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N21 Installation and Operation Manual

N21 Manual Part Number:	2-450203-010
Revision Level:	1.1.2
Revision Date:	25-July-2008
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3 YEAR LIMITED WARRANTY

Strand lighting warrants that this product will be free from defects in workmanship for materials. This warranty is void on any electronic controls which have been overloaded, abused, improperly installed or altered in any manner.

Strand Lighting's sole obligation will be at its option to repair or replace any electronics controls pro9duct proven defective if it is returned, postage prepaid, to Strand Lighting, 6603 Darin Way, Cypress, CA 90630, USA. Strand Lighting will not pay for any charge-back or charge for labor or material that does not have its prior written approval.

This warranty shall be in lieu of any other warranty, express or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. Some states do not allow limitations on how long an implied warranty lasts and do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

Prefix

Thank you for choosing Strand Lighting and the N21 Series Node. We trust that the equipment will meet all your dimming needs and will provide you with reliable service for many years.

Strand Lighting can assure you that every effort has been made to ensure that the equipment has been designed to meet the highest professional standards and that dimmer racks and their components have been assembled, inspected, and tested in accordance with our strict quality assurance program.

Should you encounter any problems or difficulties with your N21 series node, please contact the nearest Strand Lighting service representative. For a complete list of Strand Lighting offices and service centers visit our Web site at (**www.strandlighting.com**).

This manual describes the installation and operation of the N21 range of Ethernet DMX Nodes.

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Chapter 1 - General Information

N21 Node Models

The N21 Dual and four Port Ethernet DMX Nodes provide compact and cost effective networking solutions for lighting facilities of any size.

Based on a 32-Bit ARM processor, all N21 nodes utilize the Linux operating system for stable 10/100 BaseT operation. Nodes may be configured with any PC or Strand Lighting Wireless Focus Remote utilizing the FireFox™ web browser.

The N21 Network Node is available in five different configurations. The catalog numbers are as follows:

65151 - N21 Two-Port Node, Power over Ethernet, 2-gang (does not include back box: use RACO 696 or equivalent).

65152 – N21 Two-Port Node, Power over Ethernet, SN110 retrofit. (For use with surface mount recess mount nodes only)

65153 – N21 Two-Port Node, Power over Ethernet, with surface-mount back box supplied by Strand Lighting.

65153-P – N21 Two-port Node, Power over Ethernet, portable mount back box with C-Clamp/U-Bolt hardware.

65154 – N21 Four-port Node, 1U rack mount enclosure with universal AC adapter.

The 65151 can be powered from either an external +24 to +48VDC power supply or from a PoE compatible Ethernet Switch or midspan/endspan PoE injector using IEEE P802.3af-2003 power (PoE, or Power over Ethernet).

Safety Warnings

Avoid spillage from liquids. If this occurs switch power off immediately

Protect from excessive dust or other contaminants
For indoor use only

The equipment is designed and manufactured to comply with international safety standards IE950, UL1950 and CS 950 and is intended for use as part of a lighting control system. It must not be used for any other purpose where there is a risk of safety to persons. The equipment contains power voltages.

There are no serviceable parts within the N21 Node housing

Installation of the N21 Node should be undertaken by a suitably qualified person

Electrical Specifications

N21 Node Models #65151, #65153 and #65153-P

Input Voltage	+48vdc supplied as Power over Ethernet (PoE)
Input Voltage	Alternative +24vdc – 48vdc local power supply via connector J2. Pin 1 is V+, Pin 2 is Common.
Input Current	At +48vdc nominal, 45mA (with backlight at full) At +24vdc nominal, 90mA (with backlight at full)

N21 Node Model #65152

Input Voltage	+24vdc supplied from the dimmer rack power supply.
Input Current	At +24vdc nominal, 90mA (with backlight at full)

N21 Node Model #65154

Input Voltage	+5vdc supplied from an external power supply mounted in the auxiliary rack.
Input Current	At +5vdc nominal, 350mA typical; 500mA maximum (with backlight at full)

Chapter 2 - Installation

Fitting the 65151/65153 Back Boxes

The 65151 N21 Node includes the faceplate and electronics only and is suitable for flush wall mounting. The back box (RACO 696 equivalent) is supplied by others.

