



eDMX PRO

LeDMX PRO

ultraDMX2 PRO

Record Playback



USER MANUAL

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INTRODUCTION

All eDMX PRO, LeDMX PRO and ultraDMX2 PRO products with SD card holders are capable of recording any incoming Art-Net or sACN stream sent from your lighting control system. DMXking recorders are built right into the output node, unlike other standalone recorder products, which not only removes another layer of equipment/cost but also provides distributed highly scalable near unlimited universe playback count. What you see at the output node is exactly what gets recorded.

Minimum firmware required v3.0+ Update to the latest firmware using eDMX Configuration Utility v1.14+ (Windows).

Features:

- Records whatever universes are configured on the device (i.e. eDMX4 PRO can record 4 universes)
- Up to 255 shows
- Scripted show playback
- Distributed recording and playback
- High capacity SD cards supported 32GB and beyond
- All protocols and merging supported by the device is also supported for recording
- Record from Art-Net and/or sACN sources
- Record DMX-IN ports for playback as DMX-OUT
- Record USB DMX sources (ultraDMX2 PRO and eDMX2 PRO only)
- Show playback can be triggered on:
 - Power up
 - ArtTrigger commands (broadcast and unicast)
 - External contact closure (check hardware for accessory port support)

SD CARD

COMPATIBLE SD CARDS

For performance reasons we only recommend Samsung EVO Plus and Samsung PRO Plus SD cards which have been extensively tested in DMXking hardware under maximum throughput conditions.

- Samsung EVO+ 32GB Model Code: MB-MC32DA
- Samsung EVO+ 64GB Model Code: MB-MC64DA
- Samsung PRO+ 32GB Model Code: MB-SD32D
- Samsung PRO+ 64GB Model Code: MB-SD64D

We anticipate adding more verified SD cards in the near future.

Most SD cards come pre-formatted with FAT32 or exFAT file systems. Both are FAT32 and exFAT are supported by the DMXking recorder system and we recommend exFAT because file sizes >4GB are supported.

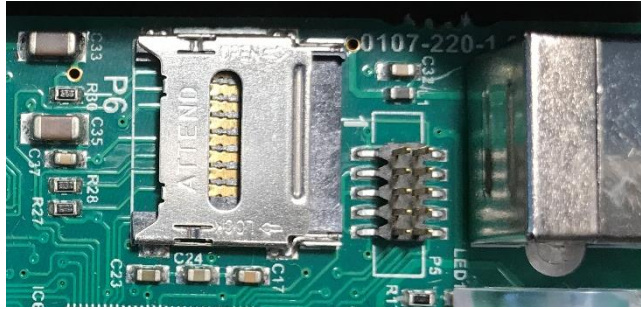
INSTALLATION / REMOVAL

Access to the internal SD card holder may require partial disassembly of the DMXking unit. This should be performed by a competent technician or DMXking distributor. Antistatic precautions should be taken and power down the unit first.

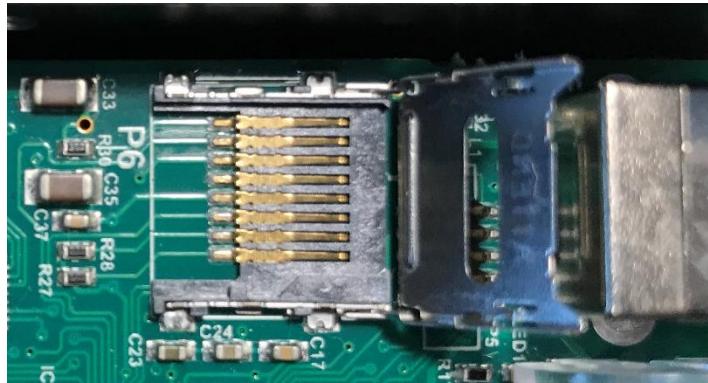
Take care to operate the SD card holder correctly. Observe Open and Lock arrows and slide the top cover in the applicable direction before hinging upwards. There is a reasonable force required to slide the top cover Open or Locked however almost no force is required to hinge it upwards when Open.



