Hauptwerk Hardware

System One

Full Organ Rebuild Solution

SYSTEM ONE
Hauptwerk Hardware

Auxiliary Board & 7 Segment Display Module Installation & User Manual

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This manual should be read in conjunction with the System ONE Control Board user manual which is available from the downloads page of the website. See link below.

https://www.hauptwerkhardware.com/downloads_page/

A brief introduction to System ONE.

What is System ONE?

System One is an electronic system which comprises a main control board and a number of separate interface boards which connect to the various controls of an organ console. It is very versatile and can be used in the smallest organ right up to the largest. It copes with pretty much any type and combination of organ controls, including:-

- Matrix Keyboards
- Bus Keyboards
- Lighted Stops/Rocker Tabs
- Motorized Stops
- Lighted Pistons
- Basic Unlit Stops & Pistons
- **Memory Level Display**
- Swell & Other Pedal Controls
- **Crescendo Indicators**
- On Demand Re-scan of static controls (Transpose, Tuning etc.)

The system requires only two Midi connections to the computer running the Virtual Pipe Organ software and it works with Windows, MacOS and Linux operating systems. There is no programming required and it is simple to set up with your virtual pipe organ of choice.

It has been designed to meet the specific needs of the organ enthusiast as well as the professional, in that it addresses the unique requirements of the organ as opposed to the many other products already used in this field which are really just generic Midi devices which the builder then has to connect together to form their own 'system'. For more information on System ONE please refer to the Overview Document available from the downloads page of the Hauptwerk Hardware website.

Who is it for?

Hauptwerk Hardware System One is designed for both enthusiasts and professional users.

If you are planning an organ console build from scratch it is the ideal solution as you can plan each feature you want in your console and be certain that System One will cope with it easily. If you are rebuilding or 'Midifying' an existing console, System One will provide you with the easiest way to connect all the controls of your console and generate the required Midi signals to work with your computer without the need to perform any programming, only a few jumpers need to be set in order to tell the system what options you want to select.

It is ideal for use with Hauptwerk, Grand Orgue and any of the many other virtual organ software solutions available which use Midi as their input.

The System ONE Auxiliary Board.

Below is a picture of the System ONE Auxiliary board.

