

### User manual for the Helvest MV100 module

## 1. General Product Presentation

### 1.1 Warnings

The boards are not toys and are not suitable for children under the age of 14. They contain small pieces that can be swallowed.

Do not leave the product unattended in a position accessible to children.

Read the instructions carefully before using the boards.

Take care to make the electrical connections as described. Incorrect connections can cause damage to the boards or be dangerous for the user.

Never power the products in any other way than indicated in the instructions, and in particular never exceed a voltage of 20V. Supply with unsuitable voltages can lead to serious risks for the user and fire hazards.

The product has functional edges and sharp parts.

Do not leave the product powered without supervision.

At the end of the product's life cycle, do not throw it in the waste but return it to the manufacturer in accordance with the conditions of sale.

### 1.2 Declaration of compliance

We, Helvest Systems GmbH, Route des Pervenches 1, CH-1700 Fribourg (Switzerland), declare under our sole responsibility that the product DCC100-E complies with the requirements of the Electromagnetic Compatibility Directive (2004/108/EG).

The product corresponds to the standards laid down in the harmonised standards EN55032:2015 and EN55024:2010+A1:2015.

### 1.3 **MVnet** MV100 module

This module is part of the Helvest Flex system and allows you to easily mount an accessory decoder or train presence feedback module, configuring it flexibly according to your needs.

The module operates in combination with an HP100 motherboard (figure 1). It is connected by inserting it into the "net" socket. Care must be taken to insert it in the correct alignment without forcing the connectors.

This module is a NET module for connection to the MVnet network.

The Mvnet network makes it possible to make decoders that manage signals, switches, lights, etc. communicate with each other, or to signal the presence of trains, push buttons, etc.

### 1.4 Main parts of the module

1- Button for board identification.

2- Board identification LED.

3 - Voltage presence LED.

4 - Network LEDs, indicating whether data is being sent/received

5 - MVnet connection terminal.

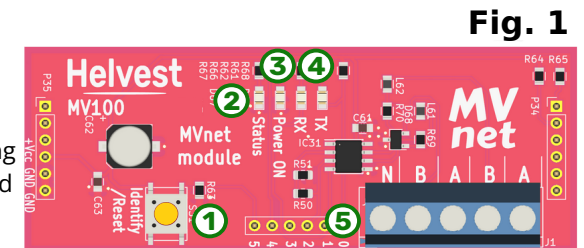


Fig. 1

## 2. How the **MVnet** network works and what is its purpose

### 2.1 **MVnet** network presentation

The MVnet network is a network to which various fixed devices of model railways can be connected. It can operate signals, turnouts, small motors, lights, level crossings, servomotors and more according to the Helvest range of modules.

The main advantages over other networks already on the market are:

It is developed according to current technologies, where devices connect and configure themselves without complications for the user.

It is a network that interfaces with existing software to manage the layout, and can coexist with all other devices.

It does not need a control unit to function, but connects to the computer via USB. You will use your control unit only to drive trains.

### 2.2 For whom the **MVnet** network is worthwhile

The MVnet network is for those who use computers to manage the layout, using one of the most popular management software programs.

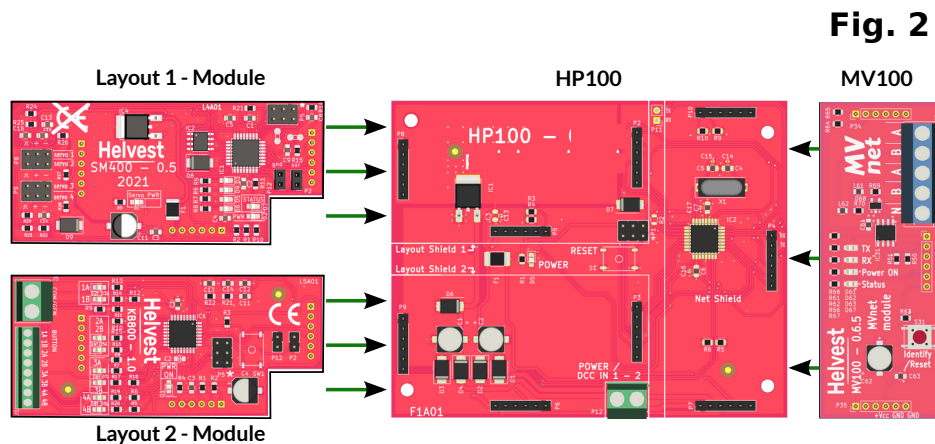
For this type of use MVnet is a modern resource, easy to configure and diagnose in the event of problems, fast and powerful.

