TDSI

USER MANUAL
Version: 0.1

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Revision History

Version	Date	Author	Remarks
0.1	03-12-2009	S. Apsey	Initial version – draft

CONTENTS

1 INTRODUCTION

The TDSI (Time Data Synchronization Interface) is an interface box which interconnects and buffers data from different sensors for use in multibeam hydrographic surveys. The TDSI also merges the PPS pulse from a GPS with the NMEA ZDA sentence into the connector going to the data acquisition computer or the Teledyne Odom Hydrographic ES3 which can then time stamp the data with the UTC time

1.1 Purpose

The purpose of this document is to explain the features and operation of the TDSI.

1.2 Scope

The scope and content of this document is focused on providing useful information to the end-user.

1.3 Glossary

TDSI	Time Data Synchronization Interface
DGPS	Differential Global Positioning System
NMEA	National Marine Electronics Association
MRU	Motion Reference Unit
VDC	Volts Direct Current
UTC	Coordinated Universal Time (The International Telecommunication Union wanted Coordinated Universal Time to have a single abbreviation for all languages. English speakers and French speakers each wanted the initials of their respective language's terms to be used internationally: "CUT" for "coordinated universal time" and "TUC" for *"temps universel coordonné"*. This resulted in the final compromise of using "UTC".)wiikipedia

2 PRODUCT DESCRIPTION

The TDSI is an interface box used to interconnect sensors and buffer data which will be used in several sources. Most MRUs require aiding from a GPS and Heading sensor to compensate the internal accelerometers when the vessel is making a turn. The TDSI routes the signal from the GPS and Heading to the MRU and also buffers up the data so the signals are not loaded down. The Teledyne Odom Hydrographic ES3 multibeam requires the PPS pulse and NMEA ZDA string to appear on the same RS232 connector to embed the UTC time in its telegrams and the TDSI does this internally.

The GPS Heading and MRU are connected in the Sensor input sections and data from each of these sensors is then available in their respective section on the TDSI. For each of the sensors there is a RS232 I/O port and two RS232 Out ports. The I/O ports allow two way communication to the sensors and the OUT RS232 DB9 only supply data from the sensor. If the operator needs to communicate with one of the sensors to change its settings they should used the connection to the I/O RS232 connector.

2.1 TDSI General Specifications

- Input power 24 VDC
- MRU Power Output voltage 24 VDC
- Input Sensors
  - GPS
  - Heading
  - MRU

  - PPS pulse from either BNC or GPS DB9
- 3 – buffered GPS output ports
- 3 – buffered Heading output ports
- 3 – buffered MRU output ports
- Dimensions
- Weight: 0.90 kg or 2 lbs.
- Propagation delay trough RS232 drivers 750ns

2.2 Scope of Material Included

TDSI
Power cable
BNC connector
Product CD with this manual

3 FRONT PANEL

The TDSI front panel is broken into four sections:

- SENSOR INPUTS
- POWER INPUT
- GPS
- HEADING
- MRU

3.1 Sensor Inputs

The sensor inputs include the GPS, MRU and Heading sensor. The TDSI will only work with RS232 signals for these sensors. The TDSI also accepts the PPS pulse from a GPS. The TDSI will work at any baud rate from 4,800 to 33,800, however the data acquisition computer and multibeam need to be configured to accept the sensor input. It is usually best to set up the GPS and Heading sensor to 19,200 baud and the MRU to the fastest rate of 33,800 baud.

3.1.1 Heading

Connect the output from the heading sensor to this RS232 port. When the TDSI is receiving data the LED next to the Heading label will blink. The rate at which the LED blinks depends on the rate the Heading sensor is

outputting data.

3.1.2 GPS

Connect the output from the GPS to this RS232 port. When the TDSI is receiving data the LED next to the GPS label will blink. The rate at which the LED blinks depends on the rate the GPS is outputting data and the number of sentences the GPS is outputting.

3.1.3 MRU

Almost all MRU sensors require aiding from a GPS and heading sensor to aid the heave algorithms. One of the conveniences of the TDSI, is this is done internally when these sensors are connected to the TDSI.

