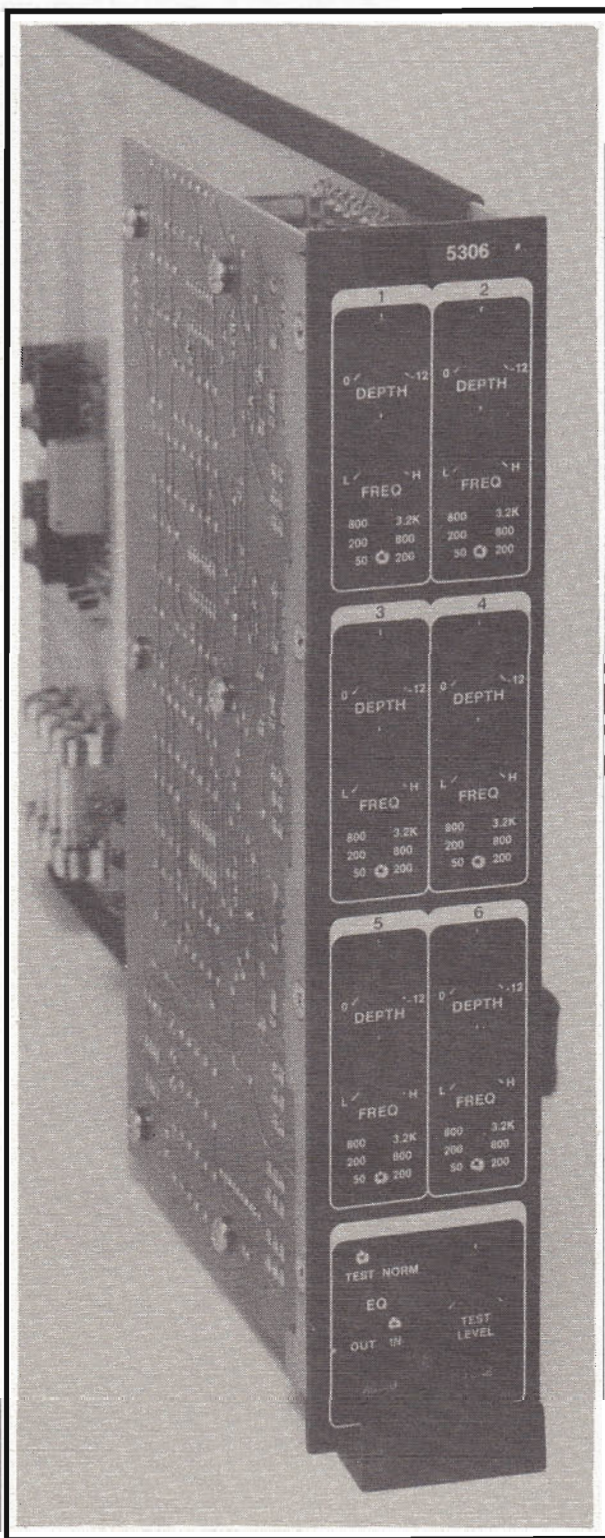


# 5306 MANUAL



## Operation and Owners Manual for the **5306 Notch Filter** 5000 Modular Sound System

## 5306 Notch Filter

The model 5306 Notch Filter is an excellent tool for control of feedback, room ring modes, mechanical vibration near the transducer, etc. A set of six, 1/10 octave notch filters, the 5306 makes possible the precise attenuation of narrow-band phenomena without adversely affecting the desired equalization curve.

As a stand-alone signal processor, the 5306 may be used to achieve greater SPL levels and/or intelligibility by systematically removing feedback and room ring modes. The 5306 becomes even more powerful when used as a complement to normal 1/3 octave sound system equalization. In addition to feedback control, the 5306 is an effective tool in reducing microphone proximity effect and annoying room resonances.

Each of the six tunable, 1/10 octave band, reject filters is adjustable from 50 Hz to 3.2 KHz. The frequency range is divided into three bands to provide high resolution and ease of tuning.

Several other features combine to make the 5306 notch filter module a versatile tool in sound operation. A NORMAL/TEST switch allows insertion of a compressor in line with the filters. The compressor has a level control on the front panel by which the compression level may be regulated to sustain and control feedback during the tuning and adjustment process. Test points are available on the front panel, for both final audio output and tuning. An IN/OUT switch on the front panel, with indicator light, allows bypass of the notches for comparison purposes. These special features are mentioned in more detail below.

