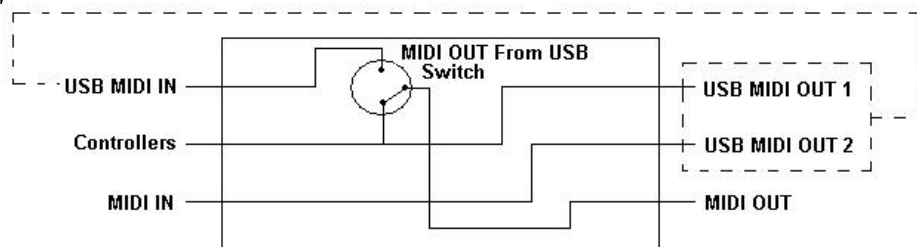# MIDI In/Out
&
MIDI Messages
Explained

EVOLUTION

MIDI In & MIDI Out Signal Flow Diagram

The MIDI IN & MIDI OUT ports have different uses depending on how you intend to connect and power the UC-33. The diagram below shows the different routing options.

About The MIDI In Port

The MIDI in plug can be used to interface another MIDI device to your PC, via the USB port. Data received from this device will be transmitted via the UC-33 to the PC. This is achieved using a second USB MIDI out. So, when you select the MIDI devices section of your sequencer you will see two UC-33 USB MIDI Ins. The first of these is used to receive the UC-33 controller data, the second is used to receive data from the other device connected to the UC-33's MIDI IN plug. So, the UC-33 is acting as a MIDI-to- USB interface for the other MIDI device.

About The MIDI Out Port

The UC-33 can of course also interface with other MIDI devices. By default (I.e. when you switch the unit on), all controller data is sent out via the MIDI output as well as the USB out.

If you want the MIDI output to act like a traditional USB-to-MIDI interface, just press the two buttons (SELECT and ASSIGN) that activate the MIDI OUT from USB mode.

If you are using a host application which can pick up multiple input drivers, you will be able to use the UC-33's MIDI input and the UC-33 surface to record MIDI data and send the whole lot out of the UC-33's MIDI output.

Important note: The UC-33 is not a MIDI THRU device and as such, MIDI data received at the UC-33's MIDI IN plug can never be sent directly to the UC-33's MIDI OUT plug. However, if the UC-33 is connected via USB to a computer, data received at the MIDI IN can be transmitted to the MIDI OUT plug, since the data is sent to the computer, and received back from the computer. MIDI OUT FROM USB mode must be engaged for this to occur.

Assigning A Note To A Button

1. **Press SELECT and press the "0" button. The display will show that you have selected controller 34.**

2. **Press ASSIGN and enter '147' this is the MIDI CC number that corresponds to Note on/off mode, as shown in Appendix B.**

3. **Press DATA MSB and enter a value of '100'. This means when you press the button, a Note on message will be sent out with a velocity of 100.**

4. **Press DATA LSB, and enter a value of '000'. This means when you release the button, a Note off message will be sent out**

5. **Press the PROGRAM button and enter '064'. This will mean you are sending out MIDI note 64 or E4, each time you press the button. The MIDI note numbers are given in Appendix D.**
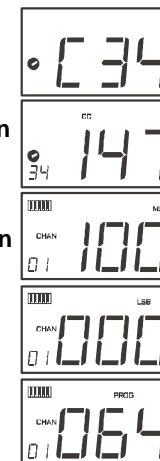
This button mode has many uses. You can use this mode to trigger samples, control lighting equipment, play keyboard notes and much more.

Note: When you press the button in note mode, the LCD display will briefly show the note velocity.

About SysEx Messages & Device ID

When transmitting SysEx messages, the individual control channel number does not define a transmit channel, but a device ID. This is made clear since when you press the CHANNEL button, the CC symbol will not be shown and there is no 'c' in the 3 digit display.

Device ID's range between 00 – 127. In most cases, you should set the device ID as 127. 127 means the SysEx message will be received by all devices.

