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

ATC-601

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 protected against the shock and vibration encountered during ramp use.

OPERATION

Setup Menu

The set up 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=000000


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
```

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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

V2.01/2.1 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 s (± 50 ns)
P_1 to P_3 8.00 s (± 50 ns)
Mode C
P_1 to P_2 2.00 s (± 50 ns)
P_1 to P_3 21.00 s (± 50 ns)
Mode S
P_1 to P_2 2.00 s (± 50 ns)
P_1 to P_3 21.00 s (± 50 ns)

Intermode Pulse Spacing
Mode A
P_1 to P_3 8.00 s (± 50 ns)
P_1 to P_4 10.00 s (± 50 ns)
Mode C
P_1 to P_3 21.00 s (± 50 ns)
P_1 to P_4 23.00 s (± 50 ns)

Pulse Widths
Mode A, C, S, Intermode
P_1, P_2, P_3 0.80 s
Mode S
P_6 (Short) 16.25 s
P_6 (Long) 30.25 s
Intermode
P_4 (Short) 0.80 s
P_4 (Long) 1.60 s
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 watts)

Accuracy
±2 dBm

DIRECT CONNECTION - PEAK PULSE POWER

Range
+46.5 to +59 dBm (45 to 800 watts)

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/m² to -85 dB W/m²)

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 feet) to 28.96 m (95 feet)

Accuracy
± 3 dB

General

CALIBRATION INTERVAL
1 year

BATTERY OPERATION
Duration 2 hours before recharge at 25°C
Automatic Shutoff 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 watts (used to recharge 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 meters (13,124 feet)

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 (11.2 in) W; 361 mm (14.2 in) D;
279 mm (11 in) H

WEIGHT
13.7 kg (30 lb)

Versions and Accessories

When ordering please quote the full ordering information

Ordering Number	*Versions*
601-110	ATC-601 Transponder Mode S Ramp Test Equipment
601-110-C	ATC-601 Transponder Mode S Ramp Test Equipment with Certificate of Calibration
601-220	ATC-601, 220 VAC operation
601-220-C	ATC-601, 220 VAC with Certificate of Calibration
	Accessories (Supplied)
	RF Coax Cable
	Antenna Shield
	Operators Manual
	Operators Guide
	Line Cord
	Directional Antenna
	Tripod
	Omni-Directional Antenna

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