

Learning DigiShow



Signal Mapping

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Three Signal Types Analog, Binary, Note

Three Signal Types

through DigiShow, they are all recognized as three basic types:



Various signals are transmitted between different devices and software. When they flow

- Analog signal, the signal quantity is a value that changes continuously
- **Binary** signal, the signal quantity has only two states, ON or OFF
- Note signal, the signal quantity also has two states, ON and OFF, but when Note is ON, it also has an intensity value between 0 and 100%

Analog Signal

• For example: the brightness of the light, the volume of the sound, the rotation angle of the servo, the value of the fader on the console



In the DMX dimming channel, the absolute value range of the analog quantity is **O ~ 255** In the **MIDI** control channel, the absolute value range of the analog quantity is **O ~ 127** In the **MODBUS** control channel, the absolute value range of the analog quantity is **O ~ 65535** In different channels, the absolute value range of the analog quantity will be different, but they can all be expressed as a percentage value between O and 100%.

In the signal bar, analog signals are displayed in blue with this waveform icon

Displays the current channel type (DMX) and channel number (Ch1)

The analog signal can fluctuate over time, and the image on the oscilloscope is as shown on the left.



Binary Signal

For example: the state of a button, the of a sensor



When using the fader, keep the HOLD on (highlighted)

In the signal bar, the binary signal will be displayed in red with this square wave icon

For example: the state of a button, the opening and closing of a relay, the trigger signal

Displays the current channel type and control description In this example, the binary value is used to control the launching of preset 1. When the binary value changes from off to on, the corresponding operation is triggered.

Launcher Preset 1

Binary signals are also commonly referred to as switching signals or digital signals. They can be switched between ON and OFF states. The image on the oscilloscope is as shown on the left.



ulletsignal packaging)



In this example the note signal is output to the	In th
MIDI bus on the computer.	will
A C1 note is sent to MIDI channel 1.	this

Note Signal

Note is not just a music signal, it has many other uses (such as light expression, sensor

Displays the current

Note is a switch signal with intensity expression (known as note velocity).

When playing a musical instrument: Note On refers to the moment when the key is pressed

Note Off refers to the moment when the key is released

ne signal bar, the note signal be displayed in green with waveform icon

The note signal can be switched between ON / OFF. When Note is ON, it will have an intensity value. The image on the oscilloscope is as shown on the left.

Signal Mapping

Signal mapping is to associate one or more pairs of input and output signals and automatically convert the input signal into the output signal at runtime. Let's make an example to map the Note signal input from the MIDI keyboard to the DMX dimming signal on the light:





Connect a MIDI keyboard to a USB port on your computer, connect the ENTTEC DMX USB Pro adapter to another USB port on your computer, and connect the lighting fixture to the DMX OUT port of the ENTTEC adapter.

If you don't already have an ENTTEC DMX USB Pro, you can also use DigiShow to complete this example without actually connecting the adapter and DMX fixtures.

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Launch the DigiShow LINK software and click the Interface Manager button in the upper right corner of the window.

In the Interface Manager dialog that appears, select the MIDI tab and click the + button to create a new interface labeled MIDI 1, where you select Input mode and your MIDI keyboard model.

MIDI Interface is typically for connecting your digital musical instruments, controllers, sequencers, as well as Ableton Live or other digital audio workstation apps running on your computer.										
MUDI Interface is typically for connecting your digital musical instruments, controllers, sequencers, as well as Ableton Live or other digital audio workstation apps running on your computer. Mode Input MDI Port Input AC Driver Bus 1 IAC Driver Bus 2 IRig KEYS 25 IND Ref So 2 IND REF SO										۲
WIDI interface is typically for connecting your digital musical instruments, controllers, sequencers, as well as Ableton Live or other digital audio workstation apps running on your computer.	MIDI Inte	erfaces								
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	MIDI	DMX	OSC	ArtNet	Modbus	Arduino	Hue	Audio	Screen	Pipe

4 Select the DMX tab and click the + button to create a new interface labeled DMX 1.

Close the Interface Manager dialog when finished.

