Audio Analyzer 830Z

INTRODUCTION

For 3 decades H. H. Scott High Fidelity components have been satisfying the needs of discerning music listeners all over the world. We welcome you to our growing family of Scott owners.

All Scott High Fidelity components are manufactured under the same rigid quality control used by manufacturers of professional equipment, where quality control procedures are followed for testing each component part as well as at each successive stage of assembly. The controls and the attention to detail, assure the high degree of reliability for which professional equipment is noted.

To be sure of obtaining the best possible performance from your new Scott High Fidelity components read this operating manual carefully and become thoroughly familiar with the unit before starting to use. Keep this manual handy for future reference.
THE ANALYZER SYSTEM

The model 830Z audio analyzer is a versatile instrument which can be used to measure sound pressure level, frequency response and distribution of any home or professional sound system. It is an irreplaceable tool for equalizing system response, for optimizing or evaluating the effects of speaker placement in the listening room and for evaluating equipment such as tape decks and amplifiers. It offers the following features.

- 10 octave audio spectrum analyzer in conjunction with a unique multi-frequency signal generator.
- Input capability for both low and high line inputs as well as external microphone.
- Separate level controls for line and mic inputs.
- Sound Pressure Level mode for measuring overall sound levels with the appropriate weighting.
- Three position range control for optimum display versatility.

INSTRUCTIONS

Unpacking
Carefully remove all items from the container and check for damage.

Before discarding any of the packing materials, examine them carefully for items you may have overlooked. It will be to your advantage to save original carton, fillers, cushionings, etc. They will prove valuable in preventing damage should you ever have to transport or ship your unit.

Accessories contained in original carton are:
- Operating Manual
- Replacement Fuse
- Warranty Card
- Line Cord
- Microphone and Microphone Stand
- Test Record

Analyzer Installation
Installation of the Model 830Z is not complicated. However, the following guidelines must be followed for satisfactory performance and to assure full coverage under the terms of the warranty.

- Do not attempt to remove the cabinet cover—there are no user serviceable parts inside the unit.
- Make sure that the Power switch is in the OFF position (lever down) before making any installation or connections.
- The analyzer and associated equipment may be placed on a table, shelf, or it may be mounted in furniture suitably designed for the purpose.
- The equipment must not be exposed to excessive dust, moisture, or direct sources of heat.
- If mounted where ventilation may be restricted, care must be taken to provide a minimum opening of approx. 50 sq. inch (320 sq. cm), for free air movement, in and out of the cabinet to the room.
- To clean the cabinet, wipe with a cloth soaked in a neutral cleaner or a polishing cloth. Do not use benzine or thinner which will damage the cabinet finish.

Analyzer Connections
Power Supply
Plug the cord set into the unit and into the wall outlet. Refer to rear panel for specified voltage and frequency before making any connections.

Microphone
Use only microphone supplied with the unit. Insert the plug from the microphone into the jack provided on the front panel. A microphone stand is included with the unit for the convenience of microphone placement.
AUX (Line In) Equipment
Use High Line input jacks for connection to the speaker output of the amplifier or receiver in use. Make connections with standard speaker wire or zip cord, being careful to connect the plus terminals to the plus (or H) terminals on the amplifier and the minus terminals to the minus, 0 or ground terminals on the amp. If an unused set of speaker terminals is not available on the amplifier, it is possible to connect the analyzer in parallel with the loudspeakers using the amplifier’s speaker terminals for both the speakers and the analyzer. Take care not to short circuit speaker cables.

Use the Low Line input jacks for any sound source with an output terminated in an RCA phono jack, such as tape decks, preamps, tuners, etc. The most convenient connection for this input is to the tape output (Tape Rec) jacks on the amplifier in use. In this way, whatever input is selected in the amplifier can be viewed on the 830Z.

Oscillator Output
The oscillator output jacks on the rear panel should be connected to the auxiliary, extra or tape inputs of the amplifier in use, using standard RCA type shielded cables. The level of the signal from this output can be adjusted by the Oscillator Level control on the front panel (11).

