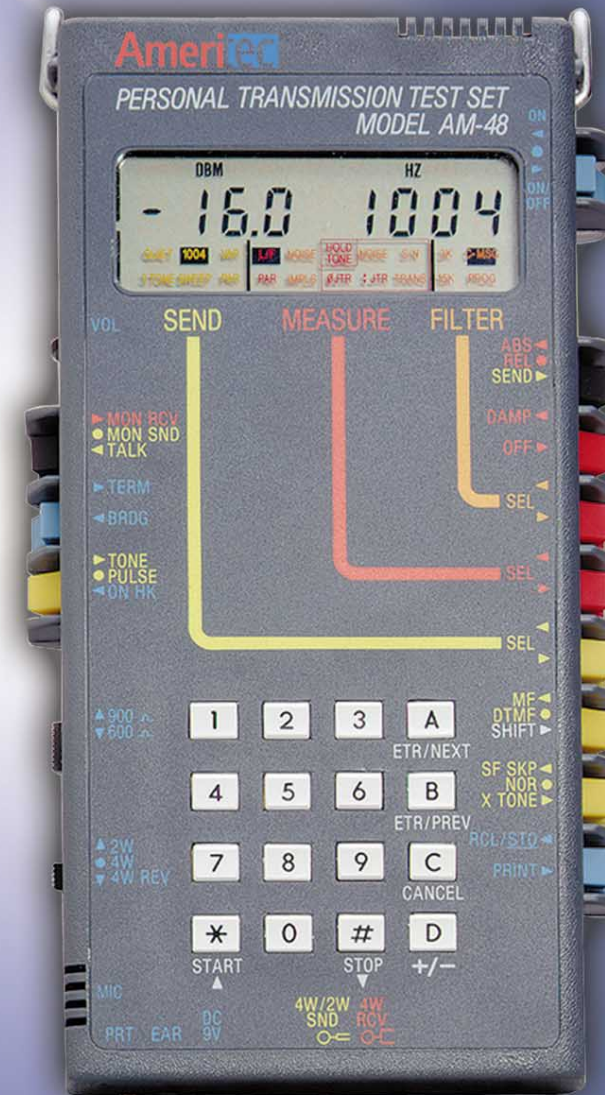


# Ameritec

## Model AM-48 Personal Transmission Test Set



AM-48 Technical Specification										
<b>Characteristics</b>	<b>GENERAL Specifications</b>									
<b>Measurements:</b>	Level (dBm), loss (dB relative) Frequency (Hz) Noise (dBm) with 3 kHz flat, 15 kHz/ flat, CMMsg, or Program filter Notched Noise with 1010 Hz notch and any of above noise-weighting filters. Signal - to -Noise ratio (dB) P/A R Amplitude jitter (%) Phase jitter (degrees) 3-level Impulse Noise Transient measurements (with tone): Dropouts Gain hits Phase hits 3-level impulse noise									
<b>Dial:</b>	Built-in 16 button keypad for dial pulse, DTMF (Touch Tone), or MF dialing.									
<b>Talk/Listen:</b>	Built-in microphone and speaker with push-talk operation on both 2-wire and 4-wire lines. Earphone jack for provided earphone.									
<b>Line Hold:</b>	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.									
<b>Impedances:</b>	Terminate: 600 or 900 Ohm. Bridge: >25 k Ohm. Balance: > 60 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.									
<b>Printer:</b>	Optional printer for hard copy of unit setup and measurement results.									
<b>Store/Recall:</b>	10 complete Unit setups may be stored by user in internal nonvolatile memory and recalled for ease of repeating frequently used tests. In addition, the results of the last impulse or transient study (along with the associated setups) are stored to nonvolatile memory at the completion of the study. They are recalled automatically whenever the unit is turned on.  Also stored in nonvolatile memory are 10 User-programmable momentary frequencies.									
<b>Characteristics</b>	<b>GENERATOR (SEND) Specifications</b>									
<b>Variable:</b>	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 10 Hz steps or auto repeat steps of 100 Hz (4 steps/second) for fast frequency slewing. Frequencies are crystal-controlled and accurate to +.5 Hz.  Level: + 10.0 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: <table border="1" style="margin-left: 20px;"> <tr> <td>200Hz</td> <td>15 kHz</td> <td>20 kHz</td> </tr> <tr> <td>±0.2</td> <td>±0.5</td> <td></td> </tr> <tr> <td>±0.5</td> <td>±1.0</td> <td></td> </tr> </table>	200Hz	15 kHz	20 kHz	±0.2	±0.5		±0.5	±1.0	
200Hz	15 kHz	20 kHz								
±0.2	±0.5									
±0.5	±1.0									
<b>1004 Hz:</b>	A fixed 1004 Hz holding tone is provided. The frequency is accurate to +.025%. Level is same as variable.									
<b>3-Tone: (Slope)</b>	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.									
<b>Sweep:</b>	A programmable frequency sweep generator is provided. It generates tones continuously from a user-specified START frequency (200 Hz to 19,999 Hz) at 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). Frequency accuracy is same as variable. Level is same as variable.									
<b>PAR:</b>	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.									

