**CLIPSAL**®

*INTEGRATED SYSTEMS*

# C-Bus™

Energy Management System

# C-Bus Manual Addendum v2.1.1
# The DIN and PRO Series

Version :
**211A**

**CLIPSAL**
C-Bus™

## Table of Contents

## Chapter 1      Introducing C-Bus Service Pack v2.1.1

# Introduction

C-Bus Service Pack v2.1.1 is a software plug-in, designed to upgrade your existing C-Bus Installation Software v2.1.0 to the current build standard. Many new features and enhancements are added, including programming support for the latest release C-Bus products. New products supported include :

- C-Bus DIN Rail Series Relays

- C-Bus DIN Rail Series Dimmers

- C-Bus Professional Series Dimmers

This Manual Addendum has been written as an introduction to the new software features, and also steps the reader through all programming options for the new DIN Rail and Professional Series products.

# What's New in Version 2.1.1 ?

C-Bus Software v2.1.1 includes the following new features :

- Addition of support for new DIN and PRO ranges of C-Bus modules.

- Improved Communications Server to handle large C-Bus Networks.

- Improved Network Status Utility (MMI) to handle large C-Bus Networks.

- Improved Software Version detection and control .

- Introducing C-Bus documentation as ADOBE ® PDF files. The Acrobat ® reader can be downloaded free, from the following web site :

  http://www.adobe.com/products/acrobat/readstep.html

- Introducing the C-Bus Calculator which helps you find the most appropriate balance of Unit Types, Power Supplies, Network Burdens etc. to ensure reliable operation of a Network  without the guess-work.  This utility is supplied on a separate installation disk.

# Software Installation Procedures

**NOTE:**

1. **Service Pack 2.1.1 requires that C-Bus Installation Software Version 2.0 (or higher) is already installed on your computer.**

2. **It is highly recommended that you quit from all other programs before proceeding with the installation process.**

## Windows 3.11 Setup Instructions

The C-Bus Installation Software runs under Microsoft Windows 3.11 or later. It is assumed that the user is familiar with this environment.

1. Start Microsoft Windows

2. Insert Disk 1 – Setup into drive A.

3. From Program Manager, select **Run...** from the **File** menu.

4. Type *a:\setup* and press the ENTER key.

## Windows 95 Setup Instructions

The C-Bus Installation Software runs under Microsoft Windows 95 or later. It is assumed that the user is familiar with this environment.

1. Insert Disk 1 – Setup into drive A.

2. Click the Start Menu, and select **Run...**

3. Type *a:\setup* and press the ENTER key.

The remainder of this document is dedicated to describing the new DIN Rail and Professional Series products. This includes all programming options of the respective Graphical User Interfaces (GUI's).

It is assumed that the user is familiar with the basic concepts of using the C-Bus Installation Software. If not, it is recommended that the user take the time to read the C-Bus Installation Software Manual (Clipsal Catalog Number 5000S/2, 5000M/2).

# Chapter 2                    The C-Bus DIN Rail Series

# The C-Bus DIN Rail Series
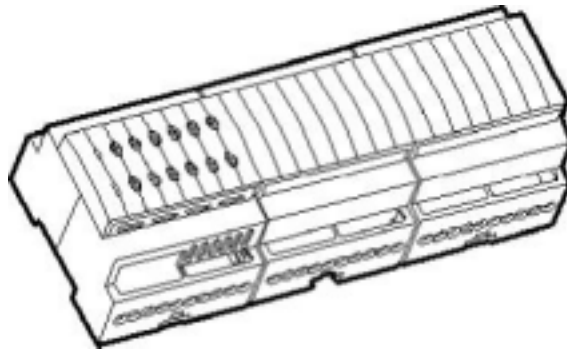
Ideal for switchboard applications, these new C-Bus Units are DIN Rail mounted, and incorporate state-of-the-art relay switching and dimming technology.

Measuring 12M wide, the Units are designed to fit a standard 35mm top hat DIN rail arrangement, making installation quick and easy without the need for special or custom enclosures.

Two RJ45 sockets and a 0.3 metre mains rated patch lead are provided with each unit, for fast network connection to the C-Bus.

The C-Bus DIN Rail Series products are fully compliant with all relevant Australian and European safety and EMC standards.

Each C-Bus DIN Rail Series Product features:

- A single phase mains 240V connection (120V export series available). The Units receive their commands from the C-Bus Network, but the C-Bus electronics are powered from the mains connection.

- Some Units feature a built-in power supply that can source 200mA to the C-Bus Network. This can provide power to approximately 10 C-Bus Key Inputs or Occupancy Sensors, and allows small networks to be established very easily, without the need for any additional Power Supplies, or Clock generating Units.

- Status indicators that show C-Bus Network Status, Mains Power and Load Status.

- A Network Burden and System Clock, each selectable via the use of the C-Bus Installation Software.

- Individual load override switches (Local Override, located on the front of the Unit), which may be used to toggle the state of the C-Bus load independently of any C-Bus commands.

- A Remote Override Input, which permits a remote switch to override any C-Bus commands and force all outputs to the On or Off state. This input may be used to test the Unit's outputs and appropriate wiring without a connection to the C-Bus during commissioning, or as an override to C-Bus in case of an emergency.

  The Remote Override Input is connected via the same RJ45 socket on the unit as the C-Bus. Up to 10 DIN Rail C-Bus Units on the same Network may be connected in this manner.

- Programmable Power-Up states. All DIN Rail C-Bus Units allow the user to specify the power-up state for each output channel. After an initial 5 second power-up diagnostic routine (relay channels latched in their previous states, dimmer channels Off), the new levels are set as programmed. All channels offer further programmable state restoration options, including power-up delay to manage inrush currents (dimmer only).

- Restart Delay (also known as relay re-strike delay). A delay is incorporated which prevents a relay terminal from being turned back On after it has been turned Off as a result of a C-Bus command. The delay is selectable from 0 seconds to 42½ minutes and is assigned to all selected terminals.

- Minimum switching thresholds, variable from 0 - 100% (Relay Units only). For example, you can easily program lighting installations for bank dimming, and load shedding applications.

- Maximum and minimum brightness thresholds, variable from 0 - 100% (Dimmer Units only). For example, you can program a minimum speed for a ceiling sweep fan, or a maximum level of brightness for incandescent and low voltage lamps, thereby prolonging their operational life. Dimming is linearised between the minimum and maximum thresholds set.

- Zero crossing filter. The incoming mains frequency is tracked and all harmonics and non-harmonics of the fundamental frequency are filtered. A special algorithm ensures that lights do not flicker due to signal injections on the mains from the power authorities.

- Thermal overload protection. The DIN Rail Dimmer Unit automatically shuts down when the internal heat sink temperature rises above 70ºC. All output channels on the Unit automatically switch Off, and may be turned back On again via C-Bus, Local Toggle or Remote Override inputs.

- Linearised brightness control. In conventional phase control dimmers, as the light is being dimmed, the rate of change in power delivered to the load is not linear. As a result, the change in brightness is more apparent when the light is at a lower brightness setting. The imbedded micro-controller in the C-Bus DIN Rail Dimmer uses an algorithm to ensure that this change in brightness is uniform throughout the control range.

- Soft turn on. Unlike conventional devices, where abrupt changes in brightness occur whenever a channel is switched On or Off, the micro-controller incorporated in the professional Series Dimmer controls the rate of brightness change. This results in a soft brightness change, and is referred to as Soft Turn On and Soft Turn Off. The feature also helps to prolong the life of incandescent light fittings.

For further information, please refer to the Installation Instructions shipped with each product.

## Chapter 3        The C-Bus Professional Series

# The C-Bus Professional Series Dimmer
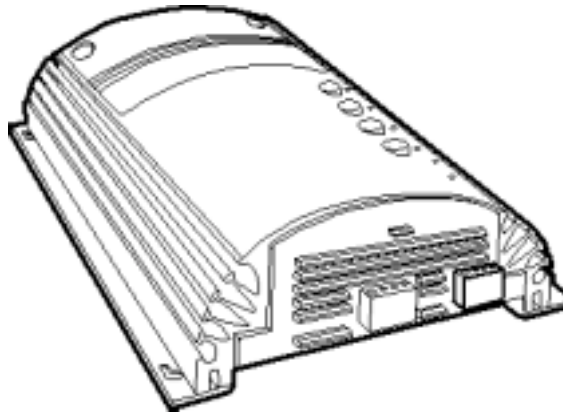


The C-Bus Professional Series Dimmers are state-of-the-art, high powered dimmers suitable for incandescent and low voltage lighting applications.

Housed in an all aluminium heatsink, the dimmers have been designed for fast installation, with features such as keyhole mounting, cable access from both front and rear, ample termination space for mains cabling, and removable terminals for the C-Bus and Override connections.

The C-Bus Professional Series Dimmers also feature a current sensing transformer on each channel. This can be used to measure the load current, with an accuracy of 5% of full scale, and may be used for load shedding, or load monitoring applications (techniques for current monitoring are not described in this document).

The C-Bus Professional Series products are fully compliant with all relevant Australian and European safety and EMC standards.

Each C-Bus Professional Series Dimmer features:

- A single phase mains 240V connection (120V export series available). The units receive their commands from the C-Bus network, but the C-Bus electronics are powered from the mains connection.

  An added feature is the unit's built-in power supply that can source 60mA to the C-Bus network. This can provide power to approximately 3 C-Bus Key Inputs or Occupancy Sensors, and allows small networks to be established very easily, without the need for any additional Power Supplies, or Clock generating Units.

- Status indicators that show C-Bus Network Status, Mains Power and Load Status.

- A Network Burden and System Clock, each selectable via the use of the C-Bus Installation Software.

- Individual load override switches (Local Override, located on the front of the Unit), which may be used to toggle and dim the state of the C-Bus load independently of the C-Bus command.

- A Remote Override Input, which permits a remote switch to override the C-Bus command and force all outputs to the On or Off state. This input may be used to test the dimmer outputs without a connection to the C-Bus during commissioning, or as an override to C-Bus in case of an emergency.

  The Remote Override Input port provided allows up to 30 Professional Series Dimmer Units on the same C-Bus Network to be interconnected in this manner.

- Programmable Power-Up states. Professional Series Dimmer Units allow the user to specify the power-up state for each output channel. After an initial 5 second power-up diagnostic routine (dimmer channels Off), the new levels are set as programmed. All channels offer further programmable state restoration options, including power-up delays from 0 to 33½ minutes to manage inrush currents.

- Maximum and minimum brightness thresholds, variable from 0 – 100%. For example, you can program a minimum speed for a ceiling sweep fan, or a maximum level of brightness for incandescent and low voltage lamps, thereby prolonging their operational life. Dimming is linearised between the minimum and maximum thresholds set.

- Continuous monitoring of the incoming mains voltage. When a change occurs, the micro-controller compensates by adjusting the output drive to the load. This minimises the change in brightness often associated with typical phase control dimmers.

- Zero crossing filter. The incoming mains frequency is tracked and all harmonics and non-harmonics of the fundamental frequency are filtered. A special algorithm ensures that lights do not flicker due to signal injections on the mains from the power authorities.

- An emergency output consisting of a voltage free relay, which changes state on the loss of mains power. The auxiliary contact may be used to signal emergency lighting for instance.

- Thermal overload protection. The professional Series Dimmer Unit automatically shuts down when the internal heat sink temperature rises above 75ºC. All output channels on the Unit automatically switch Off, and may be turned back On again via C-Bus, Local Toggle or Remote Override inputs.

- Overcurrent protection. The Professional Series Dimmer Unit automatically shuts down when the the load current rises 20% above the rated output on any channel. The unit will automatically reset itself after 5 seconds.

- Linearised brightness control. In conventional phase control dimmers, as the light is being dimmed, the rate of change in power delivered to the load is not linear. As a result, the change in brightness is more apparent when the light is at a lower brightness setting. The imbedded micro-controller in the C-Bus Professional Series Dimmer uses an algorithm to ensure that this change in brightness is uniform throughout the control range.

- Soft turn on. Unlike conventional devices, where abrupt changes in brightness occur whenever a channel is switched On or Off, the micro-controller incorporated in the professional Series Dimmer controls the rate of brightness change. This results in a soft brightness change, and is referred to as Soft Turn On and Soft Turn Off. The feature also helps to prolong the life of incandescent light fittings.

For further information, please refer to the Installation Instructions shipped with each product.

## Chapter 4    Programming C-Bus DIN and PRO Units

# C-Bus DIN and Professional Series Programming

C-Bus DIN Rail and Professional Series Units include the following devices :

1.    Relay Units

- DIN Rail Series – Twelve Channel Relay Units (RELDN12)

2.    Dimmer Units

- DIN Rail Series – Eight Channel Dimmer Units (DIMDN8)

- Professional Series – Four Channel Dimmer Units (DIMPR4)

- Professional Series – Two Channel Dimmer Units (DIMPR2)

- Professional Series – One Channel Dimmer Units (DIMPR1)

Both DIN Rail Series and Professional Series products incorporate many new features. Primarily the Units behave as Output Units, but also incorporate many of the features previously described for System Support Units, such as a software selectable Network Burden, and System Clock.

Some Units also supply power to the C-Bus Network, giving each Unit the capacity to power a number of Input Units. In this instance a C-Bus Network may not require any additional Power Supplies, nor require permanent connection of a PC Interface or Network Bridge for System Clock generation.

