbutton.

X. Once power is applied to the LRT, the Percentage of Completion screen (Figure 27) will appear, this is to report the load progress.

Full load in Progress...

0% DATA TRANSFERRED

*Press ESC to ABORT

Percentage of Completion Screen
Figure 27

Y. The system will automatically run the appropriate loader to be utilized with the LRT.

Z. When the LRT load is complete, the system will then print out a QA report. A Post Printout Menu will appear (Figure 28) that allows the user to reprint the report, save it to copy or both. After making the selection, the program will return to the LRT Load Type Menu (Figure 21). If no other LRTs are to be loaded, press

- (hyphen key)

to return to the Product Family Menu (Figure 19).

AA. Return the LRT to the stowed configuration.

<u>NOTE</u>: THE LOOP RESISTANCE TESTER WILL HAVE TO BE RE-CERTIFIED TO UL913 CERTIFICATION UPON COMPLETION OF THIS PROCEDURE.

PC DOWNLOAD STATION - BOEING SETUP	
908-30021 V008 THE BOEING COMPANY PCDS-99	
POST PRINTOUT MENU 1 REPRINT REPORT 2 SAVE REPORT TO FLOPPY RETURN TO LAST MENU	
Thu Sep 11 15:35:45 1997	Pick reprint option.

Post Printout Menu
Figure 28

INDICATION	EXPLANATION
Testing Hardware	This is displayed for a short period of time to indicate that power-up testing is in progress.
Press Start	This is only displayed while the LRT is in the Loop test. This indicates that the LRT has completed the power-up testing and is ready to begin the Loop test. The indication will be displayed at the beginning of the Loop test, or whenever it is determined that a coupler has opened during the Loop test, requiring the operator to press the Start pushbutton to initiate the test.
Battery 00%	This indication shows the approximate charge remaining on the LRT internal battery in percentage
Low Battery	This indication will display when the charge on the LRT internal battery becomes too low. When this indication is displayed, the LRT will turn itself off.
LOOPVALU 000.00m(omega Symbol)	This is only displayed while the LRT is in the Loop test. This indicates that the LRT has completed the Loop test, and the result of the test is displayed.
LOOPVALU Too Big	This is only displayed while the LRT is in the Loop test. This indication informs the operator that the loop to be measured has a resistance greater than the range of the LRT (>999 milliohms).
SNS Coup Is Open	This indication will occur during both the Loop test and the Joint test if the Sense Coupler is opened.
DRV Coup Is Open	This indication will occur during both the Loop test and the Joint test if the Drive Coupler is opened.
Connect Probes	This indication is displayed during the Joint test to instruct the operator to connect the probes to start the Joint test.

BITE Control Module Assembly Indications
Figure 29

INDICATION	EXPLANATION
UNSTABLE	This indication will occur when the Loop reading varies by more than 5%, this indicates one or both couplers have been opened or bumped, or the Loop resistance is changing.
L 123.45 (example) J 2.15	This indication is displayed when the Joint test has completed the measurement cycle. The Loop value is displayed on the top line and the Joint value on the bottom.
REDO LOOP J 1.10 (example)	This indication is displayed to inform the operator that the current calculated Loop value has changed by greater than 5% from the previous measured Loop value. It will be continuously displayed until the LRT is switched back to Loop mode.
Joint V TooBig	The voltage between the Joint Probes is causing the LRT Joint Probe input to clip. This is usually caused by stray currents in the wire bundle loop.
Loop I TooBig	The current through the Sense Coupler is causing the LRT Sense Coupler input to clip. This is usually caused by stray currents in the wire bundle loop.
Loop V TooBig	The voltage around the Loop under test is causing the LRT Drive Coupler input to clip. This is usually caused by stray currents in the wire bundle loop.
Warning Bad Cal	This will be displayed for 5 seconds for any of the following conditions: Indicate that the LRT is not Calibrated. Software download causes a LRT not Calibrated condition. LRT could not retrieve Calibration data from memory.
Display Faults?	This indication is displayed when Calibration Faults are detected. Press the “No” button to continue. (This turns the LRT off)
UseUnCa- Libratd?	This indication is displayed when the LRT is operating in the un-calibrated mode. **Caution**: Bad measurement readings will occur if the LRT is used in the un-calibrated mode. Press the “No” button to continue. (This turns the LRT off)

BITE Control Module Assembly Indications
Figure 29

INDICATION	EXPLANATION
%Battery Charge?	This indication will be displayed when the Menu button on the BITE Control Module is pressed. To exit the BITE Control Module Display, toggle the Loop/ Joint switch.
Joint TooSmall	This indication is displayed when the Joint Value is to small compared to the Loop Value to give an accurate Joint reading. This condition exceeds the operating capabilities of the LRT.
LNoise V TooBig	This indication is displayed when excessive noise voltage on the wire bundle shield interferes with the LRTs ability to read accurately during Loop Mode. Stray signals on the wire shield may be produced by motors, electronic equipment, or adjacent electronic circuits. This condition can be alleviated by de-energizing equipment in the vicinity of the circuit being tested.
LNoise I TooBig	This indication is displayed when excessive noise current on the wire bundle shield interferes with the LRTs ability to read accurately during Loop Mode. Stray signals on the wire shield may be produced by motors, electronic equipment, or adjacent electronic circuits. This condition can be alleviated by de-energizing equipment in the vicinity of the circuit being tested.
JNoise V TooBig	This indication is displayed when excessive noise voltage on the wire bundle shield interferes with the LRTs ability to read accurately during Joint Mode. Stray signals on the wire shield may be produced by motors, electronic equipment, or adjacent electronic circuits. This condition can be alleviated by de-energizing equipment in the vicinity of the circuit being tested.
JNoise I TooBig	This indication is displayed when excessive noise current on the wire bundle shield interferes with the LRTs ability to read accurately during Joint Mode. Stray signals on the wire shield may be produced by motors, electronic equipment, or adjacent electronic circuits. This condition can be alleviated by de-energizing equipment in the vicinity of the circuit being tested.
Switch Inactive	This indication is displayed when the switch that is pressed is not used for the current operation.
PSWD CHK FAILED	This indication is displayed when the LRT software is unable to validate the password entered by the operator.

INDICATION	EXPLANATION
Drv Cplr Not Flip	This indication is displayed when the operator did not flip the orientation of the Drive Coupler as directed by the Calibration/Certification Procedure.
FlipSwap Error	This indication is displayed when the operator did not swap the locations of the Joint Probes as directed by the Calibration/Certification Procedure.
Inhibit LJ Switch	This indication is displayed when the Mode Selector Switch is not in the Joint position, which is required to enable the Calibration/Certification procedure.
ReTrving Password	This indication is displayed when the LRT is retrieving the password from memory and should appear for a few seconds.
EDITPSWD XXXXXXXX	This indication is displayed when the LRT is waiting for the operator to enter the password.
Reset Inhibit	This indication is displayed when the LRT software did not detect the jumper during the password reset procedure.
Change Passwrd?	This indication is displayed when the LRT is waiting for the operator to press the “Yes” pushbutton to start the password reset procedure.
Old Pswd ********	This indication is displayed when the LRT is waiting for the operator to enter the password to be changed.
ACCEPT? XXXXXXXX	This indication is displayed when LRT is waiting for the operator to answer by pressing the “YES” or “NO” to continue the operation
New Pswd ********	This indication is displayed when the LRT is waiting for the operator to enter the new password.
VerfPswd ********	This indication is displayed when the LRT is waiting for the operator to enter the new password a second time.
PswdRdWr Passed	This indication is displayed when the password was successfully loaded into memory.
COP POP	This indication is displayed when the signals from the Sense/Drive couplers are out of phase and the Joint Probes are out of phase.
CIP PIP	This indication is displayed when the signals from the Sense/Drive couplers are in phase and the Joint Probes are in phase.

INDICATION	EXPLANATION
COP PIP	This indication is displayed when the signals from the Sense/Drive couplers are out of phase and the Joint Probes are in of phase.
CIP POP	This indication is displayed when the signals from the Sense/Drive couplers are in phase and the Joint Probes are out of phase.
Warning Bad Cal	This indication is displayed during the initial power application and indicates the LRT is not calibrated. The warning indicates the calibration constants are not initialized or fail self test requirements.
UseUncal- Libratd?	This indication is displayed during the initial power application and indicates the LRT is not calibrated. If the operator answers by pressing the “NO”switch, the LRT will turn off. If the operator answers by pressing the “YES” switch, the LRT will continue to operate in a un-calibrated capacity.
Calibrt LRT?	This indication is displayed when the LRT is waiting for the operator to press the “YES” pushbutton to start the Calibration/Certification procedure.
XXXXStd HookUp?	This indication is displayed when the LRT is directing the operator to connect the Sense/Drive Couplers to a Certification Standard. The XXXX represents the nominal value of the Certification Standard.
Test In Progress	This indication is displayed when the LRT is collecting data for the Calibration/Certification procedure, and the current test setup should not be changed.
Display LoopRes	This indication is displayed when the LRT is asking the operator if the Loop value should be displayed for data recording.
Couplers In Phase	This indication is displayed when the Sense/Drive couplers are in phase.
Couplers OutPhase	This indication is displayed when the Sense/Drive couplers are out of phase.
Drv Cplr Flipped?	This indication is displayed when the LRT is asking the operator to flip the orientation of the Drive coupler on the Loop.
ConFigJX Hookup?	This indication is displayed when the LRT is asking the operator to connect the LRT to a test setup as described in the Calibration/Certification procedure.

INDICATION	EXPLANATION
DisplayI Calcave?	This indication is displayed when the LRT is asking the operator if the calculated average of the current should be displayed for data recording.
DisplayI Measave?	This indication is displayed when the LRT is asking the operator if the measured average of the current should be displayed for data recording.
DisplayV Calcave?	This indication is displayed when the LRT is asking the operator if the calculated average of the voltage should be displayed for data recording.
DisplayV Measave?	This indication is displayed when the LRT is asking the operator if the measured average of the voltage should be displayed for data recording.
XXXXXXXE+X	This is the general form for a number displayed by the LRT during the Calibration/Certification procedure. The number may include a decimal point. The E separates the mantissa and the exponent.
JProbes Swapped?	This indication is displayed when the LRT is requesting the operator to exchange the location of the Joint Probes.
Blinking L or J	This indication is a visual indication of the gain stage used for the measurement.

BITE Control Module Assembly Indications
Figure 29

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SECTION 3 - LRT SPECIFICATIONS

ITEM	SPECIFICATION
Height/width/depth LRT Assembly Accessary Assembly Standards Assembly	 11.0 X 14.0 X 14.0 Inches (27.9 x 35.6 x 35.6 cm) 11.0 X 14.0 X 14.0 Inches (27.9 x 35.6 x 35.6 cm) 11.0 X 14.0 X 14.0 Inches (27.9 x 35.6 x 35.6 cm)
Weight LRT Assembly Accessary Assembly Standards Assembly	 30 lbs (13,6 kg) 15 lbs (6.80 kg) 25 lbs (11.34 kg)
Electrical Power	AS700-02 battery pack, nicad F cells @ 7000 mamps per cell, Apak Electronics
Operating Environment Minimum to Maximum Temperature Recommended Temperature	 -20° C to 60° C (-4° to 140° F) -10° C to 30° C (14° to 86° F)
On-Charger Minimum to Maximum Temperatur Operational Humidity Range	 0° C to 50° C (32° F to 104° F) 35% to 85% Relative humidity noncondensing
Storage Environment Minimum to Maximum Temperature Recommended Temperature	 -40° C to 60° C With greater then 25% charge on battery 5° C to 25° C With less then 25% charge on battery -5° C to 10° C (23° F to 50° F)
Power Consumption	8 watts (typical)
Internal Battery Charge Time	8 hours
Re-charging Time	6+ hours
LRT Accuracy Rate	±5% of Loop Measurement ±0.2 mΩ or whichever is greater
Joint Ranges	0.01 to 4000 milliohms
Loop Ranges	1 milliohms - 4000 milliohms

ITEM	SPECIFICATION
Battery Runtime Fully Charged	8 hours
Battery Life	600 to 700 Charge/Discharge cycles
Charger Pre-Charge Requirement	Battery temperature range of 10° C to 40° C (50° F to 104° F) sensed by the battery thermister. Battery voltage between 1 volt/cell to 2 volt/cell.
Battery Charger Output	Fast charge current 1250mA, maximum output 35 watts.
Charger Power Requirements	100 to 230 ±15 % VAC, 47 to 63 Hz
LRT Operating Frequency	200 Hz

SECTION 4 - SHIPPING

1. General

TO BE DETERMINED

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SECTION 5 - STORAGE

1. General

A. For Loop Resistance Tester non-operating conditions, storage, or transportation, temperatures shall be kept between -30° C to 35° C (22° F to 95° F). Relative humidity should be maintained between 10% to 95%, non condensing, for temperatures below 30° C (86° F). For temperatures greater than 30° C (86° F), humidity must not exceed 75%.

B. It is recommended that the Loop Resistance Tester is to be stored connected to the Battery Charger with the Battery Charger turned on. The Maintenance Charge offsets the natural self-discharge of the batteries by keeping the cells primed at peak charge. The Maintenance Charge will continue as long as the Battery Charger is connected to the LRT. The green READY indicator blinks at a one second interval during the Maintenance Charge.

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CHAPTER 2 - MAINTENANCE

SECTION 1 - SERVICING

1. General

NOTE: LRT repair facilities must comply with specific requirements defined in the UL 913 certification and listing agreement for the product.
LRT repair can be performed at the Boeing Electronics Service Center, which is approved per the LRT UL 913 listing requirements.

A. The Loop Resistance Tester (LRT) utilizes two methods to ensure the LRT is functioning properly, the Loop Resistance Tester Functional Test and the LRT Calibration Certification Procedure. The LRT Calibration Certification Procedure calibration and adjustment process uses software algorithm in the LRT and a set of Certification Standards (Loop Standards) and Shunt Standards (joint). The Algorithm compares the un-calibrated measurement of a standard with the actual resistance of that standard and determines an adjustment factor that is then stored in non-volatile memory within the LRT.
This process is repeated for every operating mode, measurement range, and coupler orientation used with the LRT. After completion of the calibration process, the adjustment factors are then used during normal operation to correct the LRT measurements.

The Post Calibration Procedure is used to validate the calibration or adjustment process used in the LRT Calibration Certification Procedure by comparing the LRT measurements in normal operation, with the resistance of the certified Certification Standards (Loop Standards) and Shunt Standards (Joint Standards) to determine if the LRT is operating within the required tolerances.

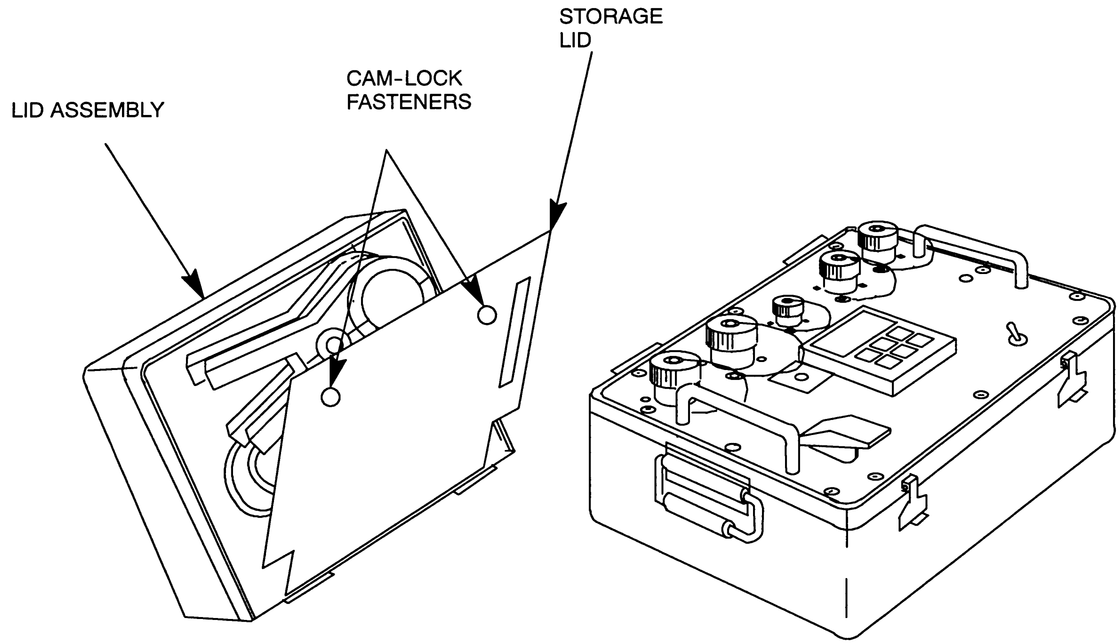
2. Loop Resistance Tester Functional Test

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.

NOTE: This test is to be used in conjunction with the Fault Isolation Table (Figure 15) to determine probable cause in case of LRT malfunction.

NOTE: Testing of the LRT to a 5% tolerance is required to guarantee an 8% accuracy over the certification interval of 12 Months. The LRT Certification Standards/Joint Shunt Standards Test should be performed every 12 Months. This is to ensure that the LRT is capable of reading the measurement values correctly. The Certification Standards have a 12 Month calibration requirement. A Certification Test For The Certification Standards (Performed By Calibration Lab) must be performed every 12 Months, and the Calibration Sticker updated. A Certification Standard is void if the calibration sticker is broken.

NOTE: The serial numbers of the 906-10260-5 and 906-10260-6 Sense/Drive couplers are recorded on the Calibration Sticker located on the Front Panel of the LRT after calibration. Calibration of the LRT will be determined invalid if the LRT is used with any Sense/Drive Couplers other then the serial numbers recorded on the Calibration Sticker.



LRT Assembly
Figure 1

A. PWA Faying Surface Test

(1) Open the Loop Resistance Tester Assembly. While holding the base stationary, slide the lid assembly to the side to disengage the lid assembly from the base (Figure 1).

(2) Ensure the LRT OFF/CHARGE - RUN Switch is in the OFF/CHARGE position (Figure 2).

(3) Using a Multimeter set to read Resistance, attach the Multimeter Probe to pin 1 of the RS-232 Connector and the other Multimeter Probe to the shell of the Joint Probe Connector on the LRT Front Panel.

(4) Verify the resistance of the PWA faying surface is less then 1 Ohm.

(5) Record the actual resistance in the appropriate location on the LRT Data Sheets (Figure 12).

(6) Disconnect the Multimeter from the LRT.

(7) On the lid assembly, turn the 2 cam-lock fasteners and open the storage lid. Remove the Sense/Drive Couplers, Joint Probe assembly, and the RS 232 Cable Assembly (Figure 1).

(8) Connect the Joint Probe Assembly to the Joint Probe Connector on the Front Panel of the LRT (Figure 2).

NOTE: The serial numbers of the 906-10260-5 and 906-10260-6 Sense/Drive couplers are recorded on the Calibration Sticker located on the Front Panel of the LRT after calibration.
Calibration of the LRT will be determined invalid if the LRT is used with any Sense/Drive Couplers other then the serial numbers recorded on the Calibration Sticker.

(9) The Sense/Drive Couplers have different colored sleeves. Connect the Sense and Drive Couplers to the corresponding colored Sense and Drive Connectors on the Front Panel of the LRT.

(10) Connect the RS 232 Cable Assembly to the RS 232 Connector on the Front Panel of the LRT.

(11) Connect the nine pin connector (P1) on the RS 232 Cable Assembly to the Terminal or PC to be used.

(12) On the Terminal or PC to be used, set up an RS 232 Terminal/Terminal Emulation Program to 9600 baud, X-on/X-off handshaking, 8bits, parity to none, 1 stop bit.

NOTE: The RS 232 Cable Assembly has an internal jumper which grounds the "shop-mode" input pin for the LRT, that enables the LRT to power up in shopmode (FTK).

B. Functional Test Kernel (FTK) Test

(1) Switch the OFF/CHARGE - RUN switch to the RUN position.

NOTE: Step (7) has to be performed within five seconds of performing step (6).

(2) On the BITE Control Module Assembly, press the orange "ON/OFF" pushbutton.

(3) At the Terminal or PC to be used, type a "space bar" character followed by a "carriage return" character.

(4) Verify the following indication on the Terminal or PC:
FTK: 68332; VERSION 1.6B

(5) To enable character echoing, type the following FORTH command and press ENTER:
ECHO

(6) To test the external RAM type the following command and press ENTER:
20.0000 3.FFFF 20.0000 TEST_RAM

(7) Verify the following indication on the Terminal or PC:
1 OK

(8) To test the RAM address, type the following command:
20.0000 12 TEST_ADDR.

(9) Verify the following indication on the Terminal or PC:
1 OK

(10) To test the dual-port RAM, type the following command:
50.0000 3FFF 50.0000 TEST_RAM.

(11) Verify the following indication on the Terminal or PC:
1 OK

(12) To test the BITE Display Module interface, type the following command:
40 40.0030 C! 40 40.0070 C!

NOTE: A minimum of two seconds must be allowed after performing step (12), before step (14) can be performed.

(13) Verify the BITE Control Module Assembly shows an alternating checkerboard pattern.

(14) Type the following command:
40.0030 READB

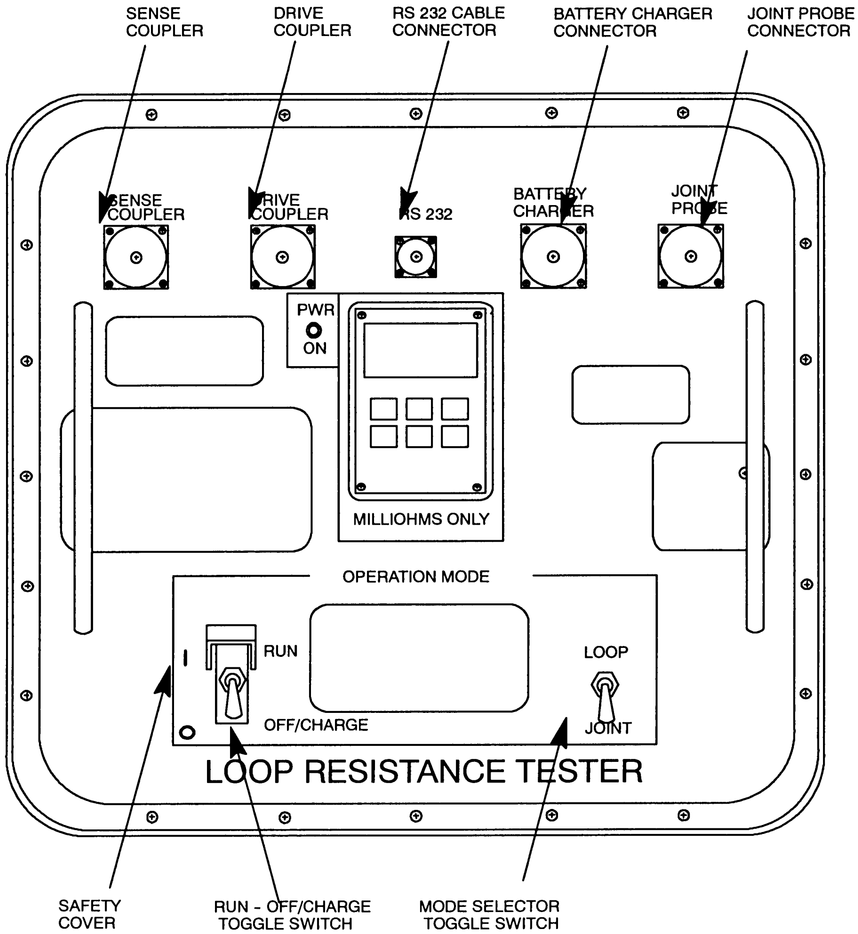
(15) Verify the following indication on the Terminal or PC:
20 OK

(16) Type the following command:
40.0070 READB

(17) Verify the following indication on the Terminal or PC:
20 OK

(18) Switch the OFF/CHARGE - RUN switch to the OFF/CHARGE position.

(19) Record the Pass/Fail of the FTK Test in the appropriate location on the LRT Data Sheet (Figure 12).



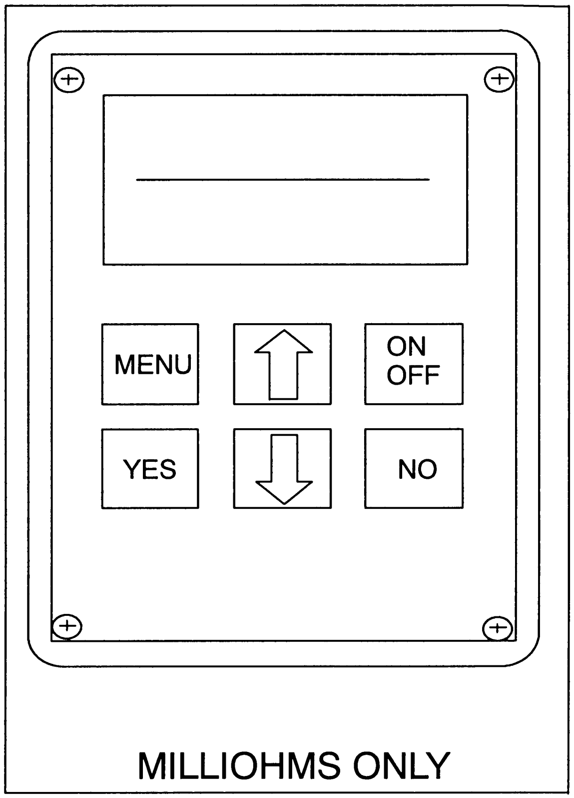
LRT Front Panel
Figure 2

C. Determining Calibration Level

(1) Position the Mode Selector Toggle Switch to the LOOP position.

(2) Switch the OFF/CHARGE - RUN switch to the RUN position.

(3) Push and hold the orange ON/OFF pushbutton on the BITE Control Module Assembly until the following indication appears on the display (Figure 3):
TESTING HARDWARE



BITE Control Module Assembly
Figure 3

(4) At the completion of the hardware test the display will show the following indication to indicate the percentage of usable charge remaining on the LRT internal battery:
Battery_%

NOTE: If a "low battery" indication is displayed, the LRT will turn off and the Battery Charging procedures will need to be performed.

(5) After the "Battery_%" the software version number will appear in the display.

(6) If the LRT is calibrated the following indication will appear on the BITE Control Module Display:
Press
Start

(7) Record that the LRT is Calibrated in the appropriate location on the LRT Data Sheets (Figure 12).

(8) If the LRT is not calibrated the following indication will appear on the BITE Control Module Display:
Warning
Bad Cal

(9) Then following indication will appear on the BITE Control Module Display:
Display
Faults?

(10) Press the NO pushbutton on the BITE Control Module and the following will appear:
UseUnCA-
Libratd?

(11) Press the YES pushbutton on the BITE Control Module and the following will appear:
Press
Start

(12) If the Calibration Sticker on the LRT Front Panel is attached, it should be removed and the Calibration Certification procedure be performed.

(13) Record that the LRT is Not Calibrated in the appropriate location on the LRT Data Sheets (Figure 12).

(14) Record the serial numbers of both the Sense and Drive couplers in the appropriate location on the LRT Data Sheets (Figure 12).

(15) If the LRT is calibrated the serial numbers on the Sense/Drive couplers must match the serial numbers marked on the Certification Sticker on the LRT Front Panel Assembly

(16) The LRT is considered calibrated if an intact calibration Sticker is attached to the LRT Front Panel Assembly, the sign-on message on the BITE Control Module Display does not include the:
Warning
Bad Cal

(17) The measurement tolerances for a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater.

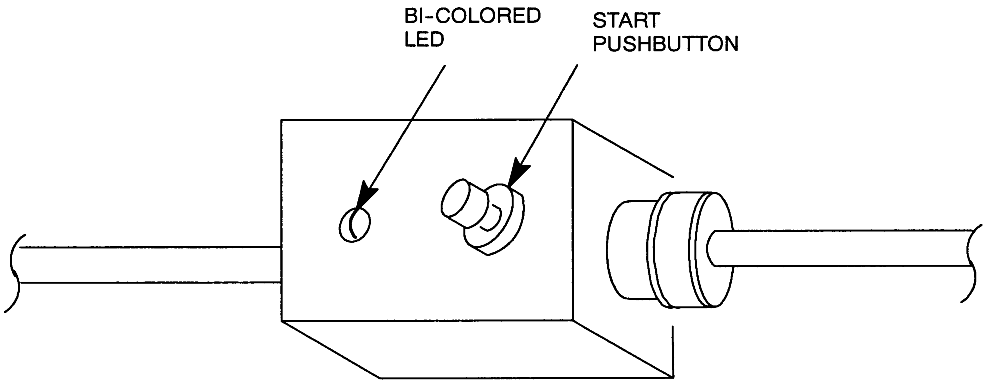
(18) The LRT is considered not Calibrated if the Calibration Sticker on the LRT Front Panel Assembly is not attached, or the sign-on message on the BITE Control Module Display includes the:
Warning
Bad Cal

(19) The measurement tolerances for a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater.

(20) Record the LRT tolerances in the appropriate location on the LRT Data Sheets (Figure 12).

D. LED and Switch Test

(1) Ensure the Bi-Colored LED mounted on the Control Box of each of the Sense/Drive couplers is lighted red (Figure 4).



Sense/Drive Coupler Control Box
Figure 4

(2) Press the Start Pushbutton on the Drive Coupler Control Box.

(3) Ensure the Bi-Colored LED mounted on the Control Box of each of the Sense/Drive couplers is lighted green. The LED will change to blinking red after a few seconds.

(4) Open the Drive Couple for a minimum of ten seconds, and verify that the BITE Control Module Display shows the following indication:
Press
Start

(5) Press the Start Pushbutton on the Sense Coupler Control Box.

(6) Ensure the Bi-Colored LED mounted on the Control Box of each of the Sense/Drive couplers is lighted green. The LED will change to blinking red after a few seconds.

(7) Open the Sense Couple for a minimum of ten seconds, and verify that the BITE Control Module Display shows the following indication:
Press
Start

(8) Press the YES pushbutton on the BITE Control Module (Figure 3).

(9) Ensure the Bi-Colored LED mounted on the Control Box of each of the Sense/Drive couplers is lighted green. The LED will change to blinking red after a few seconds (Figure 4).

(10) Open the Sense Couple for a minimum of ten seconds, and verify that the BITE Control Module Display shows the following indication:
Press
Start

(11) Press the MENU pushbutton on the BITE Control Module (Figure 3), and verify the following indication:

%Battery
Charge ?

(12) Press the NO pushbutton on the BITE Control Module, and verify that the BITE Control Module Display changes to the next menu selection.

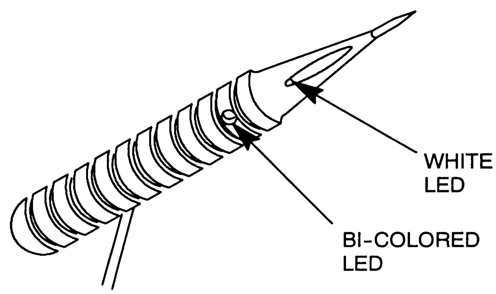
NOTE: If the message on the BITE Control Module Display ends with a "?", the display will roll to the next menu message.

(13) Press the ↓ pushbutton on the BITE Control Module, and verify that the BITE Control Module Display changes to the next menu selection.

(14) Press the ↑ pushbutton on the BITE Control Module, and verify that the BITE Control Module Display changes to the next menu selection.

(15) Position the Mode Selector Toggle Switch to the JOINT position (Figure 2).

(16) Touch and hold the tips of the Joint Probes together, verify the white LED near the tip of each Joint Probe is not lighted (Figure 5).



Joint Probe
Figure 5

(17) Verify the Bi-Colored LED in the side of each Joint Probe Changes to green. The LED will change to blinking red after a few seconds.

(18) Record the Pass/Fail of the LED and Switch Test in the appropriate location on the LRT Data Sheet (Figure 12).

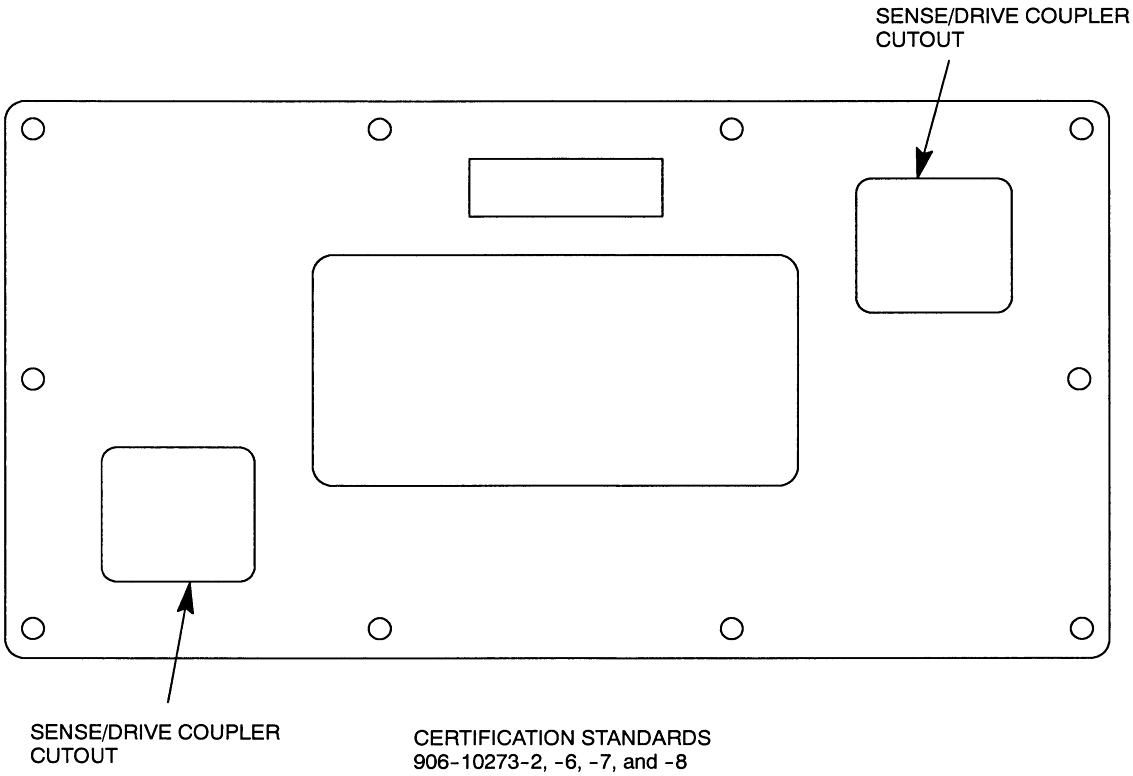
E. Loop Test

(1) Loop Test for Low Loop Resistance and Low Gain.

(a) Position the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(b) Open the Calibration Certification Assembly Case and remove the four Certification Standards.

(c) Clamp the Sense Coupler around one of the cutouts in the 906-10273-7 (2 milliohm) Certification Standard (Figure 6).



Certification/Loop Test Standards
Figure 6

(d) Clamp the Drive Coupler around the other cutout in the 906-10273-7 (2 milliohm) Certification Standard.

(e) The actual value of the 906-10273-7 (2 milliohm) Certification Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the 906-10273-7 (2 milliohm) Certification Standard in the appropriate location on the LRT Data Sheets (Figure 12).

(f) Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the actual value of the 906-10273-7 (2 milliohm) Certification Standard, determine the low and high limits for the loop measurements for the 906-10273-7 (2 milliohm) Certification Standard. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the following LRT Loop measurements are within tolerance.

(g) First Loop Measurement

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position (Figure 2), and verify the BITE Control Module Display shows the following indication:

Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a "DRV coup is open" or a "SNS coup is open" indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

9 Enter the Measured value of the 906-10273-7 (2 milliohm) Certification Standard in the appropriate location on the LRT Data Sheets (Figure 12).

10 Verify the measurement is within tolerance

(h) Second Loop Measurement

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

1 Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

2 Repeat steps 1 through 10.

(2) Loop Test for High Loop Resistance and Low Current Gain

(a) Position the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(b) Clamp the Sense Coupler around one of the cutouts in the 906-10273-8 (8.5 milliohm) Certification Standard (Figure 6).

(c) Clamp the Drive Coupler around the other cutout in the 906-10273-8 (8.5 milliohm) Certification Standard.

(d) The actual value of the 906-10273-8 (8.5 milliohm) Certification Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the 906-10273-8 (8.5 milliohm) Certification Standard in the appropriate location on the LRT Data Sheets (Figure 12).

(e) Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the actual value of the 906-10273-8 (8.5 milliohm) Certification Standard, determine the low and high limits for the loop measurements for the 906-10273-8 (8.5 milliohm) Certification Standard. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the following LRT Loop measurements are within tolerance.

(f) First Loop Measurement

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position (Figure 2), and verify the BITE Control Module Display shows the following indication:

Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a "DRV coup is open" or a "SNS coup is open" indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

9 Enter the Measured value of the 906-10273-8 (8.5 milliohm) Certification Standard in the appropriate location on the LRT Data Sheets (Figure 12).

10 Verify the measurement is within tolerance

(g) Second Loop Measurement

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

1 Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

2 Repeat steps 1 through 10.

(3) Loop Test for Low Loop Resistance and High Current Gain

(a) Position the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(b) Clamp the Sense Coupler around one of the cutouts in the 906-10273-2 (14 milliohm) Certification Standard (Figure 6).

(c) Clamp the Drive Coupler around the other cutout in the 906-10273-2 (14 milliohm) Certification Standard.

(d) The actual value of the 906-10273-2 (14 milliohm) Certification Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the 906-10273-2 (14 milliohm) Certification Standard in the appropriate location on the LRT Data Sheets (Figure 12).

(e) Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the actual value of the 906-10273-2 (14 milliohm) Certification Standard, determine the low and high limits for the loop measurements for the 906-10273-2 (14 milliohm) Certification Standard. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the following LRT Loop measurements are within tolerance.

(f) First Loop Measurement

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a ”DRV coup is open” or a ”SNS coup is open” indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

9 Enter the Measured value of the 906-10273-2 (14 milliohm) Certification Standard in the appropriate location on the LRT Data Sheets (Figure 12).

10 Verify the measurement is within tolerance

(g) Second Loop Measurement

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

1 Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

2 Repeat steps 1 through 10.

(4) Loop Test for High Loop Resistance and High Current Gain

(a) Position the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(b) Clamp the Sense Coupler around one of the cutouts in the 906-10273-6 (3600 milliohm) Certification Standard (Figure 6).

(c) Clamp the Drive Coupler around the other cutout in the 906-10273-6 (3600 milliohm) Certification Standard.

(d) The actual value of the 906-10273-6 (3600 milliohm) Certification Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the 906-10273-6 (3600 milliohm) Certification Standard in the appropriate location on the LRT Data Sheets Figure 12).

(e) Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the actual value of the 906-10273-6 (3600 milliohm) Certification Standard, determine the low and high limits for the loop measurements for the 906-10273-6 (3600 milliohm) Certification Standard. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the following LRT Loop measurements are within tolerance.

(f) First Loop Measurement

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a ”DRV coup is open” or a ”SNS coup is open” indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication (”DRV coup is open” or ”SNS coup is open”) is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the ”DRV coup is open” or ”SNS coup is open” indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

9 Enter the Measured value of the 906-10273-6 (3600 milliohm) Certification Standard in the appropriate location on the LRT Data Sheets (Figure 12).

10 Verify the measurement is within tolerance

(g) Second Loop Measurement

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

1 Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

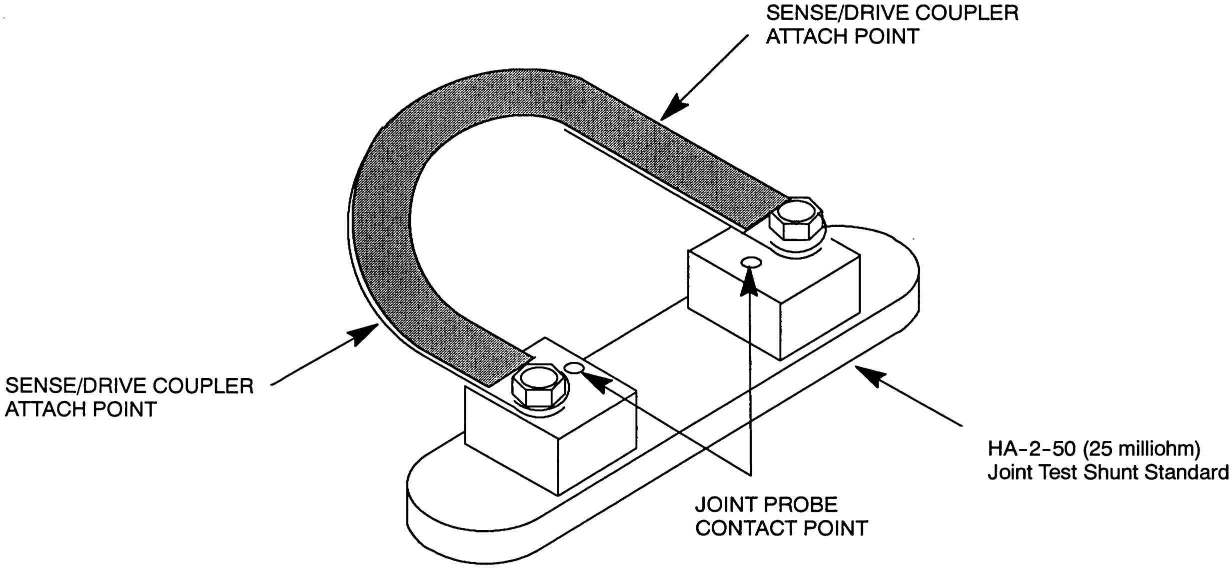
2 Repeat steps 1 through 10.

3 Remove the Couplers from the Certification Standard.

F. Joint Test

(1) Joint Test No. 1

(a) Using braided wire and the HA-2-50 (25 milliohm) Joint Test Shunt Standard, construct the loop configuration as shown in Figure 8.



Shunt Standard Configuration No.1
Figure 8

(b) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 8).

(c) The actual value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard in the appropriate location on the LRT Data Sheets (Figure 12).

(d) Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the actual value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard, determine the low and high limits for the loop measurements for the HA-2-50 (25 milliohm) Joint Test Shunt Standard. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the following LRT Joint measurements are within tolerance.

(e) Loop Value in Loop Mode

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position (Figure 2), and verify the BITE Control Module Display shows the following indication:

Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a "DRV coup is open" or a "SNS coup is open" indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:

LOOPVALU
XXX.XXmΩ

9 Enter the Measured value in the appropriate location on the LRT Data Sheets (Figure 12). This value represents the Loop Value in Loop Mode.

10 Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the Loop Value in Loop Mode, determine the low and high limits for the Loop Value in Loop Mode measurements. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the LRT Loop Value in Loop Mode is within tolerance with the Loop Value in Joint Mode measurements.

11 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

12 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

13 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

14 Apply the Joint Probes to the Shunt in the location shown (Figure 8).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

15 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

16 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

17 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:
L :XXX.XX
J :XXX.XX

18 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

19 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Step 8).

20 Verify the Joint Value is within tolerance as calculated (Paragraph (d)).

(f) 2nd Joint Value in Joint Mode With Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (d)).

(g) Loop Value in Loop Mode With the Drive Coupler Flipped

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

1 Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

2 Position the Mode Selector Switch to the LOOP position. (Figure 2), and verify the BITE Control Module Display shows the following indication:
Press
Start.

3 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

4 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

5 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a ”DRV coup is open” or a ”SNS coup is open” indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

6 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

7 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

8 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

9 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

10 Enter the Measured Loop value in the appropriate locations on the LRT Data Sheets (Figure 12).

(h) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the Shunt in the location shown (Figure 8).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Paragraph (e)).

10 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(i) 2nd Joint Value in Joint Mode With Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

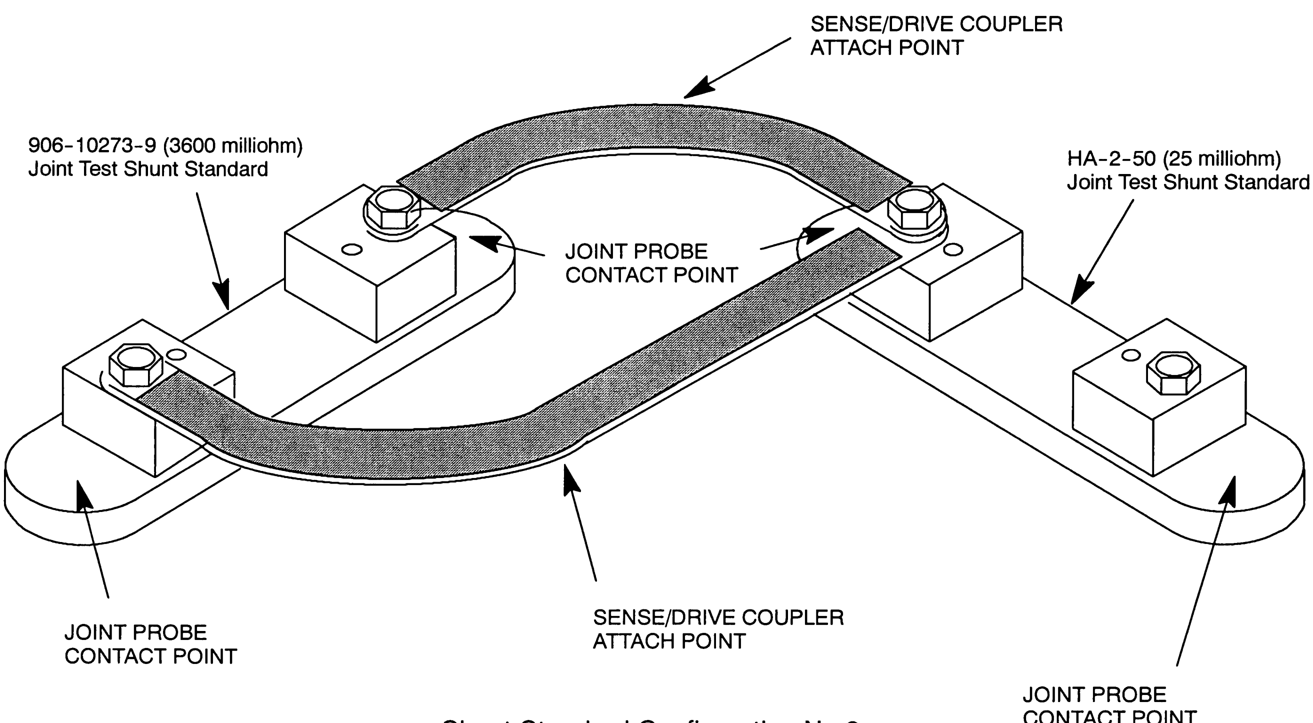
2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(2) Joint Test No. 2

(a) Using braided wire, the HA-2-50 (25 milliohm), and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 9.



Shunt Standard Configuration No.2
Figure 9

(b) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 9).

(c) The actual value of the HA-2-50 (25 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards are recorded on a Certification Sticker on the standards. Enter the actual value of the HA-2-50 (25 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards in the appropriate location on the LRT Data Sheets (Figure 12).

(d) Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the actual value of the HA-2-50 (25 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards, determine the low and high limits for the loop measurements for the HA-2-50 (25 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standard. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the following LRT Joint measurements are within tolerance.

(e) Loop Value in Loop Mode

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a "DRV coup is open" or a "SNS coup is open" indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

9 Enter the Measured value in the appropriate location on the LRT Data Sheets (Figure 12). This value represents the Loop Value in Loop Mode.

10 Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the Loop Value in Loop Mode, determine the low and high limits for the Loop Value in Loop Mode measurements. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the LRT Loop Value in Loop Mode is within tolerance with the Loop Value in Joint Mode measurements.

11 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

12 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

13 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

14 Apply the Joint Probes to the Shunt in the location shown (Figure 8).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

15 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

16 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

17 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

18 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

19 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Step 8).

20 Verify the Joint Value is within tolerance as calculated (Paragraph (d)).

(f) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the 906-10273-9 (3600 milliohm) Shunt in the location shown (Figure 9).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:
L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Paragraph (e)).

10 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(g) 2nd Joint Value in Joint Mode with Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(h) Loop Value in Loop Mode With the Drive Couplers Flipped

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

1 Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

2 Position the Mode Selector Switch to the LOOP position. (Figure 2), and verify the BITE Control Module Display shows the following indication:
Press
Start.

3 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

4 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

5 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a "DRV coup is open" or a "SNS coup is open" indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

6 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

7 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

8 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

9 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

10 Enter the Measured Loop value in the appropriate locations on the LRT Data Sheets (Figure 12).

(i) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the 906-10273-9 (3600 milliohm) Shunt in the location shown (Figure 9).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Paragraph (e)).

10 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(j) 2nd Joint Value in Joint Mode with Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

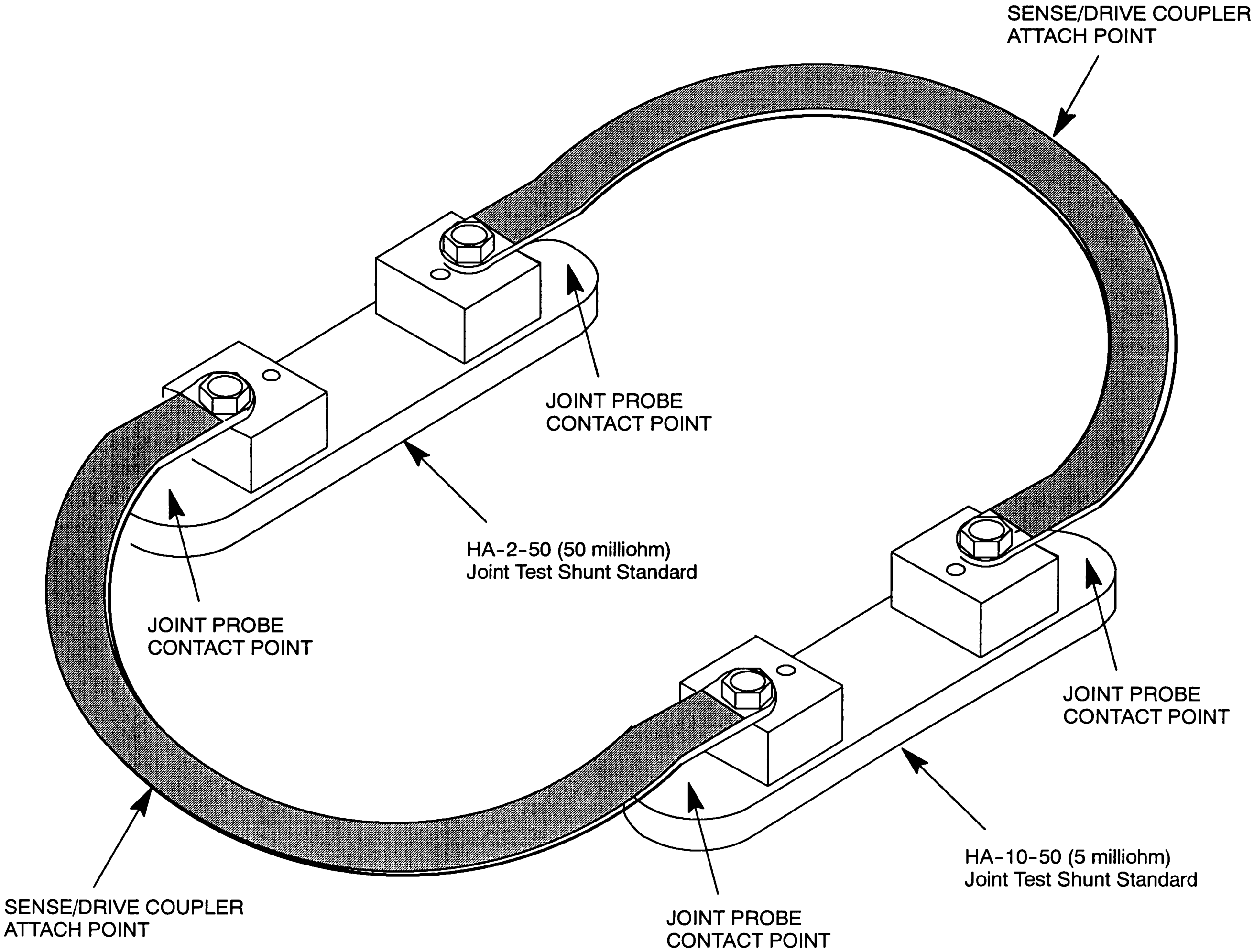
2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(3) Joint Test No. 3, 5 milliohm Shunt

(a) Using braided wire, the HA-2-50 (25 milliohm), and the HA-10-50 (5 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 10.



Shunt Standard Configuration No.3
Figure 10

(b) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 10).

(c) The actual value of the HA-10-50 (5 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the HA-10-50 (5 milliohm) Joint Test Shunt Standards in the appropriate location on the LRT Data Sheets (Figure 12).

(d) Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the actual value of the HA-10-50 (5 milliohm) Joint Test Shunt Standards, determine the low and high limits for the loop measurements for the HA-10-50 (5 milliohm) Joint Test Shunt Standard. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the following LRT Joint measurements are within tolerance.

(e) Loop Value in Loop Mode

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position (Figure 2), and verify the BITE Control Module Display shows the following indication:

Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a ”DRV coup is open” or a ”SNS coup is open” indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication (”DRV coup is open” or ”SNS coup is open”) is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the ”DRV coup is open” or ”SNS coup is open” indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication ”UNSTABLE” will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the “UNSTABLE” condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

9 Enter the Measured value in the appropriate location on the LRT Data Sheets (Figure 12). This value represents the Loop Value in Loop Mode.

10 Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the Loop Value in Loop Mode, determine the low and high limits for the Loop Value in Loop Mode measurements. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the LRT Loop Value in Loop Mode is within tolerance with the Loop Value in Joint Mode measurements.

11 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

12 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

13 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

14 Apply the Joint Probes to the Shunt in the location shown (Figure 10).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

15 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

16 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

17 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

18 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

19 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Step 8).

20 Verify the Joint Value is within tolerance as calculated (Paragraph (d)).

(f) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:

Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the HA-10-50 (5 milliohm) Shunt in the location shown (Figure 10).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Paragraph (e)).

10 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(g) 2nd Joint Value in Joint Mode with Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:

Connect Probes

2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(h) Loop Value in Loop Mode With the Drive Couplers Flipped

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

1 Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

2 Position the Mode Selector Switch to the LOOP position. (Figure 2), and verify the BITE Control Module Display shows the following indication:
Press
Start.

3 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

4 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

5 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a ”DRV coup is open” or a ”SNS coup is open” indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

6 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication (”DRV coup is open” or ”SNS coup is open”) is present then the LRT is defective and must be replaced.

7 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the ”DRV coup is open” or ”SNS coup is open” indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

8 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

9 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:

LOOPVALU
XXX.XXmΩ

10 Enter the Measured Loop value in the appropriate locations on the LRT Data Sheets (Figure 12).

(i) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:

Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the HA-10-50 (5 milliohm) Shunt in the location shown (Figure 10).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:
L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Paragraph (e)).

10 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(j) 2nd Joint Value in Joint Mode with Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(4) Joint Test No. 3, 25 milliohm Shunt

(a) Using braided wire, the HA-2-50 (25 milliohm), and the HA-10-50 (5 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 10.

(b) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 10).

(c) The actual value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the HA-2-50 (25 milliohm) Joint Test Shunt Standards in the appropriate location on the LRT Data Sheets (Figure 12).

(d) Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the actual value of the HA-2-50 (25 milliohm) Joint Test Shunt Standards, determine the low and high limits for the loop measurements for the HA-2-50 (25 milliohm) Joint Test Shunt Standard. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the following LRT Joint measurements are within tolerance.

(e) Loop Value in Loop Mode

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a "DRV coup is open" or a "SNS coup is open" indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

9 Enter the Measured value in the appropriate location on the LRT Data Sheets (Figure 12). This value represents the Loop Value in Loop Mode.

10 Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the Loop Value in Loop Mode, determine the low and high limits for the Loop Value in Loop Mode measurements. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the LRT Loop Value in Loop Mode is within tolerance with the Loop Value in Joint Mode measurements.

11 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

12 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

13 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

14 Apply the Joint Probes to the Shunt in the location shown (Figure 10).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

15 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

16 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

17 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

18 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

19 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Step 8).

20 Verify the Joint Value is within tolerance as calculated (Paragraph (d)).

(f) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:

Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the HA-2-50 (25 milliohm) Shunt in the location shown (Figure 10).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Paragraph (e)).

10 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(g) 2nd Joint Value in Joint Mode with Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(h) Loop Value in Loop Mode With the Drive Couplers Flipped

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

1 Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

2 Position the Mode Selector Switch to the LOOP position. (Figure 2), and verify the BITE Control Module Display shows the following indication:
Press
Start.

3 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

4 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

5 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a ”DRV coup is open” or a ”SNS coup is open” indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

6 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication (”DRV coup is open” or ”SNS coup is open”) is present then the LRT is defective and must be replaced.

7 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

8 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

9 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

10 Enter the Measured Loop value in the appropriate locations on the LRT Data Sheets (Figure 12).

(i) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the HA-2-50 (25 milliohm) Shunt in the location shown (Figure 10).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Paragraph (e)).

10 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(j) 2nd Joint Value in Joint Mode with Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

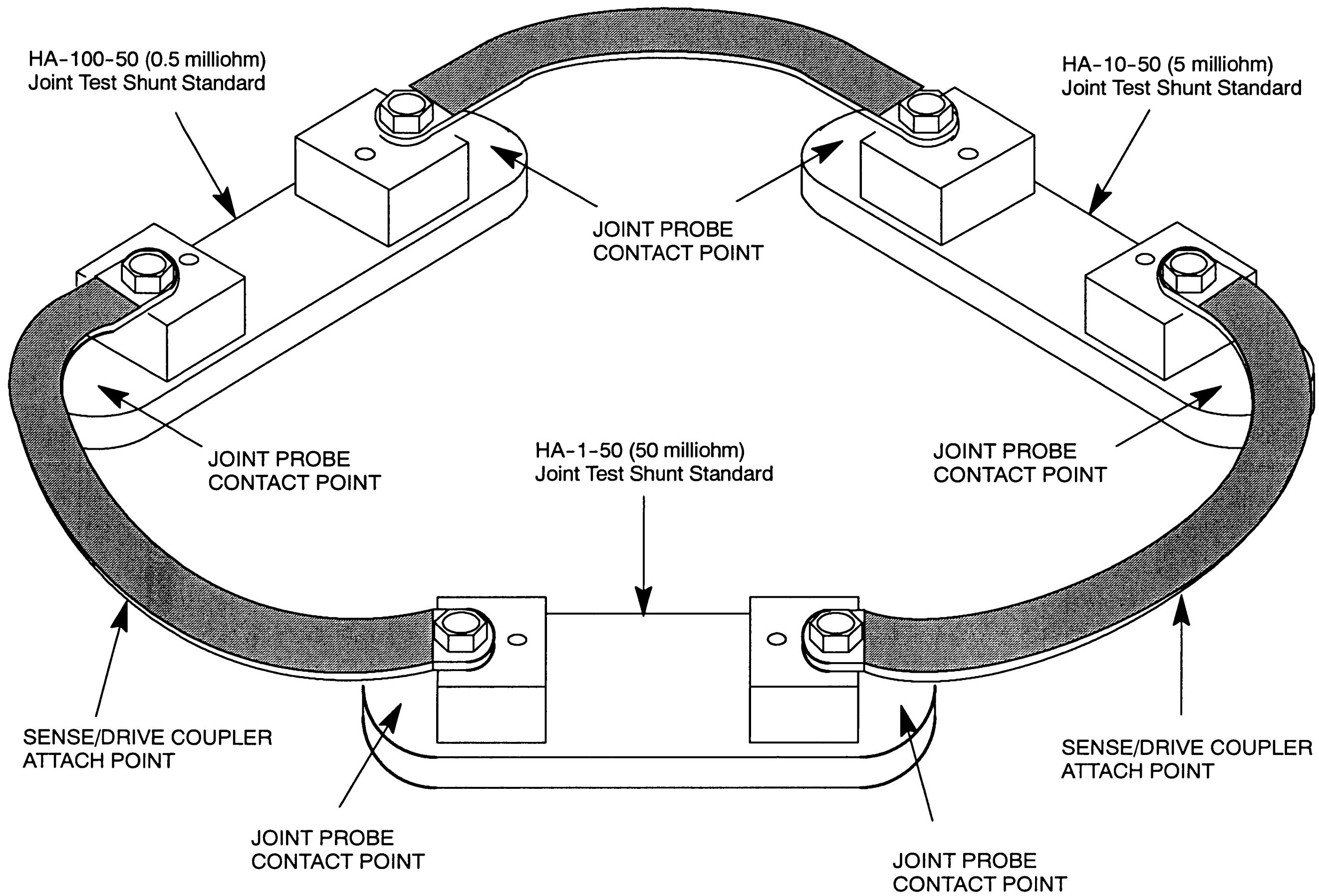
2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(5) Joint Test No. 4, 0.5 milliohm Shunt

(a) Using braided wire, the HA-100-50 (0.5 milliohm), the HA-1-50 (50 milliohm), and the HA-10-50 (5 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 11.



Shunt Standard Configuration No.4
Figure 11

(b) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 11).

(c) The actual value of the HA-100-50 (0.5 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the HA-100-50 (0.5 milliohm) Joint Test Shunt Standards in the appropriate location on the LRT Data Sheets (Figure 12).

(d) Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., HA-100-50 (0.5 milliohm) Joint Test Shunt Standards, determine the low and high limits for the loop measurements for the HA-100-50 (0.5 milliohm) Joint Test Shunt Standard. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the following LRT Joint measurements are within tolerance.

(e) Loop Value in Loop Mode

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position (Figure 2), and verify the BITE Control Module Display shows the following indication:

Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a ”DRV coup is open” or a ”SNS coup is open” indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication (”DRV coup is open” or ”SNS coup is open”) is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the ”DRV coup is open” or ”SNS coup is open” indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication ”UNSTABLE” will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the “UNSTABLE” condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

9 Enter the Measured value in the appropriate location on the LRT Data Sheets (Figure 12). This value represents the Loop Value in Loop Mode.

10 Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the Loop Value in Loop Mode, determine the low and high limits for the Loop Value in Loop Mode measurements. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the LRT Loop Value in Loop Mode is within tolerance with the Loop Value in Joint Mode measurements.

11 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

12 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

13 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

14 Apply the Joint Probes to the Shunt in the location shown (Figure 10).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

15 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

16 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

17 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

18 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

19 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Step 8).

20 Verify the Joint Value is within tolerance as calculated (Paragraph (d)).

(f) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:

Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the HA-100-50 (0.5 milliohm) Shunt in the location shown (Figure 11).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Paragraph (e)).

10 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(g) 2nd Joint Value in Joint Mode with Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:

Connect Probes

2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(h) Loop Value in Loop Mode With the Drive Couplers Flipped

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

1 Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

2 Position the Mode Selector Switch to the LOOP position. (Figure 2), and verify the BITE Control Module Display shows the following indication:
Press
Start.

3 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

4 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

5 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a "DRV coup is open" or a "SNS coup is open" indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

6 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

7 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

8 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

9 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

10 Enter the Measured Loop value in the appropriate locations on the LRT Data Sheets (Figure 12).

(i) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the HA-100-50 (0.5 milliohm) Shunt in the location shown (Figure 11).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:
L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Paragraph (e)).

10 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(j) 2nd Joint Value in Joint Mode with Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(6) Joint Test No. 4, 5.0 milliohm Shunt

(a) Using braided wire, the HA-100-50 (0.5 milliohm), the HA-1-50 (50 milliohm), and the HA-10-50 (5 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 11.

(b) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 11).

(c) The actual value of the HA-10-50 (5.0 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the HA-10-50 (5.0 milliohm) Joint Test Shunt Standards in the appropriate location on the LRT Data Sheets (Figure 12).

(d) Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., HA-10-50 (5.0 milliohm) Joint Test Shunt Standards, determine the low and high limits for the loop measurements for the HA-10-50 (5.0 milliohm) Joint Test Shunt Standard. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the following LRT Joint measurements are within tolerance.

(e) Loop Value in Loop Mode

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a "DRV coup is open" or a "SNS coup is open" indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

9 Enter the Measured value in the appropriate location on the LRT Data Sheets (Figure 12). This value represents the Loop Value in Loop Mode.

10 Using the measurement tolerances for either a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater or a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater as determined in Paragraph C., and the Loop Value in Loop Mode, determine the low and high limits for the Loop Value in Loop Mode measurements. Record the low and high limits in the appropriate location on the LRT Data Sheets (Figure 12).

NOTE: These low and high limits will be used to verify the LRT Loop Value in Loop Mode is within tolerance with the Loop Value in Joint Mode measurements.

11 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

12 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

13 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

14 Apply the Joint Probes to the Shunt in the location shown (Figure 10).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

15 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

16 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

17 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

18 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

19 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Step 8).

20 Verify the Joint Value is within tolerance as calculated (Paragraph (d)).

(f) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the HA-10-50 (5.0 milliohm) Shunt in the location shown (Figure 11).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:
L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Paragraph (e)).

10 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(g) 2nd Joint Value in Joint Mode with Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(h) Loop Value in Loop Mode With the Drive Couplers Flipped

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

1 Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

2 Position the Mode Selector Switch to the LOOP position. (Figure 2), and verify the BITE Control Module Display shows the following indication:
Press
Start.

3 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes (Figure 4).

4 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

5 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a "DRV coup is open" or a "SNS coup is open" indication will be Displayed on the BITE Control Module Assembly Display (Figure 3). This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

6 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

7 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display (Figure 3).

8 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes (Figure 4) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

9 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

10 Enter the Measured Loop value in the appropriate locations on the LRT Data Sheets (Figure 12).

(i) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red (Figure 5).

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the HA-10-50 (5.0 milliohm) Shunt in the location shown (Figure 11).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Paragraph (e)).

10 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

(j) 2nd Joint Value in Joint Mode with Joint Probes Swapped

1 Clear the joint value by toggling the Mode Selector Toggle Switch to the LOOP position and back to the JOINT position (Figure 2), and verify the BITE Control Module Display shows the following indication:
Connect Probes

2 Reverse the location of the Joint Probes and take another reading across the Shunt Standard.

3 Enter the Measured Joint value in the appropriate locations on the LRT Data Sheets (Figure 12).

4 Verify the Joint Value is within tolerance as calculated (Paragraph (1), Step (d)).

Paragraph and Step	Test Indication	Test Limits	Units	Test Results	Notes
A.(5)	PWA Ground Faying Resistance ____________________	Less then 1 Ω	Ω	Pass/Fail	
B.(19)	Functional Test Kernel (FTK) Test	N/A	N/A	Pass/Fail	
C.(7) C.(13)	Record the Calibration Level	N/A	N/A	Calibrated Not_Calibrated	
C.(14)	Record the Serial Numbers of both the Sense and Drive Couplers	N/A	N/A	Sense Coupler Serial Number ____________ Drive Coupler Serial Number ____________	
C.(20)	Record the Tolerances This tolerance applies to all subsequent test steps unless otherwise noted	Calibrated Tolerances +/- 5% or 0.2mΩ Non-Calibrated Tolerances +/- 10% or 0.5mΩ	Ω	Required Tolerance = +/-_______% or +/-_______mΩ whichever is greater	
D.(18)	LED and Switch Test	N/A	N/A	Pass/Fail	
E.(1)(e)	Record the Actual Value of the 906-10273-7 (2mΩ) Certification Standard as marked on the Certification Sticker	N/A	Ω	Actual Value __________mΩ	
E.(1)(f)	Record the Low and High Limits of the 906-10273-7 (2mΩ) Certification Standard	Based on Actual Value and Tolerance Requirements	Ω	Low Limit __________mΩ High Limit __________mΩ	

Loop Resistance Tester Data Sheet
Figure 12 (Sheet 1)

Paragraph and Step	Test Indication	Test Limits	Units	Test Results	Notes
E.(1)(g)9	Record the Measured Value of the 906-10273-7 (2mΩ) Certification Standard	N/A	Ω	Measured Value ___________mΩ	
E.(2)(d)	Record the Actual Value of the 906-10273-8 (8.5mΩ) Certification Standard as marked on the Certification Sticker	N/A	Ω	Actual Value ___________mΩ	
E.(2)(e)	Record the Low and High Limits of the 906-10273-8 (8.5mΩ) Certification Standard	Based on Actual Value and Tolerance Requirements	Ω	Low Limit ___________mΩ High Limit ___________mΩ	
E.(2)(f)9	Record the Measured Value of the 906-10273-8 (8.5mΩ) Certification Standard	N/A	Ω	Measured Value ___________mΩ	
E.(3)(d)	Record the Actual Value of the 906-10273-2 (14mΩ) Certification Standard as marked on the Certification Sticker	N/A	Ω	Actual Value ___________mΩ	
E.(3)(e)	Record the Low and High Limits of the 906-10273-2 (14mΩ) Certification Standard	Based on Actual Value and Tolerance Requirements	Ω	Low Limit ___________mΩ High Limit ___________mΩ	
E.(3)(f)9	Record the Measured Value of the 906-10273-2 (14mΩ) Certification Standard	N/A	Ω	Measured Value ___________mΩ	
E.(4)(d)	Record the Actual Value of the 906-10273-2 (14mΩ) Certification Standard as marked on the Certification Sticker	N/A	Ω	Actual Value ___________mΩ	

Loop Resistance Tester Data Sheet
Figure 12 (Sheet 2)

Paragraph and Step	Test Indication	Test Limits	Units	Test Results	Notes
E.(4)(e)	Record the Low and High Limits of the 906-10273-2 (14mΩ) Certification Standard	Based on Actual Value and Tolerance Requirements	Ω	Low Limit ________mΩ High Limit ________mΩ	
E.(4)(f)9	Record the Measured Value of the 906-10273-6 (3600mΩ) Certification Standard	N/A	Ω	Measured Value ________mΩ	
F.(1)(c)	Record the Actual Value of the HA-2-50 (25mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	N/A	Ω	Actual Value ________mΩ	
F.(1)(d)	Record the Low and High Limits of the HA-2-50 (25mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	Based on Actual Value and Tolerance Requirements	Ω	Low Limit ________mΩ High Limit ________mΩ	
F.(1)(e)9	Record the Measured Loop Value in Loop Mode	N/A	Ω	LOOPVALU ________mΩ	
F.(1)(e)10	Record the Low and High Limits of the Loop Value in Loop Mode	Based on Actual Value and Tolerance Requirements	Ω	Low Limit ________mΩ High Limit ________mΩ	
F.(1)(e)18	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :________mΩ J :________mΩ	
F.(1)(f)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value ________mΩ	
F.(1)(g)10	Record the Measured Loop Value in Loop Mode with Drive Coupler Flipped	N/A	Ω	Measured Value ________mΩ	

Loop Resistance Tester Data Sheet
Figure 12 (Sheet 3)

Paragraph and Step	Test Indication	Test Limits	Units	Test Results	Notes
F.(1)(h)8	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :_________mΩ J :_________mΩ	
F.(1)(i)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value __________mΩ	
F.(7)(c)	Record the Actual Value of the HA-2-50 (25mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	N/A	Ω	Actual Value __________mΩ	
F.(2)(c)	Record the Actual Value of the 906-10273-9 (3600mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	N/A	Ω	Actual Value __________mΩ	
F.(8)(d)	Record the Low and High Limits of the HA-2-50 (25mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	Based on Actual Value and Tolerance Requirements	Ω	Low Limit __________mΩ High Limit __________mΩ	
F.(2)(d)	Record the Low and High Limits of the 906-10273-9 (3600mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	Based on Actual Value and Tolerance Requirements	Ω	Low Limit __________mΩ High Limit __________mΩ	
F.(2)(e)9	Record the Measured Loop Value in Loop Mode	N/A	Ω	Measured Value __________mΩ	
F.(2)(e)10	Record the Low and High Limits of the Loop Value in Loop Mode	Based on Actual Value and Tolerance Requirements	Ω	Low Limit __________mΩ High Limit __________mΩ	
F.(2)(e)18	Record the Measured Loop Value in Loop Mode and Record the Measured Joint Value in Loop Mode	N/A	Ω	L :_________mΩ J :_________mΩ	

Loop Resistance Tester Data Sheet
Figure 12 (Sheet 4)

Paragraph and Step	Test Indication	Test Limits	Units	Test Results	Notes
F.(2)(f)8	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :_________mΩ J :_________mΩ	
F.(2)(g)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value __________mΩ	
F.(2)(h)10	Record the Measured Loop Value in Loop Mode with Drive Coupler Flipped	N/A	Ω	Measured Value __________mΩ	
F.(2)(i)8	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :_________mΩ J :_________mΩ	
F.(2)(j)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value __________mΩ	
F.(3)(a)	Record the Actual Value of the HA-10-50 (5mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	N/A	Ω	Actual Value __________mΩ	
F.(3)(d)	Record the Low and High Limits of the HA-10-50 (5mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	Based on Actual Value and Tolerance Requirements	Ω	Low Limit __________mΩ High Limit __________mΩ	
F.(3)(e)9	Record the Measured Loop Value in Loop Mode	N/A	Ω	Measured Value __________mΩ	
F.(3)(e)10	Record the Low and High Limits of the Loop Value in Loop Mode	Based on Actual Value and Tolerance Requirements	Ω	Low Limit __________mΩ High Limit __________mΩ	
F.(3)(e)18	Record the Measured Loop Value in Loop Mode and Record the Measured Joint Value in Loop Mode	N/A	Ω	L :_________mΩ J :_________mΩ	

Loop Resistance Tester Data Sheet
Figure 12 (Sheet 5)

Paragraph and Step	Test Indication	Test Limits	Units	Test Results	Notes
F.(3)(f)8	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :________mΩ J :________mΩ	
F.(3)(g)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value ________mΩ	
F.(3)(h)10	Record the Measured Loop Value in Loop Mode with Drive Coupler Flipped	N/A	Ω	Measured Value ________mΩ	
F.(3)(i)8	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :________mΩ J :________mΩ	
F.(3)(j)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value ________mΩ	
F.(4)(c)	Record the Actual Value of the HA-2-50 (25mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	N/A	Ω	Actual Value ________mΩ	
F.(4)(d)	Record the Low and High Limits of the HA-2-50 (25mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	Based on Actual Value and Tolerance Requirements	Ω	Low Limit ________mΩ High Limit ________mΩ	
F.(4)(e)9	Record the Measured Loop Value in Loop Mode	N/A	Ω	Measured Value ________mΩ	
F.(4)(e)10	Record the Low and High Limits of the Loop Value in Loop Mode	Based on Actual Value and Tolerance Requirements	Ω	Low Limit ________mΩ High Limit ________mΩ	
F.(4)(e)18	Record the Measured Loop Value in Loop Mode and Record the Measured Joint Value in Loop Mode	N/A	Ω	L :________mΩ J :________mΩ	

Loop Resistance Tester Data Sheet
Figure 12 (Sheet 6)

Paragraph and Step	Test Indication	Test Limits	Units	Test Results	Notes
F.(4)(f)8	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :_________mΩ J :_________mΩ	
F.(4)(g)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value __________mΩ	
F.(4)(h)10	Record the Measured Loop Value in Loop Mode with Drive Coupler Flipped	N/A	Ω	Measured Value __________mΩ	
F.(4)(i)8	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :_________mΩ J :_________mΩ	
F.(4)(j)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value __________mΩ	
F.(5)(c)	Record the Actual Value of the HA-100-50 (0.5mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	N/A	Ω	Actual Value __________mΩ	
F.(5)(d)	Record the Low and High Limits of the HA-100-50 (0.5mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	Based on Actual Value and Tolerance Requirements	Ω	Low Limit __________mΩ High Limit __________mΩ	
F.(5)(e)9	Record the Measured Loop Value in Loop Mode	N/A	Ω	Measured Value __________mΩ	
F.(5)(e)10	Record the Low and High Limits of the Loop Value in Loop Mode	Based on Actual Value and Tolerance Requirements	Ω	Low Limit __________mΩ High Limit __________mΩ	
F.(5)(e)18	Record the Measured Loop Value in Loop Mode and Record the Measured Joint Value in Loop Mode	N/A	Ω	L :_________mΩ J :_________mΩ	

Loop Resistance Tester Data Sheet
Figure 12 (Sheet 7)

Paragraph and Step	Test Indication	Test Limits	Units	Test Results	Notes
F.(5)(f)8	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :________mΩ J :________mΩ	
F.(5)(g)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value __________mΩ	
F.(5)(h)10	Record the Measured Loop Value in Loop Mode with Drive Coupler Flipped	N/A	Ω	Measured Value __________mΩ	
F.(5)(i)8	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :________mΩ J :________mΩ	
F.(5)(j)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value __________mΩ	
F.(6)(c)	Record the Actual Value of the HA-10-50 (5mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	N/A	Ω	Actual Value __________mΩ	
F.(6)(d)	Record the Low and High Limits of the HA-10-50 (5mΩ) Joint Test Shunt Standard as marked on the Certification Sticker	Based on Actual Value and Tolerance Requirements	Ω	Low Limit __________mΩ High Limit __________mΩ	
F.(6)(e)9	Record the Measured Loop Value in Loop Mode	N/A		Measured Value __________mΩ	
F.(6)(e)10	Record the Low and High Limits of the Loop Value in Loop Mode	Based on Actual Value and Tolerance Requirements	Ω	Low Limit __________mΩ High Limit __________mΩ	
F.(6)(e)18	Record the Measured Loop Value in Loop Mode and Record the Measured Joint Value in Loop Mode	N/A	Ω	L :________mΩ J :________mΩ	

Loop Resistance Tester Data Sheet
Figure 12 (Sheet 8)

Paragraph and Step	Test Indication	Test Limits	Units	Test Results	Notes
F.(6)(f)8	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :_________mΩ J :_________mΩ	
F.(6)(g)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value __________mΩ	
F.(6)(h)10	Record the Measured Loop Value in Loop Mode with Drive Coupler Flipped	N/A	Ω	Measured Value __________mΩ	
F.(6)(i)8	Record the Measured Loop Value in Joint Mode and Record the Measured Joint Value in Joint Mode	N/A	Ω	L :_________mΩ J :_________mΩ	
F.(6)(j)3	Record the Measured 2nd Joint Value in Joint Mode with Joint Probes Swapped	N/A	Ω	Measured Value __________mΩ	

Loop Resistance Tester Data Sheet
Figure 12 (Sheet 9)

G. Power Down Test

(1) On the BITE Control Module Assembly, quickly press the orange "ON/OFF" pushbutton (Figure 3).

NOTE: If the"ON/OFF" pushbutton is held down to long or the switch bounces, the LRT may immediately turn back on.

(2) Verify the LRT turns off.

(3) Disconnect and store the Sense/Drive Couplers and the Joint Probe assembly.

3. Loop Resistance Tester Internal Battery and Battery Charger (CS800-1, AVT) Test

NOTE: THERE ARE TWO BATTERY CHARGERS AVAILABLE FOR USE WITH THE 906-10247-2 LRT, THE CS800-1 (AVT) CHARGER AND THE 103486-01 (SAGE) CHARGER.

THE CS800-1 (AVT) CHARGER IS THE PREFERRED BATTERY CHARGER FOR USE WITH THE 906-10247-2 LRT.

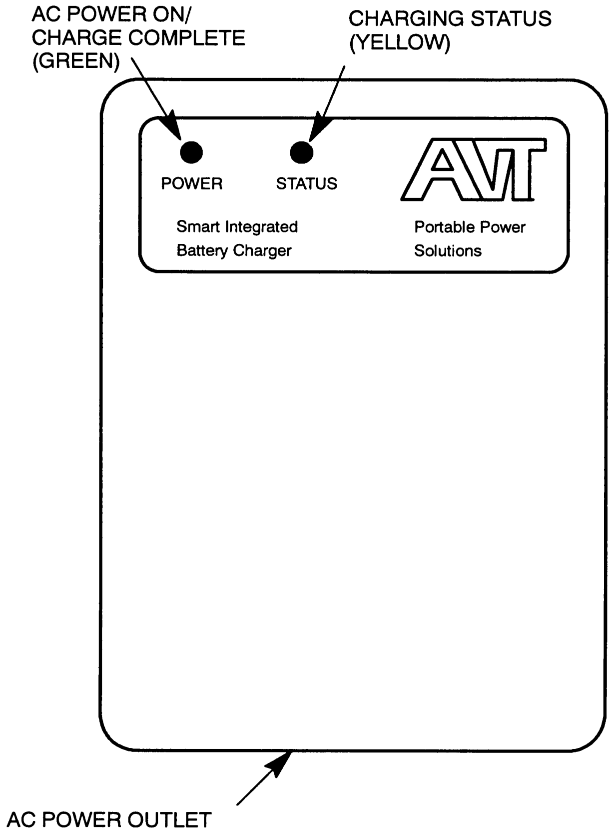
REFER TO PARAGRAPH 4. FOR TESTING OF THE 103486-01 (SAGE) BATTERY CHARGER.

WARNING: THIS PROCEDURE MUST BE PERFORMED IN A NON-HAZARDOUS LOCATION

A. The Battery Charger (CS800-1, AVT) indicators are as follows:

POWER LED lighted green - Indicates AC Power "ON" or Charge Complete.
Power LED not lighted - Indicates AC Power "OFF"

STATUS LED Not lighted - Indicates LRT Battery not detected.
Lighted green - Indicates the Charger is detecting a fully charged battery, or the charge is complete
Flashing yellow - Indicates charge is pending
Solid yellow - Indicates Charger is in fast charge mode
Flashing red - Indicates an error



Battery Charger (CS800-1, AVT)
Figure 13

B. Position the RUN - OFF/CHARGE switch to the RUN position (Figure 2).

C. On the BITE Control Module Assembly, press the orange "ON/OFF" pushbutton (Figure 3).

D. Note and record the percentage of battery charge.

E. Position the RUN - OFF/CHARGE switch to the OFF/CHARGE position (Figure 2).

F. Connect the battery charger interface cable connector to the BATTERY CHARGE connector on the LRT front panel (Figure 2).

G. Position the RUN - OFF/CHARGE switch to the RUN position (Figure 2).

H. On the BITE Control Module Assembly, press the orange "ON/OFF" pushbutton (Figure 3), and verify the LRT does not turn on.

I. Disconnect the Charger interface cable assembly from the BATTERY CHARGE connector on the LRT front panel (Figure 2).

J. Position the RUN - OFF/CHARGE switch to the OFF/CHARGE position (Figure 2).

K. Plug the Charger AC power cord into the appropriate outlet.

L. Verify that the Battery Charger POWER indicator is lighted green (Figure 13).

M. Connect the battery charger interface cable connector to the BATTERY CHARGE connector on the LRT front panel (Figure 2).

N. Verify that the STATUS LED on the CHarger is green, yellow, or flashing yellow (Figure 13).

O. Disconnect then reconnect the Charger interface cable assembly from the BATTERY CHARGE connector on the LRT front panel (Figure 2), until the STATUS LED is yellow or flashing yellow.

P. Reconnect the Charger interface cable assembly and leave the charger charging until the STATUS LED is lighted green. This may take up to seven hours if the battery is fully discharged.

Q. After charge is complete, Disconnect the Charger interface cable assembly from the BATTERY CHARGE connector on the LRT front panel (Figure 2).

R. Position the RUN - OFF/CHARGE switch to the RUN position (Figure 2).

S. On the BITE Control Module Assembly, press the orange "ON/OFF" pushbutton (Figure 3).

T. Verify that the percentage of battery charge is 90% or more.

U. Position the RUN - OFF/CHARGE switch to the OFF/CHARGE position (Figure 2).

V. Using a multimeter, measure the voltage between pins 1 and 4 of the BATTERY CHARGE connector on the LRT front panel (Figure 2).

W. Verify that the voltage is less then 1 volt.

4. <u>Loop Resistance Tester Internal Battery and Battery Charger (103486-1, Sage) Test</u>

<u>NOTE</u>: THERE ARE TWO BATTERY CHARGERS AVAILABLE FOR USE WITH THE 906-10247-2 LRT, THE CS800-1 (AVT) CHARGER AND THE 103486-01 (SAGE) CHARGER.

THE CS800-1 (AVT) CHARGER IS THE PREFERRED BATTERY CHARGER FOR USE WITH THE 906-10247-2 LRT.

REFER TO PARAGRAPH 3. FOR TESTING OF THE CS800-1 (AVT) BATTERY CHARGER.

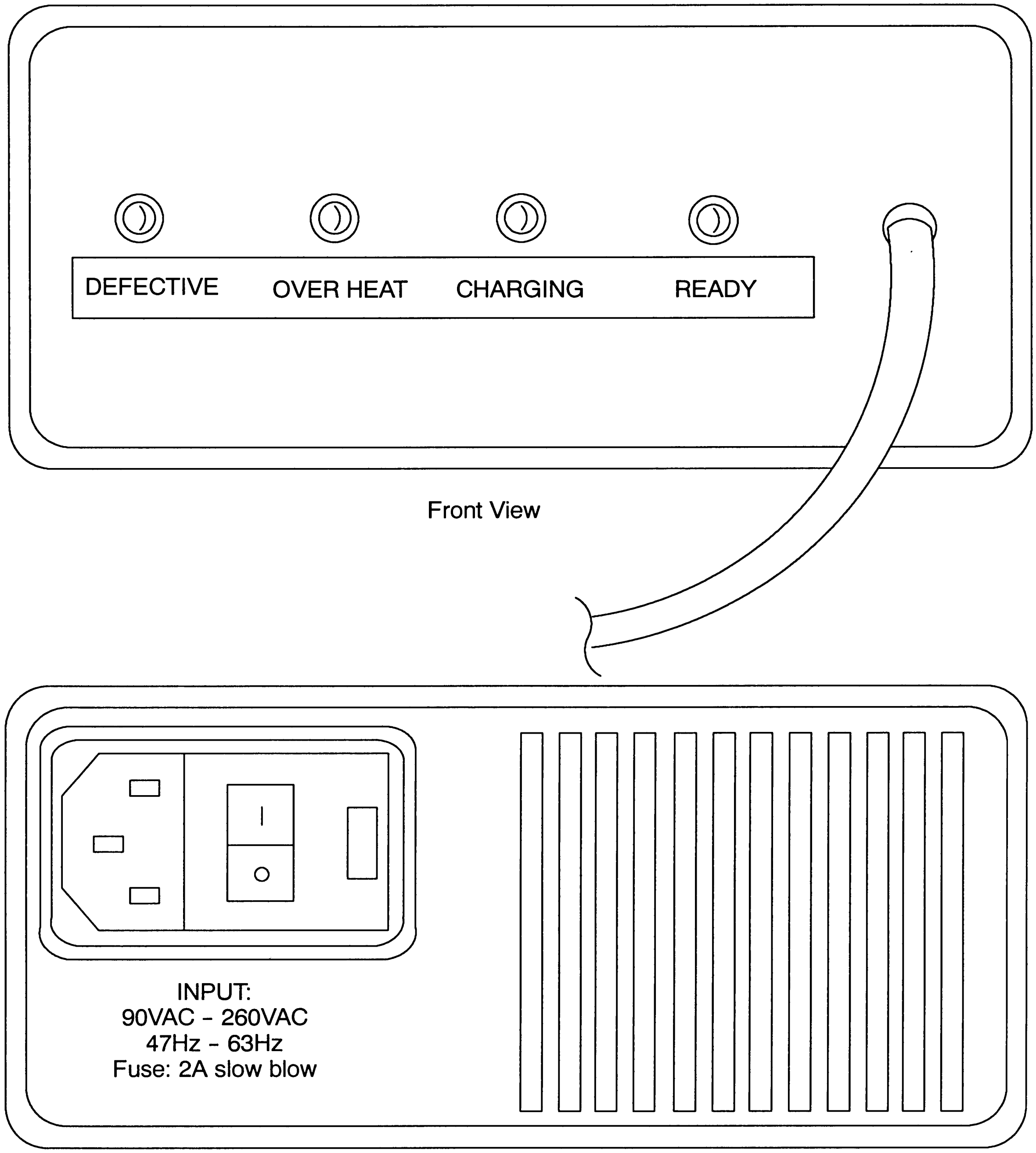
<u>WARNING</u>: THIS PROCEDURE MUST BE PERFORMED IN A NON-HAZARDOUS LOCATION

A. Position the RUN - OFF/CHARGE switch to the RUN position (Figure 2).

B. On the BITE Control Module Assembly, press the orange "ON/OFF" pushbutton (Figure 3).

C. Note and record the percentage of battery charge.

D. Position the RUN - OFF/CHARGE switch to the OFF/CHARGE position (Figure 2).



Rear View

Battery Charger Assembly (103486-1, Sage)
Figure 14

E. The Battery Charger Assembly can be configured for either 120 VAC, 60 Hz or 250 VAC, 50 Hz. The 103486-01 battery charger indicators are as follows:

READY	Green
CHARGING	Yellow

OVER HEAT Orange

DEFECTIVE Red

F. Ensure that the Battery Charger is configured for the appropriate power source (120 VAC, 60 Hz or 250 VAC, 50 Hz) by reading the Input Power indicator on the Input Power Module, on the back of the Battery Charger (Figure 14).

G. If the Battery Charger Input Power configuration is not correct, open the hinged fuse block cover and pull to remove the Fuse Block and Jumper Assembly. Rotate the Fuse Block and Jumper Assembly to the desired voltage configuration and re-install in the Input Module. Close the hinged fuse block cover on the Input Power Module and verify the proper input voltage configuration.

H. Connect the battery charger interface cable connector to the BATTERY CHARGE connector on the LRT front panel (Figure 2).

I. Switch the Battery Charger ON/OFF toggle switch located on the back of the Battery Charger to the OFF position (Figure 14).

J. Position the RUN - OFF/CHARGE switch to the RUN position (Figure 2).

K. On the BITE Control Module Assembly, press the orange "ON/OFF" pushbutton (Figure 3), and verify the LRT does not turn on.

L. Position the RUN - OFF/CHARGE switch to the OFF/CHARGE position (Figure 2).

M. Switch the Battery Charger ON/OFF toggle switch located on the back of the Battery Charger to the On position (Figure 14).

N. Verify the yellow CHARGING indicator is blinking

O. Verify the red DEFECTIVE indicator is not lighted

P. Leave the charger charging until the green READY indicator is lighted. This may take up to seven hours if the battery is fully discharged.

Q. After charge is complete,

R. Switch the Battery Charger ON/OFF toggle switch located on the back of the Battery Charger to the OFF position (Figure 14) for fifteen seconds, then switch the Battery Charger ON/OFF toggle switch back to the ON position to restart the charging cycle. Measure the time from turning the the Battery Charger ON/OFF toggle switch to the ON position to getting a green READY indicator blinking.

S. Continue turning the charger ON and OFF to restart the charging cycle until the measured time from turning the charger ON to the blinking green READY light is less then thirty minutes.

T. Disconnect the Charger interface cable assembly from the BATTERY CHARGE connector on the LRT front panel (Figure 2).

U. Position the RUN - OFF/CHARGE switch to the RUN position (Figure 2).

V. On the BITE Control Module Assembly, press the orange "ON/OFF" pushbutton (Figure 3).

W. Verify that the percentage of battery charge is equal to or greater than 70%.

X. Position the RUN - OFF/CHARGE switch to the OFF/CHARGE position (Figure 2).

Y. Using a multimeter, measure the voltage between pins 1 and 4 of the BATTERY CHARGE connector on the LRT front panel (Figure 2).

Z. Verify that the voltage is less then 1 volt.

5. LRT Internal Battery Evaluation Test

NOTE: THIS TEST IS TO BE USED FOR DETERMINING BATTERY CONDITION AND NEW BATTERY INSTALLATIONS

NOTE: THIS TEST REQUIRES A FULL (95% - 100%) BATTERY CHARGE

NOTE: The serial numbers of the 906-10260-5 and 906-10260-6 Sense/Drive couplers are recorded on the Calibration Sticker located on the Front Panel of the LRT after calibration. Calibration of the LRT will be determined invalid if the LRT is used with any Sense/Drive Couplers other then the serial numbers recorded on the Calibration Sticker.

A. The Sense/Drive Couplers have different colored sleeves. Connect the Sense and Drive Couplers to the corresponding colored Sense and Drive Connectors on the Front Panel of the LRT.

B. Position the Mode Selector Toggle Switch to the LOOP position (Figure 2).

C. Position the RUN - OFF/CHARGE switch to the RUN position.

D. On the BITE Control Module Assembly, press and hold the orange "ON/OFF" pushbutton (Figure 3) until the display comes on.

NOTE: The display will sequence through The hardware testing routine for about 5 seconds.

E. After the hardware testing routine is completed, the following indication should appear on the BITE Control Module Assembly display:

Press
Start

F. If the BITE Control Module Assembly display shows the following:

Warning
Bad Cal

followed by:

Display
Faults ?

Then on the BITE Control Module Assembly, press the "YES" pushbutton.

G. the following indication should appear on the BITE Control Module Assembly display:
    Press
    Start

H. On the BITE Control Module Assembly, press the black “MENU” pushbutton.

I. The following indication should appear on the BITE Control Module Assembly display:
    % Battery
    Charge ?

J. On the BITE Control Module Assembly, press the black “YES” pushbutton.

K. The following indication should appear on the BITE Control Module Assembly display:
    Battery
    100%

NOTE: The display will reset after about 5 seconds.

L. After the display has reset, on the BITE Control Module Assembly, press the black “MENU” pushbutton.

M. Use the ↑ and ↓ scroll pushbuttons to move down the menu until the following indication is displayed:
    Disable
    Timer

N. On the BITE Control Module Assembly, press the black “YES” pushbutton.

O. The following indication should appear on the BITE Control Module Assembly display:
    Timer
    Disabled

NOTE: The display will reset after about 5 seconds.

P. After the display has reset, on the BITE Control Module Assembly, press the black “MENU” pushbutton.

Q. The following indication should appear on the BITE Control Module Assembly display:
    Press
    Start

R. Clamp the Sense Coupler around one of the cutouts in the 906-10273-6 (3600 milliohm) Certification Standard (Figure 6).

S. Clamp the Drive Coupler around the other cutout in the 906-10273-6 (3600 milliohm) Certification Standard.

T. On the BITE Control Module Assembly, press the black “YES” pushbutton until the resistance value of the 906-10273-6 (3600 milliohm) Certification Standard is displayed.

NOTE: The value shown on the display is not important. This step is only to increase the load on the LRT internal battery.

U. The LRT must remain in this condition for 8 hours. At the end of the 8 hours, perform steps A. thru K. and record the battery charge percentage. If the LRT internal battery is unable to operate the LRT for 8 hours the LRT internal battery may need to be replaced.

6. Periodic Maintenance

A. LRT

(1) Using a lint free rag and Isopropyl alcohol, ensure the LRT is cleaned regularly. Inspect each connector, switch, and BITE Control Module Assembly for foreign matter, debris and/or damage.

B. Sense/Drive Couplers

(1) Using a lint free rag, wipe the faces of the couplers to remove any foreign matter. Ensure that no threads from the rags get snagged on the couplers.

C. Cables

(1) Visually inspect all cable assemblies for cracks or abrasions in the outer skin of the cables.

(2) Inspect each connector for bent or deformed pins, ensure no foreign matter or debris are in the connectors.

Problem Item	Symptom	Probable Cause	Recommendations
1. Power Up	The “Testing Hardware” indication does not appear on the BITE Control Module Assembly after pushing the ON/OFF Pushbutton.	Internal Battery Charge too Low.	Perform Battery Charging Procedures (Chapter 1, Section 2).
		Faulty BITE Control Module Assembly.	Perform BITE Control Module Testing/Troubleshooting Procedures (Chapter 2, Section 2).
		Faulty Main Board (wiring Harness Assembly).	Perform Main Board (Wiring Harness) (Power-Up) Testing/Troubleshooting Procedures (Chapter 2, Section 2).
		Faulty Internal battery Pack.	Perform Internal Battery Pack Testing/Troubleshooting Procedures (Chapter 2, Section 2).

Fault Isolation Table
Figure 15

Problem Item	Symptom	Probable Cause	Recommendations
	BITE Control Module Assembly display is garbled or no display.	The connection between the BITE Control Module Assembly and the LRT is bad.	Perform the BITE Control Module Removal and Installation Procedures (Chapter 2, Section 3) to ensure a good connection between the BITE Module Assembly and the LRT.
		Faulty BITE Control Module Assembly.	Perform BITE Control Module Testing/Troubleshooting Procedures (Chapter 2, Section 2).
2. Sense/Drive Couplers	Sense/Drive Coupler Bi-colored LED does not light.	MODE selector switch is not in the LOOP position.	Toggle the MODE selector switch to the LOOP position.
		Bi-colored LED is burnt out.	Remove and replace the Bi-colored LED.
		The Sense/Drive Coupler Wiring is bad.	Perform Sense/Drive Coupler Testing/Troubleshooting Procedures (Chapter 2, Section 2).
	Bi-colored LED does not change from red to green.	START Pushbutton has not been pressed.	Press the start Pushbutton.
		Sense/Drive Couplers are not closed.	Squeeze and release the couplers to improve the closure. Press the START Pushbutton.
		START Pushbutton is bad or Sense/Drive Coupler Wiring is bad.	Perform Sense/Drive Coupler Testing/Troubleshooting Procedures (Chapter 2, Section 2).
		Faulty Main Board (wiring Harness Assembly).	Perform Main Board (Wiring Harness) (Coupler Open) Testing/Troubleshooting Procedures (Chapter 2, Section 2).

Fault Isolation Table
Figure 15

Problem Item	Symptom	Probable Cause	Recommendations
3. Joint Probes	LED on the Joint Probes will not light.	MODE selector switch is not in the JOINT position.	Toggle the MODE selector switch to the JOINT position.
		Joint Probe wiring is bad.	Perform Joint Probe Testing/Troubleshooting Procedures (Chapter 2, Section 2).
	Bi-colored LED on Joint Probes does not change from red to green.	Joint Probe wiring is bad.	Perform Joint Probe Testing/Troubleshooting Procedures (Chapter 2, Section 2).
		Faulty Main Board (wiring Harness Assembly).	Perform Main Board (Wiring Harness) (Connect Probes) Testing/Troubleshooting Procedures (Chapter 2, Section 2).
4. Loop Values	Loop Test values are not within $\pm 5\%$ tolerance.	Faulty Sense/Drive couplers.	Perform Sense/Drive Couplers Testing/Troubleshooting Procedures Chapter 2, Section 2)
		Faulty Main Board (wiring Harness Assembly).	Perform Main Board (Wiring Harness) (Loop Measurement) Testing/Troubleshooting Procedures (Chapter 2, Section 2).
5. Joint Values	Joint Test values are not within $\pm 7\%$ of shunt tolerance or ± 0.2 milliohm of shunt value, which ever is greater.	Faulty Joint Probes.	Perform Joint Probes Testing/Troubleshooting Procedures Chapter 2, Section 2).

Fault Isolation Table
Figure 15

Problem Item	Symptom	Probable Cause	Recommendations
		Faulty Main Board (wiring Harness Assembly).	Perform Main Board (Wiring Harness) (Joint Measurement) Testing/Troubleshooting Procedures (Chapter 2, Section 2).
6. Software download	The percentage of completion screen does not appear when power is applied to the LRT.	LRT Internal Battery Pack low on charge or has no charge.	Remove RS232 Cable, press the ON/OFF pushbutton. If the LRT does not power up, perform the Battery Charging procedures (Chapter 1, Section 2).
		Faulty RS232 Cable.	Perform a continuity test on the RS232 Cable. Refer to the RS232 Cable Assembly - Wiring Diagram (Chapter 2, Section 2).
		Faulty Main Board (wiring Harness Assembly).	Perform Main Board (Wiring Harness) (Power-Up) Testing/Troubleshooting Procedures (Chapter 2, Section 2).
	The percentage of completion screen does appear, but the download process is not completed.	RS232 Connections are bad causing excessive noise.	Disconnect and Re-connect The RS232 cable from the LRT and the PC Download Station. Restart the Software Download Procedures (RS232) (Chapter 1, Section 2).
		The LRT non-volatile RAM is faulty: E-PROM U401, on the Main Board (Wiring Harness) is faulty.	Replace E-PROM U401. Refer to the PW Assembly (Chapter 2, Section 2).

Fault Isolation Table
Figure 15

7. Loop Resistance Tester Cleaning Instructions

A. Ensure the Loop Resistance Tester is powered off and disconnected from the Battery Charger.

B. Ensure all cables are detached from the Loop Resistance Tester and dust caps are installed.

CAUTION: DO NOT IMMERSE THE LOOP RESISTANCE TESTER IN LIQUID

C. Using a damp lint free rag and a mild detergent, clean the surfaces of the Loop Resistance Tester.

D. Using a dry lint free rag, remove the excessive moisture if necessary.

8. LRT Password Change Procedure

NOTE: THE DEFAULT PASSWORD FOR CALIBRATION IS “SWRULES”. THIS PASSWORD IS SET DURING SOFTWARE LOAD. THIS PASSWORD MAY BE CHANGED BY PERFORMING THE FOLLOWING PROCEDURES. IT IS THE RESPONSIBILITY OF THE CALIBRATING ORGANIZATION TO KEEP TRACK OF THE NEW PASSWORD.

A. Changing the LRT Password

(1) Switch the OFF/CHARGE - RUN switch to the RUN position (Figure 3).

(2) On the BITE Control Module Assembly, press the orange ”ON/OFF” pushbutton.

(3) Press the MENU pushbutton on the BITE Control Module.

(4) Press the ↓ or ↑ pushbutton on the BITE Control Module until the “Change Passwrd?” menu selection appears.

(5) Press the YES pushbutton on the BITE Control Module, and verify the following indication:
ReTrving Password

(6) Within a few seconds the BITE Control Module Display will change to the following:
Old Pswd ********

(7) Enter the Old Password by using the ↓ or ↑ pushbutton on the BITE Control Module until the desired value is blinking, press the YES pushbutton to move to the next character.

(8) After all the digits are initialized, the BITE Control Module will display the following:
ACCEPT? XXXXXXXX

(9) If the XXXXXXXX character string is correct press the YES pushbutton. If the characters are incorrect press the NO pushbutton and re-enter the correct value.

(10) The BITE Control Module will display the following:
New Pswd ********

(11) Enter the new password by using the ↓ or ↑ pushbutton on the BITE Control Module until the desired value is blinking, press the YES pushbutton to move to the next character.

(12) After all the digits are initialized, the BITE Control Module will display the following:
VerfPswd ********

(13) Re-enter the new password by using the ↓ or ↑ pushbutton on the BITE Control Module until the desired value is blinking, press the YES pushbutton to move to the next character.

(14) The BITE Control Module will display the following:
PswdRdWr Passed?

(15) After a few seconds the BITE Control Module will display the following:
Change Passwrd?

(16) The password has now been changed. Record the new password in a secure place.

9. LRT Password Reset Procedure

NOTE: THE DEFAULT PASSWORD FOR CALIBRATION IS “SWRULES”. THIS PASSWORD IS SET DURING SOFTWARE LOAD. THIS PASSWORD MAY BE CHANGED BY PERFORMING THE FOLLOWING PROCEDURES. IT IS THE RESPONSIBILITY OF THE CALIBRATING ORGANIZATION TO KEEP TRACK OF THE NEW PASSWORD.

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

A. Perform Display Panel Assembly Removal Procedure (Chapter 2, Section 3, Paragraph 5.A.).

B. Locate the access hole on the PWA back panel.

NOTE: There are two pins visible through the access hole, which must be shorted together to reset the password. If the software does not detect the jumper, the diplay will shoe “Rest Inhibit”

C. Maintain a short between these pins P1 and P2 throughout the following steps of this procedure:

(1) Switch the OFF/CHARGE - RUN switch to the RUN position (Figure 3).

(2) On the BITE Control Module Assembly, press the orange ”ON/OFF” pushbutton.

(3) Press the MENU pushbutton on the BITE Control Module. Press the ↓ or ↑ pushbutton on the BITE Control Module until the “Reset Passwrd?” menu selection appears.

(4) Press the YES pushbutton on the BITE Control Module, and verify the following indication:
ResetCompleted

(5) Within a few seconds the BITE Control Module Display will change to the following:
PswdRdWr Passed

(6) Within a few seconds the BITE Control Module Display will change to the following:
Reset Passwrd?

D. The password has now been reset to the default character string
SWRULES

E. Perform the Display Panel Installation Procedure (Paragraph 3.B.) and secure the LRT.

10. Loop Resistance Tester Calibration/Certification Test Procedure

NOTE: THE LOOP RESISTANCE TESTER MUST BE FULLY OPERATIONAL AND THE BATTERY CHARGED TO A MINIMUM OF 85% BEFORE STARTING THIS CALIBRATION/CERTIFICATION TEST PROCEDURE.
IF THE OPERATION IS IMPAIRED OR DEGRADED THE LRT MUST BE REPAIRED AT A APPROVED FACILITY, AND THE LOOP RESISTANCE TESTER FUNCTIONAL TEST (PARAGRAPH 2) MUST BE PERFORMED.

A. Calibration Environment

(1) The Loop Resistance Tester, Certification Loop Standards, and the Shunt Standards must be stored in a temperature controlled environment of 23 +/- 2 degrees Celsius for a minimum of 8 hours prior to performing this Calibration/Certification Test Procedure.

(2) The temperature of the Certification Loop Standards must be kept to +/- 0.1 degree Celsius in a draft free environment.

(3) The following temperature correction equation must be applied to all the Certification Loop Standard (This does not apply to the Shunt Standards):

(a) Temperature Corrected Resistance =

1 (100% + (temp. coefficient of resistance)
(ambient temp. - certification temp)) x (certification resistance value)

(b) Where:

1 The temperature corrected resistance is the certified resistance modified by ambient temperature.

2 The temperature coefficient of resistance is marked on the Certification Loop Standard.

3 The ambient temperature is measured during the Calibration/Certification Test Procedure.

4 The certification temperature is marked on the Certification Loop Standard.

5 The certification resistance is marked on the Certification Loop Standard.

(c) Example:

1 The certification resistance value = 14.0297 milliohms as marked on the Certification Loop Standard.

2 The temperature coefficient of resistance = +0.4%/degrees Celsius as marked on the Certification Loop Standard.

3 The temperature during the Certification Loop Standard certification = 23.5 degrees Celsius as marked on the Certification Loop Standard.

4 The ambient temperature = 22 degrees Celsius as measured by a thermometer.

5 Corrected Certification Loop Standard value = (100% + (+.4%/degrees C)(22C - 23.5C))(14.0297 milliohms)

6 Corrected Certification Loop Standard value = (100% + (+.4%/degrees C)(-1.5C))(14.0297 milliohms)

7 Corrected Certification Loop Standard value = (100% + (-.6%))(14.0297 milliohms)

8 13.945522 milliohms = (99.4%)(14.0297 milliohms)

9 The 13.945522 milliohms is the loop value corrected for temperature that must be used for the Calibration/Certification Test Procedure steps involving the 14.0297 milliohm Certification Loop Standard.

B. PWA Faying Surface Test

(1) Open the Loop Resistance Tester Assembly. While holding the base stationary, slide the lid assembly to the side to disengage the lid assembly from the base (Figure 1).

(2) Ensure the LRT OFF/CHARGE - RUN Switch is in the OFF/CHARGE position (Figure 2).

(3) Using a Multimeter set to read Resistance, attach the Multimeter Probe to pin 1 of the RS-232 Connector and the other Multimeter Probe to the shell of the Joint Probe Connector on the LRT Front Panel.

(4) Verify the resistance of the PWA faying surface is less then 1 Ohm.

(5) Record the actual resistance in the appropriate location on the Calibration Data Sheets (Figure 18).

(6) Disconnect the Multimeter from the LRT.

(7) On the lid assembly, turn the 2 cam-lock fasteners and open the storage lid. Remove the Sense/Drive Couplers, Joint Probe assembly, and the RS 232 Cable Assembly (Figure 1).

(8) Connect the Joint Probe Assembly to the Joint Probe Connector on the Front Panel of the LRT (Figure 2).

NOTE: The serial numbers of the 906-10260-5 and 906-10260-6 Sense/Drive couplers are recorded on the Calibration Sticker located on the Front Panel of the LRT after calibration.
Calibration of the LRT will be determined invalid if the LRT is used with any Sense/Drive Couplers other then the serial numbers recorded on the Calibration Sticker.

(9) The Sense/Drive Couplers have different colored sleeves. Connect the Sense and Drive Couplers to the corresponding colored Sense and Drive Connectors on the Front Panel of the LRT.

(10) Connect the RS 232 Cable Assembly to the RS 232 Connector on the Front Panel of the LRT.

(11) Connect the nine pin connector (P1) on the RS 232 Cable Assembly to the Terminal or PC to be used.

C. Determining Calibration Level

(1) Position the Mode Selector Toggle Switch to the LOOP position.

(2) Switch the OFF/CHARGE - RUN switch to the RUN position.

(3) Push and hold the orange ON/OFF Pushbutton on the BITE Control Module Assembly until the following indication appears on the display (Figure 3):
TESTING HARDWARE

(4) At the completion of the hardware test the display will show the following indication to indicate the percentage of usable charge remaining on the LRT internal battery:
Battery_%

NOTE: If a "low battery" indication is displayed, the LRT will turn off and the Battery Charging procedures will need to be performed.

(5) After the "Battery_%" the software version number will appear in the display.

(6) If the LRT is calibrated the following indication will appear on the BITE Control Module Display:
Press
Start

(7) Record that the LRT is Calibrated in the appropriate location on the Calibration Data Sheets (Figure 18).

(8) If the LRT is not calibrated the following indication will appear on the BITE Control Module Display:
Warning
Bad Cal

(9) Then following indication will appear on the BITE Control Module Display:
Display
Faults?

(10) Press the NO Pushbutton on the BITE Control Module and the following will appear:
UseUnCA-
Libratd?

(11) Press the YES Pushbutton on the BITE Control Module and the following will appear:
Press
Start

(12) If the Calibration Sticker on the LRT Front Panel is attached, it should be removed and the Calibration Certification procedure be performed.

(13) Record that the LRT is Not Calibrated in the appropriate location on the Calibration Data Sheets (Figure 18).

