

Model 1250

Model 1250 Radar Target Simulator is a digital propagation path replicator, capable of producing a moving target with appropriate target cross-section, propagation loss, with a dynamic range of over 50 dB.

Typical System Performance

- 100 ft – 1500 nautical mile target distance
- Switching speed 1 μ s
- Dynamic range: $\sim$ 70 dB (12 bit)
- Instantaneous BW: up to 2 GHz
- Latent delay: 140 ns
- Frequency Range: 0.1 to 18 GHz
- Options Available

Configure Now



Global Provider of Test & Measurement Solutions



Model 1250 Digital RF Memory Radar Target Simulator

Eastern OptX Model 1250 Radar Target Simulator is a digital propagation path replicator. It can produce a moving target with appropriate target cross-section, propagation loss, with a dynamic range of over 70 dB. The 1250 operates with pulsed, frequency hopping, or CW radars and with any encryption or modulation scheme. A high speed, user defined scenario may be triggered from the detected radar pulse or a user supplied external pulse. The 1250 will provide coherent operation with user supplied LO.

Rather than generating synthetic targets or signals, the system processes the user's actual radar pulse and applies the critical parameters encountered in real operational environments. These include precise time delay to emulate target distance, path loss associated with signal propagation, Doppler frequency shifts corresponding to target velocities up to 5,000 mph, and radar cross-section effects that accurately model target size and reflectivity.

The Model 1250 is able to define and execute complex target scenarios through an intuitive interface, specifying parameters such as range, velocity, and target signature. Each scenario includes a preamble with radar-specific characteristics - such as pulse width and repetition rate - allowing the system to seamlessly synchronize state changes between pulses without detection by the radar under test. The simulator supports both automatic triggering via detected radar pulses and external trigger inputs, while continuously monitoring and recording signal activity throughout the test. Integrated analysis capabilities, including a full-bandwidth spectrum analyzer and comprehensive data logging, provide immediate insight into both system performance and scenario execution. With built-in self-test routines, optional NIST-traceable calibration, and detailed post-test comparison tools, the platform ensures confidence in both the simulator's accuracy and the radar system's operational readiness.



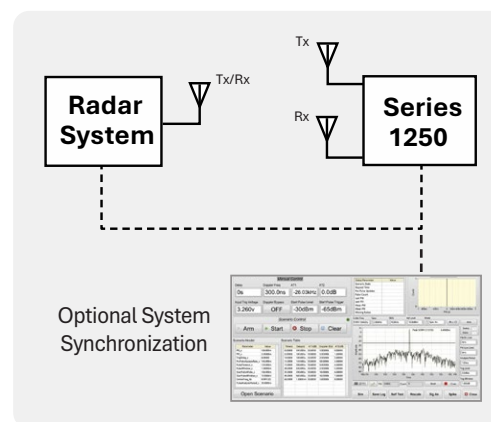


Model 1250 Radar Target Simulator Unit

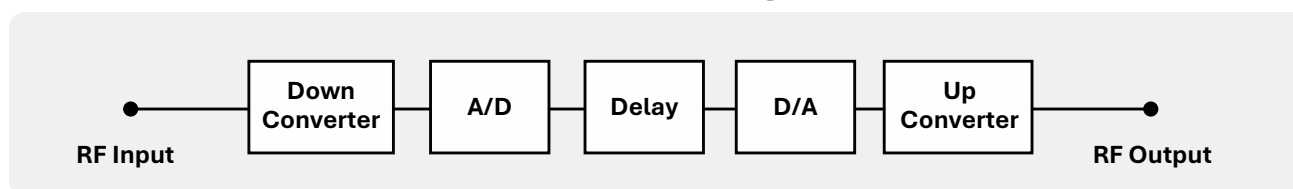


System Description

The block diagram below shows a typical 1250 System used with a common antenna radar system. The 1250 receives the signal transmitted from the radar, provides the necessary target delay, propagation loss, and Doppler, and then transmits back to the radar receiver. 60 dB of Input to Output Isolation is typical for most applications. Single antenna systems with octave band isolators are also available for specific radar bands. Direct RF connection to Radar and 1250 without external antenna is permissible and common. The system operates with single antenna or phased array systems. Optional multiple target generation is available with single or multiple output emissions.



