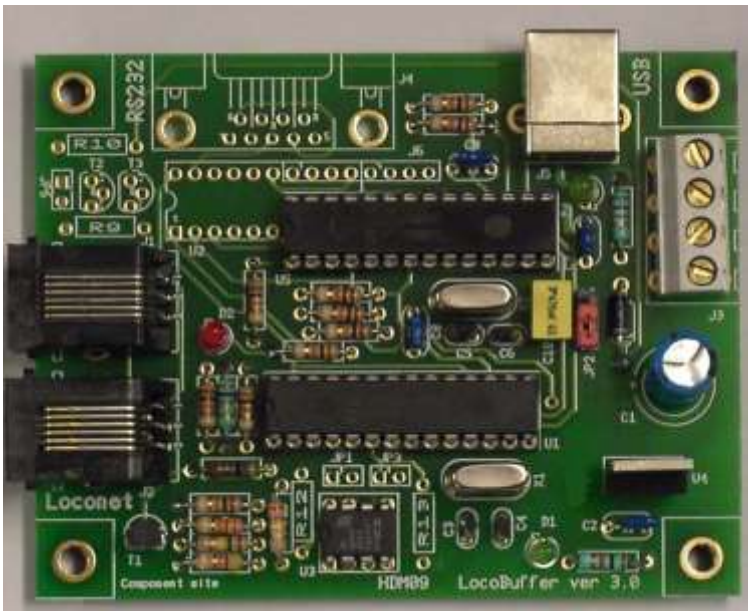
# Locobuffer Manual




## HDM09

**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!

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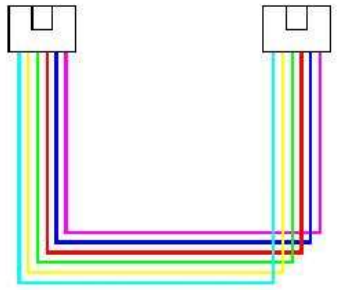
Version 19/03/2014

# ***Locobuffer 3.0***

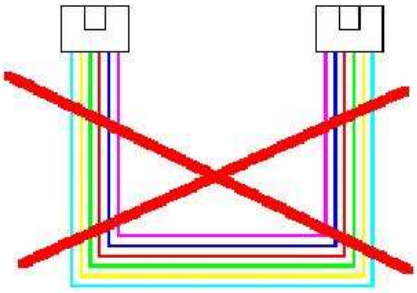
LocoBuffer is a hardware device that provides a hardware interface between a Loconet and a RS232 serial port or USB virtual serial port. Takes Loconet commands in and buffers it and sends it out the serial port at 16457 baud in MS100 compatible mode, 19200 or 57600 baud in Locobuffer mode or to the USB. 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 selectablefor 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.



