

MODEL 822S

Programmable Monochrome Video Signal Generator



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Quick Start Guide

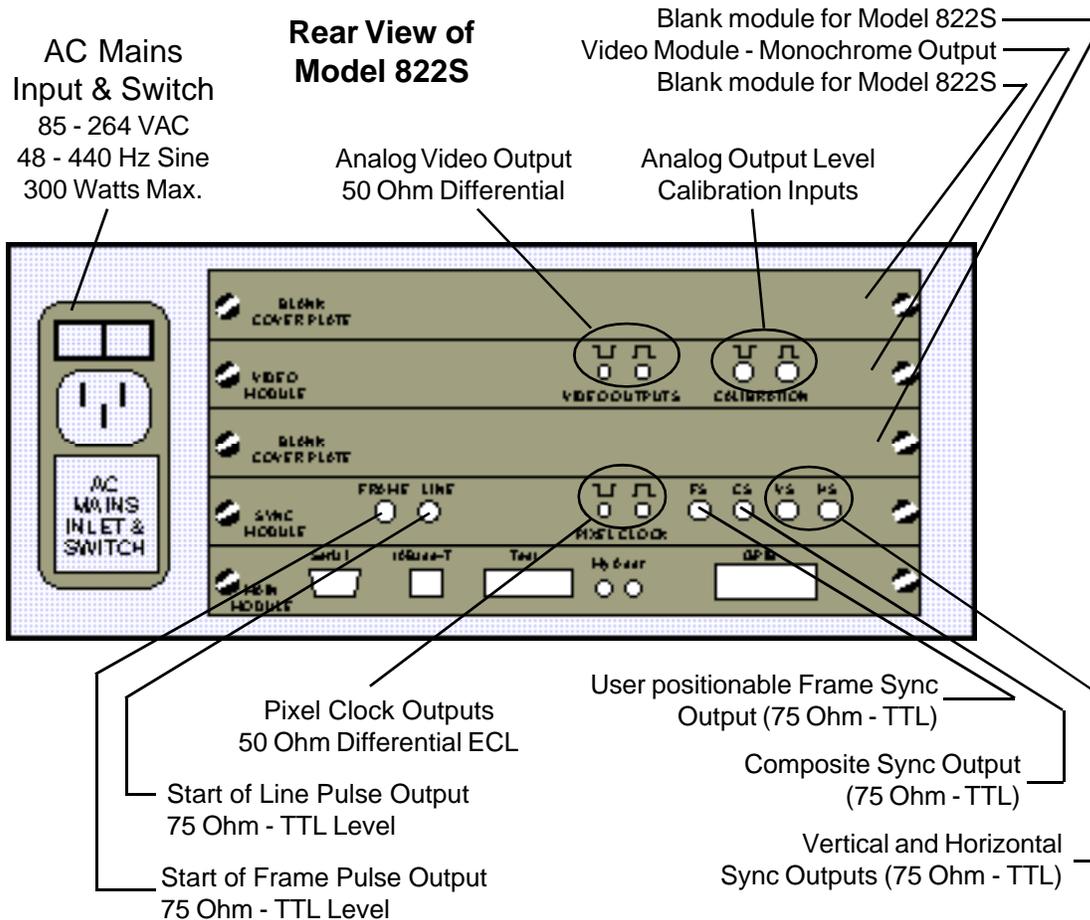


QUANTUMDATA

Quantum Data, Inc.

This Quick Start Guide is designed to help you get up and running quickly with your video generator. Detailed information on programming and operating the generator via its communications ports can be found in the VGM software's on-line help file.

Making Connections (Power & Test Signals)



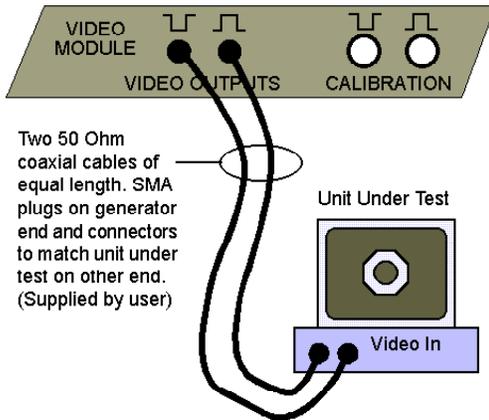
NOTES:

- 1) AC Mains power must be turned off while removing or installing any module. Failure to do so may cause damage to the mainframe and/or module. Such damage is not covered by the product or service warranties.
- 2) All modules contain electrostatic sensitive components. Proper static prevention measures must be followed while handling the modules.
- 3) The Main Module must always be used in the bottom most slot of the mainframe.
- 4) The Sync Module must always be used in the second slot from the bottom of the mainframe.

