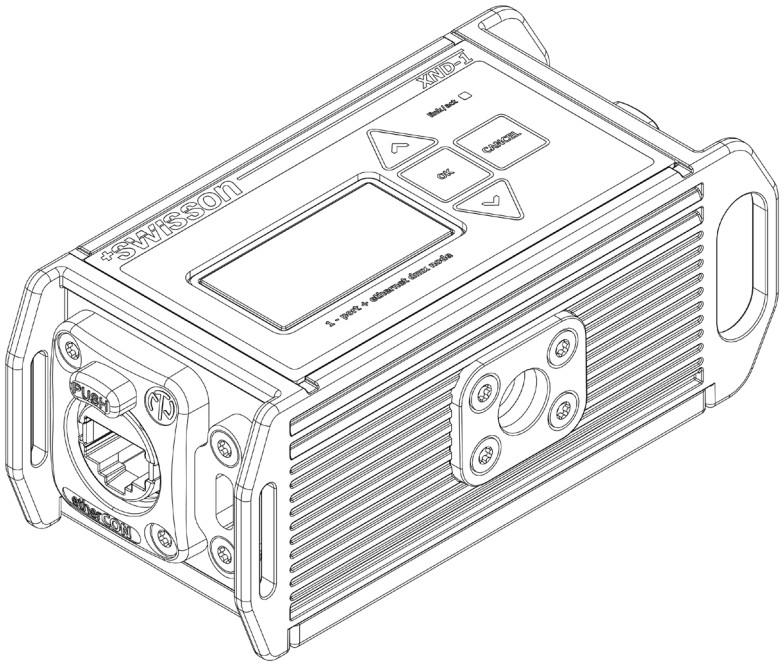
XND-1
1-Port Ethernet DMX Node
User Manual



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Introduction

The XND-1 is a user-friendly Art-Net and sACN to DMX converter that supports the distribution of one DMX universe via a single DMX port. This port can be configured as an input or output.

With a Y-cable the XND-1 is capable of distributing two DMX universes through a single DMX connector, with each port configurable independently as input or output.

Since most major lighting consoles can transmit Art-Net data, the XND-1 is all you need to leverage your console's networking capabilities. Enabling the transmission of two of universes over a single network cable. In many cases, users can also benefit from existing network infrastructure.

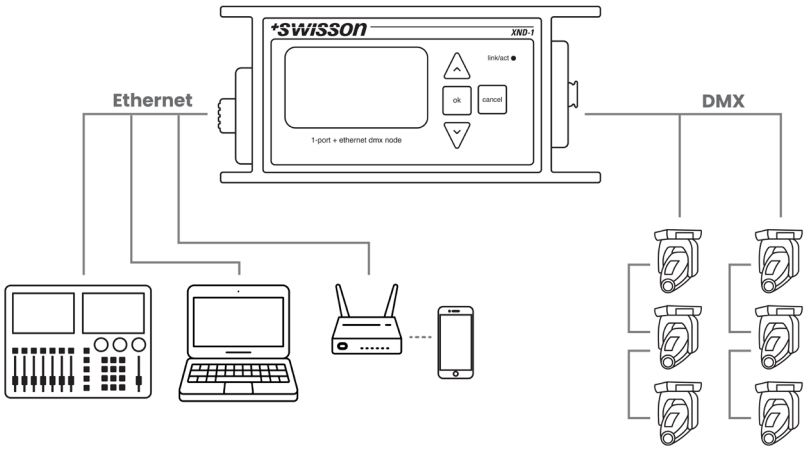
Furthermore, the XND-1 is also perfectly suited to send DMX data to your fixtures from a computer or even from a mobile device. Many light controller programs for PC or Mac support Art-Net output natively and with the help of XND-1's DHCP capability, you can even let your workplace network infrastructure do the network configuration of your XND-1 automatically for you.

With its 128x64 pixels OLED display however, configuring the network and setting up your Art-Net or sACN preferences manually is no trouble at all and helpful status information is always at hand.

Applications

- Concert lighting
- Live events
- Multimedia shows
- Theaters
- TV studios
- Theme parks
- Architectural lighting

Typical Application



Safety Information

It is essential that you read and understand this manual before operating the device and that you follow the instructions given below closely when you set up, connect and use the XND-1. Do not use the device in any way or for any purpose not described in this user manual.

This product is approved for professional use only; it is not intended for household usage. Pay attention to all warnings given in this manual and use this device only in accordance with applicable laws and regulations.

Safety Precautions

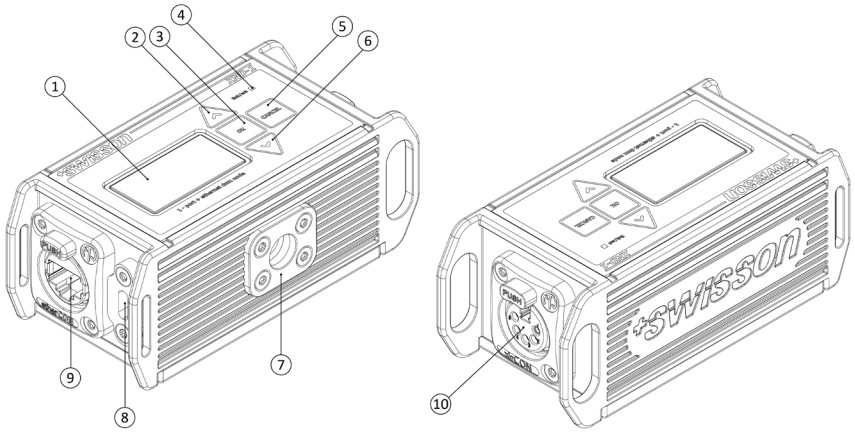
- **Disconnect the device from the power supply before removing any cover or part, including fuses, even when not in use.**
- **Ensure that the device is electrically connected to ground (earth).**
- **Use only a source of power supply that complies with local building and electrical regulations and which has both overload and ground-fault (earth fault) protection.**
- **Before using the device, check that the power distribution equipment and cables are in perfect condition and rated for the current required by all connected devices.**
- **Isolate the device from power supply immediately if the power cable or the power plugs are in any way damaged, defective or wet, or if they show signs of overheating.**
- **Do not operate the device if any cover or component is missing, damaged or deformed.**
- **Refer any service operation not described in this manual to Swisson.**
- **Provide unrestricted airflow around the device.**
- **Do not operate the device if the ambient temperature exceeds 50°C (122°F).**
- **Do not modify the device in any way not described in this manual or install other than genuine Swisson parts.**
- **Do not attempt to bypass any fuse. Replace any defective fuse with one of the specified type and rating only.**
- **When suspending the device, ensure that the supporting structure and all hardware used can hold at least 10 times the weight of all devices suspended together.**
- **When suspending the device, install a secondary attachment such as a safety cable that is approved by an official body such as, e.g. TÜV (German Technical Monitoring Association), a safety attachment for the total weight it secures. The safety cable must comply with EN 60598-2-17 section 17.6.6 and be capable of bearing a static suspended load 10 times the weight of the device.**
- **Make sure that any external cover and rigging hardware is securely fastened.**
- **Provide an adequate clearance underneath the work area and a stable platform whenever installing, servicing, or moving an overhead device.**

