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Before you start assembling this set, in the form of a kit or ready-built and tested, we recommend that you read this manual in its entirety.

Disclaimer
If you proceed to replicate the circuits presented on the website and in this manual, I wish you every success. I am not liable for any damage that occurs when building and using these circuits.

Partlist

27 note pedal	30 note pedal	32 note pedal		
27	30	32	1N4148	Diode 100V 200mA General Purpose
27	30	32	REED	Reed-contact, diameter = 2.0 mm, lengte = 14mm
7	7	7	LPV 16	PCB verbinder 16 polig
0,2	0,2	0,2	AWG 28-16G	16 polig flatcable per mtr.
24	24	24	PARK2,9X9,5	Parker 2,9 x 9,5 mm
24	24	24	DK 2MM	Spacer/Afstandsbus voor print 2 mm
4	4	4	N13072016-3	Pedal Board PCB

Carefull

The reed contacts used in this set are very fragile. Handle these boards with care and avoid damaging the reed contacts, as it can hinder the proper functioning of the reed contacts. The flat cable transitions between the boards are also vulnerable.

Introduction

This set is designed to provide contacts for a church organ pedal and consists of 4 boards on which 8 reed contacts can be mounted.
The largest size of a church organ pedal is 32 keys, which means that 4 boards will be used, connected together with a flat cable. While there are standard dimensions for a church organ pedal, especially the distance between the pedal keys, it cannot be ruled out that deviations from these standard dimensions may occur, making one long board unsuitable.

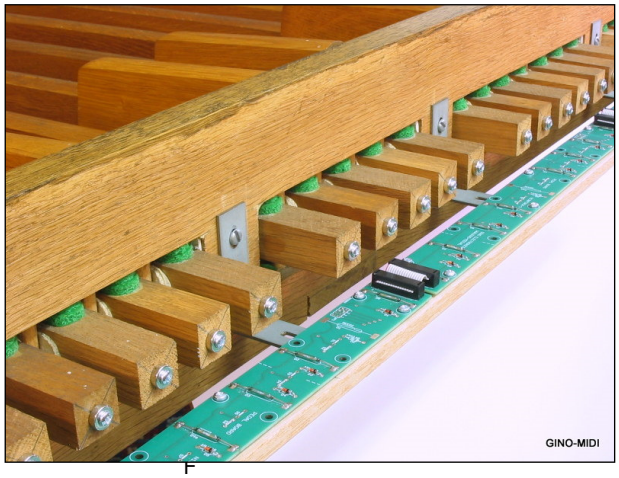


Image 1

In designing these pedal contacts, it was decided to use one board per matrix part, on which parts for 8 pedal contacts/matrix can be mounted.
The connections between the boards with flat cable allow for compensating for any deviations from the standard dimensions. The flat cable can be bent slightly to adjust the distances between the boards according to the specific pedal dimensions.
As mentioned, this set consists of 4 boards. Each board is designed to accommodate 9 reed contacts and 9 diodes, but only 8 reed contacts and 8 diodes are mounted per board. Each board essentially forms a matrix part.
In a church organ pedal, the distances between the keys' centers are approximately 34 mm.

There are also "spaces"

- between the keys E and F, and between the keys B and C (in the first octave)
- between the keys e and f, and between the keys b and c' (in the second octave)
- between the keys e' and f' (in the third octave).

These spaces have the same size as a key, effectively creating empty spaces. There are, of course, no reed contacts and diodes mounted at these spaces.

Assembly Kit

Assembly of the Boards

You can skip this paragraph if you have purchased the assembled version.
Continue reading the paragraph "**Placement of Boards and Magnets**" below

A quick note...

Components such as resistors, capacitors, diodes, transistors, and connections have long connecting wires. These components are bent to size and inserted into the board. It is wise to bend the connecting wires of these components along the board, preferably in line with the printed track. Then, cut the connecting wires as short as possible, leaving only the solder pad with the trimmed connecting wire.

Only then proceed with soldering.

This approach is recommended because soldering becomes much easier, as the solder pads are more accessible. Moreover, the resin that comes out during soldering now covers the entire solder pad, including the trimmed connecting wire, hermetically sealing it and preventing any chance of corrosion.