(14) Record the serial numbers of both the Sense and Drive couplers in the appropriate location on the Calibration Data Sheets (Figure 18).

(15) If the LRT is calibrated the serial numbers on the Sense/Drive couplers must match the serial numbers marked on the Certification Sticker on the LRT Front Panel Assembly

(16) The LRT is considered calibrated if an intact calibration Sticker is attached to the LRT Front Panel Assembly, the sign-on message on the BITE Control Module Display does not include the:
Warning
Bad Cal

(17) The measurement tolerances for a calibrated LRT are +/- 5% or +/- 0.2 milliohms whichever is greater.

(18) The LRT is considered not Calibrated if the Calibration Sticker on the LRT Front Panel Assembly is not attached, or the sign-on message on the BITE Control Module Display includes the:
Warning
Bad Cal

(19) The measurement tolerances for a non-calibrated LRT are +/- 10% or +/- 0.5 milliohms whichever is greater.

D. Setup

(1) Position the Mode Selector Toggle Switch to the JOINT position.

(2) Press the MENU Pushbutton on the BITE Control Module (Figure 3) until the BITE Control Module Display shows the following indication:
%Battery
Charge ?

(3) Press the YES Pushbutton on the BITE Control Module, and verify that the battery charge is at least 85%.

(4) Record the percentage of the battery charge in the appropriate location on the Calibration Data Sheets (Figure 18).

(5) Press the ↓ or ↑ Pushbutton on the BITE Control Module until the BITE Control Module Display shows the following indication:
Calibrt LRT?

(6) Press the YES Pushbutton on the BITE Control Module, and verify that the following indication will appear on the BITE Control Module Display:
ReTrving Password

(7) Then following indication will appear on the BITE Control Module Display:
EDITPSWD XXXXXXXX

NOTE: IF the current password is not known, refer to paragraph NO TAG for the LRT Password Reset Procedure.

(8) Enter the Password by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

(9) After all the digits are initialized, the BITE Control Module Display will show the following:
ACCEPT? XXXXXXXX

(10) If the XXXXXXXX character string is correct press the YES Pushbutton. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

(11) Then following indication will appear on the BITE Control Module Display:
2.0mΩStd HookUp ?

E. 906-10273-7 (2 Milliohm) Certification Standard First Loop Measurement

(1) Position the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(2) Open the Calibration Certification Assembly Case and remove the four Certification Standards.

(3) Clamp the Sense Coupler around one of the cutouts in the 906-10273-7 (2 milliohm) Certification Standard (Figure 6).

(4) Clamp the Drive Coupler around the other cutout in the 906-10273-7 (2 milliohm) Certification Standard.

(5) The actual value of the 906-10273-7 (2 milliohm) Certification Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the 906-10273-7 (2 milliohm) Certification Standard in the appropriate location on the Calibration Data Sheets (Figure 18).

(6) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(7) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(8) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-7 (2 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(9) Record if the Couplers In Phase or the Couplers OutPhase indication was shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

F. 906-10273-7 (2 Milliohm) Certification Standard Second Loop Measurement

(1) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(2) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(3) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(4) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(5) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-7 (2 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(6) Record if the Couplers In Phase or the Couplers OutPhase indication was shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(7) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
2 mΩStd 2.0000

G. Enter Loop Value For 906-10273-7 (2 Milliohm) Certification Standard

NOTE: The 2.0000 milliohm value must be changed to the temperature corrected value of the Certification Standard. Refer to the Calibration Environment Procedure in Paragraph A. to adjust the calibrated Loop Value for the effects of temperature.

(1) Using the example in Paragraph A., calculate the the temperature corrected value for the 906-10273-7 (2 Milliohm) Certification Standard.

(2) Enter the temperature corrected value by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

(3) After all digits are initialized the BITE Control Module Display shows the following indication:
ACCEPT? XXXXXXXX

(4) If the XXXXXXXX character string is correct press the YES Pushbutton on the BITE Control Module Display. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

H. 906–10273–8 (8.5 Milliohm) Certification Standard First Loop Measurement

(1) Verify the BITE Control Module Display shows the following indication:
8.5mΩStd HookUp ?

(2) Clamp the Sense Coupler around one of the cutouts in the 906–10273–8 (8.5 milliohm) Certification Standard (Figure 6).

(3) Clamp the Drive Coupler around the other cutout in the 906–10273–8 (2 milliohm) Certification Standard.

(4) The actual value of the 906–10273–8 (8.5 milliohm) Certification Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the 906–10273–8 (8.5 milliohm) Certification Standard in the appropriate location on the Calibration Data Sheets (Figure 18).

(5) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(6) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(7) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906–10273–8 (8.5 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(8) Record if the Couplers In Phase or the Couplers OutPhase indication was shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

I. 906–10273–8 (8.5 Milliohm) Certification Standard Second Loop Measurement

(1) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re–attach the Coupler.

(2) Open the Drive Coupler and rotate the coupler 180 degrees and re–attach the Coupler.

(3) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(4) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(5) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-8 (8.5 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(6) Record if the Couplers In Phase or the Couplers OutPhase indication was shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(7) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
8 mΩStd 8.5000

J. Enter Loop Value For 906-10273-8 (8.5 Milliohm) Certification Standard

NOTE: The 8.5000 milliohm value must be changed to the temperature corrected value of the Certification Standard. Refer to the Calibration Environment Procedure in Paragraph A. to adjust the calibrated Loop Value for the effects of temperature.

(1) Using the example in Paragraph A., calculate the the temperature corrected value for the 906-10273-8 (8.5 Milliohm) Certification Standard.

(2) Enter the temperature corrected value by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

(3) After all digits are initialized the BITE Control Module Display shows the following indication:
ACCEPT? XXXXXXXX

(4) If the XXXXXXXX character string is correct press the YES Pushbutton on the BITE Control Module Display. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

K. 906-10273-2 (14 Milliohm) Certification Standard First Loop Measurement

(1) Verify the BITE Control Module Display shows the following indication:
14mΩStd HookUp ?

(2) Clamp the Sense Coupler around one of the cutouts in the 906-10273-2 (14 milliohm) Certification Standard (Figure 6).

(3) Clamp the Drive Coupler around the other cutout in the 906-10273-2 (14 milliohm) Certification Standard.

(4) The actual value of the 906-10273-2 (14 milliohm) Certification Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the 906-10273-2 (14 milliohm) Certification Standard in the appropriate location on the Calibration Data Sheets (Figure 18).

(5) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(6) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(7) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-2 (14 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(8) Record if the Couplers In Phase or the Couplers OutPhase indication was shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

L. 906-10273-2 (14 Milliohm) Certification Standard Second Loop Measurement

(1) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(2) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(3) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(4) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(5) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-2 (14 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(6) Record if the Couplers In Phase or the Couplers OutPhase indication was shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(7) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
14 mΩStd 14.000

M. Enter Loop Value For 906-10273-2 (14 Milliohm) Certification Standard

NOTE: The 14.000 milliohm value must be changed to the temperature corrected value of the Certification Standard. Refer to the Calibration Environment Procedure in Paragraph A. to adjust the calibrated Loop Value for the effects of temperature.

(1) Using the example in Paragraph A., calculate the the temperature corrected value for the 906-10273-2 (14 Milliohm) Certification Standard.

(2) Enter the temperature corrected value by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

(3) After all digits are initialized the BITE Control Module Display shows the following indication:
ACCEPT? XXXXXXXX

(4) If the XXXXXXXX character string is correct press the YES Pushbutton on the BITE Control Module Display. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

N. 906-10273-6 (3600 Milliohm) Certification Standard First Loop Measurement

(1) Verify the BITE Control Module Display shows the following indication:
3.6ΩStd HookUp ?

(2) Clamp the Sense Coupler around one of the cutouts in the 906-10273-6 (3600 milliohm) Certification Standard (Figure 6).

(3) Clamp the Drive Coupler around the other cutout in the 906-10273-6 (3600 milliohm) Certification Standard.

(4) The actual value of the 906-10273-6 (3600 milliohm) Certification Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the 906-10273-6 (3600 milliohm) Certification Standard in the appropriate location on the Calibration Data Sheets (Figure 18).

(5) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(6) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(7) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-6 (3600 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(8) Record if the Couplers In Phase or the Couplers OutPhase indication was shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

O. 906-10273-6 (3600 Milliohm) Certification Standard Second Loop Measurement

(1) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(2) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(3) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(4) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(5) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-6 (3600 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(6) Record if the Couplers In Phase or the Couplers OutPhase indication was shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(7) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
3.6 ΩStd 3600.00

P. Enter Loop Value For 906-10273-6 (3600 Milliohm) Certification Standard

NOTE: The 3600.00 milliohm value must be changed to the temperature corrected value of the Certification Standard. Refer to the Calibration Environment Procedure in Paragraph A. to adjust the calibrated Loop Value for the effects of temperature.

(1) Using the example in Paragraph A., calculate the the temperature corrected value for the 906-10273-6 (3600 Milliohm) Certification Standard.

(2) Enter the temperature corrected value by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

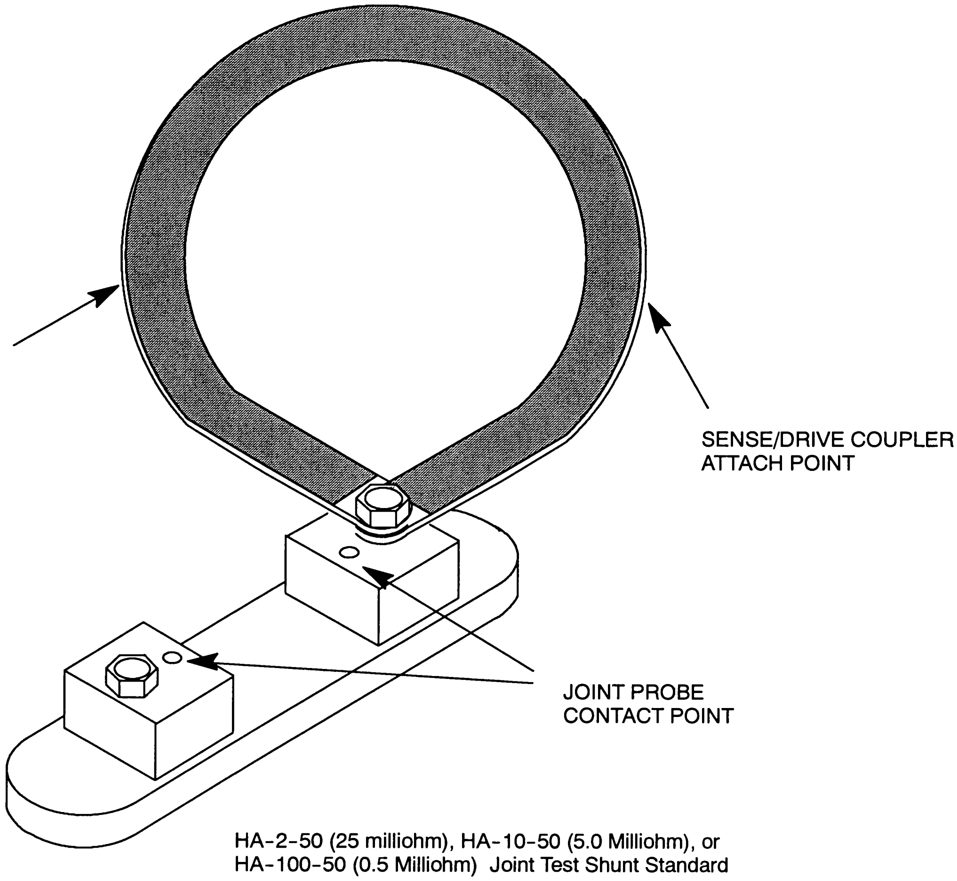
(3) After all digits are initialized the BITE Control Module Display shows the following indication:
ACCEPT? XXXXXXXX

(4) If the XXXXXXXX character string is correct press the YES Pushbutton on the BITE Control Module Display. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

Q. Joint Calibration Test

(1) Joint Test No. 1

(a) Verify the BITE Control Module Display shows the following indication:
ConFigJ1 HookUp ?.



Shunt Standard Configuration No. 5
Figure 16

(b) Using braided wire and the HA-2-50 (25 milliohm) Joint Test Shunt Standard, construct the loop configuration as shown in Figure 16.

(c) The Certified value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard in the appropriate location on the Calibration Data Sheets (Figure 18).

(d) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(e) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(f) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the HA-2-50 Joint Test Shunt Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(g) Press the No Pushbutton on the BITE Control Module (Figure 3).

(2) Joint Test No. 2

(a) Verify the BITE Control Module Display shows the following indication:
ConFigJ2 HookUp ?

(b) Using braided wire and the HA-2-50 (25 milliohm) Joint Test Shunt Standard, construct the loop configuration as shown in Figure 8.

(c) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 8).

(d) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
25 mΩStd 25.000

NOTE: The 25.000 milliohm value must be changed to agree with the Certified value as shown on the Certification Sticker attached to the HA-2-50 (25 milliohm) Joint Test Shunt Standard.

(e) Enter the Certified value by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

(f) After all digits are initialized the BITE Control Module Display shows the following indication:
ACCEPT? XXXXXXXX

(g) If the XXXXXXXX character string is correct press the YES Pushbutton on the BITE Control Module Display. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

(h) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(i) Apply the Joint Probes to the Shunt in the location shown (Figure 8).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “DisplayI CalcAve?” indication.

(j) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(k) Verify the BITE Control Module Display shows the following indication:
Displayl CalcAve?

(l) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(m) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(n) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(o) Press the No Pushbutton on the BITE Control Module (Figure 3).

(p) Verify the BITE Control Module Display shows the following indication:
Displayl MeasAve?

(q) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(r) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(s) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(t) Press the No Pushbutton on the BITE Control Module (Figure 3).

(u) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(v) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(w) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(x) Swap the Joint Probes and re-apply to the Shunt in the location shown (Figure 8).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “Displayl CalcAve?” indication.

(y) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(z) Verify the BITE Control Module Display shows the following indication:
Displayl CalcAve?

(aa) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ab) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(ac) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ad) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ae) Verify the BITE Control Module Display shows the following indication:
Displayl MeasAve?

(af) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ag) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(ah) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ai) Press the No Pushbutton on the BITE Control Module (Figure 3).

(aj) Verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

(ak) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(al) Verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “Displayl CalcAve?” indication.

(am) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(an) Verify the BITE Control Module Display shows the following indication:
Displayl CalcAve?

(ao) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ap) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(aq) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ar) Press the No Pushbutton on the BITE Control Module (Figure 3).

(as) Verify the BITE Control Module Display shows the following indication:
Displayl MeasAve?

(at) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(au) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(av) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(aw) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ax) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(ay) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(az) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(ba) Swap the Joint Probes and re-apply to the Shunt in the location shown (Figure 8).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “Displayl CalcAve?” indication.

(bb) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(bc) Verify the BITE Control Module Display shows the following indication:
Displayl CalcAve?

(bd) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(be) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(bf) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(bg) Press the No Pushbutton on the BITE Control Module (Figure 3).

(bh) Verify the BITE Control Module Display shows the following indication:
Displayl MeasAve?

(bi) Press the YES Pushbutton on the BITE Control Module (Figure 3).

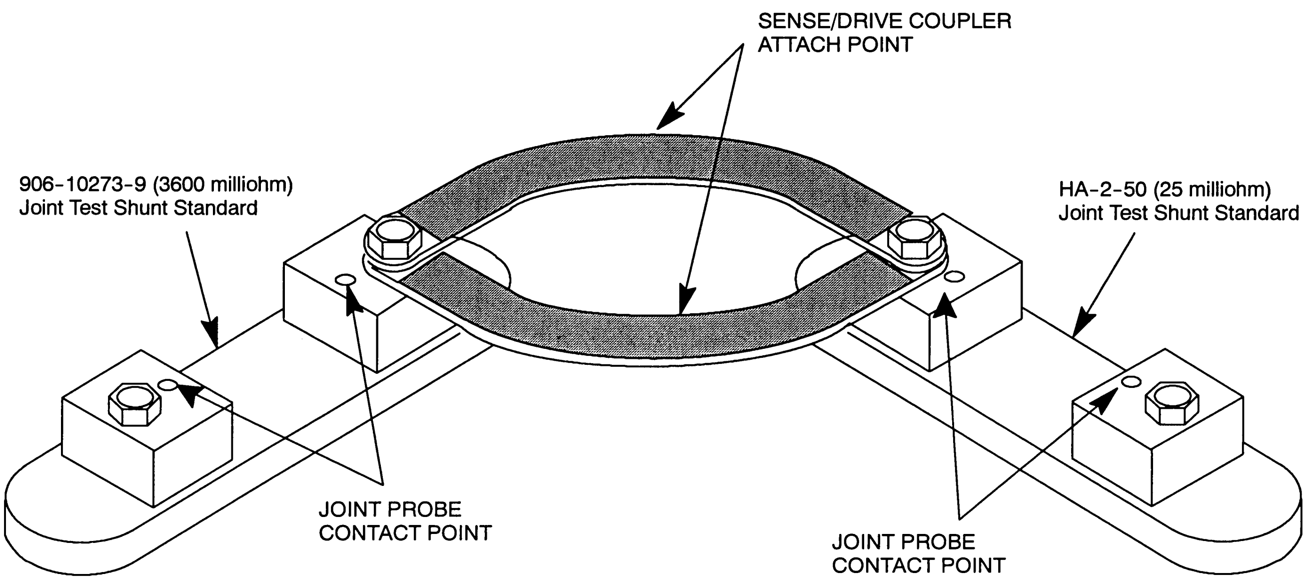
(bj) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(bk) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(bl) Press the No Pushbutton on the BITE Control Module (Figure 3).

(3) Joint Test No. 3

(a) Verify the BITE Control Module Display shows the following indication:
ConFigJ3 HookUp ?.



Shunt Standard Configuration No. 6
Figure 17

(b) Using braided wire, the HA-2-50 (25 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 17.

(c) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(d) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(e) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(f) Press the No Pushbutton on the BITE Control Module (Figure 3).

(4) Joint Test No. 4

(a) Verify the BITE Control Module Display shows the following indication:
ConFigJ4 HookUp ?.

(b) Using braided wire, the HA-2-50 (25 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 9.

(c) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(d) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 9).

(e) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
3.6ΩStd 3600.00

NOTE: The 3600.00 milliohm value must be changed to agree with the Certified value as shown on the Certification Sticker attached to the 906-10273-9 (3600.00 milliohm) Joint Test Shunt Standard.

(f) Enter the Certified value by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

(g) After all digits are initialized the BITE Control Module Display shows the following indication:
ACCEPT? XXXXXXXX

(h) If the XXXXXXXX character string is correct press the YES Pushbutton on the BITE Control Module Display. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

(i) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(j) Apply the Joint Probes to the Shunt in the location shown (Figure 9).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "DisplayI CalcAve?" indication.

(k) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(l) Verify the BITE Control Module Display shows the following indication:
Displayl CalcAve?

(m) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(n) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(o) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(p) Press the No Pushbutton on the BITE Control Module (Figure 3).

(q) Verify the BITE Control Module Display shows the following indication:
Displayl MeasAve?

(r) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(s) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(t) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(u) Press the No Pushbutton on the BITE Control Module (Figure 3).

(v) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(w) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(x) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(y) Swap the Joint Probes and re-apply to the Shunt in the location shown (Figure 9).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "Displayl CalcAve?" indication.

(z) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(aa) Verify the BITE Control Module Display shows the following indication:
Displayl CalcAve?

(ab) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ac) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(ad) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ae) Press the No Pushbutton on the BITE Control Module (Figure 3).

(af) Verify the BITE Control Module Display shows the following indication:
Displayl MeasAve?

(ag) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ah) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(ai) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(aj) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ak) Verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

(al) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(am) Verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "Displayl CalcAve?" indication.

(an) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(ao) Verify the BITE Control Module Display shows the following indication:
Displayl CalcAve?

(ap) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(aq) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(ar) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(as) Press the No Pushbutton on the BITE Control Module (Figure 3).

(at) Verify the BITE Control Module Display shows the following indication:
Displayl MeasAve?

(au) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(av) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(aw) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ax) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ay) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(az) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(ba) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(bb) Swap the Joint Probes and re-apply to the Shunt in the location shown (Figure 9).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “Displayl CalcAve?” indication.

(bc) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(bd) Verify the BITE Control Module Display shows the following indication:
Displayl CalcAve?

(be) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(bf) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(bg) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(bh) Press the No Pushbutton on the BITE Control Module (Figure 3).

(bi) Verify the BITE Control Module Display shows the following indication:
Displayl MeasAve?

(bj) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(bk) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(bl) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(bm) Press the No Pushbutton on the BITE Control Module (Figure 3).

(5) Joint Test No. 5

(a) Verify the BITE Control Module Display shows the following indication:
ConFigJ1 HookUp ?.

(b) Using braided wire and the HA-2-50 (25 milliohm) Joint Test Shunt Standard, construct the loop configuration as shown in Figure 16.

(c) The Certified value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard in the appropriate location on the Calibration Data Sheets (Figure 18).

(d) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(e) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(f) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the HA-2-50 Joint Test Shunt Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(g) Press the No Pushbutton on the BITE Control Module (Figure 3).

(h) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 16).

(i) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
25 mΩStd 25.000

NOTE: The 25.000 milliohm value must be changed to agree with the Certified value as shown on the Certification Sticker attached to the HA-2-50 (25 milliohm) Joint Test Shunt Standard.

(j) Enter the Certified value by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

(k) After all digits are initialized the BITE Control Module Display shows the following indication:
ACCEPT? XXXXXXXX

(l) If the XXXXXXXX character string is correct press the YES Pushbutton on the BITE Control Module Display. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

(6) Joint Test No. 6

(a) Verify the BITE Control Module Display shows the following indication:
ConFigJ5 HookUp ?.

(b) Using braided wire and the HA-10-50 (5 milliohm) Joint Test Shunt Standard, construct the loop configuration as shown in Figure 16.

(c) The Certified value of the HA-10-50 (5 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the HA-10-50 (5 milliohm) Joint Test Shunt Standard in the appropriate location on the Calibration Data Sheets (Figure 18).

(d) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(e) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(f) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the HA-10-50 Joint Test Shunt Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(g) Press the No Pushbutton on the BITE Control Module (Figure 3).

(h) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 16).

(i) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
5 mΩStd 5.000

NOTE: The 5.000 milliohm value must be changed to agree with the Certified value as shown on the Certification Sticker attached to the HA-10-50 (5 milliohm) Joint Test Shunt Standard.

(j) Enter the Certified value by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

(k) After all digits are initialized the BITE Control Module Display shows the following indication:
ACCEPT? XXXXXXXX

(l) If the XXXXXXXX character string is correct press the YES Pushbutton on the BITE Control Module Display. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

(7) Joint Test No. 7

(a) Verify the BITE Control Module Display shows the following indication:
ConFigJ6 HookUp ?.

(b) Using the same braided wires in Joint Test 5 and 6, the HA-10-50 (5 milliohm) and HA-2-50 (25 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 10.

(c) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(d) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
ProbesOn 5 mΩ ?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(e) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Connect Probes

(f) Apply the Joint Probes to the HA-10-50 (5 milliohm) Joint Test Shunt Standard (Figure 10).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “DisplayV CalcAve?” indication.

(g) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(h) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(i) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(j) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(k) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(l) Press the No Pushbutton on the BITE Control Module (Figure 3).

(m) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(n) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(o) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(p) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(q) Press the No Pushbutton on the BITE Control Module (Figure 3).

(r) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(s) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(t) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(u) Swap the Joint Probes and re-apply to the Shunt in the location shown (Figure 10).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “DisplayV CalcAve?” indication.

(v) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(w) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(x) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(y) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(z) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(aa) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ab) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(ac) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ad) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(ae) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(af) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ag) Verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

(ah) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(ai) Verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "DisplayV CalcAve?" indication.

(aj) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(ak) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(al) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(am) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(an) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ao) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ap) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(aq) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ar) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(as) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(at) Press the No Pushbutton on the BITE Control Module (Figure 3).

(au) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(av) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(aw) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(ax) Swap the Joint Probes and re-apply to the Shunt in the location shown (Figure 10).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “DisplayV CalcAve?” indication.

(ay) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(az) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(ba) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(bb) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(bc) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(bd) Press the No Pushbutton on the BITE Control Module (Figure 3).

(be) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(bf) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(bg) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(bh) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(bi) Press the No Pushbutton on the BITE Control Module (Figure 3).

(8) Joint Test No. 8

(a) Verify the BITE Control Module Display shows the following indication:
ProbesOn 25 mΩ ?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(b) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Apply the Joint Probes to the HA-2-50 (25 milliohm) Joint Test Shunt Standard (Figure 10).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “DisplayV CalcAve?” indication.

(d) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(e) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(f) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(g) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(h) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(i) Press the No Pushbutton on the BITE Control Module (Figure 3).

(j) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(k) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(l) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(m) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(n) Press the No Pushbutton on the BITE Control Module (Figure 3).

(o) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(p) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(q) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(r) Swap the Joint Probes and re-apply to the Shunt in the location shown (Figure 10).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “DisplayV CalcAve?” indication.

(s) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(t) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(u) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(v) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(w) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(x) Press the No Pushbutton on the BITE Control Module (Figure 3).

(y) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(z) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(aa) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(ab) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ac) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ad) Verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

(ae) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(af) Verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "DisplayV CalcAve?" indication.

(ag) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(ah) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(ai) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(aj) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(ak) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(al) Press the No Pushbutton on the BITE Control Module (Figure 3).

(am) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(an) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ao) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(ap) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(aq) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ar) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(as) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(at) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(au) Swap the Joint Probes and re-apply to the Shunt in the location shown (Figure 10).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "DisplayV CalcAve?" indication.

(av) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(aw) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(ax) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ay) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(az) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ba) Press the No Pushbutton on the BITE Control Module (Figure 3).

(bb) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(bc) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(bd) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(be) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(bf) Press the No Pushbutton on the BITE Control Module (Figure 3).

(9) Joint Test No. 9

(a) Verify the BITE Control Module Display shows the following indication:
ConFigJ5 HookUp ?.

(b) Using braided wire and the HA-10-50 (5 milliohm) Joint Test Shunt Standard, construct the loop configuration as shown in Figure 16.

(c) The Certified value of the HA-10-50 (5 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the HA-10-50 (5 milliohm) Joint Test Shunt Standard in the appropriate location on the Calibration Data Sheets (Figure 18).

(d) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(e) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(f) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the HA-10-50 Joint Test Shunt Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(g) Press the No Pushbutton on the BITE Control Module (Figure 3).

(h) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 16).

(i) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
5 mΩStd 5.000

NOTE: The 5.000 milliohm value must be changed to agree with the Certified value as shown on the Certification Sticker attached to the HA-10-50 (5 milliohm) Joint Test Shunt Standard.

(j) Enter the Certified value by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

(k) After all digits are initialized the BITE Control Module Display shows the following indication:
ACCEPT? XXXXXXXX

(l) If the XXXXXXXX character string is correct press the YES Pushbutton on the BITE Control Module Display. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

(10) Joint Test No. 10

(a) Verify the BITE Control Module Display shows the following indication:
ConFigJ7 HookUp ?.

(b) Using braided wire and the HA-100-50 (0.5 milliohm) Joint Test Shunt Standard, construct the loop configuration as shown in Figure 16.

(c) The Certified value of the HA-100-50 (0.5 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the HA-100-50 (0.5

milliohm) Joint Test Shunt Standard in the appropriate location on the Calibration Data Sheets (Figure 18).

(d) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(e) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(f) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the HA-100-50 Joint Test Shunt Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(g) Press the No Pushbutton on the BITE Control Module (Figure 3).

(h) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 16).

(i) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
0.5 mΩStd 0.500

NOTE: The 0.5 milliohm value must be changed to agree with the Certified value as shown on the Certification Sticker attached to the HA-100-50 (0.5 milliohm) Joint Test Shunt Standard.

(j) Enter the Certified value by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

(k) After all digits are initialized the BITE Control Module Display shows the following indication:
ACCEPT? XXXXXXXX

(l) If the XXXXXXXX character string is correct press the YES Pushbutton on the BITE Control Module Display. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

(11) Joint Test No. 11

(a) Verify the BITE Control Module Display shows the following indication:
ConFigJ8 HookUp ?.

(b) Using braided wire and the HA-1-50 (50.0 milliohm) Joint Test Shunt Standard, construct the loop configuration as shown in Figure 16.

(c) The Certified value of the HA-1-50 (50.0 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the HA-1-50 (50.0 milliohm) Joint Test Shunt Standard in the appropriate location on the Calibration Data Sheets (Figure 18).

(d) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(e) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(f) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the HA-1-50 (50.0 milliohm) Joint Test Shunt Standard shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(g) Press the No Pushbutton on the BITE Control Module (Figure 3).

(h) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
50 mΩStd 50.000

NOTE: The 50.000 milliohm value must be changed to agree with the Certified value as shown on the Certification Sticker attached to the HA-1-50 (50 milliohm) Joint Test Shunt Standard.

(i) Enter the Certified value by using the ↓ or ↑ Pushbutton on the BITE Control Module until the desired value is blinking, press the YES Pushbutton to move to the next character.

(j) After all digits are initialized the BITE Control Module Display shows the following indication:
ACCEPT? XXXXXXXX

(k) If the XXXXXXXX character string is correct press the YES Pushbutton on the BITE Control Module Display. If the characters are incorrect press the NO Pushbutton and re-enter the correct value.

(12) Joint Test No. 12, 5.0 milliohm Shunt

(a) Verify the BITE Control Module Display shows the following indication:
ConFigJ9 HookUp ?.

(b) Using the same braided wire used in Joint Test No. 9, No 10, No.11, HA-100-50 (0.5 milliohm), HA-1-50 (50 milliohm), and the HA-10-50 (5 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 11.

(c) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(d) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(e) Verify the BITE Control Module Display shows the following indication:
ProbesOn 5 mΩ ?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(f) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Connect Probes

(g) Apply the Joint Probes to the HA-10-50 (5 milliohm) Joint Test Shunt Standard (Figure 11).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "DisplayV CalcAve?" indication.

(h) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(i) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(j) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(k) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(l) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(m) Press the No Pushbutton on the BITE Control Module (Figure 3).

(n) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(o) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(p) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(q) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(r) Press the No Pushbutton on the BITE Control Module (Figure 3).

(s) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(t) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(u) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(v) Swap the Joint Probes and re-apply to the HA-10-50 (5 milliohm) Joint Test Shunt in the location shown (Figure 11).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "DisplayV CalcAve?" indication.

(w) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(x) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(y) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(z) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(aa) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ab) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ac) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(ad) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ae) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(af) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ag) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ah) Verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

(ai) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(aj) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(ak) Apply the Joint Probes to the HA-10-50 (5 milliohm) Joint Test Shunt Standard (Figure 11).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "DisplayV CalcAve?" indication.

(al) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(am) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(an) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ao) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(ap) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(aq) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ar) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(as) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(at) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(au) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(av) Press the No Pushbutton on the BITE Control Module (Figure 3).

(aw) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(ax) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(ay) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(az) Swap the Joint Probes and re-apply to the HA-10-50 (5 milliohm) Joint Test Shunt in the location shown (Figure 11).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "DisplayV CalcAve?" indication.

(ba) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(bb) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(bc) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(bd) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(be) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(bf) Press the No Pushbutton on the BITE Control Module (Figure 3).

(bg) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(bh) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(bi) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(bj) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(bk) Press the No Pushbutton on the BITE Control Module (Figure 3).

(13) Joint Test No. 12, 0.5 milliohm Shunt

(a) Verify the BITE Control Module Display shows the following indication:
ProbesOn 0.5 mΩ ?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers OutPhase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(b) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Apply the Joint Probes to the HA-100-50 (0.5 milliohm) Joint Test Shunt Standard (Figure 11).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “DisplayV CalcAve?” indication.

(d) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(e) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(f) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(g) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(h) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(i) Press the No Pushbutton on the BITE Control Module (Figure 3).

(j) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(k) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(l) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(m) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(n) Press the No Pushbutton on the BITE Control Module (Figure 3).

(o) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(p) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(q) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(r) Swap the Joint Probes and re-apply to the HA-100-50 (0.5 milliohm) Joint Test Shunt in the location shown (Figure 11).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a “Test In Progress” then followed by a “DisplayV CalcAve?” indication.

(s) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(t) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(u) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(v) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(w) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(x) Press the No Pushbutton on the BITE Control Module (Figure 3).

(y) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(z) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(aa) The BITE Control Module Display will show an “XXXXXXXXE+X” indication for five seconds followed by either a “COP POP”, “CIP PIP”, “COP PIP”, or “CIP POP” indication for a few seconds.

(ab) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ac) Press the No Pushbutton on the BITE Control Module (Figure 3).

(ad) Verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

(ae) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(af) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(ag) Apply the Joint Probes to the HA-100-50 (0.5 milliohm) Joint Test Shunt Standard (Figure 11).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "DisplayV CalcAve?" indication.

(ah) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(ai) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(aj) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ak) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(al) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(am) Press the No Pushbutton on the BITE Control Module (Figure 3).

(an) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(ao) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(ap) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(aq) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(ar) Press the No Pushbutton on the BITE Control Module (Figure 3).

(as) Verify the BITE Control Module Display shows the following indication:
JProbes Swapped?

(at) Press the Yes Pushbutton on the BITE Control Module (Figure 3).

(au) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(av) Swap the Joint Probes and re-apply to the HA-100-50 (0.5 milliohm) Joint Test Shunt in the location shown (Figure 11).

NOTE: The Joint Probes must not be moved until the completion of this test. This could take several seconds and will be indicated by the BITE Control Module Display first showing a "Test In Progress" then followed by a "DisplayV CalcAve?" indication.

(aw) Verify the BITE Control Module Display shows the following indication:
Test In Progress

(ax) Verify the BITE Control Module Display shows the following indication:
DisplayV CalcAve?

(ay) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(az) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(ba) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(bb) Press the No Pushbutton on the BITE Control Module (Figure 3).

(bc) Verify the BITE Control Module Display shows the following indication:
DisplayV MeasAve?

(bd) Press the YES Pushbutton on the BITE Control Module (Figure 3).

(be) The BITE Control Module Display will show an "XXXXXXXXE+X" indication for five seconds followed by either a "COP POP", "CIP PIP", "COP PIP", or "CIP POP" indication for a few seconds.

(bf) Record both indications shown on the BITE Control Module Display in the appropriate location on the Calibration Data Sheets (Figure 18).

(bg) Press the No Pushbutton on the BITE Control Module (Figure 3).

(bh) Verify the BITE Control Module Display shows the following indication:
Computng CalFactr

11. Calibration Data Sheet

NOTE: THE FOLLOWING CALIBRATION DATA RECORD SHALL BE USED TO DOCUMENT THE RESULTS OF THE CALIBRATION PROCEDURE.
CALIBRATION SHALL BE REQUIRED ON A ANNUAL BASIS, WITHIN 12 MONTHS FROM THE PREVIOUS CALIBRATION.
CALIBRATION DATA RECORDS SHALL BE ARCHIVED FOR A MINIMUM OF 6 YEARS BY THE USER

A. Record the Certified value (not the Nominal value) of the Loop and Joint Standards

Manufacturer:	The Boeing Company
Name:	Loop Resistance Tester Assembly
Part Number:	906-10247-2
LRT Serial Number:	S/N________________
Drive Coupler Serial Number	S/N________________
Sense Coupler Serial Number	S/N________________
Property Number (User Supplied)	________________
Original Password:	________________
New Password if different	________________

Paragraph and Step	Test or Data Type	Results	Notes or Circle Answer	Notes
B.(5)	________________ PWA Ground Faying Resistance	Less Than 1Ω	PASS/FAIL	
C.(7) or C.(13)	Record the Calibration Level and Tolerance. This tolerance applies to all subsequent test steps unless otherwise noted.	Calibrated or Not-Calibrated		

Calibration Data Sheet
Figure 18 (Sheet 1)

Paragraph and Step	Test or Data Type	Results	Notes or Circle Answer	Notes
C.(14)	Record the Serial Number of the Drive Coupler Sense Coupler	____________ Serial Number ____________ Serial Number		
D.(4)	Record Battery Charge	____________%		
E.(5)	Record Certified Value of the Loop Standard	____________Ω	2mΩ Nominall	
	Record Ambient Temperature	____________°C	2mΩ Nominall	
E.(8)	Record Value of the Loop Standard after adjustment for temperature	____________Ω	2mΩ Nominall	
E.(9)	Record if the Couplers are InPhase or OutPhaze		InPhase or OutPhase	Circle one
F.(5)	Record Value of the Loop Standard after adjustment for temperature	____________Ω		
F.(6)	Record if the Couplers are InPhase or OutPhaze		InPhase or OutPhase	Circle one
H.(4)	Record Certified Value of the Loop Standard	____________Ω	8.5mΩ Nominall	
	Record Ambient Temperature	____________°C	8.5mΩ Nominall	
H.(7)	Record Value of the Loop Standard after adjustment for temperature	____________Ω	8.5mΩ Nominall	
H.(8)	Record if the Couplers are InPhase or OutPhaze		InPhase or OutPhase	Circle one

Calibration Data Sheet
Figure 18 (Sheet 2)

Paragraph and Step	Test or Data Type	Results	Notes or Circle Answer	Notes
I.(5)	Record Value of the Loop Standard after adjustment for temperature	___________Ω	8.5mΩ Nominall	
I.(6)	Record if the Couplers are InPhase or OutPhaze		InPhase or OutPhase	Circle one
K.(4)	Record Certified Value of the Loop Standard	___________Ω	14mΩ Nominall	
	Record Ambient Temperature	___________°C	14mΩ Nominall	
K.(7)	Record Value of the Loop Standard after adjustment for temperature	___________Ω	14mΩ Nominall	
K.(8)	Record if the Couplers are InPhase or OutPhaze		InPhase or OutPhase	Circle one
L.(5)	Record Value of the Loop Standard after adjustment for temperature	___________Ω	14mΩ Nominall	
L.(6)	Record if the Couplers are InPhase or OutPhaze		InPhase or OutPhase	Circle one
N.(4)	Record Certified Value of the Loop Standard	___________Ω	3600mΩ Nomi-nall	
	Record Ambient Temperature	___________°C	3600mΩ Nominal	
N.(7)	Record Value of the Loop Standard after adjustment for temperature	___________Ω	3600mΩ Nominal	
N.(8)	Record if the Couplers are InPhase or OutPhaze		InPhase or OutPhase	Circle one

Calibration Data Sheet
Figure 18 (Sheet 3)

Paragraph and Step	Test or Data Type	Results	Notes or Circle Answer	Notes
O.(5)	Record Value of the Loop Standard after adjustment for temperature	____________Ω	3600mΩ Nominal	
O.(6)	Record if the Couplers are InPhase or OutPhaze		InPhase or OutPhase	Circle one
Q.(1)(c)	Record the Certified Value of the Joint Test Shunt Standard	____________Ω	25mΩ Nominal	Figure 16
	Record the value of the Wire	____________Ω	<1.5mΩ Nominal	Figure 16
Q.(1)(f)	Record the Measured Value of the Joint Test Shunt Standard	____________Ω	25mΩ Nominal	Figure 16
Q.(2)(n)	DisplayI CalcAve	____________Ω	COP POP CIP PIP	Figure 8
Q.(2)(s)	DisplayI MeasAve	____________Ω	COP POP CIP PIP	Figure 8
Q.(2)(ac)	DisplayI CalcAve	____________Ω	COP POP CIP PIP	Figure 8
Q.(2)(1)	DisplayI MeasAve	____________Ω	COP POP CIP PIP	Figure 8
Q.(2)(aq)	DisplayI CalcAve	____________Ω	COP POP CIP PIP	Figure 8
Q.(2)(av)	DisplayI MeasAve	____________Ω	COP POP CIP PIP	Figure 8
Q.(2)(bf)	DisplayI CalcAve	____________Ω	COP POP CIP PIP	Figure 8
Q.(2)(bk)	DisplayI MeasAve	____________Ω	COP POP CIP PIP	Figure 8
Q.(3)(e)	Record the Certified Value of the Joint Test Shunt Standard	____________Ω	3600mΩ Nominal	Figure 17

Calibration Data Sheet
Figure 18 (Sheet 4)

Paragraph and Step	Test or Data Type	Results	Notes or Circle Answer	Notes
	Record the value of the Wire	___________Ω	<1.5mΩ Nominal	Figure 17
Q.(4)(o)	DisplayI CalcAve	___________Ω	COP POP CIP PIP	Figure 9
Q.(4)(t)	DisplayI MeasAve	___________Ω	COP POP CIP PIP	Figure 9
Q.(4)(ad)	DisplayI CalcAve	___________Ω	COP POP CIP PIP	Figure 9
Q.(4)(ai)	DisplayI MeasAve	___________Ω	COP POP CIP PIP	Figure 9
Q.(4)(ar)	DisplayI CalcAve	___________Ω	COP POP CIP PIP	Figure 9
Q.(4)(aw)	DisplayI MeasAve	___________Ω	COP POP CIP PIP	Figure 9
Q.(4)(bg)	DisplayI CalcAve	___________Ω	COP POP CIP PIP	Figure 9
Q.(4)(bl)	DisplayI MeasAve	___________Ω	COP POP CIP PIP	Figure 9
Q.(5)(c)	Record the Certified Value of the Joint Test Shunt Standard	___________Ω	25mΩ Nominal	Figure 16
	Record the value of the Wire	___________Ω	<1.5mΩ Nominal	Figure 16
Q.(6)(c)	Record the Certified Value of the Joint Test Shunt Standard	___________Ω	5mΩ Nominal	Figure 16
	Record the value of the Wire	___________Ω	<1.5mΩ Nominal	Figure 16
Q.(7)(k)	DisplayV CalcAve	___________Ω	COP POP CIP PIP	Figure 10, 5mΩ
Q.(7)(p)	DisplayV MeasAve	___________Ω	COP POP CIP PIP	Figure 10, 5mΩ

Calibration Data Sheet
Figure 18 (Sheet 5)

Paragraph and Step	Test or Data Type	Results	Notes or Circle Answer	Notes
Q.(7)(z)	DisplayV CalcAve	____________Ω	COP POP CIP PIP	Figure 10, 5mΩ
Q.(7)(ae)	DisplayV MeasAve	____________Ω	COP POP CIP PIP	Figure 10, 5mΩ
Q.(7)(an)	DisplayV CalcAve	____________Ω	COP POP CIP PIP	Figure 10, 5mΩ
Q.(7)(as)	DisplayV MeasAve	____________Ω	COP POP CIP PIP	Figure 10, 5mΩ
Q.(7)(bc)	DisplayV CalcAve	____________Ω	COP POP CIP PIP	Figure 10, 5mΩ
Q.(7)(bh)	DisplayV MeasAve	____________Ω	COP POP CIP PIP	Figure 10, 5mΩ
Q.(8)(h)	DisplayV CalcAve	____________Ω	COP POP CIP PIP	Figure 10, 25mΩ
Q.(8)(m)	DisplayV MeasAve	____________Ω	COP POP CIP PIP	Figure 10, 25mΩ
Q.(8)(w)	DisplayV CalcAve	____________Ω	COP POP CIP PIP	Figure 10, 25mΩ
Q.(8)(ab)	DisplayV MeasAve	____________Ω	COP POP CIP PIP	Figure 10, 25mΩ
Q.(8)(ak)	DisplayV CalcAve	____________Ω	COP POP CIP PIP	Figure 10, 25mΩ
Q.(8)(ap)	DisplayV MeasAve	____________Ω	COP POP CIP PIP	Figure 10, 25mΩ
Q.(8)(az)	DisplayV CalcAve	____________Ω	COP POP CIP PIP	Figure 10, 25mΩ
Q.(8)(be)	DisplayV MeasAve	____________Ω	COP POP CIP PIP	Figure 10, 25mΩ
Q.(9)(c)	Record the Certified Value of the Joint Test Shunt Standard	____________Ω	5mΩ Nominal	Figure 16

Calibration Data Sheet
Figure 18 (Sheet 6)

Paragraph and Step	Test or Data Type	Results	Notes or Circle Answer	Notes
	Record the value of the Wire	____________Ω	<1.5mΩ Nominal	Figure 16
Q.(9)(f)	Record the Value of the Joint Test Shunt Standard	____________Ω	5mΩ Nominal	Figure 16
Q.(10)(c)	Record the Certified Value of the Joint Test Shunt Standard	____________Ω	0.5mΩ Nominal	Figure 16
	Record the value of the Wire	____________Ω	<1.5mΩ Nominal	Figure 16
Q.(10)(f)	Record the Value of the Joint Test Shunt Standard	____________Ω	0.5mΩ Nominal	Figure 16
Q.(11)(c)	Record the Certified Value of the Joint Test Shunt Standard	____________Ω	50mΩ Nominal	Figure 16
	Record the value of the Wire	____________Ω	<1.5mΩ Nominal	Figure 16
Q.(11)(f)	Record the Value of the Joint Test Shunt Standard	____________Ω	50mΩ Nominal	Figure 16
Q.(12)(i)	DisplayV CalcAve	____________Ω	COP POP CIP PIP	Figure 11, 5mΩ
Q.(12)(q)	DisplayV MeasAve	____________Ω	COP POP CIP PIP	Figure 11, 5mΩ
Q.(12)(aa)	DisplayV CalcAve	____________Ω	COP POP CIP PIP	Figure 11, 5mΩ
Q.(12)(af)	DisplayV MeasAve	____________Ω	COP POP CIP PIP	Figure 11, 5mΩ
Q.(12)(ap)	DisplayV CalcAve	____________Ω	COP POP CIP PIP	Figure 11, 5mΩ
Q.(12)(au)	DisplayV MeasAve	____________Ω	COP POP CIP PIP	Figure 11, 5mΩ
Q.(12)(be)	DisplayV CalcAve	____________Ω	COP POP CIP PIP	Figure 11, 5mΩ

Calibration Data Sheet
Figure 18 (Sheet 7)

Paragraph and Step	Test or Data Type	Results	Notes or Circle Answer	Notes
Q.(12)(bj)	DisplayV MeasAve	___________Ω	COP POP CIP PIP	Figure 11, 5mΩ
Q.(13)(h)	DisplayV CalcAve	___________Ω	COP POP CIP PIP	Figure 11, 0.5mΩ
Q.(13)(m)	DisplayV MeasAve	___________Ω	COP POP CIP PIP	Figure 11, 0.5mΩ
Q.(13)(w)	DisplayV CalcAve	___________Ω	COP POP CIP PIP	Figure 11, 0.5mΩ
Q.(13)(ab)	DisplayV MeasAve	___________Ω	COP POP CIP PIP	Figure 11, 0.5mΩ
Q.(13)(al)	DisplayV CalcAve	___________Ω	COP POP CIP PIP	Figure 11, 0.5mΩ
Q.(13)(aq)	DisplayV MeasAve	___________Ω	COP POP CIP PIP	Figure 11, 0.5mΩ
Q.(13)(ba)	DisplayV CalcAve	___________Ω	COP POP CIP PIP	Figure 11, 0.5mΩ
Q.(13)(bf)	DisplayV MeasAve	___________Ω	COP POP CIP PIP	Figure 11, 0.5mΩ

Calibration Data Sheet
Figure 18 (Sheet 8)

12. Loop Resistance Tester Post Calibration Test Procedure

NOTE: THIS POST CALIBRATION TEST PROCEDURE IS USED TO VERIFY THAT THE LOOP RESISTANCE TESTER CALIBRATION/CERTIFICATION TEST PROCEDURE WAS SUCCESSFUL.

NOTE: THE SERIAL NUMBERS OF THE 906-10260-5 AND 906-10260-6 SENSE/DRIVE COUPLERS ARE RECORDED ON THE CALIBRATION STICKER LOCATED ON THE FRONT PANEL OF THE LRT AFTER CALIBRATION.
CALIBRATION OF THE LRT WILL BE DETERMINED INVALID IF THE LRT IS USED WITH ANY SENSE/DRIVE COUPLERS OTHER THEN THE SERIAL NUMBERS RECORDED ON THE CALIBRATION STICKER.

A. Post Calibration Environment

(1) The Loop Resistance Tester, Certification Loop Standards, and the Shunt Standards must be stored in a temperature controlled environment of 23 +/- 2 degrees Celsius for a minimum of 8 hours prior to performing this Calibration/Certification Test Procedure.

(2) The temperature of the Certification Loop Standards must be kept to +/- 0.1 degree Celsius in a draft free environment.

(3) The following temperature correction equation must be applied to all the Certification Loop Standard (This does not apply to the Shunt Standards):

(a) Temperature Corrected Resistance =

1 (100% + (temp. coefficient of resistance)
(ambient temp. - certification temp)) x (certification resistance value)

(b) Where:

1 The temperature corrected resistance is the certified resistance modified by ambient temperature.

2 The temperature coefficient of resistance is marked on the Certification Loop Standard.

3 The ambient temperature is measured during the Calibration/Certification Test Procedure.

4 The certification temperature is marked on the Certification Loop Standard.

5 The certification resistance is marked on the Certification Loop Standard.

(c) Example:

1 The certification resistance value = 14.0297 milliohms as marked on the Certification Loop Standard.

2 The temperature coefficient of resistance = +0.4%/degrees Celsius as marked on the Certification Loop Standard.

3 The temperature during the Certification Loop Standard certification = 23.5 degrees Celsius as marked on the Certification Loop Standard.

4 The ambient temperature = 22 degrees Celsius as measured by a thermometer.

5 Corrected Certification Loop Standard value = (100% + (+.4%/degrees C)(22C - 23.5C))(14.0297 milliohms)

6 Corrected Certification Loop Standard value = (100% + (+.4%/degrees C)(-1.5C))(14.0297 milliohms)

7 Corrected Certification Loop Standard value = (100% + (-.6%))(14.0297 milliohms)

8 13.945522 milliohms = (99.4%)(14.0297 milliohms)

9 The 13.945522 milliohms is the loop value corrected for temperature that must be used for the Calibration/Certification Test Procedure steps involving the 14.0297 milliohm Certification Loop Standard.

B. LRT Power Control

(1) Position the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(2) Switch the OFF/CHARGE - RUN switch to the RUN position.

(3) Push and hold the orange ON/OFF Pushbutton on the BITE Control Module Assembly until the following indication appears on the display (Figure 3):
TESTING HARDWARE

(4) At the completion of the hardware test the display will show the following indication to indicate the percentage of usable charge remaining on the LRT internal battery:
Battery_%

NOTE: If a “low battery” indication is displayed, the LRT will turn off and the Battery Charging procedures will need to be performed.

(5) After the “Battery_%” the software version number will appear in the display.

(6) If the LRT is calibrated the following indication will appear on the BITE Control Module Display:
Press
Start

NOTE: THE TOLERANCE FOR ALL LOOP AND JOINT READINGS ON A CALIBRATED LOOP RESISTANCE TESTER WHILE PERFORMING THE POST CALIBRATION TEST PROCEDURE IS +/- 3.5%.

(7) If the LRT is not calibrated the following indication will appear on the BITE Control Module Display:
Warning
Bad Cal

(8) Then following indication will appear on the BITE Control Module Display:
Display
Faults?

(9) Press the NO Pushbutton on the BITE Control Module and the following will appear:
UseUnCA-
Libratd?

(10) Press the YES Pushbutton on the BITE Control Module and the following will appear:
Press
Start

NOTE: THE TOLERANCE FOR ALL LOOP AND JOINT READINGS ON A NON-CALIBRATED LOOP RESISTANCE TESTER WHILE PERFORMING THE POST CALIBRATION TEST PROCEDURE IS +/- 10% OR 0.5 MΩ WHICHEVER IS GREATER

C. Loop Test No. 1, 906-10273-7 (2 Milliohm) Certification Standard

(1) Position the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(2) Open the Calibration Certification Assembly Case and remove the four Certification Standards.

(3) Clamp the Sense Coupler around one of the cutouts in the 906-10273-7 (2 milliohm) Certification Standard (Figure 6).

(4) Clamp the Drive Coupler around the other cutout in the 906-10273-7 (2 milliohm) Certification Standard.

(5) Enter the Certified value of the 906-10273-7 (2 milliohm) Certification Standard and the ambient temperature in the appropriate location on the Calibration Data Sheets (Figure 19).

(6) Using the Post Calibration Environment Procedure (Paragraph A.) calculate the the temperature corrected value of the 906-10273-7 (2 milliohm) Certification Standard in the appropriate location on the Post Calibration Data Sheets Figure 19.

(7) 906-10273-7 (2 Milliohm) Certification Standard First Loop Measurement

(a) Toggle the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Press
Start

(c) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(d) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers Out Phase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(e) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-7 (2 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Post Calibration Data Sheets (Figure 19).

(8) 906-10273-7 (2 Milliohm) Certification Standard Second Loop Measurement

(a) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(b) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(c) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(d) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers Out Phase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(e) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-7 (2 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Post Calibration Data Sheets (Figure 19).

D. Loop Test No. 2, 906-10273-8 (8.5 Milliohm) Certification Standard

(1) Position the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(2) Open the Calibration Certification Assembly Case and remove the four Certification Standards.

(3) Clamp the Sense Coupler around one of the cutouts in the 906-10273-8 (8.5 milliohm) Certification Standard (Figure 6).

(4) Clamp the Drive Coupler around the other cutout in the 906-10273-8 (8.5 milliohm) Certification Standard.

(5) Enter the Certified value of the 906-10273-8 (8.5 milliohm) Certification Standard and the ambient temperature in the appropriate location on the Calibration Data Sheets (Figure 19).

(6) Using the Post Calibration Environment Procedure (Paragraph A.) calculate the the temperature corrected value of the 906-10273-8 (8.5 milliohm) Certification Standard in the appropriate location on the Post Calibration Data Sheets Figure 19.

(7) 906-10273-8 (8.5 Milliohm) Certification Standard First Loop Measurement

(a) Toggle the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Press
Start

(c) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(d) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers Out Phase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(e) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-8 (8.5 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Post Calibration Data Sheets (Figure 19).

(8) 906-10273-8 (8.5 Milliohm) Certification Standard Second Loop Measurement

(a) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(b) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(c) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(d) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers Out Phase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(e) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-8 (8.5 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Post Calibration Data Sheets (Figure 19).

E. Loop Test No. 3, 906-10273-2 (14 Milliohm) Certification Standard

(1) Position the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(2) Open the Calibration Certification Assembly Case and remove the four Certification Standards.

(3) Clamp the Sense Coupler around one of the cutouts in the 906-10273-2 (14 milliohm) Certification Standard (Figure 6).

(4) Clamp the Drive Coupler around the other cutout in the 906-10273-2 (14 milliohm) Certification Standard.

(5) Enter the Certified value of the 906-10273-2 (14 milliohm) Certification Standard and the ambient temperature in the appropriate location on the Calibration Data Sheets (Figure 19).

(6) Using the Post Calibration Environment Procedure (Paragraph A.) calculate the the temperature corrected value of the 906-10273-2 (14 milliohm) Certification Standard in the appropriate location on the Post Calibration Data Sheets Figure 19.

(7) 906-10273-2 (14 Milliohm) Certification Standard First Loop Measurement

(a) Toggle the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Press
Start

(c) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(d) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers Out Phase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(e) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-2 (14 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Post Calibration Data Sheets (Figure 19).

(8) 906-10273-2 (14 Milliohm) Certification Standard Second Loop Measurement

(a) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(b) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(c) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(d) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers Out Phase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(e) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-2 (14 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Post Calibration Data Sheets (Figure 19).

F. Loop Test No. 4, 906-10273-6 (3600 Milliohm) Certification Standard

(1) Position the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(2) Open the Calibration Certification Assembly Case and remove the four Certification Standards.

(3) Clamp the Sense Coupler around one of the cutouts in the 906-10273-6 (3600 milliohm) Certification Standard (Figure 6).

(4) Clamp the Drive Coupler around the other cutout in the 906-10273-6 (3600 milliohm) Certification Standard.

(5) Enter the Certified value of the 906-10273-6 (3600 milliohm) Certification Standard and the ambient temperature in the appropriate location on the Calibration Data Sheets (Figure 19).

(6) Using the Post Calibration Environment Procedure (Paragraph A.) calculate the the temperature corrected value of the 906-10273-6 (3600 milliohm) Certification Standard in the appropriate location on the Post Calibration Data Sheets Figure 19.

(7) 906-10273-6 (3600 Milliohm) Certification Standard First Loop Measurement

(a) Toggle the Mode Selector Toggle Switch to the LOOP position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Press
Start

(c) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(d) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers Out Phase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(e) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-6 (3600 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Post Calibration Data Sheets (Figure 19).

(8) 906-10273-6 (3600 Milliohm) Certification Standard Second Loop Measurement

(a) Press the No Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Drv Cplr Flipped?

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(b) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(c) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(d) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers Out Phase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(e) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the 906-10273-6 (3600 milliohm) Certification Standard shown on the BITE Control Module Display in the appropriate location on the Post Calibration Data Sheets (Figure 19).

G. Joint Test No. 1, HA-2-50 (25 milliohm) Joint Test Shunt Standard

(1) Set the Mode Selector Toggle Switch to the Joint position (Figure 2).

(2) Using braided wire and the HA-2-50 (25 milliohm) Joint Test Shunt Standard, construct the loop configuration as shown in Figure 8.

(3) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 8).

(4) The Certified value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard in the appropriate location on the Post Calibration Data Sheets (Figure 19).

(5) Press the YES Pushbutton on the BITE Control Module (Figure 3) and verify the BITE Control Module Display shows the following indication:
Test In Progress

(6) After approximately 30 seconds verify the BITE Control Module Display shows the following indication:
Display LoopRes?

NOTE: Pressing the YES Pushbutton on the BITE Control Module (Figure 3) the BITE Control Module Display will display the resistance value for approximately 5 seconds. Then the the BITE Control Module Display will change to either Couplers In Phase or Couplers Out Phase for approximately 3 seconds. The YES Pushbutton on the BITE Control Module may be pushed as many times as necessary to record the data.

(7) Press the YES Pushbutton on the BITE Control Module (Figure 3) and record the resistance value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard shown on the BITE Control Module Display in the appropriate location on the Post Calibration Data Sheets (Figure 19).

(8) Press the No Pushbutton on the BITE Control Module (Figure 3).

(9) First Joint Measurement, HA-2-50 (25 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Apply the Joint Probes to the Shunt in the location shown (Figure 8).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(10) Second Joint Measurement, HA-2-50 (25 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 8).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(11) Third Joint Measurement, HA-2-50 (25 milliohm) Joint Test Shunt Standard

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(a) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(b) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(c) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(d) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 8).

(e) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(f) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(12) Fourth Joint Measurement, HA-2-50 (25 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 8).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

H. Joint Test No. 2, HA-2-50 (25 milliohm) and 906-10273-9 (3600 milliohm) Joint Test Shunt Standards

(1) Set the Mode Selector Toggle Switch to the Joint position (Figure 2).

(2) Using braided wire, the HA-2-50 (25 milliohm) and 906-10273-9 (3600 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 9.

(3) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 9).

(4) The Certified value of the 906-10273-9 (3600 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the 906-10273-9 (3600 milliohm) Joint Test Shunt Standard in the appropriate location on the Post Calibration Data Sheets (Figure 19).

(5) First Joint Measurement, HA-2-50 (25 milliohm) and 906-10273-9 (3600 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Apply the Joint Probes to the Shunt in the location shown (Figure 9).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(6) Second Joint Measurement, HA-2-50 (25 milliohm) and 906-10273-9 (3600 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 9).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(7) Third Joint Measurement, HA-2-50 (25 milliohm) and 906-10273-9 (3600 milliohm) Joint Test Shunt Standard

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(a) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(b) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(c) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(d) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 9).

(e) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(f) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(8) Fourth Joint Measurement, HA-2-50 (25 milliohm) and 906-10273-9 (3600 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 9).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

I. Joint Test No. 3, HA-2-50 (25 milliohm) and HA-10-50 (5.0 milliohm) Joint Test Shunt Standards

(1) Set the Mode Selector Toggle Switch to the Joint position (Figure 2).

(2) Using braided wire, the HA-2-50 (25 milliohm) and HA-10-50 (5.0 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 10.

(3) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 10).

(4) The Certified value of the HA-10-50 (5.0 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the HA-10-50 (5.0 milliohm) Joint Test Shunt Standard in the appropriate location on the Post Calibration Data Sheets (Figure 19).

(5) First Joint Measurement, HA-10-50 (5.0 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Apply the Joint Probes to the Shunt in the location shown (Figure 10).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(6) Second Joint Measurement, HA-10-50 (5.0 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 10).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(7) Third Joint Measurement, HA-10-50 (5.0 milliohm) Joint Test Shunt Standard

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(a) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(b) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(c) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(d) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 10).

(e) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(f) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(8) Fourth Joint Measurement, HA-10-50 (5.0 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 10).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(f) The Certified value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the HA-2-50 (25 milliohm) Joint Test Shunt Standard in the appropriate location on the Post Calibration Data Sheets (Figure 19).

(9) First Joint Measurement, HA-2-50 (25 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Apply the Joint Probes to the Shunt in the location shown (Figure 10).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(10) Second Joint Measurement, HA-2-50 (25 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 10).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(11) Third Joint Measurement, HA-2-50 (25 milliohm) Joint Test Shunt Standard

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(a) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(b) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(c) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(d) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 10).

(e) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(f) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(12) Fourth Joint Measurement, HA-2-50 (25 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 10).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

J. Joint Test No. 4, HA-2-50 (25 milliohm) and HA-10-50 (5.0 milliohm) Joint Test Shunt Standards

(1) Set the Mode Selector Toggle Switch to the Joint position (Figure 2).

(2) Using braided wire, the HA-100-50 (0.5 milliohm), the HA-10-50 (5.0 milliohm) and the HA-1-50 (50 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 11.

(3) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 11).

(4) The Certified value of the HA-10-50 (5.0 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the HA-10-50 (5.0 milliohm) Joint Test Shunt Standard in the appropriate location on the Post Calibration Data Sheets (Figure 19).

(5) First Joint Measurement, HA-10-50 (5.0 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Apply the Joint Probes to the Shunt in the location shown (Figure 11).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(6) Second Joint Measurement, HA-10-50 (5.0 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 11).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(7) Third Joint Measurement, HA-10-50 (5.0 milliohm) Joint Test Shunt Standard

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(a) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(b) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(c) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(d) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 11).

(e) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(f) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(8) Fourth Joint Measurement, HA-10-50 (5.0 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 11).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(f) The Certified value of the HA-100-50 (0.5 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the Certified value of the HA-100-50 (0.5 milliohm) Joint Test Shunt Standard in the appropriate location on the Post Calibration Data Sheets (Figure 19).

(9) First Joint Measurement, HA-100-50 (0.5 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Apply the Joint Probes to the Shunt in the location shown (Figure 11).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(10) Second Joint Measurement, HA-100-50 (0.5 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 11).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(11) Third Joint Measurement, HA-100-50 (0.5 milliohm) Joint Test Shunt Standard

NOTE: To invert the phase of the signal from the Sense/Drive Couplers, open either the Sense/Drive Couplers and rotate the coupler 180 degrees and re-attach the Coupler.

(a) Open the Drive Coupler and rotate the coupler 180 degrees and re-attach the Coupler.

(b) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(c) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(d) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 11).

(e) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(f) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

(12) Fourth Joint Measurement, HA-100-50 (0.5 milliohm) Joint Test Shunt Standard

(a) Toggle the Mode Selector Toggle Switch to the Joint position (Figure 2).

(b) Verify the BITE Control Module Display shows the following indication:
Connect Probes

(c) Reverse the location of the Joint Probes and take another reading across the Shunt Standard (Figure 11).

(d) The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
RedoLoop
J XXXXXX

(e) Enter the Measured Joint value in the appropriate locations on the Post Calibration Data Sheets (Figure 19).

13. Loop Resistance Tester Final Calculations to Ensure Calibration

NOTE: THE CERTIFIED VALUE IS RECORDED ON A CERTIFICATION STICKER LOCATED ON THE TEST STANDARD, THE VALUE WAS DETERMINED BY A METROLOGY LAB OR CERTIFYING AGENCY.

NOTE: IN THE FOLLOWING EQUATION THE "VALUE OF THE STANDARD" MAY BE EITHER THE CERTIFIED VALUE AS MARKED ON THE CERTIFICATION STICKER ON THE STANDARD OR THE CERTIFIED VALUE CORRECTED FOR THE AFFECTS OF TEMPERATURE WHICHEVER IS APPROPRIATE.

NOTE: THE % ERROR MUST BE LESS THAN OR EQUAL TO +/-3.5% THIS IS THE PASS/FAIL CRITERIA FOR ALL LRT MEASUREMENTS LISTED IN THE POST CALIBRATION DATA SHEET.

A. Calculate the percent error for all the LRT Post Calibration measurements by using the following equation.

$$\%\ \text{error} = \frac{\text{Value of the standard - LRT Measurement}}{\text{Value of the Standard}} \times 100\%$$

14. Loop Resistance Tester Post Calibration Data Sheet

NOTE: THE FOLLOWING CALIBRATION DATA RECORD SHALL BE USED TO DOCUMENT THE RESULTS OF THE CALIBRATION PROCEDURE.
CALIBRATION SHALL BE REQUIRED ON A ANNUAL BASIS, WITHIN 12 MONTHS FROM THE PREVIOUS CALIBRATION.
CALIBRATION DATA RECORDS SHALL BE ARCHIVED FOR A MINIMUM OF 6 YEARS BY THE USER

A. Record the Certified value (not the Nominal value) of the Loop and Joint Standards

Manufacturer:	The Boeing Company
Name:	Loop Resistance Tester Assembly
Part Number:	906-10247-2
LRT Serial Number:	S/N____________________
Drive Coupler Serial Number	S/N____________________
Sense Coupler Serial Number	S/N____________________
Property Number (User Supplied)	____________________
Original Password:	____________________
New Password if different	____________________

Paragraph and Step	Test Information	LRT Measurements in mΩ or Notes	% Error	Pass/Fail
14.C.(5)	__________mΩ	Certified Value for the 2mΩ Loop Standard	N/A	N/A
	__________°C	Ambient Temperature	N/A	N/A
14.C.(6)	__________mΩ	Loop Value Corrected for Temperature	N/A	N/A
14.C.(7)(e)	Use the Temperature Corrected Value to Calculate % Error	__________mΩ	_____%	PASS/FAIL

Post Calibration Data Sheet
Figure 19 (Sheet 1)

Paragraph and Step	Test Information	LRT Measurements in mΩ or Notes	% Error	Pass/Fail
14.C.(8)(e)	Use the Temperature Corrected Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.D.(5)	____________mΩ	Certified Value for the 8.5mΩ Loop Standard	N/A	N/A
	____________°C	Ambient Temperature	N/A	N/A
14.D.(6)	____________mΩ	Loop Value Corrected for Temperature	N/A	N/A
14.D.(7)(e)	Use the Temperature Corrected Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.D.(8)(e)	Use the Temperature Corrected Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.E.(5)	____________mΩ	Certified Value for the 14mΩ Loop Standard	N/A	N/A
	____________°C	Ambient Temperature	N/A	N/A
14.E.(6)	____________mΩ	Loop Value Corrected for Temperature	N/A	N/A
14.E.(7)(e)	Use the Temperature Corrected Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.E.(8)(e)	Use the Temperature Corrected Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.F.(5)	____________mΩ	Certified Value for the 3600mΩ Loop Standard	N/A	N/A
	____________°C	Ambient Temperature	N/A	N/A
14.F.(6)	____________mΩ	Loop Value Corrected for Temperature	N/A	N/A

Post Calibration Data Sheet
Figure 19 (Sheet 2)

Paragraph and Step	Test Information	LRT Measurements in mΩ or Notes	% Error	Pass/Fail
14.F.(7)(e)	Use the Temperature Corrected Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.F.(8)(e)	Use the Temperature Corrected Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.G.(4)	____________mΩ	Certified Value for the 25mΩ Nominal Joint Test Shunt Standard	N/A	N/A
14.G.(7)	____________mΩ	Resistance Value 25mΩ Nominal Joint Test Shunt Standard	N/A	N/A
14.G.(9)(e)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.G.(10)(e)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.G.(11)(f)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.G.(12)(e)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.H.(4)	____________mΩ	Certified Value for the 3600mΩ Nominal Joint Test Shunt Standard	N/A	N/A
14.H.(5)(e)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.H.(6)(e)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.H.(7)(f)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.H.(8)(e)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL

Post Calibration Data Sheet
Figure 19 (Sheet 3)

Paragraph and Step	Test Information	LRT Measurements in mΩ or Notes	% Error	Pass/Fail
14.I.(4)	___________mΩ	Certified Value for the 5.0mΩ Nominal Joint Test Shunt Standard	N/A	N/A
14.I.(5)(e)	Use the Certified Value to Calculate % Error	___________mΩ	_____%	PASS/FAIL
14.I.(6)(e)	Use the Certified Value to Calculate % Error	___________mΩ	_____%	PASS/FAIL
14.I.(7)(f)	Use the Certified Value to Calculate % Error	___________mΩ	_____%	PASS/FAIL
14.I.(8)(e)	Use the Certified Value to Calculate % Error	___________mΩ	_____%	PASS/FAIL
14.I.(8)(f)	___________mΩ	Certified Value for the 25mΩ Nominal Joint Test Shunt Standard	N/A	N/A
14.I.(9)(e)	Use the Certified Value to Calculate % Error	___________mΩ	_____%	PASS/FAIL
14.I.(10)(e)	Use the Certified Value to Calculate % Error	___________mΩ	_____%	PASS/FAIL
14.I.(11)(f)	Use the Certified Value to Calculate % Error	___________mΩ	_____%	PASS/FAIL
14.I.(12)(e)	Use the Certified Value to Calculate % Error	___________mΩ	_____%	PASS/FAIL
14.J.(4)	___________mΩ	Certified Value for the 5.0mΩ Nominal Joint Test Shunt Standard	N/A	N/A
14.J.(5)(e)	Use the Certified Value to Calculate % Error	___________mΩ	_____%	PASS/FAIL
14.J.(6)(e)	Use the Certified Value to Calculate % Error	___________mΩ	_____%	PASS/FAIL
14.J.(7)(f)	Use the Certified Value to Calculate % Error	___________mΩ	_____%	PASS/FAIL

Post Calibration Data Sheet
Figure 19 (Sheet 4)

Paragraph and Step	Test Information	LRT Measurements in mΩ or Notes	% Error	Pass/Fail
14.J.(8)(e)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.J.(8)(f)	____________mΩ	Certified Value for the 0.5mΩ Nominal Joint Test Shunt Standard	N/A	N/A
14.J.(9)(e)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.J.(10)(e)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.J.(11)(f)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL
14.J.(12)(e)	Use the Certified Value to Calculate % Error	____________mΩ	_____%	PASS/FAIL

Post Calibration Data Sheet
Figure 19 (Sheet 5)

15. Certification Test For the Certification Standards (Performed by Calibration Lab)

NOTE: A loop resistance Certification Standard is made up of three resistors (R1, R2, R3) connected in series (Figure 20). It has three terminals (A, B, C) at the three connecting points. R1 is the resistance between terminals A and B, R2 is between B and C, and R3 is between C and A. It is not possible to open the connections and measure the resistors individually, but it is possible to measure the resistance between each pair of terminals (RAB, RBC, RCA). The objective is to find (R1, R2, R3) given (RAB, RBC, RCA), and then find the total loop resistance (R1 + R2 + R3). Calculating (RAB, RBC, RCA) etc. from (R1, R2, R3) is easy -- RAB is just a series-parallel combination of R1, R2, and R3. Going from RAB etc. to R1 etc. is more difficult. We have three equations and three unknowns, but the equations are nonlinear so matrix methods cannot be used. A solution to the equation was found using a mathematical analysis program

$$R1 = \frac{RAB^2 - 2(RAB \times RBC) + RBC^2 - 2(RAB \times RAC) - 2(RBC \times RAC) + RAC^2}{2(RAB - RBC - RAC)}$$

$$R2 = \frac{RAB^2 - 2(RAB \times RBC) + RBC^2 - 2(RAB \times RAC) - 2(RBC \times RAC) + RAC^2}{2(-RAB + RBC - RAC)}$$

$$R3 = \frac{RAB^2 - 2(RAB \times RBC) + RBC^2 - 2(RAB \times RAC) - 2(RBC \times RAC) + RAC^2}{2(-RAB - RBC + RAC)}$$

A. Remove the ten screws attaching the Certification Standards cover to the box (Figure 20).

B. Using a four-wire ohmmeter, measure the resistance value between the Standard assemblies A and B. This value will be known as RAB.

C. Using a four-wire ohmmeter, measure the resistance value between the Standard assemblies A and C. This value will be known as RAC.

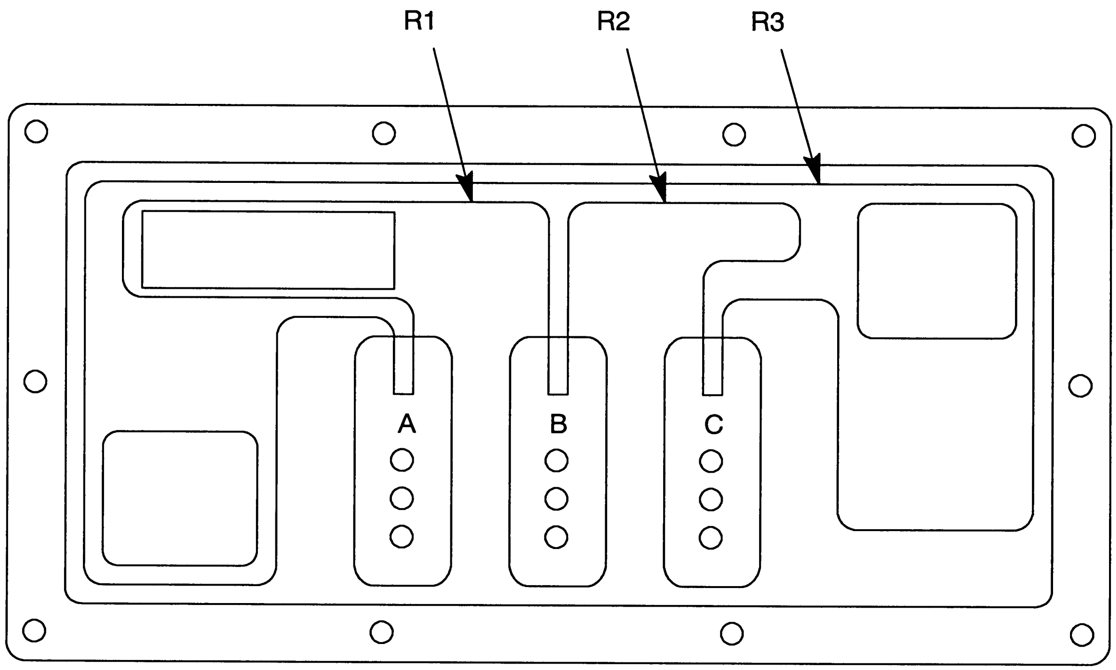
D. Using a four-wire ohmmeter, measure the resistance value between the Standard assemblies B and C. This value will be known as RBC.

E. With the values measured in steps 2,3,4, use the following formula to find a total resistance around the loop. This will be the sum of R1,R2, and R3.

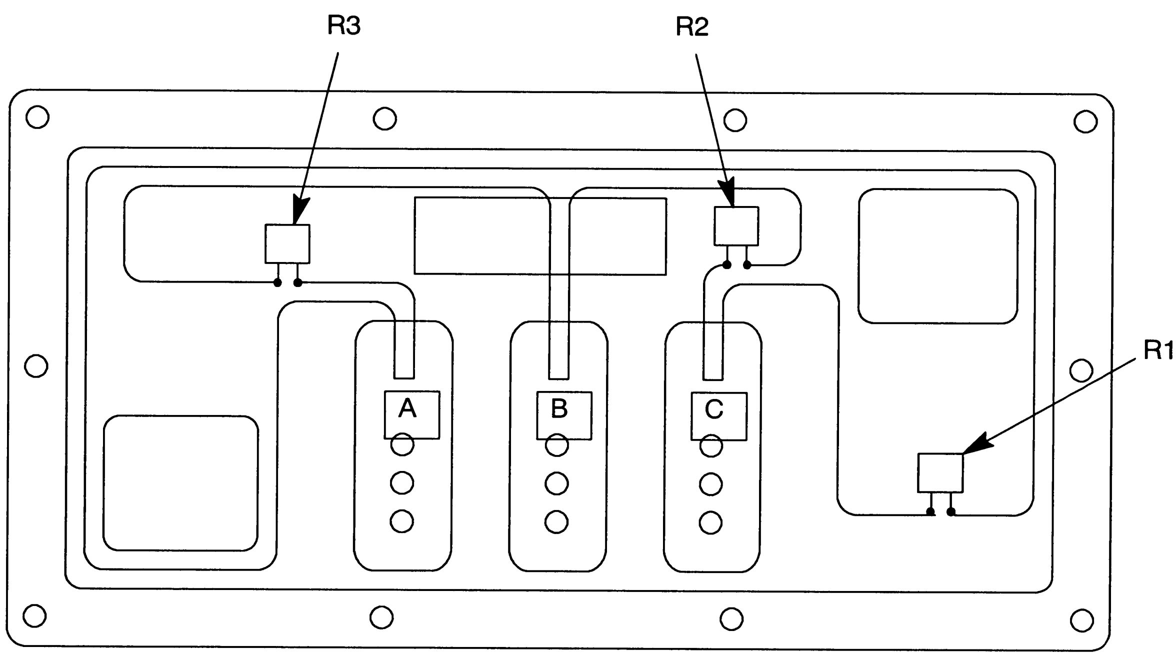
Loop value =

$$R1+R2+R3 = \frac{-(RAB^2 + (RBC - RAC)^2 - 2 \times RAB \times (RBC + RAC))^2}{2(RAB - RBC - RAC) \times (RAB + RBC - RAC) \times (RAB - RBC + RAC)}$$

F. Record the resistance value on the calibration paperwork and apply the Calibration sticker to the cover of the Certification Standard.

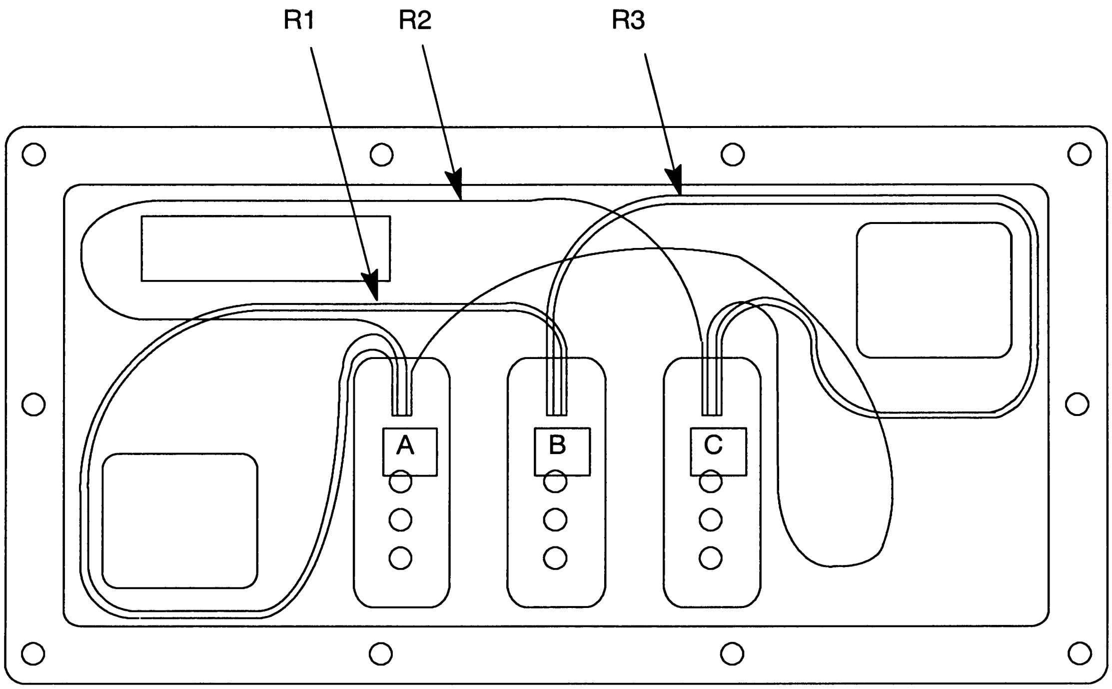


906-10273-2

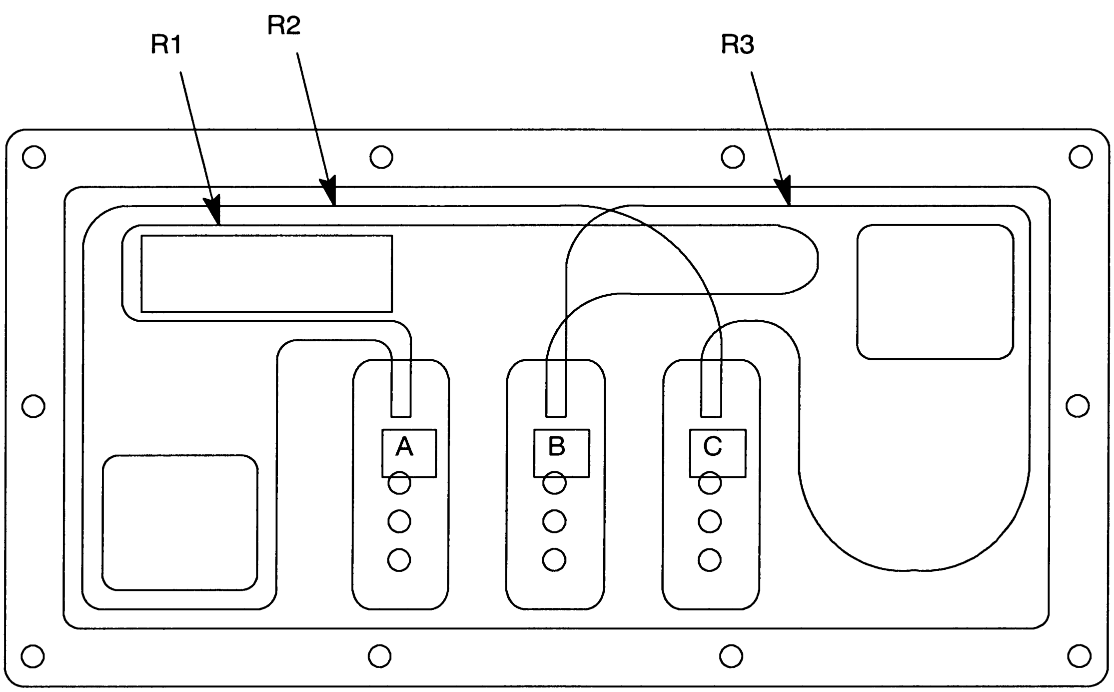


906-10273-6

Certification Standards Detail (906-10273-2 and -6)
Figure 20



906-10273-7



906-10273-8

Certification Standards Detail (906-10273-7 and -8)
Figure 21

SECTION 2 - TESTING/TROUBLESHOOTING

1. Self Test

A. This section contains information used to aid in isolating a fault to either a replaceable assembly or a repair activity. Testing/Troubleshooting should be considered part of an overall maintenance philosophy for maintaining the Loop Resistance Tester. In addition to fault isolation procedures, maintenance data (e.g. wiring diagrams and schematics), as well as vendor documentation should be used.

B. Operator Confidence Test

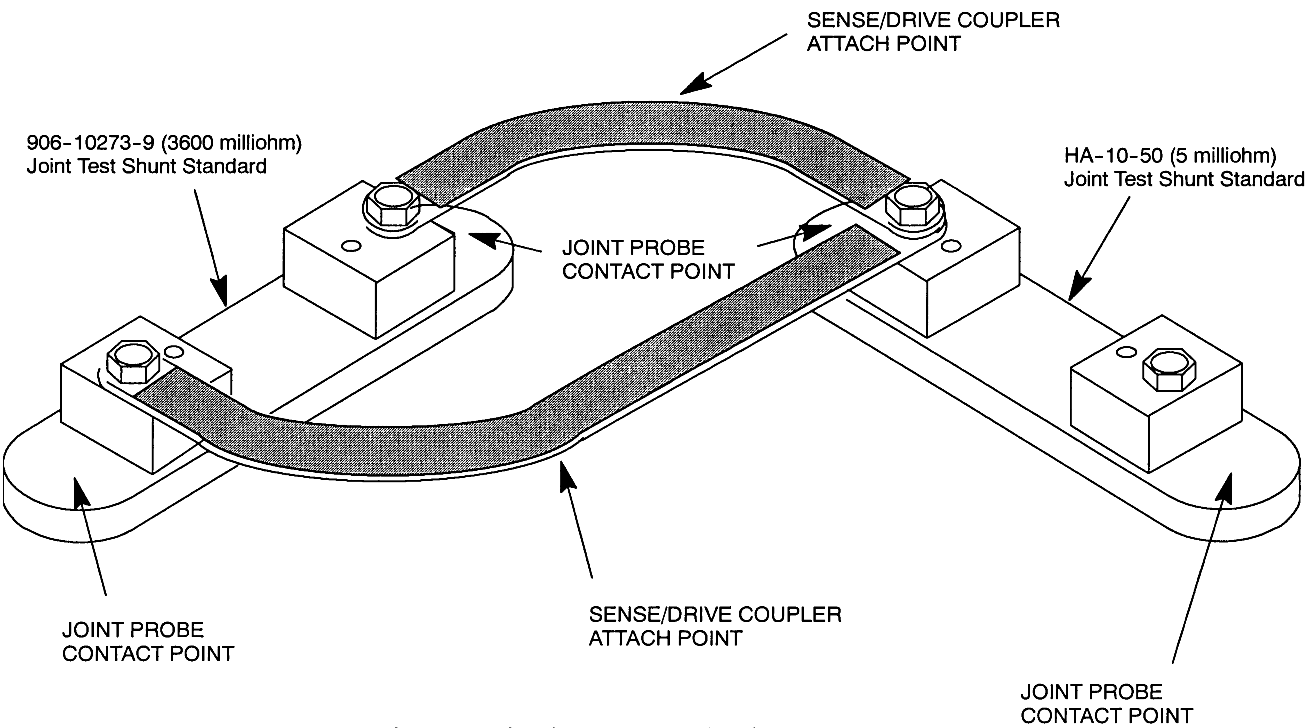
NOTE: The Operator Confinence Test utilizes a condenced portions of the Loop Resistance Tester Functional Test (Chapter 2, Section 1, Paragraph 2) to provide the operator with an indication of proper operation of the LRT before utilizing the LRT for testing.
The LRT measurements should be within +/- 10% of the expected values, or the LRT will require re-calibration. This test can be performed anytime the operator deems necessary.

The following items are required to perform the Operator Confidence Test:

906-10273-9	3600 milliohm Joint Test Shunt Standard
HA-10-50	5 milliohm Joint Test Shunt Standard
Jumper	Braided wire

(2) Test No. 1

(a) Using braided wire, the HA-10-50 (5 milliohm), and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 22.



Operator Confidence Test Configuration No.1
Figure 22

(b) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 22).

(c) The actual value of the HA-10-50 (5 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards are recorded on a Certification Sticker on the standards. Record the actual value of the HA-10-50 (5 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards in the appropriate location.

(d) Using the measurement tolerances for this test +/- 10% and the actual value of the HA-10-50 (5 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards, determine the low and high limits for the loop measurements for the HA-10-50 (5 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standard. Record the low and high limits in the appropriate location.

NOTE: These low and high limits will be used to verify the following LRT is within tolerance of this test.

(e) Loop Value in Loop Mode

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position, and verify the BITE Control Module Display shows the following indication:
Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes.

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton, either a "DRV coup is open" or a "SNS coup is open" indication will be Displayed on the BITE Control Module Assembly Display. This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display.

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:
LOOPVALU
XXX.XXmΩ

9 Record the Measured value in the appropriate location. This value represents the Loop Value in Loop Mode.

10 Using the measurement tolerances for this test +/- 10%. calculate and record the low and high limits in the appropriate location.

NOTE: These low and high limits will be used to verify the LRT Loop Value in Loop Mode is within tolerance with the Loop Value in Joint Mode measurements.

11 Position the Mode Selector Toggle Switch to the JOINT position, and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

12 Ensure that the LEDs on both Joint Probes are lighted red.

13 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

14 Apply the Joint Probes to the Shunt in the location shown (Figure 22).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

15 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

16 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

17 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:
L :XXX.XX
J :XXX.XX

18 Enter the Measured Loop value and Joint value in the appropriate locations.

19 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode Step (e).

20 Verify the Joint Value is within tolerance as calculated Paragraph (d).

(f) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position, and verify the BITE Control Module Display shows the following indication:
Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red.

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the 906-10273-9 (3600 milliohm) Shunt in the location shown (NO TAG).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations.

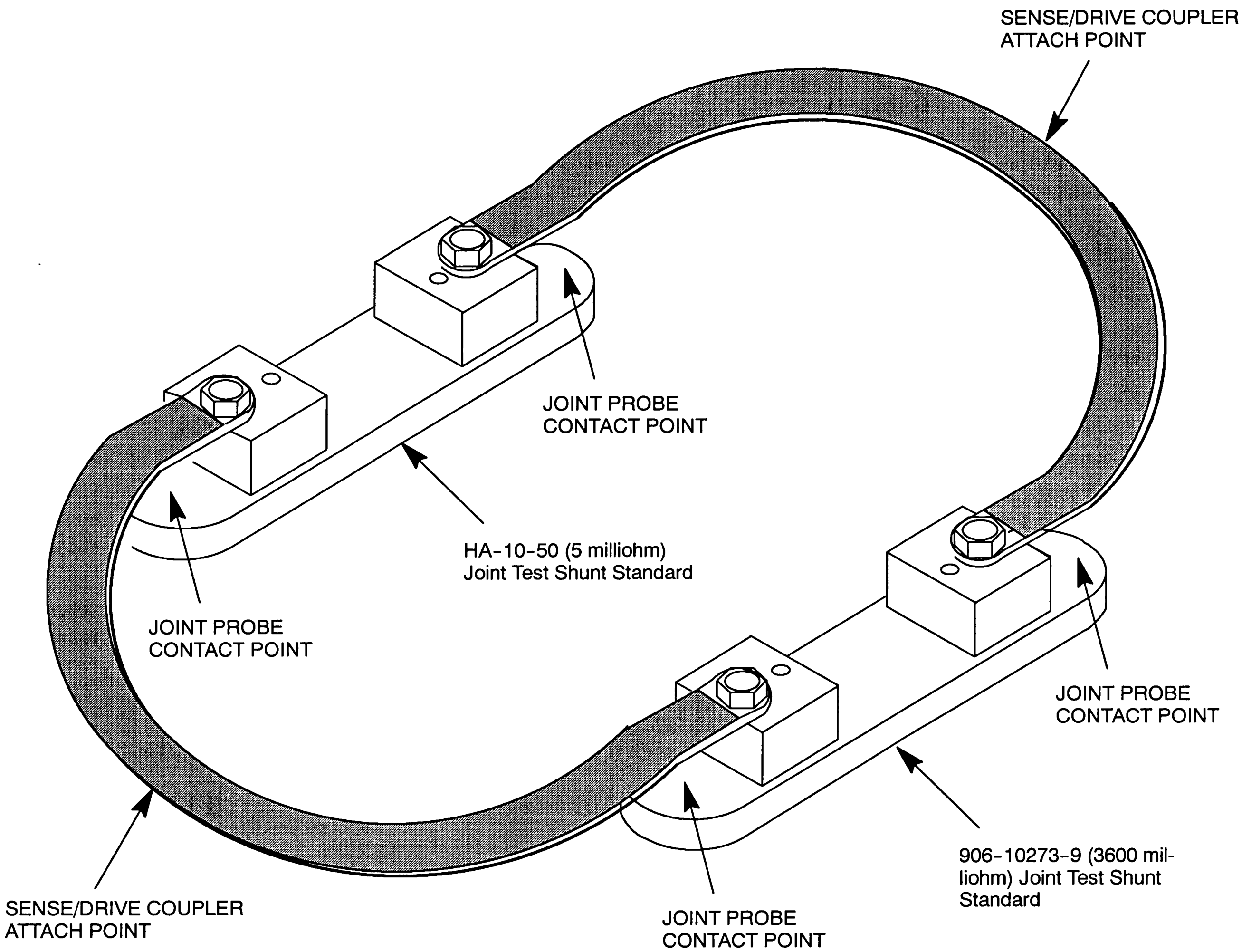
9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode Paragraph (e).

10 Verify the Joint Value is within tolerance as calculated Paragraph B., Step (d).

4 Verify the Joint Value is within tolerance as calculated Paragraph B., Step (d).

(3) Test No. 2

(a) Using braided wire, the HA-10-50 (5 milliohm), and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards, construct the loop configuration as shown in Figure 23.



Operator Confidence Test Configuration No.2
Figure 23

(b) Attach the Sense/Drive Couplers to the braided wire loop in the locations shown (Figure 23).

(c) The actual value of the HA-10-50 (5 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standard is recorded on a Certification Sticker on the standard. Enter the actual value of the HA-10-50 (5 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards in the appropriate location.

(d) Using the measurement tolerances for this test +/- 10% and the actual value of the HA-10-50 (5 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standards, determine the low and high limits for the loop measurements for the HA-10-50 (5 milliohm) and the 906-10273-9 (3600 milliohm) Joint Test Shunt Standard. Record the low and high limits in the appropriate location.

NOTE: These low and high limits will be used to verify the following LRT Joint measurements are within tolerance.

(e) Loop Value in Loop Mode

1 Toggle the Mode Selector Toggle Switch to the JOINT position then back to the LOOP position, and verify the BITE Control Module Display shows the following indication:
Press
Start.

2 Press the Start Pushbutton on either of the Sense/Drive Coupler Control Boxes.

3 Check the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes is lighted green.

4 If the Bi-Colored LED on either of the Sense/Drive Coupler Control Boxes remain red after pressing the Start Pushbutton (Figure 4), either a "DRV coup is open" or a "SNS coup is open" indication will be Displayed on the BITE Control Module Assembly Display. This is an indication of poor closure of the couplers. Gently adjust the couplers by squeezing and releasing the handles to improve the closure.

5 If a green indication cannot be achieved, Refer to Chapter 2, Section 1, for Periodic Maintenance of the Sense/Drive Couplers. If the same indication ("DRV coup is open" or "SNS coup is open") is present then the LRT is defective and must be replaced.

6 Once the Sense/Drive Couplers are closed and both Bi-colored LEDs are lighted green, the "DRV coup is open" or "SNS coup is open" indication will extinguish and the LRT will automatically start the measurement process and Display the Loop Resistance value in milliohms on the BITE Control Module Display.

7 As the measured value is Displayed, the Bi-Colored LEDs on the Control Boxes) will blink green to alert the operator that the measurement is complete. This measurement will be updated continuously about every second.

NOTE: The displayed value may bounce between several values as it is updated, then gradually settle down as successive measurement values are averaged.
For a value above 50 milliohms, it is recommended that the operator record the values to the nearest tenth of a milliohm.

NOTE: During the Loop Measurement, if the LRT determines that the value has changed by too great of an amount (>5%), the indication "UNSTABLE" will appear on the upper line of the BITE Control Module Assembly. The LRT will continue to make the measurements, but the Bi-Colored LED on each of the Sense/Drive Coupler Control Boxes will blink red, not green, when the value is available. This is to alert the operator that something has changed. The measurement will still be made, updated, and displayed, but the average will be restarted when the "UNSTABLE" condition occurs.

8 The measured resistance of the standard will be displayed on the BITE Control Module in the following format:

LOOPVALU
XXX.XXmΩ

9 Enter the Measured value in the appropriate location. This value represents the Loop Value in Loop Mode.

10 Using the measurement tolerances for this test +/- 10%, and the Loop Value in Loop Mode, determine the low and high limits for the Loop Value in Loop Mode measurements. Record the low and high limits in the appropriate location.

NOTE: These low and high limits will be used to verify the LRT Loop Value in Loop Mode is within tolerance with the Loop Value in Joint Mode measurements.

11 Position the Mode Selector Toggle Switch to the JOINT position, and verify the BITE Control Module Display shows the following indication:

Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

12 Ensure that the LEDs on both Joint Probes are lighted red.

13 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

14 Apply the Joint Probes to the Shunt in the location shown (Figure 23).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

15 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

16 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

17 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

18 Enter the Measured Loop value and Joint value in the appropriate locations.

19 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode (Step 8).

20 Verify the Joint Value is within tolerance as calculated Paragraph (d).

(f) Loop Value and Joint Value in Joint Mode

1 Position the Mode Selector Toggle Switch to the JOINT position, and verify the BITE Control Module Display shows the following indication:

Connect Probes

NOTE: After switching the Mode selector Toggle Switch to JOINT, and establishing continuity between the two Joint Probes, the LRT may detect that the Loop current has changed by too large of an amount (>5%). This will be indicated by the LEDs on the both Joint Probes blinking red. The message "REDO LOOP" will also appear on the top line of the BITE Control Module Display. This message cannot be erased except by redoing the Loop Measurement. Once the LEDs have blinked red, they will become solid red again if continuity is interrupted, and solid green when continuity is re-established, and blinking red when the joint measurement is done and the value is displayed. The joint values will then appear on the lower line of the display, and be updated as before. When the Joint measurements have been completed, the Mode Selector Toggle Switch must be switched back to the Loop position and the Loop Measurement test must be redone in order to clear the "REDO LOOP" message from the Display.

2 Ensure that the LEDs on both Joint Probes are lighted red .

3 Visually inspect the Joint Probe Contact pin. If the pin is bent or broken refer to the Joint Probe Contact Pin Removal and Installation procedures (Chapter 2, Section 3).

4 Apply the Joint Probes to the HA-10-50 (5 milliohm) Shunt in the location shown (Figure 23).

NOTE: A good connection is indicated when the LEDs on the Joint Probe turn from red to green. The LRT will automatically start the Joint Test when the LEDs are lighted green.

5 The Joint Probes must be held in place until the completion of the test. This will be indicated by the LED on either Joint Probe blinking green. The test measurement will be displayed in milliohms on the lower line of the BITE Control Module Assembly (Figure 3). These displayed values will be updated continuously as long as the Joint Probes do not break continuity. If the continuity is broken, neither the Loop test values nor the Joint test values will be updated. The last values will be displayed until continuity is re-established.

NOTE: Disconnecting either probe for more than one or two seconds will cause both of the LEDs to turn red. This is to alert the operator that continuity has been interrupted and the LRT is preparing for the next Joint Test measurement.

6 As long as you do not re-initiate continuity between the Joint Probes, the values will be displayed on the BITE Control Module Assembly. Once you start the next Joint test the previous values will be permanently lost.

7 The measured resistance of the Shunt Standard will be displayed on the BITE Control Module in the following format:

L :XXX.XX
J :XXX.XX

8 Enter the Measured Loop value and Joint value in the appropriate locations.

9 Verify the Loop Value in Joint Mode is within tolerance of the Loop Value in Loop Mode Paragraph (e).

10 Verify the Joint Value is within tolerance as calculated Paragraph (3), Step (d).

2. Fault Isolation

A. Sense/Drive Couplers

CAUTION: A THOROUGH UNDERSTANDING OF UL-913, GROUP D, INTRINSIC SAFETY REQUIREMENTS MUST BE UNDERSTOOD AND ADHERED TO. CONFIGURATION CONTROL AND TRACEABILITY MUST BE USED TO RETURN THIS UNIT TO ITS ORIGINAL CONFIGURATION IF THIS LEVEL OF MAINTENANCE IS EXCEEDED.

(1) Visually inspect all cable assemblies for cracks or abrasions in the outer skin of the cables.

(2) Inspect each connector for bent or deformed pins, ensure no foreign matter or debris are in the connectors.

NOTE: Steps (3) through (12), test the windings and the polarity of the Sense/Drive Coupler (Refer to Figure 25).

(3) Connect the windings of the Sense/Drive Coupler into an auto transformer configuration by connecting jumpers between the following pins of the Sense/Drive Coupler connector (Refer to Figure 25):

pins 2 and 3
pins 6 and 7
pins 3 and 8

(4) Set the Function Generator settings to 200 Hz, 2 to 6 volts peak, and sine wave signal.

(5) Connect the Function Generator to the following pins of the Sense/Drive Coupler connector:

signal to pin 1
signal return to pin 4

(6) Connect Oscilloscope NO. 1 to the following pins of the Sense/Drive Coupler connector:

channel 1 to pin 5 with the return clip to pin 6
channel 2 to pin 8

(7) Connect Oscilloscope NO. 2 to the following pins of the Sense/Drive Coupler connector:

channel 1 to pin 1 with the return clip to pin 4
channel 2 to pin 5

(8) On Oscilloscope NO.1, set channels 1 and 2 to any suitable vertical deflection scale that allows full screen viewing of the signal. The signals should be 180 degrees out of phase and equal in amplitude.

(9) On Oscilloscope NO.1, set channels 1 to any suitable vertical deflection scale that allows full screen viewing of the signal.
Set channel 2 to 1/100 vertical deflection of channel 1. This will allow perfect signal size matching of both channels, in a properly functioning Sense/Drive Coupler.

(10) On Oscilloscope NO.2, verify the signals are equal in amplitude and in phase with one another within ±5% tolerance.

(11) On Oscilloscope NO.2, verify the signals are equal in amplitude, 180 degrees out of phase with one another, and 1/200 in amplitude of that indicated by Oscilloscope NO.2, channel 1, within ±5% tolerance.

(12) Squeeze the Sense/Drive Coupler to the fully open position and release. Verify that the action is smooth and free of binding. Squeeze the Sense/Drive Coupler to the fully open position and verify that all amplitudes decrease. Release the Coupler and visually Verify that the Coupler surfaces contact one another.

NOTE: Steps (13) through (19), test the Start Pushbutton.

(13) Connect the Multimeter between the following pins of the Sense/Drive Coupler connector:

pins 9 and 13

(14) Depress the Start Pushbutton several times. Verify less than 1 ohm reading on the Multimeter while the Pushbutton is depressed.

NOTE: Steps (15) through (19), test the Bi-colored LED.

(15) Connect the negative lead of the 5 Volt Direct Current Source to the following pin on the Sense/Drive Coupler connector:

pin 10

(16) Connect the positive lead of the 5 Volt Direct Current Source with approximately 200 ohm resister to the following pin on the Sense/Drive Coupler connector:

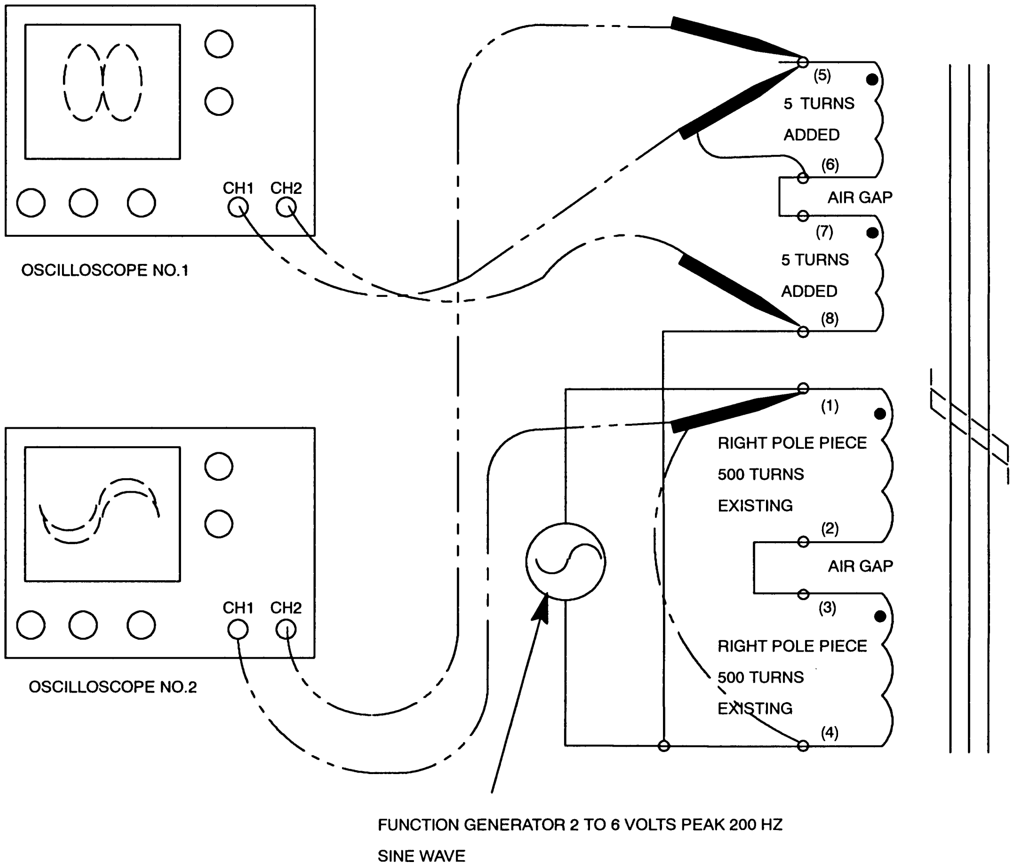
pin 11

(17) Verify the Bi-colored LED is lighted green.

(18) Connect the positive lead of the 5 Volt Direct Current Source with approximately 200 ohm resister to the following pin on the Sense/Drive Coupler connector:

pin 12

(19) Verify the Bi-colored LED is lighted red.



Sense/Drive Coupler Windings and Polarity Test
Figure 25

B. Joint Probes

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.

(1) Refer to the Joint Probe Cable Assembly wiring diagram (Figure 30) for the following test.

(2) Visually inspect all cable assemblies for cracks or abrasions in the outer skin of the cables.

(3) Inspect each connector for bent or deformed pins, ensure no foreign matter or debris are in the connectors.

(4) Using an ohmmeter, check for continuity between pins 1 and 2 of the connector with the probe tips shorted together.

(5) A high reading would indicate an open in the Joint Probes.

(6) Using a 5 VDC power supply in series with a 200 ohm resistor, connect the positive lead to pin 3 of the connector, and the negative lead to pin 4 of the connector.

(7) Verify the green LED on both Joint Probesis lighted.

(8) Failure of the LED to light would indicate an open or bad LED. Repair or replace LED.

(9) Keeping the positive lead on pin 3 of the connector, move the negative lead to pin 5 of the connector.

(10) Verify the red LED is lighted.

(11) Failure of the LED to light would indicate an open or bad LED. Repair or replace LED.

(12) Disconnect the positive lead and 200 milliohm resister from pin 4, and connect to pin 5 of the connector.

(13) Verify the red LED on both Joint Probes is lighted.

(14) Failure of the LED to light would indicate an open or bad LED. Repair or replace LED.

(15) Using a 5V DC Power Supply in series with a 100 milliohm resister, connect the positive lead to pin 6 of the connector, and the negative lead to pin 3.

(16) Verify the white LED on Probe 1 is lighted.

(17) Disconnect the positive lead and 100 milliohm resister from pin 6, and connect to pin 7 of the connector.

(18) Verify the white LED on Probe 2 is lighted.

C. Internal Battery Pack

NOTE: The Battery Pack consist of eight ”type F” Ni-Cd cells connected in series for a maximum output voltage of 12 VDC. The Battery Pack includes a Battery Termination PW Assembly that directs power to the Main PW Assembly (Wiring Harness Assembly) of the LRT or to the Battery Charger Connector. The Battery Termination PW Assembly automatically re-directs the power from the Main PW Assembly (Wiring Harness Assembly) to the Battery Charger connector when the Battery Charger is connected.

NOTE: When the Charger connector is connected, pins 8 and 9 of the Battery Pack connector are shorted to ground (Figure 32). This turns on transistors Q10 and Q11, and turns off transistors Q61, Q62, Q63, and Q66. When the Battery Charger connector is not connected, pins 8 and 9 of the Battery Pack connector are no longer shorted to ground. This allows the gate voltage of both transistors Q10 and Q11 to rise and equal the Battery voltage, then both transistors turn OFF.

(1) Remove all cable assemblies from the LRT.

(2) Ensure the RUN - OFF/CHARGE switch (S1) is in the OFF/CHARGE position.

(3) On the Battery Charger connector, short pins 8 or 9 to either of pins 1, 2, or 4. Refer to Wiring Harness Assembly - Wiring Diagram (Figure 29).

(4) Using a Digital Voltmeter, check for voltage between pins 10 and 4 of the Battery Charger connector (J4) and record the voltage.

(5) On the Battery connector (P3) of the Wiring Harness Assembly, short pins 8 or 9 to either of pins 1, 2, or 4.

(6) Using a Digital Voltmeter, check for voltage between pins 10 and 4 of the Battery connector (P3) of the Wiring Harness Assembly.

(7) If the voltage is less than 5 volts in step (4) and greater than 5 volts in step (6), the wiring between the Battery connector (P3) and Battery Charger connector (J4).

(8) Perform the Display Panel Removal Procedures (Chapter 2, Section 3).

(9) Remove and inspect fuse. Replace if necessary.

(10) On the Internal Battery Pack connector, short pins 8 or 9 to either of pins 1, 2, or 4. Refer to Battery Pack - Wiring Diagram (Figure 32).

(11) Using a Digital Voltmeter, check for voltage between pins 10 and 4 of the Internal Battery Pack connector.

(12) Refer to the Battery Termination PW Assembly Removal Procedures for removal of the Battery Pack Cover (Chapter 2, Section 3).

(13) If the voltage is greater than 5 volts in step (11), proceed to step (20).

(14) If the voltage is less than 5 volts, check the gate voltage of the transistors Q10 and Q11. With the positive probe on the point between resistors R10 and R11, and the negative probe to ground.

(15) If the gate voltage between transistors Q10 and Q11 is zero volts, replace transistors Q10 and Q11.

(16) If the gate voltage between transistors Q10 and Q11 is not zero volts, check the connections between pin 8 and 9 on the internal Battery Pack connector and/or replace resistors R10 and R11.