**It is strongly recommended that the C-Bus Calculator be used to verify the C-Bus Network design.**

In the following pages, the programming options for each type of Unit will be discussed in detail.

The DIN Rail and Professional Series Graphical User Interfaces (GUI's) incorporate seven Tab Panels. Each Tab Panel is used to configure various operating parameters as follows :

- Channel Setup

- Logic Assignments

- Channel Turn-On Options

- Power Fail Recovery Options

- Power Fail Recovery and Restart Delay Options

- Global Programming Options

- Unit Status (Not available in Database Browser, active only for a Unit scanned live from a C-Bus Network)
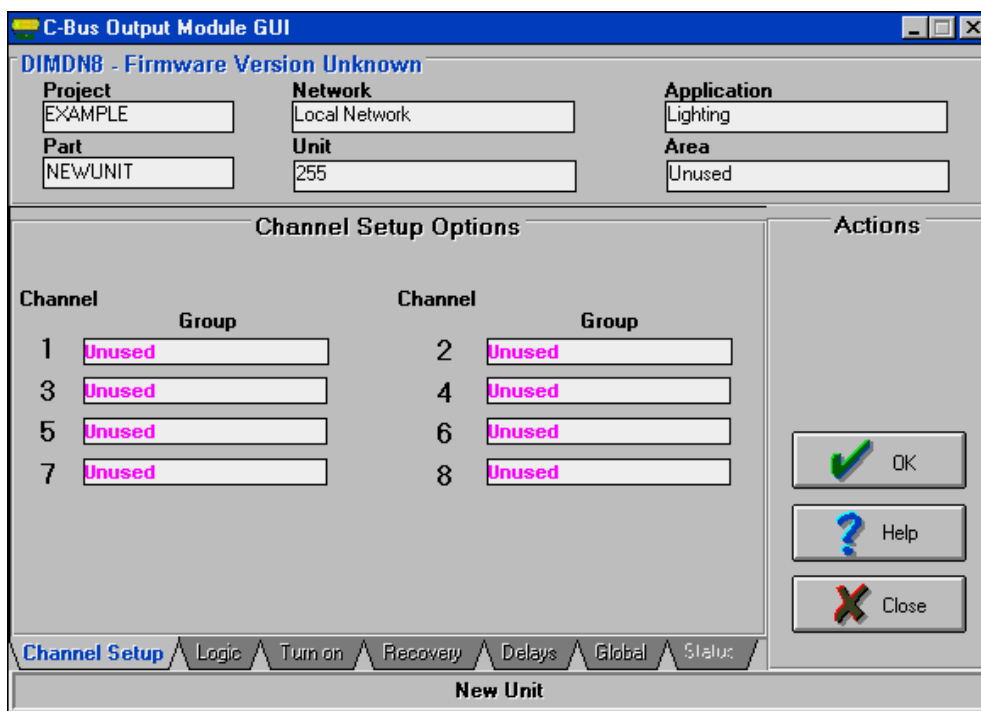


Figure 4.1  Channel Setup Tab for the Eight Channel DIN Dimmer Unit GUI

## Channel Setup Options



Figure 4.2  Channel Setup Options

**OUTPUT TERMINAL GROUP ADDRESS**

The primary means of specifying a control relationship between an Input Unit and an Output Unit is via Group Addressing. An Input Unit, such as a Key Input Unit can be configured to control a Group. Any C-Bus commands issued by the Input Unit will affect the state of that Group, and the appropriately programmed Output Unit will respond to those changes, following the status of the Group.

For example, a Key Input Unit and a DIN Relay Unit could be configured to use the 'Lounge Room Lights' Group. A C-Bus command could be issued by the Key Input Unit to turn the 'Lounge Room Lights' Group On. Seeing this activity on the Group, the DIN Relay would turn the appropriate Output Channel On.

Up to 255 Groups can be defined per Application on a C-Bus Network. The 'Unused' (FF) Group is a special reserved null Group.*

Format :     Twenty alphanumeric characters

Default :    Unused

Capacity :   Up to 255 Groups can be defined per Application on each C-Bus Network. Groups can be duplicated / repeated across multiple channels of an Output Unit.

*  The underlying hexadecimal Group Address can be referenced through the Project Manager.

DIN Rail and Professional Series Output Units have sixteen internal registers which can be used to store a level parameter for each of the assigned Group Addresses. The maximum number of Output Channels is twelve. Group Addresses Thirteen through Sixteen are used for Logic, and can be set from the Logic Tab.

**Left Click Options**

Left-click on any control Group field to select another Group from the list of available Addresses.
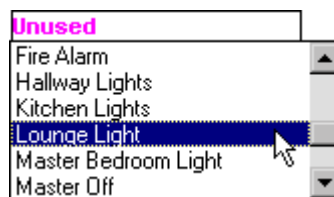


Figure 4.3  Left Click Options

**Right Click Options**

Right-click on any control Group field to create a new Group Addresses, or edit the Tag description for that Group.



Figure 4.4  Right Click Options

## Logic Functions
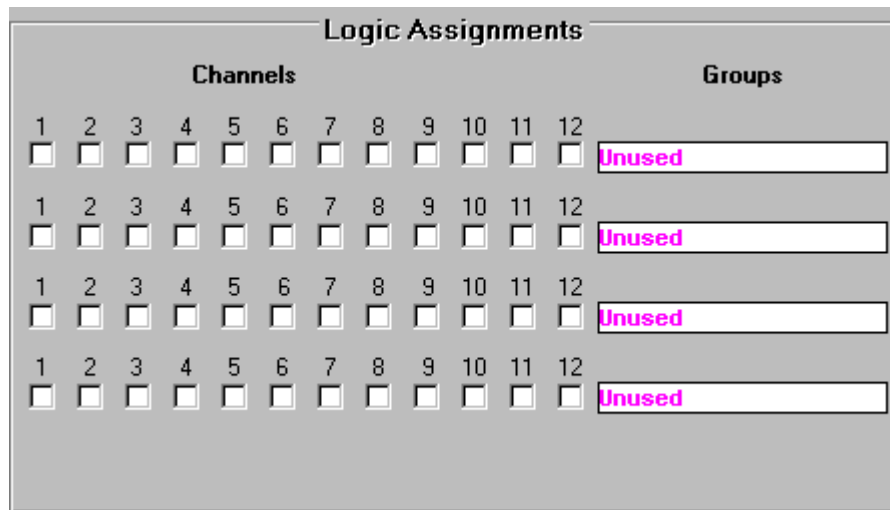


Figure 4.5  Logic Options

The output state of each Channel of an Output Unit can be programmed to be a logical function of any combination of the controlling Group levels (brightnesses). This enables the state of a load to be dependent on the state of more than one Group Address.

The Logic Tab is used to set up Group Addresses Thirteen through Sixteen (pictured on the right hand side of the GUI). Placing a control tick against an Output Channel creates a logic relationship between the Output Channel and the specified Group.

The type of relationship established is set as follows:

- For a Relay Unit, logic relationships can be created to simulate switches in series (AND logic), or switches in parallel (OR logic).

- For a Dimmer Unit, logic relationships can be created to ensure the status of the load will be equal to the maximum level of the associated Groups (Highest takes precedence - MAX logic). Alternatively, the status of the load may assume the minimum level of the associated Groups (Lowest takes precedence - MIN logic).

