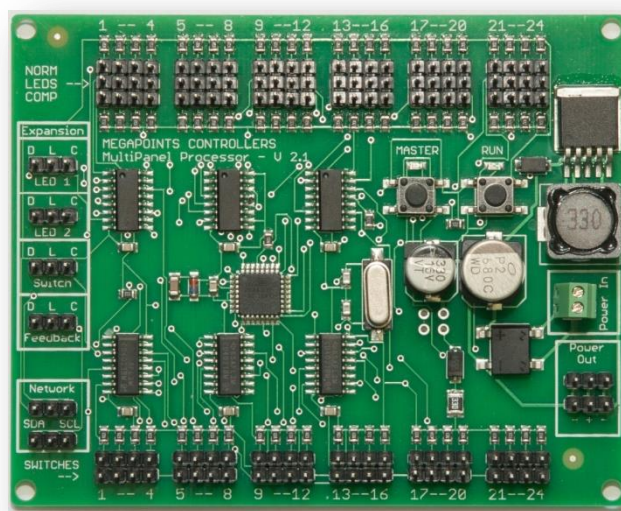


MegaPoints Controllers

MultiPanel Module V2

Multiuser mimic panel display and control module for analogue and digital model railways. This manual covers board versions 2.1 onwards.

User guide



Features include

- No soldering – truly plug and play
- Display of feedback data including block occupancy and turnout position
- Support for push buttons, lever frames and toggle switches
- Link panels together for shared control of your layout
- All features work with analogue or digital layout control
- Integrates to our one button route setting module
- User hackable and easily integrated into Arduino and Raspberry Pi

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Introduction

This board does a lot! It can control up to 192 channels for turnouts, gates, doors barriers, signals and decouplers using almost any type of motor from servo to solenoid and Tortoise switch machines. It can even operate relays for those really tough jobs where nothing else will do, all via a single integrated bi directional network cable.

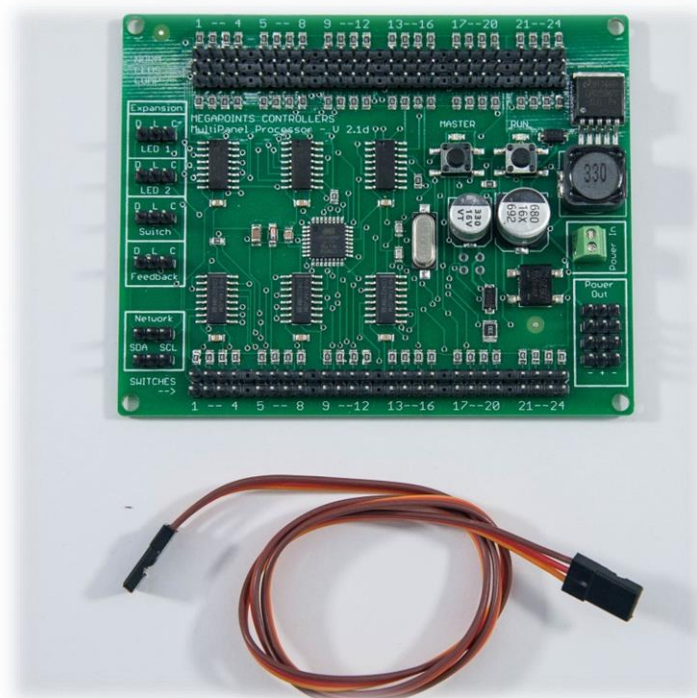
It has been designed using industry standard components and easily lends itself (*if required*) to hacking via Arduino, Raspberry Pi or PC should you wish to create a custom automated system.

Expansion occurs in 24's and is easily accomplished by plugging in switch or LED expansion boards to suit your needs. For people requiring feedback, we've built it right in. Simply plug in LED expansion boards on the feedback connector to display feedback from both analogue and digital layouts for block occupancy or turnout position indication. Attach one of our sensors or roll your own for the ultimate in controllability.

Everything is plug and play with no soldering required, right down to the LEDs and pushbuttons required to operate the unit.

This product has accompanying instructional videos detailing basic usage, installation and expansion. Please see the video section of our web site.

