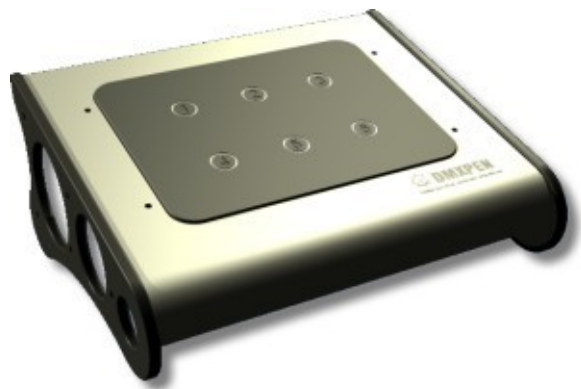




# User Manual

Version 1.03 – March 2010



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## 1.0 Introduction

Briefly the DMXPen products mission is record and carry easily: "*Design your show, record and bring with you*".

*Why recording?* The first goal of a professional light programmer is to select a light desk and learn to use it in the best way, because this means freedom of expression and productivity.

The DMXPen products range improve this concept taking care of recording what the light programmer realize what his preferred equipment.

*Why carry?* Often the light programmer presence is not necessary during the show playback, so he can realize the show and record it so the user has only the duty to activate his playback (i.e. fair booth, shop, club, etc.)

Moreover doing this with a normal light desk, mean carry heavy or expensive equipment that usually are not so familiar to the users (i.e. barman, custodian, etc.).

This is another issue improved from the DMXPen products because contains only the show engine with a simple user interface at a very low cost.

On the [www.dmxpen.com](http://www.dmxpen.com) web site, many brief documentation showing DMXPen products operation are provided that we suggest to use.

## 2.0 DMX512 ed ArtNet

Many light desk systems are PC based and are responsible to edit the show and calculate the light value step frame per frame in real time. Then is necessary to transmit this values to the fixtures using the DMX512 protocol. PC are not provided with DMX512 ports, but in most case are provided with ethernet port, so to connect PC to fixture is necessary a protocol conversion.

This concept can be applied also to many light desk that are equipped with ethernet port.

One of the most used protocol the transport DMX512 data over the ethernet line is the ArtNet protocol (Designed by and Copyright Artistic Licence (UK) Ltd) also implemented on the DMXPen products that is from this side a complete *ArtNet Node* (device able to translate ArtNet protocol on DMX512 protocol and DMX512 protocol on ArtNet protocol).

The ethernet port availability on DMXPen products allow us to:

- extend DMX universe
- develop a device network very easily (we can find on the market a lot of ethernet HUB, Switch or Access Point allowing us to: make a WiFi ArtNet transmission, make a geographic node distribution, etc.)
- implement ArtNet on a light desk not provided with an ArtNet interface (on DMXPen we have a bidirectional conversion so we can select DMX→ArtNet direction, connect the DMXPen products on a Light Desk DMX Port OutPut and obtain an ArtNet line on his ethernet port)
- analyse a DMX line from a PC

Following a brief explanations of some term used in this document:

*MAC Address:* 48bit unique physical address number assigned to device by the producer.

*IP Address:* 32bit address number that identifies uniquely any nodes or servers in a network. In DMXPen products the IP Address is assigned by the user. By default ArtNet protocol uses a Class A IP address scheme a 2 address group: 2.x.x.x for primary ArtNet address and 10.x.x.x for secondary ArtNet address.

*Subnet Mask:* 32bit address number that defines which part of the IP Address represents the network. By default all ArtNet implementations require a Subnet Mask = 255.0.0.0. This means that the first byte of the IP Address, represent the network address and the remaining three bytes represent the node address.

*Port:* ArtNet protocol uses UDP protocol as transport layer over TCP/IP protocol. Port number is a 16bit transport layer address used to identify the service. Artnet protocol uses only one port address of 6454 (0x1936). Anyway DMXPen products give the capability to change it in case of complex configuration that need a different value.

*Universe:* A 512 channels data link originated from a single source is referred to as a Universe.

*Node:* A device able to receive ArtNet control data. DMXPen products are devices able to convert DMX512 frame on ArtNet frame and vice-versa.

*Server:* A device able to transmit ArtNet control data.

*BroadCast Address:* Destination IP Address used by server to send information to all the devices connected to the network.

*ArtNet Subnet:* A group of 16 consecutive Universe is referred to as a subnet.

*ArtNet Universe:* Universe address on a single ArtNet subnet group.

*Wiring and connections:* usually ethernet device are connected through CAT5 cables using RJ45 connectors. We can have 2 type of CAT5 cables: cross cable and patch cable. *Cross* cables are commonly used to connect 2 ethernet device directly (we can use a cross cable to connect a DMXPen device directly to a PC) while *patch* cables are used to connect devices to HUB or Switch.

*Configuration Example:*

Regarding the device IP Address configuration we provide an example: image a network composed by 3 devices: 1 device server composed by a PC running a lighting software generating ArtNet e 2 DMXPen Live responsible to receive ArtNet signal to be converted on DMX512 line connected to 2 fixture lines. Moreover we indicate the 4 number composing IP Address as A.B.C.D.