**Logic Functions – Relay Units**
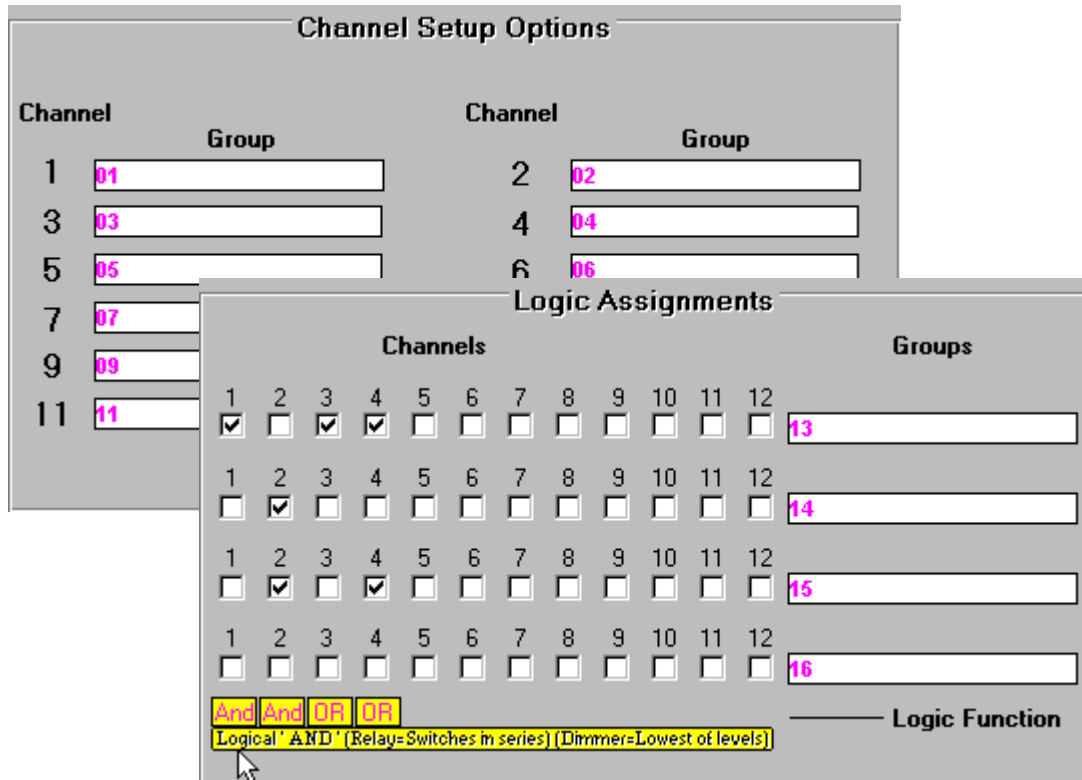


Figure 4.6  Relay Logic Example
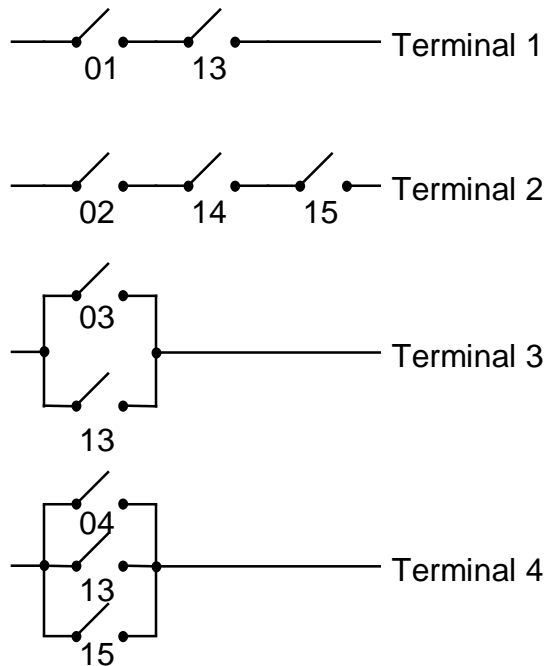


Figure 4.7  Terminal States – AND/OR Logic

**Logic Functions – Dimmer Units**
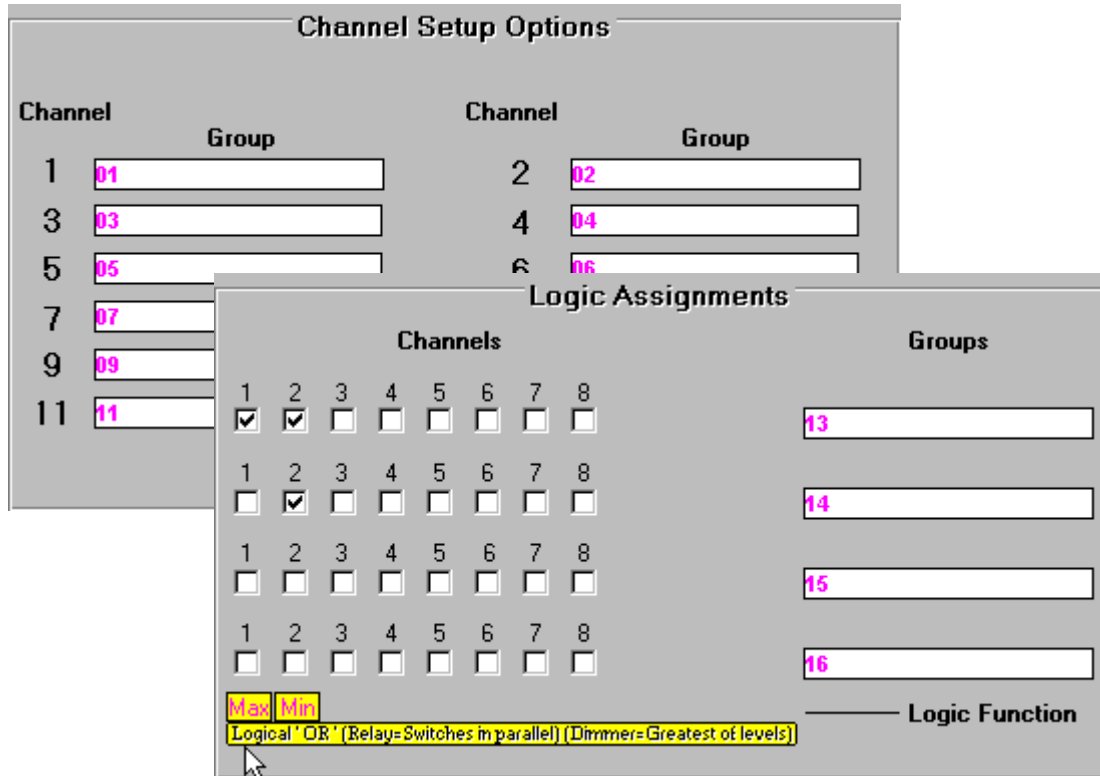


Figure 4.8  Dimmer Logic Example
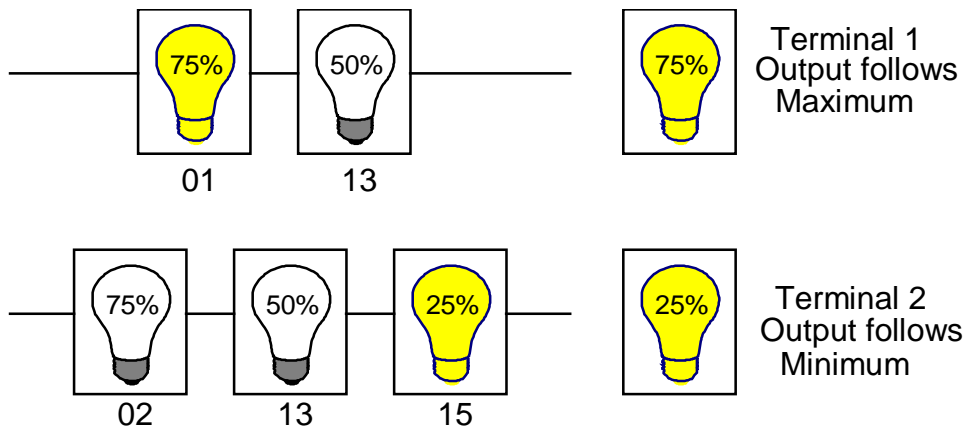


Figure 4.9  Terminal States – MAX/MIN Logic

# Turn-On Options

Output Units use Turn-On parameters to make loads respond to the level information of the controlling Group(s).

**Relay Turn-On Threshold**
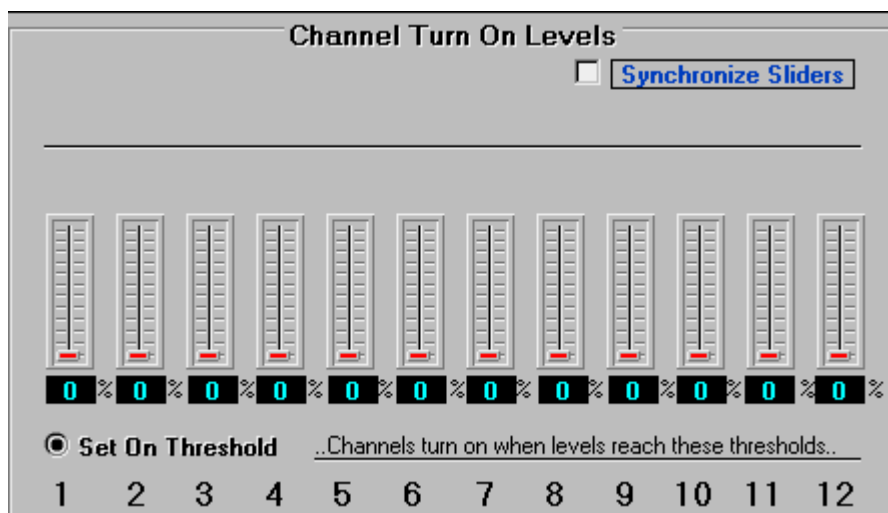


Figure 4.10  Relay Turn-On Levels

A Relay Unit allows a Turn-On Threshold to be defined. The following rules apply:

- If the current level of the controlling Group Addresses (after processing Logic options) is less than the Turn-On Threshold, the relay load is turned Off.

- If the current level of the controlling Group Addresses (after processing Logic options) is greater or equal to the Turn-On Threshold, the relay load will be turned On.

The Relay Turn-On Options are commonly used in the following applications :

- Light Level Sensor Relay switching (Sunset and switched bank dimming);

- Manual switched bank dimming;

- Staging Relay Turn-On sequences, to manage inrush currents across multiple circuits.

**Synchronise Sliders**

All Turn-On Levels can be synchronised (set to the same value). When the Synchronise Sliders box is checked, the level set on one slider will be matched by all other channels. All sliders will move in unison when one is adjusted.

<value> 0 to 100%.    Default Value: [0%]

**Dimmer Turn-On Levels**
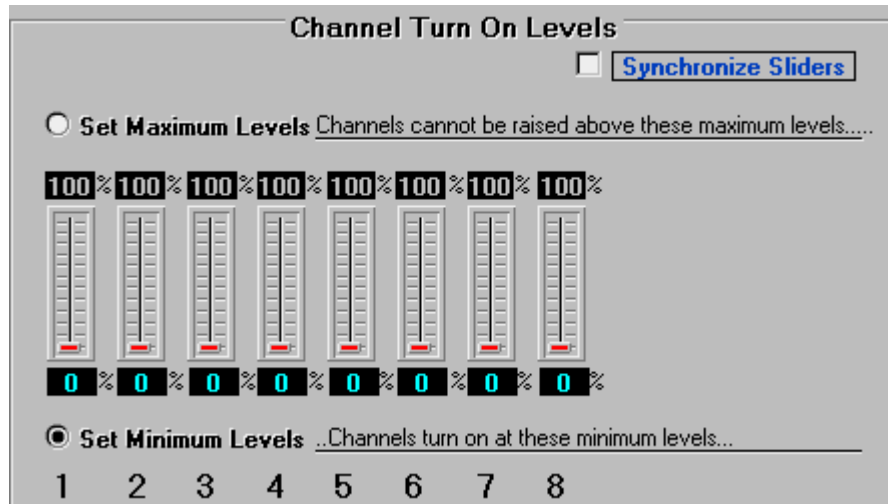


Figure 4.11  Dimmer Turn-On Levels

DIN Rail and Professional Series Dimmers allow both Minimum <u>and</u> Maximum Brightnesses to be defined. The following rules apply:

- If the current level of the controlling Group Address (after Processing Logic options) is 0%, the load will be Off.

- If the current value is 1%, the load will be On at the Minimum Brightness Level.

- If the current value is 100%, the load will be On at the Maximum Brightness Level.

- If the current level is in between the Minimum and Maximum Brightness levels, then the load will set to a linearised level in between these two values.

|   |   |   |
|---|---|---|
| For example : | Minimum Brightness | 20% |
|  | Maximum Brightness | 70% |
|  | Current Group Level | 50% |

The dimming operation will have a full scale span of :

$$\text{Dimming Span} = \text{Maximum - Minimum Brightness Level}$$

$$= 70\% - 20\%$$

$$= 50\%$$

The output brightness will therefore be approximately :

$$\text{Output Brightness} = \text{Minimum Brightness} + (\text{Group} * \text{Span})$$

$$= 20\% + (50\% * 50\%)$$

$$= 45\%$$

The Dimmer Turn-On Options are commonly used in the following applications :

- To maintain minimum brightness levels on one or more Channels;

- To increase efficiency and extend lamp life in various light fittings by imposing maximum brightness output levels for normal operation.

- Scenic lighting effects

**Synchronise Sliders**

All Turn-On Levels can be synchronised (set to the same value). When the Synchronise Sliders box is checked, the level set on one slider will be matched by all other channels. All sliders will move in unison when one is adjusted.

<value> 0 to 100%.    Default Value: [0%]

## Power Fail Recovery Options

All C-Bus Units have on-board non-volatile memory that can be used to store the operating state of the Unit in the event of a power loss. Din Rail and Professional Series Units can be programmed to restore the status of any or all Channels controlled by the Unit after a power loss.

C-Bus DIN Rail and Professional Series Output Units can also be programmed to restore to a pre-defined state other than that which was present prior to the power loss. Unlike conventional C-Bus Output Units (where one setting is imposed on all output channels), DIN Rail Units can restore each Group/Channel to individually specified levels for each Group/Channel.
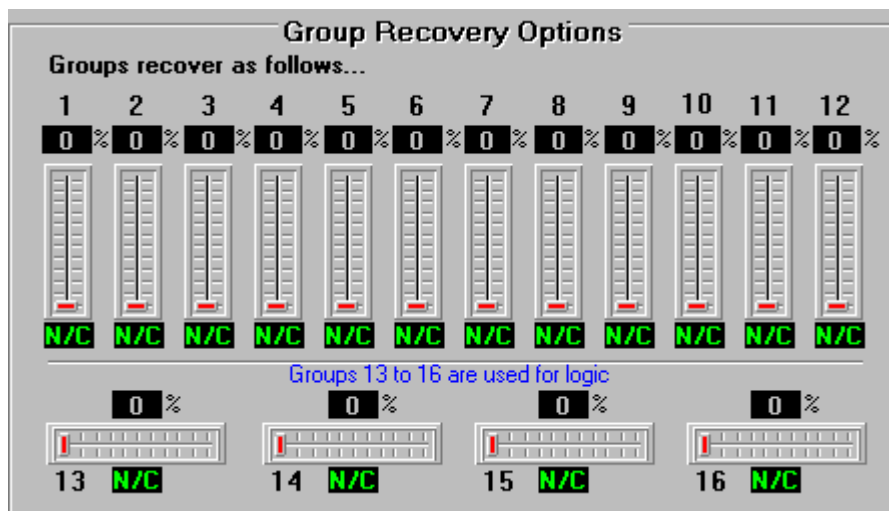


Figure 4.12  Power Fail Options

The following Group Recovery options are available:

- NO CHANGE (N/C)      No Change. The Group is set to the same level as it was prior to the power loss (equivalent to "Restore to Previous Levels").

- ON                              Restore Group Address to On (100%).

- OFF                             Restore Group Address to Off (0%).

- SET                             Restore Group Address to specified percentage level (equivalent to "Restore to Preset Levels shown below...")

The default setting for DIN Rail and Professional Series Output Units is to restore all Group Addresses to the same level that they were prior to the power loss (N/C - equivalent to "Restore to Previous Levels"). Options are changed by clicking on the status box.

Upon restoration of power, there is a short diagnostic cycle lasting approximately 5 seconds. After this initial delay, the Group Address levels are re-established on the Bus, as defined by the Power-Up options set for the Unit. An Output Unit Terminal Status is determined only after Logic and Turn-On Options have been processed. Power-Up (but not Restart) Delays are observed.

Remember – some Relay versions incorporate latching relays. Momentary contact closure on power restoration (during the initial 5 second diagnostic cycle) may be experienced even if the output is programmed to switch Off after a power fail.

It is worth noting that the DIN Rail and Professional Series products have a completely new power restoration engine. When programmed to restore Group levels to their previous state, the Unit will write the current levels to non-volatile memory only when mains power is lost. EEPROM read/write lifecycle limitations which existed for earlier C-Bus Output devices do not apply to the DIN Rail or Professional Series product ranges.

For more information about Power Fail options, refer to the chapter entitled Power Fail Recovery.

<value> 0 to 100%, No Change.          Default Value: [No Change (N/C)]

## Delay Options

C-Bus DIN Rail and Professional Series Output Units allow full control over the timing of power-up sequences. Restart (or re-strike) Delays can also be specified.

The following options are available :
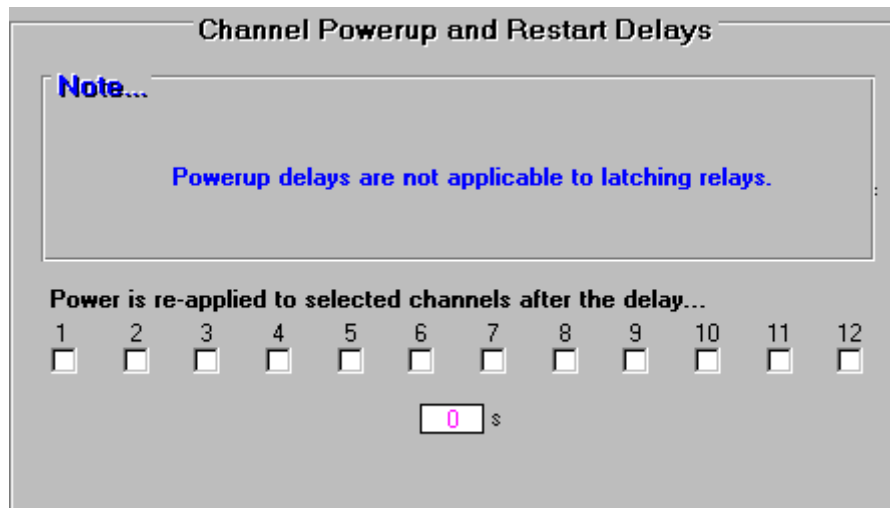


Figure 4.13  Relay Power Fail Options – Restart Delays
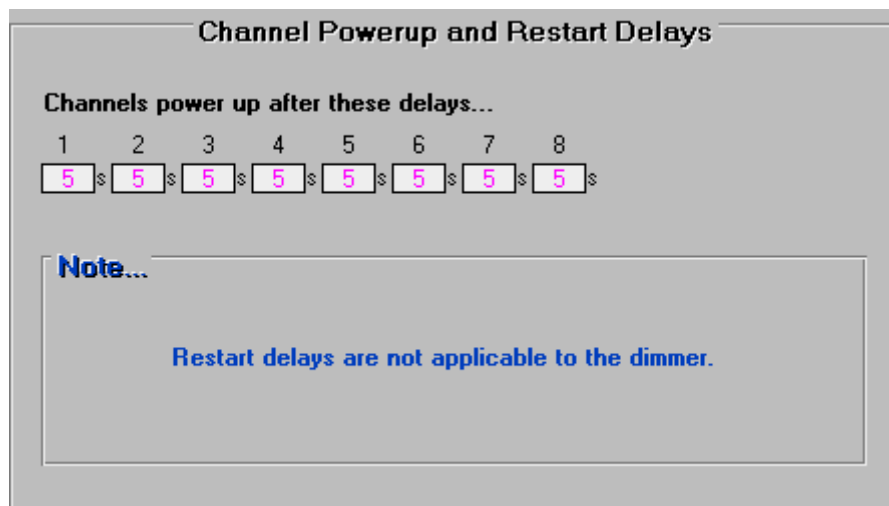


Figure 4.14  Dimmer Power Fail Options – Powerup Delays

**Power-Up Delay Options**

It may be desirable, especially in larger installations, to stagger the turning On of loads to avoid large current surges when the power is re-applied after a loss of supply. This can be done by assigning different power-up delays to different loads.

