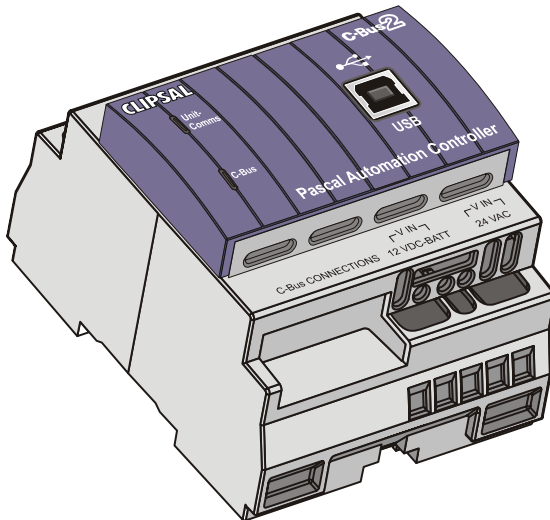




C-Bus Pascal Automation Controller

Installation Instructions

5500PACA



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1.0 Description

The 5500PACA Pascal Automation Controller (PAC) provides advanced control of a C-Bus system. It can be programmed to perform various control operations in response to events, schedules and logical computations. For example, the PAC can be programmed to switch on a heater in the bathroom, at 7:00 am during the week and 9:00 am on weekends, but only when the temperature is below 20 °C and when someone is home.

The PAC also provides a USB interface through which a PC can communicate with a C-Bus installation (like a PC Interface).

2.0 Important Notes

- A 24 V AC power supply may need to be connected to the PAC if either RS-232 port is connected to an external appliance (see Section 4.2).
- The use of any software not provided by Clipsal Integrated Systems (CIS) in conjunction with the installation of these products may void any warranties applicable to the hardware.
- If mounting the PAC in a switchboard, ensure to adequately segregate mains and extra low voltage cables, including any RS-232, C-Bus and power supply cables. If an external DC battery is to be connected, it may be better to mount the PAC in an external cabinet. This will make it easier to comply with local wiring regulations.
- Both C-Bus and RS-232 use RJ45 connections on the PAC. Take care not to connect a cable to the wrong RJ45 connector. The C-Bus connections are identified with a pink label.

3.0 Capabilities

The PAC provides C-Bus control capabilities such as scheduling, scene control, switching and dimming of lights and other electrical appliances on a C-Bus network. It includes a real time clock.

The unit can read and write data across two independent RS-232 serial ports, allowing it to interface with external (non-C-Bus) devices. This gives

the PAC the potential to control equipment such as computers, modems, and security systems. It also enables the PAC to formulate specific actions in response to information received from such equipment.

The PAC provides a USB communication interface between a PC and a C-Bus installation. This can be used by the C-Bus Toolkit software when configuring a C-Bus installation.

4.0 Wiring Instructions

The Pascal Automation Controller (PAC) may be mounted in a switchboard or external cabinet (such as a StarServe™ enclosure). Ensure to adequately segregate mains and extra low voltage cables, including any RS-232 cables and power cables for the battery backup and RS-232. If such connections are to be used, an external cabinet may be more appropriate.

A Wiring diagram for the PAC is provided in Figure 1.

