
Professional MIDI Management Systems

MIDIY

Version 3.0

Operating Manual

September 2000

**HINTON
INSTRUMENTS**

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Contents

Specification Introduction

Section 1: Installation

General, EMC Compliance	1.3
Earthing, MIDI Cables	1.4
Footswitch, RS232	1.5
Power Up & Reset	1.7
Checking	1.7

Section 2: Operation

MIDI Implementation Chart	2.2
Setting Up, Memory Protect, Filters	2.3
Events, Dumps	2.4
Panic & Clear, Terminal Modes	2.5
VT100 Mode	2.6
STATUS Page	2.7
FILTERS Page	2.9
MONITOR Page	2.10

Section 3: Commands

Summary	3.2
Single Character Commands	3.5
Double Character Commands (Dumps)	3.7
Compound Commands	3.9
Event Commands	3.11
Status Commands	3.13

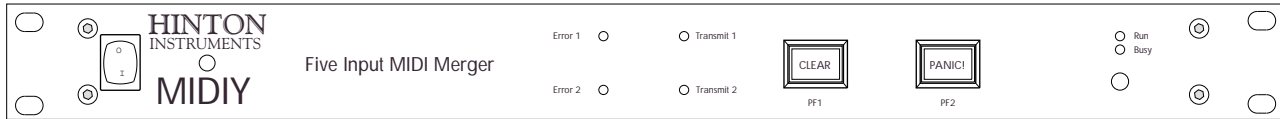
MIDI Reference Section

MIDI Codes	R.2
MIDI Manufacturers' IDs	R.4
MIDI Controllers	R.8

Online Resources

MIDI Protocol Guide	www.hinton.demon.co.uk/midi/midicode.html
Professional MIDI Guide	www.hinton.demon.co.uk/midi/promidi.html
MIDI Manufacturers Association	www.midi.org

MIDIY Specification



HARDWARE

Size:	1U 19" Rack Mounting (W:482 x H:44 x D:270mm)
Power Requirements:	85 - 260Vac mains, 50 - 60Hz. 6W max.
Front Panel Controls:	Two large shrouded programable function switches (PF1, PF2)
Rear Panel Connectors:	MIDI: DIN 41524 metal locking type: In 1, In 2, In3, Out1; In 4, In 5, Out 2. Footswitch: ¼" lockable A gauge jack: Mono NO or NC, Stereo CO. RS232: 25 way subminiature DBP with posts. DTE configuration. Earth: 2BA Terminal Post. Mains: IEC fused filter inlet. (Power switch and indicator on front panel)

SOFTWARE

Software Version:	3.0f September 2000
Input Buffer Size:	5000 bytes
Event Maximum Size:	30 x 60 bytes
Thru Delay:	<0.8ms (one input active)
RS232 Protocol:	8 data bits, 2 stop bits, no parity. Xon/Xoff flow control.
Baud Rate:	9600Bd standard, 57k6Bd fast (link selectable)

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Oldford, Frome, Somerset. BA11 2NN. England

Tel: (01373) 451927 Int: +44 1373 451927

email: tech_support@hinton.demon.co.uk

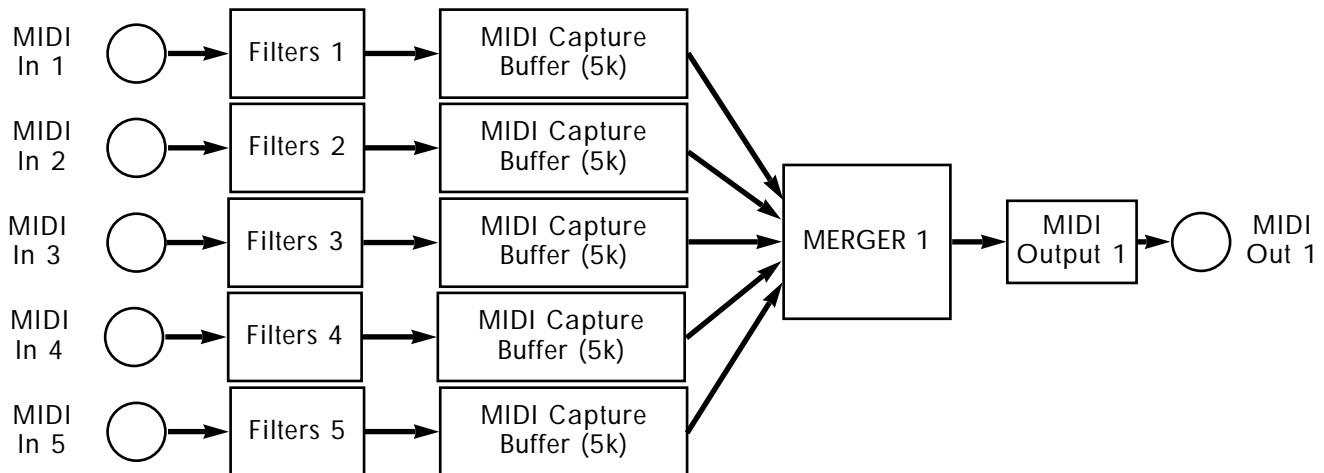
web page: <http://www.hinton.demon.co.uk>

Introduction

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MIDIY Introduction

MIDIY is a high performance MIDI Data Merger that has two configurations: a Single Five Input Merger or a Dual Three Input plus Two Input Merger.

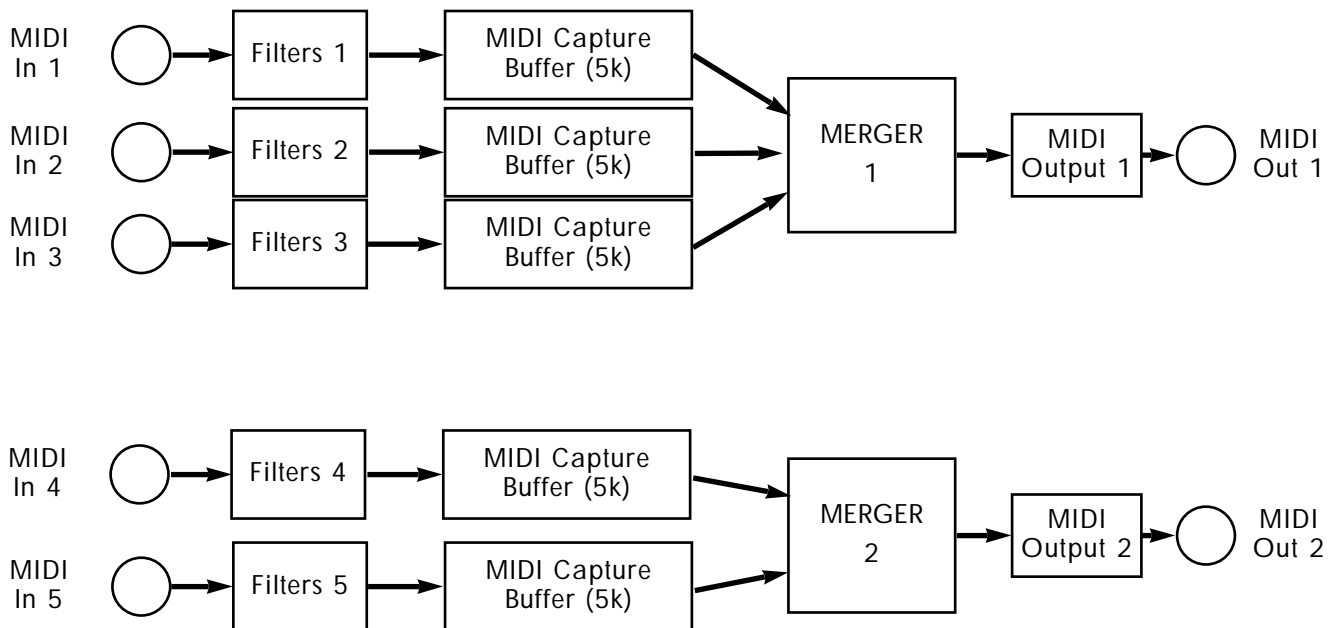


MIDIY 3.0 Single MIDI Data Flow

Each MIDI Input has its own set of Filters for every individual MIDI Status. These Filters are set up by using a computer connected to the RS232 port and the settings are stored in battery backed memory so that the computer is only necessary when the settings need to be altered or saved.

The MIDI messages that are passed through the Filters are stored in a separate Buffer Queue for each Input while each Merger joins the messages together according to the rules of MIDI 1.0 protocol and sends then to the MIDI Out. With messages coming in to only one Input there will be a small processing delay of less than half a millisecond which will not cause any adverse musical effects. When two or more messages arrive simultaneously at more than one Input the first detected will lock the Merger to that Input until that message is completed while the others are stored in the Capture Buffers and sent immediately afterwards.

