

# ETC Reference Guide

## Gateway Interactions

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### Overview

The ETC Response MIDI Gateway allows the transmission and reception of MIDI 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 the MIDI Gateway with ETC consoles, the content in this guide is not necessary and you should instead reference the Eos Family Operations Manual for additional instructions.*

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

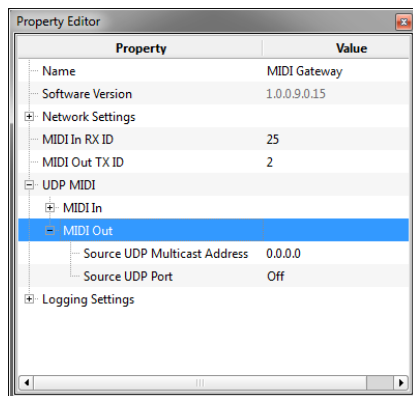
- UDP: User Datagram Protocol, a simple method of message transport over a network
- ASCII: American Standard Code for Information Interchange, a basic encoding of text to bytes
- Byte: A single unit of computer information, comprising a numeric value from 0-255
- Hexadecimal: A method of showing a number 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).

### 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 Net3 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.



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### 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.

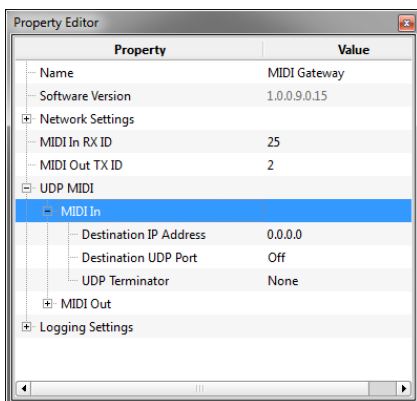
The MIDI Gateway performs basic validation of these packets and will reject messages which don't begin with "MIDI" and messages that are not valid MIDI.

### 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 Net3 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).

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### 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 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>.