**Correct**



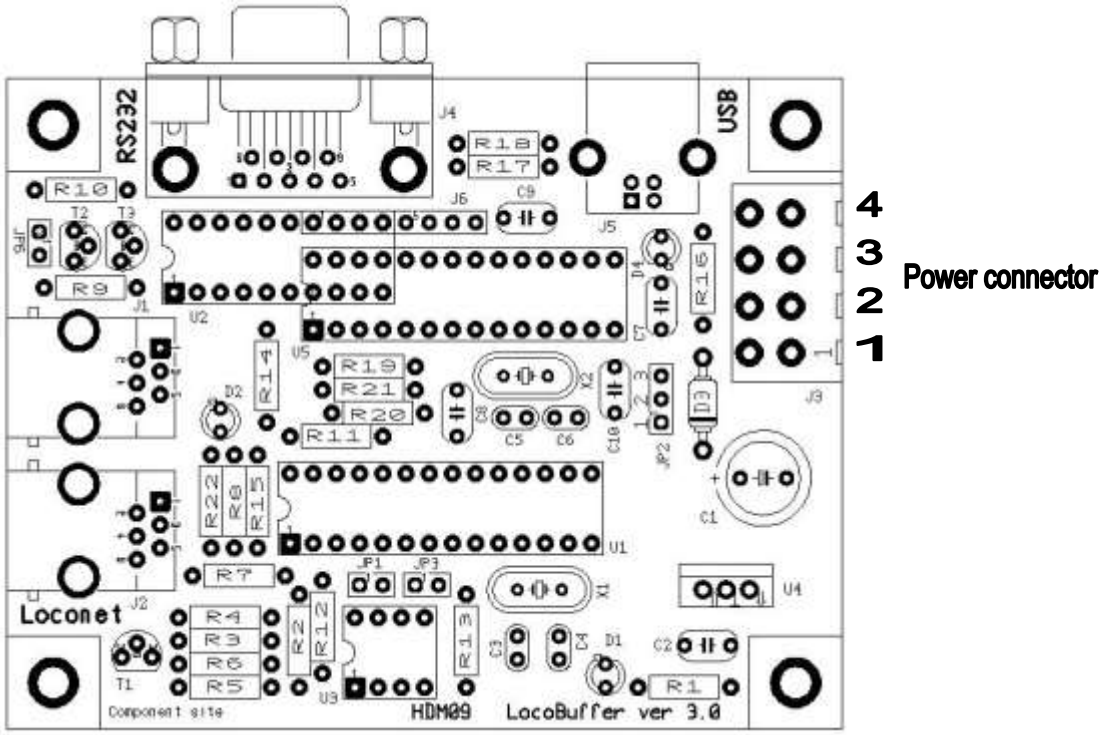
**Wrong**

## RS232 verbinding

## USB verbinding

## Bill of materials:

| UT_DEVICE | Refdes | USB | RS232 |
|---|---|---|---|
| Resistor | R1,R8 | 1kΩ | 1kΩ |
| Resistor | R16 | 1kΩ | X |
| Resistor | R2 | 220kΩ | 220kΩ |
| Resistor | R3 | 22kΩ | 22kΩ |
| Resistor | R4,R11,R15,R19 | 10kΩ | 10kΩ |
| Resistor | R12,R13 | X | 10kΩ |
| Resistor | R5 | 47kΩ | 47kΩ |
| Resistor | R6 | 150kΩ | 150kΩ |
| Resistor | R7 | 4k7Ω | 4k7Ω |
| Resistor | R14,R17,R18,R20,R21,R22 | 10kΩ | X |
| Elco | C1 | 100µF/25V | 100µF/25V |
| Capacitor | C2,C8 | 100nF | 100nF |
| Capacitor | C3,C4 | 15pF | 15pF |
| Capacitor | C5,C6 | 15pF | X |
| Capacitor | C7,C9 | 100nF | X |
| Capacitor | C10 | 470nF | X |
| Diode | D3 | 1N4001 | 1N4001 |
| LED 3mm | D1 | Green | Green |
| LED 3mm | D4 | Green | X |
| LED 3mm | D2 | Red | Red |
| Transistor | T1 | BC337-40 | BC337-40 |
| Power IC | U4 | 7805 | 7805 |
| Comparator IC | U3 | LM311N | LM311N |
| PIC processor | U1 | LB164 (PIC16F883-I/SP) | LB164 (PIC16F883-I/SP) Or LB163 (PIC16F873A-I/SP) |
| PIC processor | U5 | USB001 (PIC18F2455-I/SP) | X |
| RS232 interface | U2 | X | MAX233CPP or SP233ACP or ADM233LJN |
| XTAL | X1 | Quartz 20MHz | Quartz 20MHz |
| XTAL | X2 | Quartz 20MHz | X |
| Jumper | JP1,JP3 | X | 2 pins |
| Jumper | JP2 | 3 pins | 3 pins |
| Connector | J1,J2 | RJ12 | RJ12 |
| Connector | J3 | 4 pins print connector | 4 pins print connector |
| Connector | J4 | X | 9 pin sub-d female |
| Connector | J5 | USB type B | X |
| | | | |
| | | **Option** | **Option** |
| Resistor | R9 | 47Ω | 47Ω |
| Resistor | R10 | 10kΩ | 10kΩ |
| Transistor | T2,T3 | BC547B | BC547B |
| Jumper | JP6 | 2 pins | 2 pins |




## Option:

R9, R10, T2, T3 and JP6 (J3, D1, C1)
This is current source for Loconet to install if you not have a master Loconet control station as an 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.

## Red LED:

| | |
|---|---|
| On | No central station connected or current source on Locobuffer with JP6 selected. |
| Off | Loconet OK, no activity |
| Blinking | Loconet command transfer |

## Jumper settings:

| | | |
|---|---|---|
| JP1: | OFF | 19200 baud with RS232 connection |
| | ON | 57600 baud with RS232 connection |
| JP2: | 1-2 | 5V power for the module with external power supply |
| | 2-3 | 5V power for the module from the USB connection<br>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 |

## Power connector possibilities:

| **Input:** | **Output:** |
|---|---|
| Pin 2: 12V-15V DC input | Pin 1: 5V output |
| Pin 4: GND input | Pin 4: GND output |

## Remark:

- Put the PIC on an IC socket, then you can program the PIC later in a programmer with update software.
- 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.