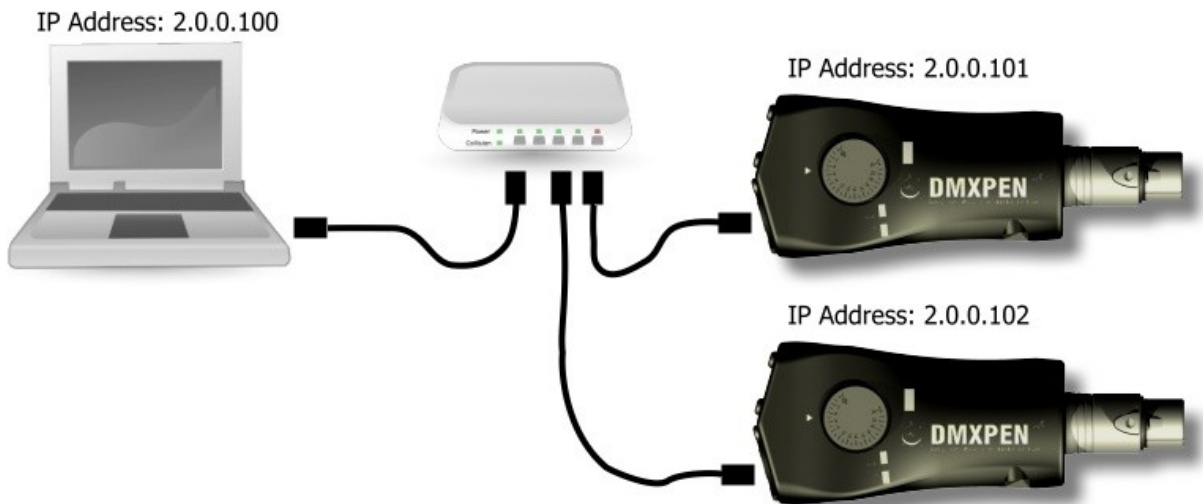
To realize i.e. a Class A network as indicated on ArtNet specification (A number of the IP Address has to be common on all devices), we can start selecting the PC IP Address, i.e. 2.0.0.100 and a SubNet Mask as 255.0.0.0. After that we know that DMXPen Live IP Address need the same PC IP Address A number (2) SubNet Mask 255.0.0.0 and Broadcast Address 2.255.255.255. We don't need other particular configuration, so we leave unchanged the ArtNet port.

For the universe number configuration, suppose to use the first 2 DMX512 universes obtaining the following configuration

| PC          |           |
|-------------|-----------|
| IP Address  | 2.0.0.100 |
| Subnet Mask | 255.0.0.0 |

| First DMXPen Pro        |               |
|-------------------------|---------------|
| IP Address              | 2.0.0.101     |
| Subnet Mask             | 255.0.0.0     |
| ArtNet Port             | 6454          |
| Broadcast Address       | 2.255.255.255 |
| Subnet Switch           | 0             |
| Universe Address Switch | 0             |

| Second DMXPen Pro       |               |
|-------------------------|---------------|
| IP Address              | 2.0.0.102     |
| Subnet Mask             | 255.0.0.0     |
| ArtNet Port             | 6454          |
| Broadcast Address       | 2.255.255.255 |
| Subnet Switch           | 0             |
| Universe Address Switch | 1             |



*Figure 1: IP Address distribution example*

At the end of this configuration, the devices are ready to use.

Refer to [www.esta.org](http://www.esta.org) web site for more DMX512 information and [www.artisticlicence.com](http://www.artisticlicence.com) web site for ArtNet protocol information.

### 3.0 PenSuite

#### 3.1 Installation

Configure network parameter is possible connecting DMXPEN device to a PC, powering it and launching PenSuite software. There are 2 possible connection type: cross cable direct connection and patch cable through HUB connection.

