# Trig-Tek™

# 200B

# Clipper Module

## User Manual

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2. Product model number
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| Fax: | +1 949 859 7139 | (USA) |

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# FOR YOUR SAFETY

Before undertaking any troubleshooting, maintenance or exploratory procedure, read carefully the **WARNINGS** and **CAUTION** notices.


This equipment contains voltage hazardous to human life and safety, and is capable of inflicting personal injury.

If this instrument is to be powered from the AC line (mains) through an autotransformer, ensure the common connector is connected to the neutral (earth pole) of the power supply.

Before operating the unit, ensure the conductor (green wire) is connected to the ground (earth) conductor of the power outlet. Do not use a two-conductor extension cord or a three-prong/two-prong adapter. This will defeat the protective feature of the third conductor in the power cord.


Maintenance and calibration procedures sometimes call for operation of the unit with power applied and protective covers removed. Read the procedures and heed warnings to avoid “live” circuit points.

Before operating this instrument:

1. Ensure the proper fuse is in place for the power source to operate.

2. Ensure all other devices connected to or in proximity to this instrument are properly grounded or connected to the protective third-wire earth ground.

If the instrument:

- fails to operate satisfactorily
- shows visible damage
- has been stored under unfavorable conditions
- has sustained stress

Do not operate until performance is checked by qualified personnel.

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# List of Tables

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# DOCUMENT CHANGE HISTORY

| Revision | Date | Description of Change |
|---|---|---|
| A | 06/13/2011 | Document Control release |
| | | |
| | | |

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# Chapter 1
# Introduction

The 200B Clipper Module is designed to provide constant drive to the Air Modulator Valve over the rated frequency range, and to prevent over modulation of the valve during either a sine or random acoustic test.

The unit has selectable filters compatible with EPT 948, EPT 200, EPT 110, or EPT 1094 Electro Pneumatic Modulator Air Valves.


**Figure 1-1, 200B Clipper Module (Front View)**

Features include:

- Master gain control
- 10:1 clipper ratio
- SE-ISO output
- Install up to six modules in a chassis
- Clipper set control
- Single-ended (SE) or Differential (Diff) Input
- Interlock circuit
- 115 or 230 VRMS selectable power input


**Figure 1-2, 200B Clipper Module (Rear View)**

# Description

The 200B/Clipper Module is designed to provide clipping with an adjustable clipper ratio and filters to accommodate four different Electro Pneumatic modulator valves used in acoustic testing.

# Specifications

## Signal Input

| | |
|---|---|
| Impedance | Greater than100 K Ohms |
| Maximum Level | 2 Volts RMS |
| Frequency Response | 5 Hz to10 KHz |
| SE-DIFF Switch | Selects SE (single ended) or DIFF (differential Input) |

## Signal Output

| | |
|---|---|
| Impedance | Less than 50 Ohms |
| Maximum Level | 30 volts pk to pk |
| Distortion (No Filter) | 1% 10 Hz to 2 kHz |
| SE-ISO Switch | Selects SE (single ended) or ISO (isolated) output |

## Clipper Monitor

| | |
|---|---|
| Impedance | Less than 100 Ohms |
| Clipper Ratio | Adjustable from 10 to 1 |

## Power

| | |
|---|---|
| | 115 or 230 VRMS (50 or 60 Hz)<br>Less than 20 watts |

## Dimensions

| | |
|---|---|
| | 7” (H) x 2.7” (W) x 14” (D) |

## Chassis Types

| | |
|---|---|
| 19” (wide) by 7” (high) rack-mounted chassis | TT-4416 |
| Single, portable carrier | TT-4216 |

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# Chapter 2
# Installation

## Installation into a Chassis

When the unit is received, unpack and inspect it for shipping damage.

Up to six of the 200B Clipper modules can be installed in a 19" x 7" rack-mounted chassis (TT-4116). Proper connections for the unit are listed in **Table 2-1**.

Mount the chassis into a 19-inch relay rack using binder head screws (10-32 x 1/2). Install the modules into the chassis. Make the operational connections described in **Table 2-1**.

The 200B Clipper module can also be installed in a single, portable carrier (TT-4216) as shown in **Figure 1-1**.

