HHDLU DESCRIPTION

1. General

The Hand Held Download Unit (HHDLU), PN 964-0446-001; manufactured by Honeywell, Redmond, Washington; is used to quickly copy the contents of the Crash Survivable Memory Unit (CSMU) from the SSFDR, SSUFDR, or AR-Series SSFDR while the recorder is installed on the aircraft.

The Hand Held Download Unit (HHDLU), PN 964-0446-021; manufactured by Honeywell, Redmond, Washington; is used to quickly copy the contents of the Crash Survivable Memory Unit (CSMU) from the AR Series COMBI or AT-Series COMBI while the recorder is installed on the aircraft.

Once the data has been copied to the HHDLU, it's removable media can be transported to the Ground Support Equipment (GSE), Automated Test/Transcription Unit, PN 964-0434-00X, where the data can be transferred and analyzed.

The HHDLU may also be used as a Digital Signal Display Unit (DSDU) to monitor the input data stream information (ARINC 573, 717) to the SSFDR, SSUFDR, AR SSFDR, AR-COMBI or AT-COMBI via an RS422 interface.

The HHDLU will operate in one of three modes:

- **Download - receives data from the recorders CSMU.**

- **DSDU - monitor the ARINC 573/717 data stream of the recorders.**

- **Self Test**

2. Leading Particulars

The HHDLU is designed to operate in the environment of the aircraft flight line and is capable of operating in any position. Some care, however, should be taken when inserting and removing the transportable media.

- **Length = 8.45 inches**

- **Width = 4.45 inches**

- **Depth = 2.75 inches**

- **Weight = 4.0 pounds maximum**

- **Power consumption is less than 10 watts**

- **Supplied with a soft nylon carrying case**

- **Utilizes a 4 line, 20 character, backlit liquid crystal display**

- **Storage Temperature: 0 to +70 degrees C**

- **Operating Temperature: 0 to +55 degrees C**

3. Maintainability

The HHDLU is constructed to facilitate shop repair by having all components/assemblies mounted onto a single backplane CCA which is easily removed with the top cover. Whenever possible, plug in assemblies have been utilized. All HHDLU modules or subassemblies are interchangeable with other assemblies bearing the same part number. No routine maintenance is required (see IPL Fig. 1). For software maintenance, the HHDLU system program is able to be updated through the PCMCIA hard disk assembly (item 35, IPL Fig. 1).
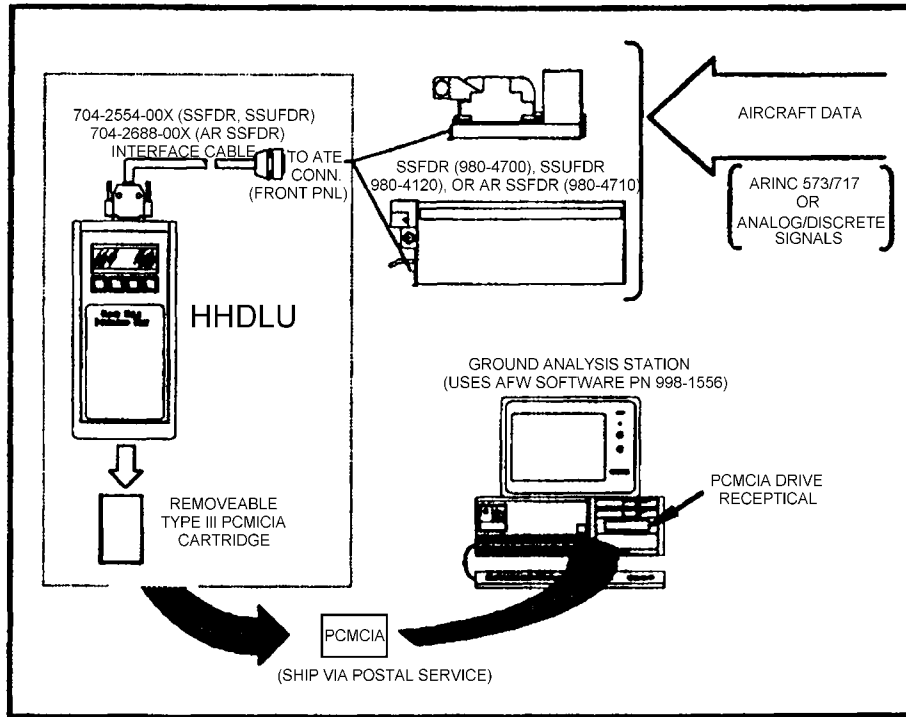
Recorders/HHDLU System
Figure 1

4. HHDLU Operation

The HHDLU is part of the Honeywell Recorder system. The system is comprised of the on air-craft recorder, the HHDLU for data extraction to a transportable media and finally the PC Auto-mated Test/Transcription Unit. The system is shown in Figure 1. The part numbers involved in the system description are listed below:

- **On Aircraft Recorder, SSFDR, PN 980-4700-XXX**

- **On Aircraft Recorder, SSUFDR, PN 980-4120XXXX**

- **On Aircraft Recorder, AR SSFDR, PN 980-4710-XXX**

- **HHDLU, PN 964-0446-001**

- **HHDLU, PN 964-0446-021**

- **Hard Disk Drive, PN 700-1679-00X**

- **Automated Test/Transcription Unit, PN 964-0434-00X**

The HHDLU operates in one of three modes - Download Mode, DSDU Mode and Self Test Mode. Upon power application, the HHDLU conducts an internal self test, checks for removable media (hard disk drive) installed in the PCMCIA slot and if so checks for a valid application pro-gram on the removable media.

