C-Bus Application Note

Themed Venue

Overview

Themed Venues such as Pubs, Clubs, Bars, and Restaurants can be complex multipurpose environments which are designed to provide a comfortable ambience for patrons and staff with the added requirement of repeatability. Owners and managers know the importance of a quality flexible venue with ambience which draws in new patrons and retains existing patrons with the direct benefit of increased revenue and repeat spend while reducing operation costs in energy usage.

All venues strive for differentiation to stand out from the crowd and achieve this by providing a consistent point of difference in service and facilities to customers. The inclusion of an automation solution within these venues provides repeatability and assists with these industry goals and market demands.

Zones and spaces are created within themed venues with a requirement to provide different experiences to the occupants. Lighting and visual entertainment play a big part of the experience and ambience.

Spaces can be setup with specific lighting scenes which transition smoothly throughout the day and evening to preset levels. Uniform transition of lighting can be implemented in front of house areas providing the perfect ambience required to achieve the desired look and feel. The inclusion of colour blending RGB LED lighting can enhance the venue internally and externally with stunning affects.

Incorporating occupancy based control strategies and including dimmable LED lighting in spaces are methods to improve energy savings. Integration of systems can provide further gains and improve patron and staff safety with centralised simplified controls and automated time scheduling of the facility.

As with any building and facility, reducing operating costs is paramount for profitability. All services and systems in the Venue such as Lighting, Heating/Cooling, Audio Visual, Security need to be controlled and monitored from a central location and also have local overrides where required.

Automating the Themed Venue improves the energy efficiency resulting in reduced OPEX and offset rising energy costs. Implementing an energy savings strategy also raises the sustainability profile of the venue and company.

All of this can be achieved using a Clipsal C-Bus system.

Typical Venue Area Layout & Features

Lighting Control System Features:

- Master central C-Bus Colour Touch Screen control of lighting
- Lighting Scenes, Welcome, Opening, Day, Afternoon, Evening
- Smooth dimming transition for lighting moods
- Time Scheduled events internal and external
- Master off switching
- Local control LCD Dynamic Labelling wall switch
- C-Bus PIR Occupancy control of Toilet lighting and fans
- Automated Colour changing RGB LED lighting control
- Sweep Fan central control
- External Heater and mist spray occupancy based control
- Audio Visual control and integration
- Air-Conditioning control and integration
- Security system and CCTV control and integration
- Security based lighting events Armed, Disarm, Alarm
- Energy Monitoring of lighting and services and load shedding

Legend:

- ● - Downlight (Dimmable)
- ⊢○ - Wall Light (Dimmable)
- ⊢⊗ - Wall Light External (Relay)
- ▬ - Fluoroscent (Relay)
- ▬ - LED-RGB (DALI)
- ◎ - Pendant Light (Dimmable)
- ◁ - Stage Lighting (DMX)
- ■ - C-Bus eDLT Switch
- ▮ - C-Bus Colour Touch Screen
- ⚷ - C-Bus Switch Plate
- ✳ - C-Bus Motion Sensor

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Control Strategy – Themed Venue

- **Central Control**

  Central control and status of all lighting is important in a large venue for energy efficiency, safety and to ensure the correct ambience is set for the required time of day. It is important to provide flexibility in a venue with multi way switching and dimming of lighting. A C-Bus touch screen provides the ease to create repeatable ambiance which is important in a themed venue environment. The ability to dim lighting smoothly with uniform transitions between lighting mood scenes ensures that patrons are retained in a comfortable. Advances in lighting have seen multiple lighting types and technologies used in venues with the need to control each individual light or in groups smoothly and simultaneously. The lighting control systems ability for central control allows for lighting integration to other systems such as the security system for lighting modes in the event of alarm or when arming or disarming the security system or Evacuation Alarm.

- **Local Control**

  Local control switches are required in areas to complement the central touch screen. The C-Bus system provides flexible multi way switching and dimming which allows local C-Bus switches located behind the bars and gaming cashier to also control lighting and provide scene setting control for the front of house areas. Utilising C-Bus enhanced Dynamic Labelling Technology (eDLT) switches with dynamic labels for each button provides the ability to graphically display related functions, providing staff the confidence of using them during service. C-Bus stainless steel switch plates installed within hygiene areas such as kitchens are functional while providing an easy to clean surface.

- **C-Bus Colour Touch Screen**

  A C-Bus Colour Touch Screen located behind the main bar or in the managers office enables the user to control and monitor the entire lighting control system and other devices from a central location. A C-Bus touch screen offers a graphical interface to C-Bus with screen pages customised and setup with graphical manual buttons for lighting moods or individual lighting control. The touch screen can also provide fully automated time scheduled lighting transitions and events. General staff can access specific pages while other pages can be restricted to managers only for changing lighting scene levels and time schedule settings by password protection. The flexibility of a touch screen caters for programming changes of lighting level settings with the ability to add additional buttons and pages during the installation and in the future which is a benefit for hospitality lighting designers and the venue owner.

- **Time Schedules**

  Time schedule based events provide repeatability in a venue for internal and external lighting scenes and integration to other systems. This can be provided by a central touch screen device based on the time of day, week, month or year, sunrise, sunset and daylight savings. External lighting and signage can also be scheduled for after hours settings switched at or before sunset and sunrise and also a combination of time schedule with external weatherproof C-Bus PE light level sensor. Time Schedules can be modified easily by a user at a device such as a C-Bus touch screen.