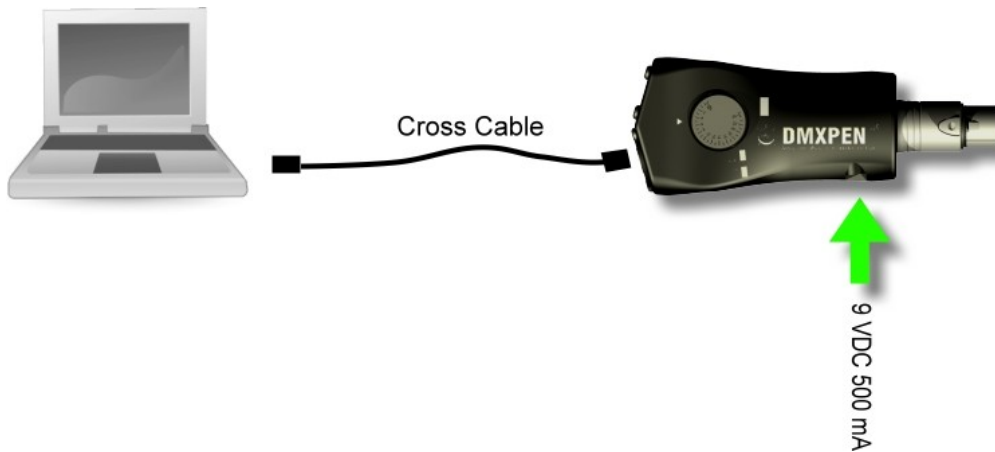


Figure 2: Cross cable direct connection

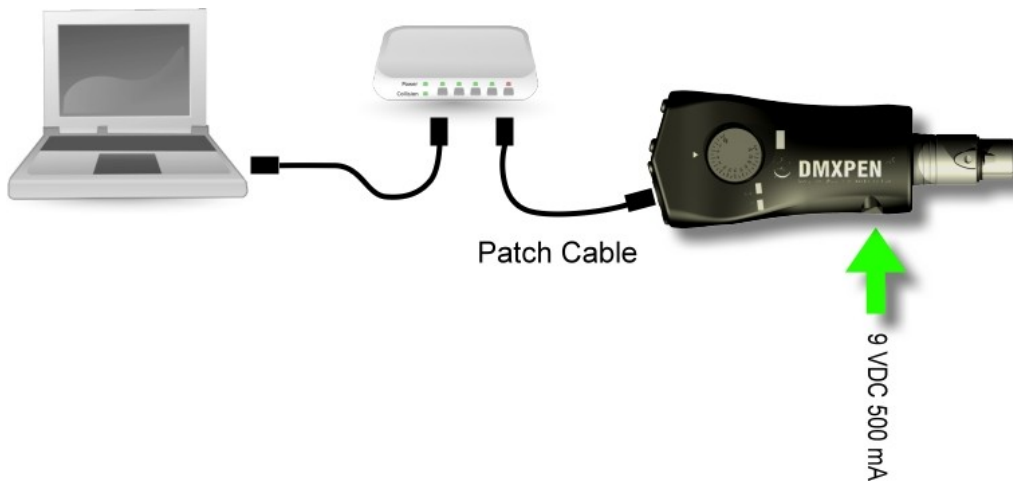


Figure 3: Patch cable through HUB connection

If PenSuite is still not installed on you PC, you can download from [www.dmxpen.com](http://www.dmxpen.com) web site (software section) or copy from the device on board microSD Card provided.

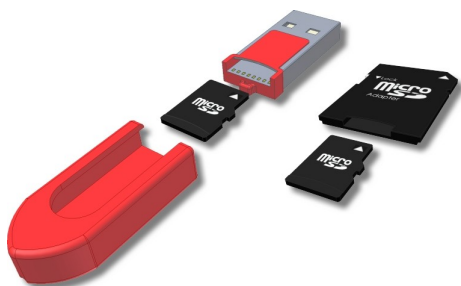


Figure 4: microSD card plug on card reader



Figure 5: microSD card reader connection to PC

PenSuite software is available in 3 versions: one Microsoft Windows ® version and two Apple Macintosh version, one for MAC OS 10.4 and one for MAC OS 10.5 ® .

PenSuite do not constrain operator to use a particular PC operating system and do not require a big installation file: is a simple executable program files, that can be downloaded in compressed format (.ZIP for Microsoft Windows ®operating system and .DMG for MAC ® operating system) and directly launched.

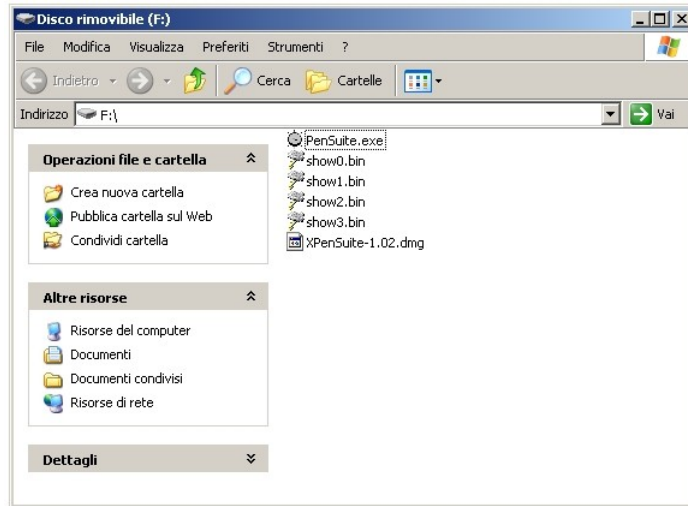


Figure 6: microSD card browsing



As you can see on the picture once launched, PenSuite is composed from 4 section: SetUp, Test DMX Out, Display DMX In e About.

### 3.2 SetUp

Once PenSuite started, the first operation to perform is the network scan to learn the device connected to the network.

To do this, press "Find Node" button and few second later the list below will be compiled with the node found on the network indicating his MAC and IP Address.

Now selecting any of the listed device, we tell to PenSuite to connect with him allowing edit, control and diagnosis operation on it.

