



Diamond Engineering

Automated Measurement Systems

D6050 Series with Gimbal Option



Features and Specifications

Introduction

Overview

The D6050 Series with gimbal option is a highly versatile multi-axis antenna measurement system suited for devices up to 60 pounds (27.2 kg). The belt-driven head is almost completely non-metallic, providing a very low-reflection environment which is ideal for a wide range of devices and/or antennas.

What's Included?

All standard D6050 packages feature a 2-axis positioner, our powerful DAMS Antenna Measurement Studio, precision RF cables and rotary joints, all tools and documentation, plus DUT mounting hardware—all backed by solid 3-year warranty.

Measurement Capabilities

- 2D & 3D Spherical Measurements (AZ over EL, EL over AZ, XYZ planes and more)
- Far Field Parameters (gain, beamwidth, efficiency, directivity, polarization, isolation, and more)
- OTA Measurements (TRP/TIS)
- Phase Center Measurements
- Spherical Near Field (optional)

Highlights

- Dual mast heads with a gimbal tray
- Can used with single mast to convert into regular D6050 with long extension rails
- Dual rotary joints (one on turntable, one on a mast)
- Multiple configuration options (height, weight capacity, speed, etc.)
- Dual, mostly non-metallic heads with a large gimbal tray
- Ultra-high precision (up to 0.02°)
- Ideal for most antennas up to 60 pounds

Configurable Models / Options

The D6050 platform is capable of operation from DC to 67 GHz with standard coaxial components and DC up to 110 GHz with waveguide components. Other upgrades and options include automated Z-axis, auto-polarization switch, and/or customized mounting options. The D6050 system can also be configured to include up to 5-axes. Full turnkey packages are available and can include anechoic chamber, network analyzer, reference horn, laptop, etc. - everything needed to get measuring quickly and easily!

System Package Options

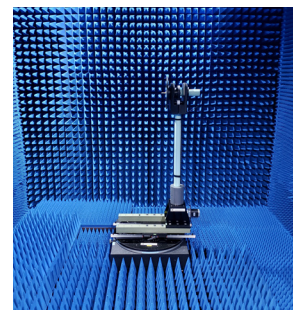
Standard Models

All standard model packages include the positioner, software, all RF components, tools and documentation and AUT mounting hardware.

D6050-GMB-NORF	No RF Components
D6050-GMB-06	6 GHz SMA RF Components
D6050-GMB-18	18 GHz SMA RF Components
D6050-GMB-40	40 GHz 2.92 mm RF Components
D6050-GMB-50	50 GHz 2.4 mm RF Components
D6050-GMB-67	67 GHz 1.85 mm RF Components
D6050-GMB-75	50 to 75 GHz mmW V-Band RF Components
D6050-GMB-90	60 to 90 GHz mmW E-Band RF Components
D6050-GMB-110	75 to 110 GHz mmW W-Band RF Components
D6050-GMB-SER	Hybrid servo motor upgrade with gimbal encoders
D6050-GMB-MOD	Custom larger gimbal tray (up to 36" wide)
D6050-GMB-FX001	Custom DUT fixtures for precision mounting

Full Turnkey Solutions

We offer **complete** turnkey measurement systems including anechoic chamber, VNA, positioner, reference antenna, and laptop with DAMS Antenna Measurement Studio. Packages can be tailored to meet your specific needs. From MHz to mmW, we can deliver a complete solution. Our chambers are custom designed and feature double-knife-edge doors with high quality absorber and honeycomb vents to ensure proper shielding. We can also provide a comprehensive system training session following the installation process.