When actively merging the delay will be dependant on the first message type, Channel messages like Notes, Controllers and Program Changes take less than one millisecond whereas System Exclusive Blocks may take several seconds. If a whole buffer is filled while another Input is monopolising the Merger the front panel Error indicators will light. This will not be a frequent occurrence and would normally indicate an unreasonable expectation of MIDI's bandwidth capacity. Once data has been lost in such circumstances the receiving equipment may be left in an undesirable state and require clearing. The two front panel pushbuttons and footswitch jack may be programmed to provide this function. On pressing Clear a predefined MIDI Event is transmitted and the Input Queues reset. If this fails to resolve the problem pressing Panic causes a sequence of Note Offs and Controller resets on every channel to be sent.



MIDIY 3.0 Dual MIDI Data Flow

MIDIY is optimised to perform the data merging function as well as can be achieved and is able to offer a guaranteed performance under all operating conditions. As it is likely the every data byte will pass through this device integrity has been the paramount aim. Exotic features that would increase the processing delay have been avoided.

The limitations of merging should be considered under high load situations. It is not possible to merge two data streams of more than 50% continuous bandwidth (or five of more than 20%) without incurring an error. It is possible to merge two streams containing MIDI Time Code, but no device will be able to make sense of the result. It is possible to merge two MIDI Clocks, but the resulting Clock rate will be the combined sum of the two. Under normal loading strange result may occur from merging similar MIDI data from two sources e.g. playing the same notes or pitchbending on two keyboards on the same channel. The exact result will be dependant on how the destination equipment interprets the code, rather than on the Merger. The Input Filters should be set up to avoid problems of this type.

Any devices that processes MIDI data is subject to two limitations:

Firstly, there is an inevitable delay caused by the serial to parallel and back to serial conversion of the data. This makes the absolute minimum delay 320 microseconds plus the processing time. Some devices store a complete MIDI message before acting on and retransmitting it which makes the delay even longer. MIDIY passes the data through on a byte by byte basis achieving a

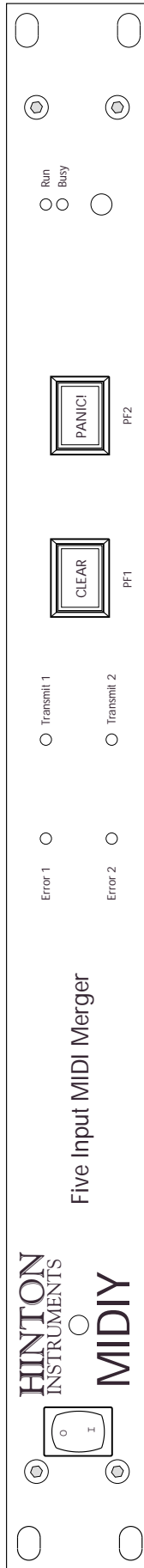
total delay better than 800 microseconds. It is good practise to reduce multiple delays wherever possible. Avoid software based routing matrices and multiport interfaces especially for large systems. A good hardware routing matrix will have constant sub-microsecond propagation delays instead of jittering millisecond or more processing delays. If using a SMPTE Timecode to MIDI converter which normally includes a merging function feed its output to MIDIY with the other signals to be merged rather than merging twice.

Secondly, any processor will create a MIDI Feedback Loop if its output is routed back to its input. Once started a constant stream of MIDI data will be generated that will overwhelm everything that receives it. Anything that can keep up with this loading will probably not be able to respond to manual switches as well so will appear to be locked up, other equipment may report buffer errors or get into an indeterminate state and require resetting. The only way to get out of this condition is to break the routing causing it, which may be harder to accomplish since nearly all MIDI routing equipment changes in the gaps between messages and these no longer exist. We recommend our MIDIX routing systems which have several features to overcome this problem. Otherwise pull out the MIDI cables if possible or turn off the equipment as a last resort.

The following sections explaining the operation of MIDIY have been written for use with a terminal (or emulator) to make the manual easier to follow. All the information is also applicable to using computer software to control MIDIY, however we suggest using a terminal to obtain familiarity with the command protocol first.

Section 1: Installation





MAINS AC Voltage
Switch Indicator

Five Input MIDI Merger

Error 1 Transmit 1
Error 2 Transmit 2

CLEAR
PF1

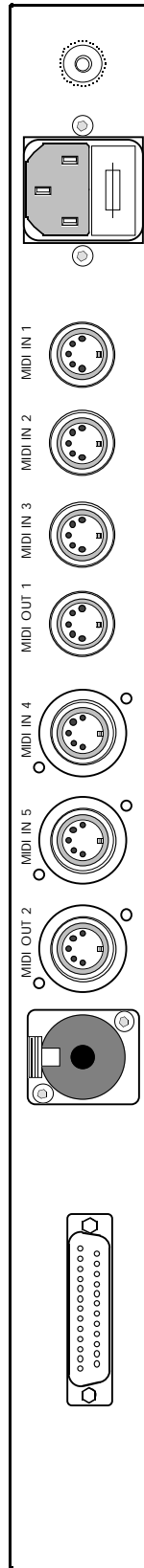
PANIC!
PF2

Run
Busy

CPU Status
Indicators

PF1 & PF2 SWITCHES
Film Inserts may be placed
under the switch caps

MIDI Data
Indicators



RS232
DTE
8bit Data
2 Stop bits
No Parity
9600Bd/57k6Bd
Xon-Xoff

FOOTSWITCH
1/4" A-gauge
TS: NO, NC
or
TRS: C/O

MIDI Connectors

MAINS INLET
85-130Vac
or
170-260Vac
50/60Hz
20mm Fuse:
100mA F

Chassis
Earth
Terminal
Connected
to Mains
Earth

General

MIDIY takes 1U of 19" rack space and requires a mains power supply with IEC connector on the left hand side. MIDIY is shipped with the mains voltage set for the country of destination, but may be changed if necessary.

The unit is cooled only by natural convection and if sited in a rack with vertical convection or fan cooling, spacing panels may be necessary to ensure that air flow is not obstructed.

Please take the normal precautions for siting an electronic instrument, do not place on a source of direct heat, in direct sunlight or near another instrument that may cause interference with either's operation.

The following statement is provided to comply with FCC regulations in the U.S.A., but the precautions and corrective measures are applicable worldwide:

"WARNING - This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense."

MIDIY and its accessories have been tested to exceed the requirements of the above FCC rules, however this does not guarantee that interference will not occur, especially if connected to other devices that do not comply with these rules. If interference is experienced after installation of this equipment turn it off to determine whether it is the source. If interference is still experienced try to correct the situation by one or more of the following measures:



- Relocate either MIDIY and its associated equipment and cabling or the equipment affected by the interference.
- Utilise different mains power outlets. MIDIY incorporates a mains line filter, try installing a filter in the mains of the other equipment.
- In the case of radio interference where 300 ohm ribbon antennas are used, try changing to 75 ohm coaxial cable.

If for any reason you should need additional information relating to radio and TV interference, you may find a booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio/TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402, Stock #004-000-00345-4.



This product is fully compliant with the European EMC Directive 89/336/EEC which applies to apparatus which is "liable to cause electromagnetic disturbance or is itself liable to be affected by such disturbance".

Test performed and passed are:

EN50082-1 : 1992

EN55022 : 1994 Class B

Earthing

The case is connected to Mains Earth and must be grounded for safety. The ground reference should be provided via the mains inlet or via the chassis terminal in countries that normally use a two pin mains connector. Do not remove the ground from the mains connector.

Do not provide a ground via the rack mounting bars. Use insulating mounting kits if this is the practise. For installations that have separate safety and technical earth systems please consult with Hinton Instruments before proceeding.

WARNING - Failure to observe this practise may result in hazard to life or damage to connected equipment.

After siting the rack connect all permanent cabling:

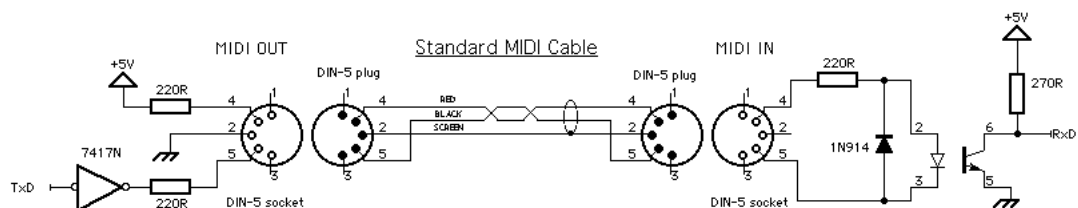
MIDI Cables

MIDIY has five MIDI IN connectors and two MIDI OUTs. All Inputs are functionally identical. MIDI Out 2 is not used in the Single Configuration.