When the TDSI is receiving data from the MRU the LED will light up. Since the data from most MRU's is continuous the LED will stay lit up rather than blink

The MRU can be connected to the TDSI in one of two ways.

3.1.3.1 MRU with Teledyne Odom Hydrographic circular connector

When an MRU is supplied by Teledyne Odom Hydrographic the cable is supplied with a circular connecter that mates up directly with the TDSI. This connector supplies power to the MRU, interfaces the GPS and Heading data to the MRU and routes the MRU data to the DB9 connectors.

3.1.3.2 MRU with Separate DB9 connectors

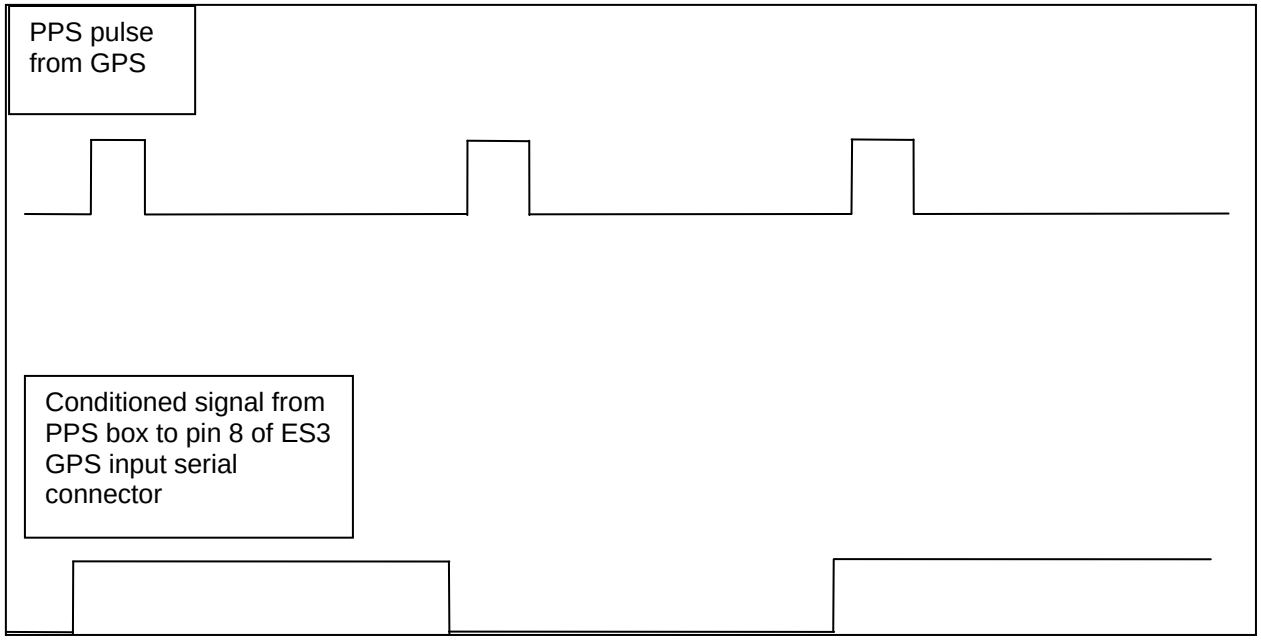
If the MRU cable is supplied by another source generally the cable will have RS232 DB9 connectors. If the MRU has 3 RS232 DB9 connectors they will be labelled MRU out, GPS in and Heading in. Connect the MRU out to the MRU DB9 in the Sensor Inputs section. Connect the GPS in to one of the GPS out DB9 connectors and connect the Heading in DB9 connector to one of the Heading out connectors

Power to the MRU is supplied by the MRU POWER OUT connection on the green connector. Pin 1 is the +24 VDC connections and is on the left side. The GND connection is on Pin 2 which is on the right side.

