



CONTROL SYSTEMS



UNITY

POWER TO CONTROL

Unity Modular Power System User Manual

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48 Channels



96 Channels

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1 Product Description

1.1 About this Manual

This “UNITY User Manual” describes the configuration and operation of the UNITY Modular Power System.

The separate “UNITY Installation Guide” describes the installation of the UNITY Rack and the connection of all circuits.

Throughout this manual:

- A word in **BOLD** text represents a button on the touch screen or a physical button.
- Emphasis is indicated by underlining.
- When referring to DMX, the actual DMX signal might be from one of the two DMX inputs or from Art-Net or sACN.

1.2 UNITY Overview

UNITY is a modular hybrid dimming/power cabinet system designed for the next generation of lighting and power control in permanent installations. It combines traditional dimming with the latest technologies of LED control and direct power relays. UNITY provides the perfect solution for new installations and as a retrofit for an outdated system. With the ability to control any load including LEDs, incandescent, neon and fluorescent fixtures, UNITY also allows you to set any channel to become a TruPower relay, perfect for powering moving lights, AV equipment and special effects.

UNITY consists of a floor mounted installation rack that contains all external connection terminals and internal power distribution. No rear access to the rack is required. The rack has one dedicated slot at the top for the UNITY Control Module (UCM) and multiple slots for the output modules below. The following types of output modules are available:

- UDM – 12 channel 10 amp Dimmer/Relay Switch module
- UDM – 12 channel 16 amp Dimmer/Relay Switch module
- UDM – 6 channel 25 amp Dimmer/Relay Switch module (factory fitted option requires special slot allocation)
- ULM - 12 channel 6 amp LED Dimmer/Relay Switch module
- USM - 12 channel 10 amp Switch Relay module
- USM - 12 channel 16 amp Switch Relay module

The system is not dependent on the UCM for normal operation because the output module configuration settings are stored locally in each output module. In addition, the input control signals are directly connected to each output module and not routed through the UCM.

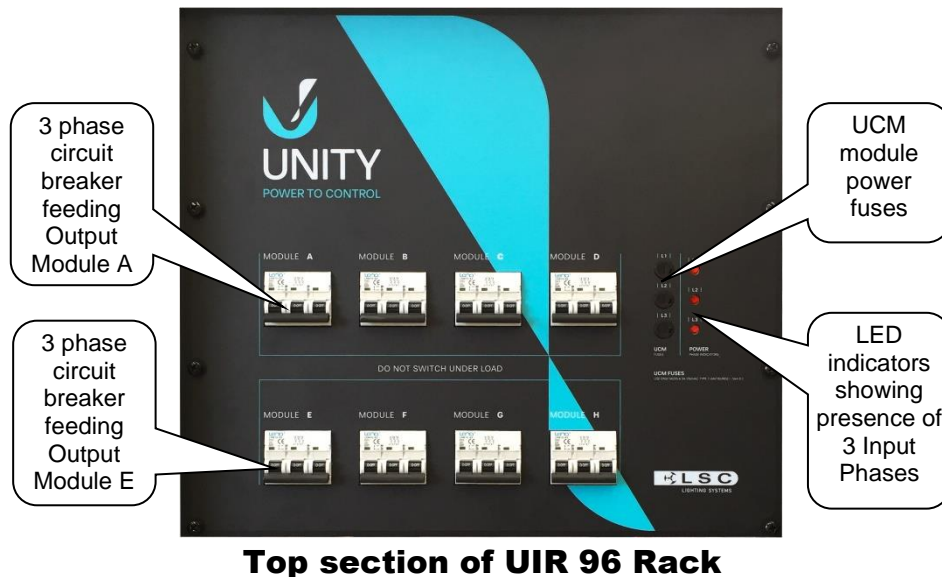
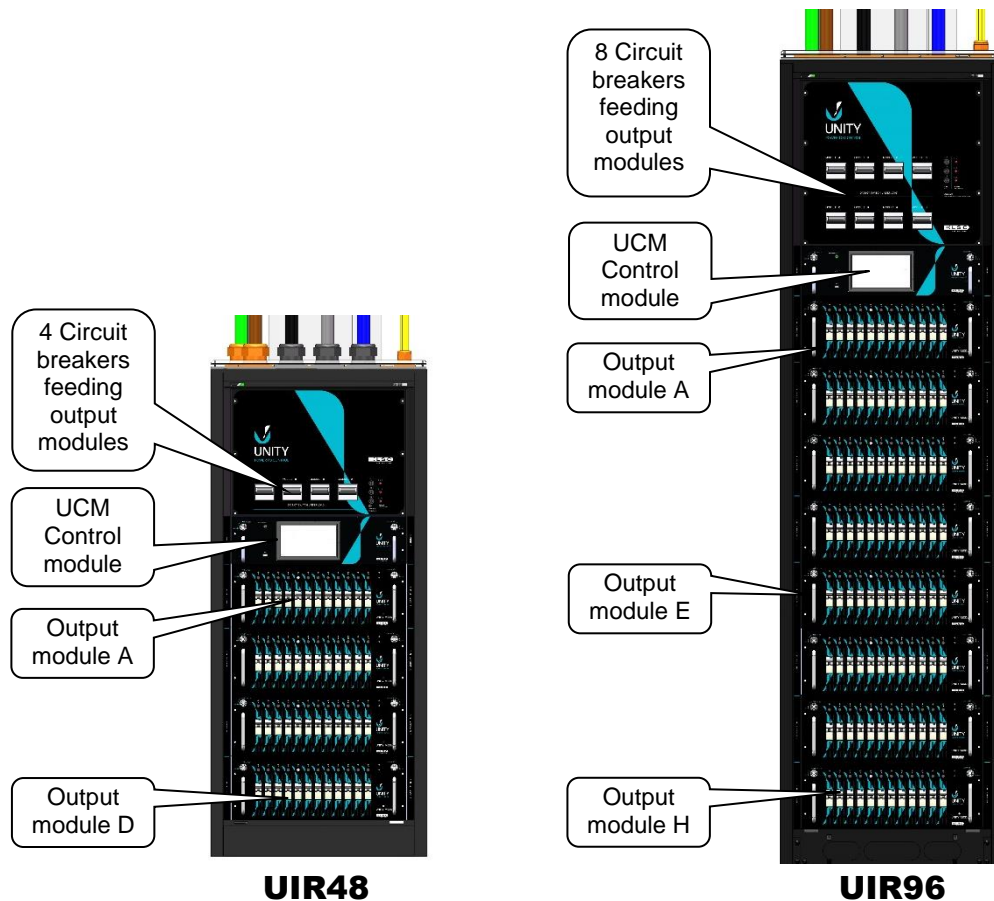
1.3 UNITY Racks

There are two rack sizes available:

- The UIR48 (UNITY Installation Rack) accommodates 4 output modules giving a total of 48 output channels.
- The UIR96 accommodates 8 output modules giving a total of 96 output channels.

Note: Ordering a UDM 6 channel 25 amp module reduces the total channel count of the rack by 6 channels. The slot for the 6 channel 25 amp module is a factory fitted option and is not interchangeable with other output modules.

The slots below the UCM can be fitted with any combination of output modules and any type of output module can be fitted in any output module location with exception of the 6 channel module.



The top section of the rack contains the 3-phase circuit breakers that feed each output module. These breakers should not be operated when their output modules are under load.

The power to the UCM is supplied from all 3 input phases via fuses located on the front of the rack. The UCM will continue to operate with only 1 phase present. The UCM fuse type is M205 6.3A/250VAC TYPE T (Anti-surge) 1.5kA B.C.

1.4 UCM UNITY Control Module

The top module location in the UNITY rack is reserved for the UCM (UNITY Control Module). Unique keying prevents any other type of module being inserted in the top position.

The UCM is designed to configure, control and monitor the dimmers, LED dimmers and switch modules located below it. It also acts as a control and reporting proxy to the outside world. All relevant information can be reported to a central controller either via LSC's HOUSTON X reporting system or via RDM (Remote Device Management). RDM monitors and controls the rack as a whole and reports all modules as a single unit.

The touch screen is used to configure the system and also to display the current system status and report any alarm conditions. The UCM touch screen menu system is fully described in section 3.



UCM

The (recessed) **RESET** button resets the operation of the UCM. All settings and configurations are retained.

The USB connector allows for the import and export of show files, configurations and software upgrades.

1.4.1 Status LED

The Status LED indicates the health of the system.

- Magenta = Booting up
- Green = Good
- Solid Red = UCM alarm
- Flashing Red = Alarm. See section 3.2
- Yellow = Acknowledged alarm

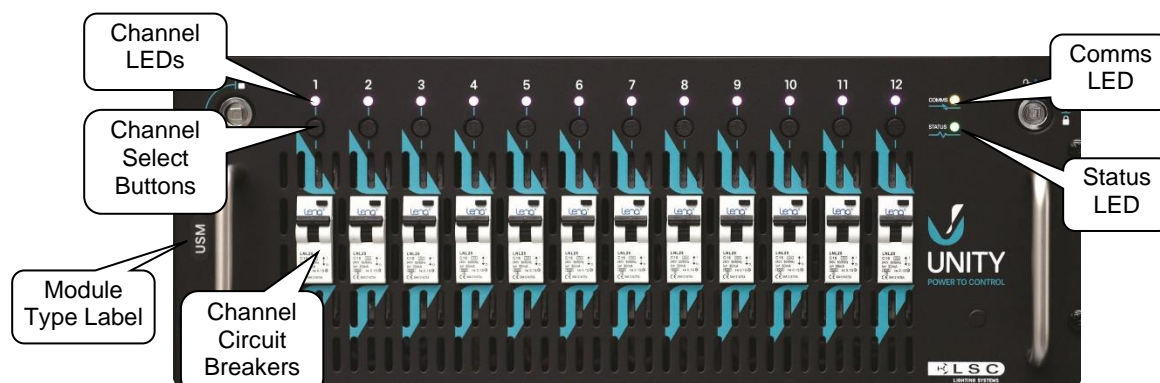
1.5 Output Modules

The module locations below the UCM can be fitted with any type of output module. You can use the menu system to specify that only a particular type of output module will operate in a specific location. See section 3.16.2.

The exception is the 6 channel 25 amp UDM which can only be fitted in specifically factory wired location. Unique keying prevents any other type of module being inserted in a 6 channel location and likewise the 6 channel module cannot be fitted into any other location.

All modules utilise self-aligning connectors and are locked into position using two front panel quarter-turn camlocks. The camlocks are fitted with switches which automatically turn off all output loads from the module when a camlock is in the open position. This feature enables you to “hot swap” modules as loads are automatically turned off when the camlocks are opened and turned back on when the camlocks are closed. Do not operate the 3-phase circuit breakers that feed each output module when their output modules are under load.

