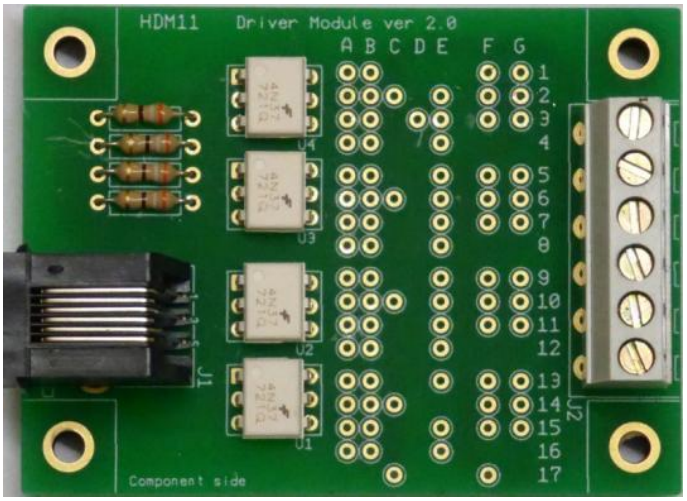
Driver Module Manual

LocoDM1



HDM11

Liability disclaimer:
Use all items that can be bought and installation instructions that can be found on this site at your own risk. They have been developed for personal use, and I find them very useful. That is why I wish to share them with other model railroad hobbyists. All items and procedures have been tested and used on my own model railroad systems without causing any damage, but this does not necessarily imply that all modifications and procedures will work in any and all environments or systems. I cannot take any responsibility when items or procedures are used under different circumstances. Always use your own judgement and common sense!

Hans Deloof
info@locohdl.be
https://www.locohdl.be

Version 19/02/2025

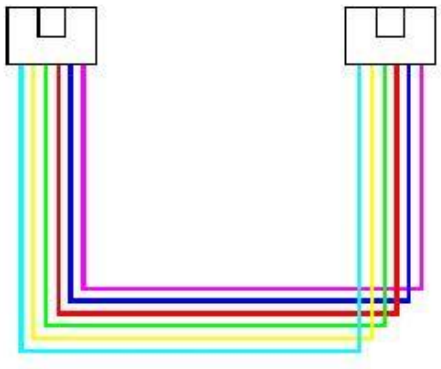
HDM11
Driver Module for LocoIO

This is a universal driver module for LocoIO. Then it is possible with the LocoIO outputs (5V, max 20mA) to drive different items with higher voltages and bigger currents.
The driver module exist of basic components that always been on the PCB as described lower. The universal part is a matrix of holes indicated trough the columns with the letters A to G and the rows with numbers 1 to 17. On the matrix we can place wires and components that give the module different functions.

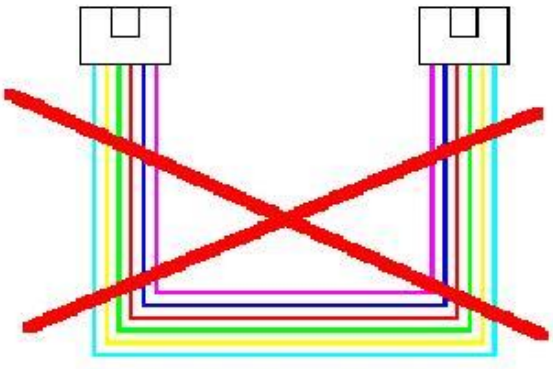
- Switches with coils
- 2-, 3- of 4- image Signals with LED's of bulbs
- Switches and signals can be connected with common Ground or common positive connection.

Driver module connection:

The Connection between LocoIO and Driver Module is with a 6-wire cable with RJ12 connectors. Important is that on the connector on both ends of the cable the pin1 to pin1 is connected. The length of the cables can be maximum 200 cm.



Correct



Wrong

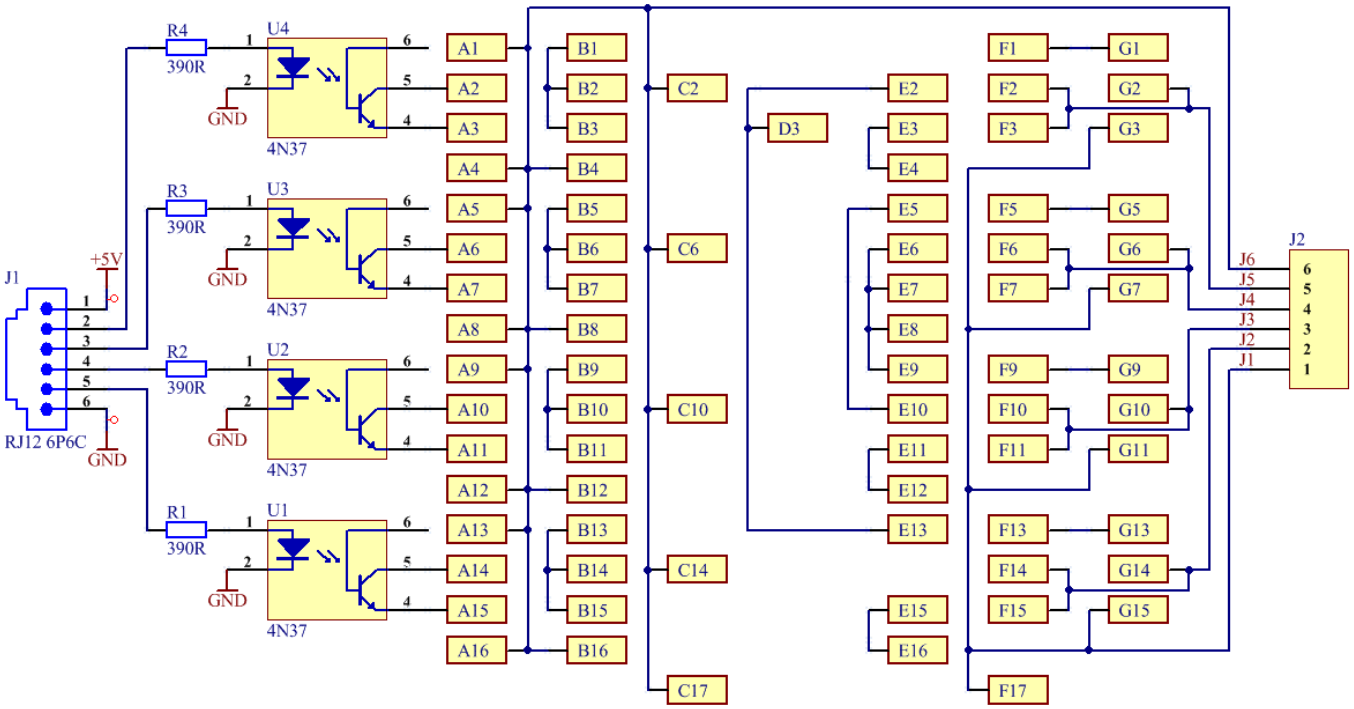
Hans Deloof
info@locohdl.be
https://www.locohdl.be

Bill of materials for the basic driver module:

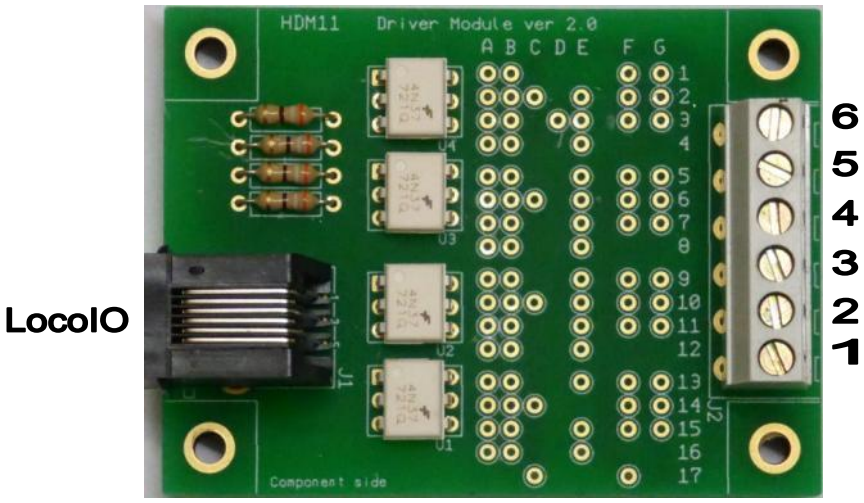
Connector	RJ12	J1
HDR_6	6 pins print connector	J2
Resistor	390Ω	R1, R2, R3, R4
Optocoupler	TIL111	U1, U2, U3, U4

Remark:

- For the optocoupler may in principle every 6 pins optocoupler been used, as the 4N27, 4N37, CNY17,…



PCB with basic components placed.



Hans Deloof
info@locohdl.be
https://www.locohdl.be

HDM11MD1

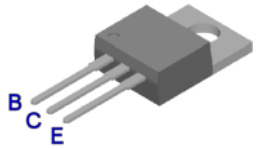
Switch driver with common positive connection.

With this circuit you can drive switches and other loads used in model railroad.
The voltage can be between 5V and 24V DC. The current depends on the transistor you use, but most of the NPN-darlington transistors in TO-220AB package begins with 4Amps or more.

Only connect the HDM11MD1 to the LocoIO, LocoServo or LocoBooster after the ports for the points have been configured, so as not to damage the module and the points if the settings are incorrect!

Bill of materials for matrix:

Wire connections	L1, … , L8	
Resistors	R9, R10, R11, R12	3k9Ω
Diodes	D1, D2, D3, D4	1N4148
Transistors	T1, T2, T3, T4	NPN-darlington in TO-220AB package

