

Sage 935AT and 930i Test Specifications Echo Sounder and Echo Generator



Purpose and Functions

Echo is one of the most important quality of service parameters on a telephone network. The Sage Instruments echo test suite includes a complete set of tools to characterize the level and delay of echoes anywhere on a network. It provides an objective measurement of this important aspect of overall voice quality.

The Sage echo test suite includes two test systems:

- Echo Sounder
- Echo Generator

Echo Sounder

The Sage Echo Sounder test measures echoes on any telephone call. Echo Sounder results display in real time on the Sage 935AT or 930i display.

Echo Sounder measures:

- Echo levels
- Echo delays
- Round trip delay
- Round trip attenuation
- One way delay
- One way attenuation

Echo Generator

The Sage Echo Generator creates multiple echoes with programmable echo delay and echo level. When combined with Echo Sounder, Echo Generator facilitates ITU G.168-type echo canceller tests. Echo Generator operates in two modes; responder and manual. In responder mode, Echo Generator operates similar to a loop back responder, automatically answering test calls that contain programmed echoes. In manual mode, the programmed echo level and delay may be changed “on the fly” from the Sage unit’s front panel. In either mode, the operator can change the level or delay of the generated echo signal via DTMF commands.

Echo Generator features include:

- Programmable echoes
- Programmable levels
- Global echo disable in manual mode
- Facilitates echo canceller tests

Echo Sounder

Test Signal

| | |
|-------------------|---------|
| Default Level | -10 dBm |
| Center Frequency | 1500 Hz |
| Bandwidth | 1000 Hz |
| Peak to RMS Ratio | 5 dB |

Echo Canceller Disabler Tone

| | |
|----------------|-------------------------|
| Frequency | 2100 Hz \pm 0.1 Hz |
| Level | -12 dBm \pm 0.1 dB |
| Phase Reversal | every 450 ms \pm 5 ms |
| Phase Jump | $>175^\circ$ |

Echo Level Measurement

| | |
|-------------------|-----------------------------|
| Measurement Range | -60 dB to 20 dB, \pm 1 dB |
|-------------------|-----------------------------|

Echo Delay Measurement

| | |
|------------------|----------------------------|
| 2-Wire Analog | 7 ms to 900 ms, \pm 1 ms |
| 4-Wire and T1/E1 | 0 ms to 900 ms, \pm 1 ms |

Test Results

The Sage test set displays and updates the decibel level and delay of up to four echoes as they occur during a telephone call.

Echo Generator

Level Range and Accuracy

| | |
|---------------|------------------------------|
| Analog 2-wire | -40 dB to 9 dB, \pm 0.5 dB |
| Analog 4-wire | -60 dB to 9 dB, \pm 0.2 dB |
| Digital T1/E1 | -60 dB to 9 dB, \pm 0.2 dB |

Delay Range and Accuracy

| | |
|--------------------------|-----------------------------|
| Analog 2-wire and 4-wire | 17 ms to 600ms, \pm 0.5ms |
| Digital T1/E1 | 12 ms to 600 ms, \pm 1 ms |

Frequency Range

| | |
|--------------------------|-------------------|
| Analog 2-wire and 4-wire | 300 Hz to 3300 Hz |
| Digital T1/E1 | 20 Hz to 3900 Hz |

First Default Echo

| | |
|---------------|-------|
| Default Level | -3 dB |
| Default Delay | 60 ms |

Second Default Echo

| | |
|---------------|--------|
| Default Level | -6 dB |
| Default Delay | 250 ms |

Responder Mode Test Duration

| | |
|--------------------------|------------------|
| Default | 10 minutes |
| DTMF Digits Programmable | 0 to 999 minutes |