Socket empty and in Locked state



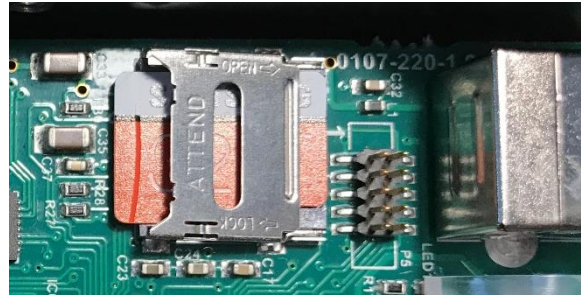
Socket cover moved to Open position



Cover hinge rotated upwards



MicroSD card placed on holder



Cover rotated down. Note it springs up a little so press it down before sliding to Lock position



Cover in Lock position. MicroSD card secured

CONCEPTS

Each node is capable of storing up to 255 show files and show duration is limited only by available space and file size if FAT32 is used. In most applications with 32GB+ SD cards it is unlikely your shows will run out of space.

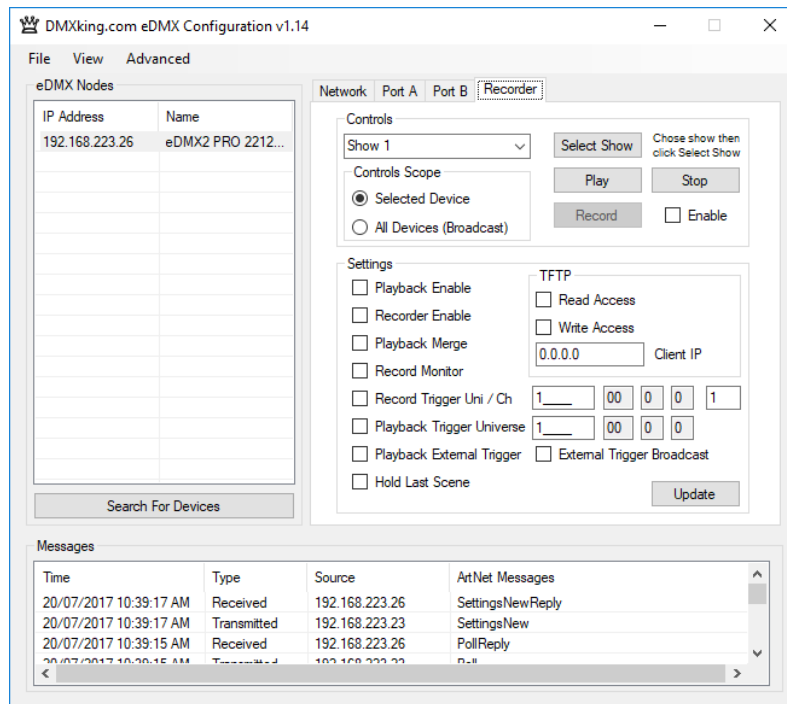
Network streams arriving at the node are timestamped and recorded into the selected show file. Whatever streams arrive at the node which would potentially appear on an output will be recorded regardless of whether another higher priority stream or merged source is also present. Non-network DMX-IN and USB-IN sources may also be recorded.

Playback of show files replicates the same network streams with all sACN priority and other merging still occurring exactly the same as live output. Live universe streams may be merged with playback or completely take over output(s) if higher priority for example. Any re-configuration of an output node such as assigning a different universe or pixel mapping will take effect because the recorded show file maintains universe specific information. A show file may be copied to another SD card where identical playback is required on many nodes.

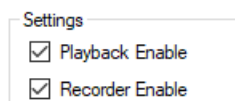
Show recording and playback are mutually exclusive. Only 1 show may be recorded or played back at a time and initiating a different show playback will immediately stop the previous activity.

BASIC SETUP

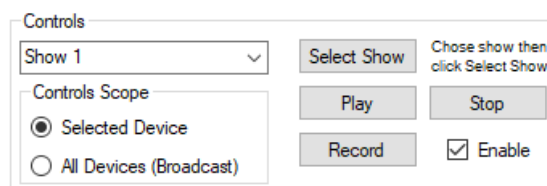
To configure record/playback features use eDMX Configuration v1.14+ (Windows OS). Firmware v3.0+ is required.



The Recorder tab contains all settings and manual controls required for operation of the record/playback features. There are other methods of control and triggering which are presented in other sections.



Playback Enable and Recorder Enable provide device wide control over what actions may occur through other controls or triggers. By default, both options are disabled and typical usage would be enabling both during show recording activities then disabling Recorder once the show(s) are stable so no accidental overwriting occurs.



The Controls panel contains a Controls Scope selection. You can direct Control commands to either the Selected Device or All Devices on a local area network segment through broadcast commands. Operation sequence is typically select a Show from the dropdown list then click Select Show followed by Play or Record. Stop will immediately stop either playback or recording.

SHOW RECORDING

BASIC OPERATION

Show recording can be initiated through the Controls panel or via network through Art-Net Trigger commands (refer to section on Art-Net Control).