The 65153 N21 Node is housed within a metal back box supplied by Strand Lighting and is suitable for surface wall mounting.

Both models are intended for permanent installations using earthed conduit to carry the network cable. The unit should not be operated without the earthed metal conduit as it may fail EMC compliance.

Flush Mounting (Model 65151)

1. Prepare the wall by cutting an appropriate sized hole for the back box (RACO 696 or equivalent).
2. Determine the most suitable position for cable entry and drill a hole in the back box for cable entry. Ensure that the hole allows cables to enter the box without fouling any components within the box when the node electronics are installed.
3. Insert the back box in the wall and secure the conduit to the back box.
4. Leave the cables in the back box ready for connection.

Surface Mounting (Model 65153)

1. Remove the four (4) screws from the front panel and lift the front plate upwards and away from the back box. (Keep the screws safe for later use).
2. Determine the most suitable position for the cable entry and drill a hole in the back box for cable entry. Ensure that the hole allows cables to enter the box without fouling any components within the box when the node electronics are installed.
3. Ensure that the back box is level by placing a spirit level on top of the box and mark the four mounting holes.
4. Drill four (4) holes in the wall and secure the back box to the wall using screws and suitable hardware.
5. Secure the conduit to the back box and leave the cables in the back box ready for connection.

5-Pin XLR Gender Changer

The N21 Node has two ports which use a female 5-pin XLR connector standard for DMX-Out. When a node port is configured for DMX-In, a gender-changer is required to convert the port from female to male.

Setting up Networking on a Windows™ PC

In order to set up networking on your PC, you must have a Network Interface Card and TCP/IP Protocol installed.

From the **Start menu**, select **Control Panel**.
Select the **Network Connections**.
Right-click on the **Network Adaptor** and select **Properties**.
Highlight **Internet Protocol** (TCP/IP) and select **Properties**.
If an IP Address and Netmask is already configured, note the settings.
If no IP Address and Netmask is specified, select **Use the following IP Address** and enter the IP Address192.168.0.150 and Subnet Mask 255.255.255.0 and Click **OK**.

Chapter 3 - N21 Node Configuration

Pre-Configuring the N21 Network Node

N21 network nodes are configured at the factory with common default values. It is therefore necessary to change the network configuration for each node before it is installed onto the network. It is logical that the configuration of the DMX ports and the LCD setting should be done at the same time and each N21 Node labeled with its IP Address ready for installation in the appropriate back box, auxiliary rack or dimmer rack.

The default Network Configuration of all N21 Nodes is as follows:

Node Name: N21_71

IP Address: 192.168.0.71

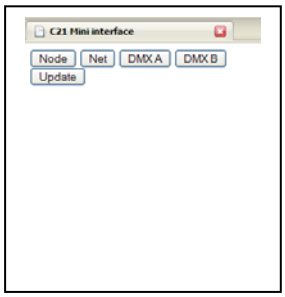
IP Netmask: 255.255.255.0

IP Gateway: 0.0.0.0

Select the Network configuration page as follows:
With the N21 Node powered and connected to a network, open the browser window and enter the default IP Address of the N21 Node (http://192.168.0.71) to display the configuration pages shown below using the 'mini' browser (see chapter 5 for an example of a standard web page).
Note: N21 nodes can only be configured using a FireFox web browser. You may download this software at http://www.mozilla.com/en-US/firefox/

Configuring the N21 Network Node

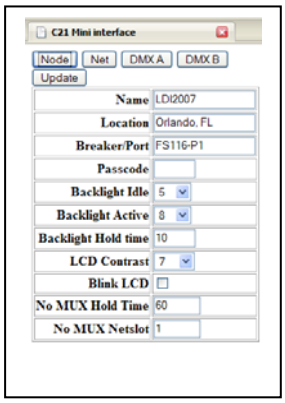
The N21 Node can be configured as follows:
These examples are using the http://192.168.0.xxx/mini/ webpage to configure the node. An example of a full web page screen can be seen in chapter 5 below.



Node Button: Accesses information specific to the node
Net Button: Access information specific to the network
DMX A Button: Accesses information specific to DMX A
DMX B Button: Accesses information specific to DMX B
Update Button: Updates the node with current configuration

Node Button

When pressed, the following options are available:



Name: A unique identifier character string of up to 16 characters. This can be any name used to identify the node on the network.

