



# THUNDER<sup>®</sup>

## TA91002 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: 250 watts RMS x 2-channels at 4 ohm and  $\leq$  1% THD+N

Signal-to-Noise Ratio (1 watt):  $>$ 71dB

#### Secondary Ratings

Power Output: 500 watts RMS x 2-channels at 2 ohm and  $\leq$  1% THD+N

Power Output: 750 watts RMS x 2-channels at 1 ohm and  $\leq$  1% THD+N

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

Power Output: 1,500 watts RMS x 1 bridged at 2 ohm and  $\leq$  1% THD+N

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

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

Maximum Input Signal: 10V

Maximum Sensitivity: 100mV

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

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

Patented Pure N-Channel Technology (Patent No: US05631608, US05783970)

Patented Power Supply (US05598325)

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

Crossover: Hi, 12dB / Low, 24dB Mono @ 40Hz-350Hz, Defeat

Subsonic @ 30Hz, 12dB/oct, Defeat

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

ARC: Cut 0-15dB, Freq. 200Hz

Remote Subwoofer Level Control

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 the amplifier's output level, temperature of the heatsink and transformers. Exhaust from the internal heatsink is strategically positioned to cool the transformers and 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. Individual Gain Control – This feature is used to fine-tune the input sensitivity of the amplifier to the source unit's output level.
6. Variable Hi, 12dB / Low, 24dB Mono 40Hz–350Hz X-over – This control allows the user to choose the exact low pass or high pass frequency range the amplifier will play for the best possible performance. The upper end of the low pass crossover range can be selected from 40Hz–350Hz at 24dB per octave with a mono output. The lower end of the high pass crossover range can be selected from 40Hz-350Hz at 12dB per octave with a stereo output.
7. Fixed Subsonic Filter – This feature limits frequencies from 30Hz at 12dB per octave and below to be sent to the subwoofers. The subsonic feature includes a selectable on/off switch and a control knob used to adjust.
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 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. A.R.C. – The Active Resonance Control (A.R.C.) is a level adjustment that reduces the resonant frequencies inside the vehicle to improve the midrange sound quality. Turn this control either clockwise or counter clockwise until the vocals of the music are up-front and centered in the vehicle. The midrange sound should be smooth and detailed.
10. 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.
11. Processor Bypass – This feature routes the audio signal around all enhancement features to achieve a purely flat response.
12. StreetWires Connectors – All MTX amplifiers include StreetWires connectors for efficient current and maximum voltage transfer.
13. Speaker Connection – These output terminals are individually labeled for proper speaker connections. When bridging the amplifier, use the left positive terminal and the right negative terminal only. Warning, do not bridge the amplifier with an impedance lower than 2 ohms (this amplifier is 1 ohm stable / 2 ohm bridgeable).
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

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 (left input should be used for high level Smart Engage™).

- Using RCA Connections: If the source unit has RCA outputs, simply attach a signal cable from source unit to amps 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, located on opposite end of the supplied high level RCA cables, 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 or poor overall sound quality.

2-channel Amplifiers- These amps will have four speaker terminals: left positive, left negative, right positive, and right negative.

- Stereo (2-channel) Connection: This configuration is typically used with full range or high frequency speakers. Each channel can drive a minimum of a 1 ohm load.
- Bridged (1-channel) Connection: This configuration is typically used with subwoofers. Both channels combined can drive a minimum of a 2 ohm mono load for max power.

Note: Please pay attention and make sure the speakers or woofers are the correct IMPEDANCE (OHMS) BEFORE attaching to the amplifier. Also, observe the proper speaker polarity.

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; 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.

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 vehicle's 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.

3. Adjusting the Hi, 12dB / Low, 24dB Mono @ 40Hz–350Hz Variable X-over Frequency Controls –
  - Setting for Subwoofers: First enable the electronic crossover by selecting the “ON” position of the X-OVER switch, and then select the “L-PASS” (low pass) position on the L-PASS/H-PASS switch. Next, using “L-PASS FREQ” 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 350Hz). 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 (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. 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.

- Setting for Components and Separates: First enable the electronic crossover by selecting the “ON” position of the X-OVER switch, and then select the “H-PASS” (high pass) position on the L-PASS/H-PASS switch. Next, using “H-PASS FREQ” 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 350Hz). This means that the amp will send the components or separates the frequencies from 40Hz to 20kHz and then start to taper down as the frequencies get over 40Hz (octave roll off). The industry standard for high pass setting or crossover point is around 120Hz. When the amp is in HP setting and the crossover point is set to 120Hz, the amp is sending the speakers 120Hz–20kHz. This crossover network allows the drivers to recreate the frequencies within a precisely designed range so that the speakers do not become distorted by trying to reproduce frequencies that they are physically unable to reproduce. This feature ensures that the components or separates do not receive low bass notes. The 12dB/oct means the slope, or the amount of other frequencies that will be affected, is fairly narrow. This design complements both the subwoofer and mids to provide greater musical detail.

- Setting for Full Range (No Crossover): To disable the electronic crossover, select the “OFF” position of the X-OVER switch. This setting will allow the amplifier to play all frequencies.

4. Setting the 30Hz, 12dB Fixed Subsonic Filter – First enable the Subsonic Filter by selecting the “ON” position of the SUBSONIC FILTER switch. This feature will help remove some of the potentially damaging low frequencies of 30 Hz and below from your subwoofer system. Use this feature if the subwoofer breaks up at lower frequencies.
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. **Adjusting the Active Resonance Control (A.R.C.) Feature** – This feature will be needed when mounting speakers lower in the door or in kick panels. Most vehicles have a natural peak that occurs at about 200Hz. By turning the Pot located on the top control panel clockwise you to CUT 200Hz up to 15dB. This allows you to remove unwanted peaks in your mids and highs that occur in most vehicles.
7. **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 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.
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 controls are 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 dial 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.

PROBLEM	CAUSE	SOLUTION
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