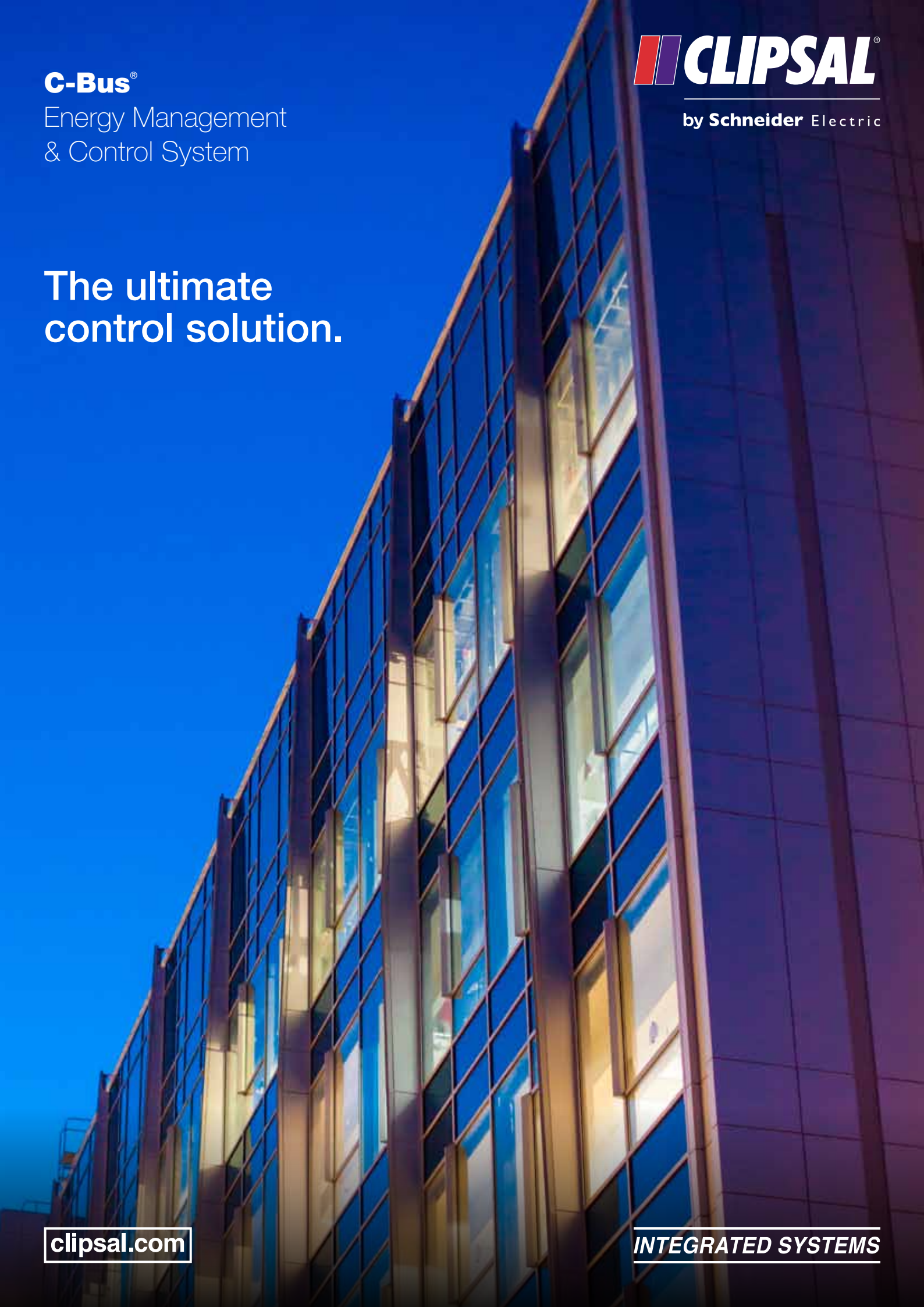
C-Bus®
Energy Management
& Control System

CLIPSAL®
by Schneider Electric

The ultimate control solution.



clipsal.com

INTEGRATED SYSTEMS

Image courtesy of Melbourne Cricket Ground, Victoria.

