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Disclaimer

Before you start building any of the projects on this website, keep in mind that I can't be held responsible for any damage that is caused by building and using the designs related to the GINO-MIDI Interface. All effort has been done to make the schematics and instructions as correct as possible and the whole project is successfully tested and used by not only me, but also by others then me.

Partlist Decoder PCB 2

|	
1	Integrated Circuit 74HCT138 (8-1 decoder IC)
1	16 Pin IC Socket
1	Multilayer ceramic capacitor 100N, 20%
1	IDC 20 Pin Male
1	IDC 16 Pin Male
1	IDC 16 Pin Female
1mtr	16 pin flatcable
1	Dual header 2 x 7 pin
1	Jumper Bleu
4	Parker 3 x 20 mm
4	Spacer 8 mm
1	PCB 09022016-1
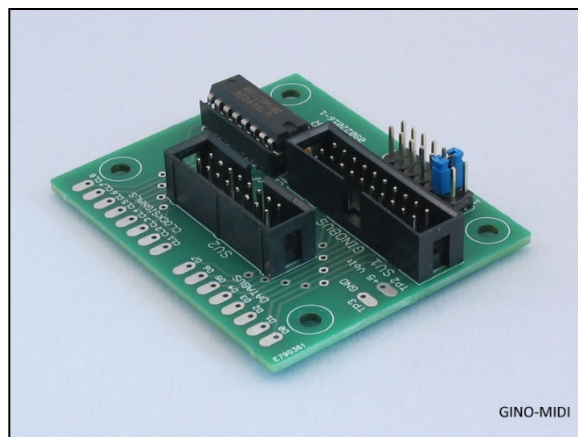
Assembly and operation

Introduction

This decoder PCB's are designed to be used with keyboards, pedal, and / or register-panel that already has a diode matrix. That is often the case with used keyboards etc. of older organs, which we use for our project. This matrix is easy to use and saves us a lot of work. Note the direction of the diode relative to the key contact. The cathode of the diode has to be connected to the key contact. See the diagram of a diode array further herein.

Explanation of the operation of a decoder PCB

A decoder PCB now form the connection between the MIDI main PCB (which may be the main board of the Small-MIDI, or the main board of the Big-MIDI), and the diode matrix.
The microcontroller of the main board gives each time a signal to each decoder PCB, with the message, "Now it's your turn to pass on the keystrokes". The identification of each decoder PCB for the microcontroller is effected by the jumper that we place at JP1. With this jumper we give as it were, an "address" to each decoder PCB.
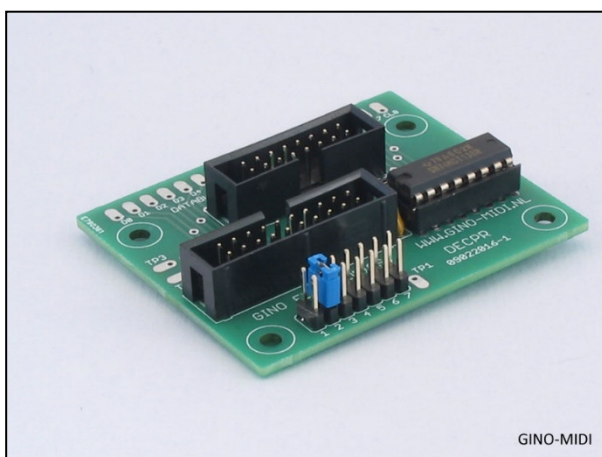
In total there are coming up 4 (Small-MIDI) or 7 (Big_MIDI) address signals from the MIDI main board and therefore can be 4 or 7 decoder PCB's connected and can be addressed.
For the 8th decoder PCB is also an address signal (TP1) available, but the signal does not come with the GINO Bus. In the extreme case that an 8th decoder board should be connected, one has to create a separate connection from the main board of the Big MIDI (TP1) to the TP1 of the corresponding decoder PCB.
A interconnection on the jumper on the PCB decoder should not be made.

The assembly (kit)

The installation of a decoder PCB is simple if the following instructions are carefully observed. It is a double-sided print, so make sure that the parts are placed correctly and flat on the print before you start soldering. Removing or correcting already soldered parts on a double-sided PCB is often difficult.

First mount the 7-pin Dual Header at JP1.

Then the capacitor C1 and the IC socket. Note the marking of the IC socket.

Then you can mount the 20 and 16 pin IDC male connectors. When mounting these IDC connectors, pay attention to the marking of pin number 1. This marking is indicated by a small triangle on the housing of these connectors.