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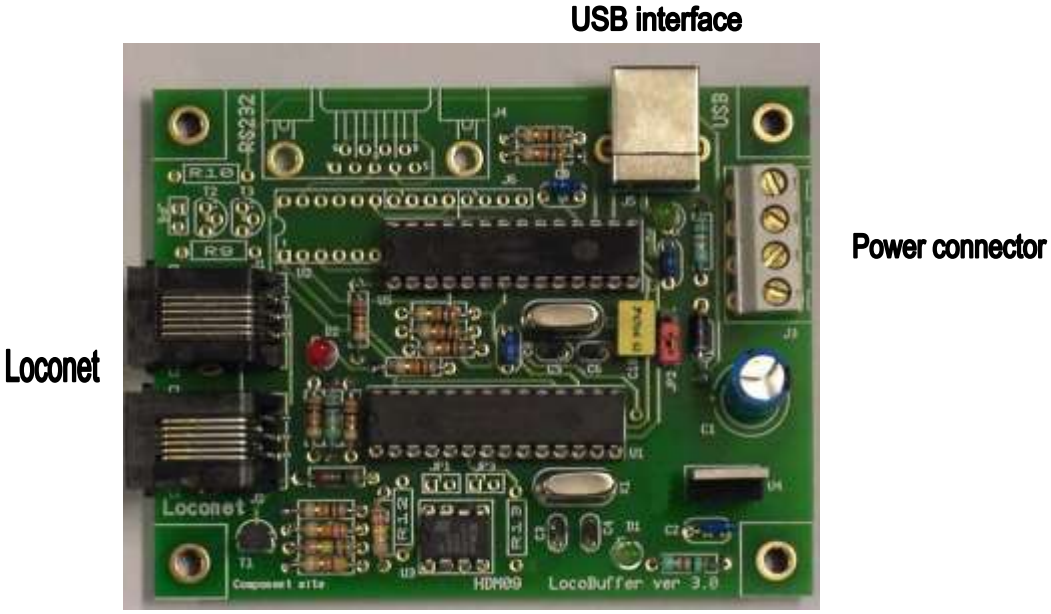
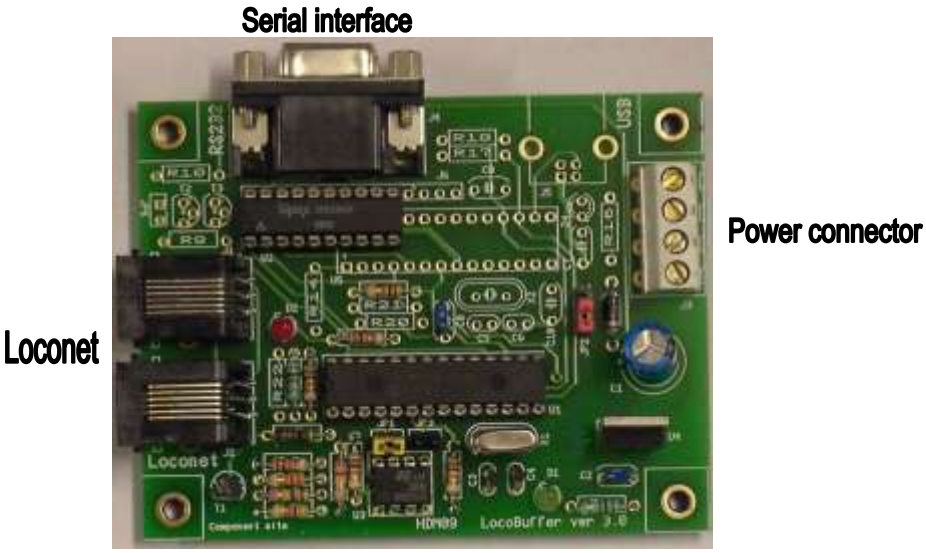
USB Interface



