Precision Simulators from...

RD-301

WEATHER RADAR TEST SET

The RD-301 is a precision simulator designed for the testing of aircraft weather radar and narrow pulse marine radar systems. This solid-state, fully integrated test set permits complete testing of routine radar functions and to examine magnetron pulse characteristics with the addition of an external oscilloscope.

- Automatic transmitter magnetron frequency tracking and digital readout
- Built-in PRF generator and digital readout
- Built-in IF sweep generator from 20 to 70 MHz and marker generator for IF and AFC testing
- Radar UUT sensitivity testing
- Contour boost capabilities for testing contour threshold circuits
- Two independent range reply systems selectable in either microseconds or nautical miles
- Video detector, frequency discriminator and spectrum analyzer outputs
- Transmitter peak pulse power measurements
- Respond to radar transmitter pulse widths of 50 ns to 30 µs
- Two-year limited warranty

Precision Simulators from

IFR SYSTEMS, INC.
10200 West York Street / Wichita, Kansas 67215 U.S.A. / 316/522-4981 / TWX 910-741-6952

RD-301 WEATHER RADAR TEST SET

FEATURES and CAPABILITIES

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

The RD-301 tracking system enables the test set to automatically acquire and track the transmitter frequency. This basic feature eliminates the need for constant returning to compensate for transmitter or signal generator drift. The video detector and frequency discriminator output connectors are provided to allow viewing of the transmitter pulse shape and spectral characteristics using an oscilloscope. The ΔF Control is used to offset the RD-301 generator frequency up to ±0.75 MHz from the magnetron frequency for AFC centering tests and receiver IF bandwidth measurements.

The IF Sweep Generator provides a means to align and test radar IF systems. The generator covers a frequency range of 20 to 70 MHz and is capable of being swept over a 4 MHz span. The high level IF output (2 volts RMS maximum) can be used for high level IF or AFC testing. The bandwidths and center frequencies are measured by the Marker Frequency Generator during sweep frequency tests.

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.

The RD-301 has two independent simulated Range Reply Controls. Range 1 Reply Delay can be set from 0.1 to 999.9 in either microseconds or nautical miles. The RNG SEL Control selects 1 through 5 equidistant range rings. Range 2 Reply Delay can be set from 0.2 to 999.9 in either microseconds or nautical miles. Its amplitude can be varied from 0 to −59 dB relative to Range 1 Reply by using the Contour/R2 Control. This Range 2 Reply can be generated in response

RD-301 WEATHER RADAR TEST SET

SPECIFICATIONS

RF SIGNAL GENERATOR

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 µs	± 25 kHz*
<2 to 0.5 µs	± 60 kHz
<0.5 to 0.1 µs	±600 kHz
<0.1 to 0.05 µs	± 2 MHz

**(10 kHz typical)*

ΔF Mode *(during track):*	Signal Generator frequency may be offset ±0.75 MHz from Tracking frequency for AFC Centering tests. Front Panel Meter reads ΔF offset. Accuracy is ±20 kHz plus 10% of reading.
Output Power:	−50 to −127 dBm in 1 and 10 dB steps calibrated at R/T. Accuracy is ±2 dB.
Contour Boost:	Contour Control provides 0 to 20 dB signal boost above the selected RF Output. Accuracy of Contour Boost is ±1 dB from 9.310 through 9.410 GHz. This boost applies to output attenuator settings of −75 dBm to −127 dBm.
Range 2 Attenuation:	0 to 59 dB ±1.5 dB below the RF Output level of Range 1, in 1 dB steps. Minimum RF Signal level of Range 2 is −127 dBm.
RF Pulse Width:	0.05 µs to 500 µs continuously variable
RF ON/OFF Ratio:	70 dB minimum
1 kHz AM:	30% AM nominal (1 kHz ±100 Hz)
Source VSWR at Waveguide Coupler:	1.25:1 maximum

IF SIGNAL GENERATOR

Frequency:	Continuously variable from 20 to 70 MHz
Sweep Width:	Continuously variable from 0 to 4 MHz
Marker Frequency:	Continuously variable from 20 to 70 MHz
Power:	+20 to −130 dBm in 1 and 10 dB steps in two ranges; accuracy is ±2.5 dB plus 1% of setting
Pulse Width:	Continuously variable from 0.5 µs to 500 µs
ON/OFF Ratio:	48 dB minimum

