ATC-601 Mode S/A/C Transponder Ramp Test Set

The ATC-601 performs Mode S/A/C transponder tests required by Federal Aviation Regulations

- ***Accurate measurement of transponder transmitting frequency, power and receiver sensitivity***
- ***AUTO TEST minimizes test time***
- ***Tests include Flight ID, Tail Number decode and UELM/DELM data link***
- ***Non-volatile storage for two sets of test data***
- ***Operating range of 0 to 300 feet from the aircraft under test***
- ***Dump test data to printer via RS-232***
- ***Built-in self test***
- ***LCD display with automatic backlight***
- ***Tripod mountable directional antenna***
- ***2 hour battery operation***
- ***FCC Type Acceptance approved***
- ***Two-year limited warranty***

IFR is a leader in the design, manufacture and marketing of Avionics test systems.

The ATC-601 performs the ATC transponder test required by the revised Federal Aviation Regulations (91.172 and Part 43, Appendix F as amended August 18, 1990) for Mode S, A and C transponders.

The ATC-601 provides a comprehensive 'AUTO TEST' function which allows the operator to verify and certify the operation of Mode S/A/C transponders with little or no intervention once the test has been commanded.

Tests may be individually run for diagnostic fault finding purposes during routine maintenance.

The ATC-601 is environmentally packaged to operate in all weather conditions and be protected against the shock and vibration encountered during ramp use.

OPERATION

Setup Menu

The setup menus are used to program parameters for power and sensitivity measurements, RS-232 parameters, test data storage, recall and data dump.

```
          ** SETUP#1 MENU **
     UUT ANTENNA: RANGE HEIGHT
           TOP = 63      18
        BOTTOM = 55       8
      SELECTED = BOTTOM
GAIN_1030=11.5 GAIN_1090=12 LOSS=1.0
```

Auto Test

The AUTO TEST screen is selected with the 'AUTO TEST' key. When initiated with the 'RUN/STOP' key, this test runs through 23 discrete tests in approximately 30 seconds.

If the required operating modes pass, this completes the 'Part 43, Appendix F' requirements. The detailed results of individual tests conducted during AUTO TEST are stored in memory and may be reviewed by using the 'SELECT' keys. Once selected, the test may be initiated by the 'RUN/STOP' key and will continue to run until the 'RUN/STOP' key is pressed again.

```
       ** AUTO TEST - PASSED **
MODE TESTED - A,C,S  FREQ: 1090.00 MHz
MODE PASSED - A,C,S   ERP:  53 dBm
MODE FAILED -         MTL: -73 dBm
DIVERSITY ISOLATION: 25 dBm
        Press RUN TO start
```

Reply Delay Test

```
** REPLY DELAY TEST - PASSED **

MODE S: 128.00 uS
 ITM A: 128.00 uS  C: 128.00 uS
 ATC A:   3.02 uS  C:   3.10 uS
     Press RUN to start
```

ATCRBS Reply Test

```
** ATCRBS REPLY TEST - PASSED **
F1 TO F2 SPACING A:20.30 uS  C:20.30 uS
F1 PULSE WIDTH   A: 0.45 uS  C: 0.45 uS
F2 PULSE WIDTH   A: 0.45 uS  C: 0.45 uS
CODE= 7777       ALT= 10,700 FT [6140]
          Press RUN to start
```

Mode S UF0 Test

```
** MODE S UF0 TEST - PASSED **

DF 0  VS=1    RI=C    AC= 10,700 FT
ADDRESS=3AC421

       Press RUN to start
```

Mode S UF11 Test

```
** MODE S UF11 TEST - PASSED **

DF11   CA=0  AA=3AC421 PI=000001


      Press RUN to start
```

Mode S UF20 Test

```
** MODE S UF20 TEST - PASSED **

DF20 FS=0  DR=00 UM=00 AC= 10,700 FT
MB=00000000000000 ADDRESS=3AC421

       Press RUN to start
```

Squitter Test

```
** SQUITTER TEST - PASSED **
PERIOD = 1.00 SECONDS
TAIL NUMBER = N12345
SQUITTER ADDRESS = 3AC421 [1654201]

       Press RUN to start
```

Flight ID Test

```
** FLIGHT ID TEST - PASSED **

DF20  BDS1=02  BDS2=00
AIS=20420CCB9C1041  FLIGHT ID=BA349
ADDRESS=3AC421
       Press RUN to start
```