What's included



The following items are included with each MultiPanel module:

- 1 x Processor board
- 1 x Network cable

No soldering

All connections are via plug and socket and require no soldering. By using LED or switch cable packs an entire mimic panel can be hooked up and plugged in. It's all plug and play and allows simple reconfiguration as your needs change by moving cable positions.

Accessible connectors

We've used commonly available connectors so you have the choice to use ready made and pre wired cable packs or make your own. We use 2.54 mm pin pitch spacing making roll your own cables easy and well within the reach of modellers.

Buttons or switches

The MultiPanel can be configured to accept button (*non latching*) or switch (*latching*) input. If you wish to hook up an array of lever frame switches to the MultiPanel you can. Using latching switches will disable some of the multi user features to prevent inconsistent operation.

Modular

Designed as a modular system that expands in units of 24, the railway modeller only needs to install what is needed for their layout. Additional LED and button modules are available and easily added as required.

Feedback data display

By connecting optional feedback modules the MultiPanel can display feedback data showing block occupancy or turnout position. This means your panel can show what's actually set on the layout irrespective of any commands or button pushes. If a turnout is thrown by hand the panel will know about it.

Flexible indication

You are free to hook up a single LED or pair of LEDs to each of the outputs depending on your needs. If a pair is used, one will always be on while the other is off, reversing when a button is pressed. This allows for route indication on turnouts etc. Our LED cable is available with a pair of LEDs attached.

If you choose to roll your own LED cable we've already installed the resistors for you. Just connect the LEDs to your cables.

Panel linking

Multiple mimic panels can be linked to allow shared control from different locations around the layout in a cooperative manner. All you need is power and a network cable.

DCC Integration

If DCC integration is required you only need to add a DCC module. This will communicate directly with the MultiPanel module and provide DCC accessory addresses for all 192 channels. As DCC commands are received the display for the mimic panel is automatically updated to correctly

MegaPoints Controllers use electronic components that should be handled with care.

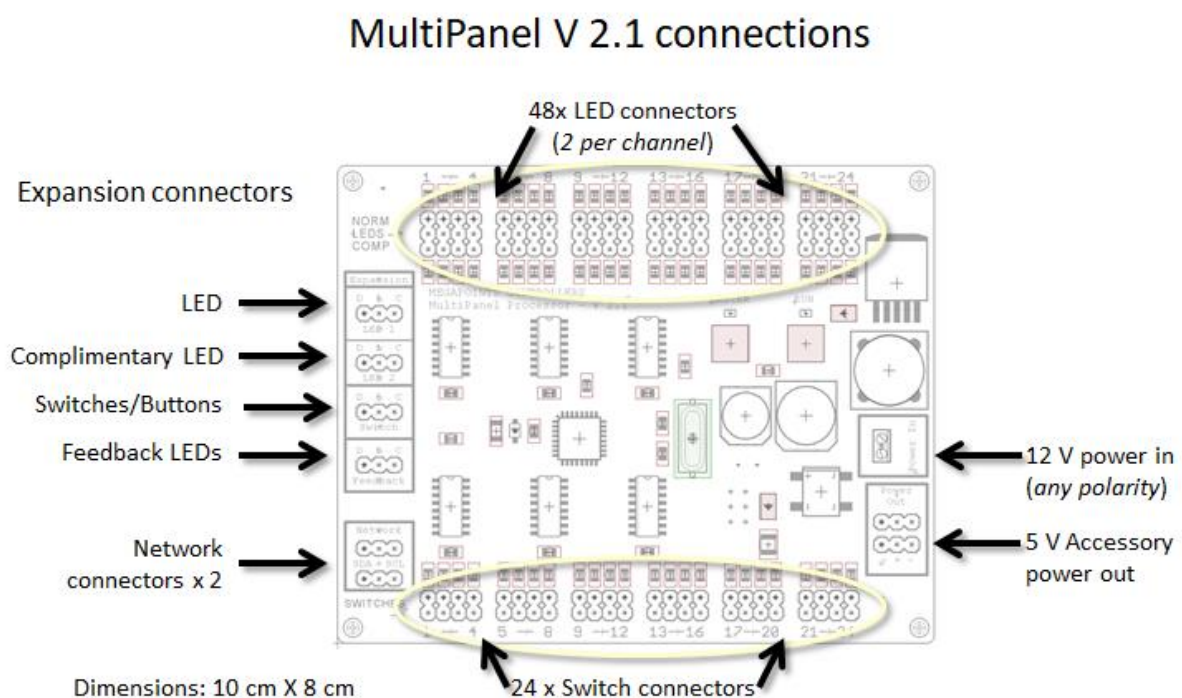
Avoid touching any components or the circuit printed on the bottom of the board.