Mounting Diodes and Connections

First, we will install the diodes and connections. Pay attention to the cathode mark on the diodes. The installation of connections depends on the matrix part. You can use the trimmed connecting wires from the diodes for the connections. They are suitable for this purpose. To bend the connections into shape "S," you can use flat-nosed pliers with a 5 mm width.

Mounting Reed Contacts

Reed contacts are very fragile. A reed contact is a hermetically sealed tube containing two narrow metal "tongues." These are placed in such a way that the ends overlap but do not touch. When a magnet is brought near, the tongues are attracted to each other, creating an electrical contact. When the magnet is removed, the contacts return to their original position. The tube is filled with a noble gas so that switching current does not affect the contacts.

The reed contacts are soldered onto the solder pads located on either side of a reed contact position. Gently bend the connecting wires into a slight "S" shape. Refer to the drawings in Image 2 and beyond. When bending the connecting wires, also consider the position of the reed contact so that the two narrow metal "tongues" always have the same direction. As seen in Image 2 and 3 later in this description, the reed contacts are always mounted in the same way. Before soldering the reed contacts, it is recommended to tin the connecting wires and solder pads first. After soldering the reed contacts, trim the protruding wire ends. Due to the slightly elongated shape of the solder pads, you can still precisely position the reed contact relative to the pedal key (with the magnet), if necessary.

What is the discant? Cut off the last print!

Likely, the last print is too long. If you have a 32-tone pedal, there's no need to shorten this last print, but if you have a 27 or 30-tone pedal, this print will need to be adjusted. On the print, some dotted lines have been provided at the appropriate places. You can use a coping saw or a hacksaw for this purpose. A new saw blade ensures a clean cut!!! Make sure to file off any burrs from the copper traces and ensure they do not touch each other. Otherwise, there may be a short circuit between the data lines.

Matrix PCB 1
Pedalkeys C, Cis, D, Dis, E, F, Fis en G
Shortcuts at S1, S3, S5 en S7
Shortcut at JP1 position 1
Diodes in the positions D1, D2, D3, D4, D5, D7, D8 and D9. (D6 so skip)
Reed contacts at the locations REED1, REED2, REED3, REED4, REED5, REED7, REED8 AND REED9. (so skip REED6)

Matrix PCB 2
Pedalkeys Gis, A, Ais, B, c, cis, d en dis
Shortcuts at S1, S3, S5 en S8
Shortcut at JP1 position 2
Diodes in the positions D1, D2, D3, D4, D6, D7, D8 and D9. (D5 so skip)
Reed contacts at the locations REED1, REED2, REED3, REED4, REED6, REED7, REED8 AND REED9. (so skip REED5)

Matrix PCB 3
Pedalkeys e, f, fis, g, gis, a, ais en b
Shortcuts at S2, S4, S6 en S8
Shortcut at JP1 position 3
Diodes in the positions D1, D3, D4, D5, D6, D7, D8 and D9. (so skip D2)
Reed contacts at the locations REED1, REED3, REED4, REED5, REED6, REED7, REED8 AND REED9. (so skip REED2)

Matrix PCB 4
Pedalkeys c', cis', d', dis', e', f', fis' en g (with a 32 tone pedal)
Shortcuts at S1, S3, S5 en S7
Shortcut at JP1 position 4
Diodes in the positions D1, D2, D3, D4, D5, D7, D8 and D9. (D6 so skip)
Reed contacts at the locations REED1, REED2, REED3, REED4, REED5, REED7, REED8 AND REED9. (so skip REED6)
Please mount this matrix board according to the size of the pedal.

Attention!

The connections at JP1 deserve some attention. The numbering is opposite to the reading direction and can be confusing.
On the boards, the diodes are marked as D1 to D9. Do not confuse this with the markings at the reed contacts where D0 to D7 is written. That notation corresponds to the data lines of the databus.

The flat cable connections

The 4 boards are now interconnected with short pieces of 16-pin flat cable and the supplied board connectors. Between the matrix part 1 and matrix part 2 boards, you need a transition/space of at least 15 mm between the boards. Please note "between the boards," so the flat cable must be longer to accommodate the connectors. The same applies to the transition/space between the matrix part 2 and matrix part 3 boards. See Image 2.

