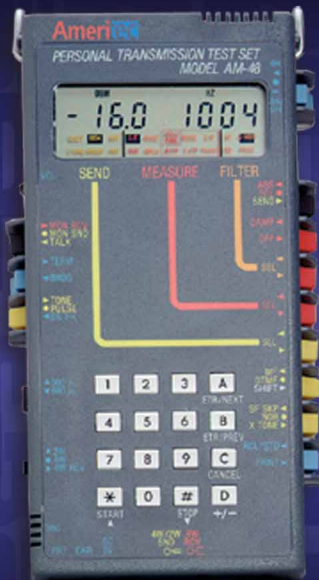


Model AM48/AM44



Hand-Held Transmission Test Set

Ameritec

Ameritec Corporation is an ISO 9001:2000 Certified Company

The AM-4 Series of Hand-Held Transmission Test Sets

There are four models in the AM-4 series family. They are AM-44 and AM-48 which comply with Bell Pub. 41009 and IEEE 743-1984 and the model AM-48E and AM44Ea which comply with ITU-T recommendations for most international applications. All units have the same physical size.

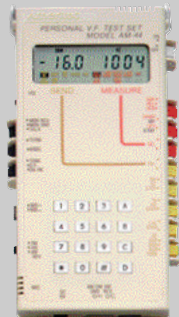
The AM-44 has a built-in dial keypad for dial pulse, touch tone and MF dialing, plus, P/AR send and measure functions. Using the AM-44 you can achieve measurements up to 5000Hz.

At the top of the line, the AM-48 includes all features of the AM-44 and combines the transient test functions AM-44 necessary to test both voice and high-speed data lines.

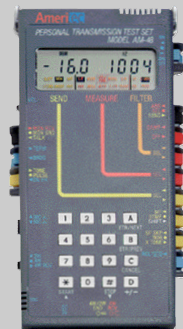
The AM-48 has an extended bandwidth of 20kHz and performs all the tests most often required when testing transmission quality on analog lines.

The AM-4 series product line offers service personnel, engineers, and technicians the means to quickly and conveniently test for transmission impairments on two and four wire analog voice and data facilities.

Below is a feature comparison of the available units:



AM-48



IEEE (BELL) STD
ITU (WORLD) STD

dBm LEVEL, ABSOLUTE
dB LEVEL, RELATIVE (LOSS)
FREQUENCY
FREQUENCY RESPONSE
NOISE, IDLE CHANNEL
NOISE WITH TONE
PARA-PEN/VAL/ERR/RATIO
THREE-TONE
PHASE, JITTER
DROP/OUTS
PHASE AND GAIN HITS
200-20,000HZ
TALK/ISTEN
DIAL PULSE, TONE AND MF
STORE/RECALL
FULL DUPLEX SEND/MEASURE
INTERNAL BATTERY CHARGE
EXTERNAL BATTERY CHARGE
AUTO SWEEP
MANUAL SWEEP
AUTO POWER OFF
MESSAGE
PROGRAM
PSYCHOMETRIC
SOUND-WEIGHTED
3 KHZ
15 KHZ
800 HZ
1010 HZ NOTCH

Model	IEEE (BELL) STD	ITU (WORLD) STD	MEASUREMENTS	MISCELLANEOUS	FILTERS
AM-48	•	•	•	•	•
AM-44a	•	•	•	•	•
AM-48E	•	•	•	•	•
AM-44Ea	•	•	•	•	•

Here's Everything You

Battery compartment
(4 "AA" size batteries)

Speaker

Flip up wire stand

Ameri

PERSONAL TRANSMISSION TEST SET
MODEL AM-48

DBM HZ
- 16.0 1004

Permanent on/Auto
Shut-off and power off
Switch

Speaker Volume
control

Speaker Monitor
selection and push
to talk

High Impedance
Bridge/Terminate
Switch

On Hook/off Hook/
Pulse-Tone Switch

Terminate Impedance
Selection

2 Wire/ 4 Wire
4 Wire Rev Switch

Microphone

VOL SEND MEASURE FILTER

▶ MON RCV
● MON SND
◀ TALK

▶ TERM
◀ BRDG

▶ TONE
● PULSE
◀ ON HK

ABS
REL
SEND

DAMP
OFF

SEL

SEL

SEL

Display selection of
measurement
(absolute or relative)
or send

Damping of display
refresh rate

Filter select

Measure select

Send select

Tone dialing selection/
secondary keypad
function select

2713 Hz Send/SF skip
switch

Store/recall and print
switch

Rugged injection
molded case

1 2 3 A
4 5 6 B
7 8 9 C
* 0 # 0

MF
DTMF
SHIFT

SF SKP
NOR
X TONE

RCL/SIO

START STOP +/-

Dual Bantam
Connectors for send
and receive pairs

Dial and parameter
entry keypad

AC Wall Adaptor

RJ11 line connector

You Need In An Analog T

The AM-48 is a powerful hand-held Transmission Impairment Test Set. Through the use of surface mount technology the AM-48 incorporates measurement capability and features unmatched.

