Model Details

Digital Waveform monitor
Digital vectorscope monitor
Group Delay and Frequency response
Noise measurement set
NTSC video monitor or picture mode
RS-232 Interface
User Defined Functions
Auto mode (Allows unattended monitoring of NTSC Video Signals using user Define limits)

Features:

NTSC Video Measurement Set

VM 700A Option 01

Many Capabilities In One Instrument

- Digital waveform monitor
- Digital vectorscope
- Group delay and frequency response
- Noise measurement set
- Automatic measurement set

Auto Mode

- Unattended monitoring of NTSC video signals from studios, STLs, Earth Stations, and transmitters
- User-specified limits

Measure Mode Provides Graphic Display Of Measurements

- K factor
- Differential gain and phase
- Chrominance to luminance delay
- Noise spectrum
- Group delay with (sin x)/x
- Color bars
- Chrominance AM/PM noise
- Relative to reference on most measurements
- Configurable for all standard test signals
- Three input channels
- Channel difference modes
- Averaging on all measurement modes
- Picture mode for source ID
- Hardcopy for analysis and documentation
- Remote control operation

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analysis.

Automatic Video Measurement Set

The VM700A Auto Mode makes standard video measurements automatically, including those specified in RS-250B/EIA-250C, NTC-7, and RS-170A. These measurements can be compared with user-defined limits. A caution or alarm message is generated when these limits are violated. Reports can be made and printed automatically at operator scheduled times.

Digital Waveform Monitor/Vectorscope

For a more detailed analysis of the waveform, the actual signal may be displayed and additional measurements made manually.

In Waveform Mode, cursors are available to aid in measuring time, frequency and amplitude. These cursors allow a very quick and precise location of the 10%, 50% and 90% points on any transition. Enabling cursors also enables an automatic calculation in the waveshape in the center of the display. The parameters calculated are sine peak-to-peak amplitude, frequency, and offset from blanking level. This is very useful for frequency response measurements with the multiburst signal.

The waveform display can be expanded around any point both vertically and horizontally. Since the data is digitized, the display remains bright at all expansion factors. The scales automatically expand with the waveform, so all units are correct as displayed. A channel difference mode (A-B, A-C, B-A, B-C, C-A, and C-B) is also provided.

A screen memory selection enables Envelope Mode, which is useful for looking at teletext, jitter, or other changes over time.

The Vector Mode provides the normal vectorscope display. The vectors may be rotated or expanded, with the rotation angle and gain values displayed numerically on the screen.

A unique "Find Colorbars" feature searches all video for colorbars and displays the vectors if found. The vectors can be referenced to either the selected channel's burst or the burst of one of the other two channels or continuous subcarrier. The phase difference between the selected channel and the reference is always displayed.

Select Line in both Waveform and Vector modes can be used to quickly specify any line for display or automatic measurement if it is the proper signal.

Graphic Displays Of Measurements

Measure Mode provides graphic displays of measurements such as noise spectrum, group delay, and K factor, for adjustments or closer analysis of the measurement. Most measurements can be made relative to a stored reference to eliminate or minimize signal source errors. Most measurements have averaging to reduce the effect of noise. A channel difference mode (A-B, A-C, and B-C) is also provided and is useful in input to output analysis of a device.

VITS ID provides a quick reference of vertical interval test signal locations.

Picture Mode

The signal source can be quickly verified using the picture display. Any line may be selected on the picture for viewing in the waveform or vector displays.

User-programmable Functions

The user can define a sequence of operations as a new function.

For example, the measurements to be made on a transmitter demodulator video output could be identified with a function labeled DEMOD. A user would simply select this function to make all measurements, and provide a printout.

The VM700A stores user defined functions as editable ASCII files.

Hardcopy

All information on the screen may be printed on printers supporting PostScript, Hewlett-Packard LaserJet or 24-pin Epson graphics via the standard RS-232C interface. Automatic measurement results can be printed on most ASCII printers using the same interface.

Remote Operation

The VM700A can be operated from a remote terminal via RS-232C to monitor unattended transmission systems and/or put systems under computer control. In addition, all files could be uploaded to a main computer, and downloaded to other VM700As. Two different protocols are supported: FTP (File Transfer Protocol) and TELNET. The user can also select a "no protocol" mode of the RS-232C interface when dealing with low baud rates. However, file transfers can only take place with FTP.

Characteristics

The performance requirements cited in this section are valid only within the following environmental limits:

Temperature range of 0 to 50 degrees Celsius, with a minimum warm-up time of 20 minutes. The following lists each measurement and its performance requirement.

The range specifies the extremes between which a measurement can be made.

All measurement accuracies specified are valid only with nominal input signals with an unweighted signal-to-noise ratio of at least 60 dB on the incoming signal and a termination accuracy of +/- 0.025% (Tektronix PN 011-0102-01 or equivalent).

Due to the statistical nature of digitizing measurement methods, reported results will meet these specifications 97% of the time.

Measurement Methods - Auto Mode

The following paragraphs describe the measurement methods for each measurement. Each timing measurement method is written for the FCC method. If there is an RS-170A method for that same measurement, and the RS-170A method differs from the FCC method, the RS-170A requirement is enclosed within square brackets in the FCC description.