Connect the MIDI Out(s) to all the MIDI equipment to be controlled. If this is more than four units, a THRU Box or a Routing Matrix should be used rather than daisy chaining via the MIDI THRU's of each device. Connect the MIDI OUT of each source equipment, master keyboard, etc. to the MIDI INs. If there are more sources of MIDI data than Inputs then either a Selector or a Routing Matrix will be required. Hinton Instruments also manufacturer a comprehensive range of professional MIDI distribution devices.

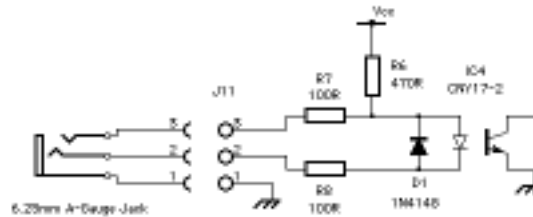
The metal DIN connectors used for the MIDI Ins and Outs may be used with latching type plugs as well as the normal type. One MIDI Out should only be connected to one MIDI In irrespective of whether it is powered on or not. Use only quality cables intended for MIDI use and not hi-fi cables. Cable lengths should not exceed 15 metres. Longer cables, including special long run types, cannot be guaranteed to work in all circumstances as they have no control over the opto-isolator type used in the receiving equipment, its sensitivity or its aging characteristic.

MIDI is an optically isolated system and the cable screens are connected to the driving circuitry ground, but not the receiver ground. Do not connect to the cable screens to the plug shells as this will connect the case ground via the receptacle chassis and may cause grounding related problems.



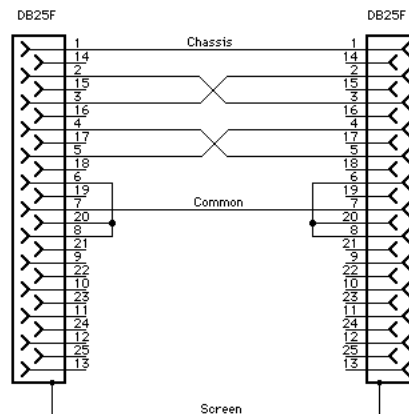
Footswitch

The footswitch jack is a locking type and the red tab must be pressed to withdraw a jack plug. The socket will accept mono or stereo ¼" A-gauge jacks and most commonly used footswitch wiring configurations are recognised. A mono jack may be normally open (NO) or closed (NC) and a stereo (TRS) jack may have changeover contacts (C/O), the polarity is sampled at reset and subsequent changes detected. A stereo jack may also be used for connection to other equipment. If full opto-isolation is required R6 should be removed.



RS232

A Computer or Terminal may be connected to MIDIY via the RS232 port. This will be required whenever the settings need to be changed, but is not necessary for the unit to operate normally. MIDIY is configured as a Data Terminal Equipment (DTE) with CTS and RTS hardware handshakes. If the computer has a 25 way male D-type connector (DB25M) on its RS232 port, similar to MIDIY, then it is likely to be a standard DTE and may be connected with a "Null Modem" cable. This is simply a DB25F - DB25F cable with pins 2 and 3 crossed over and pins 4 and 5 crossed over and a Common, pin 7.



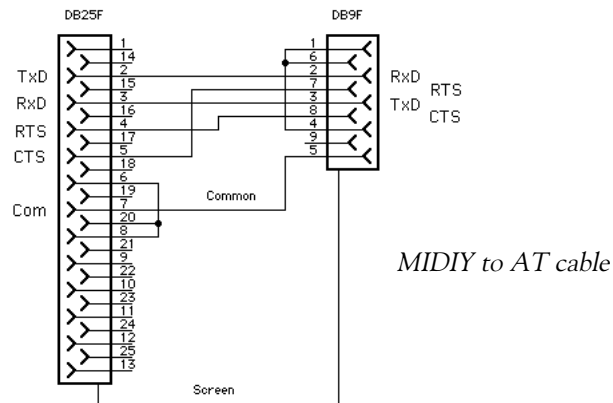
Null Modem Cable

Pin 1 is the Chassis earth and should be connected to the cable screen and connector shell, this is electrically distinct from Common and should not be joined in the mating connector. The maximum RS232 cable length for 9600Bd operation is 15 metres and for 57k6 Bd is 2.5 metres, but it is not advisable to use longer cables than needed for interference considerations. Some other pins may need to be connected. Pin 20 on MIDIY (DTR) is a permanently asserted RS232 level and may be used to satisfy inputs on the computer that need assertion before communications can start such as DSR (pin 6) or DCD (pin 8). Whether or not these other connections need to be

MIDIY Installation

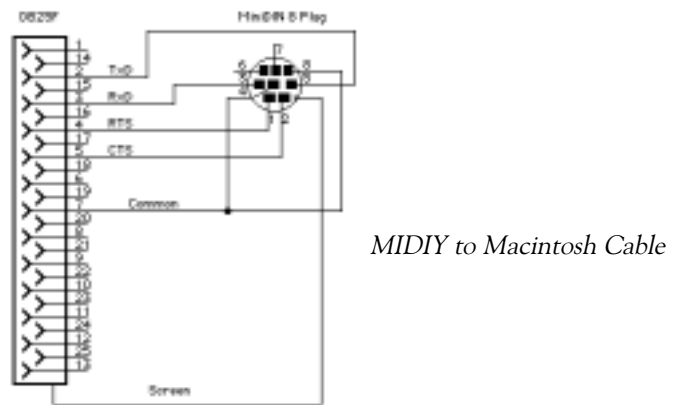
made depends on the hardware and software sophistication of the host computer. Often signals provided are not utilised, but the minimum requirement is pins 2, 3 and 7. MIDIY employs Xon/Xoff software handshaking, if your computer does not implement this protocol then the CTS/RTS lines must be used instead. If in doubt consult your computer manual.

If the computer has a 9 way D-type connector (DB9M) then it will conform to the PC-AT pinout. Use either a DB9F-DB25M adapter plus a Null Modem cable or construct a cable as shown below:



Do not use a modem cable and gender changers or other combinations.

Macintosh computers require a MiniDIN8 to DB25F cable like this:



The computer communications software should be configured as follows:

- 9600 (or 57k6) baud on Transmit and Receive
- 8 Data bits
- 2 Stop bits
- No Parity
- Xon/Xoff handshaking On
- CTS/RTS handshaking Off
- Enq/Ack handshaking Off

N.B. only one form of handshaking should be enabled at a time.

Power Up & Reset

When connected, power up the MIDIY. The presence of internal ac power is indicated by an led beneath the front panel logo, if not on check the mains power supply and the mains fuse within the IEC inlet. The inlet also contains a spare fuse which should always be a 20mm 100mA/250V Quick Acting (F) type. There is a secondary dc Anti-Surge (T) type fuse on the internal power supply board and access is obtained by removing the top lid and first disconnecting the mains lead. The rating of the secondary fuse may vary, but it is clearly shown on the power supply. Never replace fuses with different types.

There are two LEDs on the right hand side of the front panel, a red **Run** and a green **Busy**, and in normal operation the red is permanently on and the green flickering slightly. If the red LED ever goes off or the green one permanently on a fault has developed. This should not normally happen, but could occur if subject to severe interference from other equipment or if a component has failed. Turn off and on again to reset. If the fault persists or recurs either the unit or the installation has a fault and requires service.

MIDIY contains a battery backed up RAM to retain its settings. This is a lithium cell type contained within the RAM DIL socket and has an *average* lifetime of 5 years from the date of manufacture of the cell. When this runs down the first sign will be that the settings have been reset to the default values. Keep a copy of any important setups as a Dump file on a computer so that they may be restored after battery replacement. This is explained in the Operation section.

Checking

When MIDIY is reset a sign-on message will be transmitted via the RS232 port similar to:

```
MIDIY Five Input Merger
Vers:3.0f (c) 1988-2000 Hinton Instruments

Buffer 1 Size: 5000
Buffer 2 Size: 5000
Buffer 3 Size: 5000
Buffer 4 Size: 5000
Buffer 5 Size: 5000
 30 Event Lists of up to 60 MIDI bytes each
Memory Protect: 0
Block Delay: 2
Running Status 1: 0
Active Sensing 1: 0
Running Status 2: 0
Active Sensing 2: 0
```

```
If using a terminal with VT100 compatability:
first enable this mode and then type:
T2 <ret>
```

The Busy LED will glow as the message is transmitted and then the Merger will commence operation using the settings stored in its battery backed up

memory.

