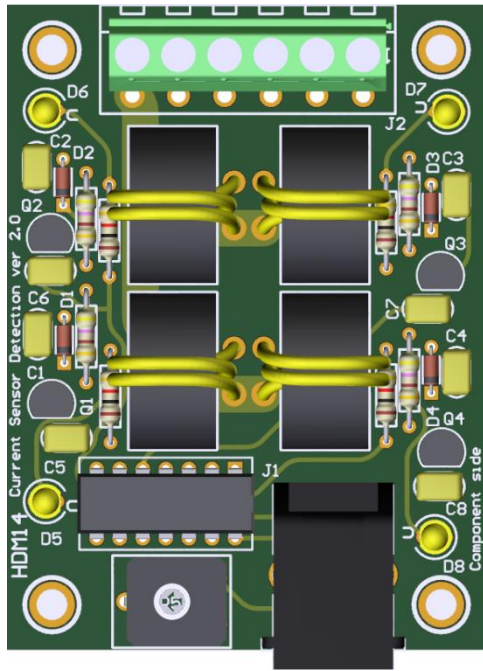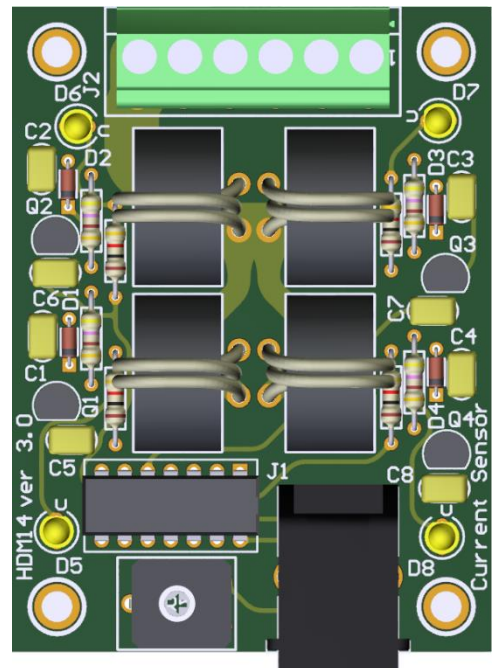# LocoCD
for Digital layouts

HDM14C Version 2.0 for scale Z, N, TT and HO

HDM14E Version 3.0 for scale O, I and G

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!

Current sensor module

In a digital layout are current sensors the best way to detected trains in a section. Even if trains are standing still there is always a decoder or lamp or LED that consume some current that is been possible to detect.
Sections can been made by electric isolated rails each digital powered thru his own current detector.
This is a simple and good working current detection for digital trains. It can be connected to LocoIO, LocoServo, LocoBooster.
The current sensor Transformer has no voltage loss on the digital signal and can detect better low currents.
Select HDM14 module in LocoHDL as "Block detection Active Low" and with "block Detection delay" for the best effect.
Do not use HDM14 along with HDM10 due to voltage difference on rails.

Bill of materials:

Resistor	470Ω (Yellow,Violet,Brown,Gold)	4	R1, R2, R3, R4	
Trim-potentiometer	47kΩ	1	R5	
Resistor	1kΩ (Brown,Black,Red,Gold)	4	R9, R10, R11, R12	**Version 2.0**
			R6, R7, R8, R9	**Version 3.0**
Capacitor	330pF (331)	4	C1, C2, C3, C4	
Capacitor	470nF (474)	4	C5, C6, C7, C8	
Diode	1N4148	4	D1, D2, D3, D4	
LED Ø3mm	Gelb	4	D5, D6, D7, D8	
Transistor	BC547C	4	T1, T2, T3, T4	
Strom Sensor Transformer	AS101	4	L1, L2, L3, L4	
Quad differential Comparator	LM339N	1	U1	
6-Pinne Connector	RJ12	1	J1	
6 pins connector	6A for **Version 2.0**	1	J2	
	18A for **Version 3.0**			

