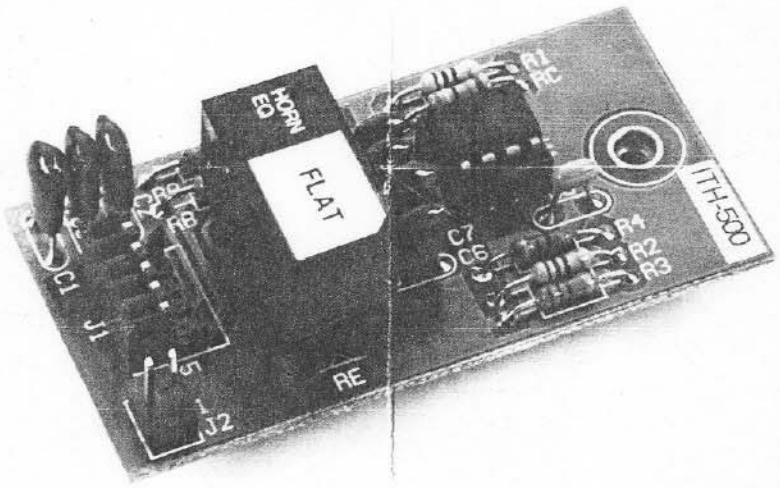
InterActive Technology
Linked Component Control
600 Cecil Street, Buchanan, MI 49107
800/234-6831, 616/695-6831, FAX 616/695-1304

ITH High Pass Filter/Equalizer PCB



DESCRIPTION

The InterActive Technology Model ITH is a fixed -frequency high pass filter and combination horn/driver equalizer PCB.The PCB plugs directly into the 5 pin header of an IT compatible Input Module. When used with the ITL low pass filter PCB, they eliminate the need for rack mount electronic crossovers and offer the ability to individually equalize specific horn/driver (or woofer/enclosure) combinations.

The third-order Butterworth low pass filter has an 18 dB per octave (60 dB per decade) roll-off rate. The modules are available in the following standard ISO frequencies: 125 Hz (ITH-125), 500 Hz (ITH-500), 315 Hz (ITH-315), 800 Hz (ITH-800), and 1250 Hz (ITH-1250). Simple equations are provided to calculate other frequencies for custom applications.

Each filter PCB is provided with a "flat" horn/driver equalization submodule. Optional submodules in the 9600 series and EQ Series are available to properly equalize almost any horn and compression driver combination for a flat power response.

The InterAcive Technology Model ITH High Pass Filter/Equalizer has the flexibility to meet or exceed the requirements for any job. Its ability to produce a flat power response for an individual horn/driver combination is not only useful but almost mandatory in today's professional installations.

INSTALLATION INSTRUCTIONS

1) Remove power and all input connections to the amplifier.
2) Remove the two screws securing the input module to the rear panel of the amplifier and pull the Input Module out of the amplifier.
3) Remove (and save) the shorting jumper from J5 or J6.
4) Install the ITH Printed Circuit Board onto the 5-pin header.
5) Secure the ITH to the Input Module by using the screw provided through the bottom side of the Input Module into the threaded standoff of the ITH.
6) Install the Input Module back into the amplifier. Secure the Module to the back panel of the amplifier using the two screws removed in step 2
7) Reconnect the power and input signals to the amplifier.

SPECIFICATIONS

Input Impedance:	15 kΩ Unbalanced
Maximum Input Level:	+18 dBu (Ref. 0 dBu = 0.775 Vrms)
Output Type:	Unbalanced
Output Source Impedance:	<50 Ω
Minimum Load Impedance:	2kΩ
Total Harmonic Distortion:	<0.01% at 0 dBu output over full bandwidth
Intermodulation Distortion (SMPTE):	<0.01% at 0 dBv output
Noise Floor:	<-90 dBu
Dynamic Range:	>108 dB
Power Requirements:	±15 VDC
Dimensions:	2.6 in L x 1.35 in W
High Pass Crossover Filter	
Type:	3rd order Butterworth
Slope:	18 dB/oct (60 dB/dec)

AVAILABLE MODELS

ITH - 125	125 Hz corner frequency
ITH - 315	315 Hz corner frequency
ITH - 500	500 Hz corner frequency
ITH - 800	800 Hz corner frequency
ITH - 1250	1250 Hz corner frequency
Included Accessories:	one "flat" horn/driver EQ submodule (16 pin DIP plug)

OPTIONS

Horn/Driver Equalization Submodule Accessories

9600A Series/EQ Series:	Submodules for modified equalization.
9600A:	Blank submodule for custom equalization.

