Hauptwerk Hardware

Tutti Midi Encoder

Professional Full Organ Midi Encoder

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Key Features.

The Tutti, as it's name suggests, is a 'Full Organ' Midi encoder, meaning that just one encoder is all that's required for all but the biggest organ consoles, saving you time and money.

- MIDI out over both 5 pin din and USB.
- Scan speed over 20 times faster than the original 'Universal Midi Encoder'.
- Fatar keyboards simply plug in directly*
- Plug in up to 6 keyboards along with stops and pistons, couplers etc.
- No programming required.
- Works with Hauptwerk, GrandOrgue and other synth modules with 5 pin MIDI in.
- 8 x 8 scan matrix directly compatible with many commercial keyboards
- Tutti connection strips available providing simple connection for keyboards with separate switch contacts or non-standard matrix arrangements. You can also connect all your stops, pistons and couplers directly to the Tutti strips.
- Range of detailed 'How to' videos available to watch on YouTube show you exactly how to use the Tutti range to create your dream console.
- Easy to interface with both Hauptwerk and GrandOrgue on Windows™ or Linux.

* Requires a Fatar Keyboard Splitter available separately.

Introduction.

The Tutti Midi encoder has been developed specially for the professional organ builder. Used in conjunction with the optional Tutti Connection Strips or Fatar keyboards it makes wiring an entire console much faster and easier than other solutions, which is exactly what our professional customers have asked for.

It requires no programming and is much faster in operation than the 'Universal Encoder'. It is designed to simply plug in and work. It has seven 16 way IDC type sockets for connection to keyboards, pedal boards, stops and pistons as well as three analogue inputs for swell and effects pedals. Each input sends Midi data on a different channel. Channels 1 to 7 are used for the keyboard inputs and channels 8, 9 & 10 for the analogue inputs. The scan matrix is 8x8 giving 64 possible inputs for each channel.

Connecting keyboards couldn't be easier! The Tutti Encoder has been designed to work with the range of Fatar keyboards and using our optional 'Fatar Keyboard Split' and leads, you can simply plug in up to 6 Fatar keyboards and you're good to go, it really is as simple as that[*].

If you have other makes of keyboard that use an 8x8 matrix then once you have figured out the pinouts of your keyboards you can simply plug them right in to the encoder and you're good[**].

For keyboards with other connection arrangements or with simple contacts for each key you can easily connect them using the optional Tutti Connection Strips. These have 64 input pairs that allow you to connect each key individually or in groups of eight and then simply plug the connection strip into the Tutti Encoder via a 16way IDC ribbon cable (available separately).

The Connection Strips contain all the necessary diodes and take care of grouping the inputs into 8's. Each input on the connection strip is labelled with the relevant note, making connecting keyboards virtually foolproof.

Stops and pistons can also be wired directly to the Tutti Connection Strips making the wiring of a console much faster and easier than ever before.

The analogue inputs consist of three pins which simply connect directly to the three connections on a potentiometer. If you have effects pedals which do not use potentiometers, there are other ways to connect analogue inputs as well, and these are described later in this manual.

The Midi data is sent out via the standard 5 pin din socket mounted on the encoder as well as via USB. The Tutti encoder is a class compliant MIDI device and is recognised natively by both Windows and Linux meaning no extra drivers are required, simply plug in via USB and you're good to go!

* Whilst you can physically connect 7 keyboards input number 7 only supports 48 keys or inputs.

** Any keyboards directly connected to the encoder must include diodes with their cathodes facing towards the keys. Fatar keyboards have this built

in.

Intended use.

