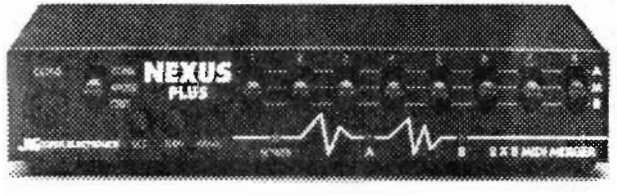
NEXUS
PLUS

2 X 8 MIDI MERGER

Owners Manual
Second Edition February 1992



JLCooper Electronics 12500 Beatrice Street Los Angeles, CA 90066

Greetings
Thank you for purchasing the JLCooper Nexus Plus, the 2 input, 8 output MIDI Merger and Processor. Nexus means "link", which perfectly describes this product. The Nexus Plus is simply the most cost efficient Merger and Processor designed to link together a medium size MIDI stage or studio rig.

Please fill out the enclosed warranty card and mail it in soon.

Nexus Plus Features
- ➤2 MIDI inputs
- ➤8 MIDI outputs
- ➤MIDI Merger
- ➤Three User-Defined Overlapping Zones
- ➤Transposition
- ➤Channel Filter
- ➤Two Bank Memory of Zones, Transposition, and Channel Filtering
- ➤Memory Uses No Battery
- ➤Panic Button
- ➤Input activity LEDs
- ➤Power LED
- ➤Front Panel MIDI Output

Table of Contents

Hookup
When hooking up your system, try to use good quality MIDI cables with a known history.

MIDI outputs always go to MIDI inputs, of course.

Any keyboard, controller, sequencer, computer, tone module, effect, drum machine, --anything with a MIDI output, hooks up to either of the two MIDI inputs.

Likewise, the eight MIDI outputs of Nexus Plus are hooked up to the MIDI inputs of any device that will receive MIDI.

Input A is the Zone, Transpose, and Channel Filter input.
If you plan on using Nexus Plus for Zoning or Transposition, hook up the MIDI output of a keyboard controller to Input A. If you plan on using Nexus Plus for Channel Filtering, hook up the MIDI output of a sequencer to Input A.