Controls

Chose show then click Select Show

Controls Scope
 Selected Device
 All Devices (Broadcast)

Enable

Settings

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Playback Enable <input checked="" type="checkbox"/> Recorder Enable <input type="checkbox"/> Playback Merge <input type="checkbox"/> Record Monitor <input type="checkbox"/> Record Trigger Uni / Ch <input type="checkbox"/> Playback Trigger Universe <input type="checkbox"/> Playback External Trigger <input type="checkbox"/> Hold Last Scene | TFTP <input type="checkbox"/> Read Access <input type="checkbox"/> Write Access <input type="text" value="0.0.0.0"/> Client IP <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="text" value="1"/> <input type="text" value="00"/> <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="1"/> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="text" value="1"/> <input type="text" value="00"/> <input type="text" value="0"/> <input type="text" value="0"/> </div> <input type="checkbox"/> External Trigger Broadcast <input style="margin-top: 10px; width: 100px;" type="button" value="Update"/> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Steps required to record a show:

- Verify your universe stream source(s) are functioning by observing DMX512 and/or Pixel outputs.
- Select Show number from dropdown dialogue then click Select Show.
- Enable the Record button by selecting the adjacent Enable box.
- Start your universe stream sources(s) and click Record.
- Click Stop once the sequence/show has completed.

At this point you have generated a show file on the SD card which can be played back upon demand. If you select the same show number and Record again it will overwrite the existing show no questions asked. To prevent accidental overwriting of shows, untick the Recorder Enable setting and click Update.

By default, during recording DMX512 and Pixel ports are disabled. By selecting the Record Monitor setting you can observe the output during recording. With LeDMX4 PRO configured for maximum pixels on every output with full pixel mapping depending on universe update rate there may not be sufficient processing capacity to both record and output simultaneously.

Stream recording starts from the first Art-Net or sACN message received after Record is clicked.

RECORD TRIGGERING

Usually a show or lighting sequence has a definite start and finish state and it may be a little tricky to start the show and click Record then Stop at a precise moment especially if the show is intended to be looped for example without noticeable transition.

Record Trigger Uni / Ch

By selecting Record Trigger Universe / Channel the show recording will not occur unless the specified channel is above 0%. Universe is sACN 1-63999 with Art-Net equivalent displayed adjacent. Channel can be entered in the right-hand box 1-512. Record Trigger Universe is independent of any other configured universe on the device and in larger systems would be broadcast or multicast to multiple devices in order to synchronize recordings.

Steps required to record a show with triggering:

- Verify your universe stream source(s) are functioning by observing DMX512 and/or Pixel outputs.
- Select Show number from dropdown dialogue then click Select Show.
- Enable the Record button by selecting the adjacent Enable box.
- Click Record. (Nothing is recorded yet)

- Start your universe stream sources(s) including the Record Trigger universe.
- Stream recording is only active when the Trigger Universe/Channel is above 0%.
- Click Stop. (Your Record Trigger probably stopped stream recording prior to this)

SHOW PLAYBACK

BASIC OPERATION

Show playback can be initiated through the Controls panel or via network through Art-Net Trigger commands (refer to section on Art-Net Control).

The image shows two panels from a software interface. The top panel, titled 'Controls', contains a dropdown menu with 'Show 2' selected, a 'Select Show' button, and a note 'Chose show then click Select Show'. Below this are 'Play' and 'Stop' buttons, and a 'Record' button with an 'Enable' checkbox. The 'Controls Scope' section has two radio buttons: 'Selected Device' (selected) and 'All Devices (Broadcast)'. The bottom panel, titled 'Settings', contains several checkboxes: 'Playback Enable', 'Recorder Enable', 'Playback Merge', 'Record Monitor', 'Record Trigger Uni / Ch', 'Playback Trigger Universe', 'Playback External Trigger', and 'Hold Last Scene'. The 'Record Trigger Uni / Ch' and 'Playback Trigger Universe' settings are shown as numeric input fields with values 1, 00, 0, 0, and 1. The 'TFTP' section has checkboxes for 'Read Access' and 'Write Access', and a 'Client IP' field with the value '0.0.0.0'. An 'Update' button is located at the bottom right of the settings panel.

Steps required to play back a show:

- Select Show number from dropdown dialogue then click Select Show.
- Click Play.
- To stop playback before the show has finished click Stop.

