

ETC Reference Guide

Gateway Interactions

Overview

Many of the ETC gateways allow the transmission and reception of different message types from ETC's Eos family of consoles but can also be interacted with directly over a TCP/IP network from third party systems or other ETC network products using a simple UDP text-based protocol.



Note: *If you are only using these gateways with ETC consoles, the content in this guide is not necessary and you should instead reference the respective gateway documentation and Eos Family Operations Manual for additional instructions.*

The content of this guide is technical in nature and assumes a general knowledge of computer protocol and networking concepts, including the following:

- **UDP:** User Datagram Protocol, a simple method of message transport over a network
- **ASCII:** American Standard Code for Information Interchange, a basic encoding of text to bytes
- **Byte:** A single unit of computer information, comprising a numeric value from 0-255
- **Hexadecimal:** A method of showing a number in base 16. Convenient for notation in computer systems, it allows a byte to be represented as a value between 00 (0) and FF (255).

Response Analog IO Gateway

The following sections detail how to use UDP with the Analog IO Gateway. For more information on the pinouts for the contact outputs and analog inputs, refer to the *Response Analog IO Gateway Setup Guide* that came with your Analog IO Gateway.

Contact Closure Outputs

You can control the contact outputs of the Analog IO Gateway using UDP messages. These contact outputs are designated as Relay On or Relay Off states. Depending on the terminal connected to your load, the physical state of the contacts can be either normally open (NO) or normally closed (NC).

Each contact output is assigned a string that triggers it to close or open. To configure your contact outputs to be controlled by UDP, set the following properties from the Property Editor in ETC Concert software.

Property	Value
Name	Response Analog/IO Gateway
Software Version	1.0.0.10
Network Settings	
Analog	
Relay	
Relay Group ID	1
Relay sACN Universe	Off
Relay UDP Multicast IP	0.0.0.0
Relay UDP Port	6000
Relay Port 1	
Relay Port 1 sACN Address	1
Relay Port 1 UDP Command	off_1
Relay Port 1 UDP Command	on_1
Relay Port 2	

- **Relay UDP Multicast IP:** The multicast IP address on which your contacts listen for UDP messages. If this is set to 0.0.0.0, the gateway listens for only unicast messages.
- **Relay UDP Port:** The port on which your contacts listen for UDP messages. If this is set to 0, UDP triggers for the relays are disabled.



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- **Relay Port # UDP Command Off:** The UDP string that triggers the selected relay into the Relay Off state.
- **Relay Port # UDP Command On:** The UDP string that triggers the selected relay into the Relay On state.



Note: *Enter the same value for Relay Port # UDP Command Off and Relay Port # UDP Command On to toggle the relay between the on and off state when the command is received.*

Analog Control Inputs

You can use the analog inputs of the Analog IO Gateway to send UDP commands based on transitions of the voltage at the input connection.

Closing occurs when the input goes from 0V to a value greater than 4.9V. Opening occurs when the input goes from a value greater than 4.9V to 4.9V or below. To configure your inputs, set the following properties from the Property Editor in Concert.

Property	Value
Name	Response Analog/IO Gateway
Software Version	1.0.0.10
▶ Network Settings	
▼ Analog	
Analog Group ID	1
Analog Threshold	0
Analog Rate	0
Analog sACN Universe	Off
Analog UDP IP Address	0.0.0.0
Analog UDP Port	6000
Analog UDP Terminator	None
▼ Analog Port 1	
Analog Port 1 Input Address	0
Analog Port 1 sACN Address	1
Analog Port 1 sACN Priority	100
Analog Port 1 UDP Comm...	off_1
Analog Port 1 UDP Comm...	on_1
▶ Analog Port 2	

- **Analog UDP IP Address:** The IP address to which the gateway sends UDP messages.
- **Analog UDP Port:** The port on which the gateway sends UDP messages.
- **Analog UDP Terminator:** The end-of-line terminator to add to your UDP messages.
- **Analog Port # UDP Command Off:** The UDP string that is sent when the input is closed.
- **Analog Port # UDP Command On:** The UDP string that is sent when the input is opened.

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Response MIDI Gateway

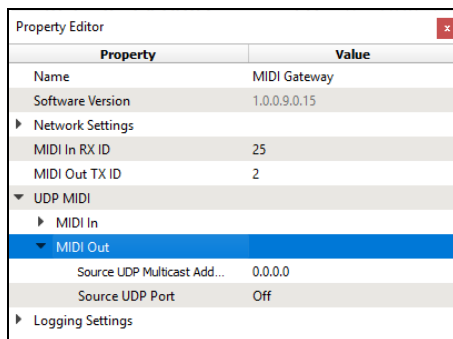
The following sections detail how to use UDP with the MIDI Gateway

Outputting MIDI

You can control third-party MIDI devices (i.e. a synthesizer) by outputting command signals from the MIDI Gateway. To do this you will need to configure the MIDI Out properties of the gateway.

MIDI Out Properties

Configure the following properties from the Property Editor in Concert to translate UDP to MIDI output.



