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DMX USB PRO MK2 (70314)
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DMX USB PRO MK2 – User Manual

The ultimate DMX USB widget with 2 universes of input or output + standalone playback.

AUSTRALIAN
DESIGNED + MADE

Content

Safety

Ensure you are familiarized with all key information within this guide and other relevant ENTTEC documentation before specifying, installing, or operating an ENTTEC device. If you are in any doubt about system safety, or you plan to install ENTTEC device in a configuration that is not covered within this guide, contact ENTTEC or your ENTTEC supplier for assistance.

ENTTEC's return to base warranty for this product does not cover damage caused by inappropriate use, application, or modification to the product.

Electrical safety

- This device must be operated in accordance with applicable national and local electrical and construction codes.
- This device can be damaged by excess voltage outside the operating range defined within this products datasheet.
- To reduce the risk of fire or electrical faults do not exceed the ratings and limitations defined in the product datasheet or this guide.
- Ensure there are no opportunities for cables to short circuit and cabling cannot be snagged or pulled.
- Do not over stretch cabling to the device's connectors and ensure that cabling does not exert force on the PCB.
- Isolate your installation from power immediately if accessories power cables or connectors is in any way damaged, defective, shows signs of overheating or are wet.
- Remove power from this product during cleaning or when it is not in use.
- Do not connect this device to a dimmer pack or mains electricity.
- Do not connect any of this device's V- or GND connectors to earth.
- Ensure your installation is protected from short circuits and overcurrent.
- Ensure all connections are complete and secure before providing power to the device.

System Planning and Specification

- To contribute to an optimal operating temperature, where possible keep this device out of direct sunlight.
- This unit has an IP20 rating and is not designed to be exposed to moisture or condensing humidity.
- Ensure this device is only operated within the specified ranges within the product datasheet.

Protection from Injury During Installation

- Always use suitable personal protective equipment when installing ENTTEC products.
- Once installation is completed, check that all hardware and components are securely in place and fastened to supporting structures if applicable.

Installation Safety Guidelines

- The device is convection cooled, ensure it receives sufficient airflow so heat can be dissipated.
- Do not cover the device with insulating material of any kind.
- Do not operate the device if the ambient temperature exceeds that stated in the device specifications.
- Do not cover or enclose the device without a suitable and proven method of dissipating heat.
- Do not install the device in damp or wet environments.
- Do not modify the device hardware in any way.
- Do not use the device if you see any signs of damage.
- Do not handle the device in an energized state.
- Do not crush the device during installation.
- Do not sign off a system without ensuring all cabling to the device and accessories has been appropriately restrained, secured and is not under tension.

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Functional features

Adjustable refresh rate

The DMX USB PRO Mk2 output settings can be configured using EMU. This allows for adjustments in refresh rate and each DMX frames packet structure.

- DMX Output Refresh Rate (per sec): This can be set between 0 and 40. **40 is the Default.**
- DMX Output Mark After Break (MAB in µsec): This can be set between 10 and 1355. **106 is the Default.**
- Break Time (µsec): This can be set between 96 and 1355. **181 is the Default.**

RDM

RDM (E1.20) is supported as standard on the DMX USB PRO Mk2.

Remote Device Management (RDM) is a protocol enhancement to USITT DMX512 that allows bi-directional communication between the DMX USB Pro Mk2 and RDM compliant devices over a standard DMX line. This protocol will allow configuration, status monitoring, and management of these devices.

Not all control software which has implemented the DMX USB Pro Mk2 as a device support RDM.

Standalone

The standalone mode built into the DMX USB Pro Mk2 allows the recording and playback of a DMX sequence/show.

The DMX USB Pro Mk2 Standalone Mode is limited to 1 Universe only and can be configured using the EMU software.

Recordings can be made either by using the DMX USB Pro Mk2's DMX input or Art-Net through the connected computers internal loopback IP address (127.0.0.1) or network.

The DMX USB Pro Mk2 only records the changing frames, to maximum the length of the recording. With 512 channels (1 Universe) being recorded, with a frame rate of 40 fps with each frame being unique from the previous, the maximum record length will be 100 seconds. If the number of channels or unique frames per second are halved, this will double the maximum recording length.

The playback of the Standalone sequence/show can be triggered from within EMU or on Power Up of the DMX USB Pro Mk2. Note: Upon opening EMU to access DMX USB PRO MK2, the standalone show will stop automatically. User will have to power cycle device or select PLAY option for standalone show to continue playing.

