Vergo

Velotron Ergo Controller Utility

Vergo will allow connection, or a bridge, between a Metabolic cart and Velotron. It emulates a Lode™ ergometer protocol so the metabolic cart software thinks it is communicating with a Lode™ ergometer.

Standard System Requirements:

• One Windows based computer for the Velotron and Vergo software and one for the Metabolic Cart.**
• A Null Modem Cable
• A Velotron
• A Metabolic Cart or control software (i.e. Labview™) providing control commands for a Lode™ ergometer.

Operation:

Vergo is the physics control for the Velotron and must be running on the computer normally connected to the Velotron. A Null modem cable (I.e., Radio Shack part #'s 26-264 and 26-152) connects the Velotron computer to the Metabolic cart computer . This means the Velotron computer will require two serial ports. If there is no spare serial port on the Velotron computer for the null modem, you will need to install a USB to Serial adapter on the Velotron Computer to connect to the null modem, or to the Velotron. **An optional connection as described on page 3 would allow the use of only one computer.

Please Note: Velotron is supplied with and requires a special/specific USB to Serial adapter if one is needed (I.e., Belkin F5U103). The null modem cable connections can use a more generic USB to Serial adapter.

Setup:

1) Whether you use USB to Serial adapters or real serial ports, you will need to determine the port number Windows™ assigns to these device by looking in the "PORTS" section in Windows™ Device Manager. In Windows™ 9X-ME, you can access Device Manager by going to Start, Control Panel and then double-click the System icon. Then left-click the Device Manger tab. In Windows™ 2000-XP you can right-click on My Computer, left-click Properties, then click on the Hardware Tab and then the Device Manager button. The Ports section will be about 2/3 down the list. Click on the (+) to the left of Ports and the serial communication ports on this computer will be found there.

2) See the cable connection options on pages 3 and 4 and use these to establish the connection layout you plan to use. After the cable connections are made, it is very important to set the connection port from the controlling computer in the Options menu. This is the port on the PC running Vergo the null modem cable is being connected to. When communicating correctly to the metabolic software, this port will display in the left status bar window, as shown above.

3) Configure the metabolic control software to establish the port it is talking "out" from. Please refer to that software application documentation for outgoing communications settings. Vergo emulates a Lode™ ergometer, so be sure your software can communicate like a Lode™ as described on page 2.

Please Note: Whether on a single computer or a dual computer, the metabolic software will have an outgoing port assignment and the Vergo will have an incoming port assignment (as described in the previous steps). The null modem must be plugged into com ports as assigned within the two software applications for communications to work correctly.

4) With the Velotron plugged into the computer and turned on, Vergo will automatically detect it, so there is no setting in the Vergo program for the Velotron connection port. It will display, as shown in the illustration above, in the right-side status bar window.

5) After the port settings have been established you should run Vergo software first to establish the communication between the Velotron and the Vergo software.

6) Now launch the control program (Metabolic Cart or Labview™, etc.). Be sure it is setup to communicate to a Lode™ ergometer. Vergo will display within the gray window the control packets being transmitted. If this does not occur, recheck your connections and port settings and try again.

7) When everything is finally talking, you can implement the test protocol from the Control Software and the Vergo software will display the control packets and the actual control data.

8) When the test is completed, you can save the data as you would from your Control Software and exit Vergo. Vergo will retain the settings last used.

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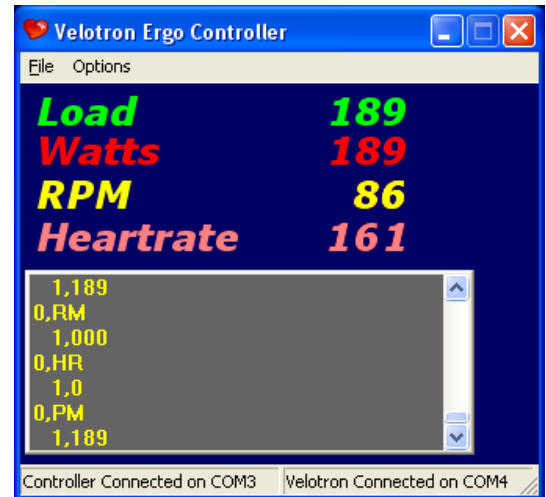
Communications Protocol

