

FPM H Series

Display Measurement System

Flexible optical performance measurement system that is scalable to meet your display measurement needs.



Overview

The FPM H Series is our most flexible optical performance measurement system that is scalable to meet your display measurement needs. Whether you need to test cell phone display modules for engineering development purposes, ruggedized displays for aerospace and military applications, or TV LCD modules for production QA/QC, we have a FPM for you.

All of our FPM H Series systems include a five axis motion system and a controller computer with software interface (manual and automated control). We offer four models based on your display size requirements starting with our FPM-500 system for testing up to 19" displays up to our largest FPM-530 system for testing up to 72" displays.

Easy to Use

The FPM H Series verifies critical optical performance parameters of the display in an easy to use automated fashion. The graphical user interface allows the operator to select a pre-defined test configuration, start, and stop the test.

Standard and Custom Tests

The FPM H Series Display Measurement System can be setup to run many standard VESA, ICDM, TCO, ISO, SPWG and other display measurement tests as well as many customized tests; too many to list. We offer test sequences that cover most display measurement requirements or you can write your own.

Typical Applications

- R&D and Engineering
- Display Production QA/QC
- Avionics / Military Display Testing
- Laptop, Tablet, and HDTV Testing
- Automotive Display Testing

Features

Complete Measurement Solution

- Optimized for displays up to 72"
- Fully automated 5-axis motion base
- Supports up to 4 optical instruments
- Quick and accurate measurements
- Full optical characterization
- Many standard VESA, ICDM, TCO, ISO, SPWG tests
- Custom automated tests
- Integrates with all major optical instruments
- Supports popular LCD testers and test pattern generators
- Westar ViewPoint software for manual system control
- NI Teststand for automated test sequences
- Excel data reports

Key Measurements¹

- | | |
|-------------------------|----------------------------------|
| • Brightness | • Viewing Angle |
| • Contrast | • Flicker (optional) |
| • Color | • Response Time (optional) |
| • Uniformity | • Gamma |
| • Cross-talk | • Custom test |
| • Color Gamut | • Voltage and Current (optional) |
| • Reflection (optional) | • Warm Up Time |

Delivery, Setup and Training

A certified Westar installer will arrive at your facility to install the FPM Display Measurement System. After installing the system, the installer will provide up to 3 days of training on operation.

Warranty and Support

The FPM H Series Display Measurement System comes with a limited 1 year warranty and 1 year of technical support. Contact Westar for extended warranty and support options.

Optical Performance Tests Supported¹

Center Screen Luminance	Luminance Uniformity	Luminance vs. Viewing Angle	Shadowing (Cross Talk)
Center Screen Color	Contrast Ratio Uniformity	Contrast Ratio vs. Viewing Angle	Gray Level Response Time ²
CIE Chromaticity	Color Uniformity	Color vs. Viewing Angle	Flicker ²
Correlated Color Temperature	Contrast Ratio	Image Retention	Reflection Testing ³
Color Gamut and %NTSC	Gamma	Warm Up Time	Custom Tests

Four Models Available

FPM-500

Optimized for up to 19" Displays⁴

Ideal for small to mid-sized displays and devices such as cell phone, tablet, and notebook displays requiring full optical characterization. This mobile system is ideal for use in a engineering laboratory or production QA/QC department.



FPM-510

Optimized for up to 30" Displays⁴

Ideal for medium sized displays such as laptop displays and LCD monitors. Configured with an orthogonal goniometer, the system easily handles deep and heavy display assemblies such as avionics, military ground vehicles, and ruggedized industrial displays.



FPM-520

Optimized for up to 48" Displays⁴

The FPM-520 is the system of choice for AMLCD panel makers worldwide. With a 48" (122 cm) polar goniometer, this workhorse serves triple-duty by performing precision optical measurements on notebook panels, monitors, and large area flat panel TVs.



FPM-530

Optimized for up to 72" Displays⁴

For very large displays, our FPM-530 with its 72" (183 cm) polar goniometer can handle the largest commercially available flat panel displays. The FPM-530 is ideal for optical measurements of large flat panel monitors or finished LCD TV products.



Cell Phone Displays
Tablet Displays
Avionics Displays

Tablet Displays
Laptop Displays
Desktop Monitors
Avionics Displays

Laptop Displays
Desktop Monitors
Medium Size HDTVs

Large Desktop Monitors
Medium / Large HDTVs

Notes: 1. Measurement capabilities depend on system configuration and optical instruments selected. 2. Temporal tests require TRD-200 option. 3. Reflection tests require SCR or ACR option. 4. Max DUT dimensions include bezel. FPM-510 can test up to 40" displays with the wide goniometer option.

