Triggering an ADCP/DVL with a TTL Signal

1 Introduction

Interference from other acoustic devices can cause velocity and direction biases. In extreme cases it the can prevent the ADCP/DVL from operating. However, it is possible to avoid this circumstance by triggering the ADCP/DVL with a TTL signal.

2 Converter Requirements

TRDI recommends the use of the B&B Electronics Model 422TTL converter. The RS422TTL unit converts RS-422 signals to TTL signals. Two channels are used to convert from RS-422 to 0 to +5 VDC TTL signals and two channels are used to convert from 0 to +5 VDC TTL signals to RS-422. A male DB25P connector is provided for the TTL side and a DB25S female connector for the RS-422 side. For more information about the converter, see http://www.bb-elec.com/bb-elec/literature/422TTL_3404ds.pdf.

NOTE. The converter does not have to be optically isolated, because there is an optical isolating circuit in the DVL.

The trigger input for the DVL needs to be a RS-422/RS-485 signal, because the trigger signal goes into a RS422 driver inside the DVL.

NOTE. The communication switch setting inside the ADCP/DVL must be set to the RS-232 position; this enables the RS-232 serial communications and the RS-485 communications for the trigger.

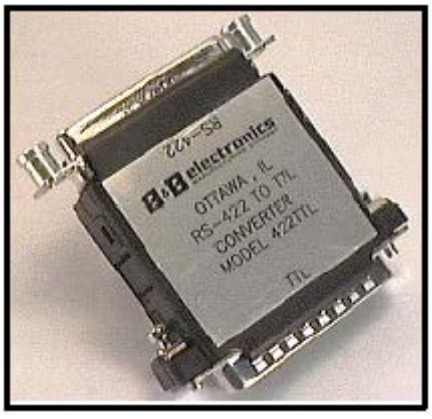

Figure 1. RS-422 to TTL Converter

3 Setup

The TTL to RS-422 converter must be externally powered (+12 VDC).

For triggering the DVL we only use one half of the converter.

TTL side of the converter:

Connect the TTL trigger signal to pin 9 and pin 7 to signal ground.

RS422 side of the converter:

Connect pin 14 to the CH B RS-485A signal.

Connect pin 2 to the CH B RS-485B signal.