The output module slot locations are labelled A to D (UIR48) or A to H (UIR96) from top to bottom of the rack.



Typical Output Module

The label on the left side of each module indicates the type of module:

- UDM = Dimmer/Relay Switch module
- ULM = LED Dimmer/Relay Switch module
- USM = Relay Switch module

1.5.1 Comms LED

The Comms LED indicates the following:

- Green = Normal operation. Either DMX1, DMX2, ArtNet or sACN input control sources are being received at the module.
- Yellow = Loss (or error) of input control sources.
- Red = The module is not currently configured for any input control sources.

1.5.2 Status LED

The Status LED indicates the following:

- Green = Normal operation.
- Yellow = One of the Camlocks is open. Module operation is suspended. No outputs will operate.
- Red = Loss of internal communications.
- Red Double Flash = The module is in an incompatible slot.

1.5.3 Channel LEDs

The Channel LED on each output channel indicates the following:

- Blue = Dimmer mode. The intensity mimics the output level of the dimmer.
- Green = Switch mode. It is either On or Off to mimic the output.
- Red Double Flash = The output circuit breaker has tripped.
- Red Single Flash = The input phase is missing or out of range (for example, low volts).

1.5.4 Channel Select Buttons

The Channel Select buttons have multiple uses.

1. When using the “Channel Config” menu on the touch screen, they can be used to select that channel for configuration.
2. When using the “View Channel” menu on the touch screen they can be used to select that channel for viewing.
3. Channel ON/OFF. Press and HOLD (for 2 seconds) to manually turn the channel on. Tap to turn it off. This can be used to temporarily turn on a channel for testing purposes.

1.5.5 UDM UNITY Dimmer Module

The UDM (UNITY Dimmer Module) provides 12 (or 6) output channels. Each channel can be individually configured for either dimming of traditional incandescent lamps or relay power switching.

In dimming mode, the module utilizes pulse transformer circuitry which allows it to control difficult loads including neon, motors and low wattage lamps, without the need for a dummy load. The dimmer circuitry also employs high quality and virtually silent 10/16A chokes with a Rise Time of 220µS (measured between 10% and 90% at 50% output level into maximum rated load).

In switching mode, the module uses LSC's "TruPower" technology that bypasses the dimmer circuitry and directly connects the output circuit to the incoming power via a mechanical relay. It also uses "Current Control Technology" where power switching occurs when the mains voltage is at zero volts (zero crossing point) to prevent nuisance tripping of breakers. The operation of each power switching relay can be controlled by either the level of its DMX channel or automatically switched on when the DMX control signal is present and off (after a programmable delay of up to 60 minutes) when DMX is no longer present. See section 3.10.2.

1.5.6 ULM UNITY LED Dimmer Module

The ULM (UNITY Led Module) provides the same features as the UDM above but is specifically designed to dim leading edge phase controlled dimmable mains powered LED's using LSC's patented LED drive technology.

1.5.7 USM UNITY Switch Module

The USM (UNITY Switch Module) provides the same features as the UDM above but without the ability to dim making this module a more cost effective choice when dimming is not required.

1.5.8 Replacing Modules

To remove a module, use the supplied Camlock key to rotate each Camlock a quarter of a turn. The camlocks are fitted with switches which automatically turn off all output loads from the module when a camlock is in the open position. This feature enables you to "hot swap" modules as loads are automatically turned off when the camlocks are opened and turned back on when the camlocks are closed.

If an output module is replaced with another module of the same type it will automatically be configured with the settings from the previous module as stored in the UCM.

If a module is plugged in and after a short period it has seen no communications from the UCM (because the UCM is missing or faulty) it will activate itself with the last configuration it had.

A module location can be configured from the UCM even with the module missing. When the module is plugged in it will be updated accordingly.

2 Quick Start Guide

2.1 Overview

All configuration of the system is performed either locally via the touch screen on the UNITY Control Module or remotely using LSC's HOUSTON X software (see section 1.1) or by importing a CSV file that has been configured on a computer (see section 3.16.5).

When configuring a new installation with a large number of racks and channels that have complex setups it can be quicker to use HOUSTON X or a CSV file than to use the touch screen.

2.2 Basic Configuration Steps

The 3 basic steps to configuring UNITY output channels using the touch screen are listed below:

2.2.1 Input Source.

Which input source will control the channel?

UNITY allows every channel in the rack to have its own selectable input source. However, in most installations, the same input source is used for all of the channels in the rack. If this is the case in your installation you can connect all of the channels to an input source in the one operation.

Touch **LOG IN**, **GLOBAL LEVEL 1**, **CHANNEL SETUP**, **SELECT CHANNELS** then choose **ALL** (channels), **DONE**.

Next touch **INPUT SOURCE**. The choices are:

- **DMX 1**
- **DMX 2** (UNITY provides 2 separate DMX connections to choose from).
- **sACN**. (DMX over Ethernet)
- **ArtNet**. (DMX over Ethernet)
- **No Source**. (The channel is OFF)

Touch your required source then touch **SAVE**. All channels in the rack are now controlled by your selected input source and the screen returns to the "Channel Setup Menu".

See section 3.6 for a detailed description.

Note. To use sACN or Art-Net protocols, Unity must have a valid IP address and NetMask set in order to work correctly. When using Art-Net, it is essential that the IP address is set to be compatible with the address on the device sending the Art-Net packets. See section 3.16.1

If sACN or ArtNet are used as an input source then the Universe that the rack responds to also needs to be selected. See sections 3.13 and 3.14

2.2.2 Patch DMX.

Which slot number (DMX address) will control the channel?

UNITY allows every channel in the rack to have its own selectable DMX address. However, in most installations, the DMX addresses within a rack will be contiguous numbers. If this is the case in your installation you can patch all of the channels in the rack in one operation by simply selecting all channels and entering the DMX address of the first channel in the rack.

From the "Channel Setup Menu" touch **PATCH DMX**.

In the previous step (Input Source) you selected "ALL Channels". This selection is still valid.

In the Patch menu, enter the **DMX address (slot) number** for the first channel in the rack then touch **DMX BLOCK ADDRESS**, then **SAVE**.

The first channel is patched to the entered DMX slot number and each subsequent selected channel is patched to the next sequential DMX slot

See section 3.7 for a detailed description including how to individually patch channels.

Note. Channels set to "AutoPower" do not need to be patched as the mere presence of their selected control source will switch on the power. See section 3.10.2.4.

2.2.3 Operating Mode

Does the load need dimmed or switched power?

UNITY allows every channel in the rack to have its own selectable operating mode. However, in most installations groups of channels are usually in the same mode. For example, channels 1 to 12 might all be set to “Dimmer” mode. If this is the case in your installation you can select the channels for a particular mode and set them all in one operation.

From “CHANNEL SETUP” menu touch **OPERATING MODE**.

Note: In earlier software versions the OPERATING MODE button was labelled as TRUPOWER. To select the channels touch, **SELECT CHANNELS**. The previous selection is still valid so touch **CLEAR** then touch the required channels then **DONE**. Use the **THRU** button to select a range of channels.

To set the selected channels to dimmer mode touch **DIMMER** then **SAVE**.

Note: In earlier software versions the DIMMER button was labelled as TRUPOWER OFF.

To set the selected channels to switch mode there are several choices:

- **NON-DIM** (control signal above 60%=ON and below 40%=OFF). This is the most commonly used setting for power switching.
- **RELAY** (control signal above 1%=ON and 0%=OFF)
- **CHANNEL(S) ON** (the channel is always ON)
- **CHANNEL(S) AUTOPOWER** (channel is ON when its selected control signal is present)

Make your selection then touch **SAVE**.

See section 3.10 for a detailed description.

Hint: It's a good idea to save your settings. See section 3.15

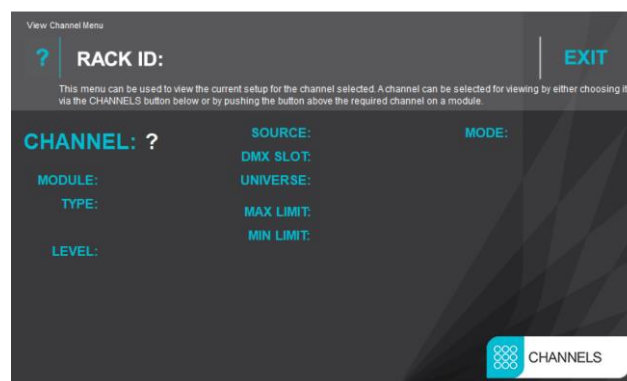
2.2.4 Optional Settings

The following optional settings are available for each channel when operating in dimmer mode:

- Dimmer Curves. See section 3.9
- Minimum Level. See section 3.10.3
- Maximum Level. See section 3.10.4

2.3 Channel Settings View

To see the current settings of an output channel, from the “Main Menu” touch **VIEW CHANNELS**.



View Channel

There are 2 methods available to select the channel to view:

1. To select a channel via the screen, touch **CHANNELS** then touch the channel number then **DONE**.
2. To select a channel via the **CHANNEL SELECT** button (located above each channel's circuit breaker on the output modules)), press the channel's button.