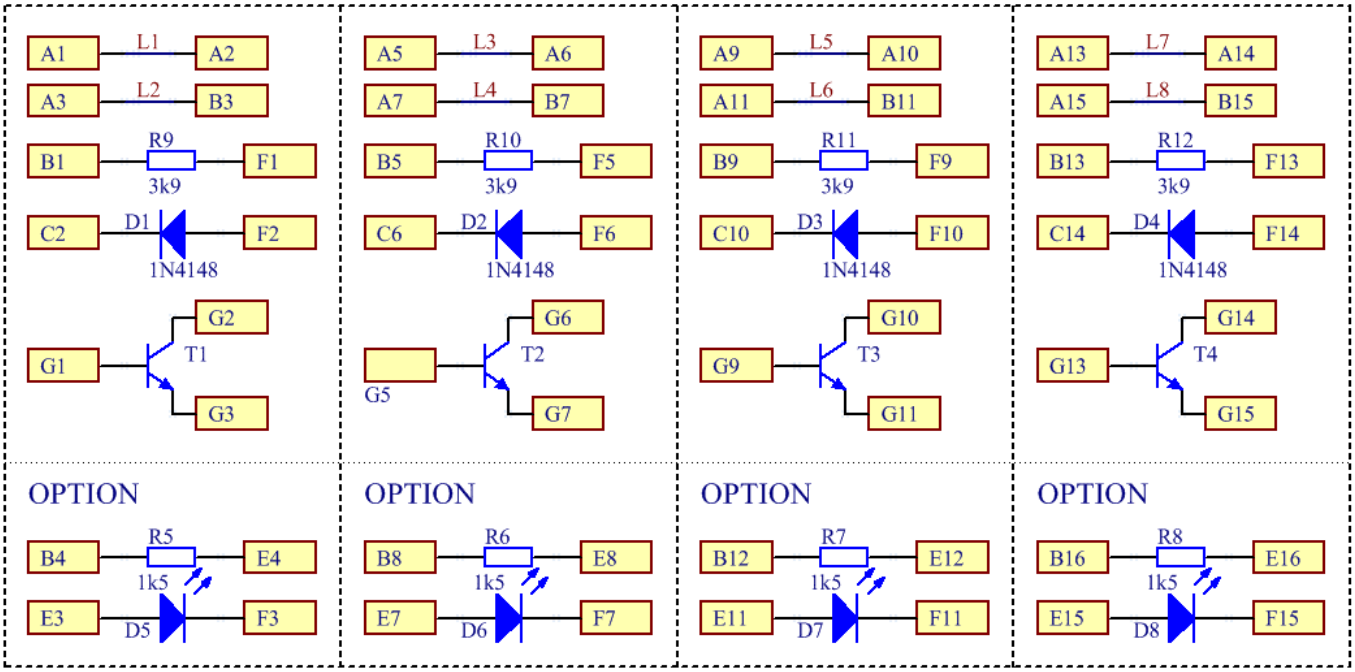


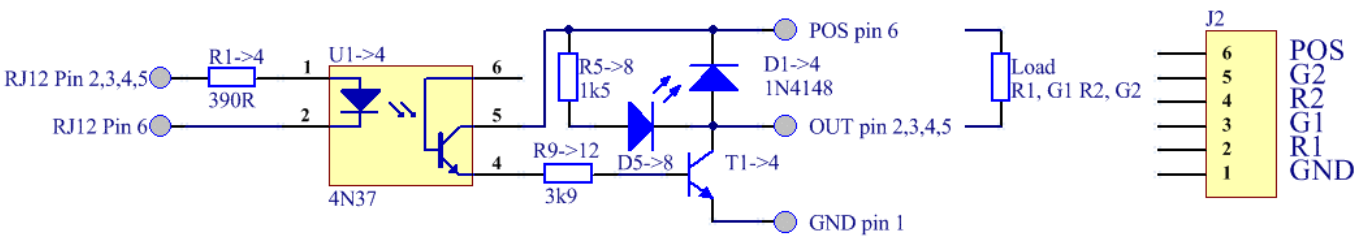
Every transistor with this pin layout
Example: TIP120, TIP121, TIP122, BDT61, BDT63, BDT65, BD645, …

Option:

Resistors	R5, R6, R7, R8	1k5Ω
LED	D5, D6, D7, D8	3mm or 5mm normal LED

This option is only if you like it to optical visualizes the working of the module.

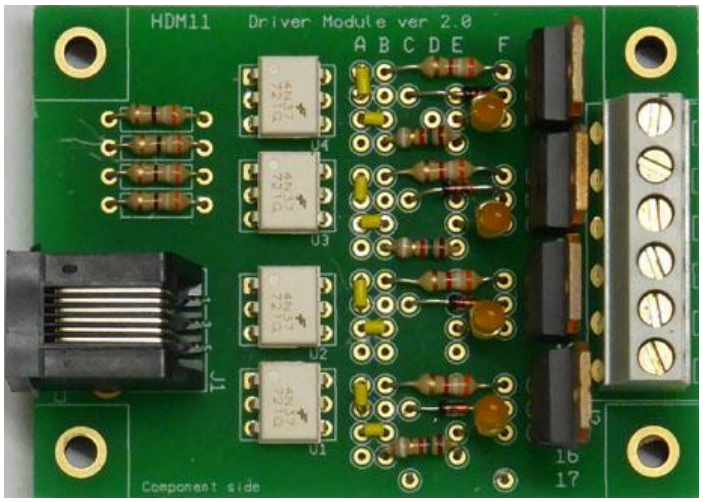


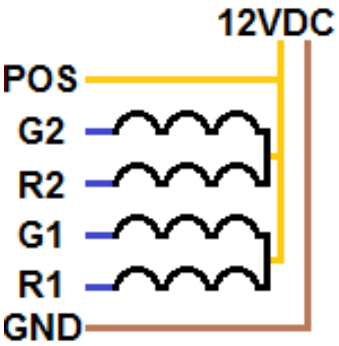


Hans Deloof
info@locohdl.be
https://www.locohdl.be

HDM11MD1

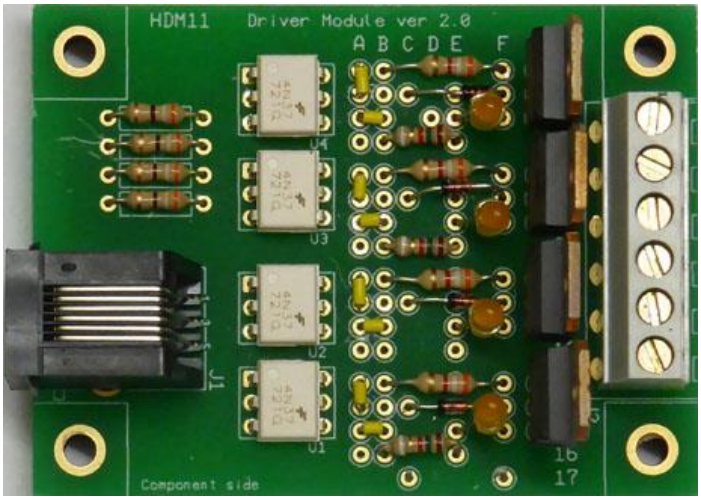
LocoIO

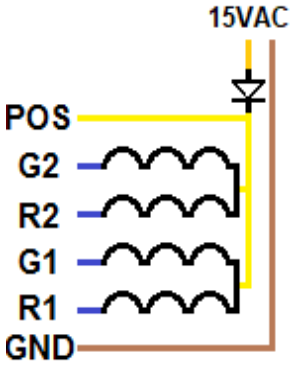




Some switch coils work only with AC voltage. (ex. diode 1N5400)

LocoIO





HDM11MD2

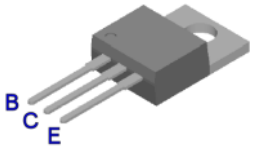
Switch driver with common ground connection.

With this circuit you can drive switches and other loads used in model railroad.
The voltage can be between 5V and 24V DC. The current depends on the transistor you use, but most of the PNP-darlington transistors in TO-220AB package begins with 4Amps or more.

Only connect the HDM11MD2 to the LocoIO, LocoServo or LocoBooster after the ports for the points have been configured, so as not to damage the module and the points if the settings are incorrect!

Bill of materials for matrix:

Wire connections	L1, … , L8	
Resistors	R9, R10, R11, R12	3k9Ω
Diodes	D1, D2, D3, D4	1N4148
Transistors	T1, T2, T3, T4	PNP-darlington in TO-220AB package

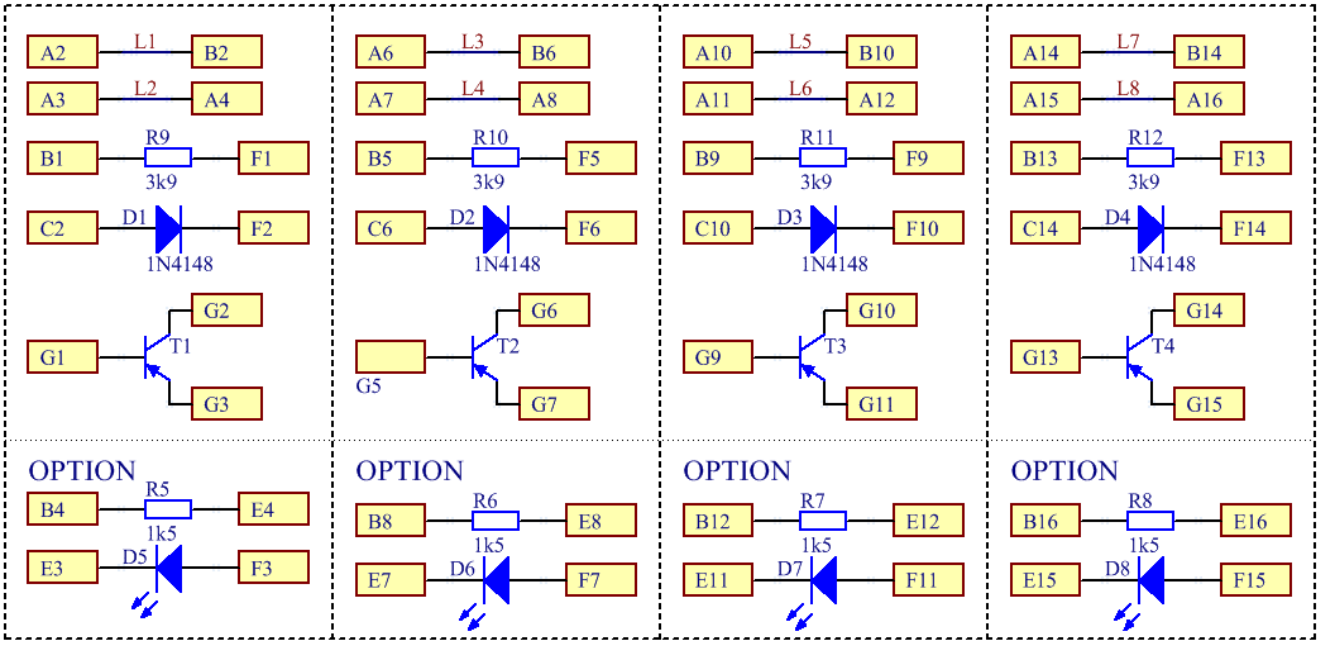


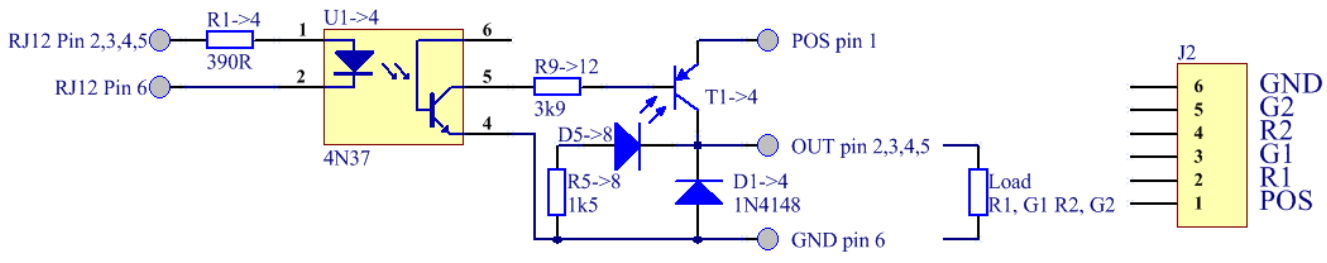
Every transistor with this pin layout
Example: TIP125, TIP126, TIP127, BDT60, BDT62, BDT64, BD646, …

Option:

Resistors	R5, R6, R7, R8	1k5Ω
LED	D5, D6, D7, D8	3mm or 5mm normal LED

This option is only if you like it to optical visualizes the working of the module.