A. Download Mode

Upon the selection of **DNLD**, the HHDLU will display a series of option messages to the operator for naming the file to be downloaded, performing simple (delete only) file mainte-nance, downloading all or a portion of the data in the Recorder. When requesting a partial

download, the operator selects the number of hours back from the time the recorder ceased recording operations (i.e., this corresponds to the most recently recorded flight information). During all data transfers, the display indicates progress with an estimate of time to completion.

Depending on the capacity of the removable media, the HHDLU provides enough storage capacity to allow multiple flight data files to be downloaded. In the event that the removable media is full (insufficient storage), the user is warned and prompted to delete any data file on the media to allow the transfer to take place. The HHDLU displays all files therefore permitting the user to delete any specific file. The storage space is always checked prior to initiating any download.

Errors that occur during the download are indicated to the user through error messages.

B. DSDU Mode

The HHDLU performs the Data Signal Display Unit (DSDU) function by displaying the ARINC 573 data stream contents currently being recorded into the crash survivable memory of the Recorder. The data is displayed on the HHDLU and is monitored via the RS422 interface. The HHDLU is capable of displaying the data information of 3 parameters from any subframe and word at any one time. The displayed parameter value (binary, decimal, hexadecimal or octal; user selectable) is not to be converted into engineering units, but is an accurate duplication of the ARINC data word.

C. Self Test Mode

HHDLU Self Test is broken into two levels. At power on, the HHDLU performs a series of tests including a BIOS test and an internal RS422 wrap around test. This insures basic functionality without requiring any external hardware. A more extensive self test is available using a separate wrap around/power cable and software located on the PCMCIA hard drive media. This test includes external RS422 wrap around, PCMCIA media read/write/erase tests, keypad and display tests and is included in the **Testing** section.

D. Upload Mode

The HHDLU design has provided for the future capability of uploading files from the transportable media to an Honeywell LRU such as a Data Management Unit (DMU) or Ground Proximity Warning Computer (GPWC), via the RS422 interface. As in the download mode, the display indicates data transfer progress with an estimate of time to completion.

5. Electrical Interface

The HHDLU has two data interfaces and one power interface. The function of the data interfaces is to provide a communication channel between the airborne equipment and the HHDLU and to provide the data to the user via the HHDLU's removable media (hard disk assembly). The power required to operate the HHDLU is derived from the airborne unit while on the aircraft or from a 115 VAC 400 Hz or 28 VDC power supply while in a test facility. These interfaces are described in the following paragraphs.

A. RS422 Serial Data Link

Communication with the various LRU's is accomplished via an Honeywell high speed data link. This data link is based upon the EIA422 specification and is currently in use on the Recorders. This interface is capable of a 750K baud rate and supports CTS/RTS terminal communication protocol.

Transient voltage and shorts to ground protection is provided on all signal input/output lines.

B. Personal Computer Memory Card Interface (PCMCIA)

To facilitate data transportability from the HHDLU, a PCMCIA interface (hard disk assembly, PN 700-1679-00X) is provided. The HHDLU has a single slot which conforms to the PCM-

CIA standard. This standard provides for a removable PCMCIA media device which is an ATA mass storage protocol peripheral, i.e. hard disk assembly which emulates a hard disk drive. The HHDLU also has an internally mounted flash memory as the dedicated system program memory.

C. Power Supply

During the download process the power necessary to operated the HHDLU is derived from the LRU. The HHDLU interface cable provides the necessary data and power signals to the LRU. The HHDLU is capable of operating with input power of 115 VAC, 400 Hz or 28 VDC.

D. Software Updates

The HHDLU program software resident in the flash memory is reconfigurable via the PCM-CIA interface. On power up, the HHDLU displays the software part number and version number until a function mode is selected.

6. User Interface

The user interface has been designed to be as simple as possible. Operation of any of the required functions is accomplished with a minimum of keystrokes. Selection of the desired mode is made through a menu system on the display. User input to the HHDLU is made via the four software programmable function keys. Each menu screen provides a means for canceling a particular selection so that an operator can always have the capability to return to the main menu. Screen examples are shown in the **Testing** section.

A. Menus

The main menu offers a choice of one of the three implemented modes of HHDLU operation. These are described in Para. 4 above.

B. Display

The HHDLU utilizes a 4 line, 20 characters, backlit liquid crystal display.

C. Keypad

The keypad consists of four tactile feedback membrane keys. Each key is software programmable with regard to its function.

D. Data Storage

HHDLU operations software is stored on the internal Flash/ROM drive. Sufficient storage space is provided to permit future HHDLU applications growth. The HHDLU operations software is programmable through the removable media port (PCMCIA).

The HHDLU download file storage capability is dependent upon the data storage capacity of the removable PCMCIA compatible media (hard disk assembly). The minimum capacity for a 1X (64 word per second) recorder download is 10 megabytes, therefore the capacity of the memory card or hard disk assembly must be 10 megabytes or more. Similarly, for a 2X recorder download, 20 megabytes is needed. Honeywell will provide, as a minimum, a 42 megabyte hard disk assembly with each HHDLU.

Data files are stored on the removable media with the default file name format.

- **DOWNLDXX.DLU**

Where XX in the default is 00 and is incremented upward with each new file to download. This permits the user to determine the oldest file for deletion should insufficient memory (data storage) space exist. The HHDLU also allows the user to rename any default file presented.