ENTTEC DMX USB Pro Mk2 Interface User Guide

Contents

ENTTEC

ENTTEC DMX USB Pro Mk2 Interface

OVERVIEW

The DMX USB Pro Mk2 is a USB -> DMX device capable of sending or receiving up to 1024 DMX channels through one simple USB 2.0 connection. It's supplied with a DB15 to DMX Dual DMX output cable to make a connection to your DMX / RDM lighting equipment simple.
The DMX USB Pro Mk2 works with a broad array of supported 3rd party software running on Windows, Linux or macOS. The Pro Mk2 features full backward compatibility with software that supports the original DMX USB Pro, to output a single universe.
A 1 universe DMX stream can be recorded using the DMX input port; or using Art-Net and saved onto the USB Pro Mk2's internal memory for infinite looping or for a fixed number of loops after powerup. The Pro Mk2's durable machined aluminum body makes it well suited to life on the road and 1500V full isolation for both data and power protects your computer from any stray voltages on the DMX line.
The DMX USB Pro Mk2 features an internal frame buffer for consistent DMX generation with perfect timing without reliance on your computer's processor.

Features

- Two universes (512 channels each) of input or output (one per DMX port).
- Fully compliant with USITT DMX512-A.
- RDM enabled (ANSI E1.20 compliant).
- Output refresh rate configurable from 1 to 40 FPS (Frames Per Second).
- Standalone mode: playback a single recorded DMX show on power-up.
- Configurable MAB and Break time using ENTTEC's Pro Manager Software to accommodate non-standard equipment.
- 1500V full isolation (data & power lines to protect your computer from surges on the DMX line).
- Drivers for Windows, macOS and Linux (drivers released and maintained by FTDI).
- Compatible with various open-source and professional lighting control programs.
- Backward compatibility with software that supports ENTTEC's DMX USB Pro.
- Developer API available to integrate into your own software

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 an 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 product's 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 or clamp 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.

Basic setup

Install Drivers

- DMX USB Pro MK2 communicates with a computer using FTDI D2XX drivers. These drivers enable the DMX USB Pro MK2 to be compatible with a range of operating system including
- Windows, Mac, and Linux (including Raspberry Pi).
- Visit the FTDI website for the latest drivers and operating system installation support:
- ftdichip.com/Drivers/D2XX.htm
- Alternatively, download ENTTEC PRO-Manager software which includes the driver setup for Windows or Mac (up to OS 10.12) from the ENTTEC website.
- **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’.

Connecting DMX USB Pro MK2

1. Connect the DMX USB Pro MK2 via the Mirco USB 2.0 port to the computer using the supplied USB cable.
2. Attach the DB15 breakout connector to the Breakout port on the DMX USB Pro Mk2.
3. Using standard DMX cable, connect any DMX-enabled fixtures to the DMX USB Pro Mk2.

Control Software

Load the control software of choice onto the computer. Choose between open-source (free) and professional (paid) software. For a full list of ENTTEC recommended software, please visit the DMX USB Pro Mk2 website. Alternatively, use the DMX USB Pro Mk2 API to write custom software.

Functional features

Adjustable refresh rate

The DMX USB PRO Mk2 output settings can be configured using PRO-Manager. 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. 10 is the Default.
- Break Time (µsec): This can be set between 96 and 1355. 96 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 that 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 PRO-Manager software.
- Recordings can be made either by using the DMX USB Pro Mk2's DMX input or Art-Net though the connected computers internal loopback IP address (127.0.0.1).
- The DMX USB Pro Mk2 only records the changing frames, to maximize 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 Pro Manager or on Power Up of the DMX USB Pro Mk2
- 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 that 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

Included in the box:

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
Steady Red	Error Mode
Flashing Red	A bad or unrecognizable API message was received.
Steady Green	DMX/RDM packet sent on port 1.
Flashing Green	DMX/RDM packet received on port 1.
Steady Yellow	DMX/RDM packet sent on port 2.
Flashing Yellow	DMX/RDM packet received on port 2.
Steady Blue	The standalone show is playing.
Steady Purple	MIDI data sent MIDI output port. *(MIDI Breakout cable PN:*79147 *discontinued Q1 2021).*
Flashing Purple	MIDI data received on MIDI input port. *(MIDI Breakout cable PN:*79147 *discontinued Q1 2021).*

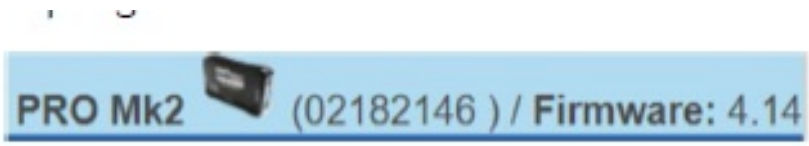
Error Mode: If the LED status Indicator is steady Red, please do the following:

- Disconnect and re-connect the USB cable to the DMX USB PRO Mk2.
- Use ENTTEC's PRO-Manager software to restore the device.

