

Configuring and Caring for your PM1 Power Multiplexer

Unlike other devices in the TDT System II family, the PM1 is designed to pass high-current signals from power amplifiers out to speakers. However, it is still susceptible to over-current and over-voltage conditions. This guide is intended to assist you in setting up your equipment to prevent damage to your PM1.

Preventing Over-Voltage Conditions

The most common cause of PM1 failure is the application of high voltages to the PM1 inputs. An amplifier that is designed to deliver 100 watts to an eight-ohm speaker can produce voltages in excess of 40 volts. These voltages create over-current conditions and can produce high voltage spikes at the PM1.

For the protection of your PM1, set up your system so that worst-case conditions will not create voltages over 10 volts. The following are some ways to prevent over-voltage conditions from occurring:

Set your amplifier to unity gain. The maximum output voltage of TDT equipment is 10 volts, so a unity-gain amplifier will never exceed the limits of the PM1. Some amplifiers have a screwdriver gain adjustment. Others have front-panel adjustments.

<p>Important! Always measure the worst-case output voltage of your amplifier before connecting its output to the PM1.</p>

Place an attenuator on the input to your amplifier. If your amplifier does not have a

suitable gain adjustment, or if the gain adjustment might be changed accidentally, try a passive attenuator (resistor network) on the input to the amp.

For an amp with 10k input impedance, a 1k pot might be sufficient for passive attenuation. Connect the center leg to the amp input (+), one of the outer legs to ground (-), and the remaining one to the source output.

Turn off the signal before switching channels. Since the PM1 does not have control over the input signal, it may be asked to turn on or off a channel when the signal input is non-zero. This creates a DC "pop" that is audibly unpleasant and that may create voltage transients across the PM1 outputs.

Where possible, in software turn off the signal to the PM1 before switching channels on or off.

Preventing Over-Current Conditions¹

Make sure loads are at least eight ohms. For a 10 volt (peak) signal, the maximum current will always be less than 1 amp.

If you wish to use low-impedance loads (less than eight ohms), consider using a passive attenuator as described in the previous section. Set it so that the maximum voltage out of the amplifier will not create a current greater than 1 A for the connected load.

¹ Revision B (Dec 1996) of the PM1 includes self-resetting fuses that trip at 1.5 amps.

Protective Measures

Fuses can protect your PM1 from gross overloads, but they don't have the quick response time that may be necessary to prevent damage to the PM1. "Fast-acting" fuses take 4 hours to burn out at the rated load, and 15 seconds at twice the rated load. In general, a 500 or 750mA fuse on each of the inputs is the best choice for protecting your PM1. They will allow brief, high-power bursts, but will interrupt prolonged over-current conditions.

Transient Voltage Suppressors (TVSs).²

TVSs across the inputs and outputs suppress voltage spikes that can damage the PM1 solid state switches. These devices protect the equipment by becoming a short circuit when the voltage across them exceeds a fixed voltage. These devices are only useful for short transients, and will quickly burn out (and become ineffective) for over-voltage conditions exceeding a few tenths of a second. TVSs are **not** a substitute for fuses or careful planning.

Other Things to Watch for

Instantaneous current amplifiers have power-boosting features to compensate for the changing frequency response of some speakers. These types of amplifiers may dramatically increase their power output for brief periods of time when a PM1 channel is switched off (the amplifier sees the output impedance rise sharply). TDT recommends that such amplifiers **not** be used with the PM1.

Multiple-amplifier configurations.

Multiple PM1s can be wired to direct the outputs of several amplifiers to an array of speakers. Make sure that your software handles the switching in such a way as not to connect two amplifiers to the same speaker. This will connect the outputs of the two amplifiers together, which can quickly cause an over-current condition.

Fusing the inputs of all your PM1s may prevent extensive damage from occurring to either the amplifiers or to the PM1.

² TVSs have been added to Revision B of the PM1.