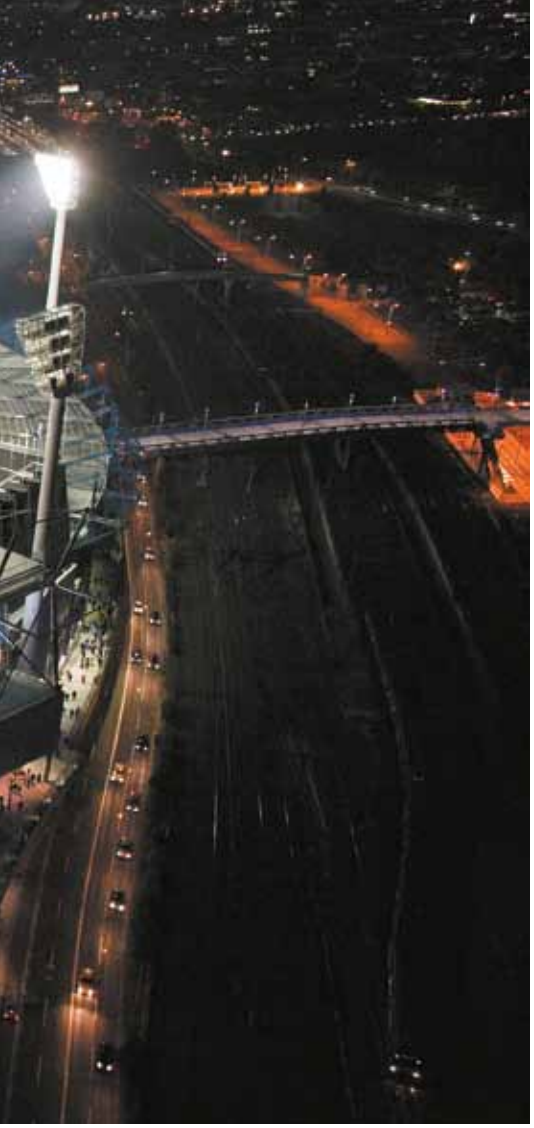
C-Bus…
the Ultimate Control Solution

In today's commercial developments, control and management systems are an integral aspect of every well-designed building, venue or complex. Modern commercial facilities require more light, more comfort, more intelligence and improved power efficiency. With an increasing focus towards getting more from less, energy efficiency is a paramount, while enhancing the functionality and ambiance of a space.

C-Bus can achieve these objectives by providing a seamless control and management solution for your next commercial project.

Utilising intelligent technology and an innovative product range, C-Bus can provide a complete solution for any commercial project through:

- energy management and efficiency
- seamless integration with building management systems
- system scalability and flexibility for future upgrades
- robust and reliable system architecture
- user-friendly control.



C-Bus provides exceptional flexibility, scalability and robust system architecture, which comes together to create the most innovative and cost effective control solution for any commercial application.

Clipsal by Schneider Electric

Established in 1920, Clipsal is Australia's number one brand of electrical products, accessories and solutions. Clipsal has grown and evolved with great success, and continues to manufacture products at Gepps Cross in South Australia.

Over the years, Clipsal has also developed a great understanding of the commercial and domestic building industries and continuously meets their broad and specific electrical requirements.

Development of building automation in the early 90s led to Clipsal becoming design and manufacturing specialists in lighting control and building management products, which is commonly known today as C-Bus.

Since then, C-Bus has gained widespread acceptance in major commercial and domestic markets.

Clipsal's reputable, high quality product range and strong history of R&D clearly positions the brand as an electrical industry leader.

As part of Schneider Electric, the largest global specialists in energy management, Clipsal can provide a total electrical solution for any project specification or customer requirements.

With a primary focus towards turning clients' objectives into reality, Clipsal is dedicated to providing customers the most innovative, sustainable and cost effective electrical solutions available - from the most exclusive boardroom to a robust factory environment.

The company has a long and proud history of working successfully with installers, end-users, lighting designers and consulting engineers, with the aim to develop mutually beneficial partnerships.

An extensive and innovative product offering ensures Clipsal can meet electrical specifications for any commercial space.

From project concept and design; to installation, commissioning and building occupation - Clipsal's comprehensive solutions are backed by exceptional service and expert advice to ensure your next project is a complete success.

C-Bus software allows simple control and monitoring of an entire network system from a user-friendly interface.

What is C-Bus?

C-Bus is an Australian designed and engineered microprocessor control system. It provides complete control of lighting and other electrical devices.

Through innovative design and extensive R&D, C-Bus is easy to install and by far the most cost effective, user-friendly control and management system available on the market.