The DMX USB Pro Mk2 draws its power from the USB connection. The DMX USB Pro Mk2 doesn't require a computer connection during Standalone Playback. The DMX USB Pro Mk2 can be powered through a 5v USB power adaptor, allowing the DMX USB Pro Mk2 to be powered from the mains.

Any DMX generated by software which will output on the DMX port that is outputting standalone mode will stop playing the sequence/show and output DMX as directed by the software.

Hardware features

- 2.0 micro USB for connection to a computer
- 15-Pin breakout port
- 1* 5-Pin Male XLR for DMX Input
- 2* 5-Pin Female XLR for DMX Output
- LED status indicator

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LED status indicator

DMX USB PRO Mk2 comes with a RGB LED indicator located on the top surface of the device (above the USB connector). When in operation, the DMX USB PRO Mk2 led will change between a combination of these states. The LED colour signifies the related activity:

Colour	Description
Flashing White	PRO Mk2 is powered on and idle
Red	Error Mode or unsupported request
Green	DMX/RDM packet sent/received on port 1.
Yellow	DMX/RDM packet sent/received on port 2.
Blue	Standalone show is playing.
Purple	MIDI data sent/received MIDI output port. *(MIDI Breakout accessory cable PN:79147 discontinued Q1 2021).*

Error Mode: If the LED status Indicator is steady Red, please do the following:
1. Disconnect and re-connect the USB cable to the DMX USB PRO Mk2.
2. Use ENTTEC's EMU software to restore the device.

Out of the Box

The DMX USB PRO MK2's default parameter Settings are:
- **DMX Output Refresh Rate (per sec):**   40
- **DMX Output Mark After Break (MAB in μsec):**   10
- **Break Time (μsec):**   96

EMU

DMX USB PRO MK2 communicates with a computer using FTDI D2XX drivers. These drivers enable the product to be compatible with a range of operating system including Windows, Mac, and Linux (including Raspberry Pi).

Visit FTDI website for the latest drivers and operating system installation support: www.ftdichip.com/Drivers/D2XX.htm.

EMU is ENTTEC's software to configure, troubleshoot, test, and update the DMX USB PRO MK2. EMU is available to download from the ENTTEC website - https://www.enttec.com/product/software-products/lighting-control-software/emu-sound-to-light-controller/

Mac: In some cases, there might be a conflict with other drivers on the Mac, to resolve such conflicts, disable the Mac "Serial drivers" or run FTDI's 'D2xxHelper'.

From the OUTPUT tab in EMU Settings Menu, click the button (Rescan for devices) to search for DMX USB PRO MK2 connected to the computer. When a device is detected, select it from the dropdown list.

Serial Number will appear next to Device Name.

Once the DMX USB PRO Mk2 is connected to EMU, click on the "Config" icon to access following info
- Config
- Firmware
- Standalone

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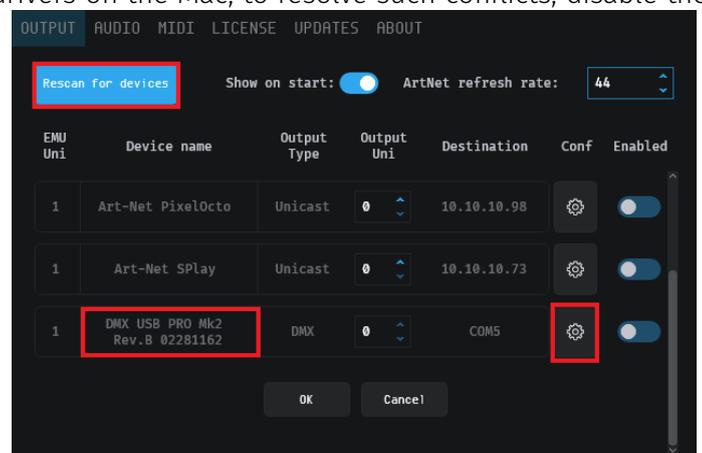
Config

Config tab allows the adjustment of DMX output parameters to accommodate for equipment that fall outside of the USITT DMX512-A standard.