Avoid placing the board on any metallic surfaces including track.

indicate the changes commanded. At all times, the user is able to operate any of the buttons to directly control the layout.

Hooking up

The following picture shows the various connectors on the MultiPanel version 2.1 module. The board contains connectors for 48 LEDs (*top*) and 24 buttons (*bottom*). LED and switch expansion modules connect to the left side of the board. Power is supplied to the screw terminals on the right side of the board. Power the board with 9 to 13.8 volts (*at up to 3 Amps depending on number of LEDs connected*) from a regulated power supply. Power for expansion modules is supplied from the lower right connectors (x2) automatically. Two MegaPoints network connectors are provided below the expansion connectors at the lower left.



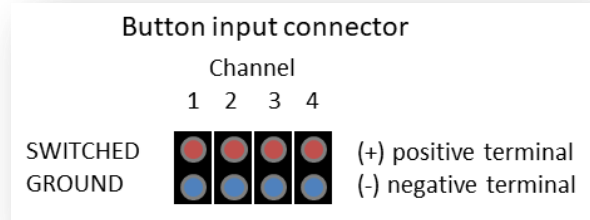
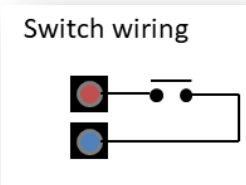
First time use

Follow these steps to quickly get started with your first MultiPanel:

- Plug in an LED pair to output 1 (black lead to outer edge).
- Plug in a button to input 1 (black lead to outer edge).
- Connect 12 volt regulated power to screw terminals and turn on (any polarity).
- Check MASTER LED is ON and RUN LED is flashing.
- Press button attached to switch input 1 and observe LEDs connected to output 1 change.
- Watch the instructional videos for more.

Connecting buttons

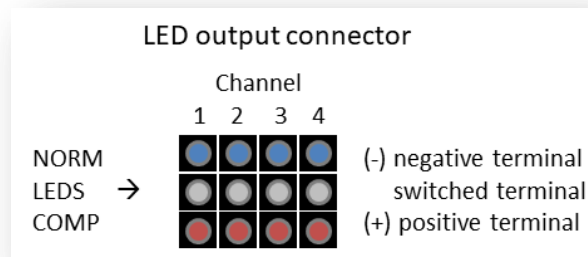
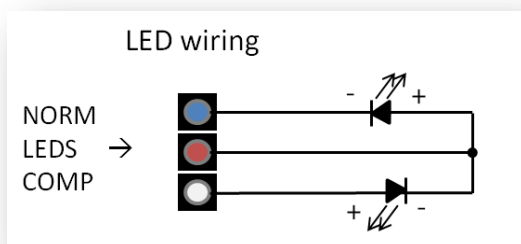
Connect buttons or switches to the lower connectors. The outer connector connects to the common ground and the upper connector (*innermost*) is switched.



Connecting LEDs

If you are using our LED cables, plug in the connector with the black cable at the top. Refer to the LED output connector diagram on the lower right for details.

If using your own LEDs and cables we've already installed 1K resistors for you. Each LED channel has three pins, with negative on the top and positive on the bottom. The middle pin floats between positive and negative depending on whether the output is reversed or not.

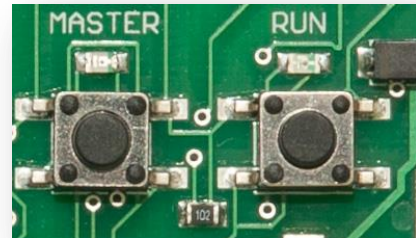


Linking subsequent MultiPanels

Switches and status indicators

The MultiPanel module contains two LED indicators and two buttons. As shipped the MASTER LED will be ON and the RUN led will flash about once per second. This indicates the MultiPanel is configured as a master (*max one master per network*) and is operating normally.