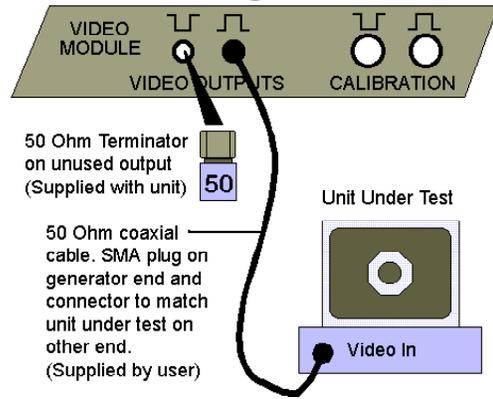
Proper Video Termination

Improper termination of the video outputs will result in degradation (ringing, undershoot and/or overshoot) of the test signals. The following figures show suggested methods for connecting the video generator to displays having 50 and 75 Ohm input impedances in both differential and single ended modes of operation.

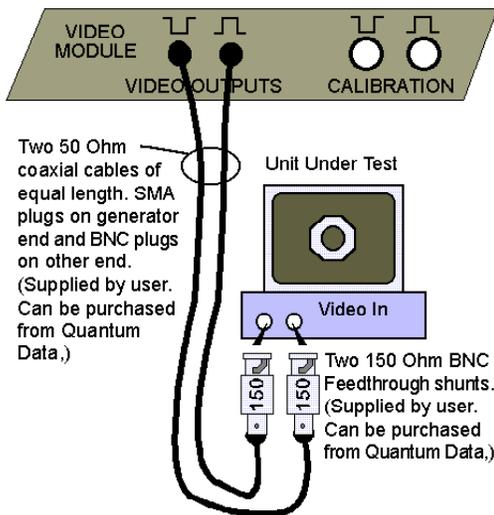
50 Ohm Differential



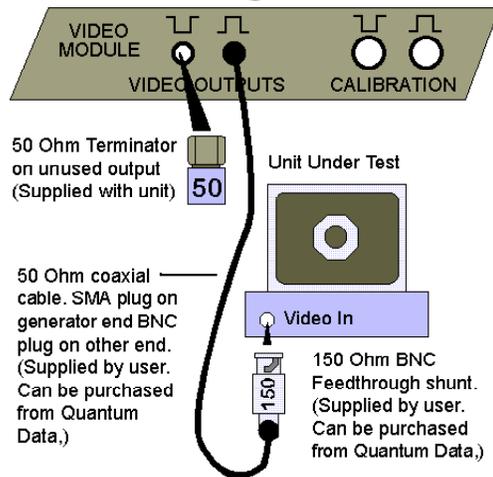
50 Ohm Single Ended



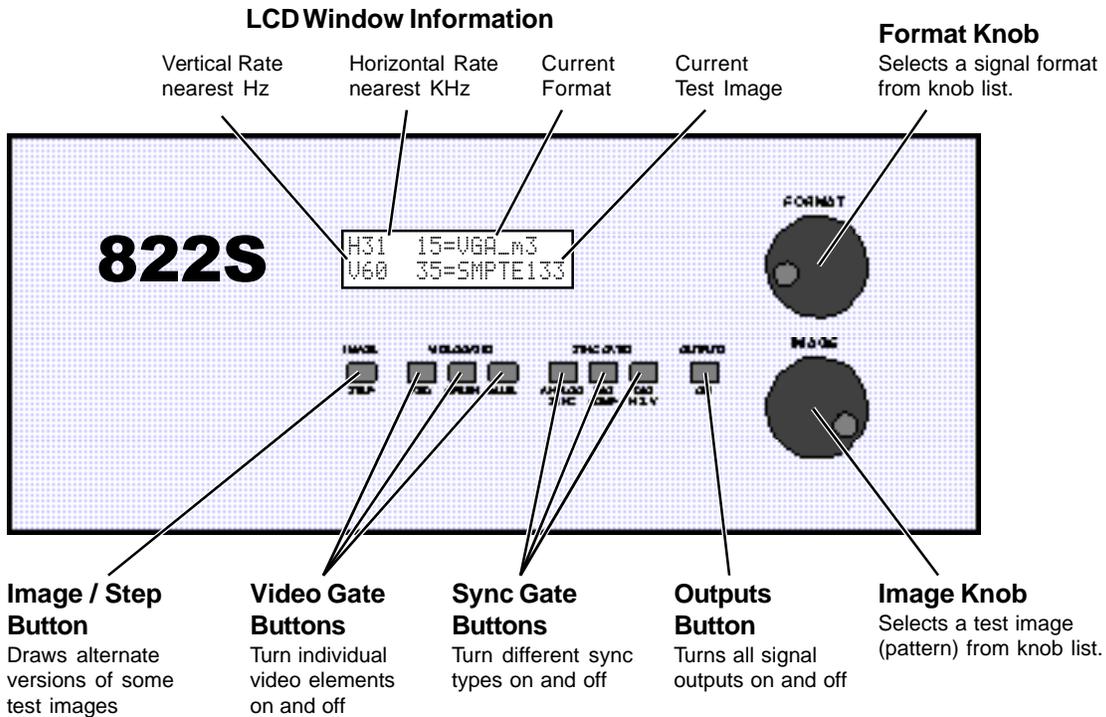
75 Ohm Differential



75 Ohm Single Ended



Front Panel Operation (Normal Mode)



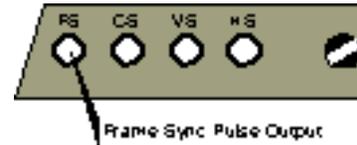
NOTES:

- 1) The firmware includes a library of over 100 standard video formats. This is a common library shared by all our Model 801, 802 and 822 series video generators. As part of the factory initialization of each unit, the firmware scans all of the library formats for compatibility with a given model and hardware configuration. All compatible formats are added to the knob list.
- 2) The firmware includes a library of over 100 built-in test images (patterns). This is a common library shared by all our Model 801, 802 and 822 series video generators. Some test images may not be compatible with some video formats and hardware configurations. An on-screen message indicates these patterns are not supported when they are selected.
- 3) User defined video formats and custom test images can be stored in the generator using Quantum Data's MS-Windows® based VGM software.

Special Operating Modes

Probe Sync Pulse Output

The FS connector on the sync module can output a TTL Level probe pulse that can be used to trigger an oscilloscope or to synchronize a camera used in automated vision systems. The pulse can be positioned manually by the operator or by commands sent by a test system. The horizontal timing can be set to a given pixel clock cycle relative to either the horizontal sync pulse or the start of active video for a given line. The vertical timing is set to a given scan line relative to either the vertical sync pulse or the start of active video in the frame. A marker can be added to the video outputs when the pulse occurs during the active portion of the video test signal.

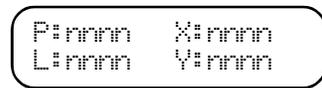


Example of Using the Probe Pulse Feature