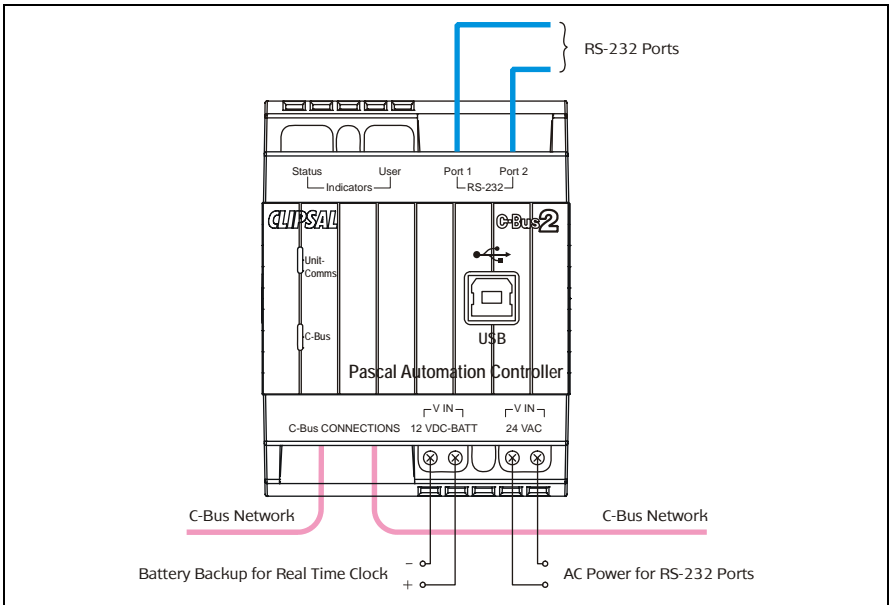


Figure 1 - 5500PACA Pascal Automation Controller Wiring

4.1 Battery Backup

The PAC includes terminals for the connection of an external 12 V DC battery backup. The real time clock has an internal capacitor backup which maintains the time for 24 hours during a power failure. The external battery backup is optional, and provides backup for the real time clock during an extended power failure.

4.2 Connecting RS-232 Devices

Two RS-232 ports are provided which allow the PAC to interface with external devices. They are NOT used for C-Bus programming, and require power in order to function. They can be powered from the DTR and RTS handshaking lines by having one high and one low. Alternatively, a 24 V AC power supply can be used to power the RS-232 ports. If you do not know whether the serial device you are connecting has control over the handshaking lines, simply try the device to see if it works. If not, connect the 24 V AC power supply.

Pinouts are provided in Table 1.



NOTE

If using the RS-232 port to connect to external devices, ensure you use a suitably shielded data cable. Cable length should be limited to 15 metres for communication at up to 19,200 bps, or 7.5 metres at 38,400 bps.

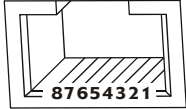
	Pin	Name	Description
	1	DCD	Data Carrier Detect *
	2	DSR	Data Set Ready *
	3	DTR	Data Terminal Ready *
	4	GND	Ground
	5	RD	Receive Data
	6	TD	Transmit Data
	7	CTS	Clear To Send *
	8	RTS	Request To Send *

Table 1 - RS-232 pinouts

* optional

5.0 Connection to the C-Bus Network

Connection to the C-Bus network is made via one of the RJ45 sockets. Use Cat-5 Unshielded Twisted Pair (UTP) C-Bus cable, and an appropriately wired RJ45 plug. Pinouts and cable conductor assignments are provided in Figure 2 and Table 2. The RJ45 sockets are internally connected. The Clipsal catalogue number for the C-Bus Cat-5 UTP cable is 5005C305B.

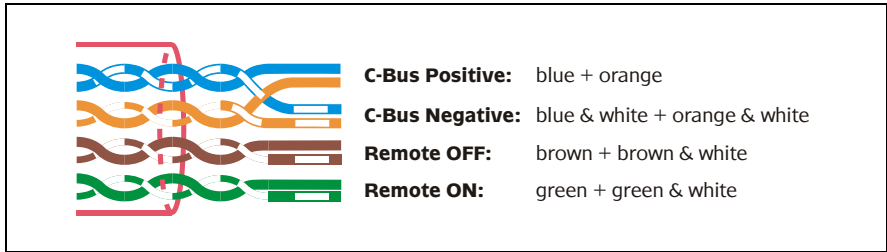


Figure 2 – C-Bus cable conductor assignments

Pin	C-Bus Connection	Colour
1	Remote ON	green & white
2	Remote ON	green
3	C-Bus Negative (-)	orange & white
4	C-Bus Positive (+)	blue
5	C-Bus Negative (-)	blue & white
6	C-Bus Positive (+)	orange
7	Remote OFF	brown & white
8	Remote OFF	brown