MODULATION MODES

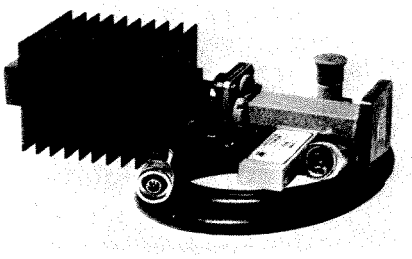
TRACK:	PRF same as Radar-Under-Test (50 Hz to 20 kHz)
INTL (Internal):	PRF continuously variable from 50 to 5000 Hz
CW:	Continuous wave output
EXT (+), EXT (−):	External synchronization pulse (see INPUTS, EXT TRIG)

RANGE

Range 1:	0.1 to 999.9 µs or nautical miles (NM). Time referenced to the 50% point of leading edge of detected radar transmitter pulse. Residual delay: 0.1 µs ±0.05 µs.
Range 2:	0.2 to 999.9 µs or nautical miles (NM). Time referenced to the 50% point of leading edge of detected radar transmitter pulse. Residual delay: 0.4 µs ±0.05 µs.
Range Accuracy:	Residual delay ±0.01% of selected range delay. Range delay is referenced to 12.3589 µs/NM.

to all transmitter pulses or alternate transmitter pulses. In auto mode, Range 1 will respond to narrow pulses and Range 2 will respond to wide pulses.

The RD-301 can also determine threshold measurements for different digital video levels, transmitter pulse width measurements, sensitivity time constant measurements, magnetron mode splitting or mode skipping measurements, automatic frequency control centering and minimum discernable signal.



Accessories Supplied:
Dummy Load, Waveguide Directional Coupler and Calibrated Coaxial Cable

RD-301 SPECIFICATIONS *(continued)*

Range Modes:

CONTOUR:	See RF Signal Generator, Contour Boost
RINGS 1, 2, 3, 4, 5:	Selectable multiples of Range 1
R2 ON:	Range 1 and 2 active
R2 ALT:	Range 2 active every other detected radar pulse
R1, R2 AUTO:	Either Range 1 or Range 2 according to detected radar transmitter pulse width. Threshold selection is internally adjustable from 0.2 µs to 1.0 µs. *(Standard setting is 0.4 µs.)*

FREQUENCY COUNTER

RF:	Displays RF Output frequency of generator: **Resolution:** 10 kHz **Accuracy:** ±250 kHz
IF:	Displays IF Generator frequency, or Marker frequency upon pushbutton command: **Resolution:** ±1 kHz **Accuracy:** 0.01%
PRF:	Displays Pulse Repetition frequency: **Resolution:** 1 Hz **Accuracy:** ±1 Hz plus 0.01%

POWER METER

Range:	0.1 kW to 12 kW peak standard. (1.0 kW to 120 kW optional)* (10 W to 1200 W optional)* **Optional power ranges include an external 10 dB attenuator not calibrated in the system*
Accuracy:	Calibrated at R/T, ±0.6 dB from 1 kW to 12 kW peak standard
Load VSWR:	1.25:1 maximum

OUTPUTS

DET (Detector):	Detected radar transmitter signal (into 50 OHM load)
Spectrum Analyzer (Back Panel):	Attenuated RF sample of radar transmitter signal
DSCRM (Discriminator):	Frequency discriminator output. 0.1 V/MHz ±10% (into 50 OHM 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 volt peak-to-peak
AUX RF OUT (Back Panel):	Auxiliary RF output from X-Band front end
VCO OUT (Back Panel):	Sample L-Band signal from VCO

INPUTS

EXT TRIG (External Trigger):	AC coupled, either polarity, 2 to 25 V peak; 50 Hz to 20 kHz.

PHYSICAL CHARACTERISTICS

Power:	105 to 125 VAC or 210 to 250 VAC, 50 to 400 Hz, 150 watts
Dimensions:	42.2cm (16.7") wide, 18.5cm (7.3") high, 46.7cm (18.4") deep
Weight:	19 kg (42 lbs.)
Waveguide Accessories:	1.4 kg (3 lbs.)

The continuous improvement of its products is the intent of IFR SYSTEMS, INC., who reserves the right to make design changes without notice.

Precision Simulators from ifr — the best is cost effective

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