Let's say the image displayed on the monitor looks bad at (900; 200); i.e. it is bad on active line # 200 at active pixel # 900 on that line. You can set the probe pulse to trigger an oscilloscope to look at the video signal for that position as it passes through the monitor's circuits.

Manually Operation of Probe Pulse Feature

- 1) Turn the test signal outputs off using the "Outputs" button (if not already off).
- 2) While holding down the "Image/Step" Button, press the "Outputs" button to turn the outputs on.
- 3) The generator will output the same video format and test image that were last selected. The LCD window will change to the Probe Pulse User Interface shown here. The video and sync gating buttons get new functions in this operating mode. You can not use the buttons to gate colors or change sync gating when the probe pulse feature is active.



The number after "P:" is the position of the probe on a given scan line relative to the leading edge of horizontal sync measured in pixel clock cycles. The number after "L:" is the number of the scan line relative to the leading edge of vertical blanking. For interlaced formats the line number is relative to the start of blanking for the first field. If the horizontal probe position is within the active area of the screen, then the X coordinate of the pixel (X:nnnn) is also displayed. Likewise, if the vertical position of the probe is in the active area, then the Y coordinate of the line (Y:nnnn) is also displayed. For interlaced formats, the L count will move the probe in consecutive lines in one field of video and then move on through blanking and the next field of video. This will cause the Y count to increment in steps of two.

The Format knob adjusts the "P:nnnn" horizontal timing probe position, while the Image knob adjusts the "L:nnnn" vertical timing probe position. The knobs have an exponential taper which is reset whenever the knob reverses direction. This feature provides both coarse and fine adjustments (i.e. you do not have to rotate the knob a thousand times to get to where you are going.). You can also use the sync gating buttons lock which digits are changed by the knobs. Pressing the "ACS" button will cause the knobs to step the counts in 100 unit increments. Pressing the "DCS" button will cause the knobs to step the counts in 10 unit increments. Pressing the "DSS" button will cause the knobs to step the counts in 1 unit increments. Pressing the same button a second time will revert the knobs to exponential operation.

