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1720 Vectorscope - Vector and Stereo Audio Dual display mode.

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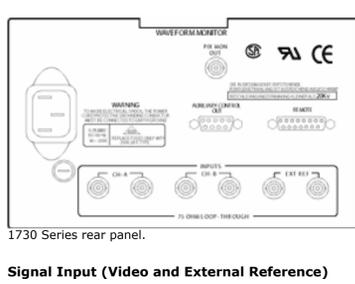
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Analog Waveform Monitors

1720 Series • 1730 Series

Characteristics

1730 Series Waveform Monitors Characteristics



1730 Series rear panel.

Signal Input (Video and External Reference)

Return Loss - >40 dB, 50 kHz to 6 MHz, power on or off.

Maximum Input - ±5 V DC + peak AC.

Loop-through Isolation - >80 dB at F_{SC}.

Channel Isolation - >50 dB at F_{SC}.

Impedance - >15 kΩ.

Vertical Deflection

Deflection Factor - Within 1% of 1 V.

Gain Range - Input signals between 0.8 V and 2 V can be adjusted to a 1 V display; (160 mV and 400 mV for X5 gain).

Position Range - 1 V signal can be positioned so that peak white and sync tip can be placed at blanking level regardless of gain range.

Frequency Response

Flat - 50 kHz to 6 MHz within 2% (X1), within 5% (X5).

Low Pass - 40 dB attenuation at F_{SC}; Low pass response within 1% of flat response (1735: 30 dB).

Chroma - Nominal bandwidth 1 MHz; 2X F_{SC} attenuation >20 dB; Chroma response within 1% of flat response.

Transient Response

Preshoot - <1%.

Overshoot - <2%.

Ringing - <2%.

Tilt - <1%.

Pulse-to-Bar Ratio - 0.99:1 to 1.01:1.

Differential Gain - <1%.

DC Restoration

Clamp Time - Back porch.

Frequency Response - Attenuation of 60 Hz on input signal:

Slow mode: <20%.

Fast mode: >90%.

Blanking Level Shift - A 10% to 90% APL change will cause <1% of blanking level shift. Presence or absence of color burst will cause <1% of blanking shift.

PIX Monitor Output

Frequency Response - 50 kHz to 6 MHz within 3%.

Differential Gain - <1%.

Differential Phase - <1%.

DC Level on Output - <0.5 V into 75 Ω load.

Intensification (Brightup) - 180 mV DC offset on select lines.

Output Impedance - 75 Ω nominal.

Return Loss - >30 dB, 50 kHz to 6 MHz.

Input to Output (PIX MON) Gain Ratio Luminance - 1:1 ±5% at 15 kHz.

Calibrator

Frequency - 100 kHz ±0.1 kHz.

Timing Accuracy - 10 μs, ±0.01 μs.

Amplitude - 1 V, ±1%.

Horizontal Deflection System

Sweep - Sweep will occur with or without input signal.

1-Line Repetition Rate - Equal to applied line rate, magnification equals 0.2 ms/div.

2-Line Repetition Rate - Equal to half applied line rate, magnification equals 1 ms/div.

2-Field Repetition Rate - Equal to applied frame rate, magnification equals X25.

Timing Accuracy - 1 ms/div.: Within 2%.

0.2 ms/div.: Within 3%.

Linearity - Within 2%.

Differential Linearity - Within 2%.

Sweep Magnification Registration - Magnification occurs about the center of the screen.

Position Range - Any portion of a synchronized video sweep can be positioned on screen in all sweep modes.

Synchronization

Internal - Composite video or black burst with sync ±6 dB of nominal.

External - Sync amplitude of 143 mV to 4 V.

Remote Sync - 2.0 to 5.0 V square wave or 4.0 V comp sync (sync polarity can be internally inverted).

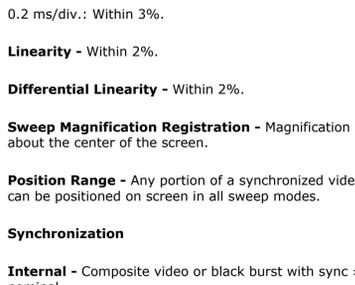
RGB/YRGB - Repetition rate: Field rate and line rate with magnification of X25 and X10, respectively.