OPERATION

Control Functions

1. Power Switch (POWER/ON)
   This switch turns the unit on (lever up). Place in down position to turn off.

2. Spectrum Display
   Provides real time readout of the energy level in each frequency band. The left-end band labelled SPL is used to measure the sound pressure level, and the other bands become inoperative in this mode.

3. Microphone Input Lever Attenuator And Fine Control
   These controls adjust the microphone input levels for positioning the display from the microphone properly on the screen. The attenuator changes the gain by 10 dB per step, while the fine control allows adjustment over the 10 dB range between steps, allowing fine centering of the display on the screen. When the unit is in the SPL mode and the Fine Control is in the CAL position, the Input Level is calibrated for dB Sound Pressure Level, with the SPL selected on the switch corresponding to the 0 point of the display.

4. Line Input Level Attenuator And Fine Control
   These controls adjust the Line input levels for positioning the display from any line input properly on the screen. As with the Mic controls, the Attenuator changes the gain by 10 dB per step, while the fine control allows adjustment over the 10 dB range between steps. When the unit is in the SPL mode, and the Fine Control is in the CAL position, the unit functions as a voltmeter, with 0 dB on the display corresponding to 1V when the Line Level Attenuator is in the 0 dB position. For other positions of the Level Attenuator, the corresponding voltage would be as follows (when the display is at 0 dB):

<table>
<thead>
<tr>
<th>Line Input Level</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>−40 dB</td>
<td>.01 Volts</td>
</tr>
<tr>
<td>−30 dB</td>
<td>.032 Volts</td>
</tr>
<tr>
<td>−20 dB</td>
<td>.1 Volts</td>
</tr>
<tr>
<td>−10 dB</td>
<td>.32 Volts</td>
</tr>
<tr>
<td>0 dB</td>
<td>1 Volt</td>
</tr>
<tr>
<td>+10 dB</td>
<td>3.2 Volts</td>
</tr>
<tr>
<td>+20 dB</td>
<td>10 Volts</td>
</tr>
</tbody>
</table>

5. Input Selector (INPUT SELECTOR)
   Selects the input to the unit. Also used for the oscillator calibration in conjunction with the Osc Level (11).
Line Input Selector (LINE/LOW-HIGH)
Selects either the low input or high input jack on the rear panel provided that the Input Selector (5) is set to one of the 3 line positions.

Mode Switch (MODE/ANALYZER-SPL)
Selects the mode of operation, audio spectrum analysis or sound pressure level indication.

Weighting Filter Switch (WEIGHT/A-OFF-C)
This switch introduces one of two weighting filters. A-curve or C-curve, for use in sound pressure level measurement. Center position is off, and should be kept in this position for most applications. See inside back.

Spectrum Range Selector (RANGE/20-30-40-dB)
The spectrum display is measured in 3 ways. This switch selects the band scale for 20 dB, 30 dB, or 40 dB, corresponding to 2, 3, or 4 dB per division.

Microphone Jack (MIC)
This jack accepts the plug from the special microphone supplied. Other microphones should not be used.

Oscillator Level Control (OSC LEVEL)
This changes the oscillation level of the multi-frequency signal generator that is built in. Clockwise rotation of the control increases, and counterclockwise rotation decreases the output level. Calibration should be made with the Input Selector (5) in the Cal position.

Operation
1) Amplifier Response Measurement (See inside back cover)
Set controls to following:
- Range: 30 dB
- Weight: Off
- Mode: Analyzer
- Line: High
- Input Selector: L, initially
- Oscillator Level: Approx. 5
- Power: On

Turn on the amplifier under test and select the input to which the analyzer is connected and adjust the volume to a comfortable level, (continuous operation at loud levels may damage speakers). Adjust the Line Input Level controls so that the 1 kHz band reads 0 dB. The frequency response of your amplifier is now displayed and you may see the effect of the tone controls, filters etc., as you adjust them. It may be advantageous to change the Range switch setting for some measurements. Switch the Input Selector to R position to observe the right channel.

