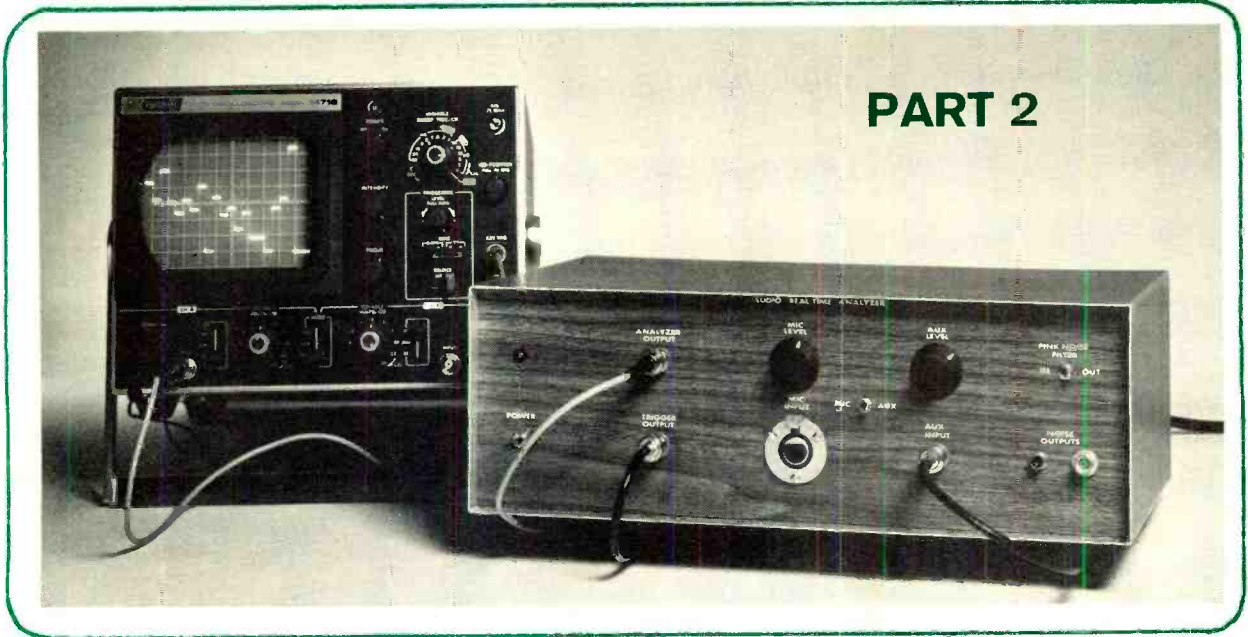


1/2-Octave Real Time Audio Analyzer



Test and calibration procedures, typical applications and how to add an optional logarithmic converter.

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LAST month, we discussed the circuitry of the Real Time Analyzer, examined overall system operation, and presented construction details. Now we'll describe the optional Logarithmic Converter and outline test and calibration procedures. Also, typical applications for the Analyzer will be suggested.

The Log Converter, shown schematically in Fig. 11, is a useful accessory which allows display of amplitude variations on the scope directly in dB. The heart of this linear-to-logarithmic converter is IC36, a 76502 integrated circuit. One half of IC35A is used as a buffer for log converter IC36. This buffer is powered by a bipolar 5-volt supply, so its output (and thus the input to IC36) is limited to +5 volts maximum. The ORIGIN ADJUST control (R144) and op amp IC35B determine the amount of dB per division of scope display. Stages IC37A and IC37B provide gain and rectification, respectively. The rectifying action of IC37B prevents any negative voltages from reaching the scope's vertical input. However, "negative" outputs are generated by IC36 whenever its input signal drops below the ORIGIN level.

Power for the log converter is derived from the RTA, with zener diodes D26 and D27 providing the required ± 5 volts

dc. Etching and drilling and parts placement guides for the log converter pc board are shown in Fig. 12. Use IC sockets or Molex Soldercons to facilitate installation of the integrated circuits. Pay attention to pin basing and polarities.

Tests and Calibration. With all IC's removed from their sockets (except the voltage regulators), plug the line cord into a wall socket and close S2. Measure the following regulated dc voltages: +5 volts across C112; -15 volts across C111; +15 volts across C110. Then see if LED1 lights. If not, check the polarity of the LED. If all is well, turn off the ac power and insert all IC's.

If you are installing the optional log converter, perform the following steps (1) through (7). Otherwise, they can be bypassed.

(1) Decide how many dB/division you want displayed on the scope, and determine how many dB will be shown in a full-scale deflection. For example, if the vertical scale of the scope is 6 cm and 4 dB/cm is desired, 24 dB will be displayed full-scale.

(2) Calculate the origin voltage. (See Table II.) The maximum permissible input to the log converter chip (IC36) is one volt. In our example, -24 dB referenced to one volt is 0.063 volt.

(3) Apply 0.5 volt dc across the converter input and adjust R140, the INPUT LEVEL control, so that the voltage at TP1 equals the calculated origin voltage.

(4) Adjust R144, the ORIGIN ADJUST potentiometer, for zero volt (± 0.1 volt) at TP2. This is a sensitive adjustment.

(5) Increase the dc voltage applied across the input to 1.5 volts. Then adjust R140 so that 1.0 volt appears at TP1. Monitor the converter output on your oscilloscope and adjust R148, the SLOPE ADJUST control until full-scale deflection of the scope trace occurs. Set the scope's vertical sensitivity to whatever value is most suitable for adjustment.

(6) Repeat steps (3), (4), and (5) until all adjustments are correct.

(7) Adjust the INPUT LEVEL control, R140, so that the signal voltage at TP1 never exceeds one volt. The RTA's maximum level reference (which appears at the Analyzer output at clock pulses 23 and 24) is 10 volts. You can use this as the signal applied to the converter input for this adjustment. But be sure to back down on R140 before you apply 10 volts at the converter input. When R140 is properly adjusted, the 10-volt reference from the RTA will cause full-scale deflection.

Next, adjust all LEVEL ADJUST controls (R75 through R94) on the filter boards to