2.4 Channel Test

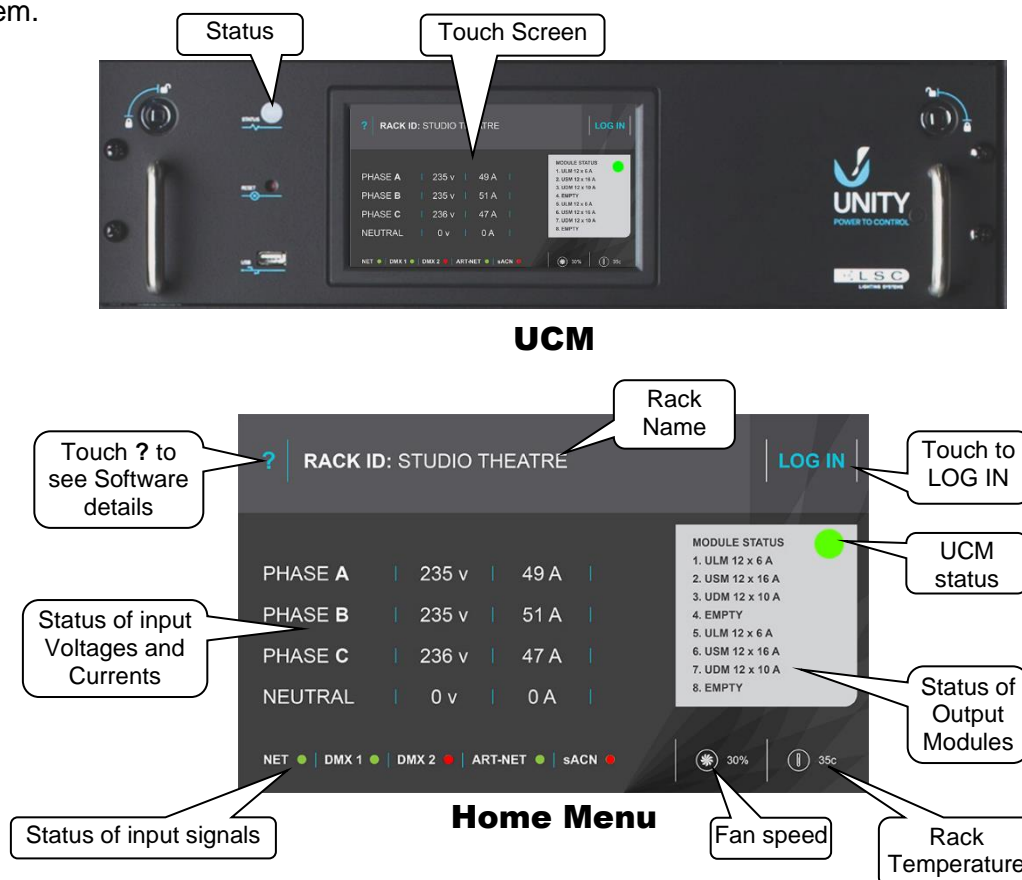
To temporarily turn ON a channel for testing purposes, press and HOLD its **CHANNEL SELECT** button (located above the channel's circuit breaker) for 2 seconds.

To return the channel to normal operation momentarily TAP the **CHANNEL SELECT** button.

3 UCM Menu System

3.1 Overview

The UNITY Control Module (UCM) touch screen is used to configure and interrogate the UNITY system.



The “Home Menu” shows the input voltage and load current of each of the three input power phases and the neutral. The “Module Status” pane on the right shows the type of output modules that are fitted and the “UCM status”.

- Flashing green = UCM OK
- Red = UCM fault

The bottom of the screen shows the fan speed and rack temperature plus the status of the Network connection and input source control signals:

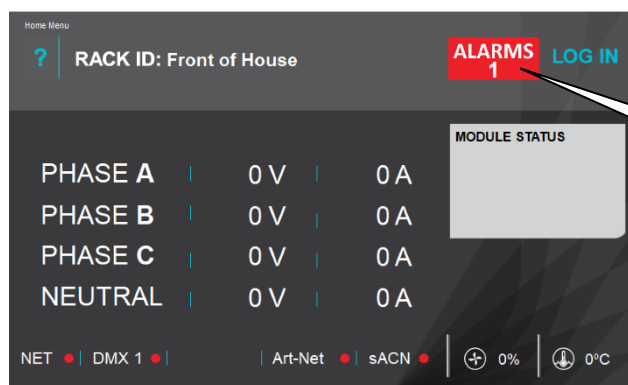
- Green = Signal present.
- Red = Signal NOT present

Touch ? to see the “About Menu” showing the software version and serial number.

The “Rack ID” can be used to display a name or user information for the rack. See section 3.16.4.

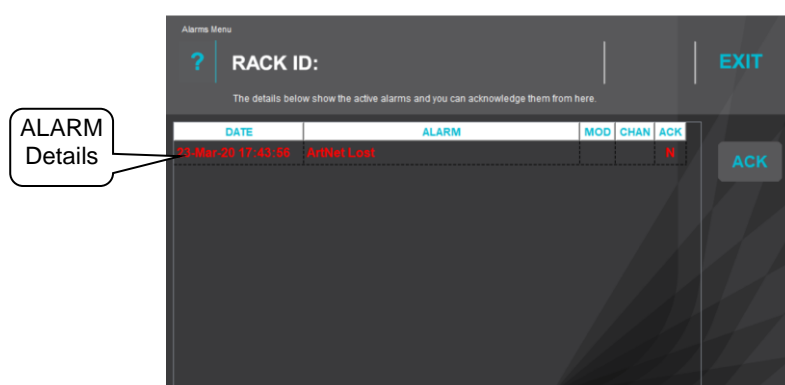
3.2 Alarms

If the system is operating correctly, the area to the left of the LOG IN button will be blank. If an alarm is detected the “STATUS” LED lights red and a Red Alarm button appears on the touch screen. If multiple alarms are present, the number in the button shows the quantity of active alarms.



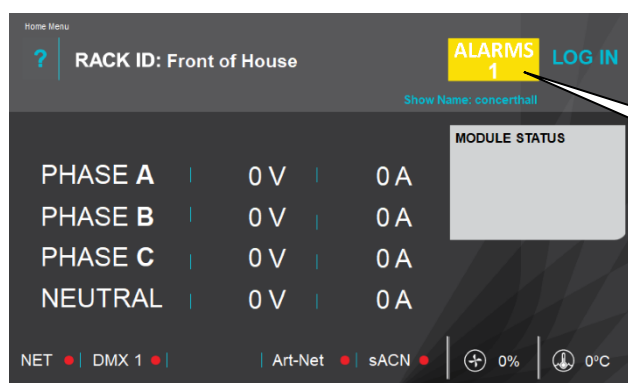
Home Menu

To see details of the alarm touch **ALARMS 1**.



Alarm Details Menu

If the cause of the alarm cannot be immediately resolved you can “acknowledge” the alarm by touching the red **alarm name** to select it then touch **ACK**. The status changes from red to yellow. Touch **EXIT**.



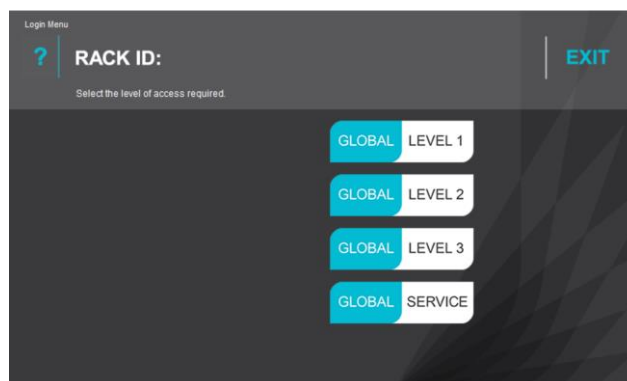
Acknowledged Alarm

The yellow acknowledged alarm allows any new alarms to be immediately brought to your attention due to their red status.

You can set which conditions will activate an alarm. See section 3.16.10.

3.3 Log In

Touch **LOG IN** to access the menus. Four access levels are available:

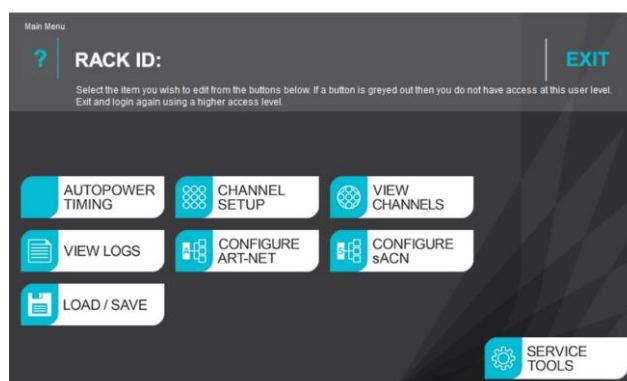


Login Menu

UNITY ships with levels 1, 2 and 3 all set to the same access. You can set the amount of access that is allowed in each level and protect each level with a PIN. See section 3.16.7. The “Service” level always requires a PIN (contact LSC) for access.

“Global” access is currently provided by all levels. “Zone” access is will be available in a future release.

Touch the access **LEVEL #** that you require and the “Main Menu” screen opens.



Main Menu

Items that are not available in the access level that you have selected are greyed-out. If you need access to a greyed-out item, exit then log in at a higher access level. After you are logged in, the system will automatically log out after 1 minute of inactivity.

Note: In all of the following menus, the **SAVE** button only appears if you have altered a setting. The altered setting is only applied when you touch **SAVE**. To discard the changes and retain the original setting touch **EXIT**.

3.4 AutoPower Timing

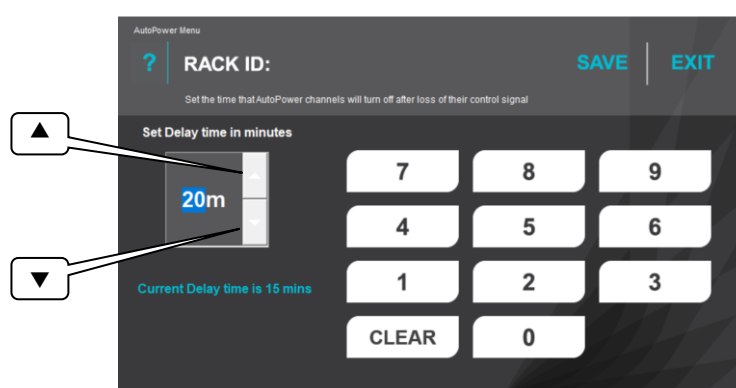
Many lighting fixtures such as LED's and moving fixtures require a constant source of non-dimmed (switched) power when they are operating.

AutoPower is a feature that automatically switches ON selected channels whenever their selected control signal is present on the input to UNITY and switches them OFF when the lighting controller is turned off and the control signal is no longer present. A channel set to AutoPower

does not listen to any specific DMX slot. Instead it looks for the presence of the source DMX universe (DMX1, DMX2, Art-Net or sACN) according to the input control source selected for that channel. When it sees a valid DMX signal from this source it turns the channel on.

A “Hold Time” can be set to prevent fixtures being turned off if there is a short interruption to the DMX signal and also to allow for a cool down period for the fixtures. The “AutoPower Timing” menu sets this hold time duration.

To set the AutoPower time, from the “Main Menu” touch **AUTOPOWER TIMING**.