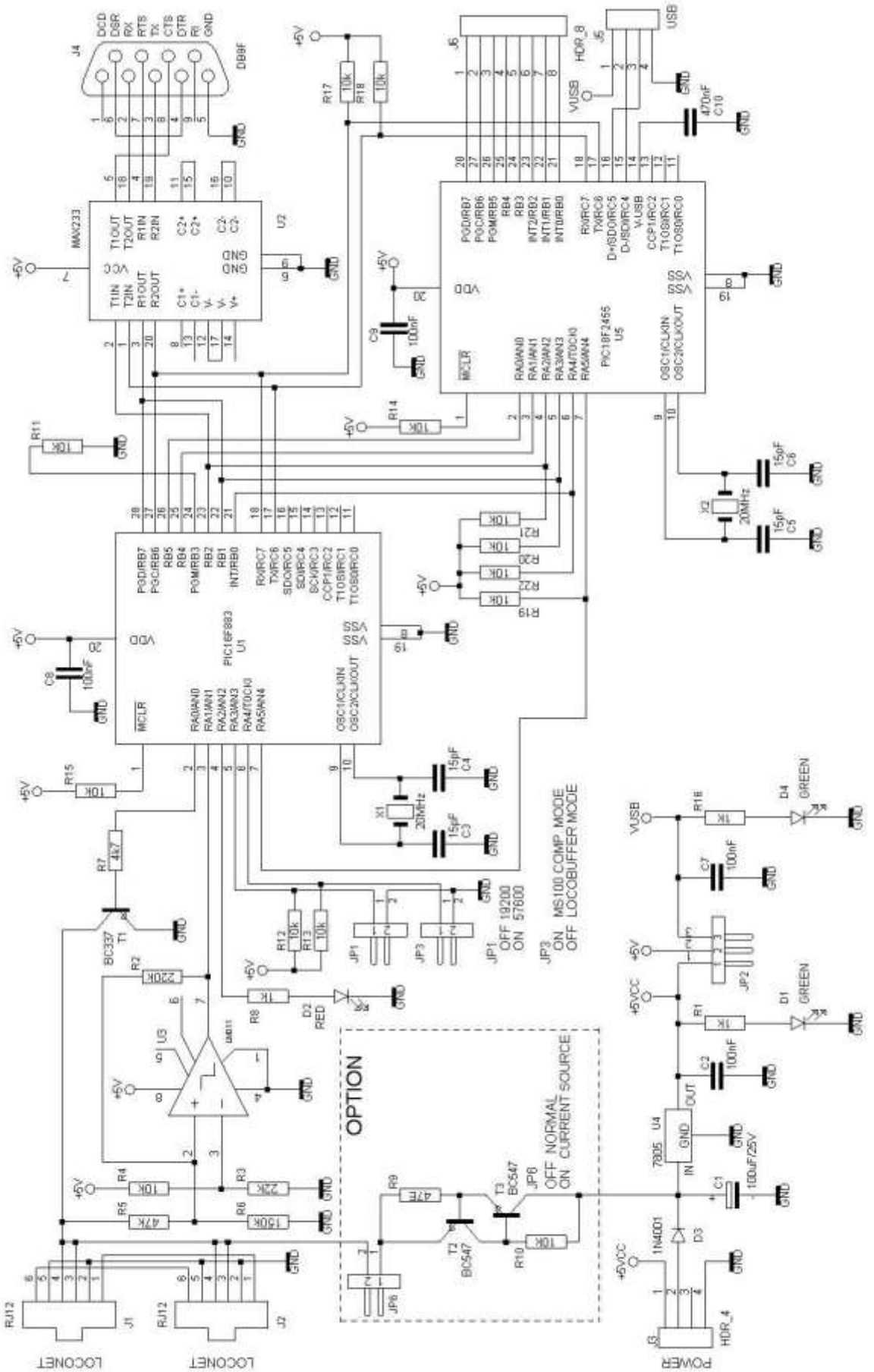

Serial interface RS232




## Railroad & Co

Some USB to serial adapter are not fully compliant to regular serial ports. Too use these with Locobuffer, it is possible that next option in RAILROAD.INI is necessary, if no connection can be made.

[Connections]
ComOption=0

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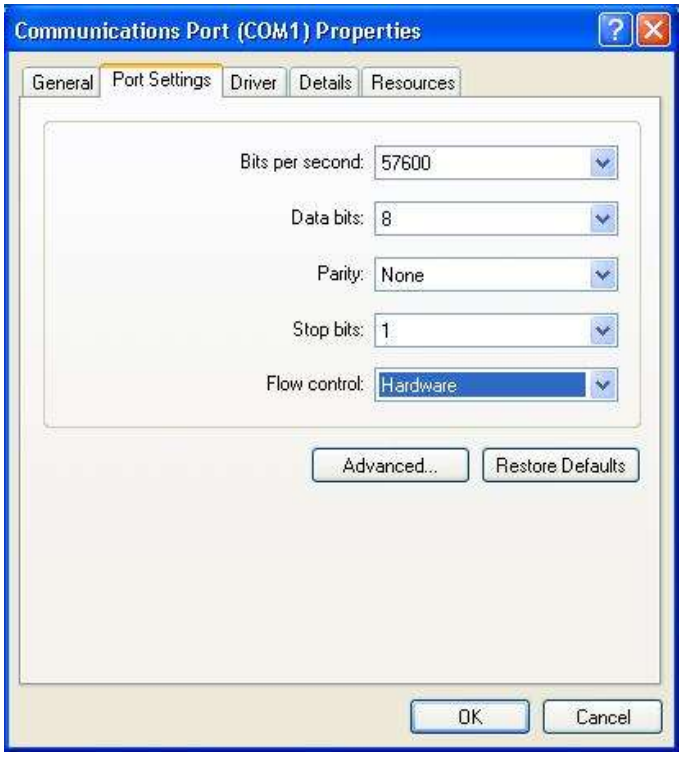
## Computer settings with RS232:




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

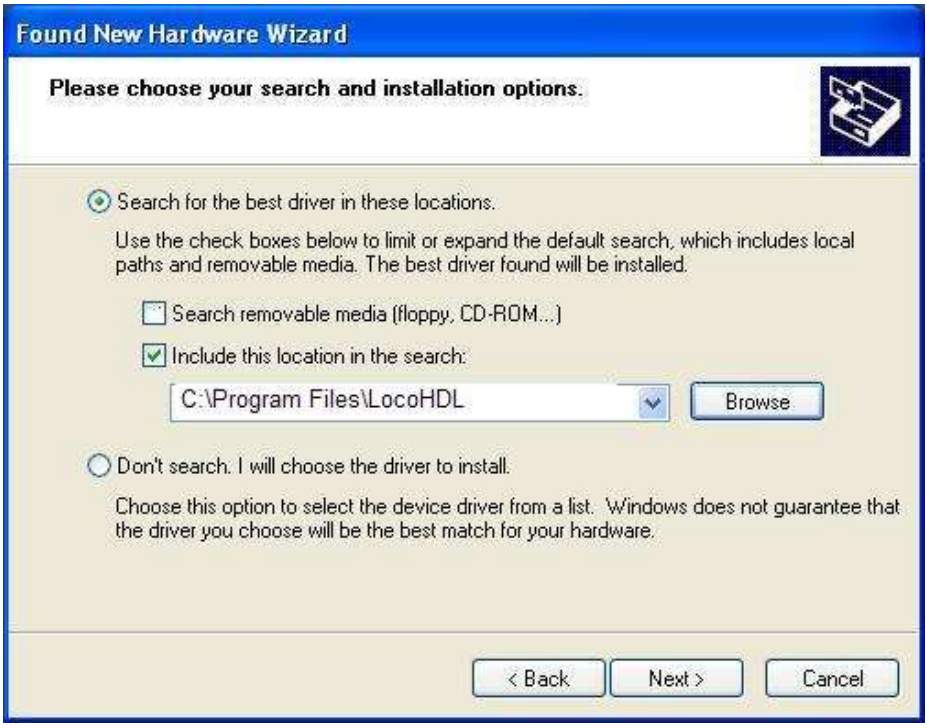
## Computer settings with USB for Windows 2000, XP or Vista:

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

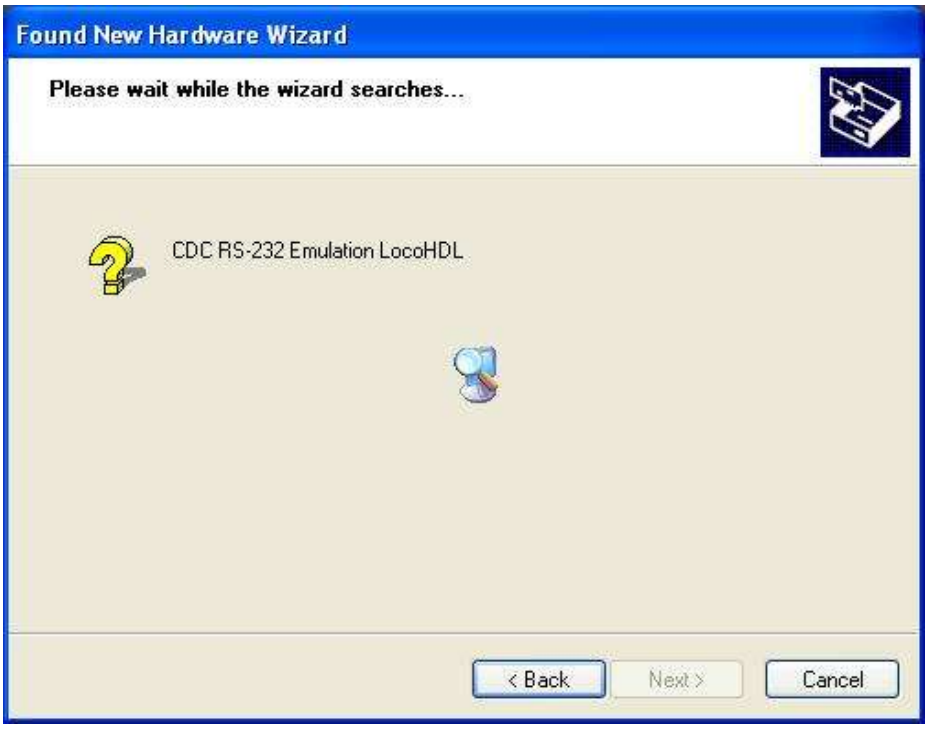
Connect the Locobuffer to the computer with a USB cable, put then power on the module.
The next picture appears on the screen:


Click on “Next”


Click on “Next”




Fill in as on above screen and click on “Next”



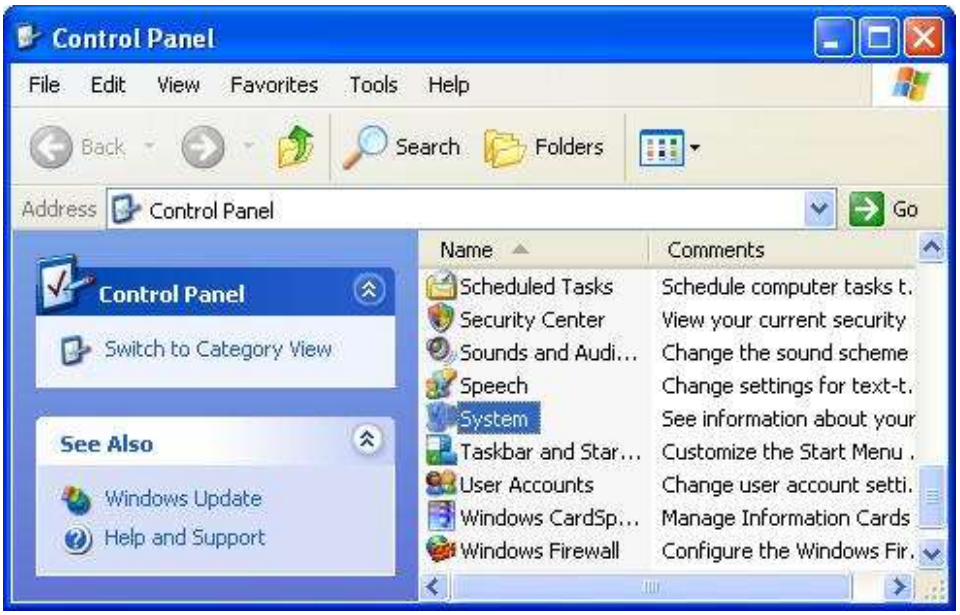

Wait


Click on “Finish”

The USB driver for Locobuffer is now installed.