Finally, place the IC in the socket and slide the jumper to the desired position at JP1. See a table below regarding the location of this jumper.
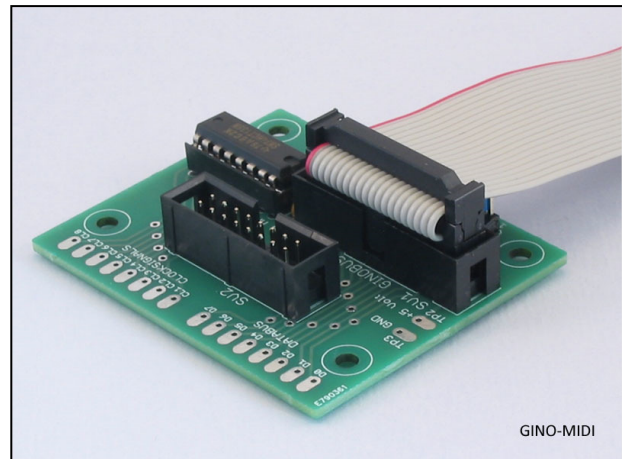
**Connecting databus and clocksignals**

As mentioned before, the decoder board is connected to the main board of the Small-MIDI or the Big-MIDI by means of the GINO Bus. In addition, the decoder PCB will also have to be connected to the diode matrix of the keyboard, pedal or register switches.
A diode matrix has 8 data lines (called data bus) and 8 clock signals. See the principle diagram of a diode matrix later in this description.

Depending on the situation, there are two options for connecting the data bus and the clock signals.

1st option:
The PCB of the current diode array has no wiring. For this you use the supplied IDC 16 Pin Female connector and the 16 pin flat cable. Split the flat cable to size and solder it to the diode matrix according to the list below.
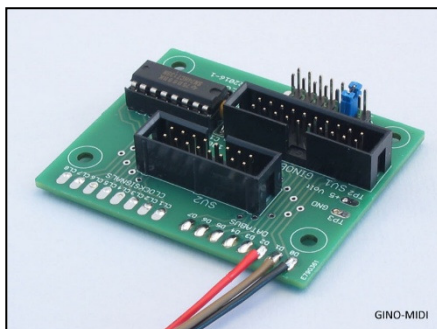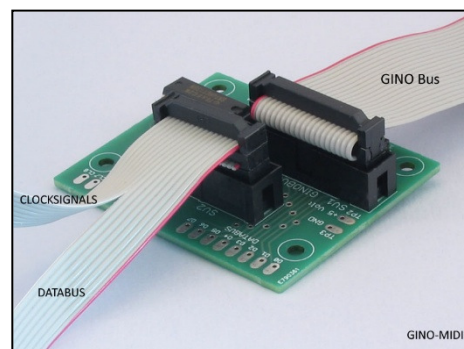
2nd option:
The PCB of the current diode matrix is constructed in such a way that wiring is already connected to it. From this wiring it will then be necessary to find out what the data bus lines are and what the clock signals are. There are solder islands on the decoder PCB to which you can connect this wiring. These solder pads are clearly recognizable on the component side of the PCB.

Instructions assembly Decoder PCB 2

Connection list of databus en clocksignals

Pinnr IDC connector	Function	Description
SV2-1	D0	Data 0
SV2-2	D1	Data 1
SV2-3	D2	Data 2
SV2-4	D3	Data 3
SV2-5	D4	Data 4
SV2-6	D5	Data 5
SV2-7	D6	Data 6
SV2-8	D7	Data 7
SV2-9	CL1	Clocksignal matrixpart 1
SV2-10	CL2	Clocksignal matrixpart 2
SV2-11	CL3	Clocksignal matrixpart 3
SV2-12	CL4	Clocksignal matrixpart 4
SV2-13	CL5	Clocksignal matrixpart 5
SV2-14	CL6	Clocksignal matrixpart 6
SV2-15	CL7	Clocksignal matrixpart 7
SV2-16	CL8	Clocksignal matrixpart 8

TP2 and TP3

On the decoder PCB you will also find two extra solder islands, namely TP2 and TP3.
These two connection points come from the GINO Bus. TP2 is +5 volts and TP3 is GND. You can use these connection points if you also need +5 volts and GND in the vicinity of this decoder print. Note: The load must not exceed 100 mA.