AutoPower Timing

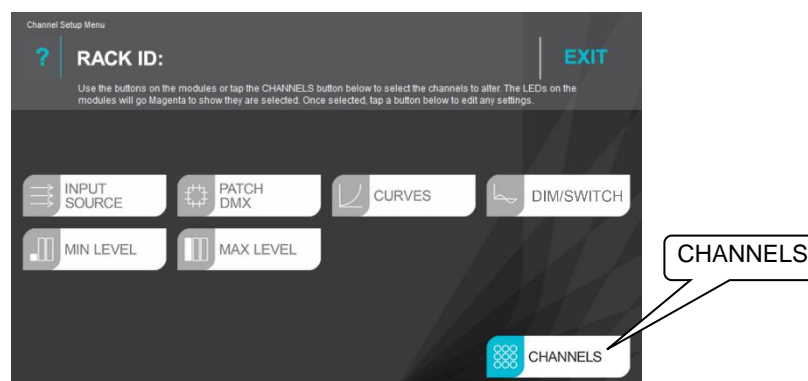
The timer can be set to any value from 1 to 60 minutes. Touch either the ▲ or ▼ buttons or enter a value via the keypad then touch **SAVE**.

When the DMX source is no longer detected the timer starts counting down. If the DMX returns whilst the timer is running, the timer is stopped and reset. If the DMX fails again, the timer starts counting down again. If the timer expires without DMX returning the AutoPower channels are turned off.

The AutoPower Timing menu only sets the hold time. The channels that are to be automatically switched on and off need to be set to “AutoPower” mode in the “OPERATING MODE” menu. See section 3.10.2.4.

3.5 Channel Setup

The “CHANNEL SETUP” menu allows you to set the parameters for the channel(s) that you have selected. From the “Main Menu” touch CHANNEL SETUP.



Channel Setup

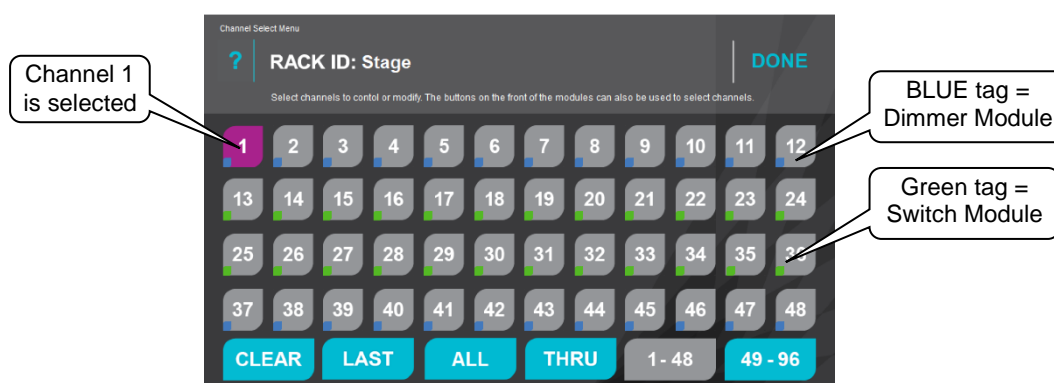
The menu buttons are greyed out because no channels have yet been selected.

3.5.1 Selecting Channels

There are 2 methods available to select the channel(s):

Method 1.

To select the channel(s) via the touch screen, touch **CHANNELS**.



Channel Select

Touch a channel to select it. Touch again to de-select it. Multiple channels can be selected. A range of channels can be selected by touching the **first channel** in the range then **THRU** then the **last channel** in the range. Touch **49-96** to access higher channel numbers. Touch **CLEAR** to de-select all channels. Touch **LAST** to recall your previous selection.

Touch the required channel number(s) then touch **DONE**.

The colour tag in the corner of the channel number indicates the type of module fitted in the slot. Blue tag = UDM or ULM Dimmer Module. Green tag = USM Switch Module.

Method 2.

Channels can be selected by pressing their **CHANNEL SELECT** button located above each channel's circuit breaker on the front of the output modules.

Multiple channels can be selected. To select a range of channels using the CHANNEL SELECT buttons on the output modules, press and **HOLD the first button** in the range then to the **last button** in the range.

When a channel has been selected, the selection number on the "Channel Select" touch screen lights purple and the LED above the CHANNEL SELECT button on the output module lights purple.

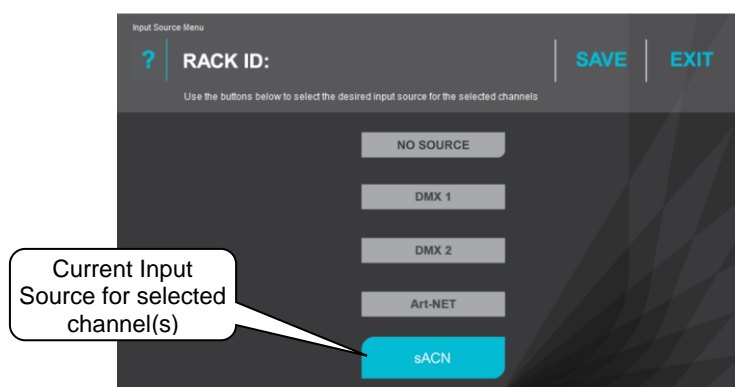
When a channel(s) has been selected, the buttons on the "Channel Setup" menu become active. The "Channel Setup" menu provides the following functions:

- INPUT SOURCE
- PATCH DMX
- CURVES
- OPERATING MODE
- MIN LEVEL
- MAX LEVEL

These functions are described in the following sections.

3.6 Input Source

Every channel can have its own selection of "Input Source". Select the channel(s) as described above then, from the "CHANNEL SETUP Menu" touch **INPUT SOURCE**. Use the buttons to select the desired input control source for the selected channels.



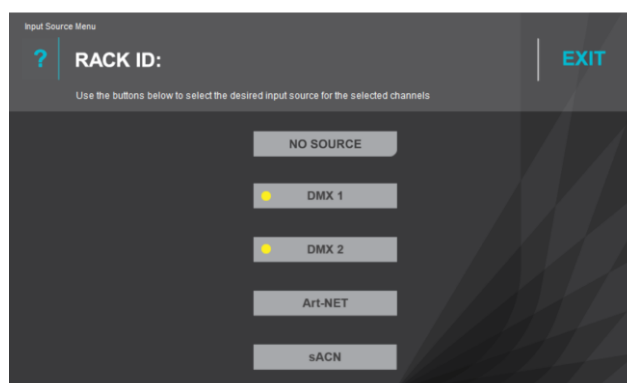
Input Source

The choices are:

- **No Source.** (The channel is OFF)
- **DMX 1**
- **DMX 2** (there are 2 DMX input connections).
- **ArtNet.** (DMX over Ethernet)
- **sACN.** (DMX over Ethernet)

Touch the required source name then touch **SAVE** to keep your setting and exit.

If multiple channels are selected and they currently have different input sources selected, then all the input sources in use are indicated in yellow as shown below.



Yellow dots indicate multiple channels are selected using different Input Sources

If there is a loss of an input control source (DMX, ArtNet or sACN) then the channels that are controlled by that source will hold their last level indefinitely until the source returns or the input power is switched off. Channels set to AutoPower remain on until the time set in the AutoPower Timing menu has expired.

Note. To use sACN or Art-Net protocols, Unity must have a valid IP address and NetMask set in order to work correctly. When using Art-Net, it is essential that the IP address is set to be compatible with the address on the device sending the Art-Net packets. See section 3.16.1
If sACN or ArtNet are used as an input source then the Universe that the rack responds to also needs to be selected. See sections 3.13 and 3.14

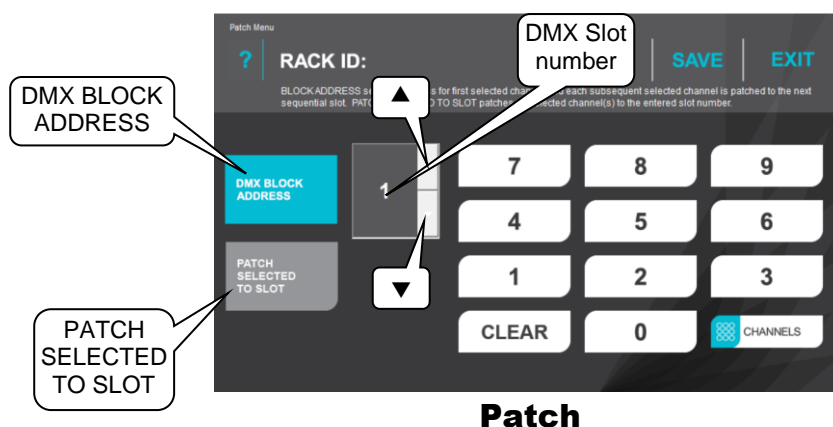
3.7 Patch DMX

Any channel that has either DMX 1, DMX 2, ArtNet or sACN selected as it "Input Source" needs to be patched to the DMX slot number that is to control it.

Note: Channels set to “AutoPower” do not need to be patched as the presence of their selected “Input Source” is all that is required to switch them on.

To patch a channel, from the “CHANNEL SETUP Menu” touch **PATCH DMX**. If you had previously selected a channel(s) then that selection is still valid. Otherwise touch **CHANNELS** or use the **CHANNEL SELECT** buttons located on the output modules to select the channel(s) to patch.

Select the DMX slot number by either entering the number on the touchscreen keypad or using the ▲ or ▼ arrows.



Patch

There are 2 methods for patching:

1. Touching **PATCH SELECTED TO SLOT** patches the selected channel(s) to the selected DMX slot number. Multiple channels can be selected and all will be patched to the same DMX slot number. Touch **SAVE** to keep your setting and exit.
2. Touching **DMX BLOCK ADDRESS** patches multiple selected channels to sequential DMX slots. Select all of the channels to be sequentially patched. Select the DMX slot number for the first selected channel and each subsequent selected channel will be patched to the next sequential DMX slot. Touch **SAVE** to keep your setting and exit.

In most installations, all of the DMX addresses within a rack will be contiguous. If this the case, in the “Channel Select” menu choose **ALL** channels, then **enter the DMX address (slot) number for the first channel in the rack** then touch **DMX BLOCK ADDRESS**. Touch **SAVE** to patch all channels in the rack and exit.

Note: If Art-Net or sACN are used as an “Input Source” then in addition to patching you must also select the required universe. See sections 3.13 and 3.14.

3.8 Multiple Rack Numbering

Channel numbers in each rack number from top to bottom of the rack. If more than one rack is installed, each rack has the same channel numbers but each rack usually has different DMX addresses. Therefore, when patching DMX slots, the first rack’s DMX slot numbers will match their channel numbers. The second and subsequent racks DMX slot numbers will continue on from the last DMX slot of the previous rack as shown in the following table.