This feature only applies after a mains power fail, and applies only to Dimmer and Non-Latching Relay Units (not yet released) that are programmed to change state on restoration of mains power.

<value> 5-60 Sec (1 Sec Steps), 60-2010 Sec (10 Sec Steps).  Default Value: [5 Sec]

**Restart Delay Options**

A delay can be specified that determines how soon an Output Channel can be re-energised (turned On) since it was last turned Off. Some types of lighting loads require sufficient time to cool before re-strike. Examples include hibays, flood lights and other HID lamps.

Note that the Restart Delay parameter is only applicable to DIN Rail Series Relay Units. The Restart Delay Time specified is globally set for all Channels. This option is not available in the Dimmer GUI.

<value> 0-2550 Sec (10 Sec Steps).  Default Value: [0 Sec]

# Global Options
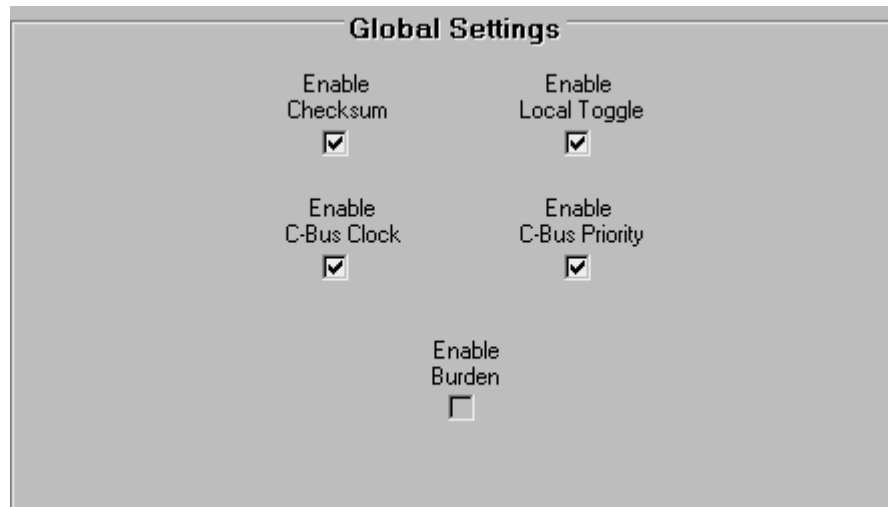


Figure 4.15  Global Options

### ENABLE CHECKSUM

An internally generated checksum is used by all C-Bus Units to monitor any errors in the non-volatile memory. The checksum is normally enabled so that any non-volatile memory errors will cause an error in the Status Report (MMI) for each Unit. If this parameter is disabled, no error will appear in the Status Report even if the Unit's non-volatile memory is losing information.

<conditions> enabled or disabled.  Default Value: [enabled]

### ENABLE LOCAL TOGGLE

All DIN Rail and Professional Series Output Units incorporate Local Toggle Buttons on the front, used to override the status of each output channel. They are used to switch the load On or Off directly, regardless of the intended terminal state as dictated by C-Bus Group Address Levels on the Bus. These momentary action switches serve the dual function of indicating the output status (On or Off). The Unit Indicator will flash when any channel has been overridden.

Local Toggle functions can be disabled if the installer wishes to restrict control to C-Bus commands only. By default, the Local Toggle functions are enabled.

<conditions> enabled or disabled.  Default Value: [enabled]

**ENABLE C-BUS CLOCK**

Many C-Bus DIN Rail and Professional Series devices are equipped with a C-Bus System Clock generator. This can effectively eliminate the need to incorporate other System Support Units in a C-Bus Network design (a valid Network must have at least one System Clock).

Under normal circumstances, multiple System Clock sources can co-exist on a C-Bus Network. In case difficulties are experienced in master clock resolution, the Clock generating function on the Unit can be disabled.

<conditions> enabled or disabled.  Default Value: [enabled]

**ENABLE C-BUS PRIORITY**

Under normal operating conditions C-Bus Group Address state changes determine the Output Unit terminal status (after Logic and Turn-On options have been processed). When in override mode, the DIN and PRO Units still "listen" to messages on the Bus, responding as instructed. C-Bus commands take priority over Local Toggle settings.

C-Bus Priority can be disabled, ensuring that all C-Bus commands received by the Unit whilst in override mode are ignored. In this case the override takes priority. The Network state of the Group Address is maintained, but not updated to the outputs until the override is removed.

<conditions> enabled or disabled.  Default Value: [enabled]

**ENABLE BURDEN**

Many C-Bus DIN Rail and Professional Series devices incorporate a software selectable Network Burden. This feature is available only on a DIN or PRO Unit with the Unit Address 001. Since Unit Addresses must be unique, this ensures that there will only ever be at most one Network Burden enabled.

For a DIN Rail Unit that has Unit Address 001 the Network Burden is in-circuit by default. Some Networks do not require this Burden, so it can be disabled (refer to C-Bus Calculator for further information as to whether the Burden is recommended/required).

Please note that changes to the Network Burden status must be saved to the Unit TWICE !!  This is to ensure that the user does not accidentally disable it, thus rendering communications ineffective, and disallowing further changes including correction of the fault.

<conditions> enabled or disabled.     Default Value:  [enabled]     If Unit Address = 001

[disabled]   Otherwise

# Unit Status

The Unit Status Panel displays the current status of an operational C-Bus DIN Rail, or Professional Series Unit. This Panel is not available for a GUI activated from the Database Browser – It is only available when interrogating a Unit Live on a Network.
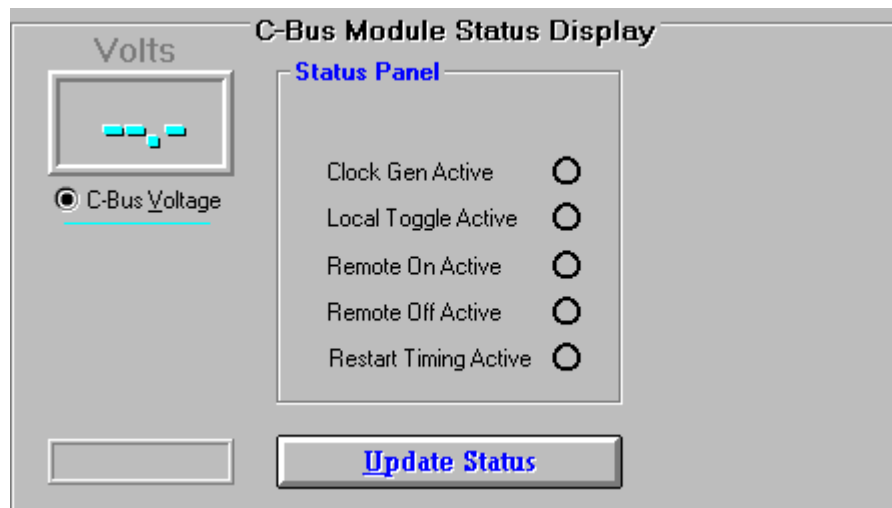


Figure 4.16  Unit Status Display – DIN Rail Series

**Update Status Button**

The Unit Status Tab shows an instantaneous snapshot of various Unit operating parameters. Click the Update Status Button to interrogate the Unit and update the display with current data.

**Clock Gen Active**

DIN Rail and Professional Series Output Units incorporate C-Bus System Clock generation circuitry. If the Units' Clock generator is acting as the master clock for the Network then the Clock Gen Active indicator will be on.

**Local Toggle Active**

Each DIN Rail or Professional Series Output Unit incorporates Local Override buttons found on the front of the Unit. If any channel of the Unit has been locally overriden, then the Local Toggle Active indicator will be on.

**Remote On Active**

DIN Rail and Professional Series Output Units provide facilities for hard wiring remote overrides to turn all channels On. If this Remote On Override feature has been used, then the Remote On indicator will be On.

**Remote Off Active**

DIN Rail and Professional Series Output Units provide facilities for hard wiring remote overrides to turn all channels Off. If this Remote Off Override feature has been used, then the Remote On indicator will be On.

**Restart Timing Active**

DIN Rail Relay Output Units allow a forced delay between successive On switching events, known as the Restart Delay (or Re-strike Delay). The setting is global for all channels. If an On command is received affecting any channel, then the output will only switch On after the Restart Time has elapsed (unless an Off command is received in the mean time). If a restart timer is active for any channel (ie load waiting to come On), then the Restart Timing Active indicator will be On.

**C-Bus Voltage and Current Readings**

The C-Bus meter box displays the C-Bus Network Voltage seen by the Unit (normally 15 to 36 $V_{DC}$. Professional Series Output Units (shown below) also include a current transformer allowing the current flow through each channel to be measured and displayed. Select which channel measurement is to be displayed using the radio button.

**Serial Number**

Each C-Bus DIN Rail or Professional Series product has a unique electronic ID. The Serial Number is read from the Unit and displayed in the bottom left hand corner of the Status Tab.
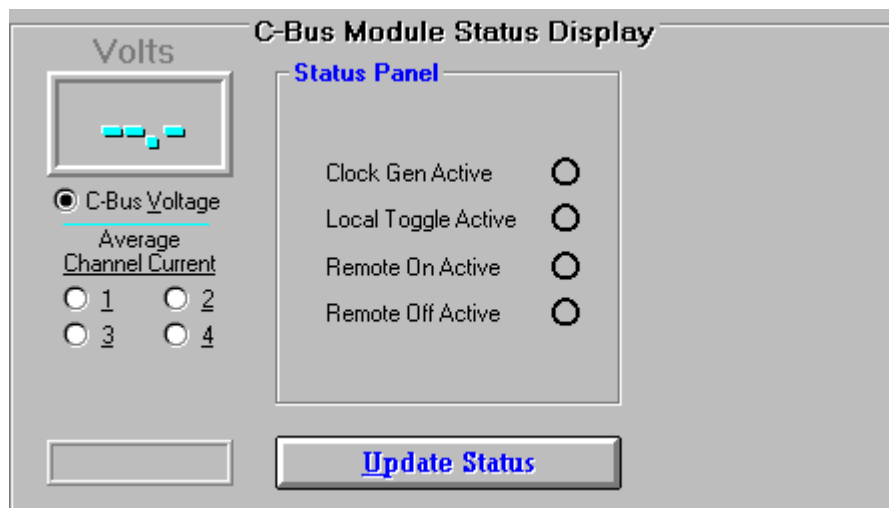