In 'unmanaged' mode MVnet can also operate without a computer, to realise small automations even on analogue layouts. This function is not yet available (end of 2023).

### 3. Electric connections

#### 3.1 Installing and powering the decoder

**WARNING:** All decoder installation and electrical connection work must be carried out with the electrical system completely switched off!



**Fig. 2**

Install the MV100 module on an HP100 board equipped with one or two Layout Modules (fig. 2).

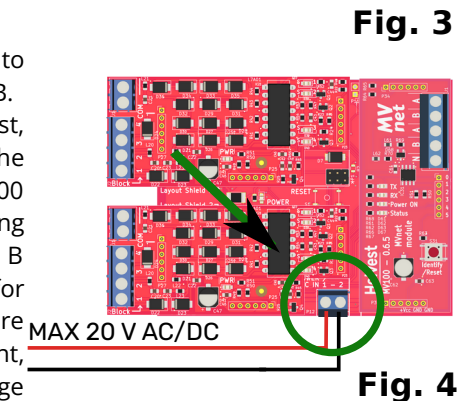
**WARNING:** In order to work with MVnet, the HP100 must have firmware 4.0 or higher. The firmware version is indicated in a label on the bottom of the HP100. HP100s shipped from Helvest are always updated to the latest version. If you have an earlier HP100, it may not be up-to-date.

Connect the power supply wires to the HP100. This connection must be made on the terminal block of the HP100 board (fig. 3). DC and AC voltages from 7 to 20 V are allowed. It is also possible to supply the HP100 with a digital bus such as DCC or mfx signal, but this is strongly discouraged because it subtracts power from the train power supply.

Connections to the installed layout modules (accessories, buttons, track sections) can be made at this stage or later.

#### 3.2 MVnet network connection

The MVnet network must be connected to terminal block no. 5 (fig. 1) in contacts A and B. Using the TWP10 cable supplied by Helvest, insert the orange cable into terminal A and the white cable into terminal B (fig. 4). Each MV100 module has two A terminals, one for incoming and one for outgoing, as in fig. 4, and two B terminals, one for incoming and one for outgoing. The direction in which the boards are connected is not important. What is important, is that in terminal A there is always the orange wire and in terminal B always the white wire.

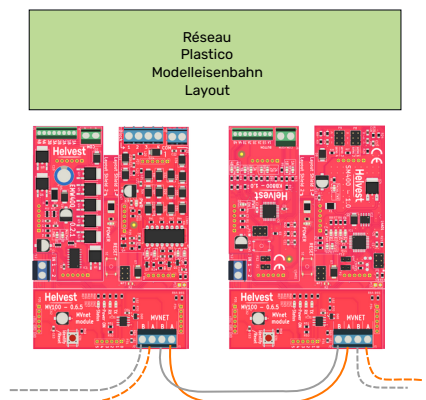


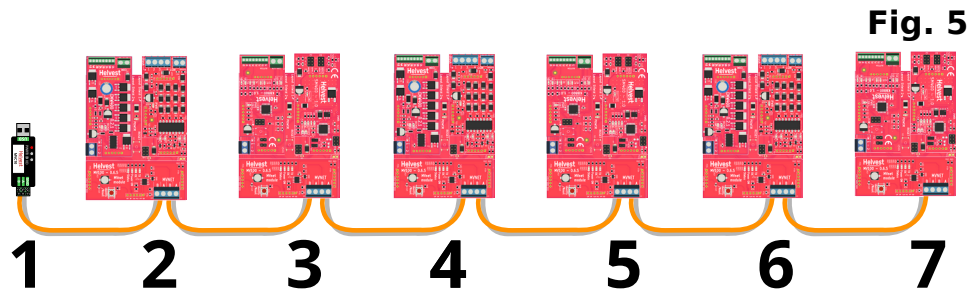
**Fig. 3**

**Fig. 4**

A few simple rules must be observed when connecting the network:

