

# ATC-1400

## FEATURES AND CAPABILITIES

### SIGNAL GENERATOR:

**Frequency Select Modes:** The desired L-Band Output Frequency can be selected by direct MHz, VOR paired, and TACAN channel designation.

**$\Delta F$  Capability:** The desired frequency is selected as indicated above in 1 MHz increments and can then be varied  $\pm 9.99$  MHz in 0.01 MHz increments.

**Manual or Automatic Stepping:** The selected frequency can be automatically varied in 1 MHz increments, upward in frequency, at a rate which can be adjusted by a front panel control.

**Suppressor On/Off:** The suppressor output may be switched ON or OFF from a front panel select switch. Suppression pulse level is adjustable on front panel.

### DME MODE:

**Range Delay:** Switch selectable - 1 NM Range, for indicator calibration, from a front panel switch. When the - 1 NM is selected, one mile is subtracted from the range.

**Velocity:** May be selected as inbound or outbound by a front panel switch. Inbound velocity decrements range to 0 NM, then increments range to maximum. Outbound velocity increments range to maximum, then decrements velocity to 0 NM. The maximum range may be set internally to 100 NM, 200 NM, or 400 NM.

**Acceleration:** Non-zero acceleration decrements the selected velocity to 0 KTS, then increments velocity to 3990 KTS.

**Squitter:** Squitter is digitally implemented to provide stable rate and distribution, as well as repeatability.

**TACAN Simulation:** TACAN Simulation is selectable by a front panel switch. When TACAN/ON is selected, the output pulses are AM modulated with 15 and 135 Hz signals, the TACAN reference and auxiliary burst signals are generated representing a bearing of 180°.

External AM modulation and pulse modulation inputs are available from the rear panel. Used with an ATC-1400 accessory box it allows a complete TACAN simulation capability.

**Echo Pulses:** Selected ON or OFF from front panel control.

**Ident Pulses:** Continuous tone or morse code may be selected from front panel control. Equalizer pulses may be selected ON or OFF from rear panel control when Ident is enabled.

**Pulse Characteristics:** The DME Pulses are formed by filtering and not by Pin Diode switching, which results in a better representation of a Gaussian shaped pulse. The pulse spectrum has adequate side lobe shaping to allow adjacent channel rejection measurements.

**DME Serial Data Interface:** The serial BCD distance word is generated by the test set 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. This

interface is designed to be compatible with ARINC characteristic 568 requirements.

There is in addition an input on the back panel of the test set to receive the serial BCD distance data from the DME UUT and be displayed on the display function readout on the front panel of the test set.

**Frequency Channeling:** The 2-out-of-5 VOR Paired Channel Frequency is available at the rear panel for control of the DME UUT when the test set is in the automatic frequency stepping mode. This interface is designed to be compatible with ARINC characteristic 568 requirements.

### TRANSPONDER MODE:

**Modes:** Modes 1, 2, T, A, B, C, D, AC<sub>1</sub>, and AC<sub>2</sub> are available. Mode AC<sub>1</sub> and AC<sub>2</sub> alternate between modes A and C. AC<sub>1</sub> will result in XPDR Code Data in 4 digit Octal Code for Mode A response to be displayed. AC<sub>2</sub> Mode will have altitude data from the Mode C response displayed in feet ( $\div 1000$ ).

**Variable Pulse Spacing:** The P<sub>2</sub> and P<sub>3</sub> pulse spacing may be varied in the + direction or - direction or may be selected to the calibrated spacing from individual switches on the front panel. P<sub>2</sub> and P<sub>3</sub> may not be varied simultaneously at different amounts, as there is a single selector for deviation amount.

**Pulse Width:** The pulse width generated in transponder mode may be varied or selected for a calibrated width by a front panel selector switch.

**Side Lobe Suppression:** The P<sub>2</sub> pulse may be switched ON or OFF from a front panel selector switch.

**Interference/DBL Interrogation:** The interference pulse and Double Interrogation functions are combined in one switch selector and cannot be selected simultaneously. The function may be switched ON or OFF by a front panel selector switch. The double interrogation may not be any closer than 24.5  $\mu$ sec to P<sub>3</sub> of the first interrogation and is independent of transponder mode selected.

**UUT Pulse Spacing Detector:** The transponder reply pulses are verified for proper position by selection of a Narrow Window, by use of a rear panel switch. In the narrow position the pulses must be within  $\pm 100$  ns of their designated position to be recognized and show up in the XPDR Code Display Readout. A Wide Window is provided by the rear panel selector switch when pulse position accuracy verification is not desired.

### UUT MEASUREMENTS:

**Transmitter Frequency Counter:** The average frequency of one (1) 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 by a selector switch on the front panel of the test set. In XPDR Mode, F<sub>1</sub> or F<sub>2</sub> may be counted.

**Transmitter Frequency Discriminator:** The frequency variation within the measured pulse may be viewed at the Discriminator Output Jack on the front panel of the test set. A reference line is supplied which represents the average frequency displayed on the UUT Transmitter Frequency counter display on the front panel.