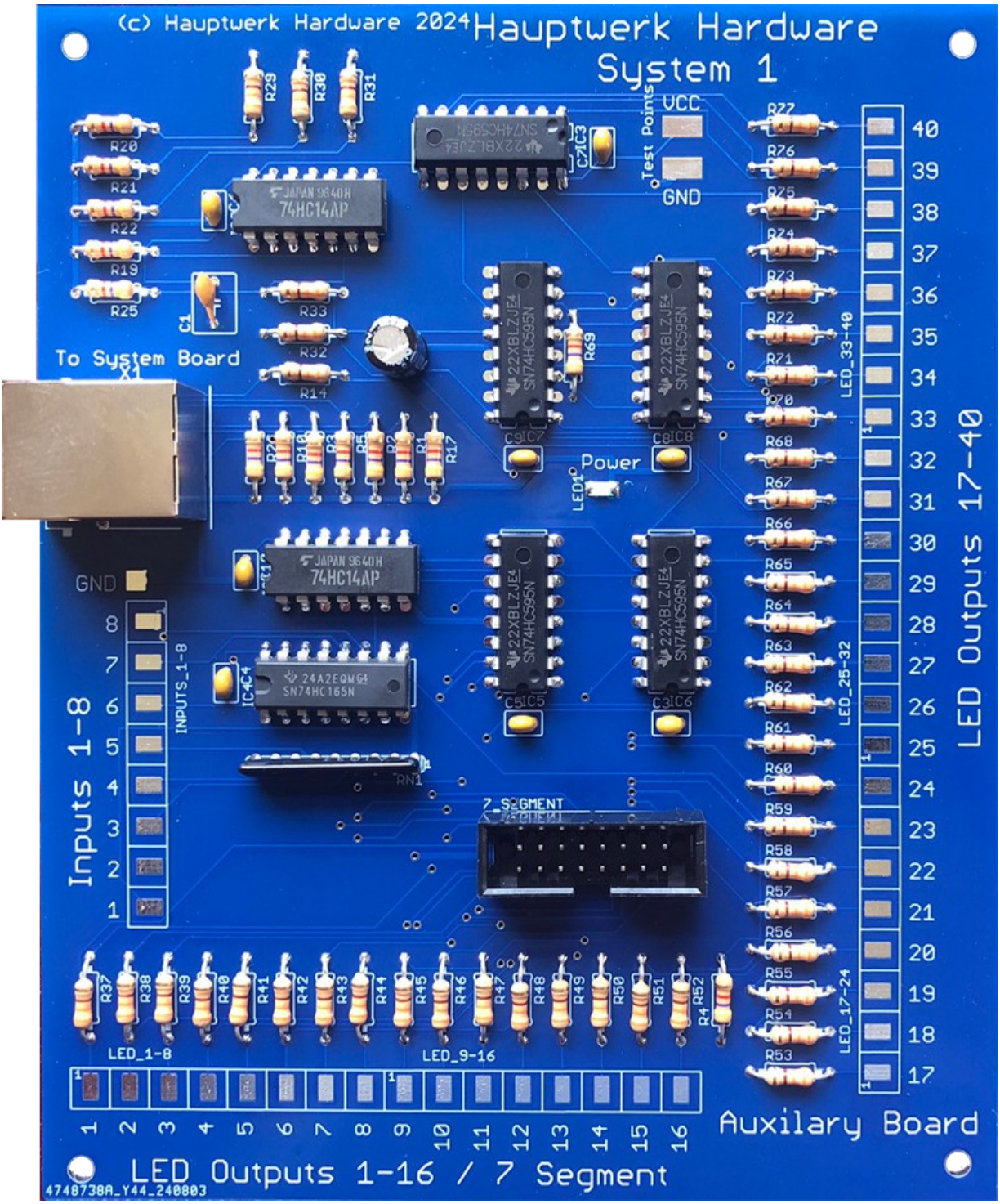

Illustration 1: The System ONE Auxiliary Board.

What does it do?

The Auxiliary Board, as it's name suggests, is used to accomplish the functions that are not already covered by the other dedicated System ONE Interfaces.

This includes driving a two digit 7 segment display which can be used as a capture system memory level indicator, or for displaying any other numerical information to the user. It is driven by midi and will display the note number of any midi 'note on' event between 00 and 99 sent to the System ONE Control Board on midi channel 12. In addition the Auxiliary board is capable of driving up to 40 LED outputs which can be used for indications of crescendo level and displaying similar general data. One could use, for example, 6 LEDs to display crescendo level, then another 6 LEDs to show perhaps reverb level or Swell level. So long as your virtual organ software is capable of outputting the desired data as note on/off events they can easily be used to drive the LED outputs on the Auxiliary board. Finally a set of 8 bus type inputs are provided which can be used for a transposer, or any other desired control input.

The Auxiliary board is very simple to use and all functions use midi channels 11 & 12.

Operating any of the set of 8 Bus type inputs causes a midi note on/off event to be sent by the System ONE Control Board on channel 11.

Any midi note on/off events between 1 & 40 received by the Control Board on channel 11 will cause the LED outputs to turn on or off.

The 7 segment display will respond to any note on events received by the Control Board on channel 12 by displaying the note number between 00 and 99.

Below is a picture of the System ONE 7 Segment Display Board.

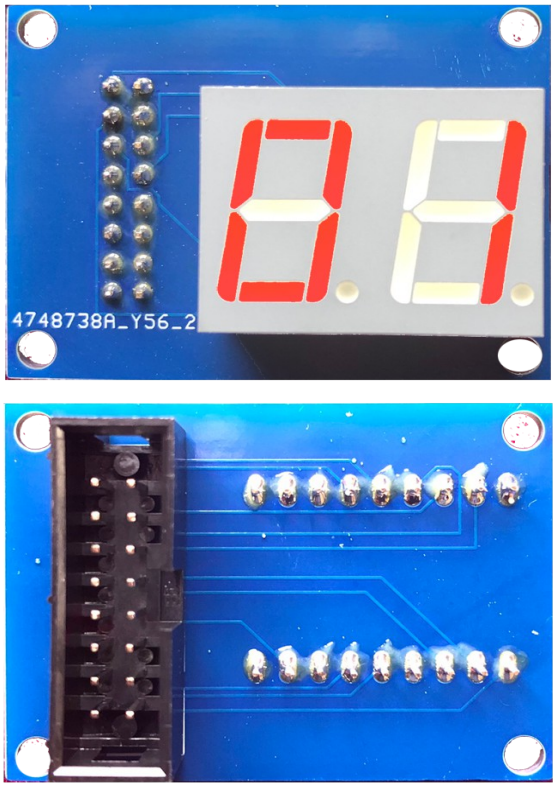

Illustration 2: The System ONE 7 Segment Display Board.