<b>Quiet:</b>	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 0 9 keys. Programmable from this mode are (1) Touch Tone dial Level (.1 to - 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.
<b>X tone:</b>	A momentary push button is provided for the generation of an auxiliary tone (2713Hz), used to activate remote 829-type loopback devices.
<b>SF Skip:</b>	A Signaling Frequency (SF) Skip mode prevents the generation of tones between 2450 Hz and 2750 Hz in variable or sweep modes.
<b>Distortion:</b>	Total distortion is < - 50 dB for the fixed 1004Hz Holding Tone Generator and < - 40 dB for all other generator modes and frequencies
<b>Characteristics</b>	<b>RECEIVER (MEASURE) Specifications</b>
<b>Level/Freq:</b>	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 19,999 Hz with an accuracy of ± .01% ± 1 Hz, and a resolution of 1 Hz. Input level + 10 to - 40 dBm.  P/AR: Peak-to-Average Ratio is measured from 0 to 120 units to a resolution of 1 P/AR unit. Accuracy is ± 2 from 30 to 110, ± 4 outside of this range.  P/AR signal level is measured from 0 to -40 dBm with a resolution of 1 dBm, using an RMS detector.
<b>Noise:</b>	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, CMMsg, and Program filter.
<b>Notched Noise:</b>	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.
<b>S/N ratio:</b>	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 10 to 70 dBm. The S/N ratio may be from 10 to 50 dB. 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.
<b>Amplitude Jitter:</b>	Displays the incidental amplitude modulation of a holding tone. The holding tone must be + 10 to - 40 dBm, 990 to 1030 Hz. Amplitude jitter is displayed from 0.0 to 25.0% with a resolution of .1% and an accuracy of ± .2% ± 5% of reading.  Weighting filters of 20-300 Hz and 4-300 Hz are provided.
<b>Phase Jitter:</b>	Displays the incidental phase modulation of a holding tone. The holding tone must be + 10 to - 40 dBm, 990 to 1030 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.
<b>Impulse Noise:</b>	The three level impulse noise low threshold can be set from 30 to 110 dBm with threshold differences of 2, 3, 4 or 6 dB. Threshold accuracy ± 1dB. A user-selected blanking interval of 1 to 255 ms blocks further counting of impulse independently for each threshold. The study for timer may be set from .1 minute to 1999.9 minutes in .1 minute steps, or set to 0 for a continuous study. Each threshold has a count capacity of 0 9999. Weighting filters same as Noise.
<b>Transients:</b>	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.

<b>Dropout threshold</b>	is -12 dB from the initial level of the holding tone. A dropout will be counted if the holding tone drops below the 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.
<b>Gain Hit threshold</b>	can be 2, 3, k or 6 d B. 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.
<b>Phase hit threshold</b>	can be 5 to 45 degrees in 1 degree steps with an accuracy of ± 5 degrees ± 10% of the setting. 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.
<b>Three-level impulse noise low threshold</b>	can be set from 30 to 110 dBm with threshold differences of 2, 3, 4 or 6 dB. Threshold accuracy ± 1dB. A blanking interval, user-set from 1 to 255 ms, blocks counting of impulses independently for each threshold.
<b>The study duration timer</b>	may be set from .1 minute to 1999.9 minutes in .1 minute steps, or set to 0 for a continuous study
<b>Each transient has a count capacity</b>	of 09999. Filters same as Noise.
<b>Damping:</b>	A damp mode reduces the display update rate from approximately 4 times/second to approximately 2 times/second for reading widely fluctuating measurements.  The same switch, when in (DAMP) position, also changes the monitoring point of the receive (RCV) monitor speaker to the output of the auto-range amplifier (significantly increasing the speaker level).
<b>Term/Bridge:</b>	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), causing no more than .2 dB loss on a 600 ohm line.
<b>POWER PHYSICAL</b>	
<b>Characteristics</b>	<b>Specifications</b>
<b>Power:</b>	Four 1.5V "AA" alkaline batteries (furnished) provide about 6-8 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.  Auto shutoff after last switch actuation is user-programmable for 0 (no shutoff) or from 1 to 255 minutes. May be overridden by placing power switch in the "on" position. Does not turn itself off while study is in progress.
<b>Physical:</b>	Size: 4.2" (106mm)W x 7.6" (193mm)H x 1.7x (43mm)D. Weight: 23 oz. with alkaline batteries Connections to phone line via dual banam jacks* and RJ11C modular jack. * (Mates with Switchcraft TT253 or ADC PJ777 phone plugs .173" Dia)
<b>AM-48E TECHNICAL SPECIFICATIONS</b>	<b>AM-48E is an export model which meets world CCITT standards. All specifications are identical to the AM48 except as follows:</b>
	1. Provided noise filters are psophometric (in place of C-Message) and sound weighted (in place of program).
	2. All noise measurements are in units of dBm instead of dBrn (0dBm = 90dBrn)
	3. SF skip range is 2130 Hz to 2430 Hz.
	4. Slope tones are: 304, 1004, 2004, and 3004 Hz.