Figure 4.17  Unit Status Display - Professional Series

# C-Bus DIN Rail Relay Units

The DIN Rail Twelve Channel Relay (voltage free) is available in several different configurations. Each variant offers a different number of channels, with different switching capacities for resistive, inductive and fluorescent loads. Other variants are designed for operation with different supply voltages and frequencies (refer to the operating instructions that are shipped with the Unit). The same Graphical User Interface is used to program all of these devices.
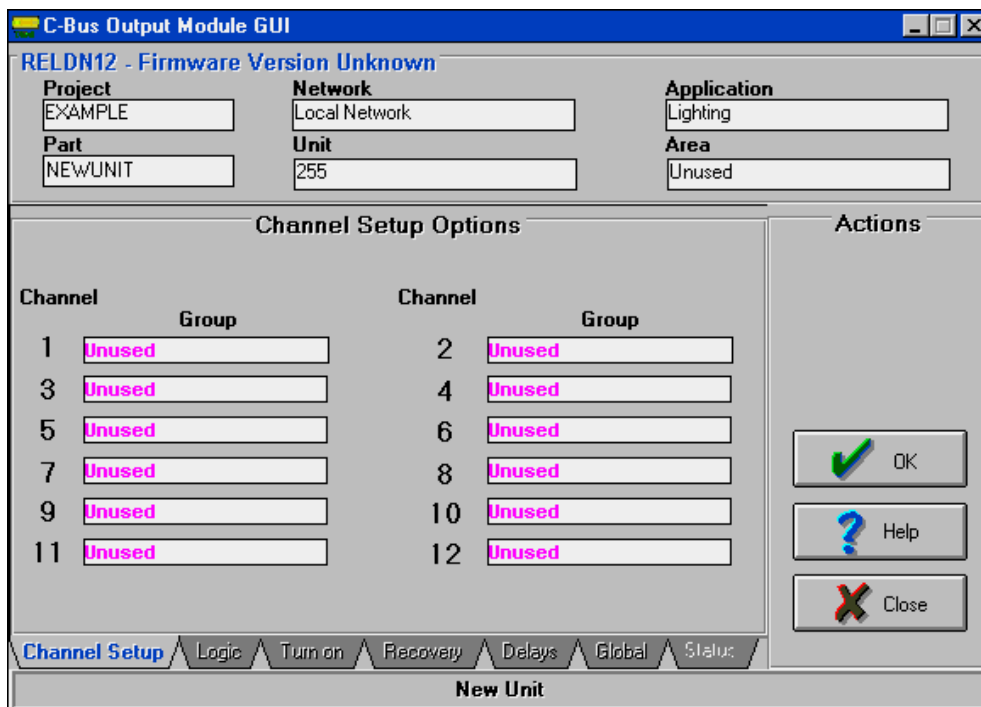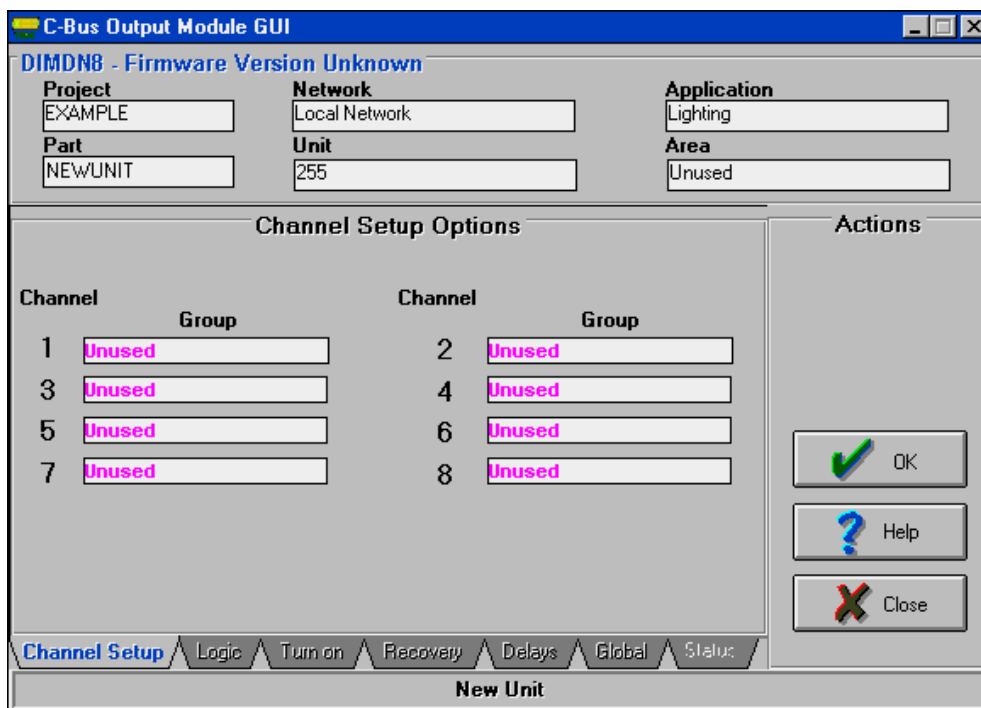


Figure 4.18  Channel Setup Tab for the DIN Rail Twelve Channel Relay Unit
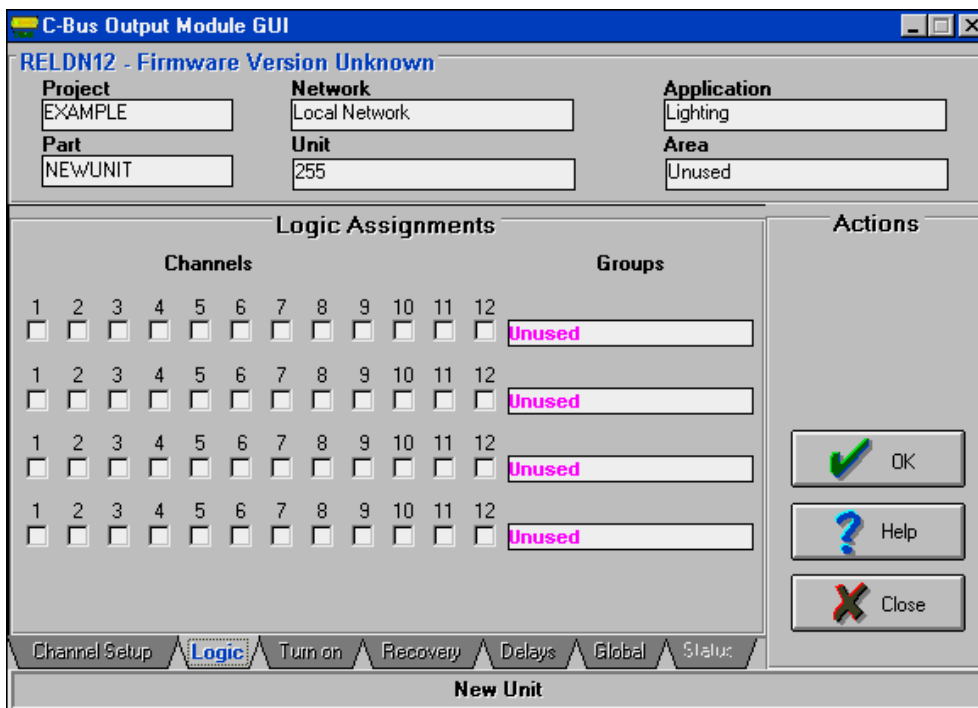
Figure 4.19  Logic Tab for the DIN Rail Twelve Channel Relay Unit
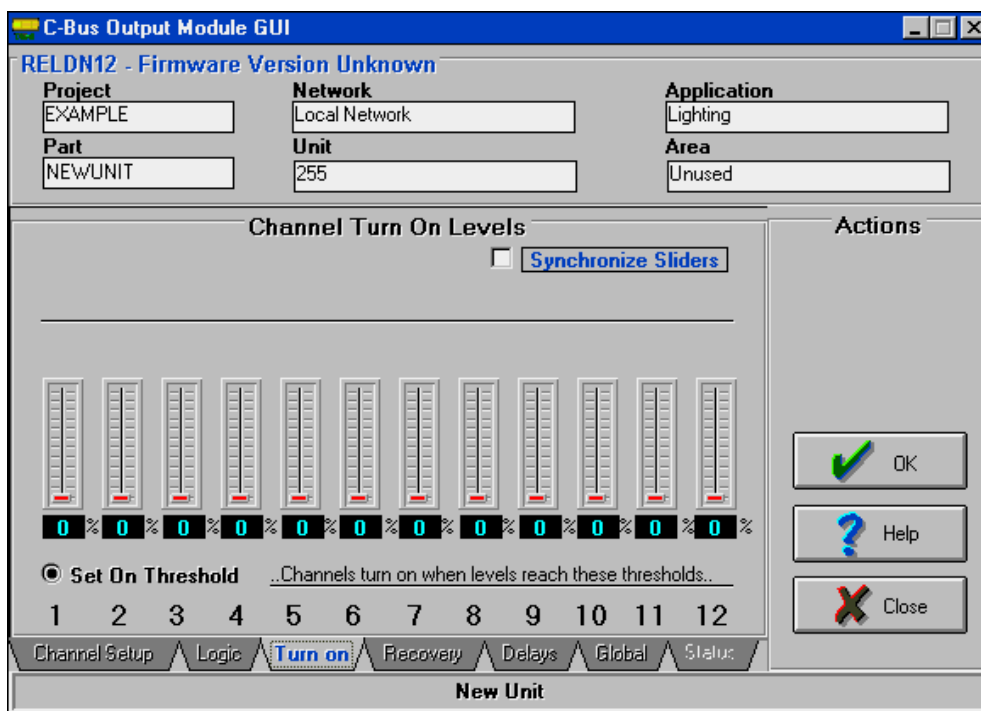


Figure 4.20  Turn-On Tab for the DIN Rail Twelve Channel Relay Unit
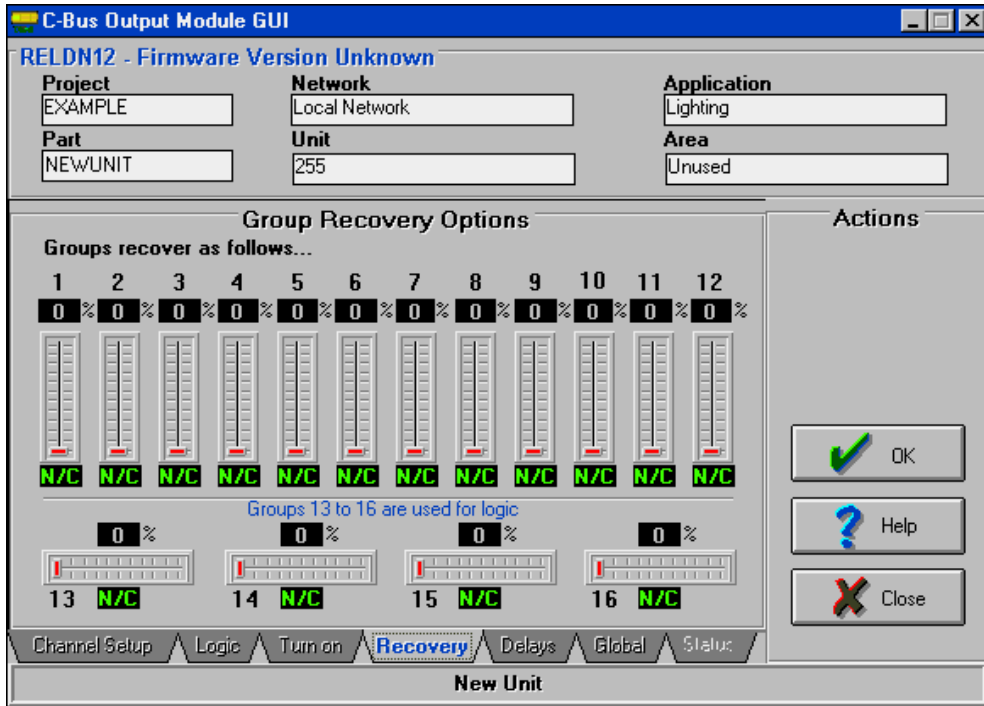
Figure 4.21  Recovery Tab for the DIN Rail Twelve Channel Relay Unit
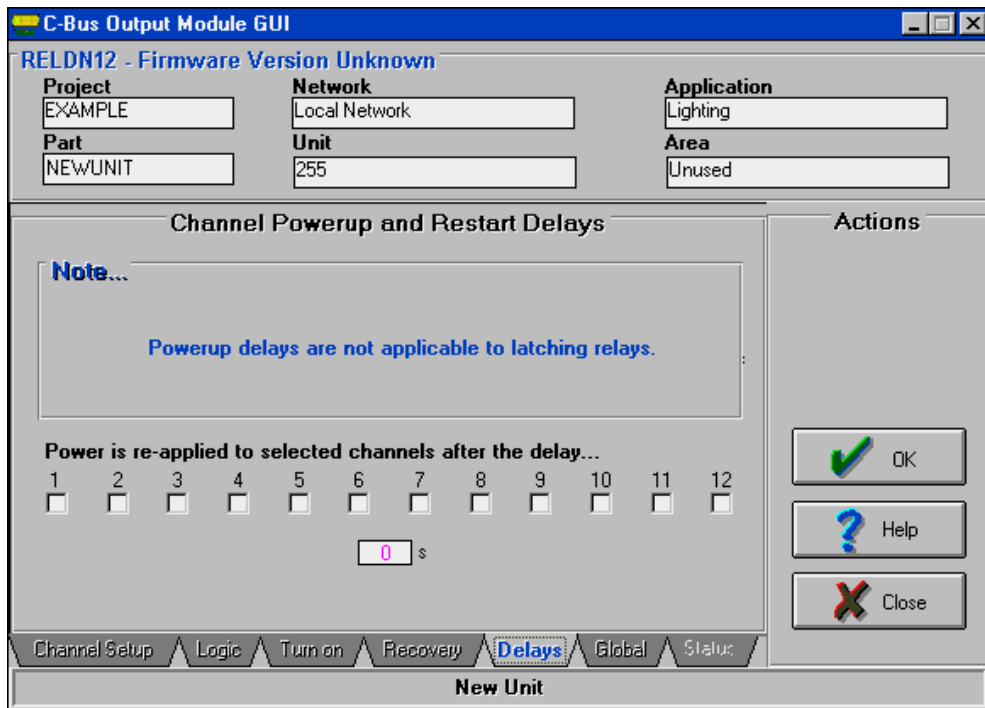


