

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**

IFR 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  $\pm 9.99$  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 0 to 399.99 NM

### Velocity

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

### Acceleration

Non-zero acceleration decrements the selected velocity to 0 KTS, then increments velocity to 3990 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<sub>1</sub> and AC<sub>2</sub> are available.

### Variable Pulse Spacing

P<sub>2</sub> and P<sub>3</sub> 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<sub>2</sub> 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<sub>1</sub> or P<sub>2</sub> may be selected to be counted. In XPDR Mode the F<sub>1</sub> or F<sub>2</sub> may be counted.

### Transmitter Frequency Discriminator

View frequency variation within the measured pulse

### Transmitter Power Meter

Transmitter power of P<sub>1</sub> or P<sub>2</sub> in DME Mode and/or F<sub>1</sub> or F<sub>2</sub> 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 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<sub>2</sub> provided on separate 1030 MHz carrier, phase unsynchronized. (Factory or factory service center installed option.)

## Specifications

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### Frequency Characteristics

#### Range

952.01 to 1222.99 MHz, selectable in 0.01 MHz increments

#### Accuracy

(See frequency counter)

#### ΔF

±9.99 MHz in 0.01 MHz increments from the selected frequency

### Generator Frequency Counter

#### Range

950 to 1225 MHz

#### Accuracy

±15 kHz

### Output Characteristics

#### Range

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

#### Overall Accuracy

±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  $\Omega$ , 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  $\mu$ s ( $\pm$ 3  $\mu$ s)

#### Amplitude

Adjustable from 3 to 27 V

#### Timing

DME function nominally 3.5  $\mu$ s prior to  $P_1$  of range reply

#### XPDR Function

0.8  $\mu$ s 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

$\pm$ 0.02 NM plus  $\pm$ 0.005% of selected range

#### VELOCITY

##### Range

0 to 3990 KT selectable in 10 KT increments

##### Accuracy

$\pm$ 0.01%

#### ACCELERATION

##### Range

0 to 399 ft/sec<sup>2</sup> selectable in 1 ft/sec<sup>2</sup> increments

##### Accuracy

$\pm$ 0.5 ft/sec<sup>2</sup>

#### SQUITTER

##### Range

Selectable from 200 to 5000 Hz in 1 Hz increments (Ave. squitter)

##### Accuracy

$\pm$ 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  $\pm$ 0.02%

#### AM Modulation %

21% ( $\pm$ 3%) each component

#### Bearing Output

180° (approx)

### Echo Pulse Characteristics

#### Position

30 NM ( $\pm$ 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

-10 to +3 dB ( $\pm$ 0.2 dB)

### REPLY EFFICIENCY CHARACTERISTICS

#### Range

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

#### Accuracy

$\pm$ 0.5%

### Pulse Characteristics

#### Spacing

12  $\mu$ s  $\pm$ 0.1  $\mu$ s (X channel),  $P_1$  to  $P_2$ , 50% pk

30  $\mu$ s  $\pm$ 0.1  $\mu$ s (X channel),  $P_1$  to  $P_2$ , 50% pk

#### $P_2$ Deviation

$\pm$ 7.0 (+0.05  $\mu$ s, -0.00  $\mu$ s)  $\pm$ 7.9 ms from nominal in 0.1  $\mu$ s increments

#### Rise Time

2.0  $\mu$ s ( $\pm$ 0.25  $\mu$ s) (10% to 90%)

#### Fall Time

2.5  $\mu$ s ( $\pm$ 0.25  $\mu$ s) (90% to 10%)

#### Width

3.5  $\mu$ s ( $\pm$ 0.5  $\mu$ s) (50% to 50%)

#### Spectrum

55 dB down at  $F_0$  ( $\pm$ 800 kHz)

### R-NAV Characteristics

#### Spacing

50  $\mu$ s ( $\pm$ 0.25  $\mu$ s) at 0 NM (X Channel) 56  $\mu$ s ( $\pm$ 0.25  $\mu$ s) at 0 NM (Y Channel)