- **Do not use the device in areas where it is exposed to direct sunlight.**
- **Do not use the device in areas that are “highly inflammable”.**

Maintenance and Handling

- **The device is designed for temporary outdoor use**
- **Do not use the device for permanent outdoor installations**
- **Inspect connectors and protective covers regularly to ensure proper IP65 protection**
- **Lubricate seals with silicone or grease regularly**
- **Operation in corrosive environments accelerates product degradation**
- **Do not immerse the device**
- **Do not leave the device exposed to severe weather conditions (heavy rain, snow, ice)**
- **Do not store the device in wet or damp conditions**

Device Overview



1. OLED display
2. [UP] button
3. [OK] button
4. Link Status LED
5. [CANCEL] button
6. [DOWN] button
7. M10 mounting point
8. USB port
9. Ethernet port
10. DMX/RDM port

Power Supply

The XND-1 can be powered using one of the following sources:

- Power over Ethernet (PoE)
- USB-C (5V input)

PoE is the default and primary power source. If both PoE and USB are connected at the same time, the device will automatically use PoE. This behavior is fixed and cannot be changed—PoE always takes priority over USB.

If the active power source is disconnected or fails, the device will automatically switch to the other available source to maintain operation.

Please note: if PoE is lost, the network connection may also become unavailable, which could compromise the operation of the system.

Primary Supply: Power over Ethernet (PoE)

The XND-1 is a PoE-PD (Powered Device) compliant with the IEEE 802.3af Class 2 standard.

To power the device, connect it to a suitable PoE PSE (Power Sourcing Equipment) using an appropriate cable. The XND-1 does not support passive PoE; only active PoE sources are supported. Turn on the power supply and wait for the XND-1 to power on.

The unit accepts both PoE Mode A and Mode B, and will automatically adapt, even when a crossover cable is used.

Secondary Supply: USB-C

The XND-1 can be also powered using USB supply (Voltage 5 V, Power XYZ W).

To power the device, connect it to a suitable USB Port using an appropriate cable. Turn on the power supply and wait for the XND-1 to power on.

Ports

The XND-1 is equipped with 5-pin XLR connector, with RJ45 connector and with USB-C connector.

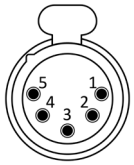
DMX/RDM Port: XLR Connector

This port is used for DMX/RDM input and output.

The XND-1 uses the Secondary Data Link complaint with the E1.11 standard.

The connector is IP65 rated (see Protection Class IP65).

Pin	Connection
1	Com
2	Data 1 -
3	Data 1 +
4	Data 2 -
5	Data 2 +



5-Pin XLR Female
(DMX Port)

Ethernet Port: RJ45 Connector

This port is used for networking and PoE supply input.

The connector is IP65 rated (see Protection Class IP65).

Pin	Network 10/100 MBit	PoE – Supply mode A	PoE – Supply mode B
1	TX+	DC+	Not used
2	TX-	DC+	Not used
3	RX+	DC-	Not used
4	Not used	Not used	DC+
5	Not used	Not used	DC+
6	RX -	DC-	Not used
7	Not used	Not used	DC-
8	Not used	Not used	DC-
Shield	Not connected	Not connected	Not connected

USB Port: USB-C Connector

This port is used for firmware updates and USB supply input.

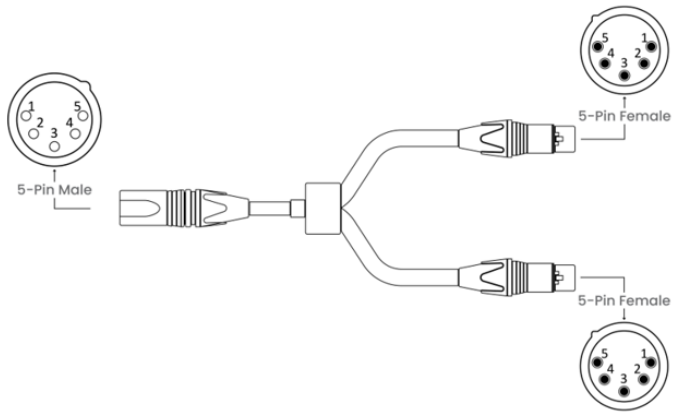
The connector is IP65 rated (see Protection Class IP65).

Y-Cable

The Y-Cable is required to distribute two universes. This upgrades the one-port node into a two-port node. The cable is labeled to help distinguish the ports.

When all connectors are plugged in, the cable is IP65 rated.

Pin	Connection
1	Com
2	Data 1 -
3	Data 1 +
4	Data 2 -
5	Data 2 +



Pin	Connection
1	Com
2	Data 1 -
3	Data 1 +
4	Not used
5	Not used

Pin	Connection
1	Com
2	Data 2 -
3	Data 2 +
4	Not used
5	Not used

Protection Class IP65

The XND-1 is IP65 rated. To achieve this level of protection, IP65 (or higher) rated cables must be plugged into the connectors, or the protective plastic cover must be installed on each port.

It can withstand splashes and jets of water, so exposure to light rain or direct cleaning with a moderate water jet will not damage the device.

Operation in corrosive environments (e.g., saltwater, swimming pools) accelerates product degradation. In such conditions, maintenance must be performed more frequently.

Settings and Menu

General Navigation

For navigating through the menus use the keypad buttons (OK, UP, DOWN, CANCEL). Most of the menus arrange items vertically. In those menus, use the DOWN button to select the item below the currently selected item or use the UP button to select the item above the currently selected item. In menus that arrange items horizontally (e.g. text fields), OK button means “to the right” and CANCEL button means “go out”.

The OK button is generally used to confirm a selection or to navigate to a selected submenu.

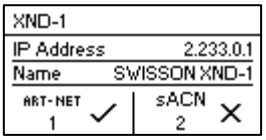
On the right side of the OK button , you can find the CANCEL button, which is generally used to dismiss a selection or to exit a menu.

By keeping the CANCEL button pressed for at least two seconds, you can always navigate to the Home Screen. From the Home Screen, the menu is launched by simply pushing the OK button.

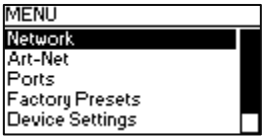
The following notation is used to describe locations in the menu: *Home > Menu > Sub menu > …*

For example, the manual could say “navigate to *Home > Menu > Art-Net*”. This can be read as follows:

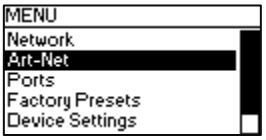
Keep CANCEL pressed for 2 seconds to reach the Home Screen.



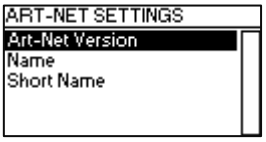
Then, press OK to get to the menu.



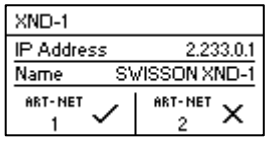
Select *Art-Net* using the DOWN button.



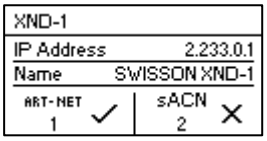
After pressing OK again to confirm the selection, the Art-Net settings menu is displayed.



