

EMACSYS CONTROL MODULE

User Manual

Introduction

The EMACSYS System is a versatile modular based control and monitoring equipment. The Control Module forms the heart of the system. Additional modules can be plugged into it to form a complete functioning unit.

As supplied the Control Module is not programmed with any meaningful firmware. Various applications, referred to as appware, together with their associated PC based interface applications can be downloaded from the EMACSYS web site www.emacsys.com.

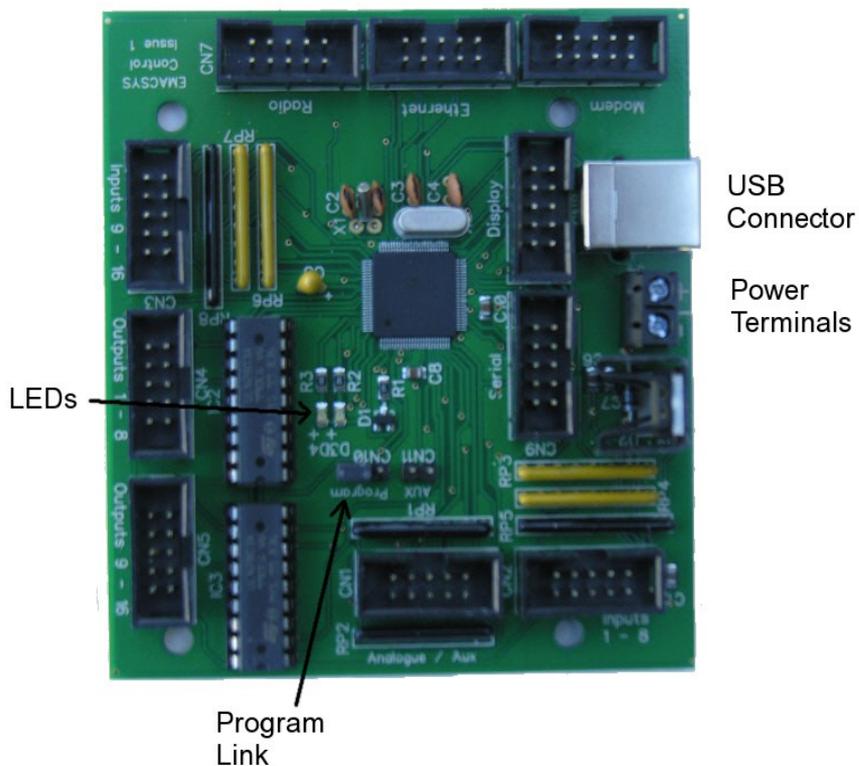
Downloading appware to the Control module is achieved by using the downloader application via the USB port.

It consists of:

- 16 Digital Inputs
- 16 Digital Outputs
- 8 Analogue Inputs
- USB Port
- 5 Peripheral Ports

Two on-board LEDs are used to show appware specific status information.

There are two on-board links one of which is used to put the Control Module into download mode, the other is application specific.



Power Requirements

The Control Module will run over the range 6 to 15 Volts d.c. However if the Relay Module is being used the range is reduced to 10 to 15 Volts as the relays themselves have a nominal rating of 12 Volts.

Current consumption is around 40mA excluding the power consumed by the peripherals. For the total consumption of your configuration add the current used for the Control Module plus the current used by all the peripherals.

Power supplies should be well regulated.

Connecting Peripherals

Peripherals are provided with connection leads and these should be connected to the correct port. Check carefully that the correct port is selected before powering the Control Module.

Most modules take their power from the Control Module and do not require any external power connections. There are exceptions so check the peripheral documentation before using.

NOTE: Peripherals should not be connected with the power applied as this may cause damage to either the peripheral or the Control Module itself.

Downloading Appware

The Control Module is capable of running a wide range of applications and these can be downloaded from the EMACSYS web site www.emacsys.com. In order to download the appware into the module you will need the Downloader application which is again available from the web site.

Run the application and load the appware. This is normally located in the appware folder off the main application folder.

Connect a USB cable between the PC and the Control Module.

Insert the jumper into the programming link.

Power the Control Module.

At this point the two LEDs should flash alternately.

Press the Download Appware button on the application. The file will now be downloaded to the Control Module. Three status bars will show the status of the erase, program and verify cycles.

Once complete de-power the Control Module and remove the programming jumper.