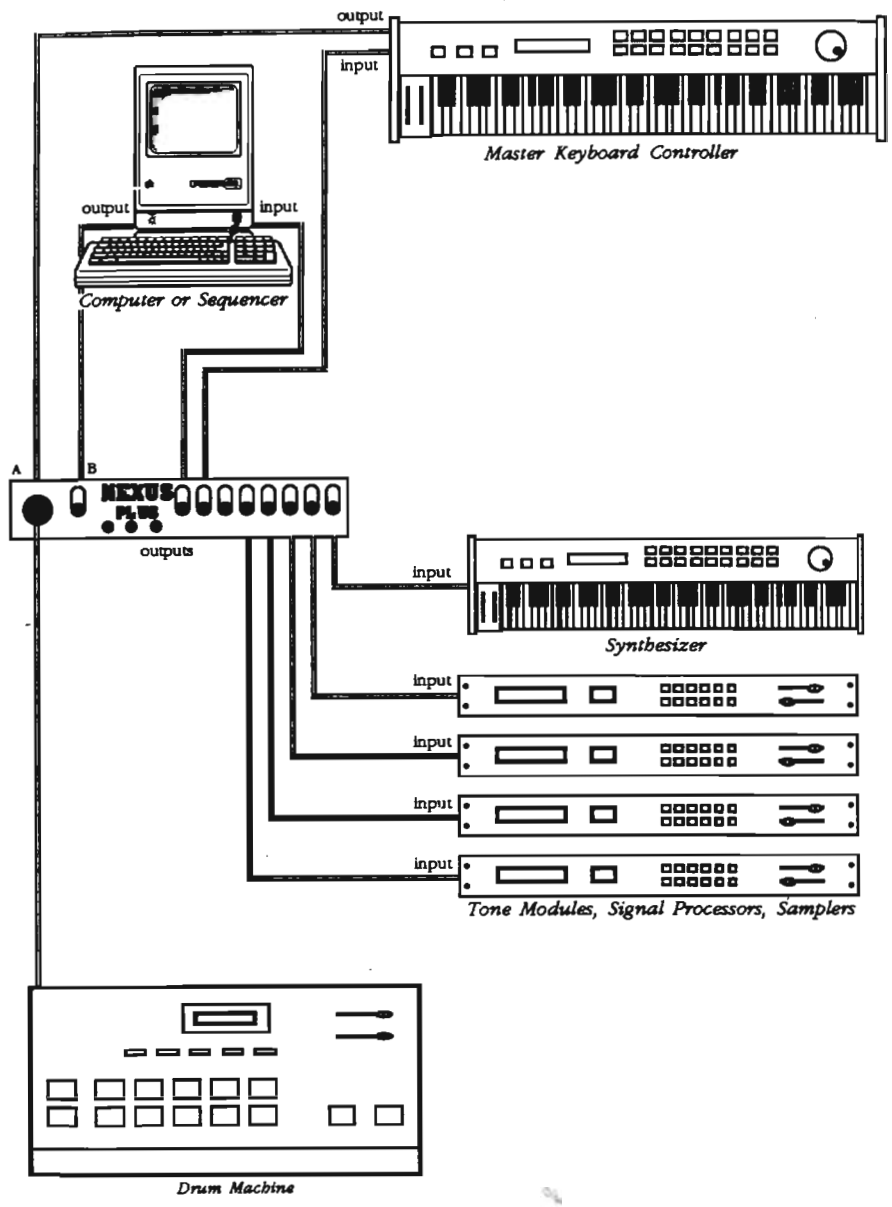
Notice the MIDI output located on the front of Nexus Plus. There is nothing special about this output. It is located on the front panel for convenience. For example, you may want to use this output when a friend brings over a drum machine, and you want to tie it into your studio without having to crawl behind the rack and rip out a lot of cables.

You'll want to hook up both a MIDI input and output for a sequencers or a synthesizer. Certain devices, such as drum machines, tone modules, and MIDI-controlled audio signal processors, might only need to receive MIDI data. For those kinds of instruments, use only Nexus Plus MIDI outputs. (That is why Nexus Plus has more outputs than inputs.)

However, even some tone modules and samplers require two-way communication. For example, you may intend to use a sampler with a MIDI System Exclusive Librarian software package. In that case, you will want to hook up both the input and the output of the sampler to the Nexus Plus.

It may be helpful to run a thin strip of masking tape below the switches to help you keep track of things. Label each switch with the name of the instrument hooked up to that output number. For example, if Nexus Plus MIDI output 4 goes to the input of an Ensoniq VFX, write "VFX" below switch 4.

A typical hook up is shown here.



Activity LEDs

There are two Activity LEDs on the front panel of Nexus Plus, one for each input. These will flicker whenever MIDI data comes into an input. Some instruments send MIDI data continuously. For example, many sequencers always send MIDI clocks. So do not be surprised if an LED stays on most of the time.

Operation

The principle of routing MIDI inputs and outputs is as follows:

Each of the 8 MIDI outputs has its own selector switch, numbered 1 through 8. Each switch has three positions, designated A, B, and M. A and B represent the two MIDI inputs. M represents the Merger and Data Processor. The position of a switch determines what data will be sent to that output.

When a switch is in the A position, anything coming into input A will be sent to that output.

When a switch is in the B position, anything coming into input B will be sent to that output.

When a switch is in the M position, inputs A and B are merged and sent to that output. Also, the Processed version of the Input A data is only available out of any output switched to M.

Say for example that MIDI data comes out of a Keyboard Controller and goes into Nexus Plus MIDI input A. Lets assume that we want the Keyboard Controller to send MIDI to five synthesizers. Say that Nexus Plus outputs 4 through 8 are hooked up to those synthesizers. So, to route the MIDI output of the Keyboard Controller into the synthesizers, flip switches 4 through 8 UP to the A position.