Custom Corner Frequency Component Values
A third-order Butterworth high pass filter performs the high pass function. The corner frequency is fixed in the module, but can be changed by substituting new values for resistors, RA, RB, and RC. If other corner frequencies are desired, the values for the three resistors may be calculated from the following equations:

RA = (24.32 x 106)/f3 Ohms
RB = (9.55 x 106)/f3 Ohms
RC = (167.3 x 106)/f3 Ohms
where f3 = the desired corner frequency in Hz.

High Frequency Equalization Submodules
The standard "flat" submodule assembly is installed at the factory and must remain in the circuit unless it is replaced with one of the 9600 series or EQ series submodules.

Custom High Frequency Equalization

I. Producing a Notch in the Frequency Response
Resistors RE1 and RE2 may be used to place a notch in the response at a given depth and frequency. The resistor designations in the following instructions refer to the designations used in figure 1.

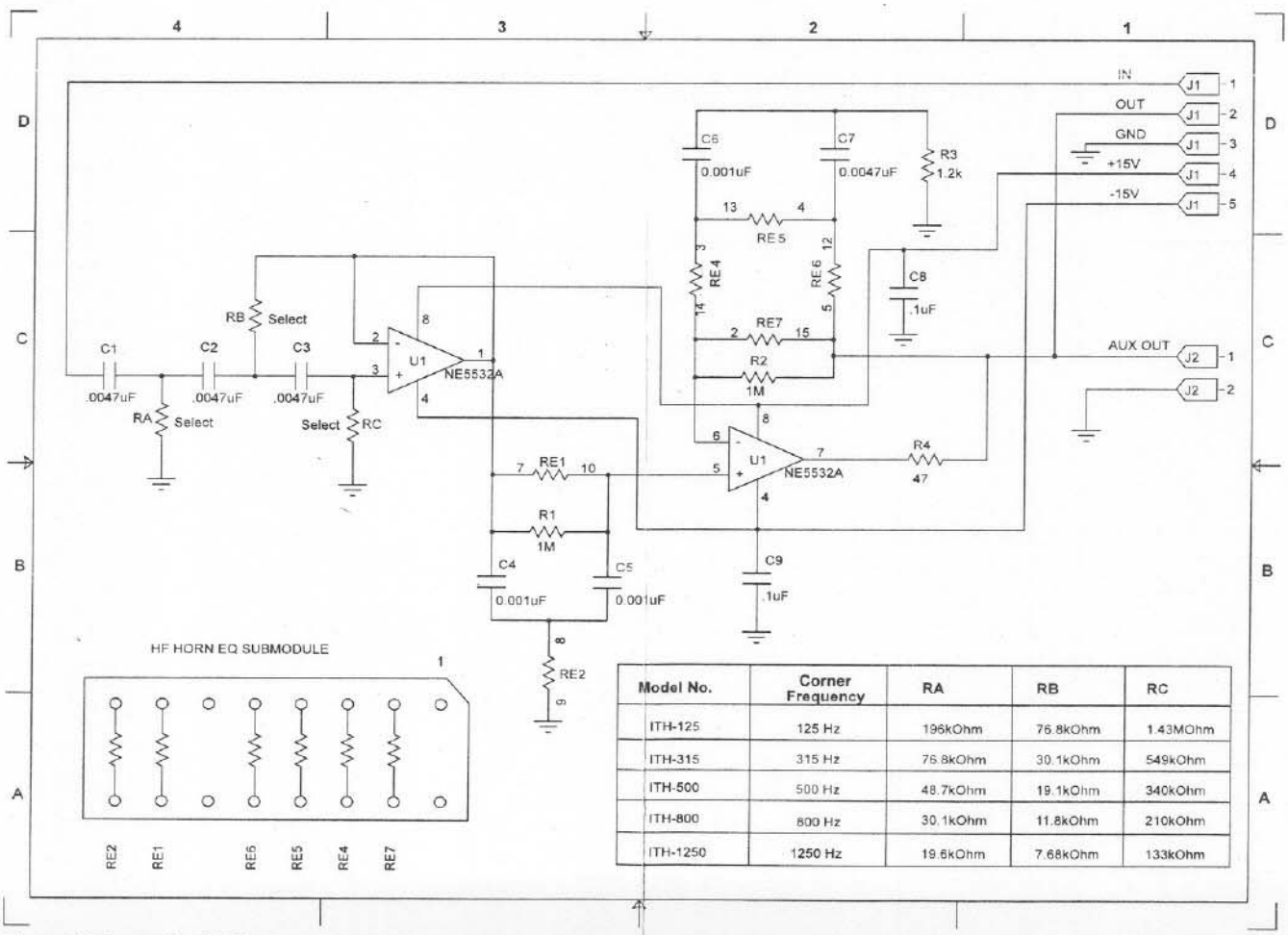
A. Changing the Notch Frequency
Increasing the values for RE1 and RE2 by the same ratio will lower the notch frequency while maintaining the same notch depth. Conversely, decreasing them will raise the notch frequency.