Please note that the device ID for a Sys Ex message assigned to a controller can not be changed using the Device ID buttons. These buttons are used for varying the global device ID of the UC33.

Number	MMC Command
01	STOP
02	PLAY
03	DEFERRED PLAY
04	FAST FORWARD
05	REWIND
06	RECORD STROBE
07	RECORD EXIT
08	RECORD PAUSE
09	PAUSE
10	EJECT
11	CHASE
12	COMMAND ERROR RESET
13	MMC RESET

Assigning RPN/NRPN To A Fader/Rotary Controller

Note: For a detailed description of RPN/NRPN data see section RPN/NRPN's Explained on page 17.

1. **Press Control select, and move the desired controller.**

2. **Press control assign and while the display is flashing, enter controller 132 for RPN coarse, 133 for RPN fine, 134 for NRPN coarse or 135 for NRPN fine.**

3. **Press DATA MSB to assign the number for the RPN/NRPN MSB.**

4. **Press DATA LSB to assign the number for RPN/NRPN LSB.**

5. **Press CHANNEL ASSIGN to assign the MIDI channel the message should be sent on.**
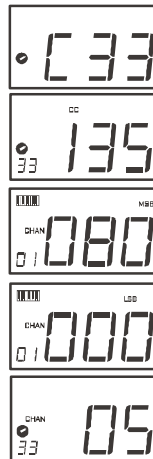
You will find most data sheets for synths that make use of NRPN's will give the MSB and LSB values that you should enter into DATA MSB and DATA LSB banks (also see Appendix F). However, some manuals may only give the hex values. The UC-33 requires you to enter the decimal value. You can easily convert hexadecimal values to decimal using the windows calculator. Simply select Scientific mode, select hex and enter the hexadecimal value you need to convert. Press the Dec button to convert it to a decimal value. Enter the decimal value into the UC-33.

Alternatively, use the look up table in Appendix C.

The following shows how to set a button to transmit a note on when pressed, and a note off when released.

Program & Bank Changes Explained

The original GM MIDI specification catered for only 128 voices, numbered from 0-127. It is possible to access a different voice by sending a program change.

In order to expand on the GM set of voices, Bank changes were devised. Each bank contains 128 patches, that can be accessed using a program change. There are 16,384 banks available, accessible by sending a 14-bit Bank change message. The first 7 bits of this message are sent in a single byte known as the Bank LSB. The last 7 bits are specified by another byte known as the Bank MSB. The BANK LSB is the most commonly used   This allows for 128 bank changes, and often there is no need to send a Bank MSB.

You will find almost all MIDI devices respond to the program change, but some that do not conform to the GM set of voices use the program change message for other purposes. Many VST instruments have adopted this approach, allowing you to use a program change to change the instrument patch. The FM7 by Native Instruments is a good example of this.

Bank changes are more rarely used, although they do exist. Bank changes are useful in manufacturer's extensions to the MIDI specification, such as Roland's GS specification and Yamaha's XG specification. Both of these require you to specify a Bank change, in order to access the extra voices and effects that these specifications provide.

Sending Program, Bank LSB and Bank MSB data is made simple using the UC-33. Simply press the PROGRAM, DATA LSB or DATA MSB button and enter the program or bank change you wish to send.

RPN/NRPN's Explained

Non-registered parameter numbers (NRPN's) are device specific messages that enable the control of synths via MIDI. The MIDI specification defines parameter numbers to allow scope for manufacturers to specify their own controllers. The more common of these have been registered by the MIDI Manufacturer's Association and are part of the MIDI specification (hence the term Registered Parameter Numbers – RPN's). (See Appendix F.)

MIDI controllers 98 and 99 represent the NRPN LSB and MSB respectively, while 100 and 101 represent the RPN LSB and MSB. This can be seen from the MIDI controllers list in Appendix D. To transmit an NRPN/RPN, these two controller messages are sent along with their user-specified values. A further controller message and value needs to be sent to specify the (coarse or fine) value adjustment.
This is specified by controller number 6 (Data entry) for coarse adjustments or number 38 for fine adjustments.