Hans Deloof
info@locohdl.be
https://www.locohdl.be

HDM11MD2

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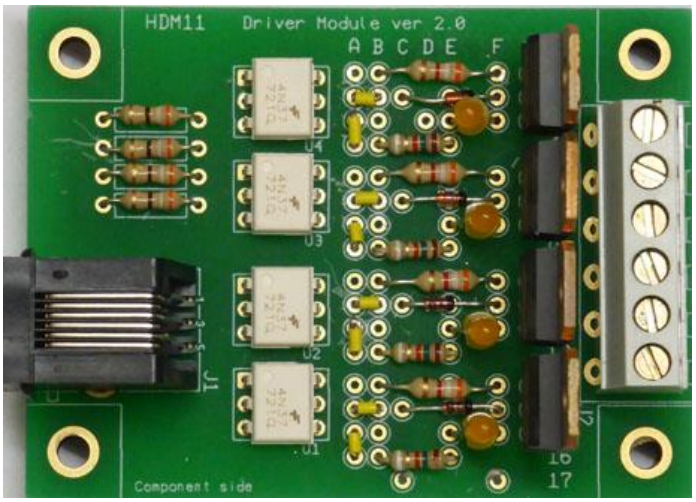

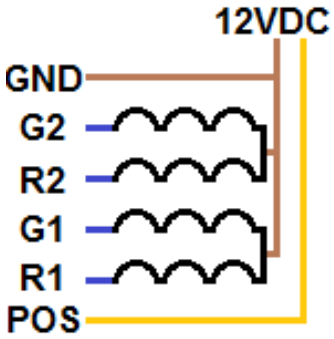

Some point coils work only with AC voltage. (ex. diode 1N5400)

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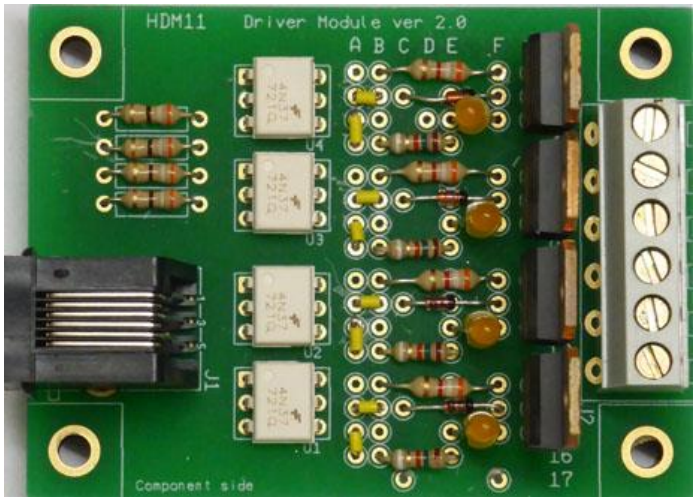
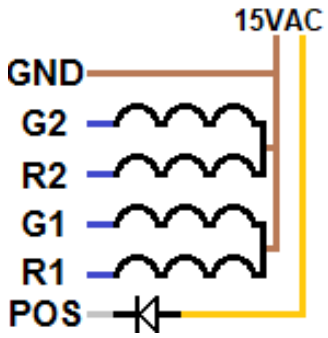




HDM11MD3

2-way signal with common ground connection.

With this circuit you can drive signals and other loads used in model railroad.
The voltage can be between 5V and 24V DC. The current depends on the optocoupler you use, but most of them can have 100mA.

Bill of materials for matrix:
Wire connections L1, … , L12

LED Option:

Resistors	R5, R6, R7, R8	1k5Ω
LED	D5, D6, D7, D8	3mm or 5mm normal LED

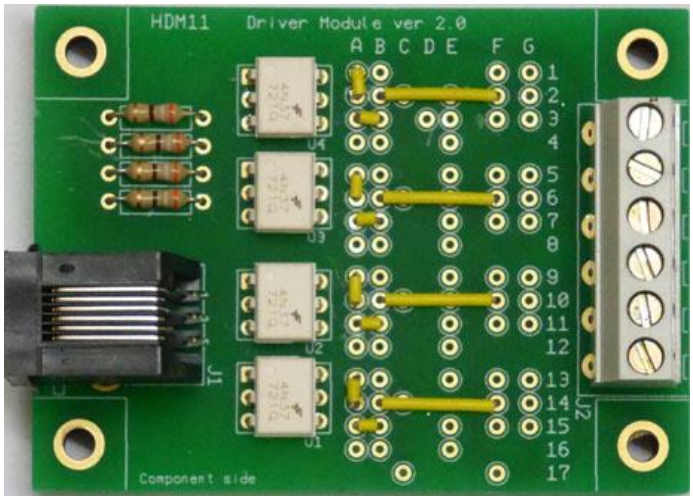
This option is only if you like it to optical visualizes the working of the module.

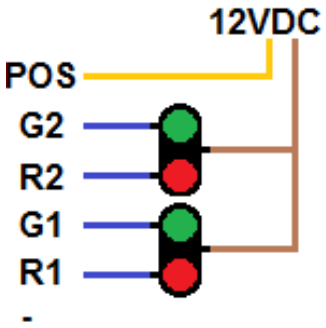
AC Option:

Diode	D1	1N4001

HDM11MD3A - Example of the board without option

LocoIO





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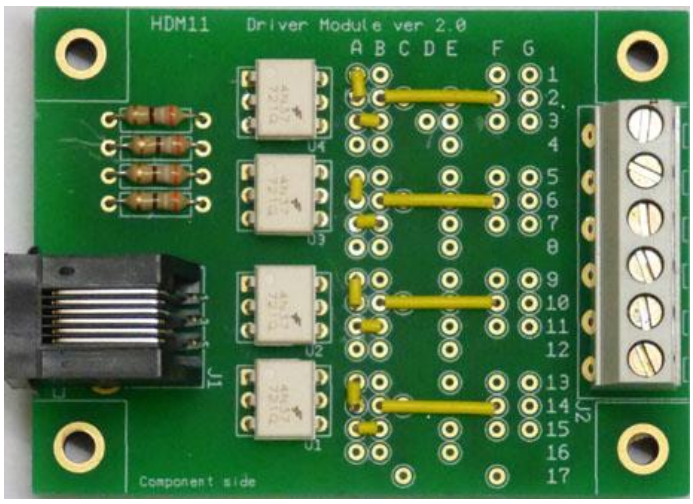
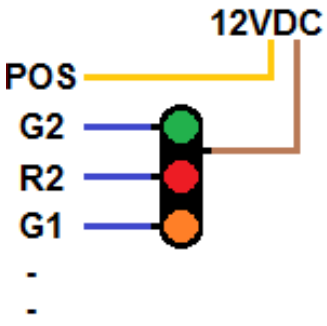
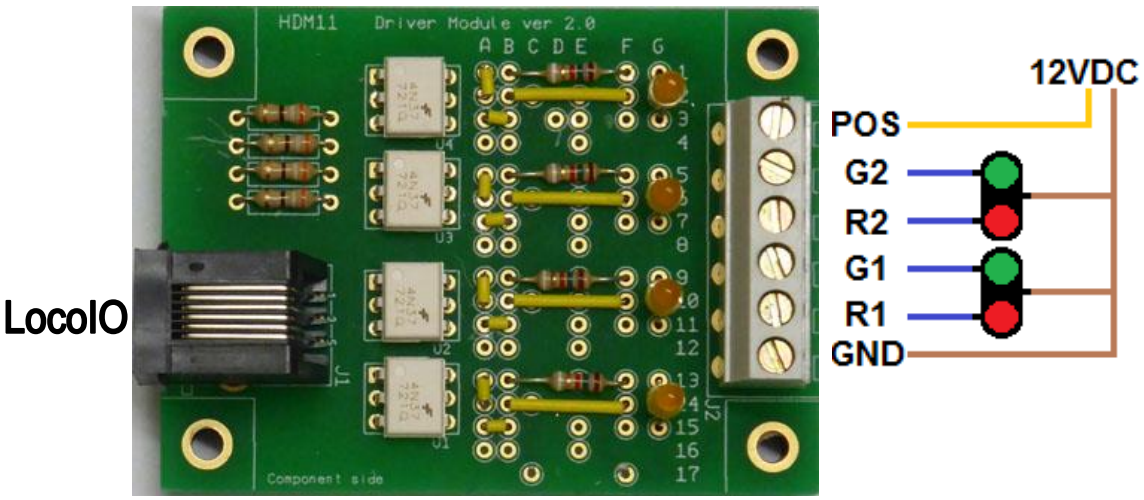


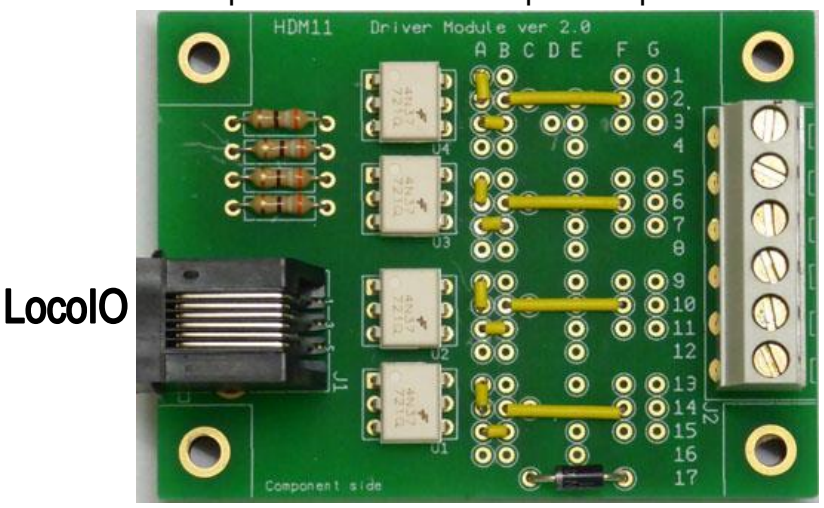


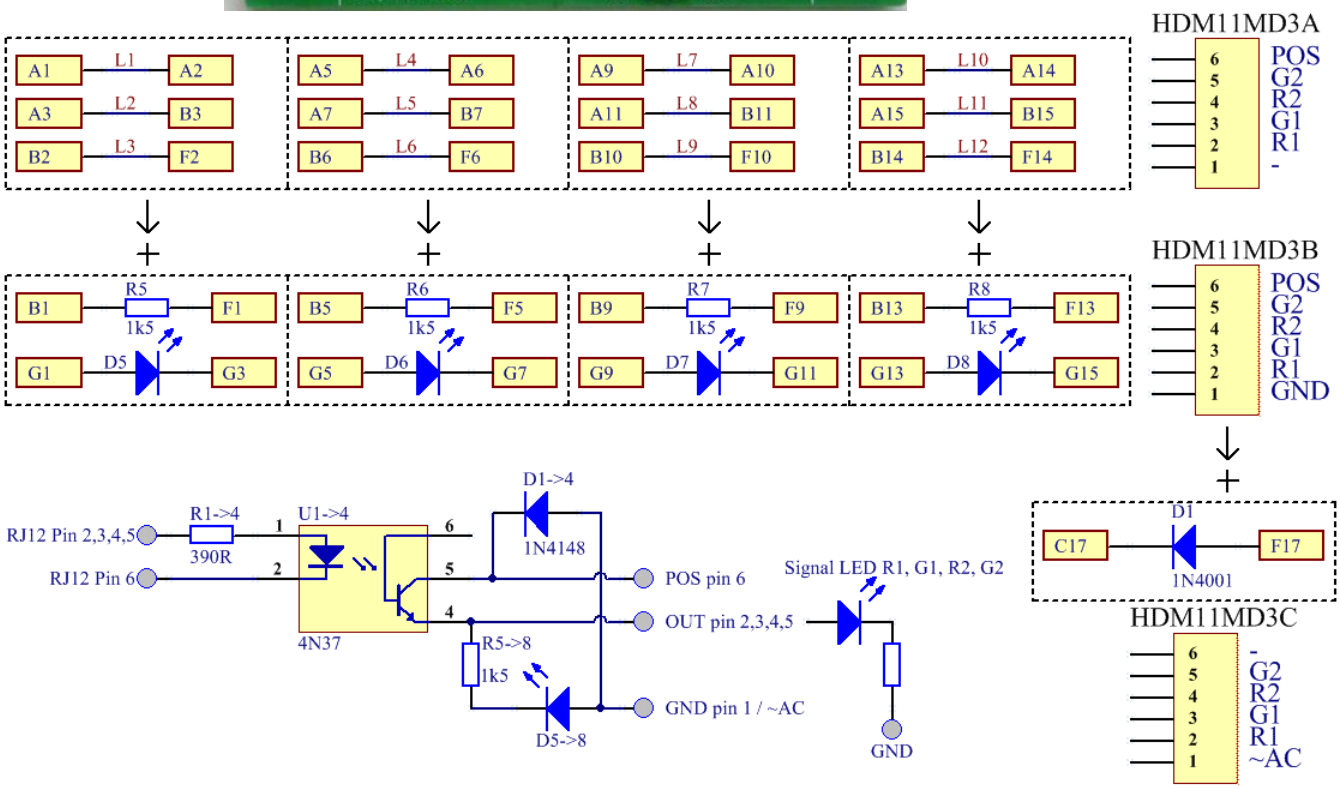
Hans Deloof
info@locohdl.be
https://www.locohdl.be

HDM11MD3B - Example of the board with LED option



HDM11MD3C - Example of board with AC power option.