NOTE: When the Charger connector is connected, pins 8 and 9 of the Battery Pack connector are shorted to ground. This turns on transistors Q10 and Q11, and turns off transistors Q61, Q62, Q63, and Q66. When the Battery Charger connector is not connected, pins 8 and 9 of the Battery Pack connector are no longer shorted to ground allowing the gate voltage on both transistors Q61 and Q66 rise to equal the Battery voltage, then both transistors turn ON. This lowers the gate voltage on transistors Q62 and Q63 to zero volts, and turns both Q62 and Q63 ON. The Internal Battery is then connected to pin 7 of the Internal Battery Pack connector. If a large current is drawn from the Battery Pack, the Positive Temperature Coefficient (PTC) thermistor (RT30) will heat up and become a large resistance, and disconnect pin 7 from the Internal Battery.

(17) Ensure pins 8 or 9 are not shorted to pins 1, 2, or 4.

(18) Using a Digital Voltmeter, check for voltage between pins 7 and 4 of the Internal Battery Pack connector.

(19) If the voltage is greater than 5 volts in step (18), proceed to step (30).

(20) Measure the voltage throughout the circuit from E103 to E26. Leaving the probe on E103, step measure the probe from E26 through the circuit towards E103 to determine where the Battery voltage drops to zero volts.

(21) If the voltage stops after a transistor such as Q62 or Q63, check the gate voltage of that transistor.

(22) If the gate voltage is around zero volts, replace that transistor Q62 or Q63.

(23) If the gate voltage is not around zero volts, check the gate voltage on the driving transistor (Q66 drives Q63 and Q61 drives Q62).

(24) If the gate voltage of the driving transistor (Q66 or Q61) is greater than 5 volts, replace that driving transistor.

(25) If the gate voltage of the driving transistor (Q66 or Q61) is less than 5 volts, Check voltage across C61.

(26) If the voltage across C61 is greater than 5 volts, check the resistance of R60 and R66.

(27) If the Resistance of R60 and R66 is correct, replace Q61 and Q66.

(28) If the resistance of R60 and R66 is not correct, replace R60 or R66.

(29) If the voltage across C61 is less than 5 volts, replace E64 or 61.

(30) On the Internal Battery Pack connector, short pins 8 or 9 to either of pins 1, 2, or 4. Refer to Battery Pack - Wiring Diagram (Figure 29).

(31) Using a Digital Voltmeter, check for voltage between pin 7 and 4 of the Internal Battery Pack connector.

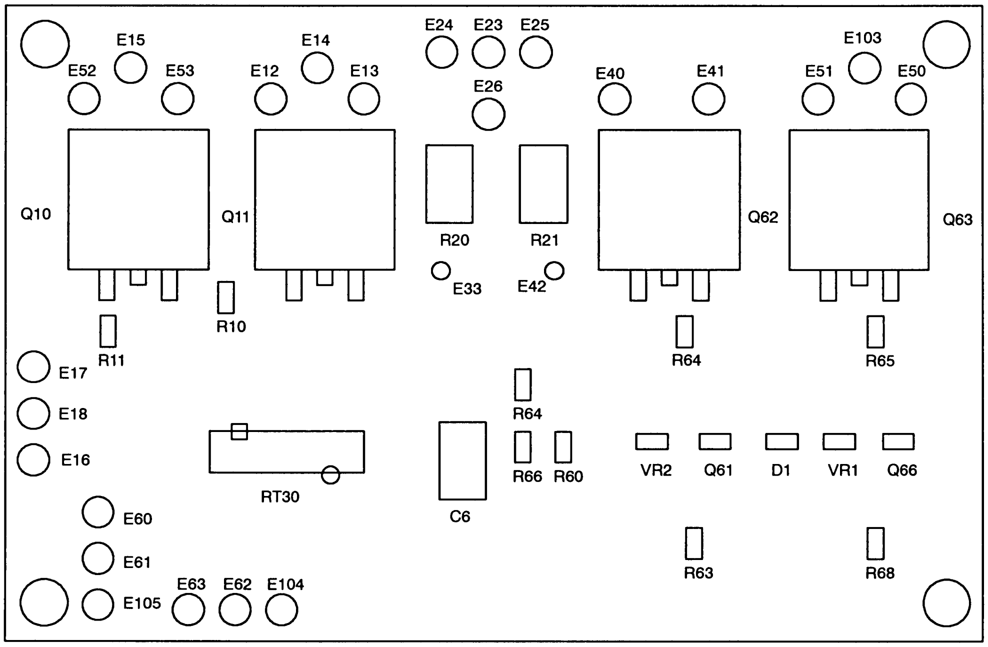
(32) Verify that voltage is removed from pin 7.

(33) Refer to the Battery Termination PW Assembly Installation Procedures for installation of the Battery Pack Cover (Chapter 2, Section 3).

(34) Perform Display Panel Installation Procedures (Chapter 2, Section 3).

(35) Restore LRT to operational condition.

(36) Perform the Battery Charging Procedures (Chapter 1, Section 2).



Battery Termination PW Assembly
Figure 26

D. Battery Charger (103486-1, Sage)

(1) If a Battery Charger malfunction is suspected, ensure that the AC power cord is unplugged from both the AC power source and the Input Power Module on the back of the Battery Charger.

(2) Inspect the Battery Charger connector on the LRT for bent pins, dirt or debris.

(3) Inspect the Battery Charger Cable and the AC power cord for cracks abrasions. Also inspect the connectors for bent pins, dirt, or debris.

(4) Open the hinged fuse block cover on the Input Power Module and inspect the 2 Amp fuse. Replace if necessary.

NOTE: The Battery Charger can be configured for either 120 VAC, 60 Hz or 250 VAC, 50 Hz.

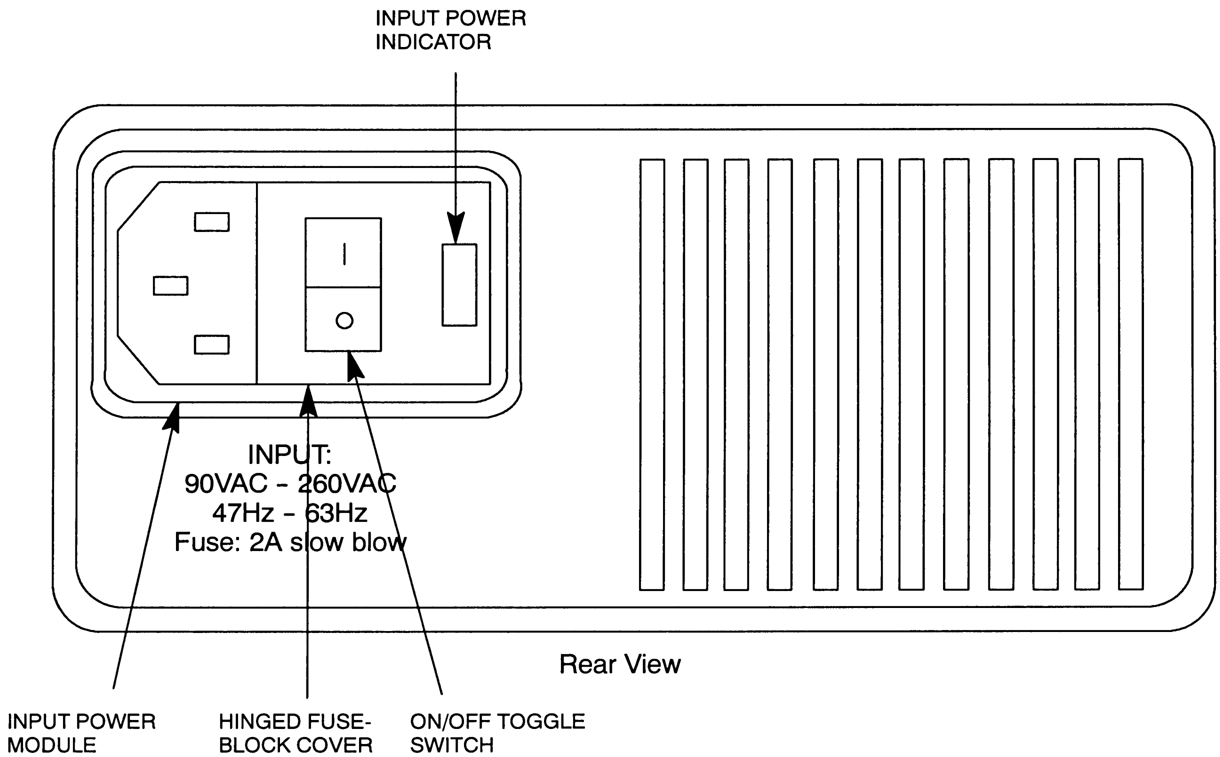
(5) Ensure that the Battery Charger is configured for the appropriate power source (120 VAC, 60 Hz or 250 VAC, 50 Hz) by reading the Input Power indicator on the Input Power Module.

(6) If the Battery Charger Input Power configuration is not correct, open the hinged fuse block cover and pull to remove the Fuse Block and Jumper Assembly. Rotate the Fuse Block and Jumper Assembly to the desired voltage configuration and re-install in the Input Module. Close the hinged fuse block cover on the Input Power Module and verify the proper input voltage configuration.

(7) If a second LRT is available, perform the Battery Charger Procedures (Chapter 1, Section 2) on the second LRT.

(8) If abnormal indications are observed, the Battery Charger is faulty and must be repaired or replaced.

(9) If normal operation is observed, then the first LRT is faulty. Perform the Internal Battery Pack Testing/Troubleshooting procedure (Paragraph C.)



Battery Charger Assembly (103486-1, Sage)
Figure 27

E. BITE Control Module Assembly

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.

(1) Ensure the LRT OFF/CHARGE - RUN switch is in the "OFF/CHARGE" position.

(2) Connect the RS232 Cable Assembly to the RS232 connector on the LRT.

(3) Connect the nine pin connector (P1) to the Terminal or PC to be used.

(4) On the Terminal or PC to be used, set up an RS232 Terminal/Terminal Emulation Program to 9600 baud, xon/xoff handshaking, 8bits, 1 stop bit.

(5) Switch the OFF/CHARGE - RUN switch to the "RUN" position.

NOTE: Step (7) has to be performed within five seconds of performing step (6).

(6) On the BITE Control Module Assembly, press the orange "ON/OFF" pushbutton.

(7) At the Terminal or PC to be used, type a "space bar" character followed by a "carriage return" character.

(8) Verify the following indication on the Terminal or PC:
FTK: 68332; VERSION 1.6B

(9) To test the BITE Display Module interface, type the following command:
40 40.0030 C! 40 40.0070 C!

NOTE: A minimum of two seconds must be allowed after performing step (9), before step (11) can be performed.

(10) Verify the BITE Control Module Assembly shows an alternating checkerboard pattern.

(11) Type the following command:
40.0030 READB

(12) Verify the following indication on the Terminal or PC:
20 OK

(13) Type the following command:
40.0070 READB

(14) Verify the following indication on the Terminal or PC:
20 OK

F. Main Board (Wiring Harness Assembly)

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.

NOTE: The Main Board (wiring Harness Assembly Testing/Troubleshooting Procedures have been devided into three sub-categories that are associated with the probable causes of malfunction most likely to occur during normal operation or the performance of the Functional Test Procedures (Chapter 2, Section 1) .The three sub-categories are Power-Up, Loop Measurements, and Joint Measurements.

(1) Power-Up

NOTE: This section of the Main Board (Wiring Harness Assembly) Testing/Troubleshooting covers the possible problems associated with not receiving the "Testing Hardware" indication on the BITE Control Module Display during the Power-Up portion of the Functional Test.

NOTE: This test assumes that the Battery Charging Procedure has been successfully completed prior to the start of this test.

(a) Ensure the LRT OFF/CHARGE - RUN switch is in the "OFF/CHARGE" position.

(b) Connect the RS232 Cable Assembly to the RS232 connector on the LRT.

(c) Connect the nine pin connector (P1) to the Terminal or PC to be used.

(d) On the Terminal or PC to be used, set up an RS232 Terminal/Terminal Emulation Program to 9600 baud, xon/xoff handshaking, 8 bits, 1 stop bit.

(e) Switch the OFF/CHARGE - RUN switch to the "RUN" position.

NOTE: Step (g) has to be performed within five seconds of performing step (f).

(f) On the BITE Control Module Assembly, press the orange "ON/OFF" pushbutton.

(g) At the Terminal or PC to be used, type a "space bar" character followed by a "carriage return" character.

NOTE: The following step checks that the +5 volt power is active in the LRT.

(h) Verify the following indication on the Terminal or PC:
FTK: 68332; VERSION 1.6B

(i) If FTK: 68332; VERSION 1.6B is indicated on the Terminal or PC, proceed to step (aa).

(j) Disconnect the RS232 Cable Assembly from the LRT.

(k) Ensure the RUN - OFF/CHARGE switch is in the "RUN" position.

(l) Remove twenty screws and washers attaching the Display Panel Assembly to the case. Refer to the Display Panel Removal procedures (Chapter 2, Section 3).

(m) Lift the Display Panel Assembly carefully to access the Main Board (Wiring Harness Assembly) without damaging the wiring.

(n) With a Digital Multimeter, check for voltage between pins 5 and 8 of the RUN - OFF/CHARGE switch (S1). Refer to the Wiring Harness Assembly - Wiring Diagram (Figure 29).

(o) If the voltage is less the 5 volts, the Battery Connector (P3) is faulty and needs to be replaced.

(p) Check for voltage between E_BATT and E_BATT_RTN on the Main Board (Wiring Harness Assembly.

(q) If the voltage is less the 5 volts, the RUN - OFF/CHARGE switch (S1) is faulty and needs to be replaced.

(r) If the voltage is greater than 5 volts, check for voltage between V110, pin 7 and ground, when pressing the On/Off switch. Refer to PW Assembly - Wiring Diagram (Figure 33).

(s) If the voltage is less than 5 volts, the U90 circuit of the Power Converter is faulty and needs to be replaced.

(t) If voltage is greater than 5 volts, check for voltage between E_P12 of the Power Converter and ground.

(u) If +12 volts is not present, the Power Converter is faulty and needs to be replaced.

(v) Check for voltage between E_N12 of the Power Converter and ground.

(w) If -12 volts is not present, the Power Converter is faulty and needs to be replaced.

(x) Check for voltage between E_P5 of the Power Converter and ground.

(y) If +5 volts is not present, the Power Converter is faulty and needs to be replaced.

(z) Re-install the Display Panel Assembly and the 20 screws and washers. Refer to the Display Panel Installation procedures (Chapter 2, Section 3).

(aa) To enable the character echoing, type the following command:
ECHO

(ab) To test the Main Board RAM, type the following command:
20.0000 3FFFF 20.0000 TEST_RAM.

(ac) Verify the following indication on the Terminal or PC:
1 OK

(ad) To test the RAM address, type the following command:
20.0000 12 TEST_ADDR.

(ae) Verify the following indication on the Terminal or PC:
1 OK

(af) To test the dual-port RAM, type the following command:
50.0000 3FFF 50.0000 TEST_RAM.

(ag) Verify the following indication on the Terminal or PC:
1 OK

(2) Coupler Open

NOTE: This section of the Main Board (Wiring Harness Assembly) Testing/Troubleshooting covers the possible problems associated with not being able to meet the ±5% tolerance required during the Loop portion of the Functional Test Procedure (Chapter 2, Section 1).

NOTE: This test assumes that the Sense/Drive Couplers Testing/Troubleshooting Procedure has been successfully completed prior to the start of this test.

(a) Using an Ohmmeter, check the continuity of the wiring and between the Sense/Drive Coupler (J1) and the PW Assembly at the following location. Refer to Wiring Harness Assembly - Wiring Diagram (Figure 29):

J1-1 - E_GNU4
J1-4 - E_IS2
J1-5 - E_GNU1
J1-8 - E_VS1

(b) If continuity is not present, the connector (J1) and/or the wiring between the connector and PW Assembly is faulty and needs to be replaced.

(c) Check the continuity of the jumpers between the following pins on the Sense/Drive Coupler (J1):

J1-2 - J1-3
J1-6 - J1-7

(d) If continuity is not present, the jumpers between the pins on connector (J1) is faulty and needs to be replaced.

(e) Using an Ohmmeter, check the continuity of the wiring and between the Sense/Drive Coupler (J2) and the PW Assembly at the following location:

J2-1 - E_GNU3
J2-4 - E_IS1
J2-5 - E_GNU2
J2-8 - E_VS2

(f) If continuity is not present, the connector (J2) and/or the wiring between the connector and PW Assembly is faulty and needs to be replaced.

(g) Check the continuity of the jumpers between the following pins on the Sense/Drive Coupler (J2):

J2-2 - J2-3
J2-6 - J2-7

(h) If continuity is not present, the jumpers between the pins on connector (J2) is faulty and needs to be replaced.

(i) If continuity is present, the relay K201 is faulty, replace relay K201.

(3) Loop Measurement

NOTE: This section of the Main Board (Wiring Harness Assembly) Testing/Troubleshooting covers the possible problems associated with not being able to get the Bi-colored LEDs to change from red to green during the Loop portion of the Functional Test Procedure (Chapter 2, Section 1).

NOTE: This test assumes that the Sense/Drive Couplers Testing/Troubleshooting Procedure has been successfully completed prior to the start of this test.

(a) If the bad Loop reading was indicated while reading the 6.5 milliohm Certification Standard, then the CURRENT_1 circuit on the PW Assembly is faulty and must be replaced. Refer to PW Assembly - Wiring Diagram (Figure 33).

(b) Test the following components of the CURRENT_1 circuit to determine which component(s) are faulty, and replace the faulty component:

K201, R250, U220, R220, C227, R232, R233,
R234, R235, U221, R236, C228, and C229.

(c) If the bad Loop reading was indicated while reading either the 14, 50, or 117 milliohm Certification Standards, then the CURRENT_2 circuit of the PW Assembly is faulty and must be replaced.

(d) Test the following components of the CURRENT_2 circuit to determine which component(s) are faulty, and replace the faulty component(s):

K201, R250, U220, R220, C220, R221, R222, R224, R225, C221, C222, R226, R227, C223, R229, R228, C225, C226, C224, R230, R231, U303, U305, and U304.

(e) If bad Loop readings were indicated while reading all of the Certification Standards, then the CURRENT_1, CURRENT_2, VOLTAGE, and the 4.3V ZENER PROTECTION circuits of the PW Assembly are suspect.

(f) Test the following components of the CURRENT_1, CURRENT_2, VOLTAGE and the 4.3V ZENER PROTECTION circuit, and replace the faulty component(s):

K201, R250, U220, R220, C227, R232, R233, R234, R235, U221, R236, C228, C229, C220, R221, R222, R224, R225, C221, C222, R226, R227, C223, R229, R228, C225, C226, C224, R230, R231, U303, U305, U304, R237, R238, C230, C231, R241, R242, R243, C235, C234,R244, R245, C236, R246, C238, C239, R248, R249, C237, R351, R350, R353, R352, R354, VR300, VR301, and C350.

(4) Connect Probes

NOTE: This section of the Main Board (Wiring Harness Assembly) Testing/Troubleshooting covers the possible problems associated with the Joint Probes Bi-colored LEDs not being able to switch from red to green as required during the Joint portion of the Functional Test Procedure (Chapter 2, Section 1).

NOTE: This test assumes that the Joint Probes Testing/Troubleshooting Procedure has been successfully completed prior to the start of this test.

(a) Using a Digital Voltmeter, check pin 14 of the Operational Amplifier (U241) for 3.7 volts. Refer to PW Assembly - Wiring Diagram (Figure 33).

(b) While shorting the Joint probes together, check pin 14 of the Operational Amplifier (U241) for 0 volts.

(c) If 3.7 volts are present in step (a), and 0 volts are present in step (b), replace the following components of the 4.3V ZENER OVERVOLTAGE PROTECTION CIRCUIT:

U301, U304, and U305

(d) If 3.7 volts are not present in step (a), and 0 volts are not present in step (b), check for 1.7 volts between E_PA and E_PB.

(e) If 1.7 volts are not present between E_PA and E_PB, replace the following components of the CONNECTED circuit:

R260, R261, and R262

(f) While shorting the probes together, check for 0 volts between E_PA and E_PB.

(g) If 0 volts are not present in step (f), the wiring between E_PA and E_PB and the Joint probe connector (J5) is faulty and needs to be replaced.

(h) If 1.7 volts are present in step (d) and 0 volts are present in step (f), replace the following components of the CONNECTED circuit:

R281, R282, R284, U241, and R283.

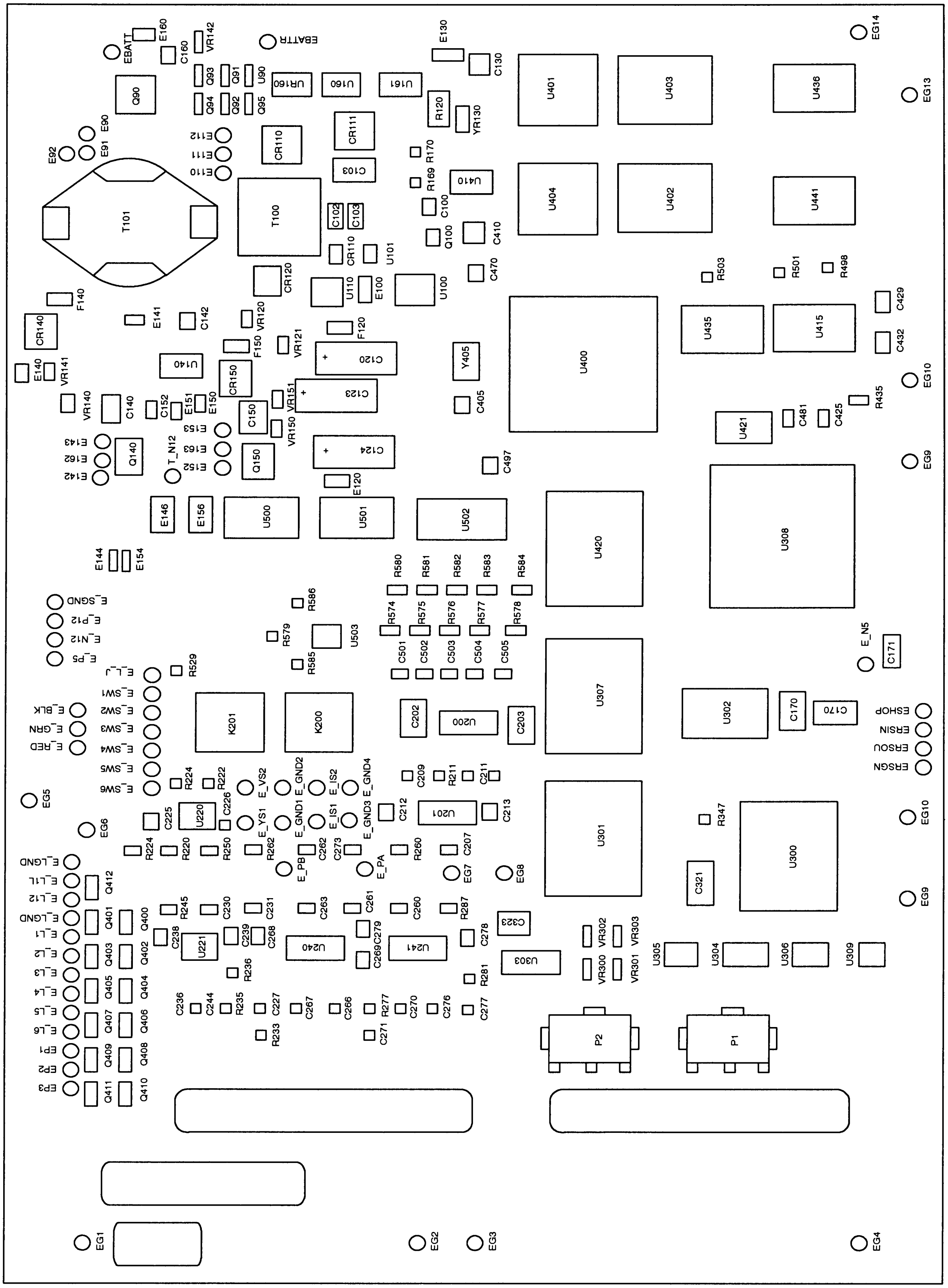
(5) Joint Measurement

NOTE: This section of the Main Board (Wiring Harness Assembly) Testing/Troubleshooting covers the possible problems associated with not being able to meet the ±5% of the Shunt tolerance or ±0.2 milliohm of shunt value, which ever is greater, required during the Joint portion of the Functional Test Procedure (Chapter 2, Section 1).

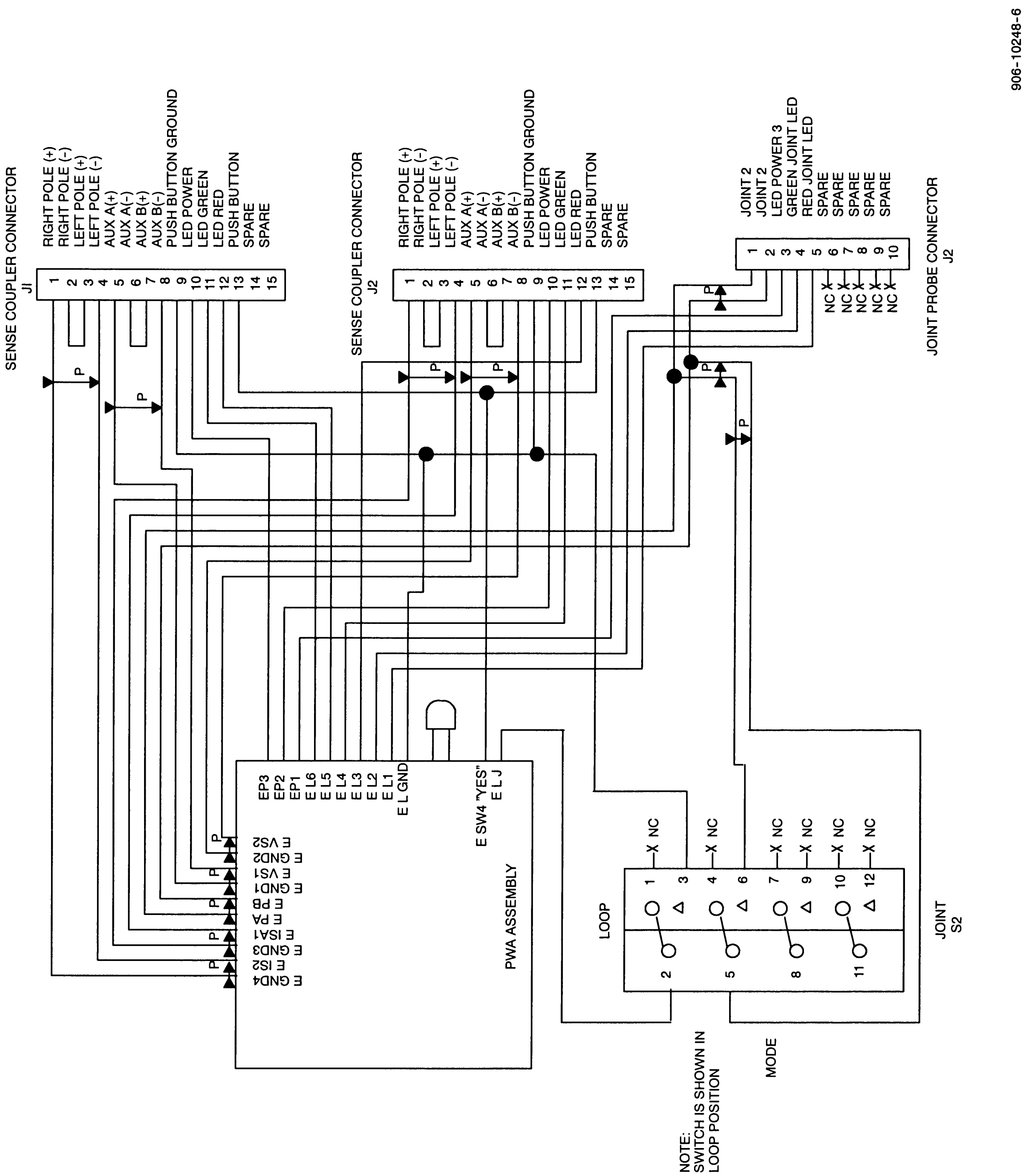
NOTE: This test assumes that the Joint Probes Testing/Troubleshooting Procedure has been successfully completed prior to the start of this test.

NOTE: The Joint-1 circuit, is an instrumentation amplifier of gain 1000. The Joint-2 circuit, is an instrumenttation amplifier of gain 10,000.

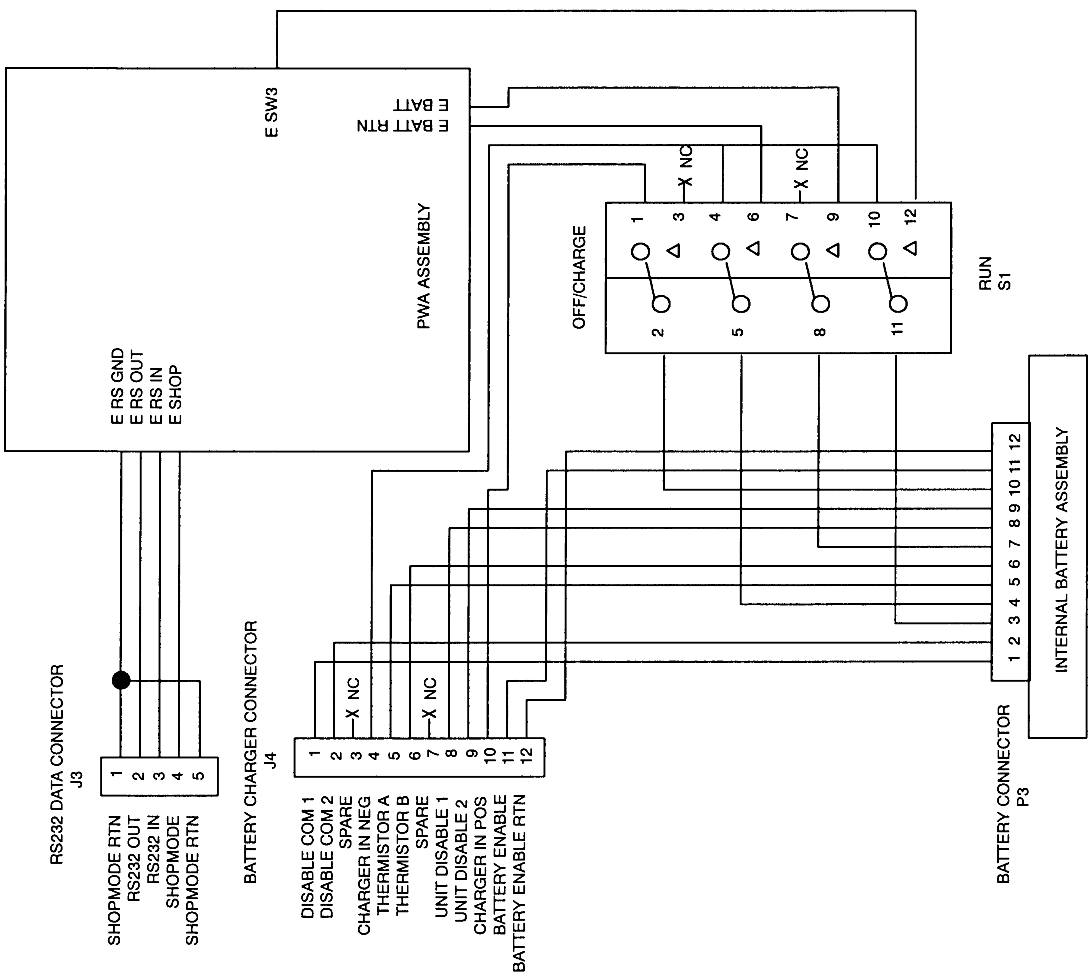
(a) Refer to Refer to PW Assembly - Wiring Diagram (Figure 33) to troubleshoot the Joint-1 and Joint-2 circuits.



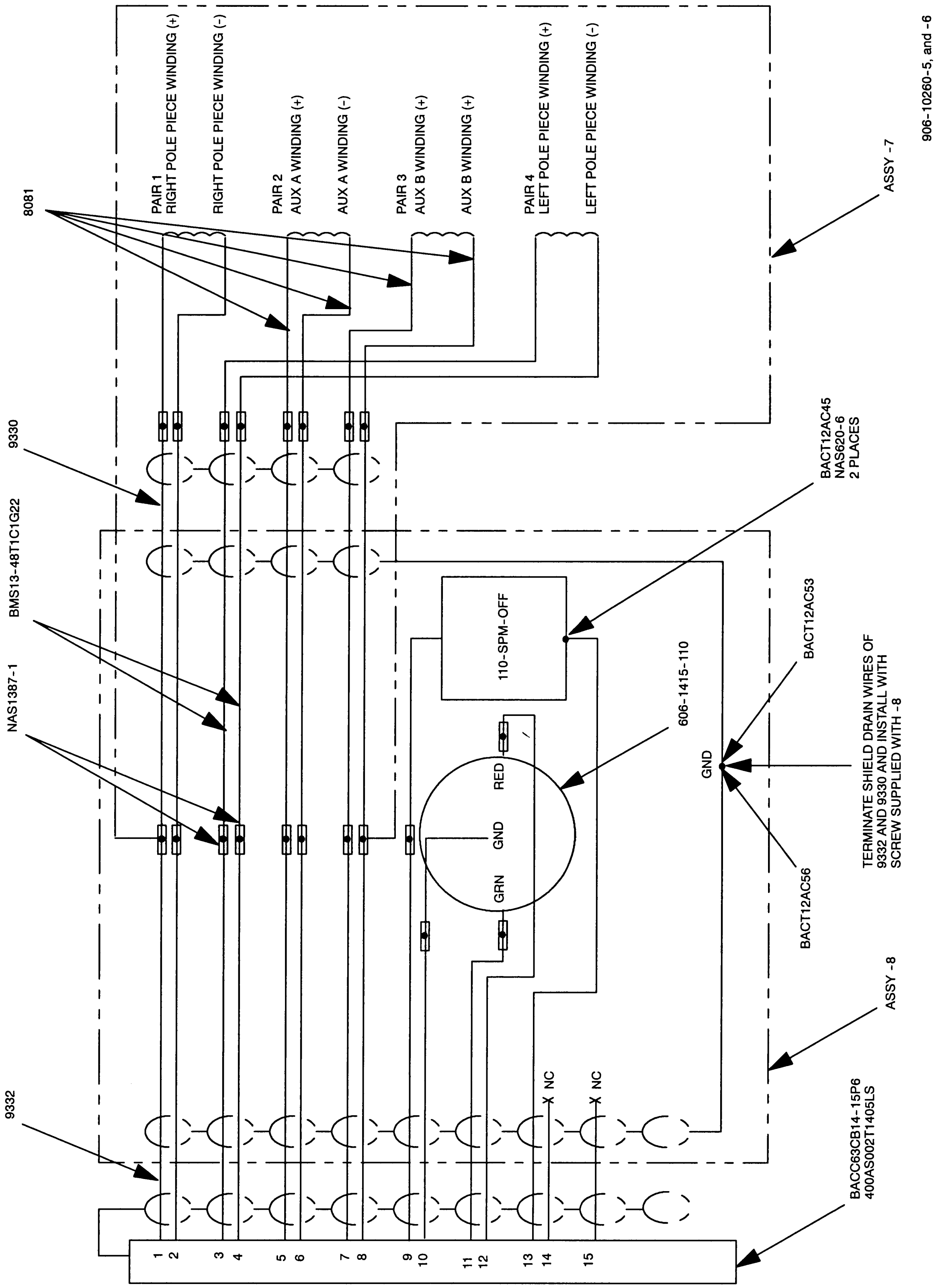
PW Assembly
Figure 28



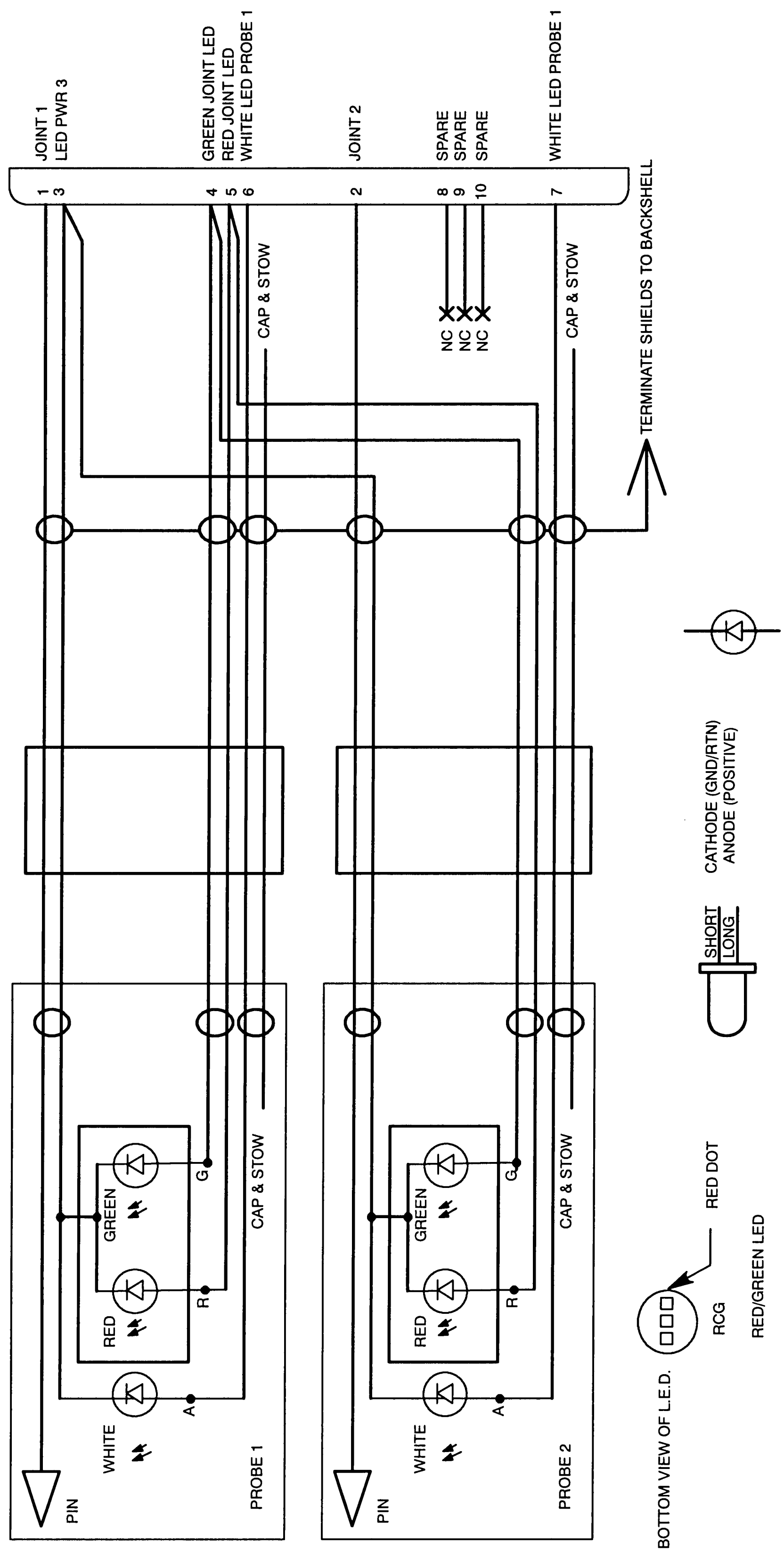
Wiring Harness Assembly - Wiring Diagram
Figure 29 (Sheet 1)



Wiring Harness Assembly - Wiring Diagram
Figure 29 (Sheet 2)



Sense/Drive Coupler Cable Assembly - Wiring Diagram
Figure 29



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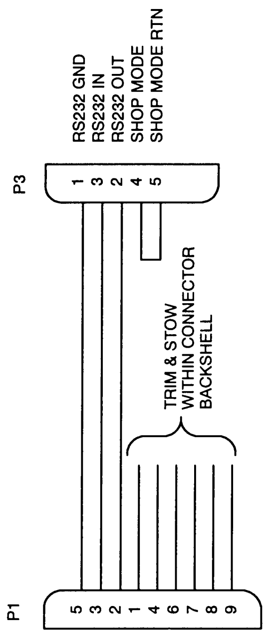
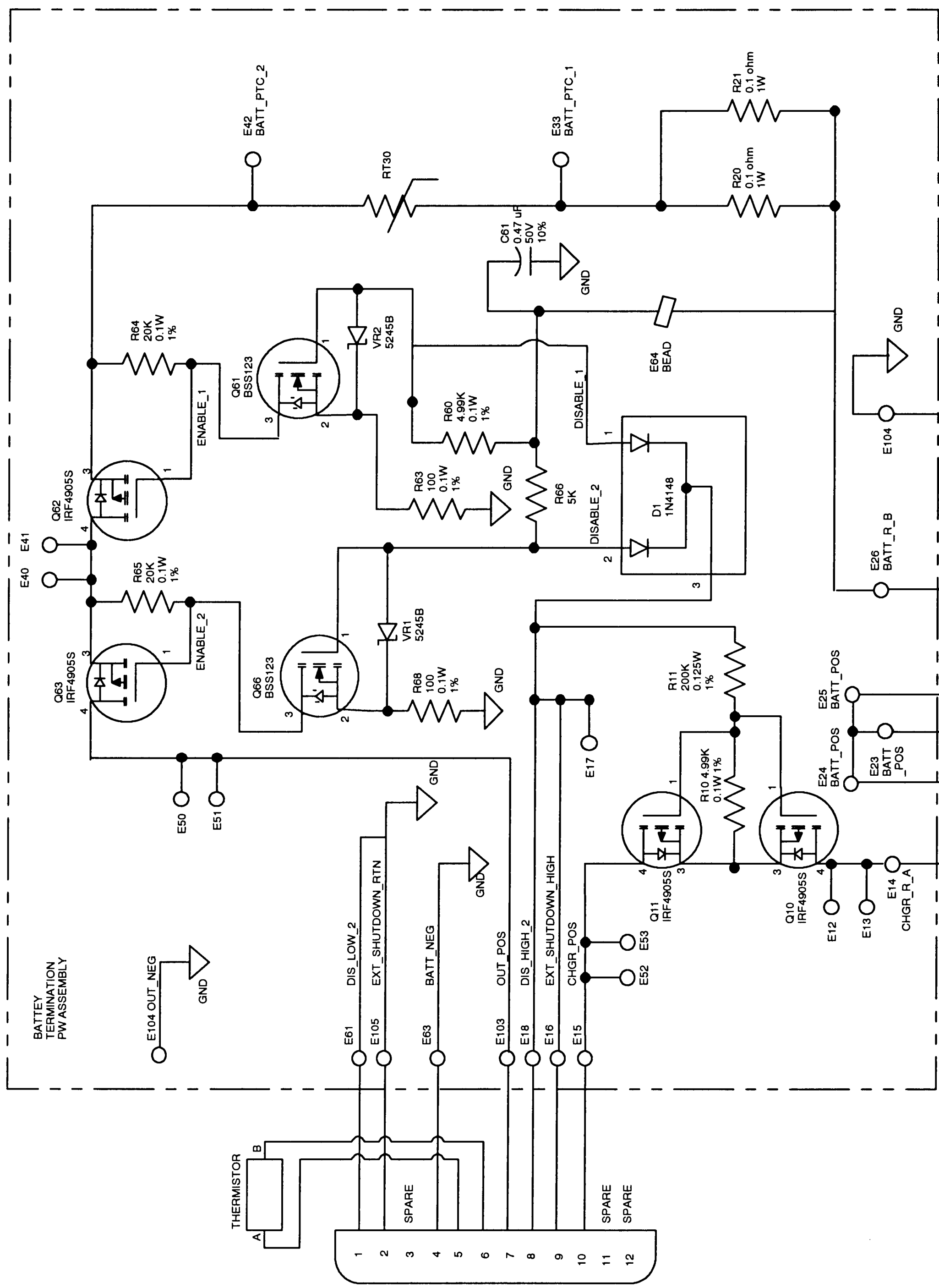
Joint Probe Cable Assembly - Wiring Diagram
Figure 30



RS232 Cable Assembly - Wiring Diagram
Figure 31



Battery Pack - Wiring Diagram
Figure 32

LEGEND:

1. ELECTROSTATIC DISCHARGE SENSITIVE MATERIAL. LABEL, TRANSPORT, STORE, AND HANDLE PER REQUIREMENTS IN BAC5485.

2. THIS IS A HIERARCHICAL SCHEMATIC AND CONSISTS OF AN UPPER-LEVEL BLOCK SCHEMATIC AND LOWER-LEVEL CIRCUIT MODULE (CM) SCHEMATICS. THE UPPER-LEVEL BLOCK SCHEMATIC CONTAINS ALL THE CM SYMBOLS AND THEIR ELECTRICAL INTERCONNECTIONS. THE CM SCHEMATICS SHOW THE DETAILED CIRCUITRY OF THE ASSEMBLY. THE UPPER-LEVEL BLOCK SCHEMATIC PROVIDES A VIEW OF OVERALL FUNCTIONALITY WHILE THE LOWER-LEVEL CM SCHEMATICS PROVIDE DETAILED ELECTRICAL INFORMATION.

3. WHEN A HYPHEN (-) APPEARS BETWEEN SHEET (SHT) NUMBERS OR BETWEEN REFERENCE DESIGNATIONS IT REFERS TO CONSECUTIVE SHEETS OR CONSECUTIVE REFERENCE DESIGNATIONS. FOR EXAMPLE, SHT 9-11 MEANS SHEET NUMBERS 9, 10, AND 11. U1-U4 MEANS REFERENCE DESIGNATIONS U1, U2, U3, AND U4. A HYPHEN IS ALSO USED TO INDICATE THE ASSOCIATION BETWEEN A CONNECTOR REFERENCE DESIGNATION AND A PIN NUMBER. FOR EXAMPLE, P1-45.

4. THE SEMICOLON (;) IS USED TO SEPARATE SHEET REFERENCES FROM CONNECTOR REFERENCES. FOR EXAMPLE, SHT 9-11; P1-1. A SEMICOLON IS ALSO USED TO SEPARATE REFERENCES TO DIFFERENT CONNECTORS FROM EACH OTHER. FOR EXAMPLE, P1-45; J1 SHT 3.

5. THE FORMAT OF A CONNECTOR REFERENCE THAT APPEARS WITH A PORT SYMBOL OR AN OFFSHEET SYMBOL DEPENDS ON WHETHER A SIGNAL IS CONNECTED TO ONE PIN OR MULTIPLE PINS.

   IF A SIGNAL IS CONNECTED TO A SINGLE PIN, THE CONNECTOR REFERENCE DESIGNATION AND PIN NUMBER ARE GIVEN. FOR EXAMPLE, P1-45.

   IF A SIGNAL IS CONNECTED TO MULTIPLE PINS, THE CONNECTOR REFERENCE DESIGNATION AND THE SHEET NUMBER WHERE THE CONNECTOR CAN BE FOUND ARE GIVEN. FOR EXAMPLE, J1 SHT 3.

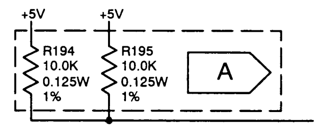
6. IF A SIGNAL IS CONNECTED TO A NO-CONNECTION SYMBOL, NC IS GIVEN.

7. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS.

8. THE FOLLOWING REFERENCE DESIGNATIONS ARE NOT ASSIGNED:
   C1-C89, C91-C99, C104-C109, C114-C115, C117-C118, C125-C129, C131-C139, C148-C149, C158-C159, C163-C169, C172-C199, C214-C219, C232-C233, C240-C259, C280-C299, C307-C309, C328-C349, C352-C404, C411-C424, C426-C427, C433-C440, C442-C469, C477-C478, C482-C483, C491-C493, C499-C500, C506-C509, CR1-CR109, CR112-CR119, CR121-CR139, CR141-CR149, E1-E89, E93-E99, E101-E109, E113-E119, E121-E129, E131-E139, E145-E149, E155-E159, E161, F1-F119, F121-F139, F141-F149, K1-K199, Q1-Q89, Q96-Q99, Q101-Q109, Q111-Q139, Q141-Q149, Q151-Q399, R1-R43, R45-R53, R55-R89, R94-R99, R106-R109, R126-R129, R134-R139, R171-R199, R215-R219, R239-R240, R251-R259, R296-R344, R348-R349, R356-R359, R416, R419, R426-R429, R437-R439, R446, R448-R449, R481-R489, R514-R519, R535-R569, R587-R593, T1-T99, U1-U89, U91-U99, U102-U109, U111-U139, U141-U159, U162-U169, U171-U199, U202-U219, U222-U239, U242-U299, U310-U399, U405-U409, U411-U414, U416-U419, U422-U434, U437-U440, U442-U499, VR1-VR119, VR122-VR129, VR131-VR139, VR143-VR149, VR152-VR159, VR161-VR299, AND Y1-Y404.

9. THE FOLLOWING ARE THE HIGHEST REFERENCE DESIGNATIONS ASSIGNED:
   C513, CR150, E163, EG14, EP3, F150, J1, K201, P2, Q412, R607, T101, U503, VR303, AND Y405.

10. UNINSTALLED PARTS ARE USED TO ALLOCATE SPACE ON THE PRINTED WIRING BOARD ASSEMBLY FOR PARTS THAT MAY BE USED IN A DIFFERENT APPLICATION. PADS AND TRACES ARE FABRICATED, BUT THE PARTS ARE NOT INSTALLED ON THIS ASSEMBLY. THE PARTS ARE IDENTIFIED ON THE SCHEMATIC WITH A DASHED BOX AND A FLAGNOTE, AS SHOWN BELOW.



A UNINSTALLED PARTS

11. AN "IC POWER AND GROUND CONNECTIONS" TABLE SHOWS THE IC REFERENCE DESIGNATIONS, THE POWER AND GROUND PINS, AND THE POWER AND GROUND NETS TO WHICH THE PINS ARE CONNECTED. THE CAPACITOR REFERENCE (CAP REF) COLUMN WHEN USED SHOWS THE REFERENCE DESIGNATIONS OF THE DECOUPLING CAPACITORS ASSOCIATED WITH EACH IC.

12. NONSTANDARD SYMBOLS

A. PORT SYMBOLS

ALL PORT SYMBOLS INDICATE THE CONTINUATION OF A SIGNAL OR SIGNALS ON EITHER THE UPPER-LEVEL BLOCK SCHEMATIC OR ANOTHER CM SCHEMATIC.

THE TWO-LETTER CODE WITHIN A PORT SYMBOL IDENTIFIES PORTS THAT ARE CONNECTED. TWO OR MORE PORTS WITH THE SAME TWO-LETTER CODE ARE CONNECTED. A PORT SYMBOL WITHOUT A TWO-LETTER CODE DOES NOT CONNECT TO ANOTHER CM SCHEMATIC, BUT CONNECTS TO THE UPPER-LEVEL BLOCK SCHEMATIC ONLY.

PORT-IN SYMBOL

NET_IN AB SHT 13; P1-46

FOR THE ABOVE EXAMPLE OF A PORT-IN SYMBOL, THE SIGNAL "NET_IN" IS CONTINUED ON SHEET 13 AND ALSO ON CONNECTOR P1, PIN 46, LOCATED ON THE UPPER-LEVEL BLOCK SCHEMATIC.

PORT-OUT SYMBOL

SHT 16; P1 SHT 6 AB NET_OUT

FOR THE ABOVE EXAMPLE OF A PORT-OUT SYMBOL, THE SIGNAL "NET_OUT" IS CONTINUED ON SHEET 16 AND GOES TO MULTIPLE PINS ON CONNECTOR P1, LOCATED ON SHEET 6.

BIDIRECTIONAL PORT SYMBOLS

NET_IO P1-46 OR P1-46 NET_IO

FOR THE ABOVE EXAMPLES OF BIDIRECTIONAL PORT SYMBOLS, THE SIGNAL "NET_IO" IS CONTINUED ON CONNECTOR P1, PIN 46, LOCATED ON THE UPPER-LEVEL BLOCK SCHEMATIC.

B. NO-CONNECTION SYMBOL

NC A NO-CONNECTION SYMBOL IS USED TO INDICATE THAT A PIN OF A DEVICE IS NOT ELECTRICALLY CONNECTED TO ANY CIRCUIT EXTERNAL TO THE DEVICE PACKAGE.

C. TEST-POINT SYMBOL

TP23 EACH OF THE STANDARD TEST-POINT SYMBOLS SHOWN IN SECTION 6 OF BDS-3020-3 HAS A DOT. THIS SCHEMATIC USES A TEST-POINT SYMBOL WITHOUT A DOT BECAUSE OF TOOL LIMITATIONS.

D. MECCA SYMBOL

E1 A MECCA SYMBOL IS USED TO SHOW THAT TWO OR MORE SIGNALS ARE CONNECTED. THE EXAMPLE ON THE LEFT IS A TWO-CONNECTION MECCA SYMBOL.

E. OFFSHEET SYMBOLS

ALL OFFSHEET SYMBOLS INDICATE THE CONTINUATION OF A SIGNAL OR SIGNALS ON AT LEAST ONE OTHER SHEET OF THE SAME UPPER-LEVEL BLOCK SCHEMATIC OR CM SCHEMATIC.

OFFSHEET-IN SYMBOL

NET_IN >> SHT 11

FOR THE ABOVE EXAMPLE OF AN OFFSHEET-IN SYMBOL, THE SIGNAL "NET_IN" IS CONTINUED ON SHEET 11.

OFFSHEET-OUT SYMBOL

SHT 12 >> NET_OUT

FOR THE ABOVE EXAMPLE OF AN OFFSHEET-OUT SYMBOL, THE SIGNAL "NET_OUT" IS CONTINUED ON SHEET 12.

BIDIRECTIONAL OFFSHEET SYMBOLS

NET_IO << >> SHT 11 OR SHT 11 << >> NET_IO

FOR THE ABOVE EXAMPLES OF BIDIRECTIONAL OFFSHEET SYMBOLS, THE SIGNAL "NET_IO" IS CONTINUED ON SHEET 11.

F. NETWORK-INTERCONNECTION SYMBOL

⟷ A NETWORK-INTERCONNECTION SYMBOL IS USED TO SHOW THAT TWO NETS ARE CONNECTED.

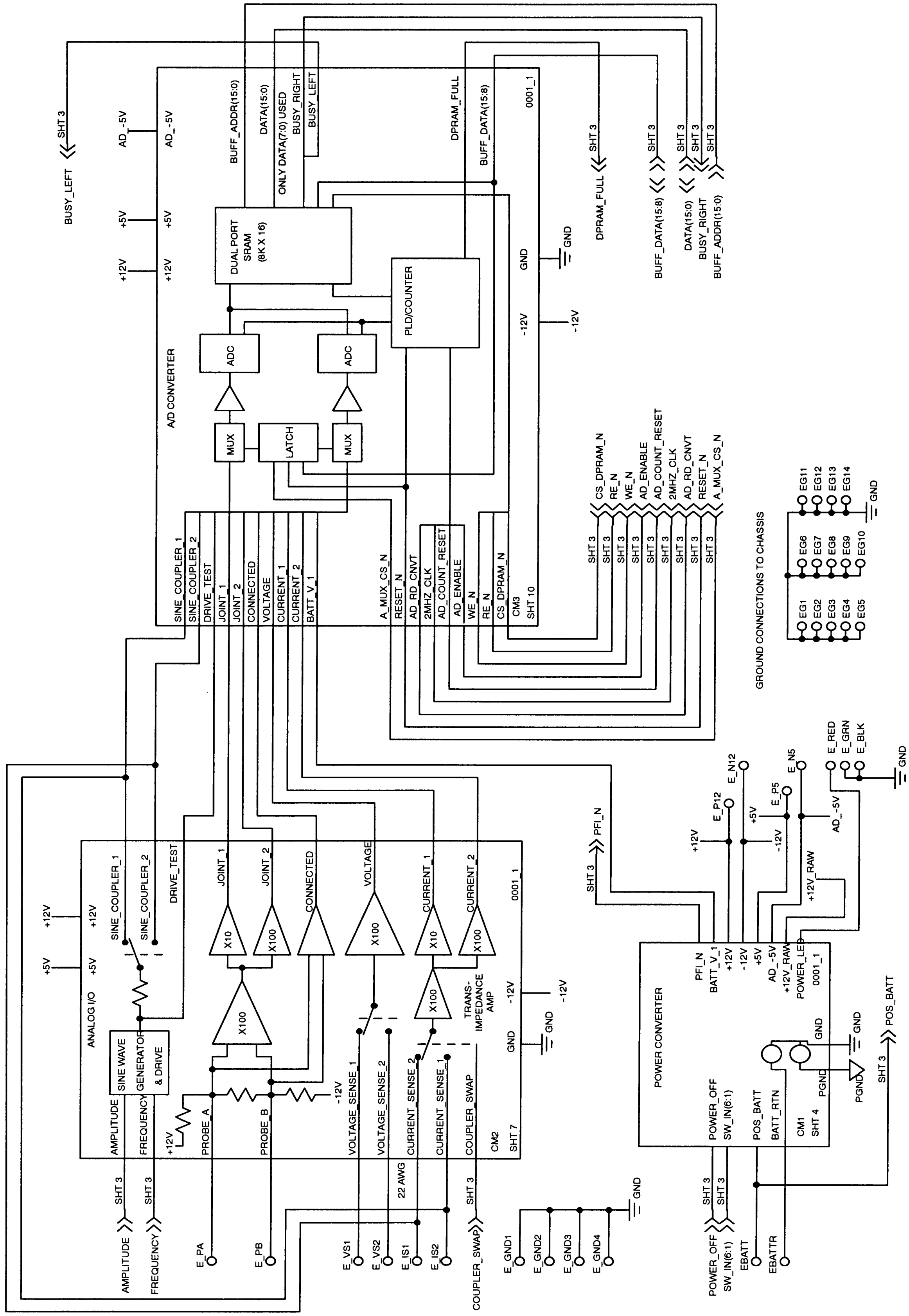
G. SAME-SHEET SYMBOL

NET_ON A SAME-SHEET SYMBOL INDICATES THE CONTINUATION OF A SIGNAL ELSEWHERE ON THE SAME SHEET.

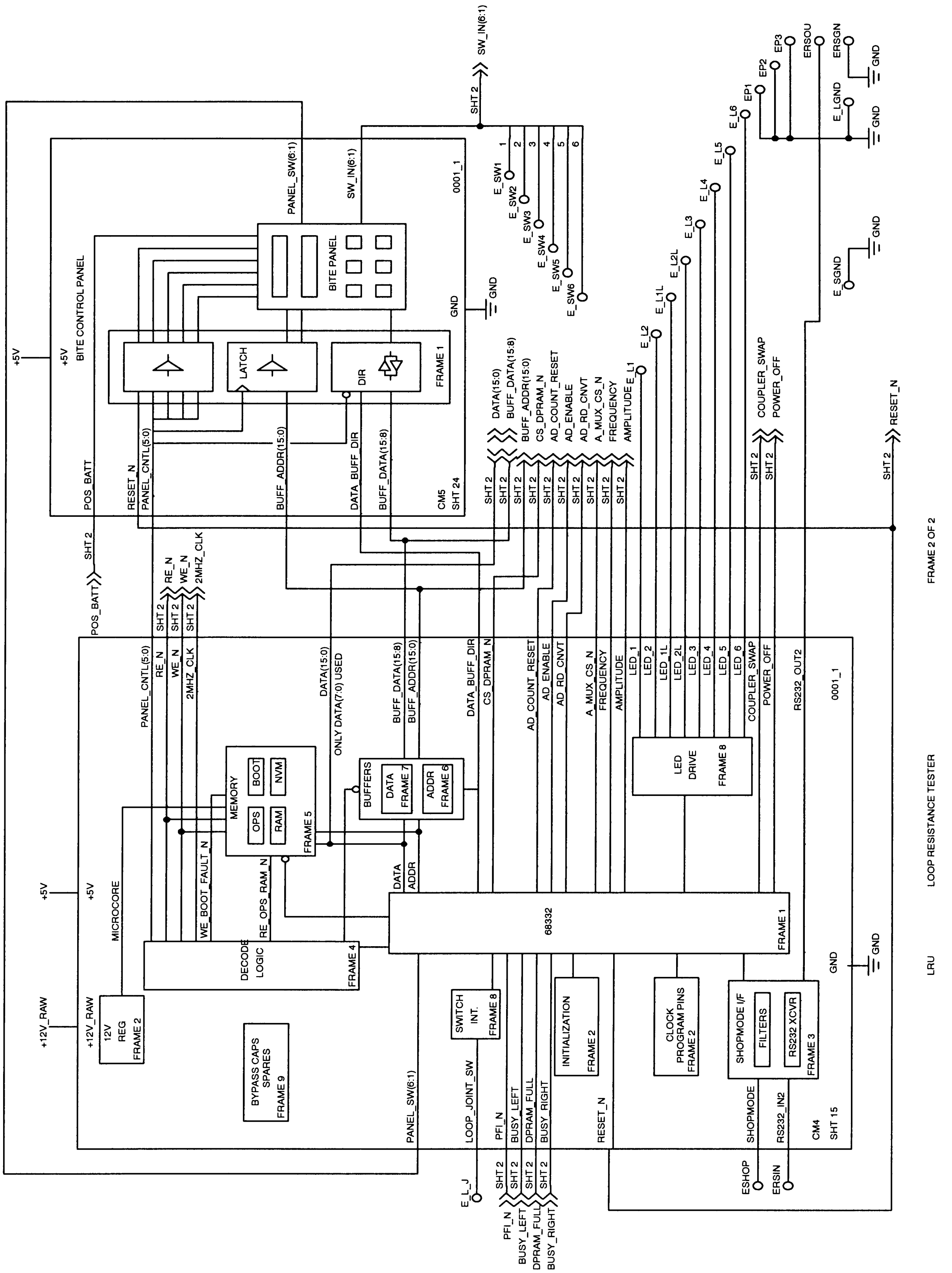
906-10250-2

SCHEMATIC DIAGRAM FOR ASSY -2

PW Assembly - Wiring Diagram
Figure 33 (Sheet 1)

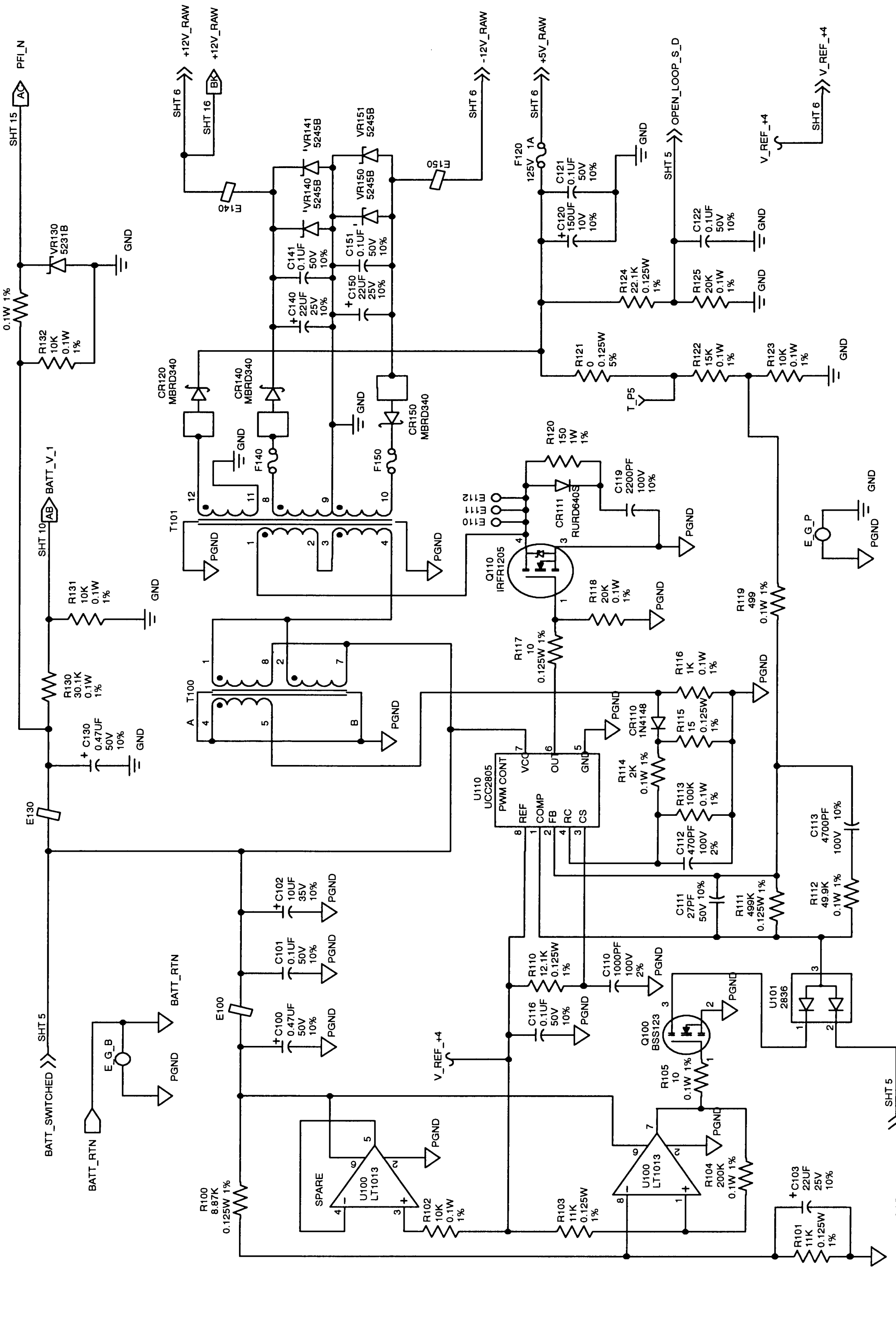


PW Assembly - Wiring Diagram
Figure 33 (Sheet 2)



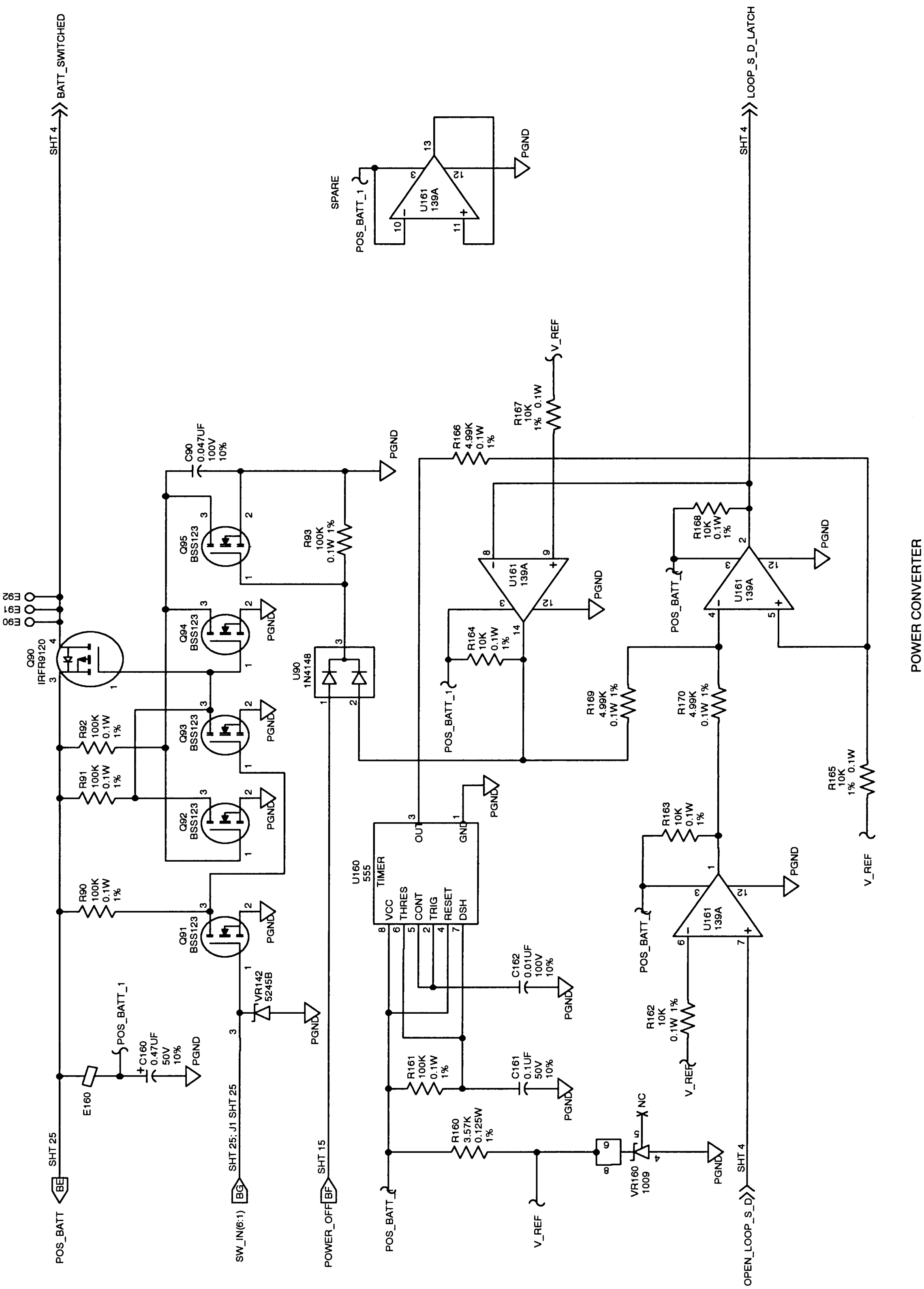
PW Assembly - Wiring Diagram
Figure 33 (Sheet 3)

9-5816 CAD MENTOR VER 8 FORM X-27230

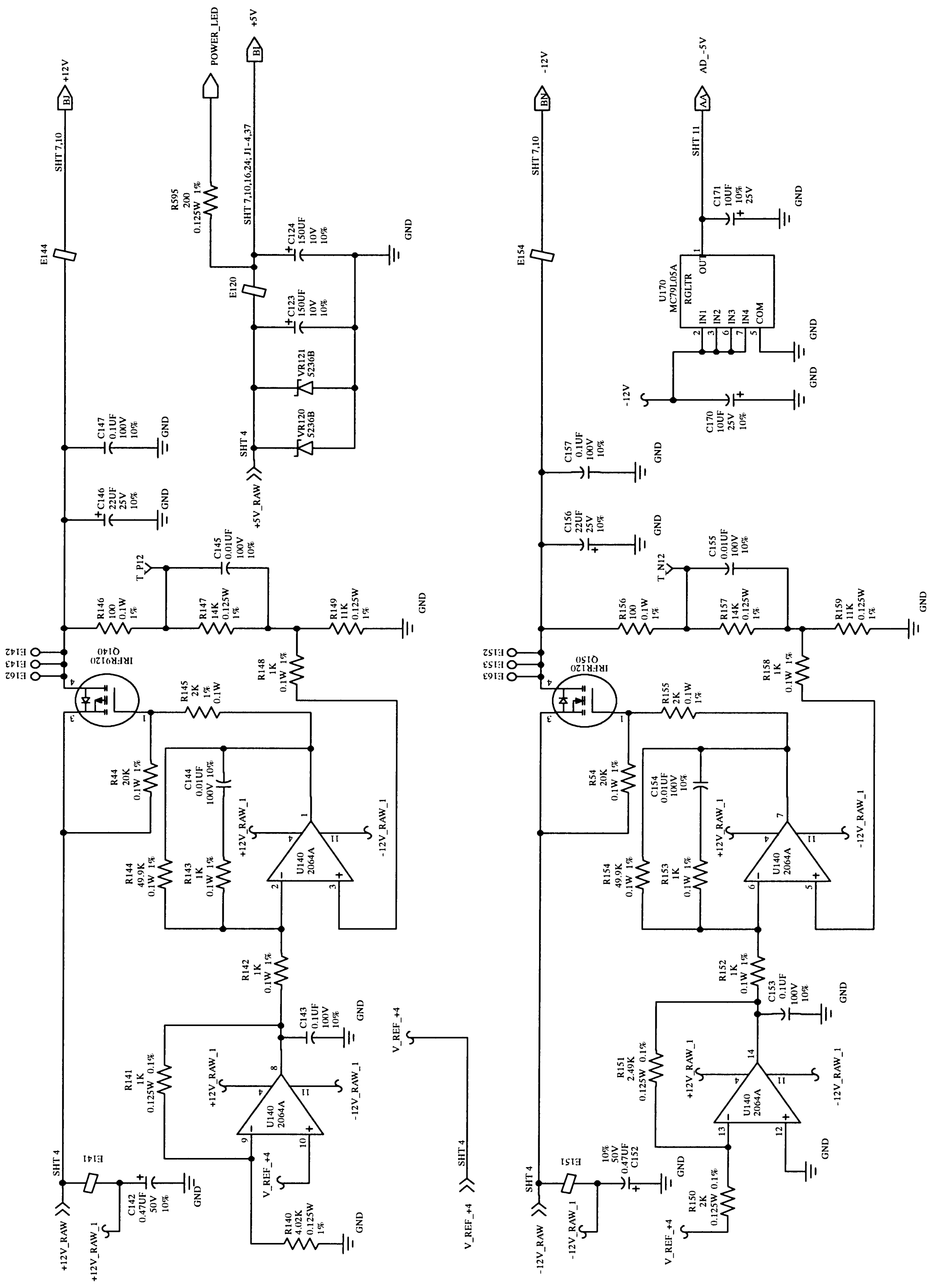


POWER CONVERTER

PW Assembly - Wiring Diagram
Figure 33 (Sheet 4)

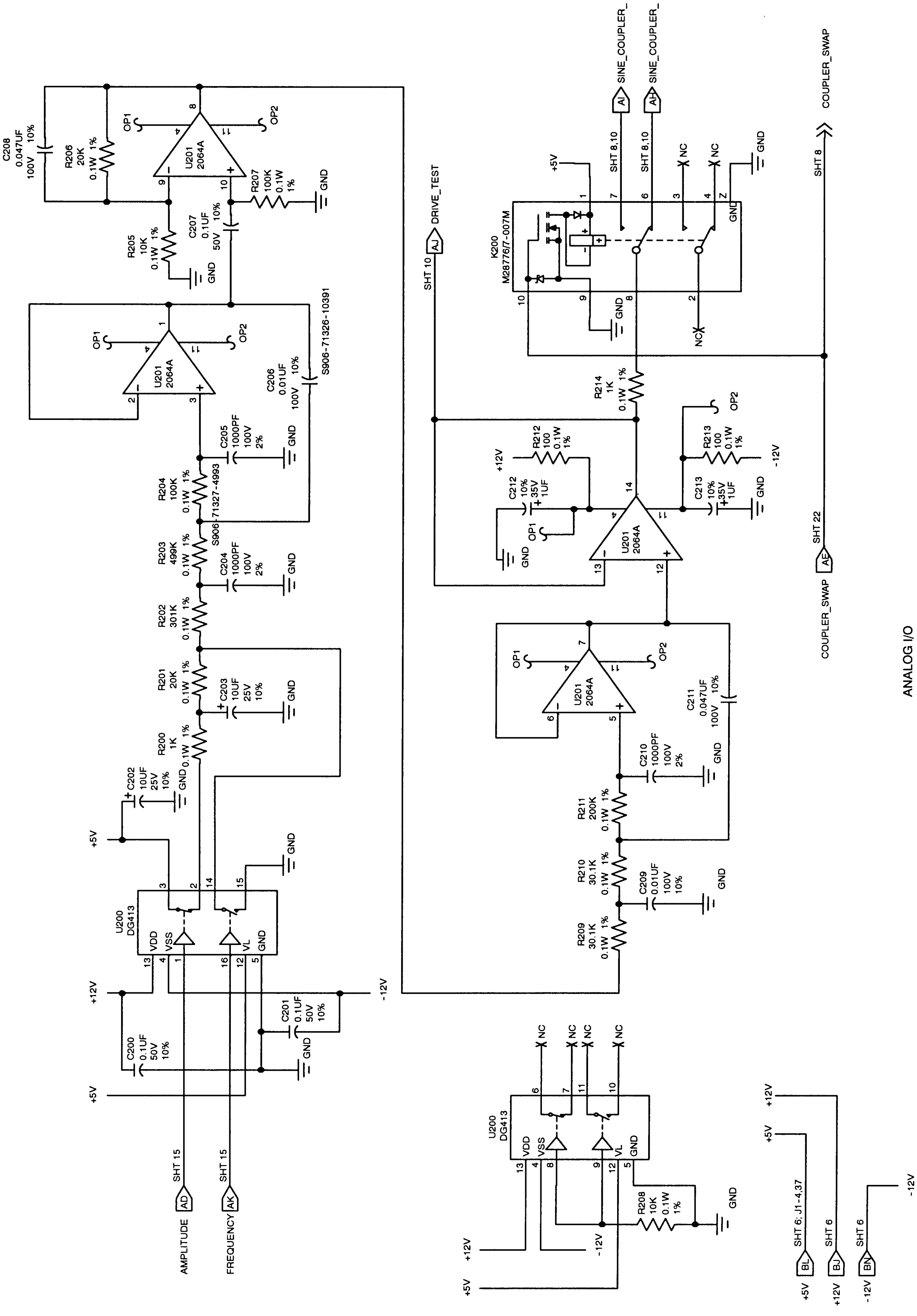


PW Assembly - Wiring Diagram
Figure 33 (Sheet 5)

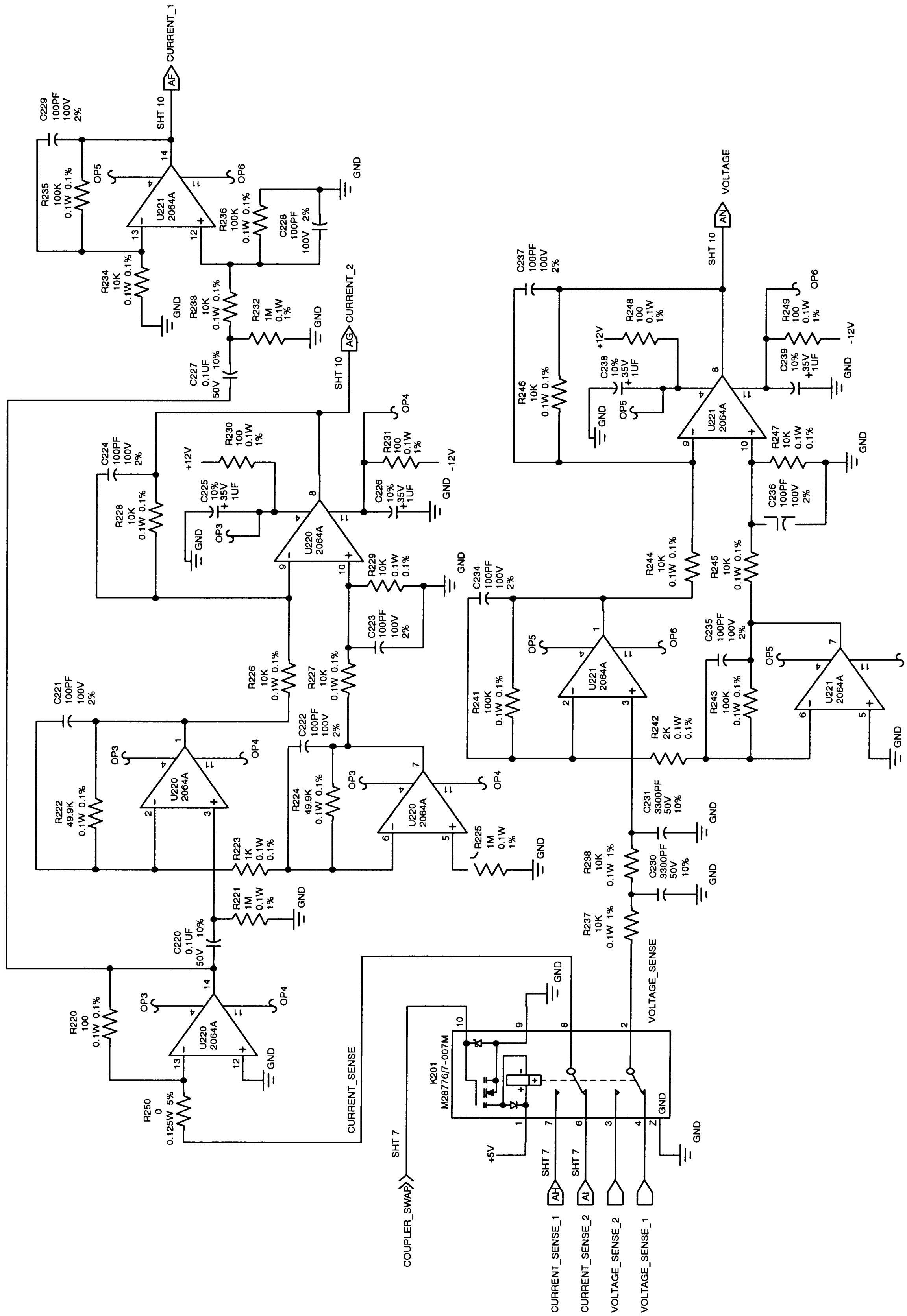


POWER CONVERTER

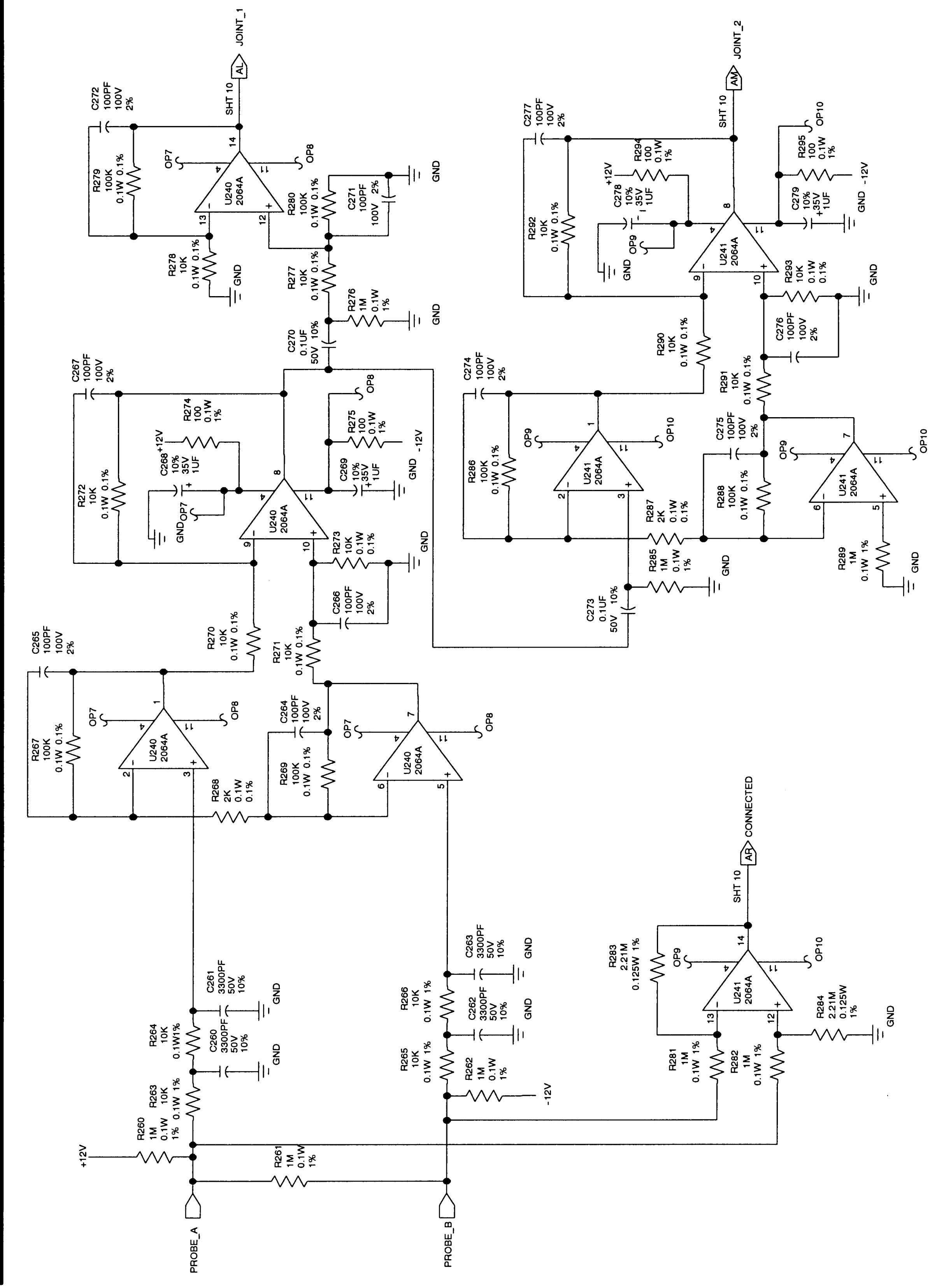
PW Assembly - Wiring Diagram
Figure 33 (Sheet 6)



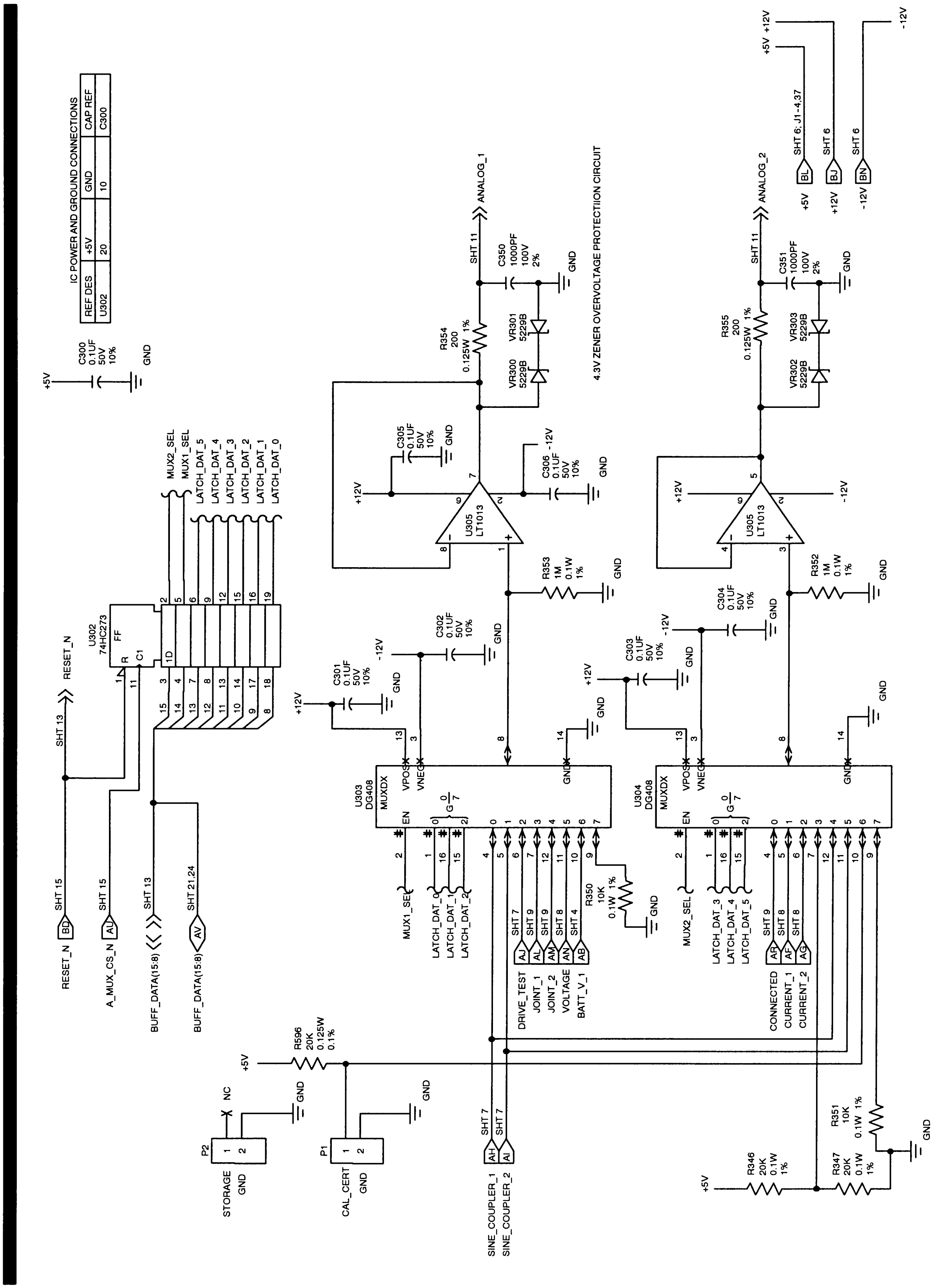
PW Assembly - Wiring Diagram
Figure 33 (Sheet 7)



ANALOG I/O
PW Assembly - Wiring Diagram
Figure 33 (Sheet 8)

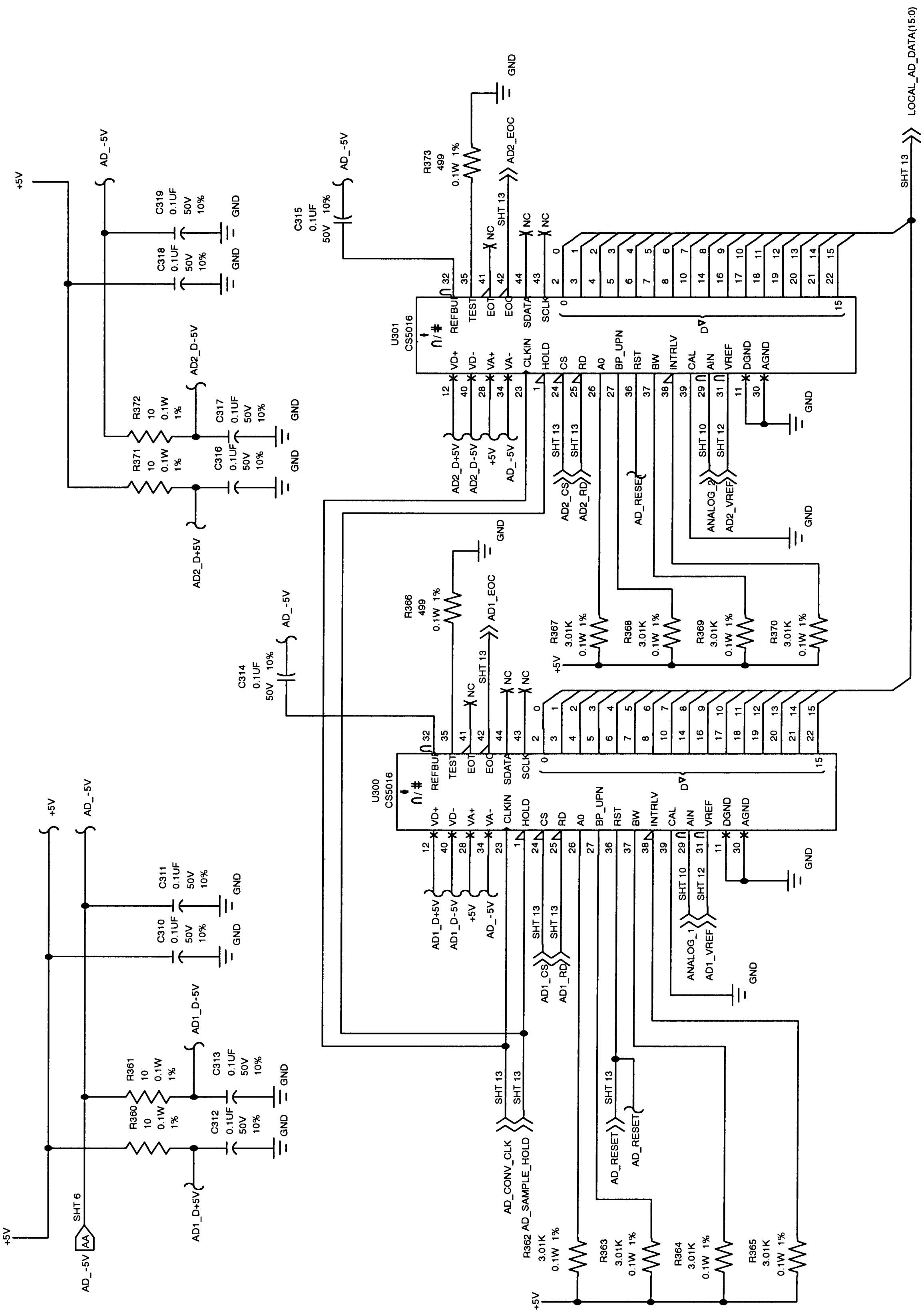


ANALOG I/O
PW Assembly - Wiring Diagram
Figure 33 (Sheet 9)



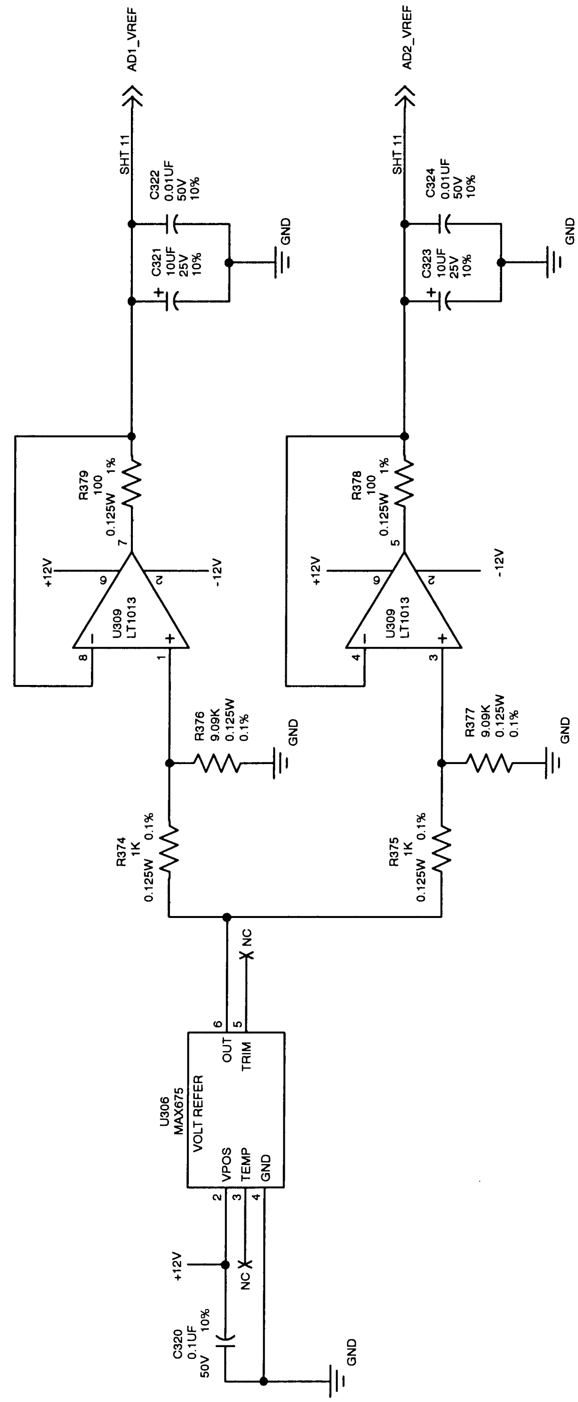
A/D CONVERTER

PW Assembly - Wiring Diagram
Figure 33 (Sheet 10)

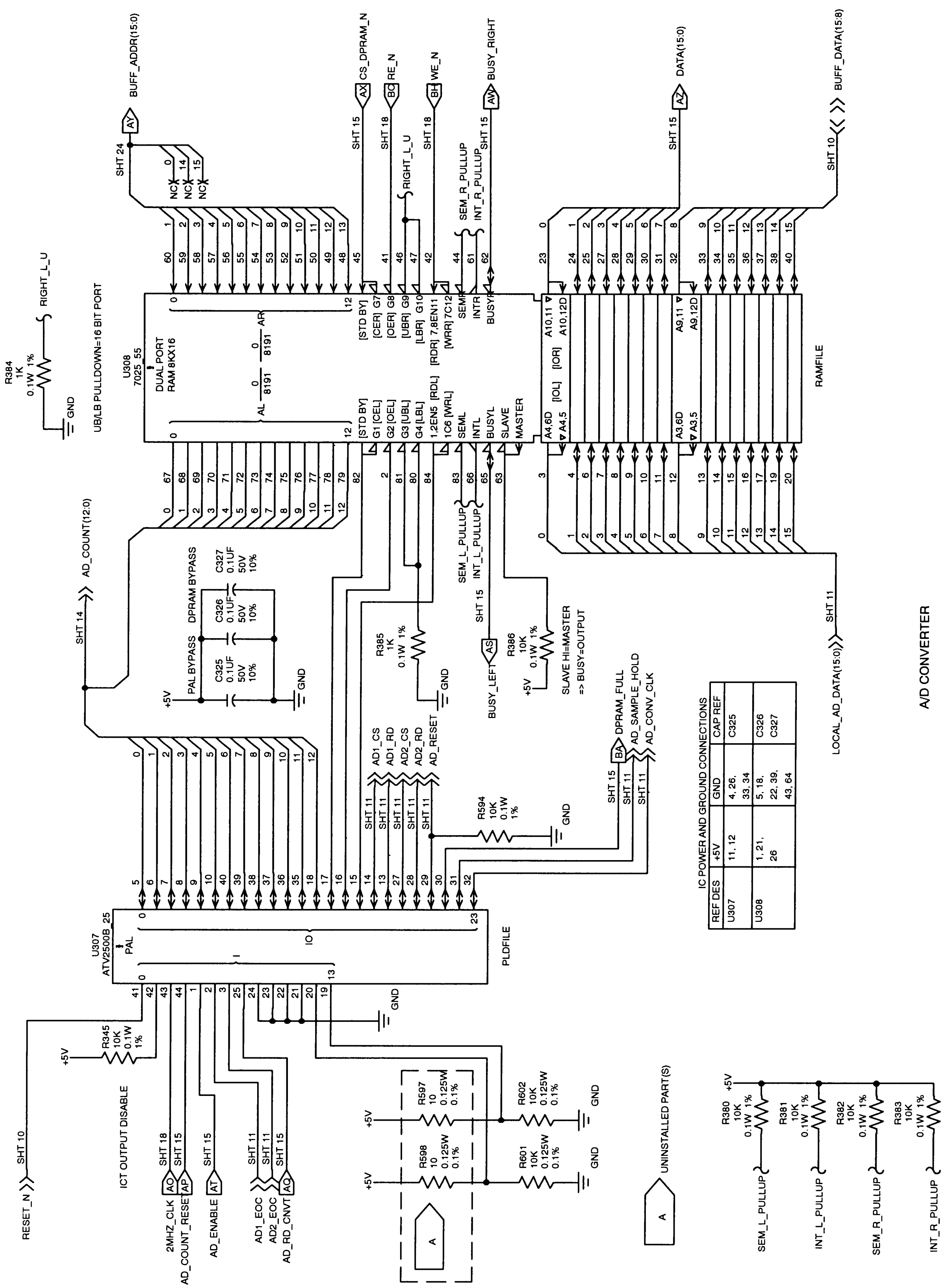


A/D CONVERTER

PW Assembly - Wiring Diagram
Figure 33 (Sheet 11)



A/D CONVERTER
PW Assembly - Wiring Diagram
Figure 33 (Sheet 12)

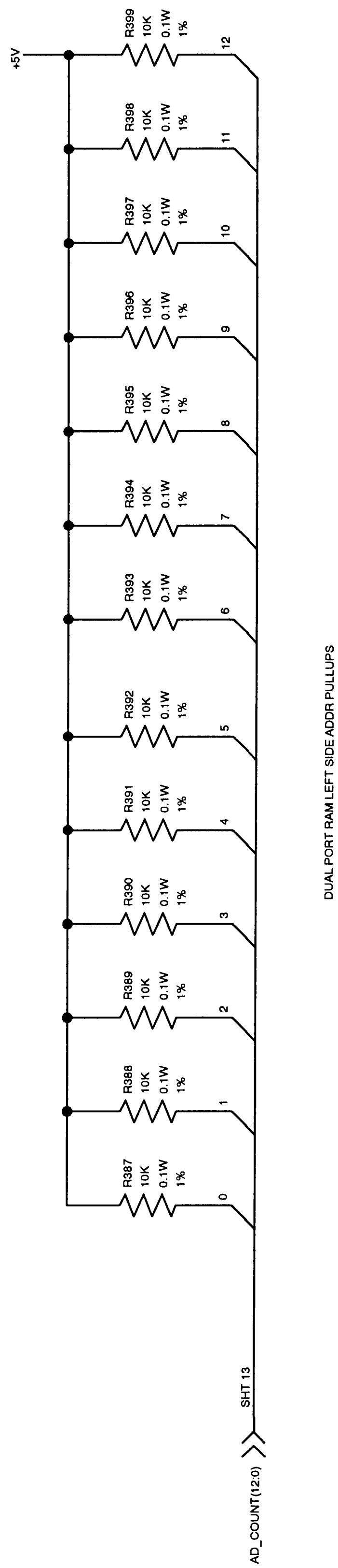


IC POWER AND GROUND CONNECTIONS

REF DES	+5V	GND	CAP REF
U307	11, 12	4, 26, 33, 34	C325
U308	1, 21, 26	5, 18, 22, 39, 43, 64	C326 C327

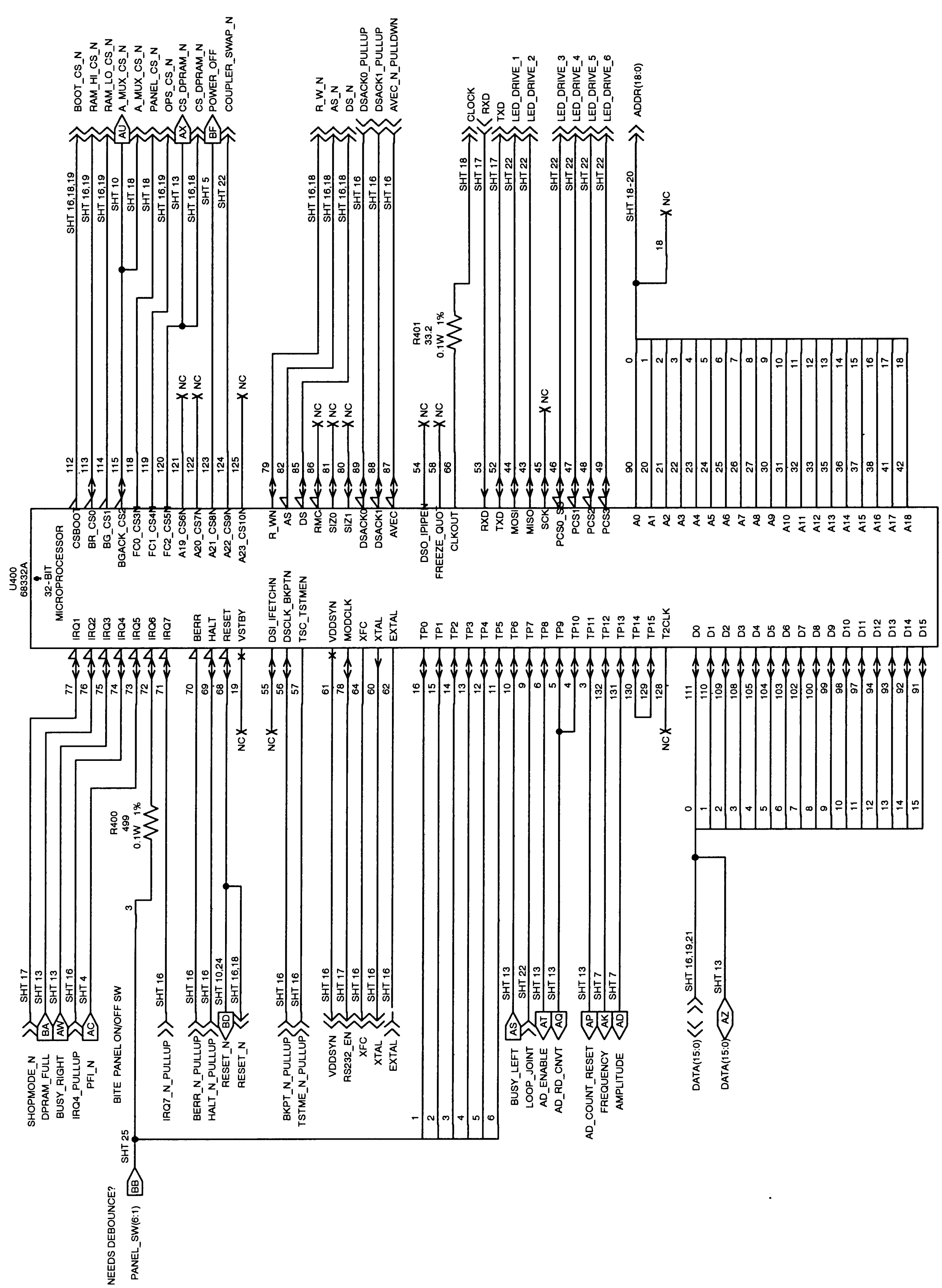
A/D CONVERTER

PW Assembly - Wiring Diagram
Figure 33 (Sheet 13)



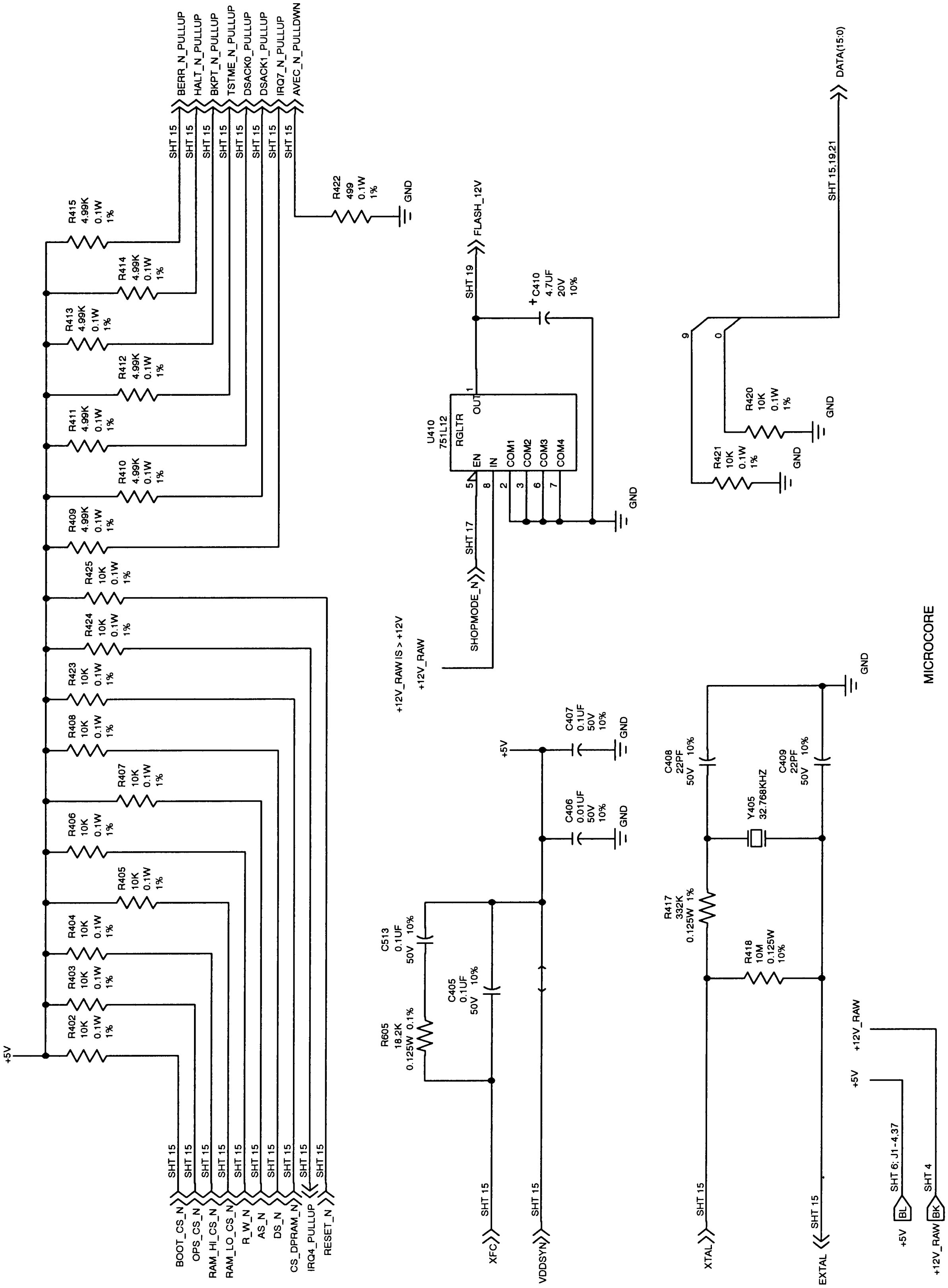
A/D CONVERTER

PW Assembly - Wiring Diagram
Figure 33 (Sheet 14)