If there is no response check all the RS232 connections carefully. If random characters are sent the baud rate has not been correctly set. Reset and try again.

If nothing is received MIDIY's CTS input is probably being held deasserted or an Xoff has been sent. To enable transmission try typing Control-Q (which is the Xon character) or check your terminal emulator flow control settings.

Type H, this should generate several pages of the Help message which will scroll up and fill the screen. If characters or words are missing then the flow control is not correctly set. If the Busy LED glows, but nothing is received MIDIY is receiving RS232 and its output is being transmitted, but the problem lies in the cable or computer data threshold.

Beware that a terminal emulator may not drive the computer's RS232 port in the same way as other application software using Operating System calls.

If you experience any difficulty with the above operations, please contact Hinton Instruments' technical support for advice.

email: techsupport@hinton.demon.co.uk

There is more reference information and contact details on our website:

<http://www.hinton-instruments.co.uk>

Section 2: Operation



Function	Transmitted	Recognised	Remarks
Basic Channel Default Changed	1 - 16 1 - 16	1 - 16 1 - 16	
Mode Default Messages Altered	O	O	
Note Number True Voice	O	O	* Note 1
Velocity Note On Note Off	O O	O O	* Note 1 * Note 1
After Touch Key's Ch's	O O	O O	* Note 1 * Note 1
Pitch Bender	O	O	* Note 1
Control Change	O	O	* Note 1
Prog Change	O	O	* Note 1
System Exclusive	O	O	* Note 1
System Common :MTC :Song Pos :Song Sel :Tune	O O O O	O O O O	* Note 1
System Real Time :Clock :MTS :Commands	O O O	O O O	* Note 1
Aux Mes- sages :Local ON/OFF :All Notes Off :Active Sense :Reset	O O O O	O O X X	* Note 1 * Note 2 * Note 2
Notes:	1: Every individual MIDI Status may be filtered independently on all three inputs. 2: Active Sensing and Reset are ignored on inputs.		

Introduction

Setting Up

The MIDIY Mergers are high performance, high quality MIDI data processing units for use in Merging multiple MIDI data streams into one in full compliance with the MIDI protocol. Although MIDIY contains sophisticated software and digital circuitry it is essentially mimicking a Y-lead, but with the reliability and integrity both essential and expected in a professional environment.

Please refer to the Installation section for full information on setting up the MIDIY hardware and connecting to a computer. This section is intended to familiarise an operator with the basic concepts and day to day use and assumes that you have powered up the rack and have a Terminal Emulator running on the computer. More detailed descriptions of the commands are given in the Command and Reference sections.

MIDIY will merge all MIDI Status types together with the exception of Active Sensing and Reset which are ignored. Certain combinations of data may not be desired, e.g. Timing Clocks and MIDI Time Code would not normally be merged, and Status Filters may be used on each MIDI Input to remove unwanted data. These filters and other settings should be configured from a computer running a specific program or a general purpose Terminal Emulator. We recommend "Microphone" for the Macintosh platform and "Procomm" for the PC, but any equivalent application may be used. A VT100 mode gives a better interface, but any dumb text terminal can perform all the necessary operations.

Memory Protect

The first task to be done with a new system or after any changes in use is to configure the Filters and Clear Events, but before this may be done *Memory Protect* must be set Off by typing:

M0↵ (where ↵ is the Return character)

When all the changes have been made this may be set back On by typing:

M1↵

Filters

Every different type of MIDI data may be independently filtered to eliminate unwanted data. The filters operate before placing data in each Input's receive buffer and may be set or cleared by typing:

Fx<hh>n↵

where x is the Input number(1 to 5), hh is the MIDI Status in hexadecimal and n is 0 for pass and 1 for remove.

All filters may be cleared by typing:

Fx <0>-

To see all the Filter settings the *Dump Filters* command may be typed (**DF**).

This will output all the Filter settings in the form of their commands which may be saved as a file and transmitted back to the MIDIY unit to restore or change it.

Commands of this form would be very tedious to type by hand for every single Status value, but do not worry this is really intended for keeping in a text file. A more user friendly method will be explained further on in this section.

Events

An Event is an arbitrary, user definable list of MIDI codes up to sixty bytes in length. MIDIY is supplied with some useful ones already defined in its memory, but this may be redefined at any time. Events are referred to by the number sign followed by a number 1 to 30 or the letter A or Z, mnemonic for All Notes Off and Zero All Controllers which use the first two Events. Events also have a sixteen character name.

To define an Event, type:

n < hh, hh, hh, . . . hh >-

where n is the Event number (1 - 30) and hh are the MIDI codes in hexadecimal. In general, hex values are always delimited by the < and > characters. To name an Event, type:

n "sixteencharacter-

To check an Event, type:

#n-

and the hex list of codes will be given. All events may be dumped with the *Dump Events* command (**D#**).

Dumps

All the information that we have set up may be dumped, separately or altogether, with the Dump commands. Dump Filters and Dump Events have already been covered, the remaining ones are *Dump Status* (**D-**) and *Dump Everything* (**D&**). These commands are executed immediately the second character is typed without waiting or allowing correction with delete or backspace.

To Save any MIDIY setup enable your communications software to receive text data for filing, then type the appropriate dump command or commands and watch the information on the screen. When it has finished, close reception and save the buffer as a file.

All the information is in printable ASCII so it may be printed or edited with any word processor. It is easier to design Event Lists "offline" with character editing software than to type it into MIDIY directly. On the Macintosh SimpleText could be used, or BBEdit if available. On the PC Notepad and PFE may be used.

To restore any setup or partial setup select the file for transmission by the communications program and send it. All the information will be echoed on the screen to confirm that it has been accepted. Note that the information has been expanded from the minimum condensed form use for dumping.

Panic and Clear

There are two special commands to deal quickly with problem situations, these are *Panic* and *Clear*. The major concern in any MIDI system, especially for live work, is getting notes stuck on. If this does happen a Panic Sequence may be sent out by simply typing ! or by pressing a front panel Programmable Function Switch configured to the Panic function.

The Panic Sequence comprises Stop, All Notes Off on all Channels, then centre all Pitchbend Wheels, Zero all Modulation Wheels, and Reset all Controllers on all Channels and finally every Note Off on all Channels. This massive stream of data is divided into blocks with a Block Delay between them to prevent overflowing the buffers in the receiving equipment. The delay may be set between 0 and 10 with the **B** command.

The Clear Sequence comprises the A and Z Events Lists. Any of the two front panel switches or an external footswitch may be programmed to trigger a Panic, Clear or Clear+Panic, the latter sends a Clear followed by a Panic if it remains held for longer than two seconds. Other functions are also available described later.

A full description of all the individual commands is in Section 3, but the general style should be apparent by now. Help may be obtained by typing H and a summary of all the commands will be paged to the screen. This is intended as an *aide memoire* rather than a complete built in manual.

Terminal Modes

So far it has been assumed that MIDIY was connected to a dumb terminal as this is the default power up state and all the command dialogue has been conducted on a scrolling screen. This may be altered with the Terminal command which had two other settings. Typing:

T0-

will turn off all command expansion echoing and is intended for driving MIDIY with dedicated computer software.