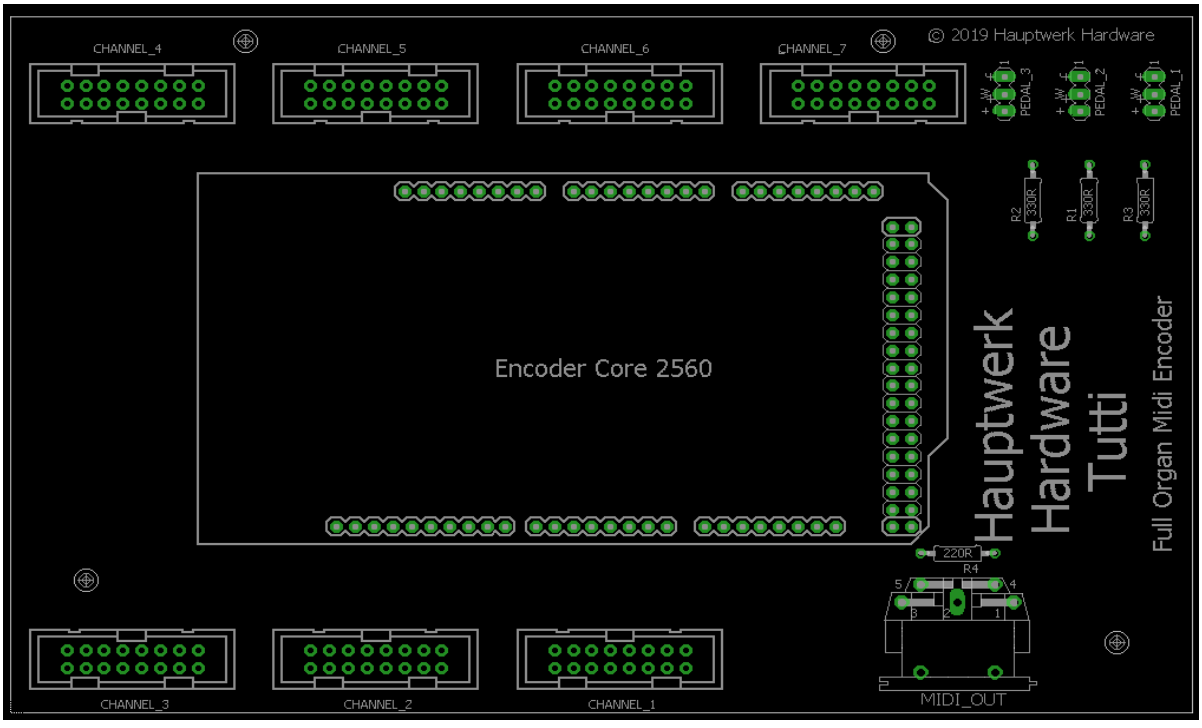
The Tutti Encoder is a MIDI encoder which is intended to be used in an organ console to scan the keyboards and other controls so that it can generate MIDI data in response to the users actions, be that of playing notes on the keyboards or pulling stops, operating thumb or toe pistons etc. as well as monitoring up to three analogue inputs such as swell or effects pedals.

It is intended to be very easy to install and use as well as being extremely versatile in terms of the sound generating equipment it can be connected to. The MIDI data is simultaneously sent via both the USB interface and the 5 pin DIN interface meaning that will work with both a computer running either Windows™ or Linux operating systems, as well as any professional sound generating device such as professional synthesiser modules, that use the standard 5 pin DIN connections.

In the rare circumstances of a console having more controls and or keyboards than the Tutti can accommodate, it is possible to use two Tutti encoders working together. In this case the second Tutti must be specified as being for a two encoder console at the time of ordering so that it can be configured correctly for this role before being sent from the factory.

Midi Summary.

The Tutti encoder has seven 16 way sockets on board which accept standard 16 way IDC plugs. Each socket represents an 8x8 scan matrix input and thus allows for a maximum of 64 digital inputs. Each socket sends MIDI data on a separate MIDI channel and the relevant channel is marked on the board by each socket. These channel assignments are fixed during manufacture and are not adjustable. The channels used for the digital inputs are 1 through 7 and the analogue inputs use channels 8, 9 & 10.



Connections.

As can be seen from the picture above the seven 16 way sockets are conveniently mounted around the edges of the board. Each socket provides for a single keyboard of up to five octaves or a set of up to 64 stops or pistons.

As the Tutti encoder has been designed to make wiring a console as easy as possible we recommend using the optional Tutti Connection Strips to make wiring your keyboards as simple as possible.