Principle diagram of a diode matrix

Instructions assembly Decoder PCB 2
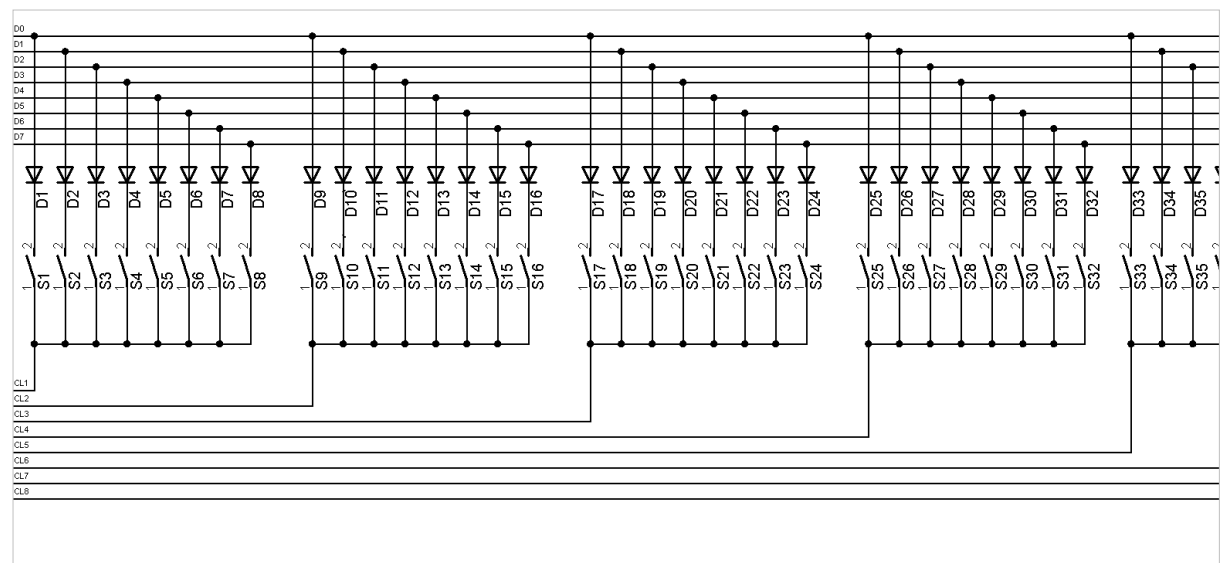
Below you will find an overview of the layout of the entire matrix, including the key names and numbers.

Clocksignals	Matrixpart	Keynames			Keynumbers
CL1	1e matrixpart	C groot	-	G groot	1 - 8
CL2	2e matrixpart	Gis groot	-	dis klein	9 - 16
CL3	3e matrixpart	e klein	-	b klein	17 - 24
CL4	4e matrixpart	c1	-	g1	25 - 32
CL5	5e matrixpart	gis1	-	dis2	33 - 40
CL6	6e matrixpart	e2	-	b2	41 - 48
CL7	7e matrixpart	c3	-	g3	49 - 56
CL8	8e matrixpart	gis3	-	c4	57 - 61

Jumpers at JP1

Jumper at 1 is the adress for port 1 at the default settings of the MIDI controller, MIDI channel 1
Jumper at 2 is the adress for port 2 at the default settings of the MIDI controller, MIDI channel 2
Jumper at 3 is the adress for port 3 at the default settings of the MIDI controller, MIDI channel 3
Jumper at 4 is the adress for port 4 at the default settings of the MIDI controller, MIDI channel 4
Jumper at 5 is the adress for port 5 at the default settings of the MIDI controller, MIDI channel 5
Jumper at 6 is the adress for port 6 at the default settings of the MIDI controller, MIDI channel 6
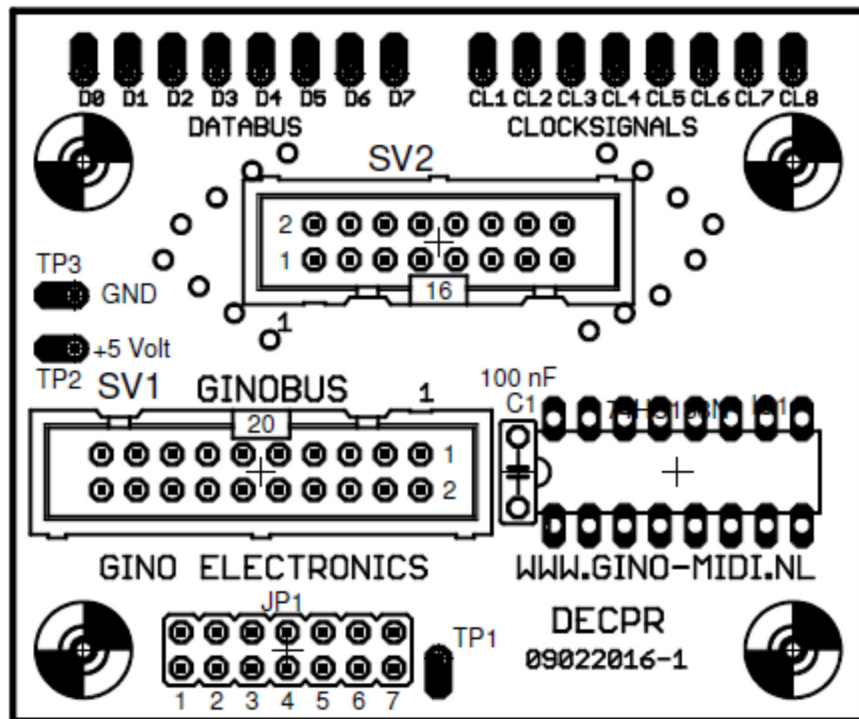Jumper at 7 is the adress for port 7 at the default settings of the MIDI controller, MIDI channel 7