Playback Merge

Selecting Playback Merge permits live network streams to be merged in with play back streams or take over depending on sACN Priority setting. Note that device limitations such as number of merge stream sources still apply regardless of live or playback source (i.e. you can't merge 2 live streams with 1 playback stream since 3 streams exceeds the merge source limit). There are no limits on the number of different sACN Priority streams and a scenario might be looped playback at priority 99 which is overridden by a lighting console at priority 100 (when present) which is overridden by an iPad at priority 101 (when present).

PLAYBACK TRIGGERING

Playback Trigger Universe 1 00 0 0
 Playback External Trigger External Trigger Broadcast

A dedicated Playback Trigger Universe can be enabled. This is independent from any configured universes for DMX512 or Pixel outputs. Typically, this universe would be broadcast or multicast to multiple devices for synchronized playback triggering from a lighting console or other Art-Net/sACN source however unicast is also supported.

Configuring a node port for DMX-IN on the same universe as the Playback Trigger Universe permits a DMX512 source to trigger show playback.

Mapping of the Playback Trigger Universe channels to Show number is as follows:

- Show 1 = Channel 2
- Show 2 = Channel 3
- [Show 4 thru Show 254]
- Show 255 = Channel 256
- Show 0 (script run) = Channel 1

Channel levels are split into 3 ranges to allow various options for playing back a show. Stop, Continue, Start.

- 0-33% Stop show
- 34-66% Continue show
- 67-100% Start show

This mapping allows a slider to be used to active a show (67-100%) then whilst it runs move to Continue (34-66%) so it runs to the end and finally upon completion it can be moved to the Stop position (0-33%). Optionally the same show can be looped by simply leaving the channel in Start show range (67-100%). At any time, a show may be stopped with the channel in Stop (0-33%).

The lowest Channel takes precedence thus setting Channel 2 & 3 to 100% will run Show 1 but if Channel 2 is stopped (level 0%) then Show 2 will run since it was the next highest channel with a Start level.

PLAYBACK EXTERNAL TRIGGER

Simple contact closure external triggering is supported on DMXking interface units which have an RJ11 accessory socket. Not all devices have this feature which is being progressively rolled out over most of the product range. We recommend using the DMXking external trigger module for easy screw terminal connections.

Input mapping:

- I/O Port 1 = Show 1
- I/O Port 2 = Show 2
- I/O Port 3 = Show 3
- I/O Port 4 = Script Run

RJ11 Pin mapping:

| RJ11 Pin number | Function |
|-----------------|-----------------------|
| 1 | +5V (do not connect!) |
| 2 | I/O Port 1 |
| 3 | I/O Port 2 |
| 4 | I/O Port 3 |
| 5 | I/O Port 4 |
| 6 | GND |

To trigger and input connect the I/O Port to GND (pin 6). Lowest I/O Port takes priority. Not sure which pin is Pin 1? Use a multimeter to check for a positive voltage between 1 and 6.

Playback External Trigger External Trigger Broadcast

Select Playback External Trigger to enable. External Trigger Broadcast permits a single unit on the network to broadcast the Show run commands to others on the same Local Area Network.

PLAYBACK COMPLETION ACTION

When playback reaches the end of a show file there are several things which determine what happens next on the DMX512 and/or Pixel outputs.

Hold Last Scene

Selecting Hold Last Scene will maintain whatever the last channel states were present at the end of a show file. If those states were blackout or sACN stream terminate then outputs will of course be off already before the hold.

Merge Mode

Highest Takes Priority (HTP)

Latest Takes Priority (LTP)

Timeout all sources

Depending on the status of DMX Output Merge Mode configuration an output may timeout as it usually would when network stream data ceases. Selecting Timeout All Sources will shut down playback sources after 3 seconds of no stream activity. Leave this unchecked and Hold Last Scene checked if you want the last show state to hold after playback completes.

When a Stop command is received output states are set to zero / blackout.

PLAYBACK AUTOMATION

Firmware v3.0 includes a basic scripting mechanism intended to run a sequence of show files optionally looped and optionally auto-run at power on. The script format is fairly rigid but fully functional for the intended purpose. Using Art-Net Trigger messages a more sophisticated playback automation system can be achieved.

A special file named "show000.txt" contains the script which is accessed through a TFTP file transfer session. In a future eDMX Configuration Utility version a simple user interface for updating script files will be available.

