

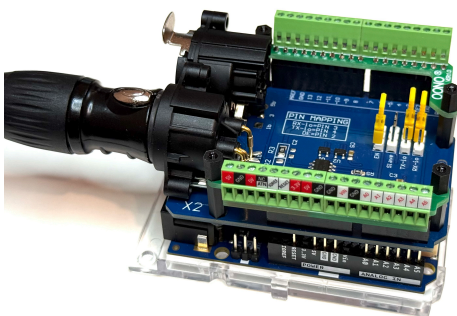


Model Train™
TECHNOLOGY

MTT-DMX™

USER MANUAL

*DMX-512 Receiver with companion app for Apple® and
Android™*



Firmware v2.6 • App Version 1.0

Model Train Technology LLC

Manual rev 1.0

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INTRODUCTION

The Model Train Technology™ MTT-DMX listens to a standard DMX-512 lighting controller and turns 16 of its channels into simple ON/OFF switch outputs. Push a fader up on your DMX console and the matching output switches ON; pull it back down and the output switches OFF. You decide the exact fader level where each channel trips, using the free MTT-DMX phone app.

Use it to let a DMX lighting console -- the same one that runs your stage or layout-room lighting -- trigger animation controllers, sound boards, relays, signals, or any device that accepts a simple switched input.

- 16 channels, each with its own adjustable trigger level (0-255).
- Live status over Bluetooth -- the app shows all 16 channels in real time, with no pairing and no connection required.
- Set-and-forget -- trigger levels, the DMX address and the device name are stored in the receiver and survive power cycles.
- Daisy-chain several receivers on one DMX line, each answering its own block of 16 channels.

WHAT YOU NEED

Item	Requirement
MTT-DMX	The receiver unit and its 13.5 V DC power adapter (included).
DMX controller	Any DMX-512 controller with a standard 3-pin XLR DMX OUT.
DMX cable	Standard 3-pin XLR male-to-female cable.
Phone	iPhone or Android with Bluetooth, running the free MTT-DMX app.
Internet	Needed only to download the app -- not needed to use it.

QUICK START

1. Connect the DMX cable from your controller's DMX OUT to the receiver's XLR input (the male connector on the receiver).
2. Plug in the 13.5 V power adapter. The receiver starts listening immediately -- there is no power switch.
3. Open the MTT-DMX app on your phone. Your receiver appears within a few seconds, showing 16 dots -- one per channel.
4. On your DMX controller, select fixture 1 and push fader 1 up. When the fader passes the trigger level (halfway, out of the box), dot 1 turns green. Pull it down and the dot goes hollow again.
5. Wire your devices to the output pins and set each channel's trigger level in the app. That's it.

Note A new receiver answers to channels 1-16. On most 192-channel consoles that is "fixture 1" -- fader 1 = channel 1 through fader 16 = channel 16, using the Page A/B switch for channels 9-16. You can move it to any other block of 16 channels from the app -- see DMX Address.

OUTPUT WIRING

Each channel drives one output pin. The outputs are active-LOW: when a channel is ON, its pin drains to ground (0 V) -- exactly what trigger inputs that "look for a ground" expect. When the channel is OFF the pin sits at 5 V.

Ground connection required. The device you are triggering must share a common ground with MTT-DMX. Connect the external device's GND / common to one of the GND pads on the unit. Without this shared ground connection the trigger signal has no return path and will not work.

Channel	Pin	Channel	Pin
CH1	D3	CH9	D11
CH2	D4	CH10	D12
CH3	D5	CH11	A0
CH4	D6	CH12	A1
CH5	D7	CH13	A2
CH6	D8	CH14	A3
CH7	D9	CH15	A4
CH8	D10	CH16	A5

The pins run in physical order along the two header rows: CH1-CH10 across the digital header (D3-D12), then CH11-CH16 along the analog header (A0-A5). Pad D2 is not used. Ground and 5 V pads are available on the power header for your device's common/return connection.

Ratings. The outputs are 5 V logic signals rated for a few milliamps -- perfect for triggering electronic inputs (animation controllers, sound modules, relay-board inputs). Do NOT connect motors, lamps, or relay coils directly to an output pin; use a relay module or driver board designed for logic-level inputs.

HEARTBEAT OUTPUT

Pad D13 is not a DMX channel -- it is a heartbeat. As long as the receiver is powered and running, D13 pulses steadily: one second drained to ground, one second released, over and over. The small LED on the board blinks in step with it.

The heartbeat gives a connected device a simple way to confirm the receiver is alive. If the pulsing ever stops, the receiver has lost power or halted. Wire it exactly like a channel output -- shared ground, active-LOW -- if your device can watch for it. If you don't need it, simply leave D13 unconnected and

use the blinking board LED as your at-a-glance "it's running" check.

