c. Leading Particulars. Tables 1-1 through 1-3 list the electrical, environmental, and physical characteristics of the AN/USM-425(V)1. The electrical characteristics are valid under these conditions: (1) the instrument has been calibrated (adjusted) as described in Section V at an ambient temperature between +20° and +30°C (+68° to +86°F), (2) the instrument is operating in an ambient temperature between −15° and +55°C (+5° to +131°F) and (3) the instrument has warmed-up for 20 minutes, or 5 minutes if above 0°C (+32°F).

Table 1-1. Electrical Characters

Item	Characteristic
	VERTICAL DEFLECTION SYSTEM
Deflection Factor	
Calibrated Range	5 millivolts/division to 5 volts/division in 10 calibrated steps in a 1-2-5 sequence.
Accuracy	Within 2% from 0° to +40°C (+32° to +104°F). Within 3% from −15° to 0°C (+5° to +32°F) and from +40° to +55°C (+104° to +131°F).
Uncalibrated Variable Range	Continuously variable between calibrated settings. Extends deflection factor to at least 12.5 volts/division.
Bandwidth at −3 dB points	Dc to at least 100 megahertz. A limit selector sets a bandwidth limit at 20 megahertz ±5 megahertz.
AC Low-Frequency Response at −3 dB points	
Without Probe or With P6101 Probe	10 hertz or less at all deflection factors.
With P6104 Probe	1 hertz or less at all deflection factors.
Maximum Input Voltage (dc or ac coupled)	±250 volts dc plus peak ac at 20 kilohertz. ±10 volts dc plus peak ac at 1 megahertz. ±5 volts dc plus peak ac at 100 megahertz.
Input Impedance	
Resistance	1 megohm within 2%.
Capacitance	Approximately 20 picofarads.
Channel Isolation	At least 100:1, dc to 10 megahertz. At least 50:1, 10 to 20 megahertz. At least 25:1, 20 to 50 megahertz. At least 15:1, 50 to 100 megahertz.
Common Mode Rejection Ratio	At least 25:1, dc to 10 megahertz. At least 10:1, 10 to 50 megahertz.
DC Drift	Not more than 0.1 centimeter/hour from 0° to +55°C (+32° to +131°F). Not more than 0.5 centimeter/hour from −15° to 0°C (+5° to +32°F).
DC Balance	Within 0.2 division over calibrated vertical deflection range.

Table 1-1. Electrical Characteristics—Continued

Item	Characteristic
Rise Time	3.5 nanoseconds or less from −15° to +55°C (+5° to +131°F).
Input Coupling Modes	Ac, dc, and ground.
Vertical Display Modes	Channel 1, channel 2, alternate, chopped, and add (algebraic).
Chopped Mode Repetition Rate	Approximately 250 kilohertz.
Cascaded Operation	
Bandwidth	DC to at least 40 megahertz.
Sensitivity	Approximately 1 millivolt/division when terminated in 50 ohms at channel 1 input and both channels set to 5 millivolts/division deflection factor.
X-Y Operation	
Bandwidth	
X-Axis	Dc to at least 4 megahertz.
Y-Axis	Same as Vertical Deflection System.
Sensitivity (both axes)	Same as Vertical Deflection System Deflection Factor (X-Axis accuracy is 4%).
Variable Range	Same as Vertical Deflection System Uncalibrated Variable Range.
Input Impedance	Same as Vertical Deflection System Input Impednace.
Maximum Input Voltage	Same as Vertical Deflection System.
Display Phase Difference	Within 3° from dc to 50 kilohertz.
Polarity Inversion	Channel 2 only.
Channel 2 Signal Output	
Bandwidth	Dc to at least 40 megahertz when terminated into 50 ohms.
Voltage	One division of deflection provides approximately 50 millivolts when terminated into 1 megohm or 25 millivolts when terminated into 50 ohms.
Resistance	Approximately 50 ohms.
Dc Level	Approximately 0 volts.