Hans Deloof
info@locohdl.be
https://www.locohdl.be

HDM11MD4

2-way signal with common positive connection.

With this circuit you can drive signals and other loads used in model railroad.
The voltage can be between 5V and 24V DC. The current depends on the optocoupler you use, but most of them can have 100mA.

Bill of materials for matrix:
Wire connections L1, … , L12

LED Option:

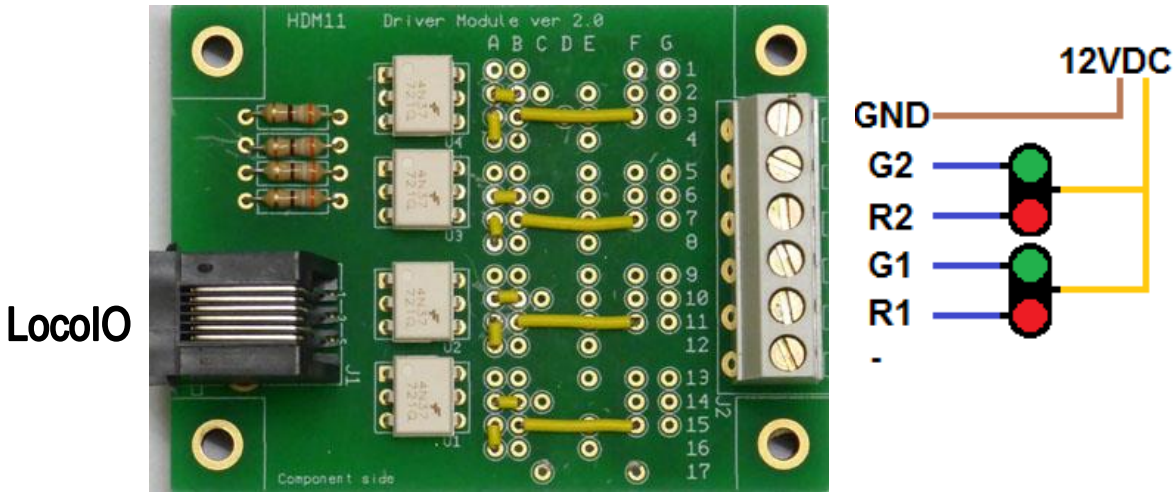
Resistors	R5, R6, R7, R8	1k5Ω
LED	D5, D6, D7, D8	3mm or 5mm normal LED

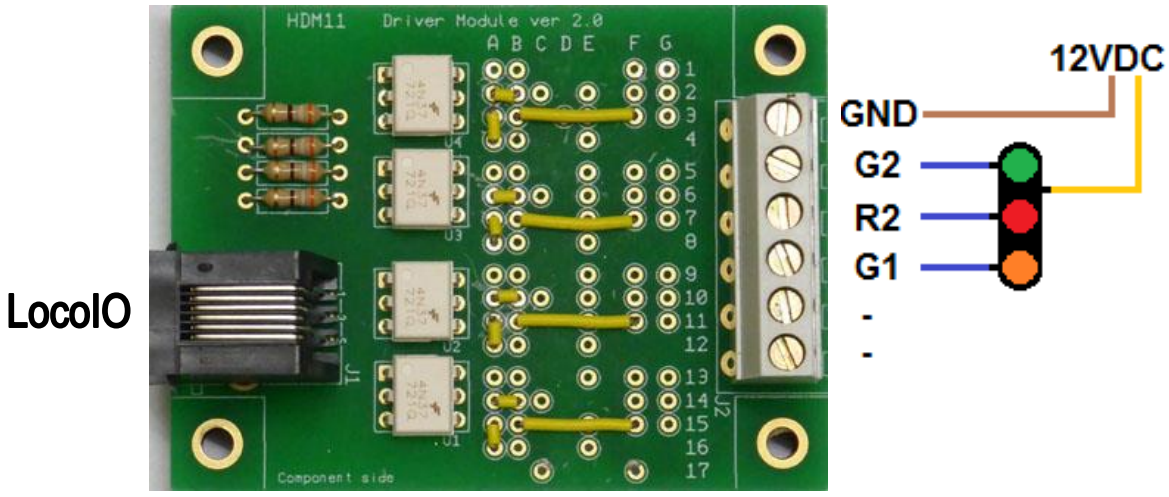
This option is only if you like it to optical visualizes the working of the module.

AC Option:

Diode	D1	1N4001

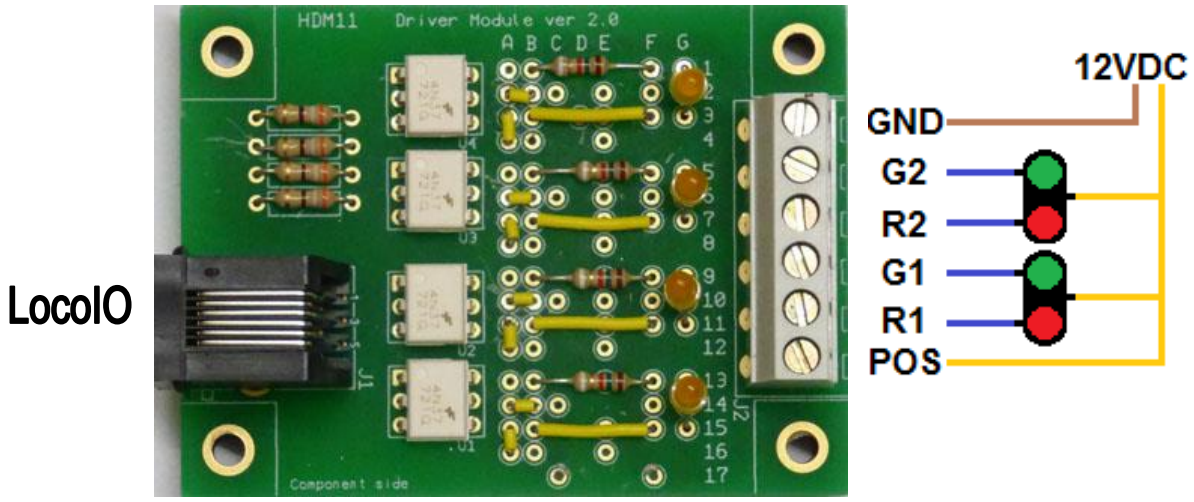
HDM11MD4A - Example of the board without option



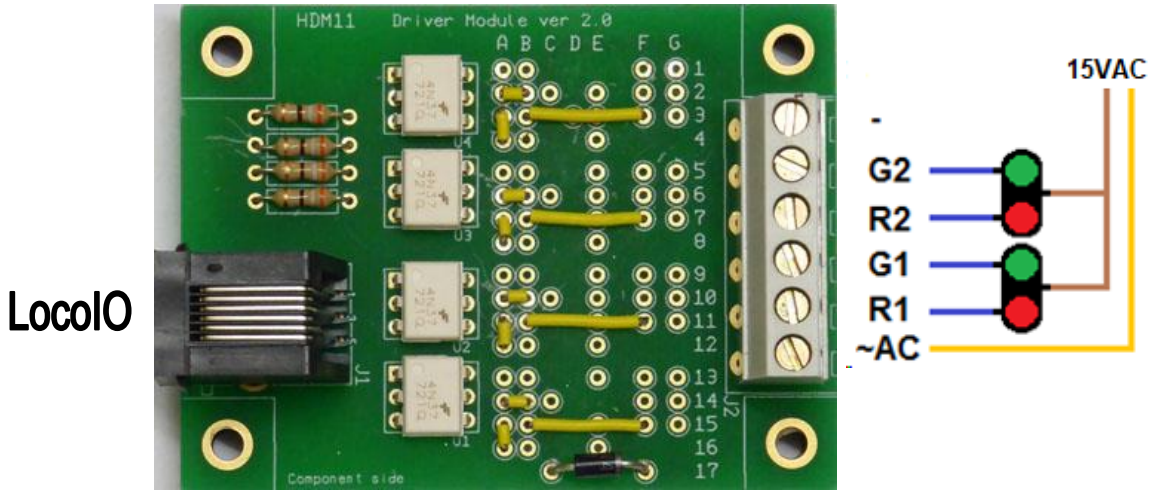


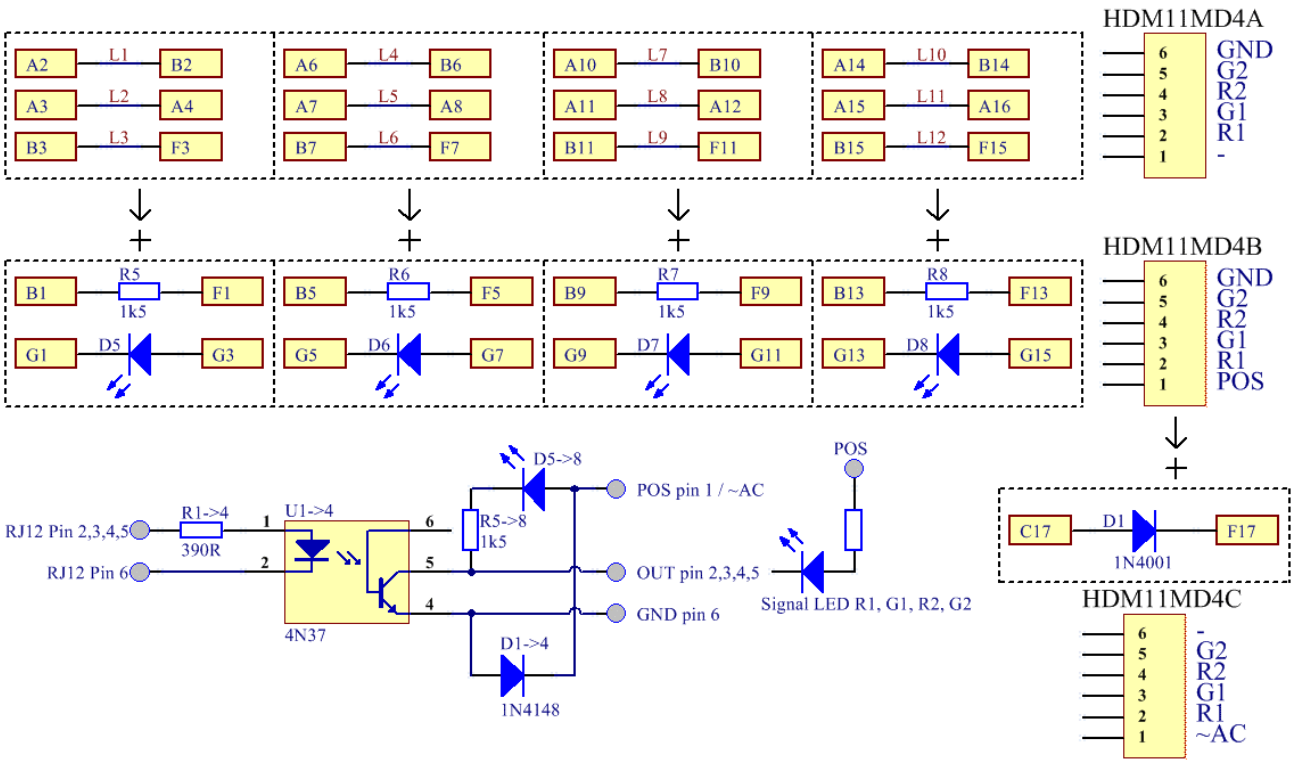
Hans Deloof
info@locohdl.be
https://www.locohdl.be

HDM11MD4B - Example of the board with LED option



HDM11MD4C - Example of board with AC power option.





