AM44/AM48/AM44

Hand-Held Transmission Test Set

Ameritec

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

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.

AM-48

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:

| | MEASUREMENTS | MISCELLANEOUS | FILTERS |

Here's Everything Yo

Battery compartment
(4 AA size batteries)

Flip up wire stand

Ameri

PERSONAL TRANSMISSION TEST SET
MODEL AM-48

DBM   HZ

- 16.0 1004

Speaker Volume control

VOL   SEND   MEASURE

MON RCV
MON SND
TALK

TERM

BRDG

TONE
PULSE

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
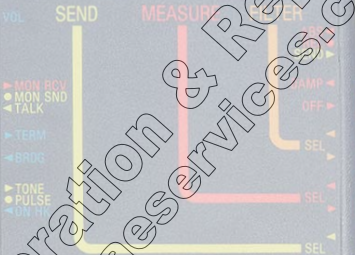
Permanent on/Auto Shut-off and power off Switch

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

ON

AMP

OFF

SEL

SEL

SEL

MF
DTMF
SHIFT

SF SKP
NOR
X TONE

RCL/STO

1 2 3 A
       ETR/NEXT

4 5 6 B
       ETR/PREV

7 8 9 C
       CANCEL

* 0 # D
START   STOP +/-

4W/2W 4W
SND RCV

Dual Bantam Connectors for send and receive pairs

Dial and parameter entry keypad

AC Wall Adaptor

RJII line connector

Unit shown is actual size,

The AM-48 is a powerful hand-held Transmission Impairment... 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 Hits
- Hits and Dropouts

It is a full function signal generator able to generate all of the test tones and performs 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 headset, balanced 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.

ransmission Test Set

Chip-Computer

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.

the built-in ... 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).

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
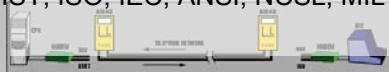

Use the AM-48 built-in dial capability on dial-up networks to access a second AM-48 for centralized 2-wire testing.

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

GENERAL

Characteristics	Specifications

Measurements: Level (dBm), loss (dB relative) Frequency (Hz) Noise (dBrn) with 3 kHz flat, 15 kHz flat, C-message Return loss — Program level — Signal — to –Noise ratio (dB) ...

Phase Jitter (degrees) 3-level Impulse Noise Transient measurements (with tone): Dropouts Gain hits Phase hits 3-level impulse noise

Dial: Built-in 16 button keypad for dial pulse, DTMF (Touch Tone), or MF dialing.

Talk/Listen: Built-in microphone and speaker with push-talk operation on both 2-wire and 4-wire lines. Earphone jack for provided earphone.

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 200Ω. The A.C. impedance is high enough to give no more than 0.2 dB loss at 600 ohm impedance.

Impedances: Terminate: 600 or 900Ohm. 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.

Store/Recall: 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.

GENERATOR (SEND)

Characteristics	Specifications

Variable: *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. Frequency is crystal-controlled and accurate to ± 5 Hz.

Level: + 10.0 dBm to ... in 0.1 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 ...

1004 Hz: A fixed 1004 Hz holding tone is provided. The frequency is accurate to ±.025%. Level is same as variable.

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.

Sweep: 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). Level is same as variable.

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.

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 0-9 keys. Programmable from this mode are (1) Touch Tone Level (–6 to –30.0 dBm), ... Power Auto Tone Off (1 to ...), (4) User-programmable tones for user momentary recall. The programmable tone provided for the generation of an internal tone (2713Hz), used to activate remote 829-type loopback devices.

SF Skip: A Signaling Frequency (SF) Skip mode prevents the generation of tones between 2450 Hz and 2750 Hz in variable or sweep modes.

Distortion: Total distortion is < – 50 dB for the fixed 1004Hz Holding Tone Generator and < – 40 dB for all other generator modes and frequencies.

RECEIVER (MEASURE)

Characteristics	Specifications

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 0.1 dBm to – 20.0 dBm.

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 ± .05% ± 1 Hz, and a resolution of 1 Hz. Input level + 10 to ...

P/AR: Peak-to-Average Ratio is measured from 0 to 120 units to 1 P/AR unit. Accuracy is ± .30 to 110, ± 4 outside of that range.

P/AR signal level is measured from 0.0 dBm to ... Resolution of 1 dBm. ... level detector.

Noise: Measures noise on an idle responding channel. Level (dBrn) is measured from 0 to 110 responding level to 1 dBrn resolution. Accuracy is ±1 dBrn from 0 to 90 dBrn, and ± 2 dBrn from 90 to 110 dBrn. The 3 kHz flat, 15 kHz flat, C-message filters and other program filters ...

Notched Noise: Notched noise is the same as noise with the filter and a 1010 Hz notch filter > 50 dB deep from program level ...

S/N Ratio: Signal to noise (S/N) ratio displays the level of signal (holding tone) to the notched noise. The signal must be between 0 to –40 dBm. The notched noise must 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.

Amplitude Jitter: 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 ± .2% ± 5% of reading. Weighting filters of 20-300 Hz and 4-300 Hz are provided.

Phase Jitter: Displays the incidental phase modulation of a holding tone. The holding tone must be + 10 to – 40 dBm, 990 to W30 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.

Impulse Noise: The three level impulse noise low threshold can be set from 30 to 110 dBrn 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 hour may be set for between 1 minute to 1999.9 minutes in 1 minute steps, or set to 0 for a continuous study. Each threshold ...

Transients: 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.

Dropout threshold 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 within 12 dB of its initial level.

Gain hit will be counted if the level of the holding tone changes suddenly by more than 3 dB with a duration of at least 4 ms ± .5 ms. A blanking interval, similar to that used for dropouts, inhibits further counting of gain hits.

Phase hit threshold 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 for 1 to 255 ms, blocks further counting of phase hits.

Three-level impulse noise low, threshold can be set from 30 to 110 dBrn with threshold differences of 2, 3, 4 or 6 dB. Threshold accuracy ±1dB. A blanking interval, user-set for 1 to 255 ms, blocks counting of impulses independently for each threshold.

Its study duration timer may be set for between 1 minute to 1999.9 minutes in 1 minute steps, or set to 0 for a continuous study.

Each transient has a count capacity of 09999. Filters same as Noise.

Damping: 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).

Term/Bridge: When in terminate, the receiver terminates the line in the selected impedance. When in bridge, the line is bridged by a high impedance (>25 k ohm), causing no more than .2 dB loss on a 600 ohm line.

POWER PHYSICAL

Characteristics	Specifications

Power: 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.

Physical: *Size:* 4.2" (106mm)W x 7.6" (193mm)H x 1.7x (43mm)D *Weight:* 21 oz. with alkaline batteries *Connections to* phone line via dual bantam jacks'' and RJ11C modular jack. '' (Mates with Switchcraft TT253 or ADC PJ777 phone plugs .173" Dia)

AM-48E TECHNICAL SPECIFICATIONS

AM-48E is an export model which meets world CCITT standards. All specifications are identical to the AM48 except as follows:
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.**