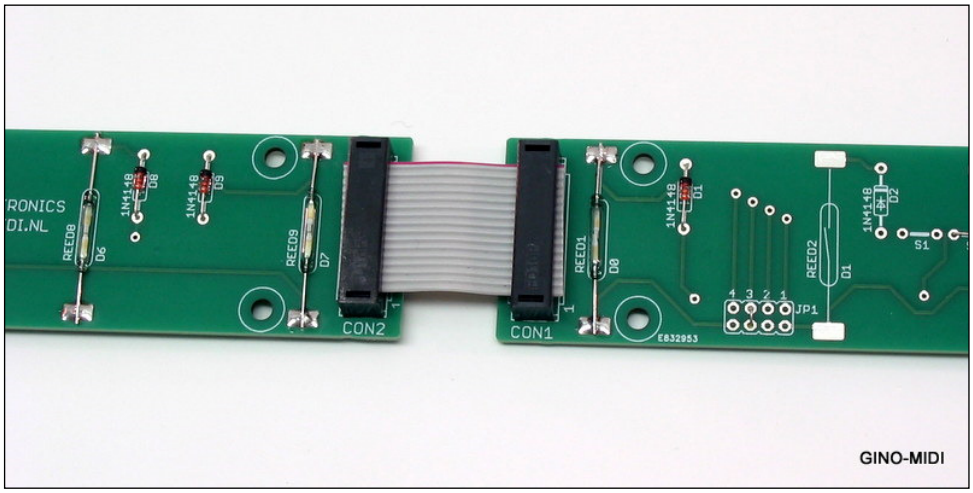


Image 2

The connections between the PCBs are realized by means of short flat cable connections.
A tool is included for clamping the PCB connectors. It is a female 16 pin IDC connector that you can use while clamping the flat cable to the PCB connector between the vice. You can insert the PCB connector into the female IDC connector so that the pins are not damaged during connection.
Make sure that you also insert and hold the flat cable correctly in the PCB connector during clamping. It is not inconceivable that the flat cable shifts during the connection and then we have wrong connections. So here's some extra attention!!
When soldering the PCB connectors, it is important that these PCB connectors are mounted tightly on the PCB.

TIP: solder a pin on each side of the connector and check whether the connector is mounted properly against the PCB. Now this can still be corrected. Then solder in the other pins as well.

Between the PCBs of matrix part 3 and matrix part 4, a transition/space of 45 mm is required. See Image 3

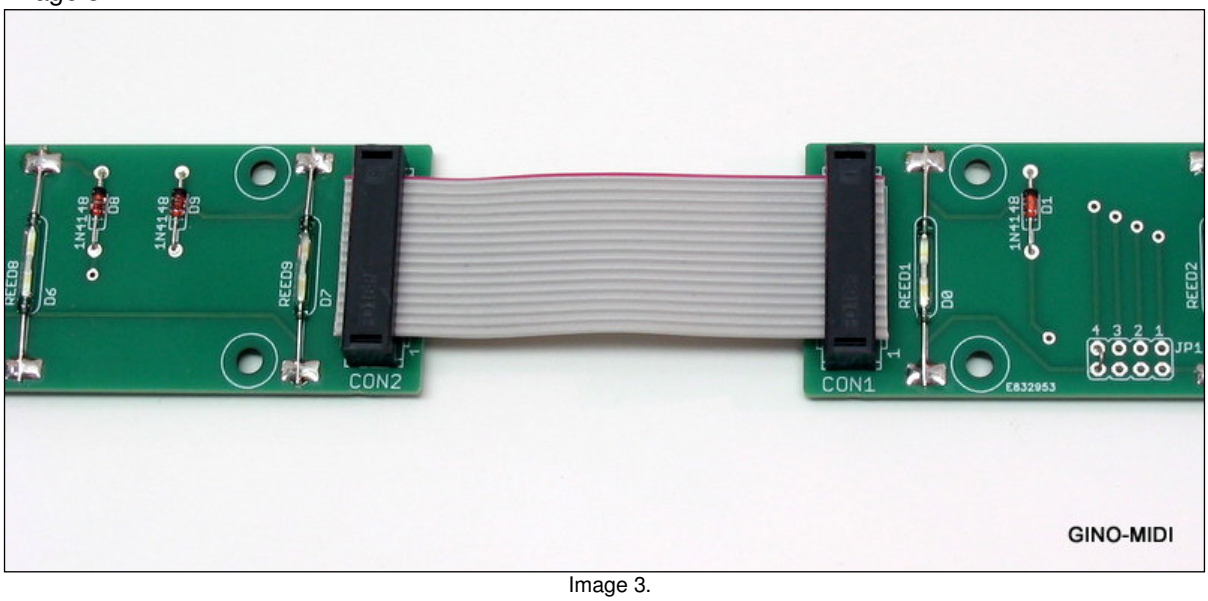


Image 3.