Additional Options

OPT-SR	No slip ring (for limited $\pm 180^\circ$ rotations only, not for 360°)
OPT-AZ	Automated linear Z-axis
OPT-AZXY	Automated linear Z- and X-axis with pseudo Y-axis
OPT-ENC	Encoder feedback capability
DPA-PDK	DAMS Platform Development Kit
OPT-SMA	Software maintenance agreement

Accessories

DEPC-D	Pre-configured PC (desktop)
DEPC-L	Pre-configured PC (laptop)
DE-SIM	DAMS Antenna & Network Simulator software add-on
DPA-SW-N2F	Spherical nearfield processing
DPA-AUTOPOL	18 GHz SPDT RF switch auto-polarizer with cables/adapters
DPA-AUTOPOL-40	40 GHz SPDT RF switch auto-polarizer with cables/adapters
DE-05xx	Broadband reference horn 500 MHz to 18, 26, 30 or 40 GHz
DE-07xx	Broadband reference horn 700 MHz to 18, 26, 30 or 40 GHz

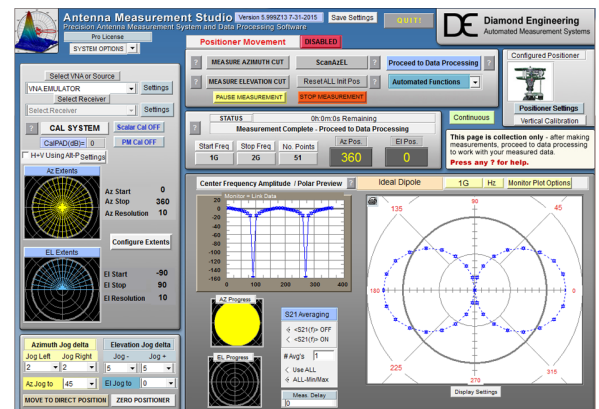
DAMS Antenna Measurement Studio (included!)

Overview

The DAMS Antenna Measurement Studio is an advanced data collection platform for both passive and active measurements. Includes several built-in semi-automatic modules for post-processing DUT data. The DAMS Studio is also capable of generating various reports and visual data representations ranging from 3D spherical plots, gain over frequency plots, Smith charts and more. The unlimited viewing license permits installation on multiple computers for post-processing or data-analysis.

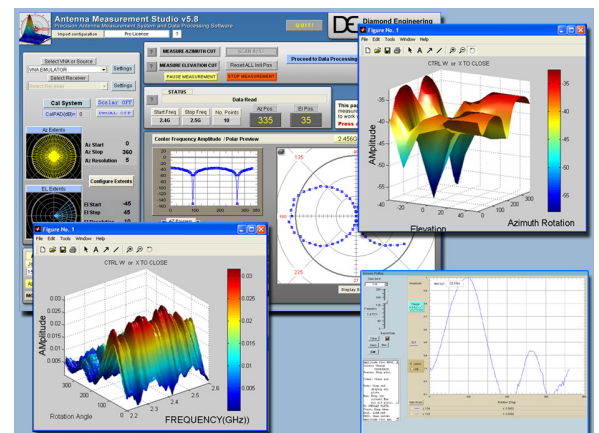
Measurement Features

- Support for vector network analyzers (VNA/PNA/ENA), spectrum analyzers, signal generators, power meters and even voltmeters.
- Extensive post-processing modules
- Export data with variable formatting options
- Measure up to 1600 frequency points @ every position
- Variable speed
- Move to max signal position
- Vertical / horizontal scan measurements
- CW/CCW antenna rotation



Data Processing and Visualization

- Process 500,000 data points under normal operation
- Quad-trace polar plots
- Dual-trace amplitude plots
- Compliance overlay
- 3D AZ/EL over freq
- 3D AZ over El
- Spherical plots
- Calibrated ref antenna import
- Path loss calculator
- Excel or .TXT export
- Complete data manipulation
- Multiple storage registers for convenience



For more information about our software, including screen shots, full specifications of capabilities and the ability to download a demo version, please visit:

http://www.DiamondEng.net/PDF/software_specs.pdf

Specifications - Standard Stepper Model

General

Dimensions

Turntable Footprint:	24" x 24" (609 mm x 609 mm)
Total Height:	61.475" (1561.4 mm)
Clearance Diameter (Min):	48" (1219 mm) surrounding clearance required for full 360° rotation with extension rails centered on turntable
Total Weight:	150 lbs (68 kg)