Control Strategy – Themed Venue

- **General Lighting Dimming**
Having the ability to dim lighting individually or as part of lighting scenes creates the ability to tailor lighting levels for various areas. Dimming of lighting also provides energy efficiency gains. Lighting can have various technologies for dimming control. It is important for smooth dimming of lighting that dimming compatibility and dimming range performance is verified when lighting types and technologies are selected in projects. A C-Bus system can control a multitude of lighting technologies from phase control LE/TE, Analogue Dimming 0-10v, Digital Dimming DSI, DALI and also DMX. C-Bus provides modules to control lighting loads such as Low Voltage down lights (LV), Compact Fluorescent Light fittings (CFL), Standard LED lighting and also colour changing LEDs etc.

- **Occupancy Detection**
Occupancy and vacancy detection of low traffic areas can be implemented for lighting and exhaust fans to provide energy savings. Passive infrared (PIR) Occupancy detectors are particularly suited for the toilets and storerooms ensuring safe passage when the area is in used. Lighting can be switched off or dimmed after a preset time period when no motion is detected and exhaust fans can set to run on for a timed period after. Instant illumination can be achieved upon the detection of movement in the area again.

- **Occupancy Detection Outdoor Entertainment Areas**
Occupancy detection can be used effectively for movement in outdoor entertainment areas to reduce energy by switching off heating when the area is unoccupied for extended periods. This can also be used in conjunction with C-Bus temperature control monitoring. Weatherproof passive infrared (PIR) occupancy detectors are particularly suited for areas such as beer gardens and terraces.

- **Occupancy Detection-External**
Occupancy detection can be used effectively for external movement outside a building for increased security and for further energy savings. Additional lighting can be turned on as a deterrent in areas when motion is detected, this also has the benefit of increased lighting levels for CCTV. Another benefit would be to provide safe staff entry and egress of the building during after hours, lighting can be turned on for a timed period for when motion is detected. Weatherproof passive infrared (PIR) occupancy detectors are particularly suited for Entries, Loading docks, rear of buildings and car parks.

- **AV Equipment**
Audio Visual devices such as TVs, Music systems, DVD, CD players and projectors can be controlled directly from a C-Bus touch screen or through a third party device using high level integration such as RS232 or TCP/IP protocols. Integration of the AV has the benefit of repeatable setup modes from start of business and automated transitions to required themes in the venue to change AV setting, lighting moods and ambience. Upon the transition of service from lunch to dinner to evening, the touch screen could be setup to manually or automatically control the AV sources which can change the mood of the area from content displayed or music played creating a more soothing ambience for dinner or other times throughout the day and evening.

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Control Strategy – Themed Venue

- **Air Conditioning Zones**

  When a lighting zone is on, the A/C can be linked for occupancy based control accordingly, providing energy efficiency gains. Alternatively local overrides can be configured on a C-Bus switch, providing manual after-hours control over the A/C within a zone. This can be implemented using a low level contact output from a C-Bus relay to interface to the A/C system or alternately use a high level integration method such as a BACnet gateway if full functionality is required.

- **Fans**

  The use of fans within the venue can assist with cooling and air movement efficiently. Fans can be controlled by a C-Bus system with the use of either a C-Bus Fan Controller, or by using relay outputs. Control of fans can be simple on, off and also speed selection from a local C-Bus switch or centrally from the Touch screen manually or as part of a time scheduled scene.

- **Heaters**

  The use of electric or gas heaters in the beer gardens of a venue can assist with enhancing the outdoor entertainment areas. Heaters can be controlled by a C-Bus system with the use of relay outputs. Control can be on, off from a local C-Bus switch or centrally from the touch screen as manual control or a time scheduled scene. Local occupancy sensors in the outdoor area to switch off the heaters can increase energy saving when the area is not in use. This can also be used in conjunction with temperature sensors to inhibit use.

- **Mist Sprays**

  The use of electric mist sprays in the beer gardens of a venue can assist with enhancing the outdoor entertainment areas. Mist sprays can be controlled by a C-Bus system with the use of a relay output. On, off control can be from a local C-Bus switch or centrally from the touch screen as manual control or a time scheduled scene. Local occupancy sensors in the outdoor area can switch off the mist spray to increase energy saving when the area is not in use.

- **Blind, Curtain and Shutter Control**

  Automated control of blinds, curtains and shutters can provide the venue with flexibility. Automated control of blinds and shutters can also improve security and energy efficiency by limiting the external environment thermal transfer into the building which reduces the heating and cooling requirements of the venue. The C-Bus system can provide intuitive control from switches or touch screens via C-Bus blind control relays connected to motorised blinds allowing control from any location. Blinds can be controlled manually or automatically and used in conjunction with scenes, sensors and time schedules.

- **Energy Monitoring**

  Business owners are becoming more conscious of reducing their operating costs and energy consumption, with various applications allowing the monitoring of their own power and utility usage. Venues with a C-Bus automation system can monitor usage using C-Bus Current Measurement Unit and Current Transformers. The venue's energy usage can be monitored and display on a smart device, web page or touch screen. Automated load shedding of non essential loads such as heaters can be implemented at peak periods by the C-Bus System. The business owner can also monitor their energy consumption and to have a more sustainable focus on the venues energy usage.

