

# TEMPEST WIDE RANGE MEASUREMENT RECEIVER MODEL R-1550A



## R-1550A RECEIVER DESCRIPTION

Dynamic Sciences International, Inc. introduces the new high performance **R-1550A TEMPEST Wide Range Measurement Receiver** to meet your TEMPEST testing needs. The enhanced R-1550A TEMPEST Receiver provides you with all of the necessary resources to conduct your TEMPEST monitoring and measuring.

The R-1550A TEMPEST Receiver includes everything you need to operate from a frequency range of 100 Hz to 2 GHz. With options, the frequency range may be extended as low as 20 Hz or as high as 40 GHz.

Use the R-1550A Receiver in the lab or take it with you in our customized shock-mounted travel case.

### STANDARD R-1550A TEMPEST RECEIVER IF BANDWIDTHS:

50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 5 kHz, 10 kHz, 20 kHz, 50 kHz, 100 kHz, 200 kHz, 500 kHz, 1 MHz, 2 MHz, 5 MHz, 10 MHz, 20 MHz, 50 MHz, 100 MHz, 200 MHz.

### ADDITIONAL R-1550A TEMPEST RECEIVER IF BANDWIDTHS:

An expanded bandwidth set below 20 kHz may be selected from the Receiver front panel. The following bandwidths are available to manually select: 250 Hz, 300 Hz, 400 Hz, 640 Hz, 800 Hz, 1.3 kHz, and 1.6 kHz, 2.5 kHz, 3 kHz, 4 kHz, 6.4 kHz, 8 kHz, 9 kHz, and 13 kHz.

You can use the R-1550A as a standalone receiver or as part of our DSI-1550A TEMPEST Test System. Low frequency measurements and the low bandwidths are generated in the system software when you configure the R-1550A TEMPEST Receiver as part the DSI-1550A-2 system. The additional software generated bandwidths are 1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz. The DSI-1550A-2 TEMPEST System, with a frequency range of 20 Hz to 2 GHz, includes an R-1550A TEMPEST Receiver, an R-1560 System Interface Unit, and the DSI-1550A system software installed on a fully integrated computer system.

You can also add an optional Microwave Downconverter (MDC) that increases the upper frequency range from the standard 2 GHz to either a maximum of 22 GHz or 40 GHz, depending on which MDC model you add to the DSI-1550A-2 configuration.

Visit our website and ask your local sales representative more about the **R-1550 TEMPEST Wide Range Receiver** and the DSI-1550 family of products.



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# R-1550A RECEIVER FEATURES AND SPECIFICATIONS

## SELECTABLE TUNING RESOLUTIONS:

Use the arrow keys below the display to select the tuning digit. The selected digit blinks. Use the step key to perform manual step tuning. The step size is determined by the selected digit. The tuning knob also tunes at the selected digit. Frequency Resolution is 0.1 Hz from 100 Hz to 250 kHz; 1 Hz from 250 kHz to 15 MHz; and 100 Hz from 15 MHz to 2 GHz.

## SYNTHESIZER DESIGN:

Synthesizer design provides you with programmable frequency control. Any frequency may be entered from the keypad with up to seven digit resolution.

## AM/FM DETECTOR SWITCH:

It automatically selects audio source. Gain controls are provided for headphone use.

## AUXILIARY VIDEO OUTPUT:

For Z-axis display; provides a direct connection for video monitoring use.

## Z-AXIS OUTPUT:

Provided on the rear panel for "rastering" of repetitive signals. Automatic remote mode selection is provided by the host computer.

## LOW NOISE FIGURE:

The nominal noise figure is 6 dB. The noise floor in a 100 Hz bandwidth is  $-41$  dB $\mu$ v. The noise floor in a 10 kHz bandwidth is  $-21$  dB $\mu$ v. There is 80 dB image rejection over the entire frequency range. The noise floor will improve by at least 6 dB $\mu$ v when the R-1550A Receiver is configured in the DSI-1550A TEMPEST Test System.

## PRESELECTION FILTERS:

There are nine bandpass filters that may be individually selected during tuning corresponding with the receiver band and the tuned frequency. Filter values are 200 MHz Low Pass, 200-350 MHz, 350-550 MHz, 550-750 MHz, 750-1000 MHz, 1100 MHz Low Pass, 1.0 GHz-1.3 GHz, 1.3 GHz-1.6 GHz, and 1.6 GHz-2.0 GHz.