Table 1-1. Electrical Characteristics—Continued

Item	Characteristic
	HORIZONTAL DEFLECTION SYSTEM
Sweep Modes	A Sweep, mixed, A intensified, and B delayed.
Sweep Rate	
Calibrated Range	
A Sweep	0.5 seconds/division to 0.05 microseconds/division in 22 steps in a 1-2-5 sequence. A ten times magnifier extends the maximum sweep rate to 5 nanoseconds/division.
B Sweep (delayed sweep)	50 milliseconds/division to 0.05 microseconds/division in 19 steps in a 1-2-5 sequence. A ten times magnifier extends the maximum sweep rate to 5 nanoseconds/division.
Accuracy	
Unmagnified	Within 2% from +20° to +30°C (+68° to +86°F). Within 3% from −15° to +55°C (+5° to +131°F). Within 6% below −15°C (+5°F).
Magnified	Within 3% from +20° to +30°C (+68° to +86°F). Within 4% from −15° to +55°C (+5° to +131°F).
Mixed Sweep	
A Sweep	Within 4%.
B Sweep	Within 2%.
Differential Time Measurement	For measurements of two or more major dial divisions.
+15° to +35°C (+59° to +95°F)	1% plug 0.1% of full scale sweep rate.
0° to +55°C (+32° to +131°F)	Add 1% to +15° to +35°C characteristic.
Below 0°C (+32°F)	Add 4% to +15° to 35°C characteristic.
Uncalibrated Variable	Continuously variable between calibrated settings at a 2.5:1 ratio.
Range (A Sweep only)	Extends the slowest A Sweep rate to at least 1.25 seconds/division.
Horizontal Linearity (unmagnified)	Within 0.25 minor division.
Magnifier Registration	Within 2.5 centimeters.
Position Drift	Not more than 0.1 centimeter/hour from 0° to +55°C (+32° to +131°F). Not more than 0.5 centimeter/hour from −40° to 0°C (−40° to +32°F).
Delayed Sweep Variable Delay	Continuously variable from 0.1 microseconds to at least 5 seconds after the start of A Sweep (depends on A Sweep rate).
Delayed Sweep Time Base Jitter	Less than 0.005% of ten times the A Sweep rate.

Table 1-1. Electrical Characteristics—Continued

Item	Characteristic
A Sweep Gate Output	
Amplitude	Approximately 5 volt positive pulse
Output Resistance	Approximately 1.5 kilohms.
B Sweep Gate Output	
Amplitude	Approximately 5 volt positive pulse.
Output Resistance	Approximately 500 ohms.
	TRIGGERING (A and B SWEEP)
Source	Normal, channel 1, channel 2, line (A Sweep only), external, external divided by 10, and starts after delay (B Sweep only).
Sensitivity	
DC Coupled	0.3 division internal or 50 millivolts external from dc to 25 megahertz; increases to 1.0 division internal or 150 millivolts external at 100 megahertz.
AC Coupled	0.3 division internal or 50 millivolts external from 30 hertz to 25 megahertz; increases to 1.0 division internal or 150 millivolts external at 100 megahertz.
LF Reject Coupled	0.3 division internal or 50 millivolts external from 50 kilohertz to 25 megahertz; increases to 1.0 division internal or 150 millivolts external at 100 megahertz; attenuates signals below about 15 kilohertz.
HF Reject Coupled	0.3 division internal or 50 millivolts external from 60 hertz to 5 kilohertz; attenuates signals below about 30 hertz and above about 50 kilohertz.
External Trigger Input	
Maximum Input Voltage	100 volts dc plus peak ac. 100 volts peak to peak ac at 1 kilohertz or less.
Input Resistance	1 megohm within 15%.
Trigger Jitter	0.5 nanoseconds or less at 100 megahertz with a 5 nanosecond/division sweep rate from -15° to $+55^{\circ}$C ($+5^{\circ}$ to $+131^{\circ}$F).
Trigger Holdoff	Continuously variable for holdoff to at least three times the sweep rate except at the 0.2 second and 0.5 second rates.
Trigger View Deflection Factor	
External	Approximately 100 millivolts/division.
External divided by 10	Approximately 1 volt/division.
Trigger Level Control Range	
External	At least ±1 volt or 2 volts peak to peak.
External Divided by 10	At least ±10 volts or 20 volts peak to peak.