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Building Integration

Other venue electrical solutions that Clipsal by Schneider Electric can provide:

- Building Management System
- Intelligent power meters and cloud monitoring systems
- Power conditioning PFC systems
- UPS power quality systems
- Variable speed drives
- Security Access control and CCTV
- Electric vehicle charging stations
- Solar Inverters on grid and off grid systems
- Switch gear, switchboards, circuit protection and surge protection
- LED lighting
- Intelligent DALI fluorescent lighting
- Emergency light fittings and DALIcontrol, for monitoring and testing of emergency and exit lights
- Electrical outlets and switches
- 56 series industrial power outlets
- Clipsal floor boxes for power and data outlets
- Data systems including High speed Cat 6/7, Fibre infrastructure
- MATV distribution (e.g. Free to Air, Foxtel Cable, Foxtel Satellite)

Typical Scene Configuration

SCENE	TIME	Bar	Restaurant	Gaming	Beer Garden	Terrace	Entry	Signage External	Stage	A/C
Welcome	-	0-10% 1mins	OFF	OFF	OFF	OFF	0-10% 1mins	OFF	-	ON
Opening	*6:00*	0-35% 5mins	0-25% 5mins	50%	OFF	ON	0-25% 5mins	OFF	-	ON
Day	*12:00*	60% 5mins	80% 15mins	50%	OFF	OFF	0-50% 5mins	OFF	-	ON
Afternoon	*3:00*	55% 15mins	80% 15mins	50%	OFF	OFF	75% 5mins	OFF	-	ON
Sunset	*5:30*	55% 15mins	75% 15mins	50%	75% 15mins	75% 15mins	75% 15mins	ON	-	ON
Evening	*9:00*	50% 15mins	70% 15mins	50%	75% 15mins	75% 15mins	75% 15mins	ON	-	ON
Closing	*12:00*	100% 1min	100% 1min	100% 1min	100% 1min	100% 1min	100% 1min	ON	OFF	ON
Leaving	-	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
Cleaning	-	100%	100%	100%	100%	100%	100%	-	-	ON
Alarm	-	100%	100%	100%	100%	100%	100%	-	-	ON

Typical Time Scheduling of Lighting Scenes

- Welcome (Entry mode when security disarmed)
- Opening 6:00am (Start of business)
- Day 12:00pm (Lunch)
- Afternoon 3:00pm
- Sunset 5:30pm (Dynamically changing with touch screen astronomical clock)
- Evening 9:00pm (Late)
- Closing 12:00am (Ramp lighting to 100% over 5 minutes)
- Leaving (All internal lighting OFF / External lighting ON) (Exit mode when security armed)
- Cleaners (All on 100%)
- Alarm intruder mode (ALL on 100%)

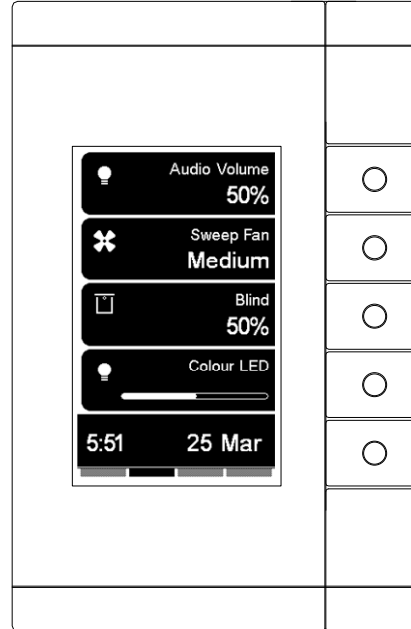# Example eDLT Switch Function and Labelling

Bar (Page 1)

Bar

Bar Feature

Beer Garden

Fans
Medium

5:51   25 Mar

Clipsal eDLT
Pure White
5085EDLB-PW
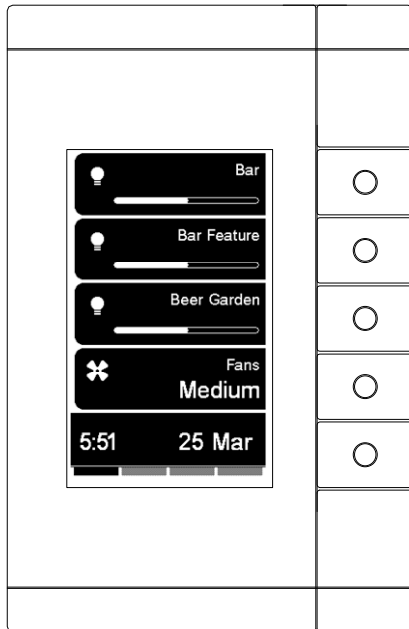
Page 1 Functions

Button 1: Bar

Button 2: Bar Feature

Button 3: Beer Garden

Button 4: Fans

Next Page Button

Bar (Page 2)