Note The heartbeat keeps pulsing even when no DMX signal is present, so a steady blink confirms the receiver itself is healthy -- separately from whether your console is sending anything.

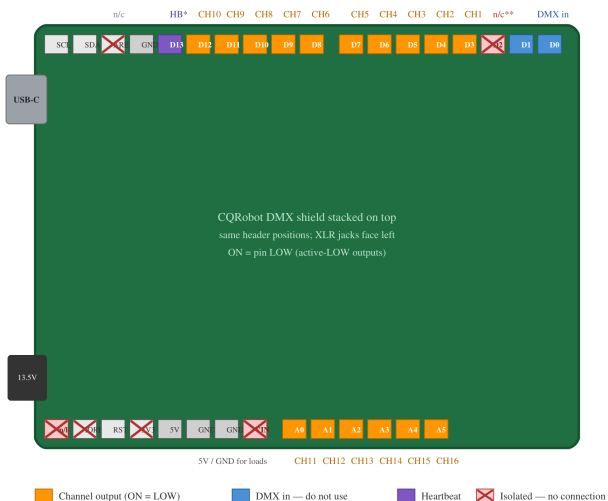
Turning the heartbeat off

If you do not need it, switch Heartbeat off on the device screen in the app. The pulsing stops, the board LED goes dark, and pad D13 is left released so nothing connected to it sees a trigger. Switch it back on at any time -- the setting is stored in the receiver.

PIN LOCATIONS

Top view of the unit with the XLR connectors to the left. Orange pads are the 16 channel outputs; use the 5V / GND pads for your device's common (shared ground) connection.

MTT-DMX — UNO R4 WiFi + DMX shield (top view, USB on left)



* D13 = HEARTBEAT: pulses LOW/HIGH every 1000 ms so a downstream device can confirm the unit is alive (the onboard LED blinks in step). ** D2 = the DMX shield's I_o n/c = the unlabeled pin left of IOREF: the R4's BOOT strap — must stay isolated in the stack. AREF, IOREF + 3V3 X'd on this bench unit only (not required in future builds).

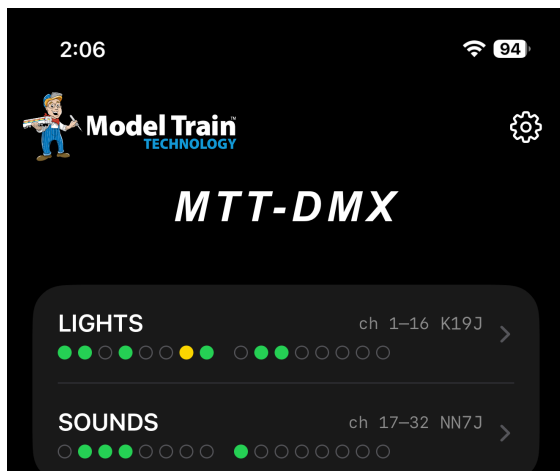
MTT-DMX pin locations (top view).

THE MTT-DMX APP

Install MTT-DMX free from the App Store (iPhone) or Google Play (Android). Allow Bluetooth access when asked -- the app uses Bluetooth to find and configure your receivers. There is nothing to pair.

The receiver list

- Every MTT-DMX receiver in range appears automatically, each with its name, serial number, and 16 live dots.
- Green dot = channel ON; hollow dot = channel OFF.
- The dots update in real time straight from the receiver's broadcast -- watch your whole system respond to the DMX console without touching anything.



The receiver list. Two receivers, each with its channel block, serial number, and live dots. The yellow dot is an inverted channel.

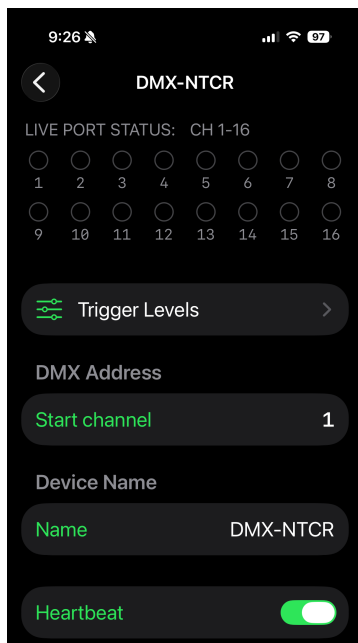
Tap a receiver to open its settings.

The device screen

Tapping a receiver opens its device screen. LIVE PORT STATUS sits at the top -- the same 16 dots -- and the receiver's settings are below it:

- Trigger Levels -- opens the sliders panel (next section).
- Start channel -- the DMX address (see DMX Address).
- Name -- the receiver's name.