The comprehensive C-Bus product range provides specifiers, lighting designers and integrators with the essential requirements to meet any control and management system specifications.

This includes wall switches; touch screens (colour and black & white); high powered commercial dimmers; control relays; multi-room audio solutions; thermostats; occupancy, light level and temperature sensors; security and access systems; energy control and monitoring solutions; and software packages.

How C-Bus Works

C-Bus utilises “distributed intelligence”, which means it does not require a central controller like other systems. This increases the redundancy of the architecture and eliminates the risk of total failure to provide a more dependable, safer system.

The C-Bus protocol has proven to be extremely robust and reliable. The C-Bus system includes gateways and interfaces to allow for a for high level of integration with other technologies and building management systems, including DSI, DMX, DALI, BACnet, OPC and TCP/IP.

C-Bus can control virtually any type of electrical load with ease, whether it’s simple digital control of lighting or variable (analogue) control, such as dimming fluorescent ballasts.

Each C-Bus device has its own in-built microprocessor and can be individually programmed with ease to integrate with other devices.

Through a two-way, closed loop communication system, C-Bus allows individual network devices to communicate directly with each other.

This creates a more intelligent network with precise control; enabling individual devices to provide information about their status.

C-Bus software allows simple control and monitoring of an entire network system from a user-friendly interface.

The user interface can also be customised and configured to suit specific requirements, with a wide selection of control screens and buttons.

A Complete Range for a Total Solution

C-Bus has been designed to suit various markets and regions, and is fully accredited for use in Australia, New Zealand, United States of America, Asia and Europe. Units are available in 120V and 240V (nominal operating voltage) and 50Hz - 60Hz operating frequency ranges.

A wide range of system units, hardware and accessories are also available to facilitate a C-Bus network.

Input Units
C-Bus Input Units are intelligent devices, which respond to real-time events and send programmable messages to the C-Bus network.

Input units create a response (or series of responses) via programmed C-Bus Output Units, based on a particular real-time event.

For example: this response could be to dim lights, operate air conditioning, open/close blinds, or a combination of these actions.

A wide range of C-Bus Input Units are available to suit specific application requirements.

The C-Bus product range offers a selection of input units, such as wall-mounted switches and touch screens. They are available in various styles, colours and designs, complementing any interior décor or building design.

Output Units
C-Bus Output Units are available in a number of configurations, including DIN rail mounted, which allows for a high volume of output units to be fitted into a small space.

These output units utilise “smart” algorithms to ensure flicker free light operation; automatically compensating for fluctuations in line voltage and frequency.

Time Based Scheduling
Time schedules can be programmed into C-Bus to switch loads or control lighting according to specific pre-defined times. Time scheduling can also be programmed to consider special calendar days, such as public holidays, Easter and Christmas.

The comprehensive C-Bus product range provides specifiers, lighting designers and integrators with the essential requirements to meet any control and management system specifications.

Constant Illumination Control
Incorporating light level sensors with a C-Bus system assists with maintaining constant light levels in an area. The system can also compensate for changing light levels from external sources (e.g. light entering through a window), as well as the gradual reduction in light output of luminaires (lumen depreciation).

Occupancy and Vacancy Control
C-Bus Occupancy Detectors utilise infrared, ultrasonic or a combination of both detection technologies. They can be retrofitted to an existing C-Bus installation, and programmed to control any output devices on a C-Bus network.

Relay Control
There is no limit to the overall handling capacity of C-Bus control systems. For maximum control flexibility and energy savings, individual zones are independently controlled.

The most commonly specified relay controls are 10A and 20A per channel, but a C-Bus system can easily accommodate all current loads.

High Powered Dimmers
C-Bus high powered dimmers are ideal for a variety of commercial dimming applications and available in two ranges; Professional and Architectural.

C-Bus Professional Dimmers
C-Bus Professional Dimmers provide exceptional value for money and are the perfect solution for day-to-day commercial dimming applications - ideal for restaurants, clubs, hotels and retail outlets.

C-Bus Architectural Dimmers
C-Bus Architectural Dimmers are full featured, modular, commercial grade dimmers – ideal for large-scale commercial dimming applications, such as ballrooms, art galleries and theatres.

A C-Bus Control and Management system has a number of software based installation tools, application programmes and third-party development tools.

Multi-Room Audio (MRA)
C-Bus Multi-Room Audio provides a high quality, multi-zone distributed audio solution. The system flexibility allows different audio sources to be selected in different zones.