Table 1-1 Electrical Characteristics—Continued

Item	Characteristic
Triggering Auto Free-running Frequency	Below 40 hertz.
	Z-AXIS INPUT
Sensitivity	Noticeable modulation at normal intensity with a 5 volt peak to peak input; positive-going signal decreases sensitivity.
Useable Frequency Range	Dc to at least 15 megahertz.
DC Input Resistance	Approximately 1.6 kilohms.
	CALIBRATOR
Output Voltage	1.0 volt within 1.0% from −15° to +55°C (+5° to +131°F).
Repetition Rate	Approximately 1 kilohertz.
Symmetry	Within 25%
Rise Time	Less than 1 microsecond.
	DISPLAY
Display Area	8 centimeters high by 10 centimeters wide.
CRT Phosphor	Type P31.
Trace Rotation Range	Adequate to align trace with horizontal center graticule line.
	POWER REQUIREMENTS
Line Voltage Ranges	
116 Volts	100 to 132 volts rms.
232 Volts	200 to 264 volts rms.
Line Frequency	48 to 440 hertz.
Maximum Power Consumption	60 watts with 115 volt, 60 hertz input.
	PROBES
P6101	
Attenuation	1X.
Input Resistance	1 megohm.
Input Capacitance	32 picofarad.

Table 1-1. Electrical Characteristics—Continued

Item	Characteristic
Bandwidth (–3 dB)	At least 34 megahertz.
Maximum Input Voltage	500 volts dc plus peak ac, derated with frequency as follows: About 400 volts at 1 megahertz. About 47 volts at 10 megahertz. About 18 volts at 30 megahertz.
P6104	
Attenuation	10X.
Input Resistance	10 megohm.
Input Capacitance	Approximately 10.5 picofarad.
Bandwidth (–3 dB)	At least 100 megahertz.
Maximum Input Voltage	500 volts dc plus peak ac derated with frequency as follows: 30 volts at 50 megahertz. 27 volts at 100 megahertz.

Table 1-2. Environmental Characteristics

Item	Characteristic
Temperature	
Operating	–15° to +55°C (+5° to +131°F).
Storage	–62° to +85°C (–79.6° to +185°F).
Altitude	
Operating	To 15,000 feet. Maximum operating temperature decreases by 1°C per 1000 feet increase in altitude above 5000 feet.
Storage	To 50,000 feet.
Humidity (Operating and Storage)	Five cycles (120 hours to 95% relative humidity referenced to MIL-T-28800).
Vibration (Operating and Non-Operating)	Along each of the three major axes: a. Cycled 5 to 25 to 5 hertz for 10 minutes at 0.025 inches peak to peak. b. Cycled 25 to 55 to 25 hertz for 5 minutes at 0.020 inches peak to peak. c. Dwelled at 55 hertz for 10 minutes at 0.020 inches peak to peak.
Shock (Operating and Non-Operating)	30 g's, 1/2 sine, 11 milliseconds duration, 3 shocks each direction per axis for a total of 18 shocks.
Transit Drop (Non-Operating)	Drop unboxed instrument 8 inches on each corner and face for a total of 14 drops. Drop test performed on a rigid wooden surface.

Table 1-2. Environmental Characteristics—Continued

Item	Characteristic
Drip-Proof (Front cover on Non-Operating)	Spray from 3 feet above instrument with instrument tilted 15° away from the horizontal plane in each of 4 directions horizontal.
Bench Handling (Operating)	Edge lifts and drops on work bench on bottom and rear faces, total of 8 drops.

Table 1-3. Physical Characteristics

Item	Characteristic
Weight	
With Panel Cover, Modules, and Accessories	27.0 pounds (12.2 kilograms)
Without Panel Cover and Accessories	24.0 pounds (10.9 kilograms)
Height (With Feet)	7.05 inches (17.91 centimeters)
Width	
With Handle	13.65 inches (34.67 centimeters)
Without Handle	12.50 inches (31.75 centimeters)
Depth	
With Panel Cover	21.45 inches (54.48 centimeters)
Handle Extended	24.10 inches (61.21 centimeters)
Probe Length (P6101 and P6104)	39.37 inches (1 meter)
Transportation	Meets the limits of National Safe Transit Committee test procedure 1A with a 30 inch drop.
Construction	Plastic alloy cabinet, aluminum alloy chassis, and glass laminate circuit boards.
Finish	Anodized front panel and textured cabinet.