

# Multiformat, Multistandard Compact Waveform Monitor

## WFM5200 Data Sheet



### Features & Benefits

- 3RU height, Half-rack Width, Short-depth (5.5 in. or 14 cm) Instrument, Ideal for Space-constrained Environments
- 4-pin XLR DC Power Input with AC Power Adapter for both AC/DC Operation
- Four SDI Inputs with Multiformat, Multistandard Support
  - WFM5200 comes standard with auto-detection of HD/SD-SDI and multiple Dual Link video formats
  - Multiple Input Mode allows monitoring of up to four SDI inputs simultaneously for multiple camera monitoring applications (Option CAM)
  - Two-channel Simultaneous Monitoring (Option CAM)
  - Upgradeable to include 3G-SDI (Level A and Level B) format support with the purchase of an upgrade key (Option 3G)
  - 16-channel embedded AES/EBU audio simultaneous monitoring support with Multichannel Surround Sound\*1 display and flexible Lissajous display (Option AUD)
  - Audio Loudness monitoring to ITU-R BS.1770-2/1771, EBU R 128, and ATSC A/85 recommendations (Option LOUD, requires Option AUD to be installed)
- Tektronix-patented Diamond and Arrowhead Displays for Color Gamut Compliance Monitoring
- New Tektronix-patented Spearhead Display and Luma Qualified Vector (LQV™) Display Facilitate Precise Color Adjustment for Post Production Applications (Option PROD)
- Comprehensive Data Monitoring (Option DATA) helps to Quickly Resolve Difficult Content Quality and Reliability Issues
- Simultaneous CEA708/608 Closed Caption monitoring; Teletext and OP47 subtitle monitoring
- Detect and decode ANC data including AFD, WSS, Video Index, TSID, V-Chip, Broadcast Flag/CGMS-A, VITC, LTC, and ANC TC
- ARIB STD-B35/B37/B39, TR-B22, and TR-B23 support
- ANC Data Inspector and SDI Data Analysis display helps troubleshoot ANC data and SDI data problems
- Simple 3G/HD/SD Color Bar and Pathological Signal Generator (Option GEN) for Troubleshooting Signal Paths and Equipment (Note: Option 3G is required for 3G-SDI test signal generation)
- Variety of Monitoring Displays
  - Tektronix-patented Timing and Lightning displays makes facility and interchannel timing easy
  - Waveform display of external reference (Black Burst or Tri-Level Sync)
  - Black Picture and Tektronix-patented Frozen Picture Detection
  - Extensive alarms, status reporting, and error logging for 10,000 events simplifies error correction tasks
  - Voltage and Timing Cursor for precise measurement
  - User-definable Safe Area Graticules and AFD Graticule facilitate editing and format conversion tasks
- Unmatched Display Versatility
  - Flexible Quad Tile Display tailored to various applications needs to increase productivity
  - TandemVu® Display for efficient camera adjustments of luma and chroma
  - Full Screen mode that maximizes display size for precise adjustments
- Unmatched Usability
  - 32 instrument presets for quick recall of commonly used configurations tailored to colorists, editors, or operators
  - Front-panel USB port enables easy transfer of presets, screenshots, and error log
  - Front-panel headphone port for easy monitoring of audio channels
  - Intuitive menu structure and context-sensitive help
  - High-brightness display with crisp, high-resolution LED backlight, ideal for indoor and outdoor usage
  - SNMP and Ethernet remote interface capabilities and GPI control facilitate centralized monitoring and control
  - DVI-I external display output for easy connection to digital or analog XGA display
  - Super lightweight and low power consumption design for portable, battery-powered applications



WFM5200 portable monitoring instrument ideal for field applications.



WFM5200 Compliance Checking in distribution or broadcast applications.

## Applications

- Camera Monitoring (Camera Shading) in Mobile Trucks (OB Vans) and Production Studio Control Rooms
- Color Correction and Manipulation
- Content Editing and Special Effects
- Content Quality Control (QC) in Production and Post Production
- Field Production Setup and Troubleshooting
- Compliance Checking in Distribution and Broadcast

\*1 Audio Surround Sound Display licensed from Radio Technische Werksütten GmbH and Co. KG (RTW).

## WFM5200

The WFM5200 Compact Video Waveform Monitor provides an ideal solution for basic video and audio (with Option AUD) monitoring needs with an integrated high-brightness, low-power consumption LED backlit display in a convenient 3RU, half-rack, short-depth form factor, suitable for space-constrained environments. This versatile instrument can accept power from a 12 V DC source, a battery, or a 100-240 V AC converter.

Standard configuration provides multiformat support for HD-SDI (SMPTE 292), SD-SDI (ITU-R BT.601) and Dual Link (SMPTE 372) signal formats. The instrument provides automatic format detection for 3G/HD/SD-SDI on each of the four inputs. Option 3G is required for support of Level A and Level B SMPTE 425/424 formats.

Optional audio monitoring support for 16 channels of Embedded AES/EBU Audio (Option AUD) provides a variety of audio level bar monitoring, multichannel surround sound display\*1 and flexible Lissajous display. A front-panel headphone port can be used for easy compliance verification of digital audio without the need for an additional piece of equipment.

This instrument provides the reliability of the Tektronix waveform monitors family in a portable, basic monitoring product. The WFM5200 offers uncompromised monitoring quality with sharp CRT-like traces, patented Gamut displays, picture thumbnail, display freeze, and an error log for 10,000 events for efficient content compliance verification.

- Video Monitoring Standards and Formats
  - 3G-SDI (Level A and Level B) – Option 3G
  - High Definition SDI – Standard
  - Standard Definition SDI – Standard
  - Dual Link (4:2:2, 4:4:4, alpha channel, 10 bit, 12 bit) – Standard
  - Multiple Input Mode (with Option CAM) allows simultaneous display of up to 4 inputs for various trace displays
  - Two-channel Simultaneous Monitoring (Option CAM)
- Color Gamut Monitoring
  - Arrowhead Display – Standard
  - Diamond and Split Diamond Displays – Standard
  - Spearhead Display – Option PROD
  - Luma Qualified Vector (LQV™) – Option PROD
- Audio Monitoring
  - 16-channel Digital AES/EBU (Embedded) – Option AUD
  - Audio Loudness Monitoring to ITU-R BS.1770-2 – Option LOUD
- Measurement and Analysis
  - Simultaneous CEA708/608 Closed Caption monitoring; Teletext and OP47 Subtitle Monitoring – Option DATA
  - SDI Digital Data Analysis – Option DATA
  - ANC Data Inspector – Option DATA
  - Color Bar and Pathological Signal Generation – Option GEN

## Ease of Use

The intuitive user interface provides backlit buttons and online help. 32 user-configurable presets allow users to recall commonly used configurations tailored to your personal work practices. These presets can be transferred to and from other units (same model) using the front-panel USB port. An Ethernet port allows for easy download of screenshots and the Error Log.

