AM5 *Classic and* AM5e *Classic*

Voice/Data Transmission Test Set



Ameritec Corporation is an ISO 9001:2000 Certified Company

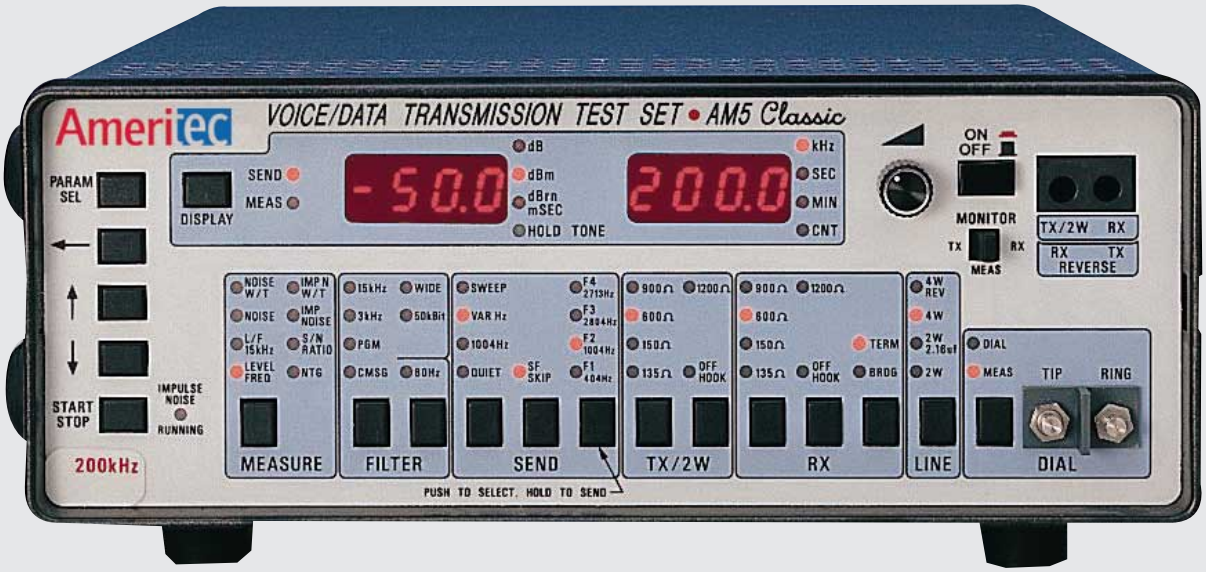
The Classic Response to your Wideband Analog Transmission Testing Needs

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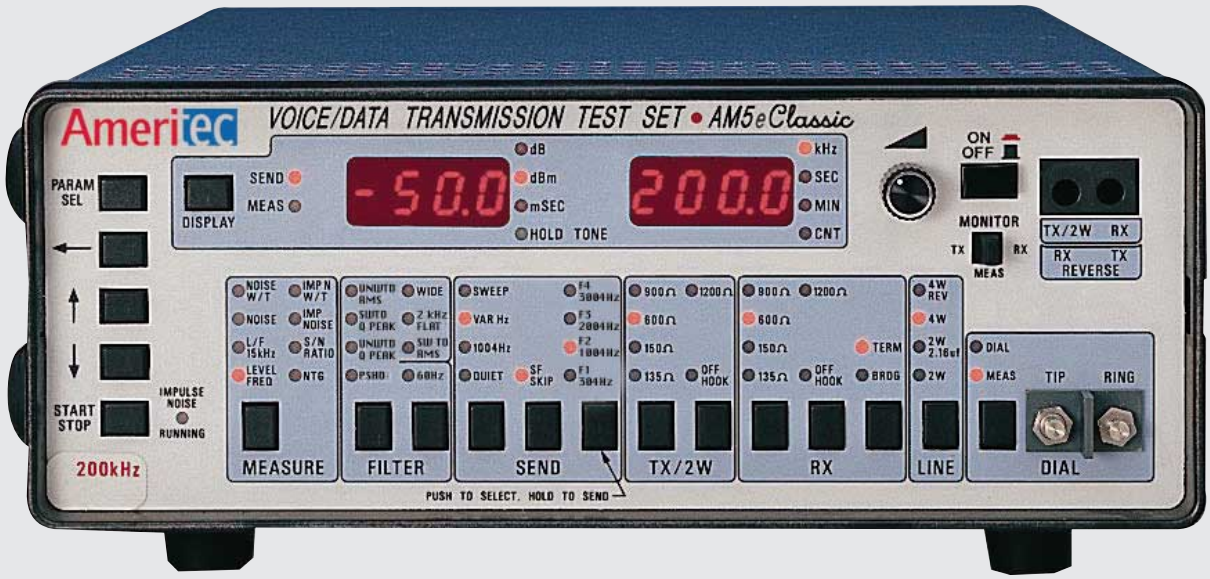
Introduction

Ameritec's AM5 Classic and AM5e Classic Wideband Transmission Test Sets are your best balance of features versus cost. They are engineered for peak performance in the field and in the lab. The AM5 Classic and AM5e Classic are easy to use, yet offer a full range of transmission impairment measurements and a highly versatile signal generator in a single compact, portable unit.