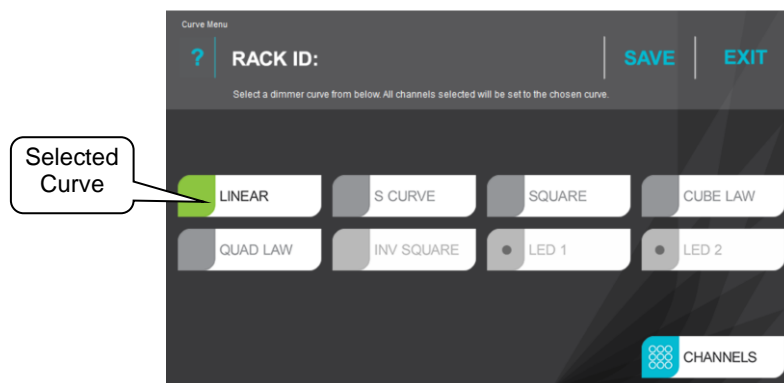
UIR48	Rack 1		Rack 2	
	Channels	DMX Slots	Channels	DMX Slots
Module 1	1-12	1-12	1-12	49-60
Module 2	13-24	13-24	13-24	61-72
Module 3	25-36	25-36	25-36	73-84
Module 4	37-48	37-48	37-48	85-96

3.9 Curves

A curve is the “transfer characteristic” between input control signal and channel output level. It defines how the dimmers output voltage responds to the control signal input.

UNITY provides several different curves and each has a different response. You can try each curve to see which one gives you the most linear results for your lighting fixtures. If your installation already has some dimmers installed you can experiment to find which curve gives the best match to your existing dimmers.

To select a curve, from the “CHANNEL SETUP Menu” touch **CURVES**. If you had previously selected a channel(s) then that selection is still valid. Otherwise touch **CHANNELS** or use the **CHANNEL SELECT** buttons located on the output modules to select the channel(s).



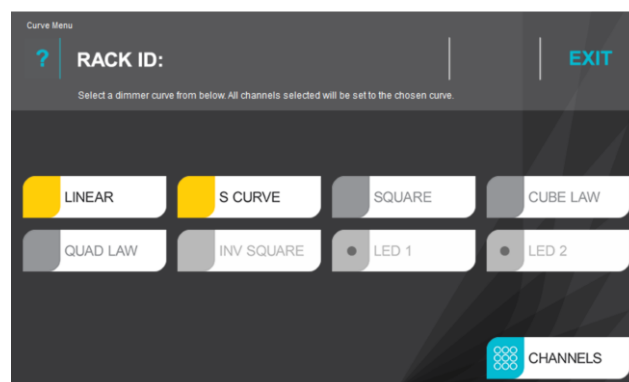
Curves

The choices are:

- **Linear** (Default)
- **S curve**
- **Square**
- **Cube Law**
- **Quad Law**
- **INV Square**. Future feature.
- **LED 1**. Future feature.
- **LED 2**. Future feature.

Touch a curve name to select it then touch **SAVE**.

If multiple channels are selected and they have currently have different curves selected, then all the curves in use are highlighted in yellow as shown below.



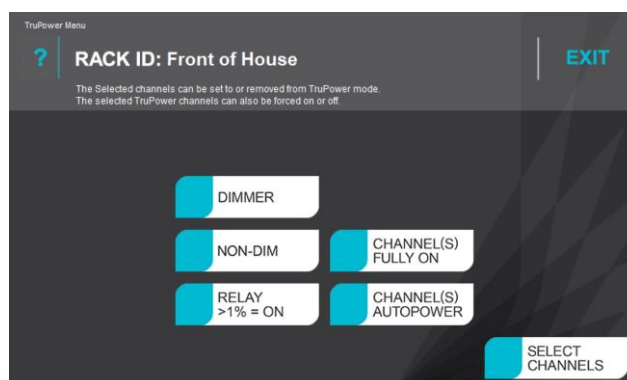
Yellow indicates multiple channels are selected using different Curves

3.10 Operating Mode (TruPower)

Every channel can be independently set to operate as either a dimmer or a switch. The exception is the USM (UNITY Switch Module) which only operates as a switch.

To select the mode, from the “CHANNEL SETUP Menu” touch **OPERATING MODE**.

Note: In earlier software versions the OPERATING MODE button was labelled as TRUPOWER.



OPERATING MODE

If you had previously selected a channel(s) then that selection is still valid. Otherwise touch **CHANNELS** or use the **CHANNEL SELECT** buttons located on the output modules to select the channel(s).

Touch the button for the desired mode as described below:

3.10.1 Dimmer Mode

To set the selected channel to dimmer mode touch **DIMMER** then **SAVE**.

Note: In earlier software versions the DIMMER button was labelled as TRUPOWER OFF.

3.10.2 Switch Modes

When a channel is set to operate as a switch there are 5 options as described below. Touch the required option then touch **SAVE**.

3.10.2.1 NON DIM

NON DIM is used for devices that need to be switched OFF or ON such as LED fixtures, motors or discharge lamps. The switch is controlled by the level of the DMX slot to which it is patched. When the level of the DMX signal rises above 60% the switch turns on. When the level of the DMX signal drops below 40% the switch turns off. This is the most commonly used setting for power switching.

3.10.2.2 RELAY

RELAY is used also for devices that need to be switched OFF or ON. It is similar to “Non Dim” but uses different thresholds for switching. When the level of the DMX signal is 1% or higher the switch turns on. When the level of the DMX signal drops to 0% the switch turns off.

Hint: Relay mode is particularly useful when long fade times are used as the “Relay” channel will switch on at the start of the up fade and switch off at the end of the down fade.

3.10.2.3 CHANNEL(S) ON

CHANNEL(S) ON, the channel is always ON.

Hint: To force a channel OFF, set its input control source to “No Source”. See section 3.6.

3.10.2.4 CHANNEL(S) AUTOPOWER

CHANNEL(S) AUTOPOWER will automatically power up DMX controlled fixtures (LED Pars, moving lights, smoke machines etc) when the lighting console is turned on and outputting DMX and then power them off again 1 to 60 minutes (selectable hold time) after the lighting console is turned off. It is designed to make life easier for operators, whilst ensuring that DMX controlled fixtures are automatically powered off at the end of a show.

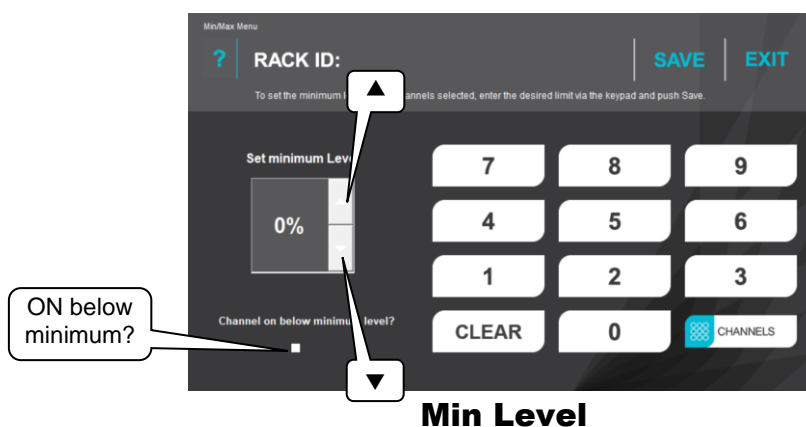
A channel set to “Channel(s) AutoPower” does not listen to any specific DMX slot. Instead it looks for the presence of the source DMX universe (DMX1, DMX2, Art-Net or sACN) according to the input control source for that channel. When it sees a valid DMX signal from this source it turns the channel on.

A “Hold Time” can be set to prevent fixtures being turned off if there is a short interruption to the DMX signal and also to allow for a cool down period for the fixtures. The “AutoPower Timing” menu sets this hold time duration. See section 3.4.

3.10.3 Min Level

“Min Level” sets a low level threshold. If the control signal is below this level, the dimmer will not respond and the output will either remain at this level or be off. See “Channel On Below Minimum Level” below for more information.

To set a minimum level for a channel(s), from the “CHANNEL SETUP Menu” touch **MIN LEVEL**. If you had previously selected a channel(s) then that selection is still valid. Otherwise touch **CHANNELS** or use the **CHANNEL SELECT** buttons located on the output modules to select the channel(s). Set the minimum level by either entering the number on the touchscreen keypad or using the ▲ or ▼ arrows.



3.10.3.1 CHANNEL ON BELOW MINIMUM LEVEL

Future Feature.

3.10.4 Max Level

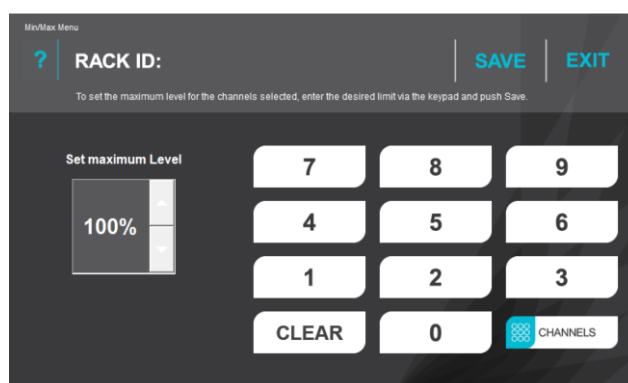
“Max Level” sets the level of the dimmer output when its control signal is set to maximum. For example, setting this value to 90% will extend the life of a lamp as it never operates on full voltage or setting it to 50% provides 115 volt output.

Note: The actual output voltage is dependent upon the dimmer curve. LSC recommends that you measure the output voltage (with a 240 volt load connected) to determine the “Max” level setting you require for a specific maximum voltage. This procedure should only be carried out by suitably qualified personnel.

To set a maximum level for a channel(s), from the “CHANNEL SETUP Menu” touch **MAX LEVEL**. If you had previously selected a channel(s) then that selection is still valid. Otherwise

touch **CHANNELS** or use the **CHANNEL SELECT** buttons located on the output modules to select the channel(s).

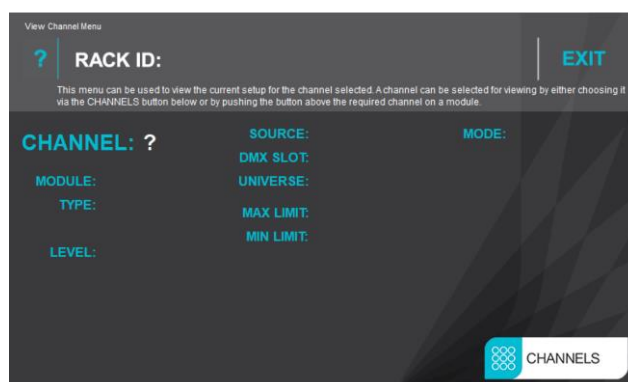
Set the maximum level by either entering the number on the touchscreen keypad or using the ▲ or ▼ arrows.