Audio Volume
50%

Sweep Fan
Medium

Blind
50%

Colour LED

5:51   25 Mar

Clipsal eDLT
Pure White
5085EDLB-PW

Page 2 Functions

Button 1: Audio Volume

Button 2: Sweep Fan

Button 3: Blinds

Button 4: Colour LED

Next/Previous Page
Button

Gaming (Page 3)

Gaming Cashier

Gaming

Pelmet

A/C

5:51   25 Mar

Clipsal eDLT
Pure White
5085EDLB-PW
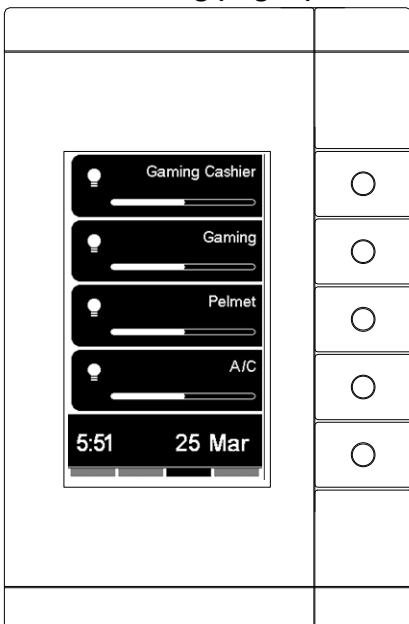
Page 3 Functions

Button 1: Gaming
Cashier

Button 2: Gaming

Button 3: Pelmet

Button 4: A/C

Next/Previous Page
Button

Restaurant (Page 4)

Restaurant

Terrace

Fan
Medium

A/C

5:51   25 Mar

Clipsal eDLT
Pure White
5085EDLB-PW
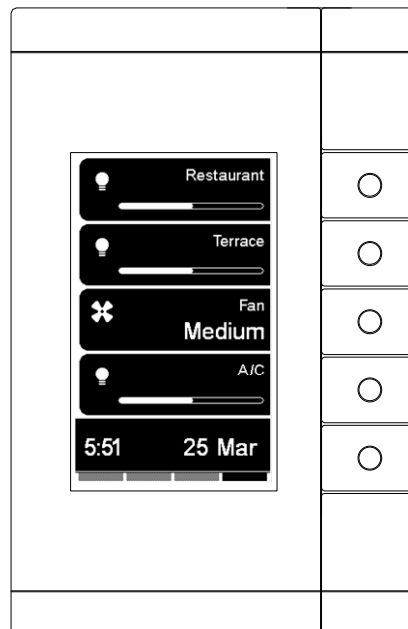
Page 4 Functions