Then all that remains is the connection via flat cable with a “Decoder PCB 2”. We also use a PCB connector there. The flat cable and the 16-pin IDC connector are supplied with the package of the decoder PCB 2. This flat cable is mounted at CONN1 on the first Matrix print. The length is of course determined by the place where you will mount the decoder PCB. Read about this in the paragraph What is the bascant? And connect it to Decoder PCB 2.

List of pin connections connector 1 and 2

Pinnr.	Name	Discription
1	D0	Data 0
2	D1	Data 1
3	D2	Data 2
4	D3	Data 3
5	D4	Data 4
6	D5	Data 5
7	D6	Data 6
8	D7	Data 7
9	CLOCK1	Clocksignal matrix 1
10	CLOCK2	Clocksignal matrix 2
11	CLOCK3	Clocksignal matrix 3
12	CLOCK4	Clocksignal matrix 4
13, 14, 15, 16	NC	Not Connected

End of description building kit

PCB placement and magnets

This paragraph discusses the placement of the PCBs and the magnets. This is only a suggestion which is not normative. There are several other options available. This also depends on the shape of the pedal.

Placement of the PCB's

The four PCBs are connected to each other with a flat cable. These prints must first have a stable surface. A nice beech lath of 36mm x 9mm can be used for this. You can buy a lath of these dimensions at the hardware store.

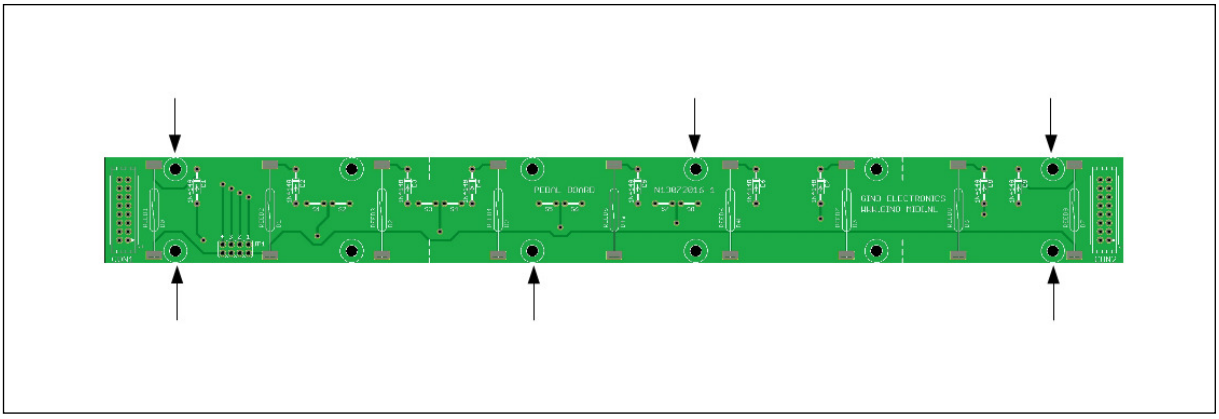


Figure 1. Mounting by means of parkers

Mount the PCBs on the batten with the supplied parkers 2.9 x 9mm and the 2mm spacers. Figure 1 shows which mounting holes of the PCB you use. Because the PCBs are connected to each other with the flexible flat cable, it is possible to correctly position the reed contacts per group/print relative to the pedal keys.

Placement of the magnets

The magnets have a round shape and are provided with an opening. This opening makes it possible to easily mount the magnets on the pedal keys. Mount the magnets in such a way that the distance from the center of the magnet to the top of the print is approximately 20mm. That is the distance X in figure 2 when the pedal key is not pressed.