Location: A unique identifier character string of up to 16 characters. This can be any name used to identify the location of the facility or PoE port connected to the Node.

Breaker/Port: A unique identifier character string of up to 16 characters. This can be any name used to identify the power breaker

Passcode: Enter the default passcode (**2606**) to unlock all of the screens. If the passcode is not entered here, all of the fields can be modified but the N21 Node cannot be updated until a password is entered. If the password has not been entered and the **UPDATE** button is pressed, a window will be displayed and the password can be entered at that time.
Note: The password must be entered on the standard web page to be <u>Authorized</u> to make changes. This is located at HOME/AUTHORIZE (see chapter 5 below).

Backlight Idle: Adjusts the low backlight level. The range is between 0 and 10. Levels set below 3 are likely to be invisible.

Backlight Active: Adjusts the high backlight level. The range is between 3 and 10. The high level is used when the LCD keys have been pressed.

Backlight Hold Time: Adjusts the time (in seconds) that the display should hold the high backlight level after a keystroke. The range is between 10 and 600 seconds. This also sets the menu timeout.

LCD Contrast: Adjusts the contrast of the LCD screen. The range is -10 to +10. Set this to 0 unless there is a good reason to change it. The extreme limit values may result in a display that is difficult to read.

Blink LCD: Selecting this option will cause the LCD screen to blink.

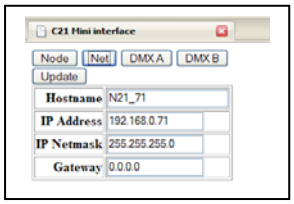
No Mux Hold Time: This option allows you to select the Hold Time should DMX be interrupted. The Hold Time will 'freeze' the current look on stage until the time runs out, at which time the lights will fade to black. The minimum Hold Time is 10 Minutes. The Maximum Hold Time is Infinite.

No MUX Netslot: The Netslot is used to monitor the loss of DMX

Having set up the '**NODE**' options, press '**UPDATE**' to update the Node configuration.

Net Button

When pressed, the following options are available:



Hostname: A unique identifier character string of up to 20 characters. This can be any name used to identify the Host Name on the network.

IP Address: A unique identifier on a network using the TCP/IP protocol to route data to a particular node within the network. The format of an IP Address is a 32-bit numeric address comprising four numbers separated by periods. Each number can be 0 to 255. The first three sets of numbers on a Class C network indentify the network and the last set of numbers identifies the node. Default IP Address is: 192.168.0.71.
Note: If the IP address on the node is changed, the new IP address will need to be entered on the browser to load the new address.

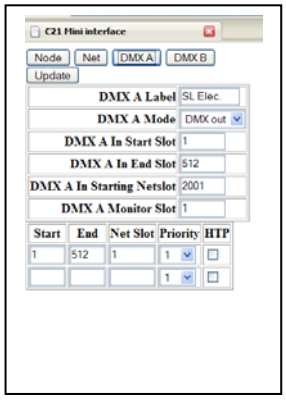
IP Netmask: This is used only in large networks comprising sub-networks. Refer to your system network administrator. Default Netmask is: 255.255.255.0

Gateway: This is used only in large networks that require routing between sub-networks. Refer to your system network administrator.
Default Gateway is: 0.0.0.0

Having set up the '**NET**' options, press '**UPDATE**' to update the Node configuration.

DMX A Button

When pressed, the following options are available:



DMX A Label: This field contains a character string of up to eight (8) characters used to identify the function of the DMX Port.

DMX A Mode: **Off:** Turns port OFF
DMX out: Sets Port for DMX output
DMX in: Sets port for DMX input
SVN: Sets port for Strand Vision-Net Protocol
SMX: Sets port for Strand Report-Net/Outlook/SWC

DMX A In Start Slot: Net Slot range start number for DMX A Input

DMX A In End Slot: Net Slot range end number for DMX A Input

DMX A In Starting Net Slot: Start number of the Net Slot for DMX A Input

DMX A Monitor Slot: This field determines which of the 512 slots from the DMX port are displayed on the status bar graph at

the sides of the LCD screen. Any slots between 1 and 512 can be entered.