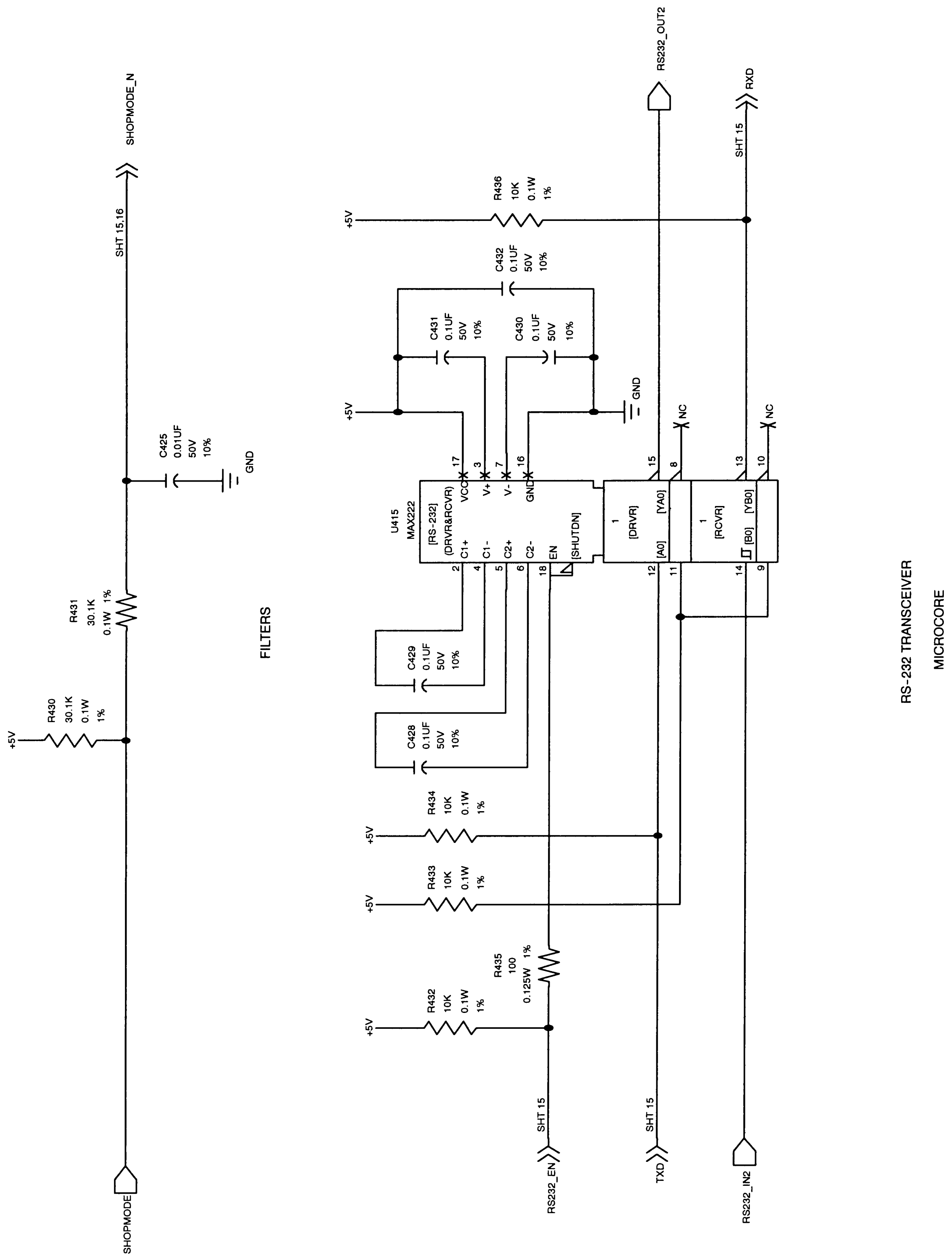
MICROCORE

PW Assembly - Wiring Diagram
Figure 33 (Sheet 15)

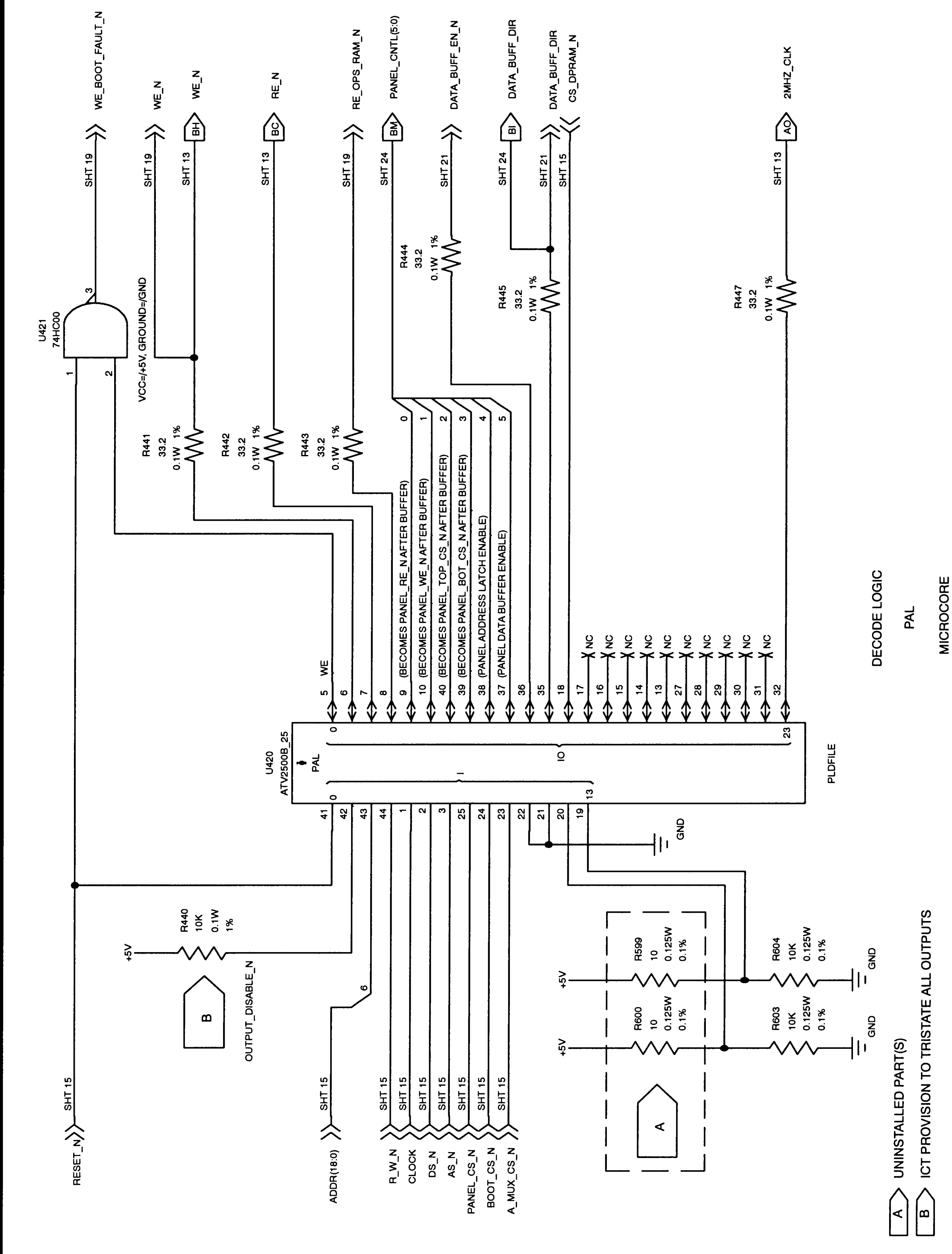


MICROCORE

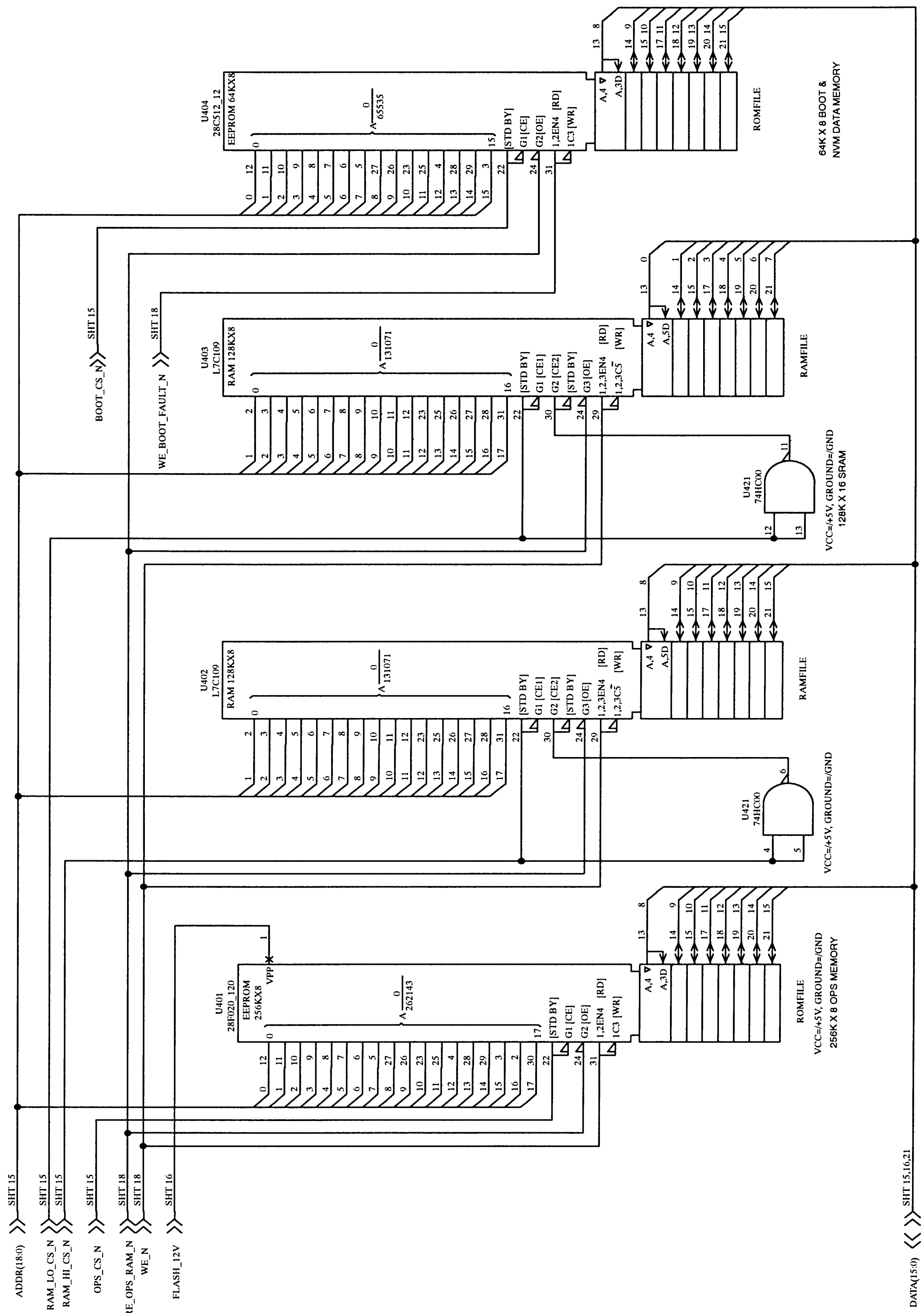
PW Assembly - Wiring Diagram
Figure 33 (Sheet 16)



PW Assembly - Wiring Diagram
Figure 33 (Sheet 17)

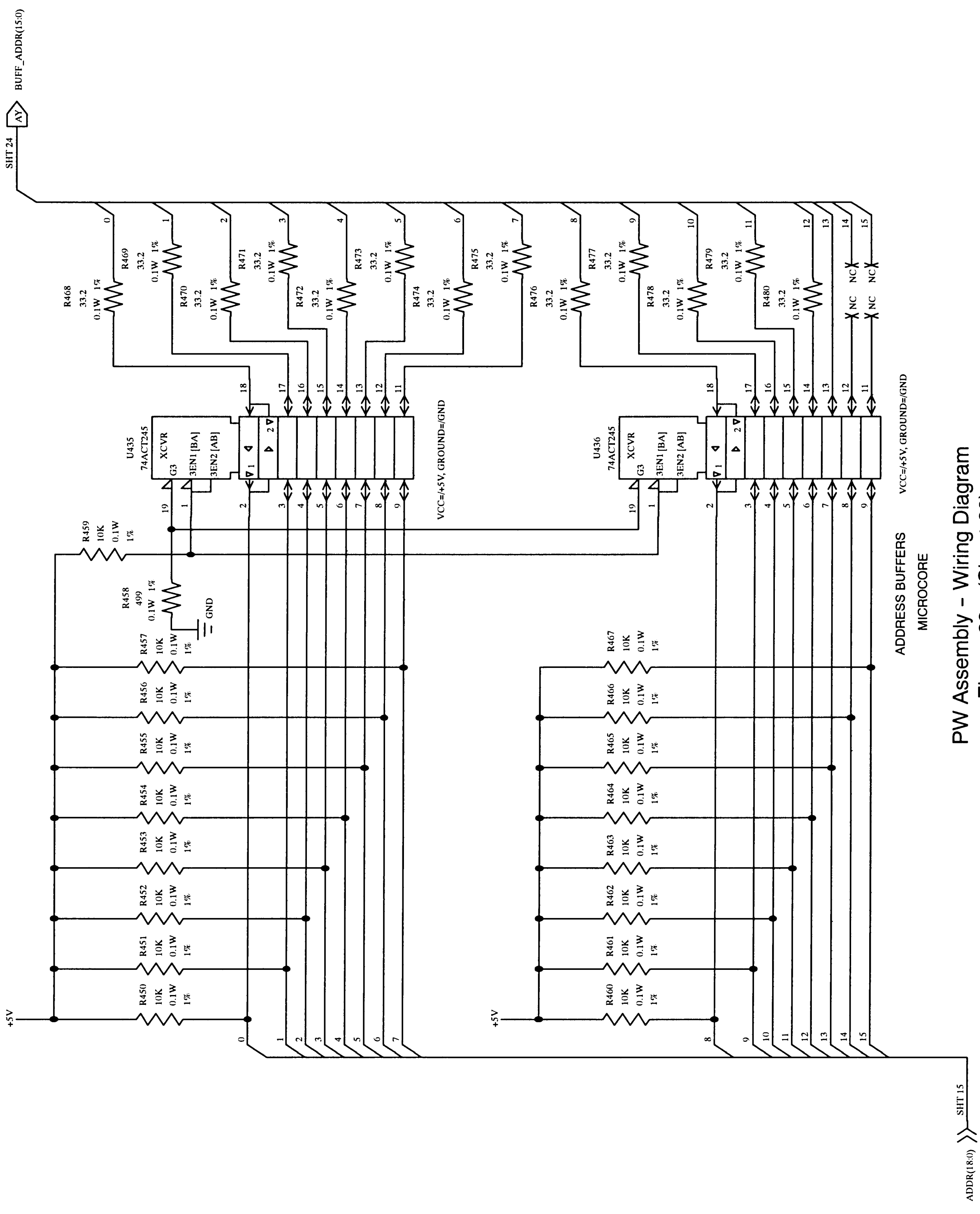


PW Assembly - Wiring Diagram
Figure 33 (Sheet 18)



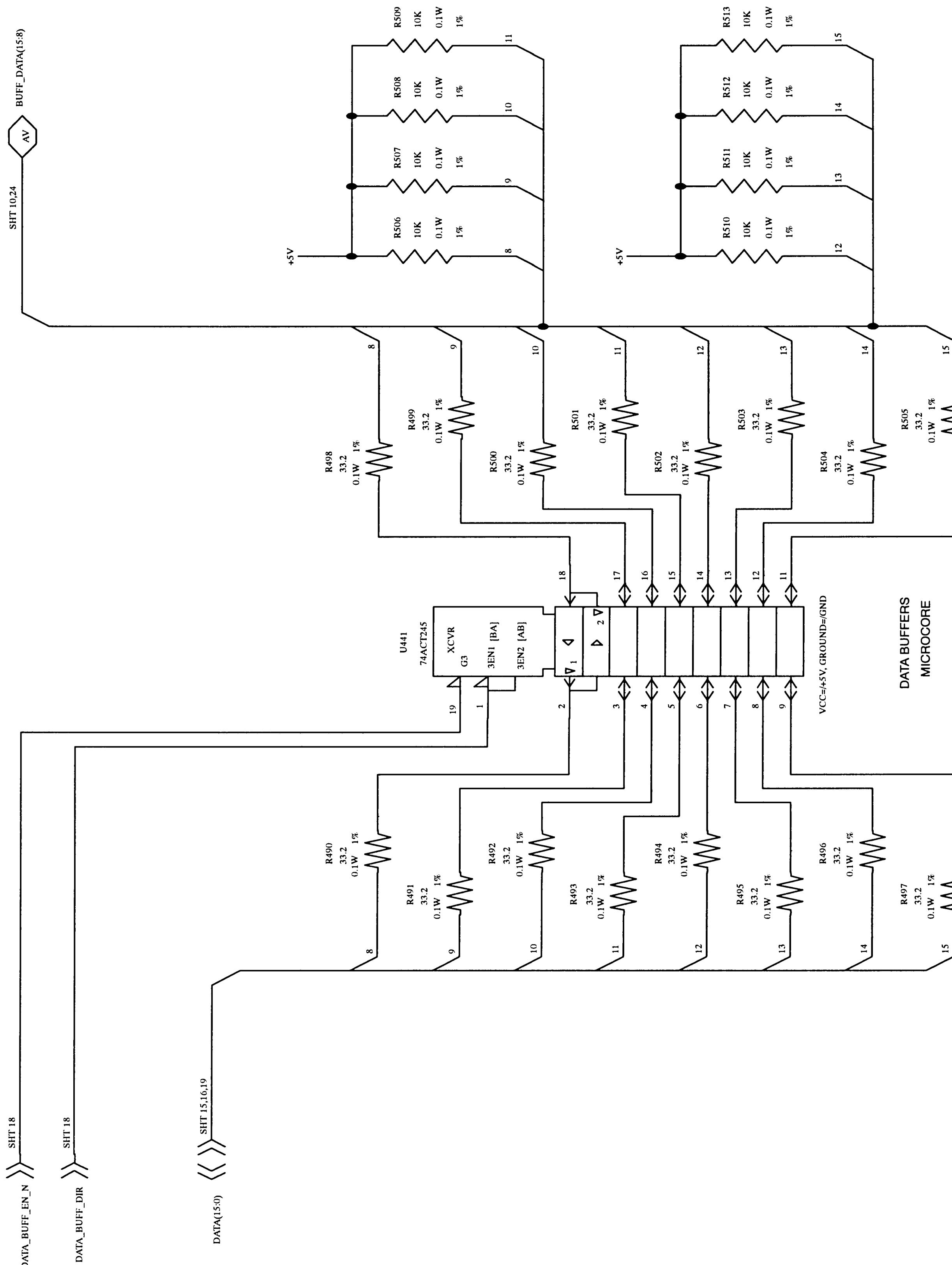
MICROCORE

PW Assembly - Wiring Diagram
Figure 33 (Sheet 19)

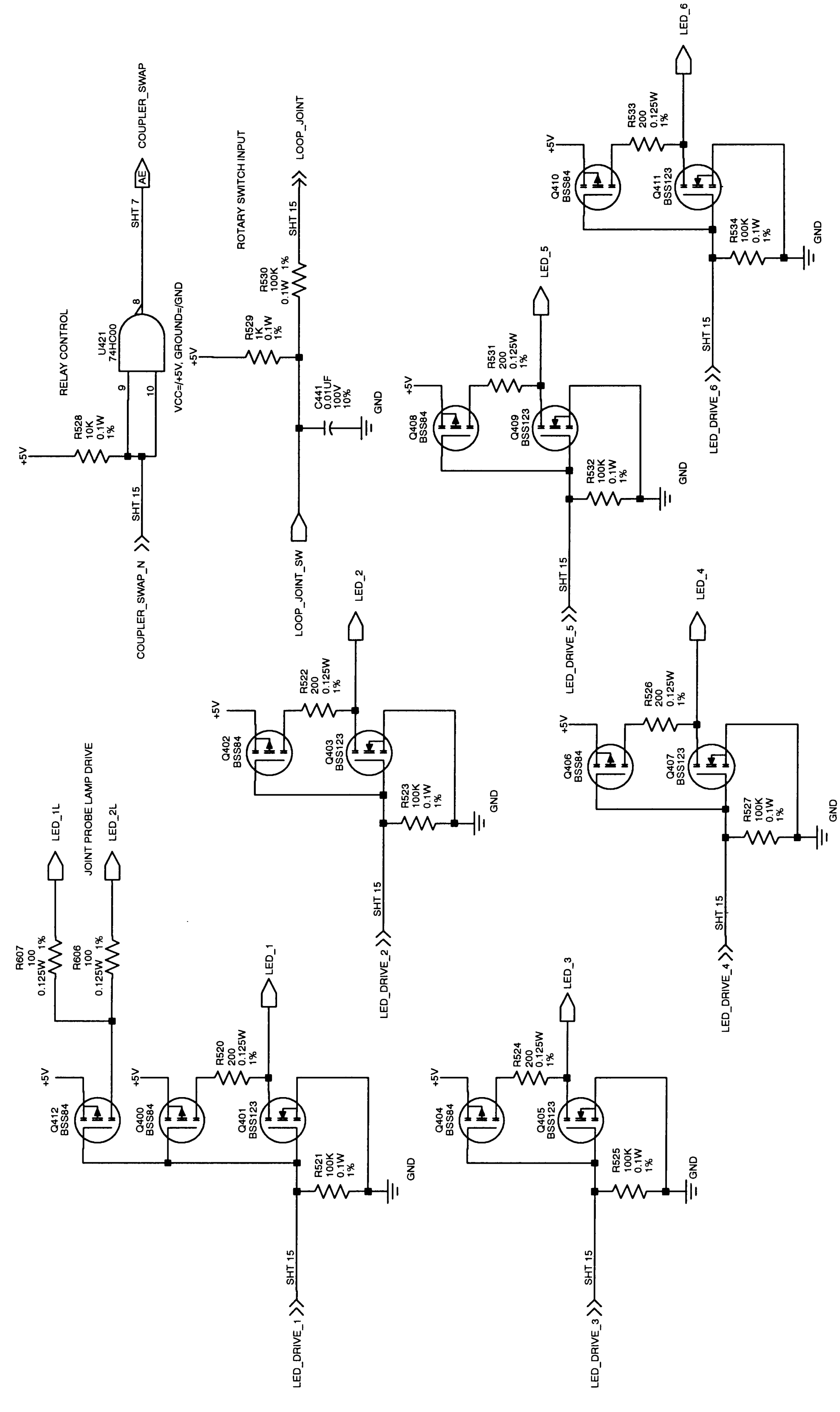


ADDRESS BUFFERS
MICROCORE

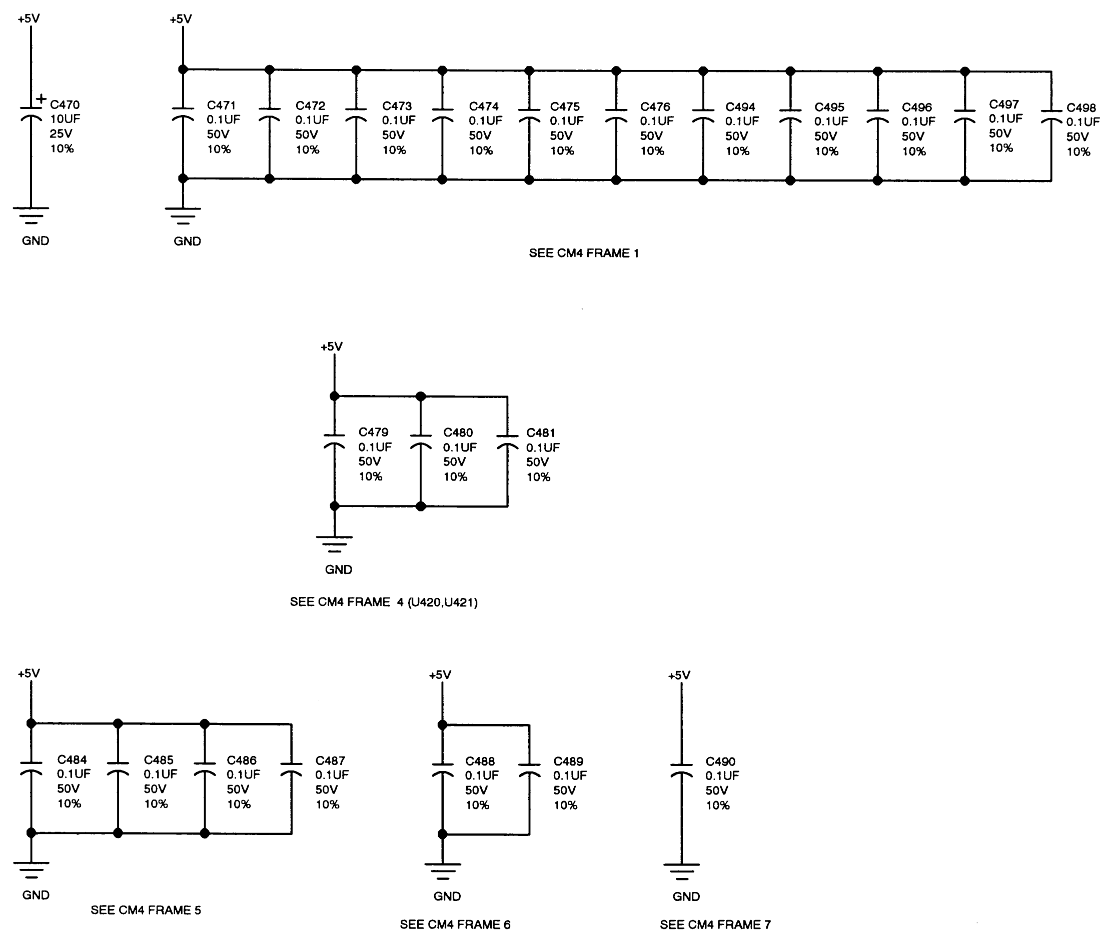
PW Assembly - Wiring Diagram
Figure 33 (Sheet 20)



PW Assembly - Wiring Diagram
Figure 33 (Sheet 21)



MICROCORE
PW Assembly - Wiring Diagram
Figure 33 (Sheet 22)



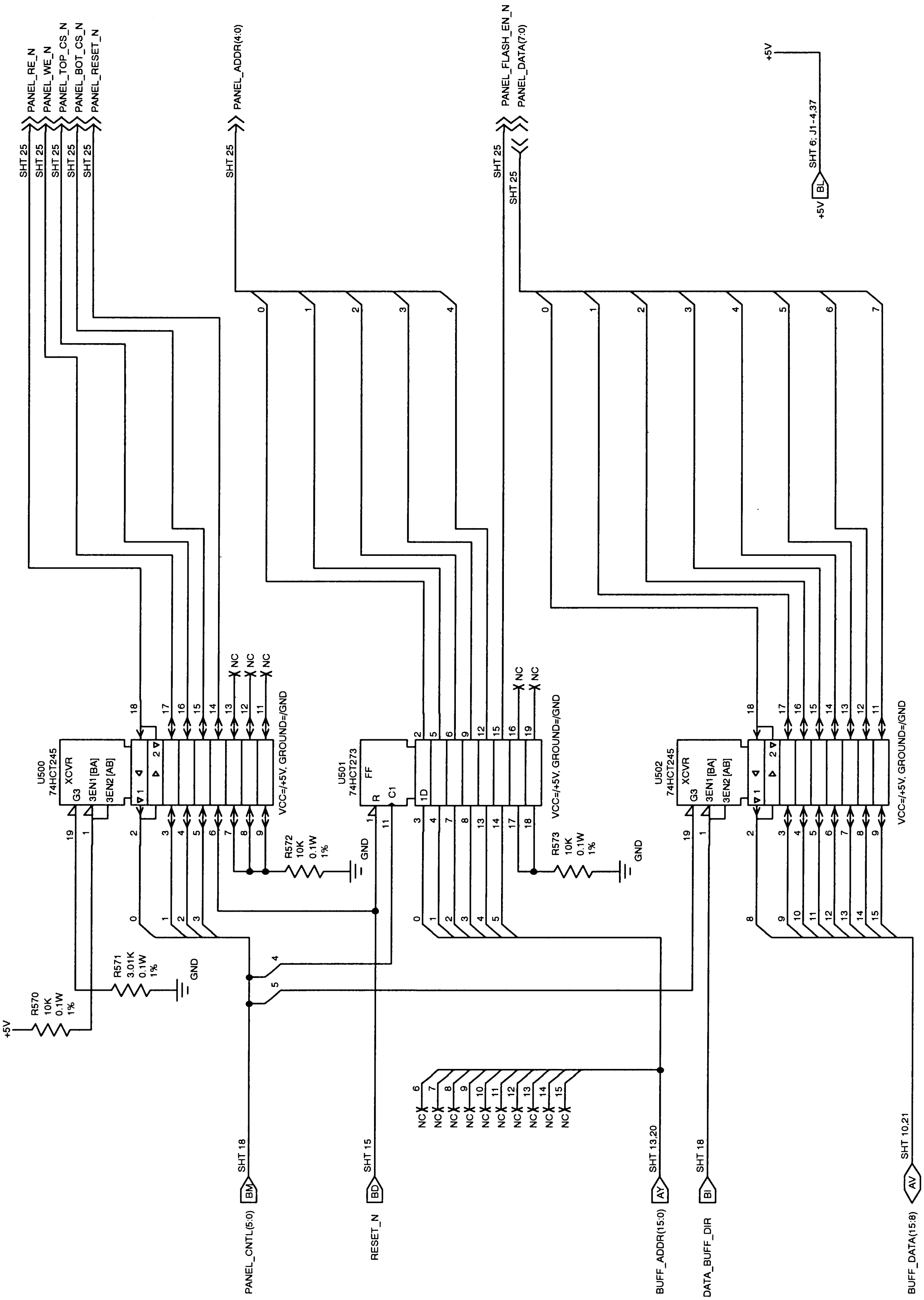
IC POWER AND GROUND CONNECTIONS

REF DES	+5V	GND	CAP REF
U400	1	2	C494
	7	8	C496
	18	17	C471
	28	29	
		34	
	39	40	C472
	50	51	C473
	63	59	C498
	65	67	C497
	84	83	C474
		101	
	107	106	C475
	96	95	
	116	117	C476
	126	127	C495
U420	11	33	C479
	12	34	C480
U421	14	7	C481
U401	32	16	C484
U402	--	--	C485
U403	--	--	C486
U404	28	14	C487
U435	20	10	C488
U436	20	10	C489
U441	20	10	C490

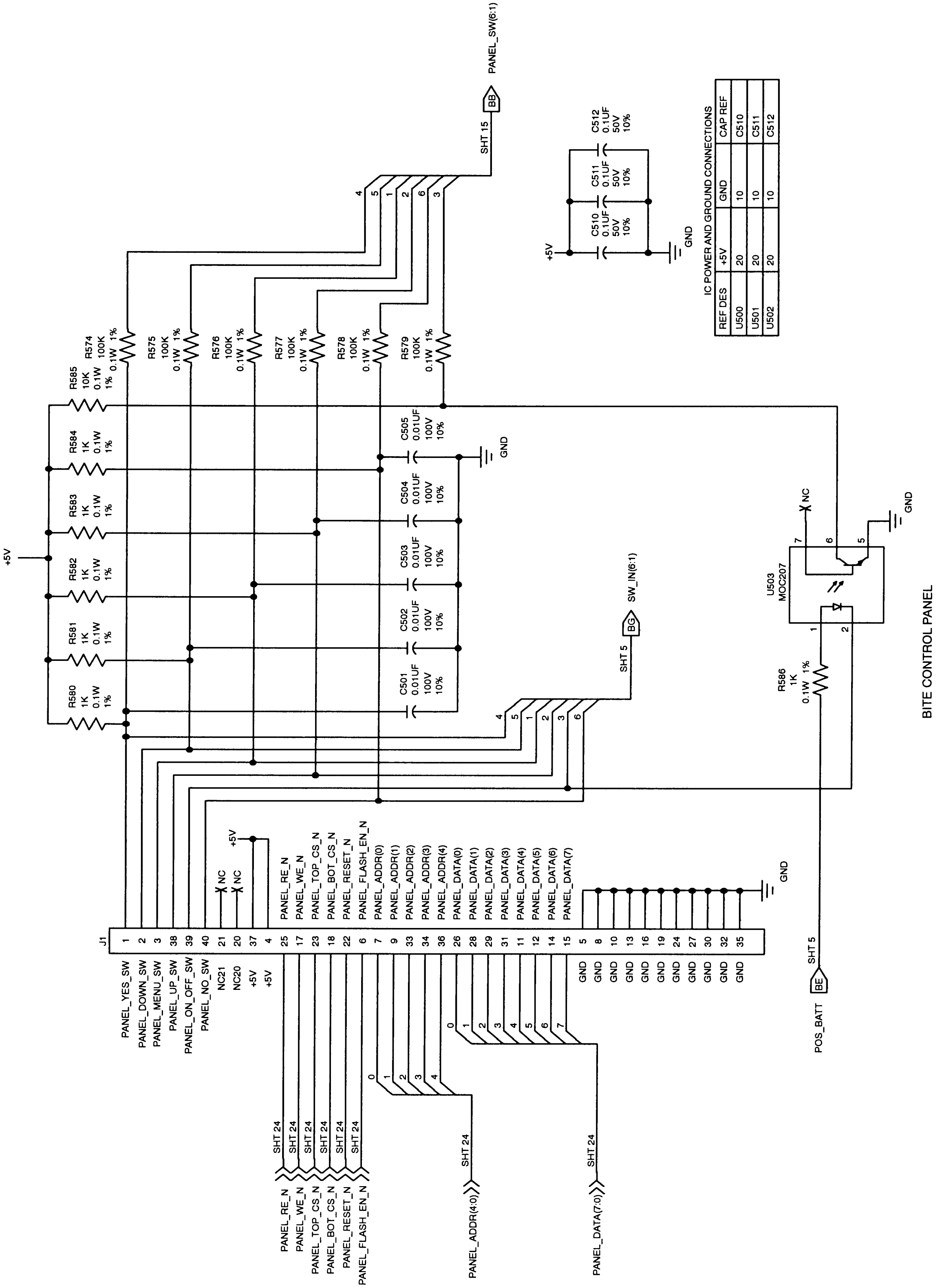
BYPASS CAPACITORS

MICROCORE

PW Assembly - Wiring Diagram
Figure 33 (Sheet 23)



PW Assembly - Wiring Diagram
Figure 33 (Sheet 24)



PW Assembly - Wiring Diagram
Figure 33 (Sheet 25)

LEGEND:

1. ELECTROSTATIC DISCHARGE SENSITIVE MATERIAL. LABEL, TRANSPORT, STORE, AND HANDLE PER REQUIREMENTS IN BAC5485.

2. THIS IS A HIERARCHICAL SCHEMATIC AND CONSISTS OF AN UPPER-LEVEL BLOCK SCHEMATIC AND LOWER-LEVEL CIRCUIT MODULE (CM) SCHEMATICS. THE UPPER-LEVEL BLOCK SCHEMATIC CONTAINS ALL THE CM SYMBOLS AND THEIR ELECTRICAL INTERCONNECTIONS. THE CM SCHEMATICS SHOW THE DETAILED CIRCUITRY OF THE ASSEMBLY. THE UPPER-LEVEL BLOCK SCHEMATIC PROVIDES A VIEW OF OVERALL FUNCTIONALITY WHILE THE LOWER-LEVEL CM SCHEMATICS PROVIDE DETAILED ELECTRICAL INFORMATION.

3. WHEN A HYPHEN (-) APPEARS BETWEEN SHEET (SHT) NUMBERS OR BETWEEN REFERENCE DESIGNATIONS IT REFERS TO CONSECUTIVE PAGES OR CONSECUTIVE REFERENCE DESIGNATIONS. FOR EXAMPLE, SHT 9-11 MEANS SHEET NUMBERS 9, 10, AND 11. U1-U4 MEANS REFERENCE DESIGNATIONS U1, U2, U3, AND U4. A HYPHEN IS ALSO USED TO INDICATE THE ASSOCIATION BETWEEN A CONNECTOR REFERENCE DESIGNATION AND A PIN NUMBER. FOR EXAMPLE, P1-45.

4. THE SEMICOLON (;) IS USED TO SEPARATE SHEET REFERENCES FROM CONNECTOR REFERENCES. FOR EXAMPLE, SHT 9-11; P1-45. A SEMICOLON IS ALSO USED TO SEPARATE REFERENCES TO DIFFERENT CONNECTORS FROM EACH OTHER. FOR EXAMPLE, P1-45; J1 SHT 3.

5. THE FORMAT OF A CONNECTOR REFERENCE THAT APPEARS WITH A PORT SYMBOL OR AN OFFPAGE SYMBOL DEPENDS ON WHETHER A SIGNAL IS CONNECTED TO ONE PIN OR MULTIPLE PINS.

   IF A SIGNAL IS CONNECTED TO A SINGLE PIN, THE CONNECTOR REFERENCE DESIGNATION AND PIN NUMBER ARE GIVEN. FOR EXAMPLE, P1-45.

   IF A SIGNAL IS CONNECTED TO MULTIPLE PINS, THE CONNECTOR REFERENCE DESIGNATION AND THE SHEET NUMBER WHERE THE CONNECTOR CAN BE FOUND ARE GIVEN. FOR EXAMPLE, J1 SHT 3.

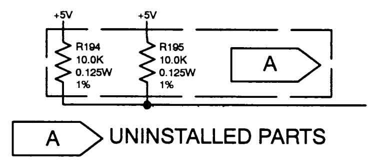
6. IF A SIGNAL IS CONNECTED TO A NO-CONNECTION SYMBOL, NC IS GIVEN.

7. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS.

8. THE FOLLOWING REFERENCE DESIGNATIONS ARE NOT ASSIGNED:
   C1-C89, C91-C99, C104-C109, C114-C115, C117-C118,
   C125-C129, C131-C139, C148-C149, C158-C159, C163-C169,
   C172-C199, C214-C219, C232-C233, C240-C259, C280-C299,
   C307-C309, C328-C349, C352-C404, C411-C424, C426-C427,
   C433-C440, C442-C469, C477-C478, C482-C483, C491-C493,
   C499-C500, C506-C509, CR1-CR109, CR112-CR119, CR121-CR139,
   CR141-CR149, E1-E89, E93-E99, E101-E109, E113-E119,
   E121-E129, E131-E139, E145-E149, E155-E159, E161, F1-F119,
   F121-F139, F141-F149, K1-K199, Q1-Q89, Q96-Q99, Q101-Q109,
   Q111-Q139, Q141-Q149, Q151-Q399, R1-R43, R45-R53, R55-R89,
   R94-R99, R106-R109, R126-R129, R134-R139, R171-R199,
   R215-R219, R239-R240, R251-R259, R296-R344, R348-R349,
   R356-R359, R416, R419, R426-R429, R437-R439, R446,
   R448-R449, R481-R489, R514-R519, R535-R569, R587-R593,
   T1-T99, U1-U89, U91-U99, U102-U109, U111-U139, U141-U159,
   U162-U169, U171-U199, U202-U219, U222-U239, U242-U299,
   U310-U399, U405-U409, U411-U414, U416-U419, U422-U434,
   U437-U440, U442-U499, VR1-VR119, VR122-VR129, VR131-VR139,
   VR143-VR149, VR152-VR159, VR161-VR299, AND Y1-Y404.

9. THE FOLLOWING ARE THE HIGHEST REFERENCE DESIGNATIONS ASSIGNED:
   C513, CR150, E163, EG14, EP3, F150, J1, K201, P2, Q412,
   R607, T101, U503, VR303, AND Y405.

10. UNINSTALLED PARTS ARE USED TO ALLOCATE SPACE ON THE PRINTED WIRING BOARD ASSEMBLY FOR PARTS THAT MAY BE USED IN A DIFFERENT APPLICATION. PADS AND TRACES ARE FABRICATED, BUT THE PARTS ARE NOT INSTALLED ON THIS ASSEMBLY. THE PARTS ARE IDENTIFIED ON THE SCHEMATIC WITH A DASHED BOX AND A FLAGNOTE, AS SHOWN BELOW.



A UNINSTALLED PARTS

11. AN "IC POWER AND GROUND CONNECTIONS" TABLE SHOWS THE IC REFERENCE DESIGNATIONS, THE POWER AND GROUND PINS, AND THE POWER AND GROUND NETS TO WHICH THE PINS ARE CONNECTED. THE CAPACITOR REFERENCE (CAP REF) COLUMN WHEN USED SHOWS THE REFERENCE DESIGNATIONS OF THE DECOUPLING CAPACITORS ASSOCIATED WITH EACH IC.

12. NONSTANDARD SYMBOLS

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PORT-IN SYMBOL

NET_IN AB SHT 13; P1-46

FOR THE ABOVE EXAMPLE OF A PORT-IN SYMBOL, THE SIGNAL "NET_IN" IS CONTINUED ON SHEET 13 AND ALSO ON CONNECTOR P1, PIN 46, LOCATED ON THE UPPER-LEVEL BLOCK SCHEMATIC.

PORT-OUT SYMBOL

SHT 16; P1 SHT 6 AB NET_OUT

FOR THE ABOVE EXAMPLE OF A PORT-OUT SYMBOL, THE SIGNAL "NET_OUT" IS CONTINUED ON SHEET 16 AND GOES TO MULTIPLE PINS ON CONNECTOR P1, LOCATED ON SHEET 6.

BIDIRECTIONAL PORT SYMBOLS

NET_IO P1-46 OR P1-46 NET_IO

FOR THE ABOVE EXAMPLES OF BIDIRECTIONAL PORT SYMBOLS, THE SIGNAL "NET_IO" IS CONTINUED ON CONNECTOR P1, PIN 46, LOCATED ON THE UPPER-LEVEL BLOCK SCHEMATIC.

B. NO-CONNECTION SYMBOL

NC A NO-CONNECTION SYMBOL IS USED TO INDICATE THAT A PIN OF A DEVICE IS NOT ELECTRICALLY CONNECTED TO ANY CIRCUIT EXTERNAL TO THE DEVICE PACKAGE.

C. TEST-POINT SYMBOL

TP23 EACH OF THE STANDARD TEST-POINT SYMBOLS SHOWN IN SECTION 1.5 OF BDS-3020-3 HAS A DOT. THIS SCHEMATIC USES A TEST-POINT SYMBOL WITHOUT A DOT BECAUSE OF TOOL LIMITATIONS.

D. MECCA SYMBOL

E1 A MECCA SYMBOL IS USED TO SHOW THAT TWO OR MORE SIGNALS ARE CONNECTED. THE EXAMPLE ON THE LEFT IS A TWO-CONNECTION MECCA SYMBOL.

E. OFFPAGE SYMBOLS

ALL OFFPAGE SYMBOLS INDICATE THE CONTINUATION OF A SIGNAL OR SIGNALS ON AT LEAST ONE OTHER SHEET OF THE SAME UPPER-LEVEL BLOCK SCHEMATIC OR CM SCHEMATIC.

OFFPAGE-IN SYMBOL

NET_IN >> SHT 11

FOR THE ABOVE EXAMPLE OF AN OFFPAGE-IN SYMBOL, THE SIGNAL "NET_IN" IS CONTINUED ON SHEET 11.

OFFPAGE-OUT SYMBOL

SHT 12 >> NET_OUT

FOR THE ABOVE EXAMPLE OF AN OFFPAGE-OUT SYMBOL, THE SIGNAL "NET_OUT" IS CONTINUED ON SHEET 12.

BIDIRECTIONAL OFFPAGE SYMBOLS

NET_IO << >> SHT 11 OR SHT 11 << >> NET_IO

FOR THE ABOVE EXAMPLES OF BIDIRECTIONAL OFFPAGE SYMBOLS, THE SIGNAL "NET_IO" IS CONTINUED ON SHEET 11.

F. NETWORK-INTERCONNECTION SYMBOL

A NETWORK-INTERCONNECTION SYMBOL IS USED TO SHOW THAT TWO NETS ARE CONNECTED.

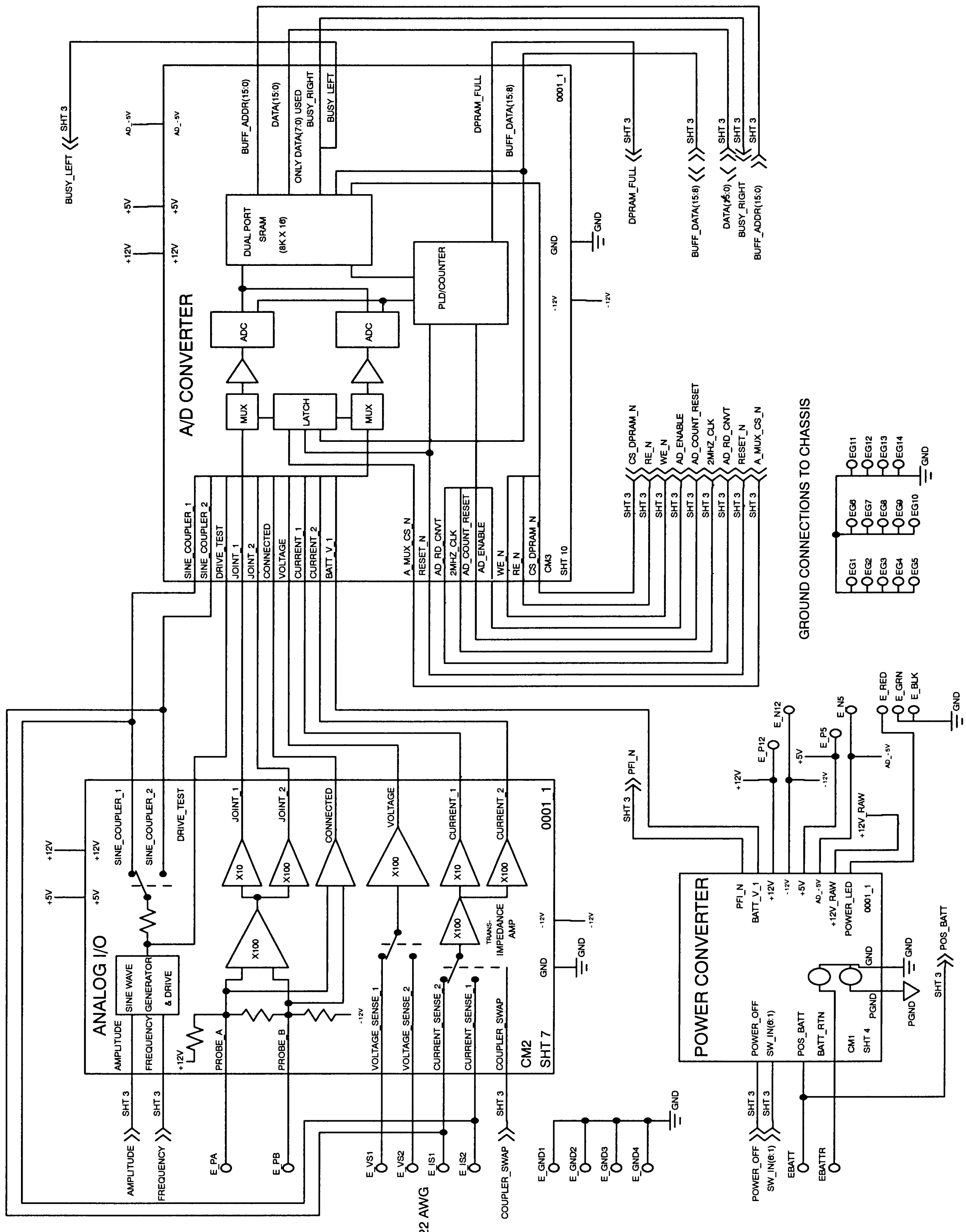
G. SAME-SHEET SYMBOL

NET_ON A SAME-SHEET SYMBOL INDICATES THE CONTINUATION OF A SIGNAL ELSEWHERE ON THE SAME SHEET.

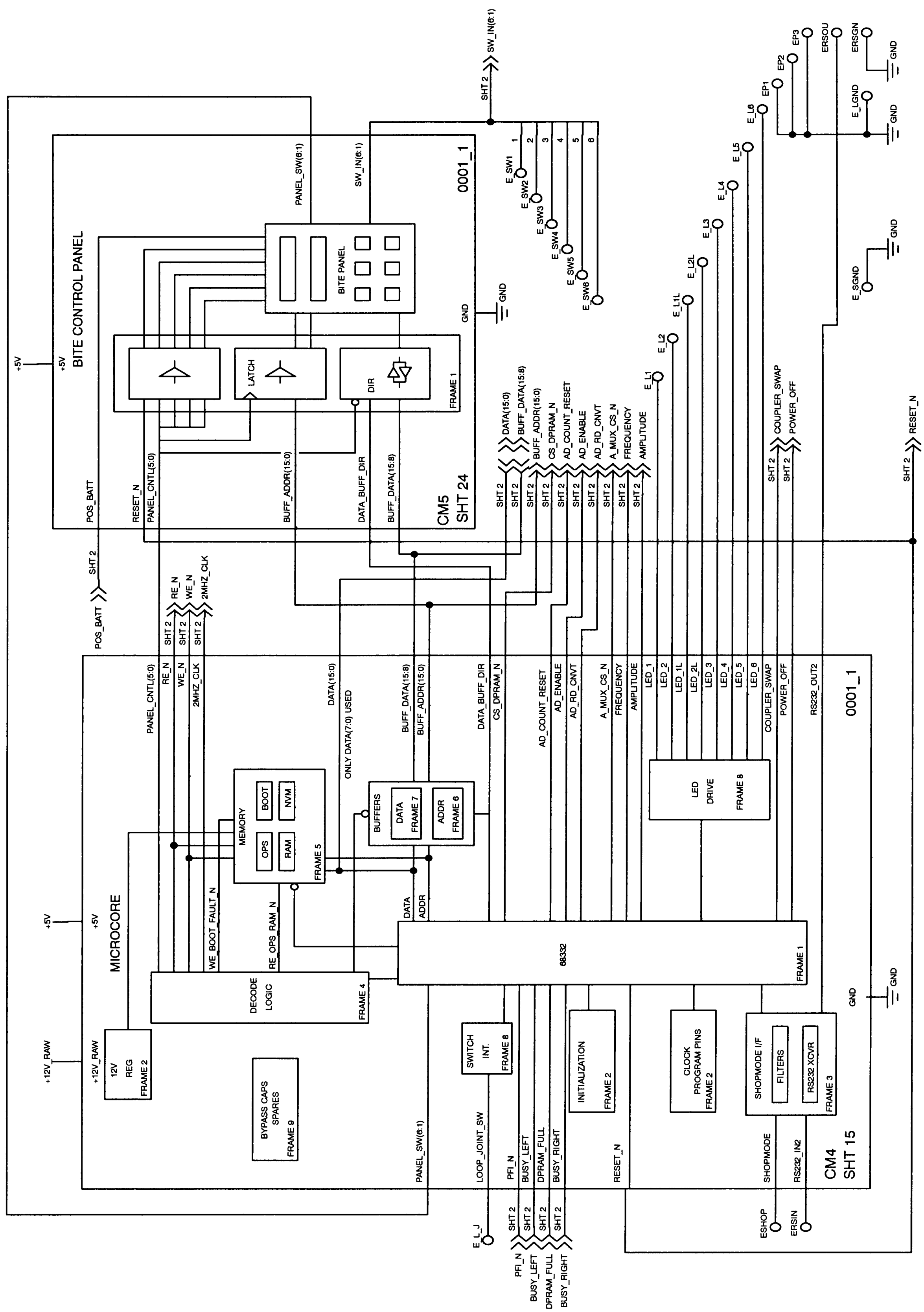
906-10250-4

SCHEMATIC DIAGRAM FOR ASSY

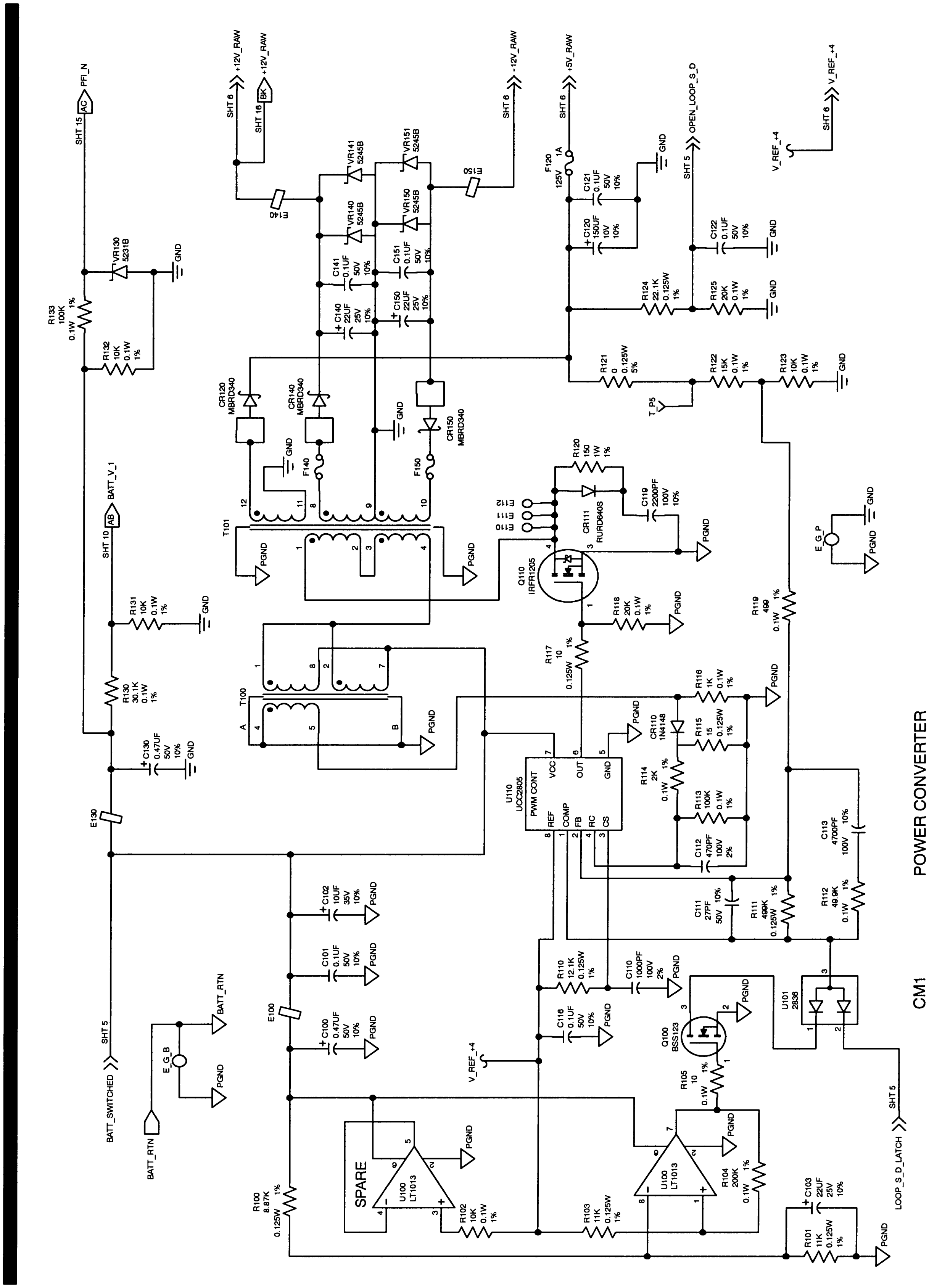
PW Assembly - Wiring Diagram
Figure 34 (Sheet 1)



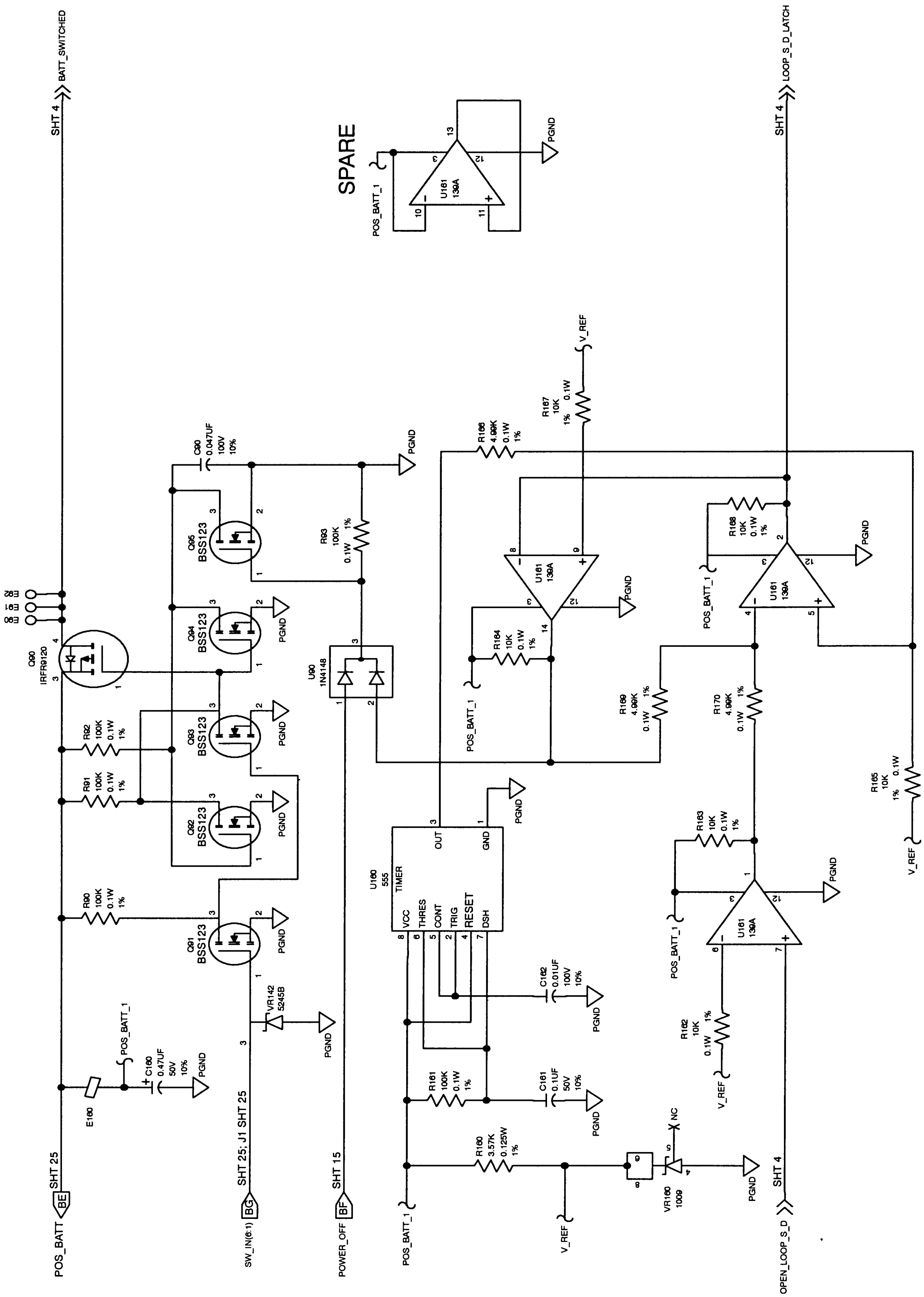
PW Assembly - Wiring Diagram
Figure 34 (Sheet 2)



PW Assembly - Wiring Diagram
Figure 34 (Sheet 3)

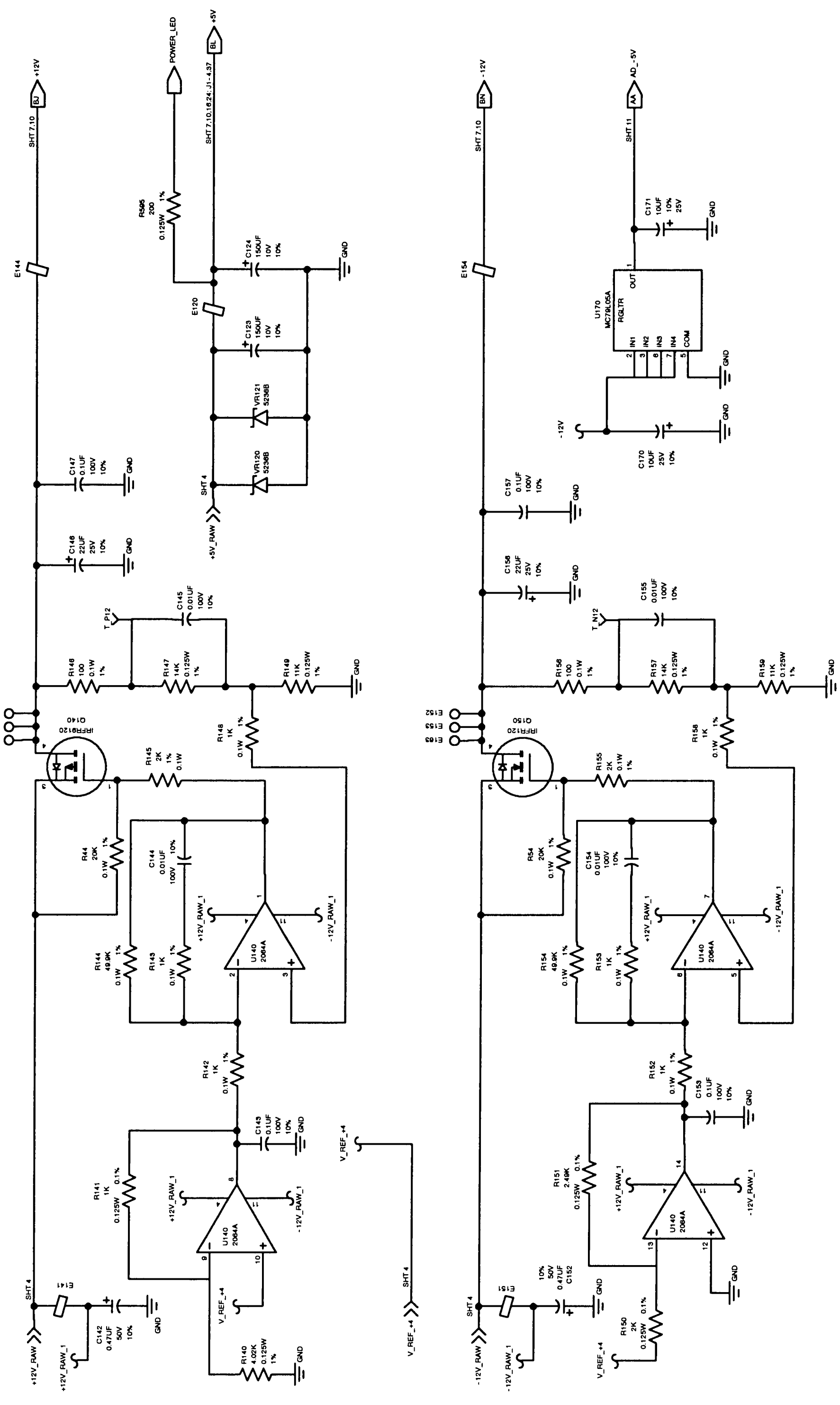


PW Assembly - Wiring Diagram
Figure 34 (Sheet 4)



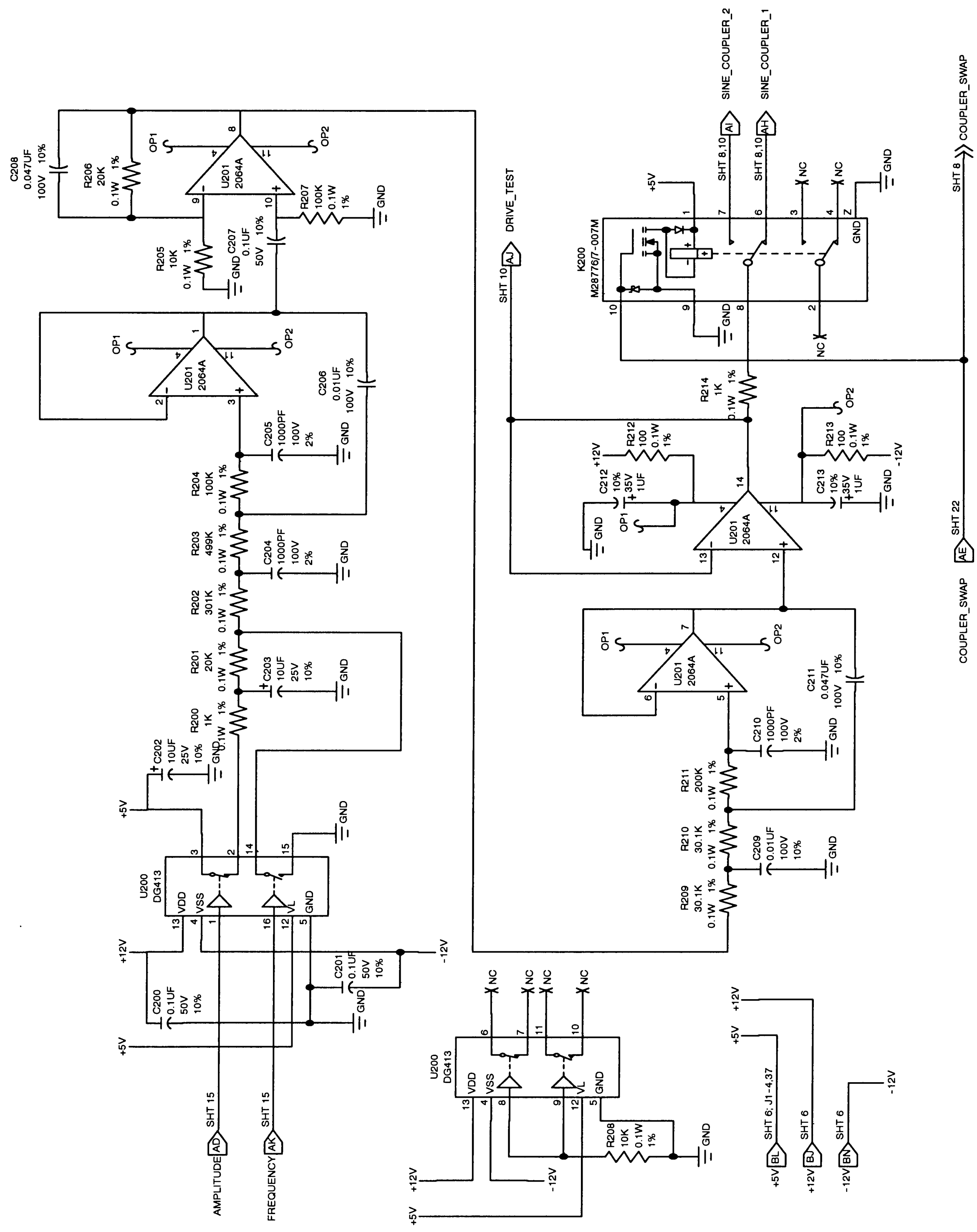
CM1 POWER CONVERTER

PW Assembly - Wiring Diagram
Figure 34 (Sheet 5)



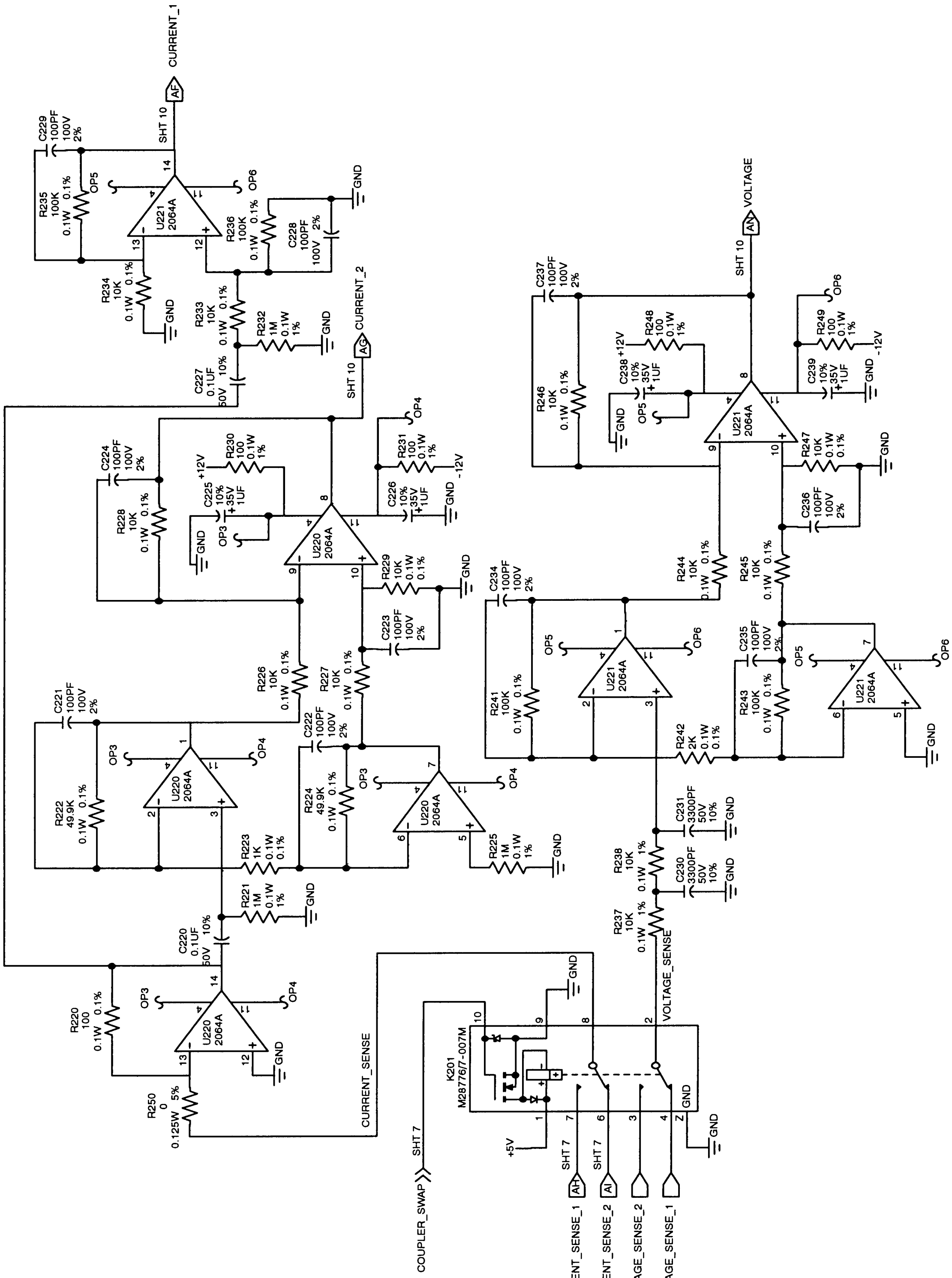
POWER CONVERTER
CM1

PW Assembly - Wiring Diagram
Figure 34 (Sheet 6)



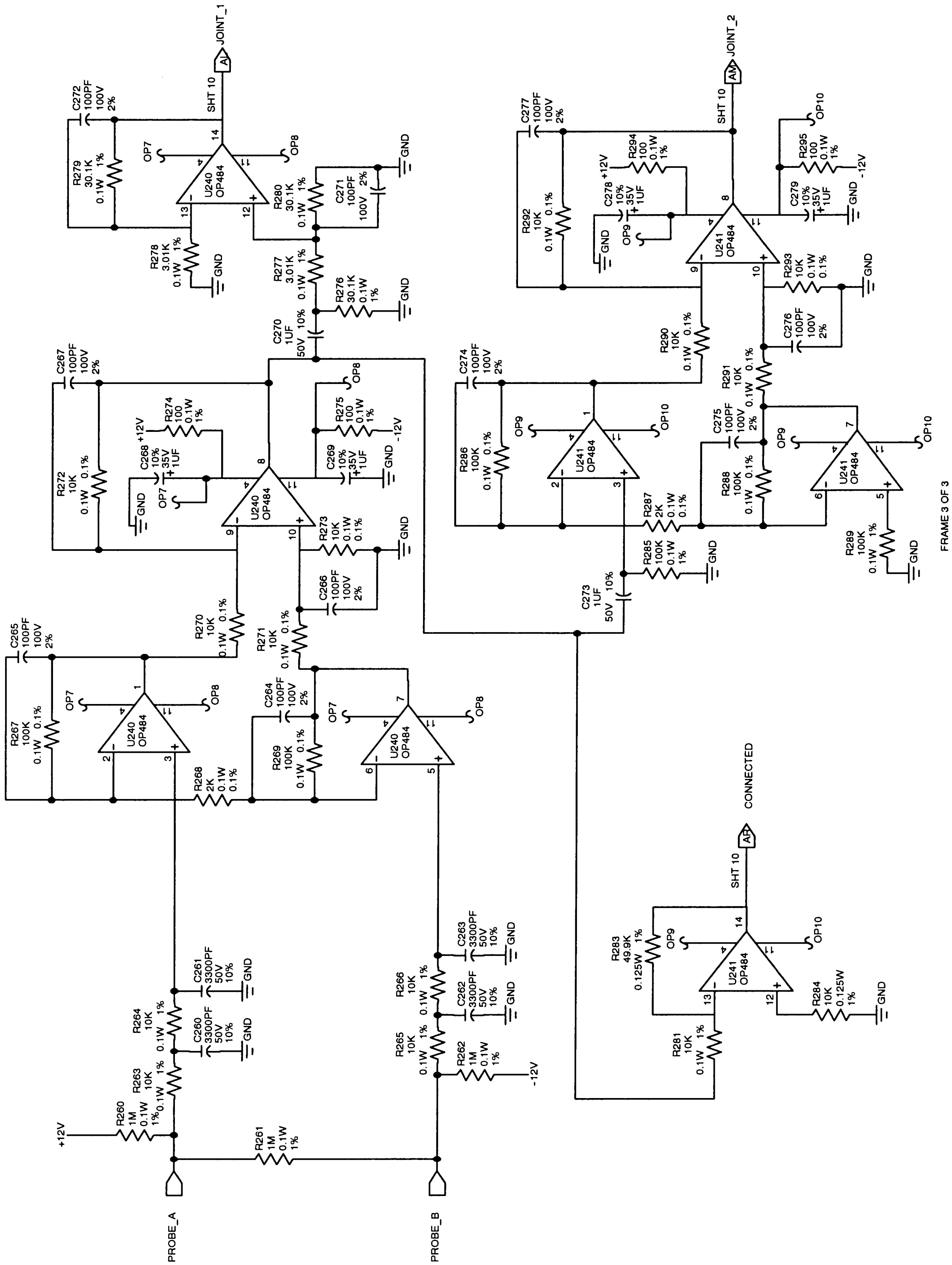
CM2 ANALOG I/O

PW Assembly - Wiring Diagram
Figure 34 (Sheet 7)



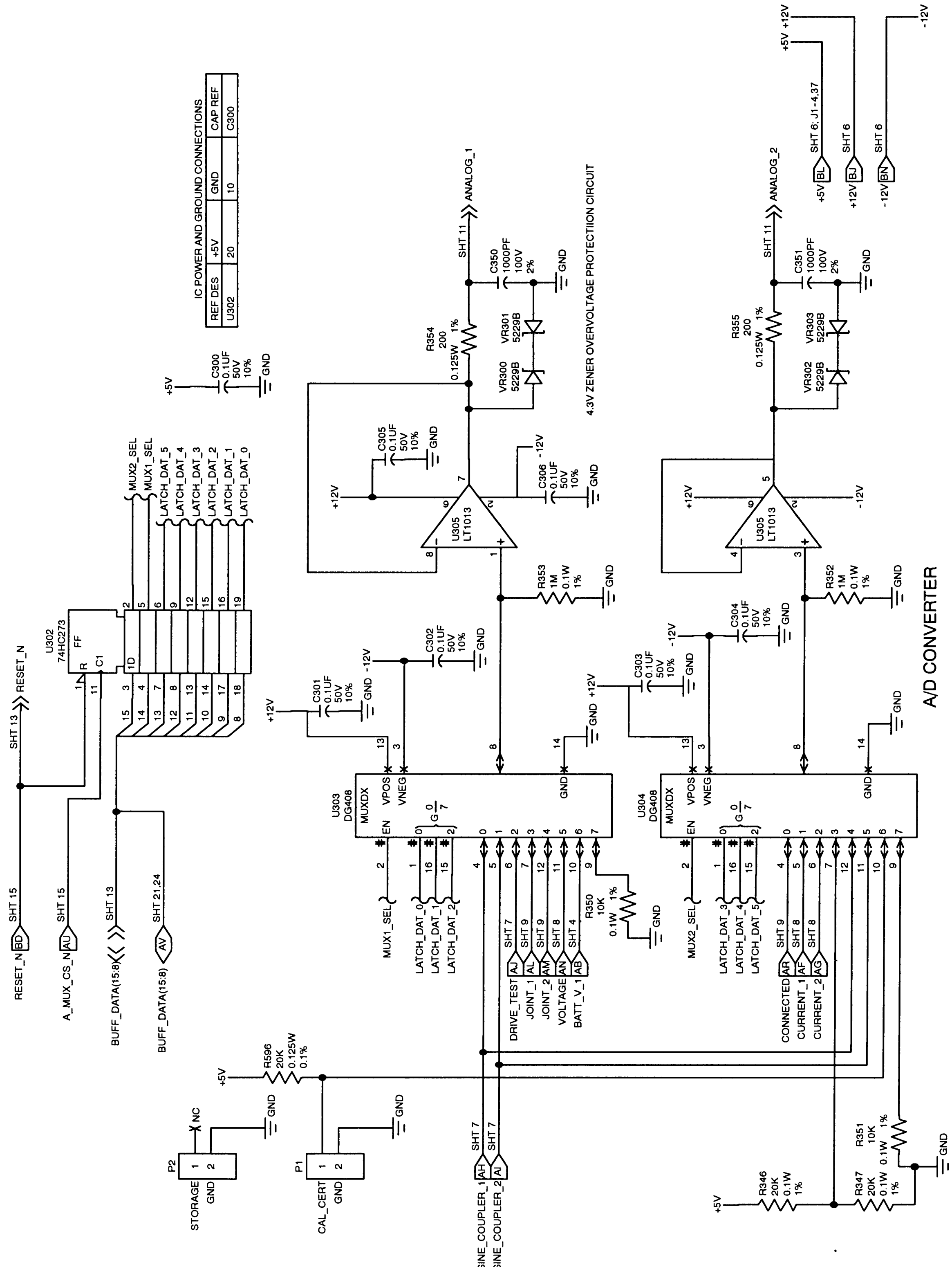
CM2 ANALOG I/O

PW Assembly - Wiring Diagram
Figure 34 (Sheet 8)

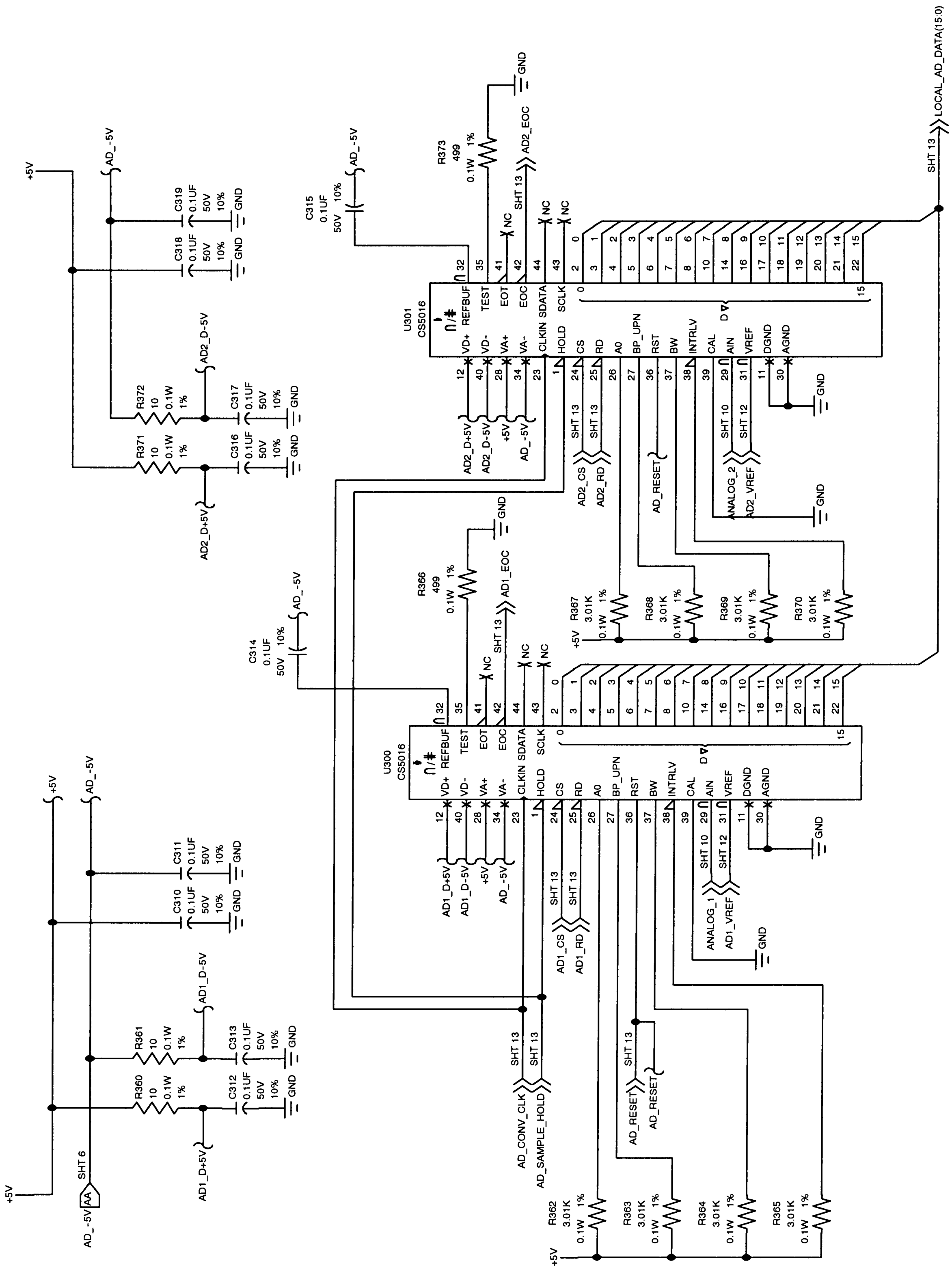


ANALOG I/O

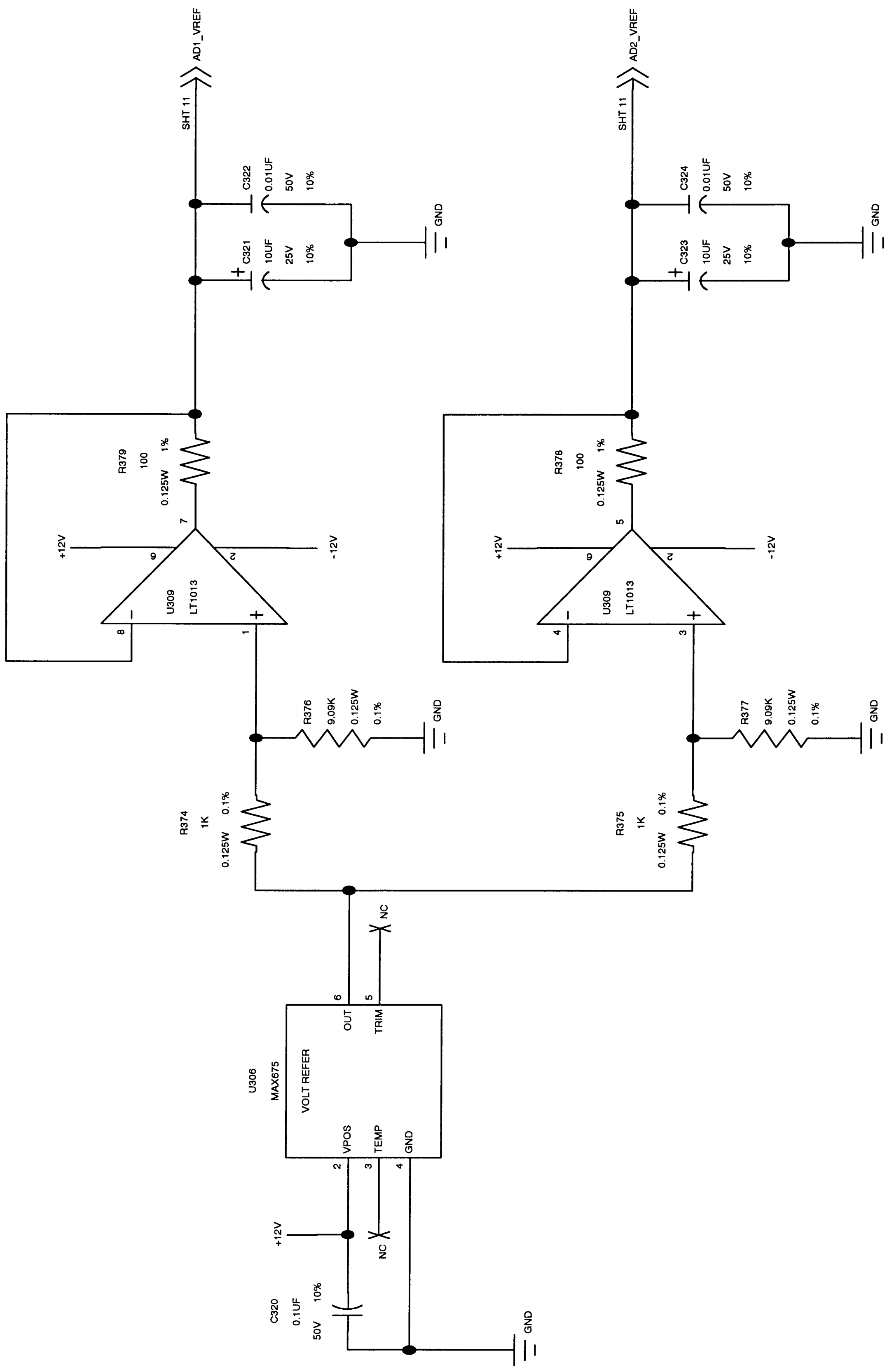
PW Assembly - Wiring Diagram
Figure 34 (Sheet 9)



PW Assembly - Wiring Diagram
Figure 34 (Sheet 10)

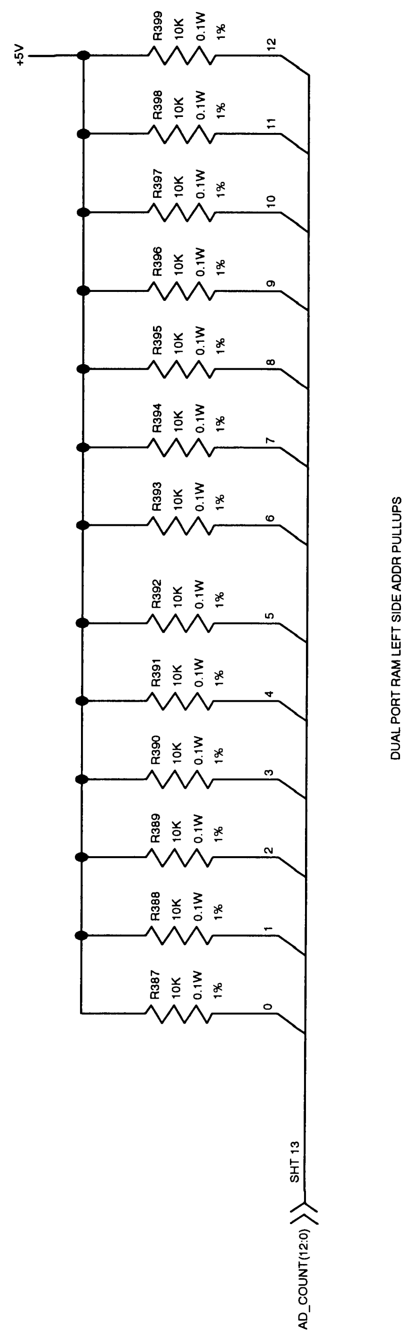


A/D CONVERTER
PW Assembly - Wiring Diagram
Figure 34 (Sheet 11)



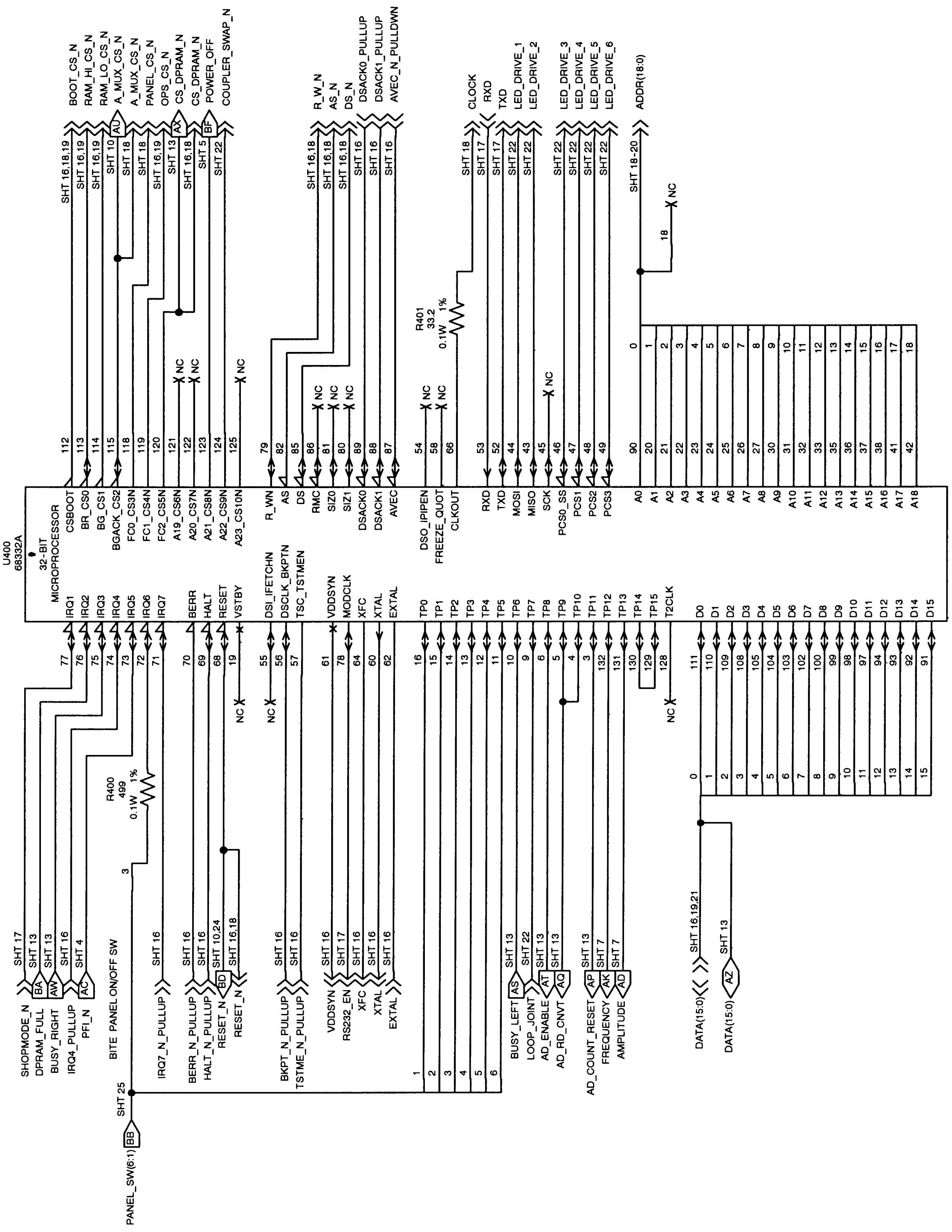
COPIED FROM P5-13 - 4.5V REFERENCE
A/D CONVERTER

PW Assembly - Wiring Diagram
Figure 34 (Sheet 12)



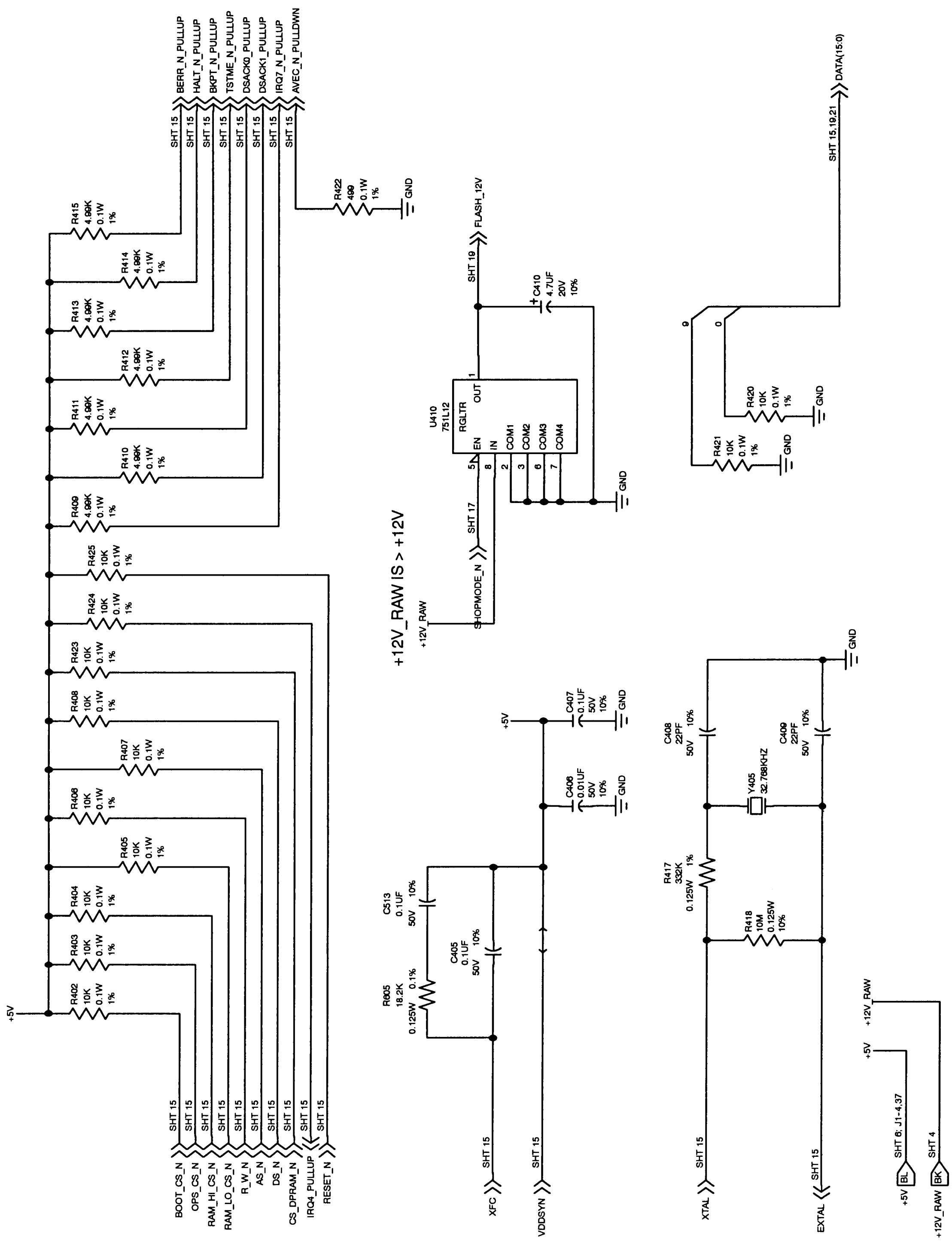
A/D CONVERTER

PW Assembly - Wiring Diagram
Figure 34 (Sheet 13)



CM4 MICROCORE

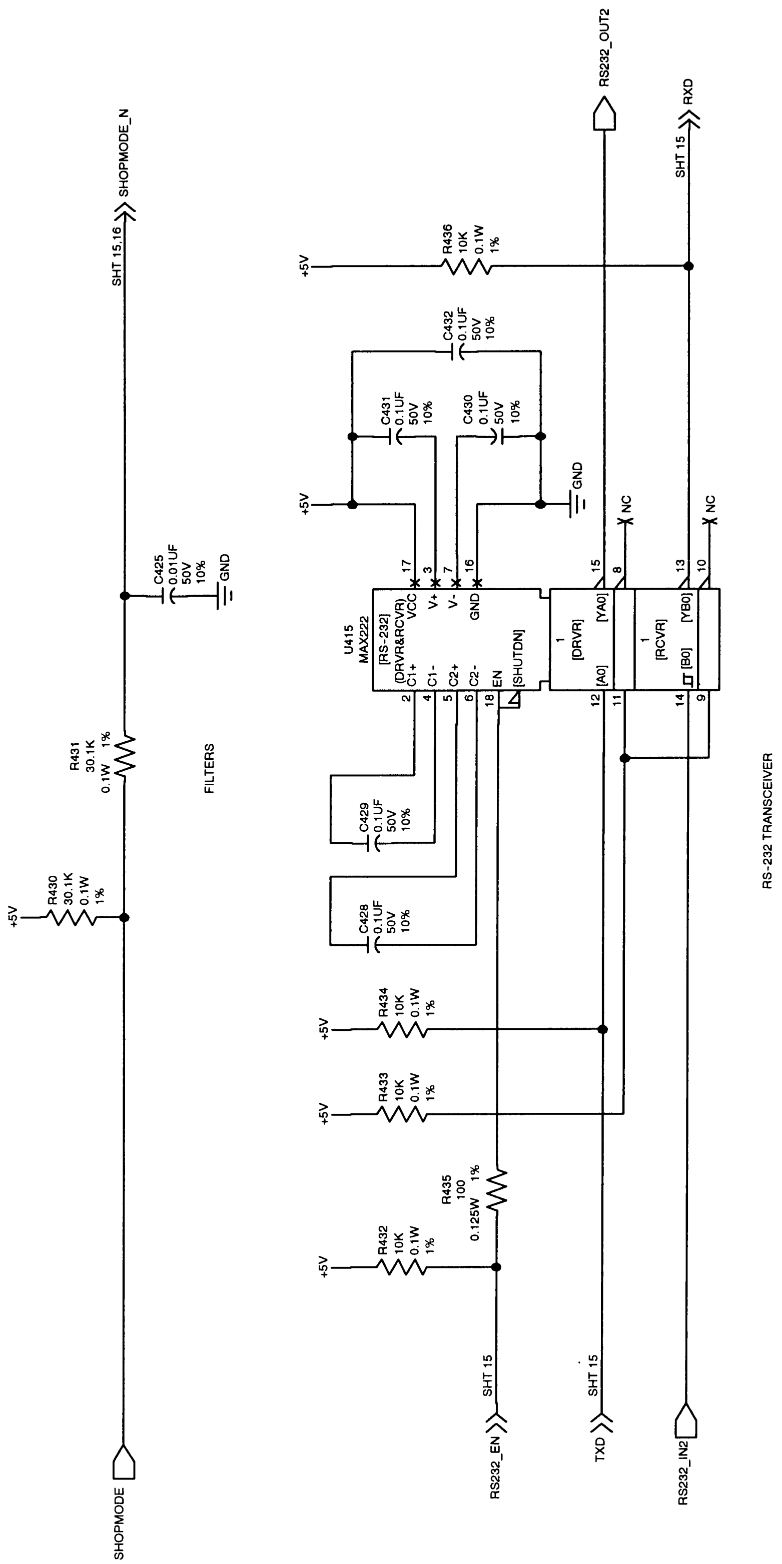
PW Assembly - Wiring Diagram
Figure 34 (Sheet 14)



CM4 MICROCORE

PW Assembly - Wiring Diagram

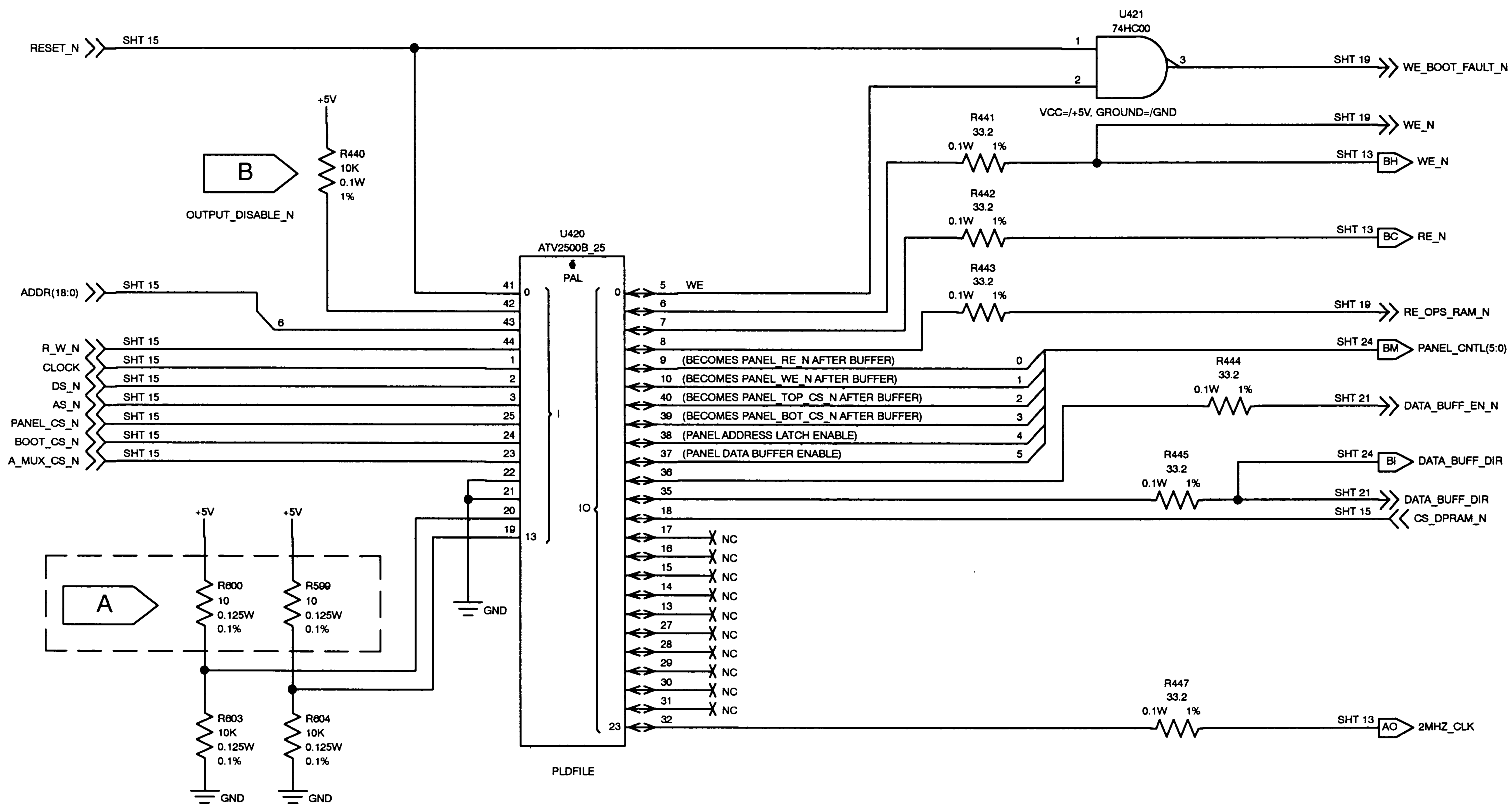
Figure 34 (Sheet 15)



SHOPMODE_INTERFACE

CM4 MICROCORE

PW Assembly - Wiring Diagram
Figure 34 (Sheet 16)



DECODE LOGIC

A UNINSTALLED PART(S)

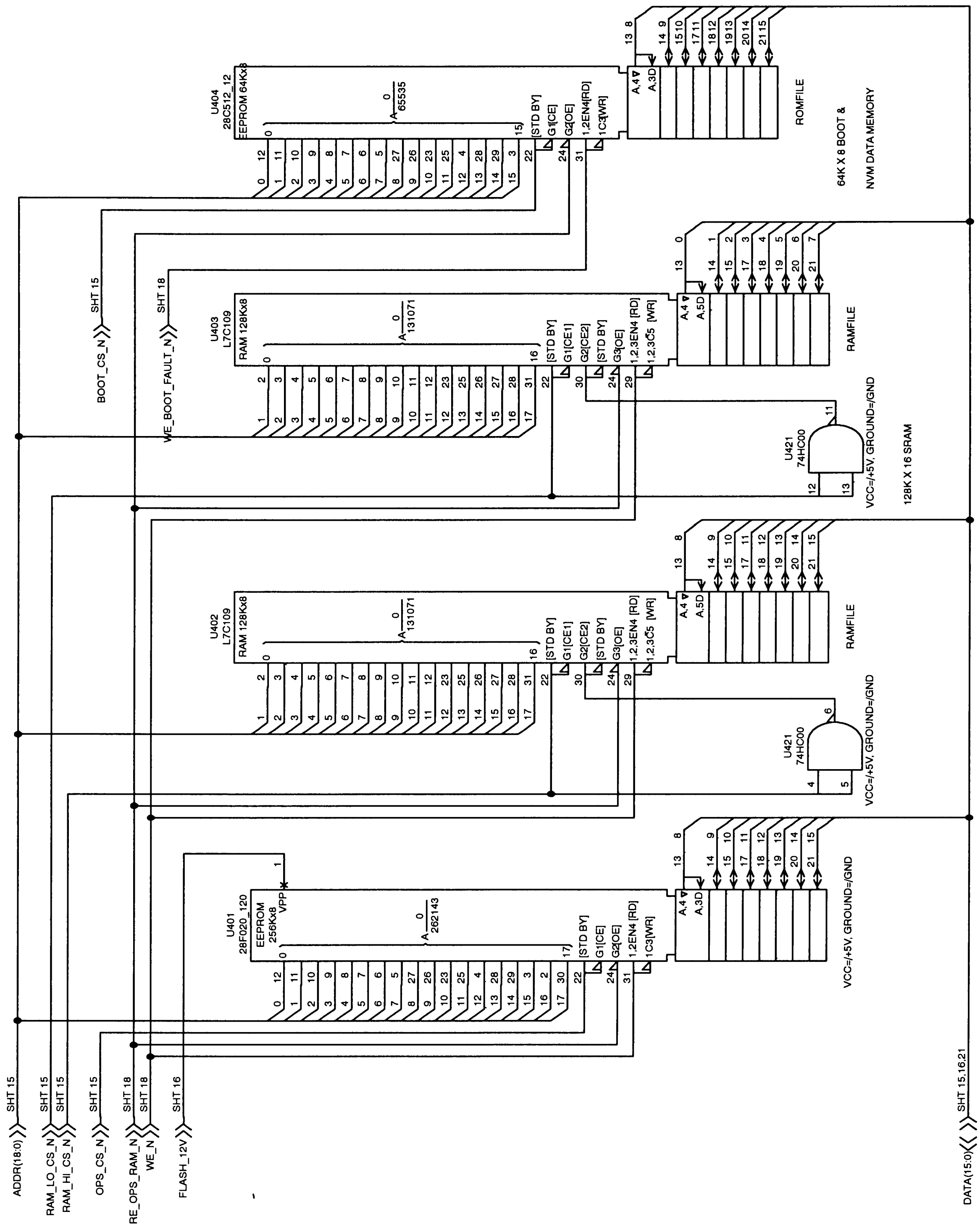
B ICT PROVISION TO TRISTATE ALL OUTPUTS WHEN INPUT HELD LOW

PAL

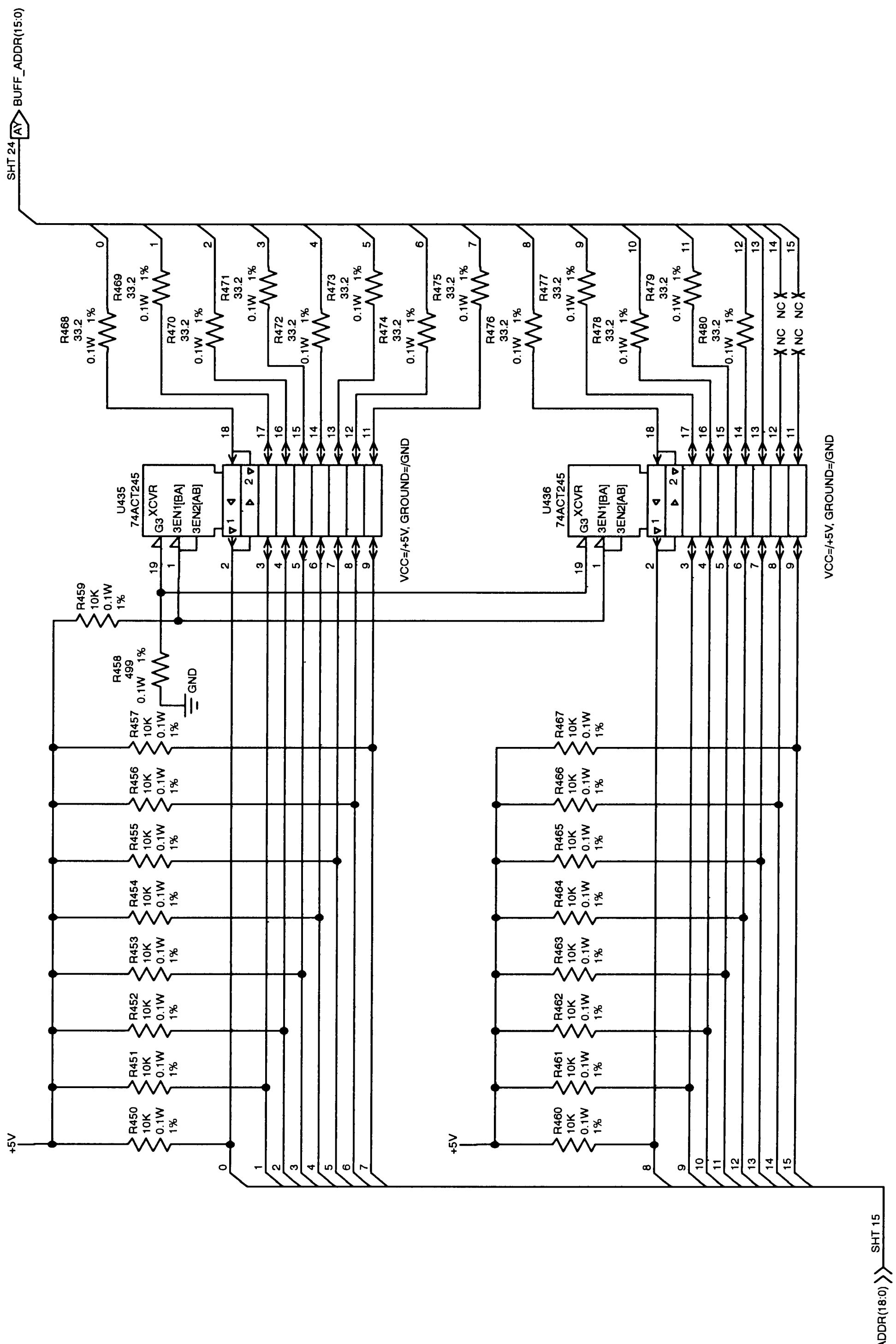
CM4 MICROCORE

PW Assembly - Wiring Diagram

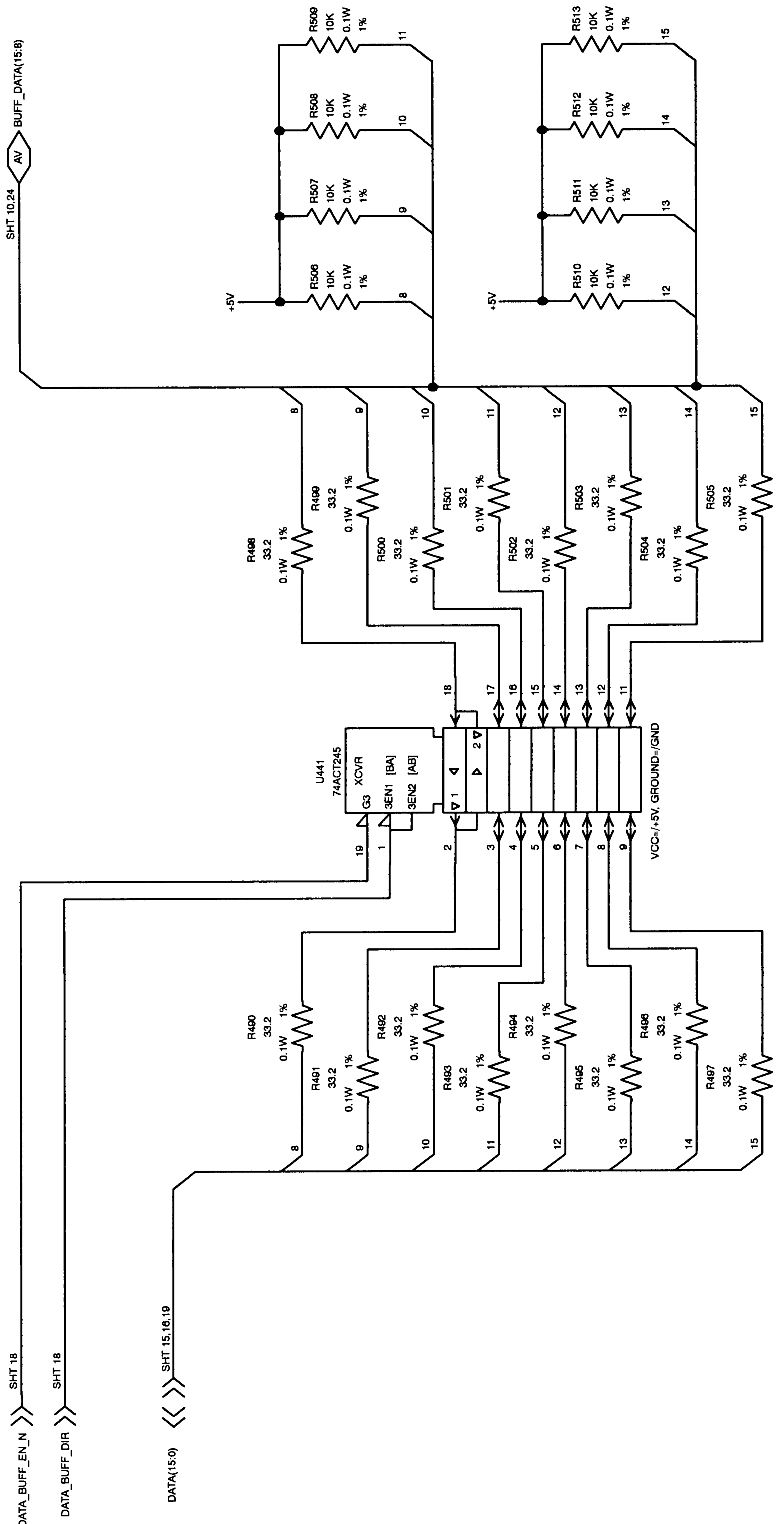
Figure 34 (Sheet 17)