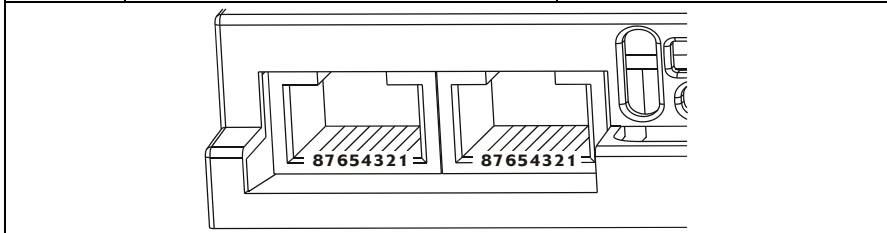


Table 2 – C-Bus RJ45 sockets and their pinouts

6.0 Indicators

6.1 Unit/Comms

The “Unit/Comms” indicator shows the status of the PAC unit. When C-Bus power is present, the indicator illuminates (as a continuous orange light). The indicator flashes erratically when data is transferred over the USB port.

Indicator Status	Meaning
On	Normal operation
Erratic flash	Data exchange in progress (USB port)
Off	No C-Bus power is connected

Table 3 – The “Unit/Comms” indicator

6.2 C-Bus Indicator

The “C-Bus” indicator shows the status of the C-Bus network at the unit. If sufficient network voltage and a valid C-Bus clock signal are present, the indicator illuminates (as a continuous orange light). If a network is connected which has a higher current load than the power supplies support, the indicator flashes to show a marginal network voltage. If no C-Bus clock is present, the indicator remains off.

Indicator Status	Meaning
On	Power is on and functional
Flashing	There is insufficient power to support the C-Bus network
Off	No C-Bus clock signal is present

Table 4 – The “C-Bus” indicator

6.3 Status Indicator

The “Status” indicator provides a guide to what the PAC is doing internally.

Indicator Status	Meaning
On	User configuration data is corrupt. A new configuration file must be transferred.
Rapid constant flash (approx. 5 Hz)	The firmware is corrupt. New firmware and a new configuration file must be transferred.
Erratic flash (approx. 1 Hz)	Logic is running. The indicator state is toggled when logic is run.

Table 5 – The "Status" indicator

6.4 User Indicator

The “User” indicator is controlled by the unit’s logic. Its state will vary depending on how the project is programmed.

7.0 C-Bus System Clock

The Pascal Automation Controller (PAC) incorporates a software selectable C-Bus system clock. The system clock is used to synchronise data communication on a C-Bus network. At least one active C-Bus system clock is required on each C-Bus network for successful communication. No more than three units on any C-Bus network should have clock circuitry enabled, so this option is normally disabled using the C-Bus Toolkit software.

If a system clock is required, it can be enabled from the unit’s “Global” tab in the C-Bus Toolkit software.

8.0 C-Bus Network Burden

The PAC incorporates a software selectable network burden. The network burden can be enabled from the unit's "Global" tab in the C-Bus Toolkit software, but only if the C-Bus system clock is also enabled.

One network burden is normally required to ensure correct operation of each C-Bus network. The Network window of a C-Bus Toolkit project provides a summary of a C-Bus network according to the units added to the Database. This can be helpful in determining how many burdens are required on a particular network.

9.0 Programming Requirements

Unit Address

The Pascal Automation Controller (PAC) must be programmed with a unique identification address (Unit Address). This is accomplished using the C-Bus Toolkit software, available from the downloads section of the Clipsal Integrated Systems (CIS) web site (<http://www.clipsal.com/cis>). The C-Bus Toolkit is also used to enable the C-Bus system clock and burden if required.

Logic Programming

The PAC must be configured with a logic project which has been customised for a particular C-Bus installation. Such a project is produced using the Programming Interface for C-Bus Embedded Devices (PICED) software. The PICED software is available from the downloads section of the CIS web site (<http://www.clipsal.com/cis>).