Special Operating Modes

Probe Sync Pulse Output (Continued)

There are two additional Probe Pulse operating modes available when outputting a progressive (non-interlaced) video format. Pressing the “R” video gating button will produce a probe pulse for each scan line that contains active video. The bottom row of the LCD will show "Probe all active" in this mode. Pressing the “G” video gating button will produce a probe pulse for each scan line (both active and blanked). The bottom row of the LCD will show "Probe all lines" in this mode. Pressing a button a second time will switch back to a single pulse per frame of video.

When the probe pulse starts within the active video area, an optional marker indicating the starting point of the pulse can be added to the video as a reference. When present, the marker is non-destructive (i.e. doesn't trash the underlying test image). The marker can be toggled ON and OFF, while the probe UI is displayed, using the Image Step button.

Remote (Computer) Operation of Probe Pulse Feature

The probe pulse can be controlled by sending commands to the generator via either its serial or GPIB (IEEE-488) ports. The commands are:

Probe Sync Pulse Gate - PSPG
0 = Disable Pulse, 1 = Enable Pulse

Probe Sync Pulse Polarity - PSPP
0 = Active Low Pulse, 1 = Active High Pulse

Probe Sync Pulse Width - PSPW
In pixels, sets the width of the active portion of the probe pulse.
Limits: $0 < \text{PSPW} < (\text{HTOT}-1)$

Probe Sync Horizontal Delay PSHD
In pixels, locates the leading edge of the probe pulse on the line relative to the leading edge of the horizontal sync pulse.
Limits: $0 \leq \text{PSHD} < (\text{HTOT}-\text{PSPW}-1)$

Probe Sync Vertical Delay PSVD
In lines, assigns in which scan line the probe pulse occurs relative to the start of the vertical blanking interval (for the first field of video in the case of interlaced operation).
Limits: $0 \leq \text{PSVD} < (\text{VTOT}-1)$

The default values at the power up are: PSPG = 0, PSPP = 1, PSPW = 160, PSHD = 0 and PSVD = 0.

The commands do not affect the probe pulse output until an FTMU command is issued. Multiple commands can be sent in one command string, using semicolons to separate the commands. No part of the input string is acted upon until a carriage return ends the input. The generator returns a R>\ prompt

Special Operating Modes

Probe Sync Pulse Output (Continued)

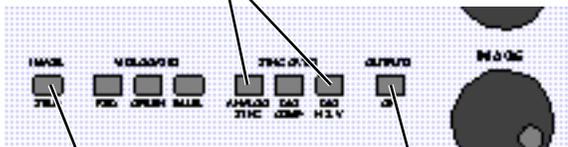
when it is done processing the string and ready for another one.

Sample command string to just enable the probe pulse:

PSPG 1; FMTU

Reinitializing Memory

(1) Momentarily hold down both buttons for about 5 seconds during power-up to enable re-initialization.



Exits re-initialization mode **without** making any changes

Re-initializes all user memory locations to factory default contents.



Reinitializing the generator's memory erases all user created data and sets all video amplitude calibration factors to 0.000. This will disable the video outputs until self calibration is performed.

Self Calibration of Analog Output Levels

The video output module on the Model 822S has a built-in precision voltage reference and comparator. They permit the video output levels to be easily and accurately self calibrated using just test cables and 50 ohm terminators. The cables and terminators are not supplied as a standard accessories with the 822S.

Momentarily hold down all three video gating buttons for about 5 seconds during power-up to start self-calibration.



1) The easiest way to start the procedure is to use the button combination shown during power up.

Self Calibration Prompt Message on LCD

Connect cables
Then rot. I Knob

Special Operating Modes

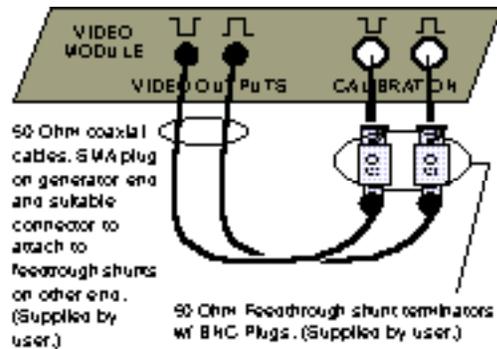
Self Calibration of Analog Output Levels *(continued)*

You can also start the procedure by sending the following command string to the generator's comm port while the unit is running:

AVCM 1; fmtu <carriage return>

Details on the connections can be found on a later page.