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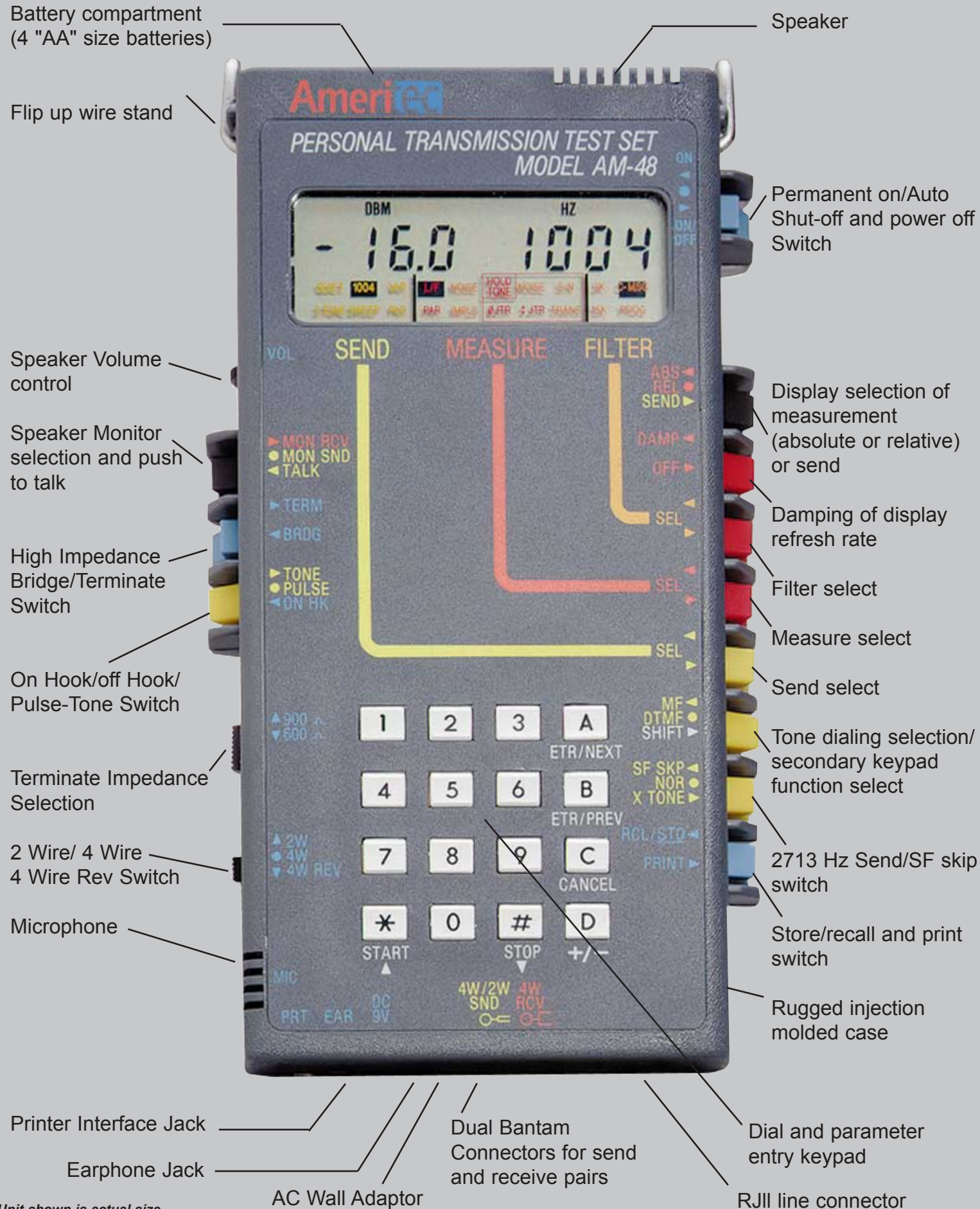
760 Arrow Grand Circle  
Covina, CA 91722 USA  
TEL 626.915.5441  
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We made our name with  
American Technology

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## A True Hand-Held TIMS Tester

# Here's Everything 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 accessory case, alkaline batteries, AC adapter, input cord, earphone, and instruction manual.