Following controls are available:

- Set Parameters to Default: Selecting this will reset value on both Port 1 & Port 2 to default value. Confirm update by clicking on "Set DMX Parameters"
- Get DMX Parameters: Retrieve and display latest settings value.
- Set DMX Parameters: Save settings

The following parameters can be adjusted:

- Break Time (μsec): This can be set between 96 and 1355. 181 is the Default.
- Mark After Break (MAB in μsec): This can be set between 10 and 1355. 106 is the Default.
- Packet Refresh Rate (per sec): This can be set between 0 and 40. 40 is the Default.
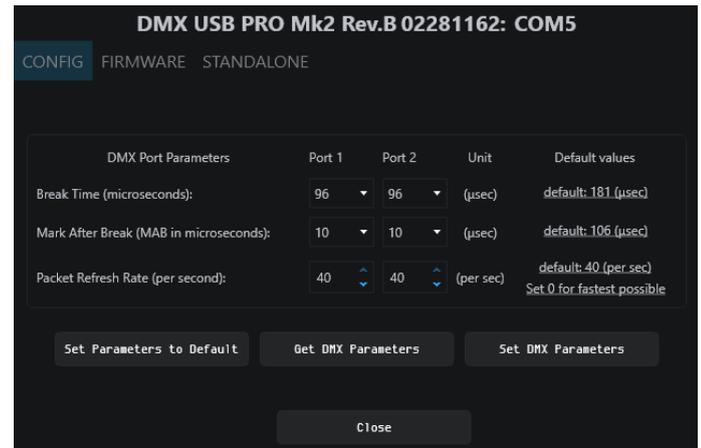
Firmware

The Firmware update procedure can be used to:

- Update to the latest feature set.
- Reset DMX USB PRO Mk2 if it ever gets stuck or stops responding. (Error mode).

The following steps will explain firmware update procedure:

1. Within EMU Firmware Tab, you will find current firmware version of connected device. Below that is a drop down to select a default firmware option or download a version from the ENTTEC website and locate it manually with 'Choose File'.

2. After selecting the firmware file, click on the "Update Firmware" button and let the update proceed. Do not remove the USB until the update is complete.

3. Once Finished, the page will automatically refresh with confirmation message, and firmware version information will be updated to reflect the updated firmware.
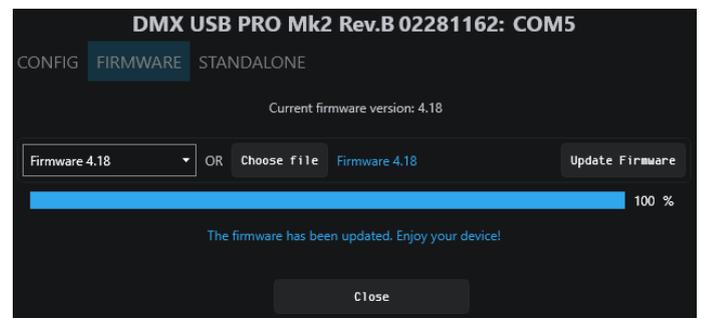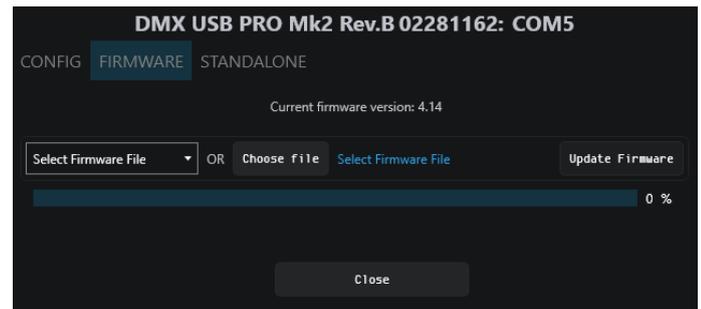
DMX Send Test

EMU can also be used to test selected DMX channels by sending DMX through DMX USB PRO MK2.

First patch a 'dummy' fixture on any DMX channel of your choice.
EMU patching introduction video: https://www.youtube.com/watch?v=7EPm0vBPnNo&ab_channel=ENTTEC

Once done, return to homepage and drag the needed faders and click 'Enabled' on settings' output tab to test DMX output. USB logo will light up on the top left to indicate output to DMX USB PRO on EMU.

With your fixtures connected to the DMX output of the DMX USB PRO MK2, you will see the desired effect for the value of the channel you change. For example, a fixture setup with intensity on Ch10, and R,G,B on Ch 1,2,3 - when you change the values on these channels you will see the effect on your fixtures. This can be used to test that your DMX USB PRO MK2 is working as expected.

