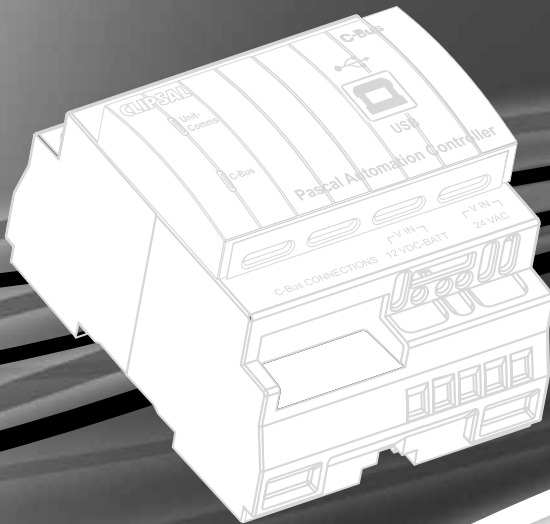


CLIPSAL[®]

by **Schneider** Electric



C-Bus[®] C-Bus Pascal Automation Controller **5500PACA**



Installation Instructions

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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 7:00am during the week and 9:00am 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 24V a.c. 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 Australia, 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 d.c. 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 back up 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.

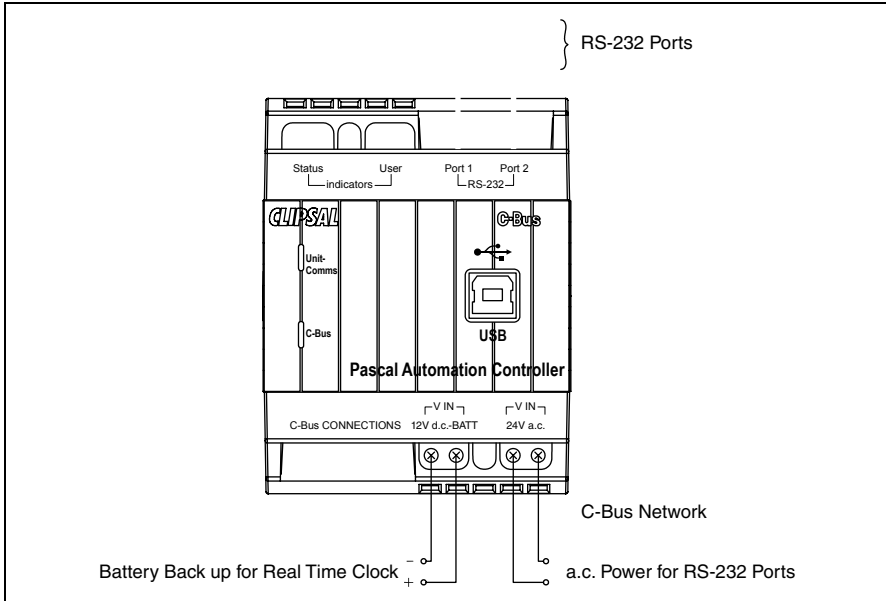


Figure 1 – 5500PACA Pascal Automation Controller Wiring

4.0 Wiring Instructions

4.1 Battery Back up

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

Pin-outs 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.

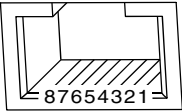
	Pin	Name	Description
	1	DCD	Data Carrier Detect *
	2	DSR	Data Set Ready *
	3	DTR	Data Terminal Ready *
	4	GND	Ground
	5	RD	Receive Data
	6	TD	Transmit Data
	7	CTS	Clear to Send *
	8	RTS	Request to Send *

Table 1 - RS-232 RJ45 connection sockets and their Pin-outs

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. Pin-outs 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.

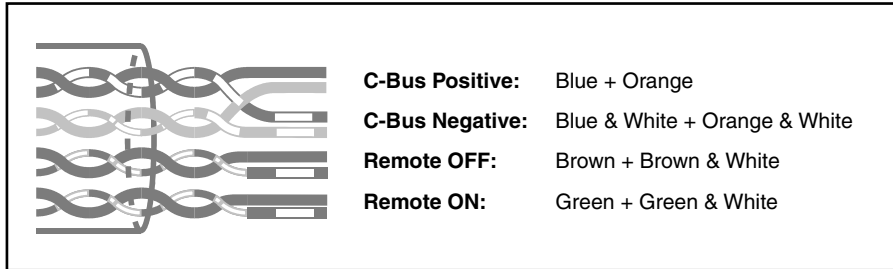


Figure 2 - C-Bus Cable Conductor Assignments

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

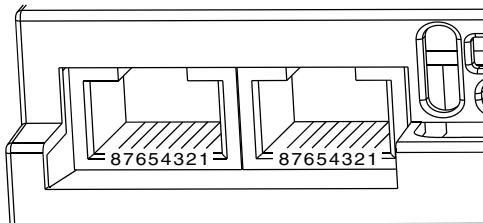


Table 2 - C-Bus RJ45 Sockets and their Pin-outs

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

6.0 Indicators

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 (approximately 5Hz)	The firmware is corrupt. New firmware and a new configuration file must be transferred.
Erratic flash (approximately 1Hz)	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) website (<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 at 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.