MASTER LED: When ON this indicates the unit is in master mode and input is via non latching pushbuttons. This is the default condition and should be ON when there's only one MultiPanel on the network with pushbuttons attached.



The master MultiPanel coordinates activity between all other network devices.

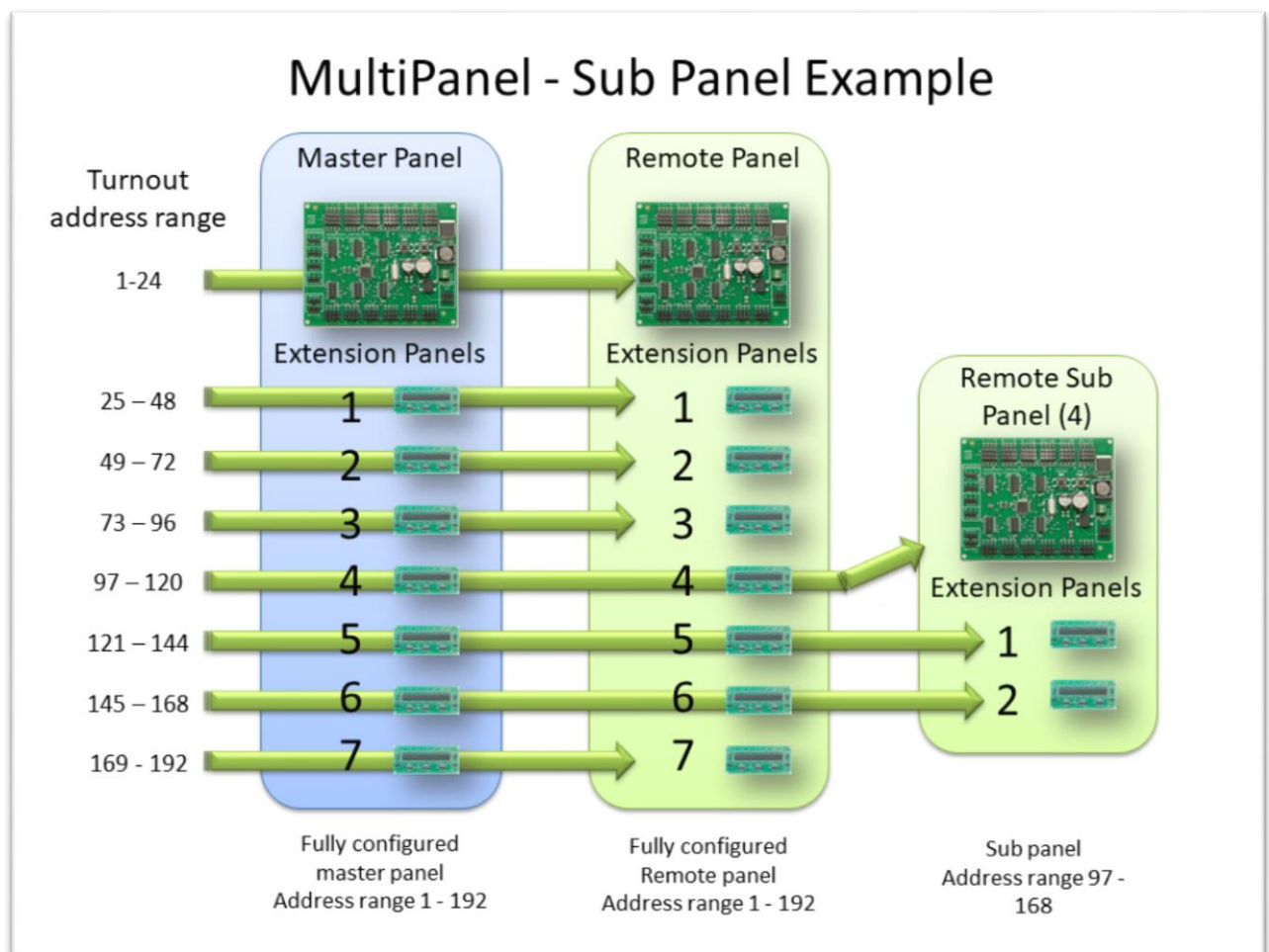
The MASTER button toggles between three possible states. To change configuration press and hold the MASTER button for approx. 3 seconds.