Model AM5 Classic conforms to North American IEEE 743-1984 standards and Model AM5e Classic conforms to international CCITT recommendations. Operating bandwidth is 20 Hz to 120 kHz. An optional bandwidth of 20 Hz to 200 kHz is available for qualifying basic rate ISDN, HDSL, 56 kbps and 64 kbps circuits.



Model AM5 Classic conforms to IEEE 743-1984 standards.



Model AM5e Classic conforms to CCITT recommendations (shown with optional Siemens connectors).

Ease of Operation

The Classic instruments were designed in response to requests from technicians in the field. Real life applications were evaluated in order to produce instruments which are powerful yet easy to use. The front panel is divided into easy to locate and easy to read areas for each of the major instrument functions. Simple selection keys are provided for all measure, filter, send, and termination functions. The operator can view the configuration of the instrument at a glance.

This compact, lightweight instrument fits anywhere. Use the basic unit as a bench-top laboratory instrument, or, with the addition of an internal battery pack and soft case, as a field instrument with the capacity for six hours of uninterrupted use.

A Wide Variety of Measurements

The instrument operating bandwidth is 20 Hz to 120 kHz, and optionally to 200 kHz, for qualifying voice band telephone circuits, high quality audio (program) and data circuits, video and even analog circuits used to carry 56 kbps and 64 kbps digital, basic rate ISDN, and HDSL transmission. Employing self-test and self-calibration circuitry, the Classic instruments are manufactured to the highest standards.

The Classic performs all basic voice/data analog transmission tests for 2-wire and 4-wire applications. All measurements are fully auto ranging and may be viewed on the bright LED display. A built-in speaker allows the operator to audibly monitor either the send or receive line to subjectively evaluate the line under test.

	AM5 Classic	AM5e Classic
IEEE 743-1984 Standards	X	
CCITT Recommendations		X
dBm Level	X	X
dB Loss	X	X
Frequency	X	X
Frequency Response (Attenuation Distortion)	X	X
Noise (Wideband or with Filters)	X	X
Noise with tone (Wideband or with Filters)	X	X
S/N Ratio (Wideband or with Filters)	X	X
Noise to Ground (Wideband or with Filters)	X	X
Impulse Noise (Wideband or with Filters)	X	X

200 kHz Extra Wideband Option

If you are not now qualifying subscriber circuits for BRI ISDN, HDSL, or 56/64 kbps data, you may soon be faced with just such a prospect. The Classic instruments are available with an optional operating bandwidth of 20 Hz to 200 kHz. The Sweep function can be programmed to automatically perform an extra wideband sweep across the 20 Hz to 200 kHz bandwidth while simultaneously measuring level and frequency across the same bandwidth. A 160 kHz flat filter is added for wideband noise measurements.

User Friendly

The Classic provides the following user friendly features:

- Compact size and light weight.
- 100% digital control of all measure, filter, send, and termination functions.
- Maintenance free, sealed, lead acid batteries (option) without the “memory” problem of NiCad batteries.
- Built-in selectable 2.16 µf termination in series with selected impedance.
- Dialing capability provided by front panel binding posts for lineman’s test set.

Fully Programmable Signal Generator

Any frequency in the 20 Hz to 120 kHz band (optionally to 200 kHz) can easily be selected at any level from -50 dBm to +13 dBm. The following preset modes are available:

- 1004 Hz
- Variable Hz (User Programmable)
- Four user programmable frequencies (Preset to 404 Hz, 1004 Hz, 2804 Hz, and 2713 Hz in AM5 Classic; preset to 304 Hz, 1004 Hz, 2004 Hz, and 3004 Hz in AM5e Classic)
- Frequency Sweep (with or without SF Skip)

The Classic operates in a full duplex mode with the ability to simultaneously send signals and measure received signals. Separate send and receive terminations and separate On Hook/Off Hook DC Hold circuits are provided. All test tones meet industry standards for purity and accuracy.