Max level

3.11 View Channels

The “View Channels” menu can be used to view all of the settings for the channel that you select. From the “Main Menu” touch **VIEW CHANNELS**.



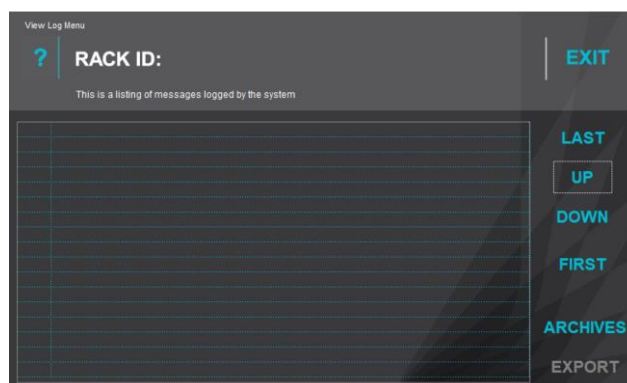
View Channel

To view the current settings for a channel either touch **CHANNELS** to select the channel via the touch screen or you can select a channel by pressing the **CHANNEL SELECT** button located above each channel’s circuit breaker on the front of the output modules.

3.12 View Logs

UNITY automatically recognises condition changes that occur in the system and stores them in a log. You can select the types of condition changes that will generate an entry into the log. See section 3.16.10.

To view the events that have been logged, from the “Main Menu” touch **VIEW LOGS**.

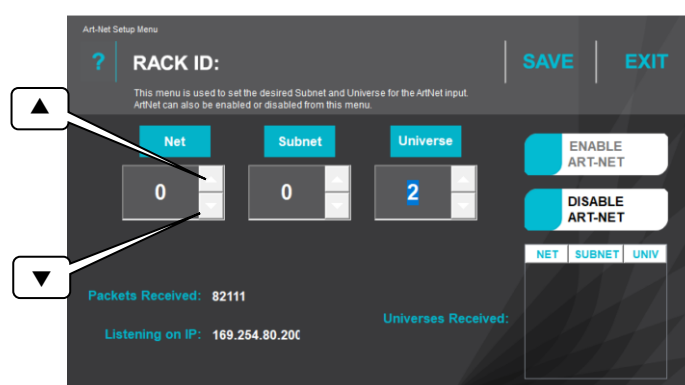


View Log

Log files are automatically archived at midnight every day. To view archived logs, touch **ARCHIVES**.

3.13 Configure Art-Net

ArtNet (designed by and copyright, Artistic Licence Holdings Ltd) is a streaming protocol to transport multiple DMX universes over a single Ethernet cable/network. To enable the ArtNet input, from the “Main Menu” touch **CONFIGURE ART-NET**.



Art-Net Setup

UNITY supports Art-Net v4. There are 128 Nets (0-127) each with 256 Universes divided into 16 Subnets (0-15), each containing 16 Universes (0-15).

Use the up ▲ and down ▼ arrows to set the “Net”, “Subnet” and “Universe” values, then touch **ENABLE ART-NET**, then **SAVE**.

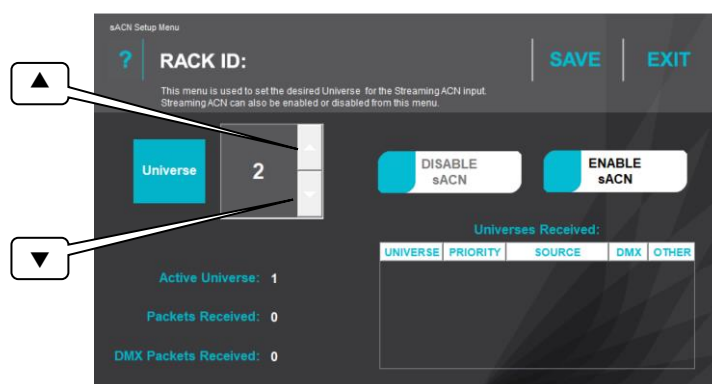
Note: If you are using Art-Net I or Art-Net II, leave the Net setting at 0 (zero) and only use the Subnet and Universe settings.

Any Art-Net universes currently being transmitted on the network will appear in the display in the bottom right corner of the screen. This can be useful when selecting a valid universe

Note. When using Art-Net, UNITY must have a valid IP address and NetMask entered in the “Network Settings” menu in order for Art-Net to work correctly. It is essential that the IP address is set to be compatible with the address on the device sending the Art-Net packets. In UNITY’s network setup menu, when using Art-Net, the option to set the IP address is offered based on the ArtNet recommendations when using a 2.0.0.0. address range. See section 3.16.1

3.14 Configure sACN

Streaming ACN (sACN) is an informal name for the E1.31 streaming protocol to transport multiple DMX universes over a single Ethernet cable/network.
To enable the sACN input, from the “Main Menu” touch **CONFIGURE sACN**.



Configure sACN

Touch the up ▲ or down ▼ buttons to select the universe to which the UNITY rack will respond then touch **ENABLE sACN**, then **SAVE**.

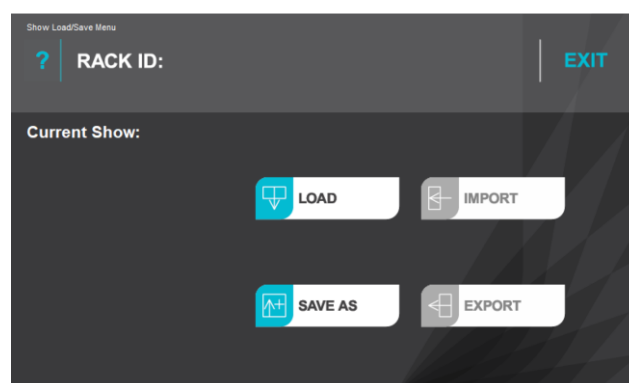
After sACN is enabled, any matching universes on the network will appear in the bottom right window. The information includes the universe number, priority, source IP address, whether the sACN data includes DMX, and ‘other’ information.

sACN uses a priority system. The priority level is set by the sACN transmitting device. If UNITY receives more than one sACN signal on the selected universe it will only respond to the signal with the highest priority setting.

Note: To use sACN, Unity must have a valid IP address and NetMask set in order to work correctly. See section 3.16.1

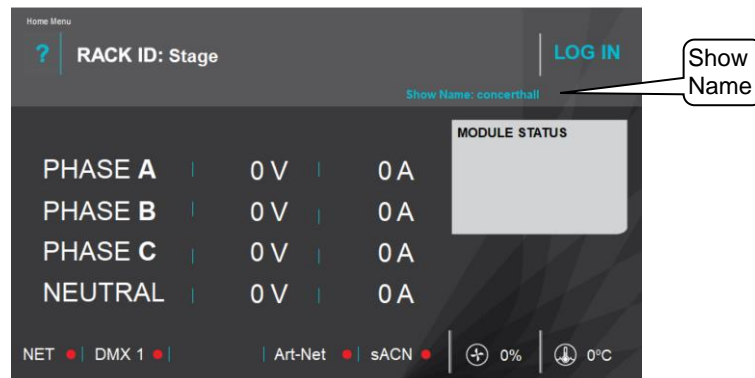
3.15 Load/Save

The user settings of a UNITY rack can be saved and recalled from the internal memory or they can be exported or imported from a USB memory stick. The file is known as a “show” and each show can be individually named using the pop-up on-screen keyboard.
To load or save a show, from the “Main Menu” touch **LOAD/SAVE**.



Load/Save

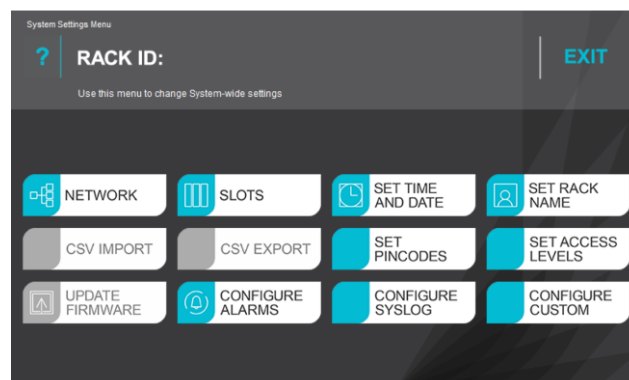
The “IMPORT” and “EXPORT” buttons are only active when a USB memory stick is plugged into the UCM’s USB connector. The USB memory stick must be DOS formatted (FAT32). The name of the current show is shown on the “Home Menu” screen.



Home Menu

3.16 System Setting

From the “Main Menu” touch **SYSTEM SETTINGS**



System Settings

The greyed out buttons become active when a USB memory stick is inserted into the UCM. The System Settings are described in the following sections:

3.16.1 Network

From the “System Settings” menu touch **NETWORK**.



Network Config

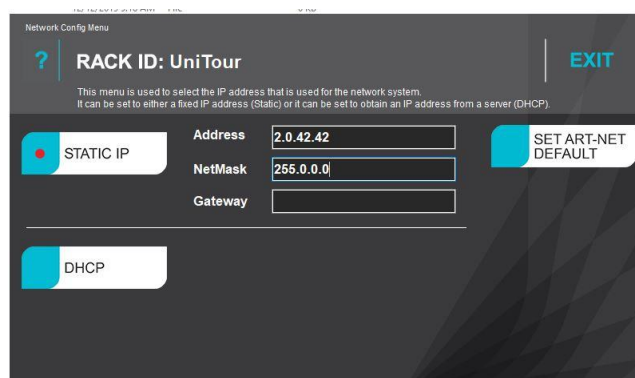
This menu is used to select the IP address that is used for this UNITY rack.

The network address can be automatically assigned by your network using a DHCP server or it can be set manually known as a Static IP.

The setting of IP addresses is dependent on the network being used and the choice of static or DHCP and other network parameters is beyond the scope of this document. Refer to your network specialist for the selections to be entered here.

- To manually enter a network touch **STATIC IP** and enter the Address and NetMask. If you touch either the “Address”, “NetMask” or “Gateway” fields, a pop up keyboard allows entry of the required settings[GP1].
- To have a network address automatically assigned, touch **DHCP**.

If ArtNet is enabled (see section 3.13) then a third option to set the IP address is offered based on the ArtNet recommendations when using a 2.0.0.0. address range. The address is calculated from the unique MAC address of the network interface card.



Network Config (Art-Net Enabled)

Touch **SAVE** to keep your settings and exit.