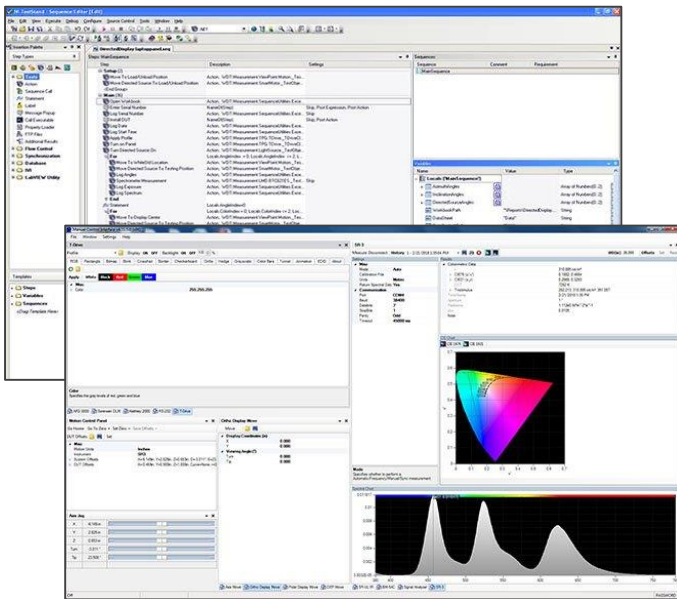
Software

TestStand - Automated Test Sequencer

For automated test scripts, the FPM H Series can be controlled using NI TestStand. Any controls in ViewPoint are available via test objects (steps) in TestStand making it easy to build elaborate test sequences. Westar offers many standard test sequences and can help you design your own custom test sequences depending on your display metrology needs.

Features

- Access motion base, instruments, test pattern generators, and other supported devices using test objects.
- Structure test steps into sequences and subsequences with global and local parameters.
- Powerful development interface for sequence design and debugging.
- Easy to user interface for sequence operation and control.
- Access Microsoft Excel for data reporting.



ViewPoint - Manual Control Interface

The FPM H Series comes with a sleek user interface for manual control called ViewPoint™. In a single interface, the user can control the instruments, light sources, test pattern generators, and motion base. ViewPoint can be customized with software controls for your specific instruments, test pattern generators, and power supplies. *See spec summary for list of supported devices*

Features

- Multi-view dockable GUI windows – arrange multiple DUT Control, Motion Control, and LMD GUIs
- Property grids for easy parameter input
- Unified LMD GUI “look and feel” and improved ease-of-use for photometers and spectroradiometers
- Enhanced CIE chromaticity charts (NTSC reference gamut, multiple measurement points, print graphs)
- Enhanced measurement history and reporting tools (print standard measurement reports from the MCI).

Options and Accessories

Goniometer

The FPM H Series can be configured with either a polar or orthogonal goniometer which is a two-axis rotational stage used to rotate the DUT for viewing angle measurements.

Each goniometer type is capable of achieving a full $\pm 90^\circ$ viewing angle both vertically and horizontally.

Regardless of the mechanical arrangement chosen, ViewPoint™ supports both polar and orthogonal viewing angle coordinates and automatically performs transformations to achieve the desired angle.

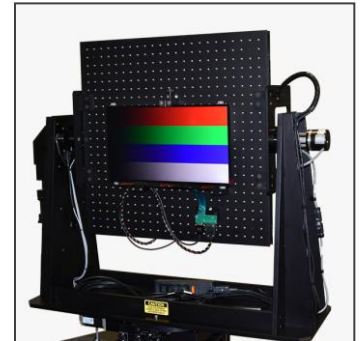
Polar Goniometer (Standard)

The Polar Goniometer rotates the display about a vertical (inclination) axis and a normal (azimuthal) axis.



Orthogonal Goniometer (Optional)

The Orthogonal Goniometer rotates the display about a vertical (turn) axis and a horizontal (tip) axis.



Optical Instruments

Our Display Measurement Systems work with more LMDs than any other display measurement system.

Used to make photometric, colorimetric, or spectral measurements of light, typical LMDs include video photometers, CCD cameras, and temporal measurement sensors.