**Table 2-1, 200B Proper/Operational Connections**

| Connection | | Function |
|---|---|---|
| INPUT | BNC J1-2 Center | Input Signal to 200B |
| | BNC J1-1 Shell | Toggle switch SE or DIFF |
| CLIPPER MONITOR | BNC Center | Signal from clipper circuit |
| | BNC Shell | Signal from ground |
| CLIPPER OUTPUT | BNC Center | Clipper Output |
| | BNC Shell | Toggle switch SE-ISO |
| AC PWR INPUT | | 115 or 230 V 50/60 Hz, primary power<br>Caution: ensure that S6 switch on the 200B circuit board is properly positioned for voltage used. |
| INTERLOCK | SP | Spare |
| | TB1–(GND) | Digital GND |
| | TB1–RST | Connect RST to GND for EXT Reset |
| | TB1-LOGIC (TTL) | Interlock Logic (Output) |

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# Chapter 3
# Operation

The electronics for the 200B Clipper is packaged on a single printed circuit board **(Figure 3-1)**. An internal 115-230 switch (S6) selects for operation with 115 or 230 VRMS power.

***WARNING***

**DO NOT APPLY 230V RMS power with the 115-230 switch in the 115 V position as it could damage the unit.**

Prior to use with the acoustic system, the clipper RATIO FILTER selection and GAIN must be set to accommodate the Pneumatic Modulator Air Volt being used.

## Filters

The 200B has four filter profiles as shown in **Figures 3-2 through 3-3**. The output of each filter can be selected by a movable jumper on the internal printed circuit board **(Figure 3-1)**. The filters are marked FILTER 1 thru FILTER 4, and are designed to accommodate the different air modulators. (See **Figure 3-2** for the equalizer level versus frequency responses).

***NOTE: The jumper locations are marked FILTER 1 thru FILTER 4. Remove the jumper and select the appropriate Filter.***

| FILTER | MODULATOR |
|---|---|
| FILTER-1 | EPT-948 |
| FILTER-2 | EPT-200 |
| FILTER-3 | EPT-110 |
| FILTER-4 | EPT-1094 |