### **INSTALLATION INSTRUCTIONS**

Installation of the 5306 into the 5000 system is very simple. Only two steps are required to install the 5306. First, "dial up" the appropriate input and output bus selections on the two rotary type selectors (see page 6, #1) on the PC board. Make sure that you have selected the proper buses. Improper bus selection will not damage the modular system, but distortion or other erratic operation may result. (see the 5000 SYSTEM INSTRUCTION MANUAL for details on operation and selection of the bus system)

Next, insert the 5306 in the guide tracks of one of the "slots" in the MAINFRAME,

and firmly push the module into the MAINFRAME until it seats in the fully inserted position. The 5306 should now be operating as an integral part of the system.

## **TUNING THE NOTCH FILTERS**

With the 5306 Notch Filter Module properly installed in the MAINFRAME, and its input and output buses properly assigned, you are ready to use the notch filters to suppress feedback frequencies or other narrow-band problems. The 1/10 octave bandwidths of the filters allows for suppression of feedback and other narrow-band phenomena by many dB without meaningfully affecting the normal "EQ". For this reason, the narrow-band 5306 is superior to 1/3 octave equalizers for suppressing feedback.

The six filters, numbered 1 through 6, are in series in the audio circuit. Since feedback frequencies sometimes occur closely spaced together, it is a good idea to begin the tuning process with all six notches "out of the way." Begin all adjustments with the depth control (see page 6, #3) for all filters set to "O", and the frequency control (see page 6, #4) set full "L" (low). The range switches (see page 6, #5) should be set in the 50-200 position. As you begin the tuning process, it's also a good idea to take notes as to approximate feedback frequencies to avoid "double tuning filters on top of one another."

With the 5306 set up as described, bring the gain of the overall system up until you are at the "edge" of feedback. At this point you should flip the TEST/NORMAL switch (see page 6, #6) to TEST to add the compressor into the circuit, and control compression level with the front panel TEST LEVEL control (see page 6, #7). Increase compression level until a single feedback frequency is sustained. It may be necessary to readjust system gain to sustain feedback. The unique screwdriver operated knobs provided have been designed to "grip" the screwdriver blade, no matter how small. The result is that there is no play in the adjustment, and that very fine adjustments may be made easily.

## **TUNE BY EAR OR BY METER?**

The 5306 may be effectively tuned by ear, or with the help of an AC volt meter (pocket VOM) or real time analyzer.



## **BY METER**

1. With the system controlled in sustained feedback through use of the TEST compressor, and while referencing the test meter to chassis ground, insert a test lead into the front panel test receptacle marked "TUNE". Any test instrument capable of measuring 0-1 volt AC is adequate. If you are using a realtime analyzer you will see immediately the approximate frequency of the feedback node. The other test lead should be connected to the chassis frame.
2. Start with filter number 1 and use the RANGE SWITCH (page 6, #5) to select one of the three frequency ranges in which the feedback frequency is found. Adjust the frequency control (page 6, #4) until the maximum level (voltage) is observed from the test point (page 6, #11). This procedure centers the filter on the feedback frequency.
3. The notch depth control (page 6, #3) is then used to insert attenuation at that frequency until the feedback node disappears. The first feedback frequency is now controlled.
4. With little or no adjustment of the compressor gain, you will find that the next feedback frequency now automatically appears. Repeat the procedures outlined above for each of the remaining 5 filters to control 6 individual frequencies.

Care should be taken to see that you are not tuning two filters to attenuate frequencies that are less than  $1/10$  octave apart. In the case of two frequencies located less than  $1/10$  octave apart, retuning one filter may take care of both frequencies. Should an extreme deep filter be needed for some reason, it is possible to "gang" or cascade two filters together by simply tuning one over the top of the other and adjusting both DEPTH controls for the desired depth.

After the tuning is completed, lower the TEST gain (gain of the compression circuit) for safety, and switch the TEST/NORMAL SWITCH (page 6, #6) back to normal.

## **BY EAR**

The only modification to the above procedure is that you must find the frequency by ear.

