Antenna Training and Measuring System
582074 (8092-00)

LabVolt Series

Datasheet

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Festo Didactic
en 120 V - 60 Hz
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General Description

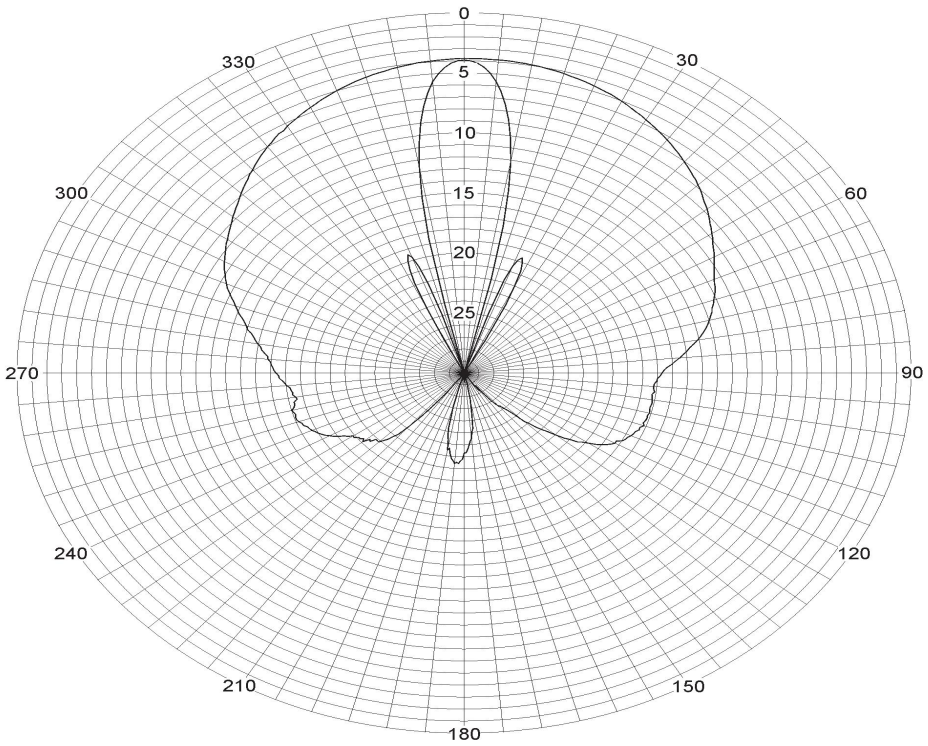
The Antenna Training and Measuring System (ATMS), Model 8092, provides teachers and students with training materials for hands-on experimentation on antennas in the 1 GHz and 10 GHz bands. A convenient and powerful antenna measuring system, the ATMS can also be utilized by design and research teams.

The complete Antenna Training and Measuring System includes a set of 1 GHz antennas, a set of 10 GHz antennas, an RF Generator, a receiving system, and the Data Acquisition and Management Software for Antennas (LVDAM-ANT), a user-friendly software operating under the Microsoft® Windows™ environment. The receiving system consists of a rotating Antenna Positioner linked to a Data Acquisition Interface connected to the USB port of a personal computer.

The system is designed for low power operation, both in the 1 GHz and 10 GHz bands (specifically at 915 MHz and at 10.5 GHz), allowing measurements of antenna characteristics in these bands. The data acquisition interface controls the antenna positioner and acquires the received antenna signal.

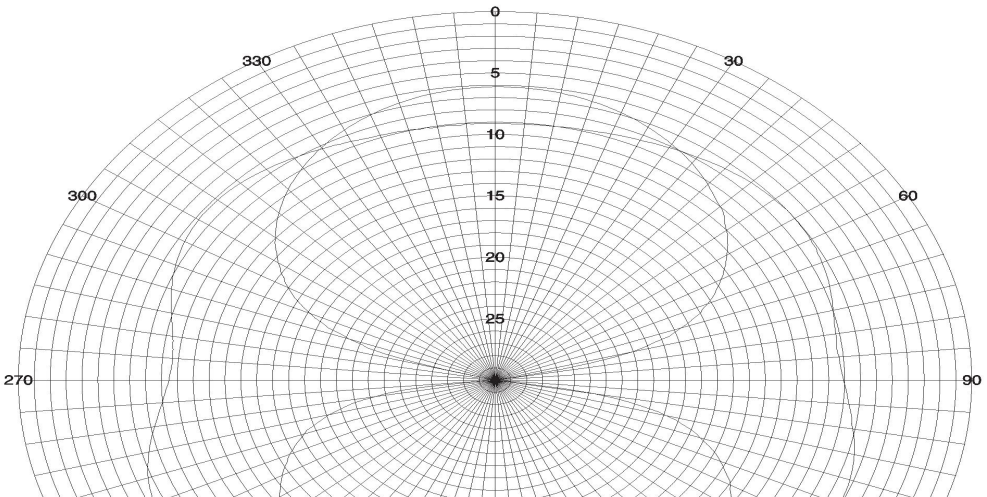
The LVDAM-ANT package provides a toolbox for controlling antenna rotation and data acquisition, as well as for displaying measured antenna characteristics in the E and the H planes. It also includes algorithms for estimating beamwidth and antenna gain from measurements or from external data.