Notice: You may only make one connection per decoder PCB.
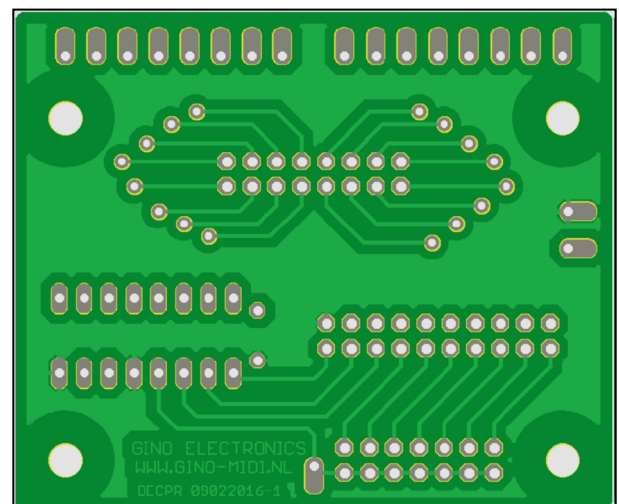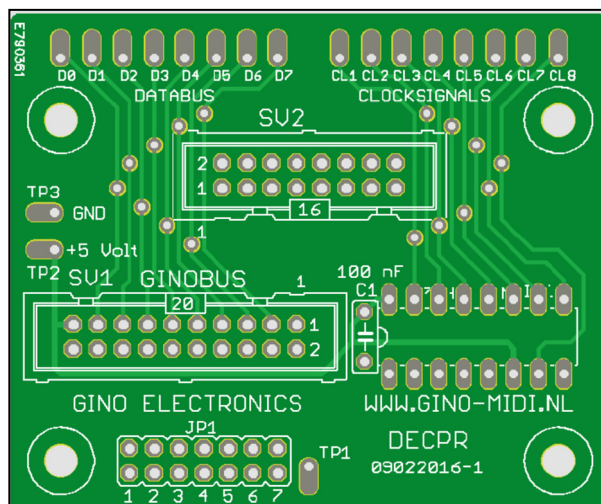
GINO-Bus

The GINO-Bus connects all decoder circuits to the main board. Below a specification of this bus.

Pen# of IDC connector	Name	Description
SV1-20	PORT 1	Signal keyboard/pedal/stops
SV1-18	PORT 2	Signal keyboard/pedal/stops
SV1-16	PORT 3	Signal keyboard/pedal/stops
SV1-14	PORT 4	Signal keyboard/pedal/stops
SV1-12	PORT 5	Only applicable for the Big-MIDI
SV1-10	PORT 6	Only applicable for the Big-MIDI
SV1-8	PORT 7	Only applicable for the Big-MIDI
SV1-6	A2	Adress 2 for decoders
SV1-4	A1	Adress 1 for decoders
SV1-2	A0	Adress 0 for decoders
SV1-1	GND	Massa/GND
SV1-3	D7	Data 7
SV1-5	D6	Data 6
SV1-7	D5	Data 5
SV1-9	D4	Data 4
SV1-11	D3	Data 3
SV1-13	D2	Data 2
SV1-15	D1	Data 1
SV1-17	D0	Data 0
SV1-19	+ 5 VOLT	Power suply + 5 volt

Mounting scheme

PCB layout

Electronic scheme