Note. To use sACN or Art-Net protocols, Unity must have a valid IP address and NetMask set in order to work correctly. When using Art-Net, it is essential that the IP address is set to be compatible with the address on the device sending the Art-Net packets. Streaming ACN utilizes multicasting and as such the actual IP address in use is generally irrelevant.

3.16.2 Slots

The output module slot locations are labelled A to D (UIR48) or A to H (UIR96) from top to bottom of the rack. Any type of output module can be fitted in any location but you can also specify that a particular slot will only accept a particular type of module. If you specify a particular type and a different type is inserted the module will not operate.

Note: The 6 channel module has a factory wired dedicated location that cannot be changed. From the “System Settings” menu touch **SLOTS**.



Set Slots

To specify that only a particular type of module can be fitted to a specific slot touch the button for that slot. For example, touch **SLOT A**. The slot choice menu opens:



Slot Choice

Touch the type of module for that slot then touch **SAVE**.

3.16.3 Set Date and Time

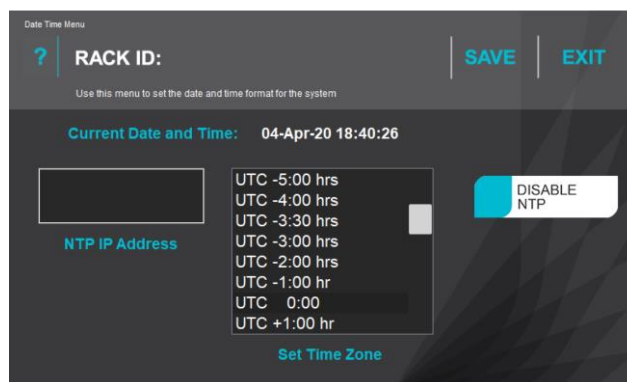
UNITY has an internal clock that is used for various purposes such as logging the date and time of events. The clock can be manually set or it can be automatically set by a network connection. From the “System Settings” menu touch **SET TIME AND DATE**.



Date Time

Touch the up ▲ or down ▼ buttons to set the date and time then touch **SAVE**.

Alternatively, to automatically set the date and time by a network connection touch **ENABLE NTP**. NTP (Network Time Protocol) is a networking protocol for clock synchronization over networks. You can connect UNITY to an NTP server or you can create your own NTP time server and run it on a private network.



NTP Enabled

Touch the box above “NTP IP Address” then use the keyboard that pops up to enter the IP address of the NTP server.

Touch the UTC time zone for your location (scroll the list if necessary) then touch **SAVE** to keep the changes and exit. To discard the changes and retain the original setting touch **EXIT**.

3.16.4 Set Rack Name

Every UNITY rack can be given a name. Names are most useful when multiple UNITY racks are installed. Names might indicate the physical location of the channels, for example, one rack might be named “Studio Theatre” and another “Front of House”.

Names might indicate the DMX addresses. Channel numbers in each rack number from top to bottom of the rack. If more than one rack is installed, each rack has the same channel numbers but each rack has different DMX addresses. Therefore, the rack name can be used to show the DMX address range for that rack.

For example:

Rack 1			Rack 2		
Channels	DMX Slots	Rack Name	Channels	DMX Slots	Rack Name
1-48	1-48	DMX 1-48	1-48	49-96	DMX 49-96

From the “System Settings” menu touch **SET RACK NAME**. Touch inside the name box then use the pop-up keyboard to enter a name.



Rack Name

Touch **SAVE** to keep the changes and exit. To discard the changes and retain the original setting touch **EXIT**.

3.16.5 CSV Import

A CSV (Comma Separated Values) file is a data file that can be edited on a computer spreadsheet program (such as excel) then imported into UNITY where the data in the file will

configure the rack. When configuring a new installation with a large number of racks and channels, it can be easier to edit and import a CSV file than to use the touch screen menus.

CSV “template” files are available from LSC to make the process as simple as possible. The templates have all of the relevant rows and columns applicable to UNITY. Contact LSC for a copy of the templates.

There are two CSV files that are used to configure a Unity system.

The first file is the SystemCSV file. This contains all the rack data that is likely to be common to all the racks in an installation (for example, Passwords, Menu Access Levels).

The second file is the RackCSV file. This contains specific rack and module data that will be unique for each rack in an installation (for example, IP address, channel Input Source, Operating Mode, Patch, Max/Min levels). There are separate files for a 48 and 96 channel racks with the first cell defining the rack size.

Slots can be configured from either CSV file. This allows for it to be defined as “Common” where every rack will be fitted with the same modules, or defined in each “Rack” file where every rack is unique. If both files contain Slot information then the last file loaded will be the values used.

Open the UNITY template CSV file using a spreadsheet program on a computer. Enter your settings into the template then save the file to a USB memory stick. Insert the memory stick containing the CSV file into the UNITY rack then from the “System Settings” menu touch **CSV IMPORT** and follow the on-screen instructions.

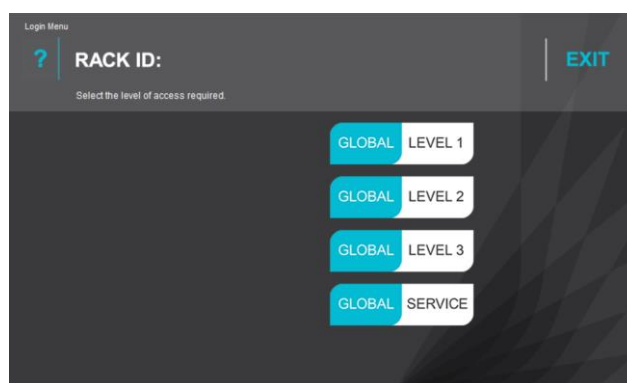
3.16.6 CSV Export

UNITY can export a CSV file that contains the rack configuration data. This data can then be edited on a computer spreadsheet and imported into the same or other racks. The data can also be used for backup. See also “CSV Import” above.

Insert a formatted (DOS FAT32) memory stick into the UNITY rack then from the “System Settings” menu touch **CSV EXPORT** and follow the on-screen instructions.

3.16.7 Set PIN Codes

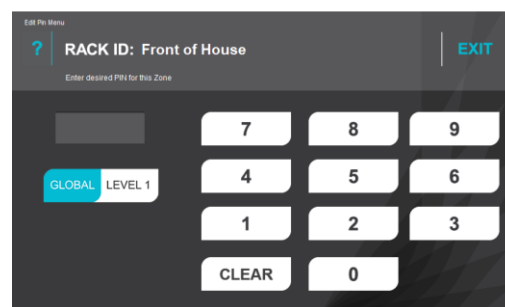
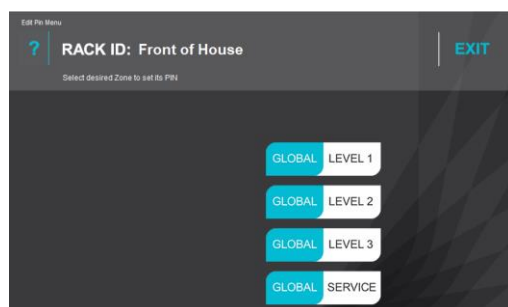
When you **LOG IN** to UNITY there are four access levels available:



Login Menu

UNITY ships with levels 1, 2 and 3 all unlocked. You can protect each level with a PIN code. The “Service” level always requires a PIN (contact LSC) for access.

From the “System Settings” menu touch **SET PINCODES**.



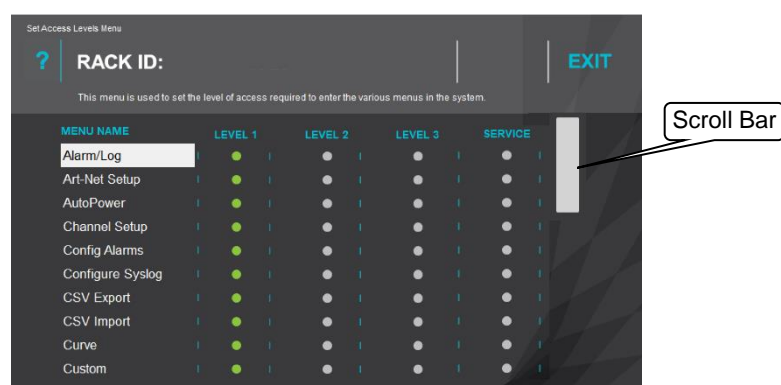
Touch the **LEVEL #** that you want to lock then use the keypad to enter a 4 to 8 digit PIN then touch **SAVE**. Repeat the PIN then touch **SAVE**.

When logging into a locked level, enter the PIN then touch **UNLOCK**.

To remove a PIN from a level, set the PIN to 0000. No PIN is required when set to 0000.

3.16.8 Set Access Levels

When you **LOG IN** to UNITY there are four access levels are available. UNITY ships with levels 1, 2 and 3 all set to the same access. You can set the level of access to menu screens that is allowed in each level. To set the access for a log-in level, From the “System Settings” menu touch **SET ACCESS LEVELS**.

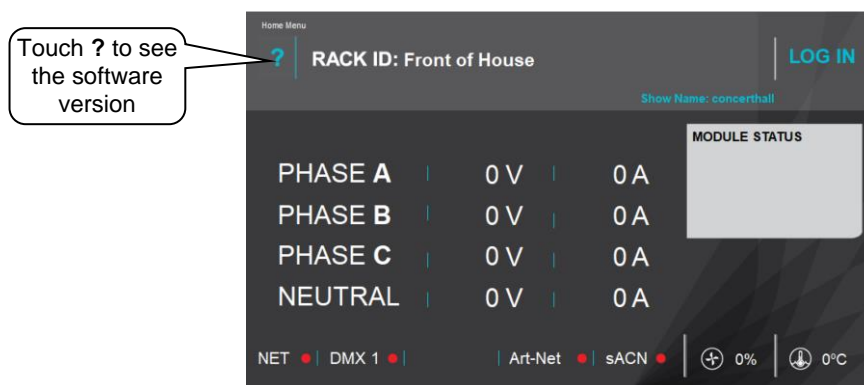


Set Access Levels

A green dot indicates that the menu name is accessible from that level or a higher level. Touch a dot to toggle it to green (access) or grey (no access). Scroll down to see more menu names. Touch **SAVE** to keep the changes and exit. To discard the changes and retain the original setting touch **EXIT**.

3.16.9 Update Firmware

LSC Control Systems has a corporate policy of continuous improvement to its products. The UNITY software (firmware) is subject to this policy as new features are added and existing features improved. The software version of your UNITY can be checked from the Main Menu by touching ? in the top left corner of the “Home Menu”.