The ATMS is a self-contained, stand-alone system that does not require other microwave equipment. However, optional antennas, a two element phasing kit, and a set of RCS demonstration accessories can be added to the ATMS in order to enhance the scope of experimentation on antennas and reflectors. These pieces of optional equipment are listed and described in the Optional Equipment and Optional Equipment Description sections of this data sheet. Furthermore, the ATMS is compatible with the 10.5 GHz Microwave Technology Training System, Model 8090. The VSWR Meter and the Power Meter of the Microwave Technology Training System, along with microwave components such as the slotted line, the Gunn oscillator, attenuators, and couplers, can be put to use for various creative laboratory projects.



Antenna Type		Attenuation (dB)	Maximum Signal		Half Power Beamwidth (º)
			Level (dB)	Position (º)	
SLOT.ANT	Waveguide (slotted)				
Plane	E	20	-3.8	0	72
	H	20	-3.9	0	12
Anten2.ant					
Plane	E				
	H				
Anten3.ant					
Plane	E				
	H				
Last Acquisition					

Slotted-Waveguide Antenna



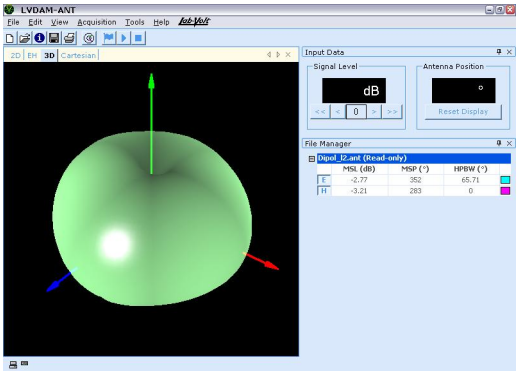


Figure 5. The E- and H-plane patterns can also be combined to produce a full 3D radiation pattern (shown in figure: dipole antenna pattern).

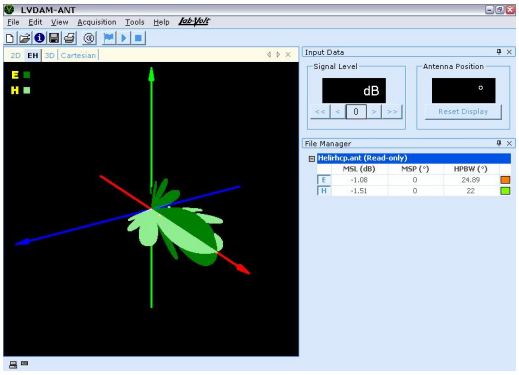


Figure 4. The acquired E- and H-plane patterns can be displayed simultaneously on a tri-dimensional (3D) display (shown in figure: helical antenna pattern).

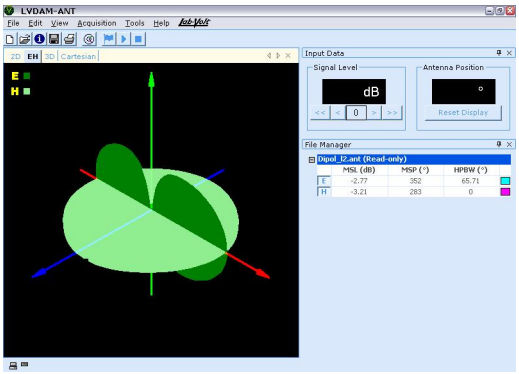


Figure 3. The acquired E- and H-plane patterns can be displayed simultaneously on a tri-dimensional (3D) display (shown in figure: dipole antenna pattern).

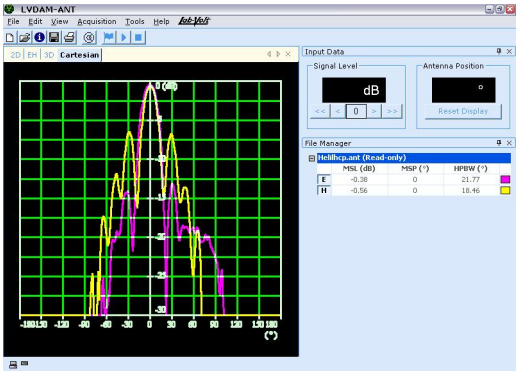


Figure 2. E- and H-plane patterns of an helical antenna plotted on a Cartesian coordinate graph.

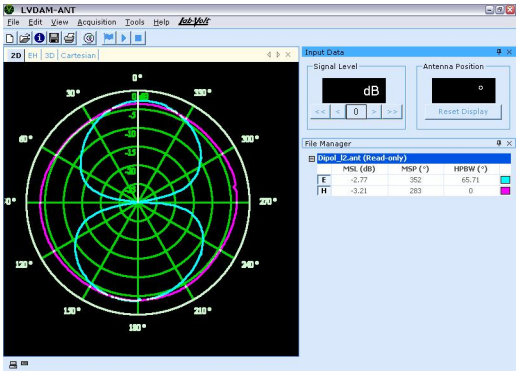


Figure 1. The E-plane and the H-plane patterns are acquired separately. These patterns can be plotted on a polar graph (as shown in figure) or a Cartesian graph (see Figure 2).

