C-Bus® Pascal Automation Controller™

C-Bus®

CLIPSAL®
LIVING ELECTRICAL

5500PACA

The Pascal Automation Controller™ (PAC) is a DIN rail mounted C-Bus® device which provides sophisticated and affordable control of a Clipsal C-Bus® system. The PAC can perform operations in response to monitored events by executing custom written embedded programs. These programs are written by installers to suit individual application needs using the Microsoft Windows™ based Programming Interface for C-Bus® Embedded Devices or 'PICED' software.

The PAC provides control based on conditional logic, time scheduling, scene control, RS-232 strings or combinations of these. The unit is programmed using a combination of software GUI's, wizards and an extended version of the standard 'Pascal' computer language, which includes customised commands specifically for C-Bus® control.

One of the primary uses of the PAC is for installers to develop custom programs which utilise conditional logic. Conditional logic is based on conditions such as time values and C-Bus® Group Address levels. The PAC is then programmed to perform actions based on these conditions.

The PAC is a native C-Bus® device and is able to interact with the complete range of C-Bus® and C-Bus® Wireless products. The unit includes a built-in realtime clock and 192Kb of user memory which allows installers to include up to 2000 lines of code in their programs. The built-in EEPROM memory retains program information; there is no need for a backup battery or a separate memory unit to back up this information in the event of a power loss. An additional backup battery is only required for backing up the real-time clock following a power loss of more than 24 hours.

The PAC only requires a C-Bus® connection to operate. It is powered from a C-Bus® network and is connected to the C-Bus® Cat-5 UTP data bus in the same way as other C-Bus® units.

The PAC provides a USB interface through which programs are downloaded. The USB connection can also be used to communicate directly with a C-Bus® installation via a PC. This allows the PAC to function as a PC Interface and can be used by the C-Bus® Toolkit software when configuring a C-Bus® installation.

The PAC supports multiple C-Bus® networks and multiple C-Bus® applications.It is possible to read from and write to RS-232 serial ports from the PAC. This enables interfaces to many automation and audio/visual products to be created. The two serial ports included can be used simultaneously.

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CLIPSAL C-Bus Control and Management System

Key Features

- Conditional and real-time events programming for C-Bus®
- Dedicated scheduling, logic and scene programming modules
- Download programs from a PC to the unit
- Connects directly to C-Bus®
- Powered from C-Bus®
- Compact size, 4M DIN modules wide
- 2 x RS-232 ports for third party device control
- Easy to understand and learn programming language
- Microsoft Windows™ based programming GUI's and wizards
- Command line programming for advanced programmers.

Programming Software

The Pascal Automation Controller™ is programmed by an installer using the **P**rogramming **I**nterface for **C**-Bus **E**mbedded **D**evices, or 'PICED' software.

The PICED software provides a programming solution for installers at many levels of expertise and has been designed to be intuitive and easy to use.

The scheduling tool allows time based events to be programmed into the Pascal Automation Controller™. The PAC checks every second whether a particular event is due to occur, and actions the event (or events) accordingly.

The scene programming tool allows installers to quickly and easily program scenes into a PAC.

The programming language used in the PICED software is based on the standard Pascal computer language, enhanced by Clipsal with specific commands related to C-Bus® control. The language includes over 200 commands to achieve the C-Bus® functionality required by clients.

The language supports commands such as:

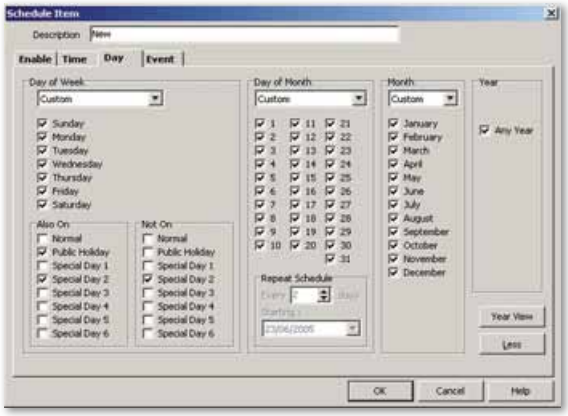
- Conditional logic (if then, and, or, not etc)
- Flow Control (for, repeat, while)
- Variables (integer, real, Boolean, character, string)
- Control and monitor C-Bus® group addresses
- Control and monitor C-Bus® scenes
- C-Bus® tag names
- Serial (RS-232)