B. Changing the Notch Depth
Increasing the value of RE1 and simultaneously decreasing the value of RE2 such that their product is the same will deepen the notch depth at a given frequency. In the same manner, the notch depth may be made shallower by decreasing RE1 and increasing RE2.

II. Producing a Top-End Boost
Resistors RE4, RE5, and RE6 determine the amount of high frequency boost and the frequency at which the boost occurs.

A. Changing the Boost Frequency
Increasing the values of RE5 and RE6 in the same proportion will lower the frequency at which the top-end boost occurs. Conversely, decreasing them will raise the frequency. A 10:1 ratio of RE5 to RE6 corresponds to approximately 10 kHz.

B. Changing the Top-End Boost
Decreasing the value of RE4 will increase the amount of high frequency boost at the frequency determined by RE5 and RE6. Likewise, increasing RE4 will flatten the response.



Model No.	Corner Frequency	RA	RB	RC
ITH-125	125 Hz	196kOhm	76.8kOhm	1.43MOhm
ITH-315	315 Hz	76.8kOhm	30.1kOhm	549kOhm
ITH-500	500 Hz	48.7kOhm	19.1kOhm	340kOhm
ITH-800	800 Hz	30.1kOhm	11.8kOhm	210kOhm
ITH-1250	1250 Hz	19.6kOhm	7.68kOhm	133kOhm

Figure 1 Schematic of ITH

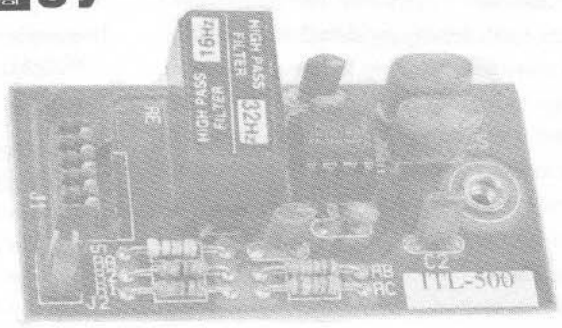
42-02-051803

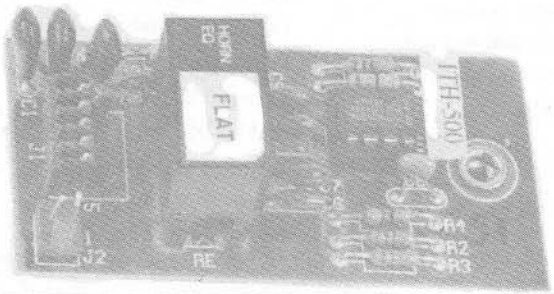
InterActive Technology
Linked Component Control

ITH and ITL

High-Pass and Low-Pass Filter/Equalizer PCBs

- Common ISO frequencies
- Independent channel control
- Optional EQ modules
- Able to link multiple channels
- Simple to install





Description

InterActive Technology provides optional signal processing PCBs for use with all IT compatible amplifiers. Model ITH is a fixed-frequency high-pass filter and combination horn/driver equalizer PCB. Model ITL is a fixed-frequency low-pass filter and combination woofer/enclosure equalizer PCB. Both filters are 3rd-order Butterworth, with an 18 dB/octave (60 dB/dec) roll-off rate.

The signal processing PCBs plug directly into the 5-pin header of an IT compatible input module. Each input channel of an IT compatible amplifier can accept an independent signal processing PCB.

