



HDM09

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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!

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LocoBuffer 3.1

LocoBuffer is a hardware device that provides a hardware interface between a LocoNet and a RS232 serial port or USB virtual serial port. Takes LocoNet commands in and buffers it and sends it out the serial port at 16457 baud in MS100 compatible mode, 19200 or 57600 baud in LocoBuffer mode or to the USB. Takes serial port commands in at 16457, 19200 or 57600 baud or from USB and buffers it and sends it out on the LocoNet. It also does them both at the same time. The baud rate is jumper selectable for the RS232 interface and automatic for the USB. It provides all the timing necessary to interface both.

The data you get will be full packets. The binary data will be packets that are 2,4,6 or multi byte in length. They will contain the data as documented in the *Digitrax LocoNet Personal Edition 1.0.*

To connect LocoBuffer to a computer you need a straight thru DB9 serial cable and can be purchased in any computer store or electronic store. You also need a cable to connect the LocoBuffer to the LocoNet. This cable will have 6 wires and RJ12 connectors on both ends.

Because of the used windows driver can only be 1 LocoBuffer connected on a PC.

You may connect multiple PC's with a LocoBuffer on LocoNet.

LocoNet connection:

The connection to LocoNet 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.



RS232 Connection



USB-A to USB-B Connection



Bill of materials:

UT_DEVICE	Refdes		USB		RS232
PCB		1	HDM09V31	1	HDM09V31
IC socket	For U1	1	28 pins	1	28 pins
IC socket	For U5	1	28 pins	0	X
Resistor	R1,R8	2	1kΩ (Brown,Black,Red,Gold)	2	1kΩ (Brown,Black,Red,Gold)
Resistor	R16	1	1kΩ (Brown,Black,Red,Gold)	0	Х
Resistor	R2	1	220kΩ (Red,Red,Yellow,Gold)	1	220kΩ (Red,Red,Yellow,Gold)
Resistor	R3	1	22kΩ (Red,Red,Orange,Gold)	1	22kΩ (Red,Red,Orange,Gold)
	R4,R10,R11,	7		7	
Resistor	R12,R13,R15,R19		10kΩ (Brown,Black,Orange,Gold)		10kΩ (Brown,Black,Orange,Gold)
Resistor	R5	1	47kΩ (Yellow,Violet,Orange,Gold)	1	47kΩ (Yellow,Violet,Orange,Gold)
Resistor	R6	1	150kΩ (Brown,Green,Yellow,Gold)	1	150kΩ (Brown,Green,Yellow,Gold)
Resistor	R7	1	4k7Ω (Yellow, Violet, Red, Gold)	1	4k7Ω (Yellow, Violet, Red, Gold)
Resistor	R9	1	47Ω (Yellow,Violet,Black,Gold)	1	47Ω (Yellow,Violet,Black,Gold)
Resistor	R14,R22	2	10kΩ (Brown,Black,Orange,Gold)	0	X
Elco	C1	1	100µF/25V	1	100µF/25V
Capacitor	C2,C8,C12,C13	4	100nF (104)	4	100nF (104)
Capacitor	C7,C9,C11	3	100nF (104)	0	X
Capacitor	C3,C4	2	15pF (15)	2	15pF (15)
Capacitor	C5,C6	2	15pF (15)	0	X
Capacitor	C10	1	470nF (474)	0	X
Diode	D3	1	1N4001 or 1N4002	1	1N4001 or 1N4002
LED 3mm	D1	1	Green	1	Green
LED 3mm	D4	1	Green	0	X
LED 3mm	D2	1	Red	1	Red
Transistor	Q1	1	BC337-40	1	BC337-40
Transistor	Q2,Q3	2	BC547B	2	BC547B
Power IC	U4	1	7805	1	7805
Comparator IC	U3	1	LM311N	1	LM311N
XTAL	X1	1	Quartz 20MHz	1	Quartz 20MHz
XTAL	X2	1	Quartz 20MHz	0	X
Jumper	JP1,JP6	2	2 pins	2	2 pins
Jumper	JP3	0	X	1	2 pins
Jumper	JP2	1	3 pins	1	3 pins
Connector	J1,J2	2	RJ12	2	RJ12
Connector	J3	1	4 pins print connector	1	4 pins print connector
Connector	J4	0	X	1	9 pin sub-d female
Connector	J5	1	USB type B	0	X
Connector	J6	1	DC-power connector	1	DC-power connector
RS232 interface	U2	0	Х	1	MAX233CPP or SP233ACP or ADM233LJN
PIC processor	U1	1	LB164	1	LB164
PIC processor	U5	1	USB001	0	Х
Spacer		4	Nylon 6.6, 5x5mm	4	Nylon 6.6, 5x5mm



Green LED's:

On Power supply voltage OK Off No power supply present

Red LED:

OnNo central station connected or current source on LocoBuffer with JP6 selected.OffLocoNet OK, no activityBlinkingLocoNet command transfer

Jumper settings:

- JP1: OFF 19200 baud for RS232
 - ON 57600 baud for RS232 and USB
- JP2: 1-2 5V power for the module with external power supply 2-3 5V power for the module from the USB connection A USB 1.0 and some USB connections of Laptops do not give enough power.
- JP3: OFF LocoBuffer mode with JP1 selectable serial speed ON MS100 compatible mode
- JP6: OFF LocoNet current source disabled
 - ON LocoNet current source enabled

This is current source for LocoNet to install if you do not have a master LocoNet control station as an LocoCentral, Intellibox, Digitrax... There is only one current source needed for a LocoNet line. If you install the components, you can enable-disable it with JP6. However, for this option you need to put power on the Power connector.