Features & Benefits

- Convenient and powerful antenna measuring system that can also be utilized by design and research teams
- Stand-alone system requiring no other microwave equipment
- Provides system-level, hands-on experimentation on antennas in the 1-GHz and 10-GHz bands in the classroom
- Rugged, high-quality components designed for hands-on training purposes
- Convenient and powerful antenna measuring system that can also be utilized by design and research teams
- Meets a variety of needs and budgets because of options
- Does not require an anechoic chamber
- Devices and components fabricated from electroless-plated brass to standard X-band waveguide dimensions
- Waveguide flanges are joined by precision quick fasteners, allowing rapid assembly and disassembly of microwave circuits
- Estimated program duration: 45 hours

List of Equipment

Qty	Description	Model number
1	RF Generator	8095643 (9505-10)
1	Antenna Positioner	581819 (9506-00)
1	Data Acquisition Interface / Power Supply	581825 (9507-30)
1	Horn Antenna, Small Aperture	581848 (9535-A0)
2	Horn Antenna, Large Aperture	581852 (9550-00)
2	Helical Antenna, Right-Hand Circular Polarization	581853 (9551-00)

Qty	Description	Model number
1	Helical Antenna, Left-Hand Circular Polarization	581854 (9552-00)
1	Patch Antennas	581855 (9553-00)
1	Slotted-Waveguide Antenna	581856 (9554-00)
1	Open-Ended Waveguide Antenna	581857 (9555-00)
1	Yagi Antenna	581860 (9560-00)
1	Wire Antennas	581861 (9561-00)
1	Cables and Accessories	581914 (9594-10)
1	Waveguide Accessories	581912 (9594-A0)
1	Antenna Support	581915 (9595-00)
1	Storage Module	581918 (9598-00)
1	Power Cord - CEE 7/VII (Type B)	789405 (95451-00)

List of Manuals

Description	Manual number
Antenna Fundamentals (Workbook)	580303 (30857-00)
Antenna Fundamentals (Workbook (Instructor))	580310 (30857-10)
Data Acquisition and Management Software (User Guide)	580315 (30857-E0)

Table of Contents of the Manual(s)

Antenna Fundamentals (Workbook) (580303 (30857-00))

- 1-1 Radiation Pattern of a λ/2 Dipole at 1 GHz
- 1-2 Radiation Pattern of an Open Waveguide at 10 GHZ
- 1-3 Gain of Pyramidal Horn Antennas
- 1-4 Experiments with λ/2, λ, and 3λ/2 Dipoles
- 1-5 Half Wave Folded Dipole Antennas and Impedance Transformation with Baluns
- 2-1 Monopole Antennas
- 2-2 Loop Antennas
- 2-3 Circular Polarization and Helical Antennas
- 2-4 Parasitic Array (Yagi-Uda) Antennas
- 3-1 Antenna Arrays: The Slot Antenna
- 3-2 Microstrip Technology: The Rectangular Patch Antenna
- 3-3 Microstrip Planar Array Antennas

Additional Equipment Required to Perform the Exercises

Qty	Description	Model number
1	Personal Computer	579785 (8990-00) [1]
1	Directional Coupler, 1 GHz	581841 (9529-00) [2]

[1] Refer to the Computer Requirements in the System Specifications section of this datasheet if the computer is to be provided by the end-user.

[2] Allows impedance measurements (optional section in 2 exercises).

Optional Equipment

Qty	Description	Model number
1	Antenna Positioner, RCS Ready	581822 (9506-A0) [3]
1	Multi-Beam Array Antenna	581858 (9556-00) [4]
2	Log-Periodic Antenna	581862 (9562-00) [5]
1	Two-Element Phasing Kit	581863 (9563-00) [6]
1	RCS Demonstration Accessories	581913 (9594-B0) [7]
1	Parabolic Reflector	581917 (9596-00) [8]
1	Antenna Training and Measuring System (Manuals on CD-ROM)	580313 (30857-A0)

Spare Part

Qty	Description	Model number
1	Helical Antenna, Right-Hand Circular Polarization	581853 (9551-00)
1	Helical Antenna, Left-Hand Circular Polarization	581854 (9552-00)
1	Wire Antennas	581861 (9561-00)
1	Cables and Accessories	581914 (9594-10)

Optional Manual(s)

Qty	Description	Model number
1	Antenna Fundamentals (Workbook)	580303 (30857-00) [9]
1	Antenna Fundamentals (Workbook (Instructor))	580310 (30857-10) [10]
1	Data Acquisition and Management Software (User Guide)	580315 (30857-E0) [11]
1	The Multi-Beam Array Antenna (Workbook)	580347 (33458-00) [12]
1	Two Element Phasing Kit Instructions (User Guide)	580352 (35166-E0) [13]
1	8092 Antenna Training and Measuring System (User Guide)	585093 (85256-E0) [14]

[3] Required instead of the conventional Antenna Positioner when using the optional RCS Demonstration Accessories.

[4] Electronic steering antenna principles.

[5] Multi-frequency antenna. No courseware.

[6] Allows showing distance/phase effect on the radiation pattern.

[7] Requires the optional Antenna Positioner, RCS Ready instead of the conventional Antenna Positioner.

[8] Most directive 10 GHz antenna, typically used in radar systems. No courseware.

[9] A copy is already included with the system.

[10] A copy is already included with the system.

[11] A copy is already included with the system.

[12] One is already included with the optional antenna.