1. Select the most likely range on the RANGE switch (page 7, #5).
2. Set the depth control (page 6, #3) to -12, or full in.
3. Slowly sweep through the frequency range, using the FREQUENCY CONTROL (page 6, #4) on the front panel. When the notch passes over the feedback frequency it will cause the feedback to stop.
4. After placing the notch over the frequency, move the depth control (page 6, #3) to 0, removing the notch, and then slowly move the depth control to increase the depth of the notch until the feedback disappears.

## **EQ IN/OUT**

The 5306 has a front panel equalizer IN/OUT switch (page 6, #8) which allows bypass of the notch filters for comparison purposes. The IN/OUT switch is a hard wire bypass and does not route the signal through any active componentry, but only through the PC trace itself.

## **LED**

The LED on the front panel (page 6, #10) serves two purposes: 1: It is an output signal presence indicator which pulses as it is modulated by the output of the 5306 and, 2: When the notch filters are bypassed with the EQ IN/OUT switch, the LED will flash on and off at a rate of about 3Hz as a reminder that the filters are bypassed.

## **TEST POINT**

The second test point, marked AUDIO (page 6, #9), on the front panel is connected through a 600 ohm resistor, to the output of the 5306. This test point allows the use of oscilloscopes, real time analyzers, AC volt meters, etc., for system documentation and trouble shooting.