CM4 MICROCORE
PW Assembly - Wiring Diagram
Figure 34 (Sheet 18)



ADDRESS BUFFERS
CM4 MICROCORE
PW Assembly - Wiring Diagram
Figure 34 (Sheet 19)

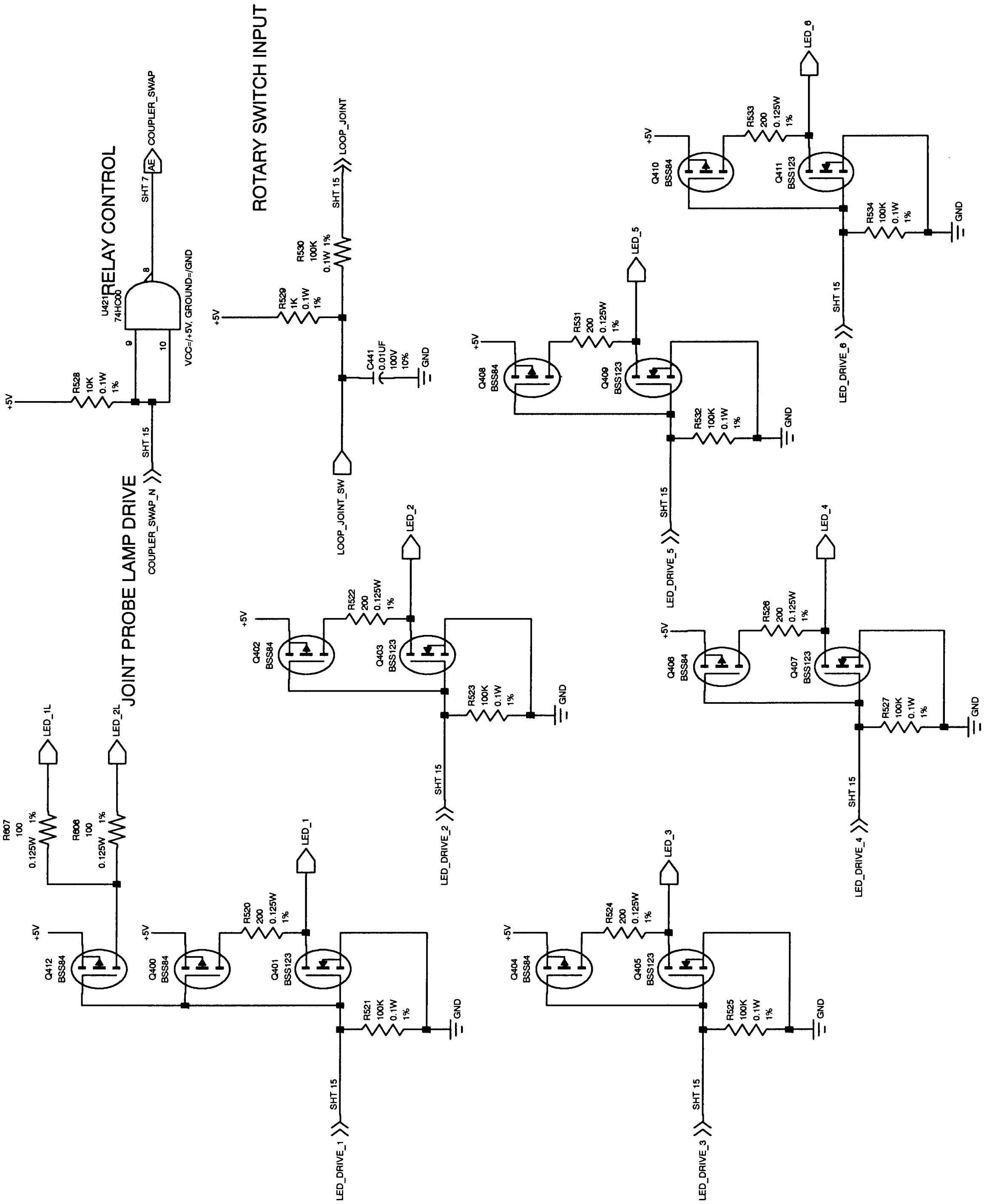


DATA BUFFERS

CM4 MICROCORE

PW Assembly - Wiring Diagram

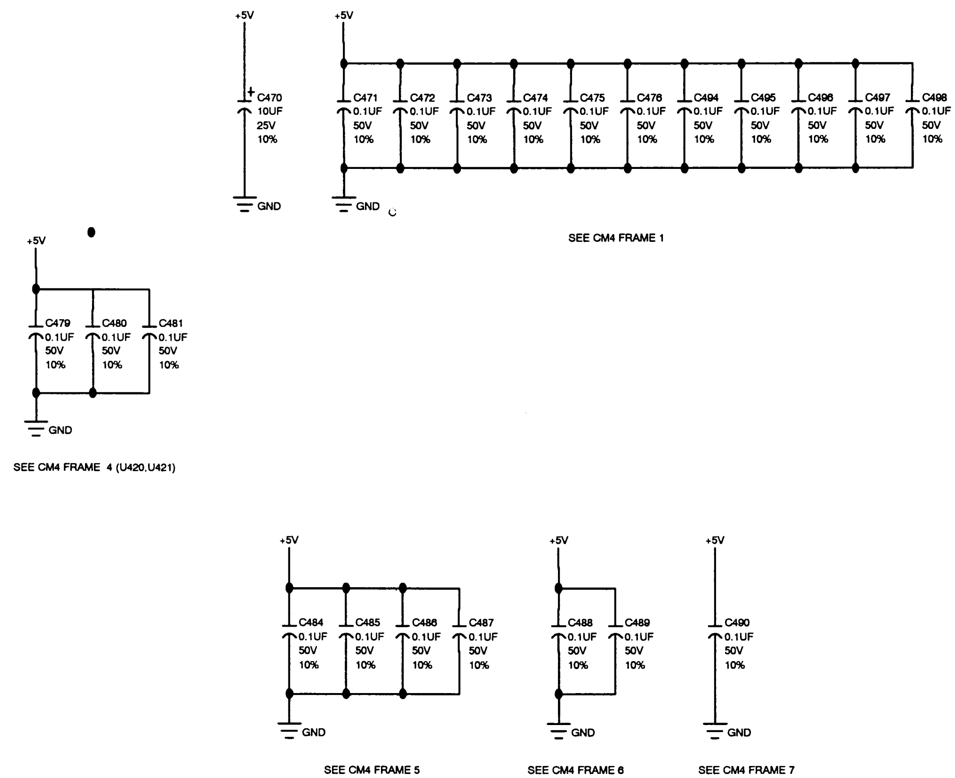
Figure 34 (Sheet 20)



CM4 MICROCORE
PW Assembly - Wiring Diagram
Figure 34 (Sheet 21)

IC POWER AND GROUND CONNECTIONS

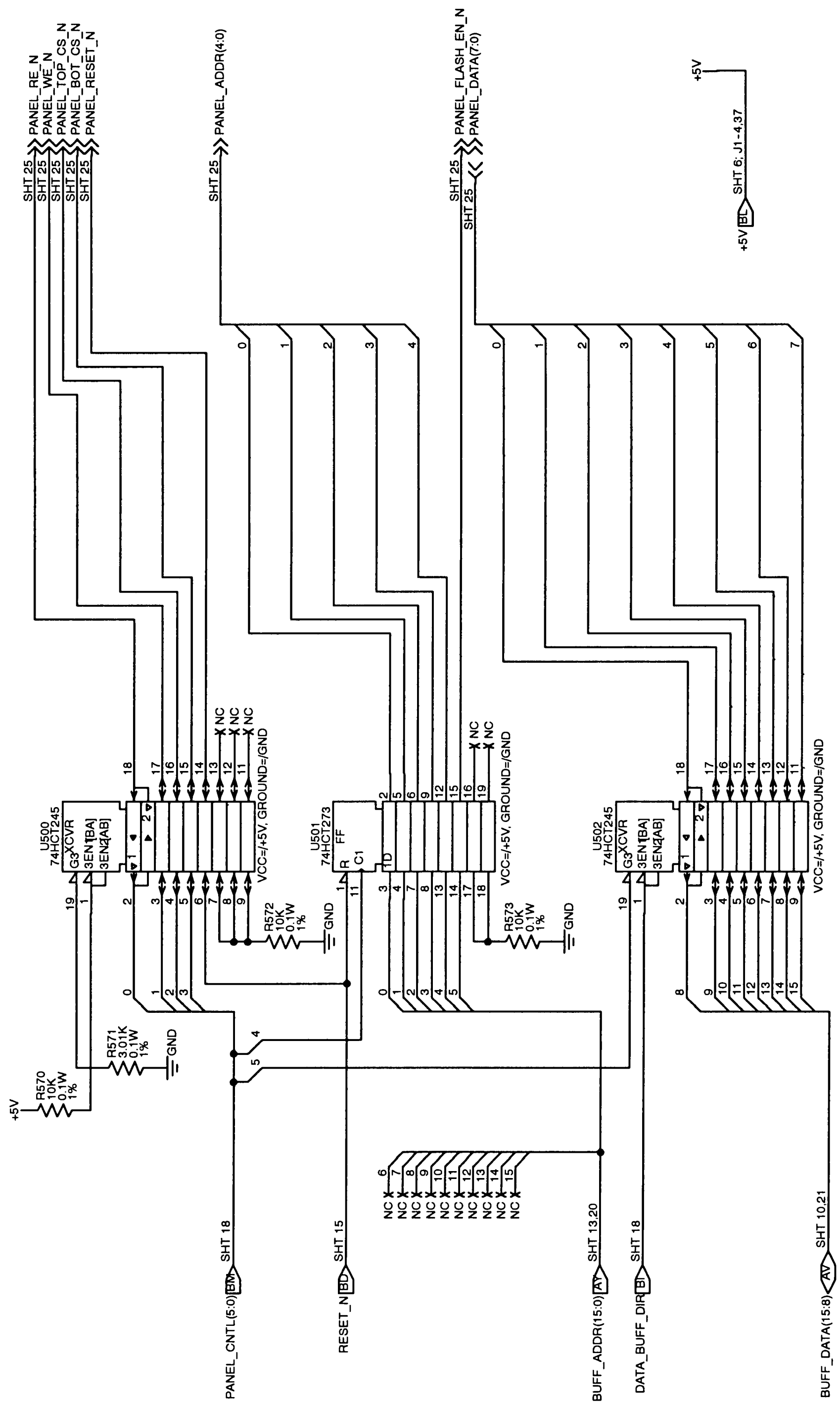
REF DES	+5V	GND	CAP REF
U400	1	2	C494
	7	8	C496
	18	17	C471
	28	29	
		34	
	39	40	C472
	50	51	C473
	63	59	C498
	65	67	C497
	84	83	C474
		101	
	107	106	C475
	96	95	
	116	117	C476
	126	127	C495
U420	11	33	C479
	12	34	C480
U421	14	7	C481
U401	32	16	C484
U402			C485
U403			C486
U404	28	14	C487
U435	20	10	C488
U436	20	10	C489
U441	20	10	C490



BYPASS CAPACITORS

CM4 MICROCORE

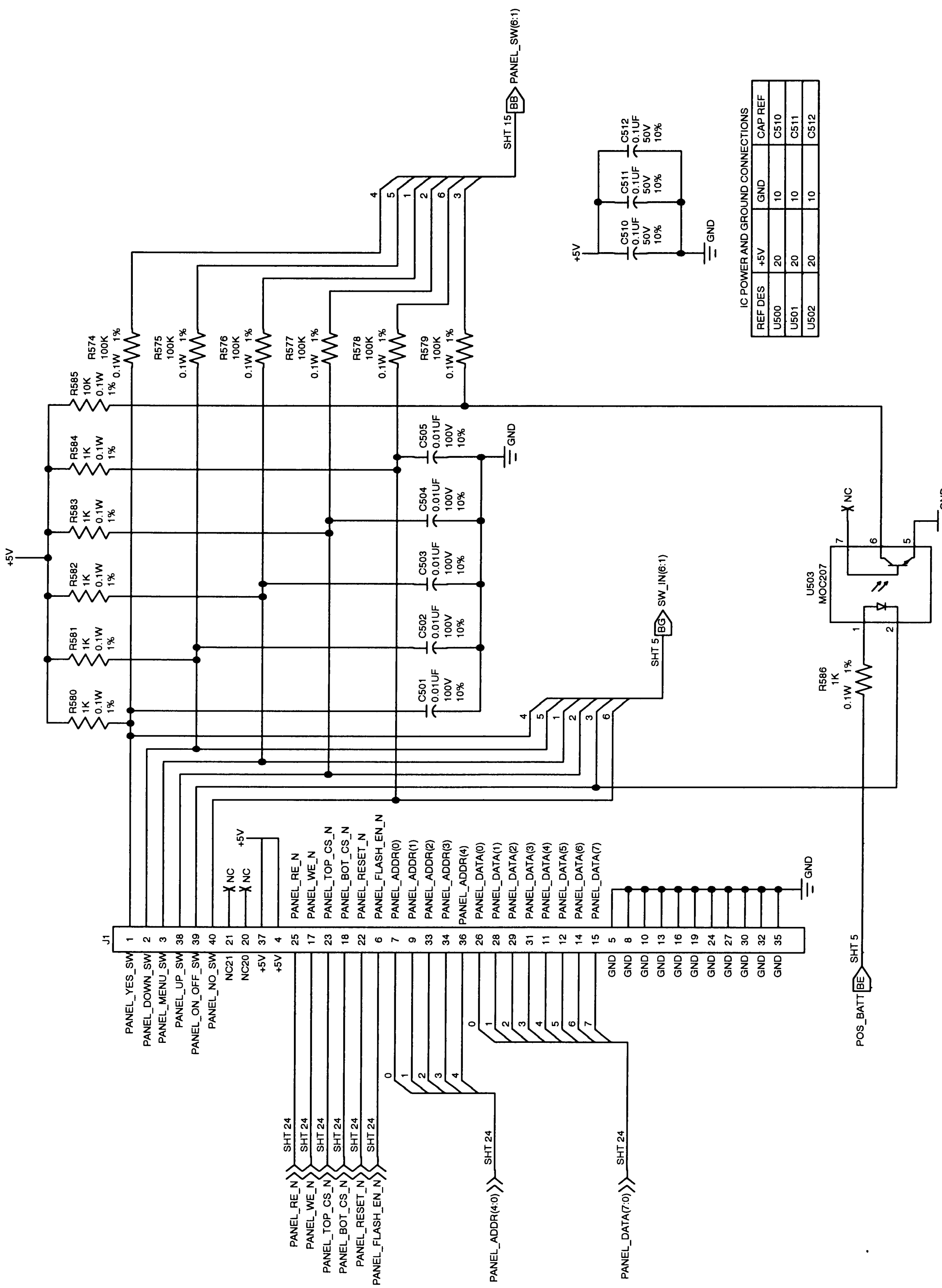
PW Assembly - Wiring Diagram
Figure 34 (Sheet 22)



CM5 BITE CONTROL PANEL

PW Assembly - Wiring Diagram

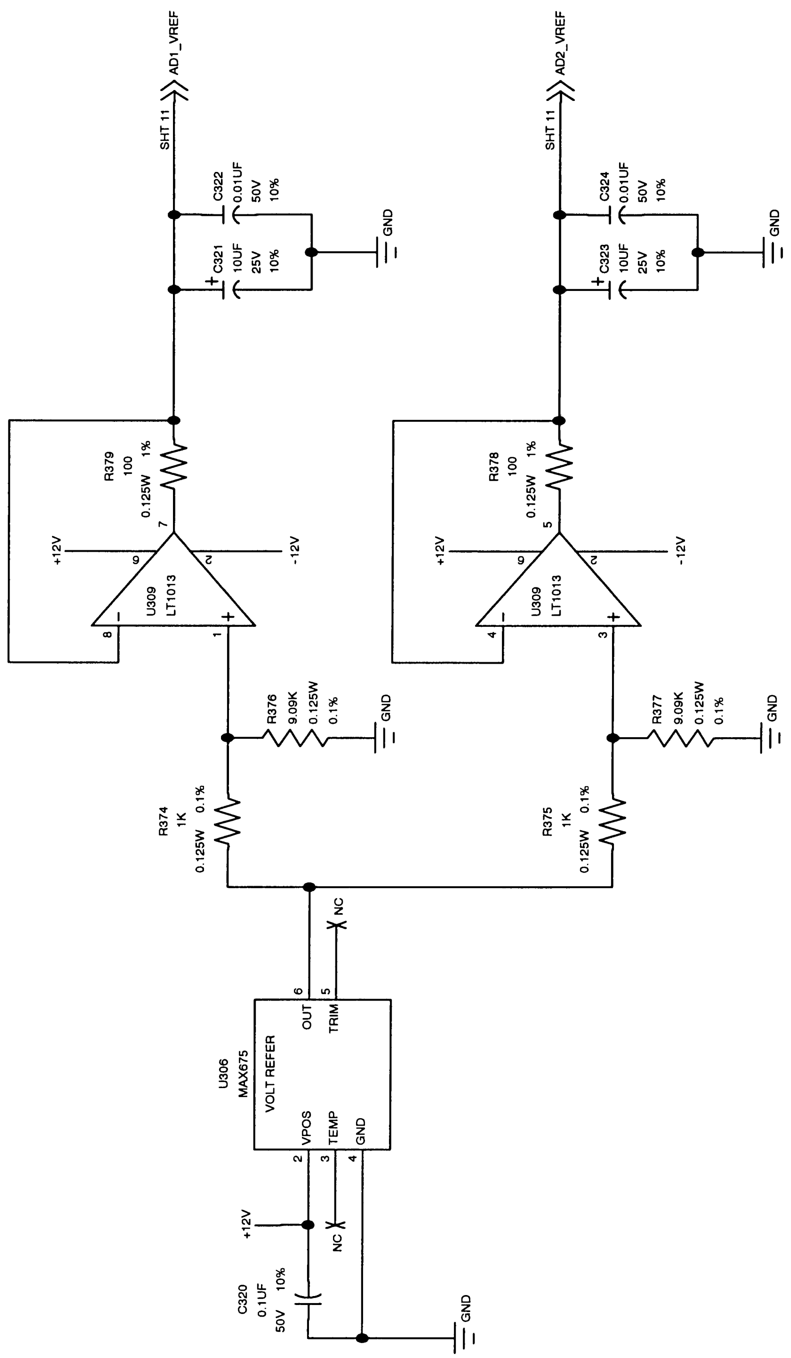
Figure 34 (Sheet 23)



IC POWER AND GROUND CONNECTIONS			
REF DES	+5V	GND	CAP REF
U500	20	10	C510
U501	20	10	C511
U502	20	10	C512

CM5 BITE CONTROL PANEL

PW Assembly - Wiring Diagram
Figure 34 (Sheet 24)



COPIED FROM P5-13 - 4.5V REFERENCE
CM3 A/D CONVERTER

PW Assembly - Wiring Diagram
Figure 34 (Sheet 25)

LEGEND:

1. ELECTROSTATIC DISCHARGE SENSITIVE MATERIAL. LABEL, TRANSPORT, STORE, AND HANDLE PER REQUIREMENTS IN BAC5485.

2. THIS IS A HIERARCHICAL SCHEMATIC AND CONSISTS OF AN UPPER-LEVEL BLOCK SCHEMATIC AND LOWER-LEVEL CIRCUIT MODULE (CM) SCHEMATICS. THE UPPER-LEVEL BLOCK SCHEMATIC CONTAINS ALL THE CM SYMBOLS AND THEIR ELECTRICAL INTERCONNECTIONS. THE CM SCHEMATICS SHOW THE DETAILED CIRCUITRY OF THE ASSEMBLY. THE UPPER-LEVEL BLOCK SCHEMATIC PROVIDES A VIEW OF OVERALL FUNCTIONALITY WHILE THE LOWER-LEVEL CM SCHEMATICS PROVIDE DETAILED ELECTRICAL INFORMATION.

3. WHEN A HYPHEN (-) APPEARS BETWEEN SHEET (SHT) NUMBERS OR BETWEEN REFERENCE DESIGNATIONS IT REFERS TO CONSECUTIVE PAGES OR CONSECUTIVE REFERENCE DESIGNATIONS. FOR EXAMPLE, SHT 9-11 MEANS SHEET NUMBERS 9, 10, AND 11. U1-U4 MEANS REFERENCE DESIGNATIONS U1, U2, U3, AND U4. A HYPHEN IS ALSO USED TO INDICATE THE ASSOCIATION BETWEEN A CONNECTOR REFERENCE DESIGNATION AND A PIN NUMBER. FOR EXAMPLE, P1-45.

4. THE SEMICOLON (;) IS USED TO SEPARATE SHEET REFERENCES FROM CONNECTOR REFERENCES. FOR EXAMPLE, SHT 9-11; P1-45. A SEMICOLON IS ALSO USED TO SEPARATE REFERENCES TO DIFFERENT CONNECTORS FROM EACH OTHER. FOR EXAMPLE, P1-45; J1 SHT 3.

5. THE FORMAT OF A CONNECTOR REFERENCE THAT APPEARS WITH A PORT SYMBOL OR AN OFFPAGE SYMBOL DEPENDS ON WHETHER A SIGNAL IS CONNECTED TO ONE PIN OR MULTIPLE PINS.

   IF A SIGNAL IS CONNECTED TO A SINGLE PIN, THE CONNECTOR REFERENCE DESIGNATION AND PIN NUMBER ARE GIVEN. FOR EXAMPLE, P1-45.

   IF A SIGNAL IS CONNECTED TO MULTIPLE PINS, THE CONNECTOR REFERENCE DESIGNATION AND THE SHEET NUMBER WHERE THE CONNECTOR CAN BE FOUND ARE GIVEN. FOR EXAMPLE, J1 SHT 3.

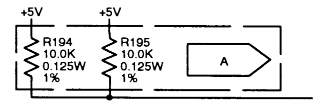
6. IF A SIGNAL IS CONNECTED TO A NO-CONNECTION SYMBOL, NC IS GIVEN.

7. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS.

8. THE FOLLOWING REFERENCE DESIGNATIONS ARE NOT ASSIGNED:
   C1-C89, C91-C99, C104-C109, C114-C115, C117-C118, C125-C129, C131-C139, C148-C149, C158-C159, C163-C169, C172-C199, C214-C219, C232-C233, C240-C259, C280-C299, C307-C309, C328-C349, C352-C404, C411-C424, C426-C427, C433-C440, C442-C469, C477-C478, C482-C483, C491-C493, C499-C500, C506-C509, CR1-CR109, CR112-CR119, CR121-CR139, CR141-CR149, E1-E89, E93-E99, E101-E109, E113-E119, E121-E129, E131-E139, E145-E149, E155-E159, E161, F1-F119, F121-F139, F141-F149, K1-K199, Q1-Q89, Q96-Q99, Q101-Q109, Q111-Q139, Q141-Q149, Q151-Q399, R1-R43, R45-R53, R55-R89, R94-R99, R106-R109, R126-R129, R134-R139, R171-R199, R215-R219, R239-R240, R251-R259, R296-R344, R348-R349, R356-R359, R416, R419, R426-R429, R437-R439, R446, R448-R449, R481-R489, R514-R519, R535-R569, R587-R593, T1-T99, U1-U89, U91-U99, U102-U109, U111-U139, U141-U159, U162-U169, U171-U199, U202-U219, U222-U239, U242-U299, U310-U399, U405-U409, U411-U414, U416-U419, U422-U434, U437-U440, U442-U499, VR1-VR119, VR122-VR129, VR131-VR139, VR143-VR149, VR152-VR159, VR161-VR299, AND Y1-Y404.

9. THE FOLLOWING ARE THE HIGHEST REFERENCE DESIGNATIONS ASSIGNED:
   C515, CR150, E163, EG14, EP3, F150, J1, K201, P2, Q412, R608, T101, U504, VR303, AND Y405.

10. UNINSTALLED PARTS ARE USED TO ALLOCATE SPACE ON THE PRINTED WIRING BOARD ASSEMBLY FOR PARTS THAT MAY BE USED IN A DIFFERENT APPLICATION. PADS AND TRACES ARE FABRICATED, BUT THE PARTS ARE NOT INSTALLED ON THIS ASSEMBLY. THE PARTS ARE IDENTIFIED ON THE SCHEMATIC WITH A DASHED BOX AND A FLAGNOTE, AS SHOWN BELOW.



A UNINSTALLED PARTS

11. AN "IC POWER AND GROUND CONNECTIONS" TABLE SHOWS THE IC REFERENCE DESIGNATIONS, THE POWER AND GROUND PINS, AND THE POWER AND GROUND NETS TO WHICH THE PINS ARE CONNECTED. THE CAPACITOR REFERENCE (CAP REF) COLUMN WHEN USED SHOWS THE REFERENCE DESIGNATIONS OF THE DECOUPLING CAPACITORS ASSOCIATED WITH EACH IC.

12. NONSTANDARD SYMBOLS

A. PORT SYMBOLS

ALL PORT SYMBOLS INDICATE THE CONTINUATION OF A SIGNAL OR SIGNALS ON EITHER THE UPPER-LEVEL BLOCK SCHEMATIC OR ANOTHER CM SCHEMATIC.

THE TWO-LETTER CODE WITHIN A PORT SYMBOL IDENTIFIES PORTS THAT ARE CONNECTED. TWO OR MORE PORTS WITH THE SAME TWO-LETTER CODE ARE CONNECTED. A PORT SYMBOL WITHOUT A TWO-LETTER CODE DOES NOT CONNECT TO ANOTHER CM SCHEMATIC, BUT CONNECTS TO THE UPPER-LEVEL BLOCK SCHEMATIC ONLY.

PORT-IN SYMBOL

NET_IN AB SHT 13; P1-46

FOR THE ABOVE EXAMPLE OF A PORT-IN SYMBOL, THE SIGNAL "NET_IN" IS CONTINUED ON SHEET 13 AND ALSO ON CONNECTOR P1, PIN 46, LOCATED ON THE UPPER-LEVEL BLOCK SCHEMATIC.

PORT-OUT SYMBOL

SHT 16; P1 SHT 6 AB NET_OUT

FOR THE ABOVE EXAMPLE OF A PORT-OUT SYMBOL, THE SIGNAL "NET_OUT" IS CONTINUED ON SHEET 16 AND GOES TO MULTIPLE PINS ON CONNECTOR P1, LOCATED ON SHEET 6.

BIDIRECTIONAL PORT SYMBOLS

NET_IO P1-46 OR P1-46 NET_IO

FOR THE ABOVE EXAMPLES OF BIDIRECTIONAL PORT SYMBOLS, THE SIGNAL "NET_IO" IS CONTINUED ON CONNECTOR P1, PIN 46, LOCATED ON THE UPPER-LEVEL BLOCK SCHEMATIC.

B. NO-CONNECTION SYMBOL

NC A NO-CONNECTION SYMBOL IS USED TO INDICATE THAT A PIN OF A DEVICE IS NOT ELECTRICALLY CONNECTED TO ANY CIRCUIT EXTERNAL TO THE DEVICE PACKAGE.

C. TEST-POINT SYMBOL

TP23 EACH OF THE STANDARD TEST-POINT SYMBOLS SHOWN IN SECTION 1.5 OF BDS-3020-3 HAS A DOT. THIS SCHEMATIC USES A TEST-POINT SYMBOL WITHOUT A DOT BECAUSE OF TOOL LIMITATIONS.

D. MECCA SYMBOL

E1 A MECCA SYMBOL IS USED TO SHOW THAT TWO OR MORE SIGNALS ARE CONNECTED. THE EXAMPLE ON THE LEFT IS A TWO-CONNECTION MECCA SYMBOL.

E. OFFPAGE SYMBOLS

ALL OFFPAGE SYMBOLS INDICATE THE CONTINUATION OF A SIGNAL OR SIGNALS ON AT LEAST ONE OTHER SHEET OF THE SAME UPPER-LEVEL BLOCK SCHEMATIC OR CM SCHEMATIC.

OFFPAGE-IN SYMBOL

NET_IN >> SHT 11

FOR THE ABOVE EXAMPLE OF AN OFFPAGE-IN SYMBOL, THE SIGNAL "NET_IN" IS CONTINUED ON SHEET 11.

OFFPAGE-OUT SYMBOL

SHT 12 >> NET_OUT

FOR THE ABOVE EXAMPLE OF AN OFFPAGE-OUT SYMBOL, THE SIGNAL "NET_OUT" IS CONTINUED ON SHEET 12.

BIDIRECTIONAL OFFPAGE SYMBOLS

NET_IO << >> SHT 11 OR SHT 11 << >> NET_IO

FOR THE ABOVE EXAMPLES OF BIDIRECTIONAL OFFPAGE SYMBOLS, THE SIGNAL "NET_IO" IS CONTINUED ON SHEET 11.

F. NETWORK-INTERCONNECTION SYMBOL

⟷ A NETWORK-INTERCONNECTION SYMBOL IS USED TO SHOW THAT TWO NETS ARE CONNECTED.

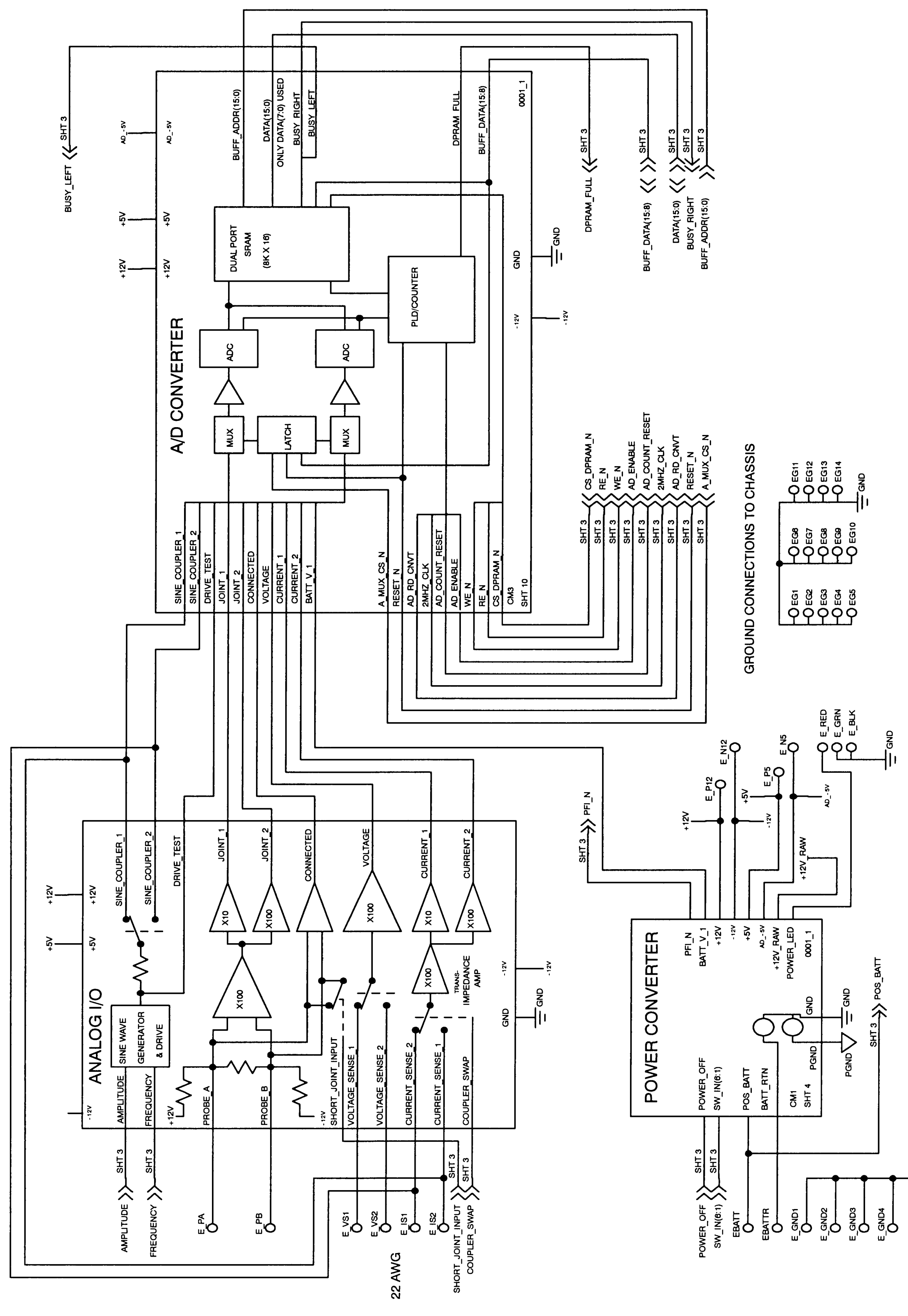
G. SAME-SHEET SYMBOL

NET_ON A SAME-SHEET SYMBOL INDICATES THE CONTINUATION OF A SIGNAL ELSEWHERE ON THE SAME SHEET.

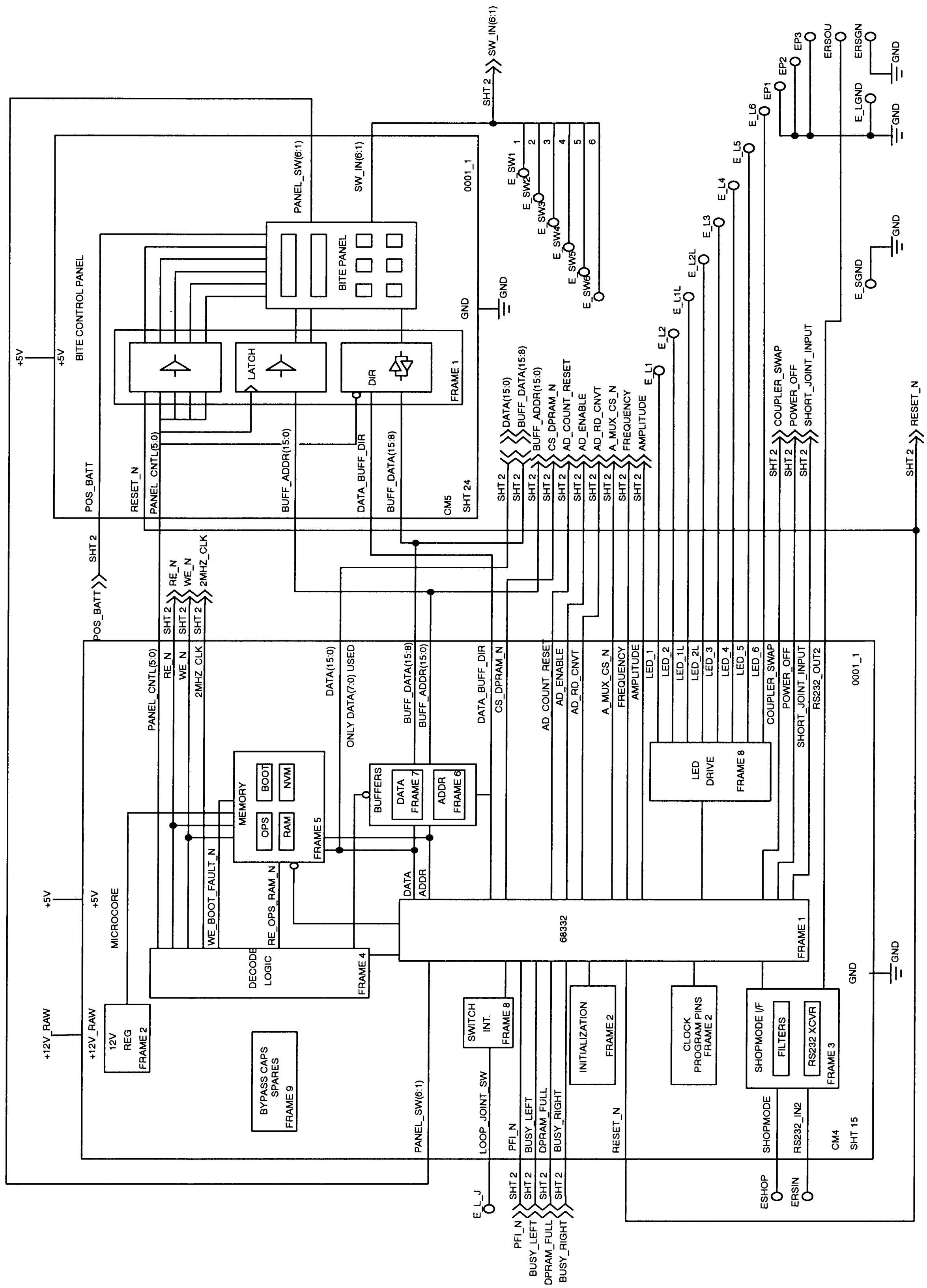
906-10250-5

SCHEMATIC DIAGRAM FOR ASSY

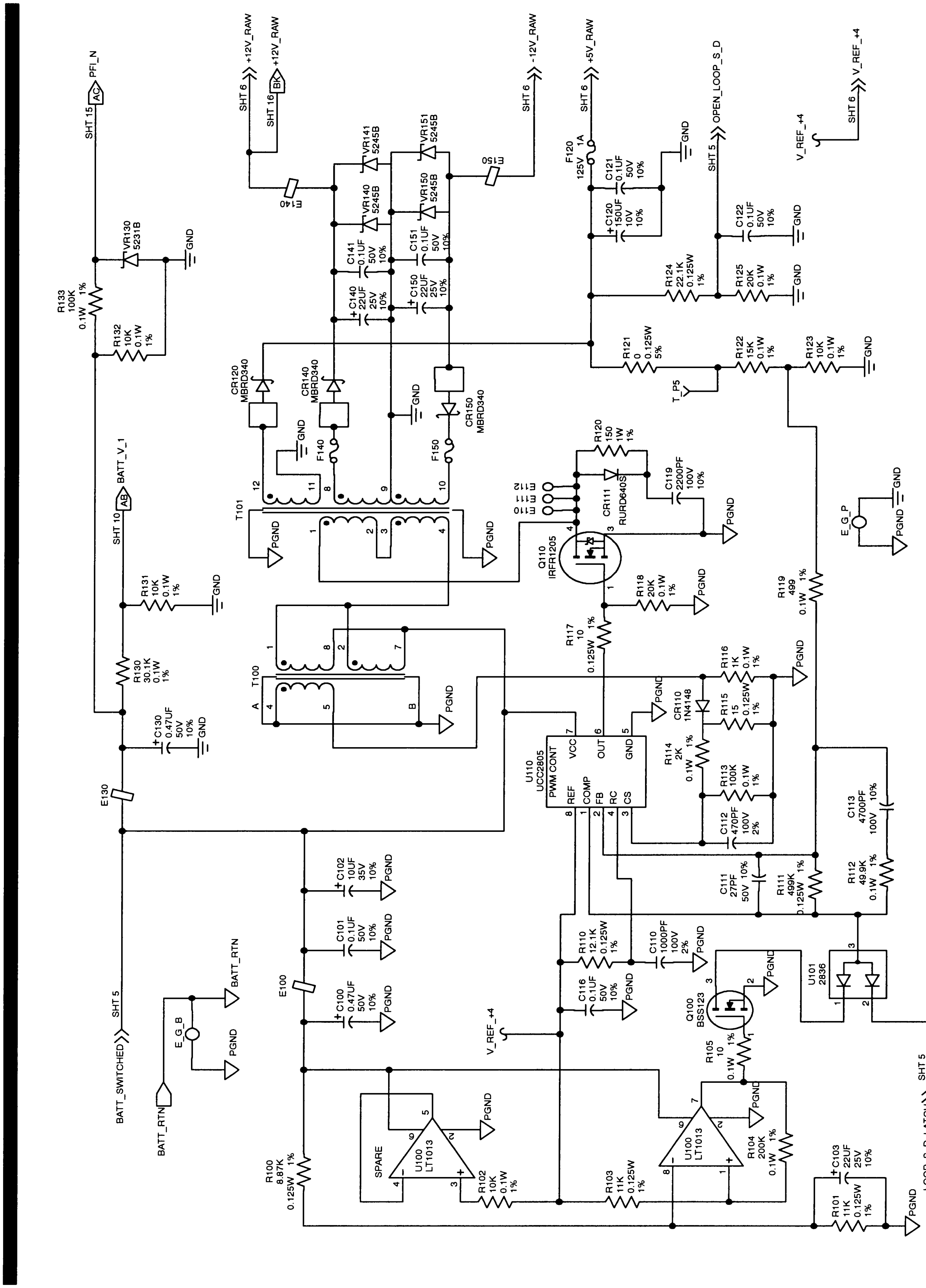
PW Assembly - Wiring Diagram
Figure 35 (Sheet 1)



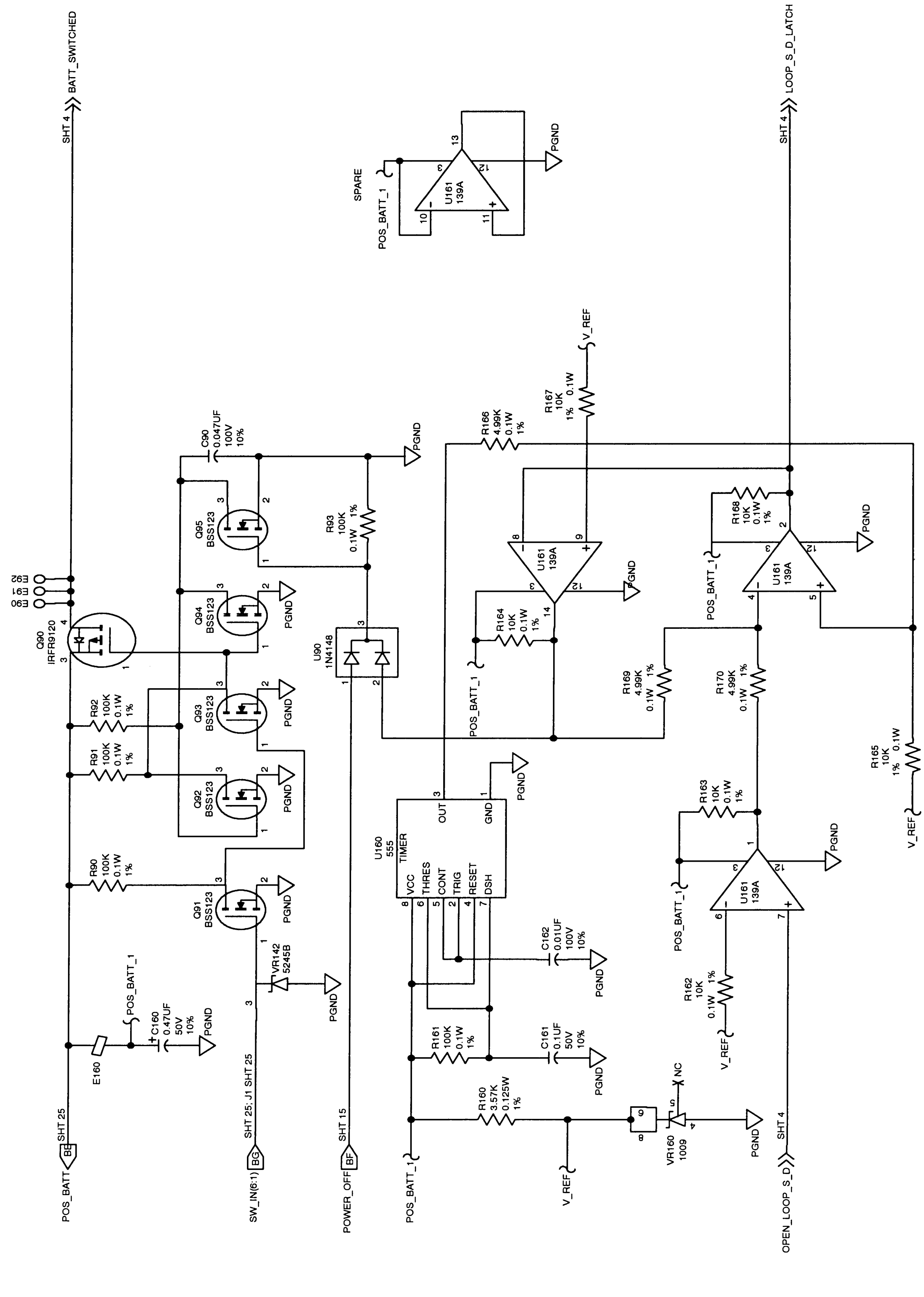
PW Assembly - Wiring Diagram
Figure 35 (Sheet 2)



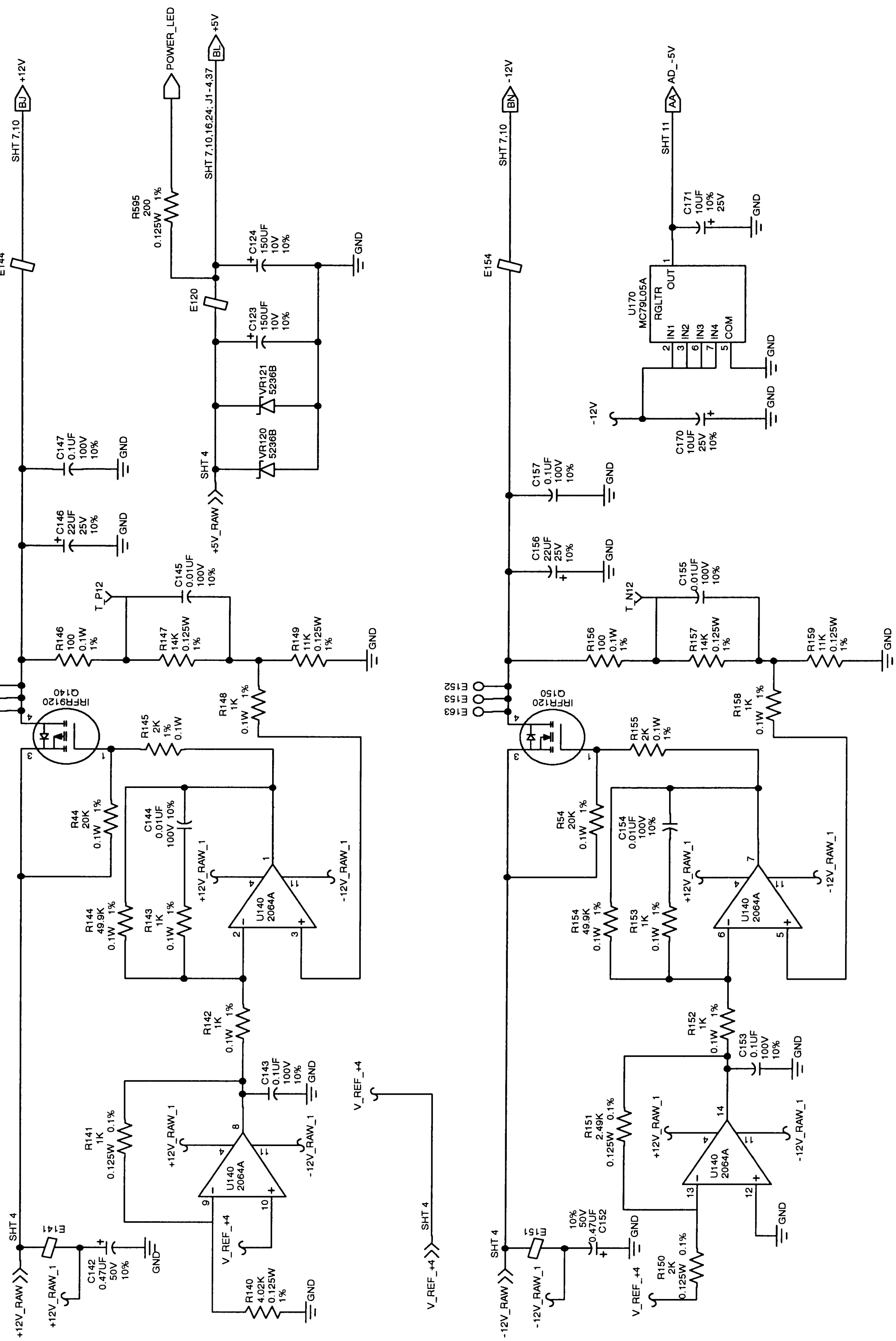
PW Assembly - Wiring Diagram
Figure 35 (Sheet 3)



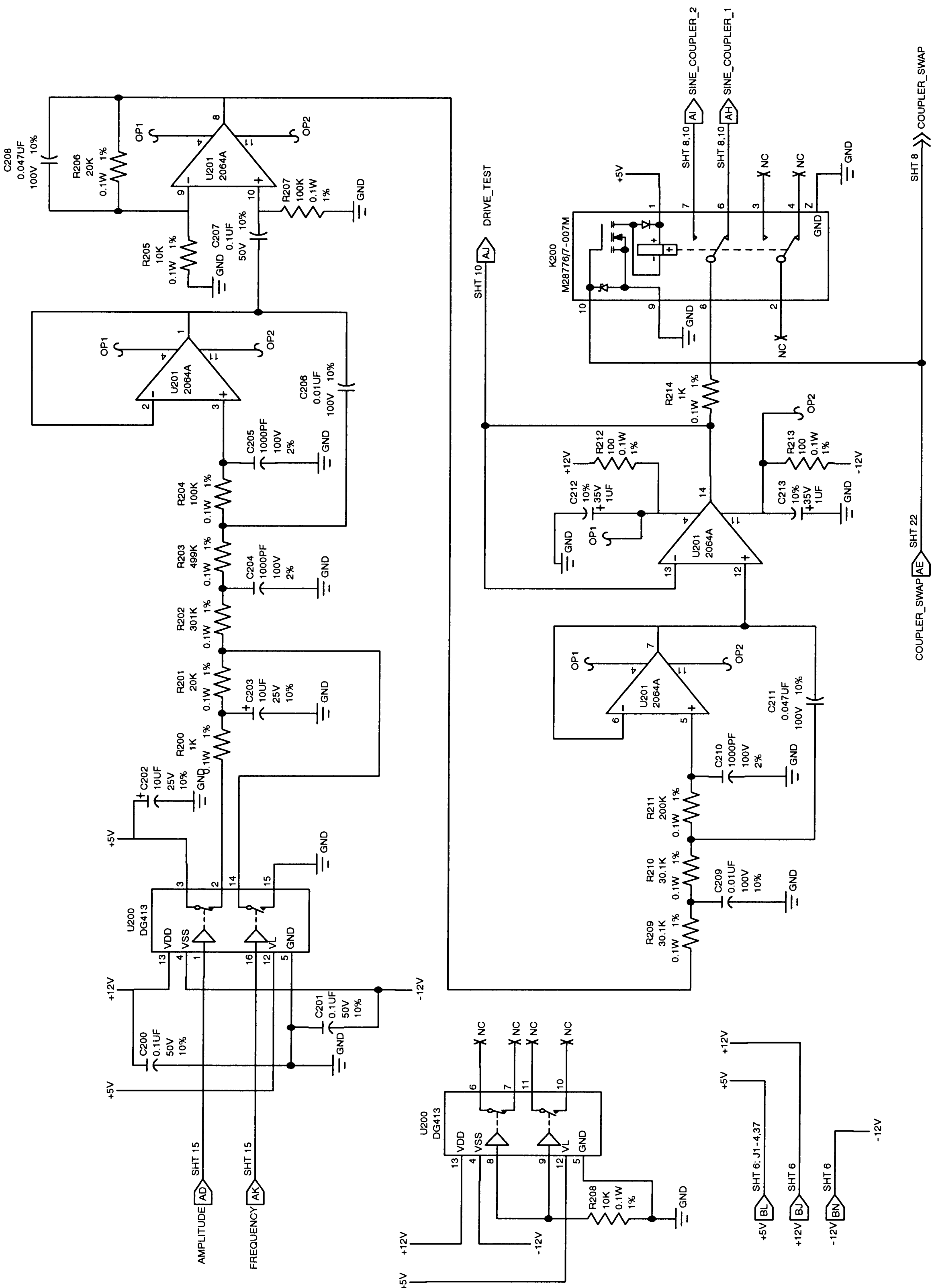
POWER CONVERTER
PW Assembly - Wiring Diagram
Figure 35 (Sheet 4)



POWER CONVERTER
PW Assembly - Wiring Diagram
Figure 35 (Sheet 5)

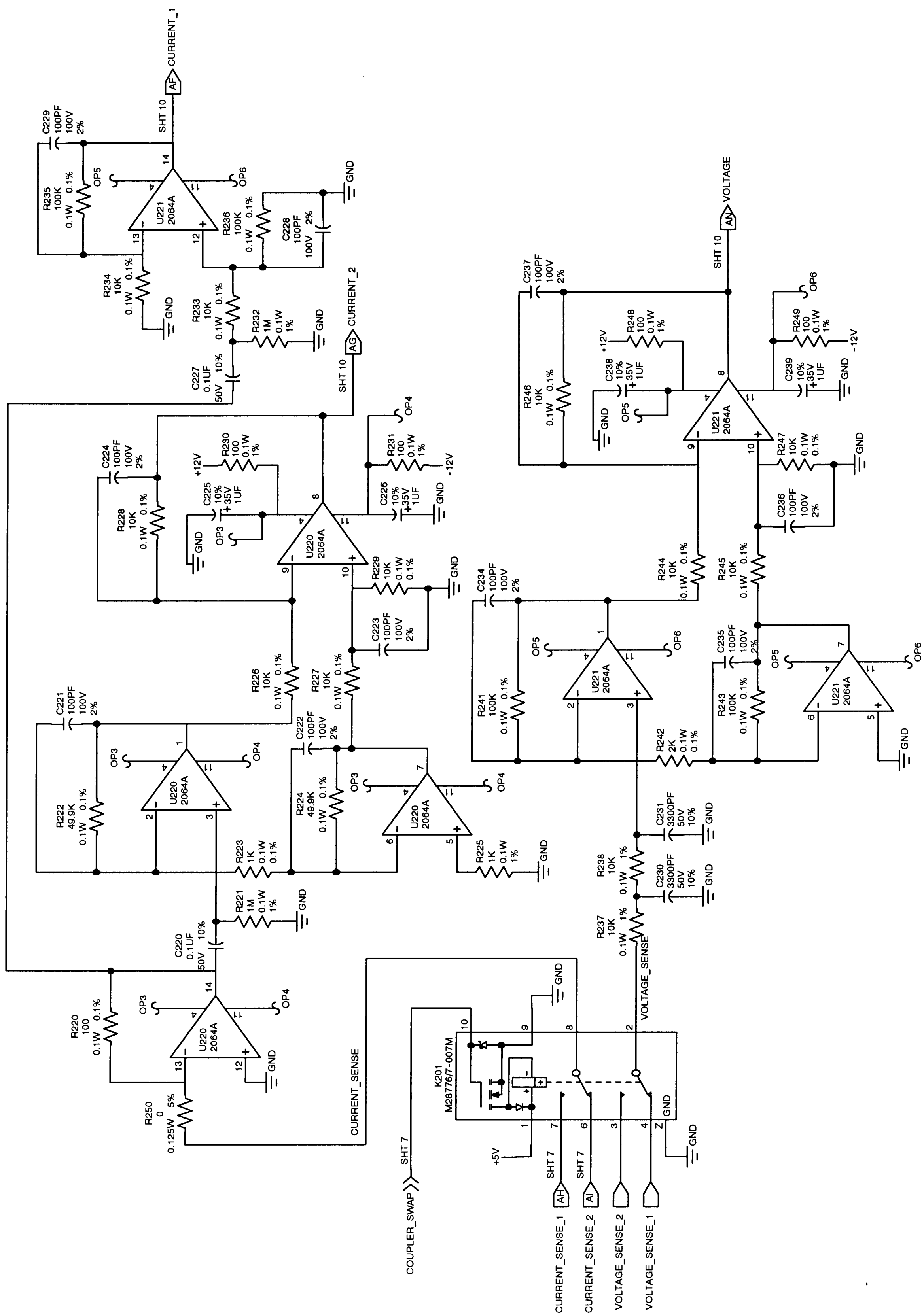


POWER CONVERTER
PW Assembly - Wiring Diagram
Figure 35 (Sheet 6)

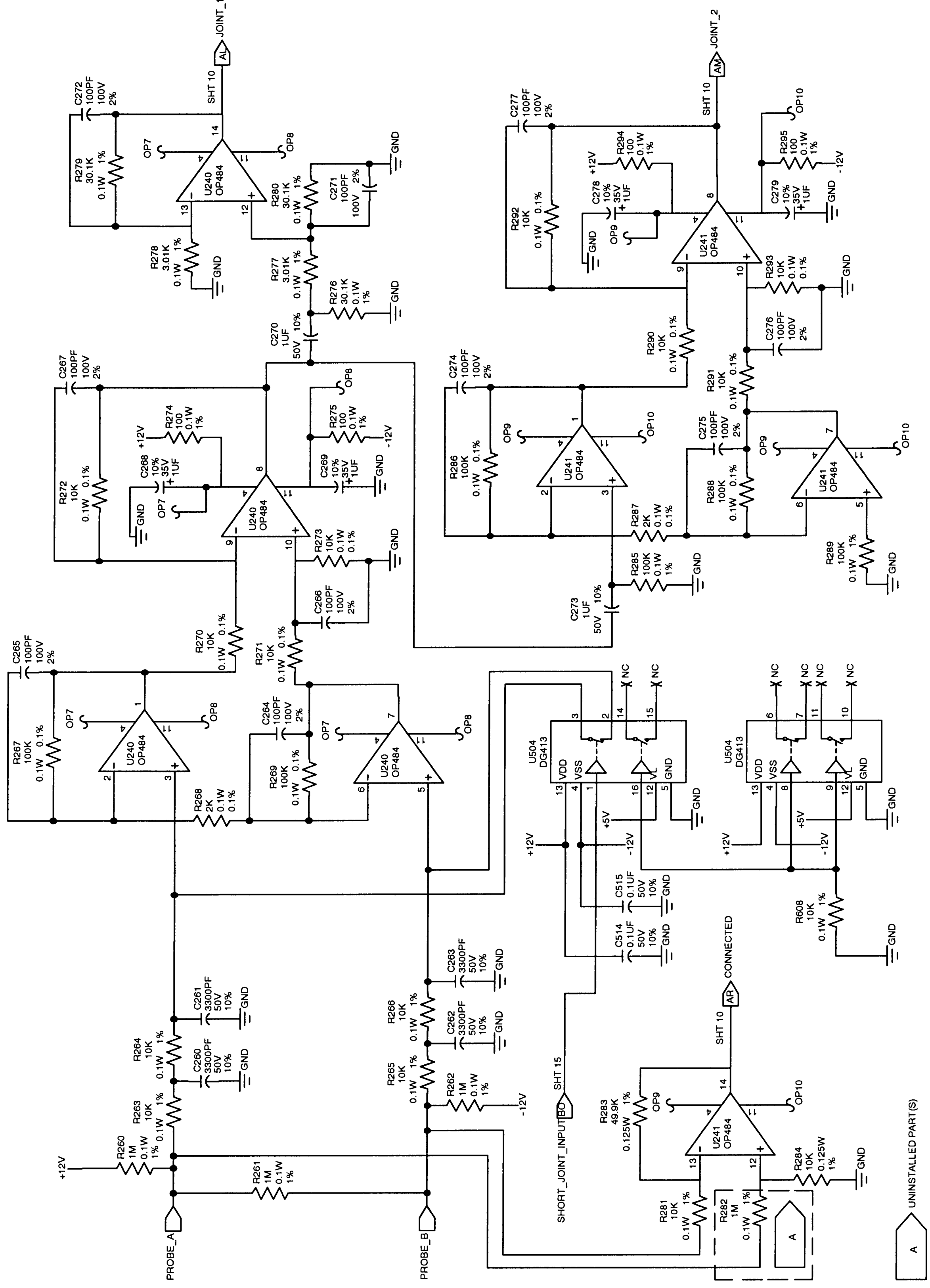


ANALOG I/O

PW Assembly - Wiring Diagram
Figure 35 (Sheet 7)

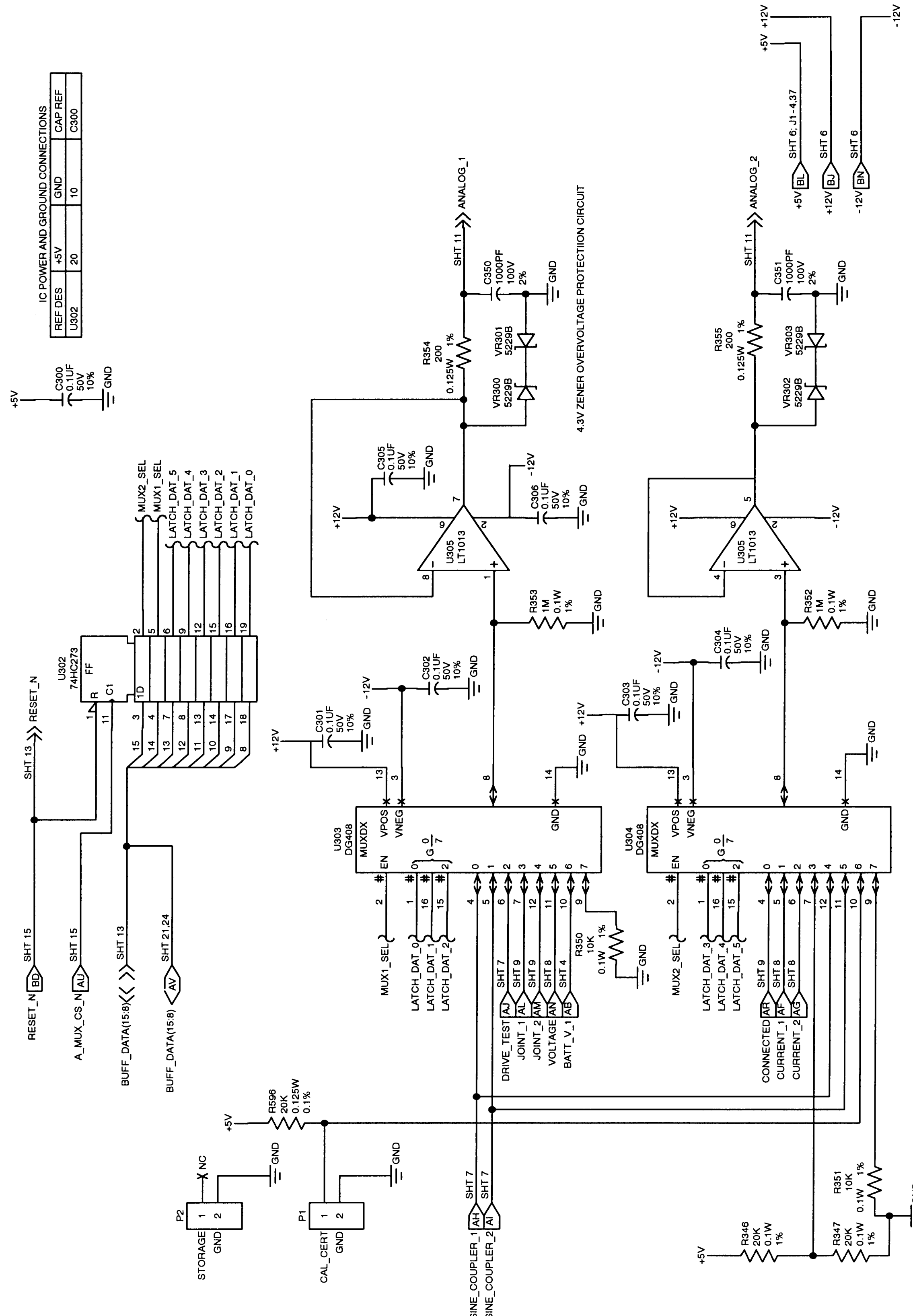


ANALOG I/O
PW Assembly - Wiring Diagram
Figure 35 (Sheet 8)



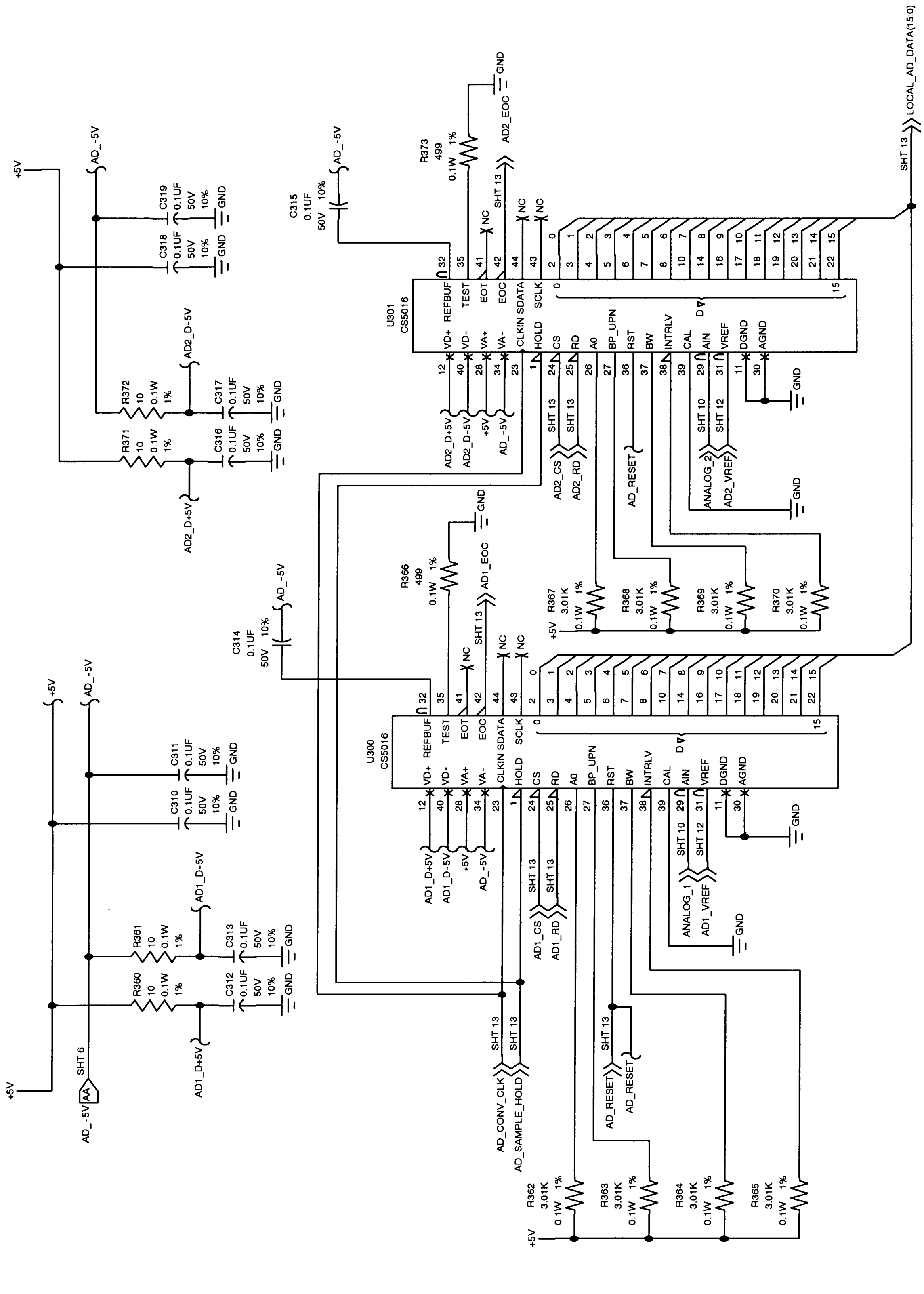
ANALOG I/O

PW Assembly - Wiring Diagram
Figure 35 (Sheet 9)

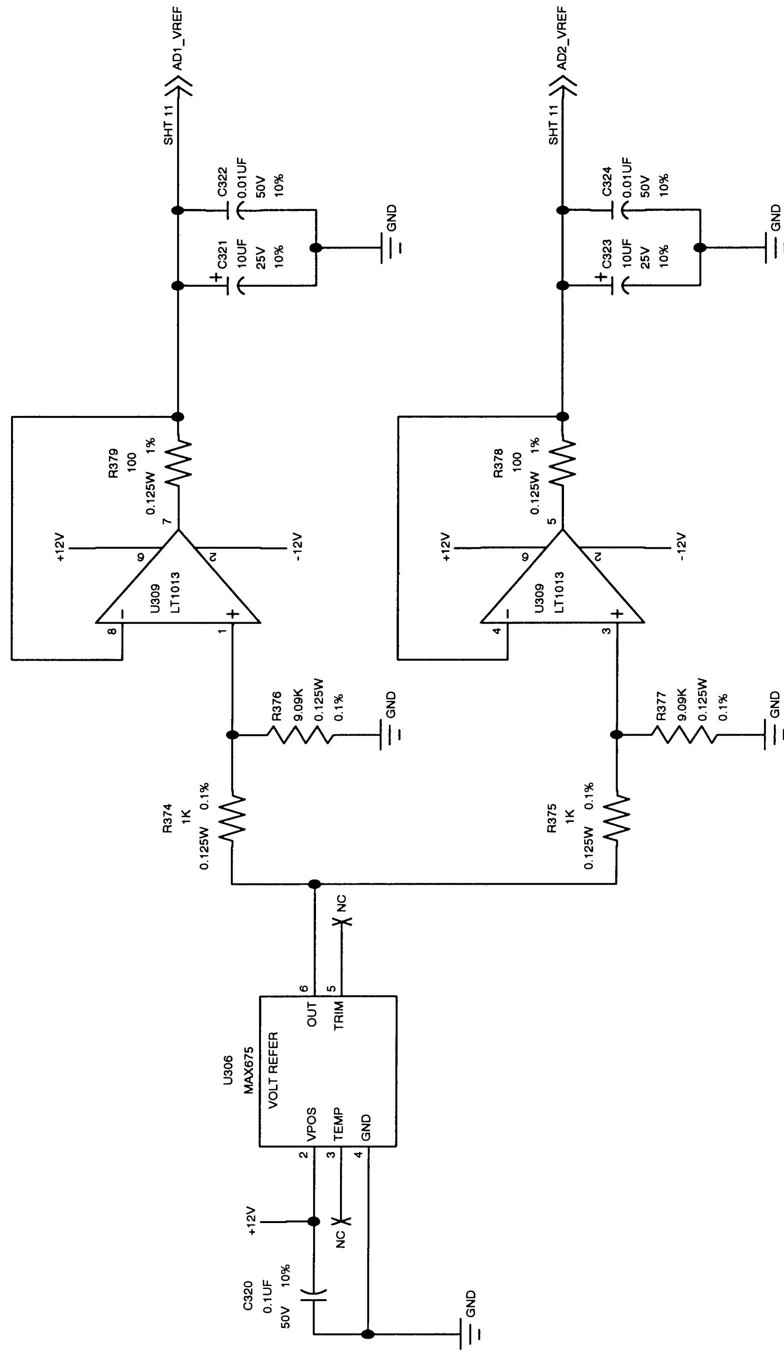


A/D CONVERTER

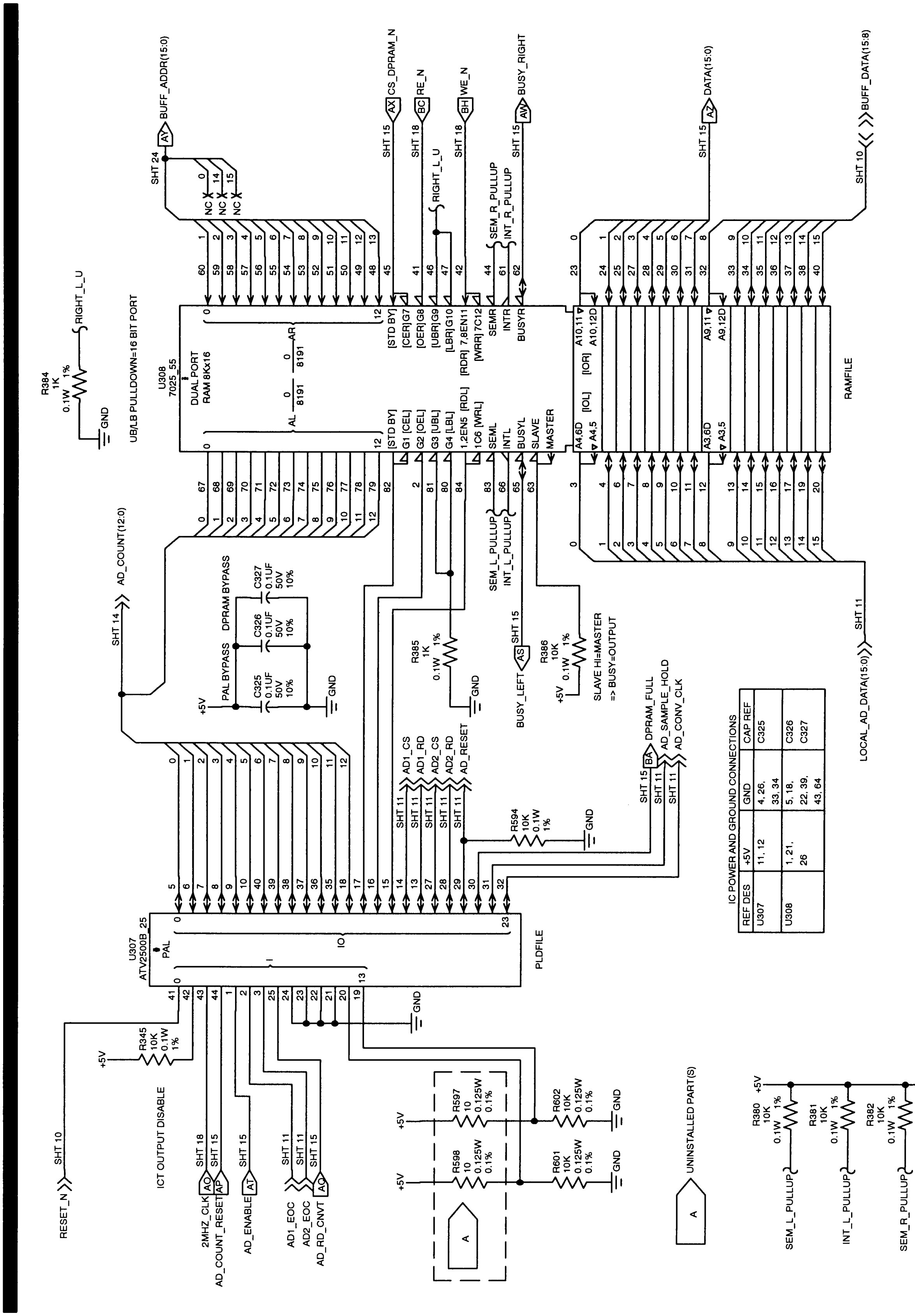
PW Assembly - Wiring Diagram
Figure 35 (Sheet 10)



A/D CONVERTER
PW Assembly - Wiring Diagram
Figure 35 (Sheet 11)

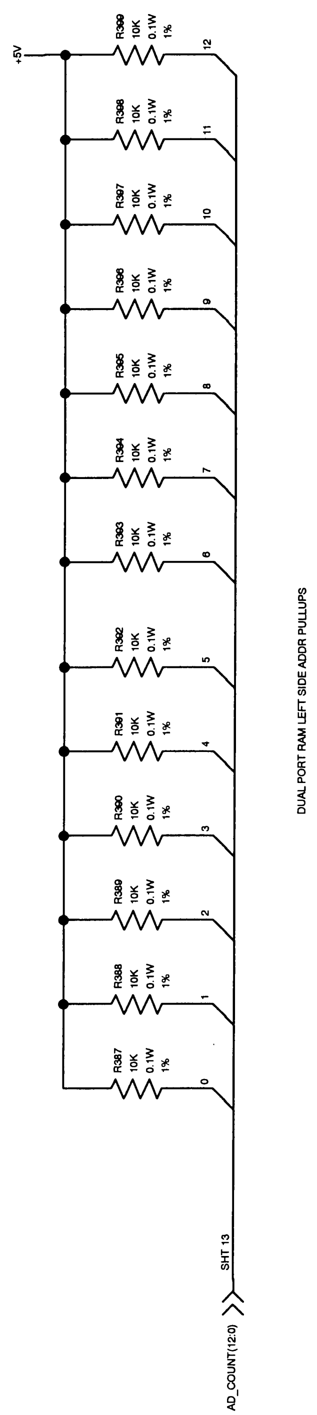


A/D CONVERTER
PW Assembly - Wiring Diagram
Figure 35 (Sheet 12)



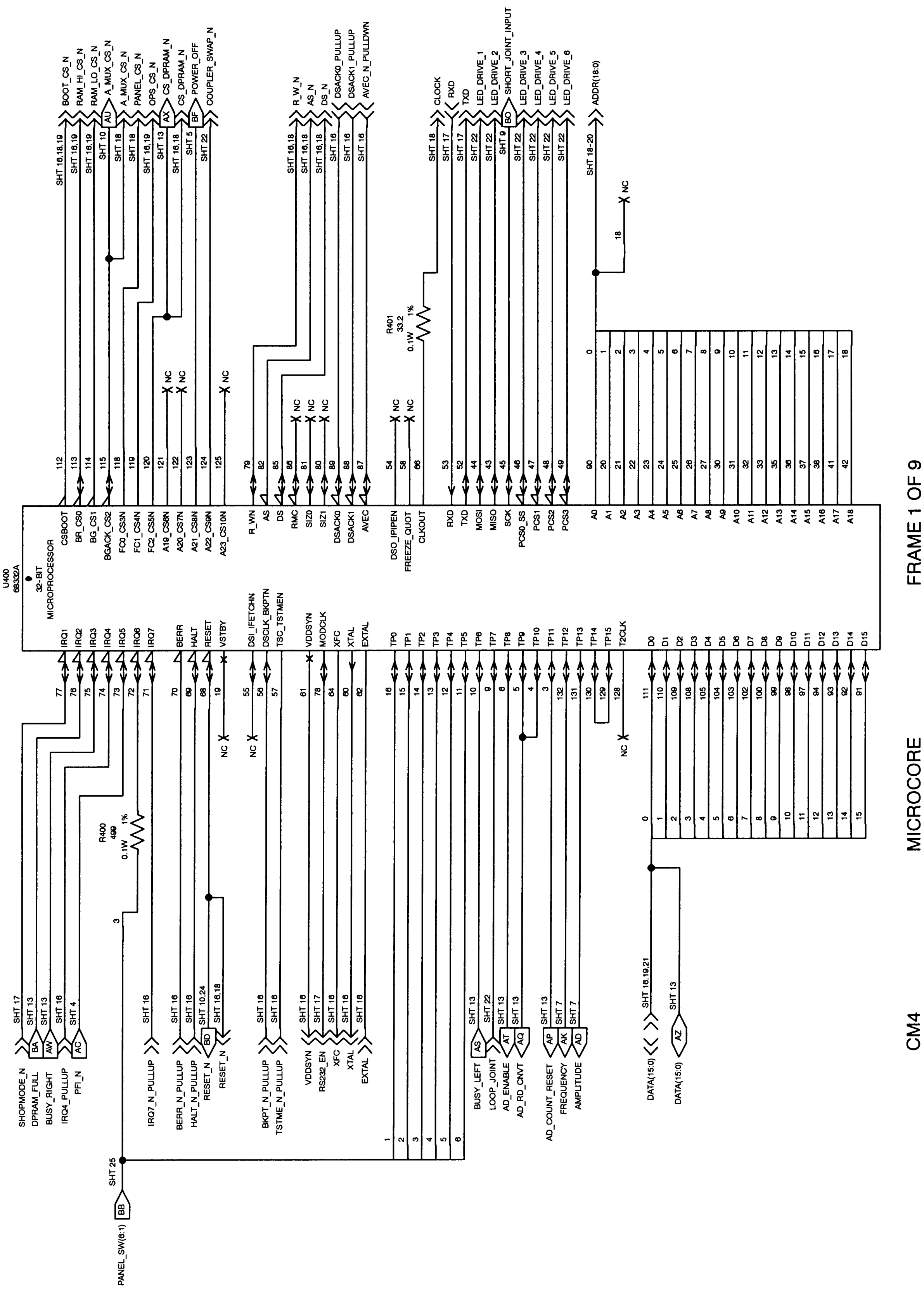
A/D CONVERTER

PW Assembly - Wiring Diagram
Figure 35 (Sheet 13)

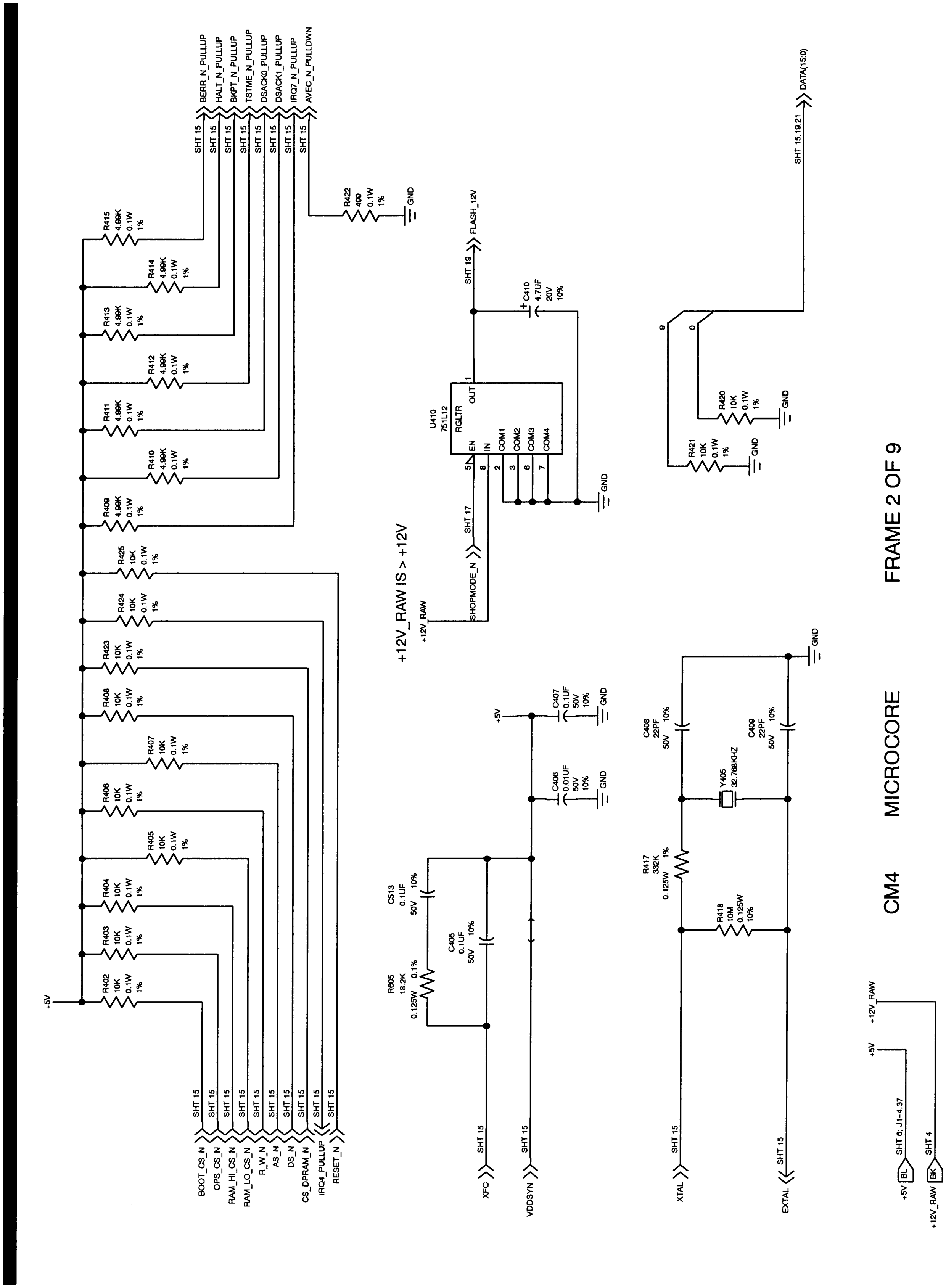


A/D CONVERTER

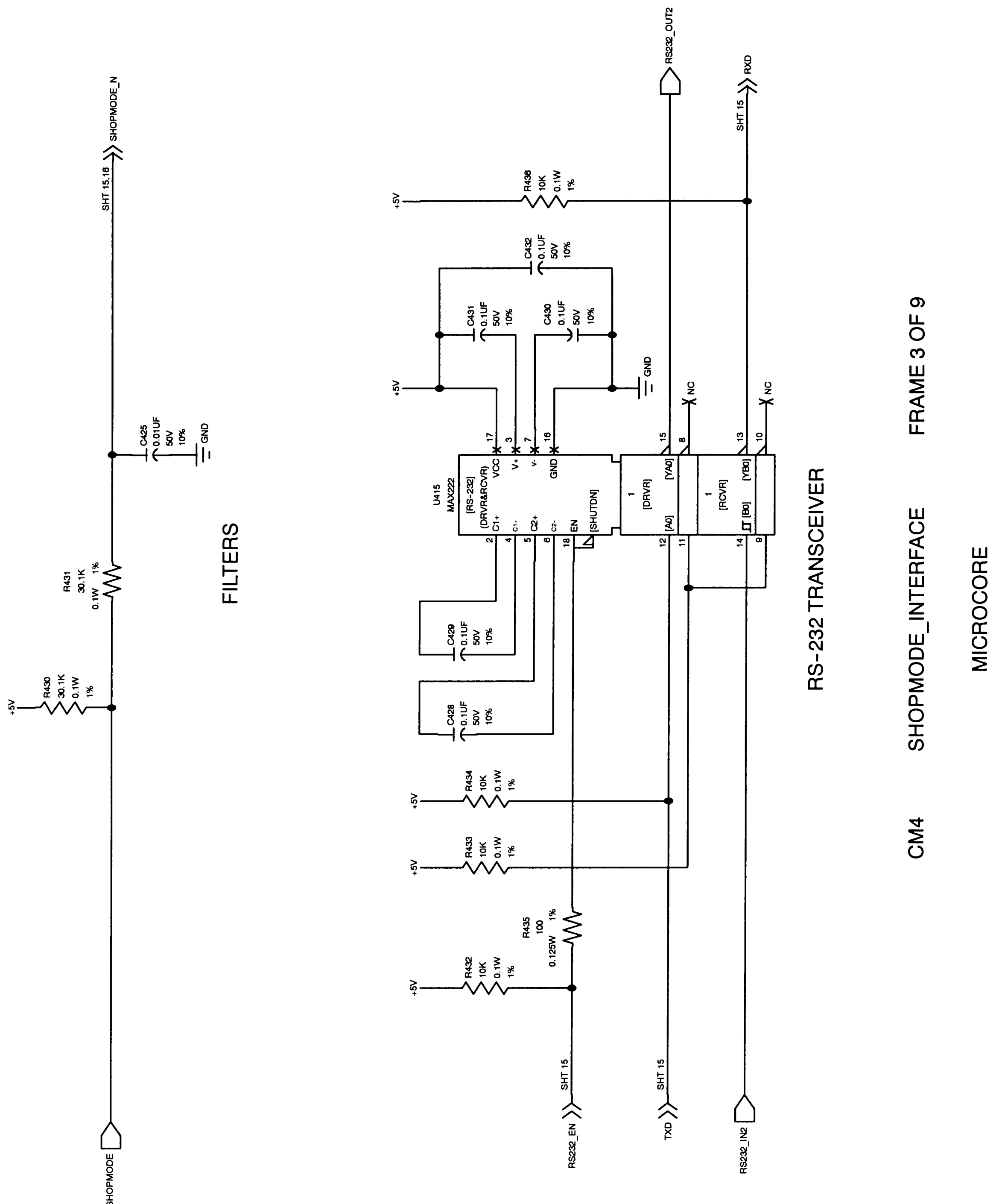
PW Assembly - Wiring Diagram
Figure 35 (Sheet 14)



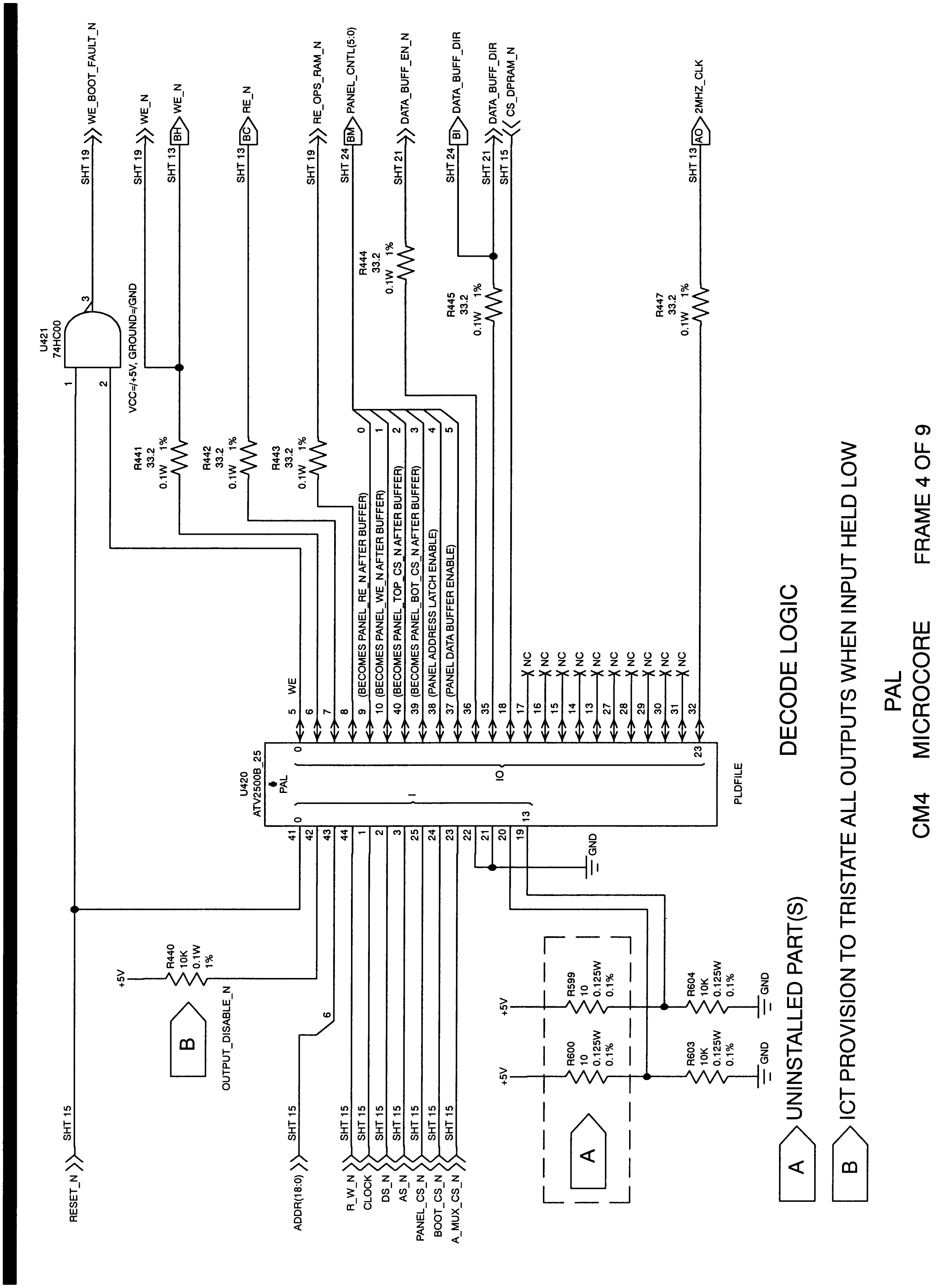
PW Assembly - Wiring Diagram
Figure 35 (Sheet 15)



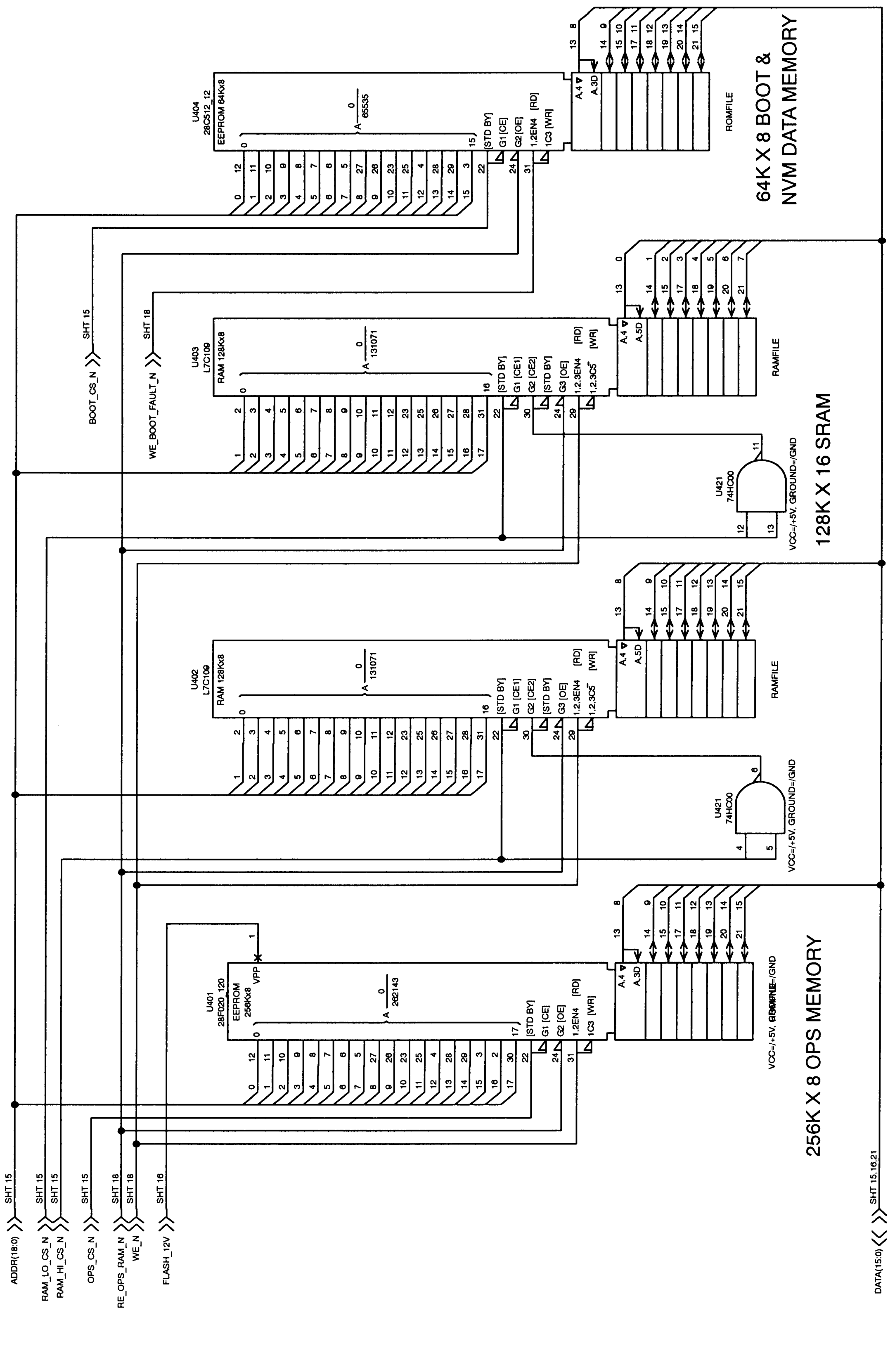
PW Assembly - Wiring Diagram
Figure 35 (Sheet 16)



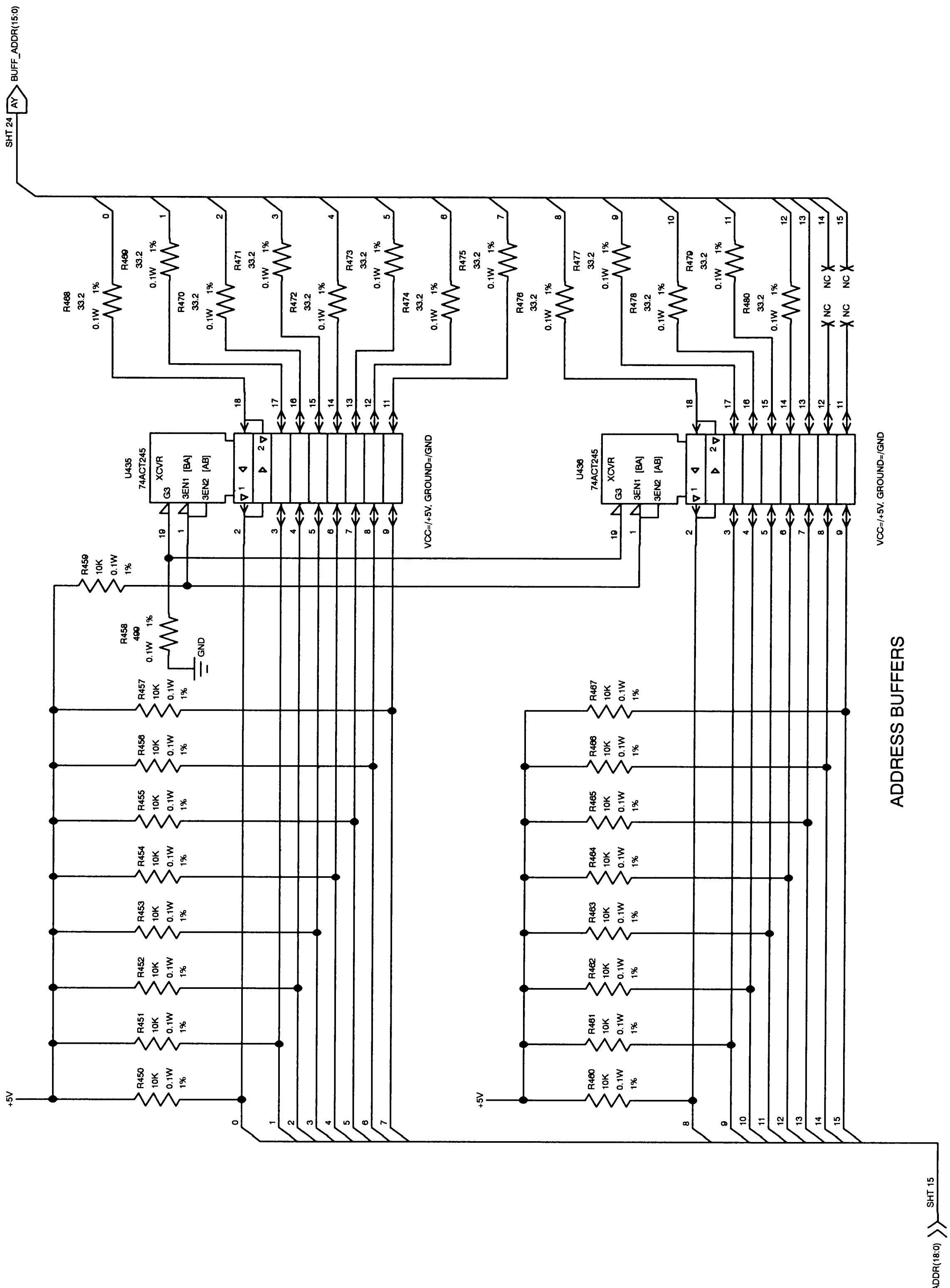
PW Assembly - Wiring Diagram
Figure 35 (Sheet 17)



PW Assembly - Wiring Diagram
Figure 35 (Sheet 18)



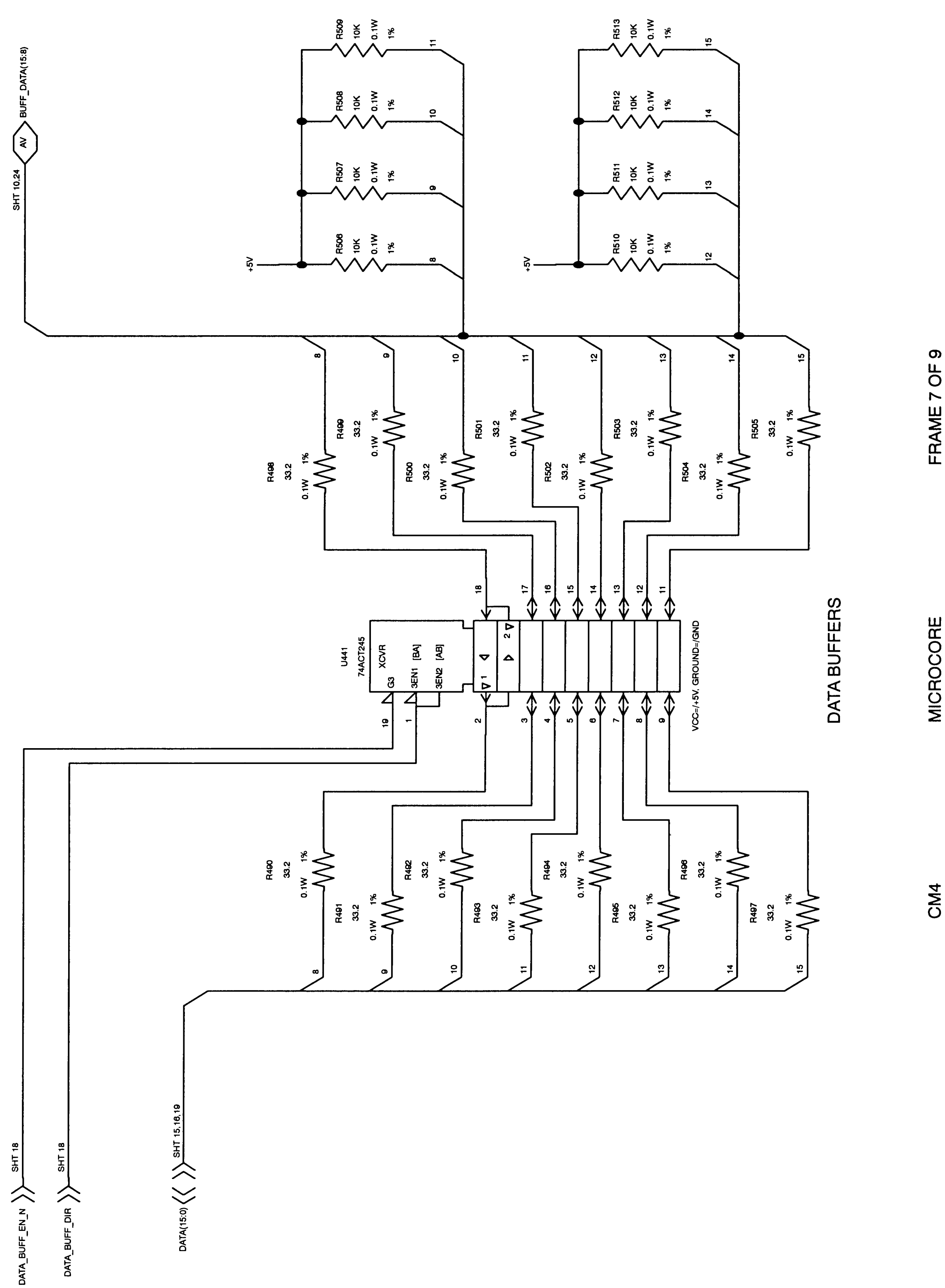
PW Assembly - Wiring Diagram
Figure 35 (Sheet 19)



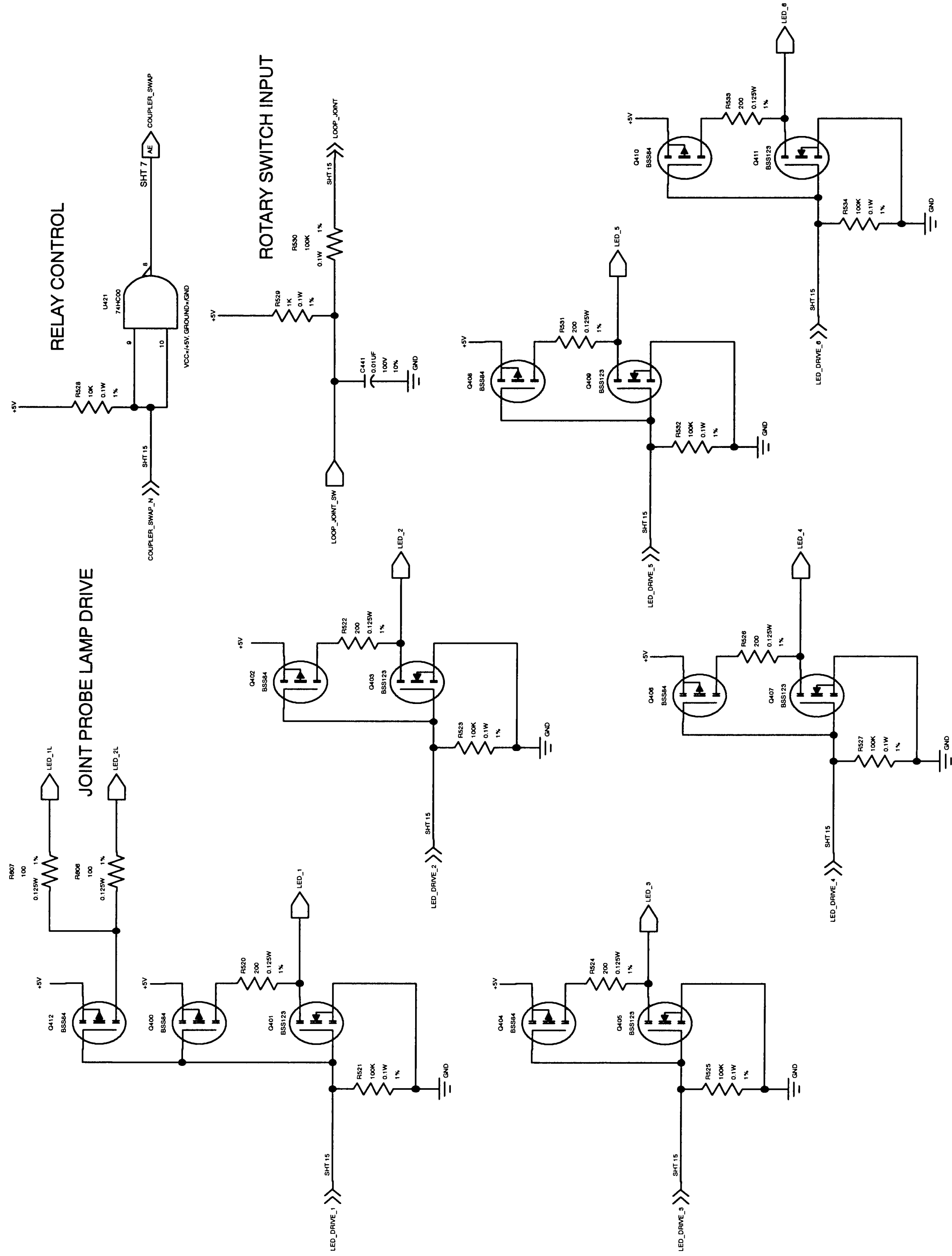
ADDRESS BUFFERS

CM4 MICROCORE FRAME 6 OF 9

PW Assembly - Wiring Diagram
Figure 35 (Sheet 20)