Connections & Operation.

The connections to the Auxiliary board are very simple. As with other System ONE Interfaces there is an RJ45 connector which is used to connect the auxiliary board to the System One Control Board using a CAT5 Ethernet type cable. This connects to the RJ45 socket on the Control Board labelled 'Auxiliary Board'.

There are 40 solder pads arranged along the bottom and up the right hand side of the auxiliary board.

The pads along the bottom of the board, labelled 'LED Outputs 1-16 / 7 Segment' are shared with the 7 segment display. This means that if you are not using the 7 segment display then these LED outputs along the bottom of the board are available for use as simple on/off LED outputs and will follow the state of midi note on/off events between 1 & 16 received on channel 11.

If you are using the 7 segment display these LED outputs are not available for general use as they provide the signals to drive the display. In this case they will not respond to midi note on/off events between 1&16 on channel 11.

The remaining 24 LED outputs which are arranged along the right hand side of the board are always available for use as general LED outputs and will always respond to midi note on/off events between 17&40 on channel 11, by changing their state to match the last midi note event.

When used, the 7 segment display will display any midi note on event between 00 & 99 on channel 12. Midi events outside this range will be ignored.

Connecting the 7 segment display board to the Auxiliary board is achieved by using a standard 16-way IDC type ribbon cable. Simply plug one end into the display board and the other end into the socket on the Auxiliary board labelled '7_segment'.

Selecting whether or not the 7 segment display is used is done by setting the position of a jumper on the System ONE Control Board.

Below is a picture of the 7 segment selection jumper on the main System ONE Control Board.

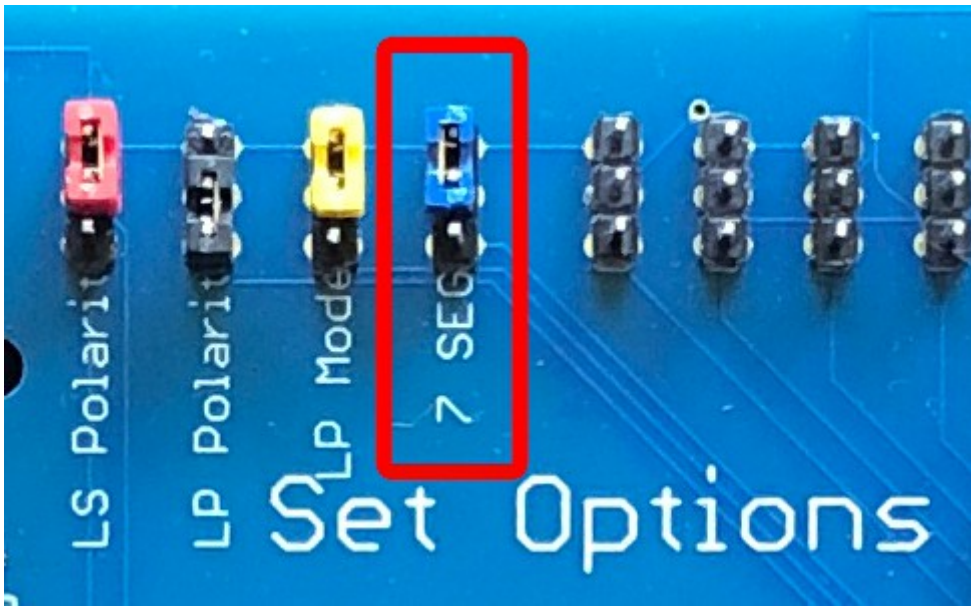

Illustration 3: The System One Control Board Selection Jumpers.

When the 7 segment selection jumper is in the rear position as shown above, the display is enabled and will display the midi note numbers received on midi channel 12. When the jumper is in the front position the display is disabled and the System will simply ignore any midi events received on channel 12.

Enabling the display will prevent the LED outputs along the bottom of the board from responding to midi note data received on channel 11 because these outputs are shared with the display socket and their state will change according to the data sent to the display.

The LED outputs along the side of the board labelled '17-40' are always available and they will change their state to match that of any midi note between 17&40 received on channel 11.