MASTER LED	RUN LED	STATE
ON	Flashing	Master mode, input via non latching pushbuttons. This is the default mode.
OFF	ON	Master mode, input via latching switches or levers. Network listening is disabled.
OFF	Flashing	Slave mode. Input is via non latching pushbutton. Must be attached to another master MultiPanel via network.

The RUN button sets the MultiPanel subpanel address when in slave mode. Each press of the RUN button changes the subpanel address and moves the control range up by 24 devices. The subpanel address is read by counting the number of flashes on the MASTER LED (1-7). After the seventh subpanel address is exceeded the unit returns to slave mode as normal. See section titled "Sub panels" for further details.

- If the MASTER LED is illuminated, press and hold the MASTER button for approx. 3 seconds until it extinguishes and enables slave mode.
- Connect MultiPanels via a network cable. Ensure SDA connects to SDA (*same pins on each panel*).

Sub panels



Sub panels allow remote MultiPanels to control a specific block of the address range without having to add expansion modules in the lower ranges. In the diagram above you can see two fully expanded MultiPanels, each capable of switching all points in the address range 1 – 192. A third MultiPanel configured as a subpanel address 4 that operates the points in the range 97 – 168. You are free to configure as many sub panels as required. Each can be set between the sub panel ranges 1 – 7. Any expansion boards fitted to the sub panel will operate on the next block up to the maximum of 7. Any blocks over 7 are ignored.

To configure a sub panel, ensure the master LED is not constantly illuminated. If it is press and hold the MASTER LED for three seconds to extinguish it and set slave mode.

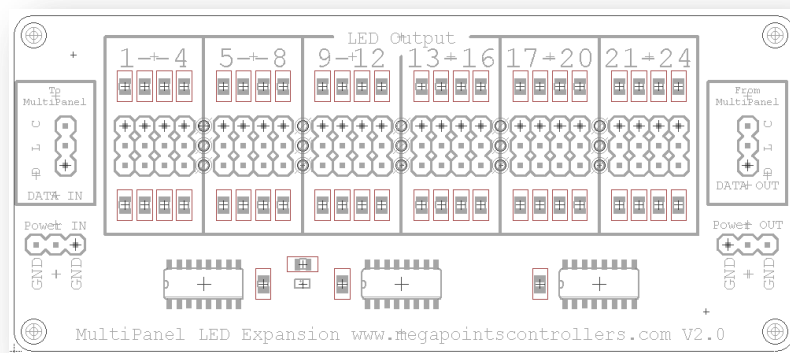
If the RUN LED is flashing the MultiPanel is configured as a normal remote panel. To set a sub panel address, press the RUN LED. The MASTER LED will begin to flash the sub panel address block (1-7). Subsequent presses of the MASTER will increment the sub panel block up to 7. Pressing MASTER again disables sub panels and the RUN LED will begin to flash again.

Expansion

Each channel is indicated by two LEDs, one normally ON and the other normally OFF. This provides an easy way to indicate the direction of a turnout or other device.

NOTE: MultiPanel module expansion boards are designed to expand within the confines of a single mimic panel. Expansion data leads should be kept as short as possible with the total length of data cable not exceeding ½ meter. Do not try to run extension boards to a second panel as excessive ringing will occur. Additional panels should only be configured with a local MultiPanel module.

