

—Procedure and the list of test equipment required to verify Performance Requirements are located in Section 5.

Table 1-1: Signal and External Reference Inputs

CHARACTERISTIC	PERFORMANCE REQUIREMENTS	SUPPLEMENTAL INFORMATION	CHECK STEP
Return Loss (75W) Video Inputs (CH-A, CH-B) EXT REF	± 40 dB from 50 kHz to 6 MHz.	Loophrough terminated in 75 Ω . Input in use or not, instrument power on or off, all deflection factor settings.	15
Crosstalk between Channels		≥ 70 dB of isolation between channels. Measured at F_{SC} between Channel A, Channel B, and EXT REF.	
Loophrough Isolation		≥ 70 dB of isolation between loophroughs. Measured at F_{SC} between Channel A, Channel B, and EXT REF.	
Input Requirements	Stable display with Composite video, or black burst with 286 mV (NTSC), 300 mV (PAL) burst ± 6 dB.		3
Dc Input Impedance (Unterminated)	≥ 15 kW.		
EXT REF Input		Composite video. (Can be CW Subcarrier if two internal jumpers are moved.)	
Absolute Maximum Input Voltage		± 12 Vdc plus peak ac.	
Maximum Operating Input Voltage		Peak ac + dc should be within +8.0 V and -5.6 V for proper operation.	

Table 1-2: Vector Mode

CHARACTERISTIC	PERFORMANCE REQUIREMENTS	SUPPLEMENTAL INFORMATION	CHECK STEP
Chrominance Processing Characteristics Nominal Subcarrier Frequency (F_{SC}) NTSC		3.579545 MHz.	
PAL		4.43361875 MHz.	
Chrominance Bandwidth Upper -3 dB Point	$F_{SC} + 500$ kHz, ± 100 kHz.		4
Lower -3 dB Point	$F_{SC} - 500$ kHz, ± 100 kHz.		4

Table 1-2: Vector Mode (Cont.)

CHARACTERISTIC	PERFORMANCE REQUIREMENTS	SUPPLEMENTAL INFORMATION	CHECK STEP
+V		+V type display as selected by front-panel button. When pushed, V axis is inverted at a ½ line rate to produce a single vector display of the PAL signal.	5
Display			
Vector Phase Accuracy	±1.25°	Measured with color bar signal.	5
Vector Gain Accuracy		Typically ±2.5%.	5
Quadrature Phasing		Typically ±0.5°.	
Subcarrier Regenerator		Subcarrier Regenerator freeruns in absence of appropriate signal. Reference can be burst of either displayed signal or external reference signal.	
Pull-In Range			
NTSC	±50 Hz of F _{SC} .		6
PAL	±10 Hz of F _{SC} .		6
Pull-In Time		Within 1 second, with subcarrier frequency within 50 Hz (10 Hz for PAL) of F _{SC} .	6
Auto Phase Lock			
Lock-in Time	<1.5 Seconds		11
Accuracy	±2°	Measured with burst at compass rose.	11
Phase Shift with Subcarrier Frequency Change			
NTSC	±2° from F _{SC} to (F _{SC} +50 Hz), or F _{SC} to (F _{SC} -50 Hz).		6
PAL	±2° from F _{SC} to (F _{SC} +10 Hz), or F _{SC} to (F _{SC} -10 Hz).		6
Phase Shift with Burst Amplitude Change	±2° from nominal burst amplitude to ±6 dB.	Internal or external burst reference.	6
Phase Shift with Input Channel Change	±0.5°.	With EXT RCT selected.	7
Phase Shift with VAR GAIN Control	±1° as gain is varied from 3 dB to -6 dB.		7
PHASE Control Range		360° continuous rotation.	
Burst Jitter	0.5° rms or less.	With 140 IRE (1 V) composite video input. INT or EXT referenced.	7
Display Characteristics			
Differential Phase	±1°.	Measured with 140 IRE (1 V) linearity signal (5 step, 10 step, or Ramp) with 40 IRE (300 mV) of subcarrier.	8
Differential Gain	±1%.		8

Table 1-2: Vector Mode (Cont.)

CHARACTERISTIC	PERFORMANCE REQUIREMENTS	SUPPLEMENTAL INFORMATION	CHECK STEP
Position Control Range HORIZONTAL	At least 1/4" (6 mm) from center.		9
VERTICAL	At least 1/4" (6 mm) from center.		9
Clamp Stability	1/64" (0.4 mm) or less.	Center Spot Movement with Rotation of PHASE Control.	9
Variable GAIN Range	+14 dB to -6 dB of 75% color bar preset gain.	+5 to -1/2 amplitude.	10