The system is C-Bus controlled and uses existing C-Bus switches and C-Bus touch screens to control the audio. It can also act as a stand-alone multi-room audio system, or used in conjunction with C-Bus Relays, Dimmers and other devices to provide an integrated automation solution.

C-Bus Software
A C-Bus Control and Management system has a number of software-based installation tools, application programmes and third-party development tools.

End-User Software Suites, developed by Clipsal, further enhance flexibility and functionality.

C-Bus Software Installation Tools provide simple and fast commissioning of a C-Bus system, while Clipsal provided development tools allow third-party developers to easily integrate software solutions into a C-Bus network.

C-Bus Toolkit Software
C-Bus Toolkit Software is an application designed to configure and commission C-Bus installations. It allows customers to install and support C-Bus hardware products.

C-Bus Toolkit Software is used for commissioning installations by configuring the behaviour of installed C-Bus hardware. Furthermore, C-Bus Toolkit Software is backward compatible, regularly updated and backed by high-level software support.

C-Bus Schedule Plus Software
C-Bus Schedule Plus Software provides a powerful and user-friendly interface to a C-Bus network. Schedule Plus allows control and monitoring of a C-Bus system, with the option to customise the appearance and operation of the interface.

C-Bus OPC Server Software
C-Bus OPC Server Software provides an interface between C-Bus and third-party systems that support OPC clients. For example, a building management system (BMS) or a SCADA presentation solution, such as those from Schneider Buildings or Schneider Industries.

The C-Bus OPC Server provides both Data Access and Alarm and Event integration allowing for high volumes of data and control traffic to pass between systems.

Image courtesy of Hassel, Photography by Earl Carter. SA Water House, South Australia.

System Units & Accessories

C-Bus BACnet Gateway
The C-Bus BACnet Gateway is an embedded device, which provides a bridge between C-Bus and building management systems that support the BACnet protocol. Gateways such as this allow for high levels of integration, while providing greater system flexibility.

DMX Gateway
The C-Bus DMX Gateway is a DIN rail mounted one-way device, which maps C-Bus group addresses and levels to a DMX-512-A interface. It permits C-Bus Input Units, such as wall switches and detectors, to control lighting devices with DMX interface capability. This includes LED lighting and theatrical equipment from various manufacturers.

Network Interface
The C-Bus Network Interface is a system support device designed to provide an isolated communications path between a TCP/IP Ethernet network and a C-Bus network.

Pascal Automation Controller (PAC)
The C-Bus Pascal Automation Controller is DIN rail mounted and four modules wide.

It enables C-Bus to perform complex control functions, real-time scheduling, calculations and protocol conversions.

The C-Bus Pascal Automation Controller is based on Pascal programming language and support commands such as if, then, and, or, etc.

It is also enhanced with specific commands related to C-Bus, supporting automation functions such as control and monitoring of C-Bus groups and scenes, C-Bus tag names and serial (RS232) commands.

Why use C-Bus?

Internationally Recognised
The core protocol of C-Bus is based on the internationally recognised ISO seven-layer communications model, ensuring C-Bus communication is extremely robust and reliable.

Compliant
C-Bus products have been designed to meet Australian, American and European Directives and Standards for electrical safety and EMC compliance. Clipsal's expert design and engineering teams are specialists in mechanical design, plastics, tooling, printed circuit board layout and environmental proofing.

This ensures product reliability and compliance with Australian and International Standards.

Simple to Design and Document
C-Bus is extremely simple to document at the project design stage. Switching and control circuits don't need to be selected until system commissioning. Network changes can also be made at any time without altering the schematics.

Only a C-Bus network connection is required for each unit at the time of installation. During commissioning, the system is programmed so that specific C-Bus commands trigger specific responses in one (or more) devices. The units' functionality can be re-programmed at any time and C-Bus units can easily be added, moved or removed.

C-Bus is extremely simple to document at the project design stage. Switching and control circuits don't need to be selected until system commissioning.

High-Level Control
Digital or analogue, C-Bus can control any type or size of load. For example, the main switch panel in a typical building could contain 100 relay channels and 100 dimming channels (or even more), yet only one C-Bus network would need to be wired to the switch panel.

C-Bus does not require a centralised computer or any other controller, however, a PC can be used to add more features if desired.

Compared to other control and management systems, this innovative design offers considerable cost advantages, while providing greater flexibility and reliability.

Every C-Bus unit is assigned a unique code, so that all devices on the C-Bus network can be identified and programmed individually.