Designed for field testing of voice and data on 2 or 4 wire telecommunications transmission circuits over the extended voice band (200 Hz to 20 kHz), the AM-48 fully complies with IEEE 743-1984 (Bell Standard 41009). The Model AM-48E is the export version and fully complies with world standard ITU-T recommendations.

The unit is actually three instruments in one:

It is a measurement set able to measure:

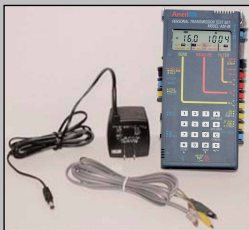
- dBm level or dB loss
- Frequency
- Frequency Response (Attenuation Distortion)
- Noise
- Noise with Tone
- Signal/Noise Ratio
- P/AR
- 3 Level Impulse Noise
- Phase and Gain Jitter
- Hits and Dropouts

It is a full function signal generator able to generate all of the test tones and waveforms needed to perform the above-listed measurements.

It is a telephone set with dial, talk and listen capability.

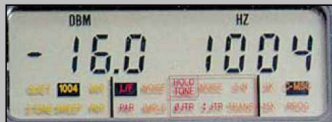
The unit is furnished complete with alkaline batteries, AC adapter, input cord, and instruction manual.

Optionally available are NiCad batteries, impedance adapter soft carrying case and a wide selection of input cords.



Simple Operation

The hand-held AM-48 is easily operated. Simply use the color-coded controls and menu selection to choose the desired measure mode and send mode. The proper units of measurement are automatically displayed and the autoranging measurement circuitry automatically



Large easily-read LCD with simultaneous display of test set-up menu and measurement.

displays the reading. If the measurement is out of range, the display will indicate "over" or "under."

All controls are edge-mounted rocker switches or slide switches with descriptive labeling on the front of the unit for all switch functions.

The keypad, normally used for dialing, has a secondary function which allows setting of all control parameters associated with the more complex tests. The keypad also allows setting of signal generator levels and frequencies.

As an added convenience, there is a mini instruction manual on the back of the unit to act as a memory jogger operation guide.

Store and Recall

A user-programmable, non-volatile memory is contained within the unit. It allows up to ten operator-defined send/measure test configurations to be stored as well as up to ten operator-defined test tone frequencies. Any of these can be recalled by a single keystroke thereby greatly simplifying operation of the unit.

Transmission Test Set

Compact Convenience

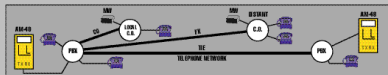
About the size of a calculator, the AM-48 weighs 23 ounces. Carry it in your briefcase, in your tool kit or even in your pocket. It is powered by four size AA alkaline batteries or an accessory AC adaptor. Optionally the unit may be used with four size AA rechargeable NiCad batteries. The AM-48 contains a built-in battery charger which, when used with the accessory AC adaptor, both charges the NiCad batteries and operates the unit.

With its built-in stand/hang bale, the unit can be propped on a table or hung from a hook. You can take it anywhere and it will always be available when you need it.

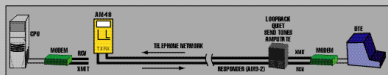
Built-In Telephone Set

With its selection of 600 or 900Ohm termination impedances as well as high impedance bridge capability, the unit can be used in a variety of applications. A unique feature of the AM-48 is the built-in dialing capability. The unit can signal with dial pulse, tone (DTMF) or MF. This feature, combined with

the built-in DC hold circuit and speaker/ microphone, enables one tester to communicate with another over the line under test. No need for a second communications line and no need for an external "butt" set (field telephone set).



Use the AM-48 built-in dial capability on dial-up networks to access a second AM-48 for centralized 2-wire testing.



Use a single unit for centralized loopback testing.



Use two sets for a complete end-to-end test of 4-wire data lines.