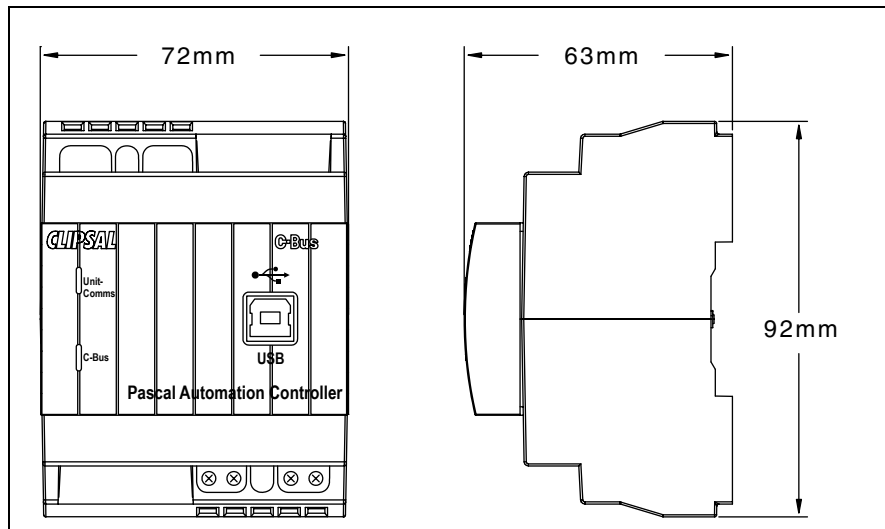
Once the PAC project is developed, the PICED software is used to transfer the project to the PAC.

10.0 Electrical Specifications

Parameter	Description
C-Bus supply voltage	15 to 36V d.c. @ 32mA (does not supply current to the C-Bus network.)
RS-232 supply voltage	24V a.c. @ 20mA
Battery back up supply voltage	12V d.c. @ 30 mA
Connections	2 x C-Bus (RJ45), 2 x RS-232 (RJ45), 1 x USB type B socket, screw terminals for d.c. battery and 24V a.c. 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	Decription
Dimensions	72(W) x 92(H) x 63(H)mm
Weight	150g
C-Bus connections	2 x 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 AS/NZS CISPR 24	IT Equipment Emissions Standard IT Equipment Immunity Standard

European Directives and Standards

The 5500PACA product complies with the following:



European Council Directive	Standard	Title
EMC Directive 2004/108/EC	EN 55022 EN 55024	IT Equipment Emissions Standard IT Equipment Immunity Standard

Other International Directives and Standards

The 5500PACA product complies with the following:

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

14.0 Technical Support and Troubleshooting

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

Technical Support Hotline: (Australia) 1300 722 247
 (New Zealand) 0800 888 219
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 (Southern Asia) +603 7665 3555 Ext 236
 Ext 242 (Malaysia)
 (South Africa) 011 314 5200
 (United Kingdom) 0870 608 8608

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

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

15.0 Warranty Statement

1. The benefits conferred herein are in addition to, and in no way shall be deemed to derogate; either expressly or by implication, any or all other rights and remedies in respect to the Clipsal product, which the consumer has under the Commonwealth Trade Practices Act or any other similar state or territory laws.
2. The warrantor is Clipsal Australia Pty Ltd of 33-37 Port Wakefield Road, Gepps Cross, South Australia 5094. With registered offices in all Australian states.
3. This Clipsal product is guaranteed against faulty workmanship and materials for a period of two (2) years from the date of installation.
4. Clipsal Australia Pty Ltd reserves the right, at its discretion, to either repair free of parts and labour charges, replace or offer refund in respect to any article found to be faulty due to materials, parts or workmanship.
5. This warranty is expressly subject to the Clipsal product being installed, wired, tested, operated and used in accordance with the manufacturer's instructions.
6. All costs of a claim shall be met by Clipsal Australia Pty Ltd, however should the product that is the subject of the claim be found to be in good working order all such costs shall be met by the claimant.
7. When making a claim the consumer shall forward the Clipsal product to the nearest office of Clipsal Australia Pty Ltd with adequate particulars of the defect within 28 days of the fault occurring. The product should be returned securely packed, complete with details of the date and place of purchase, description of load, and circumstances of malfunction.

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