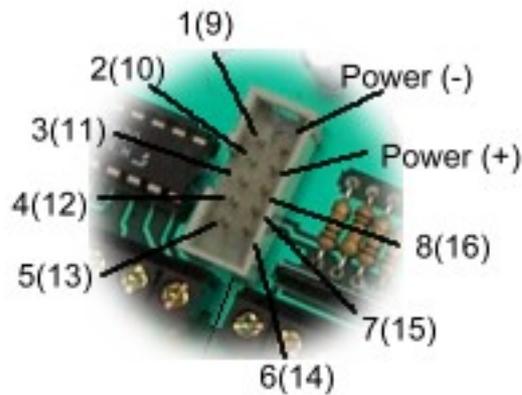
Re-apply power to the Control Module and the new application will be up and running.

It will normally be necessary to load option data and this is done with the associated interface application via the USB port.

NOTE: It is essential that the programming link is in place before power is applied if appware is to be downloaded as this link is only checked at power-up. Conversely it must not be in place at power-up if the application is to run. This is done to prevent accidental programming.

Connections

The digital inputs and outputs are available via 10 way headers. The headers also have power pins so that auxiliary modules can be powered directly from the Control Module. Each of the headers has the same pin assignment regardless of whether they are inputs or outputs. However the inputs power pin is connected to the internal 3.3 Volt power rail while the outputs power pin is connected to the external supply. The following diagram shows the pin arrangement:

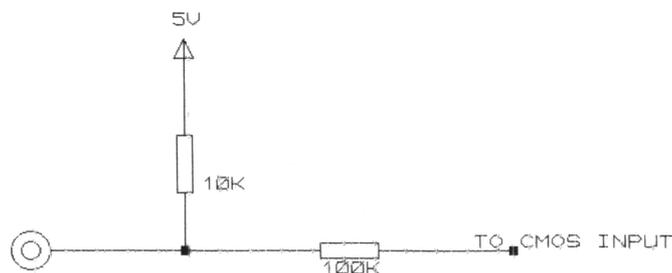


Digital Inputs

Each digital input is connected to the processor inputs via a 100K resistor. It is pulled up to the internal 3.3 Volt supply rail via a 10K resistor.

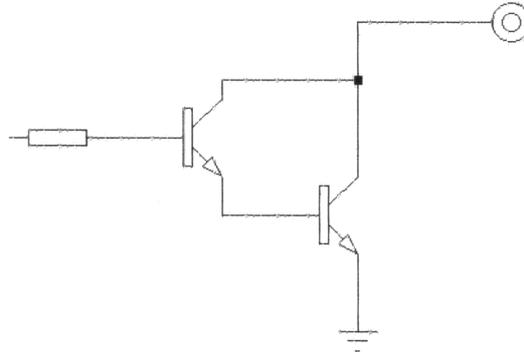
The input can be directly interfaced to digital outputs with a range of 0 – 3.3 Volts. The input voltage should not exceed 3.3 Volts. In addition the inputs can use clean contacts referenced to 0 Volts or open collector outputs again referenced to 0 Volts.

If the driving modules do not share the same power supply as the Control Module then it will be necessary to common their 0 Volt lines.

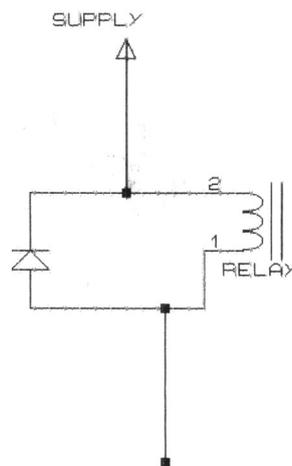


Outputs

Outputs are open collector and can be used to drive relays, solenoids, LEDs etc. The maximum current for the outputs is 50mA.



Note that if these outputs are to drive inductive loads such as relays and motors then the load must have some form of back EMF suppression fitted. IF SUPPRESSION IS NOT FITTED THEN THE OUTPUT DEVICE WILL BE DAMAGED. The following diagram shows how to interface the VIOM output to a relay.



Analogue Inputs

The analogue inputs cover the range 0 to 3.3 Volts. If a larger range is necessary then it will be necessary to use a potential divider on the input.

Measurements are referenced to the internal 3.3 Volt supply rail which has an accuracy of 5%. The resolution of the A/D converter is 10 bits.

For the highest accuracy the input impedance should be less than 2K ohms. Higher values are possible but the accuracy will be reduced and there will be increased noise levels.

The voltage on the input should not exceed 3.3 Volts. If higher voltages are possible (e.g. if you are using a potential divider) then you must ensure that voltages higher than the 3.3 Volts limit cannot be present under start up or fault conditions.

If the driving modules do not share the same power supply as the Control Module then it will be necessary to common their 0 Volt lines.

**Phaedrus Limited
The Boiler House
5 Marsh House Mill
Brussels Road
Darwen
BB3 3JJ
U.K.**

**Tel / Fax +44 (0)1254 772622
e-mail tech@emacsys.com**

Issue 1
March 2010