[13] A copy is already included with the optional antenna.

[14] A copy is already included with the optional RCS Demonstration Accessories.

Equipment Description

RF Generator 8095643 (9505-10)

The RF Generator contains two independent generators capable of producing a CW or 1 kHz square wave AM modulated RF signal at 915 MHz and 10.5 GHz. Each generator has a push-button switch for turning RF power on and off, a LED that flashes on and off when RF power is turned on, and an SMA output connector. The oscillator in the 915 MHz generator can be tuned from 800 to 1200 MHz via an external tuning voltage input. All outputs are fully protected against short-circuits and misconnections. The RF Generator is self-powered and has a standard unregulated dc power bus to supply power to other compatible modules through its top panel connector. The unit beeps when RF power is turned on to help avoid interference and to warn students in the laboratory that RF power is emitted.

Specifications

Parameter	Value
Power Requirement	
Current	1 A
Service Installation	Standard single-phase ac outlet
Unregulated DC Output (Power Bus)	+25 V typ. – 1 A max.; -25 V typ. – 1 A max.; +11 V typ. – 1 A max.
1 GHz RF Power Output	
Impedance	50 Ω
Power Level	+5 dBm (typical); 0 dBm (minimum)
Attenuation at reception	Up to -59 dBm (49 dBm software controlled and 10 dBm with included physical attenuator)
10 GHz RF Power Output	
Impedance	50 Ω
Power Level	+12 dBm (typical)
Attenuation at reception	Up to -59 dBm (49 dBm software controlled and 10 dBm with included physical attenuator)
1 GHz Tuning Voltage Input	
Voltage Range	0-10 V
Frequency Range	800-1200 MHz
Protection	
AC Line Input	Circuit breaker
Unregulated DC Power Bus	Circuit breaker
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	6.1 kg (13.4 lb)

Antenna Positioner 581819 (9506-00)

The Antenna Positioner consists of the mast for the receiving antenna (antenna under test), a drive motor, a signal detector, a variable attenuator, and a shaft encoder. The drive motor is used to rotate the mast while the rotation is controlled by the LVDAM-ANT software via the Data Acquisition Interface. An SMA connector, mounted on the base of the mast, allows a connection to be made between the receiving antenna and the signal detector. This detector provides a signal whose voltage depends on the level of the RF signal received. This signal is

available on a BNC connector for connection to the Data Acquisition Interface.

The variable attenuator allows adjustments to be made to the sensitivity of the receiving system according to the strength of the received signal, in order to prevent system saturation. This attenuator is controlled by the LVDAM-ANT software via the Data Acquisition Interface. The shaft encoder is coupled with the shaft of the drive motor and provides signals to monitor the rotation of the mast. Two multi-pin connectors on the Antenna Positioner allow connection to the Data Acquisition Interface / Power Supply .

Specifications

Parameter	Value
Unregulated DC Power Requirement	+25 V – 90 mA, -25 V – 90 mA, +11 V – 90 mA
Drive Motor Power Input	24 V – 1.25 A – AC
RF Detector	
Frequency Range	1-15 GHz
Input Impedance	50 Ω
Maximum Input Power	100 mW, CW
Signal Amplifier Input	
Impedance	10 kΩ
Center Frequency	1 kHz
Signal Output	
Voltage Range	0 to +10 V
Center Frequency	600 Ω
Range of rotation	
Range per acquisition	0° to 360°
Total range	0° to infinity (rotary joint: no reel back required)
Physical Characteristics	
Dimensions (H x W x D)	260 x 385 x 250 mm (10.2 x 15.2 x 9.8 in)
Net Weight	10.2 kg (22.4 lb)

Data Acquisition Interface / Power Supply 581825 (9507-30)

The Data Acquisition Interface links the Antenna Positioner with the personal computer that runs the LVDAM-ANT software. The link to the computer is achieved through a USB port connector mounted on the rear panel of the module. The Data Acquisition Interface converts the received signal coming from the Antenna Positioner into a digital signal which can be used by the computer. It also routes the shaft encoder signals coming from the Antenna Positioner to the computer and provides the signals required to control the drive motor and the variable attenuator in the Antenna Positioner. A BNC connector and a multi-pin connector allow connection of the Data Acquisition Interface to the Antenna Positioner.

Manual

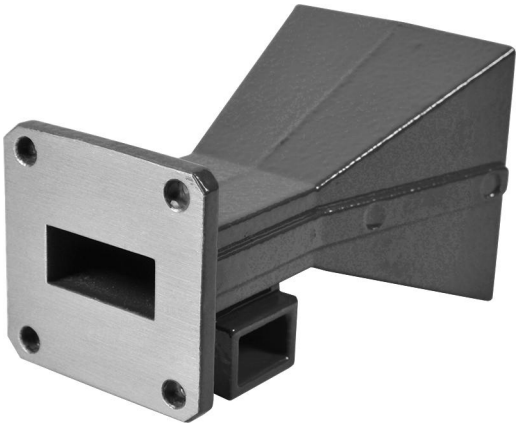
Description	Manual number
Data Acquisition and Management Software (User Guide)	580315 (30857-E0)

Specifications

Parameter	Value
Power Requirements	
Current	1.5 A
Service Installation	Standard single-phase ac outlet