Figure 4.22  Delays Tab for the DIN Rail Twelve Channel Relay Unit
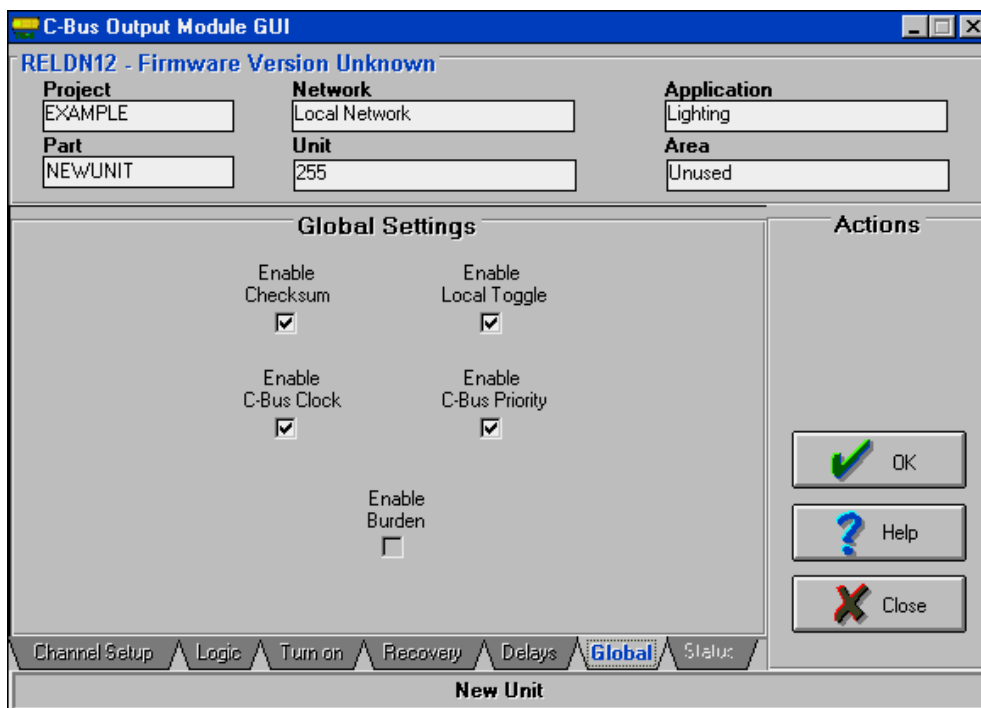
Figure 4.23  Global Tab for the DIN Rail Twelve Channel Relay Unit
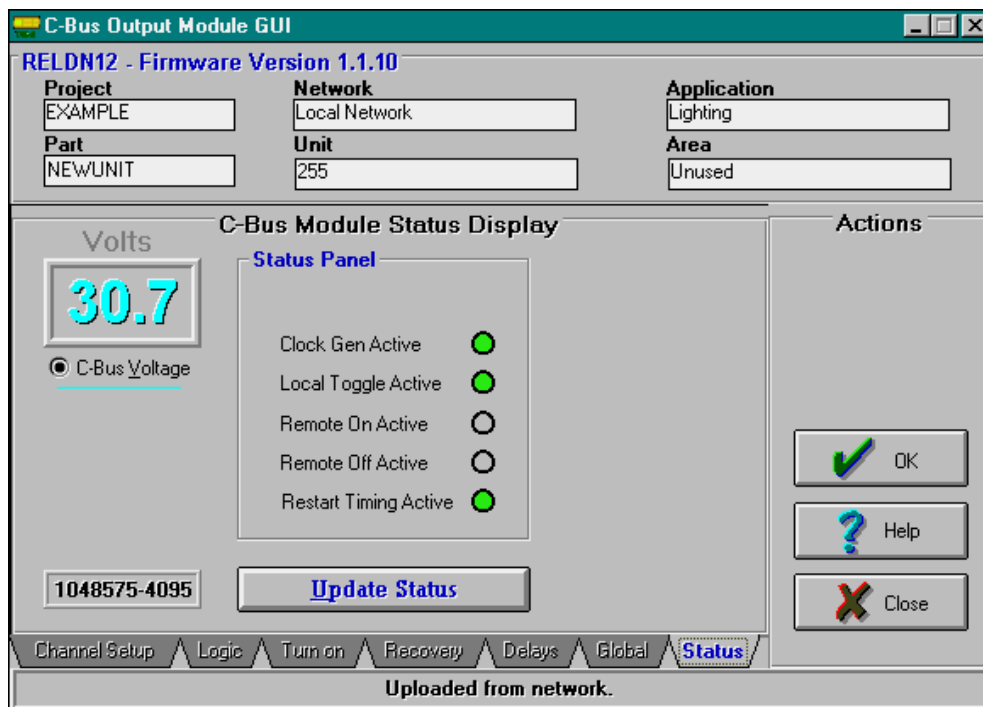


Figure 4.24  Status Tab for the DIN Rail Twelve Channel Relay Unit

# C-Bus DIN Rail Dimmer Units

The DIN Rail Eight Channel Dimmer Units utilise leading edge phase control technology, and are used to dim both incandescent and low voltage lighting. The Dimmer Unit can also be used to regulate the speed of exhaust and ceiling sweep fans (refer to the operating instructions that are shipped with the Unit).

DIN Rail Dimmers are available in several different configurations. Each variant offers a different number of channels, with a range of maximum ratings. Other variants are designed for operation with different supply voltages and frequencies (refer to the operating instructions that are shipped with the Unit). The same Graphical User Interface is used to program all of these devices.



Figure 4.25  Channel Setup Tab for the DIN Rail Eight Channel Dimmer Unit
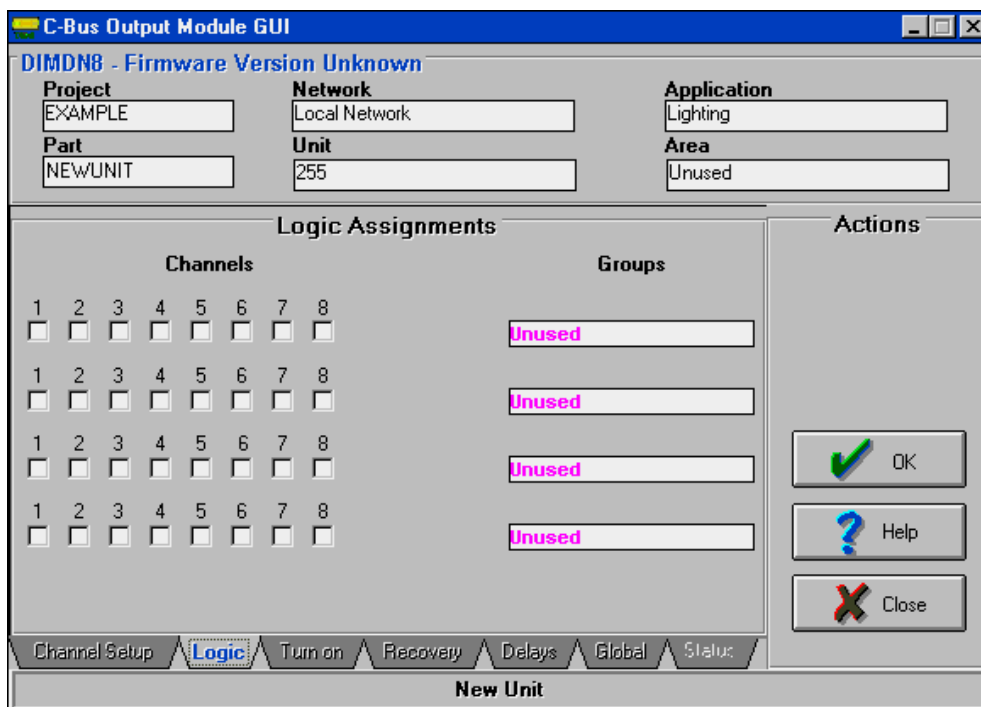
Figure 4.26  Logic Tab for the DIN Rail Eight Channel Dimmer Unit
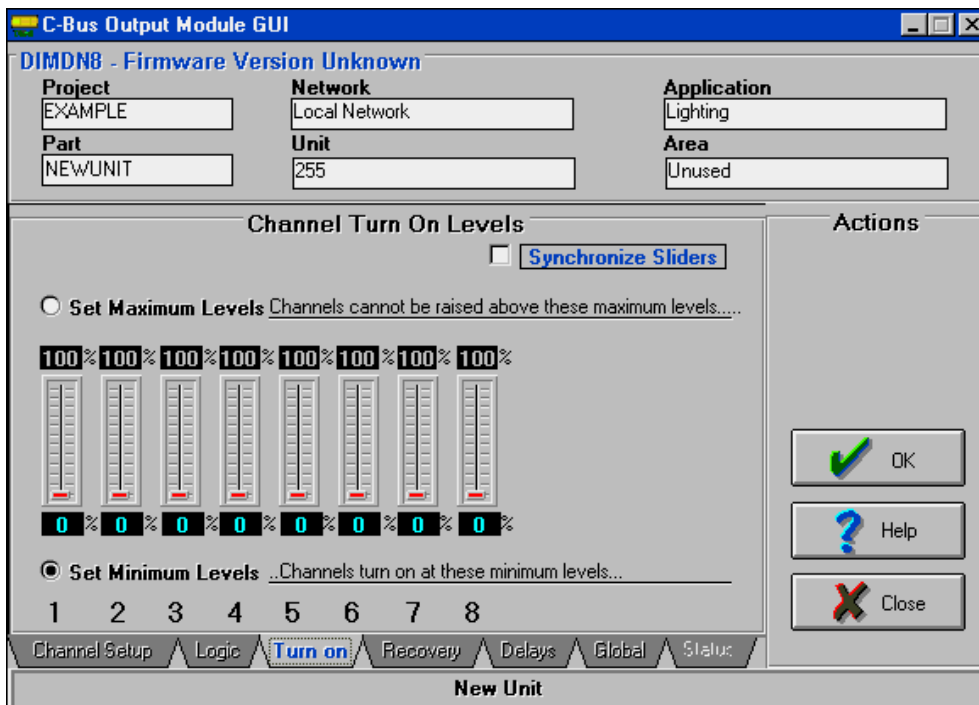


Figure 4.27  Turn-On Tab for the DIN Rail Eight Channel Dimmer Unit
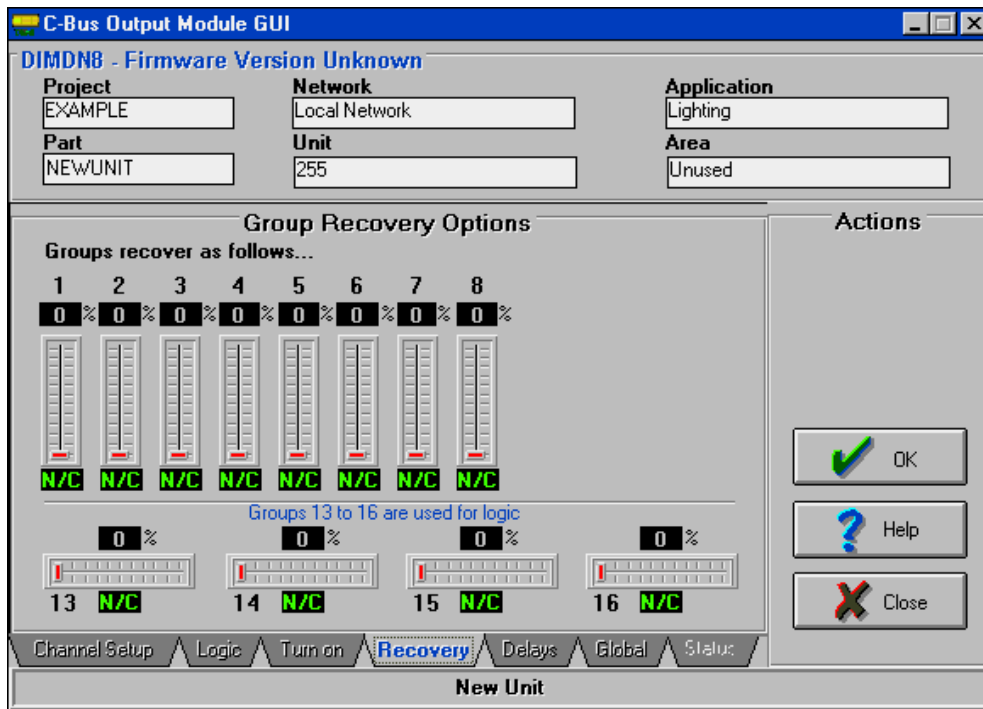
Figure 4.28  Recovery Tab for the DIN Rail Eight Channel Dimmer Unit
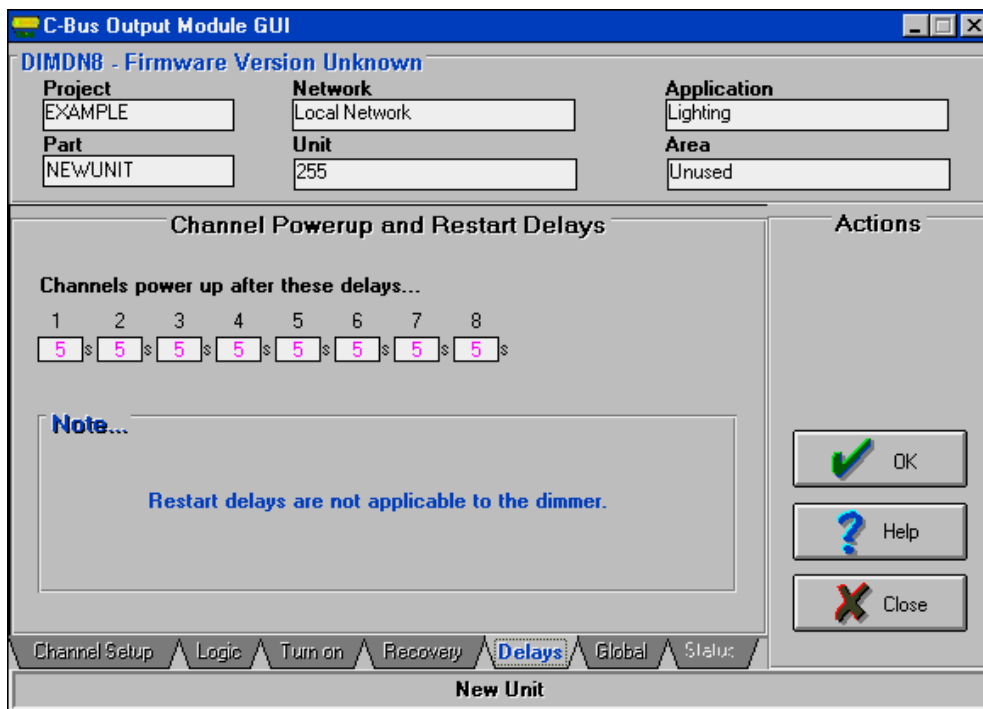