This program connects to a controller using RS-232 set to 9600 baud, no parity, 8 data bits, 1 stop bit. Vergo understands a subset of the Lode ergometer protocol as follows:

lode protocol:

<dev> <command> <cr>

   <number> <name> <ack> <nak> (06h or 15h)

Implemented commands:

   RS   request status
   SP   set power (W) or [kpm/m] (terminal mode only) (ack nak)
   PM   request actual load (W)
   RM   request actual pedal speed (rpm)
   HR   request heart rate (bpm)

Unimplemented commands:
   WK   request work done (J)
   RU   request upload all protocols
   RN   request protocol name (or nak)
   PT   request maximum load in protocol (or nak)
   AG   request age (or nak)
   WT   request weight (kg or lbs)   (or nak)
   VO   request estimated VO2 max (or nak)
   MT   request METS
   TE   request elapsed protocol time (s)
   TS   request elapsed stage ...
   TT   request 'TE, 'TS' (or nak)
   DA   request 'HR', 'VO', 'PM', 'RM', 'WK', 'MT' (or nak)
   VR   request version (or nak)
   RL   request Lfac devide answer by 1000
   SL   set Lfac eg, if 0.050 needed send 50
   CLFT   cursor left command (ack nak)
   NS   goto next stage (if possible) (exercise mode only) (ack nak)
   PS   goto previous stage (if possible) (exercise mode only) (ack nak)
   EP   escape protocol (exercise mode only) (ack nak)
   KLALL remove all protocols (menu mode only) (ack nak)
   RD   request download protocol (menu mode only) (ack nak)

Example Conversation

The following shows an example of a short conversation initiated by a Parvo™ metabolic cart followed by the response of the Vergo program. It is sending a watts ramp to the Velotron.

```
0,RS
  1,8
0,SP100
  <ACK>
0,PM
  1,100
0,RM
  1,088
0,HR
  1,135
0,PM
  1,100
0,RM
  1,088
```

Computer Connections - 1 computer

*Computer with **3 serial ports**.*
The addition of one or two serial RS-232 card(s) may be needed to comply with this requirement.