A list of NRPN's will always be given in the User Manual of a device that receives NRPN messages. It is always necessary that the NRPN MSB and LSB are sent together. Both will be specified in the device's manual. You may find the manufacturer's have only specified the numbers in Hexadecimal format. In this case, use Appendix C of the manual to translate the value to Decimal.

The UC-33 makes the process of transmitting NRPN's easy. All you need is to enter the appropriate NRPN LSB by pressing the LSB/DATA button twice, enter the NRPN MSB by pressing the MSB/DATA button twice, and as you move the UC-33 controller, an appropriate NRPN message will be sent out. Assign NRPN coarse to make big sweeps, or NRPN fine to make slight adjustments.

SysEx Explained

System Exclusive (SysEx) messages were defined in the MIDI specification to allow individual devices to have individual control via MIDI. The format of SysEx messages allows for virtually any function to be performed via MIDI – so long as the receiving device is able to translate the message, and act accordingly. This allows devices to send audio sample memory data, controller settings, and much more. It also allows the controllers of one device to be controlled by another.

It is not possible to program your own specified SysEx message into the UC-33. However, there are some useful SysEx messages pre-programmed into the UC-33, that can be accessed by assigning the appropriate MIDI CC to a controller (see Appendix B).

It should be noted that a SysEx message is not transmitted on any specified channel. All SysEx messages contain a device ID, that is used to single out devices to respond to the SysEx message. All other devices are ignored. If you are using a SysEx message on the UC-33, the global channel is ignored. When you press CHANNEL, instead of entering a channel for the controller, you will be enter a device ID instead. This is indicated by the fact that the CC symbol will not be showing.

Device ID's run from 00 to 127. 127 is the default device number setting on the UC-33. This setting transmits the SysEx message to all devices.

Although it is not possible to program the controllers of the UC-33 with your own SysEx messages, there are software applications that can receive a MIDI input signal and transmit a different, user specified message. You can program your SysEx messages into the translator software, then translate the incoming data from the UC-33 to your SysEx, depending on the controller you are using.

Setting Toggle Values For The Buttons

The 14 assignable buttons can each be assigned to toggle between two values. You may for instance want to send out value 15 when you first press the button followed by value 74 when you press the button for a second time. This is how you do it:

1. **Press the Function button labelled DATA MSB.**
2. **Type in 15 using the numerical keypad or the +/- keys.**
3. **Press the Function button labelled DATA LSB.**
4. **Type in 74 using the numerical keypad or the +/- keys.**

If you want the button to send the same value every time you press it, simply type in the same value both times.

RPN/NRPN, GM 1+2 SysEx & Other Messages

As already described, the standard MIDI controller numbers range from 0 to 131. We have extended the list of MIDI cc's that can be assigned to the controllers of the UC-33 to include RPN/NRPN, MMC and General MIDI 1&2 SysEx messages.

These advanced messages are as easy to program as a regular MIDI cc instruction by entering values 132 to 152 when programming MIDI cc's. The charts on page 8 and 9 (or Appendix B) of the full manual show you what numbers correspond to each message.

To program the values required for these advanced messages, the UC-33 requires you to press the PROGRAM, DATA LSB and DATA MSB buttons respectively.

Lets look at a couple of examples to see how this works. Please refer to the chart in Appendix B of the manual so you get to grips with the principle:

Assigning MMC Control To A Button

1. **Select the button you want to control the MMC message.**
2. **Press "ASSIGN" on the UC-33.**
3. **Type in "149" using the numerical keypad.**
   This is the number that correspond to the MMC instruction, as per the chart on page 8 and 9.
4. **Press "Channel" once.**
5. **Type in "127", using the numerical keypad.**
   This ensures that the message is set to all device ID numbers. For more information about this, please read "About SysEx Messages & Device ID" on page 13.
4. **Press the "DATA LSB" button twice.**
5. **Enter a number from the chart on the next page to select the MMC message you want:**

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