Series 1250 Block Diagram



Features

- Propagation loss replication
- I/O Antenna Gain Input
- Longitude, Latitude, and Altitude Target Input Option
- Interferer Injection (Jammer)
- Moving Target Scenario Generator
- Programmable (SCPI Commands)
- Bandwidth (limited by A/D, ~ 1 GHz)
- Microsecond switching speed
- Multipath (Clutter)
- Interferer Generator/Injector
- Radar Cross-Section Input
- Multiple Target Output
- Input/Output Signal Measurement and Displays

Options

- Multipath (Clutter)
- Interferer Generator/Injector
- Radar Cross-Section Input
- Multiple Target Output
- Input/Output Signal Measurement and Display
- Input/Output Antenna Probes

Standard System Features

- Replicates target distance and speed
- High Speed Target scenario generation
- Front Panel LCD Touch Screen Control with Intuitive graphical user interface
- Remote Control High Speed Serial Interface (100us update rate)
- Signal spectrum analysis
- Interferer Injection (Jammer)
- Programmable (SCPI Commands)
- Broadband performance (up to 2 GHz)
- Synchronous and Free-Running Modes

Typical System Performance

- Frequency Range: 0.1 to 18 GHz
- Target Range: 0 to 1500 nautical miles
- Latent delay: 140 ns typical
- Doppler Frequencies: 0 to 2 MHz in 1 Hz steps
- Removable Hard Drive
- Interferer Injection (Jammer)
- Target Speeds to 10,000 MPH
- Resolution : 2ns