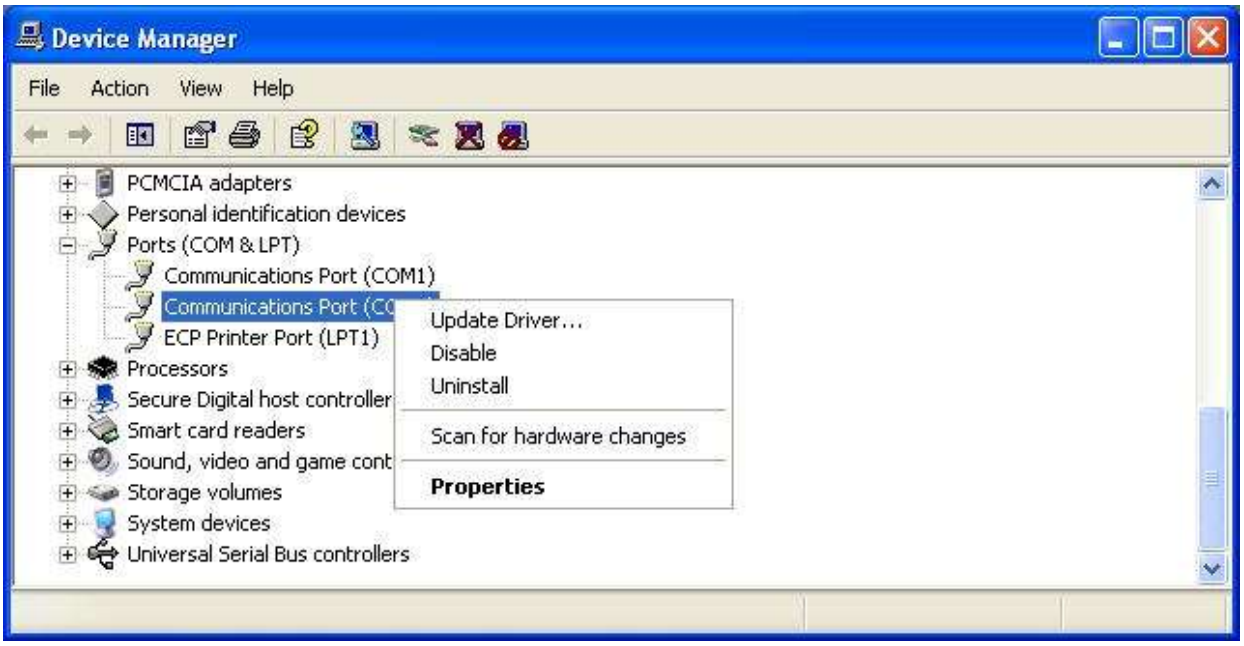
To know which virtual serial port has been linked with the Locobuffer, you do the following:

Open the Control Panel from the Start menu.




Double click on “System”