Power connector possibilities:

- Via J3: Pin 2: 12VDC input/output Pin 4: GND input/output
- Via J6: Center pin: 12VDC input Casing: GND input

Remark:

- Put the PIC on an IC socket, then you can later install an update PIC.

- If your XTAL component is in metal, look that there is no contact between the metal surface of the XTAL and the solder holes.

- With a DC power supply is the GND the same as an Intellibox or LocoBooster.

USB Interface



Serial interface RS232



Computer settings with RS232:

57600 💉
8
None
1
Hardware 🗸 🗸
vanced Restore Default

For good functioning of the LocoBuffer the "Flow control" must stand on "hardware" for the RS232 version.

Computer settings with USB for Windows 2000, XP, Vista:

Install first LocoHDL configuration programme version 3.6.1 of higher on your PC.

Connect the LocoBuffer to the computer with a USB cable, put then power on the module. The next picture appears on the screen:



Click on "Next"

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 Found New Hardware Wizard searches...

 Please wait while the wizard searches...

 Image: CDC RS-232 Emulation LocoHDL

 Image: CDC RS-232 Emulation LocoHDL
 </t

Wait



Click on "Finish"

The USB driver for LocoBuffer is now installed.

To know which virtual serial port has been linked with the LocoBuffer, you do the following: Open the Control Panel from the Start menu.



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Fill in as on above screen and click on "Next"

System Restore		Autom	Remote			
General	Cor	Computer Name Hardware		Advanced		
Device N	lanager					
X	The Device on your con properties o	e Manager lists al nputer. Use the E If any device.	the hardware devic Vevice Manager to c	es installed hange the		
			Device M	anager		
Drivers						
	Driver Signing lets you make sure that installed drivers are compatible with Windows. Windows Update lets you set up how Windows connects to Windows Update for drivers.					
	compatible how Windo	ng lets you make with Windows, W ws connects to \	sure that installed d /indows Update lets Vindows Update for	lrivers are you set up drivers.		
E	Driver Signi compatible how Windo	ing lets you make with Windows. W ws connects to V er Signing	vure that installed d /indows Update lets /indows Update for Windows 1	lrivers are you set up drivers. Update		
Hardwar	Driver Signi compatible how Windo Drive e Profiles	ing lets you make with Windows. W ws connects to V er Signing	sure that installed d /indows Update lets Windows Update for Windows	irivers are you set up drivers. Update		
Hardwar	Driver Signi compatible how Windo Driv e Profiles Hardware p different ha	ing lets you make with Windows. W ws connects to V er Signing rofiles provide a rdware configura	sure that installed d /indows Update for Windows Update for Windows I way for you to set up tions.	trivers are you set up drivers. Update		

Click on "Device Manager" in Hardware tab page



Look at the "Properties" of the different Communication Ports

General	Port Settings D	river Details				
Į	Communications Port (CDM4)					
	Device type:	Ports (COM & LPT)				
	Manufacturer:	Microchip Technology, Inc.				
	Location:	Location 0 (CDC RS-232 Emulation LocoHDL)				
Devid	ce status					
This	device is working p	properly.				
This If yo start	device is working proble u are having proble the troubleshooter.	properly.				
This If yo start	device is working proble u are having proble the troubleshooter.	properly. ems with this device, click Troubleshoot to Troubleshoot				
This If yo start	device is working p u are having proble the troubleshooter. usage:	properly. ems with this device, click Troubleshoot to Troubleshoot				

In this example is the LocoBuffer on Com4.

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Computer setting with USB for Windows 7 and Windows 8:



Click on "Device Manager"

Here you see the application "CDC RS232 Emulation LocoHDL"

Double click on the announcement



V pdate Driver Software - CDC RS-232 Emulation LocoHDL How do you want to search for driver software? Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings. Browse my computer for driver software Locate and install driver software manually. Cancel



Click on "Update Driver"

Click on "Browse my computer for driver software"

Fill in above location "C:\Program Files\LocoHDL",



To view details about the driver files.

back to the previously installed driver.

Disables the selected device. To uninstall the driver (Advanced).

To update the driver software for this device. If the device fails after updating the driver, roll

Close

Cancel

Install

Don't Install

Click on "Install"

This window appears after the installation.

Now you see that the device driver is loaded.

Driver Details

Update Driver...

Roll Back Driver

Disable

Uninstall

Windows Security

Inc.".

Would you like to install this device software?

Publisher: Microchip Technology Inc.

Always trust software from "Microchip Technology

Name: Microchip Technology, Inc. Ports (COM & ...



And then to see you that COM port has been produced which you can select in LocoHDL.

Computer setting with USB for Windows 10:

Install first LocoHDL configuration programme version 3.9.6 of higher on your PC. Connect the LocoBuffer to the computer with a USB cable, put then power on the module.

iTrain setup:

Interface	S LocoNet®
Description	LocoNet®
Control type	✔ Vehicles ✔ Accessories ✔ Feedbacks
General	erial Network Specific Image Comment
<u>P</u> ort	C COM1 C Refresh
<u>B</u> audrate	19200 Baud
<u>D</u> atabits	8 bits 💌
<u>S</u> topbits	1 bit
P <u>a</u> rity	None T
FlowControl	No flow control
1 : LocoNet®	•