MegaPoints CAN bus
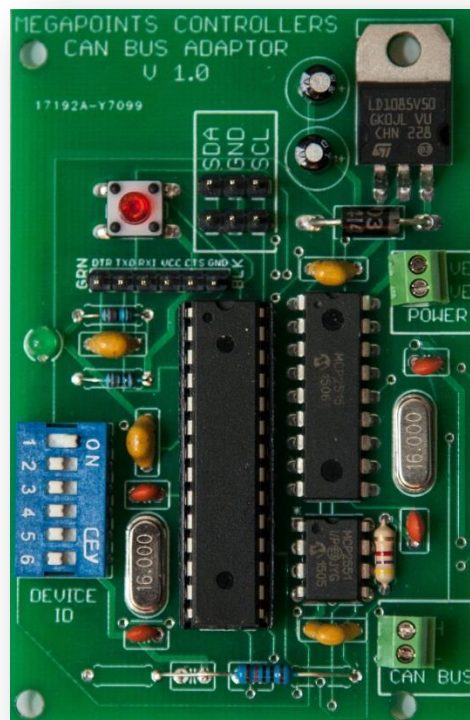
MegaPoints Controllers CAN bus adaptor

User guide

Revision 4   October 2015

© MegaPoints Controllers 2015

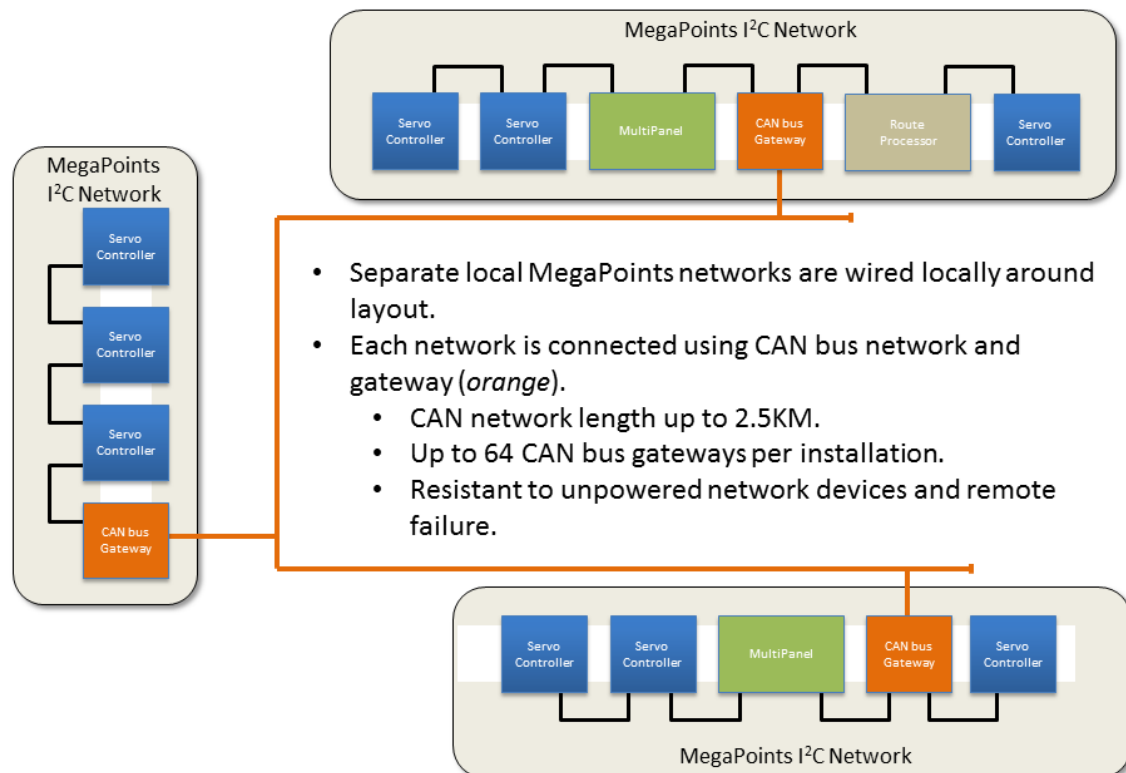Email: davef@loolee.org

Contents

Introduction

As layouts become ever larger and more complex it has become important to offer a solution that caters for increased size and distances while offering the simplicity of the MegaPoints I^2C network. The I^2C network has the benefit that it requires no configuration and supports the daisy chaining of components in an ad hoc manner.

