

RCS and ISAR Measurement Training System – Add-On to 8097-1, and 8097-2 8122693 (8097-A0)

FESTO

LabVolt Series

Datasheet



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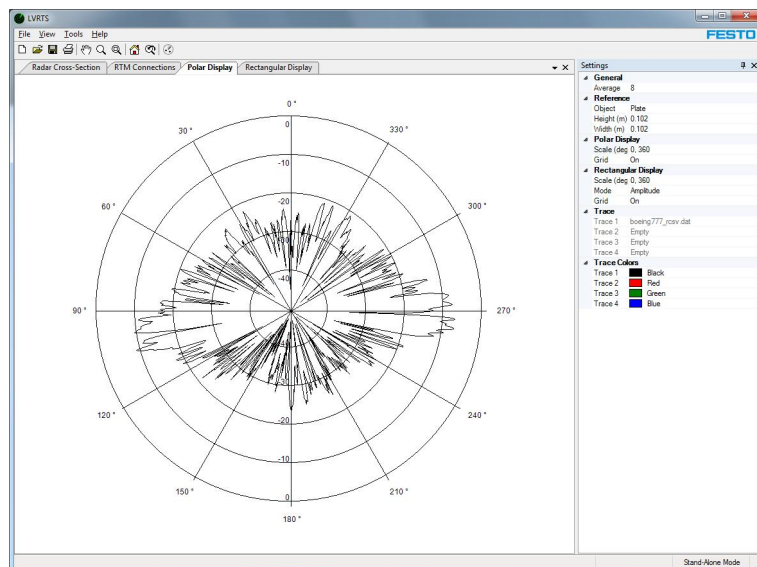
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General Description

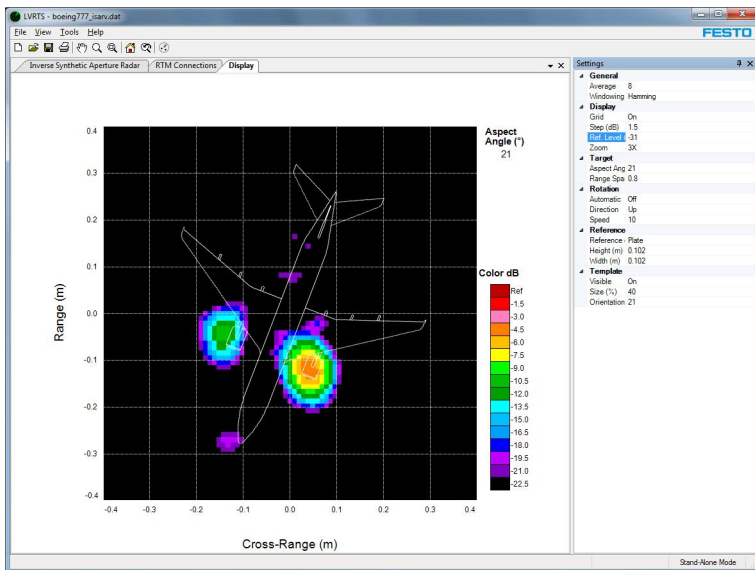
The RCS and ISAR Measurement Training System adds on to the Radar Processor/Display, Model 8097-2, to form a computer-based, pulse-mode system that can measure the radar cross section (RCS) of targets and produce inverse synthetic-aperture radar (ISAR) images of targets.

The system can generate RCS patterns of targets of up to 75 cm (30 in) in length when the longest pulse width is used. The system can also generate high-resolution ISAR images of much larger targets when the shortest pulse width is used. Because the system is based on pulse operation, it does not need to be operated in an anechoic chamber or in an outdoor range. Background clutter is rejected using time-gating and subtraction techniques during the measurement process.

The RCS and ISAR Measurement Training System includes a low-RCS target support to achieve precise RCS measurements; an RCS/ISAR data acquisition interface; an RCS measurement/ISAR imagery software included in the LVRTS software; an RCS/ISAR measurement interface module; a set of accessories including a reflective scale model of a 777 Boeing aircraft; and a system user guide. Note that RTM 9431-2 (or newer) from the Radar Processor/Display add-on is required to use this add-on. Other reflective scale models are optionally available.



RCS pattern of a scale model of a 777 Boeing aircraft obtained using the RCS and ISAR Measurement Training System.



In the ISAR imagery mode, the RCS and ISAR Measurement Training System can produce images that show the shape of a target (view of a 777-Boeing aircraft shown).



The RCS pattern of an actual aircraft can be obtained by placing a reflective scale model on top of the low-RCS rotating support of the RCS and ISAR Measurement Training System.



Accessories for 8096-A.