Following the parameter associated to each device:

- **Name:** Device name assigned from the user to the device
- **IP Address:** Device IP Address
- **Subnet Mask:** Part of the IP Address represents the network
- **Broadcast Address:** Destination IP address for command directed to all devices
- **ArtNet Port:** ArtNet protocol UDP Port
- **ArtNet Subnet:** A group of 16 consecutive Universe is referred to as a subnet. This is the device group number (0 - 15)
- **ArtNet Universe:** Device Universe address on a single ArtNet subnet group.(0 – 15)
- **DMX TX:** DMXPen Device DMX transmission mode:
  - "DMX TX on ArtNet RX": Selecting this mode, DMXPen will transmit DMX frames upon ArtNet frame receiving only. In this way the DMX frame transmission will be synchronized with ArtNet frame transmission (useful to synchronize fast device like led systems).
  - "DMX TX on Fixed Rate": Selecting this mode, DMXPen will transmit continuously at the selected rate the last DMX frame received (useful to control fixtures that recognise DMX absence to standby or error condition, causing i.e. home positioning).
- **Data Direction:** As indicated from the icon on the middle of the PenSuite SetUp window, DMXPen devices perform also ArtNet → DMX and vice-versa protocol conversion and the arrows indicate the current setup. By clicking on the icon it is possible to change data direction. DMXPen Live, display this information lighting BLUE the multifunction LED in case of ArtNet → DMX conversion and SKY BLUE in case of DMX → ArtNet conversion.



Figure 7: DMX -> ArtNet conversion selection



Figure 8: ArtNet -> DMX conversion selection

Each time that a parameter is changed (except data direction changes), a star will appear to the right side of the parameter data entry and the "Store" button became active to remember to store on the device the new value to activate the modification.

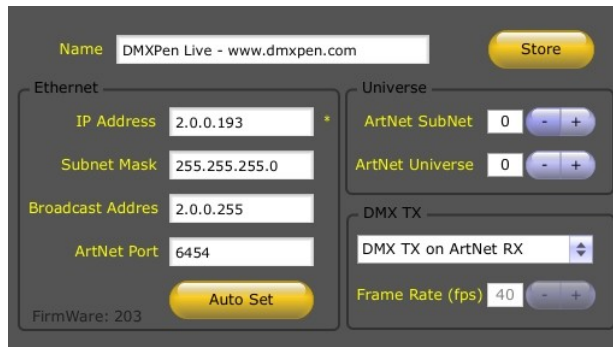


Figura 9: Esempio Modifica Parametri

To help beginner user to configure easily all this parameter an "Auto Set" button is provided. This procedure analyse the computer network configuration and calculate a standard device set up. After that to activate the new set up a "Store" button click is necessary.



Now the device is ready to use.

### 3.3 Recording

DMXPEN is able to record a lot of DMX or ArtNet stream recording session (up to 1000). Recording sessions are compressed and stored on the provided 2GByte on board microSD card. This corresponds to many hours of recording session. Anyway a card reader is provided to connect the microSD card to a PC allowing to handle recording session files like an USB memory stick. In this way copy/delete/backup operation on SHOWxxx.BIN named file recording session will be possible. It's also possible to use microSD card to store your own information, but remember to leave enough space for recording session.

DMXPEN products like the Live mode i.e., register a DMX signal stream coming from a DMX line but the provided XLR connector is a female type considered as DMX output line in the DMX standard. However DMXPEN Live DMX port is a bidirectional port and can be configured as input or output regardless. In this case we need to configure it as input and convert on 5 pole XLR male input connector type to be connected to a device that transmit DMX signal. To do this

a 5 pole XLR male-male adapter is provided.



Figure 10: 5pole XLR male-male converter to use during DMX signal recording

Before to start recording, any running playback as to be stopped and the data direction selected. This can be done in two ways: using PenSuite software, or using the on board selector.

To stop a running playback from PenSuite Software, select the device from the node list and press stop button. Press the on board selector to stop a running playback directly from DMXPen Live device.

To change data direction from PenSuite Software, select the device from the node list and press the change direction icon. Go to the changing direction position and pressing it for at least 3sec. To do the same directly from DMXPen Live device.

Remember that on ArtNet→DMX data direction, the device DMX port is configured as output and each frame received from the ethernet port will be transmitted to the DMX port.

On DMX→ArtNet data direction configuration, the device DMX port is configured as input and each frame received from the DMX line will be transmitted on the ethernet port at the Broadcast Address using the ArtNet protocol.