Sweep length:

3-Step (RGB): 3.4 to 4.1 divs.

4-Step (YRGB): 2.5 to 3.1 divs.

1720 Series Vectorscopes Characteristics



1720 Series rear panel.

Signal Input (Video and External Reference)

Return Loss - >40 dB, 50 kHz to 6 MHz, power on or off.

Maximum Input - ±5 V DC + peak AC.

Loop-through Isolation - >70 dB at F_{SC}.

Channel Isolation - >70 dB at F_{SC}.

Impedance - >15 kΩ.

Chrominance Bandwidth

Upper - -3 dB point, F_{SC} +500 kHz, ±100 kHz.

Lower - -3 dB point, F_{SC} -500 kHz, ±100 kHz.

Vector Phase Accuracy - Within 1.25°.

Vector Gain Accuracy - Within 2.5%, typical.

Quadrature Phasing - Within 0.5°, typical.

Subcarrier Regenerator

Pull-in Range - F_{SC} ±50 Hz.

Pull-in Time - Within 1 second.

Phase Shift with Subcarrier Frequency Change - 2° ±50 Hz.

Phase Shift with Burst Amplitude Change - <2° with ±6 dB change from nominal.

Phase Shift with Input Channel Change - <0.5°.

Phase Change with Variable Gain Control - ±1°.

Phase Control Range - 360° Continuous rotation.

Burst Jitter - <0.5°.

Display Differential Phase and Gain - ±1° and ±1%.

Center Dot Clamp Stability - <0.4 mm spot movement.

Synchronization

Internal - Composite video with sync ±6 dB of nominal.

External Reference - Composite video or CW subcarrier.

X Y mode

Input - Differential, DC coupled.

Input Amplitude - 2 to 9 V_{p,pr}, adjustable full scale deflection 0 dBm to +12 dBm for 600 Ω system, factory set to 0 dBm.

Maximum Input - ±15 V peak signal + DC.

Frequency Response - DC to 500 kHz (DC to 100 kHz high-gain mode).

X and Y Phase Match - Less than a trace width separation at 20 kHz.

1720 and 1730 Series Common Characteristics

CRT Viewing Area - 80 x 100 mm.

Trace Rotation - 8° range, typical.

Graticule - Internal scale with variable illumination.

Power Source

Mains Voltage Ranges - 115 V, 90-132 V, 230 V, 200-250 V.

Mains Frequency Range - 48 Hz to 66 Hz.

Power Consumption - 25 W (85 BTU/HR) maximum.

Environmental

Temperature - Nonoperating: -55°C to +75°C.

Operating: 0°C to +50°C.

Altitude - Nonoperating: To 15,240 m (50,000 ft.).

Operating: To 2,000 m (6,500 ft.).

Shock - Nonoperating: 30 Gs, 1/2 sine, 11 ms duration, 3 shocks per surface (18 total).

Transportation - Qualified under NISTA Test Procedure 1A, Category II (30-inch drop).

Humidity - Meets Tektronix Standard 062-2847-00.

Certifications

EMC - Certified to the EMC Directive 89/336/EEC.

Safety - Approved to: UL1244, CSA231.

Complies with: EN61010-1, IEC61010-1.

Physical characteristics

Dimensions	mm	in.
Height	133.4	5.25
Width	215.9	8.5
Length	460.4	8.125
Weight	kg	lbs.
Approximately	3.8	18.125

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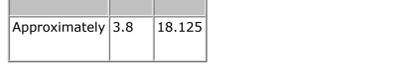
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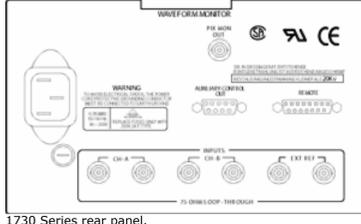
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Frequency - 100 kHz ±0.1 kHz.

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0.2 ms/div.: Within 3%.