- 2) The LCD will display a prompt asking you to make the connections for calibration.
- 5) Connect the 50 Ohm feedthrough terminators and two 50 Ohm coaxial cables as shown. The calibration routine can compensate for small losses in the cables normally with the generator if they are used for the self calibration connections.
- 4) Rotate the Image knob to start the self calibration operation.
- 5) Self calibration takes about one minute per module. The LCD will show a progress report during this time. Any messages indicating that the unit could not bring an adjustment within calibration may indicate a problem with your connections or with the module itself.



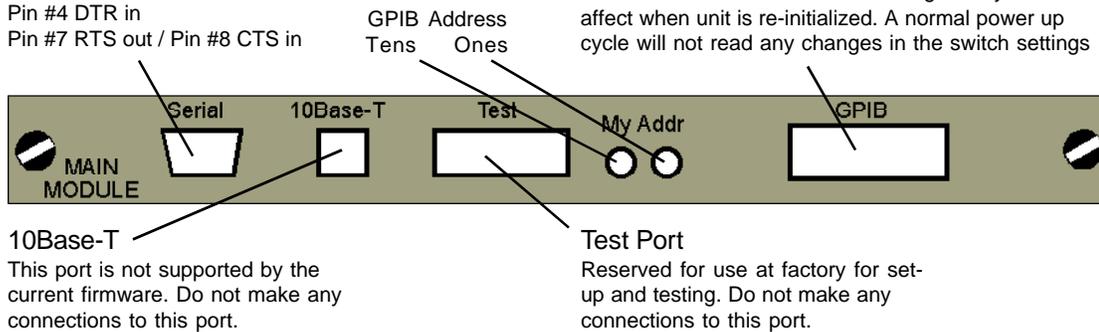
Programming and Operation via Computer

Computer Data Ports:

RS-232 (9 pin male D-Sub)
2400 Baud (factory default)
8 Data Bits / 1 Stop Bit / No Parity
Pin #2 Data in / Pin #3 Data out
Pin #4 DTR in
Pin #7 RTS out / Pin #8 CTS in

GPIB (24 pin micro-ribbon recept.)
Protocol: IEEE-488.2

NOTE: GPIB address switch changes only take affect when unit is re-initialized. A normal power up cycle will not read any changes in the switch settings



Video Generator Manager (VGM)

Quantum Data's VGM software package is supplied with this unit. It is the primary method of programming custom video formats and test images in the Model 822S video generator. It can also be used to operate the unit. The current version of VGM software is available to run under MS-Windows 95/98/NT. The current version only supports communication with the 822S via a serial port connection. The VGM software includes a help file that explains how to use the software. It also includes documentation on the command language used by the generator.

Software Developers Kit (SDK) for Windows

This Software Developer's Kit (SDK) consists of a DLL and library for writing custom windows 95/98/NT programs that communicate with all Model 801, 802 and 822 series generators. This SDK was designed for use with Microsoft's Visual C++ version 6.0. It is not normally supplied with the generator. The latest version of the kit is available for download from our Website.

Specifications

Video Timing

Pixel Clock:

Range: 7.5 MHz - 600 (optionally 800 MHz)

Step: < 0.25 Hz

Jitter: < 60 pS line to line (One Sigma)

Accuracy: 25 ppm (electronically trimmable to 0 ppm)

Horizontal Timing

Frequency: 1 KHz - 330 KHz Typical

Total pixels per line:

Range: 128 to 65,535 Pixels

Step: 1 Pixel (4 Pixels, Interlaced or 2 pixels above 520 MHz)

Active pixels per line:

Range: 1 to 4096 Pixels

Step: 1 Pixel (2 < 520 MHz)

Blank:

Range: 96 Pixels Minimum

Sync delay (front porch):

Range: 1 to (H tot - H act - HS pw) Pixels (analog)

1 to (H tot - HS pw) Pixels (digital)

Step: 1 Pixel (Must be even above 520 MHz)

Sync width

Range: 1 to (H tot - H act - HS pd) Pixels (analog)

1 to (H tot - HS pd) Pixels (digital)

Step: 1 Pixel (Must be even above 520 MHz)

Vertical Timing

Frequency: 1 Hz - 650 Hz

Total scan lines per frame:

Range: 16 to 4096 lines (progressive)

16 to 8191 lines (interlace)

Step: 1 line (progressive)

2 lines (interlace)

Active scan lines per frame:

Range: 1 - 4096 pixels

Step: 1 pixel (2 pixels above 520 MHz)

Blank:

Range: 15 lines minimum

Sync delay (front porch):

Range: 0 to (V tot - V act -VS pw) lines (analog)

0 to (V tot - VS pw) lines (digital)

Step: 1 line

Sync width:

Range: 1 to (V tot - V act -VS pd) lines (analog)

1 to (V tot - VS pd) lines (digital)

Step: 1 line

Analog Video Outputs

Encoding:

RGB

YPrPb (SMPTE 240 M HDTV)

YPrPb (SMPTE RP177 Improved

SMPTE 240 M)

YPrPb (ITU-R BT.709 Modified

SMPTE RP177)

YCrCb (SMPTE 170 M or ITU

BT.601NTSC/DAL hybrid)

YYY(Multi-channel grayscale)

Outputs : 50-ohm SMA

Outputs can be connected to 75 ohm (single-ended or differential) BNC display inputs using 150 ohm matching shunts and 50 ohm dummy loads (provided)

Rise/fall: 350 pS

Overshoot: Less than 5%

Levels:

Video Swing: 0 to +1.0V (2.0V differential)

Sync Swing: 0 to $\pm 0.4V$ (0.8V differential)

Bipolar sync available for HDTV compatibility.

Setup: 0 to 100 IRE

Calibration: Video output cables can be connected to self-calibrating inputs and automatically calibrated to within 5 mV

Sync Module Connectors

Probe Pulse: BNC (1) one pulse at start of each frame

Line Pulse: BNC (1) one pulse at start of each line

Pixel Clock: SMA (2) differential ECL, 50 ohm, 50% duty

Frame Sync: BNC(1) user repositionable pulse (e.g.. scope trigger)

Composite Sync: BNC(1)

Vertical Sync: BNC(1)

Horizontal Sync: BNC(1)

Video Module Connectors

The 8221S is a monochrome configuration using 1 module. (1,2 or 3 modules maybe used per 822 Mainframe)

Video Out:

SMA(2) 50 Ohm differential, unbuffered video output

Calibration:

BNC(2) receives video out to self-calibrate video channel

Specifications (continued)

User Interface

Front Panel:

- 16 x 2 character LCD
- LED backlight
- Format & image selector knobs
- Invert, video gate, sync gate, output on/off buttons

MS-Windows 95/98, NT:

- Virtual front panel
- Format, image & sequence editors
- File management
- Configure (start-up) file editor

MS-DOS Command line:

- Terminal emulator for interacting directly with the 822S

Computer Interface

Provided code necessary to connect the 822S to your (ATE) application program:

MS-Windows 95/98, NT DLL:

- A DLL is supplied that lets you use the 822S' extensive command library in your MS- Windows® application.

MS-DOS Driver:

- Use the 822S' command library in your MS-DOS application.

MS-DOS Send utility:

- For sending command files that customize the 822S for your application.

C source code:

- Complete C source code is supplied that lets you use the 822S' command library in your C application.

Computer Ports

GPIB INTERFACE

- Protocol: IEEE-488.2
- Connector: 24 position microribbon

SERIAL INTERFACE

- Type: RS-232C
- Baud Rates: 300 thru 38,400
- Data: 7, 8
- Stop: 1, 2
- Parity: none, odd, even
- Handshake: none, RTS/CTS

Custom Formats

- Storage: 300 + built-in formats
- Edit method: with VGM software

Miscellaneous

AC MAINS

- Frequency: 48 to 440 Hz Sinusoidal
- Voltage: 85 - 264 VAC (standard as shipped)
- Power: 300 watts

WEIGHT / SIZE

- Unpacked: Approx 50.0 lbs. / 7 x 17 x 19 in.

Supplied Cables & Adaptors

- One- 1 meter long 50 Ohm SMA - BNC cable
- Part # 30-00134

- One - 50 Ohm SMA Terminator (used to terminate unused output for differential output operation)
- Part# 30-00135

Available Options

- 150 Ohm BNC Feedthrough (used to terminate the generator's 50 Ohm output to a display having a 75 Ohm input impedance)
- Part# 30-00136

- 50 Ohm BNC Feedthrough (used to terminate the generator's 50 Ohm output to the self calibration inputs). Two required.
- Part# 30-00137



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Manual Part # 68-00183 Rev. C

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