AM-48 Technical Specification		Quiet:	In quiet mode the line is terminated with a passive resistance equal to the line impedance. Also, when in quiet, one of 10 user programmable tones may be momentarily applied to the line by depressing the T1 key. Programmable from this mode: (1) Touch Tone dial mode (+, 0-50.0 dBm); (2) Power Auto Time Off (1 to 255 minutes); (3) impulse and transient test Blanking Interval (1 to 255 ms) and (4) 10 user-programmable tones for later instant recall.	Dropout threshold is -12 dB from the initial level of the holding tone. A dropout will be counted if the holding tone drops below threshold for at least 4 ms = .5 ms. Counting of dropouts, gain hits, phase hits, and impulses is inhibited for a blanking interval which lasts until 1 second after the holding tone is restored to a level above the dropout threshold.	
Characteristics	GENERAL Specifications	X tone:	A momentary push button is provided for the generation of an auxiliary tone (1713 Hz) used to activate remote 829-type loopback devices.	Gain Hit threshold can be 2, 3, 4, or 6 dB. A gain hit will be counted if the level of the holding tone changes up or down by more than the threshold for at least 4 ms = .5 ms. A blanking interval, that is user-set from 1 to 255 ms, blocks further counting of gain hits.	
Measurements:	Level (dBm), loss (dB relative Frequency (Hz) Noise (dBm) with 1000 Hz flat, 15 kHz filter. CMoS, or Program filter. Notched Noise with 1000 Hz notch and any of above noise-weighing filters. Signal - to -Noise ratio (dB) PAR Amplitude jitter (%) Phase jitter (degrees) 3-level Impulse Noise Transient measurements (with tone): Dropouts Gain hits Phase hits 3-level impulse noise	SF Skip:	A Signaling Frequency (SF) Skip mode prevents the generation of tones between 2450 Hz and 2750 Hz in variable or sweep mode transmissions.	Phase hit threshold can be 5 to 45 degrees with a 1 degree step with an accuracy of ± 5 degrees. A phase hit will be counted if the phase of the holding tone changes by more than the threshold for at least 4 ms = .5 ms. A blanking interval, that is user-set from 1 to 255 ms, blocks further counting of gain hits.	
Dial:	Built-in 16 button keypad for dial pulse, DTMF (Touch Tone), or MF dialing.	Distortion:	Total distortion is < .50 dB for the fixed 1004Hz Holding Tone Generator and < .40 dB for all other generator modes and frequencies.	Three-level impulse noise threshold can be set from 30 to 110 dBm with threshold differences of 2, 3, 4 or 6 dB. Threshold accuracy is ± 1 dB. A blanking interval, user-set from 1 to 255 ms, blocks further counting of impulses independently for each threshold.	
Tab/Listen:	Built-in microphone and speaker with push-talk operation on both 2-wire and 4-wire lines. Earphone jack for provided earpiece.	Characteristics	RECEIVER (MEASURE) Specification	The study duration timer may be set from 1 minute to 19999 minutes in 1 minute steps, or set to 0 for a continuous study.	
Line Hold:	A single line holding circuit is provided for 2-wire operation, or the send pair of 4-wire circuits. It electronically simulates a holding coil with a D.C. resistance of approximately 200 Ohms. The A.C. impedance is high enough to give no more than 0.2 dB loss at 600 ohm impedance.	Level/Freq:	Level is measured with an average responding detector. Range is +10.9 to -65.0 dBm with 0.1 dBm resolution. Accuracy is as follows: Note: Accuracy is ± 0.1 dBm at 1004 Hz from 0.0 dBm to -20.0 dBm. Frequency is measured from 200 Hz to 19999 Hz with an accuracy of $\pm 0.1\%$ = 1 Hz, and a resolution of 1 Hz, input level ± 10 to -40 dBm.	Each transmit has a count capacity of 0999. Filters same as Noise.	
Impedance:	Terminate: 600 \pm 900 Ohm. Balance: >25 Ohm. Holding: >25 dB below 4 kHz, decreasing 6 dB/octave above 5 kHz. Return loss: >30 dB 200-5000 Hz, > 15 dB 5-20 kHz. D.C. blocking: 150 volts.	PAR:	Peak-to-Average Ratio is measured from 0 to 120 units to a resolution of 1 PAR unit. Accuracy is ± 2 from 30 to 110, ± 4 outside of this range.	Damping:	A damp mode reduces the display update rate from approximately 4 times/second to approximately 2 times/second for reading widely fluctuating measurements.
Store/Recall:	10 complete Unit setups may be stored by user in internal nonvolatile memory and recalled for repeating frequently used tests. In addition, the results of the last impulse or transient test (along with the associated setup) are stored in non-volatile memory at the completion of the study. They are recalled automatically whenever the unit is turned on. Also stored in non-volatile memory are 10 User-programmable memory frequency ranges.	Noise:	Noise is measured with an RMS responding detector from 10 to 99 dBm to 1 dBm resolution. Accuracy is ± 1 dBm from 20 to 99 dBm, and ± 2 dBm from 10 to 20 dBm. Weighting Filters are 3 kHz flat, 15 kHz flat, CMoS, and Program filter.	When in damping, the display update rate from approximately 4 times/second to approximately 2 times/second for reading widely fluctuating measurements.	