Button 1: Restaurant

Button 2: Terrace

Button 3: Fan

Button 4: A/C

Previous Page Button

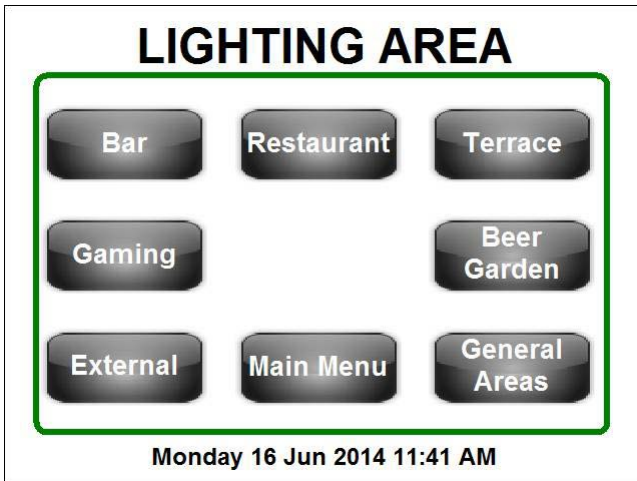*Note: Labelling and functionality is customisable to suit the project and client
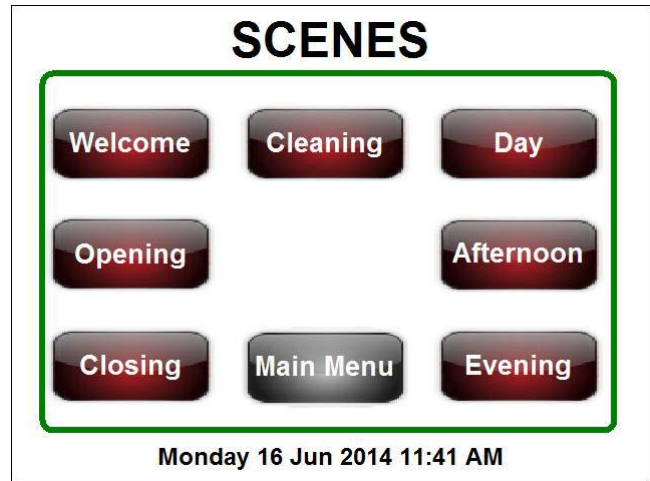
Typical Touch Screen Layouts
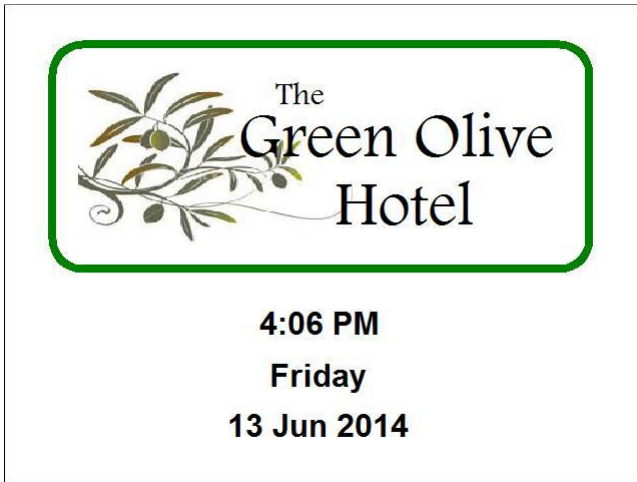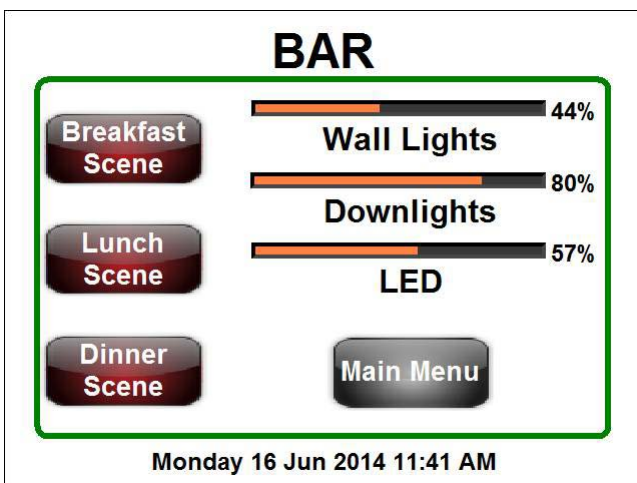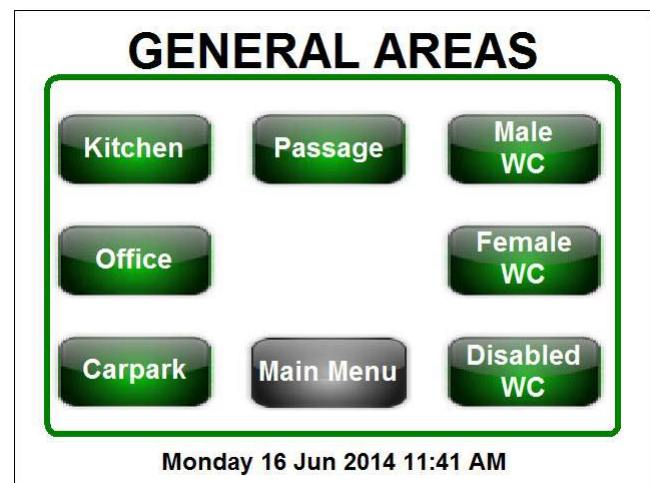

Timeout Page
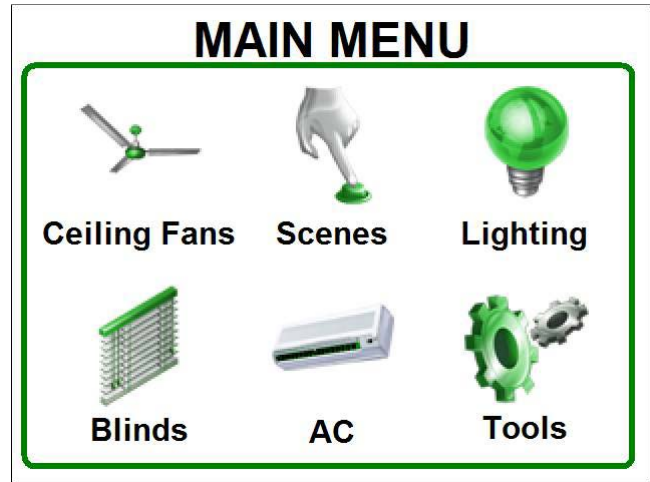
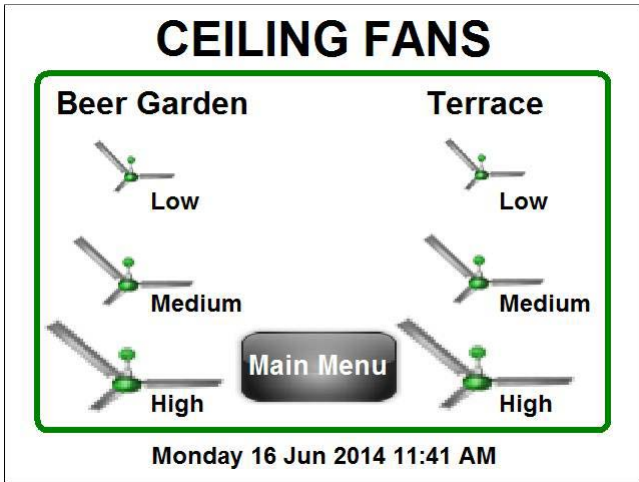Main Menu