**Transmitter Power Meter:** The transmitter power is measured in a peak power detector and displayed on the front panel. The resolution of the front panel readout is 1 watt. In DME mode, either P<sub>1</sub> or P<sub>2</sub> may be selected. In XPDR mode, either F<sub>1</sub> or F<sub>2</sub> may be selected to be measured by a switch on the front panel.

#### FRONT PANEL DISPLAYS: \_\_\_\_\_

##### Generator Function:

**Generator Frequency:** The test set Frequency may be selected from the display selector switch and viewed on the Generator Function readout. Resolution of 10 kHz is available on this readout.

**Range:** The range delay of the test set in DME mode may be selected from the display selector switch and viewed on the Generator Function readout. Resolution is 0.01 NM. This is very useful when velocity and acceleration functions are being used, as the changing range delay may be viewed.

**Velocity:** The velocity may be selected from the display selector switch and viewed on the Generator Function readout. Resolution is 10 KT. This function is very useful when acceleration is being used.

**Serial Data:** The serial BCD distance data, from the UUT will be displayed when this function is selected. This verifies the DME is supplying proper data to the indicator without having to have an indicator in the test setup.

**PRF:** The test set PRF is displayed on the readout when this function is selected. This will occur in both DME and XPDR Modes. Resolution is 1 Hz.

**XPDR Code:** The XPDR reply is decoded and displayed when this function is selected. The code is displayed as a 4 digit Octal number for modes A, B, C, D and AC<sub>1</sub>. The altitude data is displayed in feet ( $\div 1000$ ) for mode AC<sub>2</sub>.

**DME PRF/XPDR % REPLY:** The DME UUT PRF is displayed in DME Modes and the XPDR % Reply is displayed in XPDR Modes. The PRF resolution is 1 Hz and the % reply resolution is 1%.

**XMTR FREQ:** The UUT Frequency is displayed continuously in MHz with 10 kHz resolution.

**XMTR PWR:** The UUT Transmitter Power is continuously displayed with 1 watt resolution.

**RF LEVEL:** The test set Output Level at the RF Output Jack is displayed continuously with 1 dBm resolution.

#### REMOTE CONTROL: \_\_\_\_\_

**IEEE-Interface:** IEEE-488-1978 instrumentation interface is provided as a standard feature in the ATC-1400.

# ATC-1400 SPECIFICATIONS

#### SIGNAL GENERATOR: \_\_\_\_\_

##### Frequency Characteristics:

**Range:** 952.01 MHz to 1222.99 MHz selectable in 0.01 MHz increments  
**Accuracy:** (See Frequency Counter)  
 **$\Delta F$ :**  $\pm 9.99$  MHz in 0.01 MHz increments from the selected frequency

##### Generator Frequency Counter:

**Range:** 950 to 1225 MHz  
**Accuracy:**  $\pm 15$  kHz

##### Output Characteristics:

**Range:** 0 dBm to -110 dBm (into 50 $\Omega$ ) in 1 dB increments  
**Attenuator Accuracy:**  $\pm 0.3$  dB or 1%  
**Leveler Accuracy:**  $\pm 0.3$  dB  
**ON/OFF Ratio:** 80 dB minimum  
**Impedance:** 50 $\Omega$ , VSWR <1.2:1 measured at the RF Output Jack

##### Spectral Purity:

**Residual FM:** 5 kHz pk-pk maximum  
**Phase Noise:** >90 dBc/Hz measured at 150 kHz from the carrier  
**Spurious:** >60 dBc from 350 MHz to 1800 MHz

##### Suppressor Pulse Output Characteristics:

**Pulse Width:** 33  $\mu$ s  $\pm 3$   $\mu$ s (Transponder Mode) Continuous High Level (DME Mode)  
**Amplitude:** Adjustable, with a screw driver adjustment on the front panel, from 3V to 27V into a 2K $\Omega$  Load

#### 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 10 Hz to 5999 Hz in 1 Hz increments (Average Squitter)  
**Accuracy:**  $\pm 1\%$  plus  $\pm 2$  Hz  
**Distribution:** At 2700 Hz the distribution is in compliance with the requirements presented in ARINC characteristic 568

##### TACAN Simulation Characteristics: (Internal)

**AM Modulation Frequencies:** 15 Hz and 135 Hz  $\pm 0.02\%$   
**AM Modulation %:** 21%  $\pm 3\%$  each component  
**Bearing Output:** 180° approximate

##### Echo Pulse Characteristics:

**Position:** 30 NM  $\pm 1$  NM after the interrogation is received in X channel  
**Amplitude:** -19 to +6 dB, reference to the desired reply, selectable in 1 dB increments  
**Accuracy:** -10 to +3 dB  $\pm 0.2$  dB