After testing, you must close EMU, and then open any lighting control software to use DMX USB PRO MK2.
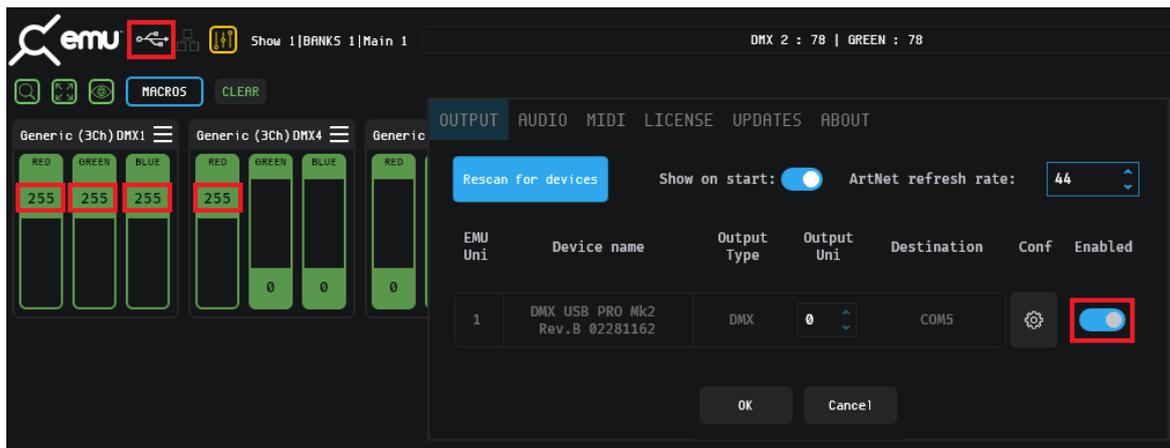
Standalone

Delete

DMX USB PRO MK2 comes with a default Standalone show. To record and create new show, EMU will prompt user to first delete stored show on DELETE tab.

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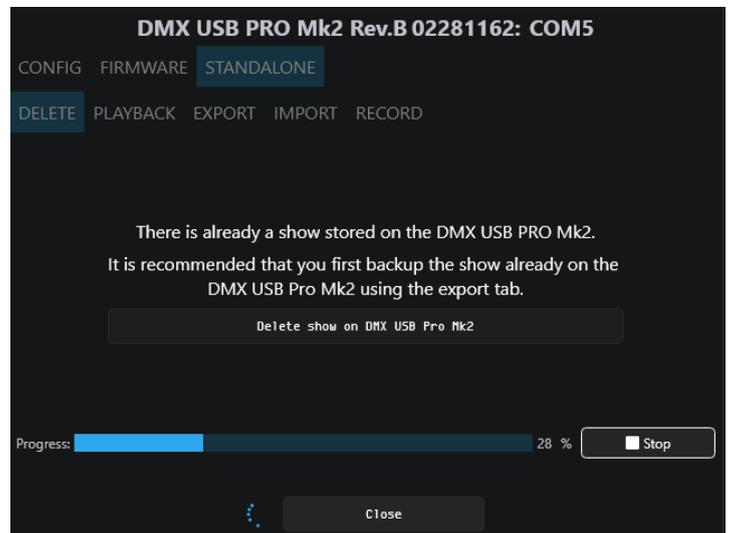
Playback

PLAY or STOP standalone show in this tab.

Note: Upon opening EMU to access DMX USB PRO MK2, the standalone show will stop automatically. User will have to power cycle device or select PLAY option for standalone show to continue playing.

Available info in this tab includes:
- Storage size and limit (Frames)
- Show Name
- Play count
- Loop Delay
- Play on Powerup
- DMX channels
- Output DMX port

Export

ENTTEC recommend back up of standalone show.

Select location to export a copy of standalone show via this tab in EMU.

Multiple DMX USB PRO MK2 can be programed for uniform standalone output using same file.

Import

Import function will be unavailble if there is standalone file on device.

Once stored file has been deleted, user may locate standalone file manually via "Choose file".
Details of standalone file is availble for preview once selected.

User will be able to play the imported show once import is complete.

Record

Record function will be unavailble if there is standalone file on device.