| Alarm Status                                                 |        |                        |  | Active Log                                                               |              |             |          |
|--------------------------------------------------------------|--------|------------------------|--|--------------------------------------------------------------------------|--------------|-------------|----------|
| Page 1 of 2                                                  |        |                        |  | Page 49 of 49                                                            |              |             |          |
| Alarm                                                        | Status | Additional Information |  | Source                                                                   | Error Status | Timecode    | Time     |
| HW Fault                                                     | OK     |                        |  | Audio Over Level                                                         | +            | 09:03:57:21 | 01:17:45 |
| SDI Input Missing                                            | OK     |                        |  | Audio Over Level                                                         | +            | 09:03:58:13 | 01:17:46 |
| SDI Input Signal Lock                                        | OK     |                        |  | Audio Over Level                                                         | +            | 09:03:59:21 | 01:17:47 |
| Reference Missing                                            | Alarm  | No Signal              |  | Audio Over Level                                                         | +            | 09:04:00:15 | 01:17:48 |
| Ref Lock                                                     | Alarm  | No Signal              |  | Audio Over Level                                                         | +            | 09:04:01:22 | 01:17:49 |
| Ref Fmt Mismatch                                             | OK     |                        |  | Audio Over Level                                                         | +            | 09:04:02:14 | 01:17:50 |
| RGB Gamut Error                                              | OK     |                        |  | Audio Over Level                                                         | +            | 09:04:03:23 | 01:17:51 |
| Composite Gamut Error                                        | OK     | C-                     |  | Audio Over Level                                                         | +            | 09:04:04:15 | 01:17:52 |
| Luma Gamut Error                                             | OK     |                        |  | Audio Over Level                                                         | +            | 09:04:05:22 | 01:17:53 |
| Video Fmt Change                                             | OK     |                        |  | Audio Over Level                                                         | +            | 09:04:06:15 | 01:17:54 |
| Video Fmt Mismatch                                           | OK     |                        |  | Audio Over Level                                                         | +            | 09:04:07:22 | 01:17:55 |
| Vid/Ref Mismatch                                             | OK     |                        |  | Audio Over Level                                                         | +            | 09:04:08:15 | 01:17:56 |
| Video Not HD                                                 | OK     |                        |  | Audio Over Level                                                         | +            | 09:04:09:22 | 01:17:57 |
| Dual Link Format Mismatch                                    | OK     |                        |  | Audio Over Level                                                         | +            | 09:04:10:15 | 01:17:58 |
| Line Length Error                                            | OK     |                        |  | Audio Over Level                                                         | +            | 09:04:11:22 | 01:17:59 |
| Field Length Error                                           | OK     |                        |  | Audio Over Level                                                         | +            | 09:04:12:35 | 01:18:00 |
| EAV Place Error                                              | OK     |                        |  | Audio Over Level                                                         | +            | 09:04:13:23 | 01:18:01 |
| SAV Place Error                                              | OK     |                        |  |                                                                          |              |             |          |
| Line Number Error                                            | OK     |                        |  |                                                                          |              |             |          |
| Arrow Left - Previous page, Right - Next page.               |        |                        |  | Arrow Left - Previous, Right - Next, Up - First, Down - Last.            |              |             |          |
| Video Session                                                |        |                        |  | Audio Session                                                            |              |             |          |
| Input: SDI Input 1A Signal: Locked                           |        |                        |  | Audio Input: Embedded A Signal Loss:                                     |              |             |          |
| Effective: Auto 1080i 59.94 - HD SDI 422 - 292M 1.485/M Gbps |        |                        |  | Channel 1 2 3 4 5 6 7 8                                                  |              |             |          |
| Selected: Auto Format - Auto Structure - Auto Transport      |        |                        |  | Clip 0 0 0 0 0 0 0 0                                                     |              |             |          |
| 32M Payload:                                                 |        |                        |  | Over 0 0 0 0 0 0 0 0                                                     |              |             |          |
| SAV Place Err: OK Y Stuck Bits: -----                        |        |                        |  | Lead 0 0 0 0 0 0 0 0                                                     |              |             |          |
| Field Length Err: OK C Stuck Bits: -----                     |        |                        |  | Mute 0 0 0 0 0 0 0 0                                                     |              |             |          |
| Line Length Err: OK                                          |        |                        |  | Silence 0 0 0 0 0 0 0 0                                                  |              |             |          |
| Line Number Err: OK                                          |        |                        |  | Peak (dBFS) -12.9 -6.3 -18.4 -12.5 -18.8 -18.8 -18.8 0.0                 |              |             |          |
| Ancillary Data: Y Present                                    |        |                        |  | High (dBFS) -18.2 -7.6 -18.3 -17.9 -19.0 -19.0 0.0                       |              |             |          |
|                                                              |        |                        |  | Active bits 24 24 24 24 24 24 24 24                                      |              |             |          |
| Statistics Status Err Secs Err Fields X Err Fields           |        |                        |  | Ltk (LKFS) -23.0 -23.0 -23.0 -23.0 -23.0 -23.0 -3.6                      |              |             |          |
| RGB Gamut Error OK 1 1 0.0031 X                              |        |                        |  | Ltk (LKFS) -20.0 -20.0 -20.0 -20.0 -3.5                                  |              |             |          |
| Comp Gamut Error OK 406 23798 72.8012 X                      |        |                        |  | Page 1 LKFS Inf: -18.0 Short: -16.0 Short Pd: 10s Chans: 1 2 3 5 6       |              |             |          |
| Luma Gamut Error OK 1 1 0.0031 X                             |        |                        |  | Changed since reset: Yes Run Time: 0 d, 00:14:11                         |              |             |          |
| Y Chan CRC Error OK 9 18 0.0469 X                            |        |                        |  | Press "SEL" to reset. Any "arrow key" stops/start.                       |              |             |          |
| C Chan CRC Error OK 9 18 0.0469 X                            |        |                        |  | Running                                                                  |              |             |          |
| Y Anc Checksum Error OK 0 0 0.0000 X                         |        |                        |  |                                                                          |              |             |          |
| C Anc Checksum Error OK 2 2 0.0052 X                         |        |                        |  |                                                                          |              |             |          |
| Black Events: 2                                              |        |                        |  |                                                                          |              |             |          |
| Frozen Events: 0                                             |        |                        |  |                                                                          |              |             |          |
| Changed since reset: Yes Run Time: 0 d, 00:14:22             |        |                        |  |                                                                          |              |             |          |
| Press "SEL" to reset. Any "arrow key" stops/start.           |        |                        |  |                                                                          |              |             |          |
| 1080i 59.94 SDI Input 1A Ref: Internal                       |        |                        |  | ID: MODEL 5200 Embed: FFFF FFFF FFFF FFFF Anc LTC: 09:04:15:20 30 fps DF |              |             |          |

Quad Tile display of Alarm Status, Error Log, Video, and Audio Sessions.

## See and Solve with Tektronix Displays

The “See and Solve” displays in Tektronix video monitors simplify video monitoring tasks such as calibration, error detection, and content correction allowing the user to detect errors at a glance and troubleshoot them efficiently.

Tektronix displays offer the sharpest CRT-like trace quality for clear waveform monitoring with the look and feel of an analog display. The familiar video waveform display can show SD/HD/3G-SDI signals in RGB, YPbPr, YRGB, or pseudo composite. Signal components can be displayed in either Parade or Overlay mode. Cursors within the waveform display allow precise measurement of Voltage and Time to be made. The vector display offers user-selectable graticules, color targets (75% or 100%), and color axis.