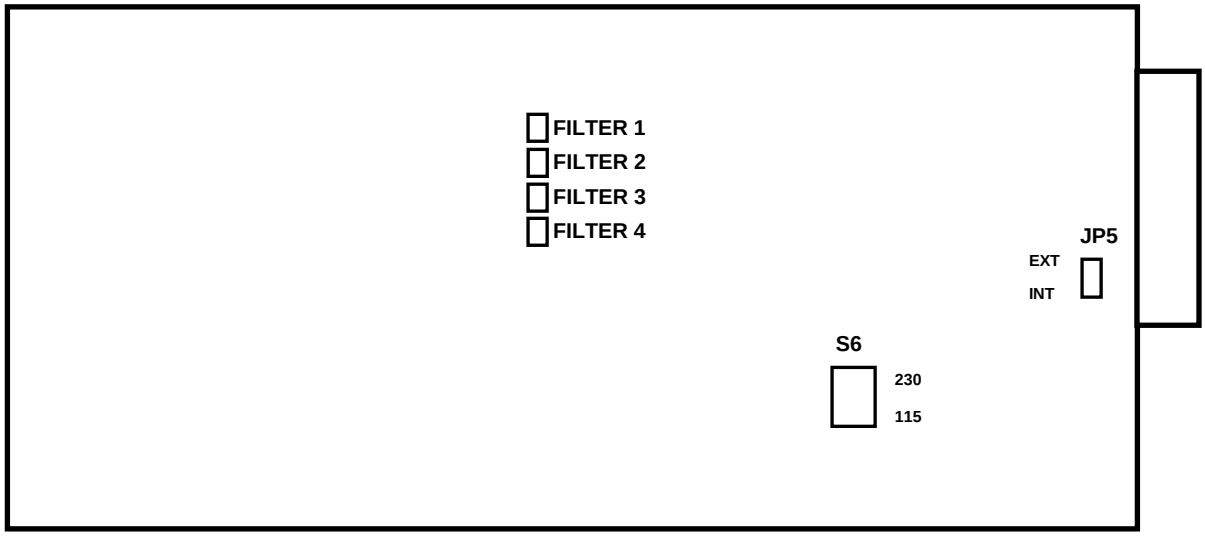


**Figure 3-1, 200B Printed Circuit Board Layout**

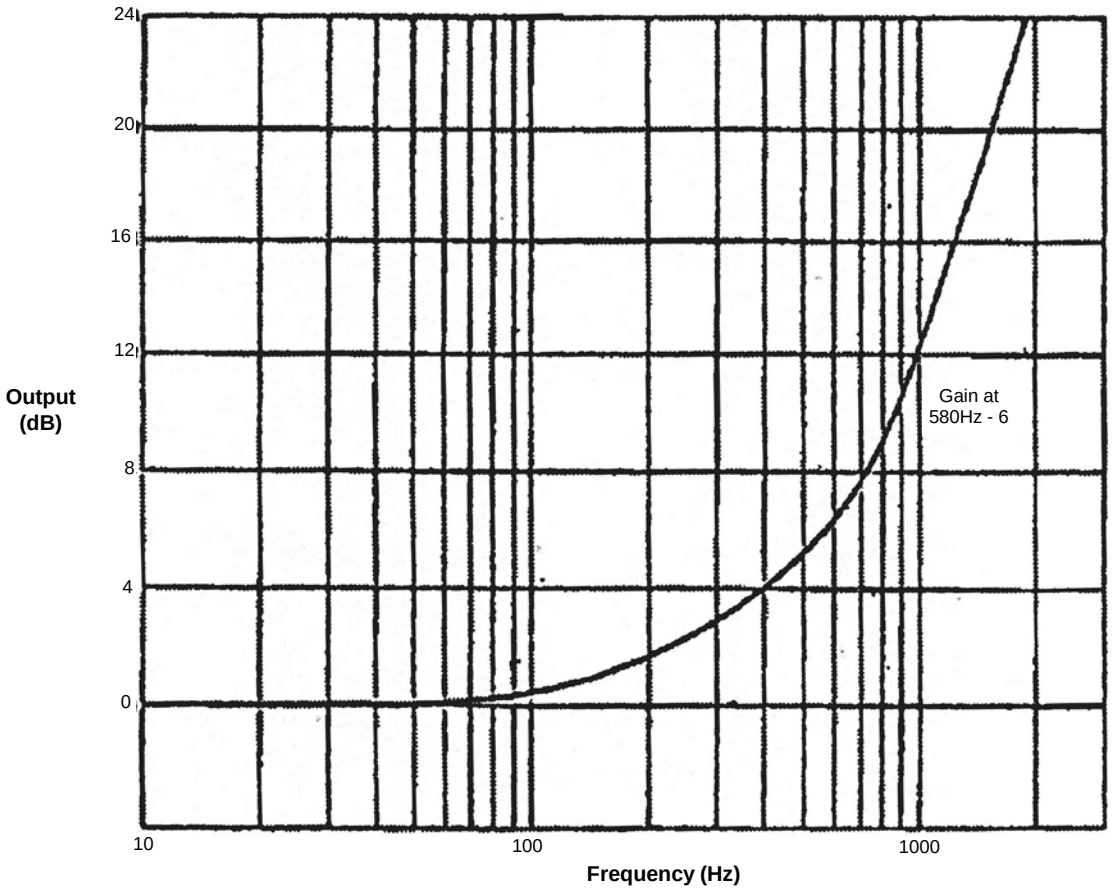


**Figure 3-2, Filter 1 Equalizer Frequency Response**

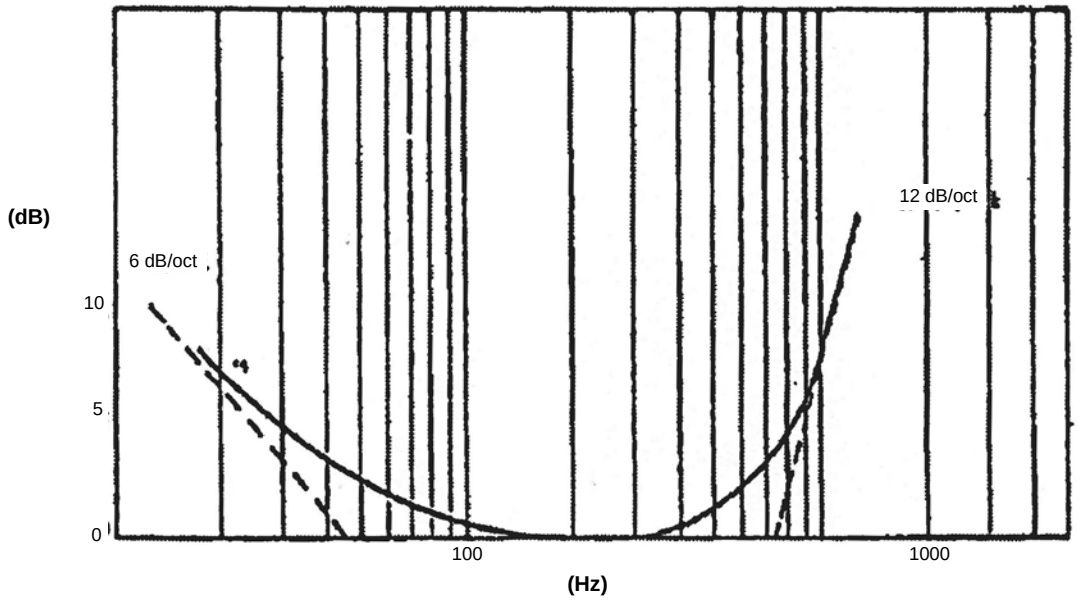


**Figure 3-3, Filter 2 Equalizer Frequency Response**

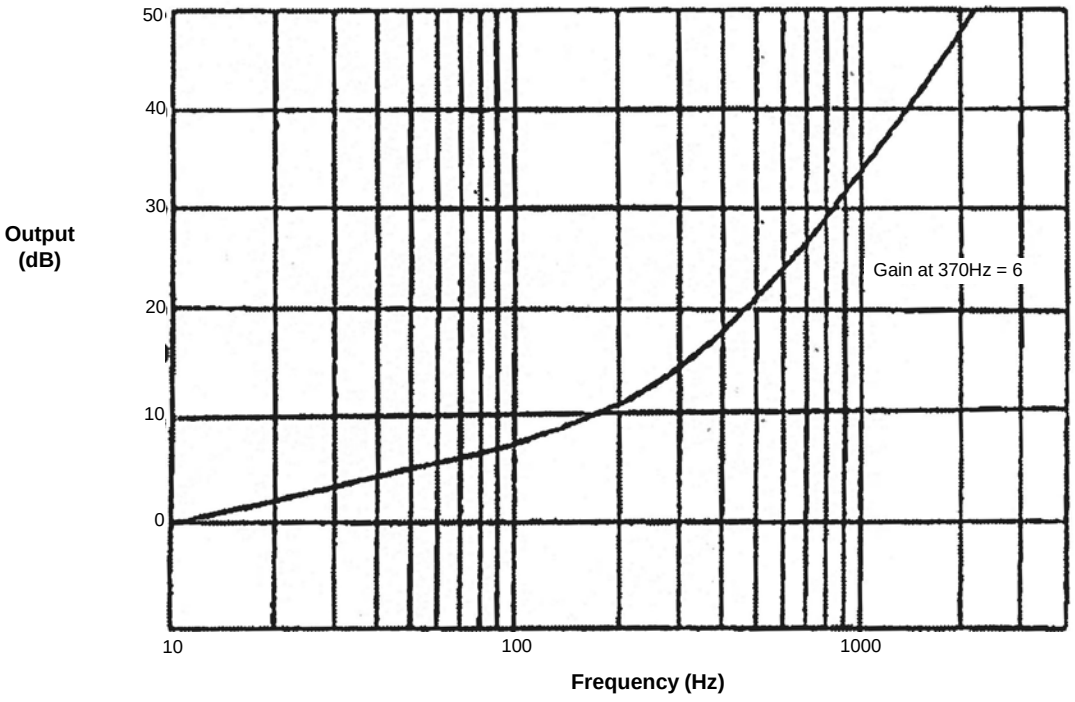


**Figure 3-4, Filter 3 Equalizer Frequency Response**

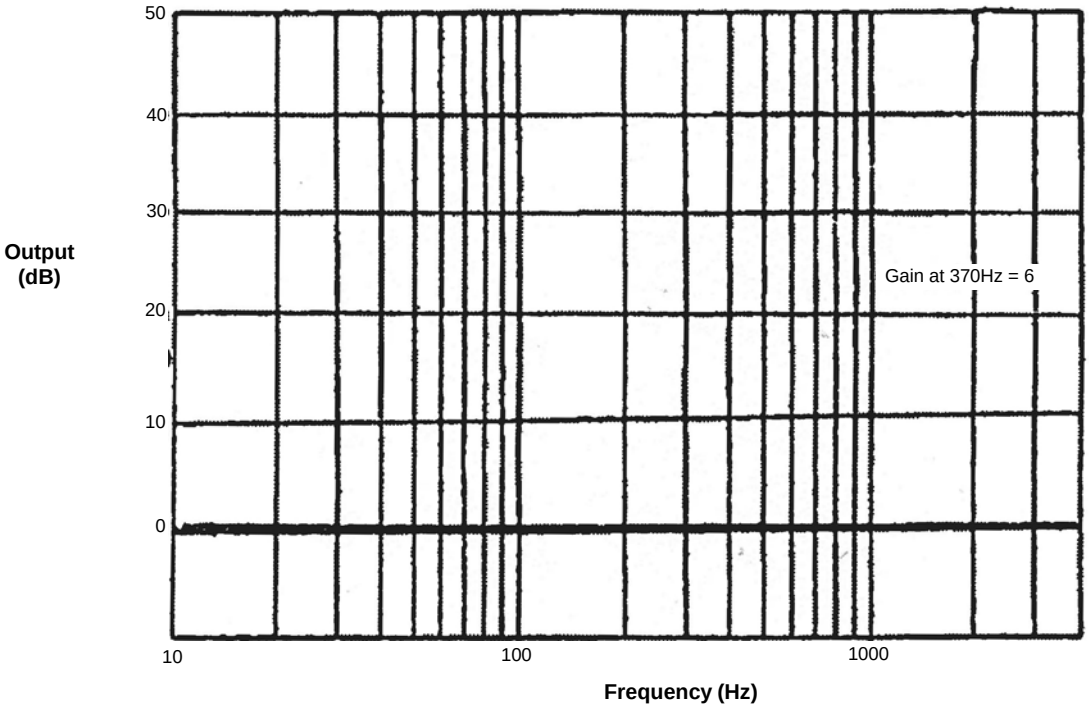


**Figure 3-5, Filter 4 Equalizer Frequency Response**

## SE-DIFF Switch (Rear Panel)

The position of the SE-DIFF toggle switch in the DIFF (differential) position provides common mode when noisy grounds are encountered. When grounds between the INPUT of the CLIPPER and the OUTPUT of the GENERATOR are common the SE (single ended) position should be used.

## Master Gain Control

When power is applied to the unit, the Interlock LED is illuminated and the output is shorted to signal ground. When the MASTER GAIN is turned completely CCW to detent, the LED goes out and the output short is removed. Set the MASTER GAIN control to mid range.