Positioner

Turntable

Frequency Ranges (GHz):	Coax: DC to 6, 18, 40, 50, or 67 GHz mmW: 50-75 (V-Band), 60-90 (E-Band) or 75-110 (W-Band) GHz
Resolution:	Native: 0.02° Commandable: .00125°
Drivetrain:	Precision worm gear table with 1.8° stepper motor
Gear Ratio:	90:1
Movement Range:	0-360° or ± 180° (re-indexable hardware limits)
Slip Ring:	Standard for unlimited rotation
Position Feedback:	Optional Encoders
Weight (positioner only):	76 lbs (34.5 kg) with slide rails
Positioner Max Speed:	4 RPM (24° per second)
AUT Mounting ¹ :	24" (610 mm) diameter acrylic plate, 0.750" thick, 1/4"-20 hole array (M6 hole array available upon request)
Through-bore Diameter:	Standard: 1.4" (35.5 mm) mmW: 3.25" (82.5 mm)
Weight Capacity:	Centered: 150 lbs (45.5 kg); distributed: 250 lbs (113.6 kg)
RF Rotary Joint:	Precision (SMA, 2.92 mm, 2.4 mm, 1.85 mm or waveguide)

Gimbal Axis

Frequency Ranges:	Coax: DC to 6, 18, 40, 50, or 67 GHz mmW: 50-75 (V-Band), 60-90 (E-Band) or 75-110 (W-Band) GHz
Resolution:	Native: 0.025° Commandable: .0015625°
Drivetrain:	Dual masts, belt driven with 1.8° stepper motors
Gear Ratio:	72:1 with precision planetary reducer on each mast
Movement Range:	360° continuous or ± 180°
Positioner Max Speed:	4 RPM (24° per second)
Position Feedback:	Default open loop, tracked by software (<i>encoder options available</i>)
Weight (Gimbal only):	70 lbs (31.8 kg)
AUT Mounting Options ¹ :	30" (762 mm) FR4 gimbal tray, 0.50" (12.7 mm) thick, 1/4"-20 array
Through-bore Diameter:	1.75" (44.5 mm)
Weight Capacity:	60 lbs (11.4 kg)
Radial Moment Capacity:	30 ft-lbs
RF Rotary Joint:	Precision (SMA, 2.92 mm, 2.4 mm, 1.85 mm or waveguide)

¹ = Custom mounting solutions available upon request

Z-Axis (optional)*(Standard feature on 50 GHz, 67 GHz and waveguide systems)*

Movement travel:	12" (+/- 6") (304.8 mm) - 14" with extended Z option
Drive Type:	Precision ground C7 steel ball-screw
Motor:	NEMA 17 stepper motor <i>(with manual control knob)</i>
Max speed:	1 in/s (25 mm/s)
Movement resolution:	0.008" (0.2 mm)
Minimum travel:	0.008" (0.2 mm)
Position feedback:	Open loop, position tracked by software <i>(encoder options available)</i>

Electrical & Communications

Controller type:	Internal 3-axis microprocessor-based controller
Resolution:	Up to 1/32 nd microstepping
Motor current:	3.125A per motor phase
Cooling:	24V fan
Communication interface:	9-pin D-Sub RS-232 <i>(USB-to-Serial adapter included)</i>
Included cable length:	10 feet (3 meters)
Input voltage:	24VDC 5A - 2.5 mm DC barrel connector
Power supply:	24VDC 5A, 110V / 220V input <i>(included)</i>

Specifications - Hybrid Servo Model

General

Dimensions

Turntable Footprint:	24" x 24" (609 mm x 609 mm)
Total Height:	61.475" (1561.4 mm)
Clearance Diameter (Min):	48" (1219 mm) surrounding clearance required for full 360° rotation with extension rails centered on turntable
Total Weight:	150 lbs (68 kg)