With several sweep rates and easy control of vertical gain and horizontal magnification, you can efficiently monitor and measure video waveform parameters.

Specialized displays provide summarized, yet comprehensive reports of alarms, session, and status of content. Powerful displays such as Video Status show a condensed view of error statistics, signal format, presence of ancillary data, and more. These Tektronix-exclusive displays simplify monitoring tasks by providing important content information at a glance.

The Black and Frozen frame detection can be used to alert the operator to a problem in the transmission chain. These and other errors can automatically be logged in the Error Log and provided as a report.

## Alarms, Quality Statistics, and Logging – Thorough and Fast Content Verification

The WFM5200 offers a variety of displays designed to show status at a glance, in addition to the status bar continually displayed at the bottom of the screen.

| Picture Display                        |  |  |  | AFD: 16:9_15 - 1111 - 4x3 Safe                                           |  |  |  |
|----------------------------------------|--|--|--|--------------------------------------------------------------------------|--|--|--|
| 1080i 59.94 SDI Input 1A Ref: Internal |  |  |  | ID: MODEL 5200 Embed: FFFF FFFF FFFF FFFF Anc LTC: 09:05:58:03 30 fps DF |  |  |  |

Picture display with Safe Area Graticule and AFD information.

A comprehensive overview of the video content status is presented in the Video Session display. Offering a time-based compilation of information, this screen is ideal for presenting evidence of compliance after content screening. Information on input format and session time is presented, along with statistics on Error Detection and Handling (EDH) / Cyclic Redundancy Check (CRC) and gamut errors.

The Alarm Status display provides continuous information on the state of each condition currently being monitored by the instrument.

To support unattended monitoring and QC applications, as well as provide documentation for service-level agreements, these instruments maintain an error log of 10,000 events, which facilitates the detection and correction of problems. Log entries are recorded with date, time of day, and time code (VITC, LTC, ANC). The error log can be downloaded to a USB memory stick or through a network connection to .TXT or .HTM formats for easy record keeping and processing on spreadsheets or database software.

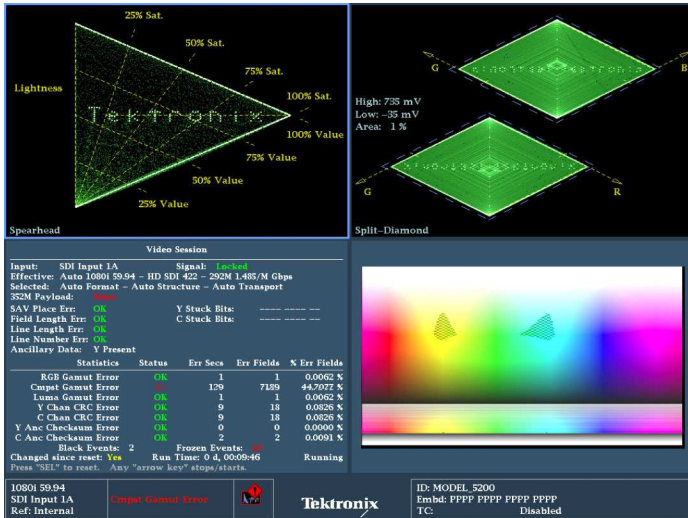
## Picture Display – Quick Visual Confirmation and Precision Content Adjustment

For a qualitative view of the content, a full-color Picture display is offered, which can be displayed as a full-screen presentation. This display is compatible with all input formats and features automatic adjustment for aspect ratio and number of active lines.

You can select bright-up conditions that show the location of RGB or composite gamut errors on the Picture display. The Line Select mode shows the location of the line currently selected within the Picture display.

Users can choose from several Safe Action and Safe Title graticules on the Picture display which help editors and operators easily identify incorrectly positioned video content such as graphics, titles, or logos.

Graticule choices include the Safe Action and Safe Title graticules defined in SMPTE RP218, ITU, and ARIB standards, plus two sets of completely flexible, user-definable graticules. These graticules facilitate editing tasks and reduce the need for format conversions.



Spearhead and Diamond gamut displays.

## Patented Tektronix Gamut Displays – Efficiently Detect and Allow Correction of Gamut Problems

The Tektronix-patented Diamond, Split Diamond, and Arrowhead displays simplify the process of verifying gamut compliance and are ideal for colorists, editors, and operators to visualize whether the content is RGB or Composite Gamut compliant with a single glance. Plus, they are designed to help isolate the Out-of-Gamut component just as easily. For SDI component content that is destined for broadcast in composite systems, the unique Tektronix Arrowhead display can be used to monitor Composite Gamut compliance without the need for a separate encoder. Within this display, a separate upper and lower luma-only gamut limit can be applied. Each of these displays offers user-selectable gamut thresholds so operators can set monitoring limits appropriate to their specific operation and include a preset for EBU-R103. You can also select bright-up conditions to see the location of gamut errors on the Picture display. In addition, gamut monitoring is fully integrated with the powerful alarm logging and reporting capabilities of the WFM5200.

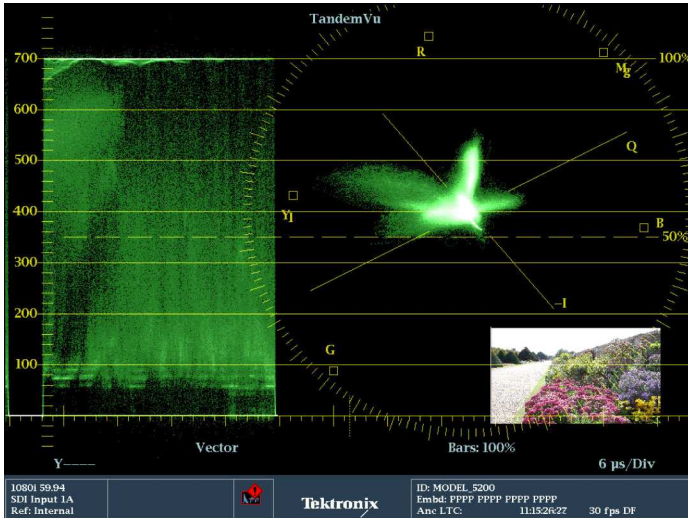
The WFM5200 also features new optional advanced color gamut monitoring capabilities (Option PROD) including the Tektronix-patented Luma Qualified Vector (LQV™) display and Spearhead display that, when used in conjunction with Tektronix proprietary Diamond and Split Diamond gamut displays, provide the most comprehensive color gamut monitoring tools available for precise color gamut adjustments.



Quad Tile display allows for displays to be viewed simultaneously.

## Quad Tile Display – Flexible Monitoring Configuration Customized to Suit Your Application

Tektronix offers multiple display options to suit a variety of applications that can be customized to the user's needs. The Quad Tile display provides flexibility to increase your productivity. The user can configure four different displays within the one instrument. A maximum of two traces can be displayed, along with picture, status, and audio bars to create flexible monitoring configurations that can be saved as presets for quick and easy recall. For instance, a waveform parade, vector, picture, and audio bar display can be configured to monitor the audio and video signal simultaneously within the Quad Tile display. Unlike instruments with predetermined view combinations, Quad Tile lets you create a Quad Tile display tailored to your specific needs and work practices. Each tile can be configured to enable easy signal analysis such as multiple alarm and status screens, different Safe Area Graticules and cursors on each tile, and more.