Mode S UELM Test

```
** MODE S UELM TEST - PASSED **
RES: DF20  DR=15  IIS=F  IDS=2
ACK: DF24  KE=1    ND=0  TAS=000F
CLO: DF20  DR=15   IIS=F IDS=2
ADDRESS=3AC421  ERROR=
          Press RUN to start
```

Power

```
** POWER TEST - PASSED **
                 ERP    MTL
TOP AVG (dBm) = 53.0  -73.4 PASSED
•BOT AVG (DBM) = 52.0  -74.3 PASSED
 INSTANTANEOUS = 47.0  -73.4
     Press RUN to start
```

Individual Tests

V2.23 Firmware

1. REPLY DELAY
2. REPLY JITTER
3. ATCRBS REPLY
4. SLS LEVEL
5. ATCRBS ONLY ALL-CALL
6. MODE S ALL-CALL
7. INVALID MODE S ADDRESS
8. SPR ON/OFF
9. MODE S UF0
10. MODE S UF4
11. MODE S UF5
12. MODE S UF11
13. MODE S UF16
14. MODE S UF20
15. MODE S UF21
16. SQUITTER
17. FREQUENCY
18. DIVERSITY
19. MTL DIFFERENCE
20. POWER
21. FLIGHT ID
22. UELM
23. DELM

Specification

Signal Generator

Output

1030 MHz DCXO controlled 10 kHz

Level

-57 to -7 dBm typically, into 50 Ω (Automatically controlled to determine receiver sensitivity [MTL] for the selected range and 4 dB typically, higher than MTL for test interrogations)

Test Antenna

VSWR

1.5:1

Gain

10 dB typical, specified on the antenna

Range 1.83 meters (6 feet) to 91.44 (300 feet)

Interrogation Test Signals

Rate

235 Hz PRF (±5 Hz)

Interlace Ratio

MTL Interrogations to test interrogations

ATCRBS	2:1
Mode S	8:1
Modes	A, C, S, Intermode

NOTE: The ATC-601 Interrogates with the mode(s) necessary to run selected test.

Pulse Characteristics

ATCRBS/Mode S Pulse Spacing

Mode A

P_1 to P_2 2.00 µs (±50 ns)

P_1 to P_3 8.00 µs (±50 ns)

Mode C

P_1 to P_2 2.00 µs (±50 ns)

P_1 to P_3 21.00 µs (±50 ns)

Mode S

P_1 to P_2 2.00 µs (±50 ns)

P_1 to P_6 3.5 µs (±50 ns)

P_1 to spr 4.75 µs (±50 ns)

Intermode Pulse Spacing

Mode A

P_1 to P_3 8.00 µs (±50 ns)

P_1 to P_4 10.00 µs (±50 ns)

Mode C

P_1 to P_3 21.00 µs (±50 ns)

P_1 to P_4 23.00 µs (±50 ns)

Pulse Widths

Mode A, C, S, Intermode

P_1, P_2, P_3 0.80 µs

Mode S

P_6 (Short) 16.25 µs

P_6 (Long) 30.25 µs

Intermode

P_4 (Short) 0.80 µs

P_4 (Long) 1.60 µs

All Modes

Accuracy ±50 ns

Rise Time 50 to 100 ns

Fall Time 50 to 200 ns

Phase Modulation

Transition time

≤80 ns

Phase Shift

180° (±10°)

Amplitude Levels

SLS Level (P_2)

-9 dB (±1 dB) and 0 dB relative to P_1 level

NOTE: SLS Level is automatically controlled in the SLS LEVEL Test.

UUT Measurements (replies)

XMTR Power (at 1090 MHz) Effective Radiated Power (ERP)

Range

+48.5 to +57 dBm (71 to 500 W)

Accuracy

±2 dBm

Direct Connection - Peak Pulse Power

Range

+46.5 to +59 dBm (45 to 800 W)

Accuracy

1 dB

Resolution

0.1 dB

XMTR Frequency

Range

1087 to 1093 MHz

Accuracy

50 kHz

Resolution

10 kHz

Receiver Sensitivity

Direct Connection - Minimum Triggering Level (MTL)

Range

-67 to -79 dBm

Accuracy

±2 dB

Radiated Field Strength (MTL)

Range

-69 to -77 dBm into 0 dBm antenna (-77 dB W/m^2 to -85 dB W/m^2)