Home Screen



Home Screen of an XND-1 running in Art-Net 4 mode, configured to a custom IP address (2.233.0.1) with Art-Net addressing information displayed in decimal.



XND-1 Home Screen with ports 1 configured to output Art-Net and ports 2 to output sACN. Decimal universe addresses.

The Home Screen shows the IP address of the node and, depending on the firmware version and configuration of the node, also the Art-Net Net and the Art-Net Sub-Net of the node or the Art-Net Name.

The numbers at the bottom of the screen display the 4-bit Art-Net universe of each output port running in Art-Net mode.

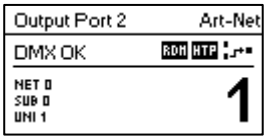
If the Art-Net version of the node is set to Art-Net or if independent Art-Net universes are enabled, Art-Net net and Art-Net sub-net are not displayed and the numbers at the bottom of the screen that correspond to a port running in Art-Net mode are values in the range of 0 to 32767. This number fully identyfies a port's universe and is also referred to as the port address. For more information on the addressing of Art-Net ports, see section Representations of Art-Net Port Addresses in the appendix.

For each port running in sACN mode, the 16-bit sACN universe, a number in the range of 1 to 63999, is displayed at the bottom of the screen. The left most number corrseponds to the universe of port 1.

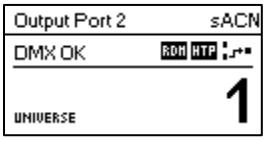
The universe number of an input port is surrounded by a rounded corner box. A filled box around the universe number of an input port indicates the presence of a valid DMX signal.

Port Screen

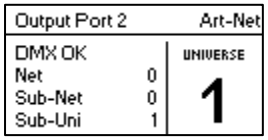
The Port Screen shows information about the selected port. It can be reached by navigating to *Home > Menu > Ports > Port X > Universe*. There are three variations of the Port Screen, depending on selected protocol and Art-Net version.



Art-Net 4



sACN



Art-Net 3

This screen can be closed by pressing CANCEL. It will disappear after 20 seconds. By pressing UP or DOWN button, universe edit mode is activated. For more information about universe numbering and editing, see section Universe on page 155.

Depending on the port mode, the label on the top left will show if the selected port is configured as an input or as an output. A disabled port just shows the port number and a "Port Off" label.

Status Indication

There are several indicators and labels on the Port Screen to show the current operating mode and the state of the selected port. The following status labels displayed on the upper left of the Port Screen show the DMX signal status:

Label	Port Mode	Description
No DMX	in, out	No DMX signal present
DMX OK	in, out	A valid DMX signal is detected
DMX Hold	out	Port is outputting a look which has been received before, but no updates have been received for at least 10 seconds
DMX Error	in	An error on the DMX signal appeared

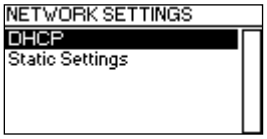
To show additional information about the selected port, there are status indicators for the presence of RDM on output ports, as well as the merge mode and status on the upper right of the display. These status indicators are only available with Art-Net 4 and sACN.

Indicator	Port Mode	Description
	out	Receiving signal from one source.
	out	Receiving signal from two sources. Merger active.
	out	Receiving signal from more than two sources. See section Merge Mode.
	in	Sending signal to broadcast or multicast address.
	in	Sending signal to unicast Address. See section Input Settings.

Indicator	Port Mode	Description
RDM	out	Art-Net RDM is enabled.
HTP	out	Merger mode is HTP. See section Merge Mode.
LTP	out	Merger mode is LTP. See section Merge Mode.

Network Settings

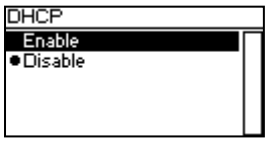
The network settings can be found under *Home > Menu > Network*.



All following settings can also be changed via web interface on the Network Settings Page as seen on page 266.

DHCP

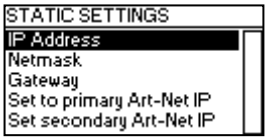
Navigate to *Home > Menu > Network > DHCP* in order to enable or disable DHCP (Dynamic Host Configuration Protocol). Choose *Enable* if you want to have your network configured by a DHCP server. This would typically be the case if you connect the XND-1 to a home or office network.



A bullet point is shown next to the currently active setting. Use the UP or DOWN button to choose the desired setting and confirm by pressing OK in order to change the setting.

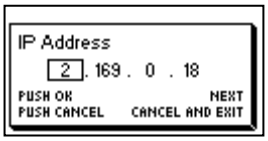
Static Settings

All settings under *Home > Menu > Network > Static Settings* apply only if DHCP is disabled and are ignored otherwise. From this menu, you can choose the IP address, the netmask and the gateway address to be used when DHCP is disabled.



IP Address

Use this menu item to configure the device's IP address. When the IP address configuration dialog is opened, it will look just like the dialog depicted to the right. A box encircling the first number indicates that the first number is selected. While the first number (byte) of the IP address is selected, use UP/DOWN button in order to choose the desired value for the first byte of the address, then push OK to confirm your selection.



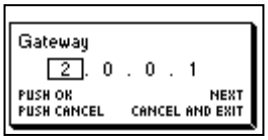
The next number will become selected allowing you to configure the second number. Simply repeat the same steps for the remaining numbers. After confirming the value of the last byte, the dialog will be closed, and the new settings will be applied.

Netmask

In order to configure the netmask, use the same procedure as for configuring the IP address.

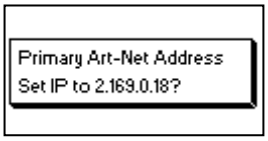
The netmask is used internally to compute the network address from the IP address. XND-1 does this by computing the bitwise AND of each byte with the corresponding byte of the IP address. The bitwise AND of the first byte of the IP address and the first byte of the netmask is the first byte of the network address and so on.

Gateway



In order to configure the default gateway address, use the same procedure as for configuring the IP address or the netmask. If the network data sent by the node needs to be routed, you may want to set this address to the address of your router. In most cases, however, this setting is not relevant.

Set to Primary Art-Net IP



After navigating to the menu item *Home > Menu > Network > Static Settings > Set to primary Art-Net IP*, a dialog as shown on the right will appear. Press CANCEL to abort or press OK in order to apply the following settings:

… *Static Settings > IP Address* is set to the primary Art-Net IP address (2.X.Y.Z). The values X, Y and Z are computed from the device's MAC address.

… *Static Settings > Netmask* is set to 255.0.0.0.

Set to Secondary Art-Net IP

As *Set to Primary Art-Net IP*, but sets network settings to the following values*:*

… *Static Settings > IP Address* is set to the secondary Art-Net IP address (10.X.Y.Z).

… *Static Settings > Netmask* is set to 255.0.0.0.

Art-Net Settings

Node-wide Art-Net settings can be configured under *Home > Menu > Art-Net*.

Art-Net Version

The menu entry *Home > Menu > Art-Net > Art-Net Version* provides the following selection:

- *Art-Net 4:* Select Art-Net 4 to use the advantages of Art-Net 4. This is the recommended setting.
- *Art-Net 3:* Select Art-Net 3 for backward compatibility.

A bullet point is shown next to the currently active setting. Use the UP/DOWN button to select the desired setting and push OK to apply the setting.