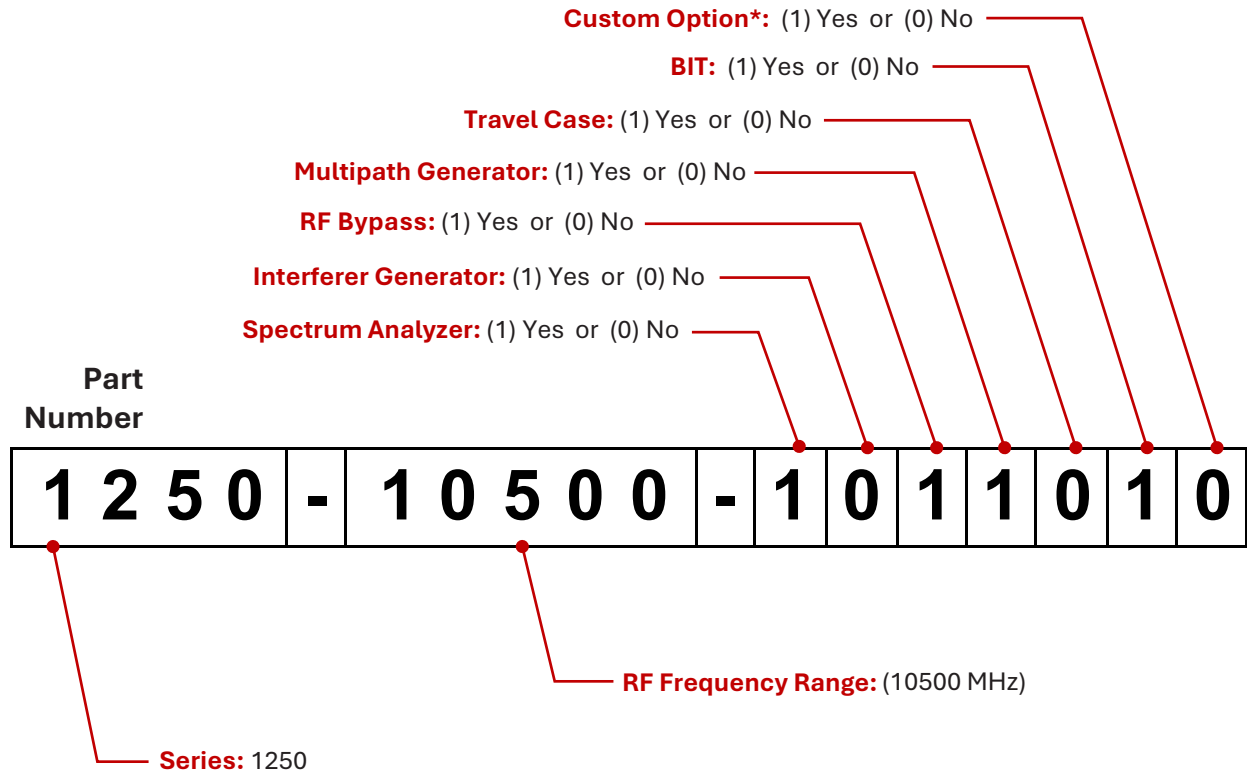




Model 1250 Radar Target Simulator Unit



Series 1250 Part Number Configurator



Model 1250 Specifications

Parameter	Specifications	Notes
Input/Output Isolation	60 dB	Minimum
Accuracy	0.1 %	Optional 0.5%
Repeatability	0.1%	At constant temperature
Minimum System Loss	TBD	Varies by RF Frequency
VSWR	2 : 1	Maximum
Spurious Free Dynamic Range	70 dB/Hz ^{2/3}	Minimum
1 dB Input Compression	-15 dBm	Minimum
Noise Figure	25 dB (13 dB Typ.)	Maximum (Lower NF optional)
Input/Output Impedance	50 Ω	Nominal
Dimensions	19" Rack Per EIA-310-D	12U, 18" to 22" depending on design





Model 1250 Radar Target Simulator Unit



Software - Main System Control User Interface

Delay Selection Propagation Loss Selection Doppler Frequency Selection Doppler Bypass Selection Scenario Diagnostics

Control-Status Scenario Graph System

Manual Control

Delay: 300.0ns Doppler Freq: -26.03kHz

Loss AT1: 0 Doppler Bypass: OFF

Scenario Status

State: Running Elapsed Time: 14.3000s

Avg Pulse Width: NaNs Avg Pulse Rate: -0s

Pulse Count: 0 Missing Pulses: 0

Scenario Control

Start Now Disarmed Cancel

Counts

PW (s)

Scenario Control (Do not start Scenario without first verifying that a Scenario is loaded (See Scenario Tab))

Pulse record histogram for each run. Shows the value and number of all pulses accepted by the system

Software - Scenario Interface Overview

Manual Control

Delay: 0.000s Doppler Freq: 0Hz AT1: 0.0dB AT2: 0.0dB

Doppler Bypass: OFF Input Trig Voltage: 3.260v Output Trig Voltage: 2.000v

Scenario Control

OFF Start Stop Clear

Scenario Header

Parameter	Value
PRI_s	1.00000
PW_s	5.00000m
TrigDelay_s	0.00000
PrePulseUpdateRate_s	100.000m
PulseTimeout_s	1.20000
PulseWindow_s	1.00000m

Open Scenario

Scenario Table

Time(s)	Delay(s)	AT1(dB)	Doppler (Hz)	AT2(dB)
0.00000	300.000n	0.00000	1.00000k	0.00000
5.00000	100.000u	0.00000	5.00000k	0.00000
10.0000	50.0000u	0.00000	2.50000k	0.00000
11.0000	150.000u	0.00000	50.0000k	0.00000
15.0000	200.000u	0.00000	5.00000k	0.00000
25.0000	500.000u	0.00000	2.50000k	0.00000
35.0000	200.000u	0.00000	10.0000k	0.00000
45.0000	600.000u	0.00000	50.0000k	0.00000
60.0000	1.20000m	0.00000	1.00000k	0.00000

Status Parameter Value

Status Parameter	Value
Scenario State	
Elapsed Time	
Pulse Count	
Mean Pulse Width	
Mean Pulse Rate	
Missing Pulses	

Counts

PW (s)

Elapsed Time (s)

Delay (s)

Doppler Freq (Hz)

Actual Delay Actual Doppler Ideal Delay Ideal Doppler

Rescale Spec An Self Test

Clear Graph Save to xls Close App

This screen shows the Radar Target Scenario selected by the user in tabular form. The user may load new Scenarios from this screen. Be sure to load a Scenario before selecting the "Start Now" key on the Control-Status Tab.