Hans Deloof
info@locohdl.be
https://www.locohdl.be

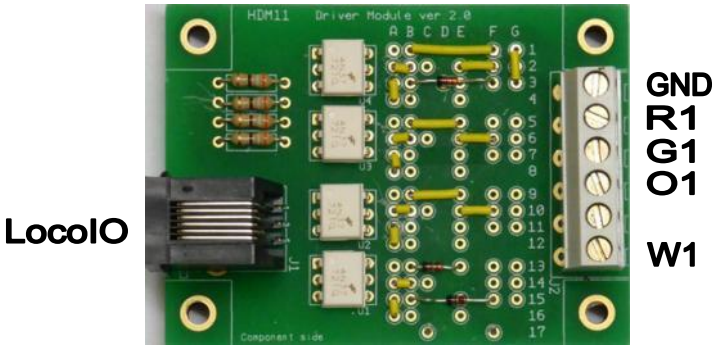
HDM11MD5

Belgium or German 4-way signal with common positive connection.

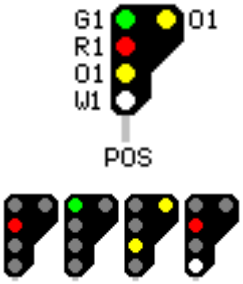
With this circuit you can drive complex signals used in model railroad.
The voltage can be between 5V and 24V DC. The current depends on the optocoupler you use, but most of them can have 100mA. Common Positive (POS) on signal and a ground connection (GND) on the board.

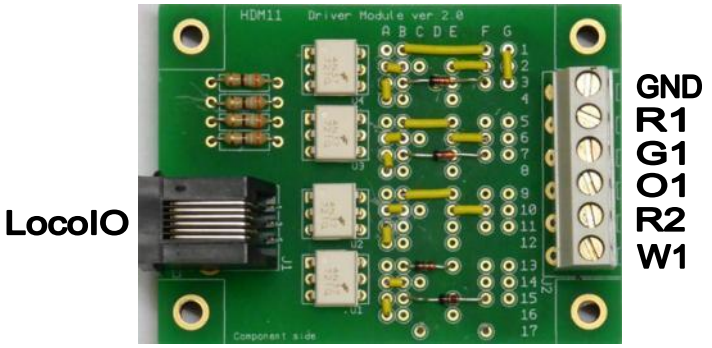
Bill of materials for matrix:

Wire connections	L1, … , L15	
Diode	D1, D2, D3, D4	1N4148

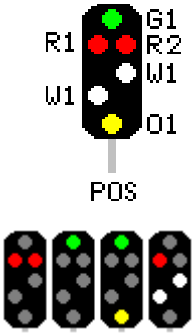


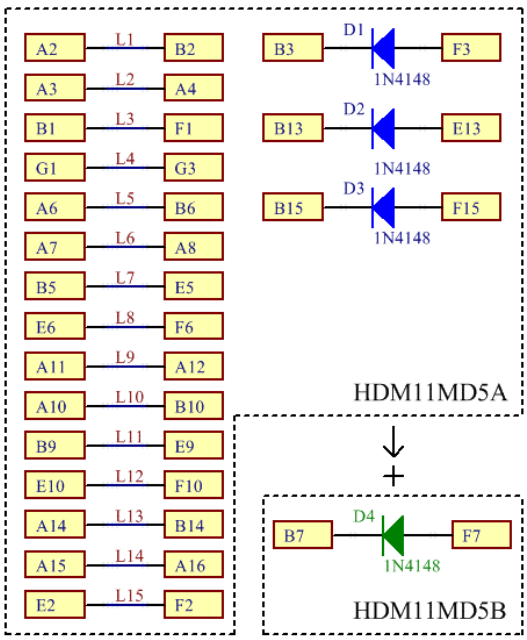
HDM11MD5A

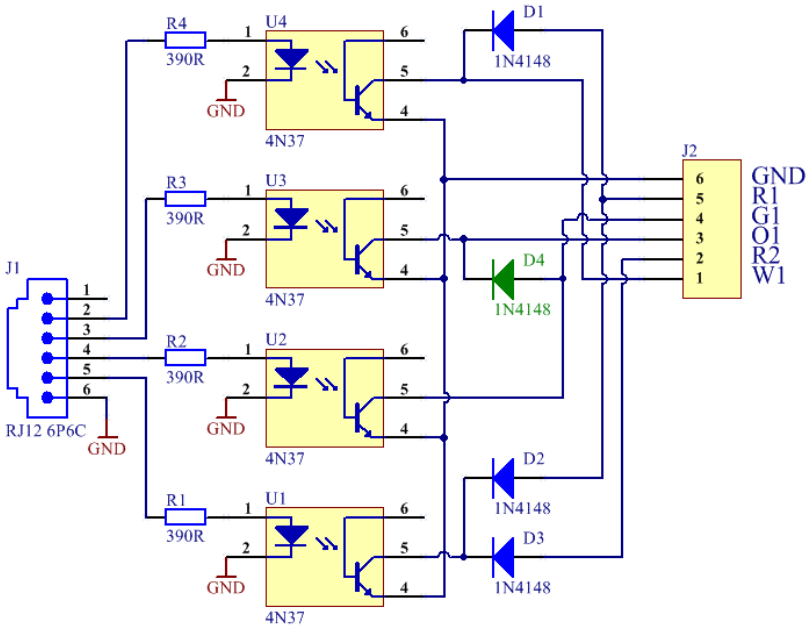




HDM11MD5B







Hans Deloof
info@locohdl.be
https://www.locohdl.be

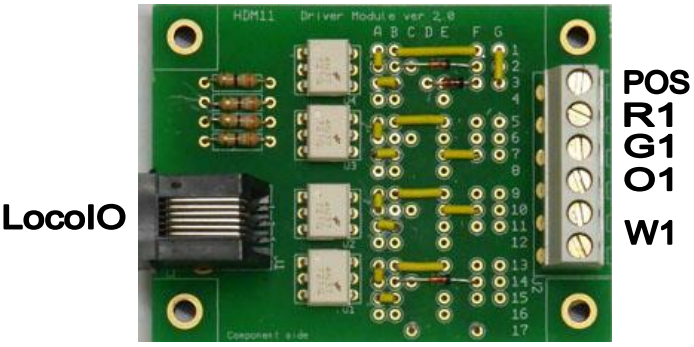
HDM11MD6

Belgium or German 4-way signal with common ground connection.

With this circuit you can drive complex signals used in model railroad.
The voltage can be between 5V and 24V DC. The current depends on the optocoupler you use, but most of them can have 100mA. Common Ground (GND) on signal and a positive connection (GND) on the board.

Bill of materials for matrix:

Wire connections	L1, … , L15	
Diode	D1, D2, D3, D4	1N4148



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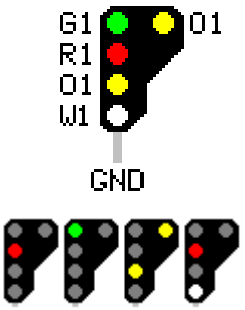

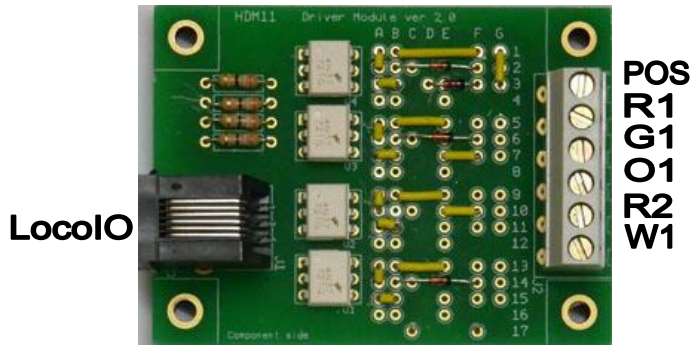

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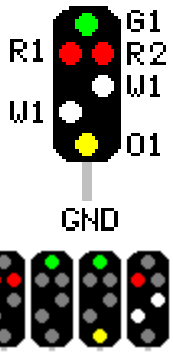
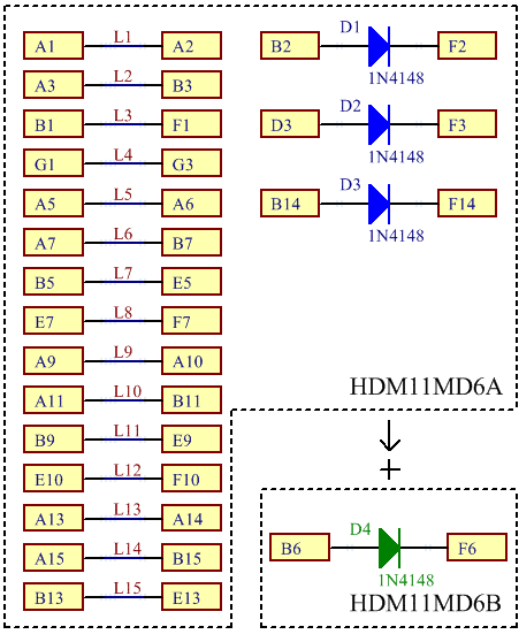
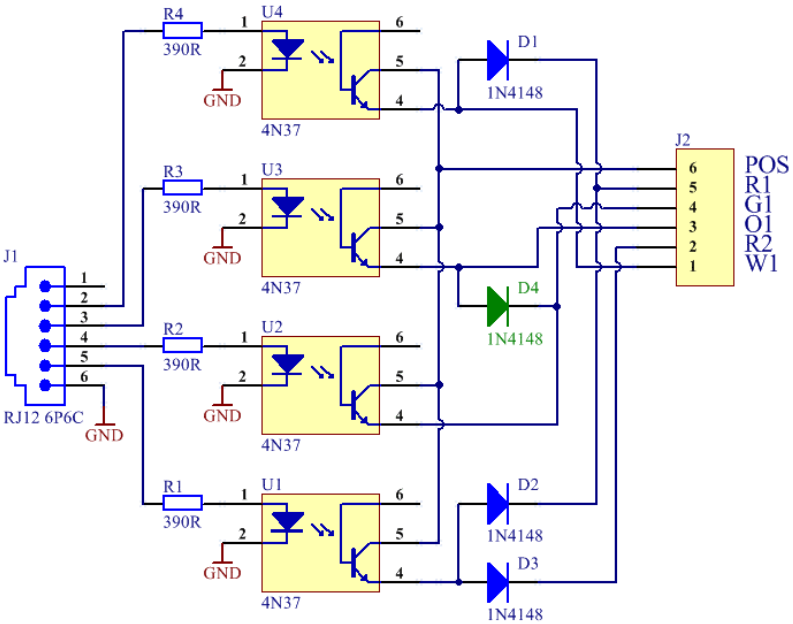