TandemVu® allows camera alignment of luma and chroma within Full Screen display.

### TandemVu® Display – Customized Waveform and Vector View

TandemVu provides the ability to visualize waveform and vector or lightning displays simultaneously. Each trace can be positioned and magnified individually based on the user's preferences.

TandemVu provides operators with an efficient way to adjust and balance cameras in production studios or outside broadcast (OB Vans) applications.

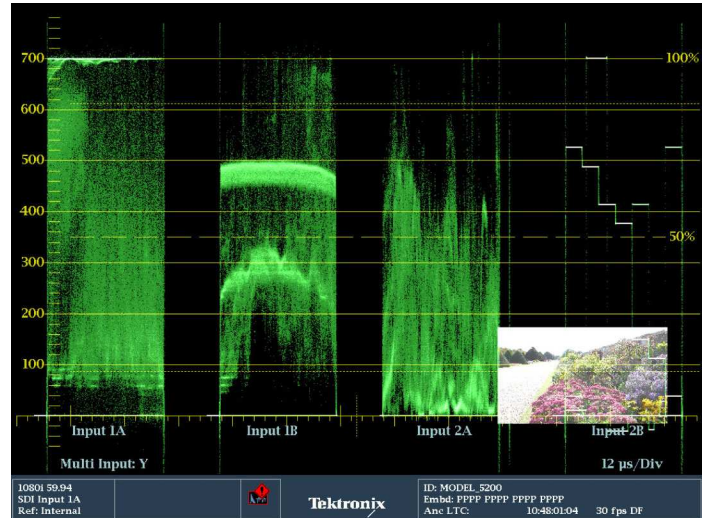
The Line Select provides a line marker in full-screen and thumbnail picture modes.

The vector display is offered with selectable 75% and 100% targets.

Each display automatically selects the appropriate graticule based on the input format.

### Multiple Input Mode Display – Multiple Cameras Balance Mode (Option CAM)

Multiple Input Mode display (Option CAM) is ideal for monitoring multiple camera inputs in a mobile truck (OB van) or production studio. Typically the operator can compare up to four camera inputs and can make adjustment of the four luma levels to match the cameras from scene to scene in Overlay or Parade modes. Allowing for the comparison of video inputs across a wide variety of these displays, various other trace modes such as Vector, Lightning, Diamond, Split Diamond, and Arrowhead can also allow the multiple inputs to be overlaid. Select any combination of the four inputs from the input buttons on the front panel to view the input within the trace display in Full Screen mode. For easy identification of the input the user can create customized labels that appear directly under the waveform trace in a Y parade of the active signals.

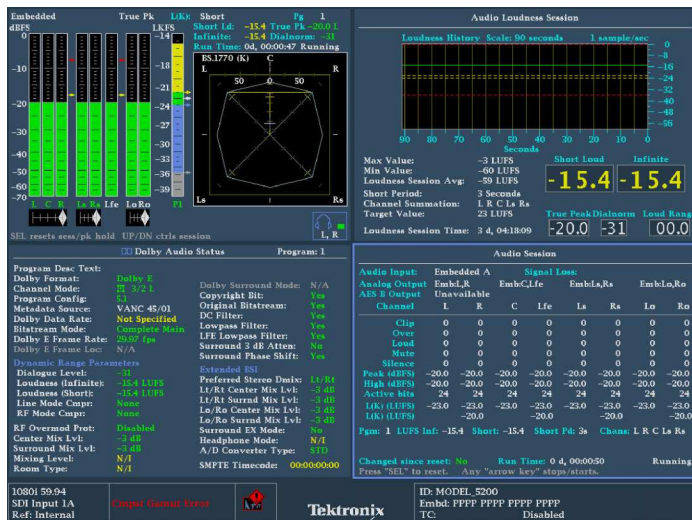


Multiple Input Mode display showing four luma signals, ideal for multiple-camera balancing.



Two-channel simultaneous monitoring of waveform and picture input, ideal for monitoring multiple camera inputs.

Two-channel Simultaneous Monitoring (Option CAM) is ideal for monitoring multiple camera inputs or comparison of incoming and outgoing transmission chains. The simple Simultaneous Input Monitoring (CAM) capability of the WFM5200 provides flexibility in monitoring multiple inputs. In mobile truck (OB van) applications this allows the operator to compare two different camera inputs with picture and waveform displays. This capability can also help operational staff quickly determine if a video quality problem existed in the input signal or arose in their facility. It enables engineering staff to quickly detect, diagnose, and resolve technical problems introduced in a piece of video equipment by comparing the input and output signals at each point in the chain.



Audio display with Surround Sound and Loudness monitoring.

## Digital Audio and Video Monitoring in One Instrument (Option AUD)

The WFM5200 (with Option AUD) provides high-quality digital filtering and oversampling to insure precise, reliable, and repeatable audio measurements. The instrument provides 16-channel embedded digital audio monitoring with Audio Bars, Lissajous Displays, Surround Display<sup>\*1</sup>, and a front-panel headphone port for easy compliance verification of digital audio without the need for an additional piece of equipment. Flexible mapping of the embedded audio inputs to the audio bar displays allows for a variety of audio mixes to be supported from multiple stereo signals to surround and stereo support.

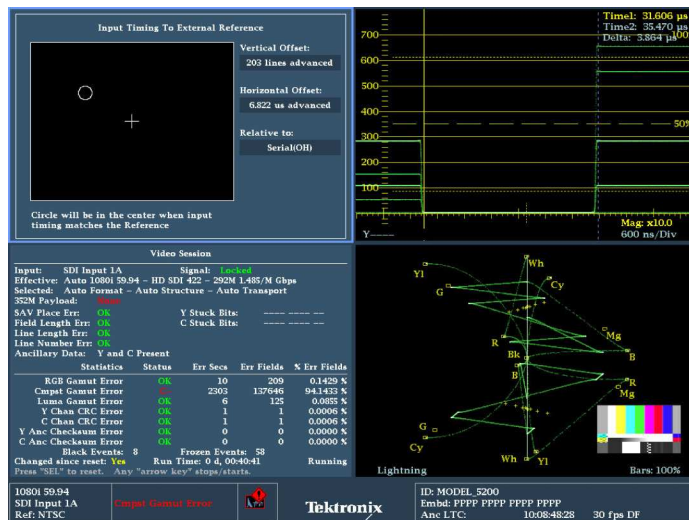
The Surround Sound<sup>\*1</sup> display provides intuitive graphical representation of channel interaction in a surround sound system. The Bars display provides indication for faults, audio levels, and provides indication of the presence of a Dolby format. The flexible Lissajous display allows the selection of any two audio channels.