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Manufactured in the USA
CAGE Code: 56N13

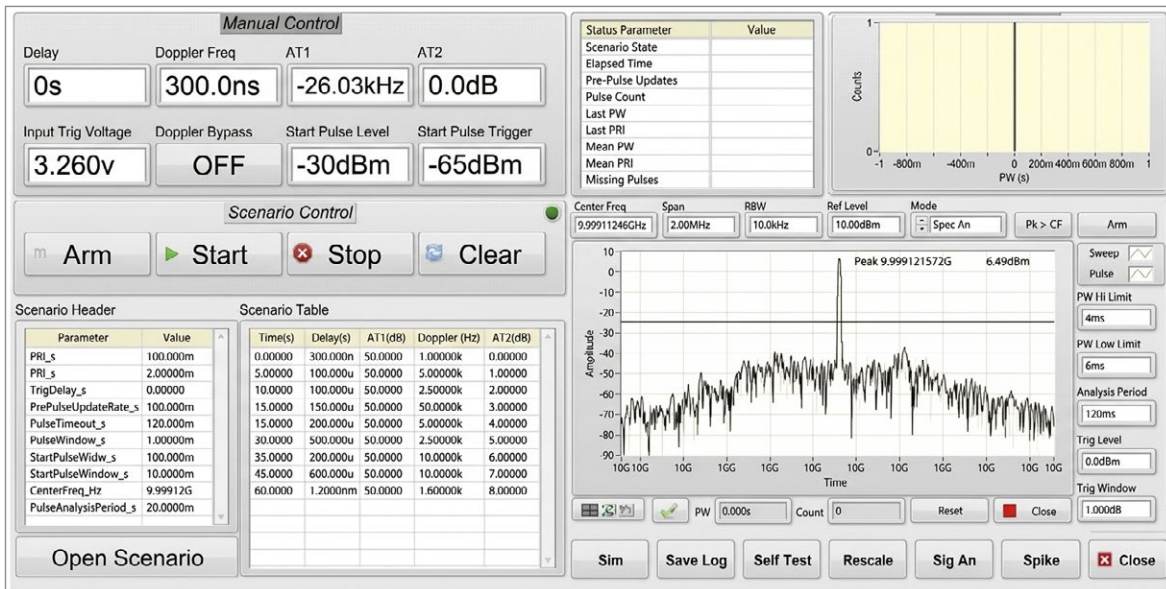
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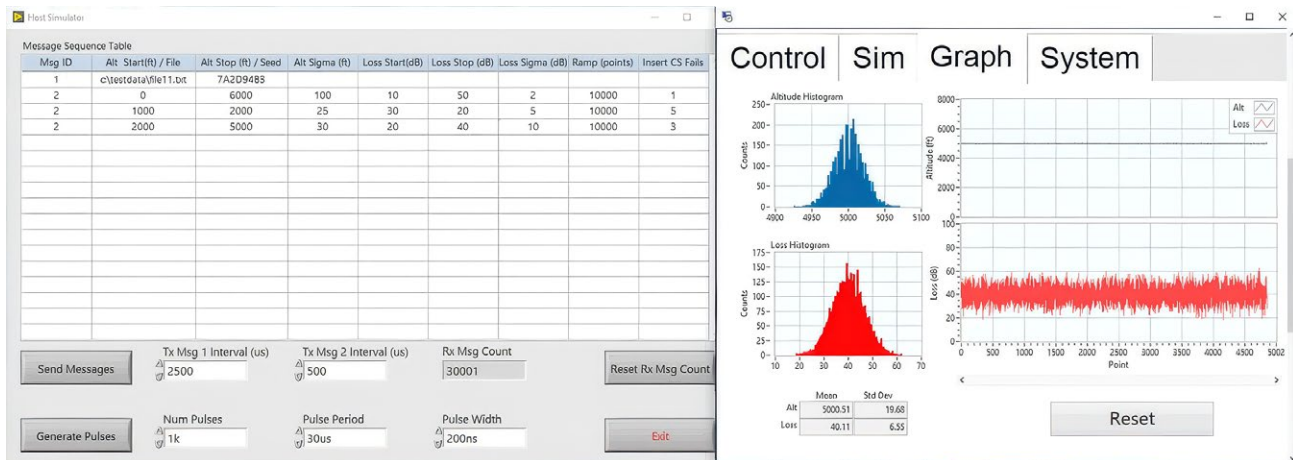


Software - Graphical User Interface Overview



This screen shows the Radar Target Scenario selected by the user in tabular form. The user may load new Scenarios from this screen. Be sure to load a Scenario before selecting the “Start Now” key on the Control-Status Tab.

Software - High Speed Interface and Simulation Control Screen (with BIT Option)



This screen shows the Radar Target Scenario selected by the user in tabular form. The user may load new Scenarios from this screen. Be sure to load a Scenario before selecting the “Start Now” key on the Control-Status Tab.