PW Assembly - Wiring Diagram
Figure 35 (Sheet 21)

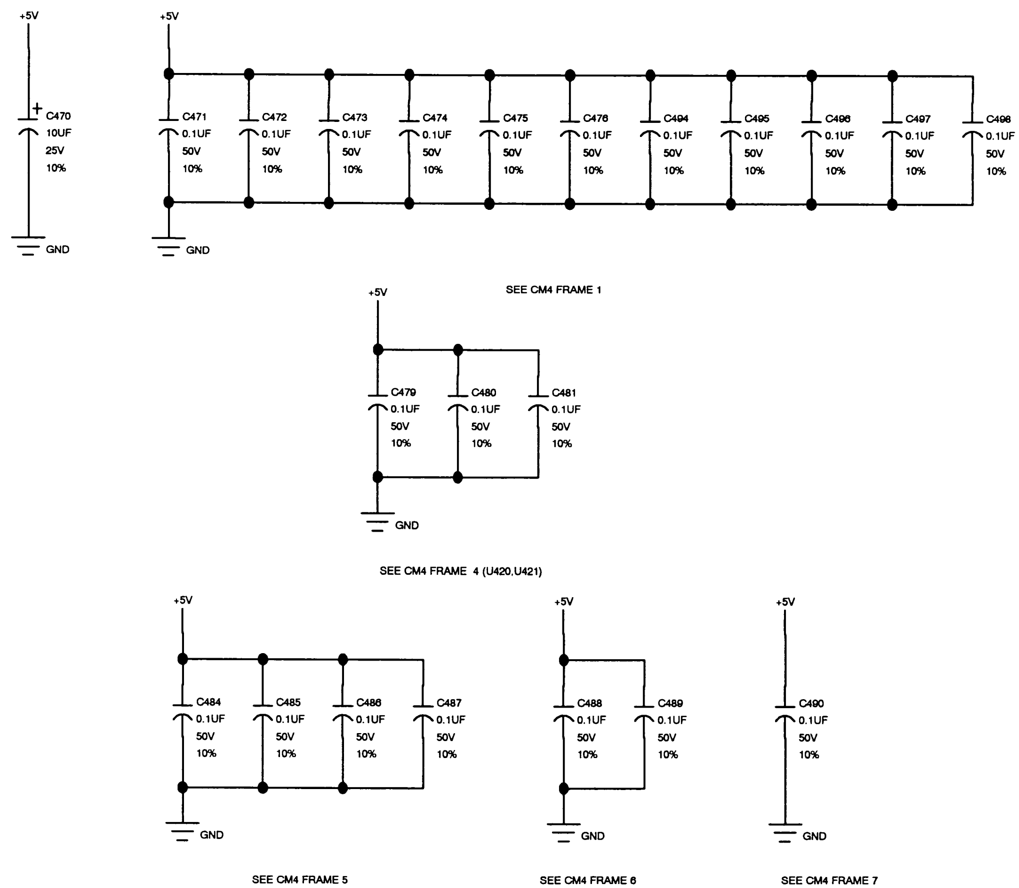


CM4 MICROCORE FRAME 8 OF 9

PW Assembly - Wiring Diagram
Figure 35 (Sheet 22)

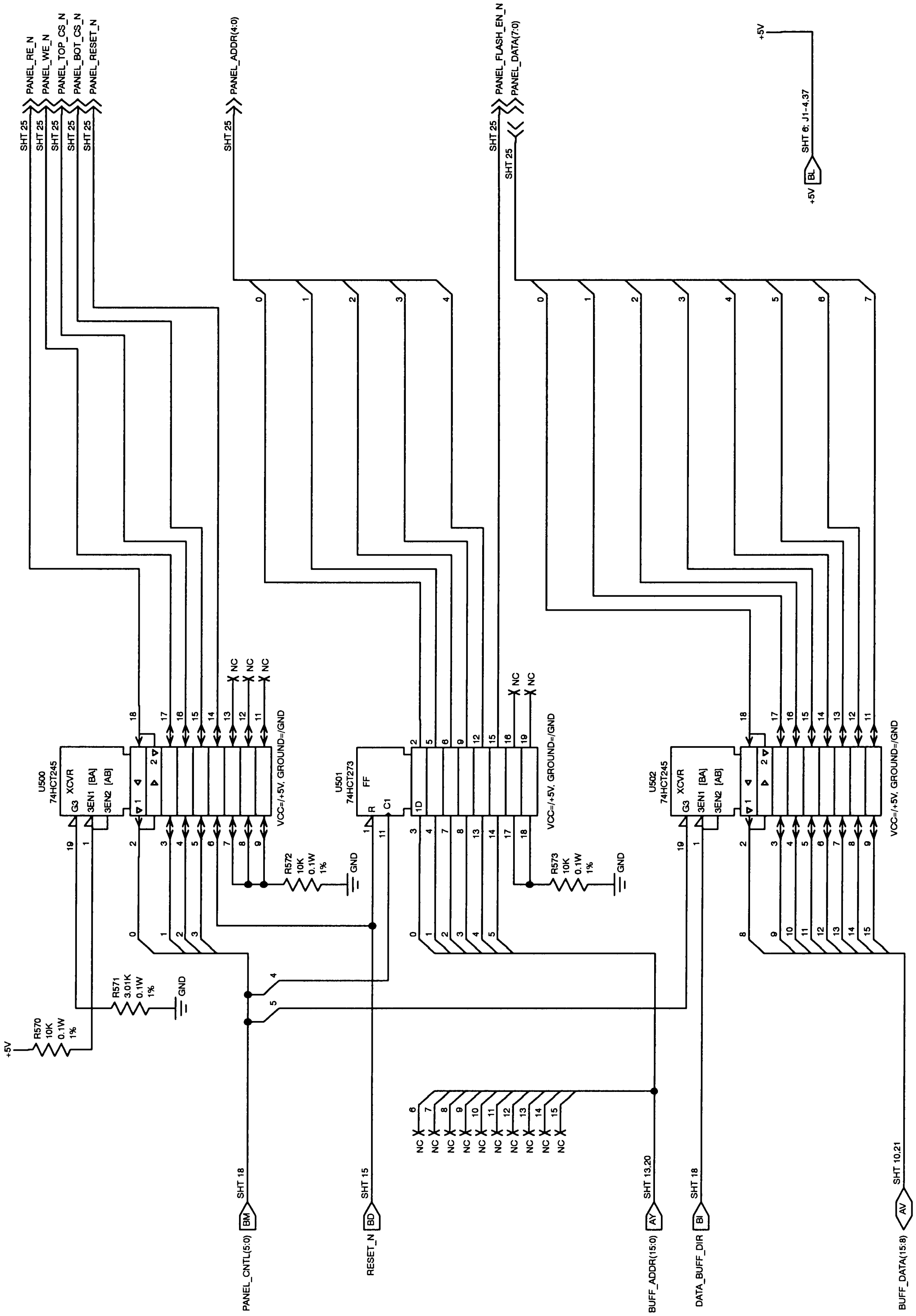
IC POWER AND GROUND CONNECTIONS

REF DES	+5V	GND	CAP REF
U400	1	2	C494
	7	8	C496
	18	17	C471
	28	29	
		34	
	39	40	C472
	50	51	C473
	63	59	C498
	65	67	C497
	84	83	C474
		101	
	107	106	C475
	96	95	
	116	117	C476
	126	127	C495
U420	11	33	C479
	12	34	C480
U421	14	7	C481
U401	32	16	C484
U402			C485
U403			C486
U404	28	14	C487
U435	20	10	C488
U436	20	10	C489
U441	20	10	C490



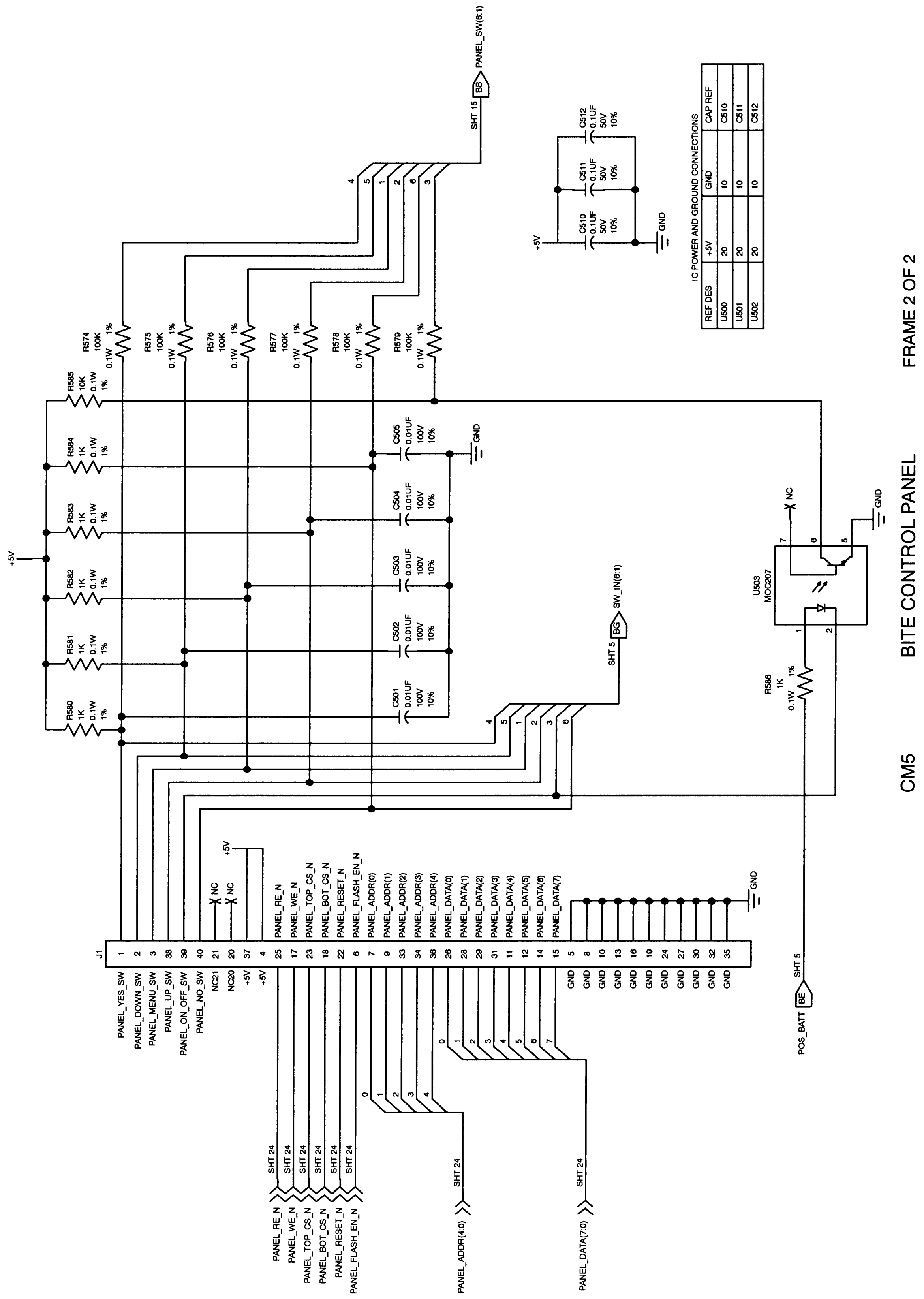
BYPASS CAPACITORS

PW Assembly - Wiring Diagram
Figure 35 (Sheet 23)



CM5 BITE CONTROL PANEL FRAME 1 OF 2

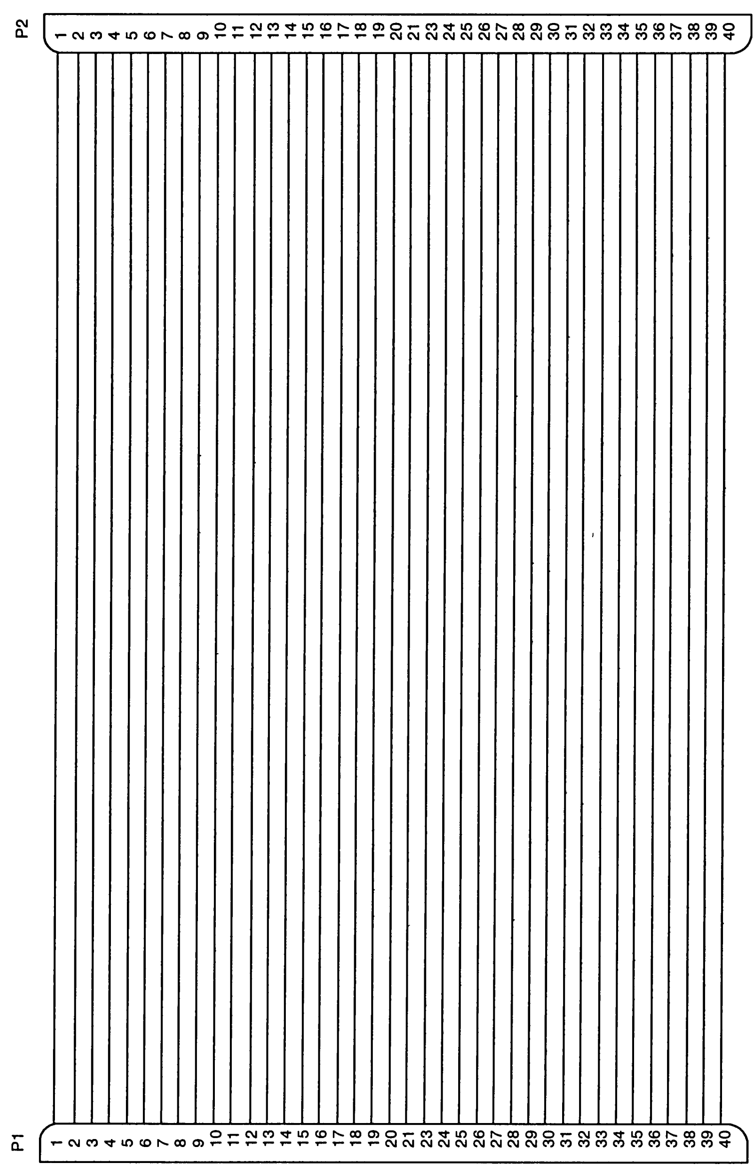
PW Assembly - Wiring Diagram
Figure 35 (Sheet 24)



REF DES	+5V	GND	CAP REF
U500	20	10	C510
U501	20	10	C511
U502	20	10	C512

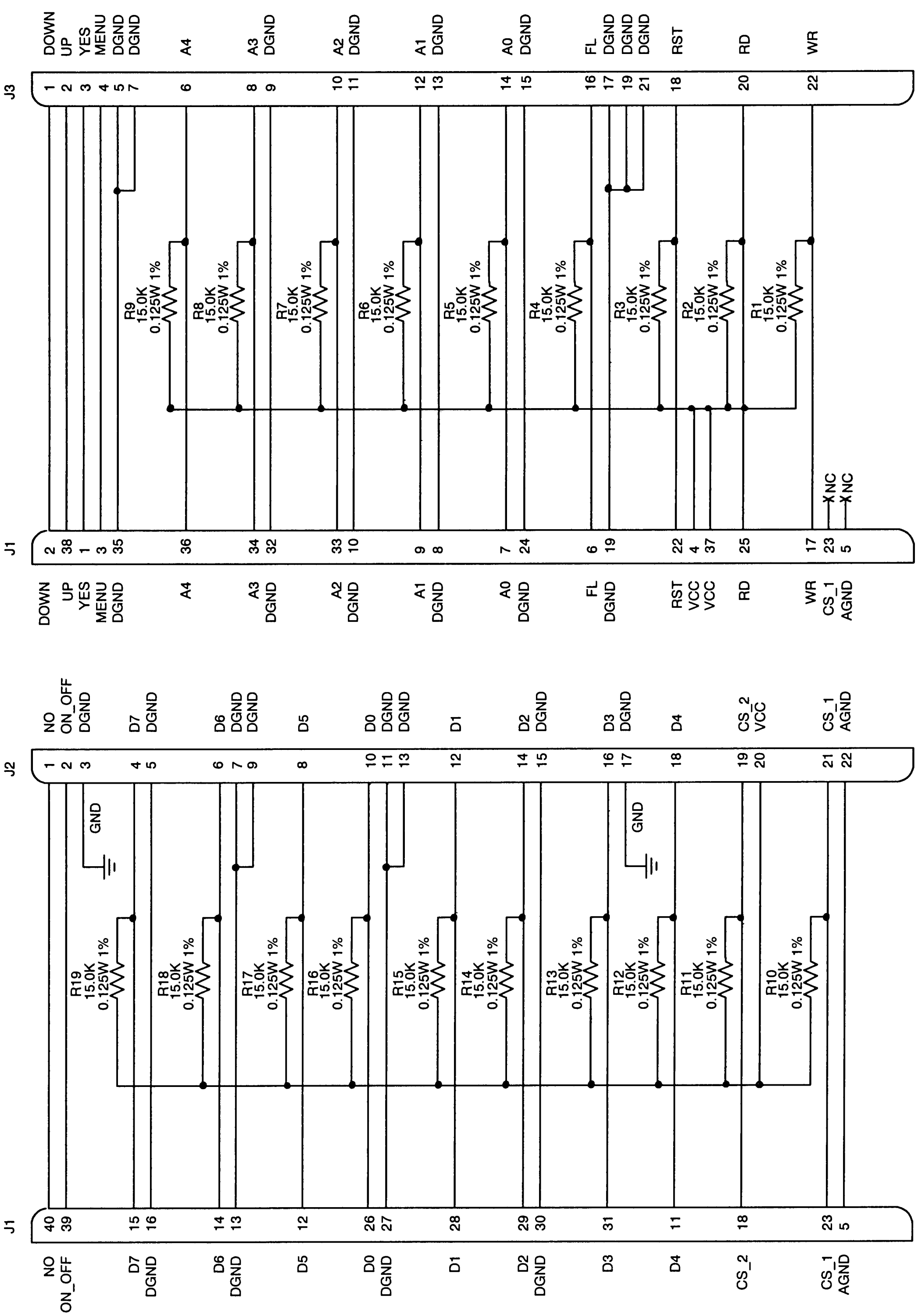
PW Assembly - Wiring Diagram
Figure 35 (Sheet 25)

182-18174-4



SCHEMATIC DIAGRAM FOR ASSY-4

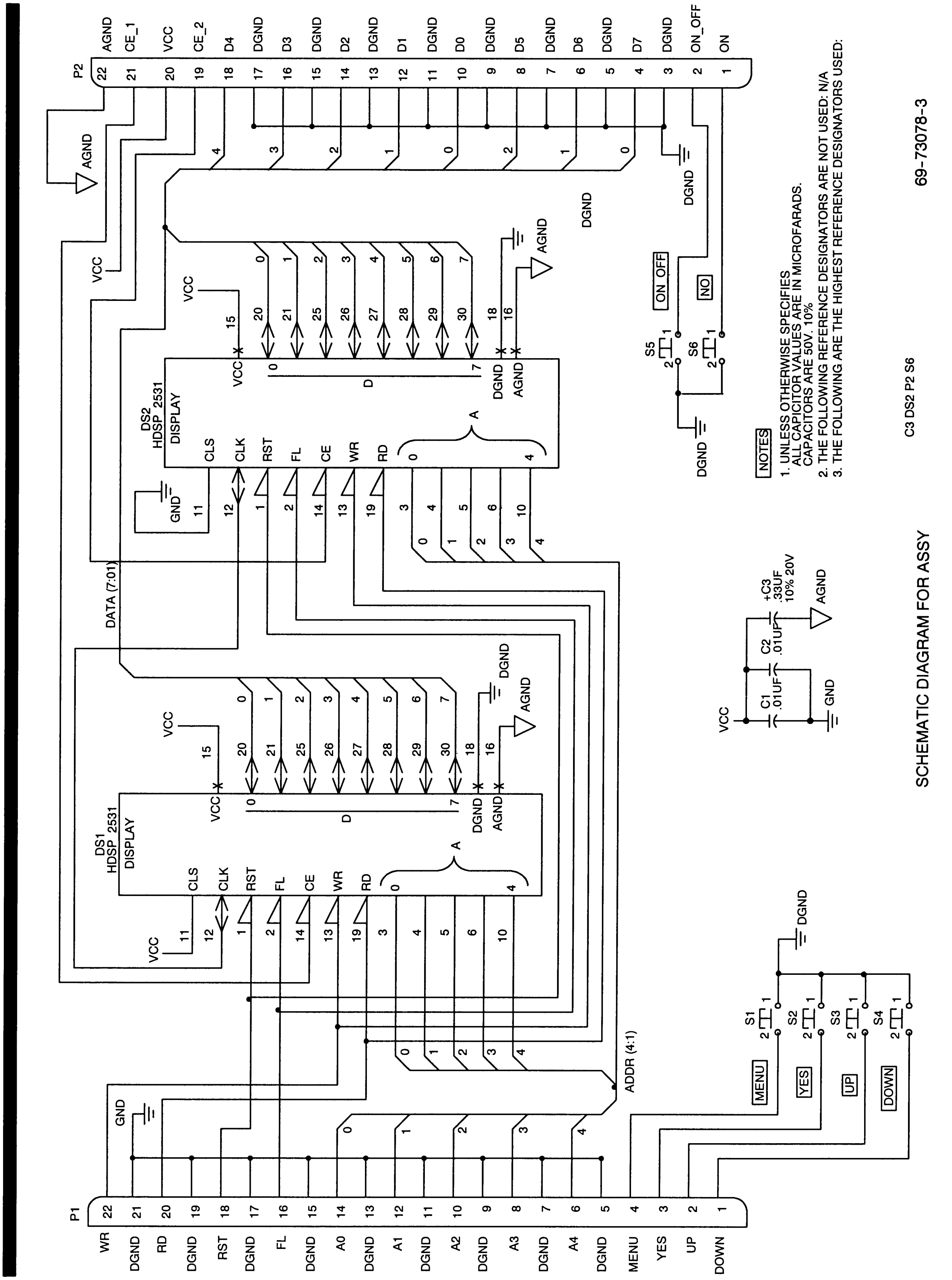
BITE Cable Assembly - Wiring Diagram
Figure 36



69-73027-3

SCHEMATIC DIAGRAM FOR ASSY-3

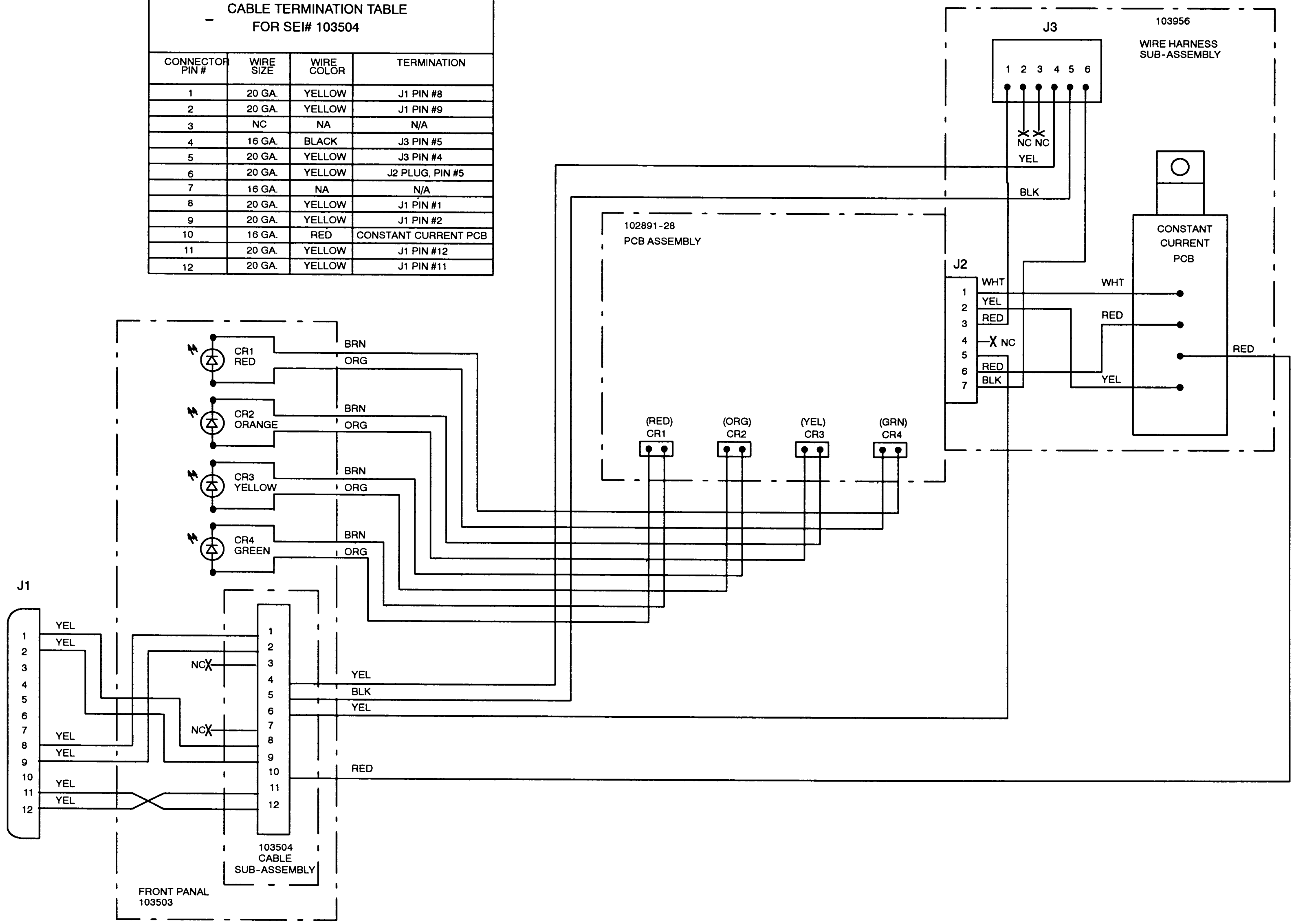
Printed Circuit Assembly (69-73027-3) - Wiring Diagram
Figure 37



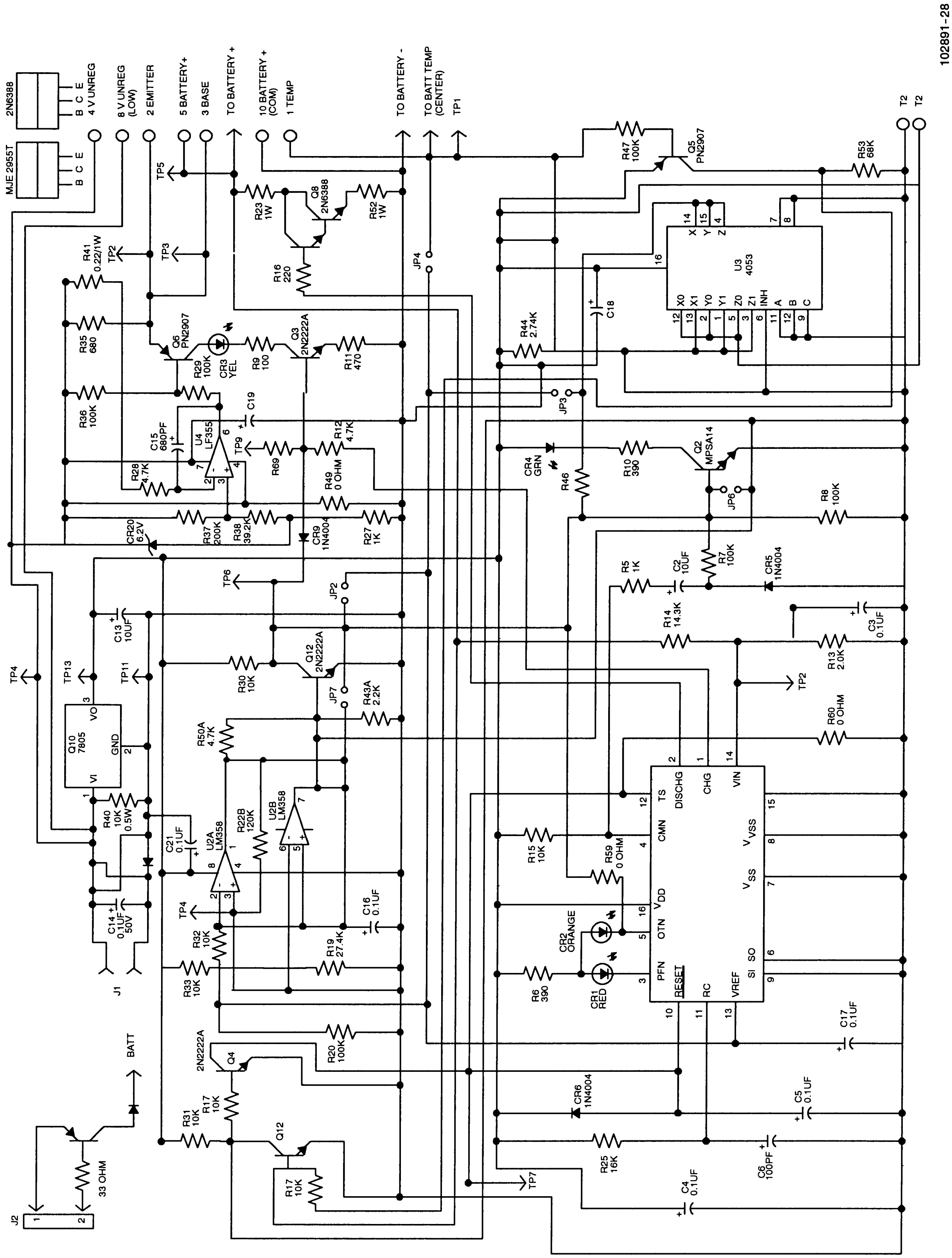
Printed Circuit Assembly (69-73028-3) - Wiring Diagram
Figure 38

CABLE TERMINATION TABLE
FOR SEI# 103504

CONNECTOR PIN #	WIRE SIZE	WIRE COLOR	TERMINATION
1	20 GA.	YELLOW	J1 PIN #8
2	20 GA.	YELLOW	J1 PIN #9
3	NC	NA	N/A
4	16 GA.	BLACK	J3 PIN #5
5	20 GA.	YELLOW	J3 PIN #4
6	20 GA.	YELLOW	J2 PLUG, PIN #5
7	16 GA.	NA	N/A
8	20 GA.	YELLOW	J1 PIN #1
9	20 GA.	YELLOW	J1 PIN #2
10	16 GA.	RED	CONSTANT CURRENT PCB
11	20 GA.	YELLOW	J1 PIN #12
12	20 GA.	YELLOW	J1 PIN #11



Battery Charger Assembly - Wiring Diagram
Figure 39



Battery Charger PCB Assembly - Wiring Diagram
Figure 40

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SECTION 3 - COMPONENT REMOVAL/INSTALLATION

1. Joint Probe Contact Pin

A. Removal

(1) Using a pair of needle nose pliers, take hold of the pin from the side of the Joint Probe and steadily pull the tip until it is free of the Joint Probe.

B. Installation

(1) Using a pair of needle nose pliers, take hold of the new pin the same way as when removing the old pin.

(2) Slowly slide the pin into the probe. There will be a slight "click" when the pin is properly seated in the Joint Probe.

NOTE: The LRT must be re-certified by a qualified Calibration Lab by performing the LRT Calibration Certification (Performed by Calibration Lab)/Functional Test (Performed by the Operator) after performing any of paragraphs 2. through 7.

2. BITE Control Module Assembly

A. Removal

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Remove four screws and washers attaching the BITE Control Module Assembly and gasket to the top of the Display Panel Assembly (Figure 41). Slide the BITE Control Module Assembly out and to the left.

(2) Disconnect the BITE Cable Assembly connector (P1) from the connector on the BITE Control Module Assembly.

B. Installation

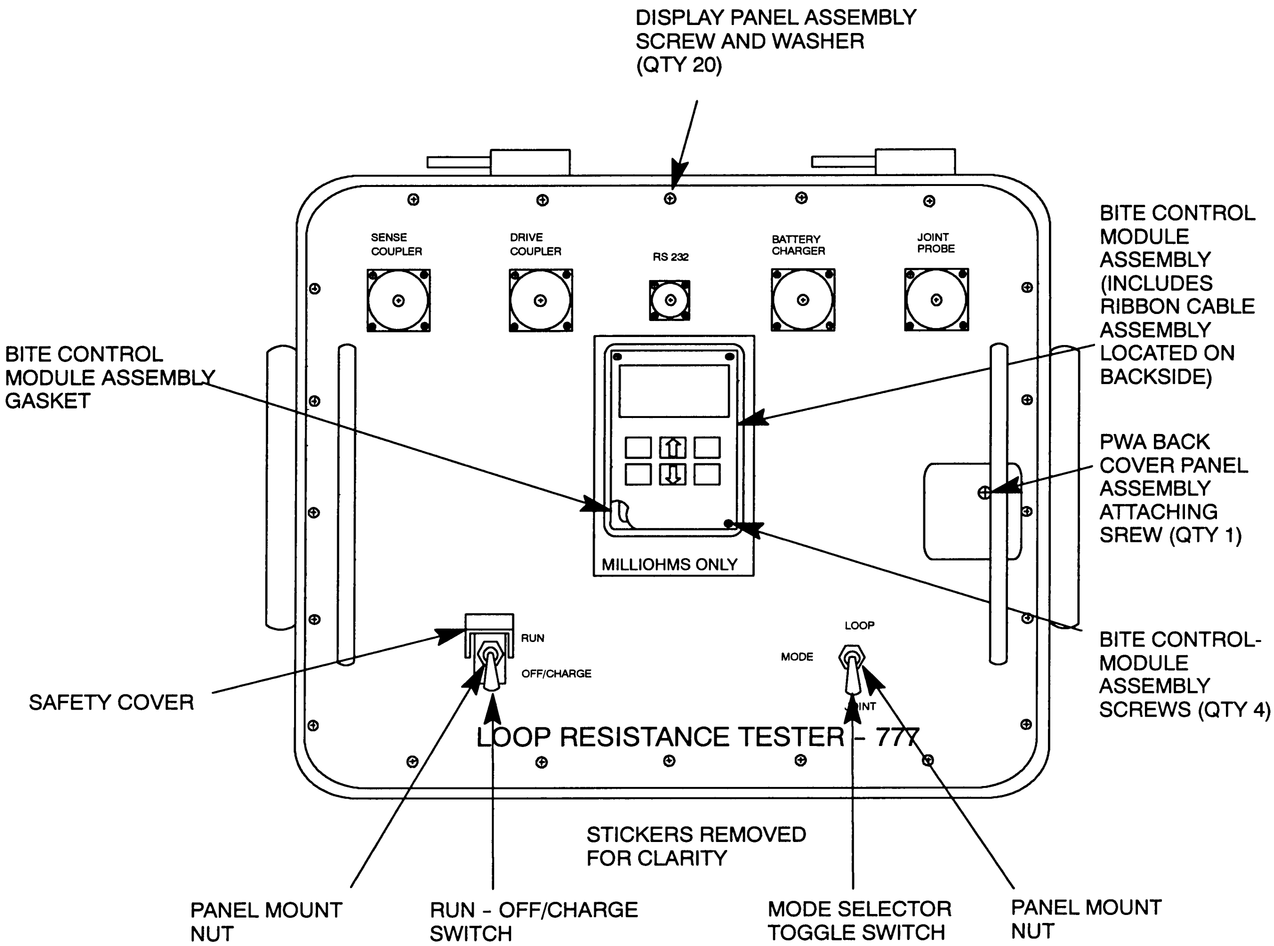
CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Connect the BITE Cable Assembly connector (P1) to the connector on the back of the BITE Control Module Assembly.

(2) Visually inspected the BITE Control Module Assembly gasket and replace if necessary.

(3) Position the BITE Control Module Assembly and Gasket on the Display Panel Assembly and install four screws and washers (Figure 41).

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.



Display Panel Assembly Remove/Install
Figure 41

3. Display Panel Assembly

A. Removal

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Perform BITE Control Module Assembly Removal Procedure (Paragraph 2.A.).

(2) Remove twenty screws and washers attaching the Display Panel Assembly to the case (Figure 41).

(3) Carefully lift the Display Panel Assembly enough to provide access to the Battery connector (P3) (Figure 45).

(4) Disconnect the Battery Connector (P3) from the Internal Battery Pack and remove Display Panel Assembly.

B. Installation

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Reconnect the Battery Connector (P3) to the Internal Battery Pack (Figure 45).

(2) Visually inspect the Display Panel Assembly gasket and replace if necessary.

(3) Position the Display Panel Assembly on the gasket and install twenty screws and washers (Figure 41).

(4) Perform BITE Control Module Assembly Installation Procedure (Paragraph 2.B.).

4. RUN - OFF/CHARGE (S1) and MODE SELECTOR (S2) Switches

A. Removal

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Perform Display Panel Assembly Removal Procedure (Paragraph 3.A.).

(2) Remove the certification sticker and the one screw going through the front of the Display Panel into the PWA Back Cover Panel Assembly (Figure 41).

(3) Remove the four screws, washers, lockwashers, and spacers attaching the PWA Back Cover Assembly to the Display Panel (Figure 42)

(4) Record position of the leads attached to the lugs of the switch to be removed. (Refer to Chapter 2, Section 2 for Wiring Harness Assembly wiring diagram).

(5) Loosen the lug screws on the back of the switch, and disconnect the Harness Assembly Terminal Lugs.

(6) (RUN - OFF/CHARGE S1 only) Remove the safety cover.

(7) Remove the panel mount nut from switch to be removed (Figure 41).

(8) From the backside of the Display Panel, remove switch from Display Panel (Figure 43).

B. Installation

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Insert the switch through the hole from the backside of the Display Panel (Figure 43).

(2) Install and tighten the panel mount nut to the switch (Figure 41).

(3) (RUN - OFF/CHARGE S1 only) install the safety cover (Figure 41).

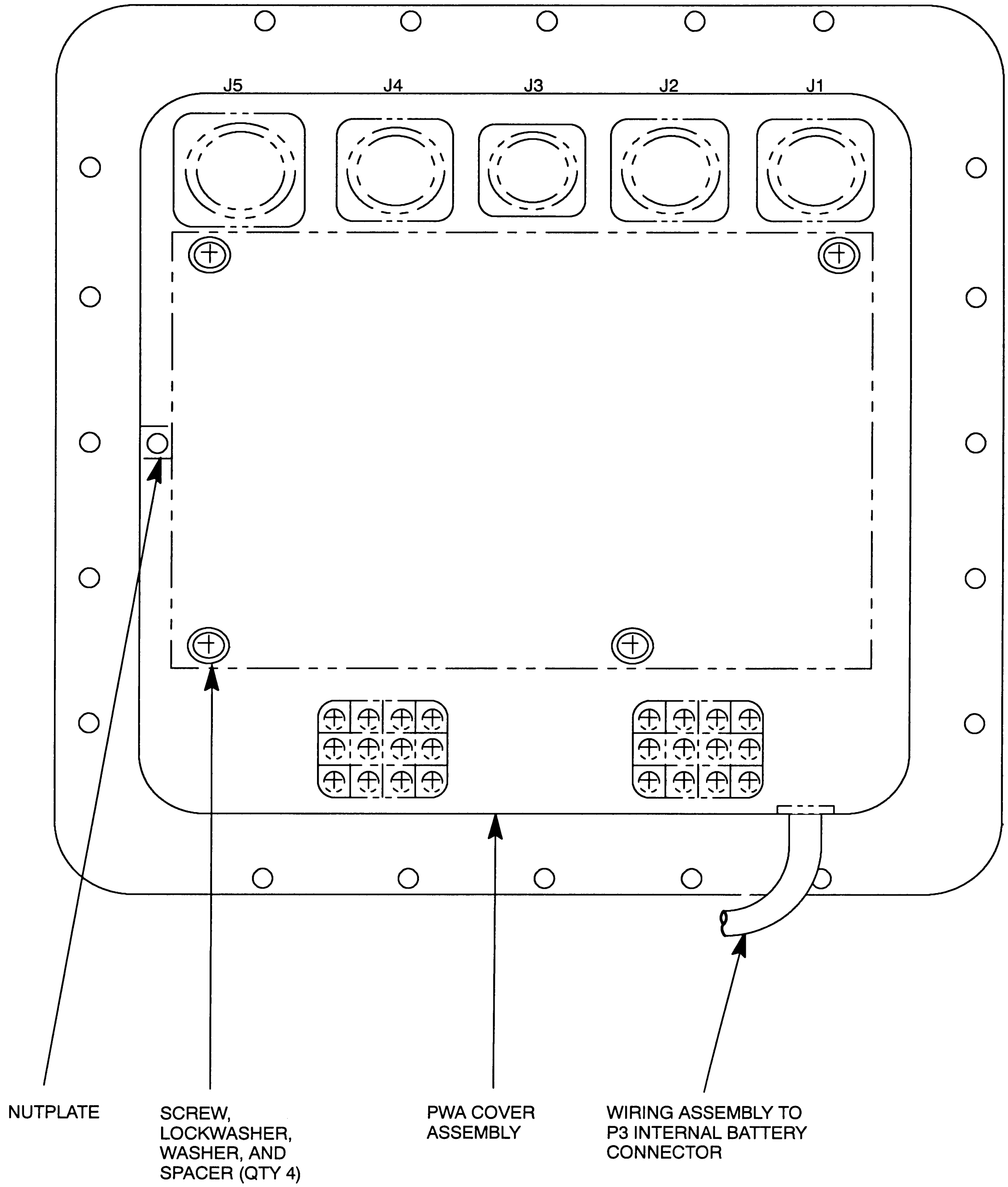
(4) Re-attach all Terminal Lugs in the positions as recorded during removal procedure (Refer to Chapter 2, Section 2, for Wiring Harness Assembly wiring diagram) and tighten lugs (Figure 43).

(5) Re-install the PWA Back Cover Assembly to the Display Panel and four spacers, lockwashers, washers ,and screws (Figure 42)

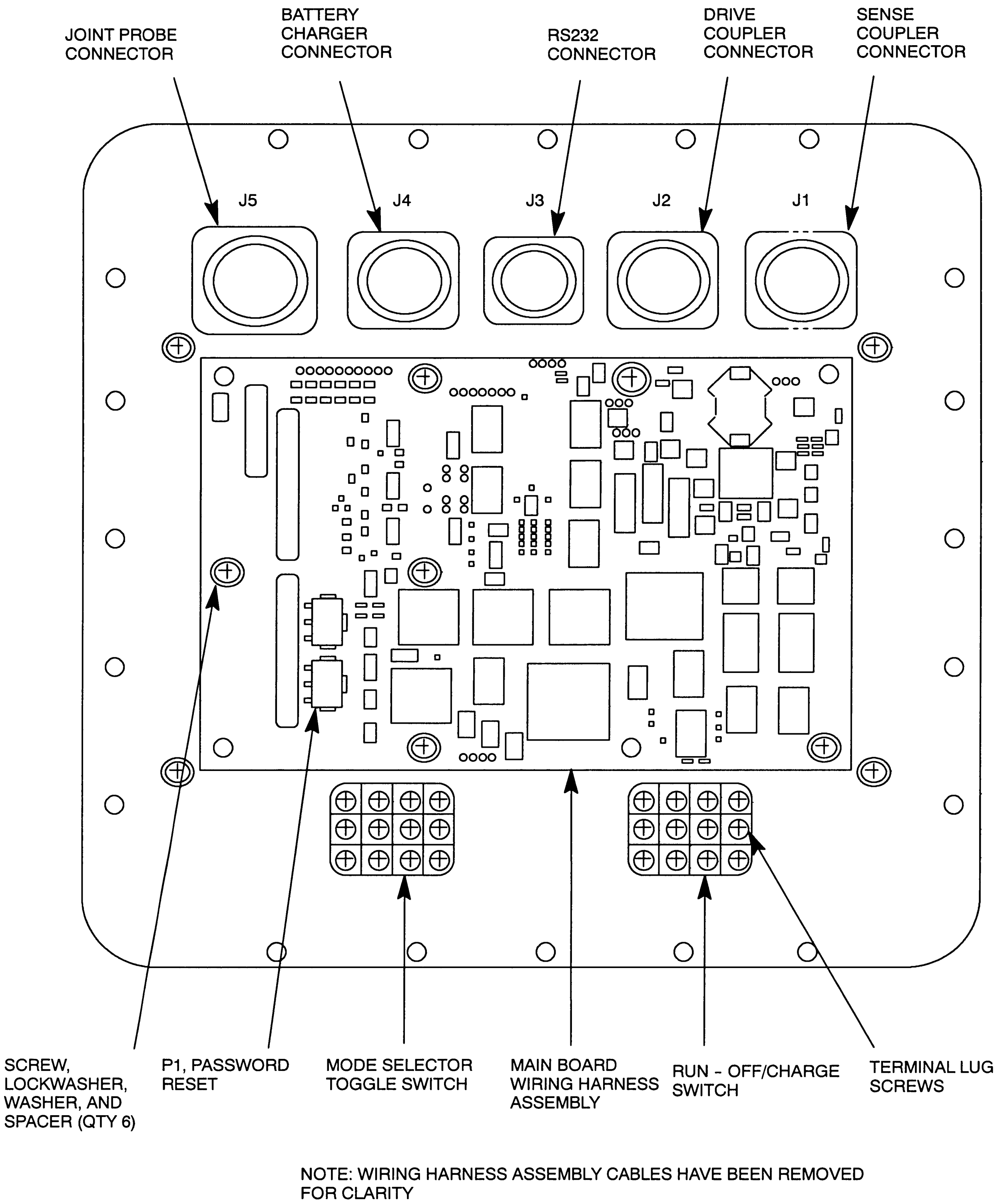
(6) Install the one screw going through the front of the Display Panel into the PWA Back Cover Panel Assembly (Figure 41).

(7) Perform the Display Panel Installation Procedure (Paragraph 3.B.)

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.



PWA Back Cover Assembly
Figure 42



Display Panel Assembly (Rear View)
Figure 43

5. Connector (J1, J2, J3, J4 and J5) Typical

A. Removal

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Unscrew connector cover (Figure 44).

(2) Remove the two screws attaching the connector cap lanyard to the Display Panel Assembly, and the connector cap.

(3) Perform Display Panel Assembly Removal Procedure (Paragraph 3.A.).

(4) Remove the certification sticker and the one screw going through the front of the Display Panel into the PWA Back Cover Panel Assembly (Figure 41).

(5) Remove the four screws, washers, lockwashers, and spacers attaching the PWA Back Cover Assembly to the Display Panel (Figure 42)

(6) Record the position of all the connector pins coming in to the back of the connector. (Refer to Chapter 2, Section 1 for Wiring Harness Assembly wiring diagram).

(7) From the front of the connector, carefully push the connector pins out the back of the connector.

(8) Remove the three remaining screws attaching the connector and connector gasket to the front of the Display Panel Assembly, and the retainer to the backside of the Display Panel Assembly, and remove connector, gasket, and retainer (Figure 44).

B. Installation

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Visually inspect the connector gasket and replace if necessary (Figure 44).

(2) Install the connector gasket on the connector, and from the front side of the Display Panel, slide the connector and connector gasket into the appropriate connector cutout in the Display Panel.

(3) From the backside of the Display Panel Assembly, install the retainer onto the connector.

(4) Install three screws through the connector, connector gasket, Display Panel, and into the retainer and tighten screws (Figure 44).

(5) From the backside of the connector, carefully push the connector pins into the connector as recorded during the removal procedure. (Refer to Chapter 2, Section 1 for Wiring Harness Assembly wiring diagram).

(6) Re-install the PWA Back Cover Assembly to the Display Panel and four spacers, lockwashers, washers ,and screws (Figure 42)

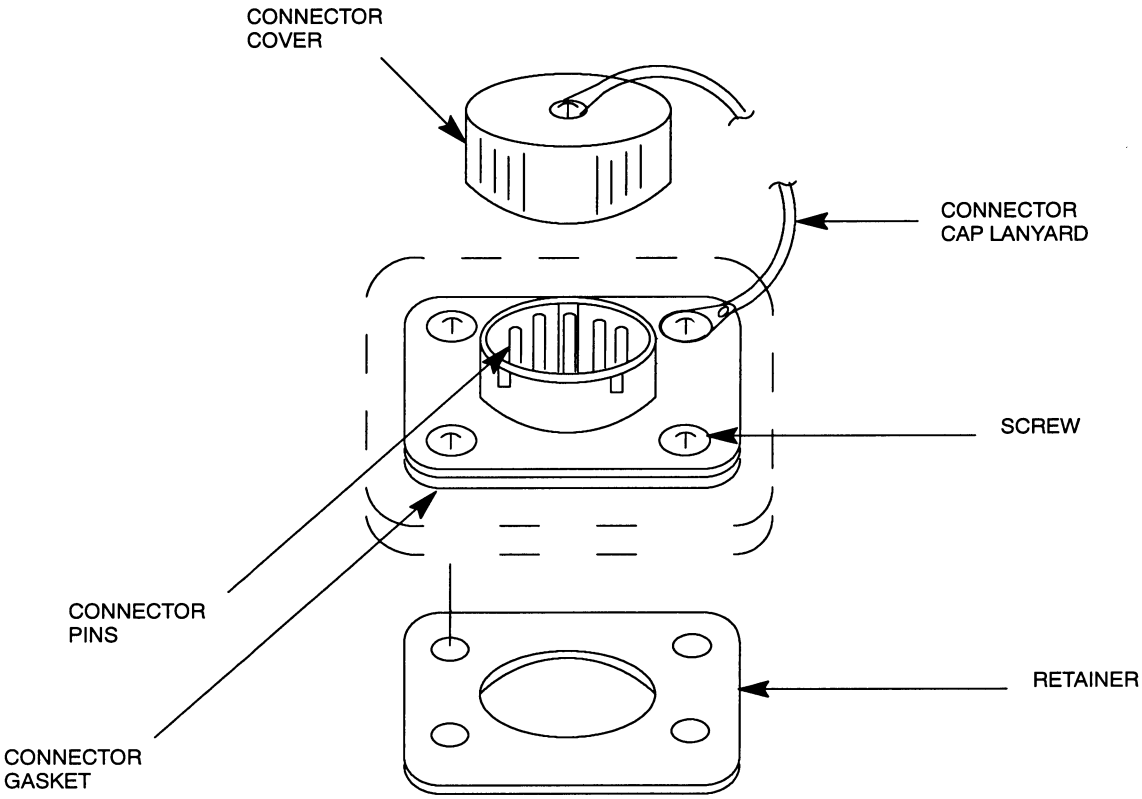
(7) Install the one screw going through the front of the Display Panel into the PWA Back Cover Panel Assembly (Figure 41).

(8) Perform the Display Panel Installation Procedure (Paragraph 3.B.)

(9) Install the two screws attaching the connector cap lanyard to the Display Panel Assembly and the connector cap.

(10) Screw connector cover back on the connector.

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.



Connector Typical
Figure 44

6. Harness Assembly

A. Removal

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Perform BITE Control Module Assembly Removal Procedures (Paragraph 2.A.).

(2) Disconnect BITE Control Module Assembly connector (P2) from the Harness Assembly.

(3) Remove twenty screws and washers attaching the Display Panel Assembly to the case (Figure 41).

(4) Carefully lift the Display Panel Assembly enough to provide access to the Wiring Harness Assembly mounted on the backside of the Electrical Panel Assembly.

(5) Record the position of all the connector pins on the back of the connectors J1, J2, J3, J4, and J5. (Refer to Chapter 2, Section 2 for Wiring Harness Assembly wiring diagram).

(6) From the front of each connector, carefully push the connector pins out the back of each connector.

(7) Record the position of all the terminal lugs attached to each of switches S1 and S2.

(8) Loosen the terminal lug screws and remove all terminal lugs from switches S1 and S2.

(9) Disconnect the Internal Battery connector P3 from the internal battery.

(10) Remove the ten screws and washers, and two clamps attaching the Wiring Harness Assembly to standoffs attached to the Display Panel Assembly.

(11) Taking care not to break any solder connections, remove the Wiring Harness Assembly.

B. Installation

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Position the Wiring Harness Assembly on the standoffs attached to the Display Panel Assembly.

(2) Install two clamps, ten screws and washers.

(3) From the backside of each of the connectors J1, J2, J3, J4, and J5, carefully push the connector pins into each connector as recorded during removal (Figure 44). (Refer to Chapter 2, Section 2 for Wiring Harness Assembly wiring diagram).

(4) On Switches S1 and S2, re-attach all Terminal Lugs in the positions as recorded during removal (Refer to Chapter 2, Section 2, for Wiring Harness Assembly wiring diagram), and tighten lugs (Figure 44).

(5) Connect the Internal Battery Connector P3 to the internal battery.

(6) Connect the BITE Control Module Assembly connector (P2) to the Wiring Harness Assembly.

(7) Visually inspect the Display Panel Assembly gasket and replace if necessary.

(8) Position the Display Panel Assembly on the gasket and install twenty screws and washers (Figure 41).

(9) Perform BITE Control Module Assembly Installation Procedures (Paragraph 2B)

NOTE: An approved facility is required to repair and return the LRT to an intrinsically safe configuration and perform the Loop Resistance Tester Functional Test to restore the UL913 Certification.

7. Battery Pack

A. Removal

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Perform Display Panel Assembly Removal Procedure (Paragraph 5.A.).

(2) Remove the four screws and washers attaching the Battery Pack to the Panel Assembly and remove Battery Pack (Figure 45).

B. Installation

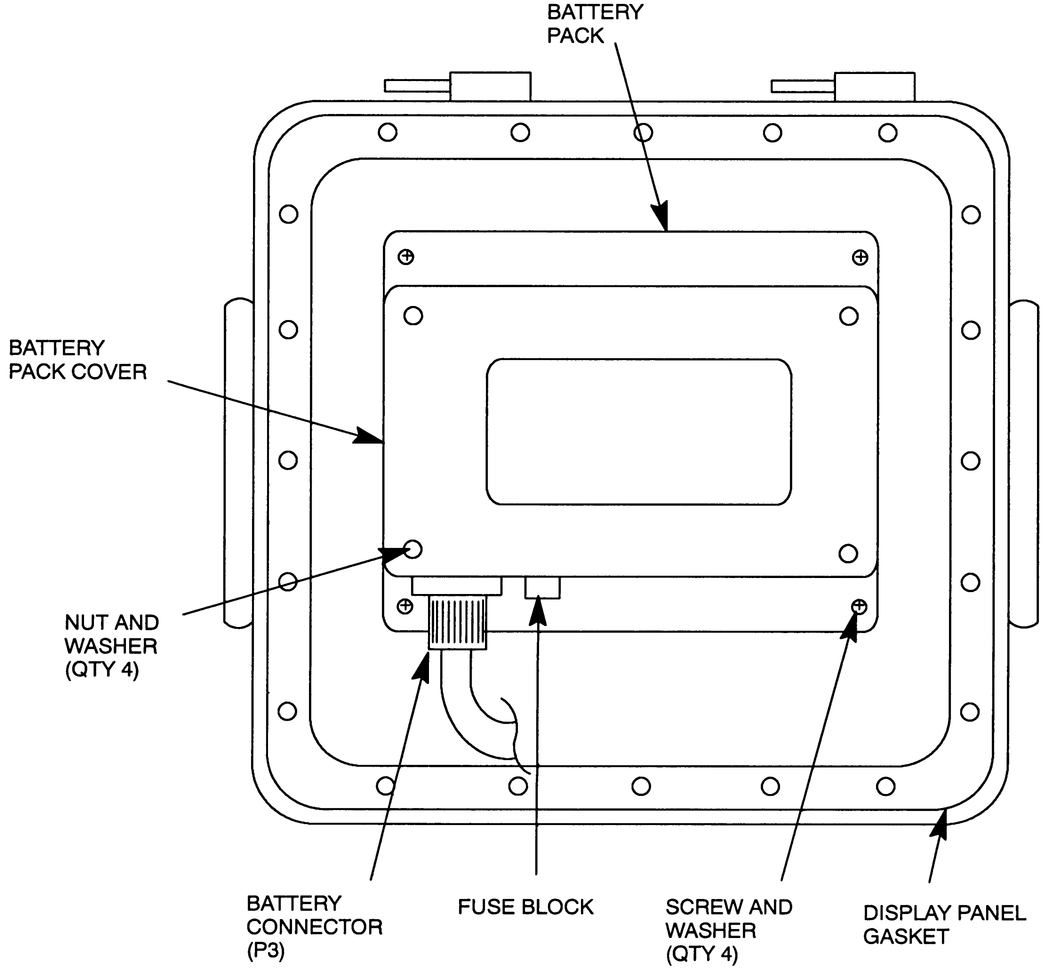
CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(1) Position Battery Pack on top of Panel Assembly and install four screws and washers (Figure 45).

(2) Perform Display Panel Assembly Installation Procedure (Paragraph 5.B.).

(3) Perform Battery Charging Procedures (Chapter 1, Section 2).

(4) Perform the LRT Internal Battery Evaluation Test (Chapter 2, Section 1, paragraph 5)



Battery Pack
Figure 45

C. Battery Termination PW Assembly

(1) Removal

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(a) Perform Battery Pack Removal Procedure (Paragraph 7.A.).

(b) Remove the four nuts and four washers attaching the Battery Pack Cover to the standoffs (Figure 45).

(c) Remove the Battery Pack Cover.

(d) Remove four screws and four nylon washers attaching the Battery Termination PW Assembly to the standoffs (Figure 46).

(e) Remove Battery Termination PW Assembly from the stand offs. Remove and retain the four nylon washers between the Battery Termination PW Assembly and the standoffs.

(f) Disconnect all electrical connections from the Battery Termination PW Assembly.

(2) Installation

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(a) Reconnect all electrical connections (Refer to the Battery Pack Wiring Diagram Chapter 2, Section 2).

(b) Install one nylon washer on each of the four standoffs (Figure 46).

(c) Align the fours standoffs with the mounting holes on the Battery Termination PW Assembly

(d) Install one nylon washer on each of the four stand offs on the top side off the Battery Termination PW Assembly and install the four screws.

(e) Align the fours standoffs with the mounting holes on the Battery Pack Cover.

(f) Install one washer on each of the four standoffs on the top side off the Battery Pack Cover and install the four nuts.

(g) Perform Battery Pack Installation Procedure (Paragraph 7.B.).

D. Internal Battery

(1) Removal

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

(a) Perform Battery Pack Removal Procedure (Paragraph 7.A.).

(b) Perform Battery Termination PW Assembly Removal procedures (Paragraph 8.A.).

(c) Remove the two nuts, two washers, and two screws attaching the Battery Retaining Strap to the Base Plate (Figure 46).

(d) Remove the Battery Retaining Strap.

(e) Disconnect all electrical connections from the Internal Battery.

WARNING: THE INTERNAL BATTERY IS GLUED IN PLACE WITH EPOXY (DP-105). OBSERVING FLAMMABLE LIQUID PRECAUTIONS WHILE USING AN APPROPRIATE SOLVENT IN A WELL VENTILATED SPACE IS REQUIRED.

(f) Use an appropriate solvent, remove the epoxy securing the Internal Battery to the Base Plate and remove the Internal Battery.

(2) Installation

CAUTION: THE INTERNAL COMPONENTS OF THE LOOP RESISTANCE TESTER ARE ELECTROSTATIC SENSITIVE. OBSERVE PROPER PROCEDURES WHEN HANDLING IN ACCORDANCE WITH BAC5485.

WARNING: THE INTERNAL BATTERY IS GLUED IN PLACE WITH EPOXY (DP-105). OBSERVING FLAMMABLE LIQUID PRECAUTIONS WHILE USING THE APPROPRIATE SOLVENT IN A WELL VENTILATED SPACE IS REQUIRED.

(a) Ensure the area were the Internal Battery is to be mounted is clean and dry.

(b) Apply the epoxy (DP-105) to the Base Plate where the Internal Battery is to be mounted.

(c) Align and mate the Internal Battery to the Base Plate and allow the Epoxy (DP-105) to cure.

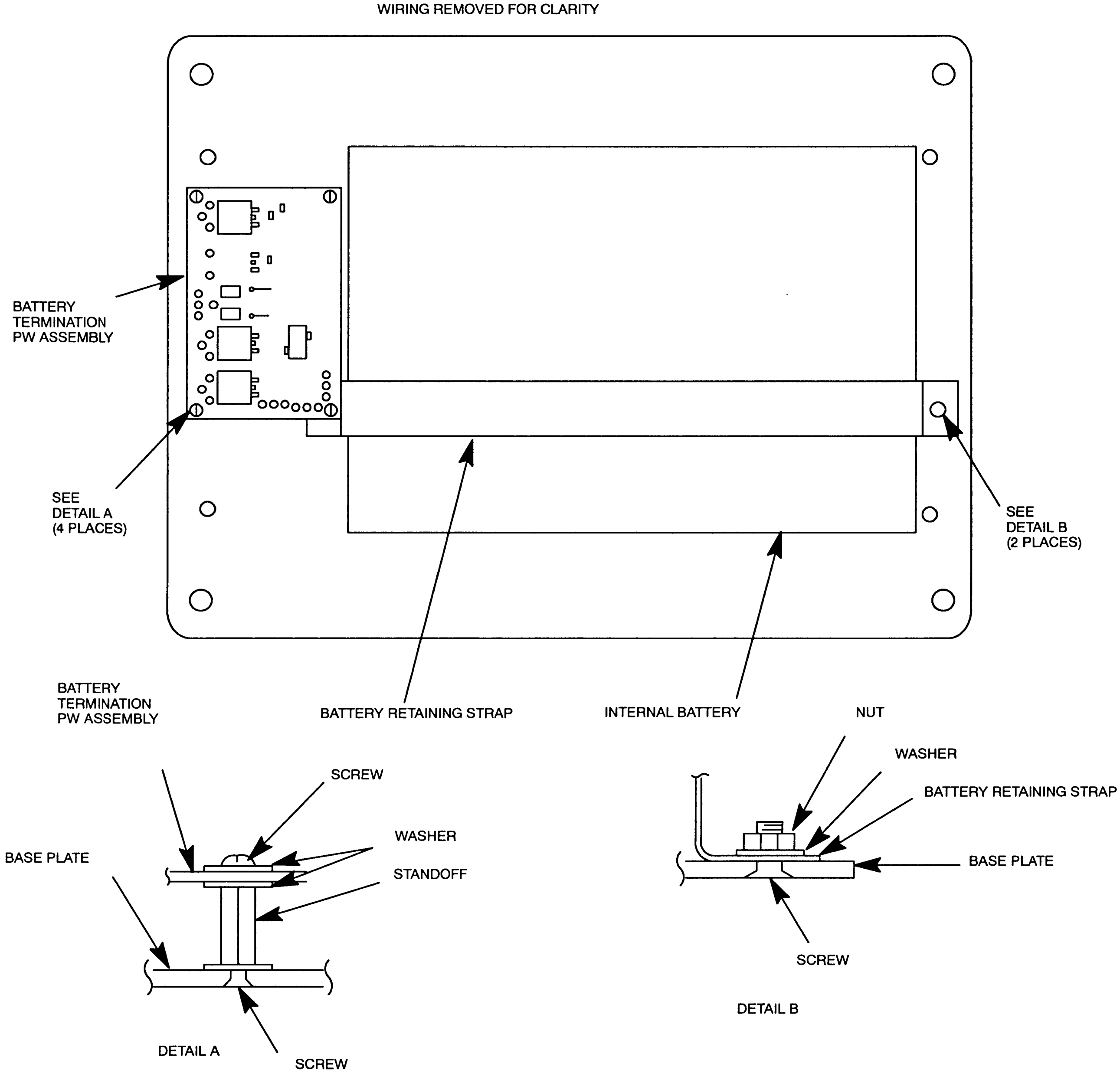
(d) Align and Install the Battery Retaining Strap on the Base Plate (Figure 46).

(e) Install the two screws, two washers, and two nuts attaching the Battery Retaining Strap to the Base Plate.

(f) Reconnect all electrical connections (Refer to the Battery Pack Wiring Diagram Chapter 2, Section 2).

(g) Perform Battery Termination PW Assembly Installation procedures (Paragraph 8.B.).

(h) Perform Battery Pack Installation Procedure (Paragraph 7.B.).



Battery Pack (Cover Removed)
Figure 46

E. Battery Charger (103486-1, Sage) Power Supply, Front Panel Assembly and Rear Panel Assembly

(1) Removal

(a) Remove two screws attaching the Front Panel sub-assembly and Front Bezel to the Base (Figure 47).

(b) Remove two screws attaching the Rear Panel sub-assembly and Rear Bezel to the Base.

(c) Carefully separate the Front Panel sub-assembly, Front Bezel, Rear Panel sub-assembly, and Rear Bezel from the Base and Cover, taking care not to stress the wiring still attached.

(d) Remove the Cover from the Base.

(e) Disconnect the two electrical connectors of the Rear Panel sub-assembly from the Power Supply, and the connector from the PCB assembly.

(f) Remove the screw and washer attaching the Rear Panel sub-assembly Ground Wire to the Power Supply.

(g) Remove the Rear Panel sub-assembly.

(h) Disconnect the Front Panel sub-assembly electrical connections from the Power Supply.

(i) Remove the Front Panel sub-assembly.

(j) Remove the three screws and three washers attaching the Power Supply to the Base Plate.

(k) Remove the Power Supply.

(2) Installation

(a) Align the four standoffs with the mounting holes of the Power Supply (Figure 47).

(b) Install three washers and three screws through the mounting holes of the Power Supply into the standoffs.

(c) Install the Rear Panel sub-assembly Ground Wire with one washer and one screw through the mounting hole of the Power Supply into the standoffs.

(d) Re-attach the electrical connections of the Front Panel sub-assembly to the appropriate locations of the Power Supply.

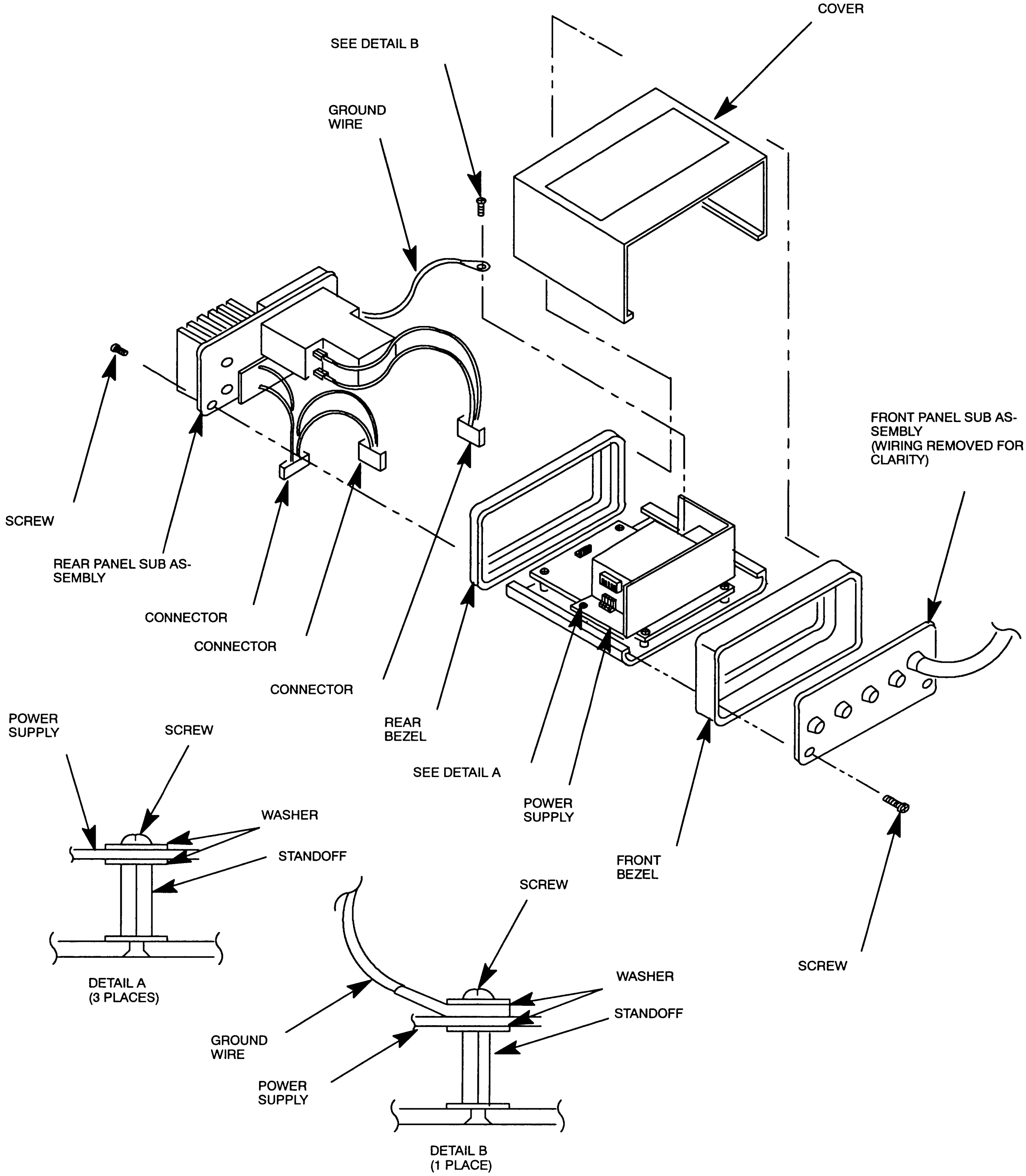
(e) Re-connect the two electrical connectors of the Rear Panel sub-assembly and to the Power Supply, and the connector to the PCB assembly.

(f) Install the Cover on the Base Plate.

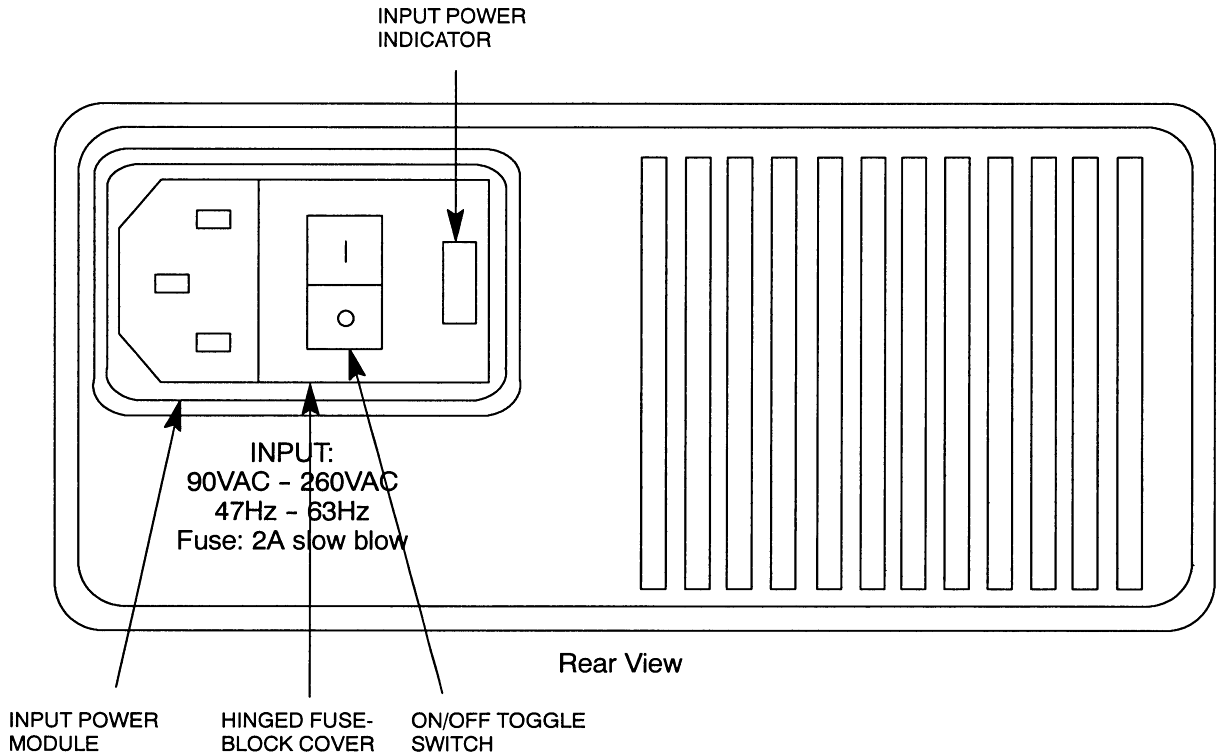
(g) Install the Front Bezel and the Rear Bezel on the Cover and Base Plate.

(h) Slide the Front Panel sub-assembly into the Front Bezel and install the two screws.

(i) Slide the Rear Panel sub-assembly into the Rear Bezel and install the two screws.



Battery Charger Assembly Remove/Install (103486-1, Sage)
Figure 47



Battery Charger Assembly (103486-1, Sage)
Figure 48

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SECTION 4 - REPAIRS

1. General

TO BE DETERMINED

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CHAPTER 3 - ILLUSTRATED PARTS LIST

1. General

   A. This section lists and illustrates replaceable or repairable component parts.

   B. Indentures show parts relationships as follows:

      Assembly
         Detail Parts for Assembly
         Subassembly
         Attaching Parts for Subassembly
            Detail Parts for Subassembly

   C. One use code letter (A, B, C, etc.) is assigned in the EF CODE column for each variation of top assembly. All listed parts are used on all top assemblies except when limitations are shown by use code letter opposite individual part entries.

2. Parts Interchangeability

Optional (OPT)	The parts are optional to and interchangeable with other parts having the same item number.
Supersedes, Superseded BY (SUPSDS, SUPSD BY)	The part supersedes and is not interchangeable with the original part.
Replaces, Replaced by (REPLS, REPLD BY)	The part replaces and is interchangeable with, or is an alternate to, the original part.

3. Service Bulletin Incorporation

   A. Part numbers created by Service Bulletin (SB) incorporation, which are identical to production part numbers, reference SB number in nomenclature column. Example: (SB XX-XXXX)

   B. Part numbers created by SB incorporation, which have no production equivalent, list new part number, nomenclature and use code in normal manner. In addition, SB number is referenced in nomenclature column.

   C. Assemblies reworked by SB, which have no part number change, have added, modified, and deleted parts identified in nomenclature column. Example: (Added by SB XX-XXXX) (Modified by SB XX-XXXX) (Deleted by SB XX-XXXX).

4. Vendors

A. Vendors are identified in the nomenclature column of each parts list by their Commercial And Government Entity (CAGE) code. All CAGE codes in parts lists of this manual are consolidated and listed with associated names and addresses in this volume.

VL1002	BCD ELECTRONICS LDT, 4170 STILL CREEK DR SUITE 200, BURNABY, CANADA V5C 6C6
V0A828	INTERCONNECT DEVICES INC. SYNERGETIX DIV, 310 S. 51 ST., KANSAS CITY, KS 66106-1019
V0FDX0	KRYOCERA NORTHWEST INC, 5701 E 4TH PLAIN BLVD VANCOuVER, WA 98661
V0GCW4	GLOBE ELECTRONIC HARDWARE INC., 3424 56TH STREET, WOODSIDE, NY 11377-2122
V0HYG7	FLUKE CORP. 1420 75TH STREET SW, EVERETT, WA 98206
V01121	ROCKWELL AUTOMATION, INC. 1201 S 2ND ST, MILWAUKEE< WI 53204-2410
V01556	EMHART INDUSTRIES INC. 50 SHELTON TECHNOLOGY CENTER, SHELTON, CT 06484-4517
V02768	ILLINIOS TOOL WORKS INC, FASTEX DIV. 195 ALGONQUIN ROAD, DES PLAINES, IL 60016-6103
V03030	EMPRO MFG CO INC. 10920 EAST 59TH STREET P.O. BOX 26060 INDIANAPOLIS, IN 46236-8337
V04FZ8	MILLER ENGINEERING INC. APAK BATTERIES, 14441 124TH AVE NE STE A-3, KIRKLAND, WA 98034-4803
V053H3	INDUSTRIAL AUTOMATION INC, 1421 S 93rd ST, SEATTLE, WA 98108-5107
V06090	TYCO ELCELTRONICS 300 CONSTITUTION DRIVE MENLO PARK, CA 94024-1164
V06324	GLEN AIR INC 1211 AIR WAY GLENDALE, CA 91201-2497
V08MU3	CONDUCTIVE RUBBER TECHNOLOGIES 22125 17TH AVENUE S.E., SUITE 117 BOTHEL, WA 98021
V09353	C & K COMPONANTS 57 STANELY AVE. WATERTOWN, MA 02172
V1R2W7	HAZARD COMMUNICATION SYSTEMS, INC WESTFALL PROFESSIONAL PLAZA, RT. 6 & 209 MILFORD, PA 18337-2174
V1YGB8	CAREY MANUFACTURING COMPANY INC. 5 PASCO HILL RD CROMWELL, CT 06416-1093
V16177	STILSON CORP DIV OF STOCKER AND YALE INC 34775 COMMERCE RD FRASER, MI 48026
V19647	CADDOCK ELECTRONICS INC. 1717 CHICAGO AVE RIVERSIDE, CA 92507-2302
V19701	NORTH AMERICAN PHILIPS CORP PHILIPS COMPONENTS DISCRETE PRODUCTS DIV 1440 W INDIANTOWN RD JUPITER, FL 33458

V2N936	VISHAY SPRAGUE (VISHAY AMERICAS, INC) 678 MAIN ST P.O. BOX 231 SANFORD, ME 04073-0231
V28520	HEYCO PRODUCTS INC. 1800 INDUSTRIAL WAY NORTH TOMS RIVER, NJ 08755-4809
V29724	THERMODYNE INTL LTD 1841 S BUSINESS PKWY ONTARIO, CA 91761-8537
V3FFX3	HEWLETT PACKARD CO 3000 HANOVER ST PALO ALTO, CA 94304-1112
V3M7L3	CAPLUGS LLC 18704 S FARRIS PL COMPTON, CA 90220-6400
V31669	PICO ELECTRONICS 143 SPARKS AVE PELHAM, NY 10803-1837
V46384	PENN ENGINEERING & MFG. CORP. OLD EASTON RD. P.O. BOX 1000 DANBORO, PA 18916
V51506	ACCURATE SCREW MCH INC 10 AUDREY PL FAIRFIELD, NJ 07004-6095
V51667	MATRA ELECTRONIC INC 17715 SUSANA ROAD P.O.BOX 5329 COMPTON, CA 90224
V55304	RADAR TECHNOLOGY 3 LIBERTY ST MERRIMAC, MA 01860-1516
V55322	SAMTEC 520 PARK E BLVD NEW ALBANY, IN 47150-7251
V55566	R A ELECTRONIC HARDWARE INC 95 SILVERMINE RD SEYMOur, CT 06483-3915
V56235	STATE OF THE ART INC 2470 FOX HILL RD STATE COLLAGE, PA 16803-1729
V56878	SPS TECHNOLOGIES INC. AEROSPACE & INDUSTRIAL PRODUCTS DIV. HIGHLAND AVE. JENKINTOWN, PA 19046-2630
V59124	KOA SPEER ELECTRONICS INC P.O. BOX 547 BOLIVAR DR BRADFORD, PA 16701
V61398	AME CORPORATION 33 JACKSONVILLE ROAD TOWACO, NJ 07082-1100
V62081	MOCAP INC. 13100 MANCHESTER ROAD ST. LOUIS, MO 63131
V71468	ITT CANNON DIV. OF ITT CORP 666 EAST DYER RD. SANTA ANA, CA 92705-5612
V71532	NORTON CO. 4600 CANTRELL RD FLOWERY BRANCH, GA 30542-3305
V73559	CARLING TECHNOLOGIES 60 JOHNSON AVE. PLAINVILLE, CT 06062-1156
V74868	AMPHENOL CORP COMMUNICATION AND NETWORK PRODUCTS DIV 4 OLD NEWTOWN ROAD DANBURY, CT 06810-5815
V75915	LITTLEFUSE INC 800 E NORTHWEST HWY DES PLAINES, IL 60016-3049
V76385	MINOR RUBBER CO. INC. 49 ACKERMAN ST. BLOOMFIELD, NJ 07003-4201
V81205	THE BOEING CO. 7775 E. MARGINAL WAY P.O. BOX 3707 SEATTLE, WA 98124
V81483	INTERNATIONAL RECTIFIER CORPORATION 233 KANSAS STREET EL SEGUNDO, CA 90245-4315
V83330	DIALIGHT CORP. 1501 ROUTE 34 FARMINGDALE, NJ 07727-3932
V86928	SEASTROM MANUFACTURING CO. 456 SEASTROM ST TWIN FALLS, ID 83301-8526

V91637	VISHAY DALE ELECTRONICS VISHAY AMERICAS INC 1122 23RD STREET P.O. BOX 609 COLUMBUS,NE 68602-0609
V95275	VITRAMON INC 10 RT 25 MONROE, CT 06468
V98376	ZERO MANUFACTURING INC 500 WEST 200 NORTH NORTH SALT LAKE, UT 84054-2734

5. Numerical Index

A. When there are more than 150 items in the parts list, a separate numerical index is included.

B. The numerical index lists in alphanumeric order, all parts listed on individual parts lists. Section number, figure number, item number, and total quantity required are listed for each part. Example: (6-1-105 6) is associated with 6 parts required for item 105 of Figure 1, section 6.

PART NUMBER CH-SECT	FIG-ITEM	QTY
AN960C10		
01 00 00	5 170	AR
01 00 00	5 195	AR
AP701		
01 00 00	5 205	1
01 00 00	1 860	1
AP702		
01 00 00	5 60	1
AP703B		
01 00 00	5 75	1
AS700-02		
01 00 00	1 35	1
01 00 00	5 1A	RF
BAC27TEX14		
01 00 00	4 115	1
BAC27TEX1486		
01 00 00	5 160	1
BAC27WEX1768		
01 00 00	1 260	1
BAC27WEX1825		
01 00 00	3 60	1
BAC27WEX1826		
01 00 00	1 245	1
BAC27WEX1986		
01 00 00	1 265	1
BACC10DK4		
01 00 00	2 120	1
BACC10DK6		
01 00 00	2 115	2
BACC10HF10A		
01 00 00	3 40	1
BACC10KE14		
01 00 00	2 80	1
BACC27EEL19346		
01 00 00	1 255	1
BACC47CP1-20		
01 00 00	5 40	9
BACC47CP2-16		
01 00 00	5 35	3
BACC63CB10-5PN		
01 00 00	3 35	1
BACC63CB14-12PN		
01 00 00	2 75	1
BACC63CB14-15P6		
01 00 00	1 90	1
BACC63CB16-10PN		
01 00 00	1 230	1
BACC63CC10-5SN		
01 00 00	2 40	1
BACC63CC14-12S		
01 00 00	5 30	1
BACC63CC14-12SN		
01 00 00	2 50	1
BACC63CC14-15S6		
01 00 00	2 30	2
BACC63CC16-10SN		
01 00 00	2 60	1
BACR10AC10		
01 00 00	2 45	1
BACR10AC14		
01 00 00	2 35	2
01 00 00	2 55	1
BACR10AC16		
01 00 00	2 65	1
BACT12AC2		
01 00 00	2 105	6
BACT12AC45		
01 00 00	1 155	1
BACT12AC53		
01 00 00	1 170	1
BACT12AC56		
01 00 00	1 165	1
BACT12AC6		
01 00 00	2 100	8
BACTEX1486		

PART NUMBER CH-SECT	FIG-ITEM	QTY
01 00 00	6 585	1
BACWEX1824		
01 00 00	4 120	1
01 00 00	4 145	1
BCREF10439		
01 00 00	6 105	10
BCREF10440		
01 00 00	6 115	1
BCREF10597		
01 00 00	6 110	7
BCREF10600		
01 00 00	6 130	1
BCREF10605		
01 00 00	5 130	1
01 00 00	6 125	5
BCREF120547		
01 00 00	6 120	5
BCREF13110		
01 00 00	6 95	1
BCREF13111		
01 00 00	6 100	3
BCREF13174		
01 00 00	6 80	13
BCREF13687		
01 00 00	6 85	1
BCREF13688		
01 00 00	6 90	1
CS0S632-12		
01 00 00	2 210	10
CS5016JL16		
01 00 00	6 500A	2
FM04A125V1-4A		
01 00 00	6 530	2
FS3457		
01 00 00	5 70	1
HA2-50		
01 00 00	4 10	1
HA10-50		
01 00 00	4 15	1
HA100-50		
01 00 00	4 20	1
IRFR1205		
01 00 00	6 510A	1
IRF4905S		
01 00 00	5 95A	4
LBL1710B		
01 00 00	5 215	1
LBL1710F		
01 00 00	5 210	1
L25J1R0		
01 00 00	5 185	2
MLA25-50		
01 00 00	4 5	1
MN1612		
01 00 00	5 25	4
MN8370		
01 00 00	5 55	4
MP808-121		
01 00 00	4 75	3
MS1610		
01 00 00	5 15	4
MS21042L06		
01 00 00	1 60	4
MS21209C0410L		
01 00 00	2 205	4
MS2257		
01 00 00	5 65	2
01 00 00	5 165	4
MS24525-23		
01 00 00	2 85	2
MS252224-1		
01 00 00	2 180	1
MS27295-1		
01 00 00	2 130	1
MS27295-3		

PART NUMBER CH-SECT	FIG-ITEM	QTY
01 00 00	2 125	3
MS27295-4		
01 00 00	2 135	1
MS3112		
01 00 00	5 190	4
MS35338-136		
01 00 00	2 25	10
MS35338-41		
01 00 00	1 30	4
MS35338-42		
01 00 00	2 170	4
MS51957-28		
01 00 00	2 10	9
MS51957-31		
01 00 00	2 15	1
MS51957-32		
01 00 00	1 10	20
MW0030		
01 00 00	5 50	4
MW1611		
01 00 00	5 20	4
NAS1149CN632R		
01 00 00	1 15	20
01 00 00	2 20	10
MS51958-61		
01 00 00	1 430	1
NAS1149CN832R		
01 00 00	2 165	4
NAS13152C06-8		
01 00 00	4 45	10
01 00 00	4 55	3
NAS43DD0-6		
01 00 00	1 100	2
NAS43D014-5FC		
01 00 00	1 135	1
NAS514P632-10P		
01 00 00	1 55	4
NAS600-7P		
01 00 00	2 5	20
NAS601-8P		
01 00 00	1 25	4
NAS602-6P		
01 00 00	2 160	4
NAS620-6		
01 00 00	1 160	2
NSPW500BS		
01 00 00	1 200	2
R5SC		
01 00 00	1 190	2
SBE4R34		
01 00 00	3 20	2
S632-3Z1		
01 00 00	1 45	4
S900-12473-310		
01 00 00	6 535	1
S900-12473-311		
01 00 00	6 535A	1
S906-10134-003		
01 00 00	5 100	2
S906-10134-017		
01 00 00	6 345	1
S906-10135-1015		
01 00 00	5 105	1
S906-10135-1200		
01 00 00	6 350	2
S906-10135-1201		
01 00 00	6 355	1
S906-10135-2002		
01 00 00	6 540	1
S906-10135-4006		
01 00 00	6 525	1
S906-10155-9415		
01 00 00	6 545	2
S906-10181-003		
01 00 00	6 135	3

PART NUMBER CH-SECT	FIG-ITEM	QTY
S906-10207-2		
01 00 00	6 575	2
S906-10207-4		
01 00 00	6 580	1
S906-10263-1		
01 00 00	6 555	1
S906-10416-1000		
01 00 00	6 250	1
S906-10416-1001		
01 00 00	6 260	1
S906-10416-1002		
01 00 00	6 270	20
S906-10416-1003		
01 00 00	6 280	10
S906-10416-2001		
01 00 00	6 300	3
S906-10416-4992		
01 00 00	6 365	2
S906-70293-238		
01 00 00	6 565	1
S906-70381-3		
01 00 00	5 135	1
01 00 00	6 550	10
S906-70490-1		
01 00 00	6 560	1
S906-71202-6305		
01 00 00	6 500	2
S906-71202-6505		
01 00 00	6 495	1
S906-71202-7500		
01 00 00	6 510	1
S906-71202-7501		
01 00 00	5 95	4
S906-71237-10R0		
01 00 00	6 290	5
S906-71326-10121		
01 00 00	6 145	20
S906-71326-10221		
01 00 00	6 140	6
S906-71326-10391		
01 00 00	5 120	2
S906-71327-1000		
01 00 00	5 140	2
01 00 00	6 245	12
S906-71327-1001		
01 00 00	6 255	18
S906-71327-1002		
01 00 00	6 265	37
S906-71327-1003		
01 00 00	6 275	22
S906-71327-1004		
01 00 00	6 285	13
S906-71327-1502		
01 00 00	6 375	1
S906-71327-2001		
01 00 00	6 295	3
S906-71327-2002		
01 00 00	5 115	2
01 00 00	6 305	8
S906-71327-2003		
01 00 00	6 310	2
S906-71327-3011		
01 00 00	6 315	9
S906-71327-3012		
01 00 00	6 320	5
S906-71327-3013		
01 00 00	6 325	1
S906-71327-33R2		
01 00 00	6 330	36
S906-71327-4990		
01 00 00	6 335	6
S906-71327-4991		
01 00 00	5 110	3
01 00 00	6 340	10

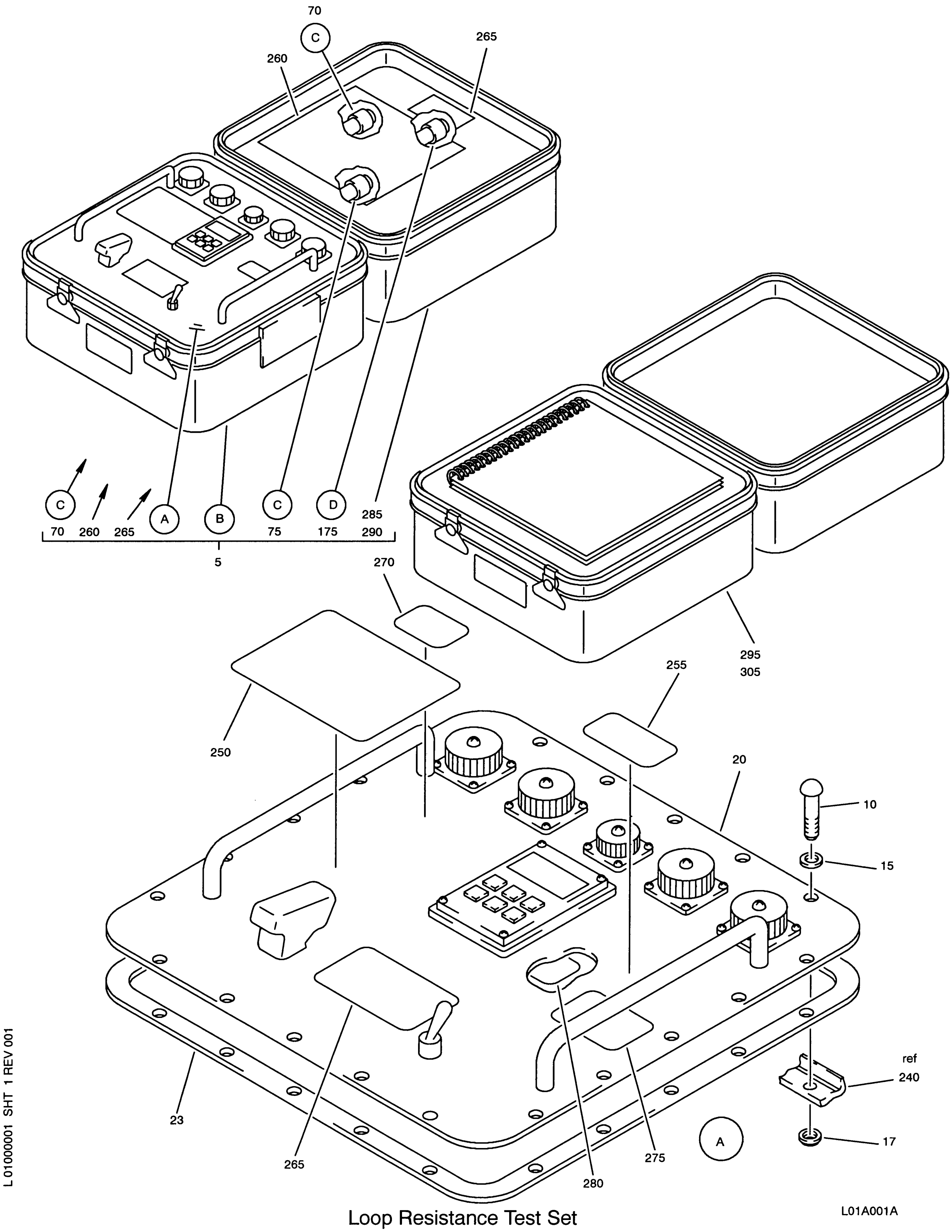
PART NUMBER	CH-SECT	FIG-ITEM	QTY
S906-71327-4992			
	01 00 00	6 360	3
S906-71327-4993			
	01 00 00	6 370	1
UCC2805D			
	01 00 00	6 495A	1
U108			
	01 00 00	1 115	1
VC156-8			
	01 00 00	2 95	1
X29498			
	01 00 00	4 125	1
Y32-Y-LL			
	01 00 00	1 85A	2
ZB1001M1			
	01 00 00	1 65	4
10-10149-10			
	01 00 00	2 145	1
10-10149-14			
	01 00 00	2 140	3
10-10149-16			
	01 00 00	2 150	1
100041			
	01 00 00	7 5	12
100075			
	01 00 00	8 10	1
100444			
	01 00 00	9 35	2
100496			
	01 00 00	7 95	4
100543			
	01 00 00	7 60	4
	01 00 00	9 30	4
100612			
	01 00 00	9 15	1
101578			
	01 00 00	7 55	1
101A073-3			
	01 00 00	1 125	1
102-189-1			
	01 00 00	3 55	1
	01 00 00	4 140	1
102191			
	01 00 00	9 80	1
102321			
	01 00 00	7 75	4
102706			
	01 00 00	9 70	1
102824			
	01 00 00	7 85	4
102825			
	01 00 00	9 5	1
102891-28			
	01 00 00	7 100	1
103-633			
	01 00 00	1 240	1
103009			
	01 00 00	9 65	3
103049			
	01 00 00	9 75	1
10308A0832-2F			
	01 00 00	2 155	2
103114			
	01 00 00	9 20	1
103151			
	01 00 00	7 40	1
103183			
	01 00 00	8 15	1
103186			
	01 00 00	8 20	1
103331-01			
	01 00 00	7 105	1
103333-03			
	01 00 00	7 25	1
103334-03			

PART NUMBER	CH-SECT	FIG-ITEM	QTY
	01 00 00	7 20	1
	01 00 00	7 35	1
103393-02			
	01 00 00	9 85	1
103397			
	01 00 00	9 60	2
103422			
	01 00 00	9 55	1
103429			
	01 00 00	7 90	4
103433			
	01 00 00	7 50	3
	01 00 00	9 45	3
103434			
	01 00 00	9 25	1
103436			
	01 00 00	9 10	1
103439-02			
	01 00 00	9 50	1
103444			
	01 00 00	7 70	1
103470			
	01 00 00	8 5	4
103486-01			
	01 00 00	3 5	1
	01 00 00	7 1A	RF
103495			
	01 00 00	8 25	1
103496			
	01 00 00	8 30	1
103501			
	01 00 00	7 65	1
103502			
	01 00 00	8 45	1
103503			
	01 00 00	7 15	1
	01 00 00	8 1A	RF
103504			
	01 00 00	8 35	1
103505			
	01 00 00	7 45	1
	01 00 00	9 1A	RF
103506			
	01 00 00	9 40	1
103510			
	01 00 00	8 40	1
103623			
	01 00 00	7 80	4
103626			
	01 00 00	7 110	1
103631			
	01 00 00	7 115	1
107173			
	01 00 00	7 10	2
	01 00 00	7 30	2
110SPM0FF			
	01 00 00	1 110	1
1100RBK			
	01 00 00	2 90	1
182-18174-4			
	01 00 00	2 185	1
2C755SFCS			
	01 00 00	1 85	2
2-56-25			
	01 00 00	5 180	4
285T0765-18			
	01 00 00	2 175	1
3AB322004			
	01 00 00	5 5	1
3AG			
	01 00 00	3 15	5
3213			
	01 00 00	1 145	1
3219			
	01 00 00	1 150	1

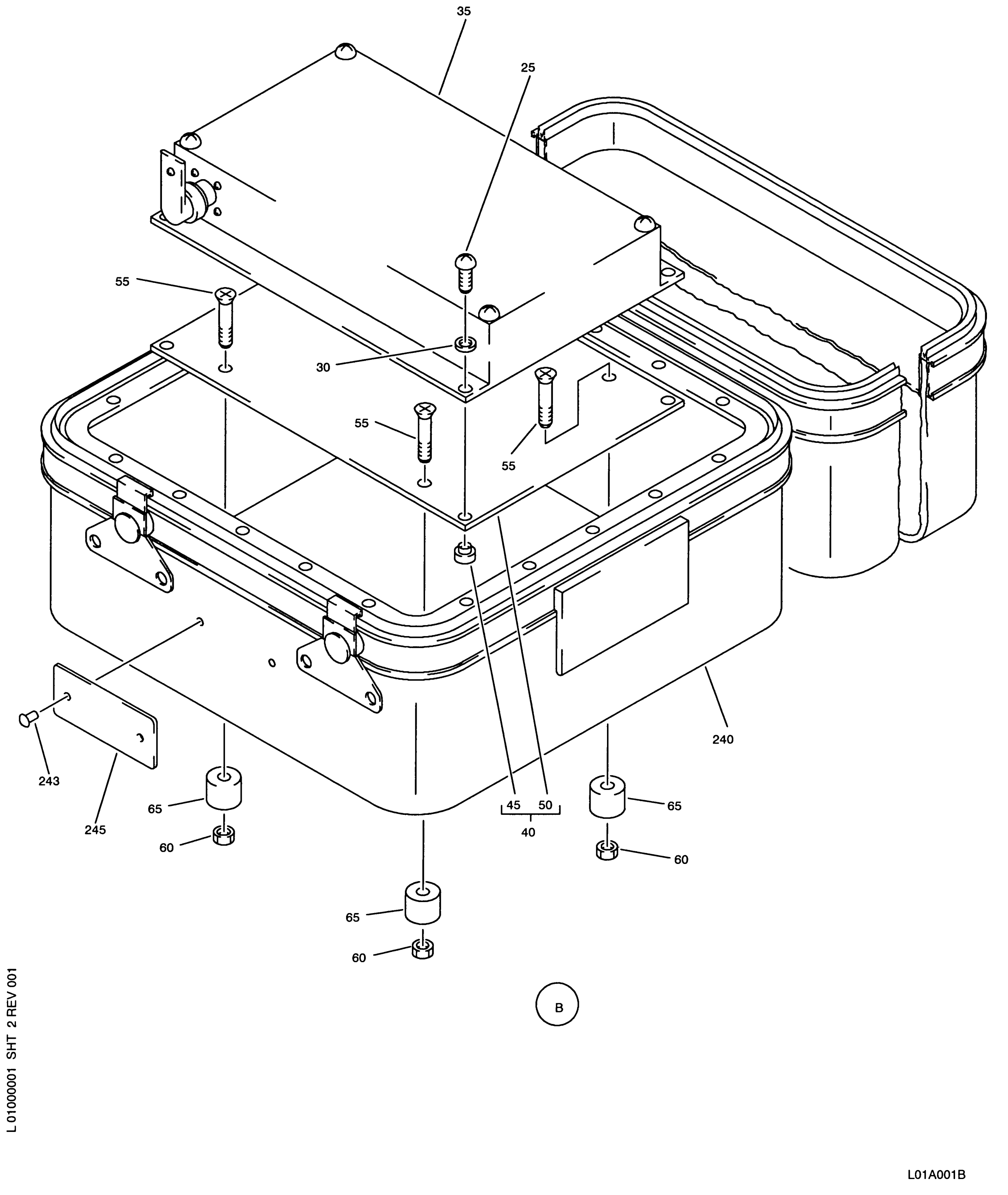
PART NUMBER	CH-SECT	FIG-ITEM	QTY
3349			
	01 00 00	5 85	AR
3452LF3			
	01 00 00	5 10	1
381A301-51-164			
	01 00 00	1 200	1
381A301-71-42			
	01 00 00	1 200A	1
400AS002T1405L3			
	01 00 00	1 95	1
400AS002T1605L3			
	01 00 00	1 235	1
45-0308			
	01 00 00	3 30	1
473001			
	01 00 00	6 525A	1
4819			
	01 00 00	5 200A	4
4836			
	01 00 00	5 200	4
4837			
	01 00 00	5 175	4
606-1415-110			
	01 00 00	1 105	1
	01 00 00	1 195	2
	01 00 00	2 195	1
69-73010-2			
	01 00 00	2 190	1
693019			
	01 00 00	1 180	2
895101264			
	01 00 00	1 120	1
900-10451-10491			
	01 00 00	6 75	4
900-12471-001			
	01 00 00	6 380	1
900-12471-040			
	01 00 00	6 385	1
900-12471-080			
	01 00 00	6 390	2
900-12471-084			
	01 00 00	6 395	1
900-12471-336			
	01 00 00	6 460	2
900-12471-345			
	01 00 00	6 400	1
900-12471-503			
	01 00 00	6 415	1
900-12471-510			
	01 00 00	6 420	1
900-12471-545			
	01 00 00	6 430	2
900-12471-582			
	01 00 00	6 405	1
900-12471-610			
	01 00 00	6 435	1
900-12471-620			
	01 00 00	6 440	1
900-12471-621			
	01 00 00	6 445	1
900-12471-630			
	01 00 00	6 450	6
900-12471-634			
	01 00 00	6 465	1
900-12471-635			
	01 00 00	6 455	3
900-12471-693			
	01 00 00	6 470	1
900-12471-701			
	01 00 00	6 475	1
900-12471-752			
	01 00 00	6 480	1
900-12471-773			
	01 00 00	6 485	1
900-12471-821			

PART NUMBER	CH-SECT	FIG-ITEM	QTY
	01 00 00	6 490	3
900-12472-003			
	01 00 00	6 515	2
900-12472-004			
	01 00 00	6 520	1
900-14050-10395			
	01 00 00	6 55	4
900-14050-10495			
	01 00 00	6 60	67
900-14050-22095			
	01 00 00	6 65	2
900-14050-27095			
	01 00 00	6 150	1
900-14050-33295			
	01 00 00	6 70	6
900-14052-1000			
	01 00 00	6 155	5
900-14052-10R0			
	01 00 00	6 160	1
900-14052-1102			
	01 00 00	6 165	4
900-14052-1212			
	01 00 00	6 170	1
900-14052-1402			
	01 00 00	6 175	2
900-14052-15R0			
	01 00 00	6 185	1
900-14052-2000			
	01 00 00	5 150	1
	01 00 00	6 190	9
900-14052-2212			
	01 00 00	6 195	1
900-14052-2214			
	01 00 00	6 200	2
900-14052-3323			
	01 00 00	6 205	1
900-14052-3571			
	01 00 00	6 210	1
900-14052-4021			
	01 00 00	6 215	1
900-14052-4993			
	01 00 00	6 180	1
900-14052-8871			
	01 00 00	6 220	1
900-40014-1001			
	01 00 00	6 225	3
900-40014-2001			
	01 00 00	6 230	1
900-40014-2491			
	01 00 00	6 235	1
900-40014-9091			
	01 00 00	6 240	2
906-10246-2			
	01 00 00	1 1A	RF
906-10247-2			
	01 00 00	1 5	1
906-10248-5			
	01 00 00	1 20	1
	01 00 00	2 1A	RF
906-10248-6			
	01 00 00	2 70	1
906-10249-2			
	01 00 00	1 40	1
906-10249-3			
	01 00 00	2 215	1
906-10249-4			
	01 00 00	1 50	1
906-10249-5			
	01 00 00	2 200	1
906-10250-2			
	01 00 00	2 110	1
	01 00 00	6 1A	RF
906-10251-5			
	01 00 00	6 570	1

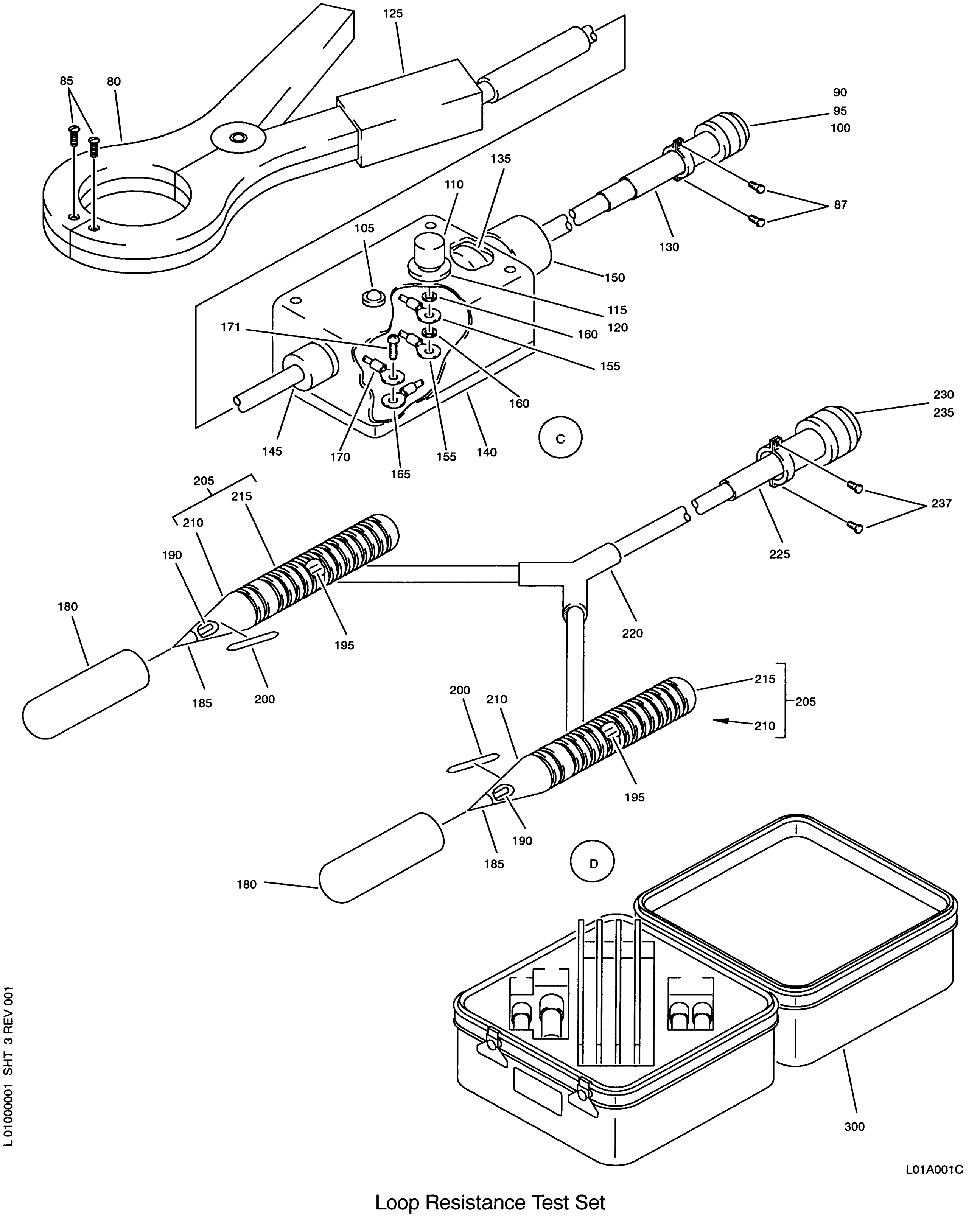
PART NUMBER	CH-SECT	FIG	ITEM	QTY
906-10252-2				
	01 00 00	6	505	1
906-10254-1				
	01 00 00	6	425	1
906-10256-2				
	01 00 00	6	410	1
906-10260-5				
	01 00 00	1	70	1
906-10260-6				
	01 00 00	1	75	1
906-10260-7				
	01 00 00	1	80	1
906-10260-8				
	01 00 00	1	140	1
906-10261-3				
	01 00 00	1	175	1
906-10261-4				
	01 00 00	1	205	2
906-10261-5				
	01 00 00	1	201	2
906-10261-6				
	01 00 00	1	185	2
906-10261-6				
	01 00 00	3	10	5
906-10261-7				
	01 00 00	1	215	2
906-10262-4				
	01 00 00	3	25	1
906-10264-1				
	01 00 00	5	90	1
906-10265-1				
	01 00 00	5	155	1
906-10271-2				
	01 00 00	3	50	1
906-10271-3				
	01 00 00	1	270	1
	01 00 00	3	1A	RF
906-10272-2				
	01 00 00	4	130	1
906-10272-3				
	01 00 00	4	135	1
906-10272-4				
	01 00 00	1	275	RF
	01 00 00	4	1A	RF
906-10273-1				
	01 00 00	4	25	1
906-10273-3				
	01 00 00	4	35	1
906-10273-4				
	01 00 00	4	40	1
906-10273-5				
	01 00 00	4	110	1
906-10273-6				
	01 00 00	4	30	1
906-10274-1				
	01 00 00	4	60	1
906-10274-10				
	01 00 00	4	105	1
906-10274-11				
	01 00 00	4	50	1
906-10274-13				
	01 00 00	4	100	3
906-10274-3				
	01 00 00	4	65	1
906-10274-4				
	01 00 00	4	70	1
906-10274-5				
	01 00 00	4	95	3
906-10274-6				
	01 00 00	4	80	AR
906-10274-8				
	01 00 00	4	85	AR
906-10274-9				
	01 00 00	4	90	AR
906-10278-1				
	01 00 00	1	250	1
906-50037-006				
	01 00 00	5	125	2
	01 00 00	6	5	12
906-50037-013				
	01 00 00	6	10	7
906-50037-1030				
	01 00 00	6	25	1
906-50037-1052				
	01 00 00	5	145	1
	01 00 00	6	15	1
906-50037-114				
	01 00 00	6	20	3
906-50037-127				
	01 00 00	6	30	1
906-50037-202				
	01 00 00	6	35	4
906-50037-204				
	01 00 00	6	40	1
906-50037-209				
	01 00 00	6	45	2
906-50037-218				
	01 00 00	6	50	5
91255A				
	01 00 00	5	80	4
91255B				
	01 00 00	5	45	4
9779-513-10				
	01 00 00	1	130	1
	01 00 00	1	225	1
9779-513-6				
	01 00 00	3	45	1