Since C-Bus uses "peer to peer" communication, every C-Bus device responds to their commands directly from the network, rather than a central computer or controller. The number of commands that can be programmed into a C-Bus system is almost limitless.

In commercial buildings, rapid problem resolution is essential, which is why C-Bus products are designed to report error conditions and highlight operational problems.

Integration
C-Bus can fully integrate with virtually any control or building management system. The flexibility and "open systems" approach of C-Bus makes it easy to integrate with other devices, including air conditioning, audiovisual equipment, security, access control, lighting, irrigation, automatic doors, motorised blinds/shutters, etc.

C-Bus can also be operated by a building management system (BMS) to control integrated third-party devices to create a seamless, user-friendly solution in a complete electrical package.

Flexibility
C-Bus provides the ultimate flexibility in switching and control. Functions can be changed, added, removed or reprogrammed at any time or at any position on the network, without any cumbersome hard rewiring. Extra C-Bus Units can be added at any time. Simply connect them to the desired point on the C-Bus network.

C-Bus can carry out almost unlimited control sequences, including centralised control; enabling override of individual units, groups, zones, buildings and sites. Any input device can be programmed as a master control point. Overrides can be positioned anywhere on the network to other C-Bus units.

Simple to Install and Commission
Clipsal offers training and certification to installers involved in C-Bus installations. Accredited C-Bus installers are available throughout Australia and New Zealand.

C-Bus is also designed to be completely backwards compatible, ensuring continued operation as networks are upgraded.

Error Reporting
In commercial buildings, rapid problem resolution is essential, which is why C-Bus products are designed to report error conditions and highlight operational problems. C-Bus can provide total master control from a central point, such as a service room. The Service Manager can monitor the entire lighting circuitry at a glance and troubleshoot any potential problems quickly and efficiently.

Energy Efficiency
Modern commercial facilities require more light, more comfort and more intelligence. With an increasing focus towards getting more from less, energy efficiency is paramount.

As part of a C-Bus system, the operator can programme specific lighting and climate control sequences - automatically operating lights and air conditioning at certain times, based on usage behaviour. C-Bus utilises intelligent technologies to maximise the energy efficiency of commercial environments. Greater energy efficiency can be achieved through the following:

Lumen Maintenance
Lumen maintenance or light level management uses a combination of light level sensing and dimming to optimise lighting levels. Light level management saves energy by preventing over illumination.

Daylight Harvesting

Daylight harvesting is used in conjunction with light level management and takes advantage of natural sunlight by dimming lighting in areas that are sufficiently lit through windows and skylights. As sunlight decreases, light level sensors increase the level of artificial light to compensate. Not only will this save energy, but also improve the comfort of building occupants.

Occupancy and Vacancy Detection

Occupancy detection is useful for controlling rooms that are not regularly used. Storage areas, meeting rooms and toilet facilities fitted with PIR sensors will activate lighting when someone enters the room. Timers can be used to switch lights off when no movement is detected after a period of time.

Vacancy detection requires the user to press a switch to first turn on the lights, after this the detectors take over and maintain the lights on while people are present in the space.

Ultrasonic detectors can also be used to provide increased sensitivity in areas where people may be relatively sedentary such as individual offices, or meeting rooms.

Occupancy and vacancy detection provides the convenience of automatic switching, with the benefit of energy savings, as lights are switched off when not required.

Schedules

Schedules are used to switch lights on for start of business and off at close of business. Different businesses within the same building may have varied operating hours and separate schedules can be programmed for various locations within a building, complex or development.

Occupancy and vacancy detection provides the convenience of automatic switching, with the benefit of energy savings, as lights are switched off when not required.

Timers

Timers can be used in conjunction with wall switches to enable lights and facilities such as air conditioning, to switch off after a predefined period. Timers are commonly used with occupancy sensors to ensure lights remain on for a minimum period of time, after movement is detected. This can also assist to prolonging the lifespan of lamps by preventing excessive on/off cycling.

Corridor Linking

Corridor linking is used to link the operation of corridor lighting with offices and other areas, ensuring the corridor remains lit if, for example, an adjacent conference room is in use. This provides occupants with a well-lit, safe passage throughout a building.

Scene Settings

Scene settings combine functions to create a particular effect, such as dimming lighting levels and closing blinds simultaneously. Scenes easily recreate the different lighting levels used at various times of the day for applications such as restaurants and hotels. Scenes are also useful in conference rooms and theatres or virtually any application where various functions are performed simultaneously.