Lighting Areas Selection

Lighting Scene Triggers
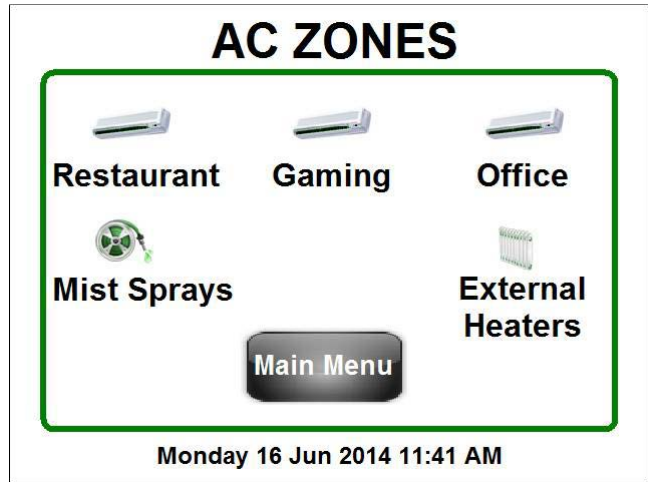

Bar Local Control
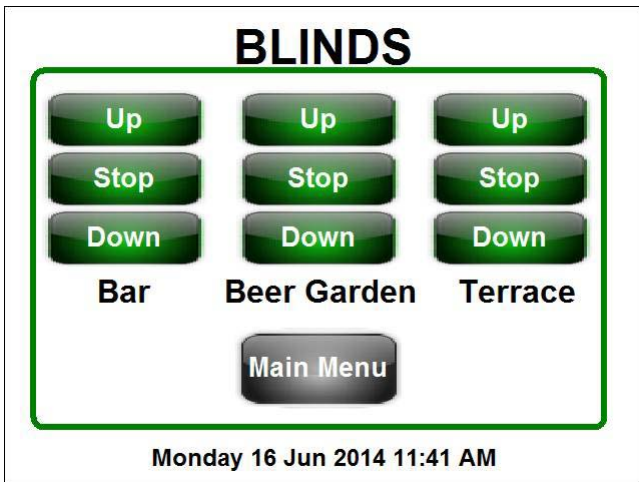

General Area Local Control

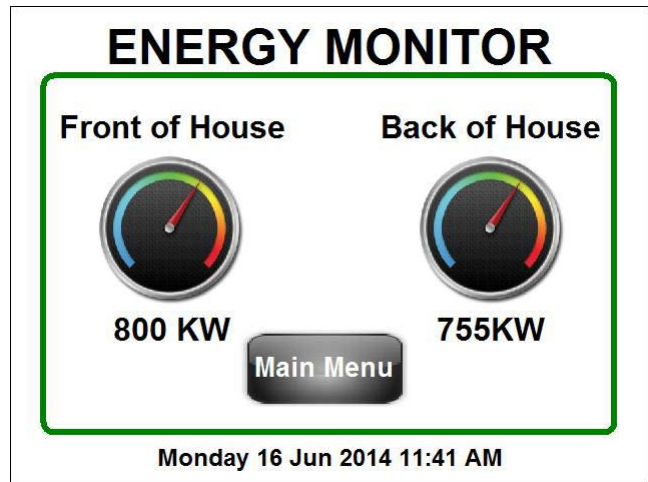# Typical Touch Screen Layouts

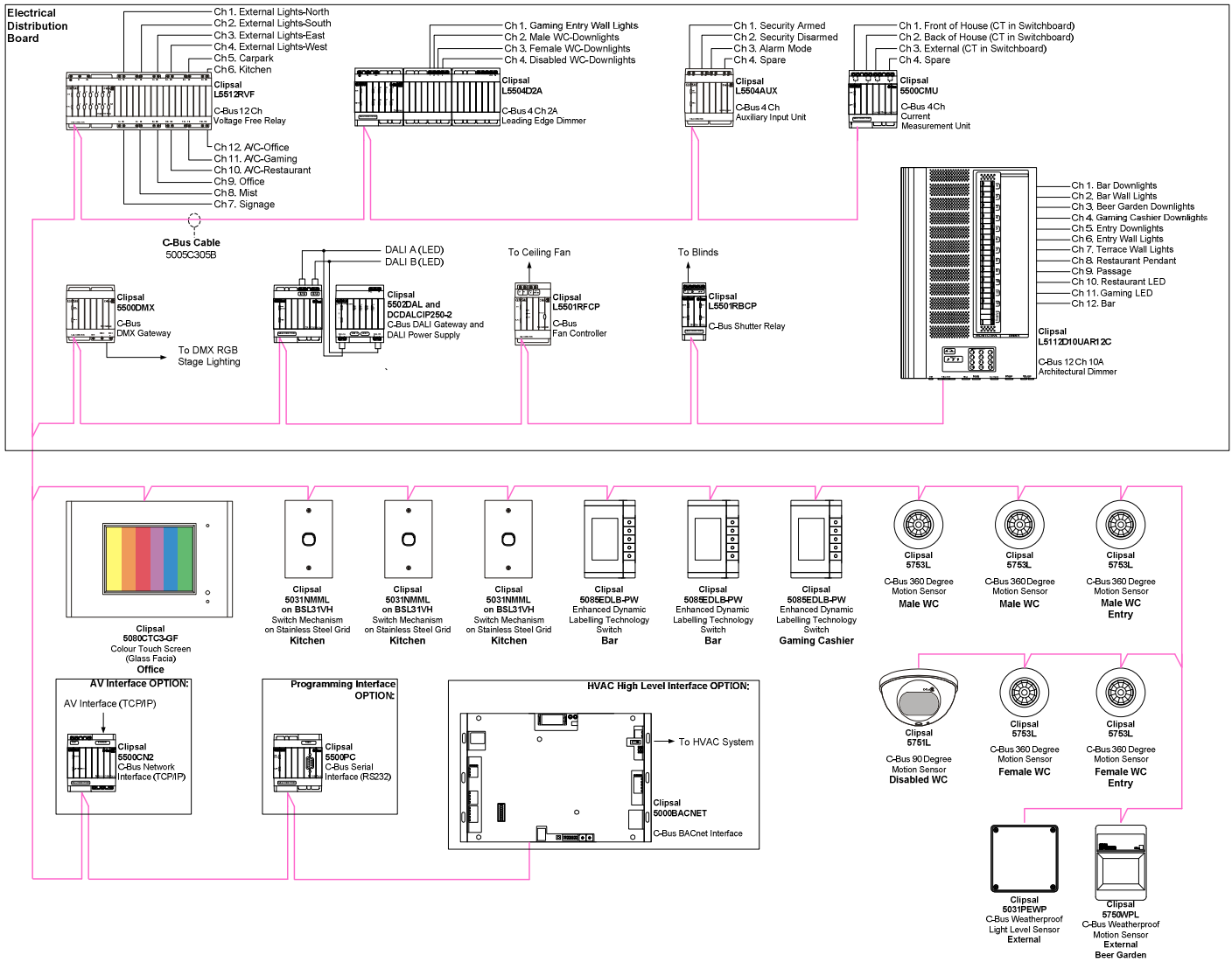

Ceiling Fans

AC Control

Blinds Control

Energy Monitoring

Themed Venue Single Line Diagram

NOTES:

Lighting in Venues can have multiple methods of dimming technology, flexibility and spare output channels should be allowed in any good design.

The C-Bus Architectural 12 Channel Dimmer L5112D10UAR12 can be fitted with Universal dimming cards and Ballast relay cards (0-10v/DSI/DALI broadcast) providing the flexibility of controlling various types of lighting and future changes.

C-Bus DIN rail output modules are available to control most lighting ballast technologies such as phase control Leading Edge(LE), Trailing Edge (TE), Analogue Dimming 0-10V, Digital Dimming DSI, Addressable Digital DALI Dimming, Addressable DMX and even Pulse Width Modulation (PWM).

Note: The Clipsal C-Bus Infinity range of Professional and Architectural Dimmers contain modular output channel cards and these can be controlled from both C-Bus and DMX staging desks. Optional cards include phase control (LE, TE, Universal) and Ballast card with on board relay and selectable output 0-10v, DSI, DALI (broadcast) allowing customization to suit most lighting ballast types.

Third Party Integration

- **Third Party Audio Visual Systems**

  AMX & Crestron AV equipment can communicate with C-Bus via a Clipsal PC Interface (5500PC) using the RS232 protocol or a Clipsal Network Interface (5500CN2) using TCP/IP. This connection will allow the third party AV equipment to control C-Bus Group Addresses at a high level. This functionality may be utilised in any themed venues.