LED expansion board

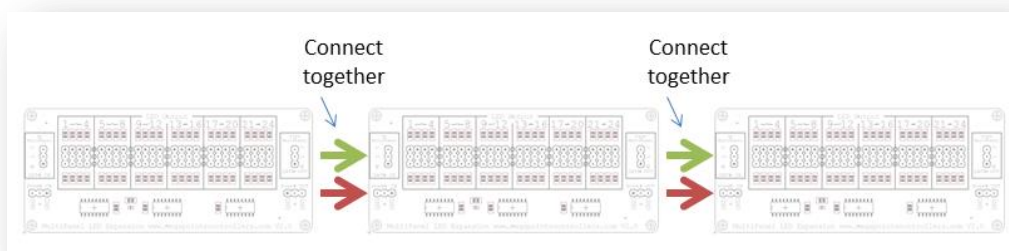


The LED expansion board (pictured above) provides an additional 48 LED outputs for 24 channels. Connect the “DATA IN” connector (top left side) to either “LED 1”, “LED 2” or “Feedback” connectors taking care to match up the “DLC” pins using one of the short cables supplied.

The “LED 1” bus is an extension of the on-board LED connectors with the first expansion board beginning at device address 25.

The “LED 2” bus is a legacy bus and signals the compliment (opposite) of the “LED 1” bus. The bus begins at address 1.

The “Feedback” bus provides LED indication of feedback data and begins at address 1.

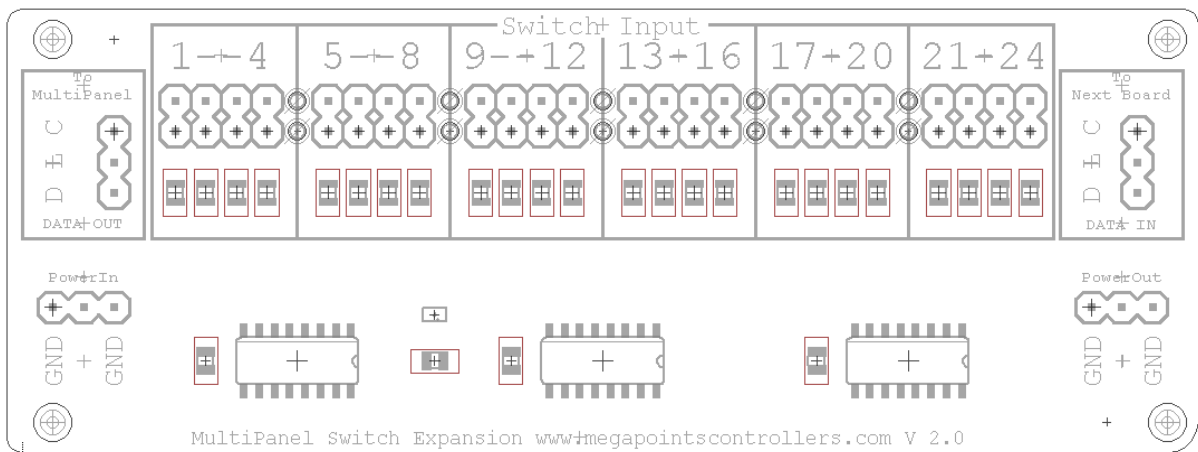


Additional LED expansion boards are daisy chained together using the short cables provided (see above).

NOTE: Take care not to mix up the power and data connectors.