Hans Deloof
info@locohdl.be
https://www.locohdl.be

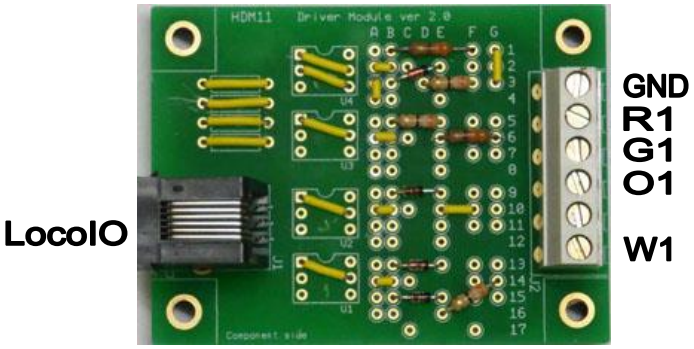
HDM11MD7

Belgium or German 4-way signal with LED's powered by LocoIO

With this circuit you can drive complex signals used in model railroad.
The 5V voltage of the LocoIO is used for driving the LED's. The resistor of the LED's are integrated in the module, the signal need to contain only the LED's.

Bill of materials for matrix:

Wire connections	L1, … , L12	
Resistors	R1, R2, R3, R4	0Ω or a wire
Resistors	R5, R7, R8	390 Ω
Resistors	R6, R9	330 Ω
Diode	D1, D2, D3, D4, D5	1N4148



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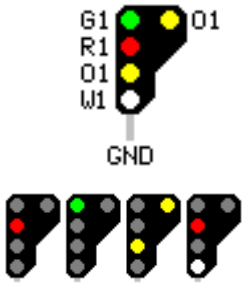

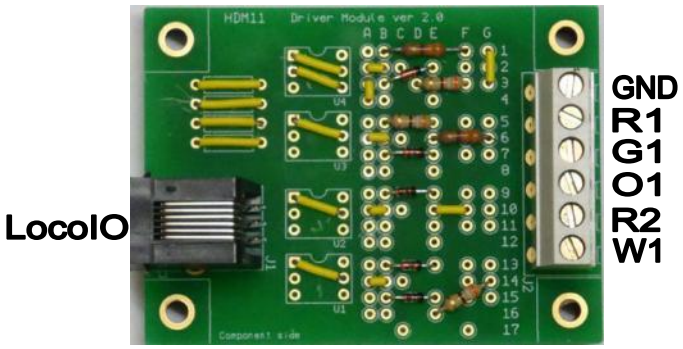

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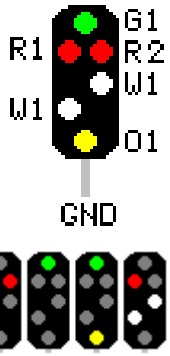
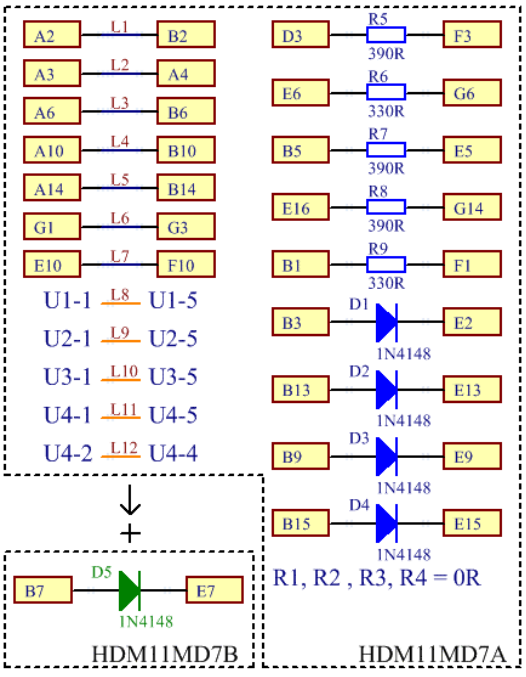
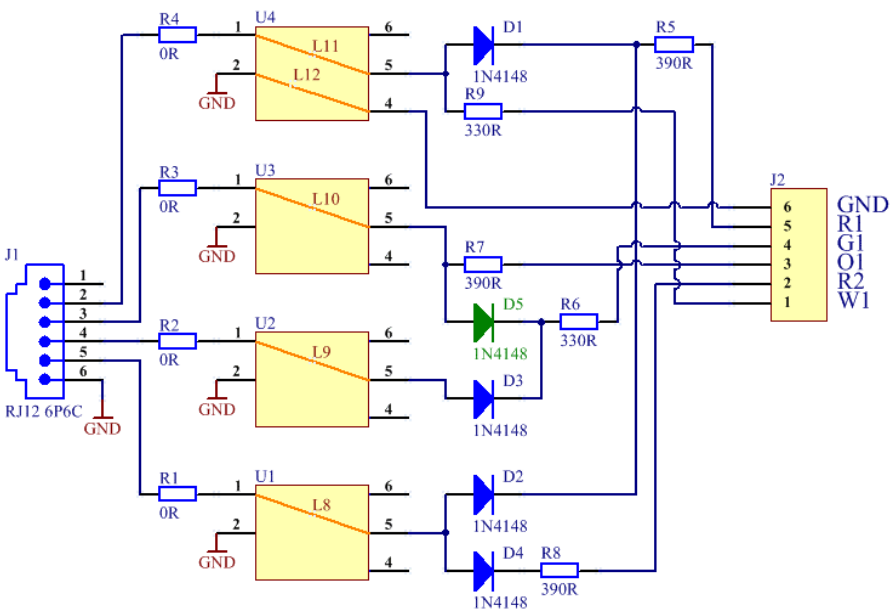






Hans Deloof
info@locohdl.be
https://www.locohdl.be

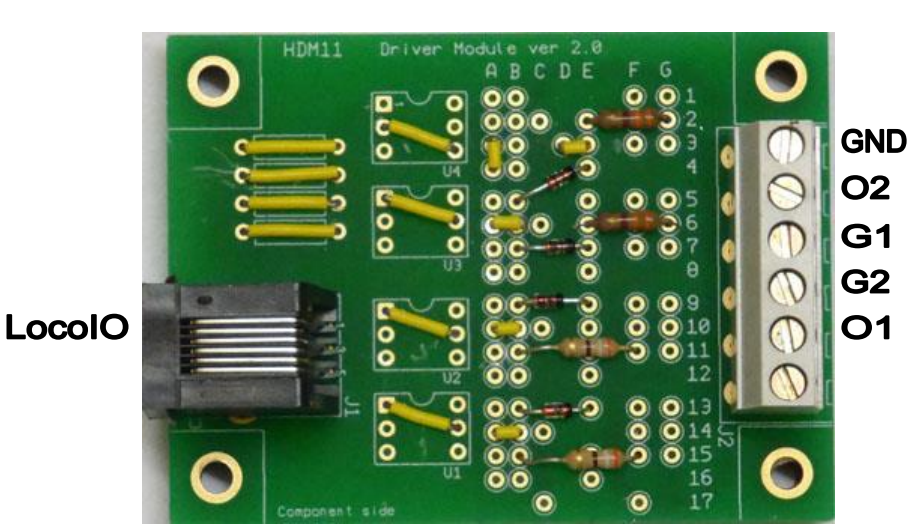
HDM11MD8

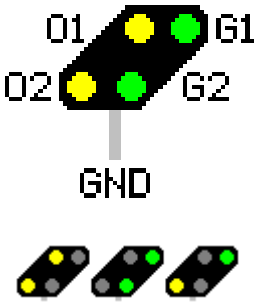
German 3-way Distance signal with LED's powered by LocoIO

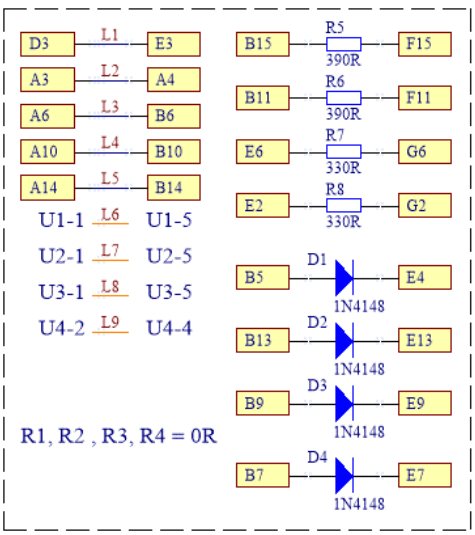
With this circuit you can drive complex signals used in model railroad.
The 5V voltage of the LocoIO is used for driving the LED's. The resistor of the LED's are integrated in the module, the signal need to contain only the LED's.

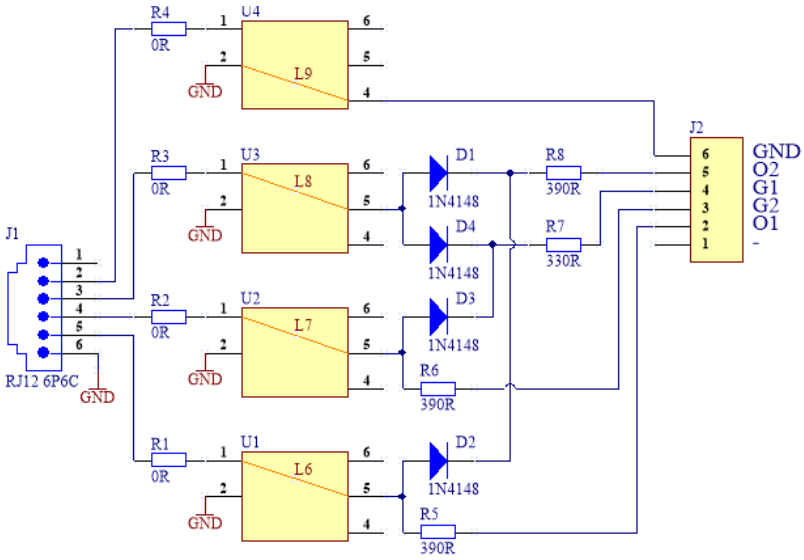
Bill of materials for matrix:

Wire connections	L1, … , L9	
Resistors	R1, R2, R3, R4	0Ω or a wire
Resistors	R5, R6, R7, R8	390 Ω
Diode	D1, D2, D3, D4	1N4148









Hans Deloof
info@locohdl.be
https://www.locohdl.be

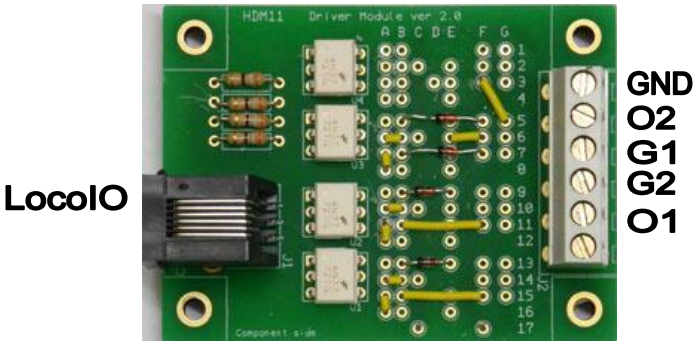
HDM11MD9

German 3-way or Swiss 4-way Distance signal with common positive connection.