DMX Inte	erfaces								
DMX interfa	ace is typically fo	or connecting you	ir lights and fixtu	res on the stage.	An Enttec DMX l	JSB Pro adapter	or compatible is	required.	
P	DMX 1		×						
USB Ser	ial Port								
Automa	atic			_					
Model					l				
Enttec	DMX USB Pro								
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MIDI	DMX	OSC	ArtNet	Modbus	Arduino	Hue	Audio	Screen	Pipe

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Now let's try to create a signal link to connect your MIDI keybo input and DMX light output. Click the + button in the upper lef corner of the window, and a blank signal bar will be added to t list on the left. To do this, you also need to select the source of input signal and the destination of the output signal in the righ area of the window, as well as the mapping conversion parame between them.

= +	LINK		DigiShow LINK		Interface Manager
Source		Destination			
no input ■ →	LINK	no output → 🖷	Select Source		
	Untitled Link 1			_	
				•	
			Signal mapping t	ransformation option	s
			Please select signal endpoi	nts of both source and des	stination
				•	
			Select Destination		

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Click the Select Source drop-down menu, select your MIDI keyboard, set the input parameters to "Channel 1" "MIDI Note" "C3", and click the Apply button.

	MIDI iRig KEYS	6 25		*			
	Channel 1	\$	MIDI Note	\$	C3(Mid C)	\$	Apply



Click the Select Destination drop-down menu, select DMX, set the output parameters to "Dimmer" "Channel 1", and click the Apply button.

<u>1</u>	DMX		¢		\$
	Dimmer	\$ Channel 1	*		Apply



8

After selected Input Source and Output Destination, the real-time status of the input and output signals will appear in the signal bar.

Click the ► Play button in the top bar of the window to start the device online and activate the signal mapping. At this time, when you press the C3 (middle C) key on the MIDI keyboard, the light changes of DMX channel 1 will be triggered synchronously.

= +			LINK				0			
MIDI Note Ch1 : C3	55% IN	70	LINK	Þ		HOLD	ТАР	55% OUT	141	
					Untitled Link 1					

In this way, more signal links can be added in DigiShow, and more mappings between input and output signals can be achieved.

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By modifying the settings in Input-output Mapping and Output Envelop, you can change the effect of the mapping transformation in real time. For example, setting Attack to 300 milliseconds and Release to 700 milliseconds will make the lighting changes appear to fade in and out.





Signal Mapping Parameters

Signal Mapping Parameters

Signal mapping is to link one input signal to another output signal. Depending on the type of these two signals, users are usually allowed to set some specific signal mapping and conversion parameters.

Binary to AnalogAnalog to BinaryNote to BinaryBinary to NoteAnalog to NoteNote to AnalogBinary to BinaryAnalog to AnalogNote to Note

This section will list all the parameters for mapping between various signals. Please read according to your needs.



When linking a binary input signal to an analog output signal, the mapping and conversion parameters that can be set by the user i

- Invert Input Signal option: used to invert the value of the input signa as when the binary state is ON, it will be inverted to OFF.
- Output Range lower limit setting: when the input binary state is OFF 2. analog value is output according to the specified lower limit value.
- 3. Output Range upper limit setting: when the input binary state is ON, analog value is output according to the specified upper limit value.
- 4. Invert Output Signal option: used to invert the value of the output si such as when the analog value is 20%, it will be inverted to 80%. Aft checking this option, the fader for manually controlling the signal ou the signal bar will also flip left and right.
- Output Smoothing setting: used to make the output analog signal 5. smoother to achieve the effect of fading in / fading out. This parame millisecond value, which sets the time required for the output signal reach the target output value.

Binary to Analog

90 Pipe Analog 1	Virtual Pipe		*
	Binary 🔶 Chanr	nel 1 🜲	
		▼	
signal nclude:	1 Invert Input Signal		-
l, such	Input-output Mapping		
the	Output Range 0 % - 60 % 0 - 3	39090	
the	2 3		
gnal, er			
tput in	4 Invert Output Signal	5 Output Smoothing - 250 ms +	
ter is a	Virtual Pipe		
	Analog 🔶 Chanr	nel 1	

Binary to Note



When linking a binary input signal to a note output signal, the sign mapping and conversion parameters that can be set by the user in

- **1.** Invert Input Signal option: used to invert the value of the input signal example, when the binary state is ON, it will be inverted to OFF.
- 2. Output Range upper limit setting: when switch the input binary state ON, the output Note On is triggered, and the specified upper limit vaused as the note velocity.
- **3.** Output Range lower limit setting: when switch the input binary state OFF, the output Note Off is triggered, and the specified lower limit valued as the note velocity.

