



# THUNDER<sup>®</sup>

## TA92001 Owner's Manual

### Introduction

Thank you for choosing MTX to help reach the ultimate goal with your vehicle. Adding MTX amplifiers and matching MTX speakers and subwoofers with StreetWires connections will put you in a better position to hear, feel, and experience all of the music the artist intended.

### Specifications

#### Primary Ratings

Power Output: 1,000 watts RMS x 1-channel at 4 ohm and  $\leq$  1% THD+N

Signal-to-Noise Ratio (1 watt):  $>65$ dB

#### Secondary Ratings

Power Output: 2,000 watts RMS x 1-channel at 2 ohm and  $\leq$  1% THD+N

Power Output: 3,000 watts RMS x 1-channel at 1 ohm and  $\leq$  1% THD+N

Power Output: 4,000 watts RMS x 1/2-channel\*\* at 4 ohm and  $\leq$  1% THD+N

Power Output: 6,000 watts RMS x 1/2-channel\*\* at 2 ohm and  $\leq$  1% THD+N

\*\* Two Amplifiers Strapped

THD+Noise (Distortion) (1 watt):  $\leq$  .5%

Frequency Response (-3dB): 20Hz-200Hz

Maximum Input Signal: 10V

Maximum Sensitivity: 100mV

Dimensions: 9-5/8" x 24-11/16" x 2-1/2" (245mm x 625mm x 65mm)

Patented Smart Engage™ Auto-Turn-On (Patent No: US06556683)

Patented Adaptive Class D Technology (Patent No: US06753729)

Patented Power Supply (US05598325)

Input Sensitivity Switch: 100mV-1V/1V-10V

Crossover: Low @ 40Hz-200Hz, 24dB

Subsonic @ 20-50Hz, 12dB/oct

Parametric EQ: Boost/Cut +/-12dB, Freq. 30Hz-80Hz, Q 0.5-4.0

Remote Subwoofer Level Control

Selectable Phase: 0 or 180 degrees

Defeatable feature Bypass

### Features

1. Prizm EFX – All MTX amplifiers include backlit adjustment controls on the top surface of the product.
  - Color – The backlit controls offer unlimited colors on the display -- from RED, GREEN, and BLUE to any color in between.
  - EFX – You can switch Prizm EFX lighting to “pulsate” with the beat of the music.
2. Xtant Technology Cooling (XTC) – A thermal-regulated turbo-charged intercooler supplies fan forced cool air evenly and constantly through tightly packed bonded fins. Fan speed is continuously variable and controlled by amplifier's output, temperature of the heatsink and transformers. Exhaust from the internal heatsink is strategically positioned to cool the transformers to maintain maximum performance at all volumes.
3. Bi-Level Inputs with Smart Engage™ – All MTX amplifiers feature RCA type input connections. All MTX amplifiers allow both high level and line level input into the RCA type input connections.
  - Low Level Input – Source units with an output signal level of 100mV–10V may be used. See “Input Sensitivity” for proper voltage level setting.
  - High Level Inputs with Smart Engage™ – All MTX amplifiers allow high level inputs through RCA type input connections using provided high level adapters. Source units with an output signal level of 100mV–10V may be used. See “Input Sensitivity” for proper voltage level setting.

• Smart-Engage™ Auto-Turn-On – An auto-turn-on circuit is included within the amplifier. A remote turn-on wire is not necessary when connecting the amplifier's high level input to a high-powered source unit (car stereo). The amplifier will automatically turn on when music is received through this type of connection. Note: Smart Engage™ is only active on the left input.

4. Input Sensitivity – The Input Sensitivity switch is used to set the proper input voltage range:

X1 POSITION: 100mV–1V (Typically for RCA Input)

X10 POSITION: 1V–10V (Typically for Speaker Level Input)