**Metabolic Program
And
Vergo Control Software
both running**

**Null Modem
Cable**

The following diagram is a the proposed means of connecting a **Velotron** to a metabolic cart using one computer. Each device and cable connection will require their own serial port.
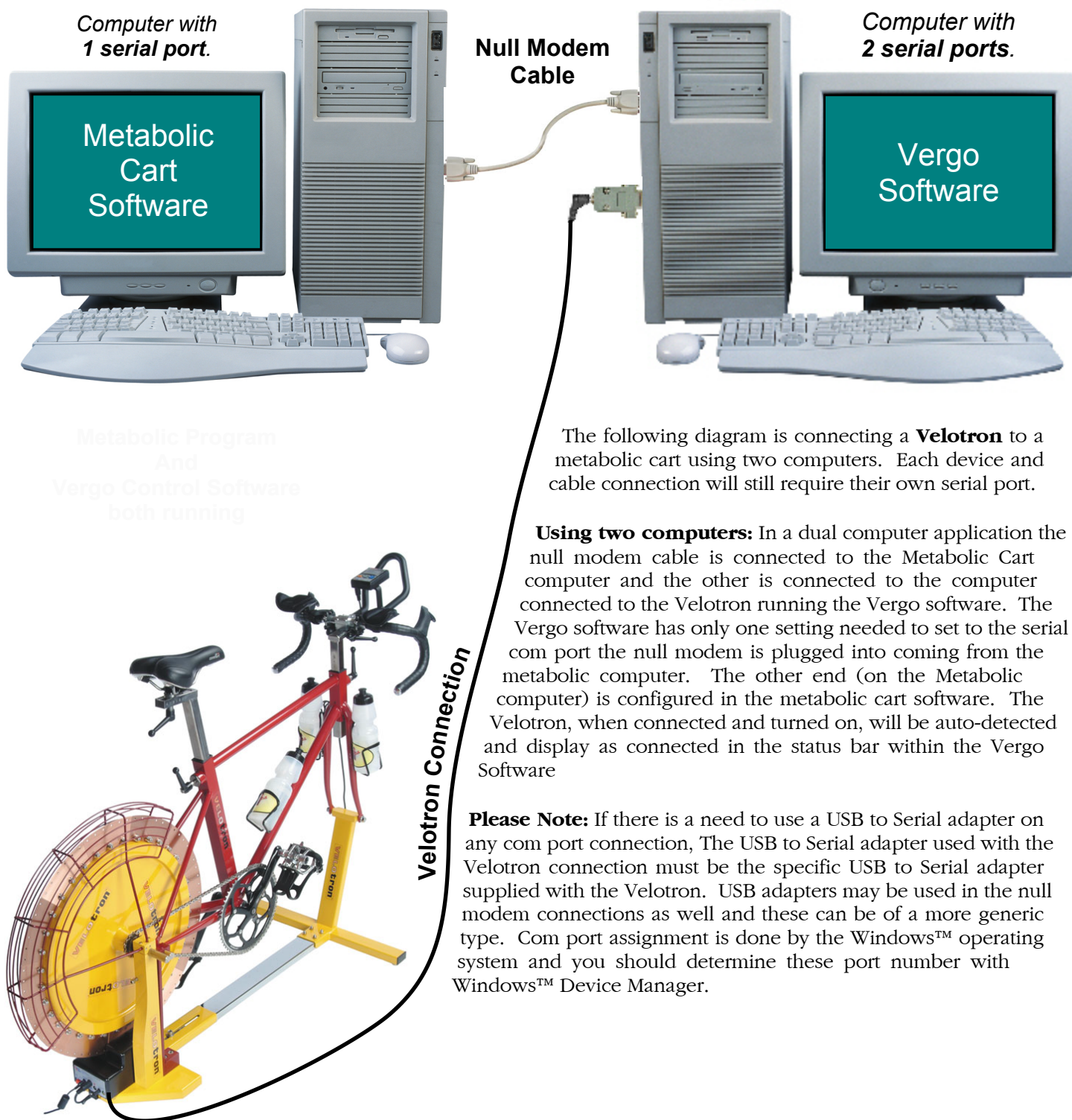
Using a single computer: In a single computer application the null modem cable is connected to the Metabolic Cart computer and the other is connected to the computer connected to the Velotron running the Vergo software. The Vergo software has only one setting needed to set to the serial com port the null modem is plugged into coming from the metabolic computer. The other end (on the Metabolic computer) is configured in the metabolic cart software. The Velotron, when connected and turned on, will be auto-detected and display as connected in the status bar within the Vergo Software

Please Note: If there is a need to use a USB to Serial adapter on any com port connection, The USB to Serial adapter used with the Velotron connection must be the specific USB to Serial adapter supplied with the Velotron. USB adapters may be used in the null modem connections as well and these can be of a more generic type. Com port assignment is done by the Windows™ operating system and you should determine these port number with Windows™ Device Manager.

Velotron Connection

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Computer Connections - two computers

Computer with **1 serial port**.

Null Modem Cable

Computer with **2 serial ports**.

Metabolic Cart Software

Vergo Software

Metabolic Program And Vergo Control Software both running

Velotron Connection

The following diagram is connecting a **Velotron** to a metabolic cart using two computers. Each device and cable connection will still require their own serial port.

Using two computers: In a dual computer application the null modem cable is connected to the Metabolic Cart computer and the other is connected to the computer connected to the Velotron running the Vergo software. The Vergo software has only one setting needed to set to the serial com port the null modem is plugged into coming from the metabolic computer. The other end (on the Metabolic computer) is configured in the metabolic cart software. The Velotron, when connected and turned on, will be auto-detected and display as connected in the status bar within the Vergo Software

Please Note: If there is a need to use a USB to Serial adapter on any com port connection, The USB to Serial adapter used with the Velotron connection must be the specific USB to Serial adapter supplied with the Velotron. USB adapters may be used in the null modem connections as well and these can be of a more generic type. Com port assignment is done by the Windows™ operating system and you should determine these port number with Windows™ Device Manager.

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