When *Art-Net 4* is selected, each output port has an independent port address in the range of 0 to 32767, which is composed of an Art-Net net, sub-net and universe number. This allows for configuring the node to any combination of Art-Net universes. When *Art-Net 3* is active, all ports of the node share the same net and sub-net numbers. For more information on the addressing of the Art-Net ports, see section Representations of Art-Net Port Addresses in the appendix.

Net

This setting is only available when the Art-Net version is set to *Art-Net 3*.

To adjust the Art-Net net of the node, navigate to *Home > Menu > Art-Net > Net* and adjust the number using the UP/DOWN button. Once the desired number has been selected, push OK to apply the new setting or press CANCEL to abort.

This part of the Art-Net address was introduced with Art-Net 3. In order to work with Art-Net I and Art-Net II controllers, Art-Net Net needs to be set to 0.

Note that changing this setting while independent Art-Net universes are enabled still affects all Art-Net port addresses. For more information, see Independent Universes below.

Sub-Net

This setting is only available when the Art-Net version is set to *Art-Net 3*.

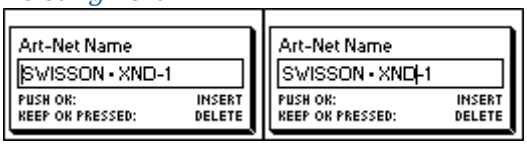
The Art-Net Sub-Net is configured under *Home > Menu > Art-Net > Sub-Net* in the same way the Net is configured.

Note that changing this setting while independent Art-Net universes are enabled still affects all Art-Net port addresses. For more information, see Independent Universes below.

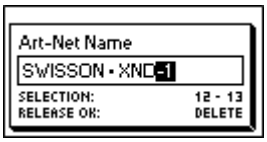
Name

The device name can be viewed and edited under *Home > Menu > Art-Net > Name*.

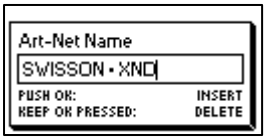
Deleting Text



To delete a text line or a part of it, position the cursor pressing UP/DOWN button immediately to the left of the first character you want to have deleted.

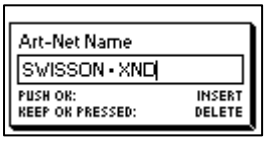


Then keep OK pressed and press UP/DOWN button until all of the text that you wish to delete appears highlighted.

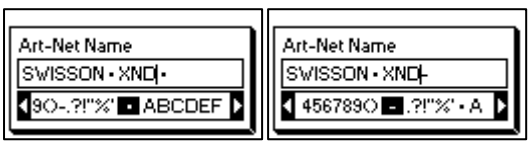


As you release the OK button, the highlighted text is removed.

Inserting or Appending Text



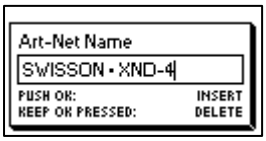
To append or insert text, move the cursor pressing UP/DOWN button to the position where you want to add your text.



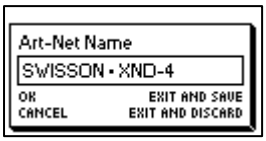
Then push the OK button and select a character to add by pressing UP/DOWN button.

Confirm your selection by pressing OK.

Repeat the above steps for the remaining characters. Then, press CANCEL to finish inserting characters.



Press CANCEL again to quit the editor.



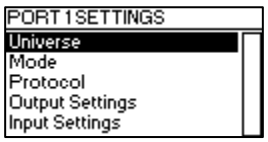
Press OK to store the changes or press CANCEL to discard all changes.

Short Name

The short name can be viewed and edited under *Home > Menu > Art-Net > Short Name*. Editing the short name is done in the same way the name is edited.

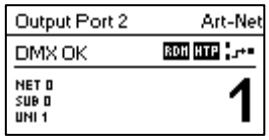
Port Settings

For each port, there is a settings menu under *Home > Menu > Ports > Port [1-2].* E.g. the menu for port 1 is under *Home > Menu > Ports > Port 1*. The port settings menu contains the items described below.



Universe

To adjust the universe of port X, navigate to *Home > Menu > Ports > Port X > Universe*.

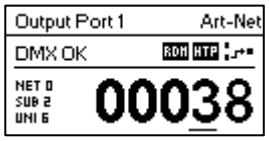


This screen provides essential information about the DMX port and allows for changing its Art-Net or sACN universe. For more information about the indicators on this screen, see section Port Screen.

Use the UP/DOWN button for changing the universe of the given port. Once the desired universe appears on the screen, push OK to use this universe or press CANCEL to revert to the previously configured universe.

Art-Net (Version 4)

This section describes the universe configuration screen of ports that are in Art-Net mode while the Art-Net version is set to *Art-Net 4*.



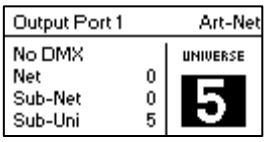
The port address is displayed as the large number at the bottom of the screen.
When editing, a slowly blinking cursor appears below the currently editable digit.
Press and hold the OK button for 3 seconds to enter digit navigation mode.
Press the OK button again to move to the next editable digit on the left.

Use the UP/DOWN buttons to increase or decrease the selected digit.
Press and hold the OK button for 3 seconds to confirm and exit.
The Art-Net Net, the Art-Net Sub-Net and the Art-Net Universe part of the port address on the lower half of the display near the left edge.
If an input port is configured for Art-Net 4, data is transmitted to the directed broadcast IP address (e.g. 2.255.255.255).

For more information about the addressing of Art-Net Ports, see section Representations of Art-Net Port Addresses in the appendix.

Art-Net (Version 3)

This section describes the screen for editing the universe of a port running in Art-Net mode when the Art-Net version is set to *Art-Net 3*.



Please note that while the universe (large number on the right-hand side of the display) is being edited but has not yet been stored, its background lights up and the number is displayed in its inverted color about once every second. If that is the case and you just want to see the configured universe number, simply press CANCEL.

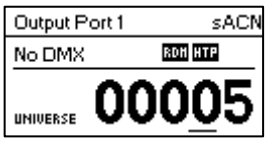
On the left-hand side of the screen, the following information is displayed on three lines below the status label (see section Status Indication on page 11): Art-Net Net, Art-Net Sub-Net and Art-Net Sub-Uni.

The Art-Net Sub-Uni is computed from the Sub-Net and the universe of a port as 16 x sub-net + universe. Some controllers address the Art-Net universe as a single number in the range of 0 to 255. Sub-Uni corresponds to that number.

If an input port is configured for Art-Net v3, data is transmitted to the directed broadcast IP address (e.g. 2.255.255.255).

sACN

Ports that are running in sACN mode display the sACN universe number and status indicators.



The sACN universe number may be in the range of 1 – 63999.
When editing, a slowly blinking cursor appears below the currently editable digit.
Press and hold the OK button for 3 seconds to enter digit navigation mode.
Press the OK button again to move to the next editable digit on the left.
Use the UP/DOWN buttons to increase or decrease the selected digit.
Press and hold the OK button for 3 seconds to confirm and exit.

If an input port is configured for sACN, data is transmitted to the sACN multicast IP address of the respective universe (e.g. 239.255.0.1 for universe 1) or to a previously configured unicast IP address.