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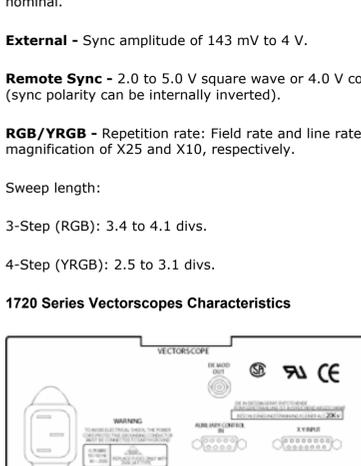
RGB/YRGB - Repetition rate: Field rate and line rate with magnification of X25 and X10, respectively.

Sweep length:

3-Step (RGB): 3.4 to 4.1 divs.

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1720 Series rear panel.

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Channel Isolation - >70 dB at F_{SC}.

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Chrominance Bandwidth

Upper - -3 dB point, F_{SC} +500 kHz, ±100 kHz.

Lower - -3 dB point, F_{SC} -500 kHz, ±100 kHz.

Vector Phase Accuracy - Within 1.25°.

Vector Gain Accuracy - Within 2.5%, typical.

Quadrature Phasing - Within 0.5°, typical.

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Pull-in Range - F_{SC} ±50 Hz.

Pull-in Time - Within 1 second.

Phase Shift with Subcarrier Frequency Change - 2° ±50 Hz.

Phase Shift with Burst Amplitude Change - <2° with ±6 dB change from nominal.

Phase Shift with Input Channel Change - <0.5°.

Phase Change with Variable Gain Control - ±1°.

Phase Control Range - 360° Continuous rotation.

Burst Jitter - <0.5°.

Display Differential Phase and Gain - ±1° and ±1%.

Center Dot Clamp Stability - <0.4 mm spot movement.

Synchronization

Internal - Composite video with sync ±6 dB of nominal.

External Reference - Composite video or CW subcarrier.

X Y mode

Input - Differential, DC coupled.

Input Amplitude - 2 to 9 V_{p-pr} adjustable full scale deflection 0 dBm to +12 dBm for 600 Ω system, factory set to 0 dBm.

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Shock - Nonoperating: 30 Gs, 1/2 sine, 11 ms duration, 3 shocks per surface (18 total).

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Humidity - Meets Tektronix Standard 062-2847-00.

Certifications

EMC - Certified to the EMC Directive 89/336/EEC.

Safety - Approved to: UL1244, CSA231.

Complies with: EN61010-1, IEC61010-1.

Physical characteristics

Dimensions	mm	in.
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Width	215.9	8.5
Length	460.4	8.125
Weight	kg	lbs.
Approximately	3.8	18.125

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1720 Vectorscope - Vector and Stereo Audio Dual display mode.

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Analog Waveform Monitors

1720 Series • 1730 Series

Features & Benefits

- Performance and Economy
- Full Frame Line Select
- Simultaneous Channel A and B Display
- Dual Filter Display
- One-button Front Panel Recall
- RGB/YRGB Display Capability
- 1730 Series Displays D-2 Servo Waveforms
- Parallax-free Internal Graticules
- Differential Phase and Gain Measurement
- Stereo Audio Phase Measurement
- Vector Center Dot Clamping
- Remote Control Capability
- Available in NTSC and PAL Standards as Well as Dual Standard
- White Phosphor Available
- Composite Serial and Parallel Monitoring Is Available with 1730D Series

Applications

- Cost-effective Signal Monitoring in Camera Control Consoles and Video Transmission Applications

The Tektronix 1730 Series Waveform Monitors and 1720 Series Vectorscopes provide comprehensive television signal monitoring for both NTSC and PAL applications. These versatile instruments are light weighting, half-rack width and have bright CRTs for video signal monitoring. Both instruments exceed normal monitoring capabilities, and their unique features make them even more powerful when operated in tandem. Each monitor has its own advanced feature set and the proven 1700 Series family performance to provide more monitor for the money. These monitors do the job faster, better and easier at an economical price.