- **Security Systems**

  Security systems are commonly interfaced to a C-Bus control system, to enable security events such as "armed", "disarmed" and "alarm" to trigger lighting events. An event can be when the "Alarm" is triggered, other events such as "All Light" is turned on as a result, to provide the security cameras a clearer view of the area.

  Security events can include:
  - Disarmed: Start of business welcome lighting sequence (Entry Scene)
  - Armed: All lighting and A/C switched off (Exit scene)
  - Alarm mode: All lighting to switch On (Alarm scene)

  Low level interfacing:
  Achieved using alarm panel relays connected to a C-Bus Bus coupler or Auxiliary Input Unit.

  High level interfacing:
  Specific security panels support an on board C-Bus interface or support RS232 for high level integration. The panel must have the provision for one of these methods to interface to C-Bus.

- **Third Party Air-conditioning Systems**

  In most small to medium scale themed venues where BMS systems are not in place or the A/C system is not capable of integration, traditional third party A/C units can be controlled on/off with the use of a C-Bus relay. Alternatively if full functionality is required a high level integration method such as a BACnet gateway (5000BACNET) could be used.

- **TCP/IP** is a standard Ethernet protocol which can be used for integration using a Clipsal Network Interface. (5500CN2)

- **RS232** is a common protocol used when integrating third party products. RS232 integration can be achieved using a Clipsal PC Interface (5500PC), C-Bus touch screens and the Pascal Automation Controller (5500PACA).

- **Infra-Red Control** can be achieved using a C-Bus IR transmitter (5034NIRT) which maps C-Bus Group Addresses to IR commands.