Start, End and Net Slot Fields: These fields allow you to enter a range of DMX outputs to be patched to a range of Netslots for each DMX port. Initially, the window permits two ranges of DMX output slots to be entered. However, when the second range is entered and the UPDATE button is pressed, another blank row is added, permitting another range of outputs to be entered for another Netslot range. This will continue until all ranges of outputs have been entered.

DMX A Out End Slot: Enter the start number of the DMX range

DMX A Out Net Slot Start: Enter the end number of the DMX range

Netslot: Enter the Netslot start number

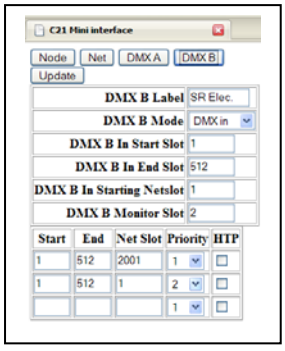
Priority: Each Netslot can be set as one (1) of sixteen (16) priority levels or none by selecting from the drop-down menu.

HTP: Each Netslot can be set to take preference when highest by selecting HTP from the drop-down menu.

Having set up the '**DMX A**' options, press '**UPDATE**' to update the Node configuration.

DMX B Button

When pressed, the following options are available:



DMX B Label: This field contains a character string of up to eight (8) characters used to identify the function of the DMX Port.

DMX B Mode: **Off:** Turns port OFF
DMX out: Sets Port for DMX output
DMX in: Sets port for DMX input
SVN: Sets port for Strand Vision-Net Protocol
SMX: Sets port for Strand Report-Net/Outlook/SWC

DMX B In Start Slot: Net Slot range start number for DMX B Input

DMX B In End Slot: Net Slot range end number for DMX B Input

DMX B In Starting Net Slot: Start number of the Net Slot for DMX B Input

DMX B Monitor Slot: This field determines which of the 512 slots from the DMX port are displayed on the status bar graph at

	the sides of the LCD screen. Any slots between 1 and 512 can be entered.
Start, End and Net Slot Fields:	These fields allow you to enter a range of DMX outputs to be patched to a range of Netslots for each DMX port. Initially, the window permits two ranges of DMX output slots to be entered. However, when the second range is entered and the UPDATE button is pressed, another blank row is added, permitting another range of outputs to be entered for another Netslot range. This will continue until all ranges of outputs have been entered.
DMX B Out End Slot:	Enter the start number of the DMX range
DMX B Out NetSlot Start:	Enter the end number of the DMX range
Netslot:	Enter the Netslot start number
Priority:	Each Netslot can be set as one (1) of sixteen (16) priority levels or none by selecting from the drop-down menu.
HTP:	Each Netslot can be set to take preference when highest by selecting HTP from the drop-down menu.

Having set up the '**DMX B'** options, press '**UPDATE**' to update the Node configuration.

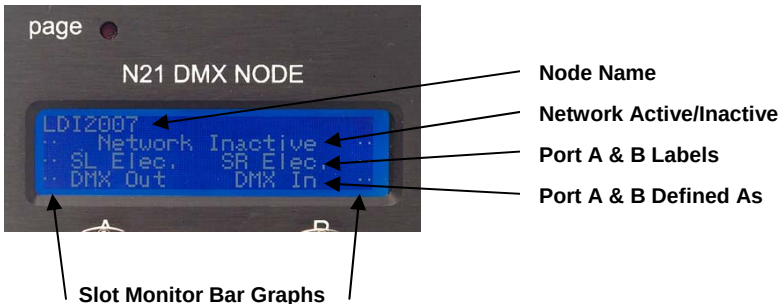
Chapter 4 - N21 Node Screens

The following section reviews the N21 Node screens.

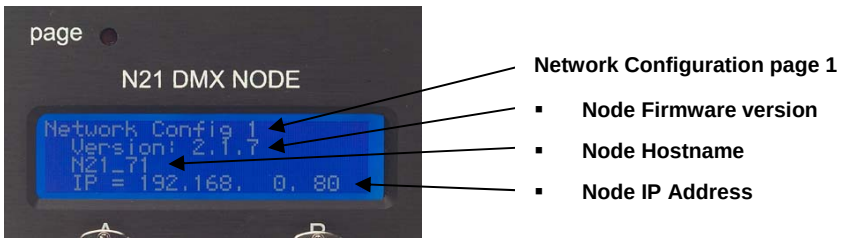
N21 – Boot Screen

During the boot-up process, the LCD screen display shows the Strand Lighting logo. Press the page button to scroll through the eight available screens.