Daisy-Chaining.

The Auxiliary board, unlike all the other System ONE interfaces, is not able to be daisy-chained with further auxiliary boards. It exists simply as a way to 'mop up' any functions not covered by other types of System ONE Interfaces, and as such provides a limited number of inputs and outputs that can be used for any purpose as well as driving a display. It is not intended as a way to connect many controls or indicators to System ONE.

Monitoring.

As with other System ONE Interfaces it is possible to monitor the midi activity from the System ONE Control board and this information can be useful in tracing issues should any unexpected behaviour occur. As previously mentioned all midi activity pertaining to the Auxiliary board takes place on midi channels 11 & 12. Monitoring the System ONE activity from the USB Serial port on the System ONE Control board will show any operations or midi sent and received, such as when a note on/off event is generated as a result of operating one of the 8 bus inputs, or when an LED is lit or extinguished as well as which number is received and displayed on the 7 segment display.

Simply connect a USB Cable from the USB Serial port on the System ONE Control board to your PC and use a terminal emulator program to communicate with the controller. The settings are 115200 baud, no parity 8 bits & 1 stops bit.

NOTE: It is advisable to take steps to ensure that if the System ONE Control Board is powered by a source other than the Serial USB connector, that a power blocker type USB connector is used for this connection so as to prevent the possibility of 'back-feeding' your PC from this USB connection.

Mounting

All System ONE boards have a number of 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 the board. 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 front surface of the board is also made from copper and the same advice applies.

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.

Our Hardware Ethos.

The hardware used in this controller is an Atmel AVR along with other components. Some of these components are readily available as a ready assembled 'core' unit which can then be programmed with whatever firmware you wish. Hauptwerk Hardware buy these 'dev' boards and use them to build our products. These microprocessors exclusively use our own production firmware and contain no boot loaders or other third party code. This firmware remains our intellectual property. It is copyright and protected from being read from the AVR.

The logic behind using these 'dev' boards is that they are readily available and likely to remain so for some considerable time. Should any of our products ever fail in the future, it is easy to simply unplug the dev board and replace it with a new one, safe in the knowledge that one will still be available. This is in contrast to our competitors bespoke boards whose availability is entirely dependent on provisions made by that particular manufacturer at the time.

Legal Disclaimer:

It is the installers responsibility to ensure that they have familiarized themselves with this product and its documentation and have the necessary understanding and technical and practical competence to be able to install and use it correctly. Whilst every care has been taken in the design, testing and documentation of this product, Hauptwerk Hardware will accept no liability whatsoever for any physical or consequential damage or injury caused by the use of any of our products in any circumstances.

Warranty.

All equipment supplied by us will carry a 12 month warranty against faulty parts or workmanship. Extended warranties are available in some countries at an additional cost. Should any part of the new system fail within this period we will repair or replace it free of charge. It should be noted however that correct operation of the new system depends on the existing console controls such as keyboards, stops etc. continuing to work correctly, along with power supplies et al, especially in pipe organs. Any failure of these existing controls will obviously have an adverse effect on the operation of the new system, this type of issue will ***not*** be covered under the warranty.

Any faulty item must be returned to us for inspection & repair. Initially the customer will pay the shipping for any products returned. All returns from outside the UK **MUST BE CLEARLY MARKED AS "WARRANTY RETURN - ZERO COMMERCIAL VALUE"** as Hauptwerk Hardware will **NOT PAY** any import duty on returns and any packages not marked as above will be returned or destroyed by UK Customs **at their discretion**.

Once the return is received by Hauptwerk Hardware we will video it's unboxing and testing. If the product is found not to be faulty a testing charge* will be made and the customer will be invoiced for this as well as the return shipping. The testing video will be made available to the customer.

If the product is found to be faulty due to faulty manufacturing or premature component failure Hauptwerk Hardware will repair or replace it at our discretion. We will reimburse the customer for the shipping costs they incurred in returning it and we will send the replacement or repaired item to the customer with free shipping.

The same procedure applies to returns from within the UK save for need to mark the package as warranty return. The warranty does not cover damage caused by mishandling, inappropriate

connection, incompetent or inappropriate installation.

Further Information.

If you require any further information or have any questions please feel free to call us on +44 (0) 333 577 2393 and we will be happy to clarify anything or provide any further information you may need. Business hours are 09:30 to 17:00 Monday – Friday UK Time.

Contact Details.

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