Loop Resistance Test Set
Figure 1 (Sheet 1)



Loop Resistance Test Set
Figure 1 (Sheet 2)



Loop Resistance Test Set
Figure 1 (Sheet 3)

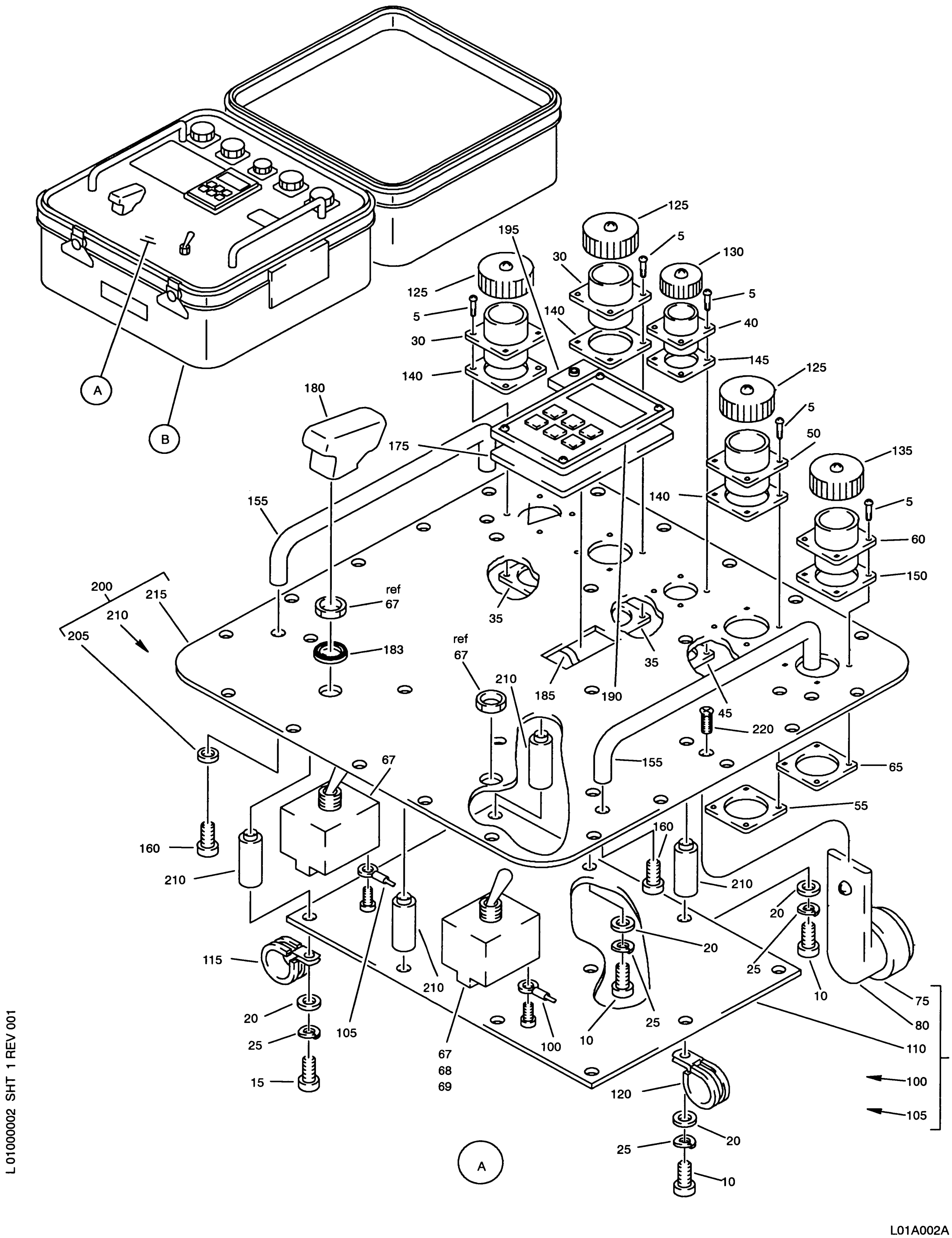
FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
1-					
			LOOP RESISTANCE TEST SET		
-1A	906-10246-2		TEST SET-LOOP RESISTANCE	A	RF
-1B	906-10246-3		TEST SET-LOOP RESISTANCE	B	RF
5	906-10247-2		.TEST ASSY-	A	1
5A	906-10247-3		.TEST ASSY-	B	1
10	MS51957-32		..SCREW-	A	20
10A	MS51957-33		..SCREW-	B	20
15	NAS1149CN632R		..WASHER-		20
17	5608-54		..WASHER-SHOULDER (V86928) (OPT ITEM 17A)	B	20
17A	5608-70		..WASHER-SHOULDER (V86928) (OPT ITEM 17)	B	20
20	906-10248-5		..PANEL ASSY-ELECTRICAL DISPLAY (FOR DETAILS SEE FIG. 2)	A	1
20A	906-10248-7		..PANEL ASSY-ELECTRICAL DISPLAY (FOR DETAILS SEE FIG. 2)	B	1
23	906-10704-1		GASKET-SPACER	B	1
25	NAS601-8P		..SCREW- (OPT ITEM 25A)		4
25A	BACS12CK06U8		..SCREW- (OPT ITEM 25)		4
30	MS35338-41		..WASHER- (OPT ITEM 30A)		4
30	BACW10EC06C		..WASHER- (OPT ITEM 30)		4
35	AS700-02		..BATTERY PACK- (V04FZ8) (FOR DETAILS SEE FIG. 5)		1
40	906-10249-2		..PANEL ASSY-		1
45	S632-3Z1		...NUT-PRESS (V46384)		4
50	906-10249-4		...PANEL-		1
55	NAS514P632 -10P		..SCREW-	A	4
55A	NAS514P632 -8P		..SCREW-	B	4
60	MS21042L06		..NUT- (OPT ITEM 60A)	A	4
60A	BACN10YR06CM		..NUT- (OPT ITEM 60)	B	4

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
65	ZB1001M1		..BUMPER- (V76385)	A	4
65A	BN51620SP242		..BUMPER- (16177)	B	4
70	906-10260-5		..CABLE ASSY-SENSE (STOW WITHIN COVER ...COMPARTMENT)		1
75	906-10260-6		..CABLE ASSY-DRIVE COUPLER ...(STOW WITHIN COVER/ ...COMPARTMENT)		1
80	906-10260-7		...PROBE ASSY		1
-85B	2C100MPFS		....SCREW- (V0HYG7)		2
-87	MS51957-17		....SCREW-		2
90	BACC63CB14 -15P6		...CONNECTOR-		1
95	400AS002T14 05L3		...BACKSHELL- (V06324)		1
100	NAS43DD0-6		...SPACER		2
105	606-1415-110		...LIGHT- LED, RED/GREEN (V83330)		1
110	110SPM0FF		...SWITCH- (V73559)		1
115	U108		...WASHER- (V73559)		1
120	895101264		...NUT- (V09353)		1
125	101A073-3		...BOOT- (V06090)		1
130	9779-513-10		...BOOT- (V74868)		1
135	NAS43D014-5FC		...SPACER		1
140	906-10260-8		...BOX-CONTROL		1
145	3213		...FITTING (V28520)		1
150	3219		...FITTING (V28520)		1
155	BACT12AC45		...LUG-TERM.		1
160	NAS620-6		...WASHER		2
165	BACT12AC56		...LUG-TERM.		1
170	BACT12AC53		...LUG-TERM.		1
175	906-10261-3		..CABLE ASSY-JOINT PROBE (STOW WITHIN COVER/ COMPARTMENT)		1
180	693019		...CAP-PROTECTIVE (V62081)		2

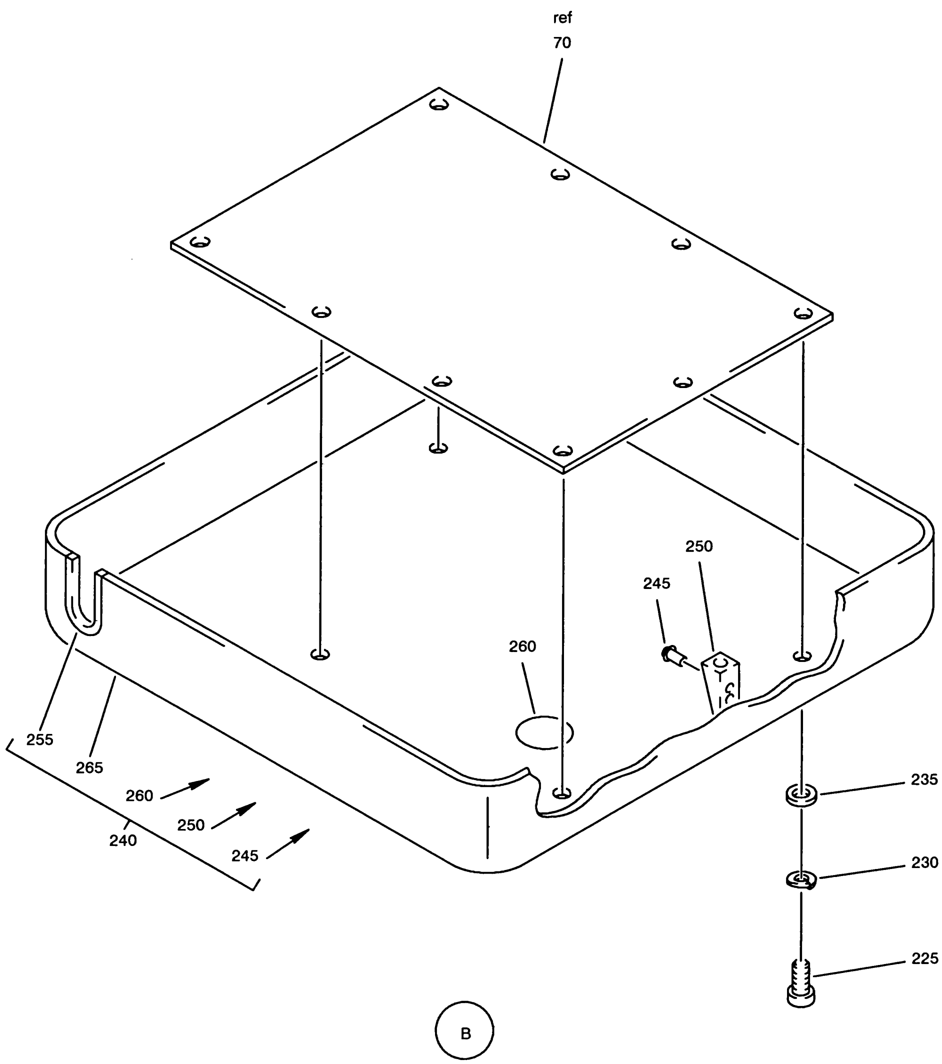
FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
185	906-10261-6		...PIN-CONTACT (OPT ITEMS 185A, 185B, 185C)		2
185A	S5B48DS		...PIN-CONTACT (V0A828) (OPT ITEMS 185, 185B, 185C)		2
185B	S5B48DS1-7200AL		...PIN-CONTACT (V0A828) (OPT ITEMS 185, 185A, 185C)		2
185C	BCREF49987		...PIN-CONTACT (V0A828) (S5B48DS1-7200AL) (OPT ITEMS 185, 185A, 185B)		2
190	R5SC		...RECEPTACLE- (V0A828)		2
195	606-1415-110		...LIGHT- LED, RED/GREEN (V83330)		2
200	NSPW500BS		...LIGHT- LED, WHITE (V83330)		2
205	906-10261-4		...PROBE-PLASTIC		2
210	906-10261-5		....PROBE FRONT		2
215	906-10261-7		....HANDLE-PROBE		2
220	381A301-51 -164		...BOOT- (V06090) (OPT ITEM 220A)		1
-220A	381A301-71-42		...BOOT- (V06090) (OPT ITEM 220)		1
225	9779-513-10		...BOOT- (V74868)		1
230	BACC63CB16 -10PN		...CONNECTOR-		1
235	400AS002T16 05L3		...BACKSHELL- (V06324)		1
237	MS51957-17		...SCREW (OPT ITEM 237A)		2
237A	BACS12CK04U8		...SCREW (OPT ITEM 237)		2
240	103-633		..CASE- (V71532) (REPL BY ITEM 240A)		1
240A	103633		..CASE- (V71532) (REPLS ITEM 240)	A	1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
240B	103633M		..CASE- (V71532) (OPT ITEM 240C)	B	1
240C	906-10247-5		..CASE- (OPT ITEM 240B)	B	1
243	MS20470A2-6		..RIVET- (OPT ITEM 243A)		2
243A	BACR15BA2A6C		..RIVET- (OPT ITEM 243)		2
245	BAC27WEX1826		..LABEL-		1
250	906-10278-1		..LABEL-UL913-88 (REPL BY ITEM 250A)		1
250A	906-10278-2		..LABEL-UL913-88 (REPLS ITEM 250) (OPT ITEM 250B		1
250B	906-10278-3		..LABEL-UL913-88 (REPLS ITEM 250) (OPT ITEM 250A		1
255	BACC27EEL19346		. .LABEL-ESDS (REPL BY ITEM 255A)		1
255A	BAC27EEL19436		..LABEL-ESDS (REPLS ITEM 255)		1
260	BAC27WEX1768		..LABEL (REPL BY ITEM 260A)		1
260A	BAC27WEX2035		..LABEL (REPLS ITEM 260)		1
265	BAC27WEX1986		..MARKER-ALUMINUM FOIL		2
270	CE2001		..LABEL (V1R2W7)		1
275	BAC27WEX1998		..LABEL		1
280	BAC27WEX1999		..LABEL		1
285	906-10249-9		..SHIELD ASSY- (STOW WITHIN COVER/ COMPARTMENT)		1
290	S5-12EXT		..PROBE-EXTENSION (VL1002) (OPT ITEM 290A, 290B) (STOW WITHIN COVER/ COMPARTMENT)	A	1
290A	CA02		..PROBE-EXTENSION (V04FZ8) (OPT ITEM 290, 290B) (STOW WITHIN COVER/ COMPARTMENT)	A	1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
290B	906-102672-1		..PROBE-EXTENSION (VL1002) (OPT ITEM 290, 290A) (STOW WITHIN COVER/ COMPARTMENT)	A	1
290C	CA02		..PROBE-EXTENSION (V04FZ8) (OPT ITEM 290D) (STOW WITHIN COVER/ COMPARTMENT)	B	1
290D	906-102672-1		..PROBE-EXTENSION (OPT ITEM 290C) (STOW WITHIN COVER/ COMPARTMENT)	B	1
295	906-10271-3		.ACCESSORY ASSY- (FOR DETEILS SEE FIG. 4)		1
300	906-10272-4		CALIBRATION UNIT- (OPTIONAL EQUIPMENT) (REPLD BY ITEM 300A) FOR DETAILS SEE FIG. 4)		RF
300A	906-10272-5		CALIBRATION UNIT- (OPTIONAL EQUIPMENT) (REPLS ITEM 300) FOR DETAILS SEE FIG. 4)		RF
305	906-10281-1		CABLE ASSY-JUMPER (OPTIONAL EQUIPMENT) (FRO DETAILS SEE FIG.10)		RF



Electrical Display Panel
Figure 2 (Sheet 1)



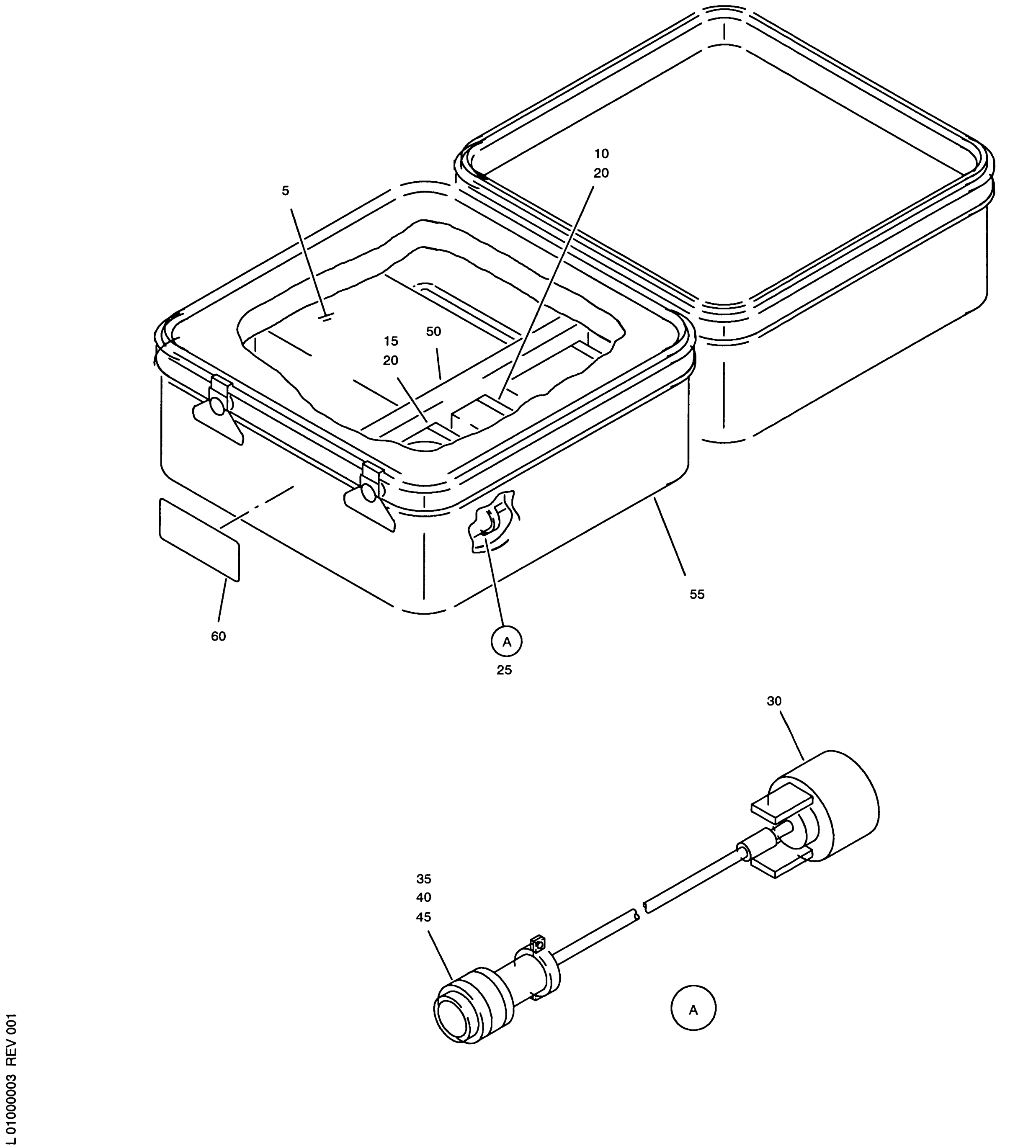
Electrical Display Panel
Figure 1 Sheet 2

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
2-					
			ELECTRICAL DISPLAY PANEL		
-1A	906-10248-5		PANEL ASSY-ELECTRICAL DISPLAY (FOR NHA SEE FIG. 1)	A	RF
-1B	906-10248-7		PANEL ASSY-ELECTRICAL DISPLAY (FOR NHA SEE FIG. 1)	B	RF
5	NAS600-7P		.SCREW-		20
10	MS51957-28		.SCREW-		9
15	MS51957-31		.SCREW-		1
20	NAS1149CN632R		.WASHER-		10
25	MS35338-136		.WASHER-		10
30	BACC63CC14 -15S6		.CONNECTOR- (J1, J2)		2
35	BACR10AC14		.RETAINER-		2
40	BACC63CC10 -5SN		.CONNECTOR- (J3)		1
45	BACR10AC10		.RETAINER-		1
50	BACC63CC14 -12SN		.CONNECTOR- (J4)		1
55	BACR10AC14		.RETAINER-		1
60	BACC63CC16 -10SN		.CONNECTOR- (J5)		1
65	BACR10AC16		.RETAINER-		1
67	MS24525-23		.SWITCH- (S1, S2)		2
68	1100RBK		.BOOT- (V61398)		1
69	VC156-8		.CAP- LUG (V3M7L3)		1
70	906-10248-6		.HARNESS ASSY-	A	1
70A	906-10248-6		.HARNESS ASSY-	B	1
75	BACC63CB14 -12PN		..CONNECTOR- (P3)		1
80	BACC10KE14		..BACKSHELL-		1
100	BACT12AC6		..LUG- TERM		8
105	BACT12AC2		..LUG- TERM		6
110	906-10250-2		..PRINTED WIRING ASSY- (OPT ITEM 110A) (FOR DETAILS SEE FIG.6)	A	1
110A	906-10250-3		..PRINTED WIRING ASSY- (OPT ITEM 110) (FOR DETAILS SEE FIG.6)	A	1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
110B	906-10250-4		..PRINTED WIRING ASSY- (OPT ITEM 110C) (FOR DETAILS SEE FIG.12)	B	1
110C	906-10250-5		..PRINTED WIRING ASSY- (OPT ITEM 110B) (FOR DETAILS SEE FIG.6)	B	1
115	BACC10DK6		.CLAMP-		1
120	BACC10DK4		.CLAMP-		1
125	MS27295-3		.CAP-		3
130	MS27295-1		.CAP-		1
135	MS27295-4		.CAP-		1
140	10-10149-14		.GASKET- (V55304) (REPLD BY ITEM 140A)		3
140A	10-101949-14		.GASKET- (V55304) (REPLS BY ITEM 140)		3
145	10-101949-10		.GASKET- (V55304) (REPLD BY ITEM 145A)		1
145A	10-101949-10		.GASKET- (V55304) (REPLS BY ITEM 145)		1
150	10-101949-16		.GASKET- (V55304) (REPLD BY ITEM 150A)		1
150A	10-101949-16		.GASKET- (V55304) (REPLS BY ITEM 150)		1
155	10308A0832-2F		.HANDLE- (V1YGB8) (OPT ITEM 155A)		2
155A	10308A0832-2F		.HANDLE- (V1YGB8) (OPT ITEM 155)		2
160	NAS602-6P		.SCREW- (REPL BY ITEM 160A)		4
-160A	MS24693C48		.SCREW (REPLS ITEM 160)		4
165			.DELETED		
170			.DELETED		
175	285T0765-18		.GASKET-		1
180	MS252224-1		.GUARD- (REPL BY ITEM 180A)		1
-180A	MS25224-1		.GUARD		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
			(REPLS ITEM 180)		
183	M5423-16-001		.WASHER-SEALING	B	1
185	182-18174-4		.CABLE, ASSY-BITE		1
190	69-73010-2		.MODULE, ASSY-BITE (FOR DETAILS SEE FIG. 11)		1
195	606-1415-110		.LIGHT-LED (V83330)		1
200	906-10249-5		.PANEL ASSY-	A	1
200A	906-10249-10		.PANEL ASSY- (OPT ITEM 200B)	B	1
200B	906-10249-12		.PANEL ASSY- (OPT ITEM 200A)	B	1
205	MS21209C0410L		..INSERT-		4
210	CS0S632-12		..STANDOFF-PRESS (V46384)		10
215	906-10249-3		..PANEL- (REPL BY ITEM 215A)		1
-215A	906-10249-6		..PANEL (REPLS ITEM 215)	A	1
-215B	906-10249-11		..PANEL (USED ON ITEM 200A)	B	1
-215C	906-10249-13		..PANEL (USED ON ITEM 200B)	B	1
220	MS24693C26		.SCREW		1
225	SS7309-632-12		.SCREW (V0GCW4)		4
230	MS35338-136		.WASHER		4
235	NAS1149CN632R		.WASHER		4
240	906-10249-7		.COVER ASSY		1
245	BACR15BB3B		..RIVET		2
250	BACN10KJ06		..NUTPLATE		1
255	BACG20ZB000 300		..GROMMET		1
260	Z391		..PLUG (V76335)		1
265	Z160-166-112		..ENCLOSURE (V98376)		1

EQUIPMENT DESIGNATOR	FIG ITEM
J1	2 -30
J2	2 -30
J3	2 -40
J4	2 -50
J5	2 -60
P3	2 -75
S1	2 -67
S2	2 -67

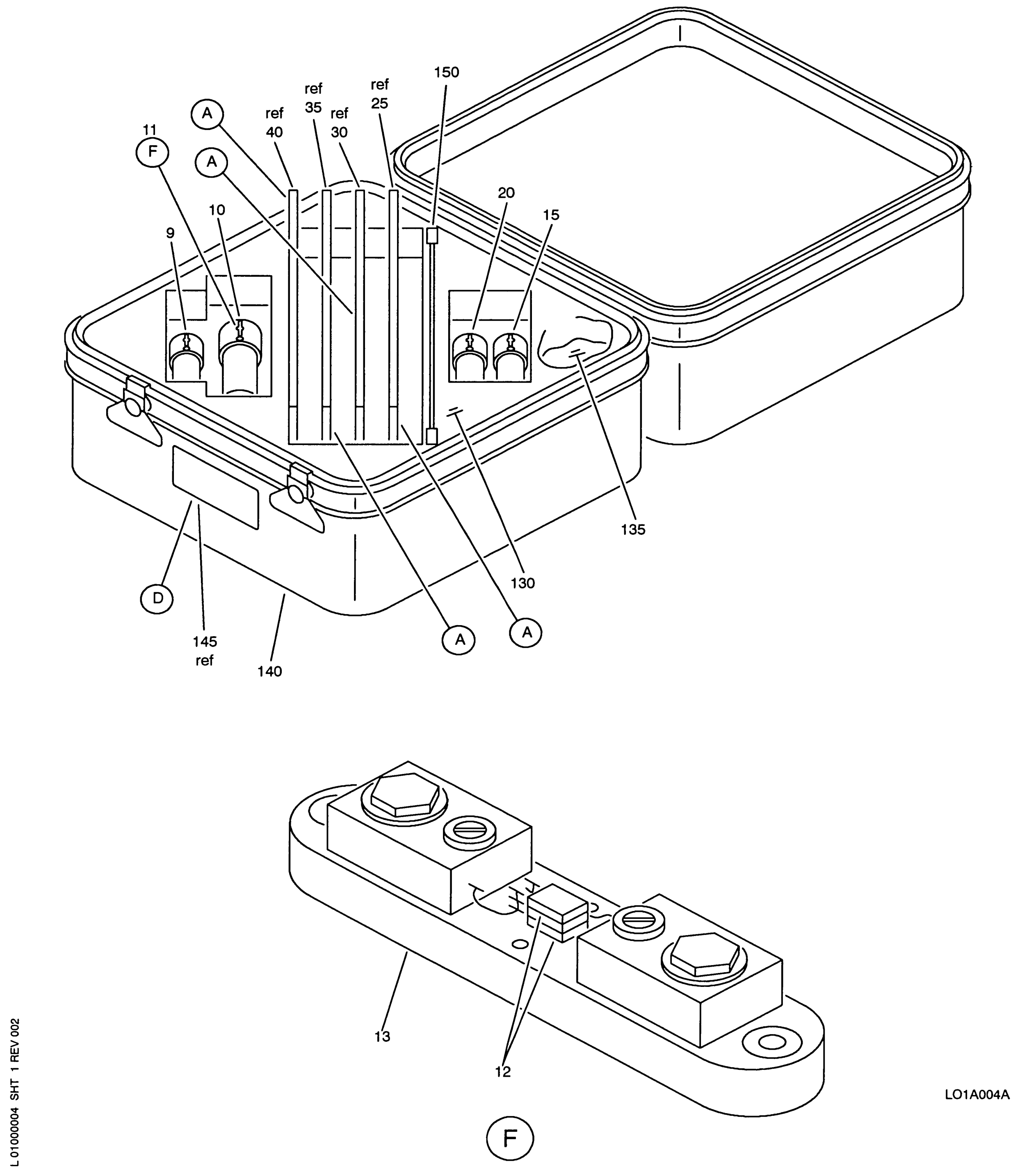


Accessory Assembly
Figure 3

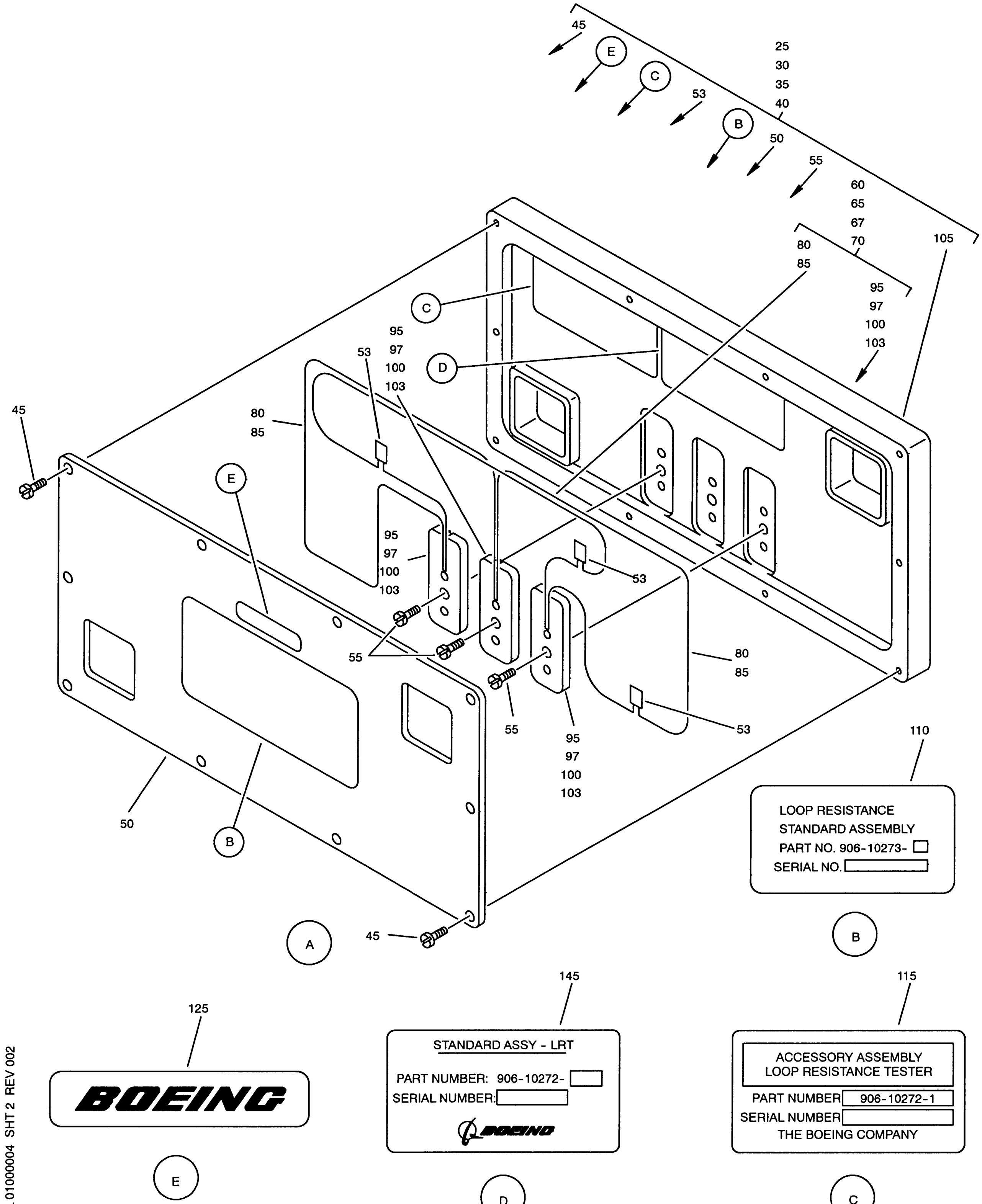
FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
3-			LOOP RESISTANCE TESTER ACCESSORY ASSEMBLY		
-1A	906-10271-3		ACCESSORY ASSY-LOOP RESISTANCE TESTER (FOR NHA SEE FIG. 1)		RF
5	103486-01		.CHARGER ASSY-BATTERY (V56878) (OPT ITEM 5A) (FOR DETAILS SEE FIG. 7)		1
-5A	CS800-1		.CHARGER ASSY-BATTERY (V04FZ8) (OPT ITEM 5)		1
10	906-10261-6		.PIN-CONTACT (OPT ITEMS 10A, 10B)		5
10A	S5B48DS1-7200AL		.PIN-CONTACT (V0A828) (OPT ITEMS 10, 10B)		5
10B	BCREF49987		.PIN-CONTACT (V0A828) (S5BA48DSTL1-7200AL) (OPT ITEMS 10, 10A)		5
15	3AG		.FUSE-2A 250V BATT CHGR (V75915) (OPT ITEM 15A)		5
15A	312002		.FUSE-3AG 2A 250V BATT CHGR (V75915) (OPT ITEM 15)		5
20	SBE4R34		.BAG-(3 X 4 IN.) (V02768)		2
25	906-10262-4		.CABLE ASSY-RS232		1
30	45-0308		..CABLE ASSY- (V71468)		1
35	BACC63CB10-5PN		..CONNECTOR- (P3)		1
40	BACC10HF10A		..BACKSHELL (OPT ITEM 40A)		1
40A	BACC10KD10		..BACKSHELL (OPT ITEM 40)		1
45	9779-513-6		..BUSHING- (V71468)		1
50	906-10271-2		.FOAM		1
55	102-189-1		.CASE- (V71532) (REPL BY ITEM 55A)		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
-55A	102189-1		.CASE- (V71468) (REPLS ITEM 55)		1
60	BAC27WEX1825		.LABEL		1

EQUIPMENT DESIGNATOR	FIG ITEM
P3	3 -35



Calibration Unit-LRT
Figure 4 (Sheet 1)



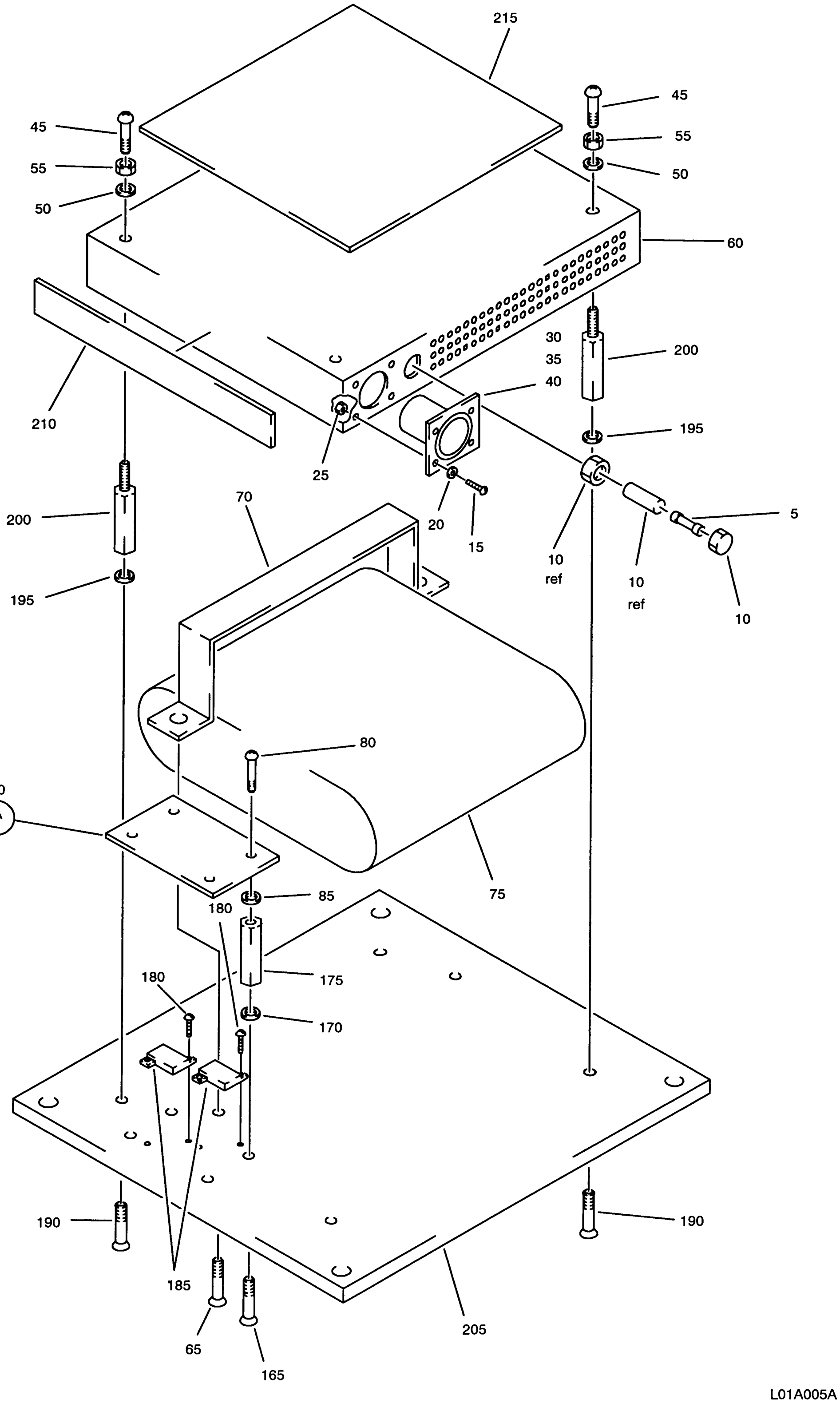
Calibration Unit-LRT
Figure 4 (Sheet 2)

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
4-					
			LOOP RESISTANCE TESTER		
-1A	906-10272-4		CALIBRATION UNIT-LRT (OPTINAL EQUIPMENT) (REPL BY ITEM 1B) (FOR NHA SEE FIG. 1)		RF
-1B	906-10272-5		CALIBRATION UNIT-LRT (OPTIONAL EQUIPMENT) (REPLS BY ITEM 1B) (FOR NHA SEE FIG. 1)		RF
9	HA1-50		.SHUNT-CURRENT 50M OHM (V03030)		1
10	HA2-50		.SHUNT-CURRENT (V03030)		1
11	906-10273-9		.SHUNT ASSY-3.6 OHM		1
12	MP808-1-2-1		..RESISTOR- (V19647)		3
13	HA1-50		..SHUNT-CURRENT (V03030)		1
15	HA10-50		.SHUNT-CURRENT 5M OHM (V03030)		1
20	HA100-50		.SHUNT-CURRENT 0.5M OHM (V03030)		1
25	906-10273-1		.STANDARD ASSY- (REPL BY ITEM 25A)		1
-25A	906-10273-2		.STANDARD ASSY- (REPLS ITEM 25)		1
30	906-10273-6		.STANDARD ASSY-		1
35	906-10273-3		.STANDARD ASSY- (REPL BY ITEM 35A)		1
-35A	906-10273-7		.STANDARD ASSY- (REPLS ITEM 35)		1
40	906-10273-4		.STANDARD ASSY- (REPL BY ITEM 40A)		1
-40A	906-10273-8		.STANDARD ASSY- (REPLS ITEM 40)		1
45	NAS13152C06-8		..SCREW-		10
50	906-10274-11		..COVER-ACETAL COLOR BLACK DELRIN (.25 X 6 X 12 IN.) (.635 X 15.24 X 30.48 CM)		1
53	MP808-121		..RESISTOR- (V59105) (R1-R3) (USED ON ITEM 30)		3
55	NAS13152C06-8		..SCREW-		3

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
60	906-10274-1		..RESISTANCE ASSY- (REPL BY ITEM 60A)		1
-60A	906-10274-2		..RESISTANCE ASSY- (USED ON ITEM 25A) (REPLS ITEM 60)		1
65	906-10274-3		..RESISTANCE ASSY- (USED ON ITEM 30)		1
67	906-10274-16		..RESISTANCE ASSY- (USED ON ITEM 35A)		1
70	906-10274-4		..RESISTANCE ASSY- (REPL BY ITEM 70A)		1
-70A	906-10274-17		..RESISTANCE ASSY- (USED ON ITEM 40A) (REPLS ITEM 70)		1
80	906-10274-6		...WIRE-MAGNET (14 IN.) (35.56 CM) (REPL BY ITEM 80A)		AR
-80A	906-10274-7		...WIRE-MAGNET (15 IN.) (38.10 CM) (USED ON ITEM 60A) (REPLS ITEM 80)		AR
85	906-10274-8		...WIRE-MAGNET (17 IN.) (43.18 CM) (USED ON ITEM 65)		AR
95	906-10274-5		...TAB-OFHC COPPER BAR (.25 X 1 X 2.5 IN.) (.635 X 2.54 X 6.35 CM) (USED ON ITEM 60A)		3
97	906-10274-12		...TAB-OFHC COPPER BAR (.25 X 1 X 2.5 IN.) (.635 X 2.54 X 6.35 CM) (USED ON ITEM 60A)		3
100	906-10274-13		...TAB-OFHC COPPER BAR (.25 X 1 X 2.5 IN.) (.635 X 2.54 X 6.35 CM) (USED ON ITEM 60A)		3
-100 A	906-10274-15		...TAB-OFHC COPPER BAR (.25 X 1 X 2.5 IN.) (.635 X 2.54 X 6.35 CM) (USED ON ITEM 67)		3

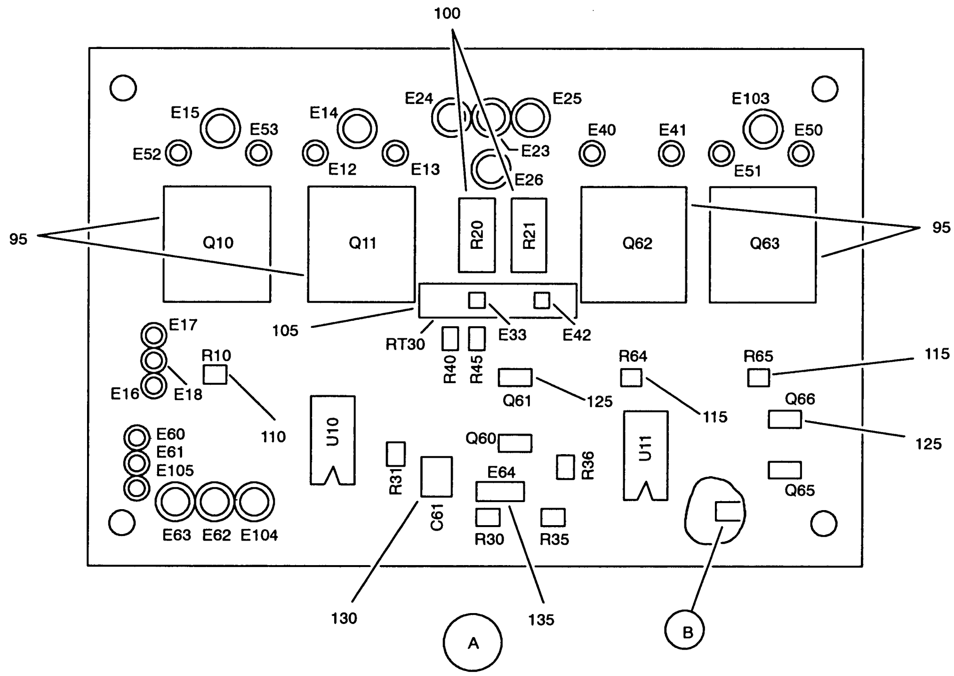
FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
103	906-10274-18		...TAB-OFHC COPPER BAR (.25 X 1 X 2.5 IN.) (.635 X 2.54 X 6.35 CM) (USED ON ITEM 70A)		3
105	906-10274-10		..BOX-ACETAL COLOR BLACK (.75 X 6 X 12 IN.) (1.905 X 15.24 X 30.48 CM) (USED ON ITEM 25A)		1
-105 A	906-10274-14		..BOX-ACETAL COLOR BLACK (.75 X 6 X 12 IN.) (1.905 X 15.24 X 30.48 CM) (USED ON ITEM 35A)		1
110	906-10273-5		..PLATE-IDENT (.06 X 2.5 X 5 IN.) (.152 X 6.35 X 12.7 CM)		1
115	BAC27TEX14		..LABEL- (USED ON ITEM 25A)		1
125	X29498		..LABEL-LOGO (BOEING FORM CATALOG) (V81205)		1
130	906-10272-2		.FOAM-		1
135	906-10272-3		.FOAM-		1
140	1021891		.CASE- (V71532) (REPL BY ITEM 140A)		1
-140 A	102189-1		.CASE- (V71532) (REPLS ITEM 140)		1
145	BACWEX1824		.LABEL (REPL BY ITEM 145A)		1
-145 A	BAC27WEX1824		.LABEL (REPLS ITEM 145)		1
150	BACJ40D30-52		.JUMPER ASSY		3

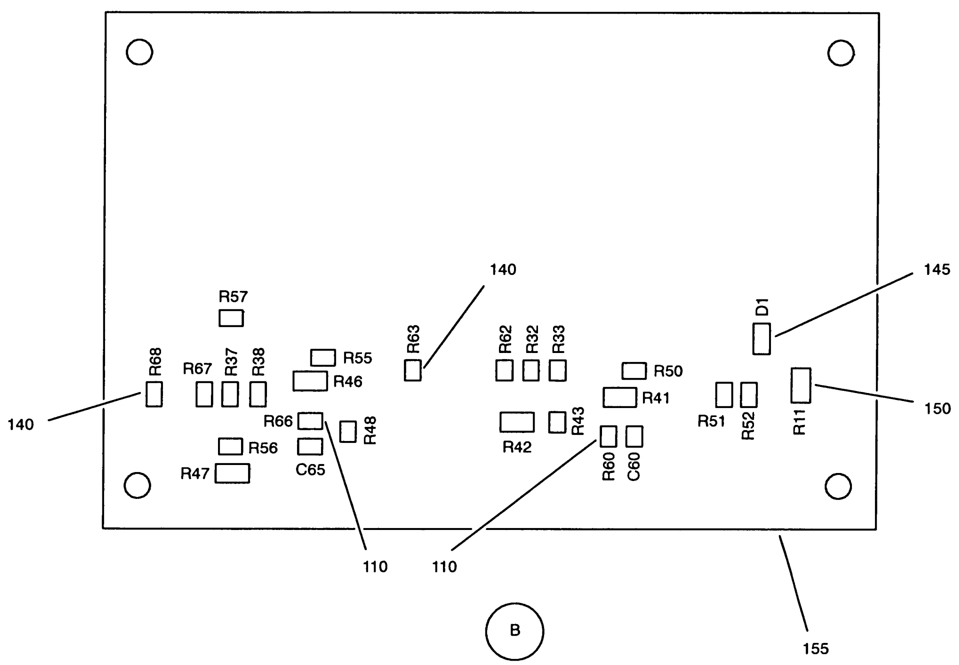
EQUIPMENT DESIGNATOR	FIG ITEM
R1	4 -53
R2	4 -53
R3	4 -53



L 01000005 SHT 1 REV 001

Internal Battery Pack
Figure 5 (Sheet 1)





L 01000005 SHT 2 REV 001

Internal Battery Pack
Figure 5 (Sheet 2)

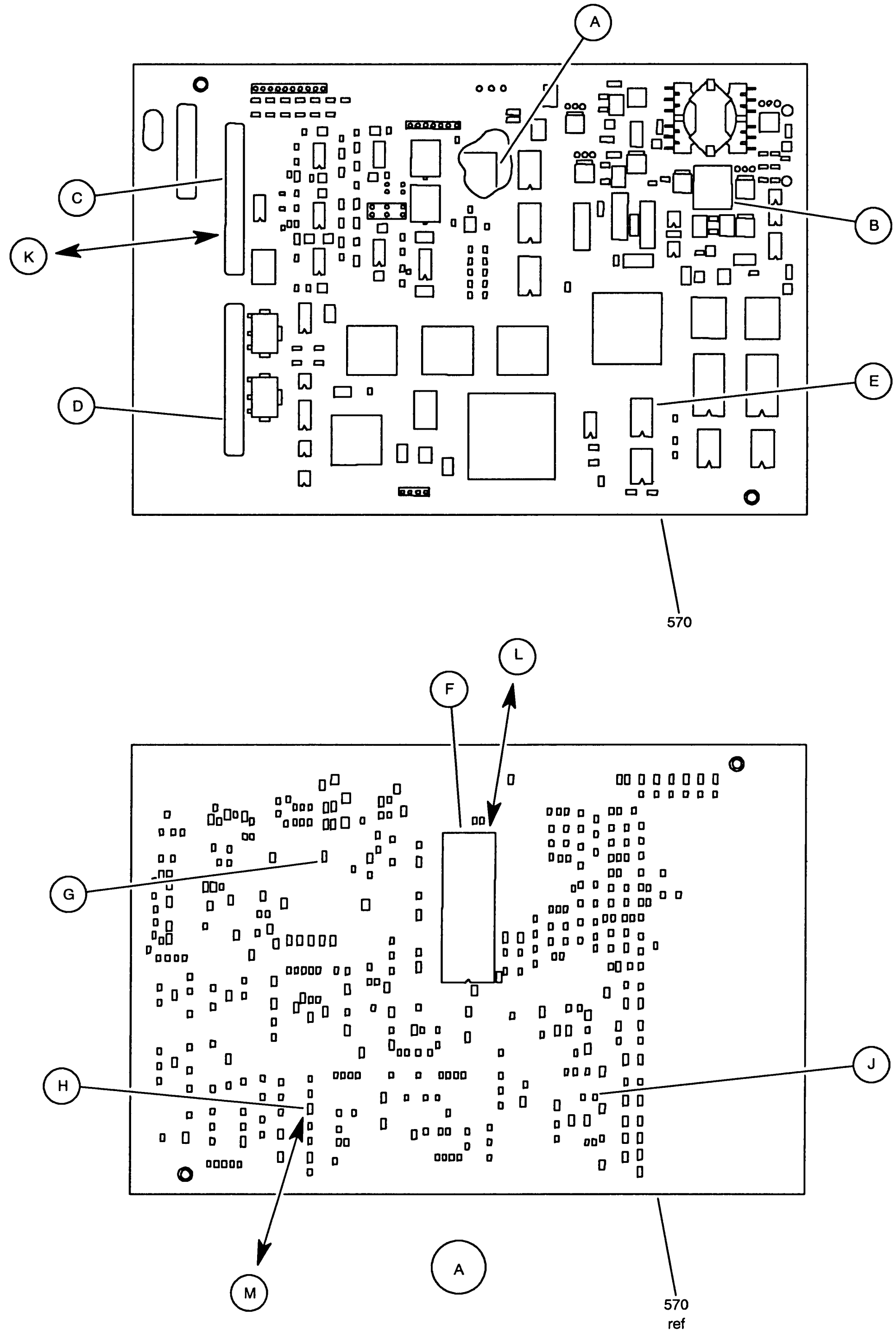
L01A005B

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
5-					
			LOOP RESISTANCE TESTER		
-1A	AS700-02		BATTERY PACK-LOOP RESISTANCE TESTER (APAK ELECTRONICS KIRKLAND, WA 98034) (V00000) (FOR NHA SEE FIG. 1)		RF
5	3AB322004		.FUSE- (V00000)		1
10	3452LF3		.HOLDER-FUSE (V00000)		1
15	MS1610		.SCREW-		4
20	MW1611		.WASHER- (V00000)		4
25	MN1612		.NUT- (V00000)		4
30	BACC63CC14 -12S		.CONNECTOR-		1
35	BACC47CP2-16		.SOCKET-		3
40	BACC47CP1-20		.SOCKET-		9
45	91255B		.SCREW-(OPTONAL) (V00000)		4
50	MW0030		.WASHER- (V00000)		4
55	MN8370		.NUT- (V00000)		4
60	AP702		.COVER- (V00000)		1
65	MS2257		.SCREW-		2
70	FS3457		.STRAP- (V00000)		1
75	AP703B		.BATTERY- (V00000)		1
80	91255A		.SCREW- (V00000)		4
85	3349		.WASHER- (V00000)		AR
90	906-10264-1		.PRINTED WIRING ASSY- TERMINATION		1
95	S906-71202 -7501		..MOSFET-P CHANNEL (OPT ITEM 095A) (Q10, Q11, Q62, Q63)		4

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
-95A	IRF4905S		..MOSFET-P CHANNEL (OPT ITEM 095) (Q10, Q11, Q62, Q63)		4
100	S906-10134 -003		..RESISTOR-1 PCT .1W 1 (R20, R21)		2
105	S906-10135 -1015		..RESISTOR-LEADED (RT30)		1
110	S906-71327 -4991		..RESISTOR-1 PCT .1W 4.99K CHIP FILM (R10, R60, R66)		3
115	S906-71327 -2002		..RESISTOR-1 PCT .1W 20K (CHIP FILM) (R64, R65)		2
120	S906-71326 -10391		..CAPACITOR-10 PCT 100V .01UF CHIP (C60, C65)		2
125	906-50037-006		..MOSFET-N CHANNEL (Q61, Q66)		2
130	BCREF10605		..CAPACITOR-10 PCT 50V .47UF CHIP (S906-10119-47468) (C61)		1
135	S906-70381-3		..FERRITE-LEADED (E64)		1
140	S906-71327 -1000		..RESISTOR-1 PCT .1W 100 (CHIP FILM) (R63, R68)		2
145	906-50037 -1052		..DIODE-ARRAY (1N4148) (D1)		1
150	900-14052 -2000		..RESISTOR-1 PCT .125W 200 CHIP FILM (R11)		1
155	906-10265-1		..PRINTED WIRING BOARD ASSY-		1
160	BAC27TEX1486		..DECAL-ESDS		1
165	MS2257		.SCREW-		4
170	AN960C10		.WASHER-		AR
175	4837		.STANDOFF- (V00000)		4
180	2-56-25		.CAP SCREW- (V00000)		4
185	L25J1R0		.RESISTOR-		2

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
			(V00000)		
190	MS3112		.SCREW-		4
195	AN960C10		.WASHER-		AR
200	4836		.STANDOFF-		4
			(V00000)		
			(OPT ITEM 200A)		
-200	4819		.STANDOFF-		4
A			(V00000)		
			(V00000)		
			(OPT ITEM 200)		
205	AP701		.BASE PLATE-		1
			(V00000)		
210	LBL1710F		.LABEL-FUSE (OPTIONAL)		1
			(V00000)		
215	LBL1710B		.LABEL-IDENT		1
			(V00000)		

EQUIPMENT DESIGNATOR	FIG ITEM
C60	5 -120
C61	5 -130
C65	5 -120
D1	5 -145
E64	5 -135
Q10	5 -95
	5 -95A
Q11	5 -95
	5 -95A
Q61	5 -125
Q62	5 -95
	5 -95A
Q63	5 -95
	5 -95A
Q66	5 -125
R10	5 -110
R11	5 -150
R20	5 -100
R21	5 -100
R60	5 -110
R63	5 -140
R64	5 -115
R65	5 -115
R66	5 -110
R68	5 -140
RT30	5 -105



L 01000006 SHT 1 REV 001

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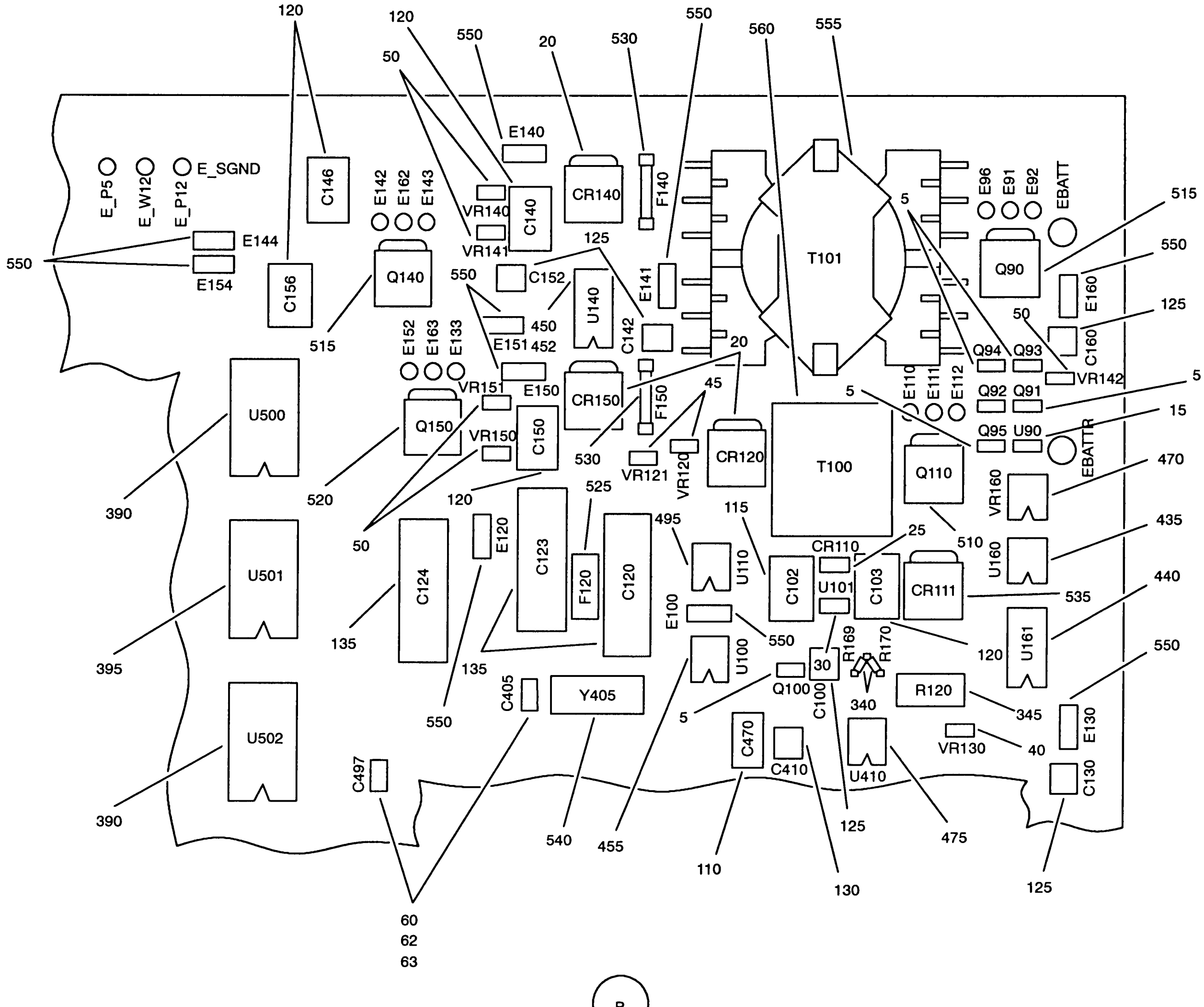
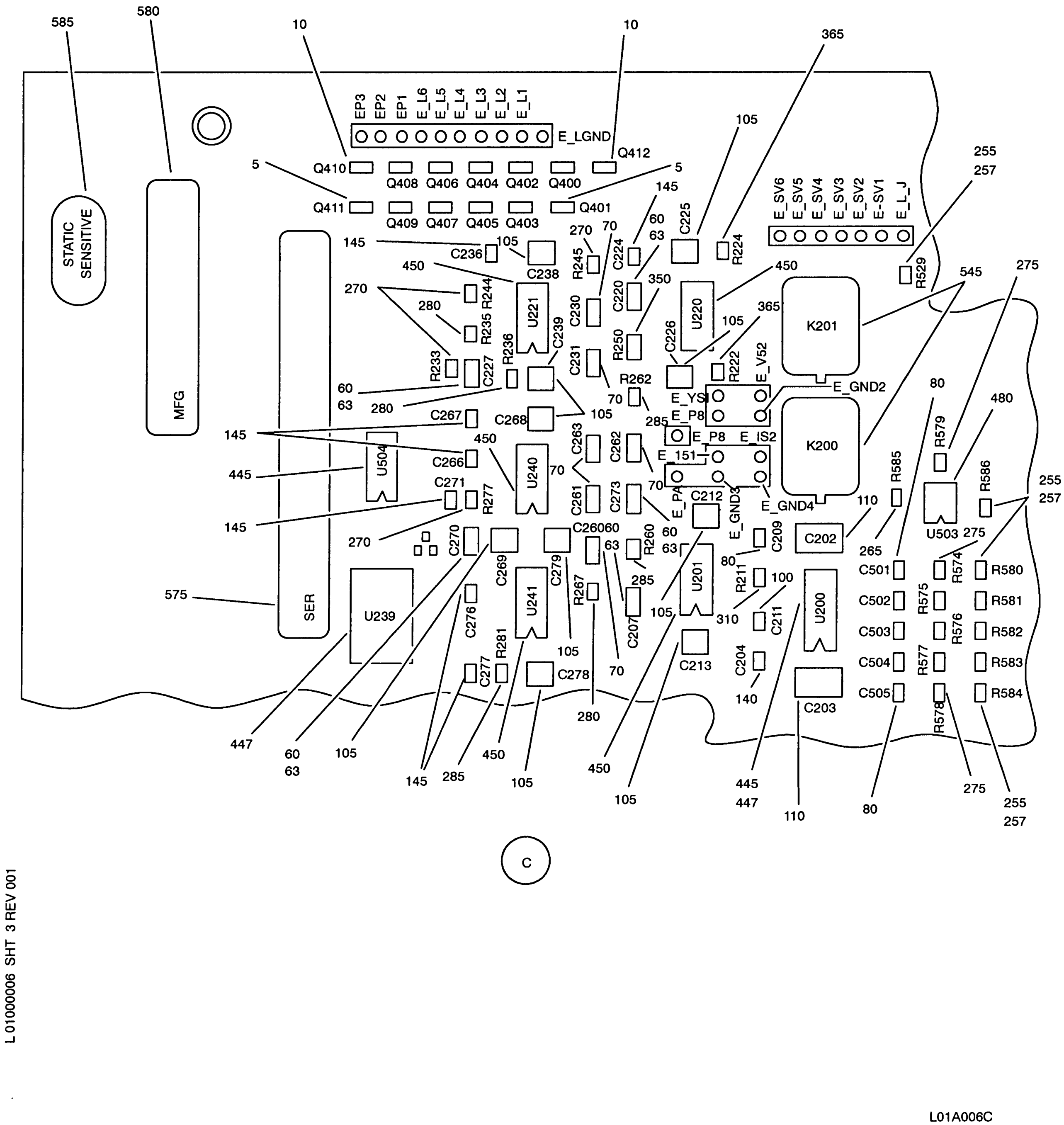
PW Assembly
Figure 6 (Sheet 1)

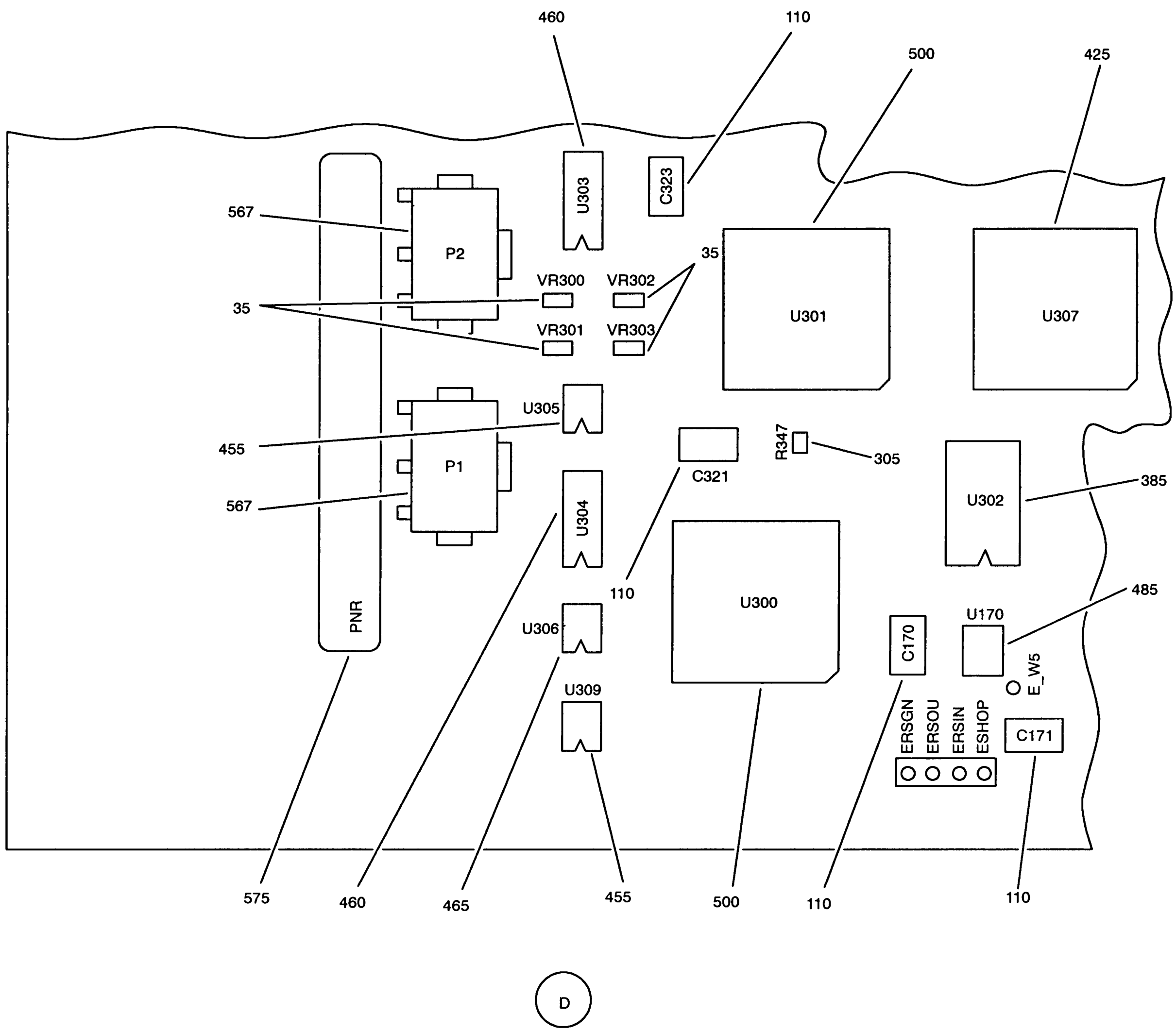


PW Assembly
Figure 6 (Sheet 2)

L 01000006 SHT 2 REV 001

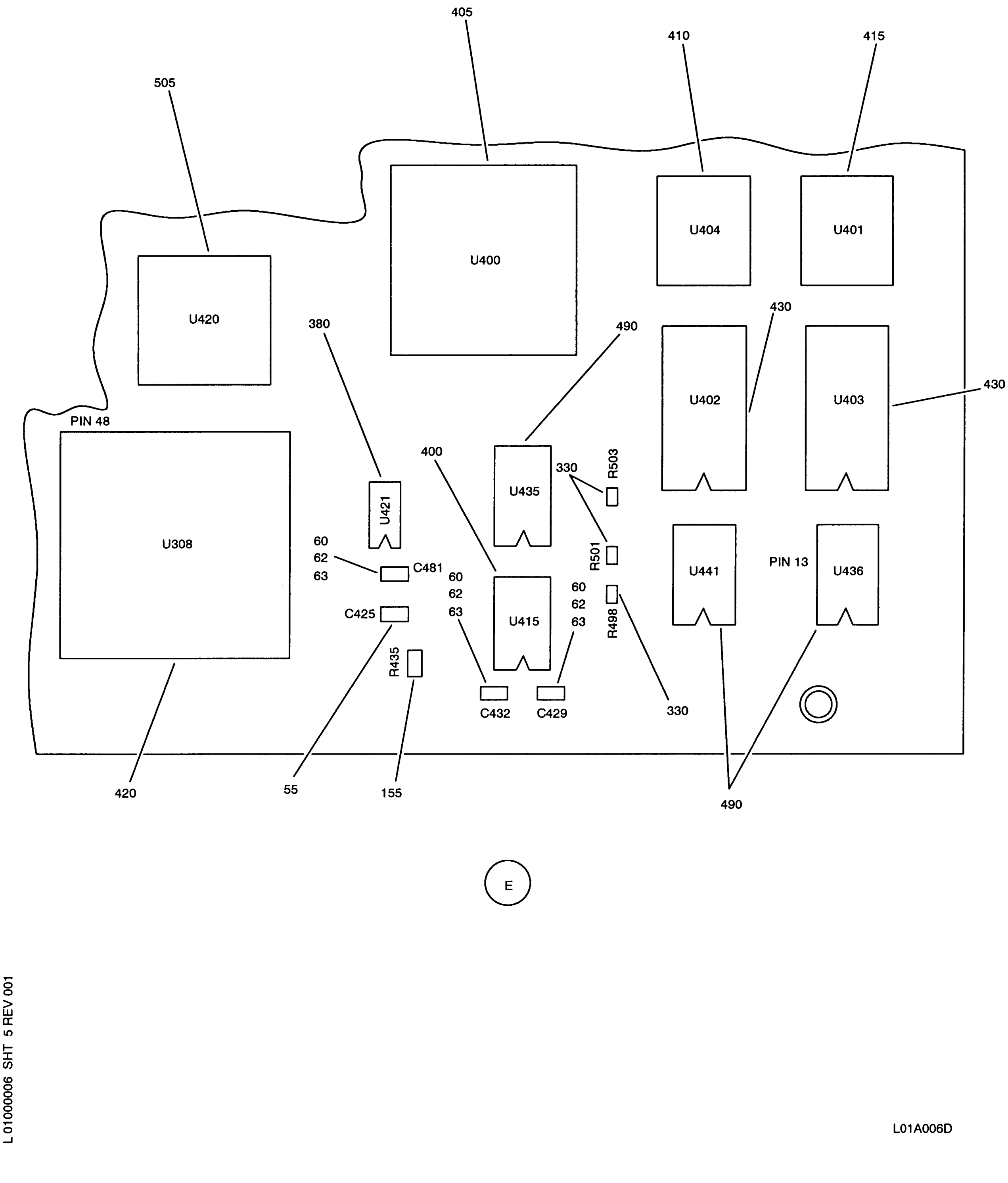


PW Assembly
Figure 6 (Sheet 3)

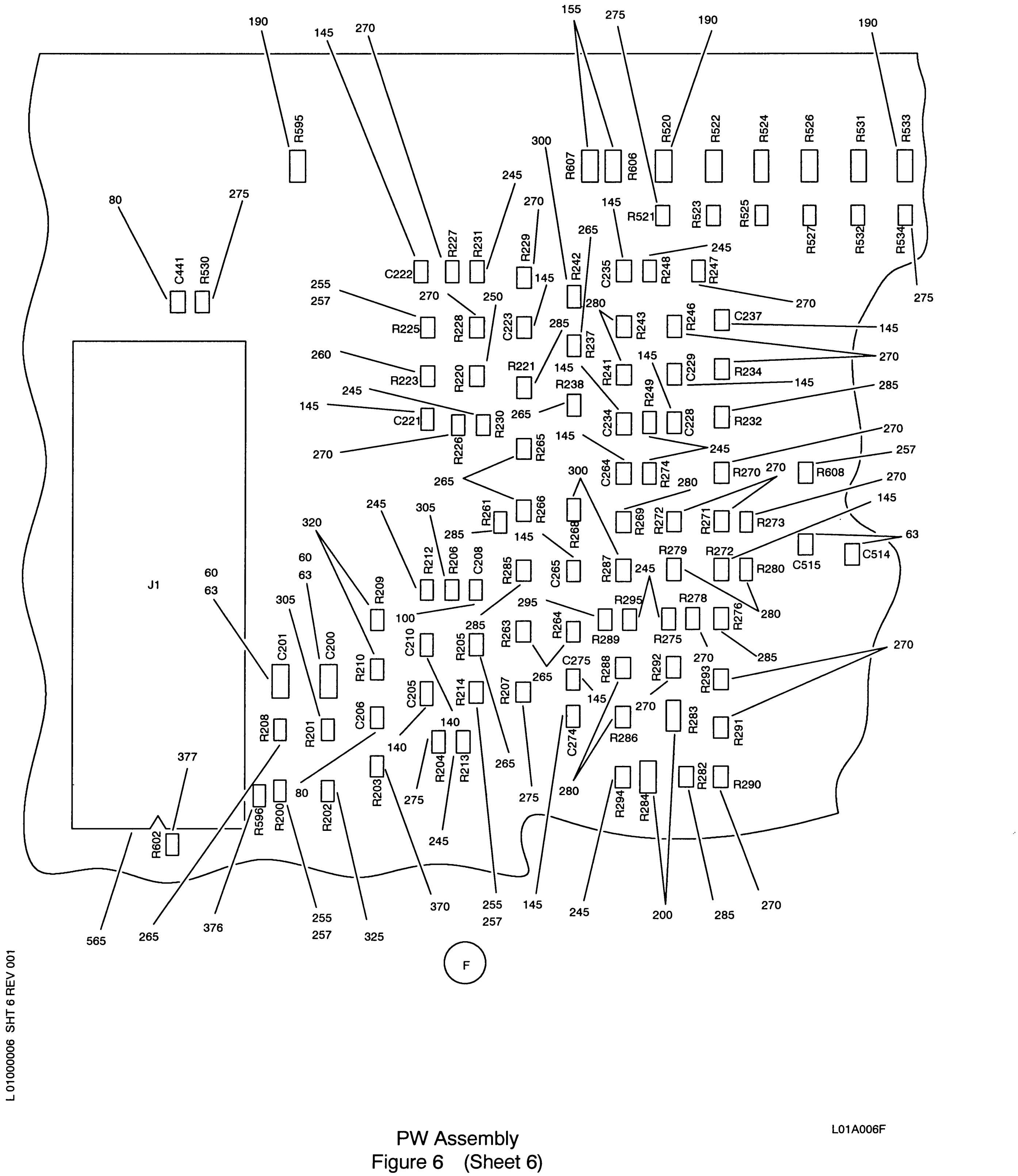


L 01000006 SHT 4 REV 001

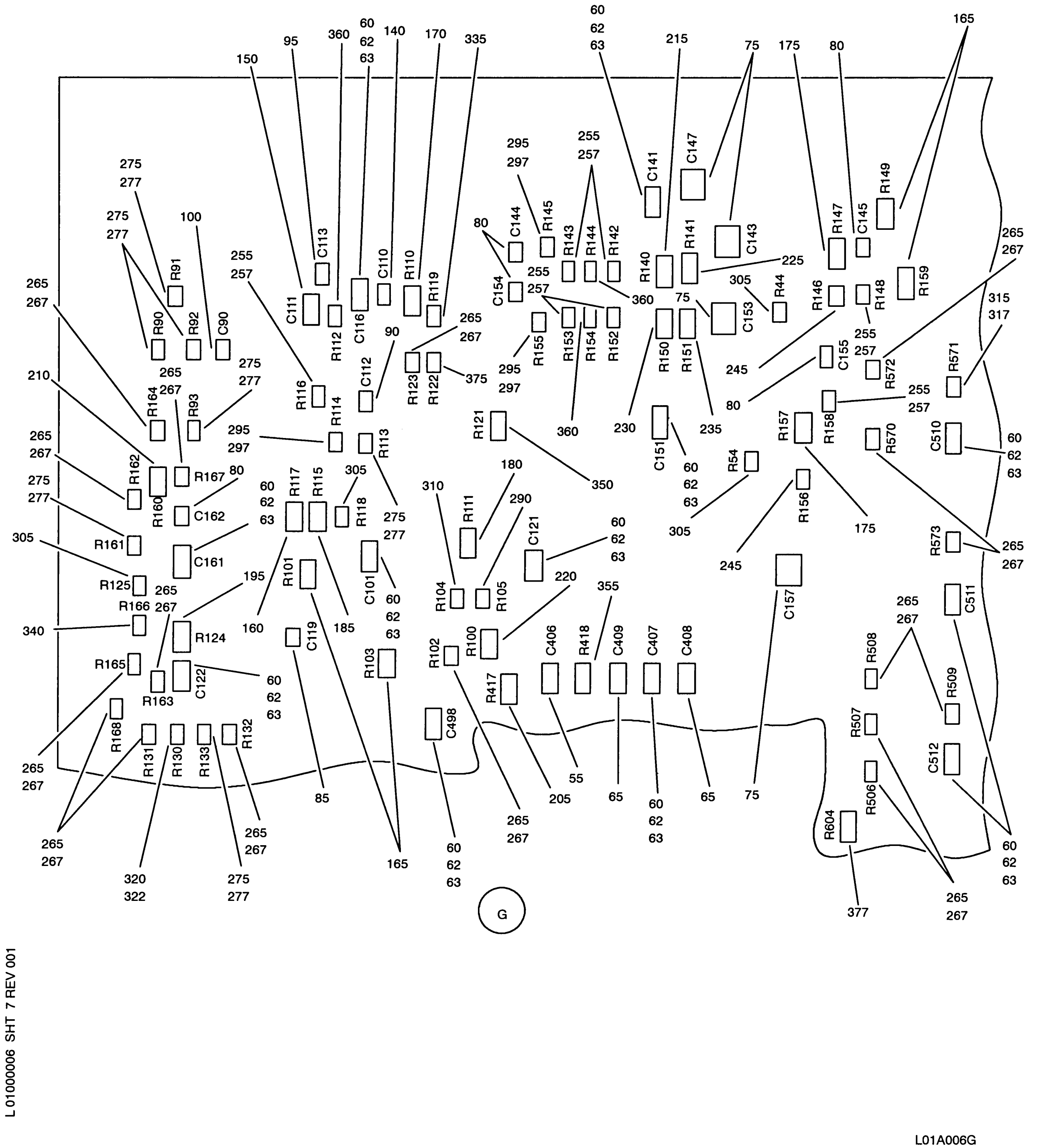
PW Assembly
Figure 6 (Sheet 4)



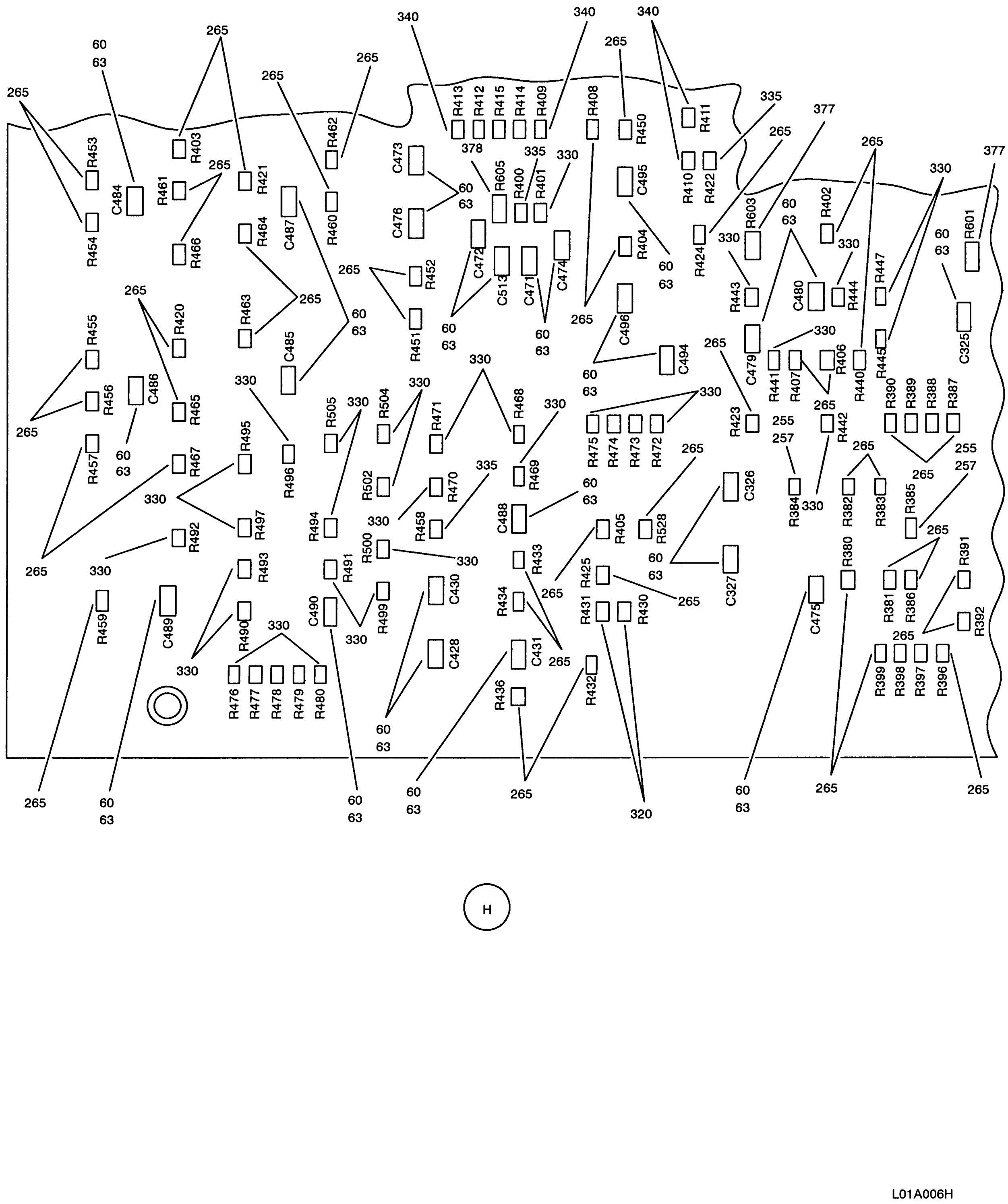
PW Assembly
Figure 6 (Sheet 5)



PW Assembly
Figure 6 (Sheet 6)



PW Assembly
Figure 6 (Sheet 7)



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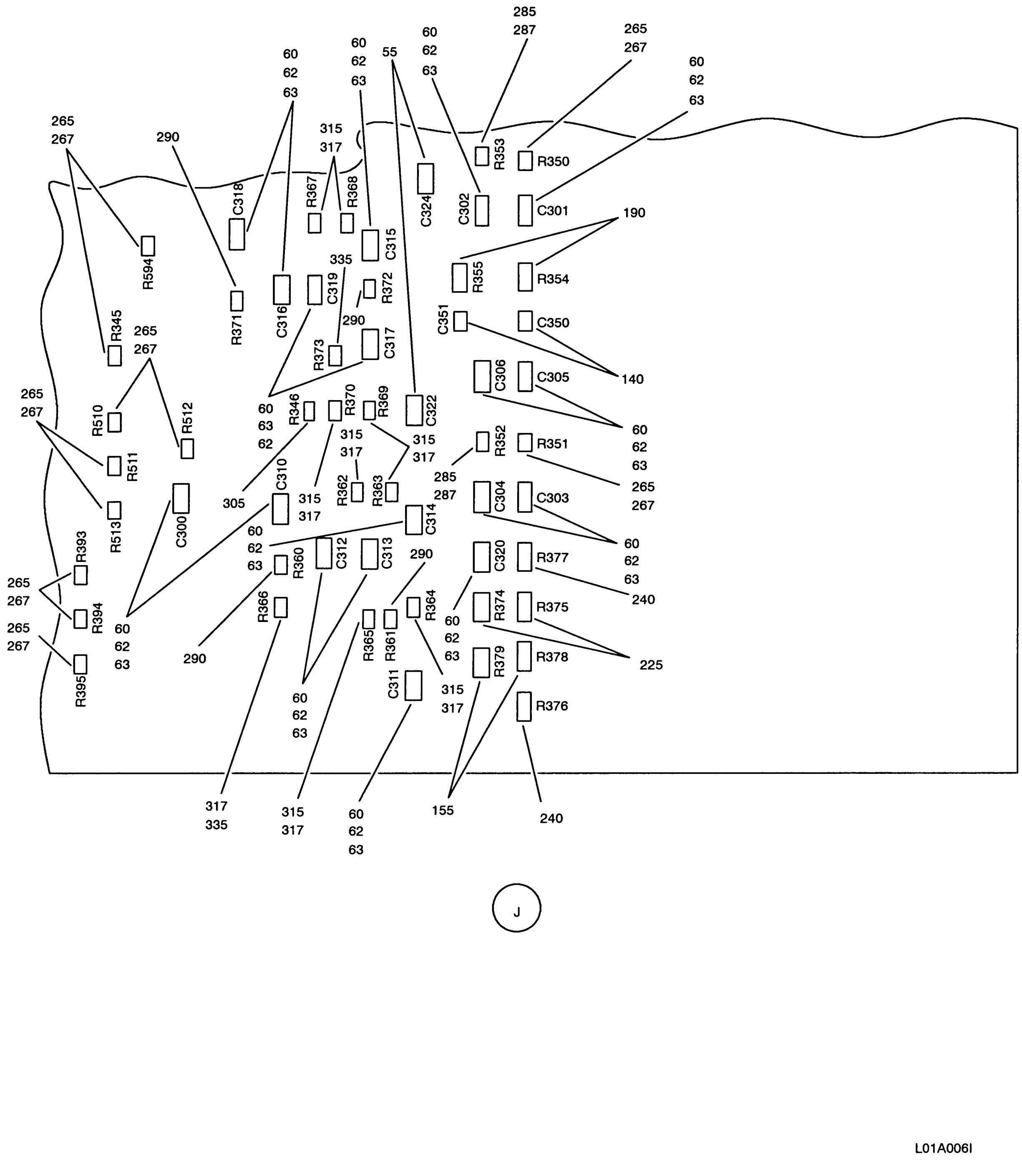
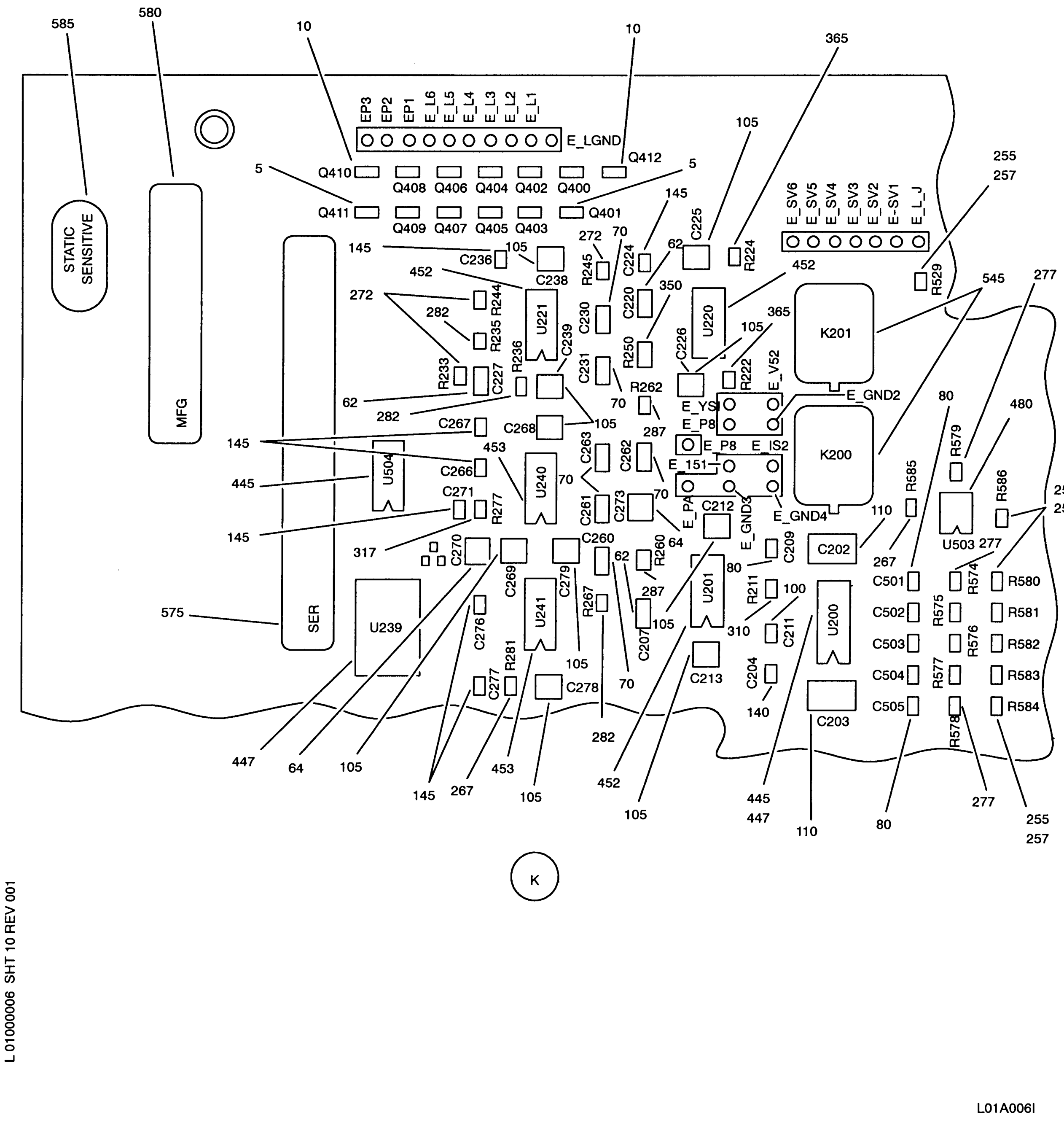
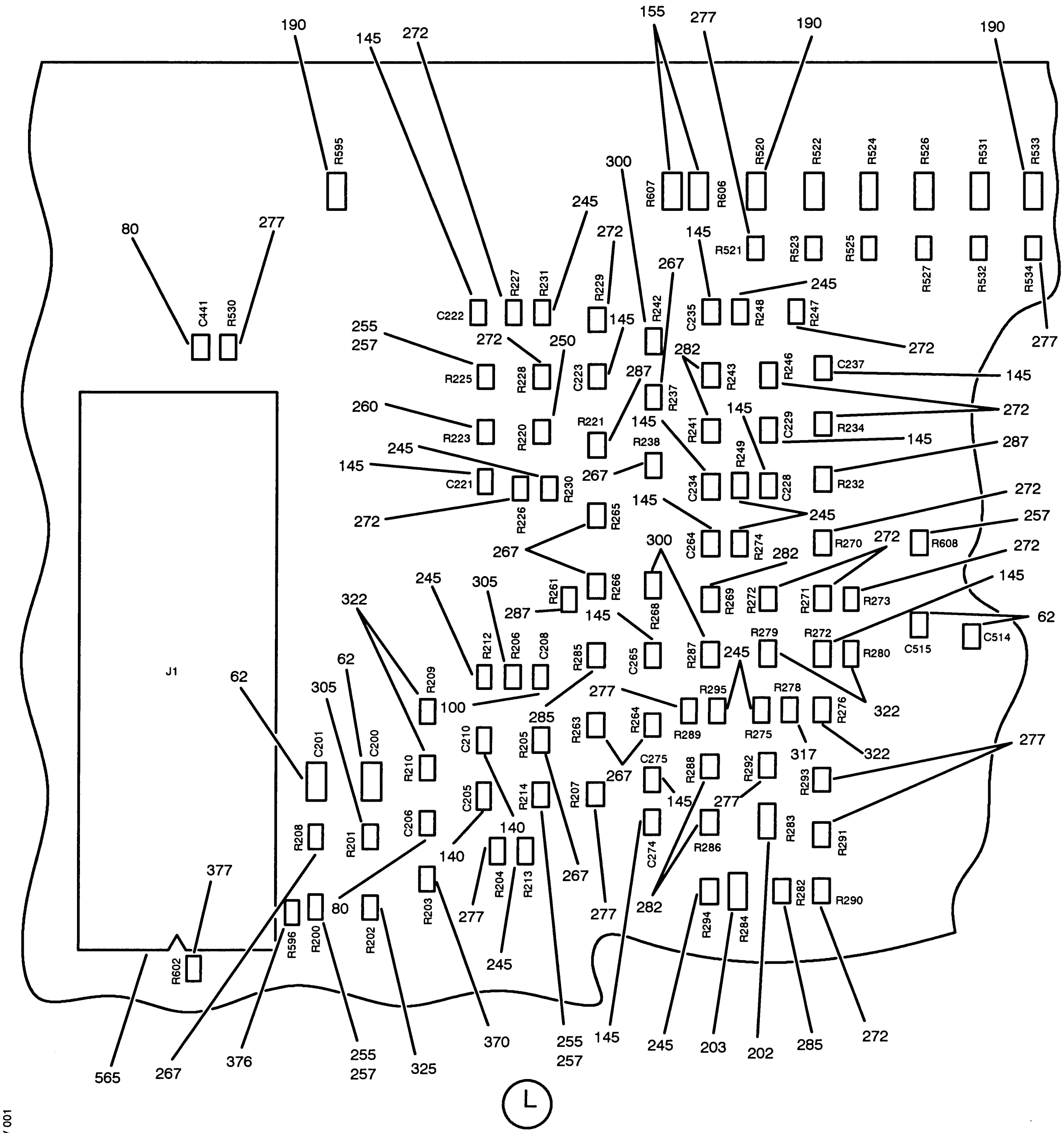
PW Assembly
Figure 6 (Sheet 8)



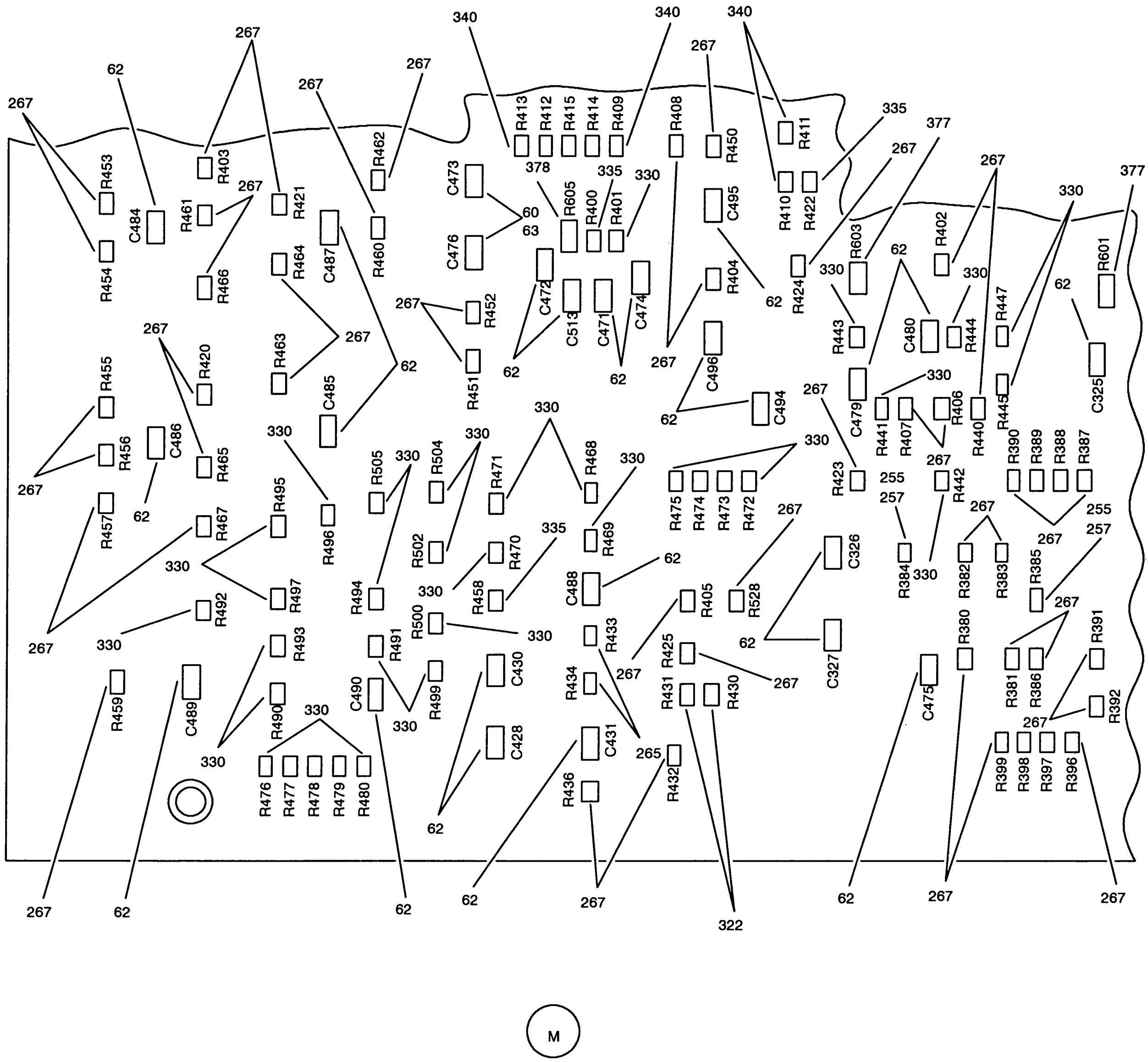
PW Assembly
Figure 6 (Sheet 9)



PW Assembly
Figure 6 (Sheet 10)



PW Assembly
Figure 6 (Sheet 11)



L 01000006 SHT 12 REV 001

PW Assembly
Figure 6 (Sheet 12)

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
6-					
			LOOP RESISTANCE TESTER PRINTED WIRING BOARD		
-1A	906-10250-2		PRINTED WIRING ASSY-LOOP RESISTANCE TESTER (STATIC SENSITIVE PART) (OPT ITEM 1B) (FOR NHA SEE FIG. 2)	A	RF
-1B	906-10250-3		PRINTED WIRING ASSY-LOOP RESISTANCE TESTER (STATIC SENSITIVE PART) (OPT ITEM 1A) (FOR NHA SEE FIG. 2)	A	RF
-1C	906-10250-5		PRINTED WIRING ASSY-LOOP RESISTANCE TESTER (STATIC SENSITIVE PART) (FOR NHA SEE FIG. 2)	B	RF
5	906-50037-006		.MOSFET-N CHANNEL (Q91-Q95, Q100, Q401, Q403, Q405, Q407, Q409, Q411)		12
10	906-50037-013		.MOSFET-P CHANNEL (Q400, Q402, Q404, Q406, Q408,Q410, Q412) (USED ON ITEM 1A, 1C)		7
15	906-50037-1052		.DIODE-ZENER (STATIC SENSITIVE PART) (U90)		1
20	906-50037-114		.DIODE-RECTIFIER (STATIC SENSITIVE PART) (CR120, CR140, CR150)		3
25	906-50037-1030		.DIODE-SWITCHING (STATIC SENSITIVE PART) (CR110)		1
30	906-50037-127		.DIODE-SWITCHING (STATIC SENSITIVE PART) (U101)		1
35	906-50037-202		.DIODE-ZENER (VR300-VR303)		4
40	906-50037-204		.DIODE-ZENER (VR130)		1
45	906-50037-209		.DIODE-ZENER (VR120-VR121)		2
50	906-50037-218		.DIODE-ZENER (STATIC SENSITIVE PART) (VR140-VR142, VR150, VR151)		5

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
55	900-14050-10395		.CAPACITOR-10 PCT 50V 010UF CHIP (C322, C324, C406, C425)		4
60	900-14050-10495		.CAPACITOR-10 PCT 50V 1UF CHIP (STATIC SENSITIVE PART) (C101, C116, C121, C122, C141,C151, C161, C200, C201, C220, C227, C270, C273, C207, C300-C306, C310-C320, C325-C327, C405, C407, C428-C432, C471-C476, C479-C481, C484-C490, C494-C498, C510-C513)	A	67
62	900-14050-10495		.CAPACITOR-10 PCT 50V 1UF CHIP (STATIC SENSITIVE PART) (C101, C116, C121, C122, C141,C151, C161, C200, C201, C207, C220, C227, C300-C306, C310-C320, C325-C327, C405, C407, C428-C432, C471-C476, C479-C481, C484-C490, C494-C498, C510-C515)	B	67
63	900-14050-10495		.CAPACITOR-10 PCT 50V 1UF CHIP (STATIC SENSITIVE PART) (C101, C116, C121, C122, C141,C151, C161, C200, C201, C207, C220, C227, C270, C273, C300-C306, C310-C320, C325-C327, C405, C407, C428-C432, C471-C476, C479-C481, C484-C490, C494-C498, C510-C513)	A	69
64	S906-10135-0147		.CAPACITOR-CHIP (STATIC SENSITIVE PART) (C270, C273)	B	2
65	900-14050-22095		.CAPACITOR-10 PCT 50V 22PF CHIP (C408, C409)		2
70	900-14050-33295		.CAPACITOR-10 PCT 50V 3300PF CHIP (C230, C231, C260-C263)		6

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
75	900-10451-10491		.CAPACITOR-10 PCT 100V 710UF CHIP (C143, C147, C153, C157)		4
80	BCREF13174		.CAPACITOR-10 PCT 100V .01UF CHIP (S906-71326-10391) (C144, C145, C154, C155, C162,C206, C209, C441, C501-C505)		13
85	BCREF13687		.CAPACITOR-10 PCT 100V 2200PF CHIP (S906-71326-22291) (C119)		1
90	BCREF13688		.CAPACITOR-2 PCT 100V 470PF CHIP (S906-71326-47121) (C112)		1
95	BCREF13110		.CAPACITOR-10 PCT 100V 4700PF CHIP (S906-71326-47291) (C113)		1
100	BCREF13111		.CAPACITOR-10 PCT 100V .047UF CHIP (STATIC SENSITIVE PART) (S906-71326-47391) (C90, C208, C211)		3
105	BCREF10439		.CAPACITOR-10 PCT 35V 1UF CHIP (S906-10119-10567) (C212, C213, C225, C226, C238,C239, C268, C269, C278, C279)		10
110	BCREF10597		.CAPACITOR-10 PCT 25V 10UF CHIP (S906-10119-10676) (C170, C171, C202, C203, C321,C323, C470)		7
115	BCREF10440		.CAPACITOR-10 PCT 35V 10UF CHIP (S906-10119-10687) (C102)		1
120	BCREF120547		.CAPACITOR-10 PCT 25V 22UF CHIP (S906-10119-22686) (C103, C140, C146, C150, C156)		5

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
125	BCREF10605		.CAPACITOR-10 PCT 50V .47UF CHIP (S906-10119-47468) (C100, C130, C142, C152, C160)		5
130	BCREF10600		.CAPACITOR-10 PCT 20V 4.7UF CHIP (S906-10119-47565) (C410)		1
135	S906-10181-003		.CAPACITOR-10 PCT 10V 150UF ELECTROLYTIC (C120, C123, C124) (OPT ITEM 135A)		3
135A	T330D157K010AS		.CAPACITOR-10 PCT 10V 150UF ELECTROLYTIC (V31433) (C120, C123, C124) (OPT ITEM 135A)		3
140	S906-71326-10221		.CAPACITOR-2 PCT 100V 1000PF CHIP (STATIC SENSITIVE PART) (C110, C204, C205, C210, C350,C351)		6
145	S906-71326-10121		.CAPACITOR-2 PCT 100V 1000PF CHIP (STATIC SENSITIVE PART) (C221-C224, C228, C229, C234-C237, C264-C267, C271, C272, C274-C277)		20
150	900-14050-27095		.CAPACITOR-10 PCT 50V 27PF CHIP (C111) (OPT ITEM 150A)		1
150A	900-14050-27021		.CAPACITOR-10 PCT 50V 27PF CHIP (C111) (OPT ITEM 150)		1
155	900-14052-1000		.RESISTOR-1 PCT .125W 100 CHIP FILM (STATIC SENSITIVE PART) (R378, R379, R435, R606, R607)		5
160	900-14052-10R0		.RESISTOR-1 PCT .125W 10 CHIP FILM (R117)		1
165	900-14052-1102		.RESISTOR-1 PCT .125W 11K		4

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
			CHIP FILM (R101, R103, R149, R159)		
170	900-14052-1212		.RESISTOR-1 PCT .125W 12.1K CHIP FILM (R110)		1
175	900-14052-1402		.RESISTOR-1 PCT .125W 14K CHIP FILM (R147, R157)		2
180	900-14052-4993		.RESISTOR-1 PCT .125W 499K CHIP FILM (R111)		1
185	900-14052-15R0		.RESISTOR-1 PCT .125W 15 CHIP FILM (R115)		1
190	900-14052-2000		.RESISTOR-1 PCT .125W 200 CHIP FILM (STATIC SENSITIVE PART) (R354, R355, R520, R522, R524, R526, R531, R533, R595)		9
195	900-14052-2212		.RESISTOR-1 PCT .125W 22.1K CHIP FILM (R124)		1
200	900-14052-2214		.RESISTOR-1 PCT .125W 2.21K CHIP FILM (R283, R284)	A	2
202	900-14042-4992		.RESISTOR-1 PCT .125W 49.9K CHIP FILM (R283)	B	2
203	900-14052-1002		.RESISTOR-1 PCT .125W 10K CHIP FILM (R284)	B	2
205	900-14052-3323		.RESISTOR-1 PCT .125W 532K (R417)		1
210	900-14052-3571		.RESISTOR-1 PCT .125W 3.57K CHIP FILM (R160)		1
215	900-14052-4021		.RESISTOR-1 PCT .125W 4.02K CHIP FILM (R140)		1
220	900-14052-8871		.RESISTOR-1 PCT .125W 8.87K CHIP FILM (R100)		1
225	900-40014-1001		.RESISTOR-1 PCT .125W 1K CHIP FILM (STATIC SENSITIVE PART)		3

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
			(R141, R374, R375)		
230	900-40014-2001		.RESISTOR-1 PCT .125W 2K CHIP FILM (STATIC SENSITIVE PART) (R150)		1
235	900-40014-2491		.RESISTOR-1 PCT .125W 2.49K CHIP FILM (STATIC SENSITIVE PART) (R151)		1
240	900-40014-9091		.RESISTOR-1 PCT .125W 9.09K CHIP FILM (STATIC SENSITIVE PART) (R376, R377)		2
245	S906-71327-1000		.RESISTOR-1 PCT .1W 100 CHIP FILM (STATIC SENSITIVE PART) (R146, R156, R212, R213, R230,R231, R248, R249, R274, R275,R294, R295)		12
250	S906-10416-1000		.RESISTOR-1 PCT .1W 100 CHIP FILM (STATIC SENSITIVE PART) (R220)		1
255	S906-71327-1001		.RESISTOR-1 PCT .1W 1K CHIP FILM (STATIC SENSITIVE PART) (R116, R142, R143, R148, R152,R153, R158, R200, R214, R384,R385, R529, R580-R584, R586) (USED ON ITEM 1A)	A	19
257	S906-71327-1001		.RESISTOR-1 PCT .1W 1K CHIP FILM (STATIC SENSITIVE PART) (R116, R142, R143, R148, R152,R153, R158, R200, R214, R225, R384,R385, R529, R580-R584, R586 R608) (USED ON ITEM 1B, 1C)		20
260	S906-10416-1001		.RESISTOR-1 PCT .1W 1K CHIP FILM (STATIC SENSITIVE PART) (R223)		1
265	S906-71327-1002		.RESISTOR-1 PCT .1W 10K CHIP FILM (STATIC SENSITIVE PART) (R102, R123, R131, R132,	A	87

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
			R162-R165, R167, R168, R205,R208, R237, R238, R263-R266,R345, R350, R351, R380-R383, R386-R399, R402-R408, R420, R421, R423-R425, R432-R434, R436, R440, R450-R457, R450-R467, R506-R513, R528,R570, R572, R573, R585, R594)		
267	S906-71327-1002		.RESISTOR-1 PCT .1W 10K CHIP FILM (STATIC SENSITIVE PART) (R102, R123, R131, R132, R162-R165, R167, R168, R205,R208, R237, R238, R263-R266, R281, R345, R350, R351, R380-R383, R386-R399, R402-R408, R420, R421, R423-R425, R432-R434, R436, R440, R450-R457, R450-R467, R506-R513, R528,R570, R572, R573, R585, R594)	B	88
270	S906-10416-1002		.RESISTOR-1 PCT .1W 10K CHIP FILM (STATIC SENSITIVE PART) (R226-R229, R233, R234, R244-R247, R270-R273, R277,R278, R290-R293)	A	20
272	S906-10416-1002		.RESISTOR-1 PCT .1W 10K CHIP FILM (STATIC SENSITIVE PART) (R226-R229, R233, R234, R244-R247, R270-R273, R290-R293)	B	18
275	S906-71327-1003		.RESISTOR-1 PCT .1W 100K CHIP FILM (STATIC SENSITIVE PART) (R90-R93, R113, R133, R161, R204, R207, R521, R523, R525,R527, R530, R532, R534, R574-R579)	A	22
277	S906-71327-1003		.RESISTOR-1 PCT .1W 100K CHIP FILM (STATIC SENSITIVE PART)	B	24