VT100 Mode

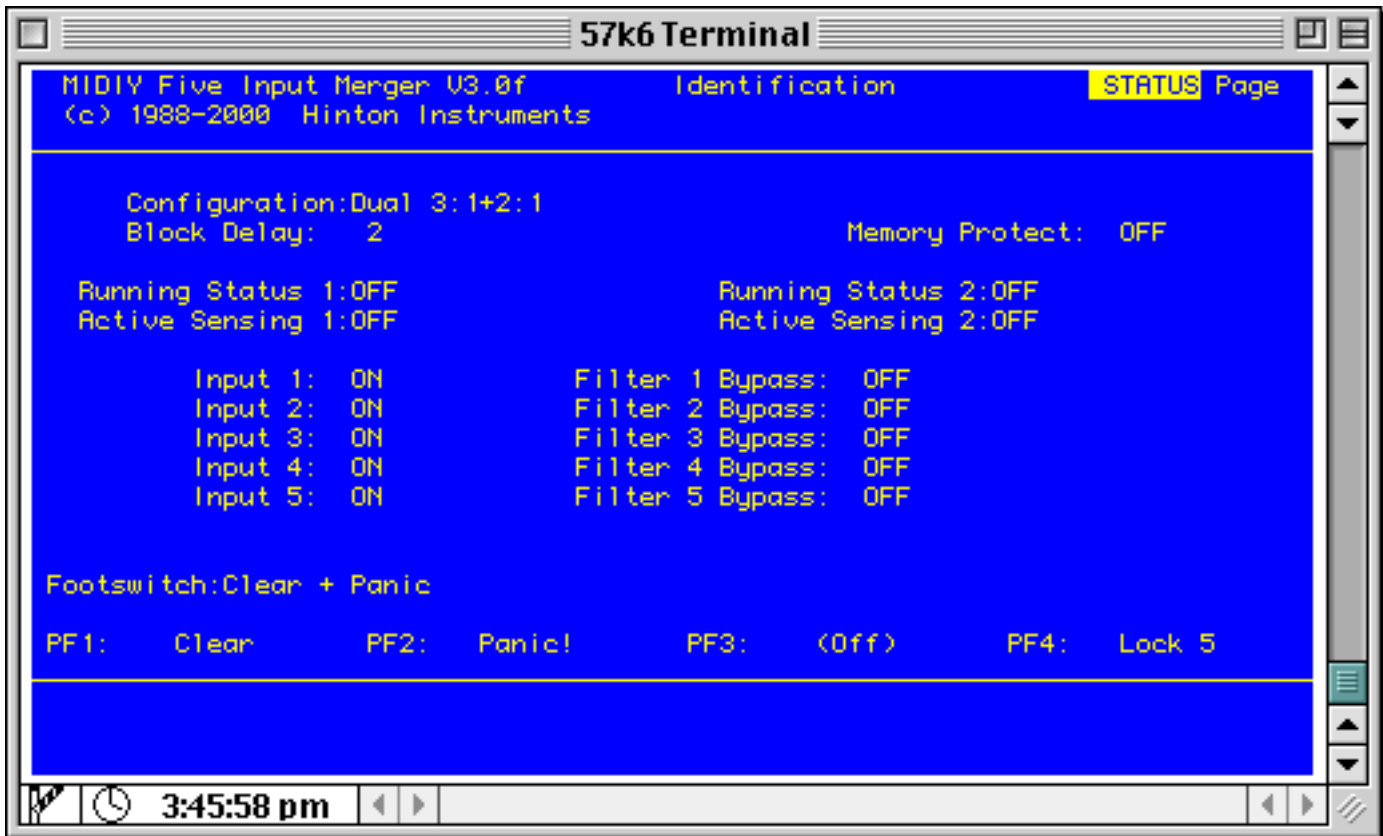
If your terminal emulator has a VT100 mode type:

T2→

and the screen will change to a fixed page display that may be controlled using the cursor and numeric keypad keys as well as all the commands.

When using a terminal emulator with VT100 capability comprehensive paged screens of all the MIDIY settings may be viewed. This technique is common to a lot of our products and ensures immunity from the hectic changes of the computer industry. In ten years time this software will still function on some computer with some emulator, just like it did ten years ago.

The following screenshot was taken using Microphone LT on a Macintosh, but it could be any equivalent product.



All information on the current state of MIDIY is shown as a series of tabular displays starting on the Main STATUS page. The screen is divided into three parts: the HEADER which shows the page name in the top right corner, the DISPLAY WINDOW taking up most of the central screen and the COMMAND WINDOW at the bottom. The Command Window behaves exactly as the Dumb Terminal mode apart from being restricted in height to four lines and all commands may still be entered here.

When MIDIY is altered by command the displays will update to show the correct current status.

The CURRENT PARAMETER is always shown in reverse video and may be

moved around the screen with the Cursor Keys. Parameter NAMES are shown ending with a colon (:) and are not active, the VALUES of parameters are to the right of the Names and may be decreased with the minus (-) key or increased with the plus (+) or comma (,) keys. (This makes sense when looking at a real VT100 application keypad which has a comma instead of the plus used by most computer keyboards.) Using these keys the value may be cycled through its range or the numeric keypad may be used for short cuts. Simply navigate the Selected item (shown here on STATUS) around the screen with the Cursor Keys and then use + or - to scroll through the available options for each parameter.

Keypad Operation

The Application Keypad section of the keyboard has special usage:

The Decimal Point key will always home to the PAGE NAME parameter. The Keypad numbers may be used to directly set a decimal value terminated by the Keypad Enter key (the screen will not update until the number is terminated). If the parameter is non-numeric the number will select a list member and if the number is out of range it will be ignored.

The top four keys of a real VT100 keypad are known as the Programmable Function keys (PF1, PF2, PF3 and PF4) and these are usually the same on emulator programs or an equivalent is provided. PF1 and PF2 correspond to the real front panel buttons and the action of all may be configured on the Main Status Page.

To abort any command type the Escape key (ESC) twice, if no command has been started this will redraw the screen. This is also useful if the terminal has been disconnected or changed and is out of step with the MIDIY.

Online Help pages are available by typing H.

The MIDIY Main Status Page

Page: STATUS/FILTER/MONITOR, changes to other screen pages.

Configuration: Single/Dual, changes merging operation between 5:1 and 3:1+2:1

Memory Protect: On/Off, prevents settings being altered.

Block Delay: 0 - 9, sets the delay between large generated blocks of data to prevent overflowing the data buffers of receiving equipment.

Running Status 1/2: On/Off, determines whether the Output 1/2 is converted to Running Status.

Active Sensing:1/2: On/Off, automatically generates Active Sensing Clocks.

Input 1 (2, 3, 4, 5): On/Off, any input may be locked out.

Filter 1 (2, 3, 4, 5) Bypass: On/Off, enables the individual filter sets on each input.

Footswitch, PF1, PF2, PF3 & PF4:

PF1-4 are the VT100 keys of which PF1 and PF2 are duplicated by the two front panel switches . Each have a programmable function:

0 (off)

1-5: Lock 1 (2, 3, 4, 5): forces any input to be exclusive.

6-10: Filter 1 (2, 3, 4, 5) Off: bypasses any input's filtering.

11-15: Lock+Bypass 1 (2, 3, 4, 5): simulates an exclusive through connection.

16: Event A: Transmits user defined Event "A" (All Notes Off).

17: Event Z: Transmits user defined Event "Z" (Zero All Controllers).

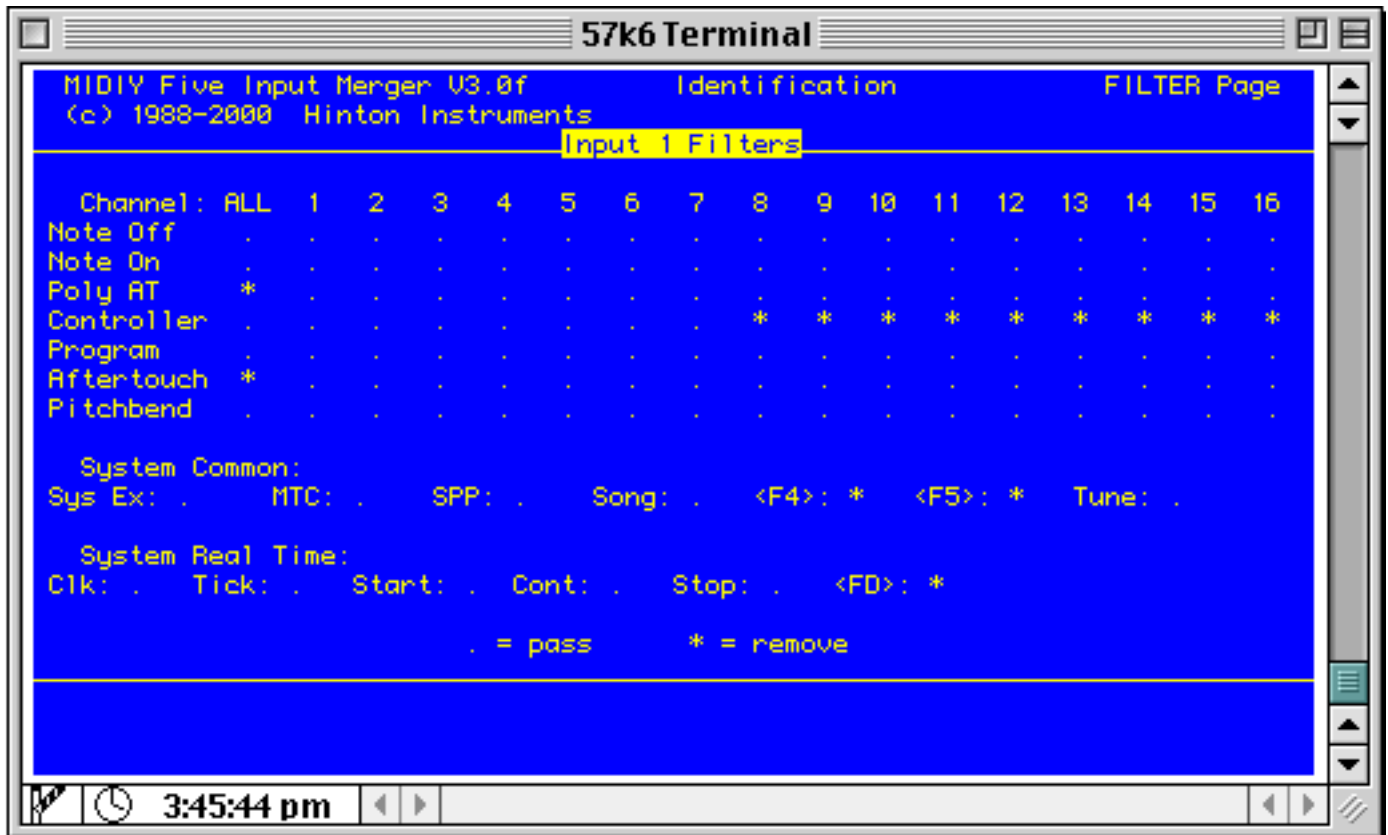
18: Clear: Transmits both Event A and Event Z.