        Pin 1 = normal not used
        Pin 2 = rail section 4
        Pin 3 = rail section 3
        Pin 4 = rail section 2
        Pin 5 = rail section 1
        Pin 6 = digital power
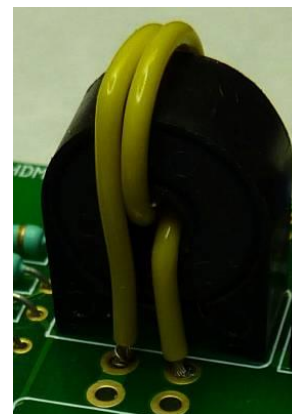
HDM14C Version 2.0
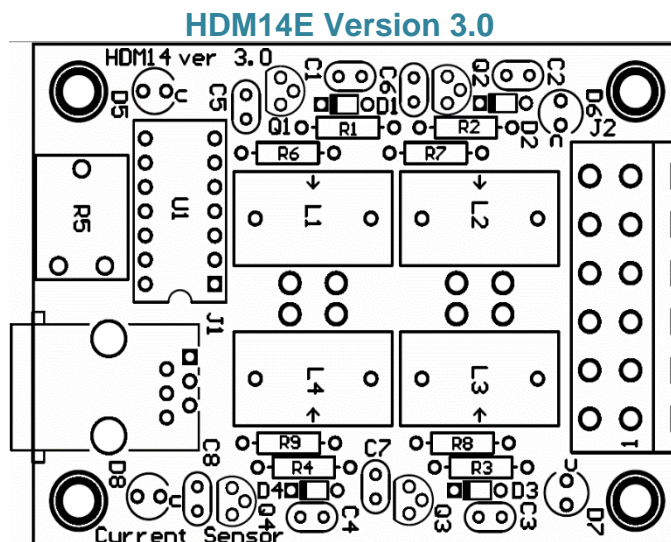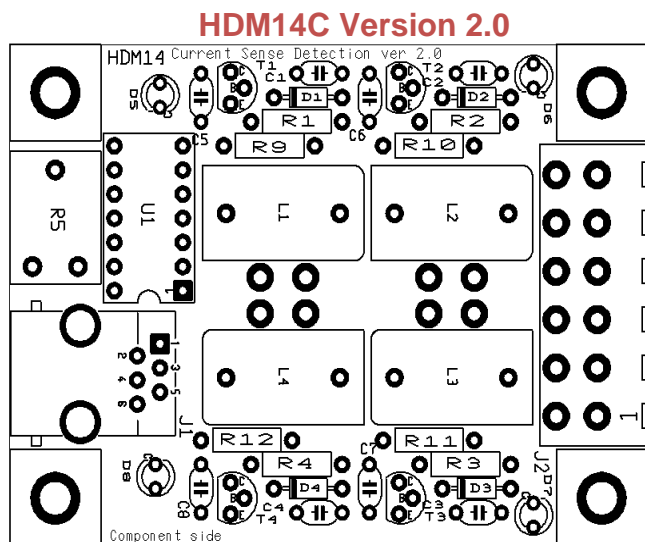
HDM14E Version 3.0

HDM14C Version 2.0 for scale Z, N, TT and HO
HDM14E Version 3.0 for scale O, I and G

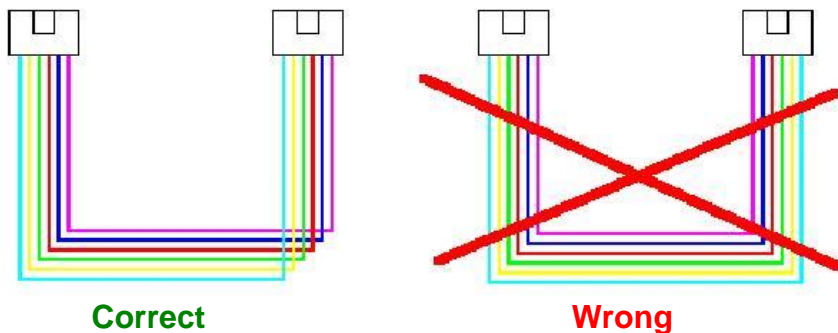HDM14C -> 12cm - 0,5mm²   HDM14E -> 12cm - 0,75mm²

Current sensor connections:

- Connection between current sensor and LocoIO
        The length of the cables can be maximum 200 cm.


Correct   **Wrong**

- The length of the cable between current sensor and rails preferably as short as possible, recommended maximum 100 cm.
        The wire **>= 0,25mm²** for HDM14C version 2.0
        The wire **>= 0,75mm²** for HDM14E version 3.0

- Per rail section is maximum power consumption:
        3A for HDM14C version 2.0
        10A for HDM14E version 3.0

- The sum of Digital power consumption is maximum:
        6A for HDM14C version 2.0
        18A for HDM14E version 3.0

Adjusting Trim potentiometer R5:
- Put nothing on the track connected to the current sensor.
- Open LocoHDL and double click on the LocoIO in the Address List connected with the current sensor.
- Wait until the module is completely read. Make sure "Block Off Delay" is disabled (unchecked).
- Turn first R5 slowly clockwise until the port indicated busy.
- Then turn R5 slowly counter clockwise until the port indicated empty and remains.
- Now the current detector is adjusted.

- Potentiometer
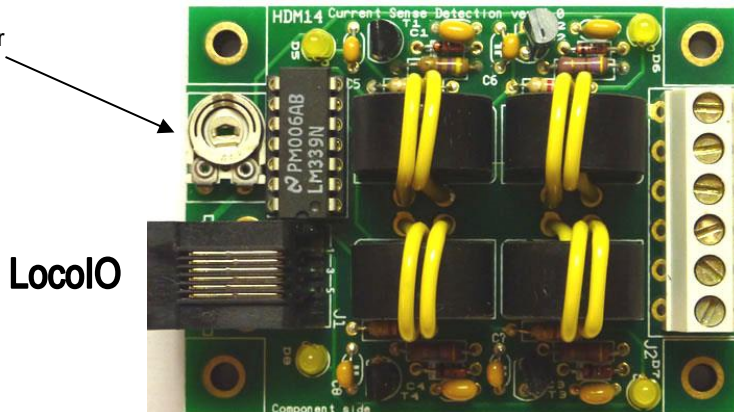
Pin 6: Digital Power
Pin 5: Rail section 1
Pin 4: Rail section 2
Pin 3: Rail section 3
Pin 2: Rail section 4
Pin 1: Not used