## Clipper Set Control

The setting of the Clipper Set Control requires a 200 Hz sinewave with a level of 200 mVRMS at the Signal Input. Turn the Clipper Set Control for a 1.41 ±.05 indicator on the Clipper Ratio Meter. When the operating signal is applied, this control may need to be changed to accommodate the change in level at the INPUT as corrected by the GAIN SET control setting.

## Gain Set Control

With the controller input setting used for the test, adjust the GAIN SET control and Power Amplifier GAIN as necessary to derive full modulation of the Pneumatic Modulator air valves.

If the drive level at the input is increased or decreased, it will affect the CLIPPER RATIO. Adjust the CLIPPER SET and GAIN SET for the desired operating level and clipper ratio.

## SE-ISO Switch (Rear Panel)

The purpose of the SE-ISO switch at the CLIPPER OUTPUT is to provide a way to remove a ground problem if encountered. The switch will normally be in the SE (single ended) position. If a ground problem exists, the ISO (isolated) position will provide COMMON MODE between the grounds of the OUTPUT of the CLIPPER and the INPUT to the POWER AMPLIFIER.

## Interlock Circuit

The interlock circuit can be controlled either INT (Internally) or EXT (Externally). JP5 jumper (**Figure 3-1**) marked INT-EXT should be placed in the desired position.

When in the INT position, the interlock is RESET by the CCW detent of the MASTER GAIN control. When the interlock is RESET, the LED is OUT. When in the EXT position, the RESET is accomplished by removing the short between the RST and the GND terminal, momentarily.

When the interlock LED is on, the TBI–LOGIC (TTL) will go Low indicating an interlock condition. In the normal operation the LOGIC is high.

## 6 Module (ISO-COM)

The purpose of the ISO-COM Switch is to either connect the chassis ground to Signal ground or isolate them from each other.

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