Squitter Period

Range

0.10 to 4.88 sec

Accuracy

±10 ms

Reply Delay

ATCRBS

Range

1.80 to 7.00 µs

Accuracy

±100 ns

Mode S and ATCRBS/Mode S All Call

Range

125.00 to 131.00 µs

Accuracy

±100 ns

Diversity Isolation

Range

0 to >20 dB (depending on Antenna range)

Antenna Range

1.83 m (6 ft) to 28.96 m (95 ft)

Accuracy

±3 dB

General

Calibration Interval

1 year

Battery Operation

Duration 2 hours before re-charge at 25°C

Automatic Shut-off after 15 minutes of non-use

AC Supply

103.5 to 129 VAC, 207 to 253 VAC, 47.5 to 420 Hz, ≤+10% of the nominal voltage

30 W (used to re-charge battery)

Environmental

Temperature

-20° to 55°C

Relative humidity

≤80% for temperatures up to 31°C decreasing linearly to 50% at 40°C (Non-condensing)

Altitude

≤4000 m (13,124 ft)

Electromagnetic Compatibility

Complies with the limits in the following standards:

EN 55011 Class B

EN 50082-1

Safety

Complies with EN 61010-1 for class 1 portable equipment and is for use in a pollution degree 2 environment. The instrument is designed to operate from an installation category 1 or 2 supply.

Dimensions

284 mm wide; 361 mm deep; 279 mm high

11.2 in. wide; 14.2 in. deep; 11 in. high

Weight

13.7 kg (30 lbs.)

Versions and Accessories

When ordering please quote the full ordering number information.

Ordering Numbers

Versions

601-110	ATC-601 Transponder Mode S Ramp Test Equipment, 110 VAC operation
601-220	ATC-601 Transponder Mode S Ramp Test Equipment, 220 VAC operation

Accessories (Supplied)

RF Coaxial Cable

Antenna Shield

Operation Manual

Operator's Guide

Line Cord

Directional Antenna

Tripod

Omni-Directional Antenna

All IFR Avionics products delivered with Factory Certificate Of Calibration

IFR - "Working together to create solutions for the world of communications."

IFR is a world leader in developing leading edge test and measurement equipment. The priority at IFR is to understand your communications test needs and respond to them. IFR has the flexibility and expertise to create just the right test solution for you. We understand that just as you are the expert in designing wireless products, we are expert in wireless test.

Combining the quality of our test products with their reliability, excellent price/performance ratio and minimal requirements for maintenance, every IFR test system represents an outstanding lifetime value.

IFR - "Working together with our customers to be flexible and innovative in providing effective test solutions for the rapid design, manufacture and maintenance of communications systems."

The added value IFR includes with each and every test set we sell will make you more productive. We offer a two-year standard warranty on all products and we will continue to support your product for five years beyond its final production. Our outstanding Customer Service Department offers calibration, out-of warranty repairs and consulting. Our Sales and Training Departments offer clear and concise product information with realistic performance specifications, technology training and application training. Our experienced engineers will help you develop application software and through continuous improvement programs, upgrades are always available.

IFR will continue to build upon our technology resources with an aggressive commitment that will enable you to excel in some of the world's most dynamic, high growth markets.

CHINA
Tel: [+86] (10) 6467 2823
Fax: [+86] (10) 6467 2821

FRANCE
Tel: [+33] 1 60 79 96 00
Fax: [+33] 1 60 77 69 22

GERMANY
Tel: [+49] (8131) 29260
Fax: [+49] (8131) 2926130

HONG KONG
Tel: [+852] 2832 7988
Fax: [+852] 2834 5364

LATIN AMERICA
Tel: [+1] (972) 899 5150
Fax: [+1] (972) 899 5154

SCANDINAVIA
Tel: [+45] 9614 0045
Fax: [+45] 9614 0047

SPAIN
Tel: [+34] (91) 640 11 34
Fax: [+34] (91) 640 06 40

UNITED KINGDOM
Chandlers Ford
Tel: [+44] (0) 2380 273722
Fax: [+44] (0) 2380 254015
Donibristle
Tel: [+44] (0) 1383 646464
Fax: [+44] (0) 1383 646468
Stevenage
Tel: [+44] (0) 1438 742200
Fax: [+44] (0) 1438 727601

USA
Tel: [+1] (316) 522 4981
Toll Free: [+1] (800) 835 2352 (US only)
Fax: [+1] (316) 522 1360

email ***info@ifrsys.com***

web ***www.ifrsys.com***

Part No. 46891/032
Issue 1
09/2001