Mode

Under *Mode*, a selection list is presented to you with the following options:

- *Output*: The port outputs data received from the network.
- *Input*: The port is configured as DMX input and sends data to the network.
- *Off*: The port is turned off.

A bullet point is shown next to the currently active setting. Use the UP/DOWN button to select the desired setting and push OK to apply the setting.

When setting multiple inputs to the same universe, the node will output the data depending on the used protocol:

- Art-Net: Only one port will send data to the network, because Art-Net streams are identified by the IP address.
- sACN: All inputs can send data to the network, because sACN identifies every stream with an own ID.

Protocol

Under *Protocol*, you can choose between the following two options:

- *Art-Net*: The port is using the Art-Net protocol for either input or output mode.
- *sACN*: The port is using the sACN protocol for either input or output mode.

A bullet point is shown next to the currently active setting. Use the UP/DOWN button to select the desired setting and push OK to apply the setting.

Output Settings

DMX Output Mode

The *DMX Output Mode* menu allows for choosing the DMX timing.

The following choices are available:

- *Max. Frame Rate (44 Hz)*
- *Relaxed (30 Hz)*

When ***Max. Frame Rate*** is selected, the DMX output signal has the following properties:

- Refresh rate: Ca. 44 Hz when 512 channels are being sent, depending on the amount of RDM requests sent from the controller and further reduced during RDM discovery.
- Break length: Ca. 180 µS.
- Mark after break: Ca. 40 µS.

The *DMX Output Mode* ***Relaxed*** has the following behavior:

- Refresh rate: Ca. 30 Hz when 512 channels are being sent, depending on the amount of RDM requests sent from the controller and further reduced during RDM discovery.
- Break length: Ca. 300 µS.
- Mark after break: Ca. 80 µS.
- A small delay of about 20 µS is inserted between slots to reduce the update rate. This may reduce problems such as flickering when legacy fixtures are in use.

Merge Mode

Under *Merge Mode*, a selection list is presented to you with the following options:

- *HTP*: Highest takes precedence. If for a given DMX channel data has been received from two sources, the higher value is used.
- *LTP*: Latest takes precedence. If for a given DMX channel data has been received from two sources, LTP merging uses the value of whichever source was the last to change the value it has sent for that given channel.
- *Off*: Merging is disabled.

Merging is applied when two Art-Net or sACN controllers send data for the same port. If more than two controllers send data for the same port, the following rules take effect:

- Art-Net: The first two appeared data streams are merged. All following ones are discarded.
- sACN: The first two streams with the same priority are merged. Further streams of the same or lower priority are discarded. If a stream with higher priority appears, the lower priority ones will be discarded.

A bullet point is shown next to the currently active setting. Use the UP/DOWN button to select the desired setting and push OK to apply the setting .

Failure Behaviour

Under *Failure Behaviour*, a selection list is presented to you with the following options:

- *Off*: The output will stop sending DMX, after no updates for the universe of the output have been received for 10 seconds[1].
- *Hold Last Look*: The output will continue to send the last look even if no updates are received.

A bullet point is shown next to the currently active setting Use the UP/DOWN button to select the desired setting and push OK to apply the setting.

Art-Net RDM

Under *Art-Net RDM,* RDM may be enabled or disabled for the output. Art-Net RDM can also be enabled for sACN ports. XND-1 discovers a maximum of 250 devices per output port.

All the previously described settings can be changed via web interface on the Port Settings Page from page 255.

Auto Universe Label

This menu is only shown when *Art-Net RDM* is enabled. Auto Universe Label is a functionality to automatically show the universe number of an XND-1 port on the display of connected Swisson devices supporting this. When enabled, the universe number is transmitted every two seconds with a small standard compliant RDM packet. Therefore, the labels are only present on output ports with *Art-Net RDM* enabled. Auto Universe Label RDM packets are transmitted as so called vendorcast messages and are ignored by every standard compliant DMX and RDM receiver not manufactured by Swisson.

Input Settings

Transmit Mode

Under *Transmit Mode*, the transmission behaviour of Art-Net or sACN data can be configured with the following settings:

- *Broadcast/Multicast*: DMX data applied to the input port is transmitted to the directed broadcast IP address (multicast for sACN). Every reachable device in the same subnet can receive the data.
- *Unicast:* DMX data applied to the input port is transmitted to a unicast IP address set by the user. Only one network device with matching IP address can receive the data.

Destination IP

This menu only appears when the *Transmit Mode* is set to *Unicast*. After opening the menu, an IP address edit window is shown. This window allows for configuring a unicast destination IP address, similar to the IP address edit windows in section Network Settings.

Local Forwarding

This menu only appears when the *Transmit Mode* is set to *Unicast* and allows to enable or disable the forwarding of DMX data to the local ports of the node. If *Transmit Mode* is set to *Broadcast/Multicast*, the data is always forwarded.

- *Enabled*: DMX data applied to an input port is forwarded to local DMX outputs of this node, if universe and protocol of the output port is matching with the input port.
- *Disabled*: DMX data is only transmitted to the configured unicast IP address and not present on local output ports of this node.

Factory Presets

Firmware Version 1.00

The *Factory Presets* menu entry of the main menu allows you to load one of the following factory defined presets on devices:

- Art-Net:
  - Art-Net RDM is enabled on all ports.
  - All ports are configured as outputs.
  - Ports 1 – 4 are configured to consecutive Art-Net universes (port addresses). The user is asked to choose a start universe.
  - The user is prompted by a separate dialog to choose whether to adjust the network settings. If he chooses to do so, the IP address is set to the primary Art-Net IP address and the netmask is set to 255.0.0.0.
- Art-Net, no RDM:
  - Same as Art-Net, RDM disabled on all ports.
- sACN:
  - All ports are configured as outputs.
  - Network settings remain unchanged.
  - Art-Net RDM is enabled.
  - Ports 1 – 4 are configured to consecutive sACN universes. The user is asked to choose a start universe.
- sACN, no RDM:
  - Same as sACN, Art-Net RDM disabled on all ports.
- 1,2: Art-Net – 3,4: sACN:
  - Art-Net RDM is enabled on all ports.
  - All ports are configured as outputs.
  - Ports 1 and 2 are configured to Art-Net.
  - Ports 3 and 4 are configured to sACN.
  - The ports are configured to consecutive universes (port addresses). The user is asked to choose a start universe.
  - The user is prompted by a separate dialog to choose whether to adjust the network settings. If he chooses to do so, the IP address is set to the primary Art-Net IP address and the netmask is set to 255.0.0.0.
- Art-Net, Office Network:
  - Same as Art-Net but network is configured via DHCP.

Device Settings and Information

Address Display Mode

Under *Address Display Mode*, a selection list is presented to you with the following options:

- *Decimal*: Art-Net Net, Art-Net Sub-Net, Art-Net or sACN universe and Art-Net Sub-Uni are displayed as decimal numbers.
- *Hexadecimal*: Art-Net Net, Art-Net Sub-Net, Art-Net or sACN universe and Art-Net Sub-Uni are presented as hexadecimal numbers with a trailing h (e.g. F3h).

A bullet point is shown next to the currently active setting. Use the UP/DOWN button to select the desired setting and push OK to apply the setting .