We can start recording session in two way:

Dopo aver selezionato la sorgente da registrare (DMX o ArtNet) cliccando sull'icona della DMXPen nella sezione di SetUp (Figure 6 e 7) ed accertandoci che il led multicolore assuma il colore appropriato (AZZURRO nel caso in cui la sorgente sia il DMX e BLU nel caso in cui la sorgente sia l'ArtNet), possiamo avviare la sessione di registrazione in 2 modi:

1. Through PenSuite DMX Show Control panel selecting the recording session number and pressing "Rec" button
2. Through the on board selector using DMXPen Live device: move to recording session number and press the selector for at least 3sec



Figure 11: Recording/Playback control panel

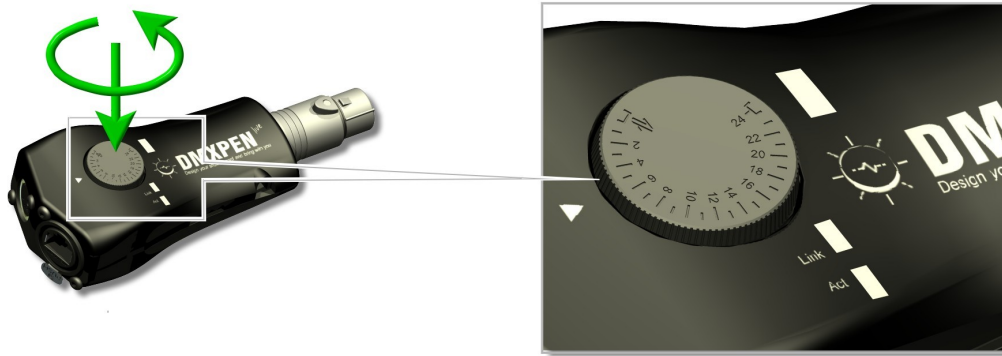


Figure 12: DMXPen Live on board selector

DMXPen products display the recording state directly from the device. Refer to device manual for more information.

DMXPen device record each received frame content and rate to guarantee a good playback fidelity.

Press PenSuite "Stop" button to stop recording session.

### 3.4 Playback

Playback can be done in 3 ways:

1. Through PenSuite DMX Show Control panel selecting the recording session number and pressing "Play" button
2. Through the on board selector using DMXPen Live device: move selector session number and press it
3. Through MIDI port: DMXPen products are arranged to receive *Program Change* MIDI command, used in most case from MIDI device to recall a preset.

Playback do not take care about data direction and send data on both DMX and ArtNet port: DMX (that is switched as output) and ethernet (using ArtNet protocol).

The playback state is stored on the DMXPen device to start automatically on each power on.

### 3.5 Test DMX Out



Selecting any device from the node list and pressing "Test DMX Out" button, ArtNet testing session of the selected device will be configured copying Device Name, IP Address, ArtNet Subnet and ArtNet Universe parameter. This automatic procedure help the operator that can edit this parameters directly from the Test DMX Out window if necessary. Now pressing "ArtNet Enable" button we can Start and Stop ArtNet frame transmission on the network.



Figure 13: Destination IP Address setup

PenSuite transmit one complete DMX512 Universe that means 512 DMX Channels. 16 of this can be connected to sliders to have a direct control on it. The edit box above each sliders allow to assign the DMX channel to control (on the figure below the first slider control DMX Channel 1, the second slider control DMX Channel 2 and so on)

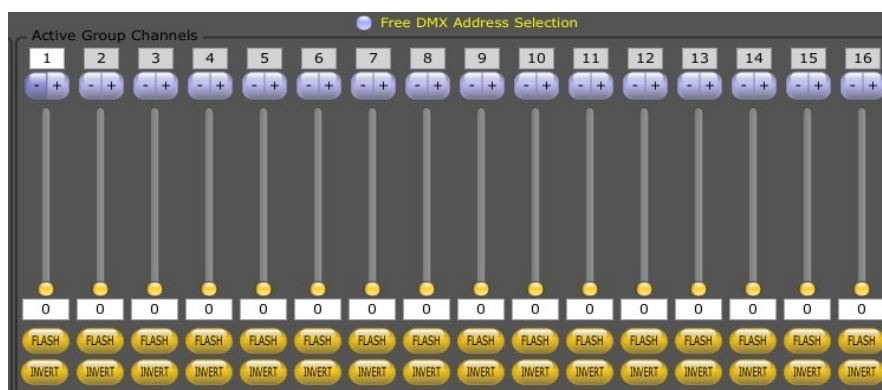


Figure 14: Slider's DMX Channel setup

With "Free DMX Address Selection" option unchecked, the 16 DMX Channels are configured as consecutive. Editing the first DMX Channel Address PenSuite will calculate the other automatically.

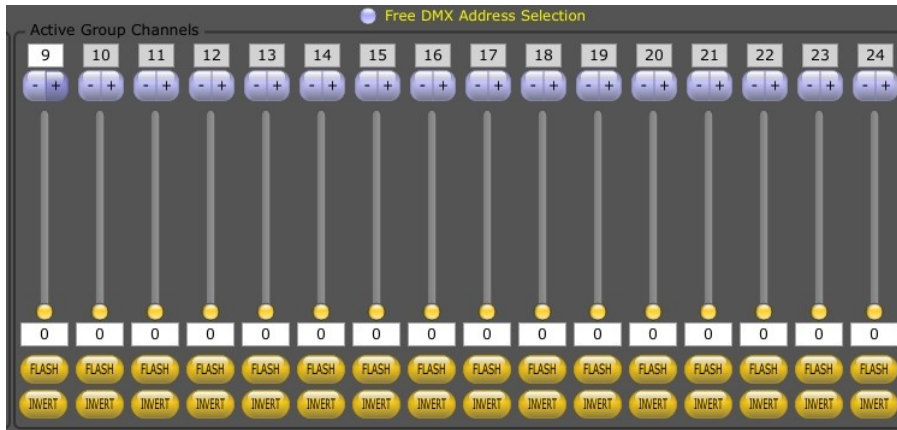


Figura 15: Esempio di indirizzamento di un gruppo consecutivo di 16 canali a partire dall'indirizzo 9

Otherwise With "Free DMX Address Selection" option checked, it is possible to assign a non consecutive DMX Channel address to each slider, but remember to not overlap address. Any overlapped DMX Channel address will be indicated in red color.