This guide introduces the MegaPoints CAN bus gateway that seamlessly links the two network types and explains when it may be necessary or desirable to implement.

The diagram below depicts three MegaPoints I^2C networks connected via CAN bus gateways to each other. This overcomes node and distance limitations that may creep into the larger installation. The MegaPoints controllers, MultiPanels and Route processor are unaware of the CAN bus and behave as though they are all connected on the same network.

MegaPoints CAN bus overview

- Separate local MegaPoints networks are wired locally around layout.
- Each network is connected using CAN bus network and gateway (*orange*).
    - CAN network length up to 2.5KM.
    - Up to 64 CAN bus gateways per installation.
    - Resistant to unpowered network devices and remote failure.

When to use this

If you plan more than five network devices or bus length over 10 meters you should consider adding the CAN bus adaptor. These can be added later when you need to expand or outright when planning the layout. They are inexpensive and provide seamless connectivity between the MegaPoints I^2C networks.

CAN bus adaptor

The CAN bus adaptor requires 12 volts DC from a smoothed power source.

Two MegaPoints I^{2}C connectors are provided to allow easy daisy chaining to local MegaPoints devices.

The CAN bus should be connected (*observing correct polarity*) using the CAN connector located at the lower right of the board. The CAN-H connector is the upper and the CAN-L connector is the lower.
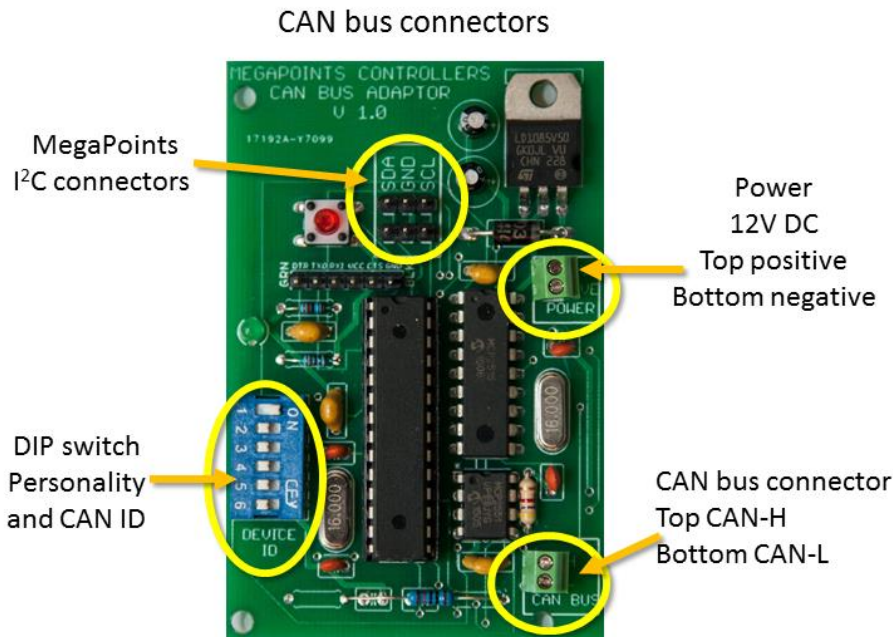
Setting the DIP switches

The CAN bus adaptor has six DIP switches located on the lower left side of the board. These may have different meanings depending on how and where they are used.

DIP	Activation mode	
SW	Normal	Boot
S1	CAN ID	CAN speed select
S2	CAN ID	CAN speed select
S3	CAN ID	
S4	CAN ID	
S5	CAN ID	
S6	Personality	

Switches 1 – 5

All CAN bus nodes must have a unique address on the same network. Switches 1-5 set the network address. Ensure each board has a unique address set. It does not matter what address you set, just that you ensure uniqueness.

S1	S2	S3	S4	S5	CAN address
ON/OFF	ON/OFF	ON/OFF	ON/OFF	ON/OFF	Ensure unique

It is recommended that the master network be configured with switches 1-5 OFF (*CAN ID 100*). The ID will match the binary number set from switches 1-5 plus 100. Therefore setting S1 & S2 both ON will set a CAN ID of 103 (*3 + 100*).