2) Test Record
Connect a turntable to your amplifier. Set the Line switch to Low and the Range switch to 20 dB, play the 1 kHz band and adjust the Line Input controls for 0 dB on the display. Now play the test record from the beginning and observe the frequency response of the cartridge and preamp.

3) Listening Room Response
Connect the microphone to the Mic jack and place the microphone in your customary listening position. Select the oscillator input to the amplifier and adjust the volume to a comfortable level. Set the Input Selector to Mic. Adjust the amplifier balance control so that only one speaker is operating, tone controls, filters, and loudness controls should be off. Adjust the Mic Input Level controls for a 0 dB reading at 1 kHz on the display. Your room response is now displayed. You may adjust your tone controls and experiment with speaker location for flattest response. Rotate the balance control to the other side and repeat the procedure for that channel.

4) Sound Pressure Level Measurement
Set controls to following positions:
- Range: 20 dB
- Mode: SPL
- Weight: Off
- Input Selector: Mic
- Mic Input Level Fine Adjust: CAL

Play music through the system and adjust the Mic Input Level coarse control so that the indicator can be observed in the display. 0 dB on the display corresponds to the Mic Input Level control setting. For each division above or below 0 dB add or subtract 2 dB (this may be 3 or 4 dB/division for other Range switch positions). If the level is below 80 dB SPL the weighting switch should be switched to the ‘C’ position, for levels below 65 dB SPL select the ‘A’ position. This gives results which more closely correlate with human hearing characteristics.

5) Tape Recorder Response
Set controls to following positions:
- Range: 20 dB
Weight: Off  
Mode: Analyzer  
Line: Low  
Input Selector: L, initially

Connect the oscillator output to the line in terminals of the tape recorder and the line outputs to the analyzer line in. Record the oscillator signal at about –10 dB on the recorder’s VU meters. Play back the tape and adjust the Line Input Level for 0 dB at 1 kHz. You can now evaluate the recorder response characteristics. Try different bias and EQ positions for flattest response. You may also determine which brands of tape give optimum results. The analyzer may also be used to monitor the spectral content of music as an aid in setting recording levels. For example, music with above average high frequency content should be recorded at somewhat lower levels to reduce the possibility of tape saturation.

**SPECIFICATIONS**

**Oscillator Section**

**Center Frequencies (Hz)**
- 32, 63, 125, 250, 500, 1k, 2k, 4k, 8k, 16k

**Sweep Bandwidth**
- Center Frequency ±10%

**Sweep Frequency**
- 16 Hz

**Frequency Response Deviation**
- ±1.2 dB

**Output Level (adjustable)**
- 0 ~ 900 mV

**Output Impedance**
- 1k ohms

**Preamp and Display Section**

**Center Frequencies (Hz)**
- 32, 63, 125, 250, 500, 1k, 2k, 4k, 8k, 16k

**Bandpass Filter**
- Pass Band: Center Frequency ±20% at –3 dB  
- Attenuation Slope: 20 dB/Octave

**Display Level Range**
- Range Selector: x2 x3 x4  
- Full Scale: 20 dB 30 dB 40 dB  
- Each Step: 2 dB 3 dB 4 dB

**Input Sensitivity (for 0 dB reference)**
- Line: 10 mV to 31V  
- Mic: 50 to 120 dB SPL with microphone supplied

**Input Impedance**
- Line: 47k ohms

**Frequency Response**
- Line: 20 to 20k ±1 dB + 1 digit  
- Mic: 30 to 16 kHz ±3 dB with mic supplied

**Weighting**
- Flat, ‘A’ or ‘C’ conforming to I.E.C. Standards

**General**

**Power Requirements**
- 100/117/220/240V switchable AC; 50/60 Hz, 10 watts

**Dimensions**
- W: 17” (430 mm)  
- H: 5.25” (132 mm)  
- D: 14.25” (297 mm)

**Weight**
- 9.7 pounds, (4.4 kilograms)
Use shielded audio cables terminated with RCA plugs.

Connect to Tape Line inputs when measuring tape recorder response.

High-Line In Termination

Weighting Characteristic

3/8"

Remove insulation from wire end.

Twist stranded wire.