Parameter	Value
Data Acquisition Interface	
Analog Signal Input Voltage Range	0 to +2.5 V
Analog Signal Input Impedance	1 MΩ
Power Supply	
Unregulated DC Power Bus Output	+25 V typ. – 1 A max.; -25 V typ. – 1 A max.; +11 V typ. – 1 A max.
Drive Motor Power Output	24 V – 1.5 A – AC
Computer Requirements	A currently available personal computer running under one of the following operating systems: Windows® 7 or Windows® 8.
Physical Characteristics	
Dimensions (H x W x D)	167 x 330 x 300 mm (6.6 x 13.0 x 11.8 in)
Net Weight	8.5 kg (18.8 lb)

Horn Antenna, Small Aperture 581848 (9535-A0)



The Horn Antenna, Small Aperture is a WR90 waveguide-type pyramidal horn antenna.

Specifications

Parameter	Value
Antenna	
Gain	13.8 dB
Frequency	10.525 GHz

Horn Antenna, Large Aperture 581852 (9550-00)

The Horn Antenna, Large Aperture, Model 9550, is a WR90 waveguide-type pyramidal horn antenna.

Specifications

Parameter	Value
Antenna	
Gain	16.7 dB
Frequency	10.525 GHz

Helical Antenna, Right-Hand Circular Polarization 581853 (9551-00)

The Helical Antenna, Right-Hand Circular Polarization is an helical antenna with SMA connector. The antenna is protected with a plexiglas dome.

Specifications

Parameter	Value
Antenna	
Gain	13.6 dB
Frequency	10.525 GHz
Axial Ratio	1.08

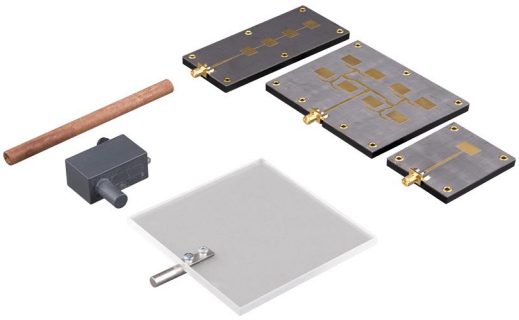
Helical Antenna, Left-Hand Circular Polarization 581854 (9552-00)

The Helical Antenna, Left-Hand Circular Polarization is an helical antenna with SMA connector. The antenna is protected with a plexiglas dome.

Specifications

Parameter	Value
Antenna	
Gain	13.6 dB
Frequency	10.525 GHz
Axial Ratio	1.08

Patch Antennas
581855 (9553-00)



The Patch Antennas set consists of three microstrip patch antennas with SMA connector that operate at a frequency of 10.525 GHz.

Specifications

Parameter	Value
Antenna Gain	
Patch (Rectangular)	7.7 dB
Patch (Series-Fed Array)	13.0 dB
Patch (Parallel-Fed Array)	14.0 dB
Antenna Frequency	10.525 GHz

Slotted-Waveguide Antenna
581856 (9554-00)

The Slotted-Waveguide Antenna is a light-weight, small-size WR90 waveguide-type slotted antenna. The slot antenna is of the "standing wave array" type. The array is terminated by a short circuit at the end of the waveguide.

Specifications

Parameter	Value
Antenna	
Gain	13.2 dB
Frequency	10.525 GHz

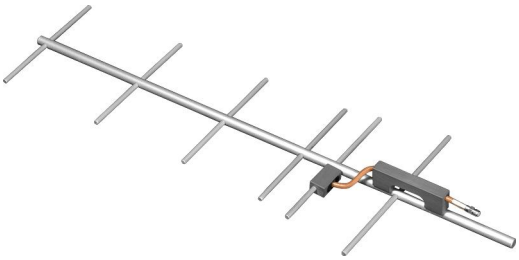
Open-Ended Waveguide Antenna 581857 (9555-00)

The Open-Ended Waveguide Antenna is of the WR90 type.

Specifications

Parameter	Value
Antenna	
Gain	TBE
Frequency	10.525 GHz

Yagi Antenna 581860 (9560-00)

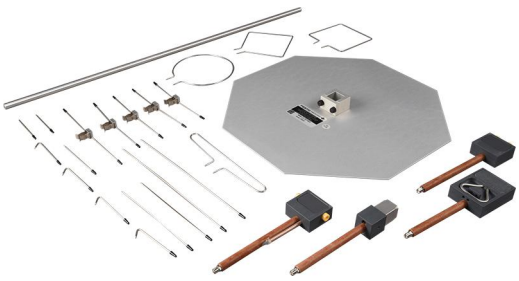


The Yagi Antenna is a six-element Yagi-Uda parasitic-array antenna with SMA connector.

Specifications

Parameter	Value
Antenna	
Gain	TBE
Frequency	1 GHz

Wire Antennas 581861 (9561-00)



The Wire Antennas is a kit that consists of an active element and a set of parasitic elements which can be assembled to obtain various types of antennas (e.g. Yagi antenna, loop antenna, folded-dipole antenna, dipole antenna).