5. Gain Control – This feature is used to fine-tune the input sensitivity of the amplifier to the source unit's output level.
6. Variable 40Hz-200Hz Low-Pass X-over with 24dB per octave Slope – This control allows the user to choose the exact low pass frequency range the amplifier will play for the best possible performance. The upper crossover frequency point can be selected from 40Hz–200Hz at 24dB per octave.
7. Variable Subsonic Filter – This feature limits the lower end of the frequencies sent to the subwoofers. The subsonic feature includes a control knob used to adjust the subsonic setting from 15Hz-60Hz at 12dB per octave.
8. Parametric Equalizer – This one band parametric equalizer provides individual frequency, Q/bandwidth, and +/-12dB gain adjustment controls. Any frequency from 30Hz to 80Hz can be chosen and boosted or cut up to 12dB. The "Q" ranges from 0.5 to 4.0 in value allowing a wide variety of bandwidth adjustment to address the subtle tuning requirements common to mobile audio systems.
9. Remote Subwoofer Level Control (Remote Gain) – This port allows the use of the optional "remote level control". The Remote Subwoofer Level Control is a bass control module that can be installed in any location within the vehicle for remote adjustments.
10. Phase Switch – The phase select switch allows you to invert the amplifiers output phase by 180 degrees to ensure the frequency interaction between the speakers is consistent within the vehicle. This also enables the advanced bridging operation when using two amplifiers on one speaker.
11. Processor Bypass – This feature routes the audio signal to around all enhancement features and crossover filters to achieve a purely flat response for use with outboard processors.
12. StreetWires Connectors – All MTX amplifiers include StreetWires connectors for efficient current and maximum voltage transfer.
13. Speaker Connection – Two sets of speaker terminals are provided for dual woofer applications. When connecting a single woofer, use only one set of speaker terminals (8 and 9 series are bridgeable with Phase Switch).
14. Power Terminals – This is the main power connection for the amplifier. The power and ground wire size should be the same gauge.
  - GND: The ground wire from this connection must be attached to bare metal on the vehicle. The distance to the ground should be as short as possible and no more than 18".
  - REM: To turn the amplifier on/off, this terminal must be connected to the source unit's "remote or electric antenna" wire.
  - +12V: The power wire from this connection must be attached to the positive side of the vehicle battery.
  - CAP+: Capacitor Positive Input - The ideal connection point for the positive sides of the capacitor to increase the amplifier's performance.
  - CAP-: Capacitor Negative Input - The ideal connection point for the negative side of the capacitor to increase the amplifier's performance.

## Before Starting

MTX recommends that you have your new Thunder amplifiers installed by an authorized MTX retailer, preferably MECP certified. If you do decide to do it yourself, make sure you have read the instructions carefully and have the following tools:

- Electric drill
- Phillips bit or screwdriver
- 1/8" bit
- Wire cutters/crimpers
- Safety glasses
- X-Acto knife
- VOM

Disconnect the vehicle's negative battery connection. Any deviation from the recommended connection procedures may cause serious damage to the amplifier, speakers, and/or vehicle electrical system. Please double check the connections before turning the system on.

## Installation Mounting

Place your Thunder amplifier at the predetermined mounting location. Use a felt pen to mark the exact position of the mounting holes on the mounting surface. Set the amplifier aside. Then with a sharp, precise blade cut small circles in the carpet and padding around the four marks denoting your mounting holes to expose the metal underneath. Use a center punch to make an indentation in the metal to ensure that you drill the exact position for the screws.

Note: Please use common sense and make sure that all vehicle wires, gas lines, brake lines, etc. are clear and will not interfere with the installation. ALWAYS WEAR PROPER SAFETY GLASSES.

## Connections

1. Bi-Level Inputs (Low/High Level Input) with Smart Engage™ –

Both a low and high level signal can be used. Be sure to lay the signal wire away from all power cables and vehicle computers. Use high quality twisted pair interconnect cables to decrease the possibility of radiated noise entering the system.

- Using RCA Connections: If the source unit has RCA outputs, simply attach a signal cable from source unit to the amp's RCA input. This will provide signal to the amp.
- Using Speaker Level Connections: If the source unit does not have RCA outputs, a high level signal can be used instead by taking the supplied high level RCA adapter cables and connecting the bare wire ends to the vehicle's rear speaker wiring. Connect the left negative speaker wire to the green with black stripe wire on the supplied high level RCA adapter. Connect the left positive speaker wire to the solid green wire. Do the same for the right speaker connection using the purple wire. Now plug the RCA connectors into the amp's inputs.

2. Speaker Wire Connections – When installing the speaker wires, please take proper measures to protect them. For example, when connecting the door speakers, the speaker wire should run from the amplifier's output terminals, under the carpet, and through the factory rubber boot (loom) that protects the wires in the inner door jam. If the factory boot cannot be used, take other measures to protect these wires. Sometimes the door has to be completely removed to use the factory boot. If this is something that you do not feel comfortable doing, please ask a professional to help you.