Say that output 2 goes to the input of a Sequencer. To record keyboard data into the sequencer, flip switch 2 to the A position.

Now lets assume that MIDI data comes out of a Sequencer into input B. Lets also assume that Nexus Plus output 1 goes to the MIDI input of a tone module. To play the sequencer data into the tone module, flip switch 1 to the B position.

Just remember that switch positions indicate sources of MIDI, that is, the instruments sending data. The switch numbers indicate the destinations of MIDI, that is, the instruments receiving data.

When using Nexus Plus, consider carefully how you set the switches. Notice that with the added flexibility of having a Nexus MIDI switcher, you have also increased the possibility of creating a MIDI loop. In a typical situation, you might want to send the output of a keyboard controller to the input of a sequencer. The output of the sequencer might be sent to some tone modules. Just don't accidentally switch the sequencer so that it sends MIDI back to itself.

IMPORTANT: Try not to route an instrument back to itself. Unless you are intentionally creating some special effect, you will likely only create confusion.

Nexus Plus MIDI Merger

The Nexus Plus MIDI Merger combines Inputs A and B.

Merging is used whenever you need to send two sources of MIDI data at once to a given destination.

For example, most MIDI sequencers only have one input. Merging allows two keyboardists to record into a sequencer at the same time. Or perhaps the sequencer is receiving MIDI Time Code from a synchronizer. Keyboard data may be merged with MTC, and both sent into the sequencer on the same MIDI cable.

Also, tone modules usually have only one MIDI input. Merging allows both a keyboard controller and a computer to simultaneously control a module or modules. This permits immediate auditing of sounds loaded in by a librarian software package. Or a multi-timbral module can be played by two keyboards at once, or a keyboard and a sequencer.

(Although most sequencers feature a "soft-thru" or an "echo-thru" function, using the Nexus Plus Merger is usually more efficient. The sequencer's computer will be less burdened, and you will have more control of the destination of the merged data. Also, MIDI data can be first processed by **Input A** Data Processor *before* being merged.)

Say that you have an tone module on output 3. You want it to receive MIDI data from both the keyboard and the sequencer. There are two ways to do this.

You could switch output 3 to B, and turn on your sequencers "MIDI echo thru" function. In that case, the Keyboard is routed to the sequencer, which merges the keyboard with the sequence data.

Or, you could simply switch 3 to the M position.

Important. In the above application suggestion, you can see that you should avoid using <u>both</u> the "echo thru" and the merger function at the same time. That would create two merges simultaneously, doubling the data sent by the keyboard controller.

Nexus Plus Data Processing

The Nexus Plus Data Processor can be programmed to Zone, Transpose, and Channel filter any MIDI data coming into **Input A**.

The Processed Data is only sent to any output switched to M.
Thus Processed and un-processed versions of Input A are simultaneously available. For example, say that a keyboard controller is plugged into Input A. Suppose also that a Transposition interval has been entered of, say, one octave down. Switch outputs 1 through 4 are switched to A, and outputs 5 through 8 are switched to M. Outputs 1 through 4 will receive the original, unprocessed MIDI data from the keyboard controller, while outputs 5 through 8 will play the same notes transposed down one octave.

Zones

Zones allow you to split up your keyboard controller, so that the channel it sends is dependant upon which notes you play. For each of three Zones, a Low Note and a High Note are selected. Any MIDI Notes that fall within the Low and High Note range will have their MIDI channel number "bumped up" by one or two channels. Thus an instrument that normally sends on MIDI channel 1 can send on MIDI channels 1, 2, and 3 simultaneously, depending on which notes you play.

Zone Applications

Many synthesizers, such as early Yamaha DX-7s, only transmit on MIDI channel #1. A Zone allows these instruments to send on *any* channel, or even several channels at once. Alternately, a sequencer sending on channels 1 through 8 may be "bumped up" to send on channels 4 through 11.