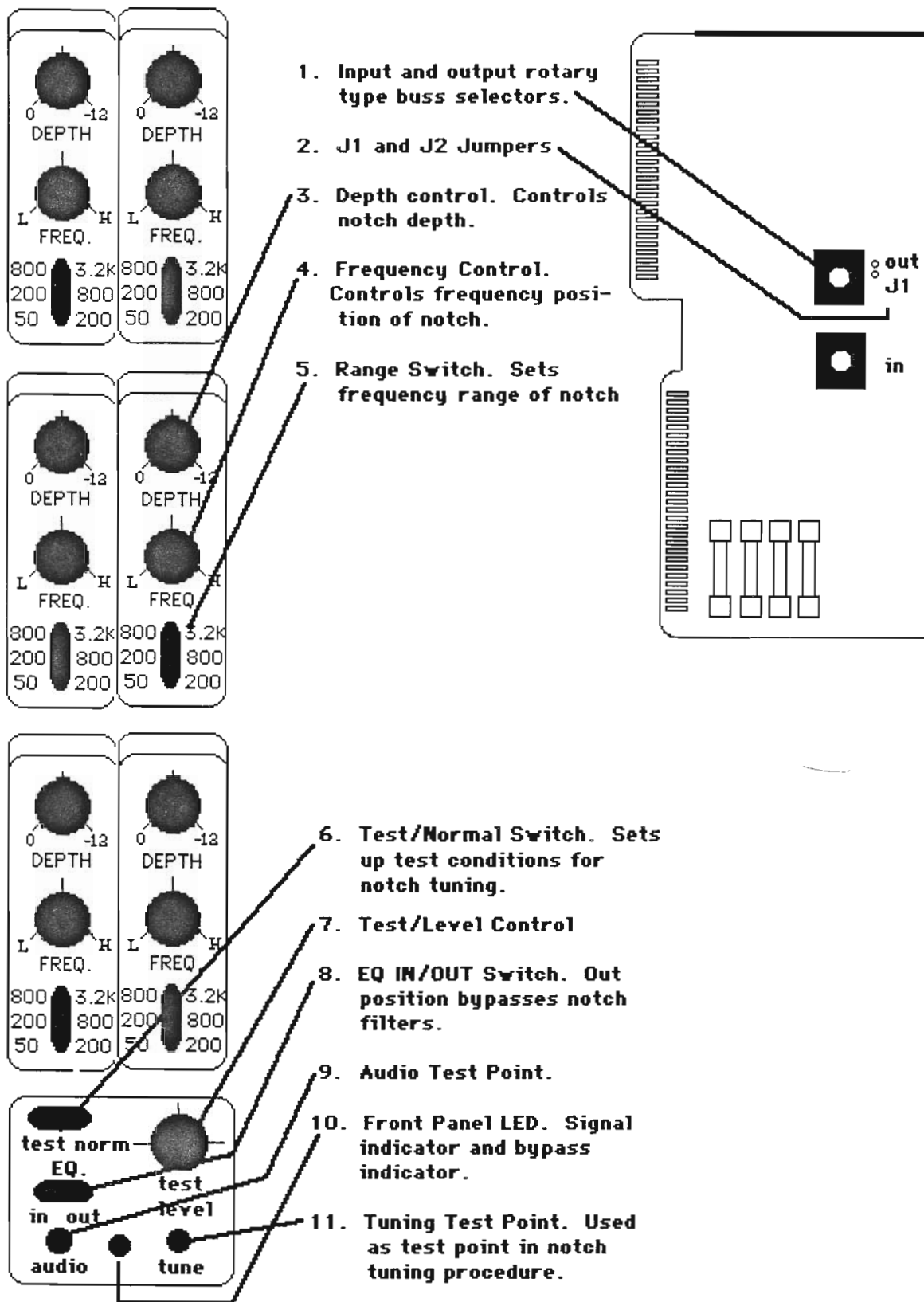
## **JUMPERS J1 AND J2**

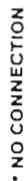
The jumpers J1 and J2 (page 6, #2) are used to disconnect the 5306 from the internal motherboard interconnect bus located in the MAINFRAME. J1, the output, is disconnected from the internal interconnect bus. In this way, any module may be isolated from the 5001 interconnect bus for access only from the external edge connector (TB-40). Clipping jumper J2 disconnects the input from internal interconnect bus. When using the 5306 in applications where it must be accessed by equipment external to the 5001 mainframe, and where it should not be connected to modules in the mainframe, clipping jumpers J1 and J2 will accomplish this. For example, if some input to the 5000 system must be made through the 5306 module, one would clip jumper J2, which would disconnect the input from the internal interconnect bus, disable the input rotary selector, and allow access to the 5306 input only from the external accessible edge connector (TB-40).

## **SPECIFICATIONS**

Max. input level: +20dBm  
Input impedance: 10,000 ohms  
Output level: +18dBm  
Output load impedance: <600 ohms  
Gain: unity  
THD: .01% @ +18dBm

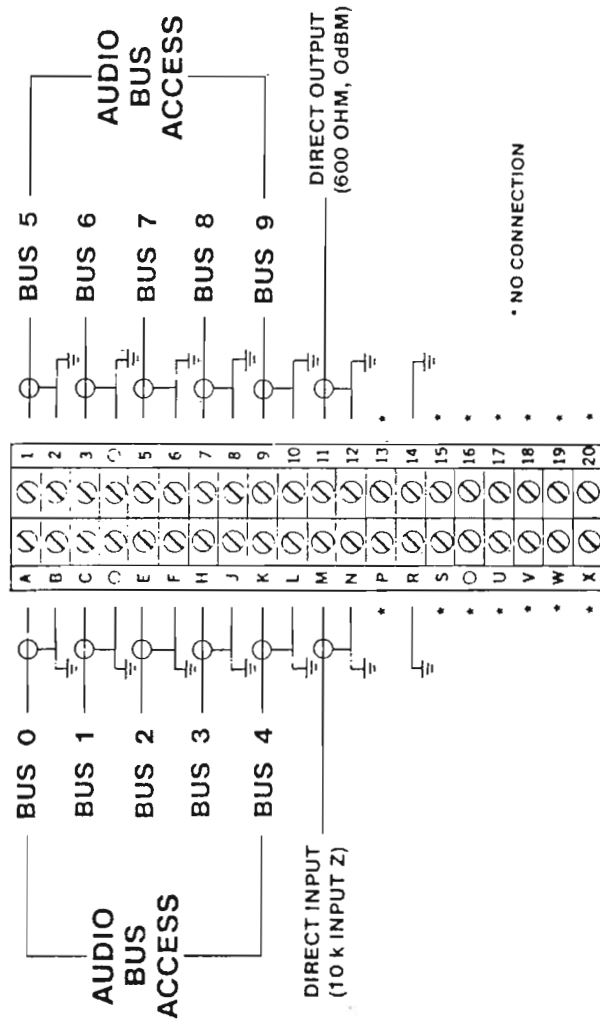
Noise: -80dBm  
Filter bandwidth: 1/10th octave  
Filter tuning range: 50-3200 Hz  
Notch depth: 1-12 dB  
Size: 8.5 x 14.2 x 1.7 inches  
(21.5 x 36.1 x 4.3 cm)  
Weight: 1 lb. 5 Oz. (.64 Kg)





## Printed Circuit Board Edge Connections





5306 TB40 Connections