B3 Pipe Note 1		Virtual Pipe	Channel 1	▲	\$
		Dinary 🔻	Channel 1		
				▼	
al					
nclude:	1 Inve	ert Input Signal			
	Input-ou	utput Mapping			
, for	Output R	Range			
to	10 % - 6	5 %	13 - 83		
lue is	3	2	2		
to					
alue is					
		Virtual Pipe			
		Note	Channel 1	♦	

Binary to Binary



When linking a binary input signal to another binary output signal, mapping and conversion parameters that can be set by the user in

- **1.** Invert Input Signal option: used to invert the value of the input signal example, when the binary state is ON, it will be inverted to OFF.
- 2. Invert Output Signal option: used to invert the value of the output signal for example, when the binary state is ON, it will be inverted to OFF. A checking this option, the fader for manually controlling the signal ou the signal bar will also flip left and right.

0 Pipe Binary 2	Virtual F Binary	Pipe	 ◆ ◆ 	*
			•	
the signal clude:	1 🔲 Invert Input	Signal		
, for				
inal, fter tput in				
	2 V Invert Outp	ut Signal		
	Virtual F	Pipe	\$	*
	Binary	Channel 2	\$	

Analog to Binary



When linking an analog input signal to a digital output signal, the smapping and conversion parameters that can be set by the user in

- 1. Invert Input Signal option: used to invert the value of the input signal as when the analog value is 20%, it will be inverted to 80%.
- 2. Output Range lower and upper limit settings: when the input analog is less than the lower limit value or greater than the upper limit value output switch value is OFF; when the input analog value is between the lower and upper limits, the output switch value is ON.
- 3. Invert Output Signal option: used to invert the value of the output signal such as when the switch value state is ON, it will be inverted to OFF. checking this option, the fader for manually controlling the signal ou the signal bar will also flip left and right.

0 Pipe Binary 1	Virtual Pipe	*
signal nclude:	1 Invert Input Signal	
l, such	Input-output Mapping	
	Input Range	
value , the :he	15 % - 75 % 9894 - 49260	
gnal, After		
itput in	3 Invert Output Signal	
	Virtual Pipe	\$
	Binary 🔶 Channel 1 🜲	

Analog to Note



When linking an analog input signal to a note output signal, the signapping and conversion parameters that can be set by the user in

- Invert Input Signal option: used to invert the value of the input signal example, when the analog value is 20%, it will be inverted to 80%.
- 2. Input Range / Output Range lower and upper limits settings: When the input analog value changes from less than the input lower to greater than the input lower limit, a Note On signal will be generat and output; and the note velocity will depend on the input analog va this time.

When the analog input value is between the input lower and upper line the output note velocity will correspond to the value range defined in output lower and upper limits. When the analog input value is greate the input upper limit, the output note velocity will always maintain the value of the output upper limit.

When the input analog value falls back below the input lower limit ag Note Off signal will be generated and output.

90 Pipe Note 1	Virtual Pipe	
		,
gnal nclude:	1 Invert Input Signal	
I. For	Input-output Mapping	
1	Input Range	
ted alue at	2 Output Range	
•.	35 % - 100 % 44 - 127	
mits, n the er than		
gain, a	Virtual Pipe	
	Note 🔶 Channel 1 🔶	

Analog to Analog



When linking an analog input signal to another analog output signal mapping and conversion parameters that can be set by the user inc

- 1. Invert Input Signal option: used to invert the value of the input signa when the analog value is 20%, it will be inverted to 80%.
- 2. Input Range / Output Range lower and upper limits settings: when the analog value is between the input lower and upper limits, the output value will correspond to the value range defined in the output lower limits. When the input value is less than the input lower limit, the out limit value is output, and when the input value is greater than the input limit, the output upper limit value is output.
- **3.** Zero Output While Reaching Lower option: after checking this option input value is less than the input lower limit, the output value will no output lower limit value, but 0.
- 4. Invert Output Signal option: used to invert the value of the output signal example, when the analog value is 20%, it will be inverted to 80%. Af checking this option, the fader for manually controlling the signal ou signal bar will also flip left and right.
- 5. Output Smoothing setting: used to make the output analog value sm achieve the effect of fading in / fading out. This parameter is a millise value, which sets the time it takes for the output signal to reach the t output value.