3.1.4 PPS Pulse

The PPS (Pulse Per Second) is used to provide an accurate reference of when the UTC time was embedded in the NMEA ZDA string. The data acquisition software and multibeam receiving the PPS pulse and UTC time can then adjust their clocks so the data can be synchronized without risk of latencies causing timing errors.

The TDSI takes the PPS signal from the GPS and toggles pin 8 (CTS) of all the GPS output connectors. Make sure the data acquisition is ready to accept the toggling of pin 8. Hypack is the only software we are aware will work this way. The ES3 will also work this way. Below is a signal diagram of how the signal toggles.



PPS pulses are either supplied by a BNC connector or a DB9 connector from the GPS. In addition some PPS pulses are Rising edge and some are Falling edge. Consult your GPS manual to determine how the signal is supplied before continuing this installation.

To change whether the TDSI receives the PPS pulse through the BNC or DB9 there is a small cover that is labelled PPS INPUT that covers a configurable dip switch. Unscrew the knurled nut to remove this cover.

3.1.4.1 BNC connector

If the PPS pulse is supplied through a BNC connector then connect the BNC cable to the PPS BNC connector of the GPS and TDSI. Determine if the signal from the GPS is Falling edge or Rising edge and then set the configuration dip switch accordingly. The different options for configuring the dip switch are labelled next to the dip switch on the front panel.

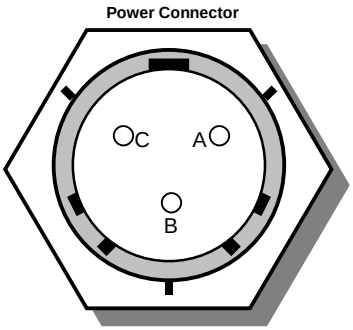
3.1.4.2 DB9 connector

The other options for the PPS pulse are through the DB9 connector's pins 8 and 9. Refer to the label on the front panel for changing this configuration.

Appendix A. CABLE CONNECTIONS:

POWER Cable Conn. (DC only)
P/N: MS3114E12-3P

Pin #	Description
A	+24 VDC
B	No Connection
C	Return



GPS Input Male DB9

Pin #	Description
2	Data from Sensor to TDSI
3	Data to Sensor from Computer
5	GND
8	PPS input
9	PPS input

HEADING Input Male DB9

Pin #	Description
2	Data from Sensor to TDSI
3	Data to Sensor from Computer
5	GND

MRU Input Male DB9

Pin #	Description
2	Data from Sensor to TDSI
3	Data to Sensor from Computer
5	GND

PPS BNC

Pin #	Description
Center	PPS Signal
Barrel	GND

MRU Circular Connector
P/N: 0400-0029-0000

Pin #	Description
A	Data from MRU
B	GND
C	Data to MRU
D	NC

E ----------	GPS data to MRU
F ----------	GND
G ----------	Heading data to MRU
H ----------	GND
J ----------	+24 VDC to MRU
K ----------	GND
L ----------	NC
M ----------	GND

GPS I/O Female DB9

Pin #	Description
2 ----------	Data from Sensor to Computer
3 ----------	Data to Sensor from Computer
5 ----------	GND

Heading I/O Female DB9

Pin #	Description
2 ----------	Data from Sensor to Computer
3 ----------	Data to Sensor from Computer
5 ----------	GND

MRU I/O Female DB9

Pin #	Description
2 ----------	Data from Sensor to Computer
3 ----------	Data to Sensor from Computer
5 ----------	GND

GPS Out Female DB9

Pin #	Description
2 ----------	Data from Sensor to Computer
5 ----------	GND

Heading Out Female DB9

Pin #	Description
2 ----------	Data from Sensor to Computer
5 ----------	GND

MRU Out Female DB9

Pin #	Description
2 ----------	Data from Sensor to Computer
5 ----------	GND

Appendix B. FUSES:

The TDSI has two internal fuses. Both fuses are 250VDC 1Amp. The first fuse is a reverse polarity protection fuse. The second fuse is protection in case the power terminals for the MRU are short together or draw to much current. To access the fuses remove the 10 screws on the front panel and remove the front panel.