Click on “Device Manager” in Hardware tab page

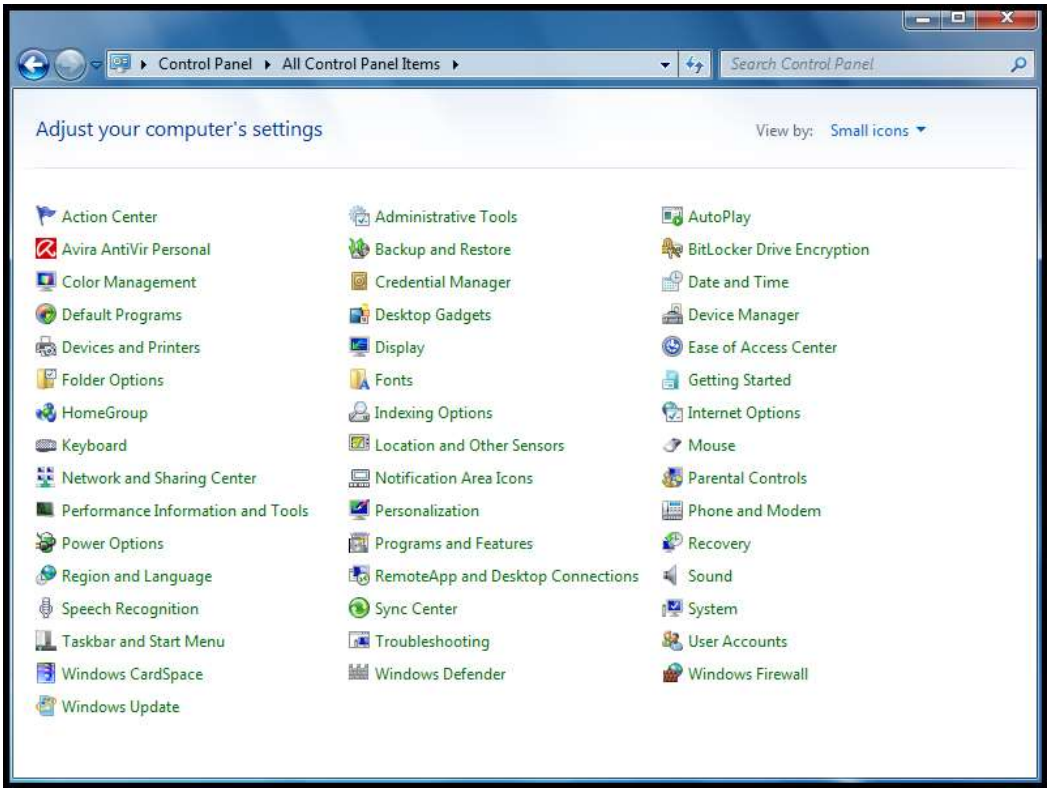



Look at the “Properties” of the different Communication Ports

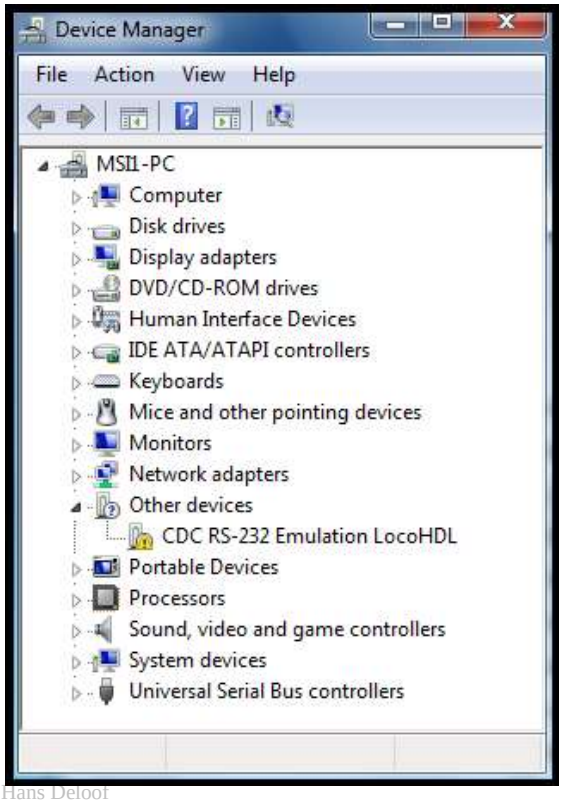

In this example is the Locobuffer on Com4.

## Computer setting with USB *for Windows7*:

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 PC communicates that no devices driver is found, but is as device present.
For installing the device driver, open the Control Panel

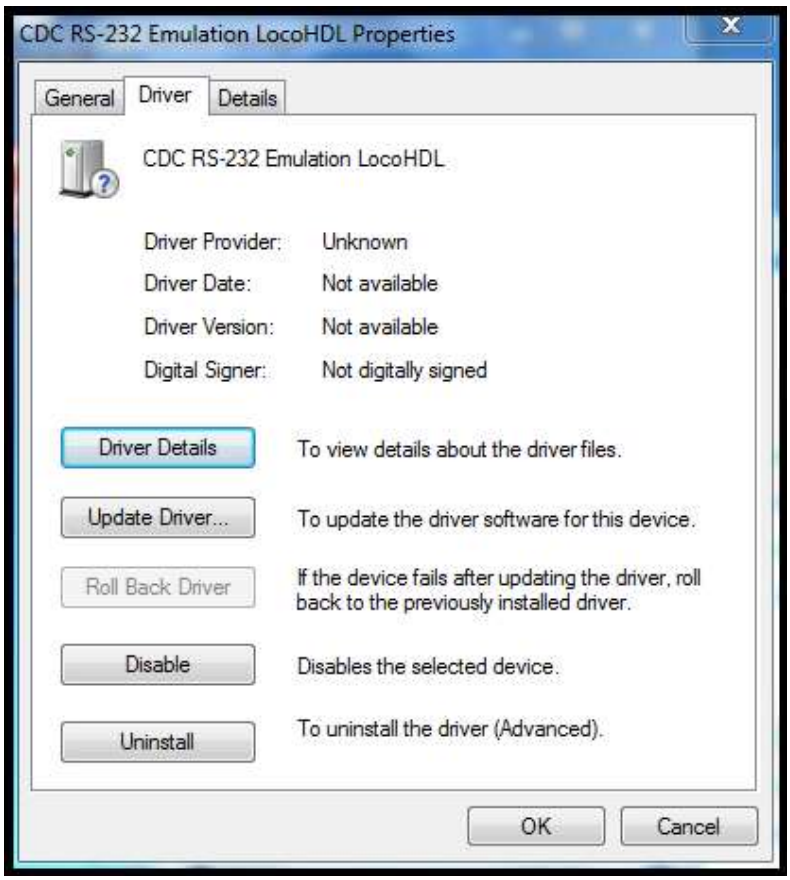



Click on “Device Manager”