02 Pipe Analog 2	Virtual Pipe	¢
	Analog 🔶 Channel 1	
, the signal		▼
lude:	1 Invert Input Signal	
l, such as	Input-output Mapping	
ne input analog and upper put lower out upper	Input Range 28 % - 70 % 18474 - 46032	
n, when the ot be the	2 Output Range 47 % - 100 % 30503 - 65535	
gnal, for ^f ter Itput in the	 3 Zero Output While Reaching Lower 4 Invert Output Signal 	5 Output Smoothing - 250 ms +
		▼
noother to econd	Virtual Pipe	\$
arget	Analog 🔶 Channel 2	



When linking a note input signal to a binary output signal, the sign mapping and conversion parameters that can be set by the user i

When the note signal is inputted as Note On, the binary signal output is and when the note signal is inputted as Note Off, the binary signal output OFF.

- 1. On Delay setting: When Note On is inputted, the output will be trigge turn ON after the set number of milliseconds
- 2. Hold setting: If this parameter is set, the binary output will remain in t state for several milliseconds and then automatically fall back to zero
- 3. Off Delay setting: When Note Off is inputted, the output will be trigge turn OFF after the set number of milliseconds (Hold and Off Delay ca usually be set to non-zero at the same time)
- 4. Invert Output Signal option: used to invert the value of the output sig such as when the binary state is ON, it will be inverted to OFF. After checking this option, the fader for manually controlling the signal out the signal bar will also flip left and right.

Note to Binary

0 Pipe Binary 1	Virtual Pi	ре	\$	
	Note	Channel 1	\$	
			•	
nal				
nclude:				
	Output Envelop	e		
JN, It is				
	1 On Delay	- 300 ms +		
	2 Hold	- 0 ms +		
red to	3 Off Delay	— 500 ms 🕂		
he ON				
ered to				
nnot	2 🗸 Invert Outpu	t Signal		
nal,				
	Virtual Pi	ре	\$	*
.put in	Binary	Channel 1	♦	



When linking a note input signal to an analog output signal, the signal mapping and conversion parameters that can be set by the user include:

- Input Range / Output Range lower and upper limits settings: When the input note velocity is between the input lower and upper limits, the output analog value will correspond to the value range defined in the output lower and upper limits. when the input note velocity is less than the input lower limit, the output lower limit value is outputted; when the input note velocity is greater than the input upper limit, the output upper limit value is outputted.
- Zero Output While Reaching Lower option: After checking this option, when 2. the input note velocity is less than the input lower limit, the output value will not be the output lower limit value, but 0.
- Invert Output Signal option: used to invert the value of the output signal, such 3. as when the analog value is 20%, it will be inverted to 80%. After checking this option, the fader for manually controlling the signal output in the signal bar will also flip left and right.
- 4. Output Envelope parameter: After the note is input, it will trigger the change of the output analog value and follow the AHDSR envelope settings.

Note to Analog







Note to Analog

When a note is input, DigiShow will automatically trigger a change in the value of the linked analog output signal, following the AHDSR settings in the Output Envelope parameter:

- 1. On Delay setting:
- 2. Attack setting: Note On is triggered.
- **3.** Hold setting:
- 4. Decay setting:
- 5. Sustain setting:
- 6. Release setting:
- 7. Off Delay setting:

Set the delay time of Note On to trigger the response in milliseconds.

Set the number of milliseconds after which the output signal value will climb to the output upper limit when

Set the output signal value to remain at the output upper limit for a number of milliseconds before falling back.

Set the number of milliseconds after which the output signal value falls back.

After the output signal value falls back, it will continue to remain at a certain level until Note Off. This setting value is the percentage of the signal level value at the highest output.

Set the number of milliseconds after which the output signal value will drop back to the lower limit (or zero) when Note Off is triggered.

Set the delay time of Note Off to trigger the response in milliseconds.







When linking a note input signal to another note output signal, the mapping and conversion parameters that can be set by the user in

Input Range / Output Range lower and upper limits settings:

When the input note velocity is between the input lower and upper I the output note velocity will correspond to the value range defined i output lower and upper limits.

When the input note velocity is less than the input lower limit, the ou note velocity will always maintain the output lower limit setting value when the input note velocity is greater than the input upper limit, the output note velocity will always maintain the output upper limit setti value.