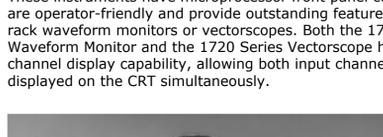
The 1720 Series and 1730 Series families cover a wide variety of video testing needs. For typical composite monitoring in the NTSC and PAL realm, the 1720 Series and 1730 Series more than handle the job. If there is a need for Dual Standard testing (PAL and NTSC), the 1735 Waveform Monitor and 1725 Vectorscope can be used. Digital testing of both composite parallel and composite serial can be accomplished with the 1730D Series of Digital Waveform Monitors. Whatever the individual video testing application, the 1720 and 1730 Series family provide an easy to use, economical solution.

Complete Line Select

The 1730 Series Waveform Monitor has full frame line select, with alphanumeric readout, that can be tracked by the 1720 Series Vectorscope when in Auxiliary mode. Any one or two lines of the entire frame can be selected and displayed or the same line(s) in both fields can be viewed at one time. An intensified zone in the two-field sweep and on the picture monitor output signal indicates the location of the line selection. In addition, any successive 15 lines can be overlaid for camera and VTR adjustments.

Simultaneous Channel A and B display

These instruments have microprocessor front panel control. They are operator-friendly and provide outstanding features in half-rack waveform monitors or vectorscopes. Both the 1730 Series Waveform Monitor and the 1720 Series Vectorscope have dual channel display capability, allowing both input channels to be displayed on the CRT simultaneously.



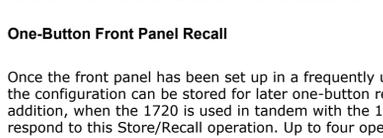
1730 Waveform Monitor - Simultaneous Channel A and B display.

Dual Filter Display

The 1730 (NTSC) and the 1731 (PAL) Waveform Monitor include dual filter display, which provides low pass and flat information in the same display. The 2-Field and 2-Line Display Modes have the Low Pass Filter applied to the left half of the trace. In the 1-Line Mode, the two signals are overlaid. These filter modes can also be used independently. Both versions of the 1730 Series have chroma filters centered around the subcarrier frequency.

One-Button Front Panel Recall

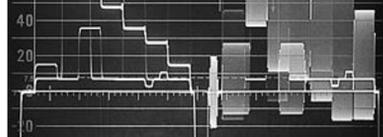
Once the front panel has been set up in a frequently used mode, the configuration can be stored for later one-button recall. In addition, when the 1720 is used in tandem with the 1730, it will respond to this Store/Recall operation. Up to four operator-selected front panel configurations can be stored from the front panel. Four other front panel configurations are factory-programmed settings and are accessible from the Remote Control interface.



1730 NTSC Dual Filter display.



1720 Stereo Audio display with phase error.



1721 PAL Vector display.



1731 PAL Dual Filter display.



Line Select Test Signal display.



1720 NTSC Vector display.

Differential Phase And Gain Measurements

The 1720 Series Vectorscope graticule has scales for measuring Differential Phase and Gain. The Differential Phase scale has markings at 2° intervals. The Differential Gain scale has markings at 5% intervals. For even greater precision, the 1720 and 1730 Series can be coupled for differential phase measurements using the field or line sweep on the 1730 Series Waveform Monitor. The Waveform Monitor Chroma filter can be used for differential gain measurements.

Stereo Audio Phase Measurements

Balanced inputs for the X Y mode are available on the 1720 Series Vectorscope through a separate input connector. This mode is particularly useful for evaluation of stereo audio with a special X Y graticule scale for both amplitude and phase measurements. X Y measurements can be displayed individually or in combination with a vector display. This input can also be used for other applications where X Y monitoring is useful.

RGB-YRGB

The Waveform Monitor can display RGB or YRGB. The RGB/YRGB staircase input is through a rear panel connector.

Vector Center Dot Clamping

The 1720 Series Vectorscopes employ center dot clamping in Vector mode for easy detection of residual sub-carrier on the signal. In addition, with no signal present, the center dot automatically dims prolonging the CRT life.

Parallax-Free Internal Graticules

Both instruments utilize post-accelerated, mesh-type CRTs equipped with internal graticules to provide parallax-free displays. Variable, evenly-illuminated scales, along with molded bezels, make waveform photography a snap.