List of Equipment

Qty	Description	Model number
1	RCS/ISAR Measurement Interface _____	581960 (9610-00)
1	RCS/ISAR Data Acquisition Interface _____	8122692 (9634-10)
1	Accessories for 8097-A _____	8129037 (9688-D0)

Manual

Description	Manual number
RCS and ISAR Measurement Training System (User Guide) _____	593911 (52792-E0)

Table of Contents of the Manual(s)

RCS and ISAR Measurement Training System (User Guide) (593911 (52792-E0))

- 1 Overview of the RCS and ISAR Measurement Training
- 2 Module Setup and Connections
- 3 RCS Measurement
- 4 ISAR Measurement

Optional Equipment

Qty	Description	Model number
1	B2 Bomber RCS Scale Model _____	587493 (39208-02) ¹
1	F-117A Stealth Fighter RCS Scale Model _____	587494 (39209-02) ²

System Specifications

Parameter	Value
Frequency Range	8 to 10 GHz
Antennas	Pyramidal horn, 73 x 91 mm (2.9 x 3.6 in) aperture, 18 dB; offset feed parabolic reflector, 30cm (11.8 in), 27 dB
Selectable Pulse Width	1, 2 and 5 ns
Variable Pulse Width	0.6 to 5.5 ns
Maximum Peak Power	200 mW
Angular Accuracy	0.25°

¹ Additional scale model to perform measurement.

² Additional scale model to perform measurement.

Equipment Description

RCS/ISAR Measurement Interface 581960 (9610-00)



The RCS/ISAR Measurement Interface contains additional RF circuitry that allows RCS and ISAR measurements to be performed using the Basic Radar Training System, Model 8096-1. This RF circuitry also allows the Basic Radar Training System to be converted into a synthetic aperture radar (SAR).

The additional RF circuitry in the RCS/ISAR Measurement Interface consists of a time-gated, variable-gain amplifier; a circulator; and two limiters. The time-gated, variable-gain amplifier increases the peak RF power transmitted. It also maintains the average RF power transmitted to a level that allows the system to be operated safely in a classroom laboratory. The circulator is used for simultaneous transmission and reception using the same antenna. The limiters prevent saturation in the I and Q channels of the receiving section of the system (i.e., the Radar Receiver and the Dual-Channel Sampler).

Specifications

Parameter	Value
Frequency Range	8 to 10 GHz
RF Amplifier	
Maximum Gain	22 dB
On Time per Pulse	~150 ns
Limiters	
Type	Diodes
Voltage Limits	±1 V
RF Input and Output Impedance	50 Ω
Sync. Input	TTL
Physical Characteristics	
Dimensions (H x W x D)	112 x 330 x 300 mm (4.4 x 13.0 x 11.8 in)
Net Weight	3.2 kg (7.1 lb)

RCS/ISAR Data Acquisition Interface 8122692 (9634-10)



The Data Acquisition Interface is a compact module designed to be installed into one of the slots on the RTM of the Radar Processor/Display. This module receives the I- and Q-channel echo signals of the radar and converts them to digital format. It also receives the PRF and synchronization signals as well as azimuth information from the Radar Synchronizer / Antenna Controller. All these signals are then routed to the RTM for digital signal processing. A digital output allows to route the synchronization signal to another module.

The Data Acquisition Interface has two BNC-connector analog inputs to receive the I- and Q-channel echo signals. It has two BNC-connector digital inputs where the PRF and synchronization signals are injected and one BNC-connector digital output to route the synchronization signal to another module. A DB15 connector is provided as a digital input for the azimuth information. All these inputs are protected from misconnections within the system. Test points are available on the module's front panel to observe the input signals using a conventional oscilloscope. DC power is automatically supplied to the RCS/ISAR Data Acquisition Interface when it is installed into the RTM.

Specifications

Parameter	Value
Analog Inputs (2)	
Voltage Range	-1.5 to +1.5 V
Impedance	10 kΩ
Digital Inputs (2)	
Parallel Digital Input	TTL, 10 bits
Test Points	4
Physical Characteristics	
Dimensions (H x W x D)	114 x 110 x 209 mm (4.5 x 4.3 x 8.2 in)
Net Weight	0.6 kg (1.4 lb)

Accessories for 8097-A 8129037 (9688-D0)



The Accessories for 8097-A set contains a low-RCS target support with a storage stand, an adjustable base and long interconnection cables for the Rotating-Antenna Pedestal, additional BNC and SMA cables, a tripod with an antenna mast, a large horn antenna, a small metal plate target, a small metal plate target with radar absorbing material (RAM) on one side, and a reflective aircraft target (777-Boeing scale model).

Optional Equipment Description

B2 Bomber RCS Scale Model (Optional) 587493 (39208-02)



Scale model of a B2 bomber for RCS measurement. Note that color may vary.

Specifications

Parameter	Value
Size	
Scale	1/100
Dimensions	50.8 X 20.3 cm (20½" X 8")

F-117A Stealth Fighter RCS Scale Model (Optional) 587494 (39209-02)

Scale model of a F-117A stealth jet fighter for RCS measurement. Note that color may vary.

Specifications

Parameter	Value
Size	
Scale	1/48
Dimensions	25.4 X 15.2 cm (10" X 16½")

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