Positioner

Turntable

Frequency Ranges (GHz):	Coax: DC to 6, 18, 40, 50, or 67 GHz mmW: 50-75 (V-Band), 60-90 (E-Band) or 75-110 (W-Band) GHz
Resolution:	Native: 0.02° Commandable: .00125°
Drivetrain:	Precision worm gear table with hybrid servo motor
Gear Ratio:	90:1
Movement Range:	0-360° or ± 180° (re-indexable hardware limits)
Slip Ring:	Standard for unlimited rotation
Position Feedback:	Optional Encoders
Weight (positioner only):	76 lbs (34.5 kg) with slide rails
Positioner Max Speed:	12.5 RPM (75° per second)
AUT Mounting ¹ :	24" (610 mm) diameter acrylic plate, 0.750" thick, 1/4"-20 hole array (M6 hole array available upon request)
Through-bore Diameter:	Standard: 1.4" (35.5 mm) mmW: 3.25" (82.5 mm)
Weight Capacity:	Centered: 150 lbs (45.5 kg); distributed: 250 lbs (113.6 kg)
RF Rotary Joint:	Precision (SMA, 2.92 mm, 2.4 mm, 1.85 mm or waveguide)

Gimbal Axis

Frequency Ranges:	Coax: DC to 6, 18, 40, 50, or 67 GHz mmW: 50-75 (V-Band), 60-90 (E-Band) or 75-110 (W-Band) GHz
Resolution:	Native: 0.025° Commandable: .0015625°
Drivetrain:	Dual masts, belt driven with hybrid servo motors
Gear Ratio:	72:1 with precision planetary reducer on each mast
Movement Range:	360° continuous or ± 180°
Positioner Max Speed:	15.6 RPM (93 ° per second)
Position Feedback:	Closed loop motor control with gimbal mounted encoder
Weight (Gimbal only):	70 lbs (31.8 kg)
AUT Mounting Options ¹ :	30" (726 mm) FR4 gimbal tray, 0.50" (12.7 mm) thick, 1/4"-20 array
Through-bore Diameter:	1.75" (44.5 mm)
Weight Capacity:	60 lbs (11.4 kg)
Radial Moment Capacity:	30 ft-lbs
RF Rotary Joint:	Precision (SMA, 2.92 mm, 2.4 mm, 1.85 mm or waveguide)

¹ = Custom mounting solutions available upon request

Z-Axis (optional)

(Standard feature on 50 GHz, 67 GHz and waveguide systems)

Movement travel:	12" (+/- 6") (304.8 mm) - 14" with extended Z option
Drive Type:	Precision ground C7 steel ball-screw
Motor:	NEMA 17 stepper motor <i>(with closed loop control)</i>
Max speed:	15 in/s (381 mm/s)
Movement resolution:	0.008" (0.2 mm) Native .0005" with Microstepping
Position feedback:	Closed loop stepper motor

Electrical & Communications

Controller type:	Internal 4-axis microprocessor-based controller
Resolution:	Up to 1/32 nd microstepping
Motor current:	Individual Motor Drivers
Cooling:	24V fan
Communication interface:	9-pin D-Sub RS-232 , <i>USB Port</i>
Included cable length:	10 feet (3 meters)
Input voltage:	120VAC , 7 Amps - Standard (IEC power plug)
Internal Power supplies:	24VDC 3A , 70VDC 7 Amp

Software Features

Pattern Measurement Modes

- Time or Frequency Domain
- Gated Frequency domain (RCS, multipath elimination)
- Index and Measure
- Simultaneous axis movement support - (Conical Scan)
- Any supported S-Parameter (S21, S11, S12, S22, etc.)

