

# Avionics

## RD-301A Weather Radar Test Set



The RD-301A Weather Radar Test Set satisfies simulation requirements for new generation noncoherent radar systems

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## RD-301A Weather Radar Test Set

- Automatic transmitter magnetron frequency tracking and digital read-out
- Internal/external modulation for simulating target scintillation for turbulence detection radars
- Transmitter peak pulse measurements
- Built-in IF sweep generator from 20 to 70 MHz and marker generator for IF and AFC testing
- Radar UUT sensitivity testing
- Two-year limited warranty

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

*The RD-301A will respond to radar transmitter pulse widths of 50 ns to 30  $\mu$ s in a frequency range of 9295 to 9500 MHz. All RF tests and measurements can be accomplished by connecting the RD-301A to the unit under test with the use of the supplied calibrated coaxial cable, waveguide coupler and dummy load.*

### Tracking System

The RD-301A tracking system enables the test set to automatically acquire and track the transmitter frequency. This basic feature eliminates the need for constant re-tuning to compensate for transmitter or signal generator drift.

### Heterodyne Monitor Output

The Heterodyne Monitor Output provides a convenient oscilloscope display of the frequency and duration of modes, identifying the location and magnitude of phase pulling within the magnetron pulse.

### Effective Peak Power (EFF)

Effective Peak Power (EFF), displayed on the Panel Meter located on the front panel, quantifies the effects of phase modulation in the magnetron replacing the requirement for the use of a spectrum analyzer. The EFF function allows the operator to choose the optimum tracking frequency in the presence of modes and phase pulling in the magnetron pulse. Using the EFF meter function in conjunction with the heterodyne monitor output verifies the frequency tracking accuracy of the test set, replacing the need for the echo box which is used for AFC centering.

### Contour Mode

The Contour Mode provides for rapid calibration and checking of contour threshold circuits, receiver color and intensity response and sensitivity by means of an additional 0 to 20 dB amplitude boost above the selected output level.

### Other Features

- Heterodyne monitor output
- (EFF) Transmitter effective peak pulse power measurements
- Built-in PRF generator and digital read-out

- Contour boost capabilities for testing contour threshold circuits
- Video detector, frequency discriminator and spectrum analyzer outputs
- Respond to radar transmitter pulse widths of 50 ns to 30  $\mu$ s

## SPECIFICATIONS

### Variable Mode Frequency

Continuously variable from 9.295 to 9.500 GHz

### Tracking Mode

Tracks radar transmitter frequencies 9.295 to 9.500 GHz and transmitter power from 0.1 to 12 kW

### Tracking Accuracy

#### Radar Transmitter

#### Pulse Width Maximum Error

30 to 2  $\mu$ s 25 kHz\*

<2 to 0.5  $\mu$ s 60 kHz

<0.5 to 0.1  $\mu$ s 600 kHz

<0.1 to 0.05  $\mu$ s 2 MHz

(\* 10 kHz typical)

### Output Power

-50 to -127 dBm in 1 and 10 dB steps calibrated at R/T. Accuracy is  $\pm 2$  dB.

### RF Pulse Width

0.05 to 500  $\mu$ s continuously variable

### RF ON/ OFF Ratio

70 dB minimum

### 1 kHz AM

30% AM nominal (1 kHz [ $\pm 100$  Hz])

### Source VSWR at Waveguide Coupler

1.25:1 maximum

## MODULATION MODE

### Track

PRF same as Radar-Under-Test (50 Hz to 20 kHz)

### INTL (internal)

PRF continuously variable from 50 to 5000 Hz

### CW

Continuous wave output

### INTL/EXT AM

50 Hz to 50 kHz

### Resolution

1 dB or 10 dB steps

Range

Range 1

0.1 to 999.9 [s or nautical miles (NM). Time referenced to the 50% point of leading edge of detected radar transmitter pulse.

Range 2

0.2 to 999.9 [s or nautical miles (NM). Time referenced to the 50% point of the leading edge of detected radar transmitter pulse.

Residual delay 0.4 to 0.05 [s

Range Accuracy

Residual delay  $\pm 0.01\%$  of selected range delay. Range delay is referenced to 12.3589 [s/NM.

Range Rings 1, 2, 3, 4, 5

Selectable multiples of Range 1

## FREQUENCY COUNTER

RF

Resolution

10 kHz

Accuracy

$\pm 250$  kHz

IF

Resolution

$\pm 1$  kHz

Accuracy

0.01%

PRF

Resolution

1 Hz

Accuracy

$\pm 1$  Hz plus 0.01%

## POWER METER

Range

0.1 to 12 kW peak standard

(1.0 to 120 kW optional)\*

(10 to 1200 W optional)\*

\*Optional power ranges include an external 10 dB attenuator not calibrated in the system.

Accuracy

Calibrated at R/T  $\pm 0.6$  dB from 1 to 12 kW peak standard

Load VSWR

1.25:1 maximum

## OUTPUTS

HET Monitor

Oscilloscope display of magnetron pulse

DET (Detector)

Detected radar transmitter signal (into 50  $\Omega$  load)

Spectrum Analyzer

Attenuated RF sample of radar transmitter signal (Back Panel)

DSCRM (Discriminator)

Frequency discriminator output 0.1 V/MHz  $\pm 10\%$  (into 50  $\Omega$  load)

SYNC (Scope Sync)

Positive polarity pulse simultaneous with radar transmitter pulse in

Track Mode, Internal PRF Generator in Internal Mode, or External

Trigger in EXT (+) or EXT (-) Mode.

DLYD SYNC (Delayed Sync)

Simultaneous with Range 1 and Range 2 generator pulses

SCOPE SWEEP

100 Hz ramp output approximately 5 Vp-p

AUX RF OUT (Back Panel)

Auxiliary RF output from X-Band front end

VCO OUT (Back Panel)

Sample L-Band signal from VCO

## GENERAL

Power

105 to 125 VAC or 210 to 250 VAC, 50 to 460 Hz, 150 W

Dimensions

422 mm wide, 185 mm high, 467 mm deep

16.7 in. wide, 7.311 in. high, 18.4 in. deep

Weight

19 kg (42 lbs.)

Waveguide Accessories

1.4 kg (3 lbs.)

## VERSIONS AND ACCESSORIES

*When ordering please quote the full ordering number information.*

Ordering Numbers

Versions

RD-301A Weather Radar Bench Test Equipment

Accessories (Supplied)

Calibrated Coaxial Cable

Dummy Load

Waveguide Directional Coupler

All Aeroflex Avionics products delivered with Factory Certificate Of Calibration