Avionics

ATC-1400A Transponder/DME Test Set

The ATC-1400A is a microprocessor-based test set designed to accomplish comprehensive testing of modern ATC transponder and DME equipment

- Continuous display of UUT, PRF, % reply and transmitter frequency and power
- Variable SLS and Echo Pulse Level
- Digital display of decoded transponder reply pulses
- Acceleration, velocity and range DME Modes
- TACAN modulation and reference bursts
- Two-year limited warranty

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

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SIGNAL GENERATOR

Frequency Select Modes

User selectable L-Band Output Frequency can be selected by direct MHz, VOR paired and TACAN channel designation.

ΔF Capability

The selected frequency can be varied ±9.99 MHz in 0.01 MHz increments.

Manual/Automatic Stepping

The selected frequency can be automatically varied in 1 MHz increments.

Suppressor ON/OFF

The suppressor pulse output may be switched ON or OFF and the level adjusted from the front panel.

DME MODE

Range Delay

Switch selectable -1.00 to 399.90 NMi

Velocity

Select inbound or outbound. Inbound and outbound velocity decrements range to 0 NM, then increments range 9990 KTS.

Acceleration

Non-zero acceleration decrements the selected velocity to 0 KTS, then increments velocity to 9990 KTS.

Squitter

Digitally implemented to provide stable rate distribution and repeatability

TACAN Simulation

When TACAN/On is selected, output pulses are AM modulated with 15 and 135 Hz signals.

Echo Pulses

Front panel selectable

Ident Pulses

Select continuous pulse or Morse code from front panel

Pulse Characteristics

DME Pulses are formed by filtering, which provides superior representation of Gaussian shaped pulses.

DME Serial Data Interface

The serial BCD distance word is generated to correspond to the range distance programmed in the test set. This serial BCD word is available at the back panel through a 25 pin D type connector.

Frequency Channelling

The 2-out-of-5 VOR Paired Channel Frequency is available for control of the DME UUT when the test set is in the automatic frequency stepping mode.

ARINC 568 compatible

Transponder Mode

Modes 1, 2, T, A, B, C, D, AC_1 and AC_2 are available.

Variable Pulse Spacing

P_2 and P_3 pulse spacing may be varied in the "+" or "-" direction or may be selected to the calibrated spacing from individual switches on the front panel.

Pulse Width

The generated pulse width may be varied or selected for a calibrated width by a front panel switch.

Side Lobe Suppression

On/Off selectable P_2 pulse

Interference/DBL Interrogation

The Interference pulse and double interrogation functions are combined in a single switch and are exclusively selectable.

UUT Pulse Spacing Detector

Transponder reply pulses are verified for proper position by selection of a narrow window. A wide window is provided when pulse position accuracy verification is not desired.

Suppression Recovery

Selection of double interrogation and suppressor pulse provides a single interrogation after suppressor pulse spacing may be varied by interference/DBL interrogation switch.

UUT MEASUREMENTS

Transmitter Frequency Counter

The average frequency of one pulse in a reply (XPDR Mode) or an interrogation (DME Mode) is counted and continuously displayed. In the DME Mode either P_1 or P_2 may be selected to be counted. In XPDR Mode the F_1 or F_2 may be counted.

Transmitter Frequency Discriminator

View frequency variation within the measured pulse

Transmitter Power Meter

Transmitter power of P_1 or P_2 in DME Mode and/or F_1 or F_2 in XPDR Mode may be selected and displayed on the front panel.

Added Features

- IEEE-488-1978 GPIB
- Automatic frequency stepping
- TACAN Channel: VOR pairing, or direct UHF frequency selection
- Variable interference and double interrogation pulse position
- DME serial data output
- DME serial data input
- 2-out-of-5 code frequency channeling outputs

ATC-1400A

Accessory Units

When interfaced with the T-1401, I-1402, S-1403DL/MLD or SI-1404 accessory units, the ATC-1400A becomes a comprehensive test system for TACAN, Mode 4 XPDR/RADAR and Mode S XPDR avionics equipment. For more information see separate data sheets.

Non-Coherent SLS Option

P_2 provided on separate 200 MHz carrier, phase unsynchronized. (Factory or factory service center installed option.)

