Titan
Digital Pod
User Manual

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Warning

Only a qualified technician or representative of Mars Labs should attempt to service the components of this system. There are no user-serviceable parts inside.

For safety and protection of the equipment, power must be turned off prior to connecting or disconnecting cables and sensors.

Titan Digital Pod
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Introduction

Designed to add digital sensor support to Titan Pods and Mini-Recorders, the Digital Pod captures data from multiple digital sources and merges it into a single data stream that is combined with the analog sensor data. The composite data stream can then be recorded, analyzed and archived using the Titan Control Software (TCS) application. The Titan Digital Pod supports twin CANbus inputs, a Serial input, and a GPS input.

This manual is intended to provide an overview of the Titan Digital Pod with complete feature descriptions, specifications, setup procedures and operational information. It contains important safety information as well.

Furnished Accessories

Digital Pod Serial Cable (BOM-2116)

The Digital Pod may also be shipped with a Breakout Cable Assembly. This cable splits the composite sensor connection on the Digital Pod into individual connectors for CAN and Serial data sensors. Two types of breakout cable assemblies are available:

> Digital Pod Breakout Cable - 2CAN (BOM-2112)
> Digital Pod Breakout Cable - 2CAN + IMU (BOM-2111)

Support

Support for this product is available by contacting the factory during regular business hours (9am – 6pm EST) at 301-470-3278. Additional information can be found on our web site: http://www.marslabs.com

General Guidelines and Warnings

Electro-Static Discharge

Electro-Static Discharge (ESD) occurs when a static charge builds up on either yourself or the Titan hardware, and then you touch the Titan hardware. The static spark can be so small that you don't feel it, however, it can flaw a semiconductor. These flaws may generate an immediate failure, or, in most cases, cause a slight reduction in performance which will continue to degrade, eventually leading to failure of the hardware. When you feel a static shock, you are experiencing a minimum of 3,000 volts of electricity.

Even though the input connectors have protection to prevent ESD damage, it is good practice to always ground yourself and the Titan hardware while connecting and removing sensors.

Always use approved ESD handling procedures to prevent ESD damage.

Grounding Titans

In general, grounding the Titan hardware to the test vehicle or test structure will usually reduce noise pickup.

All of the analog inputs of the Titan hardware have a return path to ground. However, it is very important that each senor have only one return path to avoid ground loops. When testing a vehicle, often the vehicle chassis and Titan can have very large ground imbalances of one or two volts. In such situations, ground the senors to Titan and use differential inputs across the sensor. A totally floating input (like a 9-Volt battery) must have one side grounded at the point where used, either grounded to Titan or connected to the vehicle chassis ground via a resistor (e.g. 10K ohm).

If there is a possibility that a floating sensor may be occasionally grounded, install a 10K ohm resistor from the minus input to Titan ground. When the sensor is floating, the 10K ohm resistance will reference it to Titan ground, and when it is grounded, the resistor will allow the direct minus input wire to reference the remote chassis ground.

Specific Warnings

1. When using a power adapter with the Titan, always connect the adapter to the Titan before applying power. Never hot plug a Titan device under any circumstances - hot plugging may damage the device!

2. Under no conditions should the 12V and 5V lines on the Titan hardware be shorted together or connected directly to ground.

Operation

Front Panel

The Digital Pod front panel provides a single multi-function port on a DB9M connector that accepts two CAN-bus inputs and a Serial data input (see Interface Diagram on page 8)

Rear Panel

The Digital Pod rear panel incorporates two LED status indicators, a Pod connection port and GPS connection port:

Status Indicators

– A red LED indicating data activity
– A green LED indicating power

TO POD

This port connects the Digital Pod to a Titan Pod or Titan Mini-Recorder.

TO GPS

This port accepts a GPS sensor (Garmin 18X-5Hz).

Connection Diagram

Figure 1 shows the Digital Pod in a typical configuration. The Digital Pod receives sensor data from multiple CAN-bus sources and a GPS sensor. The data is merged into a composite data stream and transmitted to a Titan Pod or Mini-Recorder, where it is merged with analog sensor data. The merged data stream is then transmitted to a PC running the Titan Control Software (TCS) application, where the information is recorded, stored and analyzed.

In the configuration shown below, the PC supplies power to all connected devices over the USB connection. Depending on the circumstance, however, the Pod or Mini-Recorder may be powered from a seperate source. Regardless of how it is powered, the Pod or Mini-Recorder always supplies power for the Digital Pod.
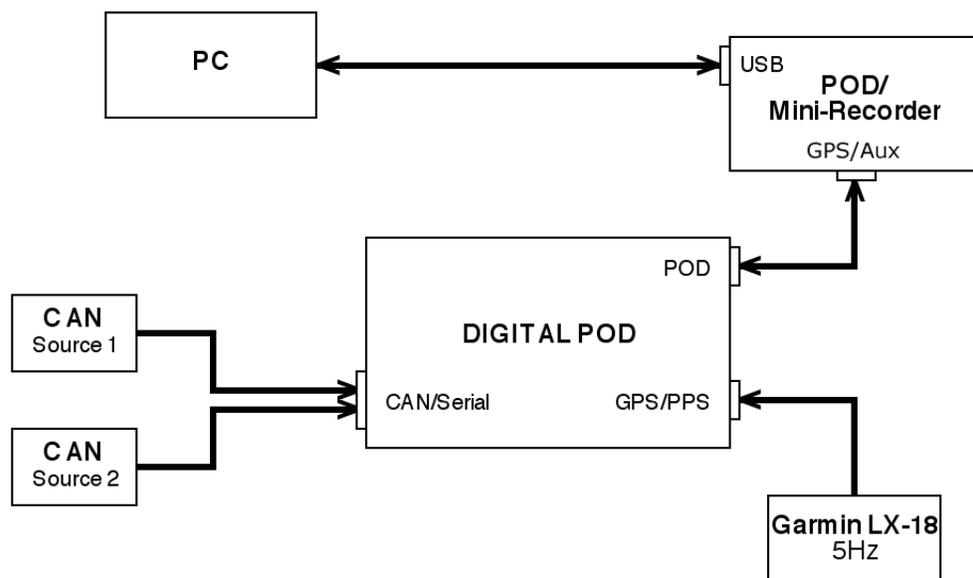
Figure 1