Calculated Antenna Parameters

- Gain
- Peak gain and position
- Beamwidth
- Front to Back Ratio
- Efficiency / TRP
- Dual Linear to Circular Transform (RHCP/LHCP)
- Nearfield to Farfield Translation Module

Data Export

- TXT / .S1P
- DAT export
- Export data and report to Excel
- Trace Data only to Excel
- MatLab Compatible .TXT Format

Plots

- Multi-Trace polar and XY plots
- Efficiency and TRP
- Beamwidth vs. Frequency
- Spherical 3D Radiation Plots with Overlays
- 3D Amplitude Plot / 3D Color Map Plot
- Built In Matlab Plots (does not require MatLab)

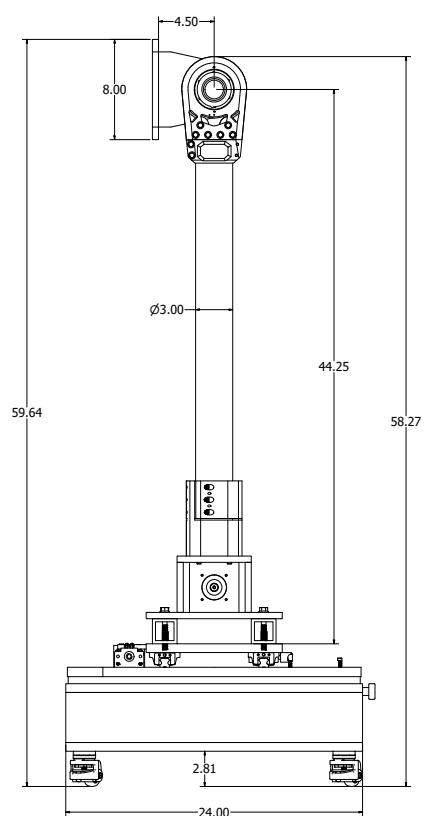
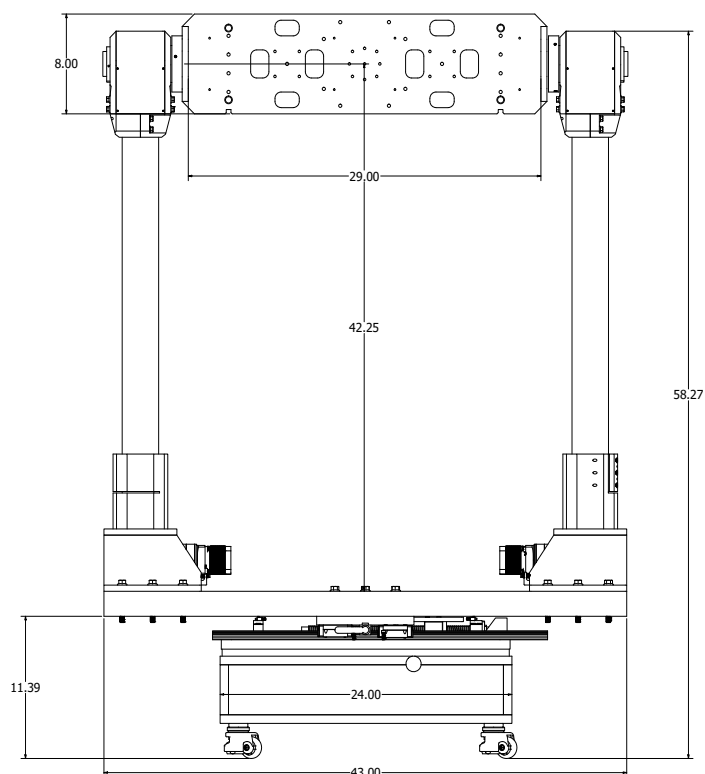
Calibration and Correction

- Gain Substitution, Gain Transfer, and 3 Point gain modules
- Calibration Profiles for gains or losses.
- Table Based Correction
- Calibration Interpolation
- Phase Correction
- Data Normalization
- Data/Register Math - Add/ Subtract

Automated / Batch Functions

- File Trigger Mode
- Position from list
- Batch plot export

General Drawing / Dimensions



More Information

Software

For more information about our software, including screen shots, full specifications of capabilities and the ability to download a demo version, please visit:

http://www.DiamondEng.net/PDF/software_specs.pdf

Broadband Reference Horns

For more information about our broadband reference horns, please visit:

http://www.DiamondEng.net/PDF/de0726_datasheet.pdf

Power Amplifiers

For more information about our broadband power amplifiers, please visit:

<http://www.DiamondEng.net/power-amplifiers>



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