Our systems support standard photometers and spectroradiometers from Topcon, Photo Research, Optronic Laboratories, and Minolta. This broad range of available instrument interfaces allows you to pick the best instrument for the job

The FPM H Series can be customized to accommodate (hardware integration) up to 4 optical instruments depending on your display metrology needs. The FPM H Series supports (software integration) the following list of instruments.

Westar

- TRD-200

Topcon

- BM-5AS, BM-5AC
- BM-7AS, BM-7AC
- SR-3AR
- SR-UL1R, SR-UL2, SR-UL2s
- Contact for Others

BW-Tek

- Exemplar

Optronic Laboratories

- OL-770

Gamma Scientific

- GS-12 NVIS

Minolta

- CS-200
- CS-2000, CS-2000A

Photo Research

- PR-655
- PR-670
- PR-705
- PR-730
- PR-740
- PR-788
- PR-880
- Contact for Others

Radiant Vision Systems

- ProMetric Series

Contact Westar if you would like to work with an instrument not listed, we may already have a software solution or can design one to fit your needs.

Display Drive Equipment

A good LCD tester or test pattern generator that can drive display modules or finished products is a must.

Our most popular LCD tester for display drive is the T-Drive III but as with instruments, our ViewPoint software interfaces with most test pattern generators on the market today. We even offer custom software interfaces to work with specialty LCD drive equipment.

Westar

- T-Drive Series
- Android App
- Windows App

Astro Systems

- VG-870

Quantum Data

- QD-802

Contact Westar if you would like to work with a LCD tester not listed, we may already have a software solution or can design one to fit your needs.

Options and Accessories – Continued

Power and Measurement

For backlight power and precision measurement, the FPM H Series integrates with a wide range of power supplies from Sorensen and meters from Keithley.

Power Supplies

- Sorensen DLM

Digital Multi-meters

- Keithley 2000

Power / DMM

- Keithley 2400

Contact Westar if you would like to work with equipment not listed, we may already have a software solution or can design one to fit your needs.

Lighting for Reflection Testing

The FPM H Series can be configured with two lighting options for diffuse and specular reflection testing, the ACR Apparatus for ambient contrast ratio measurements and SCR Apparatus for sunlight contrast ratio measurements.

ACR – Ambient Contrast Ratio

The Westar ACR-120 provides the controlled diffuse illumination necessary for making ambient contrast ratio measurements of displays of all sizes, from cell phone displays to projection TVs. The ACR-120 consists of a 12-inch sampling sphere with an external fiber-coupled light source and a sphere monitor photo detector

SCR – Sunlight Contrast Ratio

A measure of display contrast in the presence of high ambient light (simulated sunlight). The test is formally defined in MIL-L-85762A, paragraph 4.8.16, "Daylight legibility and readability inspection" and is intended to evaluate cockpit display readability in the bright sunlight. Westar offers the required lighting apparatus, fully integrated with the FPM System, and supporting test sequences and written procedures.

Automated Test Suites

The FPM H Series can be setup to run many standard VESA, ICDM, TCO, ISO, SPWG and other display measurement tests as well as programmable customized tests.

We offer test sequences that cover most display measurement requirements or you can write your own. Contact Us to learn more about the FPM capabilities.

Standardized Test Suites

- ICDM
- VESA FPDM 2.0
- TCO '99/03'05
- ICO 13406-2
- SPWG 3.5

Custom Test Suites

Custom test requirements? Special tests and modified procedures are not a problem. Contact Us to discuss your unique display measurement requirements and let us configure the optimal FPM System for you.

Contact Westar if you would like to use a test suite not listed, we may already have a solution or can design one to fit your needs.

Extended Optical Table

For extended measurement distances, the FPM H Series (excluding the FPM-500) can be configured with up to three optical tables, effectively increasing the measurement distance range between the instrument and the display.

-Long Option

(FPM-520-Long shown)

The goniometer is mounted on a sliding platform and track that spans across three optical tables.