- **MIDI Out - Source UDP Multicast Address:** This property defines how the gateway listens for UDP MIDI messages from the transmitting device. If set to "0.0.0.0", the gateway will listen for unicast UDP messages on the configured UDP port. If you set this property to a multicast IP address, it will listen for multicast UDP messages.
- **MIDI Out - Source UDP Port:** This property defines the port on which the gateway will listen for UDP messages. If the port is set to "Off" or "0", the translation of UDP messages to MIDI is disabled.

MIDI Output Packet Format

The MIDI output packet format consists of the bytes of the MIDI message formatted as a string. This allows any system capable of sending a UDP string to send MIDI messages. To define the correct string, you must have an understanding of the MIDI message format. Complete information about the MIDI standard is available from the MIDI Association Website: <https://www.midi.org/>.

The MIDI packet consists of the text "MIDI" followed by the bytes in the MIDI message encoded as a string (two characters per byte, separated by a space character).

For example, the MIDI message for "Middle C on" is 0x90 0x3C 0x64. This would be encoded in a MIDI UDP packet as the string "MIDI 90 3C 64", or in bytes:

Char	M	I	D	I		9	0		3	C		6	4
ASCII	4D	49	44	49	20	39	30	20	33	43	20	36	34

If the message includes trailing termination characters (carriage return, line feed, etc.) they will be ignored by the MIDI Gateway.

The MIDI Gateway performs basic validation of these packets and will reject messages which don't begin with "MIDI" and messages that are not valid MIDI.

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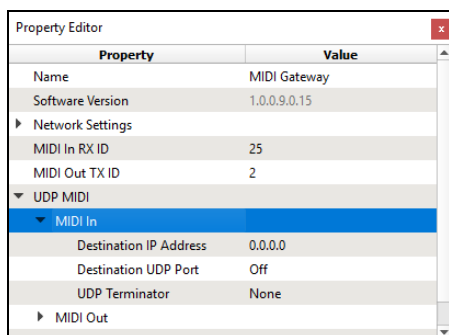
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Inputting MIDI

When inputting MIDI, you can take messages from the physical MIDI port and use them to trigger other devices over the network. Similar to MIDI output, this is carried out using a simple string-based format.

MIDI In Properties

Configure the following properties from the Property Editor in Concert to translate MIDI input to UDP.



- **MIDI In - Destination IP Address:** This defines the IP address to which MIDI messages received by the gateway will be sent. This property can be a unicast or a multicast UDP IP address. If set to "0.0.0.0", the translation of MIDI to UDP is disabled.
- **MIDI In - Destination UDP Port:** This defines the UDP port to which the translated MIDI will be sent. If the port is set to "Off" or "0", the translation of MIDI to UDP is disabled.
- **MIDI In - UDP Terminator:** This defines the terminator which will be present at the end of the UDP string. The type of terminator needed will be defined by the string receiving device. You can set this property to "None" to have no terminator, "CR" for a carriage return (ASCII character 13), "LF" for linefeed (ASCII character 10), or "CR+LF" (ASCII characters 13 and 10).

MIDI Input Packet Format

The MIDI input packet format consist of the MIDI message encoded as an ASCII string, with the selected terminator appended.

For example, consider the MIDI message "Middle C on" (in MIDI, a three byte long message, 0x90 0x3C 0x64). This would appear as a UDP message (assuming the UDP terminator is set to CR+LF):

Char	M	I	D	I		9	0		3	C		6	4	<CR>	<LF>
ASCII	4D	49	44	49	20	39	30	20	33	43	20	36	34	0D	0A

Testing UDP Interaction

ETC provides a free and open-source tool for testing transmission of MIDI data over UDP. This is a convenient method for testing UDP interaction as well as generating the strings required for UDP messages. This can be downloaded from ETC Labs: <https://github.com/ETCLabs/UDPMidiTest>. This can also be used to test MIDI full timecode that is sent through the SMPTE gateway.

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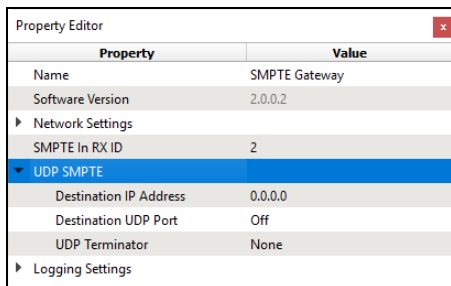
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Response SMPTE Gateway

The following sections detail how to use UDP with the SMPTE Gateway

SMPTE In Properties

Configure the following properties from the Property Editor in Concert to translate SMPTE input to UDP.