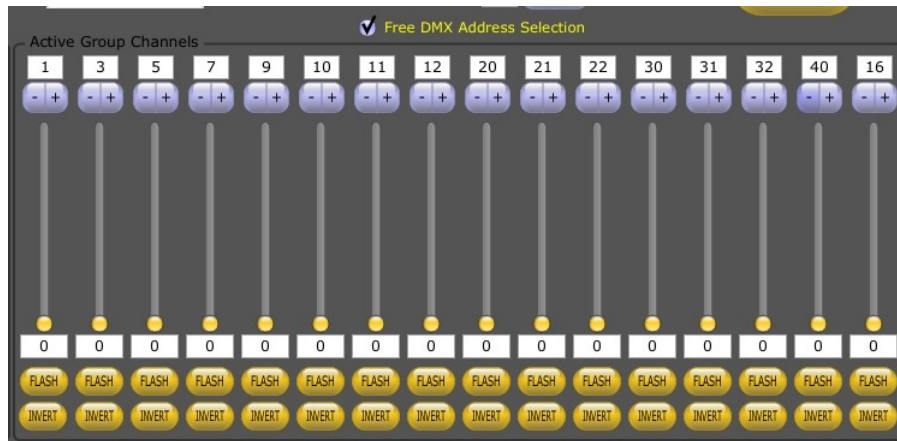


Figure 16: Consecutive DMX Channel address setup

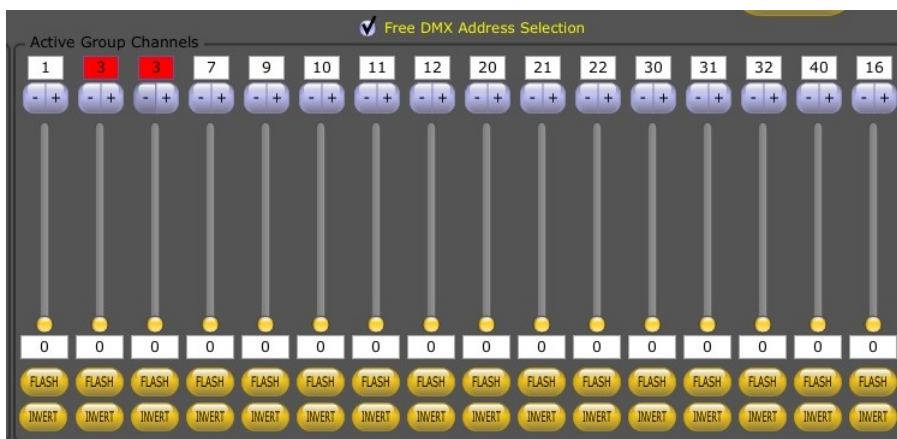


Figure 17: Not consecutive DMX Channel address setup

Now the slider is able to control the DMX Channel value directly moving the wiper or editing the value on the below edit box. "FLASH" and "INVERT" button are also provided to speed channel control.

On the left side the "Active Group Channels" section allow to select one of the three "Master" mode operation:

1. "ALL": Master slider operation will be copied to all 512 Universe channels
2. "Group": Master slider operation will be copied to the 16 "Active Group Channels" channels only
3. "Outer": Master slider operation will be copied to the 496 channels not included on the "Active Group Channels"

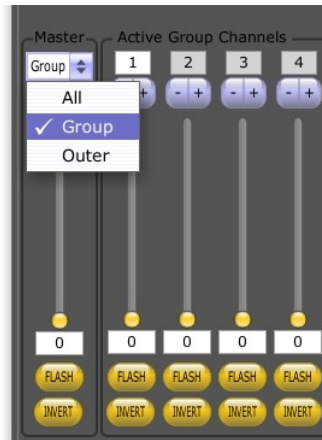


Figure 18: Master mode operation selection

Enabling ArtNet and moving slider we can see the fixture reaction in real time. Moreover is possible to store the slider state on "Cue" memory up to 16pages of 8 cue for a maximum 128 cue. Each cue has it's own "SAVE" and "LOAD" button and to store slider position is enough to move the slider and press "SAVE" button. In the same way pressing "LOAD" button a slider situation will be restored. A fade time can be also defined that will be stored to the cue pressing "SAVE" button.

Now we can press "Play" button and PenSuite will control DMX channel according cue value and fade time.