Spec Summary	FPM-500	FPM-510		FPM-520	FPM-530
Instrument Motion Base		Standard	Wide		
X Axis Range (Left – Right)	20" (50 cm)	30" (76 cm)	40" (100 cm)	47.5" (120.7 cm)	69.0" (175.0 cm)
Y Axis Range (Up – Down)	20" (50 cm)	30" (76 cm)	30" (76 cm)	47.5" (120.7 cm)	55.0" (139.0 cm)
Z Axis Range (In-Out)	20" (50 cm)	30" (76 cm)	30" (76 cm)	-47.5" (120.7 cm)	55.0" (139.0 cm)
Polar Goniometer					
Plate Dimensions	19" diagonal (round)	30" diagonal (round)		48" diagonal (round)	72" diagonal (round)
Range of Motion	Inc: ±90° Az: ±90°	Inc: ±90° Az: ±90°		Inc: ±90° Az: ±90°	Inc: ±90° Az: ±90°
Max DUT Width, Height, Diag. (4:3)	15.2" x 11.4" (19" Diagonal ⁴)	24.0" x 18.0" (30" Diagonal ⁴)		38.4" x 28.8" (48" Diagonal ⁴)	57.6" x 43.2" (72" Diagonal ⁴)
Max DUT Width, Height, Diag. (16:9)	16.6" x 9.3" (19" Diagonal ⁴)	26.2" x 14.7" (30" Diagonal ⁴)		41.8" x 23.5" (48" Diagonal ⁴)	62.8" x 35.4" (72" Diagonal ⁴)
Max DUT Weight	Contact Westar				
Ortho Goniometer (Optional)		Standard	Wide		
Plate Dimensions (Width x Height)	16" x 17"	24" x 24"	32" x 24"	48" x 24"	70" x 36"
Range of Motion	Tip: ±90° Turn: ±90°	Tip: ±90° Turn: ±90°		Tip: ±90° Turn: ±90°	Tip: ±90° Turn: ±90°
Max DUT Width, Height, Diag. (4:3)	16.0" x 12.0" (20" Diagonal ⁴)	24.0" x 18.0" (30" Diag ⁴)	32.0" x 24.0" (40" Diag ⁴)	32.0" x 24.0" (40" Diagonal ⁴)	48.0" x 36.0" (60" Diagonal ⁴)
Max DUT Width, Height, Diag. (16:9)	16.0" x 9.0" (18" Diagonal ⁴)	24.0" x 13.5" (27" Diag ⁴)	32.0" x 18.0" (37" Diag ⁴)	42.7" x 24.0" (49" Diagonal ⁴)	64.0" x 36.0" (73" Diagonal ⁴)
Max DUT Weight	Contact Westar				
Test Capabilities¹					
Center Screen	Luminance, Color, Contrast Ratio, Gamma, CIE Chromaticity, Color Gamut and %NTSC, CCT				
Uniformity	Luminance Uniformity, Color Uniformity, Contrast Ratio Uniformity				
Viewing Angle	Luminance vs. Viewing Angle, Contrast vs. Viewing Angle, Color vs. Viewing Angle				
Temporal²	Gray Level Response Time, Flicker				
Reflection³	Specular Reflection, Diffuse Reflection				
Other	Shadowing (Cross-Talk), Image Retention, Warm-Up time				
Standardized Test Suites	VESA FPDM 2.0, ICDM, TCO '99/03/05, ISO 13406-2				
Custom Tests	Yes, Contact Westar				
Options and Accessories					
Optional Instruments	Instruments from Westar, Topcon, Minolta, Photo Research, BW-Tek, Optronic Laboratories, Gamma Scientific, Radiant				
Optional LCD Testers	Westar (T Drive Series, Android App, Windows App), Astro VG Series, Quantum Data QD Series				
Optional Power Supplies / DMM	Sorensen DLM Series, Keithley 2000, 2400				
Fixturing	Optional Standard Universal Fixture (SUF) for LCMs up to 1" thick				
System Controller PC					
Processor / Motherboard	19" Rack Mounted Industrial PC with 7X USB, 6X RS-232, 2X Ethernet Ports				
Monitor and Peripherals	22" LCD Flat Panel, Keyboard, Mouse, Joystick				
Operating System and Software	Microsoft Windows, Microsoft Office, National Instruments TestStand, Westar ViewPoint				
System					
System Dimensions (W) x (D) x (H)	122cm x 76cm x 200cm	183cm x 122cm x 200cm		244cm x 152cm x 213cm	305cm x 230cm x 270cm
Rack Enclosure Dimensions	56 cm (W) x 64 cm (D) x 105 cm (H)				
Power	120 VAC, 15A, 60Hz				

Notes: 1. Measurement capabilities depend on system configuration and optical instruments selected.
 2. Temporal tests require TRD-200 option. 3. Reflection tests require SCR or ACR option. 4. Max DUT dimensions include bezel. FPM-510 can test up to 40" displays with the wide goniometer option.

Contact Us to Get Started

Call us for additional product information and pricing. We will work with you one-on-one to deliver a measurement system that meets your unique requirements!

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