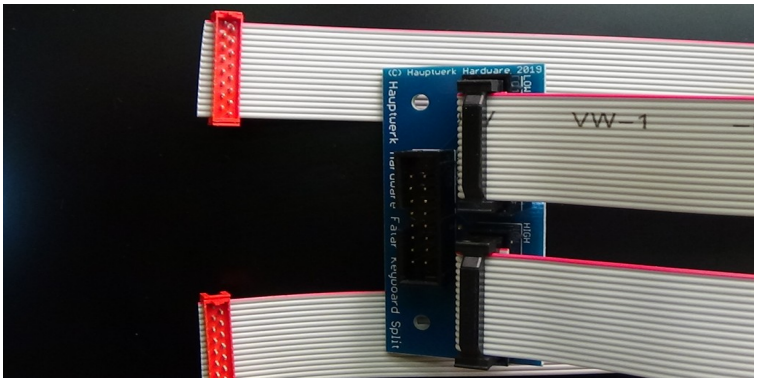
Tutti Connection Strips.

If you are using keyboards with individual contacts for each key and for when you want to connect stops or pistons to the encoder you should use the Tutti Connection Strip.

The Connection Strip has the usual 16 way connector which you connect to any one of the seven 16 way connectors via a 16 way ribbon cable. As you can see from the picture there are 64 pairs of inputs which you use to connect to each key of the keyboard or to your stops or pistons. Each input is labelled with the key note name making it as simple as possible to wire up. When you are connecting stops or pistons you can obviously ignore the note names as they are not relevant for this type of input.

Fatar Keyboards

If you are using Fatar Keyboards you will notice that they have two red sockets for connection to the encoder. There is one for the Lower part of the keyboard and a separate one for the upper part of the keyboard. When using one of our optional 'Fatar Keyboard Split' PCB's you simply plug the two cables with the red plugs into their respective red sockets on the Fatar keyboard and use a 16 way ribbon cable to connect the splitter board to any one of the 16 way sockets the encoder. It really is as simple as that!



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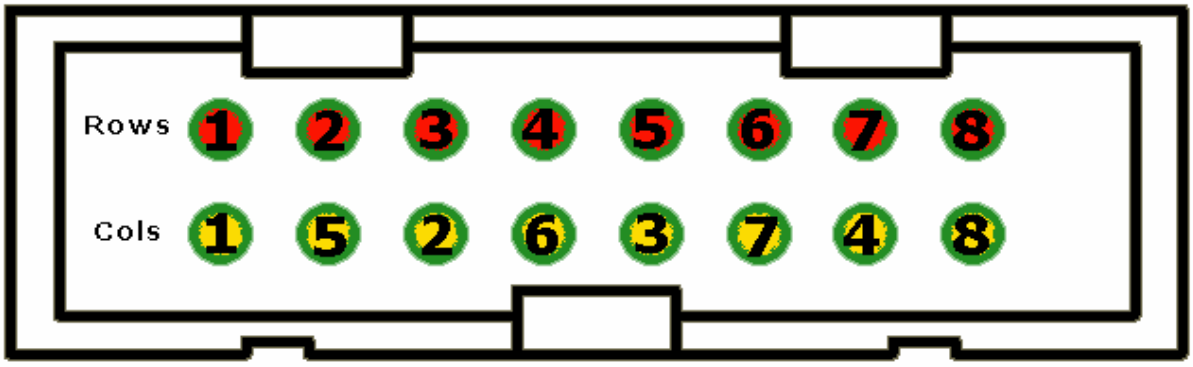
MIDI Outputs

You can connect the encoder directly to any sound generator or synthesizer via the 5 pin DIN socket as it provides a signal which conforms to the industry standard MIDI specification. This allows connection of your console to professional sound modules and allows for use in a studio environment.