Web Interface

Under *Web Interface*, a selection list is presented to you with the following options:

- *Enable*: The web interface is enabled.
- *Disable*: The web interface is disabled.

A bullet point is shown next to the currently active setting. Use the UP/DOWN button to select the desired setting and push OK to apply the setting . Changing this setting requires a restart of the node. A popup will ask for confirmation. Press OK to restart now or CANCEL to abort.

Further information can be found on page 25.

Screen Saver

Under *Screen Saver*, a selection list is presented to you with the following options:

- *Enable*: Screen saver is enabled.
- *Disable*: Screen saver is disabled.

A bullet point is shown next to the currently active setting. Use the UP/DOWN button to select the desired setting and push OK to apply the setting .

Please refer to the section Screen Saver on page 244 for more details about the behaviour of the screen saver.

Mute LED

Under *Mute LED*, a selection list is presented to you with the following options:

- *Mute*: the status indicator LED of the device remain dark regardless of the device's status.
- *Unmute*: The status indicator LED behave as described under Status LED on page 244.

A bullet point is shown next to the currently active setting. Use the UP/DOWN button to select the desired setting and push OK to apply the setting .

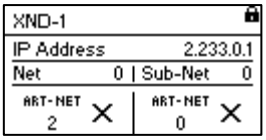
All previously listed device settings can be changed via the web interface on the

Device Settings Page as described on page 266.

User Input Locking

The menu item *User Input Locking* allows you to lock your device with a password to protect your device from unauthorized or accidental manipulation. Alternatively, the device may also be locked without a password in order to just prevent accidental manipulation. For details see Simple Locking on page 211.

When the device is locked, the user will only be able to see the Home Screen (see page 111).



When pressing the OK button from the Home Screen of a locked device, it will prompt for the password if the device was password locked. If the password is then entered correctly, the device becomes unlocked and the main menu is displayed.

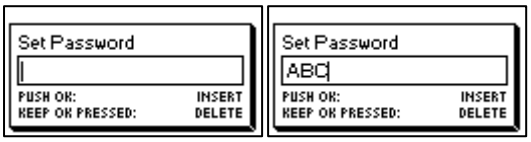
Otherwise, if simple locking was used, a dialog will be shown asking the user to press CANCEL three times within three seconds after pressing OK while the Home Screen is shown, and the device was locked. If the user does so, the device becomes unlocked.

A padlock symbol in the top right corner of the Home Screen indicates that the user input is currently locked.

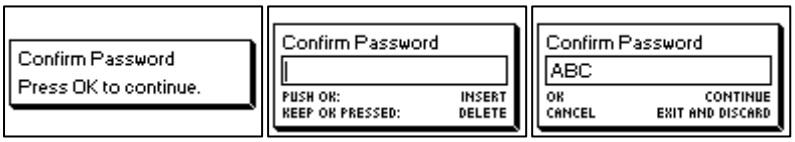
Before a device can be locked by password, a password must be set, and locking must be enabled.

Set Password

Choose the menu entry *Settings > User Input Locking > Set Password* to set a password. A dialog will show up that prompts for a password. Password editing works just like editing the device name, as detailed on page 14.

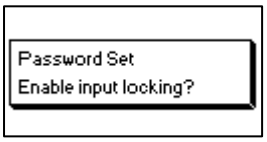


Once the password has been entered, XND-1 will ask you to enter the password a second time.



If the two entered texts match, the password is set.

Finally, after the password was successfully stored, the user will be asked whether he wants to enable password locking, if it is not already enabled.



By pressing OK, password locking is enabled. Pressing CANCEL closes the dialog and keeps password locking disabled, but the password is set anyway.

To change the password, simply open the *Set Password* dialog again. It is not required to enter the current password before changing it.

Enable/Disable Locking

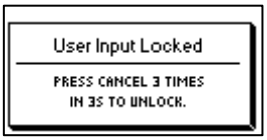
The menu entry *Settings > User Input Locking > Enable/Disable Locking* lets the user choose whether password locking is disabled or enabled.

Password Locking

If the user requests to enable password locking and a password has already been set, the user will be asked to enter the password before password locking is enabled. If the user requests to enable password locking when no password has been set up, the user will be prompted to enter and confirm a password, before password locking is enabled.

Simple Locking

Simple locking can be enabled whether a password has been set or not. When simple locking is used, the user will be asked to press CANCEL three times within 3 seconds when attempting to unlock the device by pressing the OK button from the home screen.



Lock User Input

Once password locking has been enabled, the additional menu item Lock User Input will appear on the top level of the menu and under *Home > Menu > Settings > User Input Locking*. If the user activates this menu item, he will be asked whether the device should be locked. OK will lock the device, CANCEL will keep it unlocked.

The device will also be locked when the screen saver becomes active or after a power cycle if password locking has been enabled.

Device Information

The following information about the device is available under *Home > Menu > Device Settings > Device Information*.

Model

The device model is reported as “XND-1” for all variants of the XND-1.

Boot Software

The full version number of the boot software.

Firmware

The full version number of the firmware.

Hardware

The hardware revision.

MAC Address

The MAC address of the node’s Ethernet interface.

UIDs

The RDM UIDs (unique identifiers) of the four output ports. These are numbers that unambiguously identify any RDM device. Since each output port may act as an RDM controller, each output port has assigned its own RDM UID.

Restore Default Settings

The default settings can be restored under *Home > Menu > Restore Default Settings*. In this menu, you will be asked whether you want to continue restoring all settings. Push OK to confirm or CANCEL to abort.

The default settings can also be restored from the

Device Settings Page of the web interface as described on page 266.

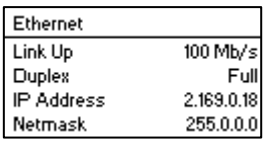
This function will restore all settings to the defaults:

- Name: SWISSON XND-1
- Short name: XND-1
- Art-Net net: 0
- Art-Net sub-net: 0
- Art-Net RDM: Disabled on all output ports
- Auto universe label: Enabled
- Independent universes: Disabled
- Art-Net version: Art-Net 4
- All outputs enabled
- DMX output mode (all ports): Relaxed
- Art-Net universe output 1-2: 0-1
- Failure behaviour (all outputs): Hold last look
- Merge mode (all outputs): HTP
- Input transmit mode: Broadcast/multicast
- Input destination IP: 127.0.0.1
- Input local forwarding: Enabled
- IP address: 2.X.Y.Z (primary Art-Net IP address)

- Netmask: 255.0.0.0
- Address display mode: Decimal
- LEDs: Unmuted
- Screen saver: Disabled
- User input locking: Disabled, password not set
- Web interface: Enabled

Ethernet Port Status Information

Navigate to *Home > Menu > Network > Port Status.*



This screen shows the following information about the status of the Ethernet port on four lines:

- The first line below the title shows whether the link is up or down and what the current connection speed is (10 Mb/s or 100 Mb/s).
- The next line informs whether the link is full or half duplex if a link is established.
- The last two lines display the currently configured IP address and the currently configured netmask.

Status LED

The LED can be muted, in which case they stay dark independently of the device's status. The information below applies when the LED is not muted (unmuted). Please refer to Mute LED on page 200 for more information about muting and unmuting the LED.