19: Panic! Generates Stop, All Notes Off, Reset All Controllers, All Sound Off, Pitchbend = centre, Modulation Wheel = 0, Hold = 0, Volume = max, Channel Aftertouch = 0; then individual Note Offs for every note on every MIDI Channel.

20: Clear + Panic: Transmits Clear Events immediately and if the switch is still held after a short pause follows with the complete Panic sequence.

The MIDIY Filter Pages

This page has five sub-pages, one for each set of Input Filters.



Every MIDI Status has an individual filter and there is additional filter for All Channels of Channel Messages which overrides any individual Channel filters.

In the example shown the sub-page parameter is selected and set to Input 1 Filters. All Channels of Polyphonic Aftertouch and Aftertouch are being filtered. Channels 5 to 16 Controllers, MIDI Time Code and undefined messages are filtered.

All Inputs should have their Filters configured for the required merging operation. Any unwanted or large bandwidth Status types should be removed to prevent the chance of exceeding the Output bandwidth. Note that Input 1 has a larger buffer than the others so this should be used for the busiest traffic.

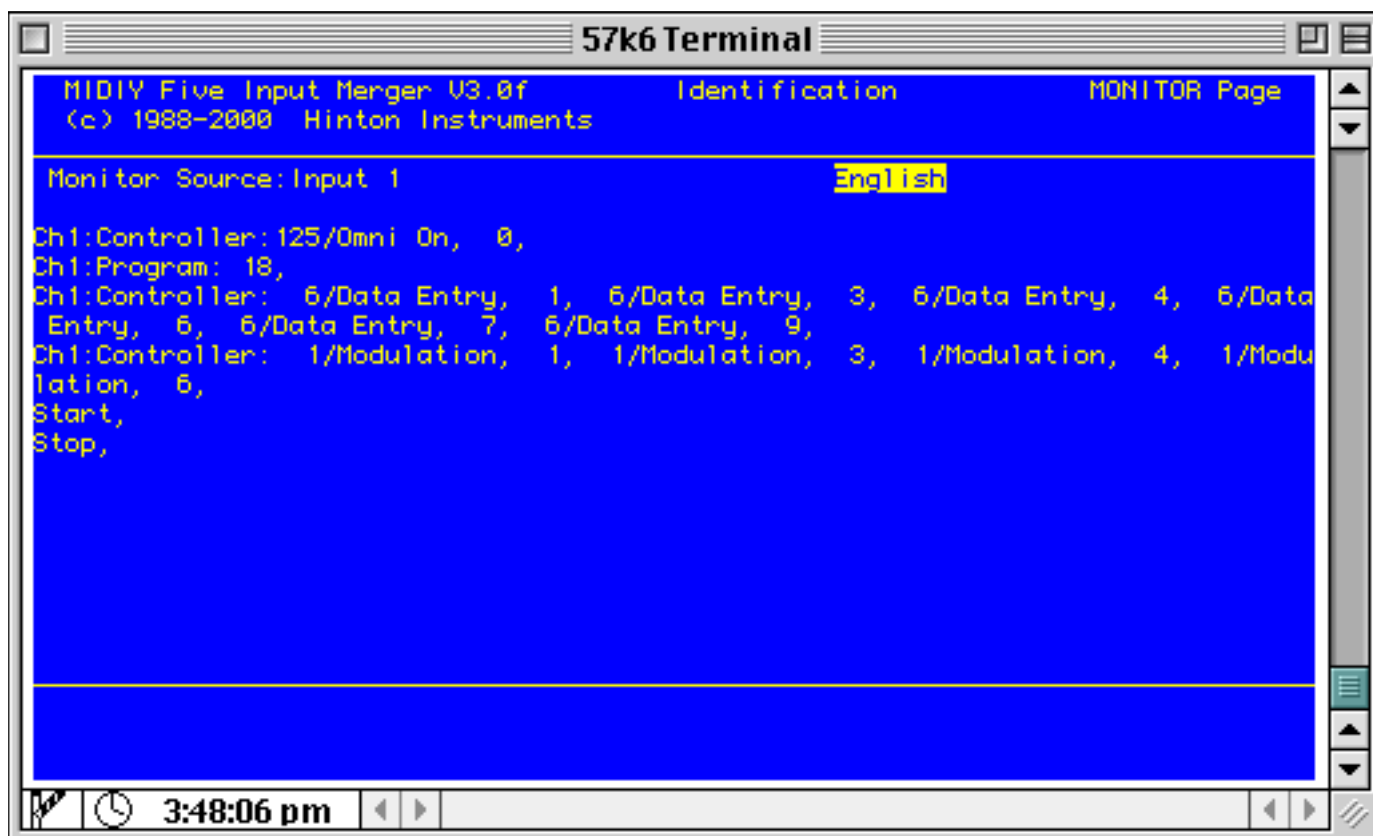
Clocks and MIDI Timecode should normally only be allowed through on one input otherwise they will conflict at the destination. Similarly Continuous Controllers will jump if two identical types are merged at the same time.

If two System Exclusive Blocks are received at once, one will be queued until the other has finished subject to the buffering limits.

MIDIY Operation

In the event of a full buffer the front panel Error LED will light. At this point the data has been corrupted and is not recoverable. Operation will continue after a Clear Event has been issued. If the error recurs it is best to investigate the incoming MIDI data and adjust filtering accordingly.

The MIDIY Monitor Page



Monitor Source: Input 1-5, selects the Input to Monitor.

Format English/Hex, chooses the style of data presentation.

IMPORTANT: When this Monitor Page is active the merger using the selected Input does not operate. In Single mode there will be no merging, in Dual mode only the other merger will be working. Only the selected Input will be monitored, but in Dual mode the other merger may be connected externally to the active input. Monitoring is only intended to help sort out equipment setup and filtering problems, it is not intended to be left running during normal operation.

The Monitor takes data from the selected Input's Capture Buffer post filtering and interprets each byte into either hexadecimal, shown as three characters, or English which takes several more characters. Even at the fastest connection speed it is possible to generate much more data than is being received in the same time so use with care.

Incoming MIDI data will be scrolled in the central Display Window. Data scrolled off the top of this area may be kept in your Terminal Emulator's buffer.

In English Mode all data is shown as transmitted except for Pitchbend and Song Position Pointer which both have two byte 14 bit data fields which are shown as a single decimal value, with Pitchbend converted to signed centre zero. Please refer to the Reference Section for details of MIDI data structure.

Section 3: Commands

MIDIY Command Summary

Conventions:	{symbol}	= a key on the computer/terminal keyboard
	{CR}	= Carriage Return (Line Feeds are ignored)
	n	= small decimal number, usually 0 to 16
	nn	= decimal number
	nnnn	= large decimal number
	hh	= hexadecimal number, 00 to FF
	hhhh	= 16 bit hexadecimal number
	< ... >	= a byte string in hex
	" "	= an alphanumeric string in ASCII
	{BS} and {DEL}	both delete backwards
	{ESC}	- aborts command

Commands may be entered manually or transmitted from an ASCII file. All Dumps and Recalls are in the correct command format for saving and retransmitting with Bulletin Board type communications software. Command files may be edited with a Word Processor.

In VT100 mode the cursor keys move parameter selection shown in reverse.