Once stored file has been deleted, following options are available for setup:
- **Show Name:** Name to identify the show being recorded
- **Play Count:** Total number of times the show is played back (from 1 to Forever).
- **Loop Delay:** The number of seconds delay, between each Loop playback.
- **Play on Power-Up:** If selected as "YES", recorded show plays on power-up (this option is required to be selected for true standalone operation).
- **DMX Channels:** The number of channels to record per DMX Frame (less channels = longer duration of recording)

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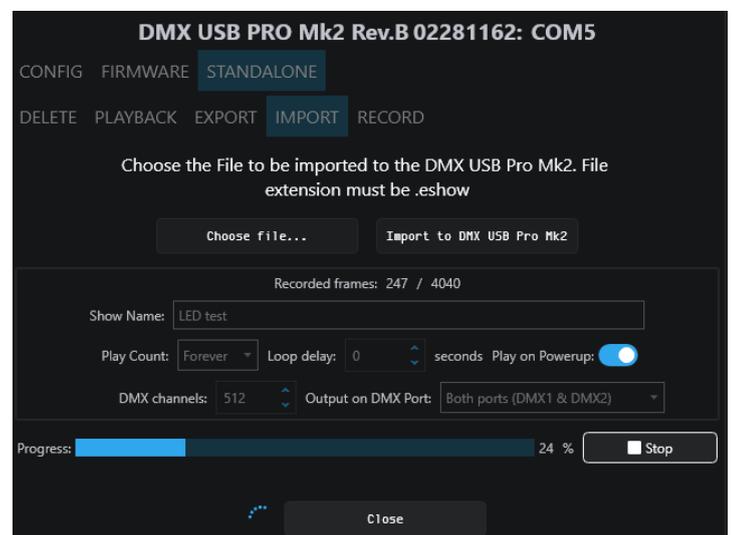
■ **Output Port:** The DMX Port to output the show (Port 1, 2 or both).
■ **Input:** Choose between a DMX input using the DMX Male connector on the breakout cable, Art-Net through the connected computers internal loopback IP address (127.0.0.1) or Artnet through network.
  □ **Art-Net Universe:** If Art-Net is set as the Input. Then an Art-Net Universe will need to be specified.
■ **Recording Control:** By enabling Recording Control, and selecting the Trigger Channel and respective value, it will only record whilst the trigger is active. Once the selected trigger channel and value is not sent anymore, the recording will stop automatically. It will still need to be manually stopped to proceed to next step of recording.

Recording begins, only when the first frame is captured. Recorded frames as counted, are shown and an estimate of the memory usage is also shown via the progress bar. The recording will stop automatically if all memory has been used.

There is no preview available during recording.

Once the recording process has finished, click on "Stop". Once the recording has been stopped, click on "Upload to DMX USB PRO Mk2" button. This will then load the show file onto memory of DMX USB PRO Mk2 and the progress is shown on the page. It is important, not to interrupt the memory load process, as it might corrupt the show. Please wait till the upload progress finalises.

Once complete, the page will reload, and display message of show stored on device. Head over to PLAYBACK tab to play the standalone show.

DMX receive

User may inspect DMX data received by DMX USB PRO MK2 via INPUT tab in EMU.

By selecting DMX USB PRO MK2 as the input device on the left side dropdown list. Individual channel will light up (light blue), indicating DMX data received.

By manually highlighting the channel, the DMX value received will be displayed in the plot beneath the matrix.
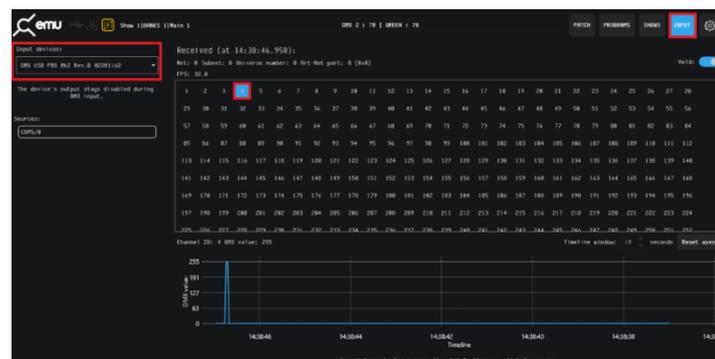
MIDI (legacy feature)

The DMX USB PRO Mk2 has the capacity to support the legacy 'DMX + MIDI accessory cable (PN: 79147)'. **discontinued Q1 2021**. This is a non-class compliant MIDI implementation included as part of the DMX USB PRO Mk2's MIDI API.