Figure 4.29  Delays Tab for the DIN Rail Eight Channel Dimmer Unit
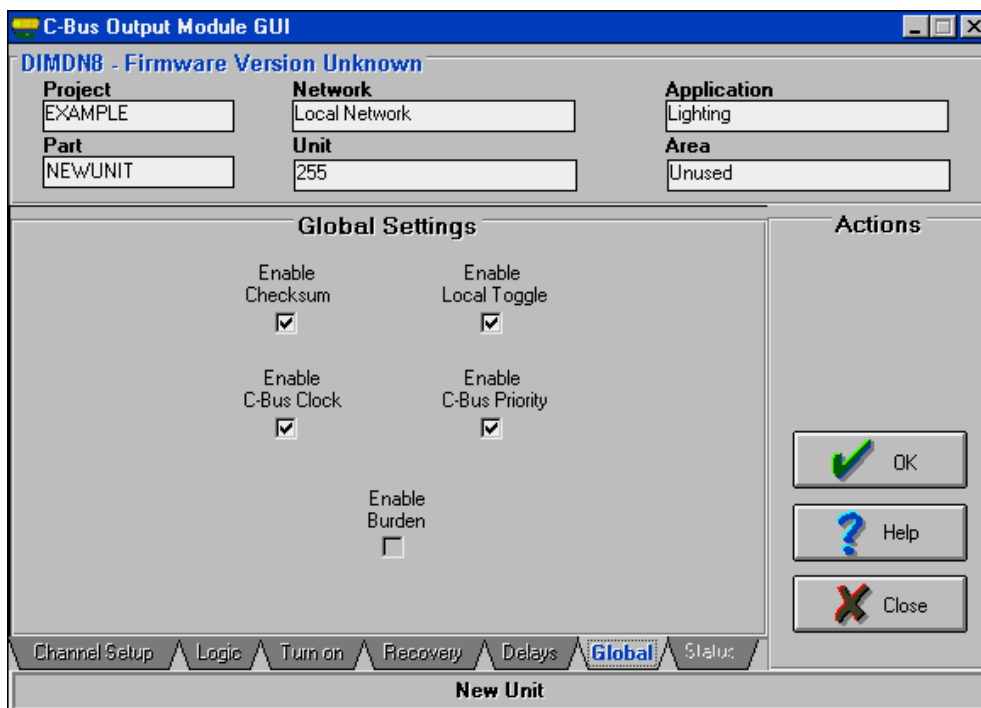
Figure 4.30  Global Tab for the DIN Rail Eight Channel Dimmer Unit
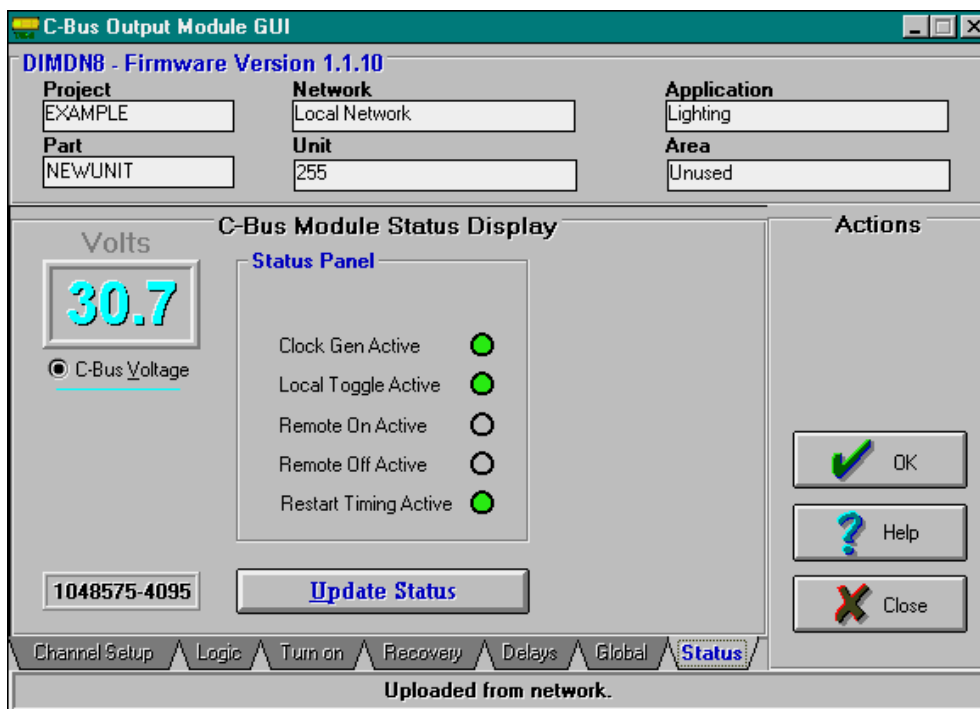


Figure 4.31  Status Tab for the DIN Rail Eight Channel Dimmer Unit

# C-Bus Professional Series Dimmer Units

The C-Bus Professional Series Dimmer Units utilise leading edge phase control technology, and are used to dim both incandescent and low voltage lighting. The Dimmer Unit can also be used to regulate the speed of exhaust and ceiling sweep fans (refer to the operating instructions that are shipped with the Unit).

Professional Series Dimmers are available in several different configurations. Each variant offers a different number of channels, with a range of maximum ratings. Other variants are designed for operation with different supply voltages and frequencies (refer to the operating instructions that are shipped with the Unit). The same Graphical User Interface is used to program all of these devices.
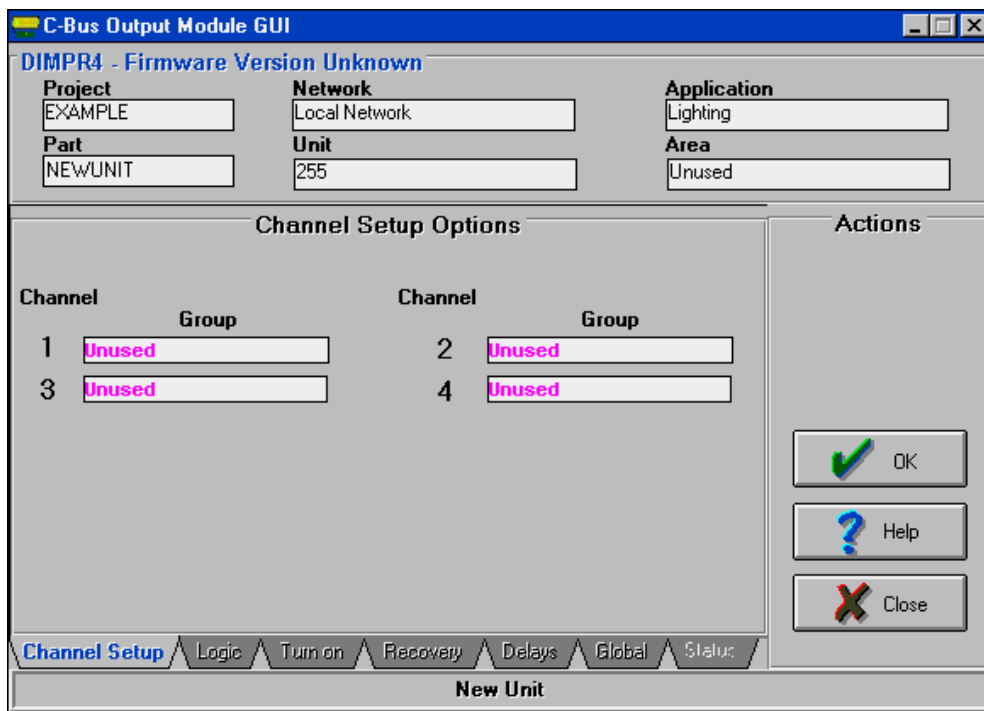


Figure 4.32  Channel Setup Tab for the C-Bus Professional Series Four Channel Dimmer Unit
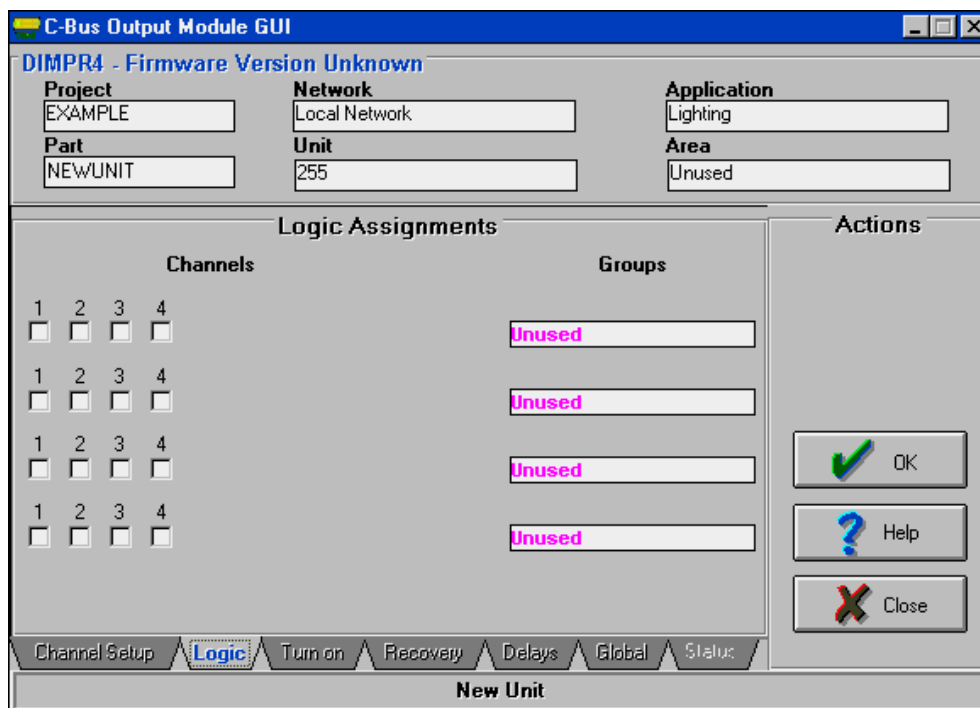
Figure 1.33  Logic Tab for the C-Bus Professional Series Four Channel Dimmer
Unit
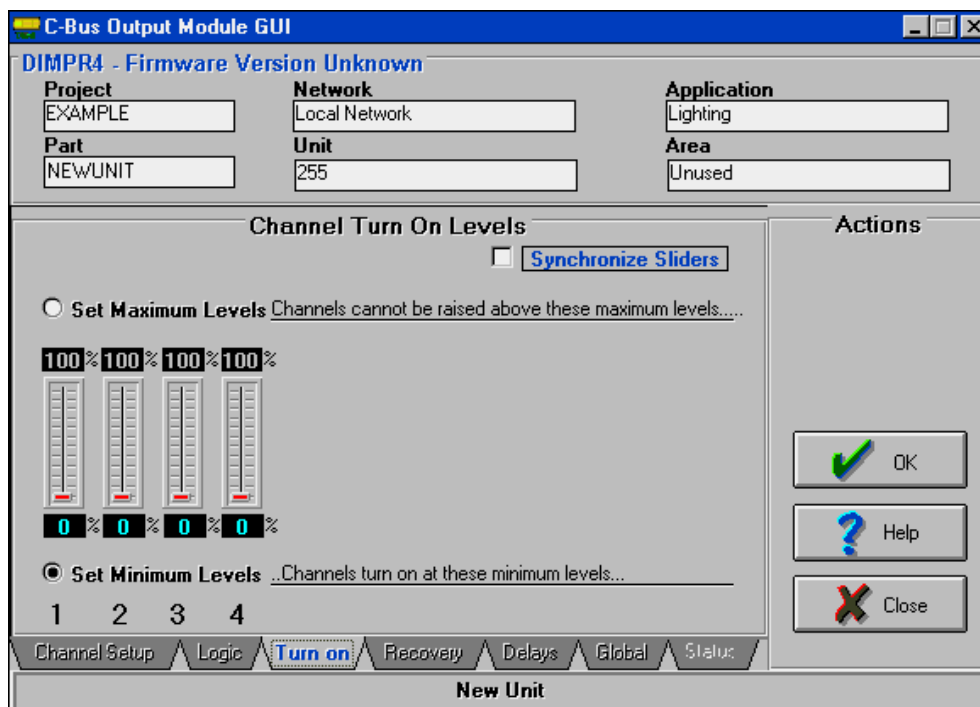