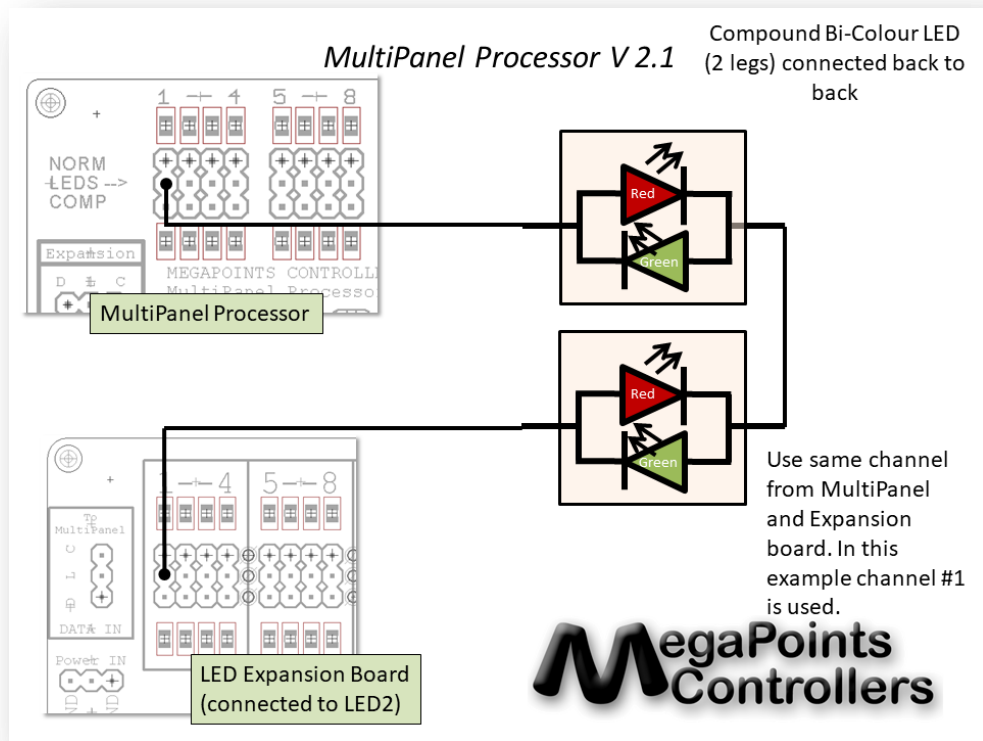
Switch expansion board

The switch expansion boards follow the same daisy chaining methodology as the LED expansion boards except are only connected to the “Switch” bus. The first switch expansion board switches channels 25 –48 with each subsequent board switching the next 24 channels.



Connecting bi-colour LEDs

It is possible to connect bi-colour LEDs if an LED expansion board is connected to the LED2 connector. Follow this diagram for hooking up. There's also a video demonstrating this technique.