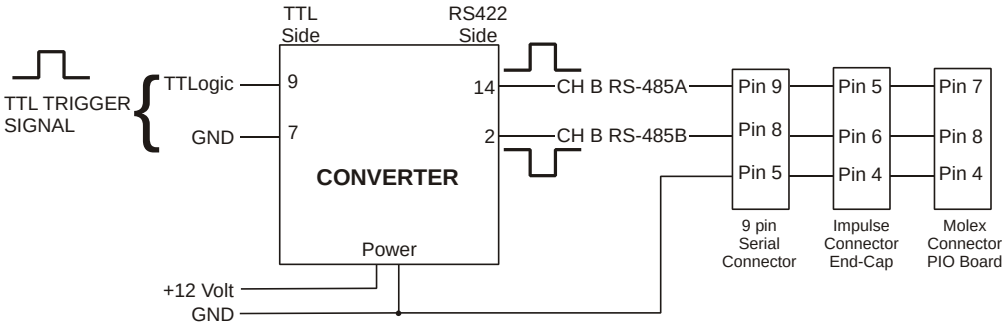

Figure 2. Triggering a DVL with a TTL Signal

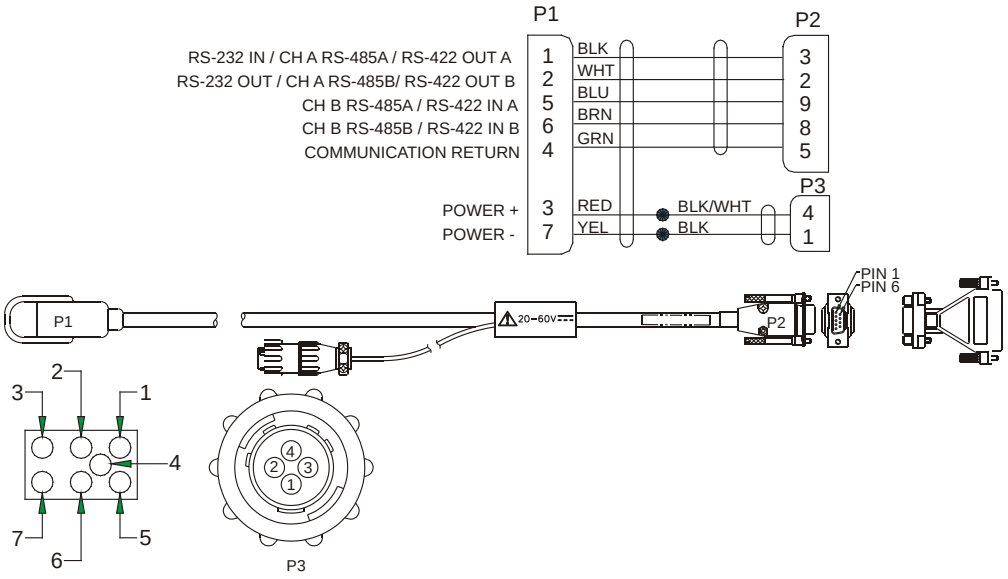

Figure 3. WorkHorse I/O Cable Wiring

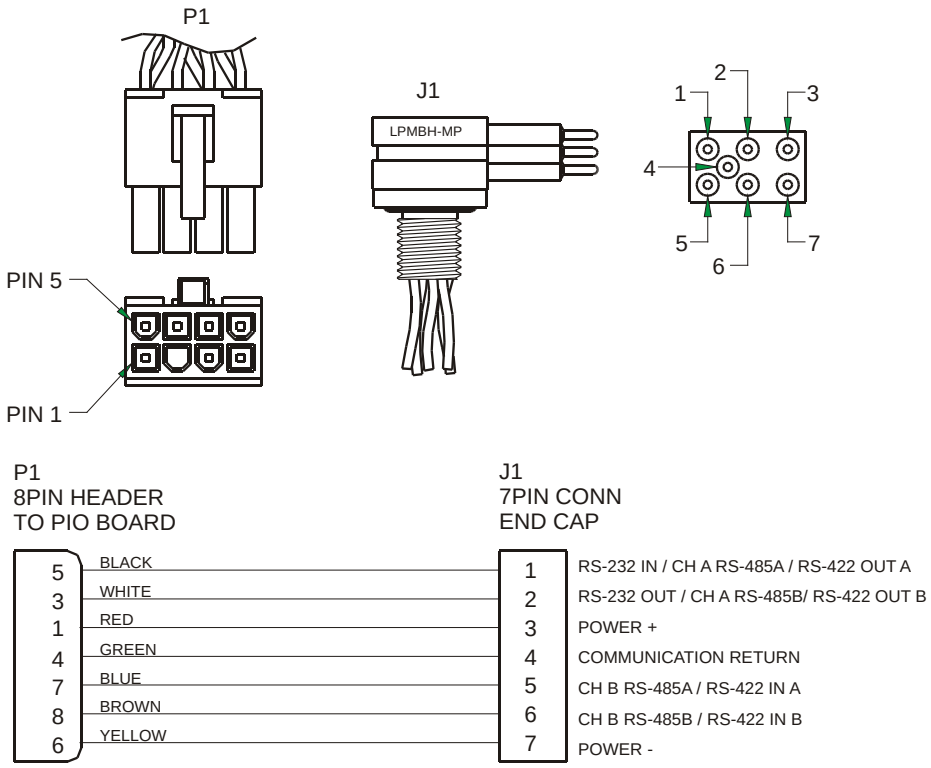

Figure 4. WorkHorse End-Cap to PIO Wiring

4 Using the Low Latency Trigger Enable

The Low Latency Trigger Enable is controlled by the CX command. Set the CX command to CX1 and send a CS command to enable data collection when a trigger is received. The DVL will ping within ~300µs of the rising edge of the trigger (see Figure 5, page 4).

NOTE. WorkHorse ADCPs will ping within ~550µs of the rising edge of the trigger.

NOTE. In order for the Low Latency Trigger Enable to work, the CL command should be set to CL0. Using CL1 may provide unpredictable results.

NOTE. The trigger pulse must be > 20µs and < 40ms. The optimum timing for the pulse is 20 to 30ms. If the pulse is between 40 to 100 ms, it will be ignored. A pulse over 100ms will provide unpredictable results.