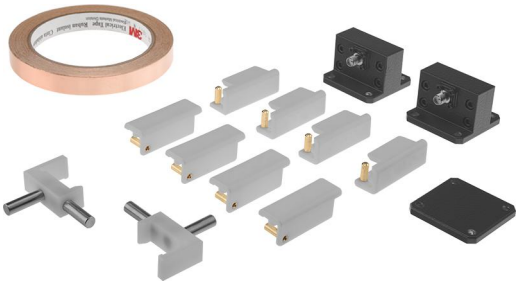
Specifications

Parameter	Value
Antenna Gain	
Dipole (λ/2)	1.9 dB
Folded Dipole with Balun	2.1 dB
Monopole (Over Ground Plane)	2.5 dB
Drooping Monopole	1.6 dB
Circular Loop	2.9 dB
Square Loop	2.9 dB
Lozenge Loop	2.9 dB

Cables and Accessories 581914 (9594-10)

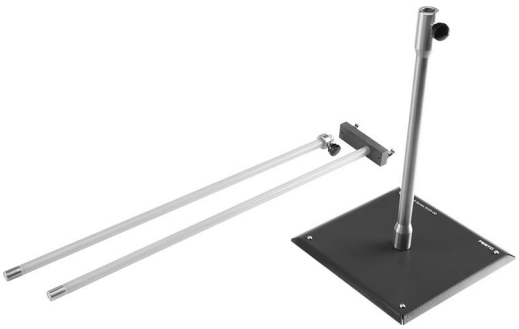
The Cables and Accessories package contains the various cables and accessories required to perform the exercises in the program training manuals. The accessories package contains the following parts: three different lengths of coaxial cables terminated with BNC connectors , whip, pigtail, and folded dipole antennas, BNC T-connectors, resistive loads with BNC connectors, headset. These accessories come in a convenient plastic storage case.

Waveguide Accessories 581912 (9594-A0)



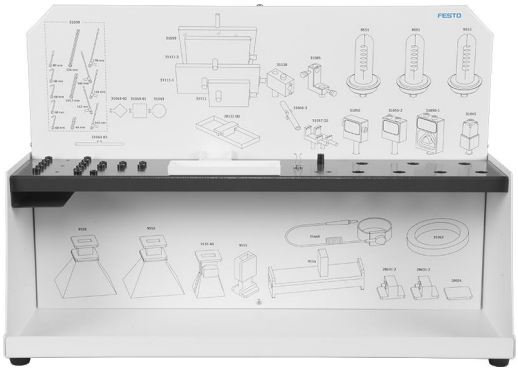
The Waveguide Accessories kit contains the accessories required when using the horn- and waveguide-type antennas of the ATMS. The kit includes quick-lock fasteners, waveguide-to-coaxial cable adapters (SMA connector), a waveguide plastic holder, a waveguide short-circuit, and copper tape to modify the characteristics of the slotted waveguide and patch antennas.

Antenna Support 581915 (9595-00)



The Antenna Support is used as a mount for the fixed (transmitting) antenna of the ATMS. It comes with different adapters to mount different types of antennas.

Storage Module
581918 (9598-00)



The Storage Module consists of a storage cabinet for storing equipment included in the Antenna Training and Measuring System, Model 8092.

Power Cord - CEE 7/VII (Type B)
789405 (95451-00)

This power cord connects the equipment to a wall outlet. It is intended for use in many countries of Europe, including: Austria, Belgium, Germany, Spain, France, Finland, Portugal, Norway, Sweden, and others.

Optional Equipment Description

Personal Computer (Optional)
579785 (8990-00)

The Personal Computer consists of a desktop computer running under Windows® 10. A monitor, keyboard, and mouse are included.

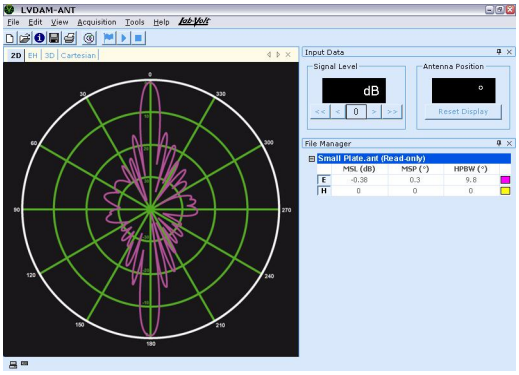
Specifications

Parameter	Value
Power Requirements	
Current	2 A
Service Installation	Standard single-phase ac outlet

Antenna Positioner, RCS Ready (Optional) 581822 (9506-A0)

This variant of the Antenna Positioner is provided with an auxiliary RF input coupled to an RF signal detector. These additional components are required when the ATMS is used with the optional RCS Demonstration Accessories, Model 9594-B, to measure and observe the near-field or far-field relative Radar Cross Section (RCS) of reflecting objects (targets). RCS patterns of targets with different shapes are acquired, displayed, and stored using the LVDAM-ANT software the same way as antenna radiation patterns are. The ATMS and RCS Demonstration Accessories allow quasi-monostatic and bi-static RCS measurements to be performed.

The standard Antenna Positioner, Model 9506, is no longer required when the Antenna Positioner, Model 9506-A, is ordered.



RCS pattern of a small metal plate obtained using the ATMS.

A switch on the front panel of the Antenna Positioner allows selection between the RF input mounted on the base of the rotating mast and the auxiliary RF input.