When connecting the speaker wires to the amplifier please observe the printed polarity markings on the amplifier's StreetWires connector. Failing to wire the speakers in proper phase could result in a loss of bass response and/or poor overall sound quality.

These amps will have two PARALLEL speaker terminals, a positive and negative for a single woofer and OPTIONAL second set of positive and negative terminals for a two woofer configuration. These amps can drive a minimum of a 1 ohm load.

- Strapping Two Amps: Strapping two Thunder TA92001 amplifiers together has never been easier. When two Thunder TA92001 amplifiers are strapped, you can expect power output in excess of 8,000 watts and a total current draw of around 600 amps. Please see Power Terminals for suggested electrical system upgrades.

To successfully link the two amplifiers together you will have to follow the steps below carefully. The following information will explain how to configure each amplifier so one becomes the "positive" (Push) amplifier and the other becomes the "negative" (Pull) amplifier. Just follow the steps below and you will be on your way to massive amounts of power.

- 1) Label the first amplifier as the Positive amp. Then set the phase switch on this amp to the 0 degree setting. Now label the second amplifier as the Negative and set the phase switch on that amplifier to the 180 degree setting.
- 2) The interconnects coming from the source unit need to be split into each of these two amplifiers. Using a "Y" connector, split the "Left" side of the interconnect from the source so that it can go into the "Left" RCA input receptacles on each amplifier. Using another "Y" connector, split the "Right" side of the interconnect into the "Right" RCA input receptacles on the amplifiers in the same way.
- 3) Only the positive speaker terminals on each amplifier will be used as the connection points for the speaker. Connect the positive side of the speaker wire to the positive terminal of the amplifier labeled Positive. Connect the negative side of the speaker wire to the positive terminal of the amplifier labeled Negative. Make sure that the impedance of the subwoofer is no lower than a 4 ohm load. This is important in order to avoid possible damage to the amplifier.

Running two amplifiers strapped will require "gain matching." This will require source material that includes test tones and a volt ohm/multi meter. Please see "Adjusting Individual Gain Controls"

Note: Please pay attention and make sure the speakers or woofers are the correct IMPEDANCE (OHMS) BEFORE attaching to the amplifier.

3. Power Terminals – Please take proper measures during installation to protect the power wires as best you can. For example, when running the power cable from the vehicle's battery through the firewall, use a firewall bushing for protection. Run the power wire through the interior of the vehicle, under the carpet, and to the amplifier. If this is something that you do not feel comfortable doing, please ask a professional to help you. Be sure to lay the power wire away from all signal cables.

When connecting the power wires to the amplifier please observe the printed markings on the amplifier's StreetWires power connector. Failing to wire the power cables properly could result in amplifier damage.

- +12V: This is the main power input for the amplifier and must be connected directly to the positive terminal of the car battery for the amplifier to operate properly. It is important that a main fuse is installed a maximum of 18" from the battery.
- GND: This is the ground connection for the amplifier and must be connected directly to the metal chassis of the vehicle for the amplifier to operate properly. A properly grounded amplifier can be run harder and longer than a poorly grounded amplifier. The ground on the amplifier should be as short as possible and be connected directly to the vehicle's metal chassis. Do not connect to factory bolts of ANY kind. When attaching the ground to the chassis, sand all the paint away from the contact point. A grounding block like the StreetWires GT0 should be used whenever possible as this piece of equipment has 5 times the surface area of a normal screw.

The gauge of the power and ground wire is often an overlooked aspect of amplifier installation. The more power the amplifier receives, the more power it will produce. Power cables have a natural resistance, and will lose voltage by the time the power makes its way to the amplifier. The larger gauge (diameter) wire will hold more voltage over longer runs. Also, by having a larger diameter ground wire, the amplifier can run more efficiently. MTX recommends using a minimum of 1/0 gauge power and ground cables to get the best performance.

- REM: This connection turns the amplifier on and off and needs to be connected to a remote turn-on wire from your source unit if you are using a low level input connection.

Note: When numerous amplifiers are used in the same system, look into using a relay with a separate power wire connected to an alternative power source to take the strain off the source unit. Normal source units can only keep a constant 12 volts to 2 or possibly 3 amps. This wire should also be run away from the RCA cables.

- CAP+: This 4 gauge terminal is internally wired in parallel with the +12V on the StreetWires Power connector. It is the ideal connection point for the positive side of a capacitor to increase the amplifier's performance.
- CAP-: This 4 gauge terminal is internally wired in parallel with the GND on the StreetWires Power connector. It is the ideal connection point for the negative side of the capacitor to increase the amplifier's performance.