- Cables other than the specific TWP10 cable supplied by Helvest can give interference and worsen reliability.
- The network must start at the MVC10 converter, on one side, and pass through all the cards connected to the network as in figure 5. The cards must all be connected one after the other. The wire must not make any branches or closed paths.





**Fig. 5**

- The maximum number of cards that can be connected to an MVC10 converter is 100. However, it is possible to connect several MV10 converters to the same computer, so it is possible to manage many thousands of accessories without problems.
- The maximum length of the wires is a few hundred metres, so there are no difficulties for indoor use even on large-scale layouts (e.g. modular layouts).
- The MVC10 adapter also has two terminals A and B, to which wires must be connected according to the same rules.

**WARNING:** All terminals A must be connected to each other and all terminals B must be connected to each other in the network. If even in one device the wires are reversed, swapping the position of A and B, the entire network will not work.

The individual HP100 boards must be connected to an independent power source: the MVnet only carries instructions and signals, it does not supply power.

**WARNING: NEVER CONNECT ANY CABLES OTHER THAN THE MVNET CABLE** to terminals A and B. Connecting cables other than the MVnet cable to A and B, for example power cables or cables from the track, will cause irreparable damage to all MV100 boards.

## 4. Use of the MVnet network

### 4.1 Connection to the PC

AFTER connecting the network as explained above, connect the USB socket to the computer as for any other device.

By supplying power to the network, the boards are switched on (LED No. 3 in figure 1 lights up).

You can then either programme the installed boards, via the LocHaus app, or operate the model railway with your usual software (always keeping the LocHaus software open).

### 4.2 How to use MVnet with your software

During operation, both LocHaus and your software must remain open.

MVnet is compatible with software that supports the LI-ETH protocol. If you have any doubts, please write to us.

The MVnet device is registered by your software as an Xpressnet device.

### 4.3 Meaning of the controls on the module (see figure 1)

Yellow 'status' LED no. 2: lights up in two situations:

1. when the LocHaus app is activated to locate the card from the computer
2. when the board is positioning an accessory.

Green 'power' LED no. 3: lights up when the board is powered.

Yellow "RX" and "TX" LED no. 4: indicate the arrival and sending of signals to the network, in normal use there is no need to pay attention to this.

Identify/Reset" button no. 1: pressed briefly, turns off LED 1 if it had been activated by LocHaus.

Pressed for more than two seconds, it resets the board.

## 5. Troubleshooting

To resolve power supply/connection issues etc., see HP100 board troubleshooting.

Problem	Possible causes
The module is plugged in but the PWR LED does not light up	The MV100 module might be incorrectly plugged in. If the PWR LED on the HP100 board does not light up, the problem is in the power supply: the wires are incorrectly connected or there is a short circuit.
LocHaus cannot locate the device	Check the MVnet connection cable throughout the network: there may be a poor contact. Ensure that the wires on terminal blocks A and B are not reversed on all devices in the network.
The converter is plugged in, the PWR LED is lit, the PC recognises it but the LocHaus app does not detect any cards.	Check whether the boards connected to the network are powered (green PWR LEDs lit on HP100 and MV100 boards). Check that the A and B contacts on any board are not reversed. Check that the wires in the terminal blocks make proper contact. Check that the network has been wired as required: no deviations, no closed paths, with the converter at one end.

If the above measures do not work, please contact us via the form on [helvest.ch](https://helvest.ch).

## 6. TECHNICAL SPECIFICATIONS

Device type: MVnet network connection module for HP100 motherboard  
 Operating voltage: 5V, supplied by the motherboard  
 Operating temperature: 0 °C - 40 °C

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