Home Menu

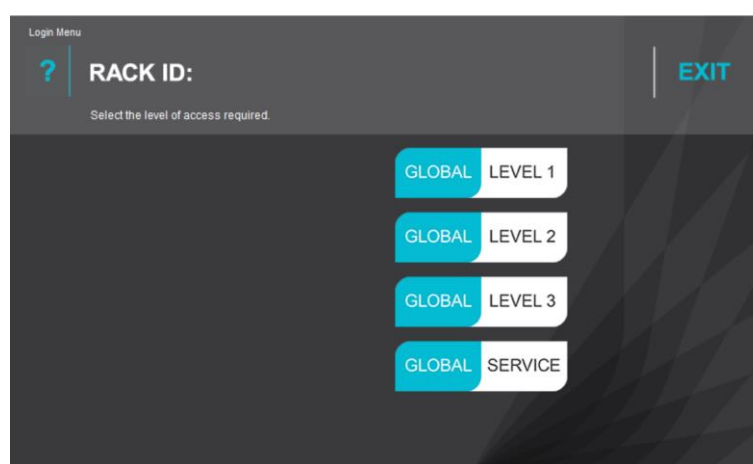
The latest firmware for UNITY can be downloaded from the LSC website.

There are 3 firmware files:

1. UNITY Universal Module Firmware (UXM). The file is named UNITYXM_vnn.upd where 'nn' is the software version number.
2. UNITY Control Module Interface Firmware (NXP). The file is named UNITYCM_vnn.upd where 'nn' is the software version number.
3. UNITY Control Module GUI (UCM). The file is named UNITYPi_vnn.img where 'nn' is the software version number.

On a USB memory stick, create a folder called LSC (in the root directory) and copy all files into the LSC folder. Insert the USB stick into the UNITY Control Module (UCM).

Software upgrades can only be performed from the Global Service log in. If you are already logged into UNITY, exit back to the HOME MENU then touch **GLOBAL SERVICE** to log in.



Login Menu

Enter the PIN code (contact LSC for details) then touch **UNLOCK**.

Touch **SYSTEM SETTINGS** then **UPDATE FIRMWARE**.

The "Firmware Update Menu" screen has a button for each of the output modules that are fitted in the UNITY rack plus buttons for the UCM Interface and the UCM App (GUI) plus a tick button.

The firmware upgrades must be performed in the correct order.

1. UNITY Universal Module Firmware (UXM). This is the firmware for all types of UNITY output modules (ULM, UDM, ULM).
2. UNITY Control Module Interface Firmware (NXP). This is the firmware for the interface microprocessor of the UNITY Control Module.
3. UNITY Control Module GUI (UCM). This is the GUI (Graphical User Interface) software for the UNITY Control Module touchscreen.

3.16.9.1 UNITY UNIVERSAL MODULE FIRMWARE (UXM).

Select the output modules to update by touching their names. LSC recommends that ALL output modules are selected so that they all get updated.

Touch the **Green Tick** button to start the process.

The file is copied from the USB stick, then each module is updated in succession. Any failures will go Red. If any module fails, repeat the process for just that one module.

Once all the modules have updated they will all reboot and install the new firmware. This is shown by the 12 LEDs on the front of each output module incrementing from 1 thru 12 in Green.

3.16.9.2 UNITY CONTROL MODULE INTERFACE FIRMWARE (NXP).

Select **UCM Interface**.

BEFORE installing this firmware please ensure that the output modules (UDM, ULM, USM) have been updated to the latest version as described above. This firmware will not function with output modules running code prior to v1.00

Touch the **Green Tick** button to start the process.

The file is copied from the USB stick, then the interface is updated. Any failures will go Red. If there is a failure, repeat the process.

Once the interface has updated touch the **Green Tick** button to reboot the interface.

The Status LED will flash Red, Green, Blue whilst the interface is being reprogrammed.

3.16.9.3 UNITY CONTROL MODULE GUI (UCM).

Select **UCM App**.

BEFORE installing this firmware please ensure that the output modules (UDM, ULM, USM) AND that the UNITY Control Module (UCM) interface have all been updated to the latest version. This firmware will not function with modules running code prior to v1.00.

Touch the Green Tick button to start the process.

The file is copied from the USB stick, then the GUI software is updated. Any failures will go Red.

This update will take considerable time and the % complete bar will go to 100% and stay there for a minute or two. Do not touch any buttons until the % indicator turns green or red. Please be patient.

If there is a failure, repeat the process.

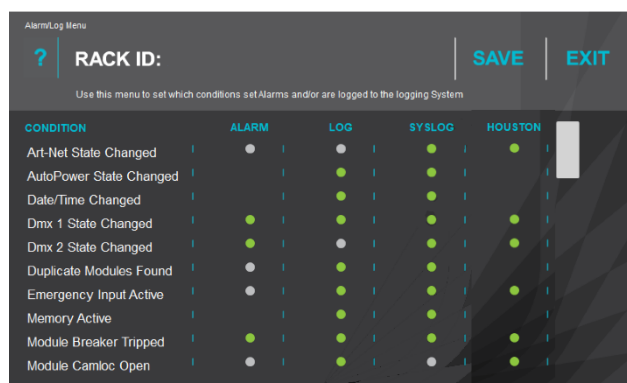
Once the software has updated touch the Green Tick button to reboot the interface.

The Status LED will turn yellow and the touchscreen will blackout. The UCM will automatically reboot, showing the splash screen when it restarts.

3.16.10 Configure Alarms

The "Configure Alarms" menu lists all of the "conditions" that UNITY continuously monitors and allows you to select which conditions will trigger an ALARM or generate an entry into the UNITY LOG or send a message to SYSLOG or HOUSTON X when a change in condition is detected.

From the "System Settings" menu touch **CONFIGURE ALARMS**.



Alarm Log

The left-hand column lists the “Conditions” that UNITY monitors. Scroll down to see more conditions.

- A green dot indicates that a condition change message will be sent.
- A grey dot indicates that a condition change is ignored.

Touch a dot to toggle it to green or grey.

ALARM. If the selected condition changes, the “STATUS” LED on the UCM lights red and a Red Alarm button appears on the touch screen. See section 3.2

LOG. If the selected condition changes, UNITY generates an entry into the Log file. The log can be viewed on the UCM or exported to USB as a CSV file for viewing on a computer spreadsheet. See section 3.12.

SYSLOG. If the selected condition changes, UNITY sends a condition change messages to a third party Syslog server via the Syslog protocol. See section 3.16.11.

HOUSTON X. If the selected condition changes, UNITY sends a condition change message to LSC’s HOUSTON X monitoring software via the ethernet connection. See section 1.1.

Note: Depending on how your system is configured, the HOUSTON or SYSLOG columns might not be shown.

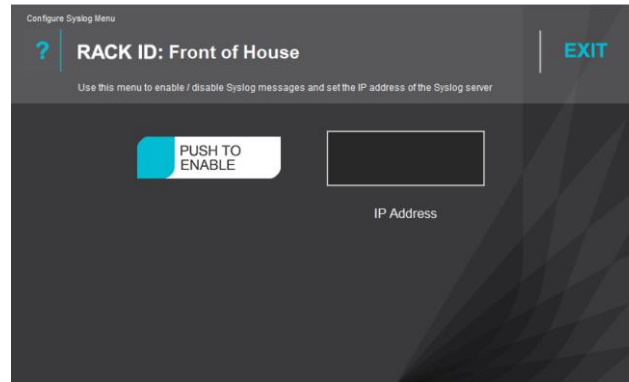
Touch **SAVE** to keep the changes and exit. To discard the changes and retain the original setting touch **EXIT**.

3.16.11 Configure Syslog

SYSLOG is a standard for message logging. It allows separation of the software that generates messages, the system that stores them and the software that reports and analyses the data. This allows a single computer to monitor any number of UNITY racks on a network and store their log messages and act on them if desired.

The “Configure Syslog” menu allows you to either enable or disable Syslog messages and also set the IP address of the Syslog server.

From the “System Settings” menu touch **CONFIGURE SYSLOG**.



Configure Syslog

Touch the box above “IP Address” then use the keyboard that pops up to enter the IP address of the Syslog server. To enable Syslog touch **PUSH TO ENABLE** then **SAVE**.

3.16.12 Configure Custom

LSC can customise UNITY by adding custom features for specific applications or venues. Contact LSC or refer to your venue specific documentation for details.

4 HOUSTON X

HOUSTON X is a LSC's monitoring and remote configuration software tool that works with LSC's professional product range. HOUSTON X connects to UNITY over ethernet, using the same connector as sACN and Art-Net.

HOUSTON X monitors the state of every connected LSC product. All status indicators from each product are replicated in HOUSTON X. Any alarms, such as loss of DMX are reported in a single unified list with the date and time of the occurrence. If an alarm occurs the ALARM indicator appears in red. Alarms can be marked as "acknowledged" whilst the problem is being resolved, changing the indicator to yellow. Any new alarms will change the indicator to flashing red again. Once all alarms are cleared, the indicator disappears.

HOUSTON X can also control every compatible connected LSC product (GEN VI, APS, MDRD, LED-CV4, UNITY, UNITOUR). Set a DMX address, set a channel to dimmer or Switch (TruPower), check the temperature, test a channel (rigger's control), find DMX cabling faults etc.

For example, you could recall the standard house patch after a custom show with a few mouse clicks on a computer located in an office (rather than visiting the dimmer room), recall the matinee settings in a matter of minutes and then change back to rehearsal mode or standard rig when required. TV stations can create a custom patch and configuration for a new show on a PC and then push this configuration to the system. Swapping shows is as simple as loading the config file and pushing a button. The entire system is updated from one location.

Contact LSC or your local LSC agent for more details on HOUSTON X.

HOUSTON X runs on Windows and Mac computers.

5 Phasing

In 3 phase power systems it is desirable that the output loads are distributed as evenly as is practical between the 3 input phases.

The outputs of each UNITY output module are fed from the following input phases:

Output Channel	Input Phase
1	1
2	2
3	3
4	1
5	2
6	3
7	1
8	2
9	3
10	1
11	2
12	3

6 Compliance Statements

6.1 RCM Compliance

The UNITY Modular Power System from LSC Control Systems complies with the Regulatory Compliance Mark (RCM).

6.2 CE Compliance Statement

The UNITY Modular Power System from LSC Control Systems has been designed and tested to the European Committee for Electrotechnical Standardization (CENELEC) standard–EN55022 (Information Technology Equipment).

6.3 C Tick Compliance Statement

All LSC products with CE Compliance automatically comply with C-Tick requirements as per Section 182 of the Radio-communications Act 1992. LSC Company Registration number is N921.

End