Loudness measurements are made to ITU-R BS.1770-2/1771, EBU R 128, and ATSC A/85 recommendations. A Loudness meter (with Option LOUD) is available within the Audio display that provides Short and Infinite Loudness measurements. The Loudness session display graphically plots Loudness measurements over time, from 90 seconds to 30 hours. The Loudness measurements can be downloaded through the network or saved to USB for further analysis.

Specialized audio displays provide deeper inspection of the signal and make the WFM5200 instrument a comprehensive compact waveform and audio monitor. The audio session displays summarize levels, faults, and number of active bits for each channel. These instruments also feature Audio Control Packet Data and Channel Status displays.

The Dolby metadata can be monitored within the instrument using the Dolby Status display that gives an in-depth view of VANC Dolby metadata that complies with the SMPTE 2020 standard. The user can also choose to monitor Dolby E guardband timing information from one of the embedded audio channels.

<sup>\*1</sup> Audio Surround Sound Display licensed from Radio Technische Werksütten GmbH and Co. KG (RTW).



Timing and Lightning displays simplify timing tasks.

## Facility Timing Made Easy

Synchronization is one of the most fundamental and critical procedures in a video facility. Every device in a system must be synchronized in order to successfully create, transmit, and recover video pictures and audio information. The intuitive Timing display clearly shows the timing offsets between HD and SD signals relative to the reference.

This Tektronix-patented Timing display makes facility timing easy through a simple graphical representation which shows the relative timing of the input signal and the reference signal (or a saved offset reference) on an X-Y axis. Simply adjust the timing of the equipment until the circle is within the center of the display for precise, direct measurements of vertical offset in number of lines and horizontal offset in  $\mu$ s.

The Lightning display shows luma and chroma amplitudes and helps users verify component timing using a color-bar signal. The Tektronix-patented Bowtie display complements the timing measurement capability of the Lightning display. Using a special Bowtie test signal in component format, this display helps make precise, accurate measurements of interchannel amplitude and timing.

## Troubleshoot Signal Paths

A simple test signal (Option GEN) can be generated from the SDI output that produces 100% or 75% color bars along with pathological test signals. This can be useful for troubleshooting a signal path or piece of equipment without the need to carry an additional generator.

| ANC Data Inspector |          |          |        |                    |
|--------------------|----------|----------|--------|--------------------|
| Name               | DID/SDID | Presence | Status | Location           |
| S299-1 Ctrl Grp 4  | E0/-     | Present  | OK     | Field 1 / Line 9   |
| S299-1 Ctrl Grp 3  | E1/-     | Present  | OK     | Field 1 / Line 9   |
| S299-1 Ctrl Grp 2  | E2/-     | Present  | OK     | Field 1 / Line 9   |
| S299-1 Ctrl Grp 1  | E3/-     | Present  | OK     | Field 1 / Line 9   |
| S299-1 Aud Grp 4   | E4/-     | Present  | OK     | Field 2 / Line 111 |
| S299-1 Aud Grp 3   | E5/-     | Present  | OK     | Field 2 / Line 131 |
| S299-1 Aud Grp 2   | E6/-     | Present  | OK     | Field 1 / Line 16  |
| S299-1 Aud Grp 1   | E7/-     | Present  | OK     | Field 1 / Line 16  |
| S2016-3 AFD-Bar    | 41/05    | Present  | OK     | Field 1 / Line 21  |
| S2020 Aud          | 45/01    | Present  | OK     | Field 2 / Line 22  |

| Detail                               | View Mode: Watch List | Time Elapsed Since Last Reset: 0 d, 00:43:26 |
|--------------------------------------|-----------------------|----------------------------------------------|
| Format: SMPTE2016.3 AFD and Bar Data | Field: 1              | Line: 21                                     |
| DID: 41 (241)                        | Type: 2               | Sample: --                                   |
| SDID: 5 (205)                        | DC: 8 (108)           | Stream: Y                                    |
| Exp/Act Chksum: 2ca / 2ca            | Link: --              | Error: OK                                    |

|     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 000 | 17c | 200 | 200 | 200 | 200 | 200 | 200 |
| 016 |     |     |     |     |     |     |     |
| 032 |     |     |     |     |     |     |     |

|             |              |           |                     |           |                |                           |                   |           |
|-------------|--------------|-----------|---------------------|-----------|----------------|---------------------------|-------------------|-----------|
| 1080i 59.94 | SDI Input 1A | Ref: NTSC | Chapel Garsim Error | Tektronix | ID: MODEL 5200 | Embd: FFFF FFFF FFFF FFFF | Anc LTC: 10113428 | 30 fps DF |
|-------------|--------------|-----------|---------------------|-----------|----------------|---------------------------|-------------------|-----------|

ANC Data Inspector provides detailed content analysis.



Datalist display provides detailed pixel-by-pixel information.

| Auxiliary Data Status |                                              |                 |                                  |
|-----------------------|----------------------------------------------|-----------------|----------------------------------|
| Anc Data:             | Y and C Present                              |                 |                                  |
| CEA608:               | S334 CDP (ANC)                               | Services:       | CC1--- TXT --- XDS: Not detected |
| CEA708:               | S334 CDP                                     | Services:       | CC1--- RP207:                    |
| Teletext:             | Not detected                                 |                 |                                  |
| CDP:                  | Present                                      | Frm Rate:       | 29.97 Data Count 608: 4 708: 0   |
| V-Chip Rating:        | Not detected                                 |                 |                                  |
| TSID:                 | Not detected                                 |                 |                                  |
| CGMS-A:               | Not detected                                 | Broadcast Flag: | Not detected                     |
| SMPTE 2016 AFD:       | 169 IS - Code Is III - AR Is 169             |                 |                                  |
| Desc:                 | Full Frame 169 (alt 4:3 center) in 169 frame |                 |                                  |
| Bar 1:                | No valid Bar data found                      |                 |                                  |
| Bar 2:                | No valid Bar data found                      |                 |                                  |

|             |              |           |                     |           |                |                           |                   |           |
|-------------|--------------|-----------|---------------------|-----------|----------------|---------------------------|-------------------|-----------|
| 1080i 59.94 | SDI Input 1A | Ref: NTSC | Chapel Garsim Error | Tektronix | ID: MODEL 5200 | Embd: FFFF FFFF FFFF FFFF | Anc LTC: 10120500 | 30 fps DF |
|-------------|--------------|-----------|---------------------|-----------|----------------|---------------------------|-------------------|-----------|

Monitoring of Ancillary data (Closed Caption, Time Code, and AFD) using Aux Data Status.

## Superior Data Analysis Capabilities for Operators and Engineers (Option DATA)

The ANC Data Inspector provides an industry-leading solution to help broadcasters easily and accurately ensure that all required VANC data is present and correctly configured through an intuitive ANC data display.

In contrast to other solutions, the ANC Data Inspector enables operators to quickly and easily ensure that the VANC data is present and free of errors. When errors are detected, engineers are quickly guided to a more detailed view of the data packet content for further analysis.

Closed Caption (CEA708/608) and individual Teletext subtitles can be simultaneously decoded and displayed within the Picture display. Teletext subtitle pages can be decoded in either WST or OP47 format.