Note to Note

68 Pipe Note 2	Virtual Pipe Note Channel 1	
		▼
e signal nclude:		
	Input-output Mapping	
	Input Range	
mits,		
n the	20 % - 71 % 26 - 9	C
	Output Range	
tout		
	30 % - 100 % 38 - 12	7
9		
ng		
	Virtual Pipe	+
	Note 🔶 Channel 2	*



Virtual Pipe

Virtual Pipe

- Virtual pipe is an additional communication interface provided by DigiShow, which can easily copy and transmit signals between different signal links, so as to organize the signal link table more flexibly.
- As the name implies, the signal in the virtual pipe does not really exist when • DigiShow communicates with hardware devices or external software. But in the signal link table, it can be linked to any real signal.
- Users can define their own analog, binary or note type signals in the virtual pipe. They can appear at the input or output of each signal link. When the value of the virtual pipe signal at the output end of the signal bar changes, the signal with the same name at the input end of other signal bars will immediately trigger a synchronous update.



Virtual Pipe Example

Let's use an example to explain the use of virtual pipes. In this project, an analog channel and a binary channel in the virtual pipe are used to realize the joint control of multiple lights.



1

Create three new signal bars, Light 1, Light 2, Light 3, each containing a DMX output signal terminal for controlling the light. Now you can move the fader in the signal bar to dim each light individually.



2

Create a new signal bar named Dimmer All, and set its output and the input of Light 1 to 3 to Virtual Pipe, Analog, Chanel 1. Now you can move the fader in Dimmer All to dim the three lights simultaneously.



Virtual Pipe Example



The signal Binary 1 in the virtual pipe transmits the signal from the output of Switch All to the input of Dimmer All.

When mapping from Binary 1 to Analog 1, set the Output Smoothing parameter to 1000 milliseconds. When switching all lights on and off fully through Binary 1, there will be a onesecond smooth gradient.

The signal Analog 1 in the virtual pipe transmits signals from the output of Dimmer All to the input of Light 1 to 3.







Analog Signal in Virtual Pipe

In DigiShow, the analog signals in various interfaces usually have their specific value ranges, while the value range of the analog signals in the virtual pipe can be defined by the user:



The default value range of the virtual pipe analog signal is 0 to 65535.

Click the gear button 🔹 to modify the Value Range in the pop-up setting panel.

In this example, we adjust the signal value range to 0 ~ 255

This will keep the signal value range consistent with the DMX channel.

Remote Pipe

After opening the remote connection service, two DigiShow programs running on different computers can also share the signals in the virtual pipe. The signals with the same name in the DigiShow signal bars on different computers can always keep the values synchronized.

1	Master Co	omputer
	Virtual Pipe 1	8
	Mode	Comment
	Local Pipe	
	Remote Link Service	TCP Port
	Enabled 🔶	50000
L	Disabled (default)	
	Enabled	
	Enabled (multiple)	

Go to the Pipe configuration page of Interface Manager and select Remote Link Service as Enabled to enable the remote link service to allow another DigiShow program to share this virtual pipe.

Using Enabled (multiple) mode will allow multiple remote DigiShow programs or third-party programs* to access.

2 Slave Computer		
Virtual Pipe 2		
Mode Romoto Pino	Comment	
Remote IP	TCP Port	
192.168.0.100	50000	

In the DigiShow program on another computer, set the mode of the virtual pipe in Interface Manager to Remote Pipe, and set Remote IP to the IP address of the main computer.

Then the two DigiShow programs on the two computers can share the same virtual pipe.

* The remote pipe implements network communication based on web socket. DigiShow provides an interface library that allows developers to make third-party extensions through this interface.



Multiple Virtual Pipes

A virtual pipe is included by default in a new DigiShow project. Users can also create multiple virtual pipes to manage virtual signals for different purposes.

Virtual Pipe 1	Virtual Pipe 2	None Beat Maker
Mode Comment	Mode Comment	Preset Launcher
		Virtual Pipe A
Local Pipe	Local Pipe	Virtual Pipe B
Remote Link Service	Remote Link Service	More
		Virtual Pipe A
Disabled (default)	Disabled (default)	Analog 🌲 Channel 1 🌲 Apply



You can create multiple virtual pipe interfaces in the Pipe configuration page in Interface Manager. To make it easier to distinguish them later, you can fill in some short description information in the Comment field. Later, when you configure the input and output interfaces for the signal link, you will be able to distinguish them clearly.

Summary

- Understand the three types of signals in DigiShow: Analog, Binary, Note
- Understand the parameters of mapping and conversion between various types.
- Understand the basic concept of Virtual Pipe.

Understand the basic concept of Signal Mapping in DigiShow.