Accessory Covers

Several “units in a lid” are available for use with the AM5 Classic.

The 30-0033XT provides Loop Start, Ground Start, DID and Types I, II and III E&M signaling. The adapter incorporates a ring generator with manual cadence selection and automatic ring trip. The unit also supplies both 24 and 48 VDC loop supply voltage with a switch to allow for simulation of a 1240 ohm loop resistance.

The 30-0070S provides CSU loopback, DSU Non-Latching loopback, DSU Latching loopback and a manual (or forced) loopback. Secondary Channel is supported for all modes of loopback. SW56 testing can also be performed using an external butt set to provide on/off hook and pulse dial functions. Far end signaling (wink, delay, answer) is indicated via a front panel LED.

The 30-0070 is the same as the 30-0070S, but, without SW56 capabilities.



Classic instrument with 30-0033XT Signalling Adapter.

Portable or Rack Mount

About the size and weight of a telephone directory, the Classic is easily transported from lab to field. A rack mounting kit is avail- able which will allow 19” relay rack mounting in only two (2) rack increments of space.

Available Models

AM5-C-120	AM5 Classic, 120 kHz, IEEE
AM5-C-200	AM5 Classic, 200 kHz, IEEE
AM5-EC-120	AM5e Classic, 120 kHz, CCITT
AM5-EC-200	AM5e Classic, 200 kHz, CCITT

Provided

Model AM5 Classic or Model AM5e Classic, power cord & instruction manual.



Classic instrument with case (optional), instruction manual, power cord, and bantam cables (optional).

Optional Battery

An optional internal, rechargeable battery pack is available for full portable “cordless” operation. The batteries are of the sealed lead acid type and require no maintenance. A front panel low battery indicator indicates when recharging is needed. The built-in charger will charge the batteries while the unit is in operation.

Options

24-0017	Internal Power Pack (Sealed Rechargeable Lead Acid Batteries) and Internal Charger
25-0041	“Siemens” Type Line Test Connections

Accessories

30-0033XT	Signalling Adapter with Ring Generator Cover
30-0070	DDS Loopback Test Set Cover
30-0070S	DDS/SW56 Loopback Test Set Cover
87-0070	Padded Soft Carrying Case
85-0076	19” Rack Mount Kit
85-0233	19” Rack Mount Shelf for Classic with 25-0041 Adapter
48-0062	6 Ft. Bantam to Clip Cable, 2 Req’d
48-0047	6 Ft. Bantam to Bantam Cable, 2 Req’d
48-0048	6 Ft. Bantam to 310 Cable, 2 Req’d
85-0078	Protective Front Panel Cover

Technical Specifications

20 Hz to 120 kHz Bandwidth

LEVEL FREQUENCY

Transmitter:

Var Mode: 20 Hz to 120 kHz in 10 or 100 Hz Steps

1004 Hz Mode: 1004 Hz Fixed

F1, F2, F3 & F4: (AM5 Classic) 404, 1004, 2804, 2713 Hz
(AM5e Classic) 304, 1004, 2004, 3004 Hz

Sweep Mode: Start Freq: 20 Hz-120 kHz
Stop Freq: 20 Hz-120 kHz
Step Size: 1 Hz-119.9 kHz
Step Dwell: 1/4 Sec-999.9 Sec
Inter Sweep Delay: 1/4 Sec-999.9 Sec

SF Skip: (AM5 Classic) 2450-2750 Hz
(AM5e Classic) 2130-2430 Hz

Frequency Accuracy: ± .01%

Level Range: -50 dBm to +13 dBm

Resolution: .1 dB

Accuracy:

dBm	20	200	20k	120k
+13	±.25	±.1	±.25	
-40	±.5	±.5	±.5	
-50				

(Accuracy not specified below 400 Hz with 135 ohm or 150 ohm impedance). Maximum output is +13 dBm when using 600 ohm, +10 dBm when using 900 ohm or 1200 ohm, and +3 dBm when using 135 ohm or 150 ohm.

