MIDIZ

Dual Long Haul Converter

Operating Manual

HINTON INSTRUMENTS

Professional MIDI Management Systems

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MIDIZ Specification

Case

1U 19” Rack Mounting (W:482 X H:44 x D:270 mm). Steel chassis.

Power

85V-250V mains, 50/60Hz. 4W max.

Front Panel

On/off switch
LED status indicator

MIDI Connections:
DIN 41524 circular metal locking type; In A, In B, Out A, Out B

Rear Panel

MIDI Connections:
DIN 41524 circular metal locking type; In A, In B, Out A, Out B (paralleled with front panel)

Long Haul Connections:
Two XLR3M (outputs) and two XLR3F (inputs); Out A, In A, Out B, In B

Mains:
IEC fused, filtered inlet

Earth:
M5 Bolt

Electrical

Long Haul Cable Type:
Audio grade screened twisted pair, 80-90 okms/km.

Maximum Length:
>1000 metres, tested to 100 ohms per conductor.

Output Signal:
0 to +5V max. complimentary @ 31.25kHz.

Delay:
0.5 microseconds @ 100 metres.
11.0 microseconds @ 1000 metres.

Pulse Width Distortion:
< 1.0%

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MIDIZ Installation

General

MIDIZ takes 1U of 19" rack space and requires a mains power supply with IEC connector on the left hand side. MIDIZ will work on a mains voltage in the range of 85V-250V AC.

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 my 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, persuant 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.

MIDIZ 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 MIDIZ and its associated equipment and cabling or the equipment affected by the interference.**
- **Utilise different mains power outlets. MIDIZ 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".

Tests performed and passed are: EN50082-1 : 1992, EN55022 : 1994 Class B

This product may contain nuts.

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.

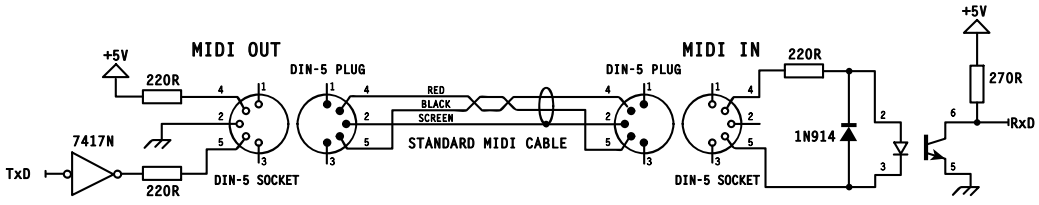
MIDI Cables

MIDIZ has four MIDI connectors on both front and rear panels: two inputs, A & B, and two outputs, A & B. These connectors are wired in parallel and only one of each type should be connected at a time. MIDIZ may be inserted transparently in any MIDI connection scheme without any adverse delay effects.

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 Thrus 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. If two sources need to be combined a MIDI Data Merger will be required. Hinton Instruments also manufactures 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 the cable screens to the plug shells as this will connect the case ground via the receptacle chassis and may cause grounding related problems.



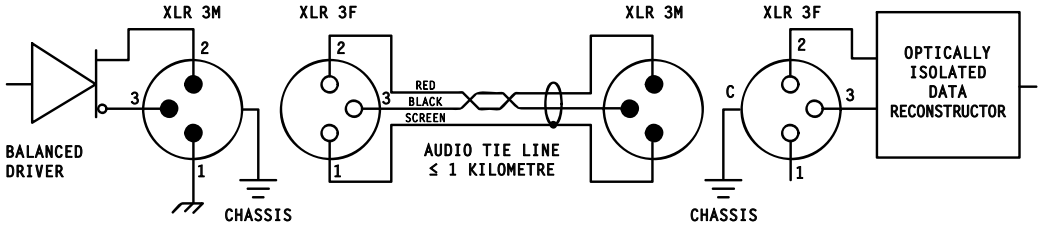
Long Haul

The MIDIZ Long Haul connectors on the rear panel are XLR compatible types intended to be used with screened, balanced twisted pair audio distribution cabling. Outputs are male, inputs are female and pin 1 is connected to the cable screen in compliance with normal audio practise. It does not matter if you use a pin 2 hot or pin 3 hot convention as long as the phase is not inverted in the cable run.