Typical Equipment

Part Number	Description	Quantity
L5512RVF	Clipsal C-Bus 12 Ch Voltage Free Relay 10A	1
L5112D10UAR12C	Clipsal C-Bus 12 Channel 10A Architectural dimmer	1
L5504D2A	Clipsal C-Bus 4 Ch Leading Edge Dimmer 2A	1
5500DMX	Clipsal C-Bus DMX Gateway	1
5502DAL	Clipsal C-Bus DALI Gateway	1
DCDALCIP250-2	Clipsal DALI 2 Line Power Supply 250mA	1
L5504AUX	Clipsal C-Bus 4 Ch Auxiliary Input Unit	1
5500CMU	Clipsal C-Bus 4 Ch Current Measurement Unit	1
5080CTC3-GF	Clipsal C-Bus Colour Touch Screen- Glass Facia	1
5031NMML	Clipsal C-Bus Switch Mechanism	3
BSL31VH	Clipsal Stainless Steel 1 Gang Grid	3
5085EDLB-PW	Clipsal C-Bus Enhanced Dynamic Labelling Technology Switch	3
5753L	Clipsal C-Bus 360 Degrees PIR Motion Sensor	5
5751L	Clipsal C-Bus 90 Degrees PIR Motion Sensor	1
5750WPL	Clipsal C-Bus Outdoor PIR Motion Sensor	1
5031PEWP	Clipsal C-Bus PE Cell Sensor Weatherproof IP56	1
L5501RBCP	Clipsal C-Bus Blind Shutter Control Relay	3
L5501RFCP	Clipsal C-Bus Fan Controller	3
5500CN2	Clipsal C-Bus Ethernet Interface	1
5500PC	Clipsal C-Bus Serial interface	1
Optional		
5000BACNET	Clipsal C-Bus BACnet HLI Gateway (C-Bus – BACnet IP)	1

DB Output Channel Schedule

Output Unit	Channel Number	Description	Load Type	Control Gear	Number of Fittings
C-Bus 12 Ch Relay	1	External Lights-North	LED	ON/OFF	6
	2	External Lights-South	LED	ON/OFF	6
	3	External Lights-East	LED	ON/OFF	5
	4	External Lights-West	LED	ON/OFF	4
	5	Carpark	LED	ON/OFF	4
	6	Kitchen	Fluorescent	ON/OFF	7
	7	Signage	Fluorescent	ON/OFF	2
	8	Mist	Contact Output		1
	9	Office	Fluorescent	ON/OFF	3
	10	A/C-Restaurant	Contact Output		
	11	A/C-Gaming	Contact Output		
	12	A/C-Office	Contact Output		
C-Bus 12 Ch Architectural Dimmer	1	Bar Downlights	LED	LE/TE Dimmer	16
	2	Bar Wall Lights	LED	LE/TE Dimmer	5
	3	Beer Garden-Downlights	LED	LE/TE Dimmer	20
	4	Gaming Cashier-Downlights	LED	LE/TE Dimmer	8
	5	Entry Downlights	LED	LE/TE Dimmer	4
	6	Entry Wall Lights	LED	LE/TE Dimmer	8
	7	Terrace-Wall Lights	LED	LE/TE Dimmer	6
	8	Restaurant-Pendant	LED	LE/TE Dimmer	3
	9	Passage	Fluorescent	ON/OFF	3
	10	Restaurant LED	LED	DALI	20
	11	Gaming LED	LED	0-10V	12
	12	Bar	Fluorescent	DSI	4
C-Bus 4Ch LE Dimmer	1	Gaming Entry Wall Lights	LED	LE Dimmer	3
	2	Male WC-Downlights	LED	LE Dimmer	7
	3	Female WC-Downlights	LED	LE Dimmer	4
	4	Disabled WC-Downlights	LED	LE Dimmer	2
C-Bus DMX Gateway	4	DMX RGB Stage Lighting	LED	DMX	4
C-Bus DALI Gateway	A-1,2,3	BAR LED	LED	DALI	12
	A-4,5,6	External RGB LED	LED	DALI	3
	B-1,2,3	Restaurant LED	LED	DALI	1
	B-4,5,6	Gaming LED	LED	DALI	20
C-Bus Auxiliary Input Unit	1	Security Armed	Contact Input		
	2	Security Disarmed	Contact Input		
	3	Alarm Mode	Contact Input		
	4	Spare			
Current Measurement	1	Front of House	Contact Input	Current Transformer	
	2	Back of House	Contact Input	Current Transformer	
	3	External	Contact Input	Current Transformer	
	4	Spare			

Resource Links

For further information including Product Datasheets, Installation Instructions and Downloads visit

http://www.clipsal.com/cis

It is recommended that a Clipsal C-Bus trained specialist is engaged for large integration projects for design, programming and commissioning. This should be a C-Bus Approved installer, Clipsal PointOne Integrator or a Clipsal Platinum partner depending on the size of the project and level of integration required.

C-Bus Platinum partners are skilled in commercial projects covering areas such as TCP/IP, lighting control design, building management systems, lighting principles, as well as sound understandings of Building Code of Australia Section J, Australian Standards, NABERS and Green Star Ratings.

In addition, C-Bus Platinum members will provide professional detailed documentation and specifications for projects including handover training to the client.

Engaging a Clipsal Platinum Partner provides key benefits to the contractor, consultant and the end user including the manufacturers support from project design through to completion.

C-Bus Platinum Partner can also offer extended C-Bus product warranty from the standard 2 years to 4 years subject to the site being inspected and becoming a certified C-Bus Approved site.

For further information on the Clipsal Platinum Partner program visit

http://www.clipsal.com/platinum