Additional Equipment Required to Perform the Exercises

Qty	Description	Model number
1	RCS Demonstration Accessories	581913 (9594-B0) [15]

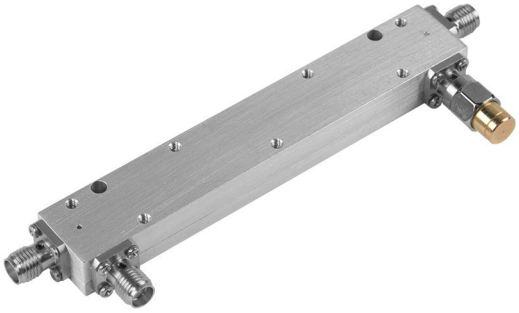
Specifications

Parameter	Value
Unregulated DC Power Requirement	+25 V – 90 mA, -25 V – 90 mA, +11 V – 90 mA
Drive Motor Power Input	24 V – 1.25 A – AC
RF Detector	
Frequency Range	1-15 GHz
Input Impedance	50 Ω
Maximum Input Power	100 mW, CW
Signal Amplifier Input	
Impedance	10 kΩ
Center Frequency	1 kHz
Signal Output	
Voltage Range	0 to +10 V
Impedance	600 Ω
Physical Characteristics	
Dimensions (H x W x D)	260 x 385 x 250 mm (10.2 x 15.2 x 9.8 in)

[15] The RCS demonstration accessories are required in order to perform RCS measurements.

Parameter	Value
Net Weight	10.2 kg (22.4 lb)

Directional Coupler, 1 GHz (Optional) 581841 (9529-00)



The Directional Coupler consists of an AtlanTecRF A2023-20 directional coupler used in different microwave and antenna training systems.

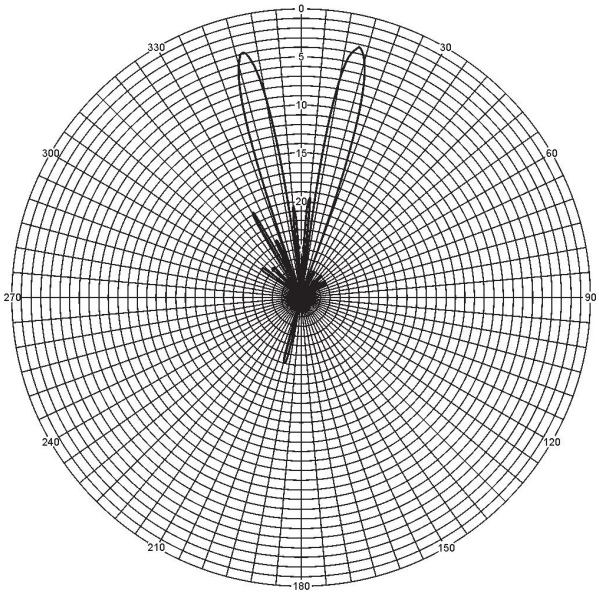
Specifications

Parameter	Value
Directional Coupler	
Type	AtlanTecRF A2023-20
Frequency	1 GHz
Coupling	20 dB
Average Power	50 W
Directivity	23 dB
Insertion Loss	0.35 dB

Multi-Beam Array Antenna (Optional) 581858 (9556-00)

The Multi-Beam Array Antenna (MBAA) is designed to operate in the X frequency band (8-12.4 GHz) and provides students with training in phased array antenna theory. It allows hands-on experimentation in Advanced antenna principles used in the fields of radar imagery as well as satellite and space-diversity communication systems.

The MBAA uses a microstrip Rotman lens to modify the phase shifts to a linear array of radiating elements. The antenna beam can be steered to various discrete directions by manually switching the connection to one of the MBAA RF port connectors. The MBAA can also be operated with multiple beams (2) by using the included power combiner. The MBAA is mechanically designed to provide easy installation on the ATMS Antenna Positioner. The student manual included with the MBAA deals with the multi-beam array antenna theory and design, antenna beam characteristics, and beam combination effects.



MBAA radiation pattern obtained using the ATMS when two beams are simultaneously excited.

Manual

Description	Manual number
The Multi-Beam Array Antenna (Workbook)	580347 (33458-00)

Table of Contents of the Manual(s)

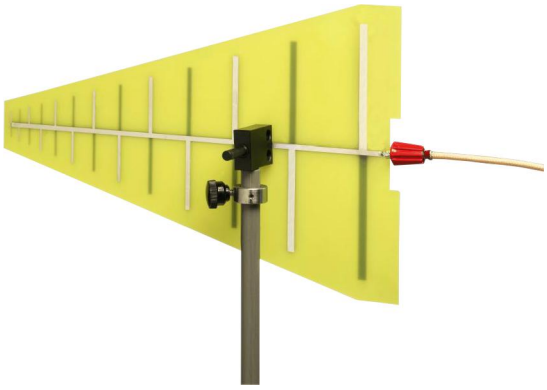
The Multi-Beam Array Antenna (Workbook) (580347 (33458-00))

- 1 Multi-Beam Array Antenna Operation
- 2 MBAA Gain and Performance Evaluation
- 3 MBAA Multi-Beam Operation