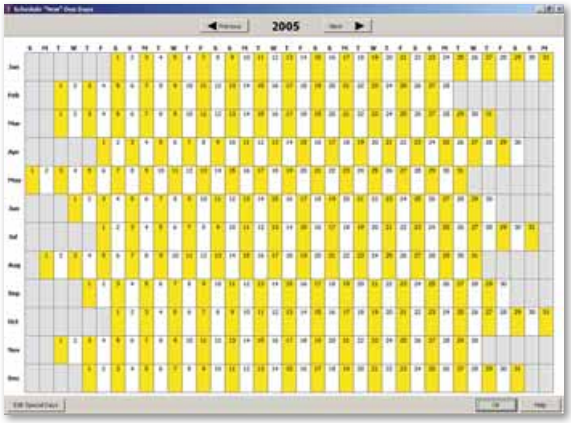
Programming Wizard

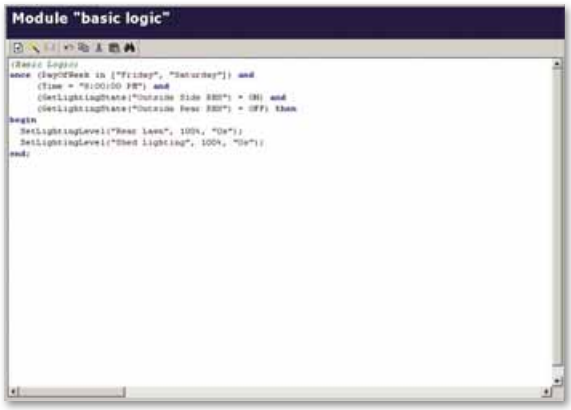
Logic based programs can be created with the programming wizard. The wizard provides a GUI based point and click method for creating basic logic programs. These basic logic programs are suitable for a number of typical applications.

More complex programs are produced by advanced users utilising the freeform text programming method.

Programs can be input by typing text directly into the editing window. To assist the readability of typed programs, the logic commands are highlighted automatically in a different colour.







ELECTRICAL SPECIFICATION	
Connections	2 x C-Bus® (RJ45)2 x RS-232 (RJ45) 1 x USB type B socket 2 x screw terminals for DC battery + / - (for extended real-time clock backup) 2 x screw terminals for RS-232 power
C-Bus® supply voltage	15 to 36V d.c. @ 32mA
RS-232	The two RS-232 ports allow the PAC to interface with third party device or system. These ports are opto-isolated and require to be powered if used. They can be powered from the DTR and RTS handshaking lines if the RS-232 ports (if the third party serial device has control over the handshaking lines) or via an external power supply connected to the PAC.
RS-232 supply voltage	24V a.c. @ 20mA (Note, this power connection does not charge the external backup battery).
Backup battery	Super Capacitor included for backing up of time clock for 24 hours after C-Bus® loss. External battery connection for extended time clock backup. No battery backup required for program configuration backup.
Battery backup supply voltage	12V d.c. @ 30mA
C-Bus® system clock	Software selectable
Network burden	Software selectable
Operating humidity range	10 to 95% RH
Operating temperature range	0° to 45°C

PROGRAMMING SPECIFICATION	
Available user memory for programming	192Kb
Maximum program length	~2000 lines
Maximum number of C-Bus® applications supported	10
Maximum number of C-Bus® group addresses supported	255 group addresses on each C-Bus application, 2550 total
Number of programming commands available	>200
Maximum number of If-Then conditions	No specific limit, >1000
Maximum levels of If-Then “nesting”	No specific limit, >1000
Maximum number of individual modules in a program	50
Number of flags	No specific limit, >1000
Number of variables	No specific limit, >1000
Number of timers	20 in-built, >1000 user definable
Maximum number of event schedules	250
Variable mathematical functions	Yes
Schedule events by time	Yes
Sunrise/Sunset events (dynamic, based on longitude & latitude)	Yes
Daylight savings time adjustment	Yes
Adjust clock within schedule	Yes
Random event times	Yes
Power failure recovery process	User defined
Time resolution	1 second
Clock accuracy	0.5 second per day

RS-232 INTERFACE SPECIFICATIONS	
User-controllable	Yes
Number	2
Baud rate	600 to 38400 Baud
Transmit (output) capability	ASCII, binary, variable values, etc.
Receive (input) capability	ASCII, binary, variable values, etc.
Maximum receive data length	255 bytes

C-Bus Pascal Automation Controller™

MECHANICAL SPECIFICATION	
Enclosure	DIN rail mounted, 4M Modules wide
Dimensions (WxHxD)	72 x 92 x 63 mm
Programming connector	USB for PAC program downloading and C-Bus® Communication (PC Interface functionality)
C-Bus® connectors	2 x RJ45 sockets (in parallel)
RS-232 port connectors	Port #1 1 x RJ45 Port #2 1 x RJ45
Weight	150g

Part Number	Description
5500PACA	C-Bus® Pascal Automation Controller™ (PAC)

Product of Clipsal Australia Pty. Ltd.
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