Figure 1.34  Turn-On Tab for the C-Bus Professional Series Four Channel
Dimmer Unit
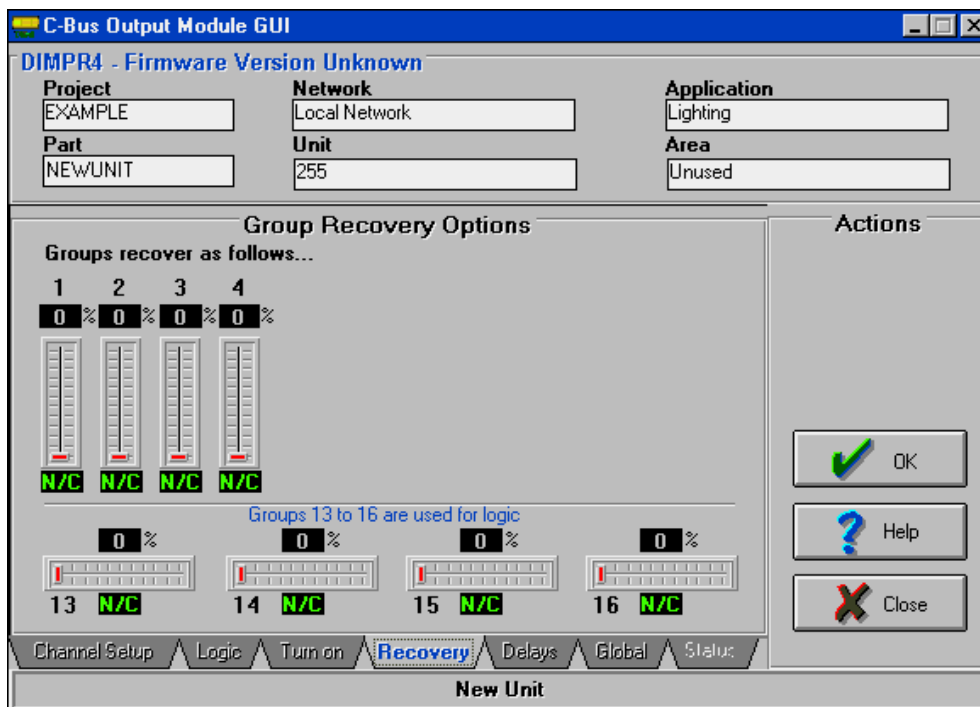
Figure 1.35  Recovery Tab for the C-Bus Professional Series Four Channel
Dimmer Unit
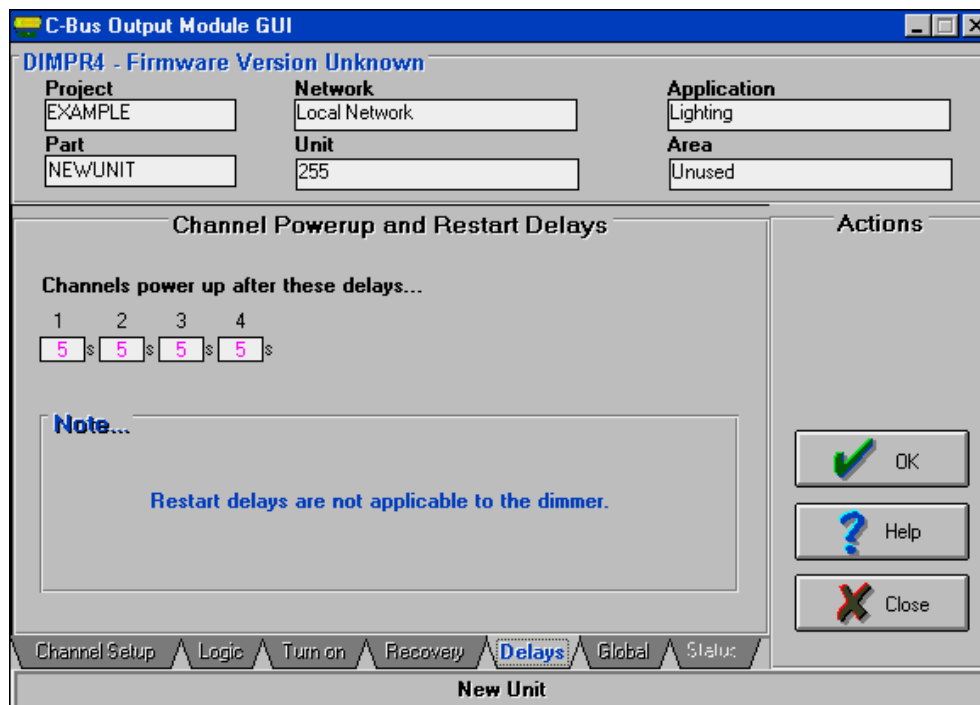


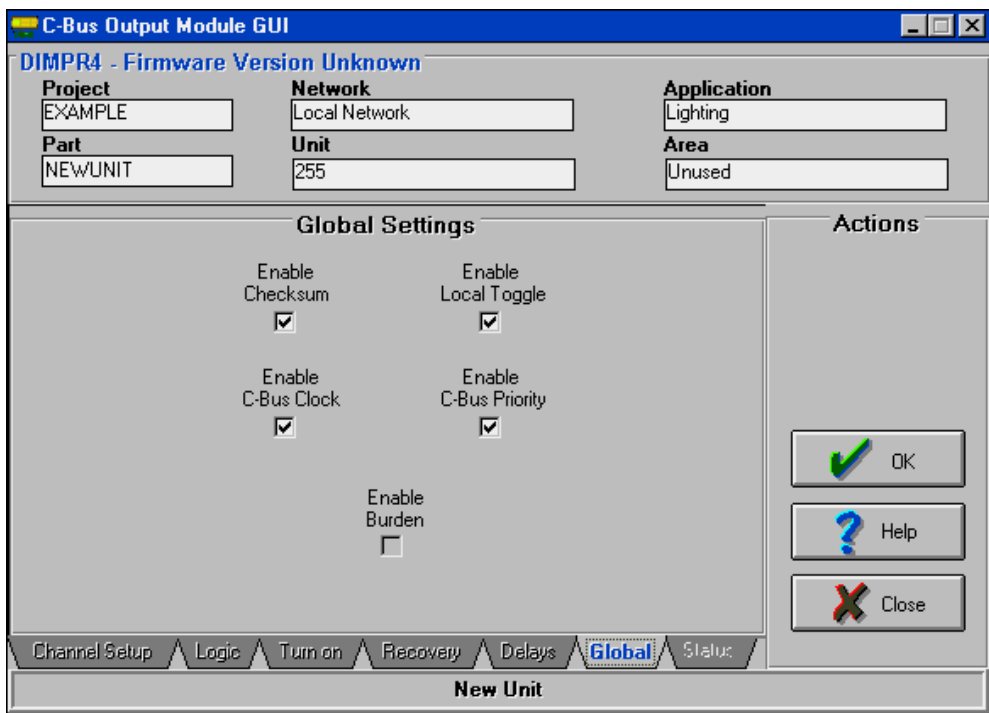Figure 1.36  Delays Tab for the C-Bus Professional Series Four Channel Dimmer
Unit

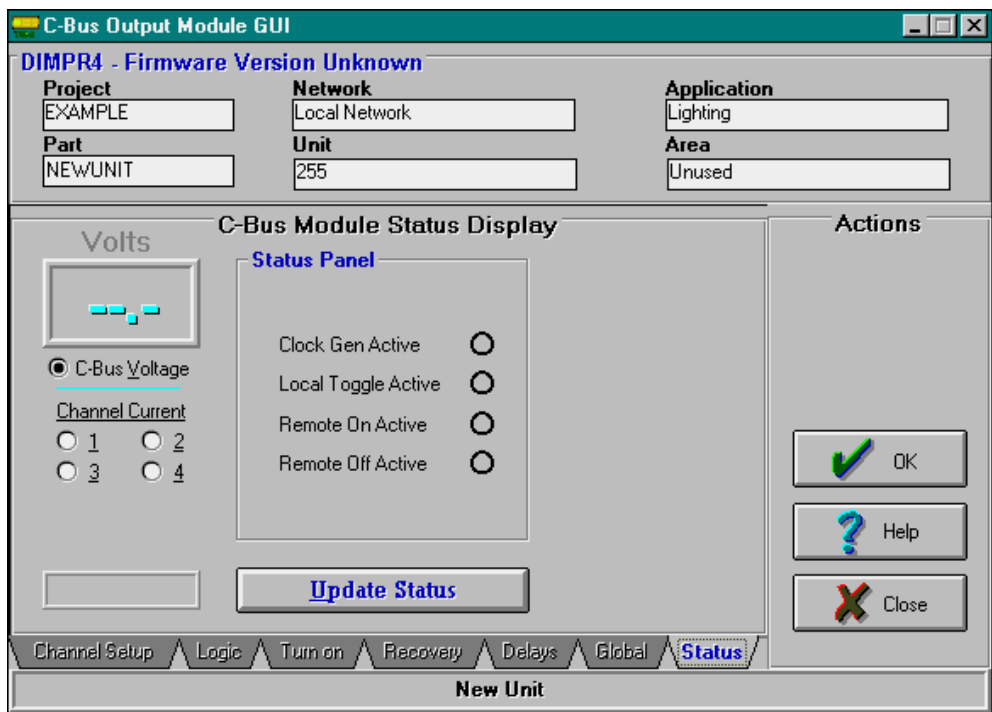Figure 1.37  Global Tab for the C-Bus Professional Series Four Channel Dimmer
Unit



Figure 1.38  Status Tab for the C-Bus Professional Series Four Channel Dimmer
Unit

## Chapter 5                    Frequently Asked Questions

# Frequently Asked Questions

Q1.     How many DIN Rail Output Units can I have on my C-Bus Network ?

A maximum of 10 DIN Rail C-Bus Units can be installed on any single Network. This restriction applies only to those DIN Rail products that incorporate a power supply (sourcing power to the C-Bus Network).

P Suffix products such as the 5512RVFP do not incorporate a power supply on-board. Up to 100 0of these Units may be connected to any single C-Bus Network.

Be sure to make use of the C-Bus Calculator (A C-Bus Network Design Verification Software Tool) to ensure that your design is viable.

Q2.     How many Professional Series Dimmer Units can I have on my C-Bus Network ?

A maximum of 30 C-Bus Professional Series Dimmer Units can be installed on any single Network. This restriction applies only to those PRO products that incorporate a power supply (sourcing power to the C-Bus Network). Be sure to make use of the C-Bus Calculator (A C-Bus Network Design Verification Software Tool) to ensure that your design is viable.

Q3.     When do I use the Network Burden built into my DIN or PRO Unit, versus the traditional Network Burden jumper selectable from my PC Interface ?

It is recommended that all C-Bus Installations incorporating either DIN or PRO Units with on-board Power Supply (sourcing power to the C-Bus Network) utilise the software selectable Network Burden provided with those Units. Alternatively, an external Network Burden could be fitted.

DO NOT USE THE C-BUS NETWORK BURDEN JUMPER SELECTABLE FROM THE 5100 C-BUS PC INTERFACE. THIS BURDEN SHOULD BE DISABLED (JUMPER POSITION A).

Q4.     My DIN or PRO Units are correctly configured to switch from the appropriate Group
        Addresses, but do not respond to switching commands on the Bus. What could be
        wrong ?

        There are many possible reasons that this may occur (please refer to the C-Bus Manual,
        Clipsal Cat No. S/2, 5000M/2 for general fault finding and troubleshooting guides).
        DIN and PRO Units also include new control features that the user should be wary of.
        Possible causes of the problem described include :

        Possible Cause #1

        Unit is in Local Override Mode (activated by pressing toggle buttons on the front of the
        Unit), and C-Bus Priority (located on the Global Tab of the GUI) has been disabled.
        The "Unit" LED on the front of the Unit will flash to indicate this, or it can be
        determined from the Status Tab on the GUI when communicating live with the
        Network.

        Possible Cause #2

        Unit is in Remote Override Mode (activated by override switch(es) hard wired on the
        RJ socket along with the C-Bus Connection). If this action is not intentional, then it is
        possible that the incorrect cabling termination/colour convention has been used, or that
        there is a short circuit somewhere on the Network (short circuit from C-Bus negative
        rail to remote override On or Off). Loads on the affected Unit(s) will either be all On,
        or all Off. The Unit LED on the front of the DIN Rail Unit will flash, giving a visible
        indication that it is in Remote Override mode. The active override can also be verified
        from the Status Tab on the GUI when communicating live with the Network.

Q5.     How am I able to install Category 5 Data cable for DIN Rail connection to the Safety
        Extra Low Voltage (SELV) C-Bus Network into a Low Voltage mains rated
        distribution board without violating wiring standards for insulation, isolation and
        segregation?

        The distinctive pink Clipsal C-Bus Category 5 Cable (Catalogue Number 5005C305B)
        has been specially chosen not only for it's superior impedance and communications
        performance in a C-Bus application, but also because of it's unique double-insulated
        jacket construction. This cable has been thoroughly tested by a NATA approved testing
        laboratory and certified for use in mains rated applications. The installer must use RJ
        jack, or other suitably insulated termination techniques to ensure full compliance.

        Note :  The installer must fix mains cabling in the distribution board using cable ties or
        trunking as required by local wiring rules. Care must be taken not to allow copper
        strands to enter either DIN or Professional Series Units.

# List of Figures