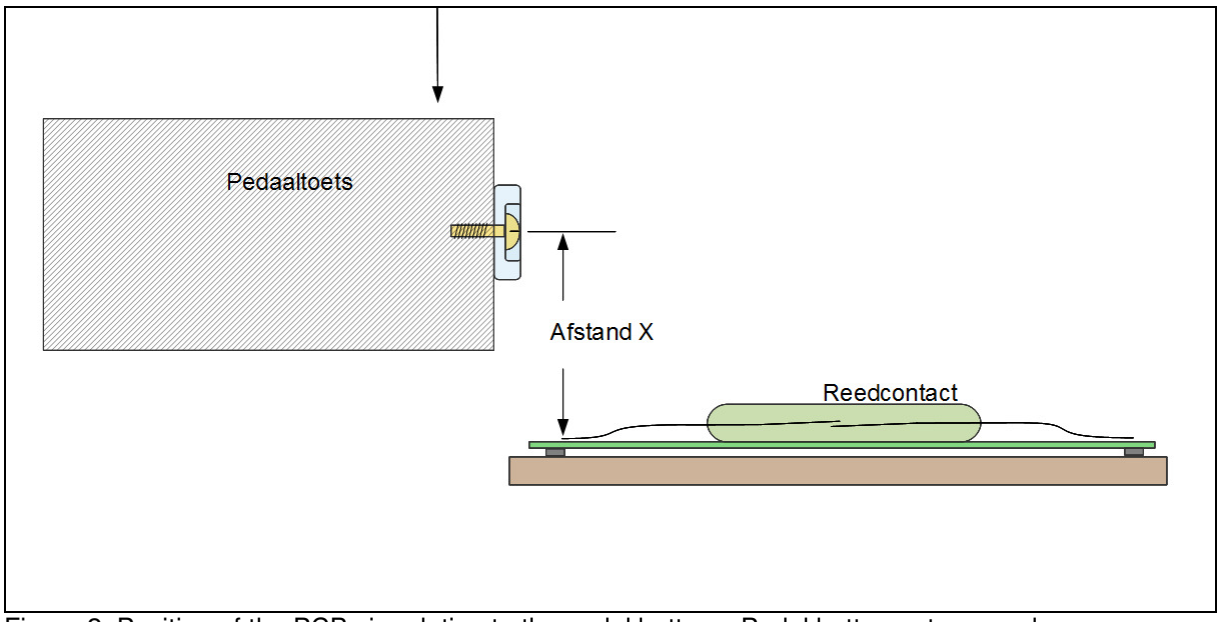


Figure 2. Position of the PCBs in relation to the pedal buttons: Pedal button not pressed.

What is important now is the position of the magnet in relation to the reed contact.
A reed contact consists of a glass tube containing two spring-loaded contacts, which are just open in the rest position. These contacts consist of a magnetisable material. By magnetizing the contacts in the right way, they are closed. In order for the contacts to attract each other, there must be one 'North Pole' and one 'South Pole'. This is done by holding the magnet at right angles to one of the soldering points of the reed contact. When the pedal button is pressed, the reed contact will close due to the action of the magnet. The reed contact closes at a distance of 13 mm. The pedal button can then be pressed further until the minimum distance of 5 mm is reached (distance Y).
So first we have an empty passage of the pedal key from 20mm to 13mm, then the reed contact closes and the pedal key responds, after which the pedal key can be pressed a few millimeters further to 5 mm (distance Y).