Remote Control

Internal front panel presets, RGB/YRGB enable, along with front panel recall/setup can be accessed through the waveform monitor remote connector.

Available in NTSC, PAL and Dual Standard

Both the 1730 Series and the 1720 Series are available in either NTSC or PAL versions. The 1721 Vectorscope and the 1731 Waveform Monitor are the PAL versions. The 1735 Waveform Monitor and 1725 Vectorscope provide PAL/NTSC Dual Standard Monitoring.

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1720 Vectorscope - Vector and Stereo Audio Dual display mode.

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Analog Waveform Monitors

1720 Series • 1730 Series

Ordering Information

1720

Vectorscope (for NTSC System Applications).

1721

Vectorscope (for PAL System Applications).

1725

Vectorscope (for PAL/NTSC dual System Applications).

1730

Waveform Monitor (for NTSC System Applications).

1731

Waveform Monitor (for PAL System Applications).

1735

Waveform Monitor (for PAL/NTSC dual System Applications).

All Include: Instruction manual, power cable assembly, spare fuse, auxiliary control cable 012-1422-01 (1720 Series only).

Opt. 74 - Substitute P4 (white) phosphor on CRT on these models: 1720, 1725, or 1735.

Optional Accessories

Item	Description
1700F00	Plain cabinet; for half-rack 1700 Series and WFM601 Series, safety controlled
1700F00A	Rackmount insert; for WFM700 Series, half-rack 1700 Series and WFM601 Series
1700F02	Portable cabinet; includes handle, feet, and tilt stand
1700F06	Filler panel; covers unused rack space in WFM7F05
1700F07	Drawer; half-rack, fits WFM7F05 dual-rack cabinet
WFM7F05	Rack adapter; dual side-by-side for WFM700, 1700 Series, and WFM601 Series

Service

Opt. R5 - Repair Service 5 Years

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- Cost-effective Signal Monitoring in Camera Control Consoles and Video Transmission Applications

The Tektronix 1730 Series Waveform Monitors and 1720 Series Vectorscopes provide comprehensive television signal monitoring for both NTSC and PAL applications. These versatile instruments are light weight, half-rack width and have bright CRTs for video signal monitoring. Both instruments exceed normal monitoring capabilities, and their unique features make them even more powerful when operated in tandem. Each monitor has its own advanced feature set and the proven 1700 Series family performance to provide more monitor for the money. These monitors do the job faster, better and easier at an economical price.

The 1720 Series and 1730 Series families cover a wide variety of video testing needs. For typical composite monitoring in the NTSC and PAL realm, the 1720 Series and 1730 Series more than handle the job. If there is a need for Dual Standard testing (PAL and NTSC), the 1735 Waveform Monitor and 1725 Vectorscope can be used. Digital testing of both composite parallel and composite serial can be accomplished with the 1730D Series of Digital Waveform Monitors. Whatever the individual video testing application, the 1720 and 1730 Series family provide an easy to use, economical solution.

Complete Line Select

The 1730 Series Waveform Monitor has full frame line select, with alphanumeric readout, that can be tracked by the 1720 Series Vectorscope when in Auxiliary mode. Any one or two lines of the entire frame can be selected and displayed or the same line(s) in both fields can be viewed at one time. An intensified zone in the two-field sweep and on the picture monitor output signal indicates the location of the line selection. In addition, any successive 15 lines can be overlaid for camera and VTR adjustments.

Simultaneous Channel A and B display

These instruments have microprocessor front panel control. They are operator-friendly and provide outstanding features in half-rack waveform monitors or vectorscopes. Both the 1730 Series Waveform Monitor and the 1720 Series Vectorscope have dual channel display capability, allowing both input channels to be displayed on the CRT simultaneously.



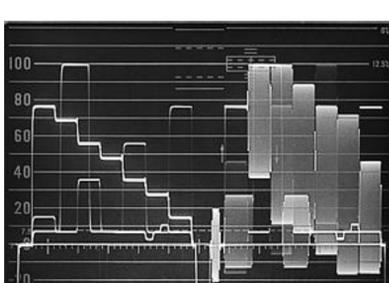
1730 Waveform Monitor - Simultaneous Channel A and B display.