The Auxiliary Data Status display provides summary information on Active Format Description (AFD) per SMPTE 2016, Video Index Aspect Ratio, Wide Screen Signaling (WSS), V-Chip, TSID, CGMS-A, Broadcast Flag, CEA708/608 Closed Caption, Teletext, and Time Code information.

Today there is a wide array of metadata that provides information to a variety of equipment through the processing chain. Monitoring of this metadata is critical to ensure that the processing equipment correctly handles the signal. For instance, correct format of the AFD ensures that the aspect ratio on the display is correctly formatted and the automated AFD graticule is available for the Picture display of the WFM5200 along with the binary data and text description for easy monitoring.

The Datalist display provides detailed information on the actual data values in HD/SD-SDI and 3G-SDI (with Option 3G) input signals. Users can easily use this display to locate protocol errors in the input signals.

The right side of the display shows the data values in hexadecimal, decimal, or binary format and uses the following color coding for easy identification of data types and errors:

- Green – Active video data
- Blue – Data in horizontal or vertical blanking intervals
- White – EAV, SAV, and other reserved words
- Yellow – Data outside nominally allowed values
- Red – Data with illegal values

The left side of display shows un-interpolated digital values plotted against sample numbers as a digital waveform. You can configure this unique display in either Video mode or Data mode.

In Video mode, the display shows the Y, Cb, Cr values aligned temporally, but offset vertically. Like the waveform display, you can configure the display to show 1, 2, or all 3 components.

## Video Input and External Reference Formats Supported

### Automatic Detection of a Wide Range of Signal Formats

The WFM5200 waveform monitor accepts a wide variety of input signal formats and external references. The monitor will automatically detect the signal format and establish the appropriate settings for the various displays.

| Setting                             | STD SD | STD HD | External Reference Inputs |     |                |          |       |                 |       |                 |          |       |          |       |
|-------------------------------------|--------|--------|---------------------------|-----|----------------|----------|-------|-----------------|-------|-----------------|----------|-------|----------|-------|
|                                     |        |        | Bi-level Sync             |     | Tri-level 720p |          |       | Tri-level 1080p |       | Tri-level 1080i |          |       | 1080 SF  |       |
|                                     |        |        | NTSC                      | PAL | 50 Hz          | 59.94 Hz | 60 Hz | 23.98 Hz        | 24 Hz | 50 Hz           | 59.94 Hz | 60 Hz | 23.98 Hz | 24 Hz |
| BT601<br>483i,<br>59.94 Hz<br>(525) | X      |        | X                         |     |                | X        |       |                 |       |                 | X        |       |          |       |
| BT601<br>576i,<br>50 Hz<br>(625)    | X      |        |                           | X   | X              |          |       |                 |       | X               |          |       |          |       |
| 296M<br>720p,<br>23.98 Hz           |        | X      | X                         |     |                | X        |       | X               |       |                 | X        |       | X        |       |
| 296M<br>720p,<br>24 Hz              |        | X      |                           |     |                |          | X     |                 | X     |                 |          | X     |          | X     |
| 296M<br>720p,<br>25 Hz              |        | X      |                           | X   | X              |          |       |                 |       | X               |          |       |          |       |
| 296M<br>720p,<br>29.97 Hz           |        | X      | X                         |     |                | X        |       |                 |       |                 | X        |       |          |       |
| 296M<br>720p,<br>30 Hz              |        | X      |                           |     |                |          | X     |                 |       |                 |          | X     |          |       |
| 296M<br>720p,<br>50 Hz              |        | X      |                           | X   | X              |          |       |                 |       | X               |          |       |          |       |
| 296M<br>720p,<br>59.94 Hz           |        | X      | X                         |     |                | X        |       |                 |       |                 | X        |       | X        |       |
| 296M<br>720p,<br>60 Hz              |        | X      |                           |     |                |          | X     |                 | X     |                 |          | X     |          | X     |
| 240M<br>1035i,<br>59.94 Hz          |        | X      | X                         |     |                | X        |       |                 |       |                 | X        |       |          |       |
| 240M<br>1035i,<br>60 Hz             |        | X      |                           |     |                |          | X     |                 | X     |                 |          | X     |          | X     |
| 274M<br>1080i,<br>50 Hz             |        | X      |                           | X   | X              |          |       |                 |       | X               |          |       |          |       |
| 274M<br>1080i,<br>59.94 Hz          |        | X      | X                         |     |                | X        |       |                 |       |                 | X        |       |          |       |
| 274M<br>1080i,<br>60 Hz             |        | X      |                           |     |                |          | X     |                 | X     |                 |          | X     |          | X     |
| 274M<br>1080p,<br>23.98 Hz          |        | X      | X                         |     |                | X        |       | X               |       |                 | X        |       | X        |       |
| 274M<br>1080p,<br>24 Hz             |        | X      |                           |     |                |          | X     |                 | X     |                 |          | X     |          | X     |
| 274M<br>1080p,<br>25 Hz             |        | X      |                           | X   | X              |          |       |                 |       | X               |          |       |          |       |
| 274M<br>1080p,<br>29.9 Hz           |        | X      | X                         |     |                | X        |       |                 |       |                 | X        |       |          |       |

| Setting              | STD SD | STD HD | External Reference Inputs |     |                |          |       |                 |       |                 |          |       |          |       |
|----------------------|--------|--------|---------------------------|-----|----------------|----------|-------|-----------------|-------|-----------------|----------|-------|----------|-------|
|                      |        |        | Bi-level Sync             |     | Tri-level 720p |          |       | Tri-level 1080p |       | Tri-level 1080i |          |       | 1080 SF  |       |
|                      |        |        | NTSC                      | PAL | 50 Hz          | 59.94 Hz | 60 Hz | 23.98 Hz        | 24 Hz | 50 Hz           | 59.94 Hz | 60 Hz | 23.98 Hz | 24 Hz |
| 274M 1080p, 30 Hz    |        | X      |                           |     |                |          | X     |                 |       |                 |          | X     |          |       |
| 274M 1080sf, 23.9 Hz |        | X      | X                         |     |                | X        |       | X               |       |                 | X        |       | X        |       |
| 274M 1080sf, 24 Hz   |        | X      |                           |     |                |          | X     |                 | X     |                 |          | X     |          | X     |
| 274M 1080sf, 25 Hz   |        | X      |                           | X   | X              |          |       |                 |       | X               |          |       |          |       |
| 274M 1080sf, 29.9 Hz |        | X      | X                         |     |                | X        |       |                 |       |                 | X        |       |          |       |
| 274M 1080sf, 30 Hz   |        | X      |                           |     |                |          | X     |                 |       |                 |          | X     |          |       |