Receiver:

Level Range: -64.9 to +13 dBm

Resolution: .1 dB

Accuracy:

dBm	20	200	20k	120k
+13	±.5	±.2*	±.5	
-50	±1.0	±.1.0	±.1.0	
-65				

* Accuracy is ± .1 dB @ 1004-1020 Hz @ 0 to -20 dBm (Accuracy not specified below 400 Hz with 135 ohm or 150 ohm impedance)

Detector: Average

Filters: (AM5 Classic) 120 kHz Lo Pass, 15 kHz Lo Pass, 60 Hz Hi Pass
(AM5e Classic) 120 kHz Lo Pass, Sound UnWTD [J.16], 60 Hz Hi Pass

Frequency Range: 20 Hz to 120 kHz

Resolution/ Accuracy:
1 Hz ±1 Hz @ 20 Hz to 10 kHz
10 Hz ±10 Hz @ 10 kHz to 100 kHz
100 Hz ±100 Hz @ 100 kHz to 120 kHz

Sensitivity: -55 to +13 dBm with S/N Ratio >20 dB

NOISE

Transmitter: Quiet Termination

Receiver:

Range: (AM5 Classic) 10 to 99 dBrn (20 to 99 dBrn @ 135/150 ohm)
(AM5e Classic) -80 to +9 dBm (-70 to +9 dBm @ 135/150 ohm)

Resolution: 1 dB

Accuracy: (AM5 Classic) ±1 dB @ 20 to 100 dBrn ±2 dB @ 10 to 20 dBrn (±1 dB CMSG).
(AM5e Classic) ±1 dB @ -70 to +10 dBm ±2 dB @ -80 to -70 dBm (±1 dB PSHO)

Filters: (AM5 Classic) 120 kHz Lo Pass, C-Message, Program, 3 kHz Flat, 15 kHz Flat, 50 kBit, 60 Hz.
(AM5e Classic) 120 kHz Lo Pass, Psophometric [P. 53], Sound WTD [J.16], Sound UnWTD [J. 16], 2 kHz Flat (750-2300 Hz) [O.71], 60 Hz

Detector: (AM5 Classic) RMS
(AM5e Classic) RMS or Quasi Peak [J. 16]

NOTCH NOISE (NOISE WITH TONE)

Transmitter: 1004 Hz (Holding Tone)

Notch: 995-1025 Hz > 50 dB

Other Specifications Same as "Noise" Above

NOISE TO GROUND

Transmitter: Quiet Termination

Receiver:

Range: (AM5 Classic) 40 to 129 dBrn
(AM5e Classic) -50 to +39 dBm

Resolution: 1 dB

Accuracy: ± 1.5 dB

Filters/Detector: Same as "Noise" Above

SIGNAL TO NOISE RATIO

Transmitter: 1004 Hz (Holding Tone)

Receiver:

Signal Range: -40 to +10 dBm

Noise Range: (AM5 Classic) 10 to 70 dBrn (20 to 70 dBrn @ 135/150 ohm)
(AM5e Classic) -80 to -20 dBm (-70 to -20 dBm @ 135/150 ohm)

Ratio Range: 10 to 50 dB

Accuracy: ± 1 dB @ 10 to 40 dB
± 2 dB @ 40 to 45 dB
± 3 dB @ 45 to 50 dB
Noise Below 20 dBrn (-70 dBm) reduces accuracy to ± 2 dB except when using "CMSG" filter (AM5 Classic) or "PSHO" filter (AM5e Classic)

IMPULSE NOISE (3 LEVEL) PER IEEE 743 AND CCITT 0.71

Transmitter: Quiet Termination

Receiver:

Minimum Threshold: (AM5 Classic): 30 dBrn
(AM5e Classic): -60 dBm

Threshold Difference: 2, 3, 4 or 6 dB

Threshold Accuracy: ± 1 dB

Timer: .1 to 999.9 Min or Continuous

Max Count: 999.9 Each of 3 Counters

Dead Time: 1 to 255 ms (125 ms preset)

GENERAL

Input: 4 Wire, 4 Wire Reverse, 2 Wire, or 2 Wire with 2.16 µf Termination.

Receive Impedance: 135, 150, 600, 900, 1200 ohm

High Impedance Bridge: 50K ohm, Bridging Loss < .2 dB

Transmit Source Impedance: 135, 150, 600, 900, 1200 ohm

DC Blocking: 200 VDC

Balance: > 90 dB @ 50-120 Hz Decreasing 6 dB/Octave Above 120 Hz

Hold Circuit: Transmit and Receive Independent DC = 200 ohm, AC = >20K ohm

Monitor: Built-In Speaker With Selection of Transmit, Receive or Measure Monitor

Power: 115 VAC or 230 VAC 50/60 Hz @ 26 VA. Optional Internal Sealed Lead Acid Battery with Recharger

Weight: Net Basic Unit: 6 lbs./2.72 kg., without batteries. 10 lbs./4.54 kg. with batteries.