With this circuit you can drive complex signals used in model railroad.
The voltage can be between 5V and 24V DC. The current depends on the optocoupler you use, but most of them can have 100mA. Common Positive (POS) on signal and a ground connection (GND) on the board.

Bill of materials for matrix:

Wire connections	L1, … , L11/L15	
Diode	D1, D2, D3, D4, D5, D6	1N4148



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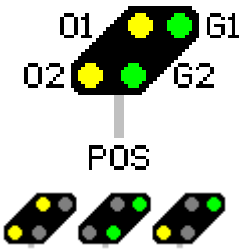

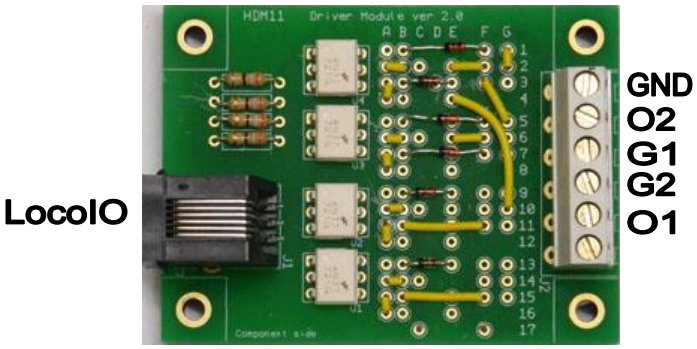

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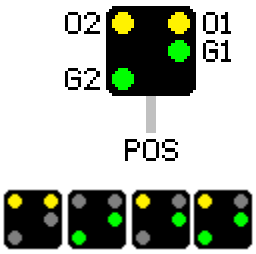
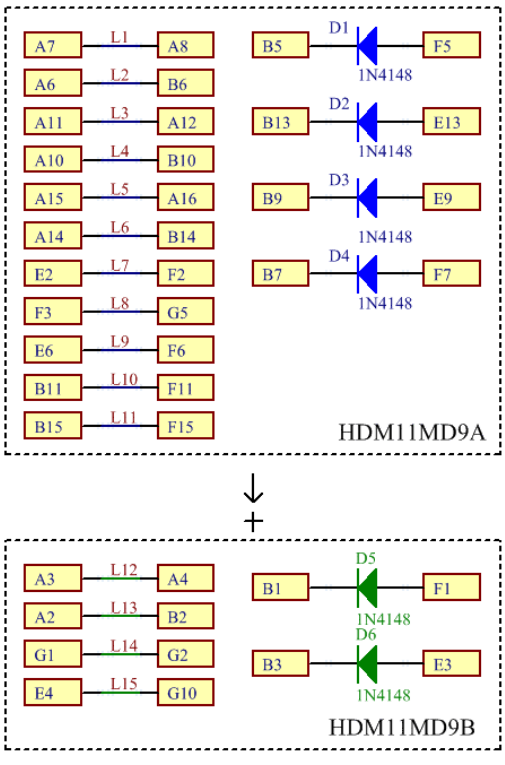
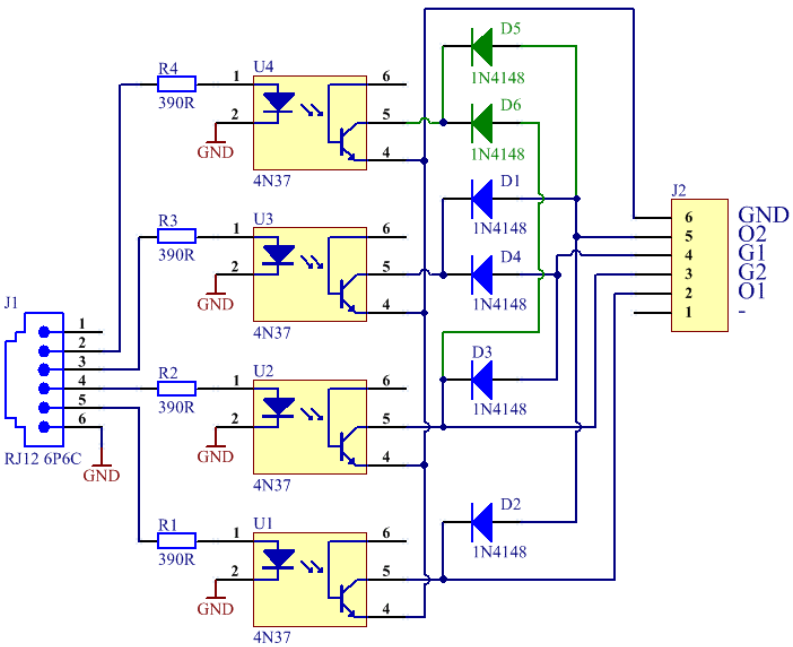






Hans Deloof
info@locohdl.be
https://www.locohdl.be

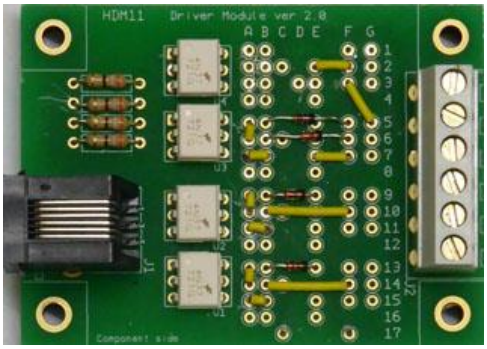
HDM11MD10

German 3-way or Swiss 4-way Distance signal with common ground connection.

With this circuit you can drive complex signals used in model railroad.
The voltage can be between 5V and 24V DC. The current depends on the optocoupler you use, but most of them can have 100mA. Common Ground (GND) on signal and a positive connection (POS) on the board.

Bill of materials for matrix:

Wire connections	L1, … , L11/L15	
Diode	D1, D2, D3, D4, D5, D6	1N4148



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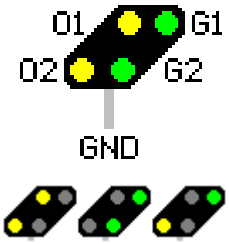

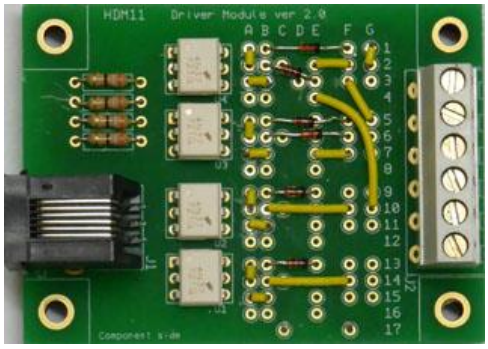

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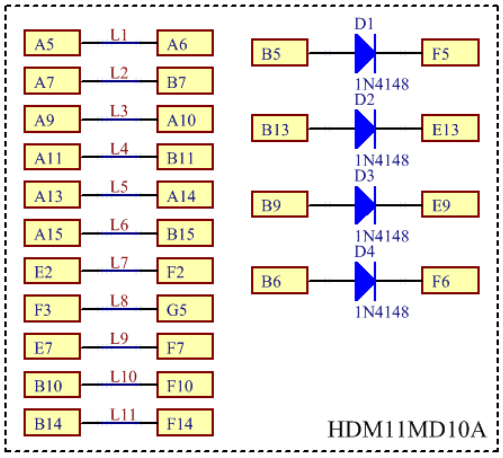
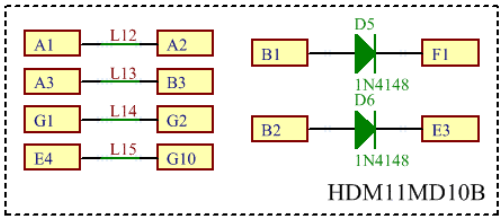
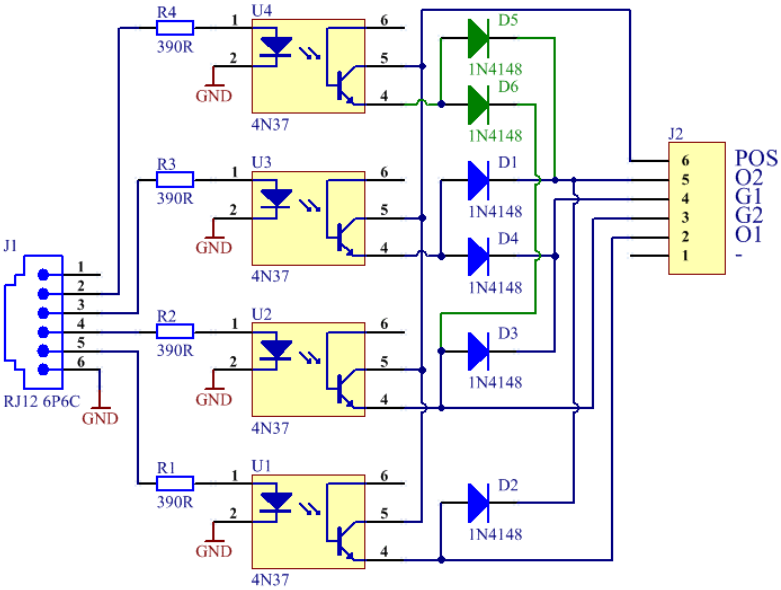






Hans Deloof
info@locohdl.be
https://www.locohdl.be

Version 19/02/2025

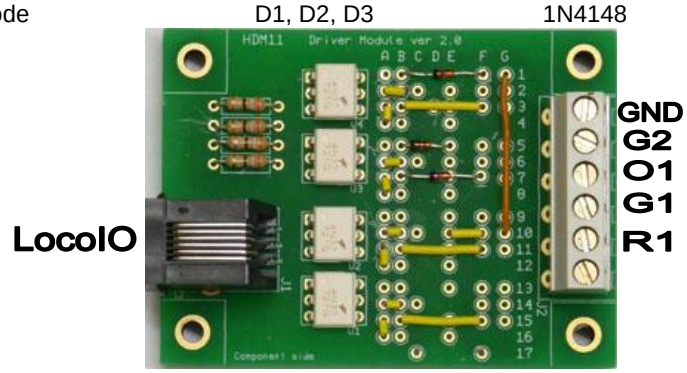
HDM11MD11

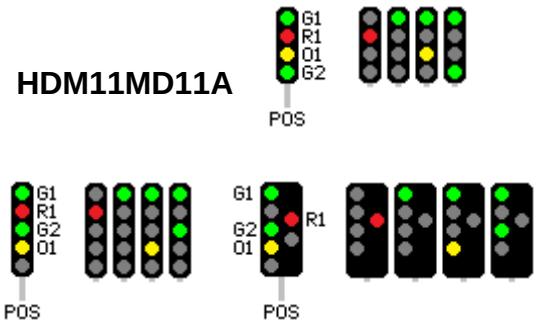
Swiss 4-way signal with common Positive connection.