### Supported Dual Link Formats

| Format           | Sample Structure        | Frame/Field Rates                                                                         |
|------------------|-------------------------|-------------------------------------------------------------------------------------------|
| <b>Dual Link</b> |                         |                                                                                           |
| 1920 × 1080      | 4:2:2 YCbCr 10 bit      | 60, 60/1.001, and 50 progressive                                                          |
|                  | 4:4:4 RGB               | 30, 30/1.001, 25, 24 and 24/1.001 progressive, PsF 60, 60/1.001, and 50 fields interlaced |
|                  | 4:4:4:4 RGB +A 10 bit   |                                                                                           |
|                  | 4:4:4 RGB 12 bit        |                                                                                           |
|                  | 4:4:4 YCbCr 10 bit      |                                                                                           |
|                  | 4:4:4:4 YCbCr +A 10 bit |                                                                                           |
|                  | 4:4:4 YCbCr 12 bit      |                                                                                           |
| 2048 × 1080      | 4:2:2 YCbCr 12 bit      | 30, 30/1.001, 25, 24, and 24/1.001 progressive, PsF                                       |
|                  | 4:2:2:4 YCbCr +A 12 bit |                                                                                           |
|                  | 4:4:4 RGB               |                                                                                           |
|                  | 4:4:4:4 RGB +A 10 bit   |                                                                                           |
|                  | 4:4:4 RGB 12 bit        |                                                                                           |
|                  | 4:4:4 YCbCr 10 bit      |                                                                                           |
|                  | 4:4:4:4 YCbCr +A 10 bit |                                                                                           |
|                  | 4:4:4 YCbCr 12 bit      |                                                                                           |
|                  | 4:2:2 YCbCr 12 bit      |                                                                                           |
|                  | 4:2:2:4 YCbCr +A 12 bit |                                                                                           |
|                  | 4:4:4 XYZ 12 bit        |                                                                                           |

### Supported 3G Single Link Formats

| Format                | Sample Structure                       | Frame/Field Rates                                                                                 |
|-----------------------|----------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>3G-SDI Formats</b> |                                        |                                                                                                   |
| <b>Single Link</b>    |                                        |                                                                                                   |
| 1920 × 1080           | 4:2:2 YCbCr 10 bit Level A and Level B | 50, 59.94, 60 progressive                                                                         |
|                       | 4:2:2 YCbCr 10 bit Level B             | 23.98, 23.98sF, 24, 24sF, 25, 25sF 29.97, 29.97sF, 30, 30sF progressive 50, 59.94, 60 interlaced  |
|                       | 4:4:4 YCbCr 10 bit                     | 23.98, 23.98sF, 24, 24sF, 25, 25sF, 29.97, 29.97sF, 30, 30sF progressive                          |
|                       | 4:4:4:4 YCbCrA 10 bit                  |                                                                                                   |
|                       | 4:4:4 YCbCr 12 bit Level B             |                                                                                                   |
| 2048 × 1080           | 4:4:4 RGB 10 bit                       | 23.98, 23.98sF, 24, 24sF, 25, 25sF, 29.97, 29.97sF, 30, 30sF progressive                          |
|                       | 4:4:4:4 RGB +A 10 bit                  |                                                                                                   |
|                       | 4:4:4 RGB 12 bit Level B               |                                                                                                   |
| 2 × HD 1920 × 1080    | 4:2:2 YCbCr 12 bit                     | 23.98, 23.98sF, 24, 24sF, 25, 25sF, 29.97, 29.97sF, 30, 30sF progressive 50, 59.94, 60 interlaced |
|                       | 4:2:2:4 YCbCrA 12 bit                  |                                                                                                   |
|                       | 4:4:4 YCbCr 12 bit Level B             |                                                                                                   |
| 2 × HD 1280 × 720     | 4:4:4 RGB 12 bit Level B               | 23.98, 24, 25, 29.97, 30, 50, 59.94, 60 progressive                                               |
|                       | 4:4:4 XYZ 12 bit Level B               |                                                                                                   |

## Characteristics

### Serial Digital Video Interface

| Characteristic                   | Description                                                                                                                       |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Inputs                           | 4 inputs<br>Auto-detection between 3G, Dual Link, HD, and SD signals<br>(Option 3G required for 3G formats)                       |
| Input Type                       | BNC, internally terminated 75 $\Omega$                                                                                            |
| Input Level                      | 800 mV <sub>p-p</sub> , $\pm 10\%$                                                                                                |
| Input Equalization               | 270 Mb/s: Up to 215 m of type 1694A cable<br>1.5 Gb/s: Up to 200 m of type 1694A cable<br>3 Gb/s: Up to 130 m of type 1694A cable |
| Output                           | SDI Switched Output. Selectable, active input, or test signal                                                                     |
| Return Loss (Inputs and Outputs) | >15 dB from 1 MHz to 1.5 GHz, power on or off<br>>10 dB from 1.5 GHz to 3 GHz, power on or off                                    |
| Monitor Output                   | Signal Format (DVI-I Output) – 1024×768, 60 Hz vertical rate                                                                      |

### External Reference

| Characteristic     | Description                                       |
|--------------------|---------------------------------------------------|
| Sync Formats       | NTSC and PAL and tri-level sync                   |
| Input Type         | Passive loop through BNC, 75 $\Omega$ compensated |
| DC Input Impedance | 20 k $\Omega$ , nominal                           |
| Return Loss        | >40 dB to 6 MHz<br>>35 dB to 30 MHz               |
| Lock Range         | $\pm 50$ ppm                                      |

### Serial Digital Waveform Vertical Characteristics

| Characteristic                | Description                                                                                                 |
|-------------------------------|-------------------------------------------------------------------------------------------------------------|
| Vertical Measurement Accuracy | At 1x gain, $\pm 0.5\%$ of 700 mV full scale; at 5x gain, $\pm 0.2\%$ of 700 mV full scale                  |
| Gain                          | 1x, 5x, variable range 0.25x to >7.5x                                                                       |
| Frequency Response            |                                                                                                             |
| SD                            | Luminance (Y) channel $\pm 0.5\%$ to 5.75 MHz<br>Color Difference channels (Pb, Pr) $\pm 0.5\%$ to 2.75 MHz |
| HD                            | Luminance (Y) channel $\pm 0.5\%$ to 30 MHz<br>Difference channels (Pb, Pr) $\pm 0.5\%$ to 15 MHz           |

### Waveform Horizontal Characteristics

| Characteristic        | Description |
|-----------------------|-------------|
| Sweep Timing Accuracy | $\pm 0.1\%$ |
| Sweep Linearity       | $\pm 0.1\%$ |

### Audio Characteristics

| Characteristic                       | Description                                                                                                              |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Level Meter Resolution               | 0.056 dB steps at 30 dB scale from full scale to $-20$ dBFS<br>0.20 dB steps at 70 dB scale for signals above $-20$ dBFS |
| Meter Ballistics                     | True peak, PPM type 1, PPM type 2, BBC PPM, extended VU, Loudness                                                        |
| Defined/Programmable Level Detection | Mute, clip, user-programmable silence, over                                                                              |
| Level Meter Accuracy                 | $-0.5$ dB (for analog), $-0.2$ dB (for digital) from 20 Hz to 20 kHz, 0 to $-40$ dBFS sine wave, Peak Ballistic mode     |