Both the PAC and C-Bus Toolkit project files should be saved to disk and kept in an archive at your premises. It is also recommended to give a copy to the customer.

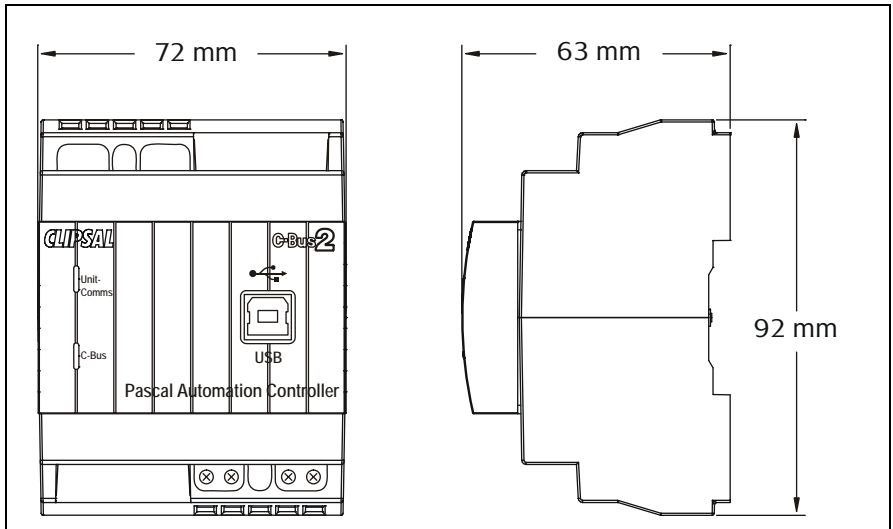
Once the PAC project is developed, the PICED software is used to transfer the project to the PAC.

10.0 Electrical Specifications

Parameter	Description
C-Bus supply voltage	15 to 36 V DC @ 32 mA Does not supply current to the C-Bus network.
RS-232 supply voltage	24 V AC @ 20 mA
Battery backup supply voltage	12 V DC @ 30 mA
Connections	2 × C-Bus (RJ45), 2 × RS-232 (RJ45), 1 × USB type B socket, screw terminals for DC battery and 24 V AC power
C-Bus system clock	software selectable
Network burden	software selectable
Operating temperature range	0 to 45 °C
Operating humidity range	10 to 95% RH

11.0 Mechanical Specifications

Parameter	Description
Dimensions (W×H×D)	72 × 92 × 63 mm
Weight	150 g
C-Bus Connections	2 × RJ45 sockets (in parallel)



12.0 Standards Complied

DECLARATIONS OF CONFORMITY

Australian/New Zealand EMC & Electrical Safety Frameworks and Standards

The 5500PACA product complies with the following:



Regulations	Standard	Title
EMC (C-Tick)	AS/NZS CISPR 22	IT Equipment Emissions Standard
	AS/NZS CISPR 24	IT Equipment Immunity Standard

European Directives and Standards

The 5500PACA product complies with the following:



European Council Directive	Standard	Title
EMC Directive 89/336/EEC	EN 55022	IT Equipment Emissions Standard
	EN 55024	IT Equipment Immunity Standard

Other International Directives and Standards

The 5500PACA product complies with the following:

Regulations	Standard	Title
EMC	CISPR 22	IT Equipment Emissions Standard
	CISPR 24	IT Equipment Immunity Standard

13.0 Warranty

The C-Bus Pascal Automation Controller carries a two year warranty against manufacturing defects (refer to the Warranty Statement).



Technical Support and Troubleshooting

For further assistance in using this product, consult your nearest Clipsal Integrated Systems Sales Representative or Technical Support Officer.

Technical Support Hotline: 1300 722 247 (Australia)
0800 888 219 (New Zealand)

Technical Support Email: techsupport.cis@clipsal.com.au

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A list of worldwide contacts, additional product information and technical resources is provided at <http://www.clipsal.com/cis/>

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