Ethernet Port

The link LED, which lights up in green if an Ethernet link has been established. Traffic is indicated by short interruptions.

Identify

The XND-1 can help the user to locate the device under certain conditions through the identify process. The node can be set in an identified state, by means of communication, like Art-Net, RDM or the web interface. The identified device will blink its display once per second for as long as the identification is active.

Screen Saver

The OLED display will automatically turn itself off when no user input is received for 40 seconds in order to improve the durability of the product, if the screen saver is enabled. Once the display is turned off, it can be turned on again by pushing any button or by turning the encoder wheel by one unit in any direction.

The screen saver can be enabled or disabled under *Home > Menu > Device Settings > Screen Saver*.

Firmware Updates

Firmware updates will be provided on the product page on the Swisson website. To update the firmware, connect the XND-1 to your PC using the USB-C connector. Please refer to the separate documentation also provided on the product web page for details about the process of updating the product's firmware.

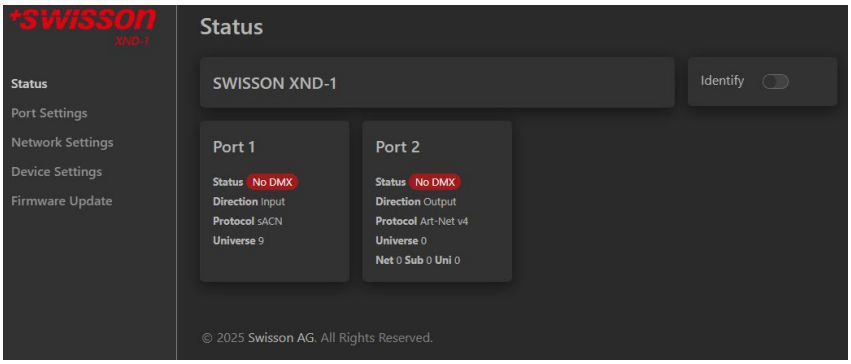
Alternatively, firmware updates can be done via web interface on the Firmware Update Page as described on page 26.

Web Interface

The XND-1 allows the use of a web interface hosted by the device. Through this interface the status may be observed, settings can be adjusted, and firmware updates can be carried out. The web interface is accessed by typing the devices configured IP address in a web browser of a computer, that is connected to the same network as the XND-1.

Status Page

The status page is the first to welcome the user after accessing the web interface. It lets the user get an overview over every individual port's status and configuration at a quick glance. In addition to the overview a toggle switch can be enabled to set the device identified.



The ports can display five different status messages, like the ones described on page 11:

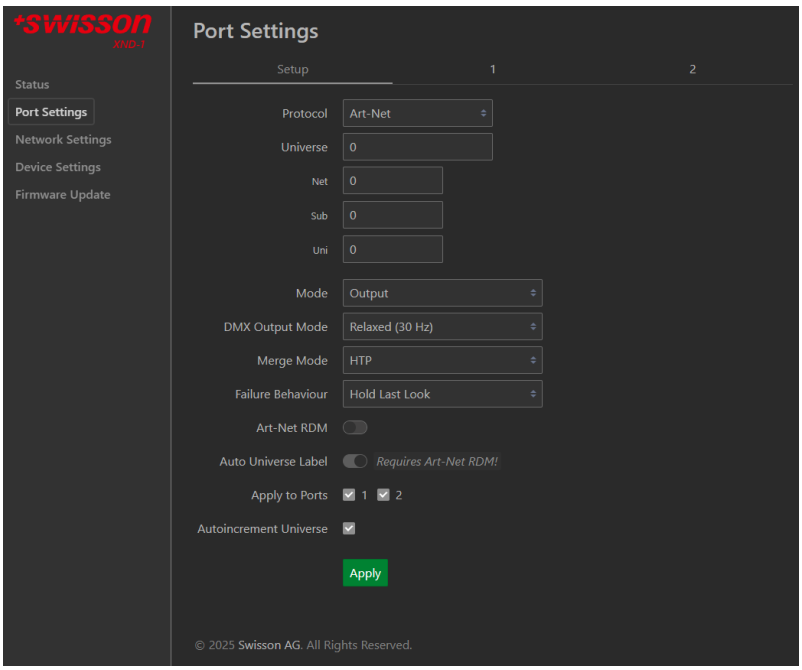
- *OK*: The port is receiving/transmitting successfully.
- *No Update*: Not receiving any updates on this universe for the last 10 seconds.
- *Off*: The port is currently disabled through settings made by the user.
- *No DMX*: The port is not receiving/transmitting any DMX.
- *Error*: The port is producing errors and requires user intervention.

Port Settings Page

On the port settings page each port can be configured individually, or changes can be applied to multiple ports at once. To configure the ports separately, select the number in the top menu first, after which changes can be made to the settings. Once the changes are made, they can be sent to the device by pressing the apply button.

More information on the port settings can be found on page 15.

When setting up multiple ports at the same time under the Setup tab, the user has the option to select which ports the changes should be applied to and choose to autoincrement the universe number along the ports that are being configured.

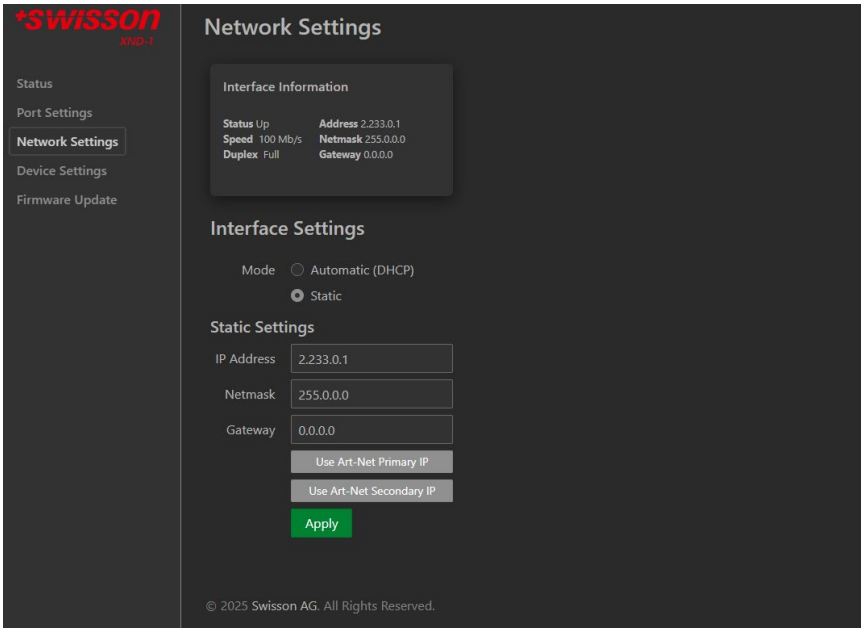


Network Settings Page

The network settings page enables the user to change network settings and see relevant information concerning the Ethernet port status.

For a detailed description of the network settings, please consult page 12 where they are described in detail.