The file is in ASCII text and for v3.0 firmware must start with the following lines:

```
DMXKING  
VER=0.1
```

Followed by either:

```
AUTORUN or AUTOOFF
```

A list of shows:

```
show001  
show002  
show006
```

And finally to loop the show list (optional):

```
show000
```

EXAMPLE SHOW SCRIPTS

Run script upon power up, show001 looped.

```
DMXKING
VER=0.1
AUTORUN
show001
show000
```

Run script only upon Play, show006 followed by show002 followed by show006 followed by show003 then stop.

```
DMXKING
VER=0.1
AUTOOFF
show006
show002
show006
show003
```

*Note each line must contain CR+LF characters at the end. Windows Notepad generates CR+LF on line ends however you'll need to check your Linux/OS X text editor is configured to do this.

ART-NET CONTROL

Underlying record/playback is controlled by ArtTrigger commands. See the latest version of the ArtNet specification for details of the exact message format.

OEMCode 0xFFFF or 0x6A6B are accepted through either unicast or broadcast ArtTrigger messages.

Key = 3, SubKey = show number (0 – 255 where 0 is the script file “show”)

Key = 2, SubKey = command (see table below)

| SubKey value (for Key = 2) | Command |
|----------------------------|--------------------------------------|
| 'G' (Hex 0x47) | Show GO |
| 'S' (Hex 0x53) | Show STOP |
| 'R' (Hex 0x52) | Show RECORD |
| 'P' (Hex 0x50) | Show PAUSE (not implemented in v3.0) |

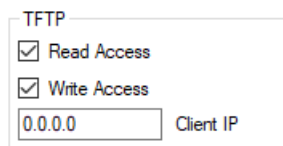
Typical ArtTrigger command sequences:

| Sequence of ArtTrigger messages | Action |
|--------------------------------------------------------------------|-----------------------------------------------------|
| ArtTrigger Key = 3, SubKey = 1 + ArtTrigger Key = 2, SubKey = 'G' | Start playback of show001 |
| ArtTrigger Key = 2, SubKey = 'S' | Stop playback or recording of current show (if any) |
| ArtTrigger Key = 3, SubKey = 99 + ArtTrigger Key = 2, SubKey = 'R' | Start recording show099 |
| ArtTrigger Key = 3, SubKey = 0 + ArtTrigger Key = 2, SubKey = 'G' | Start script file playback |

If you plan on implementing ArtTrigger in your own software use WireShark to observe messages generated by the eDMX Configuration Utility when Select Show (Key 3) and Play/Stop/Record (Key 2) are clicked to verify your own code is generating the correct message format.

FILE ACCESS

Low level file access to the SD card is available through TFTP protocol. All files are stored in the root directory and may also be externally manipulated/copied/deleted using any computer capable of mounting FAT32 or exFAT volumes. For large show files of many GB size the speed of transfer is not great since the DMXking device only have a fraction of the computing power a typical desktop computer has.



By default, TFTP file access is disabled. Read Access and Write Access is controlled separately and a specific Client IP may be specified to limit connections to only 1 computer. Setting Client IP to 0.0.0.0 allows any computer on the network access.

Microsoft Windows OS does not come with a TFTP Client program enabled. You can enable this application through Control Panel. Search "Turn Windows features on or off" and locate "TFTP Client" in the list.

It is recommended a folder is created under the root directory for storing show and script files. For example C:\shows. Then create sub folders for each DMXking device using whatever naming convention suits your application (e.g. C:\shows\LeDMX-Unit-1)

To write a show script file using Windows TFTP Client perform the following steps:

- Open a Command Prompt window.
- Type `cd c:\shows\LeDMX-Unit-1`
- Type `tftp -i 192.168.0.113 PUT show000.txt show000.txt`

Of course you would need to have created the file show000.txt first on the computer and saved it in the c:\shows\LeDMX-Unit-1 folder. Also the IP address of your unit may well be different from the example of 192.168.0.113 so change accordingly.

To read a show script file:

- Open a Command Prompt window.
- Type `cd c:\shows\LeDMX-Unit-1`
- Type `tftp -i 192.168.0.113 GET show000.txt show000.txt`

The show000.txt file can be opened with Notepad, edited and the PUT back again as above. Obviously once the Command Prompt window is open and in the correct folder location you can skip those steps and just run tftp commands.

To read the SD card root directory file list:

- Type `tftp -i 192.168.0.113 GET files.txt files.txt`

This is a special file that is dynamically generated upon request since the TFTP protocol does not support directory listing by itself. Open files.txt in Notepad to view the directory listing.

You can use any TFTP Client application you like and for large file transfers the Windows TFTP Client doesn't actually comply with wraparound block counts so fails miserably. Our recommendation is the haneWIN TFTP implementation which can be found here <https://www.hanewin.net/tftp-e.htm>