$P_1$  at time of interrogation

$P_2$  at time of reply

#### Width

7  $\mu\text{s}$  ( $\pm 1$   $\mu\text{s}$ )

#### IDENT PULSE CHARACTERISTICS

##### Rate

1350 Hz ( $\pm 0.02\%$ )

#### EQUALIZER PULSED CHARACTERISTICS

100  $\mu\text{s}$  after ident pulse

#### Transponder Mode Characteristics

##### INTERROGATION RANGE

##### Range

10 to 7999 Hz selectable in 1 Hz increments

##### Accuracy

$\pm 0.0005\%$

#### PULSE CHARACTERISTICS

##### Mode Spacing

3.0  $\mu\text{s}$  ( $\pm 5$  ns) (Mode 1)

5.0  $\mu\text{s}$  ( $\pm 5$  ns) (Mode 2)

6.5  $\mu\text{s}$  ( $\pm 5$  ns) (Mode T)

8.0  $\mu\text{s}$  ( $\pm 5$  ns) (Mode 3/A)

17.0  $\mu\text{s}$  ( $\pm 5$  ns) (Mode B)

21.0  $\mu\text{s}$  ( $\pm 5$  ns) (Mode 1)

25.0  $\mu\text{s}$  ( $\pm 5$  ns) (Mode 1)

##### Variable Pulse Spacing

$\pm 1.85$   $\mu\text{s}$  selectable in 0.05  $\mu\text{s}$  increments for  $P_1$  to  $P_2$ ,  $P_1$  to  $P_2$  independently variable in direction relative to  $P_1$

#### Width

0.8  $\mu\text{s}$  ( $\pm 5$   $\mu\text{s}$ ) (CAL switch position)

0.20 to 1.85  $\mu\text{s}$  selectable in 0.05  $\mu\text{s}$  increments (VAR Switch Position)

#### Rise Time

70 ns ( $\pm 20$  ns) (10% to 90%)

#### Fall Time

70 ns ( $\pm 20$  ns) (90% to 10%)

#### SIDE LOBE SUPPRESSION (SLS)

##### Amplitude

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

##### Accuracy

$\pm 0.2$  dB for -10 to +3 dB

#### INTERFERENCE PULSE CHARACTERISTICS

##### Position Range

-17.5 to +399.0  $\mu\text{s}$  referenced to  $P_1$ , selectable in 0.1  $\mu\text{s}$  increments

#### Accuracy

$\pm 0.05$   $\mu\text{s}$

#### Width

Continuously adjustable from 0.2 to 5  $\mu\text{s}$  by front panel control

#### DOUBLE INTERROGATION CHARACTERISTICS

##### Range

Measured from  $P_1$  first interrogation, selectable to 0.1  $\mu\text{s}$

##### Accuracy

$\pm 5$   $\mu\text{s}$  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

$\pm 20$  kHz (DME Mode)

$\pm 50$  kHz (XPDR Mode)

#### TRANSMITTER FREQUENCY DISCRIMINATOR OUTPUT

##### Response

1 MHz/V  $\pm 10\%$  into open load

2 MHz/V  $\pm 10\%$  into a 50  $\Omega$  load

##### Bandwidth

10 MHz minimum

#### TRANSMITTER POWER METER CHARACTERISTICS

##### Frequency Range

1020 to 1155 MHz

##### Amplitude Range

0 to 3999 W pk

##### Accuracy

$\pm 0.5$  dB (from 50  $\Omega$  source) 100 to 3999 W

$\pm 0.7$  dB (from 50  $\Omega$  source) 1 to 99 W

#### General

##### Power

105 to 120 VAC or 220 to 250 VAC, 50 to 400 Hz. Power consumption is less than 100 W

##### 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

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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

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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.*

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