## SPURIOUS RESPONSE:

$\geq 120$  dBm

## INPUT VSWR:

2.1 maximum

## MAXIMUM TOLERATED RF INPUT:

CW (rms): 0.5 watt  
Peak: 1,000 watts  
1 usec 1 kHz PRF

## IF SHAPE FACTOR:

Nominally 4:1 (60 to 6 dB)

## IF OUTPUT CENTER FREQUENCIES:

21.4 MHz and 1450 MHz

## IF OUTPUT LEVEL (INTO 50 OHMS):

+10 dBm

## AGC MODES:

Off, Fast, Slow

## VIDEO OUTPUT IMPEDANCE:

50 Ohms

## VIDEO OUTPUT LEVEL (INTO 50 OHMS):

AM: 3.0 Volts (10V Aux.)  
M: 1.0 Volt P-P Nominal

## AUDIO DETECTOR FUNCTION:

AM, FM, BFO (CW)

## AUDIO GAIN CONTROL RANGE:

40 dB

## AUDIO OUTPUT LEVEL:

2.5 Volts (rms) into 8 Ohms

## NOISE FIGURE:

Nominally 6 dB

## PRESELECTING FILTERING:

>Automatic selection as a function of tuned frequency

## AM DETECTOR DYNAMIC RANGE:

30 dB to 35 dB

## CLOCK FREQUENCY STABILITY (aging rate):

$5 \times 10^{-8}$  per year

## CLOCK FREQUENCY STABILITY OFFSET VS TEMPERATURE:

$5 \times 10^{-8}$ , 0 to 35°C

## OPERATING FREQUENCY STABILITY:

After 30 minutes warm-up, stability is equal to clock stability

## MTBF:

>3500 hours calculated  
>4000 hours field experience

## INTERFACE:

IEEE-488

## POWER REQUIREMENTS:

115/230 VAC +/- 10%  
50 - 60 Hz, single phase

## AUDIO BANDWIDTH:

100 Hz to 20 kHz minimum at -3 dB

## DIMENSIONS:

7" High x 17" Wide x 16" Deep

## WEIGHT:

45 lbs.

# R-1550A RECEIVER FEATURES AND SPECIFICATIONS (cont'd)

## INPUT CHARACTERISTICS:

RF INPUT	Two Type-N switch selectable One BNC isolated for Band 1
VSWR	2:1, 50 Ohms
MAX INPUT LEVEL	1 watt CW
DYNAMIC RANGE	>60 dB
RESIDUAL RESPONSES	<120 dBm
INPUT ATTENUATOR	0 to 100 dB in 1dB steps
IMPULSIVE RESPONSE	<2% Overshoot

## DETECTOR:

DEMODULATION MODES	AM, FM, CW (BFO), Log-AM
OUTPUTS	Separate AM/FM, Aux. Video and Z-axis
VIDEO BANDWIDTH	.5 x IF Bandwidth, automatically selected
PULSE STRETCHER	Variable 0.1 to 100 usec
SLIDEBACK (SQUELCH)	Continuously adjustable

## IF FILTERS - BANDWIDTHS (6dB):

ANALOG FILTERS, LINEAR PHASE	200, 250, 300, 500, 640, 800 Hz 1, 1.3, 1.6, 2, 2.5, 3, 4, 5, 6.4, 8, 10, 13, 16 20 kHz
SKIRT SELECTIVITY	<3:1 (60 to 6 dB)
IMPULSIVE RESPONSE	<12% Overshoot
ANALOG FILTERS, 12 dB GAUSSIAN	50 Hz, 100 Hz, 50 kHz to 200 MHz in a 1-2-5 sequence
SKIRT SELECTIVITY	<4:1 (60 to 6 dB)
IMPULSIVE RESPONSE	<12% Overshoot

## FREQUENCY RANGE:

100 Hz to 2 GHz in 4 Bands
Band 1 100 Hz to 250 kHz
Band 2 250 kHz to 15 MHz
Band 3 15 MHz to 1 GHz
Band 4 1 GHz to 2 GHz

## FREQUENCY RESOLUTION:

0.1 Hz	100 Hz to 250 kHz
1 Hz	250 kHz to 15 MHz
10 Hz	15 MHz to 2 GHz

## FREQUENCY TUNING:

1 MHz for bandwidths of 10 MHz or greater  
Numeric Keypad, UP/Down Arrow Keys or Tuning Knob  
Tuning resolution is selectable in decade steps.

## FREQUENCY STABILITY:

$<5 \times 10^{-8}$  (0 to 35°C)

## AGING:

1 ppm/per year

## REFERENCE OUTPUT:

20 MHz @ dBm on rear panel

## FREQUENCY DISPLAY:

7-digits	0.1 Hz Resolution 20 Hz to 250 kHz
8-digits	1 Hz Resolution 250 kHz to 15 MHz
8 digits	10 Hz Resolution 15 MHz to 2 GHz



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