Dual Filter Display

The 1730 (NTSC) and the 1731 (PAL) Waveform Monitor include dual filter display, which provides low pass and flat information in the same display. The 2-Field and 2-Line Display Modes have the Low Pass Filter applied to the left half of the trace. In the 1-Line Mode, the two signals are overlaid. These filter modes can also be used independently. Both versions of the 1730 Series have chroma filters centered around the subcarrier frequency.

One-Button Front Panel Recall

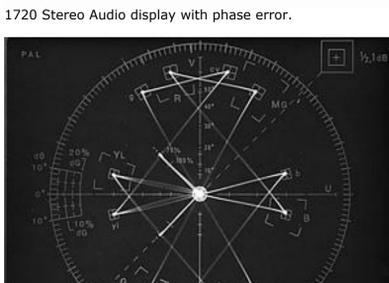
Once the front panel has been set up in a frequently used mode, the configuration can be stored for later one-button recall. In addition, when the 1720 is used in tandem with the 1730, it will respond to this Store/Recall operation. Up to four operator-selected front panel configurations can be stored from the front panel. Four other front panel configurations are factory-programmed settings and are accessible from the Remote Control interface.



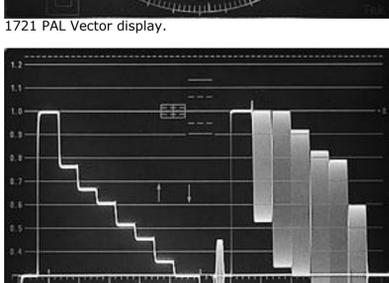
1730 NTSC Dual Filter display.



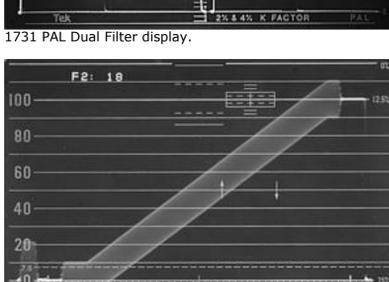
1720 Stereo Audio display with phase error.



1721 PAL Vector display.



1731 PAL Dual Filter display.



Line Select Test Signal display.



1720 NTSC Vector display.

Differential Phase And Gain Measurements

The 1720 Series Vectorscope graticule has scales for measuring Differential Phase and Gain. The Differential Phase scale has markings at 2° intervals. The Differential Gain scale has markings at 5% intervals. For even greater precision, the 1720 and 1730 Series can be coupled for differential phase measurements using the field or line sweep on the 1730 Series Waveform Monitor. The Waveform Monitor Chroma filter can be used for differential gain measurements.

Stereo Audio Phase Measurements

Balanced inputs for the X Y mode are available on the 1720 Series Vectorscope through a separate input connector. This mode is particularly useful for evaluation of stereo audio with a special X Y graticule scale for both amplitude and phase measurements. X Y measurements can be displayed individually or in combination with a vector display. This input can also be used for other applications where X Y monitoring is useful.

RGB-YRGB

The Waveform Monitor can display RGB or YRGB. The RGB/YRGB staircase input is through a rear panel connector.

Vector Center Dot Clamping

The 1720 Series Vectorscopes employ center dot clamping in Vector mode for easy detection of residual sub-carrier on the signal. In addition, with no signal present, the center dot automatically dims prolonging the CRT life.

Parallax-Free Internal Graticules

Both instruments utilize post-accelerated, mesh-type CRTs equipped with internal graticules to provide parallax-free displays. Variable, evenly-illuminated scales, along with molded bezels, make waveform photography a snap.

Remote Control

Internal front panel presets, RGB/YRGB enable, along with front panel recall/setup can be accessed through the waveform monitor/remote connector.

Available in NTSC, PAL and Dual Standard

Both the 1730 Series and the 1720 Series are available in either NTSC or PAL versions. The 1721 Vectorscope and the 1731 Waveform Monitor are the PAL versions. The 1735 Waveform Monitor and 1725 Vectorscope provide PAL/NTSC Dual Standard Monitoring.

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