SPECIFICATIONS

SIGNAL GENERATOR CHARACTERISTICS

Range

952.01 to 1222.99 MHz, selectable in 0.01 MHz increments

Accuracy

±0.001%

ΔF

±9.99 MHz in 0.01 MHz increments from the selected frequency

OUTPUT CHARACTERISTICS

Range

0 to -127 dBm (into 50 Ω) in 1 dB increments

Overall Accuacy

±2.0 dB 0 to -90 dBm

±2.5 dB -90 to -110 dBm

Frequency Flatness

±0.6 dB Maximum

ON/OFF Ratio

80 dB minimum

Output Impedance

50 Ω, VSWR < 1.2:1

Residual FM

5 kHz peak to peak maximum

Phase Noise

> 90 dBc/Hz measured at 150 kHz from the carrier

Spurious

>60 dBc from 350 to 1800 MHz

SUPPRESSOR PULSE OUTPUT CHARACTERISTICS

Pulse Width

33 µs (±3 µs)

Amplitude

Adjustable from 3 to 27 V

Timing

DME function nominally 3.5 µs prior to P_1 of range reply

XPDR Function

0.8 µs prior to P_3

DME MODE CHARACTERISTICS

RANGE DELAY

Range

0 to 399.99 NM selectable in 0.01 NM increments. -1 NM selected by individual switch

Accuracy

±0.02 NM plus ±0.005% of selected range

VELOCITY

Range

0 to 9990 KT selectable in 10 KT increments

Accuracy

±0.05%

ACCELERATION

Range

0 to 399 ft/sec² selectable in 1 ft/sec² increments

Accuracy

±0.5 ft/sec²

SQUITTER

Range

Selectable from 10 to 5999 Hz in 1 Hz increments (Ave. squitter)

Accuracy

±2%

Distribution

At 2700 Hz the distribution is in compliance with the requirements presented in ARINC characteristics 568

TACAN SIMULATION CHARACTERISTICS (INTERNATIONAL)

AM Modulation Frequencies

15 and 135 Hz ±0.02%

AM Modulation %

21% (±3%) each component

Bearing Output

180° (approx)

ECHO PULSE CHARACTERISTICS

Position

30 NM (±1 NM) after the interrogation is received in X channel

Amplitude

-19 to +6 dB, referring to the desired reply, selectable in 1 dB increments

Accuracy

±0.2 dB (0 to -10 dB)
±0.5 dB (-11 to -19 dB)

REPLY EFFICIENCY CHARACTERISTICS

Range

0% to 100% selectable in 10% increments (1% under GPIB control)

Accuracy

±1.0% of interrogations 0% and 100%
±5.0% of interrogations 10% and 90% Typical

PULSE CHARACTERISTICS

Spacing

12 µs ±0.1 µs (X channel), P_1 to P_2, 50% pk

30 µs ±0.1 µs (X channel), P_1 to P_2, 50% pk

P_2 Deviation

±7.9 µs in 0.1 µs increments (X and Y Channel)

Note: in X channel, P_1 and P_2 merge when P2 is deviated greater than -5.0 µs

Rise Time

2.0 µs (±0.25 µs) (10% to 90%)

Fall Time

2.5 µs (±0.25 µs) (90% to 10%)

Width

3.5 µs (±0.5 µs) (50% to 50%)

Spectrum

>55 dB down from center frequency measured at ±800 kHz

R-NAV CHARACTERISTICS

Spacing

50 µs (±0.25 µs) at 0 NM (X Channel) 56 µs (±0.25 µs) at 0 NM (Y Channel)

P_1 at time of interrogation

P_2 at time of reply

Width

7 µs (±1 µs)

IDENT PULSE CHARACTERISTICS

Rate

1350 Hz (±0.02%)

EQUALIZER PULSED CHARACTERISTICS

100 µs after ident pulse

TRANSPONDER MODE CHARACTERISTICS

INTERROGATION RANGE

Range

10 to 7999 Hz selectable in 1 Hz increments

Accuracy

±0.005%

PULSE CHARACTERISTICS

Mode Spacing

3.0 µs (±5 ns) (Mode 1)

5.0 µs (±5 ns) (Mode 2)

6.5 µs (±5 ns) (Mode T)

8.0 µs (±5 ns) (Mode 3/A)

17.0 µs (±5 ns) (Mode B)

21.0 µs (±5 ns) (Mode 1)

25.0 µs (±5 ns) (Mode 1)

Variable Pulse Spacing

±1.85 µs selectable in 0.05 µs increments for P_1 to P_2, P_1 to P_2 independently variable in direction relative to P_1

Width

0.8 µs (±5 ns) (CAL switch position)

0.20 to 1.85 µs selectable in 0.05 µs increments (VAR Switch Position)

Rise Time

70 ns (+10 ns, -20 ns) (10% to 90%)

Fall Time

70 ns (+10 ns, -20 ns) (90% to 10%)

SIDE LOBE SUPPRESSION (SLS)