Property	Value
Name	SMPTE Gateway
Software Version	2.0.0.2
Network Settings	
SMPTE In RX ID	2
UDP SMPTE	
Destination IP Address	0.0.0.0
Destination UDP Port	Off
UDP Terminator	None
Logging Settings	

- **Destination IP Address:** This defines the IP address to which SMPTE messages received by the gateway will be sent. This property can be a unicast or a multicast UDP IP address. If set to "0.0.0.0", the translation of SMPTE to UDP is disabled.
- **Destination UDP Port:** This defines the UDP port to which the translated SMPTE will be sent. If the port is set to "Off" or "0", the translation of SMPTE to UDP is disabled.
- **UDP Terminator:** This defines the terminator which will be present at the end of the UDP string. The type of terminator needed will be defined by the string receiving device. You can set this property to "None" to have no terminator, "CR" for a carriage return (ASCII character 13), "LF" for linefeed (ASCII character 10), or "CR+LF" (ASCII characters 13 and 10).

SMPTE Input Packet Format

The Response SMPTE gateway converts the SMPTE timecode input into a format matching the MIDI packets described previously, with the current SMPTE timecode encoded as a MIDI full timecode System Exclusive (SysEx) message.

For example, consider a timecode message where the time is 08:01:22:12 (in Hours:Minutes:Seconds:Frames). This would be represented as a UDP message, where the prefix, header, timecode and end segments are one continuous string.

Prefix	Char	M	I	D	I	
	ASCII	4D	49	44	49	20

Header	Char	F	0		7	F		7	F		0	1		0	1	
	ASCII	46	30	20	37	46	20	37	46	20	30	31	20	30	31	20

Timecode	Char	0	8		0	1		2	2		1	2	
	ASCII	30	38	20	30	31	20	32	32	20	31	32	20

End	Char	F	7	<CR>	<LF>
	ASCII	46	37	0D	0A

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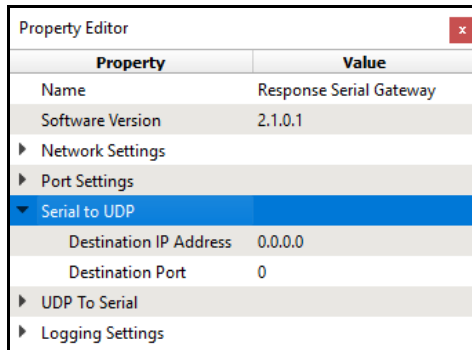
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Response Serial Gateway

The following sections detail how to use UDP with the Serial Gateway.

Serial to UDP Properties

Configure the following properties from the Property Editor in Concert to translate serial data received by the physical serial port to be transmitted on the network as UDP.



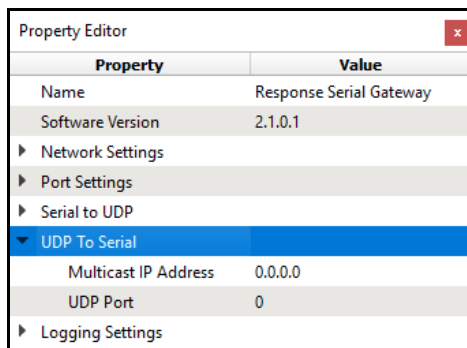
The screenshot shows the 'Property Editor' window for 'Response Serial Gateway'. The 'Serial to UDP' section is expanded, showing 'Destination IP Address' set to '0.0.0.0' and 'Destination Port' set to '0'. Other sections like 'Network Settings', 'Port Settings', 'UDP To Serial', and 'Logging Settings' are collapsed.

Property	Value
Name	Response Serial Gateway
Software Version	2.1.0.1
▶ Network Settings	
▶ Port Settings	
▼ Serial to UDP	
Destination IP Address	0.0.0.0
Destination Port	0
▶ UDP To Serial	
▶ Logging Settings	

- **Destination IP Address:** The IP address (unicast or multicast) to which the gateway sends the converted UDP packet information. If set to 0.0.0.0 the translation of serial to UDP is disabled.
- **Destination Port:** The UDP port to which the gateway sends the converted UDP packet information. If set to 0 the translation of serial to UDP is disabled.

UDP to Serial Properties

Configure the following properties from the Property Editor in Concert to translate UDP messages from the network to be serial data which is transmitted on the physical port.



The screenshot shows the 'Property Editor' window for 'Response Serial Gateway'. The 'UDP To Serial' section is expanded, showing 'Multicast IP Address' set to '0.0.0.0' and 'UDP Port' set to '0'. Other sections like 'Network Settings', 'Port Settings', 'Serial to UDP', and 'Logging Settings' are collapsed.

Property	Value
Name	Response Serial Gateway
Software Version	2.1.0.1
▶ Network Settings	
▶ Port Settings	
▶ Serial to UDP	
▼ UDP To Serial	
Multicast IP Address	0.0.0.0
UDP Port	0
▶ Logging Settings	

- **Multicast IP Address:** This property defines how the gateway listens for UDP messages from the transmitting device. If set to 0.0.0.0 the gateway will listen for unicast UDP messages on the configured UDP port. If you set this property to a multicast IP address, it will listen for multicast UDP messages.
- **UDP Port:** This property defines the port on which the gateway will listen for UDP messages. If set to 0 the translation of UDP messages to serial is disabled.

Additionally, you must set the Port Settings property **Terminator** to CR, LF, or CR+LF. This identifies the trigger for sending UDP messages, whether it is a carriage return (CR), line feed (LF) or both.