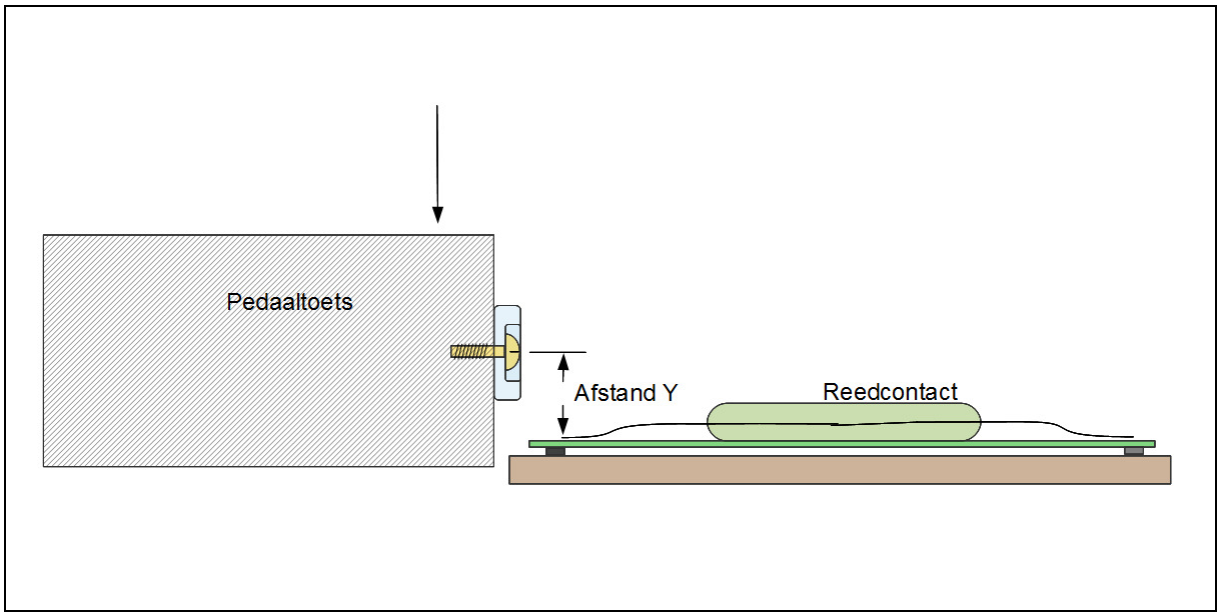


Figure 3. Position of the PCBs relative to the pedal buttons: Pedal button pressed.

NOTE: If we keep the magnet in the middle of the reed contact, the contacts will have the same polarity and they will not close. Figure 4 therefore shows how NOT to do it.

<u>So you can clearly see in figures 2 and 3 that the pedal button moves IN FROND OF the PCBs.</u>

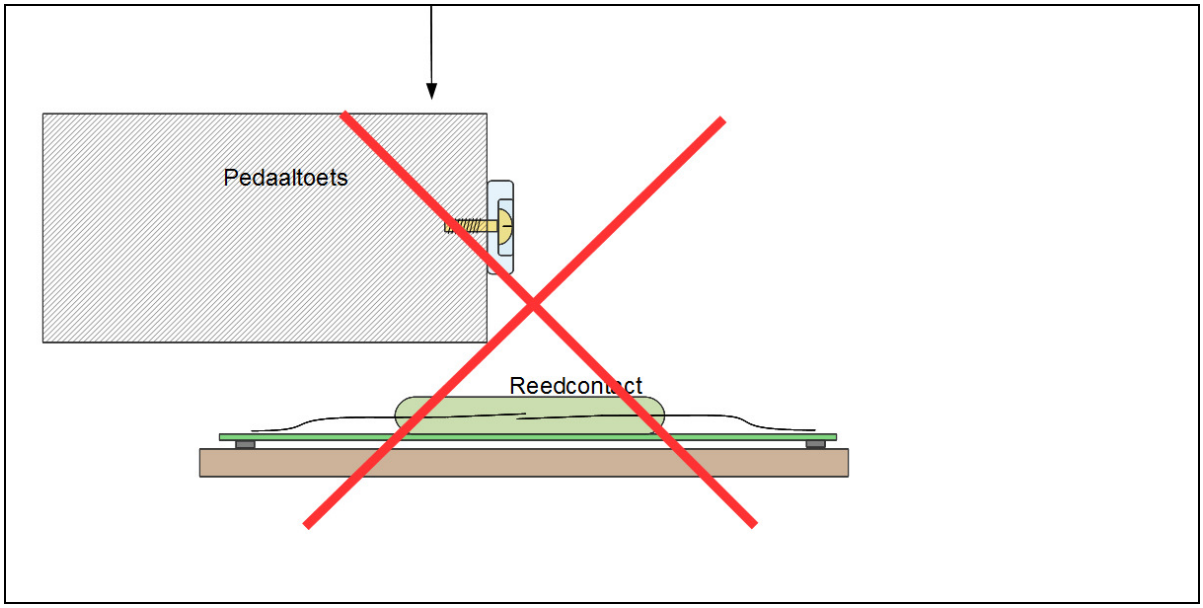


Figure 4. This is an incorrect setup.