Dimensions: 8.3" W x 3.5" H x 12.1" D, 210 mm W x 89 mm H x 307 mm D

Operating Temp.: 0 to 50 Degrees Celsius

Line Connection: Dual Miniature Phone Jacks* (Front Panel) and Screw Terminals (Rear Panel). Optional "Siemens" Jacks (Front Panel)

* Mates with ADC PJ777 or Switchcraft TT253



Rear of Classic instrument with TX/2W, RX, and ground connectors.

Technical Specifications

20 Hz to 200 kHz Bandwidth

LEVEL FREQUENCY

Transmitter:

Var Mode: 20 Hz to 200 kHz in 10 or 100 Hz Steps

1004 Hz Mode: 1004 Hz Fixed.

F1, F2, F3, & F4: (AM5 Classic) 404, 1004, 2804, 2713 Hz
(AM5e Classic) 304, 1004, 2004, 3004 Hz

Sweep Mode: Start Freq: 20 Hz – 200 kHz
Stop Freq: 20 Hz – 200 kHz
Step Freq: 1 Hz – 199.9 kHz
Step Dwell: 1/4 Sec – 999.9 Sec
Inter Sweep Delay: 1/4 Sec.– 999.9 Sec.

SF Skip: (AM5 Classic) 2450 – 2750 Hz,
(AM5e Classic) 2130 – 2430 Hz

Frequency Accuracy: ±.01%

Level Range: -50 dBm to +13 dBm

Resolution: .1 dB

Accuracy:

	20	200	20k	150k	200kHz
+13					
	±.25	±.1	±.25	±.5	
dBm-40					
	±.5	±.5	±.25	±1.0	
-50					

(Accuracy not specified below 400 Hz when using 135 ohm or 150 ohm TX termination). Maximum output is +13 dBm when using 600 ohm, +10 dBm when using 900 ohm or 1200 ohm, and +3 dBm when using 135 ohm or 150 ohm.

Receiver:

Level Range: -64.9 to +13 dBm

Resolution: .1 dB

Accuracy:

	20	200	20k	150k	200kHz
+10					
	±.5	±.2	±.5	±1.0	
dbm-40					
	±.5	±.2*	±.5	±2.0	
-45					
	±1.0	±1.0	±1.0	±3.0	
-65					

*Accuracy is ±.1 dB @ 1004 – 1020 Hz @ 0 to -20 dBm. (Accuracy not specified below 400 Hz with 135 ohm or 150 ohm impedance)

Detector: Average

Filters: (AM5 Classic) 200 kHz Lo Pass, 15 kHz Lo Pass, 60 Hz Hi Pass (AM5e Classic) 200 kHz Lo Pass, Sound Un WTD [J.16], 60 Hz Hi Pass

Frequency Range: 20 Hz to 200 kHz

Resolution/Accuracy: ±0.01% of reading ±1 count

Sensitivity: -55 to +13 dBm with S/N Ratio >20 dB

NOISE

Transmitter: Quiet Termination

Receiver:

Range: (AM5 Classic) 10 to 99 dBrn (20 to 99 dBrn @ 135/150 ohm).
(AM5e Classic) -80 to +9 dBm (-70 to +9dBm @ 135/150 ohm).

Resolution: 1 dB

Accuracy: (AM5 Classic) ± 1dB @ 20 to 100 dBrn ±2 dB @ 10 to 20 dBrn (±1 dB CMSG).
(AM5e Classic) ±1 dB @ -70 to +10 dBm ±2 dB @ -80 to -70 dBm (±1 dB PSHO).

Filters: (AM5 Classic) 160 kHz Lo Pass, C-Message, Program, 3 kHz Flat, 15 kHz Flat, 50 kBit, 60 Hz.
(AM5e Classic) 160 kHz Lo Pass, Psophometric [P.53], Sound WTD [J.16], Sound UnWTD [J.16], 2 kHz Flat (750-2300 Hz) [O.71], 60 Hz.

Detector: (AM5 Classic) RMS,
(AM5e Classic) RMS or Quasi Peak [J.16]

Please see the remaining 20 Hz to 120 kHz Bandwidth specifications for completion of the 20 Hz to 200 kHz Bandwidth specifications.

A C-Message filter (AM5 Classic) or Psophometric filter (AM5e Classic) is automatically selected for Notch Noise testing if no other filter has been selected.

About Ameritec

Ameritec Corporation is a micro-electronics design and manufacturing company located in the Greater Los Angeles area.

Dedicated to the special testing needs of the telecommunications industry, we proudly offer products which employ the latest microcomputer techniques. Everything we produce is highly sophisticated in circuitry and software, yet is easy to use because of the degree of "human engineering" incorporated into the design.

All specifications subject to change without notice.

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