Note: When strapping two of these amplifiers, it is important to remember that in order to get the desired power out of them, you have to supply them with the power they need. With the current draw these amplifiers are capable of pulling, we at MTX highly suggest upgrading to a dual alternator setup at 600 A. At the same time, you must upgrade the stock battery and add a couple more batteries to the system. We recommend a minimum of three batteries with a cold cranking amp (CCA) rating of 725 or more. Please remember to install a minimum of 1/0 AWG power and ground cable for the electrical system upgrades and the amps. Just adding extra batteries will not solve the need for power; it will actually put more of a load on the alternator, in turn yielding less power to the audio system.

Double check all the previous connection installation steps, in particular the speaker and power wiring. Securely mount the amplifier. If everything is in order, reconnect the vehicles negative battery connection and begin following the feature setup and adjustment steps.

#### Feature Setup and Adjustments

##### 1. Selecting the Input Sensitivity Range –

Before you turn on your system, you must select the proper input sensitivity range on your amp using the button labeled INPUT SENS located in the GAIN CONTROL section of the control panel.

- Setting for Aftermarket Source Units: Refer to your aftermarket owner's manual for line level output specification. If the specification is not available, please follow the instructions listed below.

X1 POSITION: 100mV–1V (Typically for RCA Input)

- Setting for Factory (OEM) Source Units: To check the amount of voltage that is present from the source unit, take a multi meter, or a volt/ohm meter, on the AC setting, (range from 100mV up to 10 volts) attach the positive and negative leads directly to any exposed speaker. It will not matter if the polarity is correct, it will read the same amount of voltage.

X10 POSITION: 1V–10V (Typically for Speaker Level Input)

Note: It is important not to have the amp set up to receive a low voltage signal and give it a high voltage signal. Doing this can cause damage to the amp.

2. Adjusting the Gain Control – Before you start setting your amp gains, be sure to defeat all EQs ("off" position). You want to set the gain levels properly BEFORE applying any equalization.

Start with the source unit's volume around  $\frac{3}{4}$  of the way up and the gain on the amp all the way down (counter-clockwise). Slowly increase the gain clockwise until the speaker starts to distort. Immediately decrease gain until the distortion goes away. This will be a good reference point on the volume control to where the signal starts to distort. Remember every CD will be different; use common sense and constantly listen for obvious distortion and adjust volume accordingly. The gain on the amp has nothing to do with how much power the amp can produce, just how fast the amp puts out max power. Just like in an automobile, full throttle is very rarely needed.

Note: When adjusting the gains for two amplifiers strapped, you must adjust each amplifier's gain, frequency, and EQ so you will be able to "match" the two amps and ensure both amplifiers are sending the same ac voltage to the woofer. This will require source materials that include test tones and a volt ohm/multi meter.

- a) Set the volume around half, play a flat tone (60-80 Hz) through your head unit and hit repeat. Use this same frequency and volume for the entire process.
- b) Set your multi meter on ac voltage and connect it to the Positive amplifier's positive and negative output terminals.
- c) Switch the multi meter between the amps and make the necessary adjustments so that the flat tones produced match. If you have access to two multi meters, simply place one on each amplifier's terminals and make the adjustments.

##### 3. Adjusting the Low, 24dB @ 40Hz-200Hz Variable Low Pass X-over Frequency Controls–

- Setting for Subwoofers: Using "X-OVER" you have control over what frequency you want your amp to start crossing over your signal. By turning this control all the way counter-clockwise, you are crossing the signal over at 40Hz (the range is counter-clockwise 40Hz to clockwise 200Hz). This means that the amp will send the woofers frequencies from 20Hz to 40Hz and then start to taper down as the frequencies get over 40Hz (24dB/octave roll off). The industry standard for low pass crossover point is right around 90Hz. However, by experimenting with the crossover point (higher or lower) you will find what sounds best in this install. The decibel per octave roll off (dB/oct) means how fast the amplifier tapers down as the frequencies get higher. This amp uses a 24 decibel per octave roll off, which is pretty steep, or tapers off fairly quickly from the crossover point. This design complements both the subwoofer and mids to provide greater musical detail.