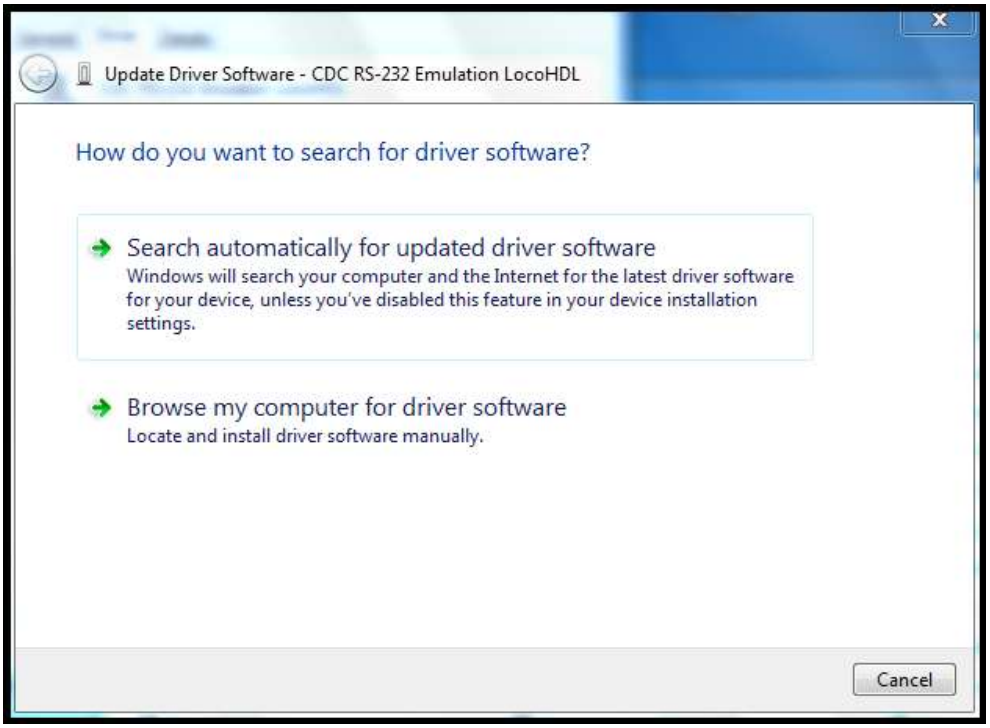



Here you see the application
“CDC RS232 Emulation LocoHDL”

Double click on the announcement




Click on “Update Driver”

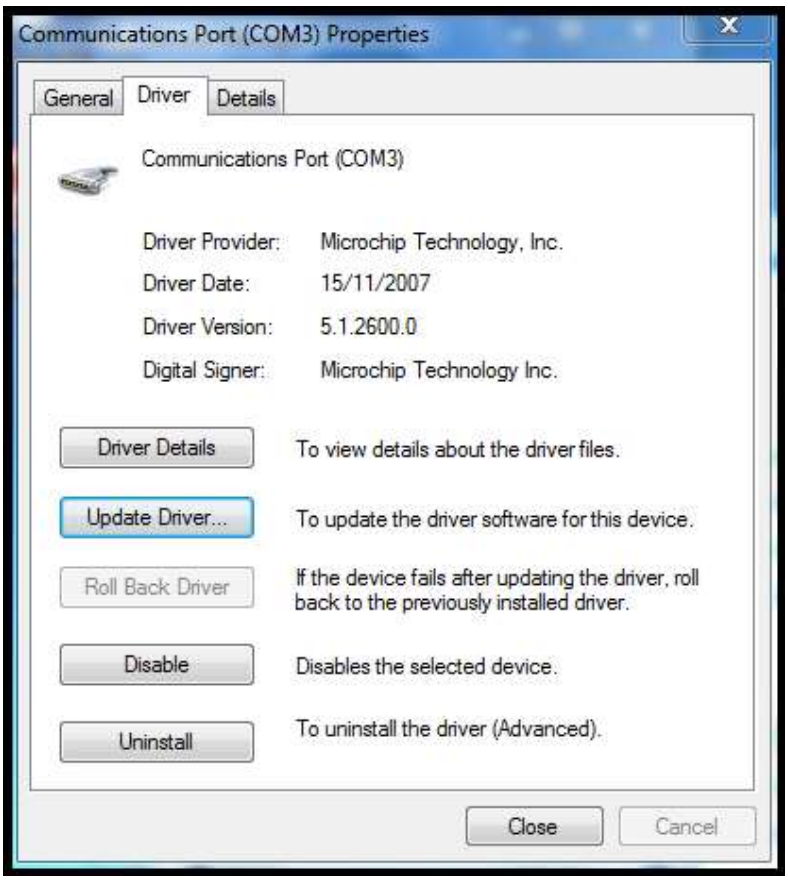



Click on “Browse my computer for driver software”

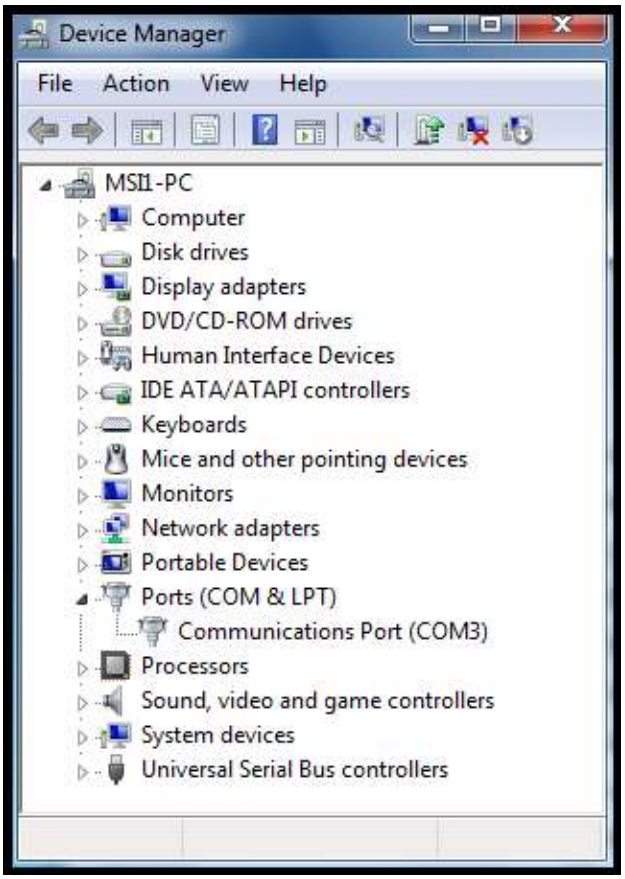

Fill in above location “C:\Program Files\LocoHDL”,


Click on “Install”


This window appears after the installation.




Now you see that the divice driver is loaded.




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