In live performance, the Input A processor permits you to define Zones on your keyboard, such that the notes you play determine which tone module will sound. If the slave is a multi-timbral tone module, you can decide in real time which voices you will hear simply by playing different ranges of the keyboard. Although a lot of keyboards have this capability already built in, many do not. Those that do have a often limit the number of MIDI channels that you can send on for a given note.

Zones solve a common sequencing problem, too. Suppose that Nexus Plus is assigned to route a sequencer to several MIDI slave tone modules, each set to receive on a different MIDI channel. For example, your modules might be set to receive on channels 1 through 3.

Now suppose that you reconfigure Nexus Plus to route a keyboard controller to the same slave tone modules. But your keyboard is sending on channel 1. Most keyboards can send only on one or two channels at the same time.

So, the keyboard would not be able to control these slaves, unless you were to walk over to the rack of tone modules and change the receive channel of each tone module to channel 1. This is a time-consuming and difficult operation, since a receiving channel number is generally not changeable remotely via MIDI.

Using Zone solves this problem by making your controlling keyboard send data on three channels at once, controlling all the slaved tone modules. Thus the tone modules can always be left on different MIDI channels than the keyboard.

Zone Programming Procedure
Flip the left mode switch up to the **ZONE** position. Check that the MIDI output of the keyboard controller is plugged into Input A.

(If you wish to apply Zones to the output of a sequencer, check that the sequencer output is routed to Input A. Then switch Nexus Plus to route the output of a keyboard controller to the input of the sequencer. Turn the "Echo Through" function of the sequencer ON. This is sometimes called "soft through". This will allow you to play the keyboard to enter Low and High Notes into Nexus Plus to define the Zones.)

The procedure is quick and simple, you will be holding in the **SET** button, and then playing six notes. You will play Low Note/High Note for the first, second, and third zones, respectively.

The first zone passes notes within the defined range on the basic (incoming) MIDI channel. The second Zone passes notes within the defined range on 1+ the basic MIDI channel. The third zone passed notes within the defined range on 2+ the basic MIDI channel.

Press and hold in the **SET** button. The A LED turns on, indicating that Nexus Plus is waiting for you to enter a Low Note.

This Low Note defines the lowest note of the first zone. After entering this note, the B LED turns on, indicating that the Nexus Plus is waiting for you to enter a High Note. This corresponds to the upper range of your first zone.

After you enter this high note, the A LED turns on again, indicating the Nexus Plus is waiting for you to enter the Low Note of the second zone. Once you have entered this note, the B LED turns on again. Nexus Plus is now waiting for you to enter the High Note of the second Zone.

In a similar manner, enter the Low Note and High Note for the third Zone. After all six notes have been entered, both LEDs turn off. Release the **SET** button.

(You could stop at two zones and release the set button if you choose, you do not have to use all three Zones.)

Zone Bank Select
Nexus Plus can store two different Zone assignments. The position of the BANK button determines which of the two memory locations have been selected. To enter or recall a different set of three Zones, press the BANK button.

Clearing Zones
To Clear out a set of three Zones, first select the **BANK** that you want to clear. Check that the mode switch is in the **ZONE** position. Press and release the **SET** button, without playing any notes.

Transpose
The Transpose feature is used when you want some slaved instruments to play at some interval higher or lower than the master. Transposition only affects Notes that come into Input A. For example, if you have a piano sound on your controlling keyboard and a bass sound on a tone module, you may want the tone module to play an octave lower than the controller. It is much easier to program Nexus Plus to transpose MIDI Notes, rather than to change the key of each receiving instrument! This feature may also be used for special effects and static harmonies, with a tone module tracking a fifth higher or a third lower, etc.

Transposing Procedure
Flip the left mode switch to the **XPOSE** position. Check that the MIDI output of the keyboard controller is plugged into Input A.

Hold in the **SET** button. While holding in the **SET** button, play a note on the keyboard controller. The interval of transposition is equal to the interval between this note and middle C (MIDI note number 60).

For example, to enter a transposition of +4 (up a major fourth), play an F above middle C while holding in the SET button. Release the **SET** button.