4. Setting the 20Hz–50Hz, 12dB Variable Subsonic Filter – This feature will help remove some of the potentially damaging low frequencies from your subwoofer system. By turning this control all the way counter-clockwise you are limiting the signal below 20Hz. By turning this control all the way clockwise you are limiting the signal below 50Hz. Start at 20Hz and adjust this feature until your bass response sounds smooth and detailed.
5. Adjusting the Parametric Equalizer – In some applications, the bass amplifier needs some help in boosting or cutting certain frequencies. A parametric equalizer is distinguished from a conventional equalizer circuit in that it allows the user to control the level of the boost or cut, as well as the center frequency and the bandwidth of the boost or cut (the range of frequencies affected).

The following steps describe what each of the three controls of the parametric Bass EQ do in isolation. It is important to understand these behaviors, because they must all be considered when setting up the EQ.

- Setting the “Q”: The “Q” feature can be adjusted to affect a range of frequencies from as wide as 0.5 to as narrow as 4.0 and as a general rule of thumb, start tuning with a “Q” setting below “2”. Higher “Q” values are rarely needed unless there is some truly bizarre acoustic problem in the system. Lower “Q” values give you a broader (and usually more natural-sounding) effect. A “Q” of “1.6” (10 o’clock setting) is a good starting point.
- Setting the Frequency: Begin listening for the loudest musical spot or range within the bass range of your sound system. Adjust the center frequency to match this point. For most systems, the best “Center Frequency” adjustment will be between 40-50Hz. Use 45Hz (12 o’clock setting) as a starting point and adjust up or down gradually.
- Setting the Boost/Cut: Once you determined the loudest musical spot or range within the bass range of your sound system, start cutting until the response is smooth and even. You can also boost low spots within the musical range, but don’t go crazy with the boost knob. There is a lot of boost available, 12dB, but begin with a low boost setting (around 3dB) and try to stay below 6dB whenever possible. Remember that for every 3dB of additional boost you dial in, you are asking the amplifier to double its power output for a given signal in the boost region.

6. Remote Subwoofer Level Control (Remote Gain) – Let’s say the amplifier’s gain is set at halfway. When the remote subwoofer level control is plugged in, you now have external control of the gain from zero to halfway. The installation of this level control is NOT necessary to get full power from amplifier.

Note: One Remote Subwoofer Level Control can control two or more amplifiers using a mini plug Y-adapter.

7. Setting the Phase – Depress the PHASE button to ensure the subwoofer interacts correctly between the mid-bass or midrange speakers. The PHASE button is located in the PROCESSOR section of the control panel. Whether you want the position of the phase at 0 degrees or 180 degrees will be determined once you hear your audio system produce smooth, tight and louder bass. You need to try both 0 and 180 positions to hear the difference.
8. Processor Bypass – The “PROCESSOR BYPASS” switch has two modes of operation, on or off. If the switch is set to “ON” position, all Crossover filters and EQ controls are bypassed, leaving only the operation of the gain control adjustments. If the switch is set to “OFF” position, all Crossover filters and EQ enabled.
9. Prizm EFX – Now that you have completed adjusting all your amplifier settings, you can set the lighting effects to your personal taste.
  - Selecting Colors: You can change the backlit colors simply by turning the Pot labeled PRIZM COLOR located in the MTX PRIZM EFX section of the control panel left or right. Starting at the left most position, the colors range from RED to GREEN, BLUE, and then RED again. You can choose any color in between making the combinations unlimited.
  - Selecting the EFX Feature: You can switch Prizm EFX lighting to “pulsate” with the beat of the music. Simply depress the button labeled PRIZM EFX located in the in the MTX PRIZM EFX section of the control panel to turn this feature on or off.

## Trouble Shooting

Read this if you want to be a do-it-yourselfer or give us a call at 800-CALLMTX.

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
No LED indication	No +12V at remote connection No +12V at Power connection Insufficient ground connection Blown power fuse	Supply +12V to terminal Supply +12V to terminal Verify ground connection Replace fuse
LED on, no output	Volume on head unit off Speaker connections not made Gain control on amplifier off Signal processing units off All speakers blown	Increase volume on head unit Make speaker connections Turn up gain Apply power to signal processor Replace speakers
Output distorted	Head unit volume set too high Amplifier gain set too high	Lower head unit volume Lower amplifier gain
Balance reversed	Speakers wired L + R reversed RCA inputs reversed	Wire speakers with correct orientation Reverse RCA input
Bass is weak	Speakers wired out phase Not using MTX woofers	Wire with correct of phase Buy MTX woofers
Blowing fuses	Excessive output levels Amplifier defective	Lower volume Return for service

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