Figure 19: Cue progress display

During cue playback, a green progress bar will display the cue playback state.

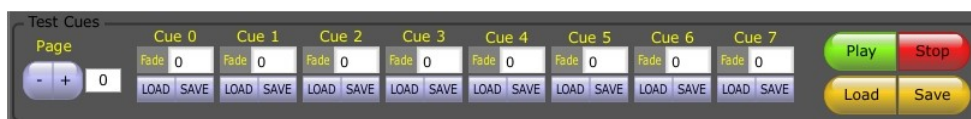


Figure 20: Cue control panel

As you can see from the figure above, on the cue control panel right side "Play" and "Stop" allow start and stop cue playback and "Load" and "Save" button allow to record cue sequences on XML files.



Figure 21: Cue test sequence save example

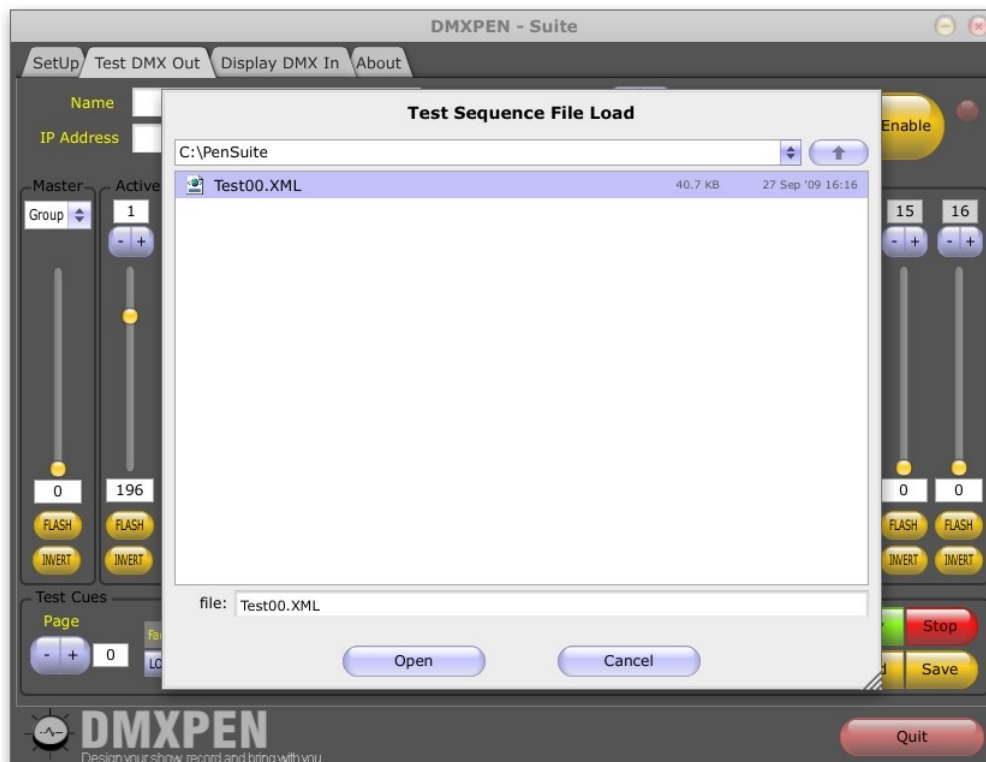
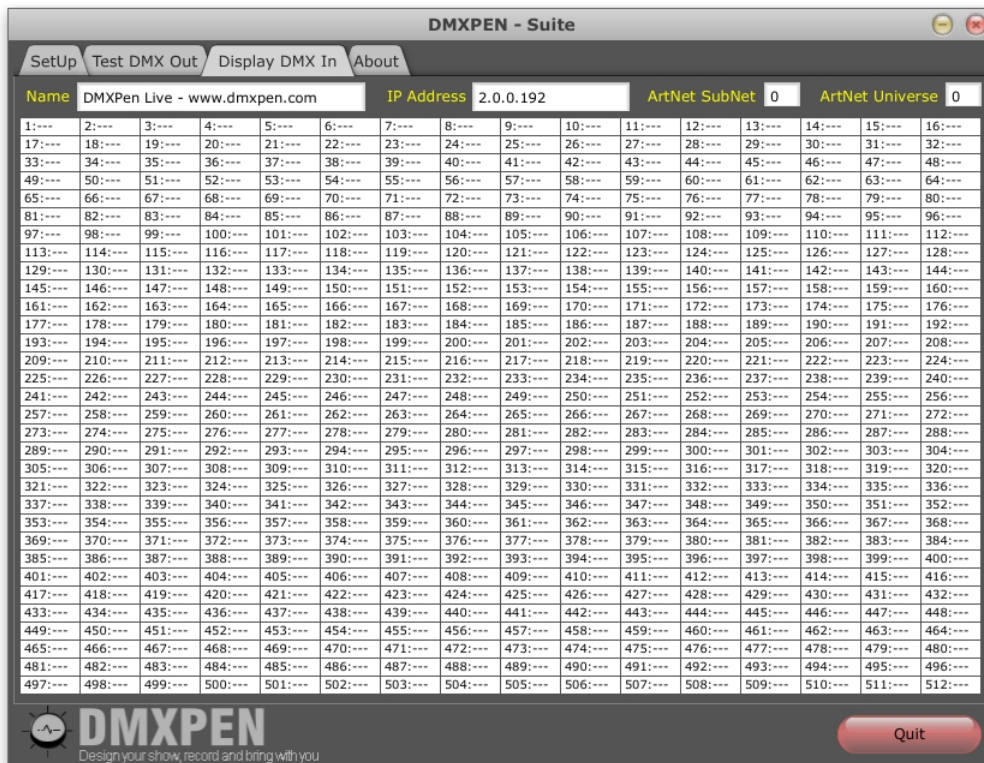