Transposition Bank Select
You may enter two different Transposition intervals. The position of the **BANK** button determines which of the two memory locations have been selected. To enter or recall another Transposition interval, press the **BANK** button.

Clearing Transposition
To Clear out a Transposition interval, first select the **BANK** that you want to clear. Check that the mode switch is in the **XPOSE** position. Press and release the **SET** button, without playing any notes.

Channel Filter
The Channel Filter removes all MIDI data passing through Input A except data on one selected MIDI channel.

Channel Filter Applications
Some early MIDI instruments, like the Emulator I and the Memory Moog, are permanently in Omni Mode. This makes them nearly impossible to use with a sequencer, because they will always try to play every track. The Nexus Plus Channel Filter allows you to select a single MIDI channel that will control the older instrument, essentially "de-omnifying" it.

Channel Filter Procedure
Flip the left mode switch down to the **CFILT** position. Channel filtering is usually applied only to a sequencer. Check that the MIDI output of the sequencer is plugged into Input A.

To select the one channel that you want the channel filter to pass through, you will need to send a single note into the Nexus Plus. The channel number of this note will be stored in memory. The easiest way to send this note is to switch Nexus Plus to route the output of a keyboard controller to the input of the sequencer. Then turn the "Echo Through" function of the sequencer ON. (Sometimes called "soft through"). This will allow you to play the keyboard to enter the one note into the Nexus Plus to set the Channel Filter

Hold in the **SET** button. While holding in the **SET** button, play a note on the keyboard controller. Release the **SET** button. The MIDI Channel of this note has been captured in the memory of Nexus Plus. The next time that MIDI data comes into Input A, the internal data processor will test the data. Any channel messages (Notes, Controller, Pitch Bend, Program Change, or After Touch) that are not on the captured channel number will be filtered out.

Channel Filter Bank Select
You may enter two different Channel Filtering set ups. The position of the **BANK** button determines which of the two memory locations have been selected. To enter or recall another Channel Filter set up, press the **BANK** button.

Clearing Channel Filter
To Clear out a Channel Filter channel number, first select the BANK that you want to clear. Check that the mode switch is in the **CFILT** position. Press and release the SET button, without playing any notes.

Panic Button
There are those dreaded moments in any MIDI musician's life when a mysterious note or chord gets "stuck". This can happen when the musician does something wrong, like switching an output while a sequence is passing through. But there are definitely times when there seems to be no explanation at all, other than "that happens every once in awhile". AC noise may be the culprit, or a new piece of software with a bug. When this happens during a rehearsal, it is annoying. When this happens in the studio, it is costly. When it happens on stage, it is disastrous. To the rescue is the Panic button on Nexus Plus.

When activated, Nexus Plus sends MIDI commands out of all eight outputs, telling all slaves to "unstick".

The Nexus Plus will send a lot of commands, trying just about everything to unstick that note. It will take about 2 seconds for all of these commands to go out, but in general, it is best to release the Panic button as soon as you hear the note unstick. Due to the high volume of MIDI messages, some MIDI slave devices may display a "Buffer Full" warning. This should cause no problem, but should nonetheless be avoided by releasing the Panic as soon as possible.

In our lab tests, however, notes usually unstick themselves in less than a second. It really depends on the receiving instrument. Some respond to All Notes Off commands, which the Nexus Plus sends out first. These are followed by Sustain Pedal Up commands, which may help in some cases. After these commands are sent, individual Note Off commands are sent out starting at Note 1 on MIDI Channel 1, and continuing on up to Note 127 on MIDI Channel 16.

Troubleshooting and Servicing

If a particular instrument is not receiving MIDI, check first the activity LEDs to make sure that MIDI is coming into Nexus Plus. Then check the switch settings. FInally, make sure that the receiving instrument is set to the correct MIDI channel.

If you experience any operational difficulties, let us reassure you that every unit is 100% factory tested.

There are no "user-serviceable" parts inside Nexus Plus. For warranty service in the U.S. in the event of a malfunction, call the factory to obtain a Return Authorization before sending the unit back. Please, read the instructions and debug your system before calling the factory.