Legacy software (PRO-Manager) provides the ability to send test MIDI notes and display received MIDI data.

MIDI Connector pinouts

5pin MIDI OUT				
Pin 1: NC	Pin 2: 0V	Pin 3: NC	Pin 4: Data +	Pin 5: Data -
5pin MIDI IN				
Pin 1: NC	Pin 2: NC	Pin 3: NC	Pin 4: Data +	Pin 5: Data -

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DMX ports

Send and receive DMX using the DMX USB Pro Mk2 breakout cable. The DMX USB Pro Mk2 has the hardware capabilities to output 2 Universes of DMX whilst also inputting 1 Universe of DMX at the same time.

Depending on how your 3rd party software of choice has implemented the DMX USB Pro Mk2 API, the hardware capabilities may be limited.

DMX out

The DMX USB Pro Mk2 breakout cable feature two DMX Female ports to allow the DMX USB PRO Mk2 to control DMX Lights connected to it via DMX512.

It is not necessary to have any connection to the DMX Out socket (or a breakout cable connected) while programming the DMX USB PRO Mk2.

Some software used with the DMX USB PRO Mk2 is limited and may not support 2 full universes.

DMX in

The DMX USB Pro Mk2 breakout cable features one DMX Male port, which can be used for DMX In. This socket should be connected to the DMX512 controller or console whose output is to be captured by the DMX USB PRO Mk2. Input is captured and sent to the software interfacing with the DMX USB PRO Mk2.

Some software used with the DMX USB PRO Mk2 is limited and may not support DMX Input.

- Although there is only one DMX Input (DMX1) socket in the breakout cable, the other socket (DMX2) can also be used as an input by using a Gender Changer
- Each port can only be used as input or output at any single time.
- Both ports are isolated and separated, so one can be used to receive DMX input, and the other to output DMX, as long as the software supports this operation.

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Servicing, Inspection & Maintenance

- **The device has no user serviceable parts. If your installation has become damaged, parts should be replaced.**

- **Power down the device and ensure a method is in place to stop the system from becoming energized during servicing, inspection & maintenance.**

Key areas to examine during inspection:

- Ensure all connectors are mated securely and show no sign of damage or corrosion.
- Ensure all cabling has not obtained physical damage or been crushed.
- Check for dust or dirt build up on the device and schedule cleaning if necessary.
- Dirt or dust buildup can limit the ability for a device to dissipate heat and can lead to damage.

The replacement device should be installed in accordance with all steps within the installation guide. To order replacement devices or accessories contact your reseller or message ENTTEC directly.

Cleaning

Dust and dirt build up can limit the ability for the device to dissipate heat resulting in damage. It's important that the device is cleaned in a schedule fit for the environment it is installed within to ensure maximum product longevity. Cleaning schedules will vary greatly depending on the operating environment. Generally, the more extreme the environment, the shorter the interval between cleanings.

- **Before cleaning, power down your system and ensure a method is in place to stop the system from becoming energized until cleaning is complete.**

- **Do not use abrasive, corrosive, or solvent-based cleaning products on a device.**

- **Do not spray device or accessories. The device is an IP20 product.**

To clean an ENTTEC device, use low-pressure compressed air to remove dust, dirt, and loose particles. If deemed necessary, wipe the device with a damp microfiber cloth.

A selection of environmental factors that may increase the need for frequent cleaning include:

- Use of stage fog, smoke or atmospheric devices.
- High airflow rates (i.e., in close proximity to air conditioning vents).
- High pollution levels or cigarette smoke.
- Airborne dust (from building work, the natural environment or pyrotechnic effects).

If any of these factors are present, inspect all elements of the system soon after installation to see whether cleaning is necessary, then check again at frequent intervals. This procedure will allow you to determine a reliable cleaning schedule for your installation.

Package Contents

- DMX USB PRO MK2
- USB Type-A -> Micro USB Type-B Cable
- DMX Breakout cable 0.1M - DB15 to 3x 5pin DMX

Ordering Information

For further support and to browse ENTTEC's range of products visit the ENTTEC website.

Item	Part No.
DMX USB PRO Mk2	70314

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Due to constant innovation, information within this document is subject to change.