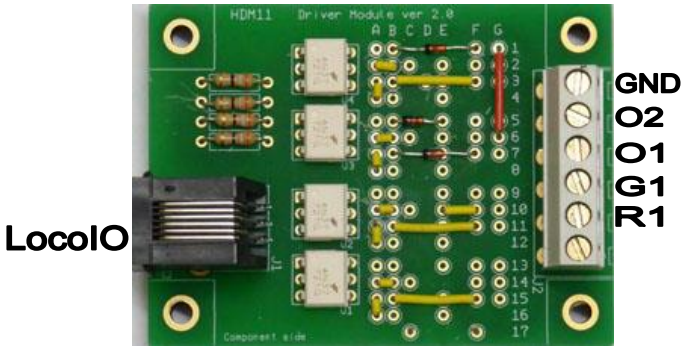
With this circuit you can drive complex signals used in model railroad.
The voltage can be between 5V and 24V DC. The current depends on the optocoupler you use, but most of them can have 100mA. Common Positive (POS) on signal and a ground connection (GND) on the board.

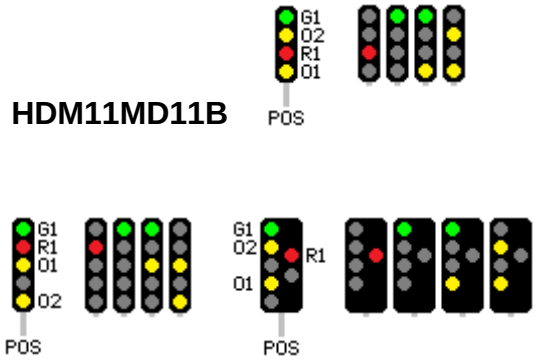
Bill of materials for matrix:

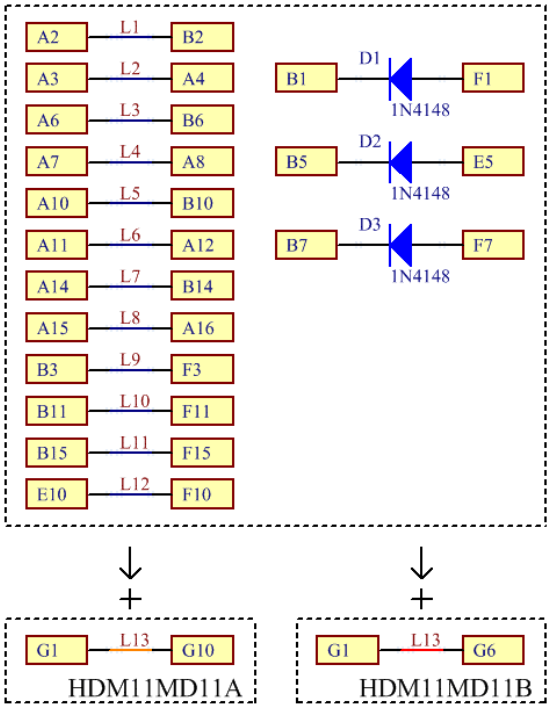
Wire connections	L1, … , L13	
Diode	D1, D2, D3	1N4148

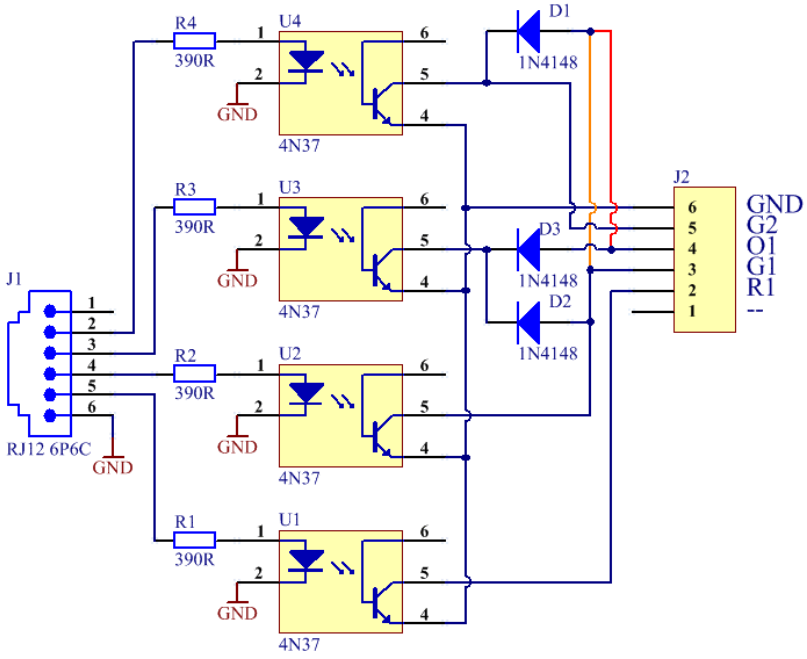












Hans Deloof
info@locohdl.be
https://www.locohdl.be

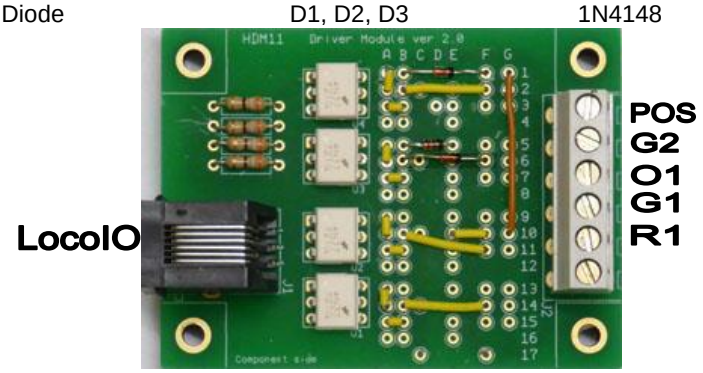
HDM11MD12

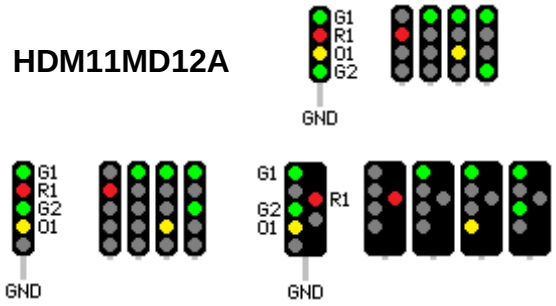
Swiss 4-way signal with common Ground connection.

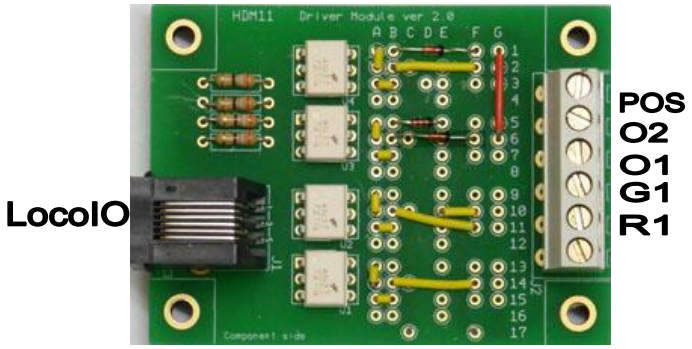
With this circuit you can drive complex signals used in model railroad.
The voltage can be between 5V and 24V DC. The current depends on the optocoupler you use, but most of them can have 100mA. Common Ground (GND) on signal and a positive connection (POS) on the board.

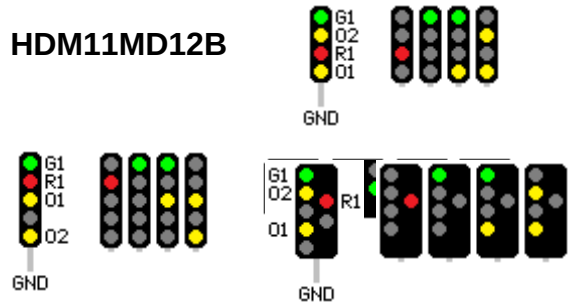
Bill of materials for matrix:

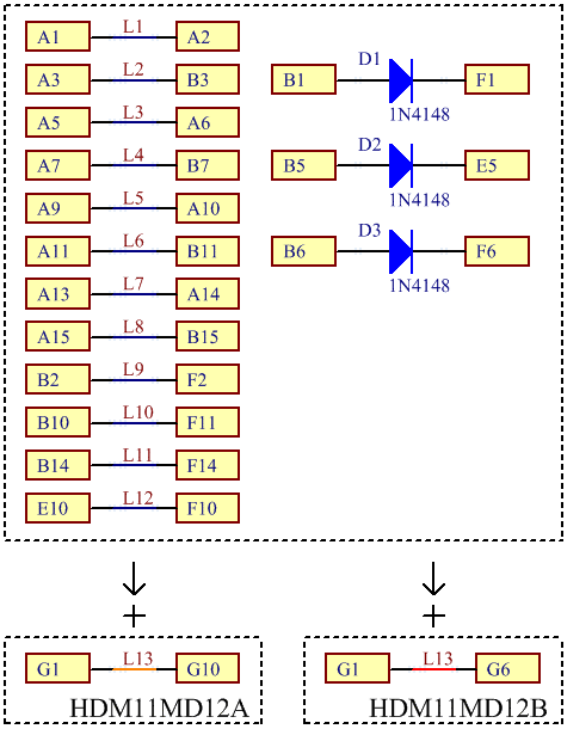
Wire connections	L1, … , L13	
Diode	D1, D2, D3	1N4148

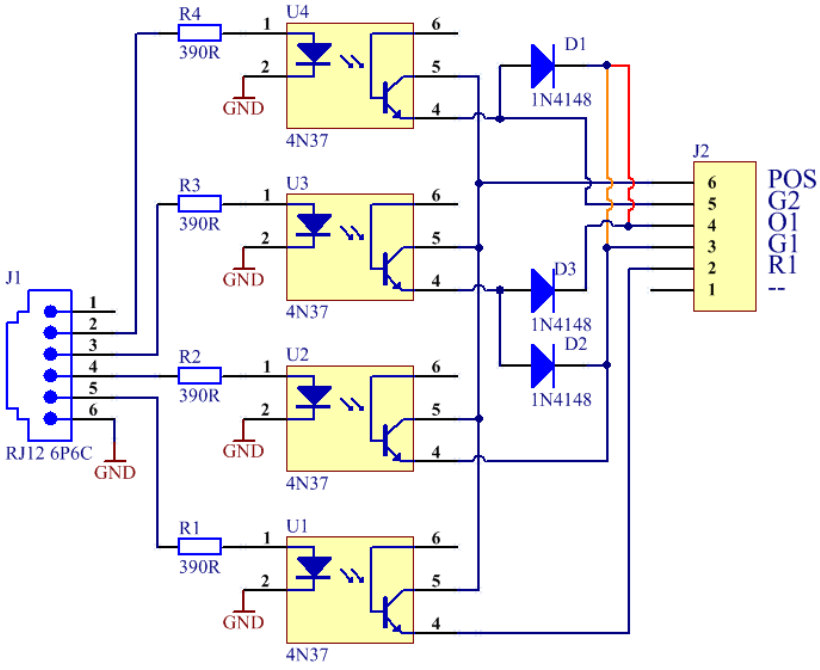












Hans Deloof
info@locohdl.be
https://www.locohdl.be