C-Bus improves efficiency of lighting and building management systems (BMS) through intelligent control. It assists in achieving mandated energy requirements and directives, while contributing to reducing energy costs and excess consumption.

Benefits of C-Bus?

C-Bus is a tried and tested lighting control, building automation and energy management solution. C-Bus meets the following objectives in any commercial environment:

Sophisticated Lighting Systems
C-Bus offers lighting engineers the flexibility to achieve sophisticated lighting systems, which would otherwise be difficult and costly using conventional techniques and equipment. The planning process is significantly reduced and engineers can respond rapidly to the ever-changing demands and technology of modern buildings.

Simplified Installation
For the electrical contractor, installation time is dramatically reduced, with cost savings in labour and material. With the reduction of switch wiring, installations are simpler and require less space to accommodate the same functions.

The installer can easily program and commission the system using the free tools provided by Clipsal. The same software also allows changes to be made at any time to meet new requirements.

User-Friendly Control
Through extensive research and innovative design, the wide selection of wall C-Bus switches and touch screens provide user-friendly control of lighting, audiovisual and other devices on a C-Bus network.

Energy Efficiency and Management Solutions
C-Bus improves efficiency of lighting and building management systems (BMS) through intelligent control. It assists in achieving mandated energy requirements and directives, while contributing to reducing energy costs and excess consumption. C-Bus also utilises gateways and interfaces to other technologies, greatly improving system efficiency.

Future-Proof Installations
Building investors are often concerned with optimising capital expenditure, minimising ongoing running costs, reducing pay-back periods and having the flexibility to change building layouts to accommodate tenants' needs; C-Bus can achieve these objectives.

A C-Bus system can be easily reprogrammed to satisfy tenants' specific requirements, while saving on rewiring costs. C-Bus also utilises "distributed intelligence", which means it does not require a central controller.

This increases system architecture redundancy, while increasing reliability and integrity – creating a dependable, safer system.

The open topology of C-Bus makes it extremely versatile when wiring, allowing either "daisy chain" or "star-wired" wiring configurations, or a combination of both; ensuring the most convenient, efficient and reliable solution for any project.

Flexibility is further increased by the backward compatibility of C-Bus products and technology, so it operates seamlessly with previously installed hardware.

Consistent Look and Feel
Clipsal offers an extensive selection of switch designs, along with coordinated products such as sockets, data outlets and light fittings. This allows designers to work with one supplier and create a complementary control solution that has a consistent look and feel.

Superior Support
The C-Bus Design and Engineering Division is based in Adelaide, South Australia. C-Bus Software is completely designed in Australia.

Clipsal's engineering and design knowledge has led to the development an extensive C-Bus range of products to suit Australian and world markets - meeting the requirements and regulations of lighting and building industries.

How it all Comes Together

Environmental Policies
All C-Bus products are manufactured in accordance with stringent environmental practises, such as zero halogen, PVC minimisation and RoHS. OEM products used by Clipsal are also sourced from manufacturers that adhere to these guidelines.

Technical and Professional Services Group
Clipsal's Technical and Professional Services Group works with the customer to deliver an energy management solution that suits their specific requirements. They consider aspects such as the project budget, building architecture, space, occupants and energy goals when designing a solution that is safe, efficient and sustainable. Clipsal's Technical and Professional Services Group also provides all the documentation required to support mandatory building requirements.

Partner Program
Using a company that is part of Clipsal's partner program, is your assurance that the company working on your investment has attained the highest level of competence, having successfully completed dedicated training for commercial applications of Clipsal's products and technologies. Our partners are committed to constantly upgrading their skill base across all technologies, enabling them to provide you with the best and most current solutions.

Clipsal's Technical and Professional Services Group works with the customer to deliver an energy management solution that suits their specific requirements.

From system design, through to installation, then on to programming and commissioning, using a company that is part of Clipsal's partner program will ensure that your project reaches its full potential, delivering the best performance, functionality and value for money.

Global Specialists in Energy Management
As part of Schneider Electric, global specialists in energy management, Clipsal by Schneider Electric is uniquely positioned to provide cost-effective and environmentally sustainable electrical solutions for the commercial market sector.

The extensive C-Bus product range provides a positive return on investment and reduces energy consumption, while meeting electrical specifications for any commercial project.

CLIPSAL®

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