Table 1-3: X Y Mode

CHARACTERISTIC	PERFORMANCE REQUIREMENTS	SUPPLEMENTAL INFORMATION	CHECK STEP
Input		DC Coupled differential inputs through rear-panel REMOTE connector.	
Input Amplitude	2 to 9 V p-p.	Adjustable full scale deflection 0 dBm to +12 dBm for 600W system. Factory set to 0 dBm.	
Maximum Input Voltage	+ or -15 V peak signal plus dc.		
Frequency Response	Dc to greater than 200 kHz.	3 dB point.	14
High Gain Mode	Dc to greater than 100 kHz.	3 dB point. Not a differential input, minus inputs must be grounded.	14
X and Y Input Phase Matching	Less than a trace width of separation at 20 kHz.	Singleended. Phase matching may be improved, above 20 kHz, by adjustment.	13

Table 1-4: CRT Display

CHARACTERISTIC	PERFORMANCE REQUIREMENTS	SUPPLEMENTAL INFORMATION	CHECK STEP
CRT Viewing Area		80 X 100 mm.	
Accelerating Potential		13.75 kV.	
Trace Rotation Range	Greater than $\pm 1^\circ$ from horizontal.	Total adjustment range is typically 8° .	12
Graticule		Internal Vector, variable SCALE illumination.	

Table 1-5: Power Source

CHARACTERISTIC	PERFORMANCE REQUIREMENTS	SUPPLEMENTAL INFORMATION	CHECK STEP
Mains Voltage Ranges	90–250 V.		2
Mains Frequency Range	48 Hz to 66 Hz.		
Power Consumption		25 Watts (85 BTU/HR) maximum.	

Table 1-6: Environmental Characteristics

CHARACTERISTIC	SUPPLEMENTAL INFORMATION
Temperature Non-Operating Operating	–55° C to +75° C. 0° C to +50° C.
Altitude Non-Operating Operating	To 50,000 feet. To 15,000 feet.
Vibration – Operating	15 minutes each axis at 0.015 inch, frequency varied from 10–55–10 Hz in 1-minute cycles with instrument secured to vibration platform. Ten minutes each axis at any resonant point or at 55 Hz if no resonant point is found.
Shock – Non-Operating	30 g's, 1/2 sine, 11 ms duration, 3 shocks per surface (18 total).
Transportation	Qualified under NTSC Test Procedure 1A, Category II (30-inch drop).
Humidity	Will operate at 95% relative humidity for up to five days. Do not operate with visible moisture on the circuit boards.

Table 1-7: Certifications and compliances

Category	Standards or description
EC Declaration of Conformity – EMC	Meets intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Union: EN 50081-1 Emissions: EN 55022 Class B Radiated and Conducted Emissions EN 50082-1 Immunity: IEC 801-2 Electrostatic Discharge Immunity IEC 801-3 RF Electromagnetic Field Immunity IEC 801-4 Electrical Fast Transient/Burst Immunity
Australia/New Zealand Declaration of Conformity – EMC	Complies with EMC provision of Radiocommunications Act per the following standard(s): AS/NZS 2064.1/2 Industrial, Scientific, and Medical Equipment: 1992

Table 1-7: Certifications and compliances (cont.)

Category	Standards or description
FCC Compliance	Emissions comply with FCC Code of Federal Regulations 47, Part 15, Subpart B, Class A Limits.
Safety Standards	
U.S. Nationally Recognized Testing Laboratory Listing	UL1244 Standard for electrical and electronic measuring and test equipment.
Canadian Certification	CAN/CSA C22.2 No. 231 CSA safety requirements for electrical and electronic measuring and test equipment.
European Union Compliance	Low Voltage Directive 73/23/EEC, amended by 93/69/EEC EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use.
Additional Compliance	IEC61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use.
Installation (Overvoltage) Category	Terminals on this product may have different installation (overvoltage) category designations. The installation categories are: CAT III Distribution level mains (usually permanently connected). Equipment at this level is typically in a fixed industrial location. CAT II Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected. CAT I Secondary (signal level) or battery operated circuits of electronic equipment.
Pollution Degree	A measure of the contaminants that could occur in the environment around and within a product. Typically the internal environment inside a product is considered to be the same as the external. Products should be used only in the environment for which they are rated. Pollution Degree 2 Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service.
Safety Certification Compliance	
Temperature, operating	+5 to +40° C
Altitude (maximum operating)	2000 meters
Equipment Type	Test and measuring
Safety Class	Class 1 (as defined in IEC 1010-1, Annex H) – grounded product
Overvoltage Category	Overvoltage Category II (as defined in IEC 1010-1, Annex I)
Pollution Degree	Pollution Degree 2 (as defined in IEC 1010-1). Note: Rated for indoor use only.

Table 1-8: Physical Characteristics

CHARACTERISTIC	SUPPLEMENTAL INFORMATION
Dimensions	
Height	5 1/4 inches (133.4 mm).
Width	8 1/2 inches (215.9 mm).
Length	18 1/8 inches (460.4 mm).
Weight	8.5 lbs (3.8 kg).