The electrical signals used corresponding to a high audio level (5Vdc complimentary pulses) equivalent to greater than +8dbm and are, of course, at the MIDI baseband frequency of 31.25kHz.

THIS MAY CAUSE DAMAGE IF CONNECTED TO AUDIO EQUIPMENT

Avoid connection to monitoring systems, high (audio) frequency voicecoils are not designed to withstand continuous high frequency tones. More care should be taken than when routing SMPTE/EBU Timecode signals.

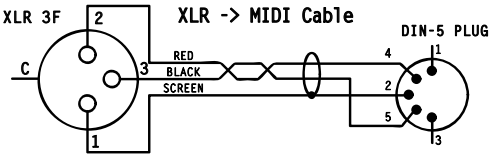


The MIDIZ circuitry is optically isolated, similar to the MIDI circuitry, and will drive over 1 kilometre of screened balanced cable with a large tolerance to cable and connector types. It does not require a controlled impedance like many other transmission systems. The cable screen should be maintained throughout the run and should not be earthed at any point along the way, e.g. at patchfields. Failure to observe this may result in high frequency noise being picked up by audio equipment. Also consider that the driver may be connected to a different phase of the mains from the receiver or, in outside concert applications, to a generator so it is important not to connect the screen to chassis at the receiving end.

Otherwise connect in a similar way to MIDI:

- **One output drives one input only.**
- **Do not place phase reversers, attenuators, transformers or active circuitry in line.**
- **Avoid connecting two outputs together or to phantom power supplies. Although the drive circuitry appears to sustain these conditions it is neither recommended nor guaranteed.**

For short runs (over 15m and up to 100m) the Long Haul output may drive MIDI directly with a suitable adapter cable as shown:



Checking

The limiting factor is the dc resistance of the cable path. Typical cables have a resistance of 80 to 90 ohms per conductor per kilometre and MIDIZ is tested to 100 ohms. If in any doubt, to check a cable path short pins 2 and 3 at one end and measure the resistance between pins 2 and 3 at the other with a multimeter. Anything up to 200 ohms is acceptable.

Also check that there is no connection to pin 1 with an audio cable tester.

Mains

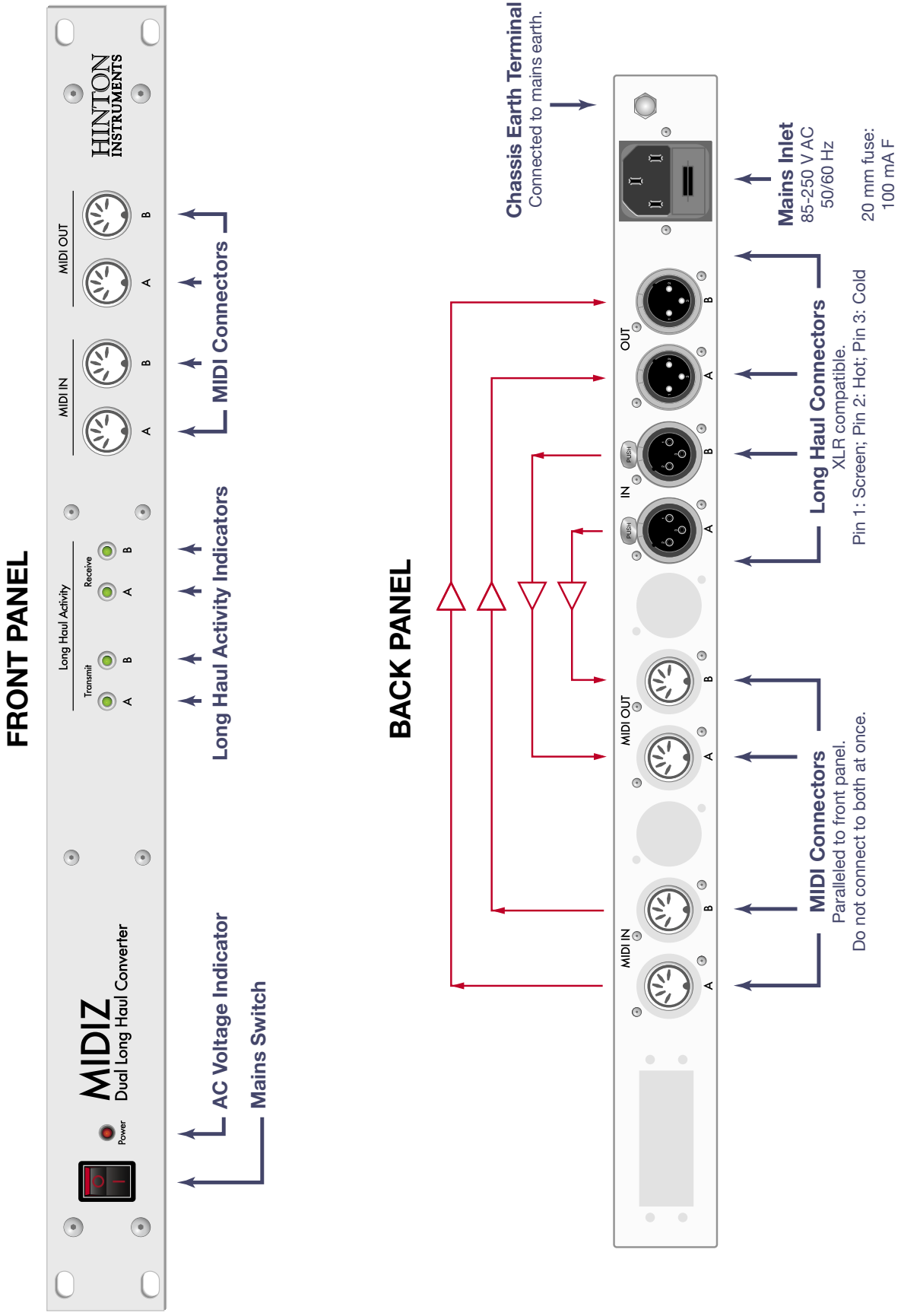
MIDIZ is compatible with all worldwide mains voltages and will run on anything between 85V and 250V AC.