### Power

- 12 V DC In
- Power adapter accepts 100 to 240 V AC  $\pm 10\%$  50/60 Hz

### Input Voltage

| Characteristic                       | Description                                                                                                                                                                            |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage Range                        | 12 to 15 V DC nominal<br>10.75 to 18 V DC min-max operating                                                                                                                            |
| Supply Connection                    | XLR 4-pin male connector<br>Pin 1 = V(–)<br>Pin 4 = V(+)<br>Pin 2, 3: NC                                                                                                               |
| Power Consumption                    | 27 W typical<br>35 W max                                                                                                                                                               |
| Surge                                | 10 A at 12 V                                                                                                                                                                           |
| Fuse Rating                          | 4 A, internal self-resetting fuse                                                                                                                                                      |
| Transient, Over, and Reverse Voltage | Reverse- and over-voltage protected to $\pm 30$ V DC<br>The unit may power itself down in the presence of high transient voltages. This prevents damage to the unit and is not a fault |

### Physical Characteristics

| Dimension | mm  | in. |
|-----------|-----|-----|
| Height    | 133 | 5.3 |
| Width     | 213 | 8.4 |
| Depth     | 140 | 5.5 |
| Weight    | kg  | lb. |
| Net       | 1.5 | 3.3 |

## Ordering Information

| Model   | Option | Description                                                                                                                                                                                                              |
|---------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WFM5200 |        | 3G/HD/SD Waveform Monitor, 4 SDI Inputs (3G, HD, and SD-SDI support on the same inputs – auto detect)<br><br>Base unit includes HD, SD, and Dual-Link signal format support<br><br>Option 3G required for 3G-SDI support |
|         | 3G     | Add support for 3G-SDI signal formats (Level A and Level B)                                                                                                                                                              |
|         | AUD    | Add 16-channel Embedded AES Audio Monitoring (including Multichannel Surround Sound Display)                                                                                                                             |
|         | CAM    | Add multiple camera (up to 4 cameras) simultaneous monitoring capability                                                                                                                                                 |
|         | DATA   | Add Ancillary Data monitoring (including decoding of 708 and 608 Closed Captions, Teletext and OP47 Subtitles, AFD, and CGMS-A), ANC Data Inspector, and advanced Data Analysis capabilities                             |
|         | GEN    | Add 3G/HD/SD-SDI Color Bar and Pathological Signal Generation capability<br><br>Option 3G required for 3G-SDI Signal Generation capability                                                                               |
|         | LOUD   | Add Audio Loudness monitoring capabilities including Loudness Meter, Loudness Trend Chart, and Loudness Data Logging capabilities<br><br>Must also order Option AUD                                                      |
|         | PROD   | Add Advanced Gamut Monitoring Package (including Spearhead display and Luma Qualified Vector display)                                                                                                                    |

**Note:** Please specify power plug when ordering.

## Post Sale Upgrade Options

| Model    | Option | Description                                                                                                                                                                                         |
|----------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WFM520UP |        | Post Sale Upgrade for WFM5200 3G/HD/SD-SDI Waveform Monitor<br><br>Option 3G required to be installed in the WFM5200 for 3G-SDI support                                                             |
|          | 3G     | Add support for 3G-SDI signal formats (Level A and Level B)                                                                                                                                         |
|          | AUD    | Add 16-channel Embedded AES Audio Monitoring (including Multichannel Surround Sound Display)                                                                                                        |
|          | CAM    | Add multiple camera (up to 4 cameras) simultaneous monitoring capability                                                                                                                            |
|          | DATA   | Add Ancillary Data monitoring (including decoding of 708 and 608 Closed Captions, Teletext and OP47 Subtitles, AFD, and CGMS-A), ANC Data Inspector, and advanced Data Analysis capabilities        |
|          | GEN    | Add 3G/HD/SD-SDI Color Bar and Pathological Signal Generation capability<br><br>Option 3G required for 3G-SDI Signal Generation capability                                                          |
|          | LOUD   | Add Audio Loudness monitoring capabilities including Loudness Meter, Loudness Trend Chart, and Loudness Data Logging capabilities<br><br>Option AUD must also be installed in the WFM5200 base unit |
|          | PROD   | Add Advanced Gamut Monitoring Package (including Spearhead display and Luma Qualified Vector display)                                                                                               |

**International Power Plugs**

| Option   | Description                 |
|----------|-----------------------------|
| Opt. A0  | North America power         |
| Opt. A1  | Universal Euro power        |
| Opt. A2  | United Kingdom power        |
| Opt. A3  | Australia power             |
| Opt. A5  | Switzerland power           |
| Opt. A6  | Japan power                 |
| Opt. A10 | China power                 |
| Opt. A11 | India power                 |
| Opt. A12 | Brazil power                |
| Opt. A99 | No power cord or AC adapter |

**Optional Accessories**

| Accessory                          | Description                                                                                                                                                |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Cabinet Accessories</b>         |                                                                                                                                                            |
| WFM50F01                           | Portable Cabinet                                                                                                                                           |
| WFM50FSC<br>(WFM50F01 is required) | Soft Carrying Case to accompany the WFM5000 Series Portable Cabinet                                                                                        |
| WFM RACK-NN                        | Dual Rack Cabinet for a combination of any WFM5000, WFM6000, WFM7000, or WFM8000 Series                                                                    |
| WFM RACK-ON                        | Dual Rack Cabinet Old-New for a combination of any WFM5000, WFM6000, WFM7000, or WFM8000 Series with older-style 1700 Series, WFM601, 764, or 760 products |
| WFM RACK-S2                        | Full rack, short depth, 3RU rackmount to fit one or two WFM5xxx or WFM4xxx                                                                                 |
| WFM50F06                           | Filler Panel for Dual Rack Cabinet                                                                                                                         |
| <b>Battery Accessories</b>         |                                                                                                                                                            |
| WFM50FGM                           | Battery Adapter Plate (Anton Bauer Gold-Mount)                                                                                                             |
| WFM50FVM                           | Battery Adapter Plate (Sony/IDX V-Mount)                                                                                                                   |

**Service Options**

| Option    | Description                                                                                                                                                                                                                                                        |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Opt. C3   | Calibration Service 3 Years                                                                                                                                                                                                                                        |
| Opt. C5   | Calibration Service 5 Years                                                                                                                                                                                                                                        |
| Opt. D3   | Calibration Data Report 3 Years (with Opt. C3)                                                                                                                                                                                                                     |
| Opt. D5   | Calibration Data Report 5 Years (with Opt. C5)                                                                                                                                                                                                                     |
| Opt. G3   | Complete Care 3 Years (includes loaner, scheduled calibration and more)                                                                                                                                                                                            |
| Opt. G5   | Complete Care 5 Years (includes loaner, scheduled calibration and more)                                                                                                                                                                                            |
| Opt. R3   | Repair Service 3 Years (including warranty)                                                                                                                                                                                                                        |
| Opt. R5   | Repair Service 5 Years (including warranty)                                                                                                                                                                                                                        |
| Opt. R5DW | Repair Service Coverage 5 Years (includes product warranty period). 5-year period starts at time of customer instrument purchase. This option is available if the instrument is within product warranty. It is not available once instrument exits warranty period |
| Opt. R3DW | Repair Service Coverage 3 Years (includes product warranty period). 3-year period starts at time of customer instrument purchase. This option is available if the instrument is within product warranty. It is not available once instrument exits warranty period |



WFM5200 Front Panel.



WFM5200 Rear Panel.



Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.



Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.



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**For Further Information.** Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit [www.tektronix.com](http://www.tektronix.com)



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