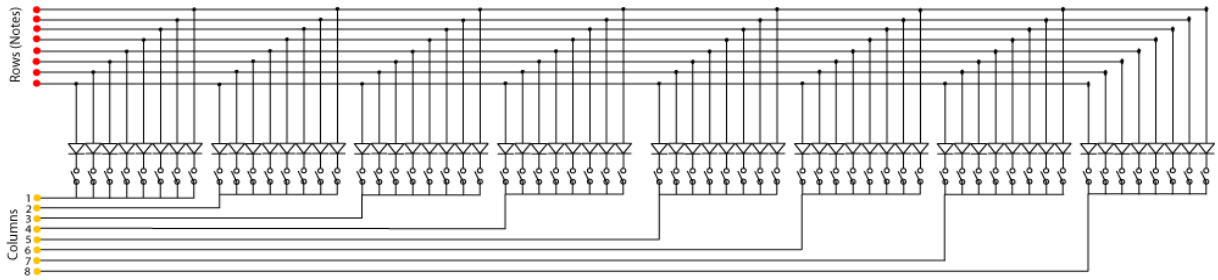
The USB MIDI out connector can also be used to power the encoder, and the Tutti is seen by the host computer as a class compliant MIDI device. It will appear in the Hauptwerk software and in GrandOrgue as 'Tutti Encoder'. No drivers are required for use with either Windows™ or Linux operating systems.

Direct Wiring

Should you not want to use our Connection strips and prefer to add the necessary diodes and wire everything yourself you can either use one of the optional break out boards or construct your own custom 16 way leads. The encoder uses a standard 8x8 scan matrix and the connections are shown below.



The row (note) inputs are shown in red and run from left to right. The column inputs are shown in yellow and run staggered from left to right. You would connect your keyboards and other inputs via diodes as shown in the diagram below.



If you are using the Tutti Connection Strips or the Fatar Keyboard Split PCB's then all of this is taken care of on the boards and all you have to do is connect the keys directly to the boards.

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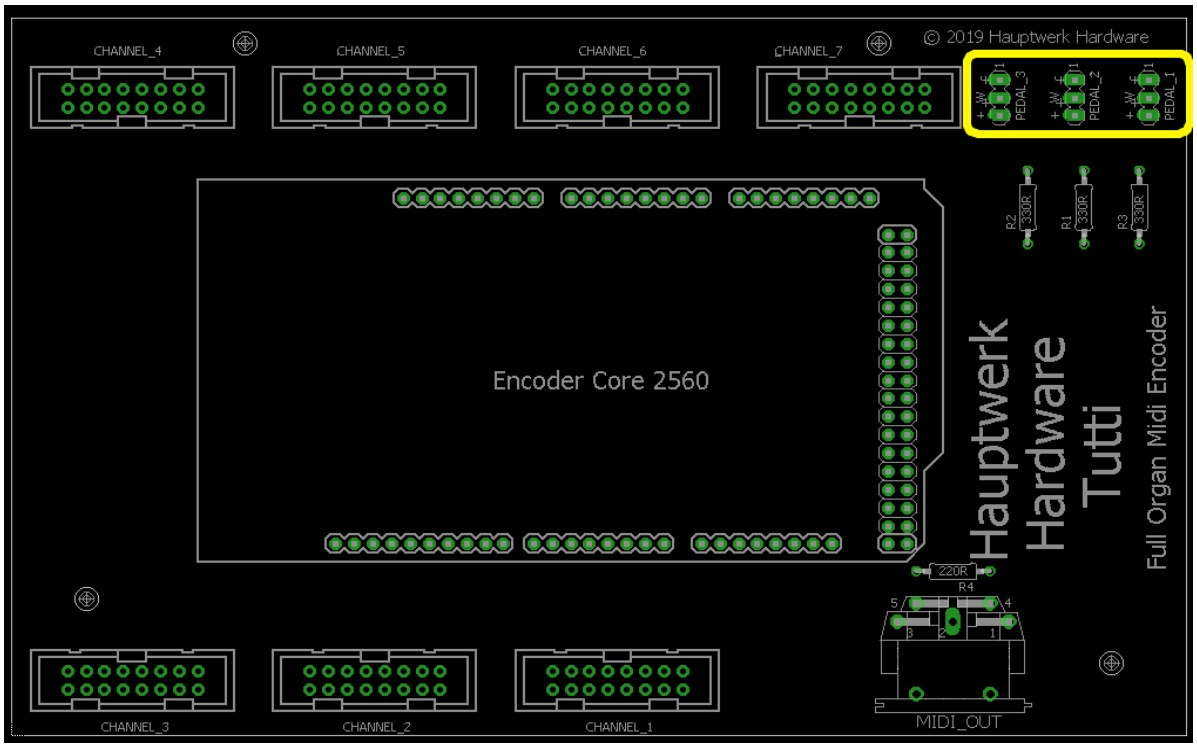
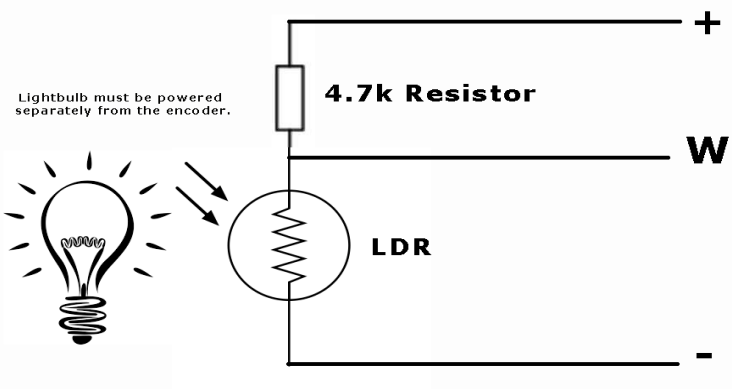
Analogue Inputs