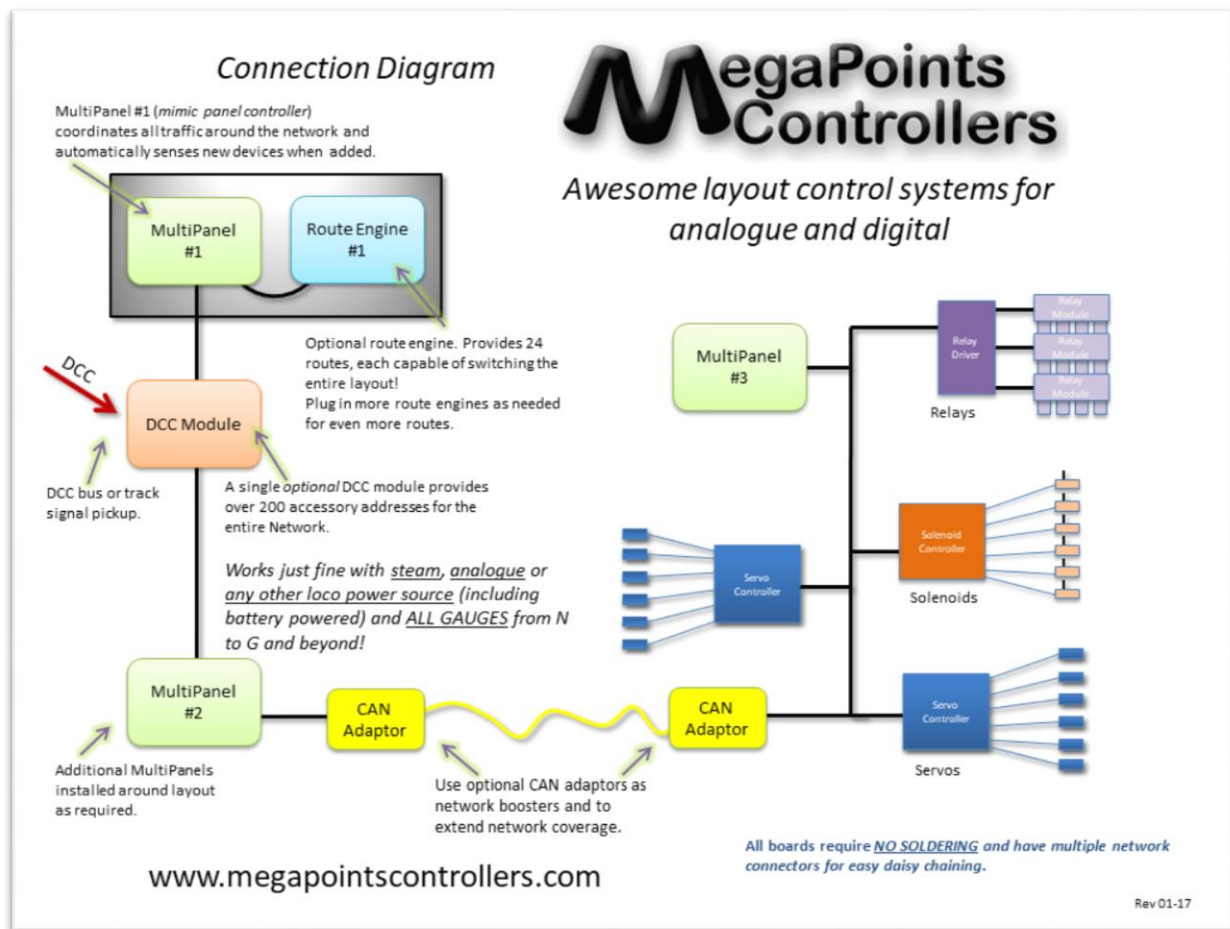


Specifications

Power requirements	9 – 13.8 Volts DC regulated 0.5 - 3 Amp depending on number of LEDs connected and illuminated, any polarity
On-board LED connectors	48 (<i>two per channel</i>)
On board switch connectors	24
Maximum control channels	192
Maximum feedback channels	192
Network	2 x I ² C connectors, bi directional
LED1 Bus expansion	Up to 168 channels (1 st 24 on-board)
LED2 Bus expansion	Up to 192 channels (<i>compliment of LED1 bus</i>)
Switch Bus expansion	Up to 168 channels (1 st 24 on-board)
Feedback Bus expansion	Up to 192 channels
Power output	2 x 5 V for bus expansion boards
Maximum driven LEDs per module (<i>via expansion boards</i>)	1,152

Accessories

The diagram below provides insight how devices can be hooked up.



The following accessories are suitable for use with the MultiPanel module.

Cable packs

Switch cable packs: Supplied in 12's pre wired with our rear mount pushbutton on a 15cm lead.

Switch lead packs: Leads and plugs supplied in 12's. No buttons attached freeing you to attach your own preference.

LED cable packs: Supplied in 12's each lead is 15cm long and has two LEDs attached in GREEN/GREEN or GREEN/RED.

Output devices

Servo Controller: The Servo Controller can directly drive up to 12 servos operating turnouts, bouncing semaphore signals, gates, barriers, doors and decouplers. Servos are so programmable that they can be used almost anywhere animation is required.

Relay driver: The relay driver board can be configured as a matched frog driver for servos or used independently for switching up to 10 Amps around a layout. As well as routine switching duties the relays can also be used to isolate and switch section power on analogue (DC) systems.

Solenoid driver: This drives up to six traditional solenoid motors from an AC or DC power source. Features intelligent sequencing and intelligent circuitry removes the need for a capacitive discharge unit.

Input devices

DCC Module: An optional accessory decoder for over 200 DCC accessory addresses. Able to communicate via the MultiPanel module and provide optional DCC control where desired.

Feedback Module: This optional device allows up to 24 channels per device onto the network for the MultiPanel to display. This device connects to optional sensors for current sensing, turnout position indicating and infra red. Works with both digital (DCC) and analogue (DC) systems.

Route Module: This optional device adds one touch route selection to your entire layout. Able to control servos, semaphores, solenoids and relays as part of the same route.

Network

CAN Module: Greatly extends the maximum distance of the network (up to 2000 meters) and maximum number of attached devices to over 100.

Contacting us

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If you have any product improvement suggestions we'd be very pleased to hear from you.

NOTE: We operate a policy of continuous improvement. Colours, specifications and the placement of components may vary from time to time.