When connected power up the MIDIZ. The presence of internal AC power is indicated by an LED to the right of the mains switch. 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. The fuseholder slides out like a drawer once the mains cable is removed and there is a spare fuse inside. Remember to replace this if used!

There is a delay of approximately 5 seconds after powering on before long haul transmission and reception become active. This is deliberate as much MIDI equipment transmits erroneous data when it is first turned on.

If you experience any difficulty with the above operations or require any further information, please contact Hinton Instruments: **support@hinton-instruments.co.uk**.

More reference information and contact details are available on our website: **http://www.hinton-instruments.co.uk**.


FRONT PANEL
MIDIZ
Dual Long Haul Converter
Power
Long Haul Activity
Transmit
Receive
A
B
MIDI IN
MIDI OUT
HINTON INSTRUMENTS
AC Voltage Indicator
Mains Switch
Long Haul Activity Indicators
MIDI Connectors
BACK PANEL
Chassis Earth Terminal
Connected to mains earth.
Mains Inlet
85-250 V AC
50/60 Hz
20 mm fuse:
100 mA F
Long Haul Connectors
XLR compatible.
Pin 1: Screen; Pin 2: Hot; Pin 3: Cold
MIDI Connectors
Paralleled to front panel.
Do not connect to both at once.
OUT
IN
MIDI OUT
MIDI IN
PUSH

MIDIZ Operation

In Use

Each MIDIZ unit comprises two MIDI to Long Haul converters and two Long Haul to MIDI converters. Each pair is designated “A” and “B”, but there is no other connection between the pairs and they may be used completely independently. Any MIDI source may be connected to the MIDIZ MIDI In, converted to Long Haul, transmitted over audio tie lines up to 1 kilometre in length, connected to another MIDIZ and converted back to MIDI.

The front panel has four green LED indicators: Send A and B and Receive A and B. These display outgoing and incoming Long Haul data for each of the two channels. The displays can show individual MIDI bytes as a brief flash and other types of MIDI data produce characteristic flickering or various intensity level glows. With a little practice normal MIDI operation and fault conditions may be easily recognised. Active Sensing and slow tempo Clocks show as a dim flicker, MTC shows as a non-flickering glow and Controller movements and System Exclusive Blocks as brighter bursts. Remember that Note Offs occur between Note Ons, so the LEDs may flash at times that do not correspond to perceived sounds.