N21 – Main Screen



N21 – Network Configuration Screen 1

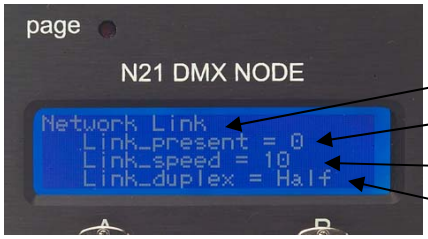


N21 – Network Configuration Screen 2

Network Configuration page 2

- **Node Netmask**
- **Node Gateway**
- **Node MAC Address**

N21 – Network Link Screen



Network Link Page

- **Link Present = Yes/No (0 or 1)**
- **Link Speed = 10BaseT or 100BaseT**
- **Link Duplex = Half or Full**

N21 – Node Status Screen 1

Node Status Page 1

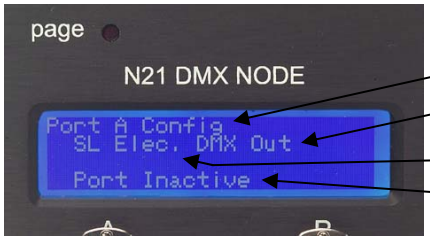
- **Node Temperature (Fahrenheit or Celsius)**
- **Node Date**
- **Node Up-Time**

N21 – Node Status Screen 2

Node Status Page 2

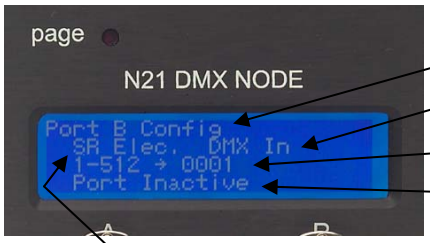
- **Available Memory**
- **Available Flash RAM**

N21 – Port A Configuration Screen



- **Port A Configuration**
- **Port Set as DMX-In/DMX-Out/ SVN/SMX/Off**
- **Port Label**
- **Port Active/Inactive**

N21 – Port B Configuration Screen



- **Port B Configuration**
- **Port Set as DMX-In/DMX-Out/ SVN/SMX/Off**
- **NetSlot range and start number**
- **Port Active/Inactive**
- **Port Label**

N21 – Screen Icons

The N21 Node has three (5) icons which are present in the upper right corner. They are:

Status Link

- This will be present when the N21 Node has linked with the Ethernet port on the switch.

Link Speed

- 10Mbps will show a white '**S**' on a blue background.
- 100Mbps will show a blue '**S**' on a white background.

Link Duplex

- Half duplex will show a white '**F**' on a blue background.
- Full duplex will show a blue '**F**' on a white background.

Down Arrow

- Indicates DMX output traffic. This icon is shown for either or both DMX ports when the port is actively transmitting DMX512 data.

Up Arrow

- Indicates DMX input traffic. This icon is shown for either or both DMX ports when the port is actively receiving DMX512 data.