- {+} or {,} increments the selected parameter and {-} decrements it.
- {Keypad numbers} followed by {Enter} set the parameter directly
- {Keypad .} Homes to Page Selector
- {ESC} twice to abort command or redraw screen

Single Character Commands:

?	- Show Status
^	- Interrogate Vers/Rev
!	- Global Panic
A	- send All Notes Off event (Event #1) to both Outputs
Z	- send Zero All Controllers event (Event #2) to both Outputs
H	- Help

Double Character Commands:

D{CR}	- Dump current status
DF	- Dump Filters
D#	- Dump Events
D&	- Dump Everything

Commands terminated with CR:

Bn	- Block Delay (n: 0 - 10)
Cn	- Configuration (n: 1 = Single, 2 = Dual)
Mn	- Memory Protect (n: 0 = off, 1 = on)
PFt=n	- Define Function (t: S, 1, 2, 3, 4; n = 0 - 20)*
Tn	- Terminal type (n: 0 = off, 1 = Dumb, 2 = VT100)
"...	- set unit ID
;...	- Comment
S1n	- Active Sensing 1 (n: 0 = off, 1 = on)
S2n	- Active Sensing 2 (n: 0 = off, 1 = on)
R1n	- Running Status 1 (n: 0 = off, 1 = on)
R2n	- Running Status 2 (n: 0 = off, 1 = on)

In=s - Input n switch (n: 1, 2, 3, 4 or 5; s: 0 = off, 1 = on)*
Fn=s - Filter n Bypass (n: 1, 2, 3, 4 or 5; s: 0 = off, 1 = on)*

F1<hh>n - Filter Input 1 Status hh (n: 0 = off, 1 = on)
F2<hh>n - Filter Input 2 Status hh (n: 0 = off, 1 = on)
F3<hh>n - Filter Input 3 Status hh (n: 0 = off, 1 = on)
F4<hh>n - Filter Input 4 Status hh (n: 0 = off, 1 = on)
F5<hh>n - Filter Input 5 Status hh (n: 0 = off, 1 = on)

#nn CR - show Event List nn
#nn " - name Event List nn
#nn <hh,...hh> - define Event List nn

On#mm - send Event List mm to Output n (n = 1, 2)
On<hh,hh, ... hh> - send message to Output n (n= 1, 2)

MIDIY may be completely controlled from the RS232 port by either a terminal (dumb or smart) or a computer either emulating a terminal or running a program specific to MIDIY. The commands are given as readable lines of ASCII characters and are structured for entry by hand typing or by transmitting from a saved text file.

There is one command per line determined by the first character after a Carriage Return {CR}, Line Feeds are ignored. Upper and lower case are treated as the same and any illegal command will generate an error message:

H for Help

There are three types of command:

Single Character commands that take immediate effect

Double Character commands

and Compound Commands ending with a Carriage Return

Apart from the single character commands all may be aborted by sending the ASCII Escape character {ESC}, <1Bh>, once or, if in VT100 mode, twice. It is only necessary to type the minimum number of characters to make a command unambiguous, e.g. F1 for Filter Input 1 or F2 for Filter Input 2, any following characters will be ignored until a valid argument is entered.

Some arguments may be defaulted by entering a {TAB} or {CR}, but not a {Space}. This has been done for ease of manual entry and for keeping commands saved in ASCII files.

Single Character Commands:

?	- Show Status
^	- Interrogate Vers/Rev
!	- Global Panic Clear
A	- send All Notes Off event
Z	- send Zero All Controllers event
H	- Help

The single character commands are all operations requiring a single keystroke for fast manual entry.

? - Show Status

Also invoked at power on/reset, shows the title, software version and revision and the current status. e.g.:

```
MIDIY Five Input Merger
Vers:3.0f (c) 1988-2000 Hinton Instruments

Buffer 1 Size: 5000
Buffer 2 Size: 5000
Buffer 3 Size: 5000
Buffer 4 Size: 5000
Buffer 5 Size: 5000
 30 Event Lists of up to 60 MIDI bytes each
Memory Protect: 0
Block Delay: 2
Running Status 1: 0
Active Sensing 1: 0
Running Status 2: 0
Active Sensing 2: 0
```

^ - Interrogate Vers/Rev

This character returns the program title and software version and revision number followed by the serial number. It is intended to be used by a computer program to check that it is connected to the correct equipment and firmware, but is useful if sharing one terminal between several units.

! - Global Panic Clear

will transmit a generated MIDI Panic sequence comprising Stop, All Notes Off and Reset all Controllers; a delay followed by centre Pitchbend, zero Modulation Wheel, maximum Volume and zero Channel Aftertouch; another delay and then 128 Note Offs for all sixteen MIDI Channels and finally one Active Sensing message to guarantee clearing any stuck notes in any equipment. The sequence is transmitted on both MIDI Outputs.

The sequence is sent as a series of blocks, with a variable delay between them, to avoid overflowing the input buffers of the connected equipment. This delay may be altered with the **B** command.

Panic Clear

will appear on the screen and the front panel **Busy** LED will show the operation in progress. All buffers are cleared.

A - send All Notes Off event

Event #1, which is nominally for All Notes Off messages, but may be redefined to be any MIDI code sequence up to 60 bytes long, is transmitted on both Outputs and the Input buffers are cleared.

Z - send Zero All Controllers event

Event #2, which is nominally for Controller Zeroing messages, but may be redefined to be any MIDI code sequence up to 60 bytes long, is transmitted on both Outputs and the Input buffers are cleared.

To send Event #1 or #2 on one Output only see the **O** command.

H - Help

displays several pages of concise descriptions of every available command. The information is similar to the summary of commands at the beginning of this section.

After each page the message:

More ... ESC to abort, any key to continue ...

will be shown until the end of the information. In VT100 mode the help information will be shown in the central window, rather than the command window, which will be restored when completed or aborted with a double {ESC}.

Double Character Commands:

D{CR}	- Dump current status
DF	- Dump MIDI Input Filters
D#	- Dump Event Lists
D&	- Dump Everything

All the commands in this group invoke a partial or complete dump in readable ASCII format. These commands may be given to view the current setups or to save them to disk via a computer. When using a terminal emulator with disk filing, enable capture reception before issuing the Dump command and then save the capture buffer to disk when the dump (seen on the screen) has finished.

All dumps are in MIDIY command format so that the file may be simply transmitted back to restore that state. As the dumps are in printable ASCII they may be edited with any word processor and cut and pasted to make new setup files. Comments may be added to the files for future reference by preceding with a semicolon, e.g.:

```
;dump of World Tour settings (keep safe!)
```

All D commands cause the message

```
;Dump
```

to appear on the screen to acknowledge that the command has been started. The message starts with a semicolon to turn it into a safe comment in case the dump is being save to disk, otherwise it would be interpreted as a command when sent back. This line may be deleted when editing files.

When shipped MIDIY contains “factory presets” of useful events. It is recommended that a complete dump is saved to disk and used as a template to produce new files.

D{CR} - Dump current status

produces a dump of the current settings as a series of abbreviated commands. e.g.:

```
B 2  
R1:0  
R2:0  
S1:0  
S2:0  
I1=1  
...etc
```

When reloaded these commands will update or restore the operational settings for Block Delay, Running Status, Active Sensing, Input Switches, Filtering Bypass and the Programmable Functions.

DF - Dump MIDI Input Filters

dumps the current state of the Input filters as an Open All Filters command followed by a series of Status filter definitions for each closed filter.

e.g. if only one Pitchbend Filter for Channel 7 were closed the dump would be:

```
F 1<0>  
F 1<E6>1  
F 2<0>  
F 3<0>  
F 4<0>  
F 5<0>
```

The command to open all the filters first saves having a command for every single filter.

D# - Dump Event Lists

gives all the Events as Name Event and Define Event commands.

D& - Dump Everything

is equivalent to all of the above Dump commands in turn.

Commands terminated with CR:

- Bn - Block Delay
- Mn - Memory Protect
- Tn - Terminal type
- PFt=n - Define Function
- "... - set unit ID
- ;... - Comment

Bn - Block Delay

n may be in the range 0 to 10 and sets the duration of the delay between data blocks in the Panic and Clear sequences. the value should be adjusted to be the smallest compatible with the MIDI equipment being used. Too small a value may cause this sequence to overload some of the MIDI Receive buffers and so have the opposite effect to that intended. Too large a value will increase the total time taken unnecessarily.

Mn - Memory Protect

n may be 0 to turn protection of or 1 to turn it on. A default argument may be entered by typing {CR} to show the current state without altering it. When set On all commands that alter the stored memory will be treated as errors.