Generator (SEND)	GENERATOR (SEND) Specifications	Notched Noise:	Notched noise is the same as noise with the addition of a 1010 Hz notch filter, minimum 50 dB deep from 995 to 1025 Hz.	Term/Bridge:	When in terminate, the receiver terminates the line in the selected impedance. When in badge, the line is bridged by a high impedance (>25 k Ohm) loading no more than 2 dB loss on a 600 ohm line.
Characteristics	Variable:	S/N ratio:	Signal-to-Noise (S/N) ratio displays the ratio of signal (holding tone) to notched noise. The signal must be ± 10 to -40 dBm. The notched noise may be from 10 to 50 dBm. Resolution is 1 dB. Accuracy is ± 1 dB for notched noise 20 to 70 dBm, and ± 2 dB for notched noise from 10 to 20 dBm.	POWER PHYSICAL	
Frequency:	200 Hz to 19 999 Hz in 1 Hz steps. Frequency may be entered directly via the keypad or stepped up or down in 1 Hz steps or auto repeat steps of 100 Hz (4 steps/second) for fast frequency slewing. Frequencies are crystal-controlled and accurate to ± 3 Hz.	Amplitude Jitter:	Displays the incidental amplitude modulation of a holding tone. The holding tone must be ± 10 to -40 dBm, 990 to 930 Hz. Amplitude jitter is displayed from 0.0 to 25.0% with a resolution of 1% and an accuracy of $\pm 2\%$ = 5% of reading.	Characteristics	
Level:	± 10 dBm to 50.0 dBm in 1 dB steps. Level may be entered directly via the keypad or stepped up or down in 1 dB steps or auto repeat steps of 1.0 dB (± 4 steps/second) for fast level slewing. Level accuracy is as follows: 200Hz 15kHz 20kHz	Phase Jitter:	Displays the incidental phase modulation of a holding tone. The holding tone must be ± 10 to -40 dBm, 990 to 930 Hz. Phase jitter is displayed in degrees from 0.0 to 25.0 degrees with a resolution of .1 degree and an accuracy of ± 2 degree = 5% of reading. Weighting filters of 20-300 Hz and 4-300 Hz are provided.	Power:	Four 1.5V "AA" alkaline batteries (furnished) provide about 6 hours operation. Optional NiCAD batteries offer the economy of rechargeability but with reduced operating time. External AC adapter powers unit with 9V DC and charges optional NiCAD batteries in the unit.
1004 Hz:	A fixed 1004 Hz holding tone is provided. The frequency is accurate to $\pm 0.25\%$. Level is same as variable.	Impulse Noise:	The three level impulse noise threshold can be set from 30 to 110 dBm with threshold differences of 2, 3, 4 or 6 dB. Threshold accuracy is ± 1 dB. A user-selected blanking interval may be set from 1 minute to 19999 minutes in 1 minute steps, or set to 0 for a continuous study. Each threshold has a count capacity of 0999. Weighting filters same as Noise.	Physical:	Size: 4.2" (106mm)W x 7.6" (193mm)H x 1.75" (44mm)D Weight: 23 oz. with alkaline batteries Connections to phone line via dual bantam "sex" and RJ11 modular jack. * Dates with Switchcraft FT23 or ADC P1777 phone plug, 1735 (Dsa) plug
3-Tone (Slope)	A three tone slope frequency mode is provided which cycles continuously between 404 Hz, 1004 Hz, and 2804 Hz, giving 5 seconds of each tone. Frequency accuracy is same as variable. Level is same as variable.	Transmits:	Counts dropouts, gain hits, phase hits, and 3 level impulse noise with tone. Holding tone must be ± 10 to 40 dBm, 995 to 1025 Hz.	AM-48E Technical Specifications	
Sweep:	A programmable frequency sweep generator is provided. It generates tones continuously from a user-specified START frequency (200 Hz to 19 999 Hz) to a user-specified STOP frequency (200 Hz to 19 999 Hz) at a user-specified frequency STEP interval (1 Hz to 19 999 Hz) and at a user-specified step RATE (0.1 second to 1,999.9 seconds). Frequency accuracy is same as variable. Level is same as variable.			AM-48E is an expert model which meets world CCITT standards. All specifications are identical to the AM48 except as follows:	
PAR:	A PAR waveform generator is provided which generates the 16 simultaneous frequency PAR waveform per Bell 41009 specifications. The level may be set from 0.0 dBm to 40.0 dBm with 0.1 dBm resolution.			1. Provided noise tones are psychometric (in place of C-Message) and sound weighted (in place of program). 2. All noise measurements are in units of dBm instead of dBm (0dBm = 90dBm). 3. SF skip range is 2130 Hz to 2430 Hz. 4. Slope tones are: 304, 1004, 2004, and 3004 Hz.	

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