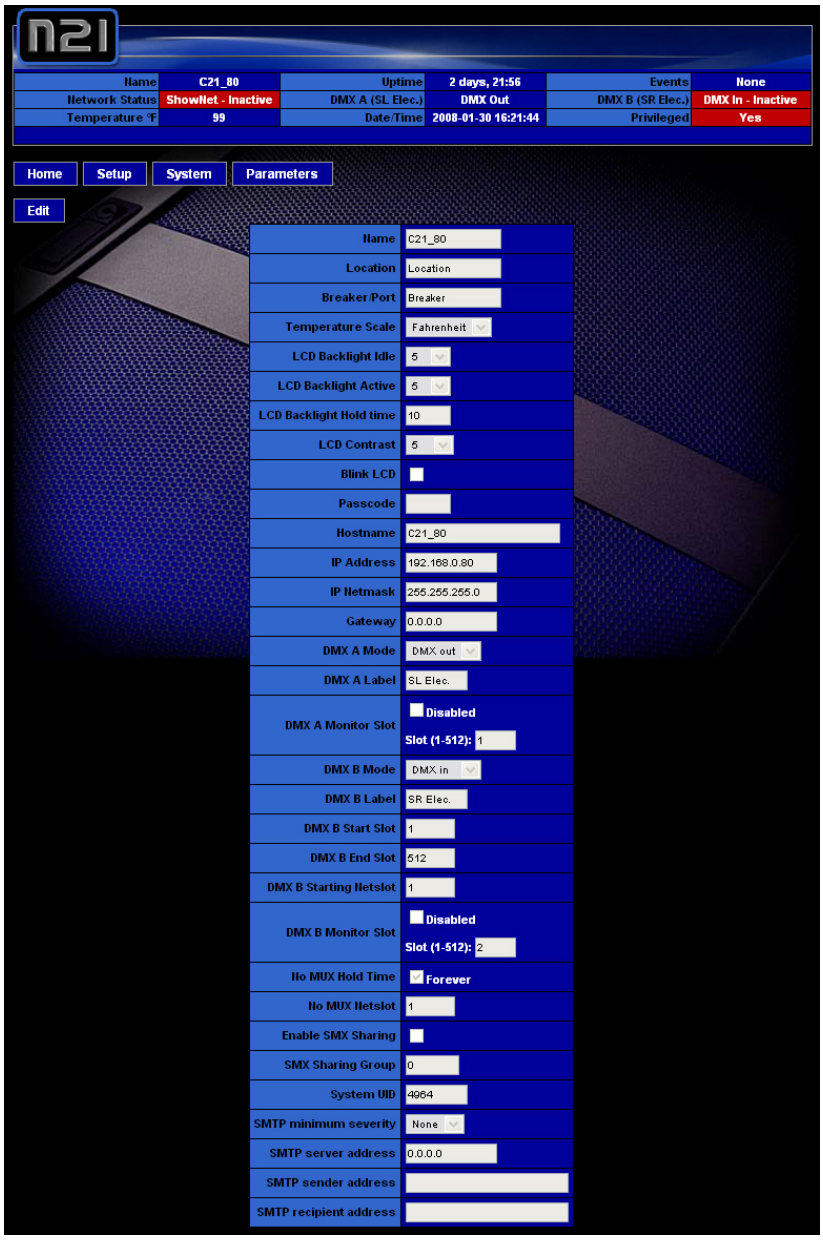
Chapter 5 - N21 Node Web Page Example

Example of the Node Parameter Screen:

Below is an example of an N21 Node web page. The web pages are accessed when the IP address for the node is entered: (Example: HTTP://192.168.0.71).

Once the Node has been accessed, all of the web pages can be browsed and configured. The web page example below is located under the HOME/SETUP/SYSTEM/PARAMETERS, and provides a single screen to set the majority of the options of the N21 Node.

Note: Without entering the Authorization Password, the web pages will only provide preview information and cannot be changed. When the password **(2606)** is entered under HOME/AUTHORIZE button, the upper screen will highlight in red that you are **Privileged** and allow you to edit the fields.



N21 Node Quick Installation Guide

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The N21 Node has two ports which use a female 5-pin XLR connector standard for DMX-Out. When a node port is configured for DMX-In, a gender-changer is required to convert the port from female to male.

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Input Current	At +48vdc nominal, 45mA (with backlight at full) At +24vdc nominal, 90mA (with backlight at full)

N21 Node Model #65152

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Input Current	At +24vdc nominal, 90mA (with backlight at full)

N21 Node Model #65154

Input Voltage	+5vdc supplied from an external power supply mounted in the auxiliary rack.
Input Current	At +5vdc nominal, 350mA typical; 500mA maximum (with backlight at full)

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Surface Mounting (Model 65153)

1. Remove the four (4) screws from the front panel and lift the front plate upwards and away from the back box. (Keep the screws safe for later use).
2. Determine the most suitable position for the cable entry and drill a hole in the back box for cable entry. Ensure that the hole allows cables to enter the box without fouling any components within the box when the node electronics are installed.
3. Ensure that the back box is level by placing a spirit level on top of the box and mark the four mounting holes.
4. Drill four (4) holes in the wall and secure the back box to the wall using screws and suitable hardware.
5. Secure the conduit to the back box and leave the cables in the back box ready for connection.

PHILIPS

sense and simplicity