Horizontal Interval Timing Measurements

These timing measurements are made within the active picture area, averaging the results over 32 lines starting at line 50 and skipping 1 frame plus 5 lines for each successive sample (i.e., average over line 50 of first field, line 56 of second field, line 62 of the third field, etc.).

Breezeway Width: Measured from the 10% point on the trailing edge of horizontal sync (nominally -4 IRE) to the leading half-amplitude point of the burst envelope.

Color Burst Width: Measured from the leading half-amplitude point on the burst envelope [leading zero crossing of the first half-cycle of burst that exceeds 50% of burst amplitude] to the trailing half-amplitude point on the burst envelope [trailing

burst amplitude] to the trailing half-amplitude point on the burst envelope [trailing zero crossing of the last half-cycle of burst that exceeds 50% of burst amplitude].

Front Porch Duration: Measured from the 10% point on the trailing edge of setup (+4 IRE nominally) to the 10% [50%] point on the leading edge of sync (nominally -4[-20] IRE).

Horizontal Blanking Width: Measured between the points on the leading and trailing edges of horizontal blanking that are at an amplitude of 10% [50%] of sync above blanking level (nominally 4 [20] IRE).

Horizontal Sync Rise Time and Fall Time: Measured between the 10% and 90% points on the leading and trailing edges of horizontal sync, respectively (nominally 4IRE and 36IRE).

Horizontal Sync Width: Measured between the 10% [50%] points on the leading and trailing edges of horizontal sync (nominally 4 [20] IRE).

SCH Phase: Phase at the middle of burst relative to the 50% point on the sync leading edge.

Sync to Setup: Measured from the 10% [50%] point on the leading edge of sync (nominally 4 [20] IRE) to the point on the trailing edge of blanking that is equivalent to 10% of sync (nominally 4 IRE).

Sync-to-Start-of-Burst: Measured from the 50% point on the leading edge of sync (nominally 20 IRE) to the leading zero crossing of the first half-cycle of burst that exceeds 50% of burst amplitude.

Sync-to-End-of-Burst: Measured from the 10% point on the leading edge of horizontal sync (nominally 4 IRE) to the half-amplitude point on the trailing edge of the burst envelope.

Vertical Interval Timing

Equalizing Pulse Width: Measured between the 10% [50%] points on the equalizing pulse (nominally 4 [20] IRE).

Serration Width: Measured between the 10% [50%] points of serration (nominally 4 [20] IRE).

Vertical Blanking Width: Measured between the points on setup [active picture] at a level equal to 10% [50%] of sync amplitude (nominally 4 [20] IRE), where setup [active picture] immediately precedes and follows the vertical blanking interval.

Color Bar Measurements

Color Bar Amplitude Error: Measured as deviation of the peak-to-peak amplitude of each color bar from the nominal value for that color bar expressed as a percent of the nominal value. Six values reported.

Color Bar Phase Error: Measured as deviation of the phase of each color bar from the nominal phase for that color bar, relative to burst phase. Six values reported.

Color Bar Chrominance-Luminance Gain Ratio: Measured as ratio of chrominance level to luminance level of each color bar, relative to the nominal ratio for each color bar. Six values reported.

Measure Mode

All accuracies for measurements with averaging capabilities assume the default average of 32. All accuracies for measurements with relative to reference mode assume an average of 256 was used to create the reference.

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- Bar Line Time
- Bounce
- Burst Frequency (Requires a reference signal.)
- Chrominance To Luminance Gain And Delay
- Chrominance Frequency Response
- Chrominance Noise
- Chrominance Non-Linearity (Accuracies for chrominance non-linearity amplitude and phase)
- Color Bar
- SMPTE Color Bars Nominal Values
- Differential Gain And Phase
- Frequency Response And Group Delay
- Horizontal Blanking
- Horizontal Timing
- Incidental Carrier Phase Modulation
- Jitter
- K Factor
- Line Frequency
- Luminance Non-Linearity
- Multiburst (Total Harmonic Distortion on packets must be </= 46 dB.)
- Noise Spectrum
- SCH Phase
- Vertical Blanking

Auto Mode

- RS-170A Horizontal Blanking Interval Timing Measurements
- RS-170A Vertical Blanking Interval
- FCC Horizontal Blanking Interval Timing Measurements
- FCC Vertical Blanking Interval Timing Measurements
- Amplitude And Phase Measurements
- Frequency Response Measurements
- Incidental Carrier Phase Modulation
- Color Bar Measurements
- Out-Of-Service Measurements
- Waveform Distortion Measurements
- VIRS Measurements
- Signal-To-Noise Ratio Measurements

Power Requirements

Mains Voltage Range: 87 VAC to 132 VAC
or 174 VAC to 250 VAC.

Mains Frequency: 47 Hz to 63 Hz.

Power Consumption: 250 Watts.

Environmental

Temperature:
Operating: 0 to +50 degrees C ambient.

Physical Characteristics

Dimensions:
Width: 483 mm (19 in.)
Height: 222 mm (8.75 in.)
Depth: 556 mm (21.90 in.)
Weight: Approximately or equal to 20 kg (45 lb.)

Ordering Information

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