When used in combination, an ITH and ITL eliminate the need for a rack-mount electronic crossover and offer the ability to individually equalize specific output device combinations.

The ITH PCB is supplied with a "flat" equalizer submodule. Optional submodules in the 9600 Series and the EQ Series are available to properly equalize almost any horn and compression driver combination for a flat response. The standard ITL PCB equalizer submodule provides a maximally flat response with a 12 dB/octave low-frequency roll-off beginning at either 16 Hz or 32 Hz, depending on orientation. Other responses, including low-frequency peaking, may be achieved through simple resister value changes on the PCB.

The following high-pass filters are available:

Model No.	Corner Frequency
ITH-125	125 Hz
ITH-315	315 Hz
ITH-500	500 Hz
ITH-800	800 Hz
ITH-1250	1,250 Hz

The following low-pass filters are available:

Model No.	Corner Frequency
ITL-125	125 Hz
ITL-500	500 Hz
ITL-800	800 Hz
ITL-1250	1,250 Hz

Architects' and Engineers' Specifications

The specified signal processor PCB shall afix to the 5-pin header of an InterActive Technology compatible amplifier signal input module. Each amplifier channel can be independently configured with a specific signal processing PCB.

Each signal processing PCB shall be provided with a "flat" response equalizer submodule with provision to adapt optional equalization. Each PCB module shall accept 9600 Series and EQ Series equalizer submodules.

Each filter module shall implement a 3rd-order Butterworth filter with an 18 dB per octave (60-dB per decade) roll-off rate. PCB modules shall be available in standard ISO frequencies.

The specifier may choose between the following high-pass filter frequencies: 125 Hz, 315 Hz, 500 Hz, 800 Hz, 1,250 Hz.

The specifier may choose between the following low-pass filter frequencies: 125 Hz, 500 Hz, 800 Hz, 1,250 Hz.

The specified signal processing PCB shall be an InterActive Technology model ITH for high-pass filtering or model ITL for low-pass filtering, followed by the appropriate frequency for the application.

ITH/ITL High-Pass/Low-Pass Filter/Equalizer PCB

Uniform Limited Warranty Statement

InterActive Technology products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than EVI Audio Service or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to EVI Audio Service or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from EVI Audio Service at 10500 W. Reno Avenue, Oklahoma City, OK 73127 (800-845-8727 or FAX 405-577-3274). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. InterActive Technology shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Specifications

Specifications listed are applicable to both the ITH and ITL signal processing PCB modules unless otherwise stated.

Input Impedance:
15 kohms unbalanced

Maximum Input Level:
+18 dBu
(ref. 0 dBu = 0.775 Vrms)

Output Type:
Unbalanced

Output Source Impedance:
<50 ohms

Minimum Load Impedance:
2 kohms

Total Harmonic Distortion:
<0.01% at 0 dBu output
over full bandwidth

Intermodulation Distortion (SMPTE):
<0.01% at 0 dBu output

Noise Floor:
<-90 dBu

Dynamic Range:
>108 dB

Power Requirements:
±15 V dc

Dimensions,
Height: 66 mm (2.6 in.)
Width: 34 mm (1.35 in.)

Connector Type:
J1 5-pin header, bottom entry
Pin 1 = input
Pin 2 = output
Pin 3 = ground
Pin 4 = +15 V dc
Pin 5 = -15 V dc
J2 2-pin header
Pin 1 = aux out
Pin 2 = ground

Crossover Filter:
Type: 3rd-order Butterworth
Slope: 18 dB/octave (60 dB/dec)

ITH Optional Horn/Driver Equalizer Submodules:
9600A Series and EQ Series
9600A (blank for custom equalization)

ITL Low-Frequency Equalizer:
Type: 2nd order undamped filter
Slope: 12 dB/octave (40 dB/dec)

High-Pass Filter Frequencies:

Model No.	Corner Frequency
ITH-125	125 Hz
ITH-315	315 Hz
ITH-500	500 Hz
ITH-800	800 Hz
ITH-1250	1,250 Hz

Low-Pass Filter Frequencies:

Model No.	Corner Frequency
ITL-125	125 Hz
ITL-500	500 Hz
ITL-800	800 Hz
ITL-1250	1,250 Hz

InterActive Technology
Linked Component Control

600 Cecil Street, Buchanan, MI 49107
616/695-6831, Fax 616/695-1304

Part Number 534255—9705