VAIF-1 (Revision 0.9)
VeloAce interface for RS232 connection

How it works
The RTS line is activated (*space* level) by software and shorted by the sensor to RXD. This way, the UART detects at least a start bit (RXD goes from *mark* to *space*). We do not care about the further reception since all we wanted has already been detected. The UART now samples the data byte and finally the stop bit. So we get either a valid byte (stop bit sampled *mark*) or a framing error (stop bit sampled *space*).

Connection for handhelds with 10pin original connector
This applies to Palm **IIIx**, **IIIe**, **IIIxe**, **IIIc**, **V**, **Vx**, **m100**, **m105**.
It is recommended to use a standard *HotSync* or *modem* cable for interfacing the handheld connector. Pin numbers are counted from **right** to **left** when looking at the connector from the **back** side of the handheld.
- Connect handheld pin **3** (**RXD**) to the one pin of the wheel sensor.
- Connect handheld pin **4** (**RTS**) to the other pin of the wheel sensor.

For a standard HotSync cable, these lines end up at pin **3** (**RXD**) and pin **8** (**RTS**) of the **Sub-D 9pin female** plug.

Connection for handhelds with 16pin universal connector [NOT TESTIFIED]
This applies to Palm **m125**, **m130**, **m500**, **m505**, **m515**, **i750**.
It is recommended to use a standard *HotSync* or *modem* cable for interfacing the handheld connector. You might need to connect the **ID** signal by opening the case of the handheld plug. *[PLEASE REPORT]* Pin numbers are counted from **right** to **left** when looking at the connector from the **back** side of the handheld.
- Connect handheld pin **10** (**RXD**) to the one pin of the wheel sensor.
- Connect handheld pin **14** (**RTS**) to the other pin of the wheel sensor.
- Connect handheld pin **8** (**ID**) to the one pin of a **7.5k**Ohm resistor (1% tolerance).
- Connect handheld pin **1** (**GND**) to the other pin of the resistor.

For a standard HotSync cable, the data lines end up at pin **3** (**RXD**) and pin **8** (**RTS**) of the **Sub-D 9pin female** plug.
The resistor is required to enable the RS232 interface, instead of USB.

Connection for other handhelds
I did not have the time to research connections for all Palm OS handhelds. Interfacing handhelds like **Handspring Visor** or **Sony Clié** should be possible. Some of them have **TTL** levels instead of RS232 levels at their serial interfaces. This is not a problem, since the required *space* level can then be generated by switching against **GND**, instead of RTS. Maybe you can figure it out by yourself.
If you are using such a handheld, please report whether you had success.

VAIF-2 (Revision 0.9)

VeloAce interface for wireless IrDA connection

How it works

The wheel sensor signal triggers the first stage of a dual monoflop. This stage causes a delay of over one frame time. Possible bouncing of the sensor is eliminated because of the non-retriggerable nature of the monoflop and the relatively long delay. The second stage is triggered by the end of the first stage and causes a positive pulse of around **3/16** of a bit time (specified IR light pulse duration for the **IrPHY** layer).
This emitted IR light flash is detected as a start bit by the receiver. The succeeding data bits, as well as the stop bit, will all be sampled as logical '1' (missing IR pulse leads to *mark* level on the UART). Due to the delay caused by the first stage, the IR pulse can not be re-triggered within the current frame. It is therefore guaranteed that this circuit sends one valid data frame.

Realisation

This circuit is very trivial. Be sure to use the **HC** *(low-voltage)* variant of the monoflop.
One **3V** lithium battery, such as a **CR2025** or **CR2032**, should theoretically last for several years. You could also use two **LR44** (each 1.5V) batteries in series.
In idle state, the current from the battery was not measurable, i.e. <0.1μA. During a ride, the mean current is around 20μA (could not measure it very well). With the sensor switch permanently closed, the pull-down resistor draws around 35μA (try to avoid this when parking your bike).
All in all, one battery should last for around 1 or 2 years, I guess.
The total cost of materials should be around **3 Euro** for the board, IC, LED, resistors, capacitors and battery.

Schematic