Switch 6

Switch 6 controls the personality of the board. If the board is to connect to the MultiPanel master network (*panel #1*) then set the switch to ON. Only one board on any layout should be set to master mode. All other boards should have switch 6 set to OFF (*default*).

S6	Personality	
OFF	Normal	
ON		Master

If this switch is changed while the unit is powered the mode will reset and the board will reboot to activate the change.

Can bus speed

The default CAN bus speed is 100 Kbps and is suitable for maximum network lengths around 500 meters. The following table lists the available bus speeds and the approximate maximum distances that can be achieved.

S1	S2	CAN Speed	Max Length
OFF	OFF	100 Kbps	500 Meters
ON	OFF	50 Kbps	1000 Meters
OFF	ON	20 Kbps	2500 Meters

NOTE: If the CAN bus speed is changed, it must be changed to match on all CAN bus adaptors.

To change the CAN bus speed, do the following:

- Remove power to the CAN adaptor
- Set S1 and S2 to the desired bus speed.
- Hold down the red pushbutton to the left of the MegaPoints I^{2}C network connectors while applying power.
- Release after power has been applied for approx. one second.
- Remove power.
- Reset the DIP switches to the CAN ID that was previously set.
- Set the slave/master mode DIP switch (S6).
- Power on and use.

Terminating the bus

Use the supplied terminator resistors to terminate each end of the CAN bus. Only the furthest boards on the bus are terminated. Ensure the termination resistors (*120 Ω*) are removed from any intermediate boards. Termination resistors connect to the two pins at the bottom of the board.

Cabling

The CAN bus should be cables using a twisted pair. If using a multi pair cable such as CAT-5 or CAT-6 ensure to use both sides of the same pair rather than individual cables of different pairs. The CAN bus only requires a single twisted pair cable.
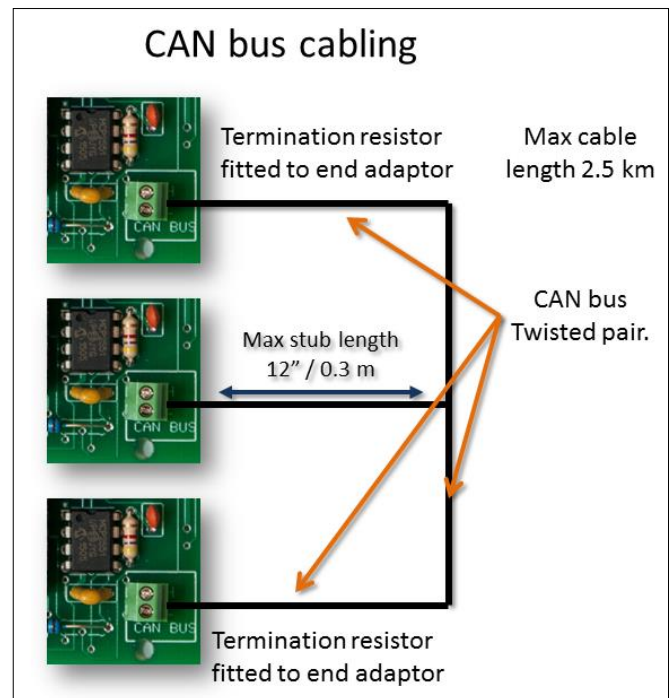
Setting up

MultiPanel master node

If the CAN adaptor is connecting to the MultiPanel master network follow this procedure:

- Set personality (S6) to ON.
- Set CAN ID to 100 (S1-S5) OFF.
- Termination resistor:
    - Remove terminator resistor if not end node.
    - Connect terminator resistor if end node.
- Connect to 12 volt power supply.
- Connect to CAN bus.
- Connect to local I^{2}C network.

All other nodes

For all other CAN adaptors follow this procedure:

- Set personality (S6) to OFF.
- Set CAN ID to 101 or greater (S1-S5) ON in unique combination.
- Termination resistor:
    - Remove terminator resistor if not end node.
    - Connect terminator resistor if end node.
- Connect to 12 volt power supply.
- Connect to CAN bus.
- Connect to local I^{2}C network.

Contacting us

Web: www.loolee.org

Email: davef@loolee.org

Phone: (+44) 07846 409320

All parts ©MegaPoints Controllers 2015

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

NOTE: We operate on a policy of continuous improvement. Colours, specifications and even the placement of components may vary from time to time. Documentation will continue to be updated to reflect changes or answer frequent customer questions as they arise.