Manual

Water Level Instrument Update

Model 6509

Revision History

File name / Revision	Date	Authors
Previous version BX	2004	RS/ JH
Unidata Manual - 6509 Water Level Instrument User Manual Rev B Issue 2.0	2007	AB/CB/JH/MS/KC

1 Introduction

The 6509X is an upgrade kit for the 6509B Encoder Water Level Instrument (WLI). It upgrades all of the electronics and adds SDI-12 functionality.

6509 - **Front** Pulley Instrument

6541 - **Rear** Pulley Instrument

The 6541 WLI (rear pulley) superseded the 6509 WLI (rear pulley).

The 6509X upgrade kit consists of a circuit board and an encoder assembly that are installed into the existing housing. Note that a 6509B version encoder shaft is fitted to the encoder assembly (this shaft is longer than the one used in the 6541 WLI).

2 Functions & Specifications

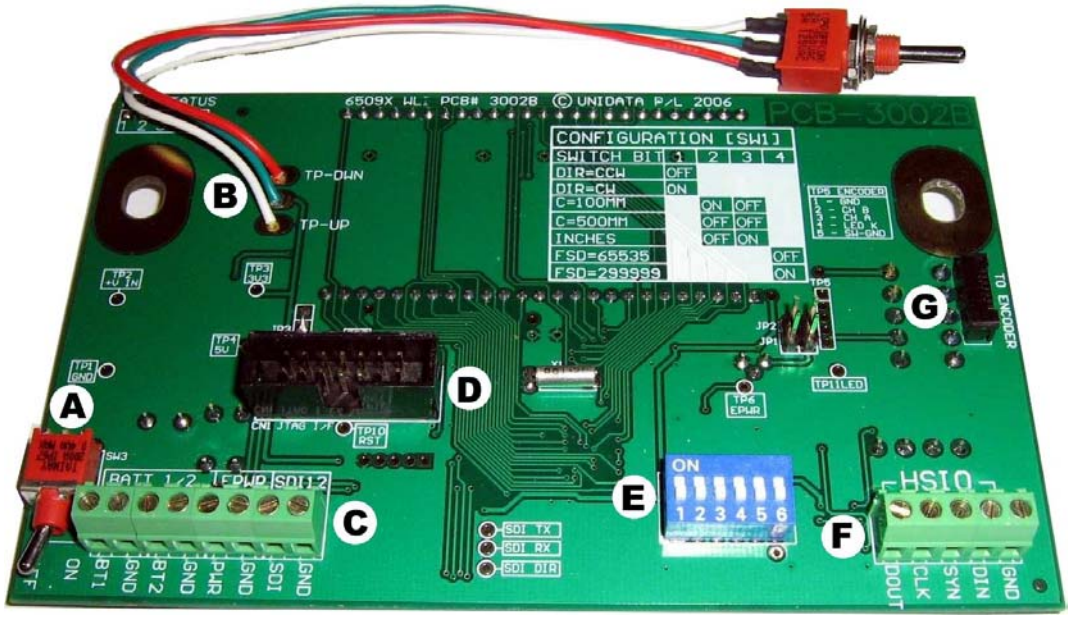
The 6509X has the following features:

- LCD display - always on.
- SDI-12 interface - version 1.3 compliant.
- HSIO interface - Unidata interface.
- An external toggle switch for datum point setting.

Specifications	
Power Supply:	7.5 - 18.0Vdc, typically 1.4mA. Alkaline battery pack or external supply. Low battery indication: ~6V.
Operating Temperature:	-10°C ⇔ +60°C.
Humidity:	0-100% RH non-condensing.
Data Interfaces:	SDI -12 (sensor) version 1.3 HSIO – Unidata std.
Configuration Options:	Rotation Direction: cw / ccw Measurement Units: mm, feet Range: 65535 or 299999 maximum count.
Pulley Sizes:	[500mm] 1mm resolution. [100mm] 0.1mm resolution. [1 foot] 0.01' resolution.

3 Installation & Wiring

The layout of the 6509X circuit board is shown below. When mounted in the enclosure the wiring terminal strips and the 6 way configuration switch are located along the bottom edge. When installed removal of the rear enclosure cover is required to access the wiring terminations. The layout of the circuit board is as shown below:



A	Power switch
B	Datum / level setting switch connections
C	Power & SDI-12 terminals
D	Programming port - manufacturer use only
E	Mode configuration switches
F	HSIO terminals
G	Encoder connector