Tn - Terminal type

n may be 0 for off, 1 for "dumb" terminal and 2 for intelligent terminal (VT100) and defaults to 1 after power up or reset.

When n=1 MIDIY assumes that it is communicating with a dumb terminal and expands all responses to make them readable to the user. When n=0 responses are minimal and terse and are intended for communication with a computer program that does not require superfluous information.

The dumb terminal mode will work with any terminal or emulator on any computer and uses only a single scrolling screen.

The intelligent terminal mode uses a subset of the VT100 protocol that will work on any hardware or software emulation of the VT100 i.e. it does not use dim, underline or double size attributes that are often unavailable. This mode features a number of paged displays for better visual presentation and it is recommended for manual setting up and control. For dumps and restoring files it may be preferable to work in dumb terminal mode.

If changing from VT100 mode to another a VT100 reset terminal command is sent which will clear the screen, but may cause some emulators to reload their settings from disk so do not be alarmed if you notice your disk activity at this point.

PFt=n - Define Function

t = 1-4, S; n = 0-20

A VT100 terminal has four programable function keys (PF1 to PF4) at the top of the keypad and the front panel switches correspond to PF1 and PF2 while the footswitch is termed PFS. The functions of these controls is set by an argument in the range 0 - 20:

0 (off)

1-5: Lock 1 (2, 3, 4, 5): forces any input to be exclusive.

6-10: Filter 1 (2, 3, 4, 5) Off: bypasses any input's filtering.

11-15: Lock+Bypass 1 (2, 3 4,5):

simulates an exclusive through connection.

16: Event A: Transmits user defined Event #1 (All Notes Off).

17: Event Z: Transmits user defined Event #2 (Zero All Controllers).

18: Clear: Transmits both Event #1 and Event #2.

19: Panic!: Generates Stop, All Notes Off, Reset All Controllers, All Sound Off, Pitchbend = centre, Modulation Wheel = 0, Hold = 0, Volume = max, Channel Aftertouch = 0; then individual Note Offs for every note on every MIDI Channel.

20: Clear + Panic: Transmits Clear Events immediately and if the switch is still held after a short pause follows with the complete Panic sequence. (N.B. only real switches can have this function, not VT100 keys.)

e.g. to setup the left pushbutton to lock Input 2 and bypass all filtering (as if Input 2 were directly connected to the Output) give the command:

PF 1=12

to make the footswitch trigger the All Notes Off sequence (Event "A"):

PFS=16

"... - set unit ID

Up to twenty characters may be entered after the quote to identify the unit. This will be shown in the centre of the Header Window in VT100 mode.

;;... - Comment

All characters following a semicolon are treated as comments until an {ESC} or {CR}. This may be used to annotate commands within a text file or for disabling commands.

Event Commands:

#nn {CR} - show Event List nn
 #nn " - name Event List nn
 #nn <hh,...hh> - define Event List nn

#nn {CR} - show Event List

Typing # will produce on the screen:

Event #: 1

the event number may now be entered followed by a {CR} and if within range the event title will be shown followed by the event list data on the next lines:

```
Event #:    1 "All Notes Off
#  1 < B0, 7B, 00, B1, 7B, 00, B2, 7B, 00, B3, 7B, 00, B4, 7B, 00, B5, 7B, 00, B6, 7B, 00, B7,
        7B, 00, B8, 7B, 00, B9, 7B, 00, BA, 7B, 00, BB, 7B, 00, BC, 7B, 00, BD, 7B, 00, BE, 7B,
        00, BF, 7B, 00, >
```

This command is intended for use by an operator to check the contents of an Event List, the first line should not be saved to disk as it is not a command. Use **D#** to dump events, see page 3.8.

If the event type is not delimited with a {CR} the event data may be entered with the following commands:

#nn " - name Event List nn

Up to sixteen printable characters may be entered following the quote character, further characters or trailing comments will be ignored. Delete and Backspace both delete backwards and the string may be aborted by typing {ESC} or stored by typing {CR}

#nn <hh,...hh> - define Event List

After typing the < character to start hexadecimal entry up to sixty bytes may be given to define the Event List. {CR} will not terminate this command until the hex entry is ended by typing >. Leading Spaces, {TAB}s and {CR}s will be ignored so that the event list may go over more than one line in a file and formatted for clarity.

The data defining an Event List will be used whenever that event is invoked. The validity of the MIDI protocol within the list is not checked either on entry or use. MIDIY is shipped with preset Event Lists which may be dumped and used as a template for editing into new events.

All MIDI equipment should include all the MIDI codes it recognises in its manual and if any difficulty is encountered translating this information into Event Lists or such information is not given by the manufacturer please consult Hinton Instruments web site or contact technical support.

The Reference Section gives a synopsis of MIDI protocol structure with Controller numbers and System Exclusive IDs.

O - Output Commands

Onn #mm - send Event List mm

Onn <hh, hh, ... hh> - send message

Events or arbitrary MIDI messages may be set from either of the two Outputs individually.

Onn #mm - send Event List mm

nn = 1 or 2; mm = 1 to 30

Any of the stored Events lists may be sent to either Output by this command. The Event is inserted in the Merger Output between MIDI messages and the correct Status will be restored afterwards if running status data is incoming.

Onn <hh, hh, ... hh> - send message

nn = 1 or 2.

This is a free format version of the previous command. Each MIDI byte is transmitted from the selected Output as soon as it is delimited so that {Delete} and {Backspace} only function within each byte rather than the whole message. {CR} will not end this command until the hex entry is first ended by typing >. Leading Spaces, {TAB}s and {CR}s will be ignored so that data may go over more than one line in a file.

While this command is in use Merging is suspended at the selected Output and incoming data is queued in the Capture Buffers. If this command is used to manually setup up equipment while constant data such as a Clock or MTC is present the buffers may overflow and the Error LED will light. Upon completion of this command if data has been lost in this way the buffers will be cleared and

;WARNING: Incoming Data was lost during this Output operation

will appear on the terminal. Otherwise all stored data will be merged and transmitted, but this may be a large burst depending on what has accumulated. This is a very powerful command, but should be used with caution.

There is no limit to the number of bytes transmitted so it may be used to send large System Exclusive blocks and complex equipment setups.

MIDIY 3.0 Status Commands:

S1n - Output 1 Active Sensing (n: 0 = off, 1 = on)

S2n - Output 2 Active Sensing (n: 0 = off, 1 = on)

R1n - Output 1 Running Status (n: 0 = off, 1 = on)

R2n - Output 2 Running Status (n: 0 = off, 1 = on)

In=s - Input n switch

Fn=s - Filter n Bypass

F1<hh>n - Filter Input 1 Status hh

F2<hh>n - Filter Input 2 Status hh

F3<hh>n - Filter Input 3 Status hh

F4<hh>n - Filter Input 3 Status hh

F5<hh>n - Filter Input 3 Status hh

S1n, S2n- Output Active Sensing

n: 0 = off, 1 = on.

When set On a MIDI Active Sensing Clock (FEh) is automatically generated at the specified Output approximately every 90ms whenever no MIDI data is being transmitted. This feature is essential for some MIDI devices that require Active Sensing and will shut down if not received within 300ms of the last MIDI byte received.

R1n, R2n - Output Running Status

n: 0 - off, 1 = on.

When set On redundant Channel Status bytes are removed from the Output data according to Running Status protocol to reduce possible accumulative delays. This is reset after any 90ms pause to ensure that Data does not become separated from its Status.

In=s - Input n switch

n = 1-5; s: 0 - off, 1 = on.

Each of the five Inputs may be turned completely on or off. The Lock actions of the programmable function switches are saved and restored using a group of these commands.

e.g. Lock Input 2 is defined by:

I1=0

I2=1

I3=0

I4=0

I5=0

Filter Commands

To reduce the amount of data being processed by MIDIY and unnecessary delays each Input has independent filters for every MIDI Status type (except Active Sensing and Reset which are not merged). Any Filter set may be switched in or out with the following command:

$F_n=s$, where n : 1-5; s : 0 - off, 1 = on.

Any filter may be set to pass or remove a MIDI Status with:

$F_n<hh>s$

where n specifies the set for Input numbers 1 to 5, hh is the MIDI Status in hex and s is 0 for pass and 1 for remove. When a Filter is "on" it removes both that Status and its associated Data from the MIDI stream.

A special form of this command, $F_n<0>$, will clear all filtering on Input n . hh must be between 80h and FDh and F0h operates both System Exclusive Start and End i.e. there is not an F7h filter.

e.g. To clear Input 3 Filters and then setup filtering for Polyphonic Aftertouch on Channel 5 and MIDI Time Code:

F3<0>

F3<B4>1

F3<F1>1