Optionally available are hand-held printer, NiCad batteries, impedance adapter 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).

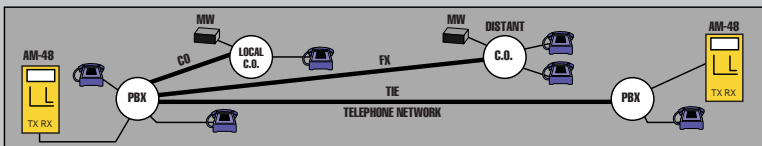
## Hand-Held Accessory Printer

The available Model AM-47 printer takes advantage of the manual and automatic printout modes of the AM-48. The printer is about the same size as the AM-48, is self contained, powered by rechargeable internal battery pack and fits into the AM-48 accessory case.

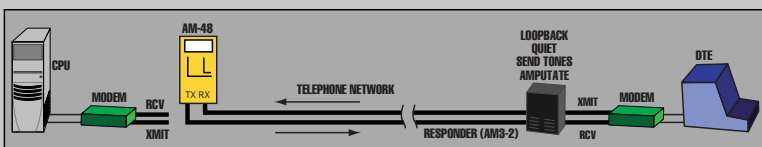
A touch of the AM-48 "Print" key will cause a printout of the currently

Displayed measurement as well as test parameters. When making timed tests such as impulse noise or transients, the AM-48 will automatically print out each 15 minutes and at the end of the study.

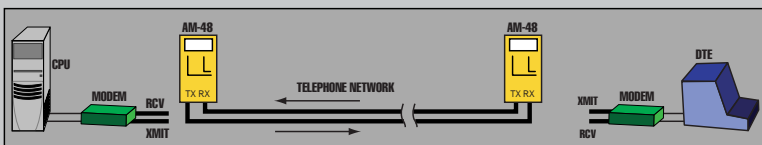
The printer uses standard adding machine paper and a replaceable ink cartridge using an impact printing mechanism.



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.

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

There are three 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 which comply with ITU-T recommendations for most international applications. All units have the same physical size.

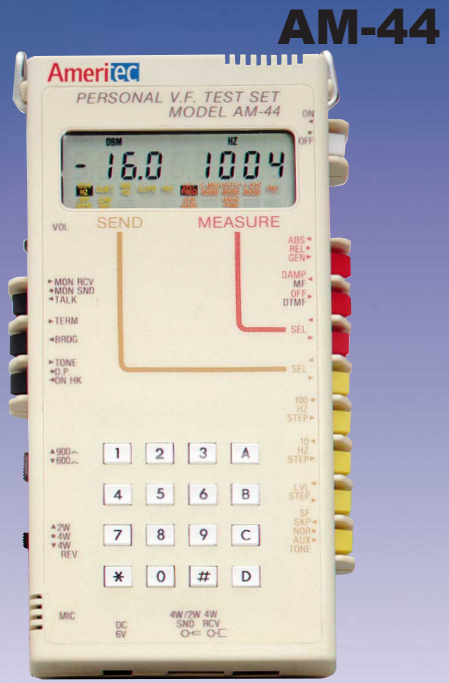
The AM-44 has a built-in dial keypad for dial pulse, touch tone and MF dialing, plus, P/AR send and measure functions. Using the AM-44 you can achieve measurements up to 5000Hz.

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:



dBm LEVEL, ABSOLUTE  
 dB LEVEL, RELATIVE (LOSS)  
 FREQUENCY  
 FREQUENCY RESPONSE  
 NOISE, IDLE CHANNEL  
 NOISE, WITH TONE  
 SIGNAL/NOISE RATIO  
 P/AR (PEAK/AVERAGE RATIO)  
 THREE LEVEL IMPULSE NOISE  
 PHASE JITTER  
 GAIN HITS  
 DROPOUTS  
 PHASE AND GAIN HITS  
 200-5,000Hz  
 200-20,000Hz  
 TALK/LISTEN  
 DC HOLD (ON/OFF/HOOK)  
 DIAL PULSE, TONE AND MF  
 PRINTER OUTPUT  
 EARPHONE OUTPUT  
 STORE/RECALL  
 FULL DUPLEX SEND/MEASURE  
 INTERNAL BATTERY CHARGE  
 AUTO SWEEP  
 MANUAL SWEEP  
 AUTO POWER OFF  
 C-MESSAGE  
 PROGRAM  
 PSOPHOMETRIC  
 SOUND-WEIGHTED  
 3 kHz  
 15 kHz  
 820 kHz  
 1010 Hz NOTCH

	AM-48	AM-44	AM-48E
IEEE (BELL) STD	• • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • •
ITU (WORLD) STD	• • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • •
	<b>MEASUREMENTS</b>		
	<b>MISCELLANEOUS</b>		
	<b>FILTERS</b>		