Figure 22: Cue test sequence load example

### 3.6 Display DMX In



Pressing the "Display DMX In" button located below the note list on the SetUp page, the ArtNet display page is arranged to receive ArtNet frame from the selected device and display all the 512 channel values it in real time on a single view. A "---" text will be displayed in case of data not present.

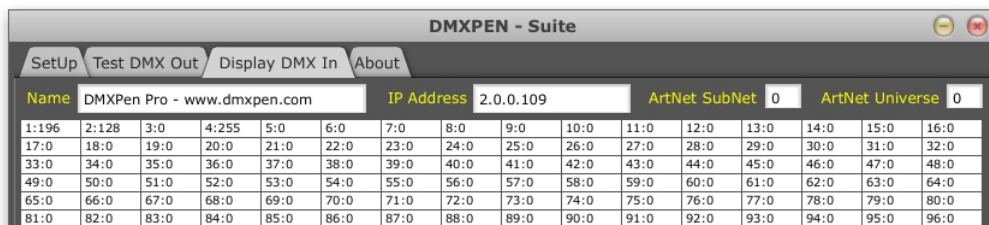


Figure 23: ArtNet receiving example

This section is useful to display a DMX line source content or to analyse DMXPen devices playback operation.

### 3.7 DIP Address Calculator

On the "About" tab as well as Copyright and software release information, a DIP Switch DMX Address calculator was included. A value inserted on "DMX Address" edit bow, will be converted on binary format and a DIP switch scheme will be displayed.

Moreover the "DMX Step" edit box allow to specify the DMX Address calculated on each "+" and "-" action on "DMX Address".

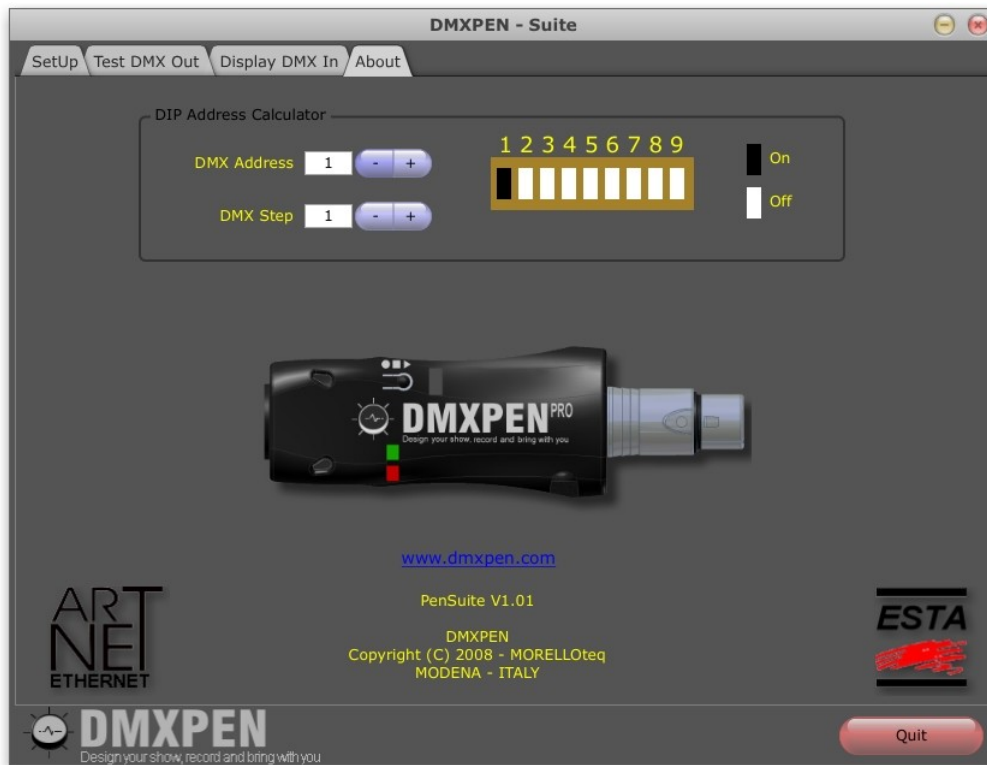


Figura 24: DIP Address Calculator

[www.dmxpen.com](http://www.dmxpen.com)

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