If an LED stays on at full intensity it usually indicates that a MIDI feedback loop has been created, usual causes of this problem are routing the Output of a merger or sequencer back to its Input.

There is a delay in the signal corresponding to the cable length and is in the order of 11 microseconds for a full kilometre, reduce pro rata for shorter runs. The MIDIZ Long Haul receiving circuitry reconstitutes the waveform of the original signal so that this is a pure delay and not a data pulse width distortion like that normally associated with MIDI Thrus using slow speed opto-couplers. Most MIDI processing devices delay MIDI data in excess of 400 microseconds so the delays due to Long Haul transmission will not be perceived or cause any adverse effect.

MIDIZ converters may be cascaded on a point to point basis to send MIDI data between MIDI equipment distributed over a wide area.

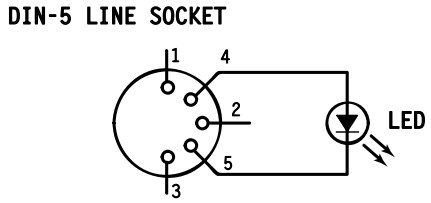
MIDI or Long Haul connections should not be changed while data is active. This may cause undesirable results in the receiving equipment as truncated MIDI data tends to be interpreted as System Real Time codes e.g. Stop, Active Sensing or Master Reset. MIDIX routing matrices which use safe switching techniques are recommended to alleviate this problem.

The MIDIZ Long Haul circuitry is a proprietary design to a high specification. It is not RS422 as has been used for similar purposes with mixed results. It is not compatible with other devices purporting to achieve the same function.

The Long Haul conversion does not effect the MIDI data in any way apart from the very slight delay. No selective processing is done, either all the data is transmitted or none at all.

Troubleshooting

For diagnosing MIDI transmission and distribution related problems we recommend fitting both a 5 pin DIN plug and a 5 pin DIN line socket with an LED soldered across pin 4 and 5, with the anode to pin 4, so that the LED body just protrudes through the cable support.



These testers may be used to check that MIDI data is being transmitted by substituting them for the receiving equipment, they should not be used in parallel.

Starting with a MIDI source plug the line plug into its MIDI out and observe the LED flicker when MIDI data should be sent. Replace the normal MIDI cable and plug the line socket into the other end to check that the cable is not faulty. Pin 4 shorted to pin 5 or to the screen will cause this LED to be permanently off, whereas pin 5 shorted to screen will cause the LED to be fully on.

Work along the MIDI data route until you are sure that data is being presented to the MIDIZ MIDI Input. Using a short XLR cable connect the corresponding Long Haul output back to a Long Haul Input and check that the latter's Receive LED is flickering when data is sent. If not try swapping the A and B channels.

When you are satisfied that the Long Haul output is transmitting, follow a similar process at the receiving unit to the destination MIDI equipment. If the Receive LED is flickering, but the MIDI equipment behaves strangely this could indicate a phase inversion in the XLR cabling. Otherwis check that the MIDI equipment is set up for transmitting and receiving on the same MIDI Channel and that the relevant Modes and Status types are enabled.

The MIDIZ Long Haul Converter should give years of fault free operation, but it has been designed for ease of servicing in the event of any component failure. Many have been in continuous use for over ten years or used on major international tours and events. Spare components and sub assemblies are available for critical maintenance applications, please enquire if you need this support.

MIDI Implementation Chart

Function		Transmitted	Recognised	Remarks
Basic Channel	Default Changed	1-16 1-16	X X	
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
Aftertouch	Key Channel	O O	O O	* Note 1 * Note 1
Pitch Bend		O	O	* Note 1
Control Change		O	O	* Note 1
Program Change		O	O	* Note 1
System Exclusive		O	O	* Note 1
System Common	MTC Song Position Song Select Tune	O O O O	O O O O	* Note 1 * Note 1 * Note 1 * Note 1
System Real Time	Clock Commands	O O	O O	* Note 1 * Note 1
Aux Messages	Local ON/OFF All Notes Off Active Sense Reset	O O O O	O O O O	 * Note 1 * Note 1 * Note 1

Notes: 1. Every MIDI Byte is passed without processing.

O : Yes
X : No