- Heartbeat -- switches the D13 pulse on or off.



The device screen.

Tap Start channel or Name to open a small editor with Save and Cancel. Nothing is stored until you tap Save.

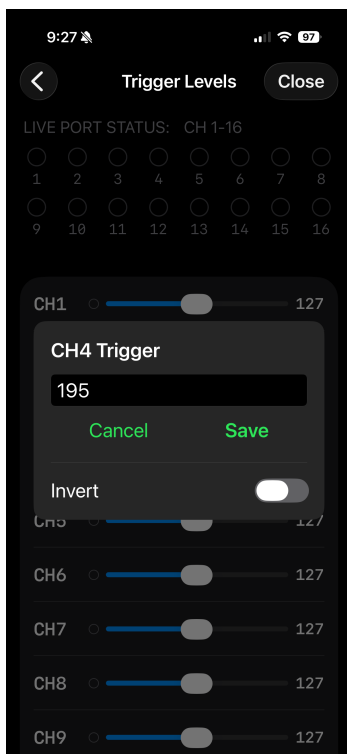
SETTING TRIGGER LEVELS

Open Trigger Levels from the device screen. Each channel has a slider from 0 to 255 -- the DMX value at which the channel switches ON. Out of the box every channel is set to 127 (half fader). The live port dots stay pinned at the top of the panel so you can watch a channel react while you set it; Close returns you to the device screen.

- Drag the slider to the level you want. When you let go, the slider's knob turns green for one second -- then the new levels are saved to the receiver automatically. There is no separate save button.
- Need an exact number? Press and hold the value at the right of a channel row. A small editor opens where you can

type any value from 0 to 255, with an Invert switch (see Inverted Channels). Tap Save.

- Adjust several sliders in quick succession and they all save together.



Press and hold a channel's value to type an exact number.

To test a trigger: set it, then move that fader on your DMX console and watch the channel's dot flip exactly at the level you chose.

Note The receiver adds a little "grip" below each trigger (about 5 counts) so a fader parked right at the trigger level will not chatter the output on and off.

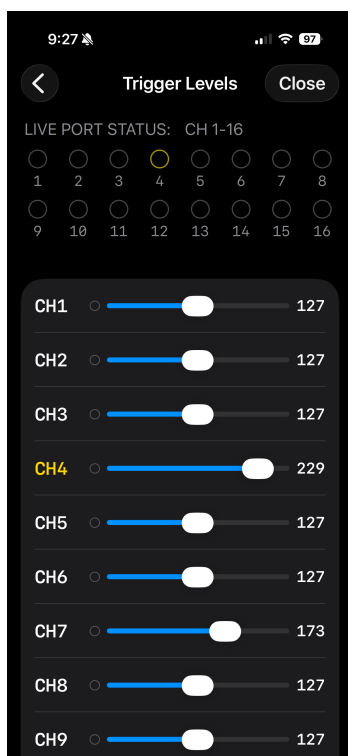
INVERTED CHANNELS

Normally a channel switches ON when its DMX value reaches the trigger level, and OFF when it falls back below. An inverted channel does the opposite: it is ON while the value is at or BELOW the trigger, and switches OFF when the value rises above it. Pulling a fader down turns the output on.

Each channel is set on its own. Press and hold the channel's value in Trigger Levels, turn on the Invert switch, and tap Save.

Spotting an inverted channel

- In Trigger Levels its CH number is shown in yellow instead of white.
- In LIVE PORT STATUS its dot is yellow instead of green -- filled when the channel is on, outlined when it is off.



CH4 inverted: yellow channel number, yellow dot in the port grid.

Note Everything else behaves the same. The receiver still ignores small wobbles around the trigger level, so an inverted channel will not chatter either.

NAMING YOUR RECEIVERS

If you use more than one MTT-DMX, give each a name you'll recognize ("YARD LIGHTS", "TOWN SIGNS"). On the device screen tap Name, type the new name (up to 16 characters) and tap Save Name. The name is stored in the receiver itself, so it appears in the list on every phone.

To go back to the factory name, clear the field and tap Save Name -- it resets to DMX- followed by the unit's serial number.

DMX ADDRESS

A DMX-512 console sends one stream of up to 512 channels down the cable, and every device on that cable hears all of it. What makes each device respond to different faders is its start channel: the point in the stream where its own block begins. MTT-DMX uses 16 channels starting there.

A new receiver starts at channel 1, so it answers to channels 1-16. To use more than one receiver, daisy-chain the DMX cable from unit to unit and give each one a different start channel in the app -- open the receiver, type the number under DMX Address, and tap Save Address. The receiver list shows each unit's block so you can see the whole layout at a glance.

