C-Bus Pascal Automation Controller™

C-Bus2™

CLIPSAL®
INTEGRATED SYSTEMS

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 **P**rogramming **I**nterface for **C**-Bus **E**mbedded **D**evices 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 real-time 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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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:

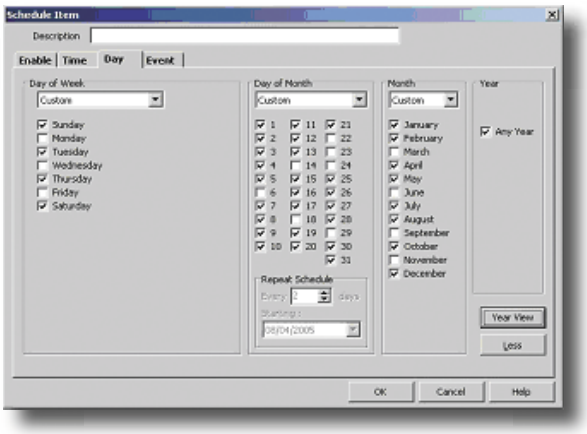
- Conditional logic (if then, and, or, not etc)
- Flow Control (for, repeat, while)
- Variables (integer, real, Boolean, character, string)
- Control and monitor C-Bus group addresses
- Control and monitor C-Bus scenes
- C-Bus tag names
- Serial (RS-232)

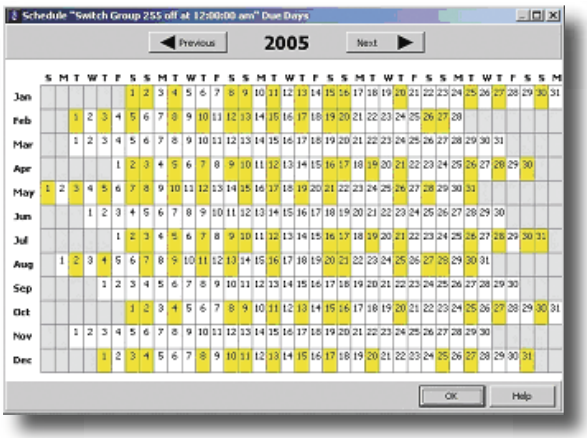
Programming Wizard

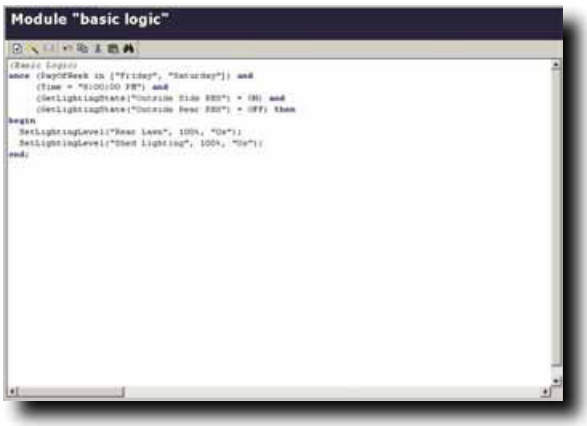
Logic based programs can be created with the programming wizard. The wizard provides a GUI based point and click method for creating basic logic programs. These basic logic programs are suitable for a number of typical applications. More complex programs are produced by advanced users utilising the freeform text programming method.

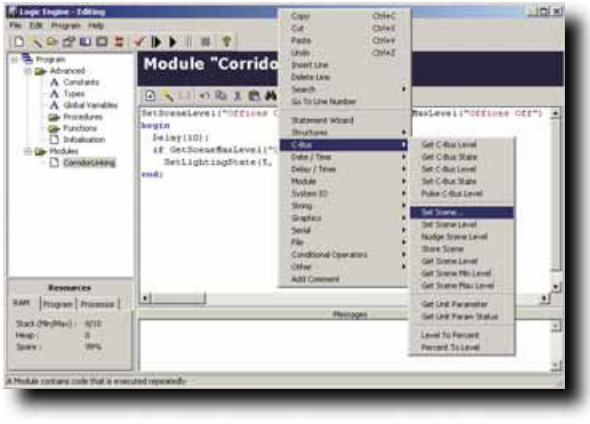
Freeform Text Programming

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

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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 Integrated Systems Pty Ltd
Member of Clipsal Australia Holdings Group
ABN 15 089 444 931

Head Office
12 Park Terrace, Bowden
South Australia 5007
PO Box 103 Hindmarsh,
South Australia 5007

Telephone (08) 8440 0500
International +61 8 8440 0500

Facsimile (08) 8346 0845
International +61 8 8346 0845

Internet www.clipsal.com/cis
E-Mail cis@clipsal.com.au

CIS Technical Support Hotline
1300 722 247

International Enquiries

International Sales and Marketing
Telephone +61 8 8269 0587
Facsimile +61 8 8340 7350
E-Mail export@clipsal.com.au

New Zealand
Clipsal Industries (NZ) Ltd
Telephone +64 9 576 3403

Malaysia
Clipsal Integrated Systems (M) Sdn Bhd
Telephone +60 3 7665 3555

Singapore
Clipsal Integrated Systems Pte Ltd
Telephone +65 6415 3232/3233

China
Clipsal China Limited
Telephone +86 755 8237 5959

Greece
Schneider Electric AE
Telephone +30 69 4646 3200

Hong Kong
Clipsal Integrated Systems (HK) Limited
Telephone +852 2487 0261

India
Schneider Electric India Pvt Ltd
Telephone +91 11 5159 0000

Indonesia
PT Clipsal Graha Nusa
Telephone +62 21 630 6430

Korea
Clipsal Korea Co. Ltd
Telephone +82 549 5550

Pakistan
Clipsal Pakistan (Pvt) Ltd
Telephone +92 21 506 7278

Philippines
Clipsal Phillipines Inc.
Telephone +632 683 0275-78

South Africa
Clipsal South Africa (Pty) Ltd
Telephone +27 11 314 5200

Taiwan
Clipsal (Taiwan) Co Ltd
Telephone +886 2 2558 3456

Thailand
Clipsal Thailand Ltd
Telephone +66 2 952 5338-42

United Arab Emirates
Clipsal Middle East
Telephone +971 6 5570 777

United Kingdom
Clipsal Integrated Systems
C/o Schneider Electric
Telephone +44 870 608 8 608

Vietnam
Clipsal - VTEC
Telephone +848 856 3002

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