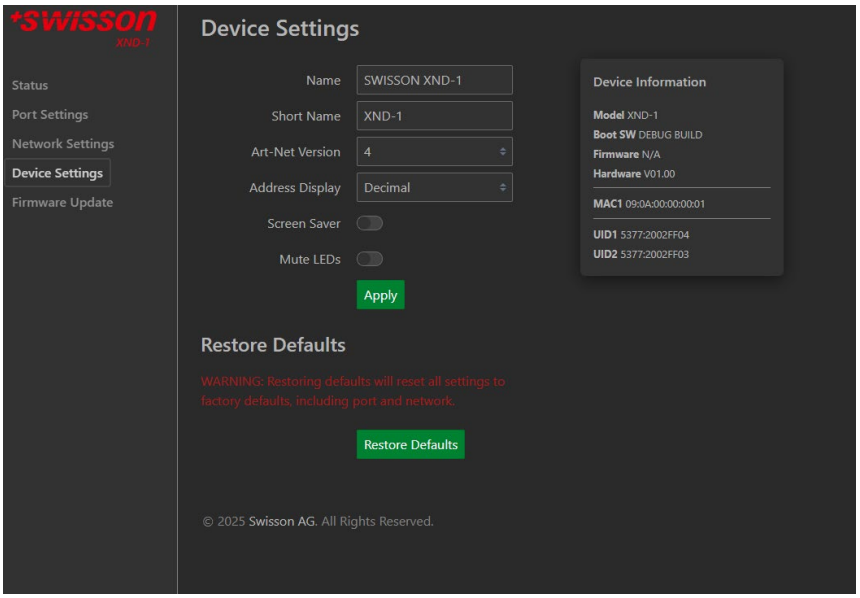
Attention: Changes to the network settings could result in the device not being accessible via network! Use with caution!



Device Settings Page

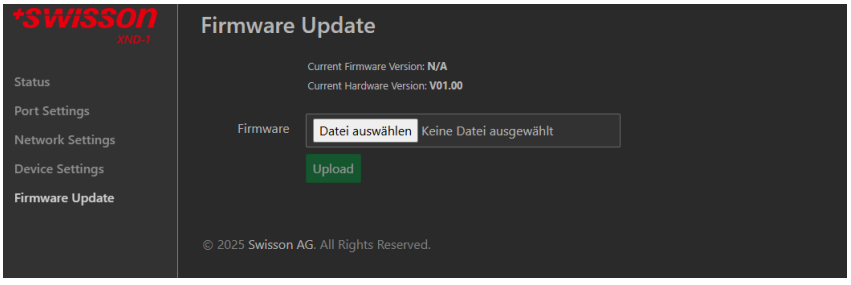
This page allows the user to view and make changes to any relevant device information. Furthermore, the factory defaults can be restored from here.

A detailed description of the device settings can be found on page 19.



Firmware Update Page

From this page firmware updates can be performed. To do so, simply select the desired firmware file and then upload it. Additionally, this page informs you about the currently loaded firmware and the hardware version.



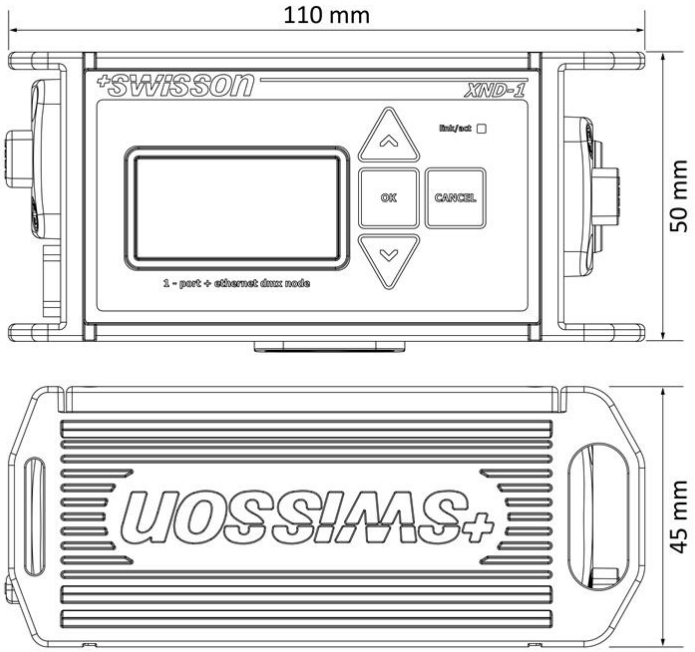
For more information on firmware updates, see page 24.

Browser Compatibility

The web interface is compatible with most current web browsers.

Technical Data

Dimensions



Depth..... 110 mm (4.3 in)

Width ..... 50 mm (1.9 in)

Height..... 45 mm (1.8 in)

Weight..... 250 g (0.55 lb)

Specifications

Ambient temperature ..... -20°C…50°C (-22°F…122°F)

Protection Class..... IP65

PoE Standard..... IEEE 802.3af

PoE Class 2

Voltage USB..... 5 V DC

Power consumption..... ??? W

Ethernet ..... 10BASE-T / 100BASE-TX, auto negotiating, auto MDI-X

Network protocols ..... Art-Net 1 - 4, sACN (ANSI E1.31), sACN draft version (v0.2)

DMX..... ANSI E1.11

RDM ..... ANSI E1.20

Electrical standard signal ports EIA-485

Ordering Information

10 48 42	XND-1 PRO-Set	Swisson XND-1, USB-C Cable, Y-Cable
10 48 40	XND-1 BASIC Set	Swisson XND-1, USB-C Cable
10 90 42	XAC-Y-Cable	Y-Cable

Credits

LwIP

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Art-Net

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Appendix

Representations of Art-Net Port Addresses

According to the Art-Net 3 specification, the address of an Art-Net port consists of three parts: The Art-Net net, sub-net and universe number. The Art-Net universe and sub-net number both have a value between 0 and 15 (4 bits). Many controllers combine these values to the sub-uni number, resulting in a value between 0 and 255 (8 bits), with the sub-net part occupying the more significant digits. Thus, the sub-uni can be calculated with the formula 16 x sub-net + universe = sub-uni.

The Art-Net net number was added in Art-Net 3 and has a value between 0 and 127 (7 bits). So, when working with controllers using Art-Net I or Art-Net II, the Art-Net net must be set to 0.

The Art-Net net, sub-net and universe can be combined to a 15-bit port address with values from 0 to 32767, as shown below.

Bit Digit	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Subdivided Representation	Net (0 - 127)							Sub-Net (0 - 15)				Universe (0 - 15)			
Alternative Representation	Net (0-127)							Sub-Uni (0 – 255)							
15-bit Port Address Rep.	(0 – 32767)														

For the instances where the Art-Net net number is 0, the 15-bit port address is equivalent to the sub-uni. The table below gives an overview of the entire Art-Net 3 address space and how it is converted to a 15-bit port address.

Art-Net Address			15-bit Port Address	
Net (0 - 127)	Sub-Net (0 - 15)	Universe (0 - 15)		
0	0	0	0	Art-Net II addresses
0	0	1	1	
…			…	
0	0	15	15	
0	1	0	16	
0	1	1	17	
…			…	
0	1	15	31	
0	2	0	32	
0	2	1	33	
…			…	
0	15	15	255	
1	0	0	256	
1	0	1	257	
….			….	
127	15	14	32766	
127	15	15	32767	
z	**y**	**x**	$\mathbf{z * 256 + y * 16 + x}$	

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