Start channel	Answers to	On the console
1	Channels 1-16	Fixture / Scanner 1
17	Channels 17-32	Fixture / Scanner 2
33	Channels 33-48	Fixture / Scanner 3
49	Channels 49-64	Fixture / Scanner 4

The pattern continues in steps of 16. Any start channel from 1 to 497 is allowed, so you are free to use blocks that suit your console.

Note Two receivers set to the same start channel will respond identically -- handy if you want the same trigger in two places, but usually a sign that one of them still needs its own address.

ABOUT & VERSION NUMBERS

Tap the gear at the top right of the app's main screen to open About. It lists the app's own version, and for every receiver in range: its name, serial number, firmware version, and the block of DMX channels it answers to.

Please have these to hand if you ever contact us for support -- they tell us exactly which combination you are running.

Note Firmware version is reported by receivers running v2.5 or later. An earlier receiver shows a dash instead of a number; everything else on the screen still works.

HOW TRIGGERING WORKS

- Your DMX console sends every channel as a value from 0 (fader down) to 255 (fader full).
- The receiver compares each channel's value against that channel's trigger level, about 40 times per second.
- Normal channel -- value at or above the trigger: ON (output pin drains to 0 V); below it: OFF (pin released).
- Inverted channel -- value at or below the trigger: ON; above it: OFF.
- Trigger levels are stored inside the receiver. Power it off, move it, power it on -- your settings are still there. The phone is only needed to change settings, not to run the system.

TROUBLESHOOTING

Problem	Check
No receiver in the app list	Check the receiver has power, phone Bluetooth is on, and the app has Bluetooth permission.
Dots never change	Check the cable runs controller DMX OUT to receiver XLR IN, and the console is outputting (Blackout off, faders up).
Channel trips at the wrong level	Open the device screen and check that channel's trigger slider. Channels ship at 127.
Wrong channels respond	Check the unit's DMX Address -- it answers to the 16 channels starting there.
Output never triggers the device	Confirm the device's GND is wired to a GND pad on the unit, and its input expects an active-LOW trigger.
Two receivers -- which is which?	Name them (Section 9). The serial under each name is unique to the hardware.
Board LED not blinking	Heartbeat may be switched off in the app -- that is normal, and stops the LED as well as the pulse.
A channel works backwards	That channel is inverted -- CH number and dot show yellow. Press and hold its value and turn Invert off.

SPECIFICATIONS

Item	Specification
DMX input	DMX-512, 3-pin XLR. 16 channels beginning at the start address.
DMX address	Start channel 1-497, set from the app, stored in the receiver.
Outputs	16 switched outputs, active-LOW (ON = pulled to ground, OFF = released). The connected device supplies its own pull-up and must share the ground.
Trigger levels	0-255 per channel, set from the app, stored in the receiver.
Channel logic	Per channel: normal (ON at or above the level) or inverted (ON at or below).
Heartbeat	Switchable 1-second pulse on pad D13, with the board LED.
Wireless	Bluetooth Low Energy: live status broadcast plus app configuration. No pairing.
App	MTT-DMX, free, for iPhone and Android.
Power	13.5 V DC adapter (included), 2.1 mm centre-positive barrel.
Update rate	Follows the DMX stream, about 40 packets per second.

ELECTRONICS & STATIC ELECTRICITY

The **MTT-DMX™** circuit board and components are exposed when the cover is off. Electricity can be dangerous. Static electricity can cause component failure. Scuffing along a carpet and then touching one of the component connectors can cause a static spark. These components are fairly rugged -- some designed for the automotive industry. Just be mindful of the risk. The current on the board will not harm you if the board is powered and operated as per the instructions.

WARRANTY

ONE YEAR MANUFACTURER WARRANTY: We warrant this **product** to be free from defects in workmanship and materials, under normal residential use and conditions, for a period of one (1) year from the original invoice date. Shipping and handling fees are to be paid for by the customer.

LIMITATION OF LIABILITY

UNDER NO CIRCUMSTANCE SHALL COMPANY OR ITS AFFILIATES, PARTNERS, SUPPLIERS OR LICENSORS BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, SPECIAL OR EXEMPLARY DAMAGES ARISING OUT OF OR IN CONNECTION WITH YOUR USE, OR INABILITY TO USE THE PRODUCT, WHETHER OR NOT THE DAMAGES WERE FORESEEABLE AND WHETHER OR NOT COMPANY WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, COMPANY'S AGGREGATE LIABILITY TO YOU SHALL NOT EXCEED THE AMOUNT OF THE PRODUCT. THE FOREGOING LIMITATION WILL APPLY EVEN IF THE ABOVE STATED REMEDY FAILS OF ITS ESSENTIAL PURPOSE.



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