**Reply Efficiency:**

**Range:** 0% to 100% selectable in 10% increments  
**Accuracy:** ±0.01%

**Pulse Characteristics:**

**Spacing:** 12  $\mu\text{s}$  ± 0.1  $\mu\text{s}$  (X channel), P<sub>1</sub> to P<sub>2</sub>, 50% pk.  
 30  $\mu\text{s}$  ± 0.1  $\mu\text{s}$  (Y channel), P<sub>1</sub> to P<sub>2</sub>, 50% pk.  
**P<sub>2</sub> Deviation:** -5.0  $\mu\text{s}$  to +7.9  $\mu\text{s}$  from nominal in 0.1  $\mu\text{s}$  increments (X channel)  
 ±7.9  $\mu\text{s}$  from nominal in 0.1  $\mu\text{s}$  increments (Y channel)  
**Rise Time:** 2.0 ± 0.25  $\mu\text{s}$  (10% to 90%)  
**Fall Time:** 2.5 ± 0.25  $\mu\text{s}$  (90% to 10%)  
**Width:** 3.5 ± 0.5  $\mu\text{s}$  (50% to 50%)  
**Spectrum:** 55 dB down at f<sub>0</sub> ± 800 kHz

**R-NAV Pulse Characteristics:**

**Spacing:** 50  $\mu\text{s}$  ± 0.25  $\mu\text{s}$  at 0 NM (X channel)  
 56  $\mu\text{s}$  ± 0.25  $\mu\text{s}$  at 0 NM (Y channel)  
 P<sub>1</sub> at time of interrogation  
 P<sub>2</sub> at time of reply  
**Width:** 7  $\mu\text{s}$  ± 1  $\mu\text{s}$

**TRANSPONDER MODE CHARACTERISTICS:** \_\_\_\_\_**Interrogation Rate:**

**Range:** 10 Hz to 7999 Hz selectable in 1 Hz increments  
**Accuracy:** ±0.005%

**Pulse Characteristics:**

**Mode Spacing:** 3.0 ± 5 ns (Mode 1)  
 5.0 ± 5 ns (Mode 2)  
 6.5 ± 5 ns (Mode T)  
 8.0 ± 5 ns (Mode A)  
 17.0 ± 5 ns (Mode B)  
 21.0 ± 5 ns (Mode C)  
 25.0 ± 5 ns (Mode D)

**Variable Pulse**

**Spacing:** ± 1.85  $\mu\text{s}$  selectable in 0.05  $\mu\text{s}$  increments for both P<sub>2</sub> and P<sub>3</sub>.  
 P<sub>2</sub> and P<sub>3</sub> independently variable in direction relative to P<sub>1</sub>.

**Width:** 0.8 ± 5 ns (CAL Switch Position)  
 0.20  $\mu\text{s}$  to 1.85  $\mu\text{s}$  selectable in 0.05  $\mu\text{sec}$  increments (VAR Switch Position)

**Rise Time:** 70 ± 20 ns (10% to 90%)

**Fall Time:** 70 ± 20 ns (90% to 10%)

**Side Lobe Suppression (SLS):**

**Amplitude:** -19 to +6 dB, relative to P<sub>1</sub>, selectable in 1 dB increments

**Accuracy:** ±0.2 dB for -10 dB to -3 dB  
 ±0.5 dB for -19 dB to -11 dB and +4 dB to +6 dB

**Interference Pulse Characteristics:**

**Position Range:** -19.5  $\mu\text{s}$  to +399.0  $\mu\text{s}$ , referenced to P<sub>1</sub>, selectable in 0.1  $\mu\text{s}$  increments

**Accuracy:** +0.00  $\mu\text{s}$ , -0.05  $\mu\text{s}$

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

**Double Interrogation Characteristics:**

**Range:** Measured from P<sub>1</sub> first interrogation to P<sub>1</sub> second interrogation, selectable in 0.1  $\mu\text{s}$  steps

*Minimum:* P<sub>3</sub> first interrogation plus 25  $\mu\text{s}$   
*Maximum:* 399  $\mu\text{s}$

**Accuracy:** ±0.03%

**UUT Pulse Spacing Detector:**

**Window Width:** 220 ± 20 ns, (Narrow), referenced to F<sub>1</sub>  
 750 nominal, (Wide), referenced to F<sub>1</sub>

**UUT MEASUREMENT CHARACTERISTICS:** \_\_\_\_\_**Transmitter Frequency Counter Characteristics:**

**Range:** 1020 MHz to 1155 MHz

**Accuracy:** ±20 kHz (DME Mode)  
 ±50 kHz (XPDR Mode)

**Transmitter Frequency Discriminator Output:**

**Gain:** 1 MHz/volt ± 10%

**Bandwidth:** 10 MHz minimum

**Transmitter Power Meter Characteristics:**

**Frequency Range:** 1020 MHz to 1155 MHz

**Amplitude Range:** 50W to 2.0KW pk.

**Accuracy:** ±0.5 dB (from a 50 $\Omega$  source)

# ATC-1400

## PHYSICAL CHARACTERISTICS

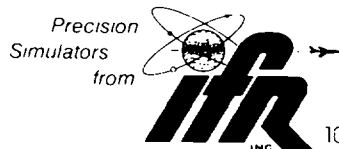
**Power:** 105 to 120 VAC or 220 to 250 VAC, 50 to 400 Hz. Power consumption is less than 100 watts.

**Dimensions:** 16.8" wide, 7.3" high, 18.4" deep (42.6cm W, 18.5cm H, 46.7cm D)

**Weight:** 44 lbs. (20 kg) approximately

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