PRO-Manager

- ENTTEC provides a free cross-platform app to configure, troubleshoot, test and update DMX USB PRO Mk2. Pro-Manager is available to download from the ENTTEC website.
- PRO-Manager runs inside a browser window and it opens the page by default. This can also be found within a web browser by visiting: http://localhost:55555
- From the PRO-Manager Home page, click the button (Find Devices) to search for DMX USB PRO Mk2 connected to the computer. When a device is detected, select it from the dropdown list.

After a device has been selected, the Devices Serial Number and Firmware version will be displayed in the top Right of the screen.



Devices

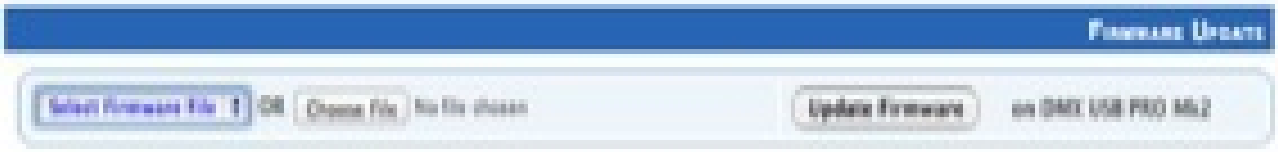
Once the DMX USB PRO Mk2 is connected to PRO-Manager, the Devices tab gives a quick overview of the selected device.
This will display:

- Devices Serial Number
- Devices Firmware version
- Device Type
- Device Capability
- Firmware Update

Firmware update

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 the firmware update procedure:
- Within PRO-Manager Device Tab, at the bottom of the screen is a drop-down to select a default firmware option, or download a version from the ENTTEC website and locate it manually with

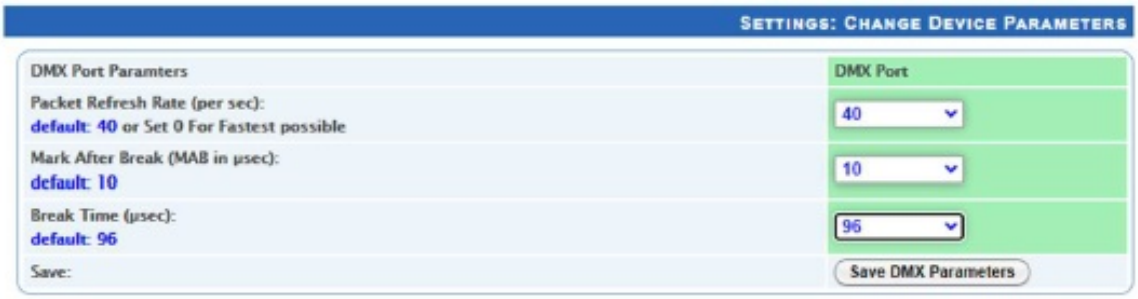


- After selecting the firmware file, click on the “Update Firmware” button and let the update proceed. Do not remove the USB until the update is complete. The update progress is displayed on the webpage.

- Once Finished, the page will automatically refresh, and device information will be updated to reflect the updated firmware.

Settings

Once the DMX USB PRO MK2 is connected to PRO-Manager, the Settings tab allows the adjustment of the DMX output parameters to accommodate for equipment that fall outside of the USITT DMX512-A standard.



The following parameters can be adjusted:

- 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. 10 is the Default
- Break Time (µsec): This can be set between 96 and 1355. 96 is the Default

DMX send

PRO-Manager can be used to test the output of the DMX USB Pro Mk2. The test output can be sent in the following ways:

- “Test Patterns” and select one of a the pre-programmed test patterns to test the DMX output
- “Live Art-Net” which will start listening for an Art-Net Broadcast though the loopback IP address (127.0.0.1).
- “From Faders” and drag the desired channels fader to test the DMX output.

The output can then be verified using either DMX-enabled equipment or by using a DMX tester While DMX is being output, the LED will blink to signify which DMX port is being used to output.
DMX Send is not designed as a Lighting Control software, it’s designed as a troubleshooting tool. After testing, PRO-Manager will need to be closed, before opening the preferred lighting control software. The DMX USB Pro Mk2 will only be recognized by one software at a time, as the software latches onto the USB port.

DMX receive

This tab will show a snapshot of the DMX values received through the 5-Pin Male XLR. Refresh the window to see the updated values.

100	97	255	119	153	87	163	236	186	130	120	156	255	240	103	103	115	102
160	170	255	136	255	0	132	0	211	67	169	136	0	139	111	0	164	186
255	0	118	0	48	197	160	247	255	216	149	242	255	255	255	0	137	163
115	149	184	96	98	109	103	112	117	101	40	106	95	102	125	178	103	102
176	87	148	57	255	170	30	127	82	124	0	157	0	0	0	0	113	0
206	53	184	0	112	0	157	0	48	0	0	0	114	0	0	109	49	68
169	0	0	96	57	81	0	85	90	242	107	0	62	0	162	0	250	0
0	255	145	0	82	79	156	200	0	166	137	144	22	103	255	102	0	121

Standalone mode

- 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 PRO-Manager software.
- Recordings can be made either by using the DMX USB Pro Mk2's DMX input or Art-Net though the connected computers internal loopback IP address (127.0.0.1).
- The DMX USB Pro Mk2 only records the changing frames, to maximize 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 Pro Manager or on Power-Up of the DMX USB Pro Mk2
- 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.