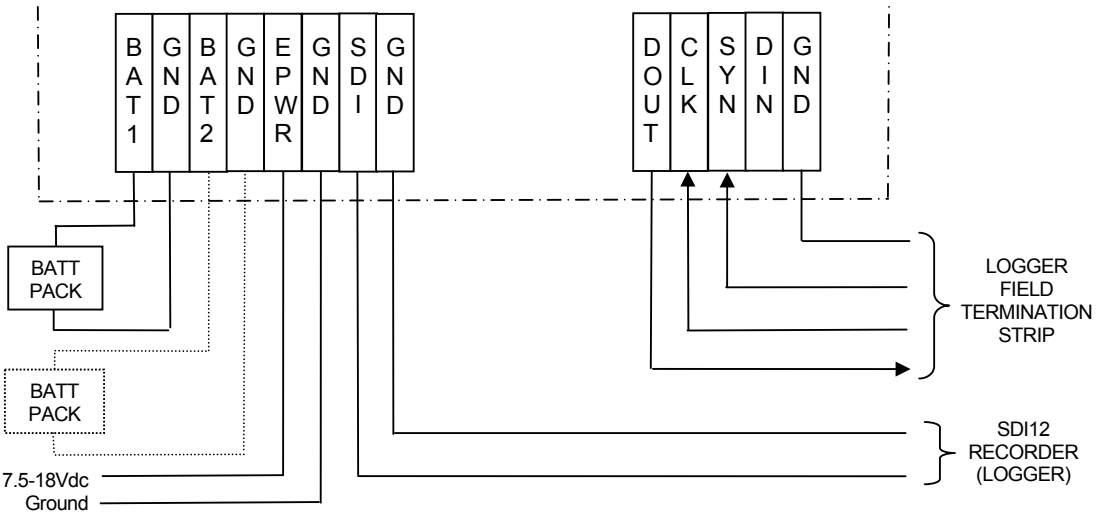
Power and SDI-12 Connections (Left hand terminal block)

Terminal		Function
1	BT1	Primary battery power input
2	GND	
3	BT2	Secondary battery power input
4	GND	
5	PWR	External power input
6	GND	
7	SDI	SDI-12 signal & ground
8	GND	

HSIO Connections (Right hand terminal block)

Terminal		Function	
1	DOUT	HSIO data output	(6541B → logger)
2	CLK	HSIO clock	(logger → 6541B WLI)
3	SYN	HSIO synch. / latch signal	(logger → 6541B WLI)
4	DIN	HSIO Data input	(2nd instrument → 6541B WLI)
5	GND	HSIO interface ground	common

Wiring diagram.



4 Configuration Switch Settings

A six way DIP switch located on the PCB is used to configure the unit.

Sw	Function	Off	On
1	Rotation Direction	CCW*	CW*
2	Metric Pulley Size	500mm	100mm
3	Imperial Mode	Off [metric]	12" [0.01"]
4	Full Scale Display	65535	299999
5	Unused		
6	Unused		

* Direction as viewed from the PCB / configuration switch side of the instrument whilst setting up.

5 SDI-12 Usage

If the 6541B is running from a battery power source, only SDI-12 & Gnd connections are required for SDI-12 communications, alternately the power can be delivered to the instrument from the SDI-12 recorder instrument.

Measurements are instantaneously available allowing the use of the “aR0!” and “aRC0!” commands.

Valid instrument addresses are (ASCII) 0 → z inclusive. The default instrument address at delivery is “0”.

Command	String Sent to 6541B	String Response from 6541B
Acknowledge Active	a!	a<CR><LF>
Send identification	aI!	a13Unidata 6541B 102<CR><LF> 13 ~ SDI12 Version (1.3) 6541B ~ Product model number 102 ~ Firmware version is 1.02
Change Address	aAb!	b<CR><LF> Where “b” is the new address.
Address Query	?!	a<CR><LF>
Start measurement	aM!	a0001<CR><LF>
Send data	aD0!	a<value><CR><LF>
Continuous Measurements	aR0!	a<value><CR><LF>
Continuous Meas. + CRC	aRC0!	A<value><CRC><CR><LF>

In the commands:

- “a” is the sensor address.
- “!” terminates the command.
- “<CR><LF>” terminates the response from the instrument.

Leading zeros are excluded from the returned ASCII string except for the one immediately left of the decimal point. If the level displayed was “000.09”, the ASCII string returned would be “0.09”.
To change the instruments address connect a Starlogger to the instrument via the SDI-12 port. With the Starlogger connected to the PC running V3 or V4, enter the SDI-12 transparent mode and send the change address command aAb! (where a= current address, b = new address), the reply will be b<CR><LF>.

6 Document Revision History.

Revision	Comment	Author	Date
A	Initial release	RDS	14-11-2006
B	Configuration switch 1, direction setting – conflict between PCB overlay markings and manual CCW ⇔ CW transposed. Reworded manual to clarify. Swapped CCW & CW in drawing in section 4.	RDS	30-11-2006

Unidata Pty Ltd
40 Ladner Street
O'Connor 6163
Western Australia

Tel. +61 8 9331 8600
Fax.+61 8 9331 8611

www.unidata.com.au