The Tutti Encoder has three analogue inputs shown outlined in yellow in the diagram below. These can be used for swell and expression pedals. If you have a pedal that is fitted with a potentiometer you simply have to run three wires from the pot' to any one of the three analogue inputs. These inputs have three pins each and they simply connect to the pot' in the way they are laid out. In other words the centre pin of the input connects to the centre pin of the pot and the outer pins of the input connect to the outer connections of the pot', it does not matter which outer pin connects to which side of the pot' so long as the centre goes to the centre of the pot'.



There are other possibilities for connecting analogue inputs. Many older swell pedals have an optical arrangement containing a light bulb and a light dependant resistor separated by a plate which moves with the action of the pedal. This is arranged so that more light is allowed to fall onto the LDR as the pedal is advanced. It is possible to use this type of pedal with the Tutti Encoder but you need to add a resistor and ensure that the power supply for the light bulb is ***completely separated*** from the encoder wiring. The diagram below shows how to wire it up.



There are pedals which work in a different way and these have a rotating contact which contacts more connections as the pedal is advanced. Usually there are 10 or more, 17 seems to be a common amount, of connections. These pedals are usually used as crescendo pedals and ***are not suitable for use with the Tutti Encoder.***

Mounting

The Tutti Encoder has 4 mounting holes of 3mm diameter each. These are for mounting the board in a convenient place within your console. It is important to consider that the reverse of the board is made from copper and that parts of this copper surface carry the electrical signals to and from the encoder. It is therefore necessary to ensure that whatever mounting method you use does not allow the reverse of the board to come into contact with any conductive surface as doing so may present a fire risk and or cause irreparable damage to both the board and the encoder itself. It is suggested that suitable insulating spacers be used in mounting the board leaving a gap of at least 5mm between the board and the mounting surface.

The board is suitable for mounting at any angle in any plane. The board must be installed in a position where it will not suffer condensing moisture, water, physical shock or any contact with moving parts. It must be protected from any conductive items, parts or waste that may fall on it.

Tips & Tricks

It is worth noting that you can connect any combination of keyboards and stops or pistons to a single input. For example if you connected a 32 note pedal board that would leave 32 inputs unused. If you are using Tutti Connection Strips these have 64 inputs or if you are wiring it yourself without using connection strips there would be 32 inputs left on the matrix. It is quite possible and allowable to use these remaining inputs for other controls such as stops or pistons. This saves the expense of buying a separate connection strip for each type of input. In the case of the pedal board you could reasonably use 32 inputs on the connection strip for the pedals themselves and then use say, 15 more for toe pistons. Equally you could use 40 inputs on a connection strip for the stops and then another 20 inputs on the same strip for thumb pistons. The auto-detect feature of the Hauptwerk software will easily discriminate between different inputs on a single strip or MIDI channel.