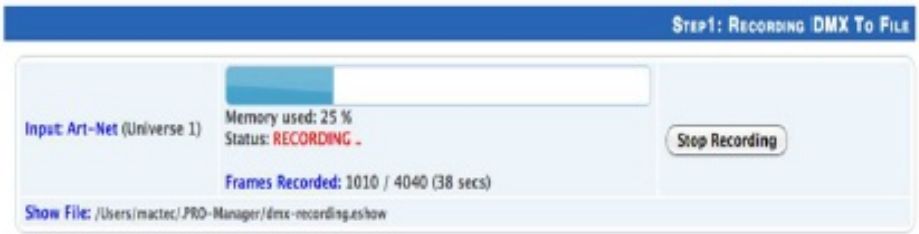
Recording Options:
Below is a guide to the recording process.

- Show Name: Name to identify the show being recorded
- DMX Channels: The number of channels to record per DMX Frame (less channels = longer duration of recording)
- 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).
- Output Port: The DMX Port to output the show. (Only one Port [single universe) is allowed).
- Input: Choose between a DMX input using the DMX Male connector on the breakout cable or Art-Net though the connected computer’s internal loopback IP address (127.0.0.1)..
  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.

Start Recording
Initially the sequence/show is recorded to a binary file, that is saved onto the connected computer in a location shown under the progress window.

- 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.



- While recording from Art-Net, the DMX is also output on selected DMX Port and serves as a preview of the

recording. Whilst recording from DMX input, the DMX will not be output during the recording. Once the recording process has finished, click on “Stop recording”. Once the recording has been stopped, click on the “Write to Memory” button. This will then load the show file on to the 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 finalizes.

Once complete, the page will reload and will display the Standalone Show Control window.

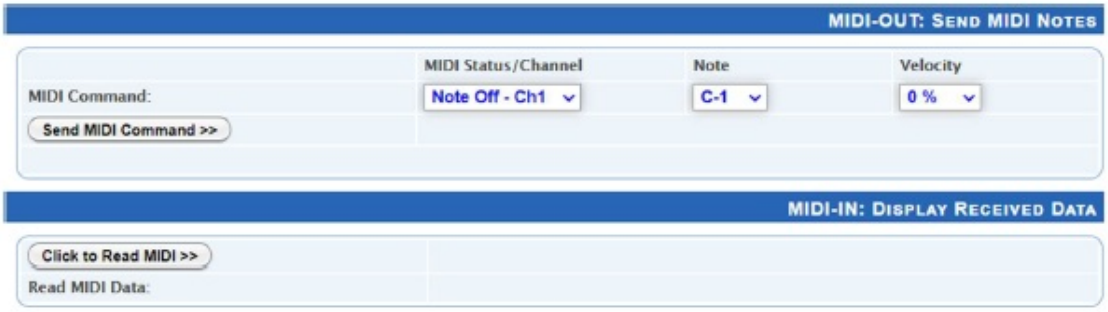
Standalone show control:
This page will display information based on the current sequence/show which has been recorded based on the settings set during the record process. Below is a guide to the Playback control.

- Play Icon: This will start the Standalone Mode playback
- Stop Icon: This will stop the Standalone Mode playback
- Record Icon: This will wipe the current Standalone sequence/show and allow a new sequence/show to be recorded

- Export Show to File: This will download the sequence/show on the DMX USB PRO Mk2 to a binary file to a computer connected to the DMX USB Pro Mk2. This file can then be transferred to another computer if required.
- Import Show to DMX USB Pro Mk2: This will import the sequence/show on the DMX USB PRO Mk2 from a binary file on the computer connected to the DMX USB Pro Mk2. This export/import process allows the duplication of a show file onto multiple DMX USB Pro Mk2 devices.
- Delete Show: This will delete the current sequence/show from the DMX USB Pro Mk2, ready for a new sequence/show to be recorded.

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.
- PRO-Manager provides the ability to send test MIDI notes and display received MIDI data with this legacy function.



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.

DMX connector pin out
5pin DMX OUT/ DMX IN:

- Pin 2: Data –
- Pin 3: Data +
- Pin 4: NC
- Pin 5: NC

Any suitable 3 to 5pin DMX adaptor can be used to connect to 3pin DMX cables or fixtures. Please note the pinout, before connecting to any non-standard DMX connector

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 cleaning.

- 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 devices 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

- PRO Mk2

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

Ordering information

Visit www.enttec.com for further support and browse ENTTEC's range of LED lighting and control products.

Item	Part No.
DMX USB PRO Mk2	70314

Documents / Resources

	ENTTEC DMX USB Pro Mk2 Interface [pdf] User Guide DMX USB Pro Mk2, Interface, DMX USB Pro Mk2 Interface