What is the Bascant? And connect to Decoder PCB 2

Matrix PCB 1 is of course the Bascant, the low end of the pedal. You can recognize this PCB by the jumper at number 1 at JP1.

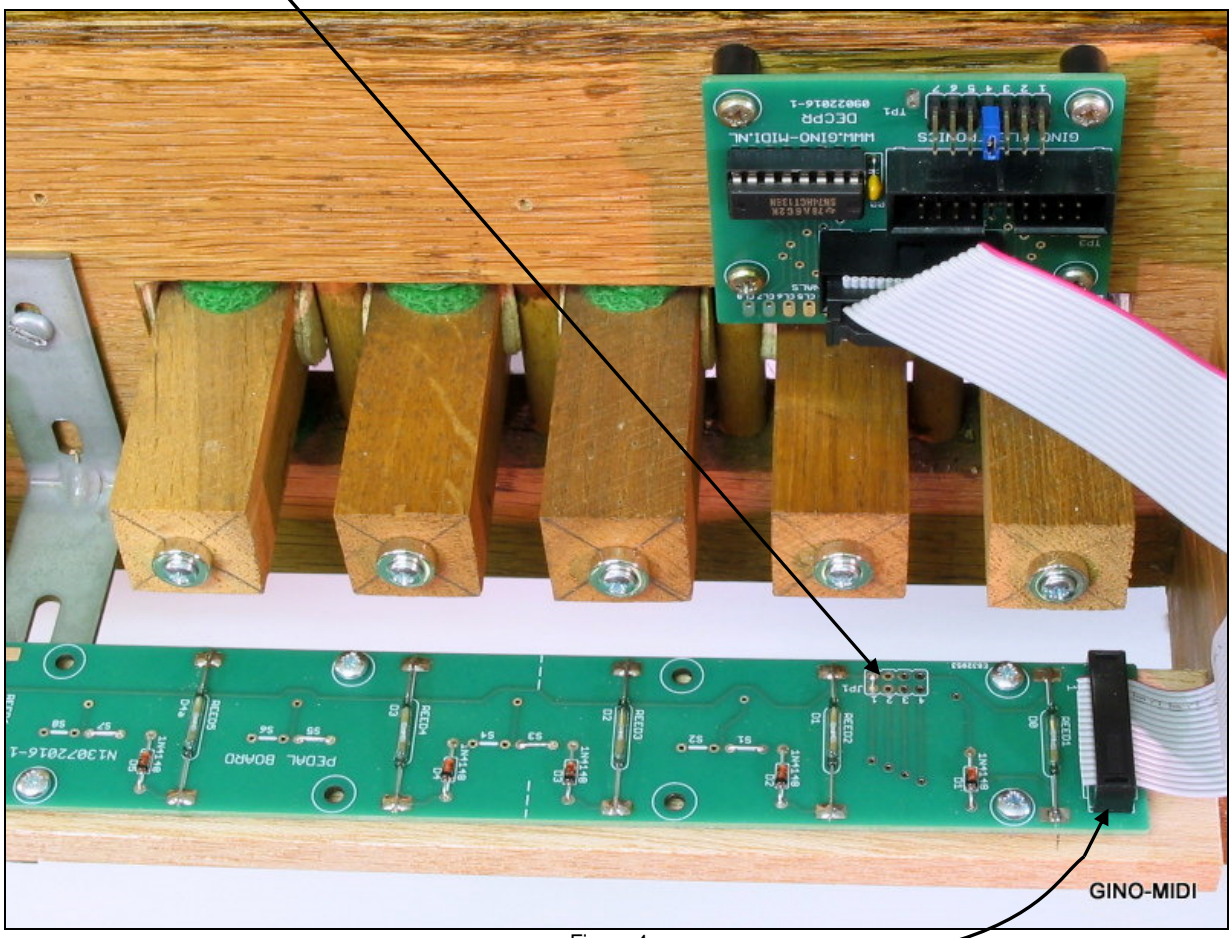


Figure 4

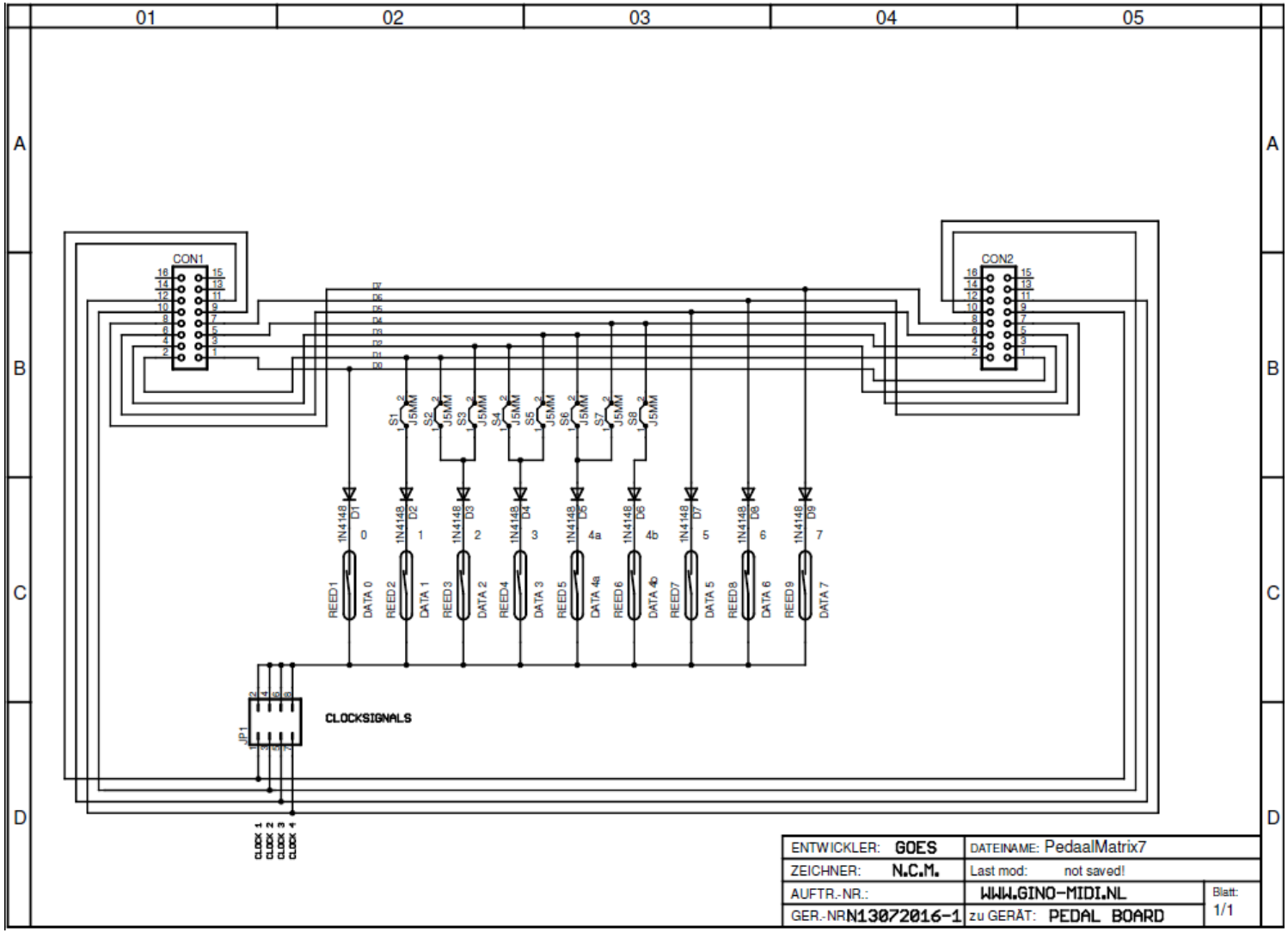
A 16-pin flat cable runs from this PCB that can be connected to “Decoder PCB 2”. As with every diode matrix of the GINO-MIDI system, a decoder is required per matrix. So also with the pedal. You can mount this decoder PCB close to Matrix PCB 1 on the pedal or somewhere in the organ. See Figure 4.

The connection of this first pedal contact print (bascant) with "Decoder PCB 2" deserves some extra attention.
The red wire of the flat cable of connector CONN1 of the Bascant is connected to pin 1 of this connector. This red wire corresponds to pin 1 of connector SV1 of “Decoder PCB 2”.

Finally

This manual can still be rewritten.
Please consult the website https://www.shop.gino-midi.nl/download-pagina/

Schema



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