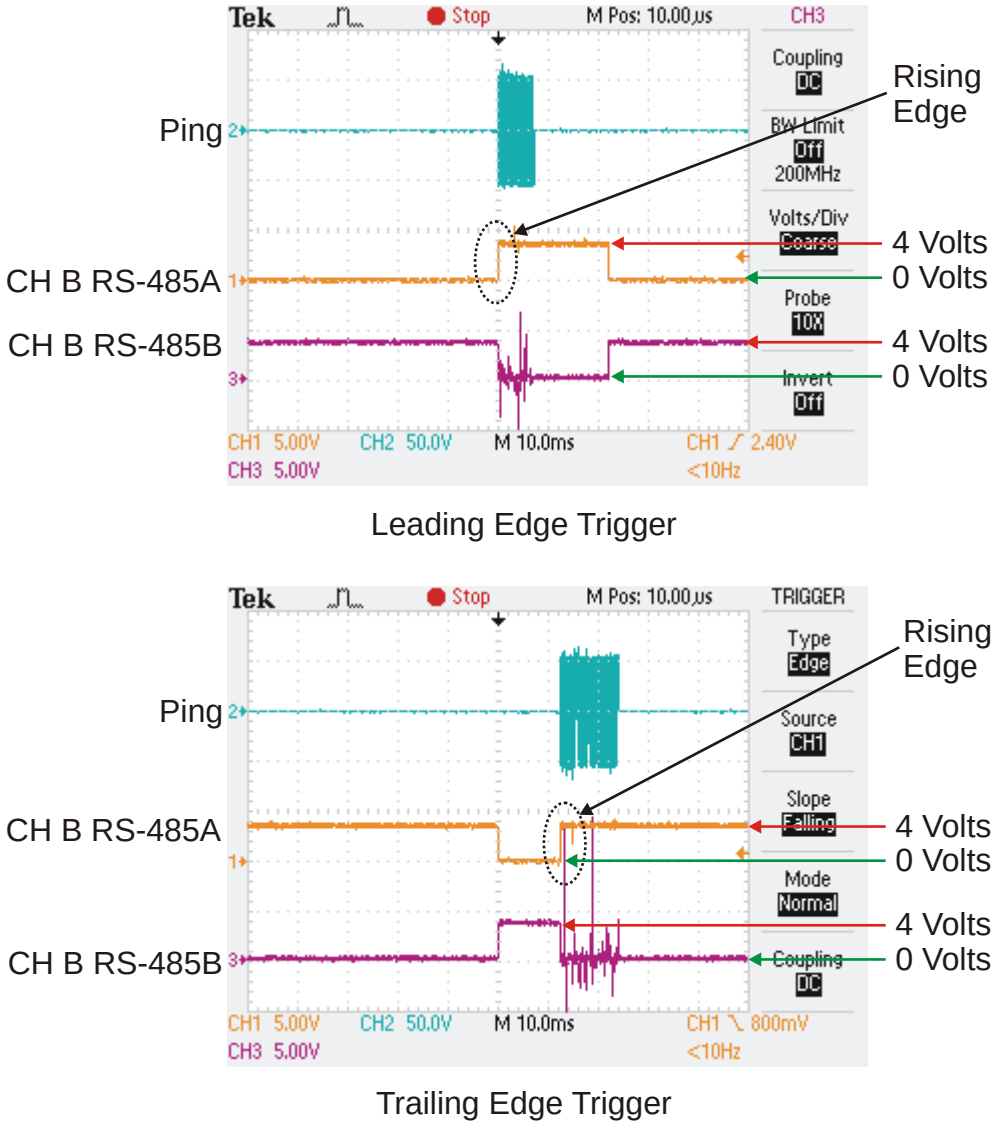

Figure 5. Timing Pulse

The DVL performs a cycle of reading sensors, transmitting, blanking, and processing (known as overhead). When the CX command is enabled and a CS command is sent, the DVL will enter a transmit trigger wait state just before the transmitting portion of the cycle. It is during this wait state that the trigger is read by the DVL. This results in the following caution:

> **CAUTION.** The DVL does not store trigger pulses. This means that the DVL will only acknowledge pulses it sees during the transmit trigger wait state. For example, if three trigger pulses were sent to the DVL in quick succession only the pulse that occurred during the transmit trigger wait state would be used. The other pulses would be ignored and lost.

It is important to prevent the CH B RS-485 A and B lines from getting into certain states that prevent WorkHorse operation or can cause erratic results (see Table 1, page 5).

Table 1: RS485 State Table

Description	CH B RS-485A	CH B RS-485B
WorkHorse works normal	0 Volts	4 Volts
Banner Wake Up AB	4 Volts	0 Volts
Not possible to issue Break via serial port	4 Volts	0 Volts
If in Ping Mode, power is removed and then power applied, the Banner Alarm Wakeup will occur. Triggering will continue to work.	0 Volts	4 Volts

NOTES