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
			(R90-R93, R113, R133, R161, R204, R207, R285, R521, R523, R525,R527, R530, R532, R534, R574-R579)		
280	S906-10416-1003		.RESISTOR-1 PCT .1W 100K CHIP FILM (STATIC SENSITIVE PART) (R235, R236, R241, R243, R267,R269, R279, R280, R286, R288)	A	10
282	S906-10416-1003		.RESISTOR-1 PCT .1W 100K CHIP FILM (STATIC SENSITIVE PART) (R235, R236, R241, R243, R267,R269, R286, R288)	B	8
285	S906-71327-1004		.RESISTOR-1 PCT .1W 10 CHIP FILM (STATIC SENSITIVE PART) (R221, R225, R232, R260-R262, R276, R281, R282, R285, R289,R352, R353)	A	11
287	S906-71327-1004		.RESISTOR-1 PCT .1W 10 CHIP FILM (STATIC SENSITIVE PART) (R221, R232, R260-R262, R276, R281, R282, R352, R353)	B	7
290	S906-71237-10R0		.RESISTOR-1 PCT .1W 10 CHIP FILM (R105, R360, R361, R371, R372)		5
295	S906-71327-2001		.RESISTOR-1 PCT .1W 2K CHIP FILM (STATIC SENSITIVE PART) (R114, R145, R155, R289)		4
297	S906-71327-2001		.RESISTOR-1 PCT .1W 2K CHIP FILM (STATIC SENSITIVE PART) (R114, R145, R155)		3
300	S906-10416-2001		.RESISTOR-1 PCT .1W 2K CHIP FILM (STATIC SENSITIVE PART) (R242, R268, R287)		3
305	S906-71327-2002		.RESISTOR-1 PCT .1W 20K CHIP FILM (R44, R54, R118, R125, R201, R206, R346, R347)		8

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
310	S906-71327-2003		.RESISTOR-1 PCT .1W 200K CHIP FILM (R104, R211)		2
315	S906-71327-3011		.RESISTOR-1 PCT .1W 3.01K CHIP FILM (R362-R365, R367-R370, R571	A	9
317	S906-71327-3011		.RESISTOR-1 PCT .1W 3.01K CHIP FILM (R277, R278, R362-R370, R571)	B	11
320	S906-71327-3012		.RESISTOR-1 PCT .1W 30.1K CHIP FILM (R130, R209, R210, R430, R431)	A	5
322	S906-71327-3012		.RESISTOR-1 PCT .1W 30.1K CHIP FILM (R130, R209, R210, R276, R279, R280, R430, R431)	B	8
325	S906-71327-3013		.RESISTOR-1 PCT .1W 301K CHIP FILM (STATIC SENSITIVE PART) (R202)		1
330	S906-71327-33R2		.RESISTOR-1 PCT .1W 33.2 CHIP FILM (R401, R441-R447, R468-R480, R490-R505)		36
335	S906-71327-4990		.RESISTOR-1 PCT .1W 499 CHIP FILM (R119, R366, R373, R400, R422, R458)		6
340	S906-71327-4991		.RESISTOR-1 PCT .1W 4.99K CHIP FILM (R166, R169, R170, R409-R415)		10
345	S906-10134-017		.RESISTOR-1 PCT .1W 150 CHIP WIREWOUND (R120)		1
350	S906-10135-1200		.RESISTOR-5 PCT .125W 0 CHIP FILM (R121, R250)		2
355	S906-10135-1201		.RESISTOR-10 PCT .125W 10M CHIP FILM (R418)		1
360	S906-71327-4992		.RESISTOR-1 PCT .1W 49.9K CHIP FILM (STATIC SENSITIVE PART) (R112, R144, R154)		3

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
365	S906-10416-4992		.RESISTOR-1 PCT .1W 49.9K CHIP FILM (STATIC SENSITIVE PART) (R222, R224)		2
370	S906-71327-4993		.RESISTOR-1 PCT .1W 499K CHIP FILM (R203)		1
375	S906-71327-1502		.RESISTOR-1 PCT .1W 15K CHIP FILM (R122)		1
376	906-40014-2002		.RESISTOR-1 PCT .125W 20K CHIP FILM (STATIC SENSITIVE PART) (R596)		1
377	906-40014-1002		.RESISTOR-1 PCT .125W 10K CHIP FILM (STATIC SENSITIVE PART) (R601-R604)		4
378	906-40014-1822		.RESISTOR-1 PCT .125W 18.2K CHIP FILM (STATIC SENSITIVE PART) (R605)		1
380	900-12471-001		.GATE- (STATIC SENSITIVE PART) (U421)		1
385	900-12471-040		.FLIP FLOP- (STATIC SENSITIVE PART) (U302)		1
390	900-12471-080		.TRANSCEIVER- (STATIC SENSITIVE PART) (U500, U502)		2
395	900-12471-084		.FLIP FLOP- (STATIC SENSITIVE PART) (U501)		1
400	900-12471-345		.TRANSCEIVER-INTERFACE (STATIC SENSITIVE PART) (U415)		1
405	900-12471-582		.PROCESSOR- (STATIC SENSITIVE PART) (U400)		1
410	906-10256-2		.EEPROM- (STATIC SENSITIVE PART) (U404)		1
415	900-12471-503		.EEPROM- (STATIC SENSITIVE PART) (U401)		1
420	900-12471-510		.SRAM- (STATIC SENSITIVE PART)		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
			(U308)		
425	906-10254-1		.PMD- (STATIC SENSITIVE PART) (U307)		1
430	900-12471-545		.SRAM- (STATIC SENSITIVE PART) (U402, U403)		2
435	900-12471-610		.TIMER- (STATIC SENSITIVE PART) (U160)		1
440	900-12471-620		.COMPARATOR- (STATIC SENSITIVE PART) (U161)		1
445	900-12471-621		.SWITCH-SOLID STATE (STATIC SENSITIVE PART) (U200, U504) (USED ON ITEMS 1B, 1C)		2
447	900-12471-621		.SWITCH-SOLID STATE (STATIC SENSITIVE PART) (U200, U239) (USED ON ITEMS 1A)	A	2
450	900-12471-630		.AMPLIFIER- (STATIC SENSITIVE PART) (U140, U201, U220, U221, U240, U241)	A	6
452	900-12471-630		.AMPLIFIER- (STATIC SENSITIVE PART) (U140, U201, U220, U221)	B	4
455	900-12471-635		.AMPLIFIER- (STATIC SENSITIVE PART) (U100, U305, U309)		3
460	900-12471-336		.MULTIPLEXER-ANALOG (STATIC SENSITIVE PART) (U303, U304)		2
465	900-12471-634		.VOLTAGE REFERENCE- (STATIC SENSITIVE PART) (OPT ITEM 465A) (U306)		1
-465 A	900-12471-386		.VOLTAGE REFERENCE- (STATIC SENSITIVE PART) (OPT ITEM 465) (U306)		1
470	900-12471-693		.VOLTAGE REFERENCE- (STATIC SENSITIVE PART) (STATIC SENSITIVE PART) (VR160)		1
475	900-12471-701		.VOLTAGE REGULATOR- (STATIC SENSITIVE PART)		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
			(U410)		
480	900-12471-752		.ISOLATOR-OPTICAL (STATIC SENSITIVE PART) (U503)		1
485	900-12471-773		.VOLTAGE REGULATOR- (STATIC SENSITIVE PART) (U170)		1
490	900-12471-821		.TRANSCEIVER- (STATIC SENSITIVE PART) (U435, U436, U441)		3
495	S906-71202-6505		.POWER CONTROLLER- (STATIC SENSITIVE PART) (OPT ITEM 495A) (U110)		1
-495 A	UCC2805D		.POWER CONTROLLER- (STATIC SENSITIVE PART) (OPT ITEM 495) (U110)		1
500	S906-71202-6305		.CONVERTER- (OPT ITEM 500A) (U300, U301)		2
-500 A	CS5016JL16		.CONVERTER-AD (STATIC SENSITIVE PART) (OPT ITEM 500, 500B) (U300, U301)		2
-500 B	CS5016JL16		.CONVERTER-AD (STATIC SENSITIVE PART) (OPT ITEM 500, 500A) (U300, U301)		2
505	906-10252-2		.PMD- (STATIC SENSITIVE PART) (U420)		1
510	S906-71202-7500		.MOSFET-N CHANNEL (OPT ITEM 510A) (Q110)		1
-510 A	IRFR1205		.MOSFET-N CHANNEL (OPT ITEM 510) (Q110)		1
515	900-12472-003		.MOSFET-P CHANNEL (STATIC SENSITIVE PART) (Q90, Q140)		2
520	900-12472-004		.MOSFET-N CHANNEL (STATIC SENSITIVE PART) (Q150)		1
525	S906-10135-4006		.FUSE-1A (OPT ITEM 525A) (F120)		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
-525 A	473001		.FUSE-1A (V31669) (OPT ITEM 525) (F120)		1
530	FM04A125V1-4A		.FUSE-.25A (F140, F150)		2
535	S900-12473-310		.RECTIFIER- (STATIC SENSITIVE PART) (OPT ITEM 535A) (CR111)		1
-535 A	S900-12473-311		.RECTIFIER- (OPT ITEM 535) (CR111)		1
540	S906-10135-2002		.CRYSTAL-32.768KHZ (Y405)		1
545	S906-10155-9415		.RELAY-DPDT (STATIC SENSITIVE PART) (K200, K201)		2
550	S906-70381-3		.FERRITE-BEAD LEADED (E100, E120, E130, E140, E141, E144, E150, E151, E154, E160)		10
555	S906-10263-1		.TRANSFORMER- (T101)		1
560	S906-70490-1		.TRANSFORMER- (T100)		1
565	S906-70293-238		.CONNECTOR- (J1)		1
570	906-10251-5		.PRINTED WIRING BOARD ASSY- (USED ON ITEM 1B, 1C)	A	1
570A	906-10251-6		.PRINTED WIRING BOARD ASSY- (USED ON ITEM 1B, 1C)		1
575	S906-10207-2		.LABEL-BAR CODE		2
580	S906-10207-4		.LABEL-BAR CODE		1
585	BACTEX1486		.DECAL-		1

EQUIPMENT DESIGNATOR	FIG ITEM
C90	6 -100
C100	6 -125
C101	6 -60
	6 -62
	6 -63
C102	6 -115
C103	6 -120
C110	6 -140
C111	6 -150
C112	6 -90
C113	6 -95
C116	6 -60
	6 -62
	6 -63
C119	6 -85
C120	6 -135
C121	6 -60
	6 -62
	6 -63
C122	6 -60
	6 -62
	6 -63
C123	6 -135
C124	6 -135
C130	6 -125
C140	6 -120
C141	6 -60
	6 -62
	6 -63
C142	6 -125
C143	6 -75
C144	6 -80
C145	6 -80
C146	6 -120
C147	6 -75
C150	6 -120
C151	6 -60
	6 -62
	6 -63
C152	6 -125
C153	6 -75
C154	6 -80
C155	6 -80
C156	6 -120
C157	6 -75
C160	6 -125
C161	6 -60
	6 -62
	6 -63

EQUIPMENT DESIGNATOR	FIG ITEM
C162	6 -80
C170	6 -110
C171	6 -110
C200	6 -60
	6 -62
	6 -63
C201	6 -60
	6 -62
	6 -63
C202	6 -110
C203	6 -110
C204	6 -140
C205	6 -140
C206	6 -80
C207	6 -60
	6 -62
	6 -63
C208	6 -100
C209	6 -80
C210	6 -140
C211	6 -100
C212	6 -105
C213	6 -105
C220	6 -60
	6 -62
	6 -63
C221 - C224	6 -145
C225	6 -105
C226	6 -105
C227	6 -60
	6 -62
	6 -63
C228	6 -145
C229	6 -145
C230	6 -70
C231	6 -70
C234 - C237	6 -145
C238	6 -105
C239	6 -105
C260 — C263	6 -70
C264 — C267	6 -145
C268	6 -105
C269	6 -105
C270	6 -60
	6 -62
	6 -63
C271	6 -145
C272	6 -145

EQUIPMENT DESIGNATOR	FIG ITEM
C273	6 -60
	6 -62
	6 -63
C274 — C277	6 -145
C278	6 -105
C279	6 -105
C300 — C306	6 -60
	6 -62
	6 -63
C310 — C320	6 -60
	6 -62
	6 -63
C321	6 -110
C322	6 -55
C323	6 -110
C324	6 -55
C325 — C327	6 -60
	6 -62
	6 -63
C350	6 -140
C351	6 -140
C405	6 -60
	6 -62
	6 -63
C406	6 -55
C407	6 -60
	6 -62
	6 -63
C408	6 -65
C409	6 -65
C410	6 -130
C425	6 -55
C428 — C432	6 -60
	6 -62
	6 -63
C441	6 -80
C470	6 -110
C471 — C476	6 -60
	6 -62
	6 -63
C479 — C481	6 -60
	6 -62
	6 -63
C480	6 -60
C481	6 -60
C484 — C490	6 -60
	6 -62
	6 -63

EQUIPMENT DESIGNATOR	FIG ITEM
C494 — C498	6 -60
	6 -62
	6 -63
C501 — C505	6 -80
C510 — C513	6 -60
	6 -62
	6 -63
C514-C515	6 -60
	6 -62
	6 -63
CR110	6 -25
CR111	6 -535
CR120	6 -20
CR140	6 -20
CR150	6 -20
E100	6 -550
E120	6 -550
E130	6 -550
E140	6 -550
E141	6 -550
E144	6 -550
E150	6 -550
E151	6 -550
E154	6 -550
E160	6 -550
F120	6 -525
F140	6 -530
F150	6 -530
J1	6 -565
K200	6 -545
K201	6 -545
Q90	6 -515
Q91 — Q95	6 -5
Q100	6 -5
Q110	6 -510
Q140	6 -515
Q150	6 -520
Q400	6 -10
Q401	6 -5
Q402	6 -10
Q403	6 -5
Q404	6 -10
Q405	6 -5
Q406	6 -10
Q407	6 -5
Q408	6 -10
Q409	6 -5
Q410	6 -10
Q411	6 -5
Q412	6 -10

EQUIPMENT DESIGNATOR	FIG ITEM
R44	6 -305
R90 — R93	6 -275
	6 -277
R100	6 -220
R101	6 -165
	6 -277
R102	6 -265
R103	6 -165
R104	6 -310
R105	6 -290
R110	6 -170
R111	6 -180
R112	6 -360
R113	6 -275
	6 -277
R114	6 -295
	6 -277
R115	6 -185
R116	6 -255
R117	6 -160
R118	6 -305
R119	6 -335
R120	6 -345
R121	6 -350
R122	6 -375
R123	6 -265
	6 -277
R124	6 -195
R125	6 -305
R130	6 -320
	6 -277
R131	6 -265
	6 -277
R132	6 -265
	6 -277
R133	6 -275
	6 -277
R140	6 -215
R141	6 -225
R142	6 -255
R143	6 -255
R144	6 -360
R145	6 -295
	6 -297
R146	6 -245
R147	6 -175
R148	6 -255
R149	6 -165
R150	6 -230
R151	6 -235

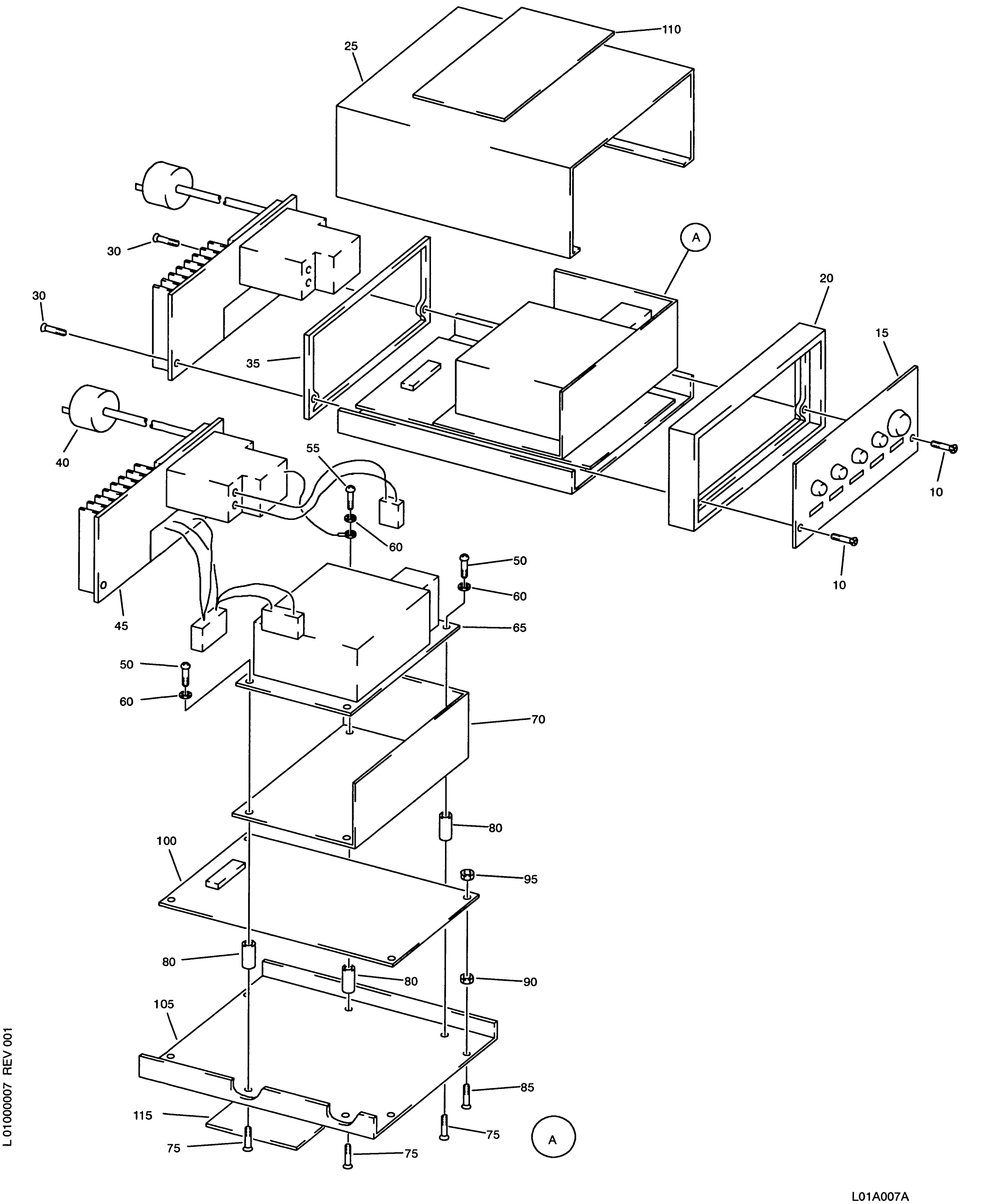
EQUIPMENT DESIGNATOR	FIG ITEM
R152	6 -255
R153	6 -255
R154	6 -360
R155	6 -295
	6 -297
R156	6 -245
R157	6 -175
R158	6 -255
R159	6 -165
R160	6 -210
R161	6 -275
	6 -276
R162 — R165	6 -265
	6 -256
R166	6 -340
R167	6 -265
	6 -266
R168	6 -265
	6 -266
R169	6 -340
R170	6 -340
R200	6 -255
R201	6 -305
R202	6 -325
R203	6 -370
R204	6 -275
	6 -277
R205	6 -265
	6 -267
R206	6 -305
R207	6 -275
	6 -277
R208	6 -265
	6 -267
R209	6 -320
	6 -322
R210	6 -320
	6 -322
R211	6 -310
R212	6 -245
R213	6 -245
R214	6 -255
R220	6 -250
R221	6 -285
	6 -287
R222	6 -365
R223	6 -260
R224	6 -365
R225	6 -285
	6 -257

EQUIPMENT DESIGNATOR	FIG ITEM
R226 — R229	6 -270
R230	6 -245
R231	6 -245
R232	6 -285
	6 -287
R233	6 -270
	6 -272
R234	6 -270
R235	6 -280
	6 -182
R236	6 -280
	6 -282
R237	6 -265
	6 -267
R238	6 -265
	6 -267
R241	6 -280
	6 -282
R242	6 -300
R243	6 -280
	6 -282
R244 — R247	6 -270
	6 -272
R248	6 -245
R249	6 -245
R250	6 -350
R260 — R262	6 -285
	6 -287
R263 — R266	6 -265
	6 -267
R267	6 -280
	6 -282
R268	6 -300
R269	6 -280
	6 -282
R270 — R273	6 -270
	6 -272
R274	6 -245
R275	6 -245
R276	6 -285
	6 -322
R277	6 -270
	6 -317
R278	6 -270
	6 -317
R279	6 -280
	6 -322
R280	6 -280
	6 -322
R281	6 -267
	6 -285
R282	6 -285
R283	6 -200
	6 -202
R284	6 -200
	6 -203
R285	6 -277
	6 -285
R286	6 -280
	6 -282
R287	6 -300
R288	6 -280
	6 -282
R289	6 -277
	6 -285
R290 — R293	6 -270
	6 -272
R294	6 -245
R295	6 -245
R345	6 -265
	6 -267
R346	6 -305
R347	6 -305
R350	6 -265
	6 -267
R351	6 -265
	6 -267
R352	6 -285
	6 -287
R353	6 -285
	6 -287
R354	6 -190
R355	6 -190
R360	6 -290
R361	6 -290
R362 — R365	6 -315
	6 -317
R366	6 -335
	6 -317
R367 — R370	6 -315
R371	6 -290
R372	6 -290
R373	6 -335
R374	6 -225
R375	6 -225
R376	6 -240
R377	6 -240
R378	6 -155
R379	6 -155

EQUIPMENT DESIGNATOR	FIG ITEM	EQUIPMENT DESIGNATOR	FIG ITEM
R380 – R383	6 -265	R525	6 -275
	6 -267		6 -277
	6 -267	R526	6 -190
R384	6 -255	R527	6 -275
	6 -257		6 -277
R385	6 -255	R528	6 -265
	6 -257		6 -267
R386 – R399	6 -265	R529	6 -255
	6 -267		6 -257
R400	6 -335	R530	6 -275
R401	6 -330		6 -277
R402 – R408	6 -265	R531	6 -190
	6 -267	R532	6 -275
R409 – R415	6 -340		6 -277
R417	6 -205	R533	6 -190
R418	6 -355	R534	6 -275
R420	6 -265		6 -277
	6 -267	R54	6 -305
R421	6 -265	R570	6 -265
	6 -267		6 -267
R422	6 -335	R571	6 -315
R423 – R425	6 -265	R572	6 -265
	6 -267		6 -277
R430	6 -320	R573	6 -265
	6 -322		6 -267
R431	6 -320	R574 – R579	6 -275
	6 -322		6 -277
R432 – R434	6 -265	R580 – R584	6 -255
R435	6 -155		6 -257
R436	6 -265	R585	6 -265
	6 -267		6 -267
R440	6 -265	R586	6 -255
	6 -267		6 -257
R441 – R447	6 -330	R594	6 -265
R450 – R457	6 -265		6 -267
	6 -267	R595	6 -190
R459	6 -265	R606	6 -155
	6 -267	R607	6 -155
R460 – R467	6 -265	T100	6 -560
	6 -267	T101	6 -555
R468 – R505	6 -330	U90	6 -15
R506 – R513	6 -265	U100	6 -455
	6 -267	U101	6 -30
R520	6 -190	U110	6 -495
R521	6 -275		6 -495A
	6 -277	U140	6 -450
R522	6 -190		6 -452
R523	6 -275	U160	6 -435
	6 -277	U161	6 -440
R524	6 -190	U170	6 -485

EQUIPMENT DESIGNATOR	FIG ITEM
U200	6 -445
	6 -447
U201	6 -450
	6 -452
U220	6 -450
	6 -452
U221	6 -450
	6 -452
U240	6 -450
	6 -453
U241	6 -450
	6 -453
U300	6 -500
	6 -500A
	6 -500B
U301	6 -500
U302	6 -385
U303	6 -460
U304	6 -460
U305	6 -455
U306	6 -465
	6 -465A
U307	6 -425
U308	6 -420
U309	6 -455
U400	6 -405
U401	6 -415
U402	6 -430
U403	6 -430
U404	6 -410
U410	6 -475
U415	6 -400
U420	6 -505
U421	6 -380
U435	6 -490
U436	6 -490
U441	6 -490
U500	6 -390
U501	6 -395
U502	6 -390
U503	6 -480
VR120	6 -45
VR121	6 -45
VR130	6 -40
VR140 — VR142	6 -50
VR150	6 -50
VR151	6 -50
VR160	6 -470
VR300 - VR303	6 -35
Y405	6 -540

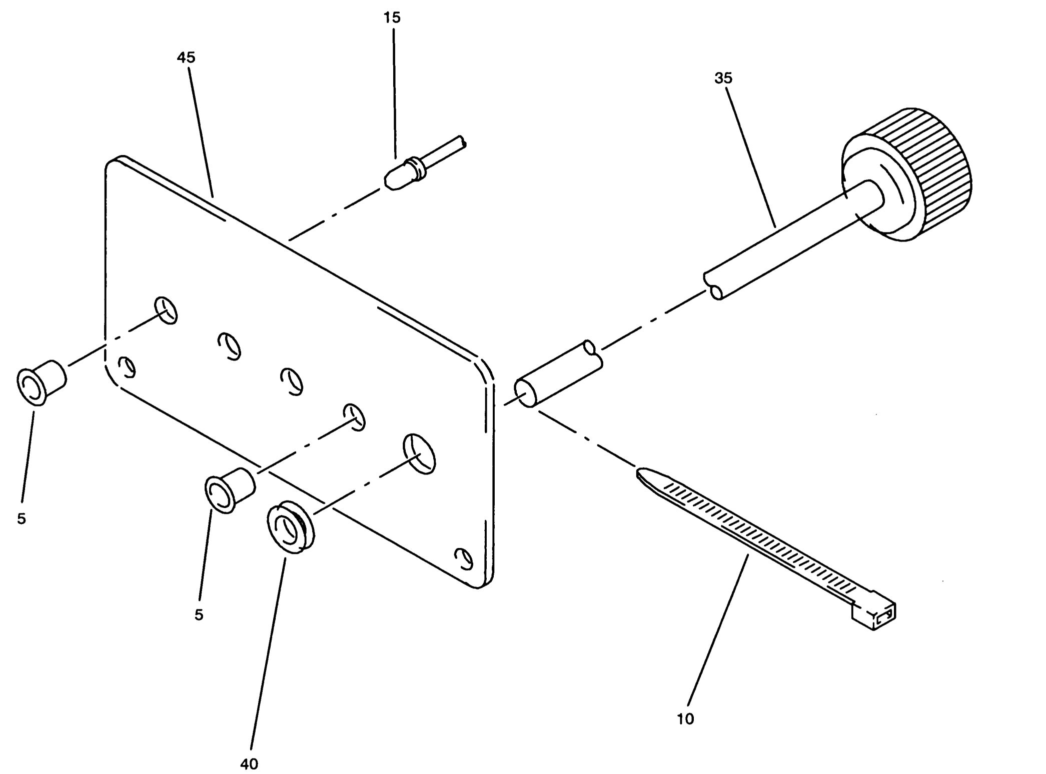
EQUIPMENT DESIGNATOR	FIG ITEM



Battery Charger (103486-1, Sage)
Figure 7

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
7-					
			LOOP RESISTANCE TESTER BATTERY CHARGER		
-1A	103486-01		CHARGER ASSY-BATTERY (LRTS) (V56878) (FOR NHA SEE FIG. 3)		RF
5	100041		.TIE WRAP-4 (V56878)		12
10	107173		.SCREW-FH PH (V56878)		2
15	103503		.PANEL ASSY-FRONT (V56878) (FOR DETAILS SEE FIG. 8)		1
20	103334-03		.BEZEL-FRONT (THICKER) (V56878)		1
25	103333-03		COVER- (V56878)		1
30	107173		.SCREW-PH PH (V56878)		2
35	103334-03		.BEZEL-REAR (THICKER) (V56878)		1
40	103151		.POWER CORD- (V56878)		1
45	103505		.PANEL ASSY-REAR (V56878) (FOR DETAILS SEE FIG. 9)		1
50	103433		.SCREW- PH PH (6-32 X 1/4 IN.) (V56878)		3
55	101578		.SCREW- PH MS (6-32 X 5/16 IN.) (V56878)		1
60	100543		.WASHER-#6 INTERNAL STAR (V56878)		4
65	103501		POWER SUPPLY- (V56878)		1
70	103444		.FISHPAPER ASSY- (V56878)		1
75	102321		.SCREW (V56878)		4
80	103623		.SPACER- (V56878)		4
85	102824		.SCREW- (V56878)		4
90	103429		.NUT-KEPS 4-40 (V56878)		4
95	100496		.NUT-4-40 HEX SELF		4

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
			(V56878)		
100	102891-28		.PCB ASSY-		1
			(V56878)		
105	103331-01		.BASE-		1
			(V56878)		
110	103626		.LABEL-CAUTION		1
			(V56878)		
115	103631		.LABEL-COMPANY MODEL SERIAL		1
			(V56878)		



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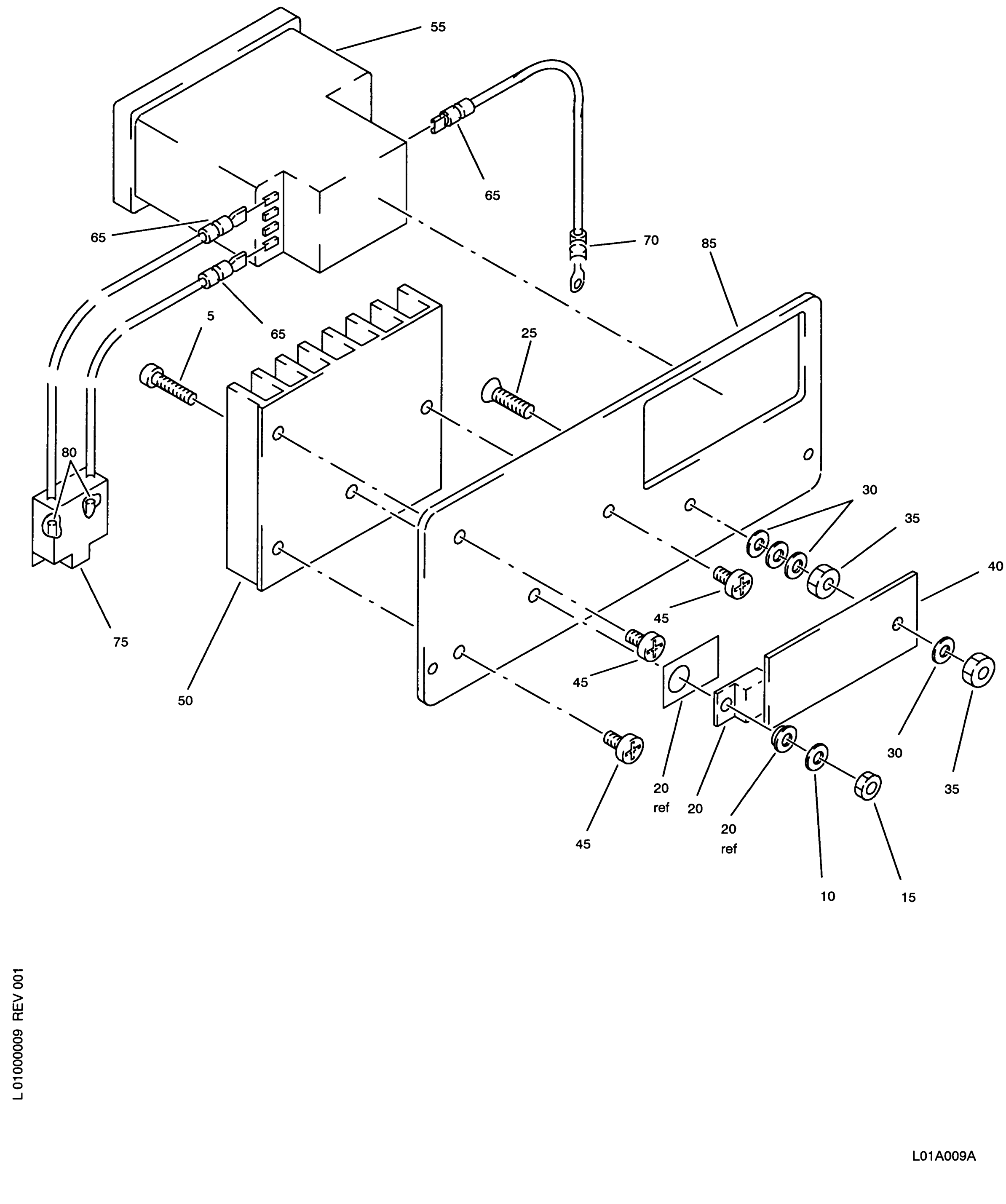
Battery Charger Front Panel Assembly (103486-1, Sage)
Figure 8

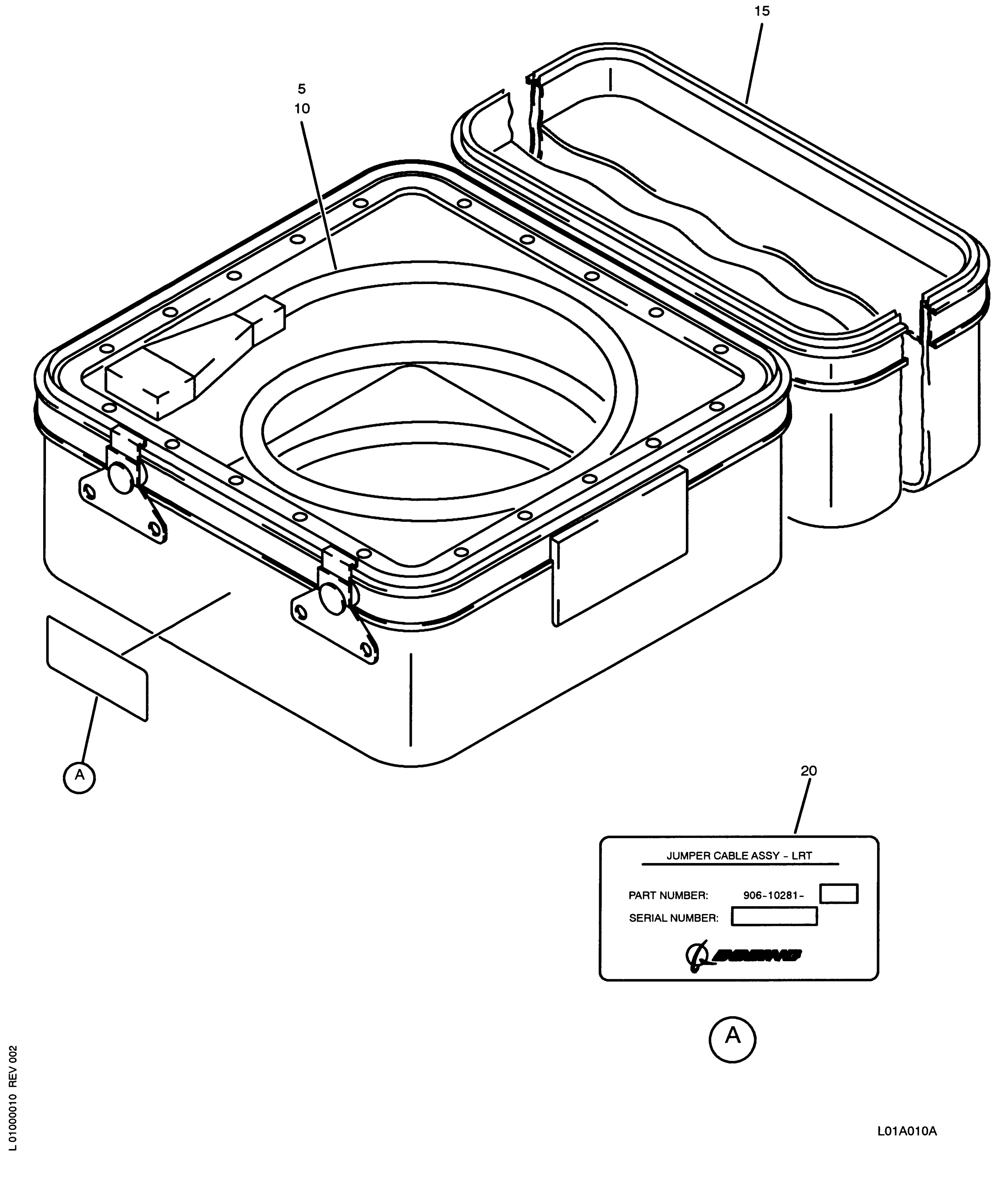
FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
8-					
			LOOP RESISTANCE TESTER BATTERY CHARGER FRONT PANEL ASSEMBLY		
-1A	103503		PANEL ASSY-FRONT (LRT) (V56878) (FOR NHA SEE FIG. 7)		RF
5	103470		.HOLDER-LED (V56878)		4
10	100075		.TIE WRAP-(6 IN.) (V56878)		1
15	103183		.LED-RED DIFFUSED (V56878)		1
20	103186		.LED-ORG DIFFUSED (V56878)		1
25	103495		.LED-YEL DIFFUSED (V56878)		1
30	103496		.LED-GRN DIFFUSED (V56878)		1
35	103504		.CABLE ASSY- (V56878)		1
40	103510		.GROMMET- (V56878)		1
45	103502		.PANEL- (V56878)		1



Battery Charger Rear Panel Assembly
Figure 9

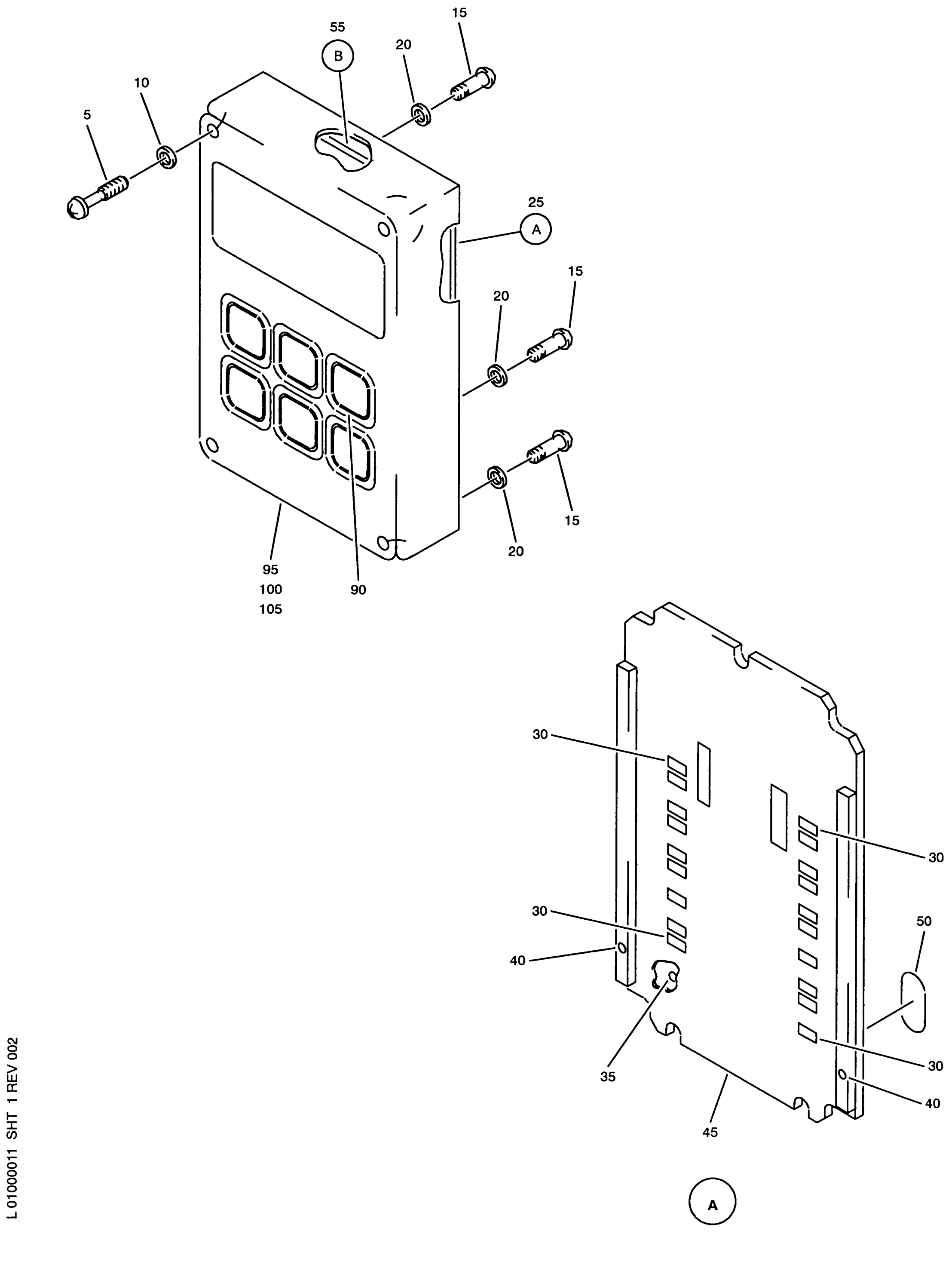
FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
9-			LOOP RESISTANCE TESTER BATTERY CHARGER REAR PANEL ASSEMBLY		
-1A	103505		PANEL ASSY-REAR (LRTS) (V56878) (FOR NHA SEE FIG. 7)		RF
5	102825		.SCREW-PH PH (4-40 X 1/2 IN.) (V56878)		1
10	103436		.WASHER-NO. 4 ZINC FLAT (V56878)		1
15	100612		.NUT-HEX 4-40 (V56878)		1
20	103114		.MOUNTING KIT-TO-220 (V56878)		1
25	103434		.SCREW-FH PH (6-32 X 1/2 IN.) (V56878)		1
30	100543		.WASHER-NO. 6 INTENAL STAR (V56878)		4
35	100444		.NUT-HEX 6-32 (V56878)		2
40	103506		.HARNESS ASSY-WIRE (V56878)		1
45	103433		.SCREW-FH PH (6-32 X 1/4 IN.) (V56878)		3
50	103439-02		.HEATSINK ASSY- (V56878)		1
55	103422		.ENTRY MODULE-PWR (V56878)		1
60	103397		.FUSE-250V 2 AMP (V56878)		2
65	103009		.TERMINAL-SLIP ON (.187 X.032 IN.) (V56878)		3
70	102706		.TERMINAL-RING NO. 6 18-22 GA (V56878)		1
75	103049		.CONNECTOR-MOLEX 3 PL HOUSING (V56878)		1
80	102191		.PIN-(08-50-0106) (V56878)		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
85	103393-02		.PANEL- (V56878)		1

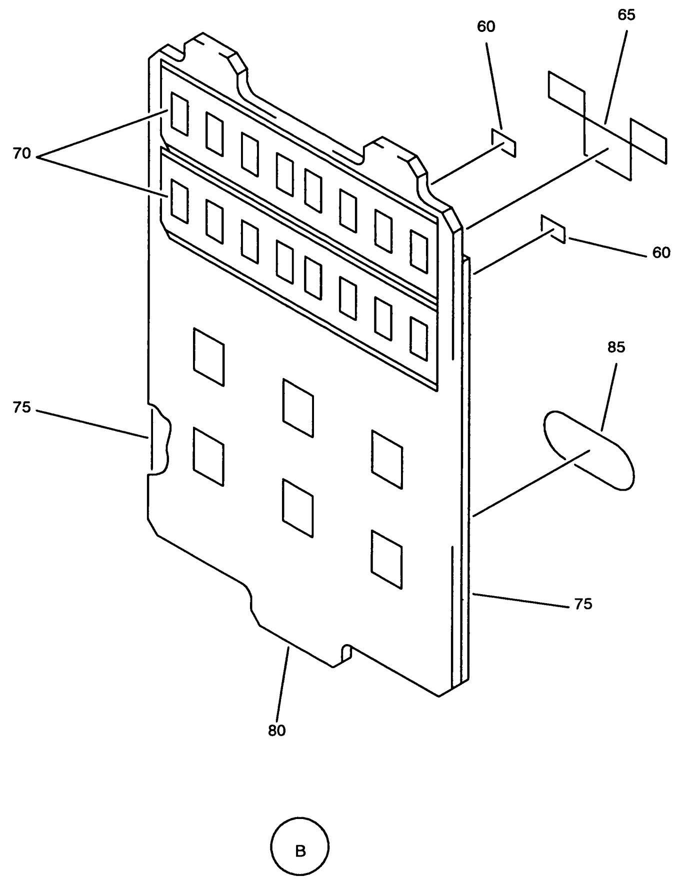


Jumper Cable Assembly
Figure 10

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
10-					
			JUMPER CABLE ASSY		
-1	906-10281-1		CABLE ASSY-JUMPER (OPTIONAL EQUIPMENT) (FOR NHA SEE FIG. 1)		RF
5	1A2401-1		.CABLE ASSY-12 FOOT (V053H3)		1
10	1A2402-1		.CABLE ASSY-42 FOOT (V053H3)		1
15	103911		.CASE (V29724)		1
20	BAC27WEX1823		.MARKER-ALUMINUM FOIL (.635 X 15.24 X 30.48 CM)		1



Bite Module Assembly
Figure 11 (Sheet 1)



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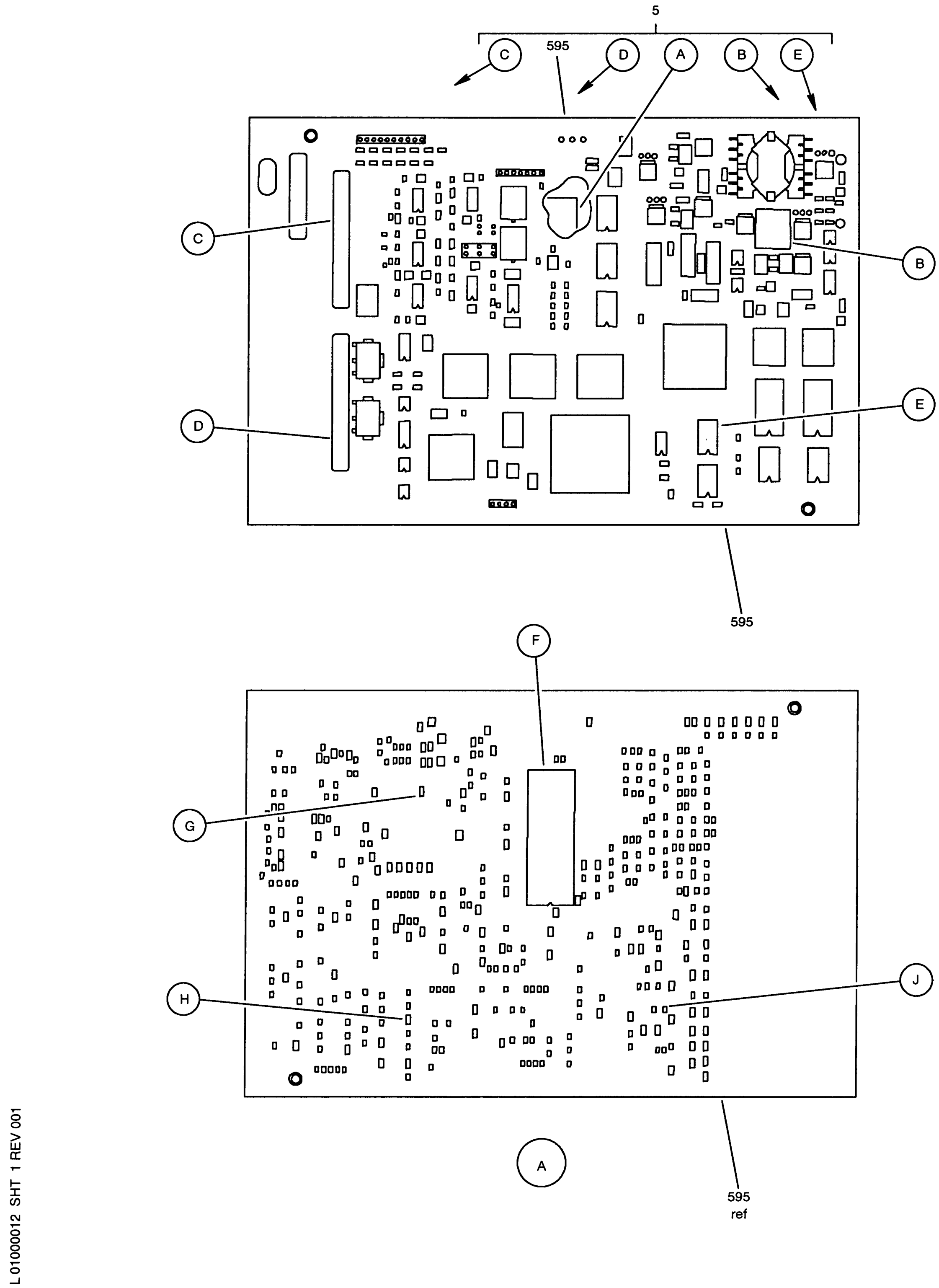
Bite Module Assembly
Figure 11 (Sheet 2)

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
11-					
			BITE MODULE ASSY		
-1A	69-73010-2		MODULE ASSY-BITE FOR NHA SEE FIG. 2)		RF
5	114072FP500SS1 1		.SCREW- (V51506) (OPT ITEM 5A)		4
-5A	6234SS0440-6B		.SCREW- (V1YGB8) (OPT ITEM 5)		4
10	NAS620C4L		.WASHER		4
15	MS51957-5		.SCREW		3
20	NAS620C2		.WASHER		3
25	69-73027-3		.CIRCUIT ASSY-PRINTED I/O		1
30	BCK1502FB		..RESISTOR-CHIP FILM 15.0K, .125W, 1PCT (V01121) (SPEC 900-14052-1502) (R1-R19) (OPT BCK1502FK (V011211)) (OPT CRW1206-150FT (V91637)) (OPT CRW1206-1502FB (V91637)) (OPT RK73H2BTE1502F (59124)) (OPT 9C12063A1502FKRT) (V19701)) (OPT 9c12063A1502FKRB) (V19701)) OPT C1206CPX1502F10 (V56235)		19
35	S906-70293-227		..CONNECTOR- (J1) (OPT ITEM 35A, 35B)		1
-35A	40C212-10		..CONNECTOR- (V51667) (J1) (OPT ITEM 35, 35B)		1
-35B	40C212-11		..CONNECTOR- (V51667) (J1) (OPT ITEM 35, 35A)		1
40	S906-70293-231		..CONNECTOR- (J2, J3) (OPT ITEM 40A, 40B)		2
-40A	SL122G19		..CONNECTOR-		2

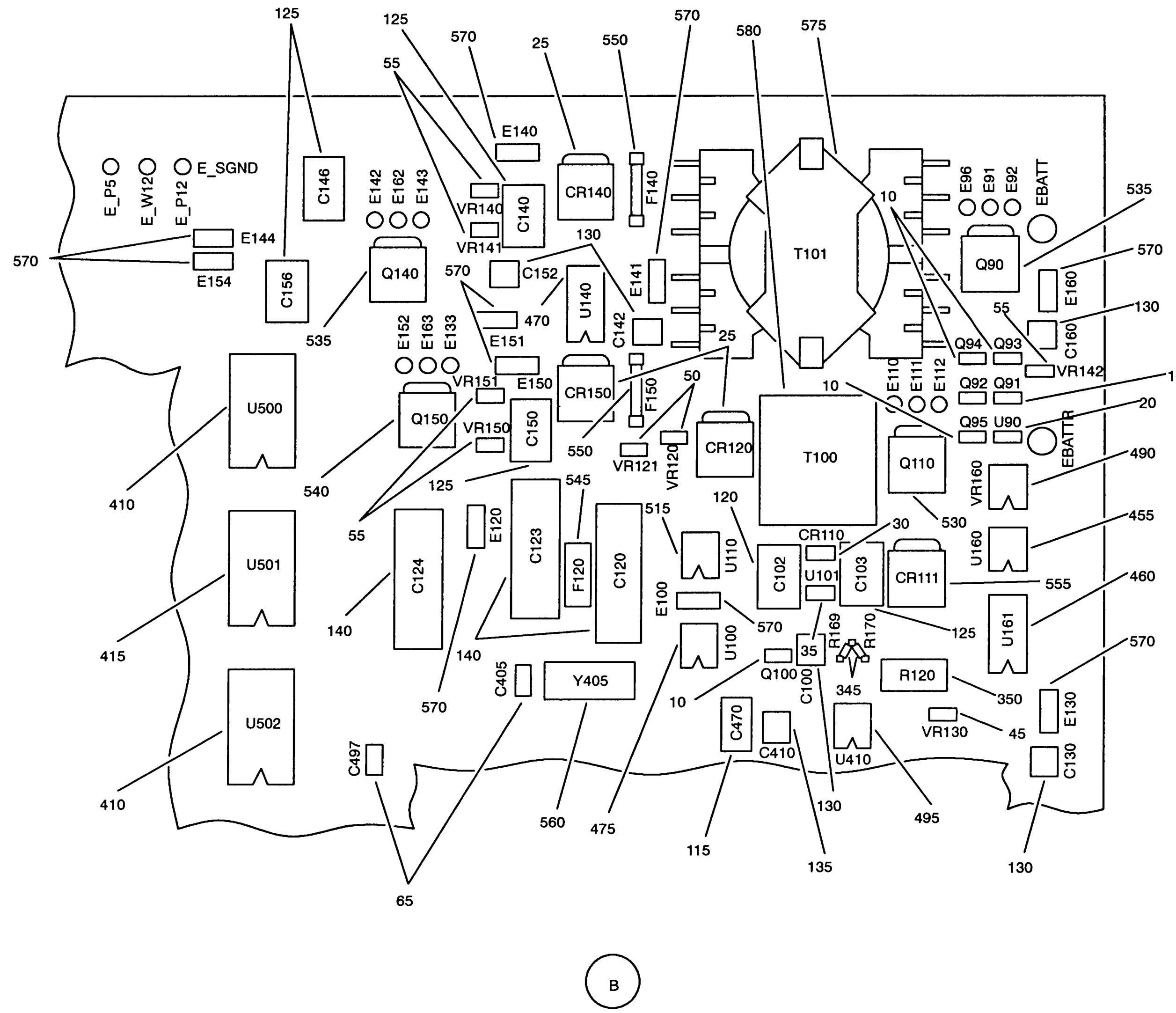
FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
			(V55322) (J2, J3) (OPT ITEM 40, 40B)		
-40B	SL122T19		..CONNECTOR- (V55322) (J2, J3) (OPT ITEM 40, 40A)		2
45	906-30237-4		..BOARD		1
50	BAC27TEX1486		..DECAL-ESDS		1
55	69-73028-3		.CIRCUIT ASSY-PRINTED KEY BOARD		1
60	R1206X103K3B04		..CAPACITOR-CHIP .01UF, 100V, 10PCT (V0FDX0) (SPEC 900-14050-10391) (C1, C2) (OPT 12061C103KHT1AV (V0FDX0)) (OPT 7009Y103KXBAT (V95275))		2
65	293D054		..CAPACITOR-CHIP 33UF, 20V, 10PCT (V2N936) (SPEC BCREF11105) (TOO LONG PART NO. S906-10119-33685) (C3)		1
70	HDSP2531		..OPTICAL DISPLAY-ESDS (V3FFX3) (DS1, DS2)		2
75	S906-70293-230		..CONNECTOR- (P1, P2) (OPT ITEM 75A, 75B)		2
-75A	BBL122GE		..CONNECTOR- (V55322) (P1, P2) (OPT ITEM 75, 75B)		2
-75B	BBL122TE		..CONNECTOR- (V55322) (P1, P2) (OPT ITEM 75, 75A)		2
80	906-30236-4		..BOARD		1
85	BAC27TEX1486		..DECAL-ESDS		1
90	100534		.SWITCH- (V08MU3)		1
95	69-73014-1		.HOUSING ASSY		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
100	69-73014-2		..HOUSING		1
105	6035-02BR188		...INSERT (V01556)		3

EQUIPMENT DESIGNATOR	FIG ITEM
C1	11 -60
C2	11 -60
C3	11 -65
DS1	11 -70
DS2	11 -70
J1	11 -35 11 -35A 11 -35B
J2	11 -40 11 -40A 11 -40B
J3	11 -40 11 -40A 11 -40B
P1	11 -75 11 -75A 11 -75B
P2	11 -75 11 -75A 11 -75B
R1-R19	11 -30



Printed Wiring Assembly
Figure 12 (Sheet 1)



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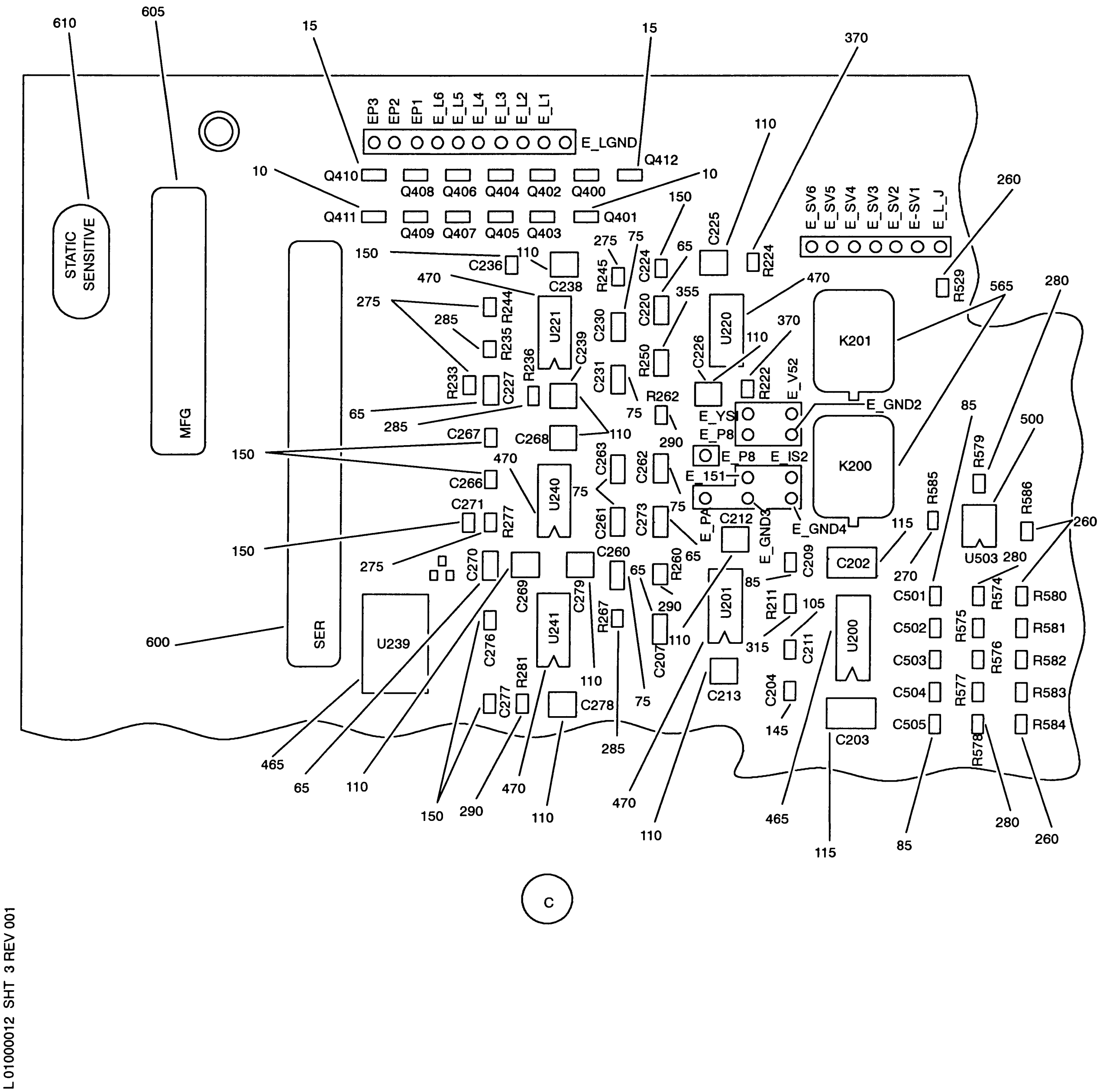
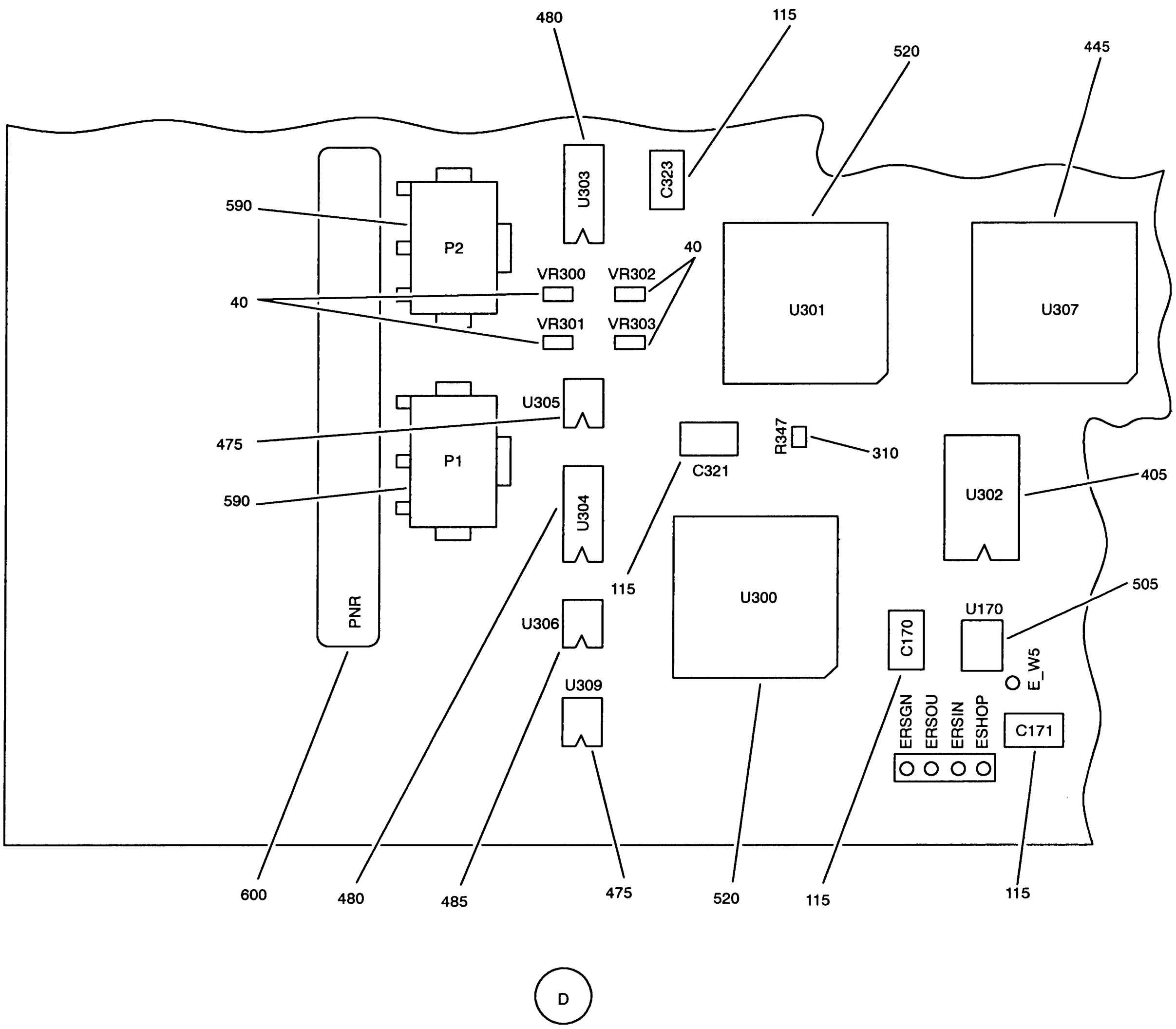
Printed Wiring Assembly
Figure 12 (Sheet 2)



Printed Wiring Assembly
Figure 12 (Sheet 3)



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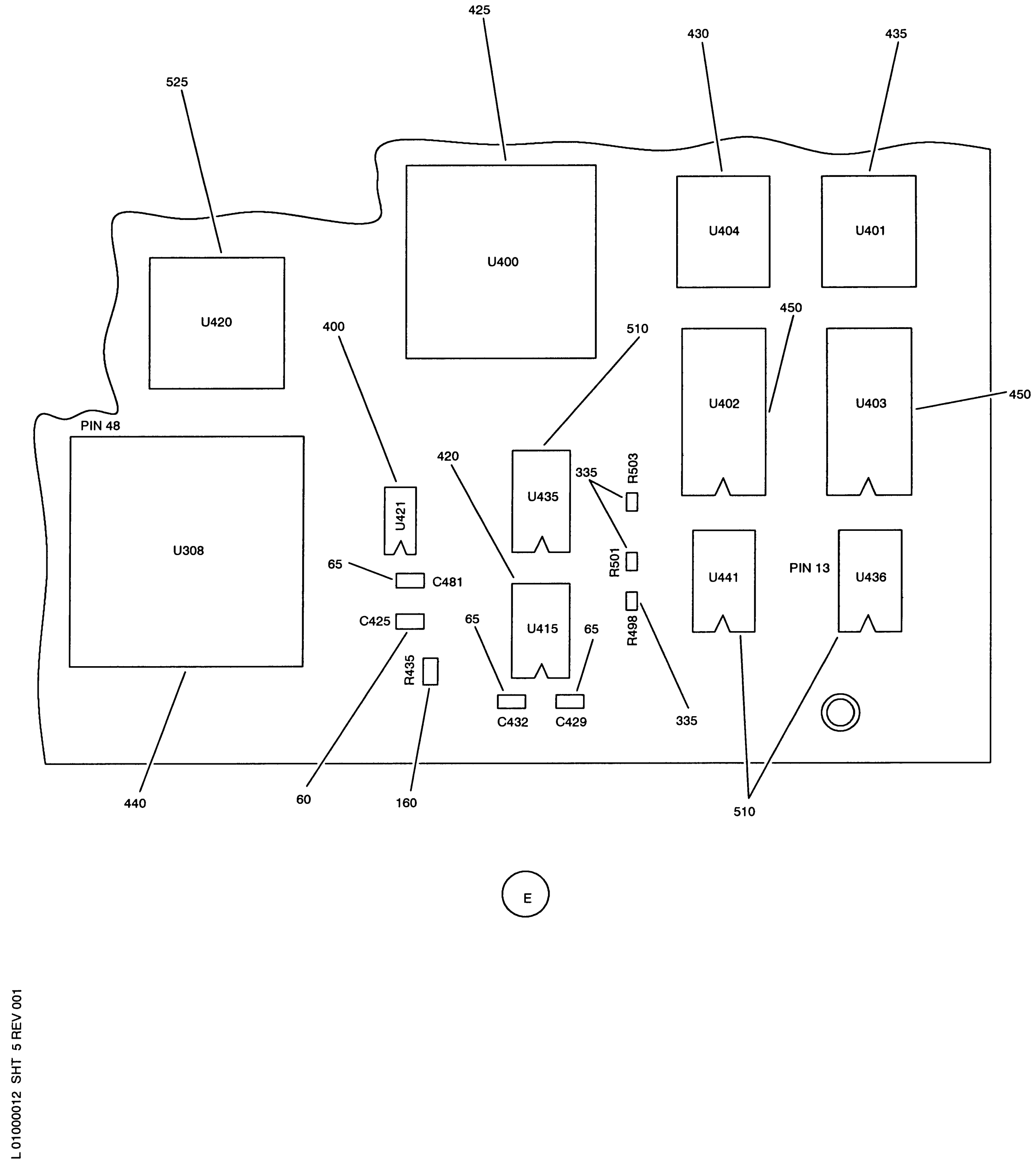
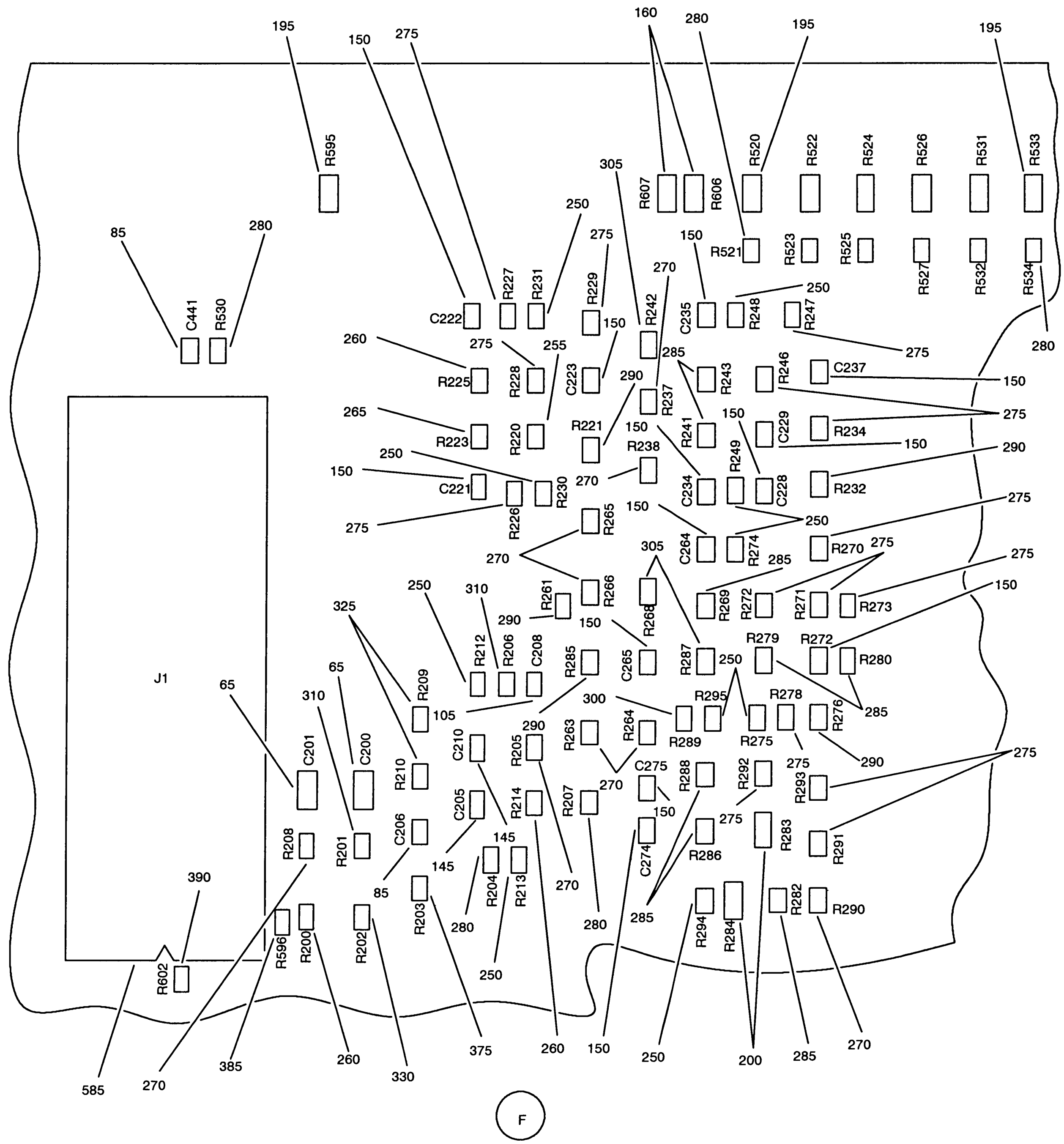
Printed Wiring Assembly
Figure 12 (Sheet 4)



Printed Wiring Assembly
Figure 12 (Sheet 5)



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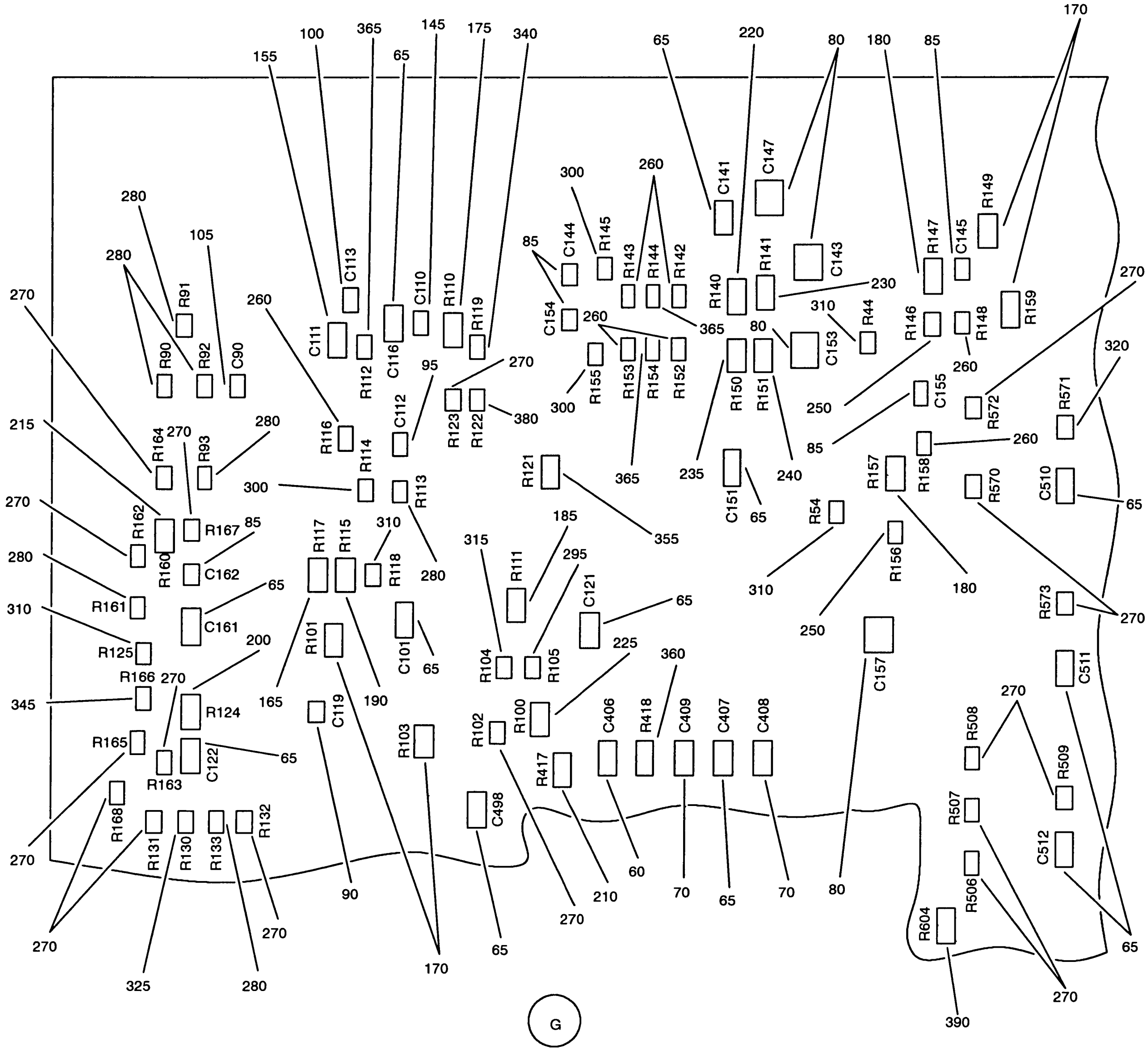
Printed Wiring Assembly
Figure 12 (Sheet 6)



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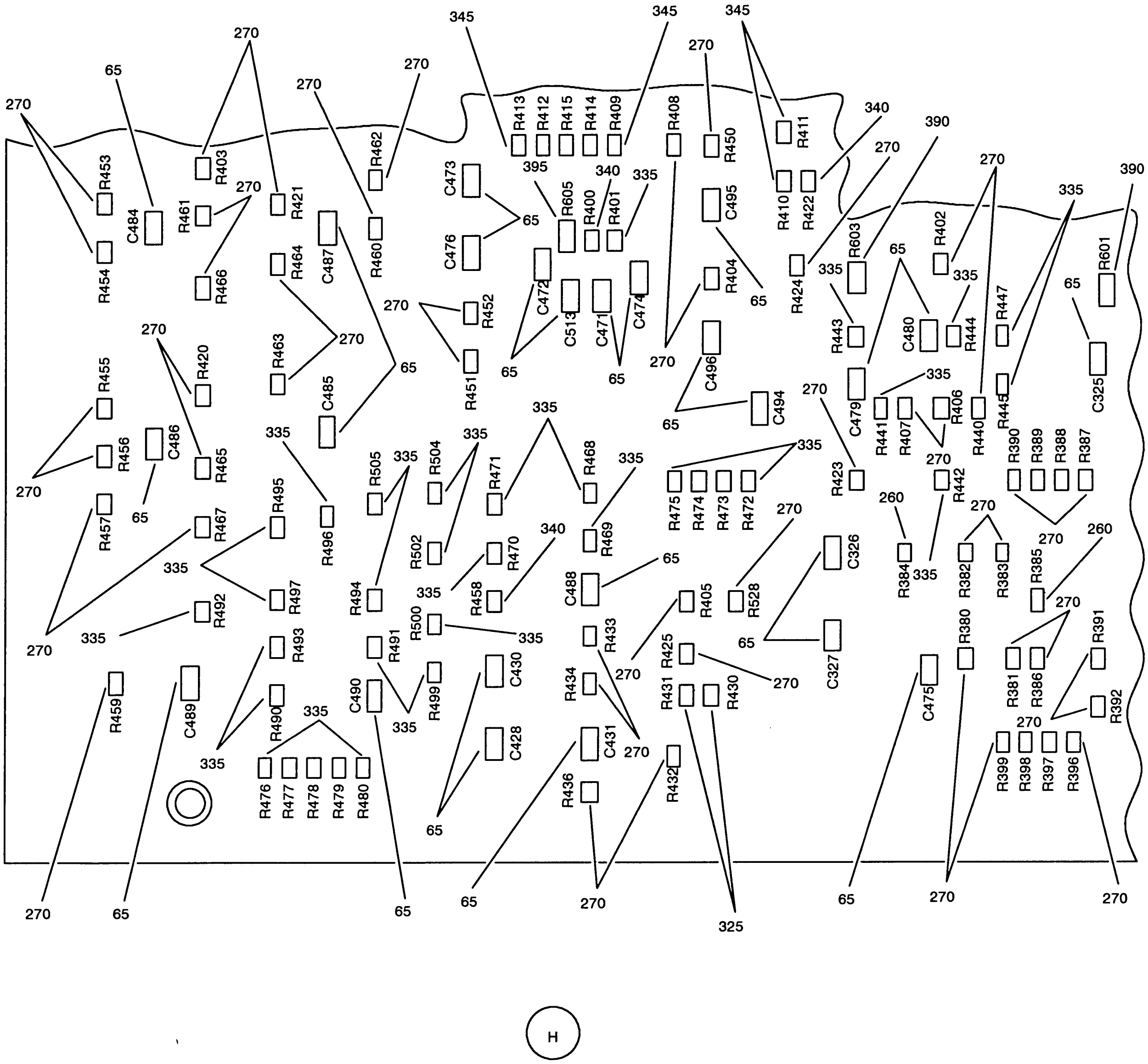
Printed Wiring Assembly
Figure 12 (Sheet 7)



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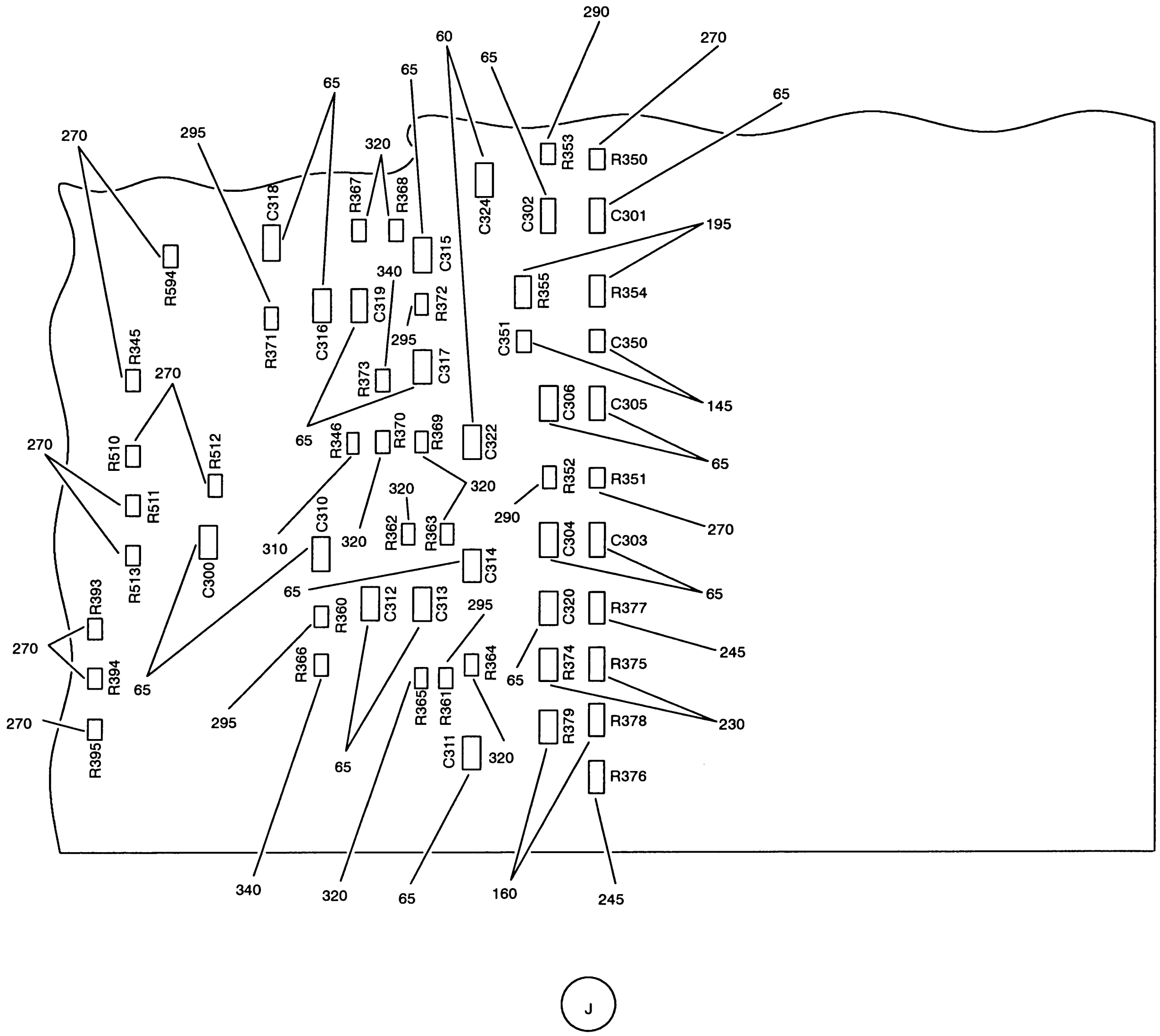
Printed Wiring Assembly
Figure 12 (Sheet 8)



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Printed Wiring Assembly
Figure 12 (Sheet 9)

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
12-					
			PRINTED WIRING ASSY-LOOP RESISTANCE TESTER		
-1A	906-10250-4		PRINTED WIRING ASSY-LOOP RESISTANCE TESTER (STATIC SENSITIVE PART) (FOR NHA SEE FIG. 2)		RF
5	906-10250-2		.PRINTED WIRING ASSY (STATIC SENSITIVE PART)		1
10	906-50037-006		..MOSFET-N CHANNEL (Q91-Q95, Q100, Q401, Q403, Q405, Q407, Q409, Q411)		12
15	906-50037-013		..MOSFET-P CHANNEL (Q400, Q402, Q404, Q406, Q408, Q410, Q412)		
20	906-50037-1052		..DIODE-ZENER (STATIC SENSITIVE PART) (U90)		1
25	906-50037-114		..DIODE-RECTIFIER (STATIC SENSITIVE PART) (CR120, CR140, CR150)		
30	906-50037-1030		..DIODE-SWITCHING (STATIC SENSITIVE PART) (CR110)		1
35	906-50037-127		..DIODE-SWITCHING (STATIC SENSITIVE PART) (U101)		1
40	906-50037-202		..DIODE-ZENER (VR300-VR303)		4
45	906-50037-204		..DIODE-ZENER (VR130)		1
50	906-50037-209		..DIODE-ZENER (VR120, VR121)		2
55	906-50037-218		..DIODE-ZENER (STATIC SENSITIVE PART) (VR140-VR142, VR150, VR151)		5
60	900-14050-10395		..CAPACITOR-10 PCT 50V .01 UF CHIP (C322, C324, C406, C425)		4

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
65	900-14050-10495		..CAPACITOR-10 PCT 50V .1UF CHIP (STATIC SENSITIVE PART) (C101, C116, C121, C122, C141, C151, C161, C200, C201, C207, C220, C227, C270, C273, C300-C306, C310-C320, C325-C327, C405, C407, C428-C432, C471-C476, C479-C481, C484-C490, C494-C498, C510-C513)		67
70	900-14050-22095		..CAPACITOR-10 PCT 50V 22PF CHIP (C408, C409)		2
75	900-14050-33295		..CAPACITOR-10 PCT 50V 3300PF CHIP (C230, C231, C260-C263)		6
80	900-10451-10491		..CAPACITOR-10PCT 100V .1UF CHIP (C143, C147, C153, C157)		4
85	BCREF13174		..CAPACITOR-10 PCT 100V .01UF CHIP (S906-71326-10391) (C144, C145, C154, C155, C162, C206, C209, C441, C501-C505)		13
90	BCREF13688		..CAPACITOR-10 PCT 100V 2200PF CHIP (S906-71326-22291) (C119)		1
95	BCREF13688		..CAPACITOR-2 PCT 100V 470PF CHIP (S906-71326-47121) (C112)		1
100	BCREF13110		..CAPACITOR-10 PCT 100V 4700PF CHIP (S906-71326-47291) (C113)		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
105	BCREF13111		..CAPACITOR-10 PCT 100V .047UF CHIP (STATIC SENSITIVE PART) (S906-71326-47391) (C90, C208, C211)		3
110	BCREF10439		..CAPACITOR-10 PCT 35V 1UF CHIP (S906-10119-10567) (C212, C213, C225, C226, C238, C239, C268, C269, C278, C279)		10
115	BCREF10597		..CAPACITOR-10 PCT 25V 10UF CHIP (S906-10119-10676) (C170, C171, C202, C203, C321, C323, C470)		7
120	BCREF10440		..CAPACITOR-10 PCT 35V 10UF CHIP (S906-10119-10687) (C102)		1
125	BCREF120547		..CAPACITOR-10 PCT 25V 22U CHIP (S906-10119-22686) (C103, C140, C146, C150, C156)		5
130	BCREF10605		..CAPACITOR-10 PCT 50V .47UF CHIP (S906-10119-47468) (C100, C130, C142, C152, C160)		5
135	BCREF10600		..CAPACITOR-10 PCT 20V 4.7UF CHIP (S906-10119-47565) (C410)		1
140	S906-10181-003		..CAPACITOR-10 PCT 10V 150UF ELECTROLYTIC (C120, C123, C124) (OPT ITEM 140A)		3
140A	T330D157K010AS		..CAPACITOR-10 PCT 10V 150UF ELECTROLYTIC (C120, C123, C124) (OPT ITEM 140)		3

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
145	S906-71326-10221		..CAPACITOR-2 PCT 100V 1000PF CHIP (STATIC SENSITIVE PART) (C110, C204, C205, C210, C350, C351)		6
150	S906-71326-10121		..CAPACITOR-2 PCT 100V 100PF CHIP (STATIC SENSITIVE PART) (C221-C224, C228, C229, C234-C237, C264-C267, C271, C272, C274-C277)		20
155	900-14050-27095		..CAPACITOR-10 PCT 50V 27PF CHIP (C111) (OPT ITEM 155A)		1
155A	S906-71326-27021		..CAPACITOR-10 PCT 50V 27PF CHIP (C111) (OPT ITEM 155)		1
160	900-14052-1000		..RESISTOR-1 PCT .125W 100 CHIP FILM (STATIC SENSITIVE PART) (R378, R379, R435, R606, R607)		5
165	900-14052-10R0		..RESISTOR-1 PCT .125W 10 CHIP FILM (R117)		1
170	900-14052-1102		..RESISTOR-1 PCT .125W 11K CHIP FILM (R101, R103, R149, R159)		4
175	900-14052-1212		..RESISTOR-1 PCT .125W 12.1K CHIP FILM (R110)		1
180	900-14052-1402		..RESISTOR-1 PCT .125W 14K CHIP FILM (R147, R157)		2
185	900-14052-4993		..RESISTOR-1 PCT .125W 499K CHIP FILM (R111)		1
190	900-14052-15R0		..RESISTOR-1PCT .125W 499K CHIP FILM (R115)		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
195	900-14052-2000		..RESISTOR-1 PCT .125W 200 CHIP FILM (STATIC SENSITIVE PART) (R354, R355, R520, R522, R524, R526, R531, R533, R595)		9
200	900-14052-2212		..RESISTOR-1 PCT .125W 2.21K CHIP FILM (R124)		1
205	900-14052-2214		..RESISTOR-1 PCT .125W 2.21K CHIP FILM (R283, R284)		2
210	900-14052-3323		..RESISTOR-1 PCT .125W 332K CHIP FILM (R417)		1
215	900-14052-3571		..RESISTOR-1 PCT .125W 3.57K CHIP FILM (R160		1
220	900-14052-4021		..RESISTOR-1 PCT .125W 4.02K CHIP FILM (R140)		1
225	900-14052-8871		..RESISTOR-1 PCT .125W 8.87K CHIP FILM (R100)		1
230	900-40014-1001		..RESISTOR-1 PCT .125W 1K CHIP FILM (STATIC SENSITIVE PART) (R141, R374, R375)		3
235	900-40014-2001		..RESISTOR-1 PCT .125W 2K CHIP FILM (STATIC SENSITIVE PART) (R150)		1
240	900-40014-2491		..RESISTOR-1 PCT .125W 2.49K CHIP FILM (STATIC SENSITIVE PART) (R151)		1
245	900-40014-9091		..RESISTOR-1 PCT .125W 9.09K CHIP FILM (STATIC SENSITIVE PART) (R376, R377)		2

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
250	S906-71327-1000		..RESISTOR-1 PCT .1W 100 CHIP FILM (STATIC SENSITIVE PART) (R146, R156, R212, R213, R230, R231, R248, R249, R274, R275, R294, R295)		12
255	S906-10416-1000		..RESISTOR-1 PCT .1W 100 CHIP FILM (STATIC SENSITIVE PART) (R220)		12
260	S906-71327-1001		..RESISTOR-1 PCT .1W 1K CHIP FILM (STATIC SENSITIVE PART) (R116, R142, R143, R148, R152, R153, R158, R200, R214, R225, R384, R385, R529, R580-R584, R586)		19
265	S906-10416-1001		..RESISTOR-1 PCT .1W 1K CHIP FILM (STATIC SENSITIVE PART) (R223)		1
270	S906-71327-1002		..RESISTOR-1 PCT .1W 10K CHIP FILM (STATIC SENSITIVE PART) (R102, R123, R131, R132, R162-R165, R167, R168, R205, R208, R237, R238, R263-R266, R345, R350, R351, R380-R383, R386-R399, R402-R408, R420, R421, R423-R425, R432-R434, R436, R440, R450-R457, R459, R460-R467, R506-R513, R528, R570, R572, R573, R585, R594)		87

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
275	S906-10416-1002		..RESISTOR-1 PCT .1W 10K CHIP FILM (STATIC SENSITIVE PART) (R226-R229, R233, R234, R244-R247, R270-R273, R277, R278, R290-R293)		20
280	S906-71327-1003		..RESISTOR-1 PCT .1W 100K CHIP FILM (STATIC SENSITIVE PART) (R90-R93, R113, R133, R161, R204, R207, R521, R523, R525, R527, R530, R532, R534, R574-R579)		22
285	S906-10416-1003		..RESISTOR-1 PCT .1W 100K CHIP FILM (STATIC SENSITIVE PART) (R235, R236, R241, R243, R267, R269, R279, R280, R286, R288)		10
290	S906-71327-1004		..RESISTOR-1 PCT .1W 1M CHIP FILM (STATIC SENSITIVE PART) (R221, R232, R260-R262, R276, R281, R282, R285, R352, R353)		11
295	S906-71327-10R0		..RESISTOR-1 PCT .1W 10 CHIP FILM (R105, R360, R361, R371, R372)		5
300	S906-71327-2001		..RESISTOR-1 PCT .1W 2K CHIP FILM (STATIC SENSITIVE PART) (R114, R145, R155, R289)		4
305	S906-10416-2001		..RESISTOR-1 PCT .1W 2K CHIP FILM (STATIC SENSITIVE PART) (R242,R268, R287)		3

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
310	S906-71327-2002		..RESISTOR-1 PCT .1W 20K CHIP FILM (R44, R54, R118, R125, R201, R206, R346, R347)		8
315	S906-71327-2003		..RESISTOR-1 PCT .1W 200K CHIP FILM (R104, R211)		2
320	S906-71327-3011		..RESISTOR-1 PCT .1W 3.01K CHIP FILM (R362-R365, R367-R370, R571)		9
325	S906-71327-3012		..RESISTOR-1 PCT .1W 30.1K CHIP FILM (R130, R209, R210, R430, R431)		5
330	S906-71327-3013		..RESISTOR-1 PCT .1W 30.1K CHIP FILM (STATIC SENSITIVE PART) (R202)		1
335	S906-71327-33R2		..RESISTOR-1 PCT .1W 33.2 CHIP FILM (R401, R441-R445, R447, R468-R480, R490-R505)		36
340	S906-71327-4990		..RESISTOR-1 PCT .1W 499 CHIP FILM (R119, R366, R373, R400, R422, R458)		6
345	S906-71327-4991		..RESISTOR-1 PCT .1W 4.99K CHIP FILM (R166, R169, R170, R409-R415)		10
350	S906-10134-017		..RESISTOR-1 PCT 1W 150 CHIP WIREWOUND (R120)		1
355	S906-10135-1200		..RESISTOR-5 PCT .125W 0 CHIP FILM (R121, R250)		2
360	S906-10135-1201		..RESISTOR-10 PCT .125W 10M CHIP FILM (R418)		1
365	S906-71327-4992		..RESISTOR-1PCT .1W 49.9K CHIP FILM (STATIC SENSITIVE PART) (R112, R144, R154)		3

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
370	S906-10416-4992		..RESISTOR-1 PCT .1W 49.9K CHIP FILM (STATIC SENSITIVE PART) (R222, R224)		2
375	S906-71327-4993		..RESISTOR-1 PCT .1W 499K CHIP FILM (R203)		1
380	S906-71327-1502		..RESISTOR-1 PCT .1W 15K CHIP FILM (R122)		1
385	906-40014-2002		..RESISTOR-1 PCT .125W 20K CHIP FILM (STATIC SENSITIVE PART) (R596)		1
390	906-40014-1002		..RESISTOR-1 PCT .125W 10K CHIP FILM (STATIC SENSITIVE PART) (R601-R604)		4
395	906-40014-1822		..RESISTOR-1 PCT .125W 18.2K CHIP FILM (STATIC SENSITIVE PART) (R605)		1
400	900-12471-001		..GATE- (STATIC SENSITIVE PART) (U421)		1
405	900-12471-040		..FLIP FLOP- (STATIC SENSITIVE PART) (U302)		1
410			..TRANSCEIVER- (STATIC SENSITIVE PART) (U500, U502)		2
415	900-12471-084		..FLIP FLP- (STATIC SENSITIVE PART) (U501)		1
420	900-12471-345		..TRANSCEIVER-INTERFACE (STATIC SENSITIVE PART) (U415)		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
425	900-12471-582		..PROCESSOR- (STATIC SENSITIVE PART) (U400)		1
430	900-10256-2		..EEPROM- (STATIC SENSITIVE PART) (U404)		1
435	900-12471-503		..EEPROM- (STATIC SENSITIVE PART) (U401)		1
440	900-12471-510		..SRAM- (STATIC SENSITIVE PART) (U308)		1
445	900-10254-1		..PMD- (STATIC SENSITIVE PART) (U307)		1
450	900-12471-545		..SRAM- (STATIC SENSITIVE PART) (U402, U403)		2
455	900-12471-610		..TIMER- (STATIC SENSITIVE PART) (U160)		1
460	900-12471-620		..COMPARATOR- (STATIC SENSITIVE PART) (U161)		1
465	900-12471-621		..SWITCH-SOLID STATE (STATIC SENSITIVE PART) (U200, U239)		2
470	900-12471-630		..AMPLIFIER- (STATIC SENSITIVE PART) (U140, U201, U220, U221, U240, U241)		6
475	900-12471-635		..AMPLIFIER- (STATIC SENSITIVE PART) (U100, U305, U309)		3
480	900-12471-336		..MULTIPLEXER-ANALOG (STATIC SENSITIVE PART) (U303, U304)		2

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
485	900-12471-634		..VOLTAGE REFERENCE- (STATIC SENSITIVE PART) (U306) (OPT ITEM 485A)		1
485A	900-12471-386		..VOLTAGE REFERENCE- (STATIC SENSITIVE PART) (U306) (OPT ITEM 485)		1
490	900-12471-693		..VOLTAGE REFERENCE- (STATIC SENSITIVE PART) (VR160)		1
495	900-12471-701		..VOLTAGE REGULATOR- (STATIC SENSITIVE PART) (U410)		1
500	900-12471-752		..INSULATOR-OPTICAL (STATIC SENSITIVE PART) (U503)		1
505	900-12471-773		..VOLTAGE REGULATOR- (STATIC SENSITIVE PART) (U170)		1
510	900-12471-821		..TRANSCEIVER- (STATIC SENSITIVE PART) (U435, U436, U441)		3
515	S906-71202-6505		..POWER CONTROLLER- (U110) (OPT ITEM 515A)		1
515A	UCC2805D		..POWER CONTROLLER- (U110) (OPT ITEM 515)		1
520	S906-71202-6305		..CONVERTER-AD (U300, U301) (OPT ITEM 520A, 520B)		2
520A	CS5016JL16		..CONVERTER-AD (U300, U301) (OPT ITEM 520, 520B)		2
520B	CS5016JL16		..CONVERTER-AD (U300, U301) (OPT ITEM 520, 520A)		2
525	906-10252-2		..PMD- (STATIC SENSITIVE PART) (U420)		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
530	S906-71202-7500		..MOSFET-N CHANNEL (Q110) (OPT ITEM 530A)		1
530A	IRFR1205		..MOSFET-N CHANNEL (V81483) (Q110) (OPT ITEM 530)		1
535	900-12472-003		..MOSFET-P CHANNEL (STATIC SENSITIVE PART) (Q90, Q140)		2
540	900-12472-004		..MOSFET-N CHANNEL (STATIC SENSITIVE PART) (Q150)		1
545	S906-10135-4006		..FUSE-1A (F120) (OPT ITEM 545A)		1
550	FM04A125V1-4A		..FUSE-.25A (F140, F150)		2
555	S900-12473-310		..RECTIFIER- (STATIC SENSITIVE PART) (CR111) (OPT ITEM 555A)		1
555	S900-12473-311		..RECTIFIER- (STATIC SENSITIVE PART) (CR111) (OPT ITEM 555)		1
560	S906-10135-2002		..CRYSTAL-32.768KHZ (Y405)		1
565	S906-10155-9415		..RELAY-DPDT (STATIC SENSITIVE PART) (K200, K201)		2
570	S906-70381-3		..FERRITE-BEAD LEADED (E100, E120, E130, E140, E141, E144, E150, E151, E154, E160)		10
575	S906-10263-1		..TRANSFORMER- (T101)		1
580	S906-70490-1		..TRANSFORMER- (T100)		1
585	S906-70293-238		..CONNECTOR- (J1)		1

FIG & ITEM NO.	PART NO.	AIRLINE PART NO.	NOMENCLATURE	USE CODE	QTY PER ASSY
590	S906-70293-287		..CONNECTOR- (P1, P2)		2
595	906-10251-5		..PRINTED WIRING BOARD ASSY		1
600	S906-10207-2		..LABEL-BAR CODE		2
605	S906-10207-4		..LABEL-BAR CODE		1
610	BACTEX1486		..DECAL-		1
615	906-10250-6		.KIT-COMPONENT (STATIC SENSITIVE PART)		AR
620	S906-10135-0147		..CAPACITOR-CHIP (C270, C273)		2
625	S906-71327-3011		..RESISTOR-CHIP FILM 3.01K, .1W, 1PCT (R277, R278)		2
630	S906-71327-1002		..RESISTOR-CHIP FILM 10K, .1W, 1PCT (R281)		1
635	900-14052-4992		..RESISTOR-CHIP FILM 49.9K, .125W, 1PCT (R283)		1
640	900-14052-1002		..RESISTOR-CHIP FILM 10K, .125W, 1PCT (R284)		1
645	S906-71327-1003		..RESISTOR-CHIP FILM 100K, .1W, 1PCT (R285, R289)		2
650	S906-71327-3012		..RESISTOR-CHIP FILM 30.1K, .1W, 1PCT (R276, R279, R280)		3
655	900-12471-372		..AMPLIFIER- (STATIC SENSITIVE PART) (U240, U241)		2

EQUIPMENT DESIGNATOR	FIG ITEM
C90	12 -105
C100	12 -130
C101	12 -65
C102	12 -120
C103	12 -120
C110	12 -145
C111	12 -155
	12 -155A
C112	12 -95
C113	12 -100
C116	12 -65
C119	12 -90
C120	12 -140
	12. 140A
C121	12 -65
C122	12 -65
C123	12 -140
	12 -140A
C124	12 -140
	12 -140A
C130	12 -130
C140	12 -125
C141	12 -65
C142	12 -130
C143	12 -80
C144	12 -85
C145	12 -85
C146	12 -125
C147	12 -80
C150	12 -125
C151	12 -65
C152	12 -130
C153	12 -80
C154	12 -85
C155	12 -85
C156	12 -125
C157	12 -80
C160	12 -130
C161	12 -65
C162	12 -85
C170	12 -115
C171	12 -115
C200	12 -65
C201	12 -65
C202	12 -115
C203	12 -115
C204	12 -145
C205	12 -145
C206	12 -85

EQUIPMENT DESIGNATOR	FIG ITEM
C207	12 -65
C208	12 -105
C209	12 -85
C210	12 -145
C211	12 -105
C212	12 -110
C213	12 -110
C220	12 -65
C221 - C224	12 -150
C225	12 -110
C226	12 -110
C227	12 -65
C228	12 -150
C229	12 -150
C230	12 -75
C231	12 -75
C234 - C237	12 -150
C238	12 -110
C239	12 -110
C260 – C263	12 -75
C264 – C267	12 -150
C268	12 -110
C269	12 -110
C270	12 -65
	12 -120
C271	12 -150
C272	12 -150
C273	12 -65
	12 -620
C274 – C277	12 -150
C278	12 -110
C279	12 -110
C300 – C306	12 -65
C310 – C320	12 -65
C321	12 -115
C322	12 -60
C323	12 -115
C324	12 -60
C325 – C327	12 -65
C350	12 -145
C351	12 -145
C405	12 -65
C406	12 -60
C407	12 -65
C408	12 -70
C409	12 -70
C410	12 -135
C425	12 -60
C428 – C432	12 -65

EQUIPMENT DESIGNATOR	FIG ITEM
C441	12 -85
C470	12 -115
C471 — C476	12 -65
C479 — C481	12 -65
C484 — C490	12 -65
C494 — C498	12 -65
C501 — C505	12 -85
C510 — C513	12 -65
C514-C515	12 -65
CR110	12 -30
CR111	12 -555
	12 -555A
CR120	12 -25
CR140	12 -25
CR150	12 -25
E100	12 -570
E120	12 -570
E130	12 -570
E140	12 -570
E141	12 -570
E144	12 -570
E150	12 -570
E151	12 -570
E154	12 -570
E160	12 -570
F120	12 -545
	12 -545A
F140	12 -550
F150	12 -550
J1	12 -585
K200	12 -565
K201	12 -565
P1 - P2	12 -590
Q90	12 -535
Q91 — Q95	12 -10
Q100	12 -10
Q110	12 -530
	12 -530A
Q140	12 -535
Q150	12 -540
Q400	12 -15
Q401	12 -10
Q402	12 -15
Q403	12 -10
Q404	12 -15
Q405	12 -10
Q406	12 -15
Q407	12 -10
Q408	12 -15
Q409	12 -10

EQUIPMENT DESIGNATOR	FIG ITEM
Q410	12 -15
Q411	12 -10
Q412	12 -15
R100	12 -225
R101	12 -170
R102	12 -270
R103	12 -170
R104	12 -315
R105	12 -295
R110	12 -175
R111	12 -185
R112	12 -365
R113	12 -280
R114	12 -230
R115	12 -190
R116	12 -260
R117	12 -165
R118	12 -310
R119	12 -340
R120	12 -350
R121	12 -355
R122	12 -380
R123	12 -270
R124	12 -200
R125	12 -310
R130	12 -325
R131	12 -270
R132	12 -270
R133	12 -280
R140	12 -220
R141	12 -230
R142	12 -260
R143	12 -260
R144	12 -365
R145	12 -300
R146	12 -250
R147	12 -180
R148	12 -260
R149	12 -170
R150	12 -235
R151	12 -240
R152	12 -260
R153	12 -260
R154	12 -365
R155	12 -300
R156	12 -250
R157	12 -180
R158	12 -260
R159	12 -170
R160	12 -215

EQUIPMENT DESIGNATOR	FIG ITEM
R161	12 -280
R162 — R165	12 -270
R166	12 -345
R167	12 -270
R168	12 -270
R169	12 -345
R170	12 -345
R200	12 -260
R201	12 -310
R202	12 -330
R203	12 -375
R204	12 -280
R205	12 -270
R206	12 -310
R207	12 -280
R208	12 -270
R209	12 -325
R210	12 -325
R211	12 -315
R212	12 -250
R213	12 -250
R214	12 -260
R220	12 -255
R221	12 -290
R222	12 -370
R223	12 -265
R224	12 -370
R225	12 -260
R226 — R229	12 -275
R230	12 -250
R231	12 -250
R232	12 -250
R233	12 -275
R234	12 -275
R235	12 -285
R236	12 -285
R237	12 -270
R238	12 -270
R241	12 -285
R242	12 -305
R243	12 -285
R244 — R247	12 -275
R248	12 -250
R249	12 -250
R250	12 -355
R260 — R262	12 -290
R263 — R266	12 -270
R267	12 -285
R268	12 -305
R269	12 -285

EQUIPMENT DESIGNATOR	FIG ITEM
R270 — R273	12 -275
R274	12 -250
R275	12 -250
	12 -650
R276	12 -290
R277	12 -275
	12 -625
R278	12 -275
	12 -625
R279	12 -285
	12 -625
R280	12 -285
	12 -650
R281	12 -290
	12 -630
R282	12 -290
R283	12 -205
	12 -635
R284	12 -205
	12 -640
R285	12 -290
	12 -645
R286	12 -285
R287	12 -305
R288	12 -285
R289	12 -300
	12 -645
R290 — R293	12 -275
R294	12 -250
R295	12 -250
R345	12 -270
R346	12 -310
R347	12 -310
R350	12 -270
R351	12 -270
R352	12 -290
R353	12 -290
R354	12 -195
R355	12 -195
R360	12 -295
R361	12 -295
R362 — R365	12 -320
R366	12 -340
R367 — R370	12 -320
R371	12 -295
R372	12 -295
R373	12 -340
R374	12 -230
R375	12 -230
R376	12 -245

EQUIPMENT DESIGNATOR	FIG ITEM
R377	12 -245
R378	12 -160
R379	12 -160
R380 — R383	12 -270
R384	12 -260
R385	12 -260
R386 — R399	12 -270
R400	12 -340
R401	12 -335
R402 — R408	12 -270
R409 — R415	12 -345
R417	12 -210
R418	12 -360
R420	12 -270
R421	12 -270
R422	12 -340
R423 — R425	12 -270
R430	12 -325
R431	12 -325
R432 — R434	12 -270
R435	12 -160
R436	12 -270
R440	12 -270
R44	12 -310
R441 — R445	12 -335
R447	12 -335
R450 — R457	12 -270
R458	12 -340
R459	12 -270
R460 — R467	12 -270
R468 — R480	12 -335
R490 - R505	12 -335
R506 — R513	12 -270
R520	12 -195
R521	12 -285
R522	12 -195
R523	12 -280
R524	12 -195
R525	12 -280
R526	12 -195
R527	12 -280
R528	12 -270
R529	12 -260
R530	12 -280
R531	12 -195
R532	12 -280
R533	12 -195
R534	12 -280
R54	12 -310
R570	12 -270

EQUIPMENT DESIGNATOR	FIG ITEM
R571	12 -320
R572	12 -270
R573	12 -270
R574 — R579	12 -280
R580 — R584	12 -260
R585	12 -270
R586	12 -260
R594	12 -270
R595	12 -195
R596	12 -385
R601 - R604	12 -390
R605	12 -395
R606	12 -160
R607	12 -160
R90 - R93	12 -280
T100	12 -580
T101	12 -575
U90	12 -20
U100	12 -475
U101	12 -35
U110	12 -515
	12 -515A
U140	12 -470
U160	12 -455
U161	12 -460
U170	12 -505
U200	12 -465
U201	12 -470
U220	12 -470
U221	12 -470
U239	12 -465
U240	12 -470
	12 -655
U241	12 -470
	12 -655
U300	12 -520
	12 -520A
	12 -520B
U301	12 -520
	12 -520A
	12 -520B
U302	12 -405
U303	12 -480
U304	12 -480
U305	12 -475
U306	12 -485
	12 -485A
U307	12 -445
U308	12 -440
U309	12 -475

EQUIPMENT DESIGNATOR	FIG ITEM	EQUIPMENT DESIGNATOR	FIG ITEM
U400	12 -425		
U401	12 -435		
U402	12 -450		
U403	12 -450		
U404	12 -430		
U410	12 -495		
U415	12 -420		
U420	12 -525		
U421	12 -400		
U435	12 -510		
U436	12 -510		
U441	12 -510		
U500	12 -410		
U501	12 -415		
U502	12 -410		
U503	12 -500		
VR120	12 -50		