Specifications

Parameter	Value
Frequency Range	8.0-12.4 GHz
Overall Array Gain (@ 10.5 GHz)	10-13 dB
Maximum Sidelobe Level	-15 dB
Maximum VSWR	1.8
Polarization	Horizontal
Scanning Range	±35°
Number of Beams	8
Beamwidth	6° ±1°
Physical Characteristics	
Dimensions (H x W x D)	70 x 380 x 430 mm (2.8 x 15.0 x 16.9 in)
Net Weight	1.0 kg (2.2 lb)

Log-Periodic Antenna (Optional)
581862 (9562-00)



The Log-Periodic Antenna is designed to familiarize students with the principles of frequency independent antennas. The nominal frequency range of the Log-Periodic Antenna is 700 to 3600 MHz, but it can be operated from 700 to 1200 MHz when used with the ATMS (by tuning the frequency of the ATMS 1-GHz RF Generator). The antenna can be mounted to the ATMS Antenna Positioner for either vertical or horizontal polarization. When operating at frequencies other than the regular 915MHz, using a second Log-Periodic antenna for transmission will lead to better results. For full flexibility in experimenting with this antenna, it is recommended that two are used, one for transmission and one for reception.

Specifications

Parameter	Value
Gain	7.0 dB (typically)
Maximum VSWR	2.0
Frequency Range	700-3600 MHz
H-Plane Beamwidth	100°
E-Plane Beamwidth	60°
Input Impedance	50 Ω
Front-to-Back Ratio	
Minimum	5 dB
Typical	15 dB
Physical Characteristics	
Dimensions (H x W x D)	73 x 287 x 192 mm (2.9 x11.3 x 7.6 in)
Net Weight	0.13 kg (0.28 lb)

Two-Element Phasing Kit (Optional)
581863 (9563-00)

The Two-Element Phasing Kit enables students to observe the effects of antenna phasing on the resulting antenna radiation pattern (combined radiation pattern). Different combined radiation patterns such as end-fire, broadside, and cardioid can be obtained. These can be measured, stored, and analyzed using the ATMS.

Two drooping monopole antennas installed on the ATMS Antenna Positioner ready for experimenting the effects of antenna phasing.

The Two Element Phasing Kit consists of an additional drooping monopole antenna (one is already included in the ATMS), an additional antenna mast with vertical mounting clips (one is already included in the ATMS), a power splitter/combiner, and a set of RF cables of different lengths. Phase shifts of 0, 90, and 180 degrees can be produced with the supplied RF cables. Other phase shifts can be produced by using RF cables having lengths that differ from those of the supplied RF cables.

Manual

Description	Manual number
Two Element Phasing Kit Instructions (User Guide)	580352 (35166-E0)

Specifications

Parameter	Value
Operating Frequency	1 GHz
RF Cable Lengths	
RF Cable Lengths	30.0 (11.8 in)
	35.4 cm (13.9 in)
	40.8 cm (16.1 in)
Physical Characteristics	
Dimensions (H x W x D)	73 x 287 x 192 mm (2.9 x11.3 x 7.6 in)
Net Weight	1.58 kg (3.4 lb)

RCS Demonstration Accessories (Optional) 581913 (9594-B0)

The RCS Demonstration Accessories kit contains all the accessories required to measure the relative RCS pattern of targets using the ATMS. It includes targets of various shapes (small and large metal plates, cylinder, and prism-shaped target), a 2 m SMA cable, a fixed antenna support, and an antenna mounting pole.

ATMS ready to measure the RCS of a metal plate. Notice the connection of a second horn antenna to the auxiliary RF input of the optional Antenna Positioner, Model 9506-A

Manual

Description	Manual number
8092 Antenna Training and Measuring System (User Guide)	585093 (85256-E0)

Parabolic Reflector (Optional) 581917 (9596-00)

The Parabolic Reflector allows students to study the characteristics of the parabolic antenna, one of today's most widely used antennas, that finds applications in cellular telephony, satellite communications, radars, etc.

The Parabolic Reflector mainly consists of a parabolic reflector and a chassis. It allows a complete parabolic antenna to be assembled using the small-aperture horn antenna included in the ATMS. A mast included in the Parabolic Reflector allows the assembled parabolic antenna to be installed on the ATMS Antenna Positioner. This mast also allows the parabolic antenna to be tilted 90° for either vertical or horizontal polarization.

Specifications

Parameter	Value
Frequency Range	8.0-12.4 GHz
Gain (typical)	27 dB
H-Plane Beamwidth (@ 9.0 GHz)	6°
E-Plane Beamwidth (@ 9.0 GHz)	8°
Input Impedance	50 Ω
Physical Characteristics	
Dimensions (H x W x D)	375 x 370 x 510 mm (14.8 x 14.6 x 20.1 in)
Net Weight	1.5 kg (3.3 lb)

Antenna Training and Measuring System (Manuals on CD-ROM) (Optional) 580313 (30857-A0)

List of Manuals

Description	Manual number
Antenna Fundamentals (Workbook)	590627 (30857-00)
Antenna Fundamentals (Workbook (Instructor))	590631 (30857-10)
Data Acquisition and Management Software (User Guide)	590634 (30857-E0)
The Multi-Beam Array Antenna (Workbook)	590744 (33458-00)
Two Element Phasing Kit Instructions (User Guide)	590776 (35166-E0)

Reflecting the commitment of Festo Didactic to high quality standards in product, design, development, production, installation, and service, our manufacturing and distribution facility has received the ISO 9001 certification.

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