Amplitude

-19 to +6 dB, relative to P_1, selectable in 1 dB increments

Accuracy

±0.2 dB for -10 to +3 dB

INTERFERENCE PULSE CHARACTERISTICS

Position Range

-17.5 to +399.0 µs referenced to P_1, selectable in 0.1 µs increments

Accuracy

±0.05 µs

Width

Continuously adjustable from 0.2 to 5 µs by front panel control

DOUBLE INTERROGATION CHARACTERISTICS

Range

Measured from P_1 first interrogation to P_1 second interrogation, selectable to 0.1 µs increments

Accuracy

±5 ns plus 0.05%

UUT PULSE SPACING DETECTOR

Window Width

Narrow: 220 ns nominal, referenced to P_1
Wide: 750 ns nominal, referenced to P_1

UUT MEASUREMENT CHARACTERISTICS

TRANSMITTER FREQUENCY COUNTER CHARACTERISTICS

Range

1020 to 1155 MHz

Accuracy

±20 kHz (DME Mode)

±50 kHz (XPDR Mode)

TRANSMITTER FREQUENCY DISCRIMINATOR OUTPUT

Response

1 MHz/V ±10% into open load

2 MHz/V ±10% into a 50 Ω load

Bandwidth

10 MHz minimum

TRANSMITTER POWER METER CHARACTERISTICS

Frequency Range

1020 to 1155 MHz

Amplitude Range

0 to 3999 W pk

Accuracy

±0.5 dB (from 50 Ω source) 100 to 3999 W

±0.7 dB (from 50 Ω source) 1 to 99 W

GENERAL

Power

Source Voltage and Frequency

100 to 120 VAC, 60 Hz
220 to 240 VAC, 50 Hz.

Power Consumption

120 W maximum
94 W nominal at 115 VAC
86 W nominal at 230 VAC

Nominal Input Current

1.49 A at 115 VAC
0.88 A at 230 VAC

Electromagnetic Compatibility

Complies with the limits specified in the following standards:

EN 55011:1991 Class B

EN 50082-1

Safety

Conforms with EN 61010-1 for class 1 portable equipment.

Temperature

5° to 40°C

Relative Humidity

≤80% for temperatures upto 31°C, decreasing linearly to 50% at 40°C

Altitude

≤4000 m (13,124 ft)

Mains Supply Fluctuations

≤±10% of the nominal voltage

Transient Overvoltages

According to installation category II

Pollution Degree

2

Dimensions

426 mm wide, 185 mm high, 467 mm deep

16.8 in. wide, 7.3 in. high, 18.4 in. deep

Weight

20 kg (44 lbs.) approximately

VERSIONS AND ACCESSORIES

When ordering please quote the full ordering number information.

Ordering Numbers

Versions

1400-110	ATC-1400A Transponder/DME Bench Test Equipment, 110 VAC operation
1400-220	ATC-1400A Transponder/DME Bench Test Equipment, 220 VAC operation

Accessories

1401-110	T-1401 TACAN Bearing and DME Simulation, 110 VAC operation
1401-220	T-1401 TACAN Bearing and DME Simulation, 220 VAC operation
1402-110	I-1402 Mode 4 Transponder/Interrogator, 110 VAC operation
1402-220	I-1402 Mode 4 Transponder/Interrogator, 220 VAC operation
1403-110	S-1403DL Mode S Transponder, 110 VAC operation
1403-220	S-1403DL Mode S Transponder, 220 VAC operation
1403MLD-110	S-1403DL/MLD Mode S with Level Diversity, 110 VAC operation
1403MLD-220	S-1403DL/MLD Mode S with Level Diversity, 220 VAC operation
1404-110	SI-1404 Modes S & 4 Transponder with MLD, 110 VAC
1404-220	SI-1404 Modes S & 4 Transponder with MLD, 220 VAC

Options

AC1000	Non-coherent SLS option

All Aeroflex Avionics products delivered with Factory Certificate Of Calibration

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CHINA Beijing
Tel: [+86] (10) 6467 2761 2716
Fax: [+86] (10) 6467 2821

CHINA Shanghai
Tel: [+86] (21) 6282 8001
Fax: [+86] (21) 62828 8002

FINLAND
Tel: [+358] (9) 2709 5541
Fax: [+358] (9) 804 2441

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

GERMANY
Tel: [+49] 8131 2926-0
Fax: [+49] 8131 2926-130

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

INDIA
Tel: [+91] 80 5115 4501
Fax: [+91] 80 5115 4502

KOREA
Tel: [+82] (2) 3424 2719
Fax: [+82] (2) 3424 8620

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

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

UK Burnham
Tel: [+44] (0) 1682 604455
Fax: [+44] (0) 1682 662017

UK Stevenage
Tel: [+44] (0) 1438 742200
Fax: [+44] (0) 1438 727601
Freephone: 0800 282388

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

AEROFLEX
A passion for performance.

www.aeroflex.com

info-test@aeroflex.com

Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.

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