Interface

CAN/Serial:

The CAN/Serial connector on the front panel provides dual CANbus and Serial Data Inputs as shown:
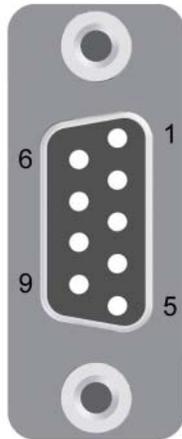
Pin Number	Function
1	CAN 2 L
2	CAN 1 L
3	GND
4	CAN 2 H
5	Serial RX (see note 2)
6	GND
7	CAN 1 H
8	Serial TX (see note 2)
9	Power (optional - see note 1)

Notes:

*1. Although pin 9 is designated as the Power pin, it is **not** internally connected to provide power. If your configuration requires that the Digital Pod provide sensor power, please contact Mars Labs.*

2. As shipped, the Serial RX and TX pins are not connected internally. To activate the serial port, open the Digital Pod and place a jumper on header J4 (TX) and J5 (RX):
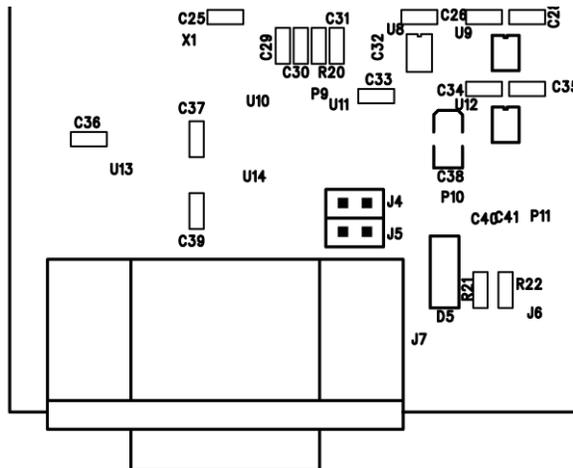
GPS Port:

An RJ11 connector on the rear panel provides GPS and Pulse-Per-Second (PPS) inputs. The pinout of the GPS/PPS port appears below. The labels identify the signal lines coming *from* the GPS device.
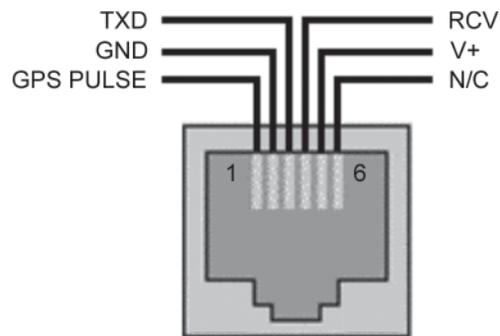
'To POD' Port:

An RJ11 connector on the rear panel provides a dedicated connection to a Titan Pod or Mini-Recorder as shown in the connection diagram on page 7. For use only with the supplied Digital Pod Serial Cable.

Features and Specifications

Key Features

- Supports multiple digital sensor sources:
  - Garmin LX18-5Hz (GPS/PPS)
  - SAE J1939 CANbus
  - ECU CAN (ISO 15031 / SAE J1979)
  - Wheel Force Transducer (CAN interface)
  - 3DM-GX3-25 IMU
  - Generic Serial
- Lightweight, portable unit suitable for in-vehicle applications.
- Connections via industry-standard connectors
- Optimized for use with Titan High Speed Mini-Recorders & Pods

Specifications

Physical Interfaces:	(1) RJ11 - GPS input (shared with PPS)
	(1) DB9M - CAN/Serial
	(1) RJ11 - Interface to Titan Mini-Recorder or Pod
Power Requirements	5 Volts DC (supplied by the Titan Mini-Recorder or Pod)
Dimensions	8.0 cm x 5.4 cm x 2.3 cm (L x W x H)

Troubleshooting

This section under development

Warranty

Mars Labs warrants all their manufactured equipment to be free from defects in material and workmanship. **Mars Labs** liability under this warranty is limited to servicing or adjusting any equipment returned to the factory for that purpose, and to replace any defective parts thereof. The warranty remains effective for 365 days following delivery to the original purchaser. During this time, equipment will only receive repair when the original purchaser prepays all return transportation charges, and **Mars Labs** finds to its satisfaction that the equipment is indeed defective.

If the fault has been caused been misuse or abnormal conditions of operation, normal service charges will prevail. In this case, an estimate will be submitted before work is started. **Mars Labs** must authorize any warranty returns.

Mars Labs reserves the right to make changes in the design of its instruments without incurring any obligation to make the same changes on equipment previously purchased.

This warranty will be void if unauthorized alterations or modifications are found which impede the repair or testing of the equipment.

Receipt of Equipment

The equipment should be tested as soon as it is received. If the equipment is damaged in any way, a claim should be obtained by the claim agent, and this report should be forwarded to **Mars Labs**.

Mars Labs will then advise the customer of the disposition to be made of the equipment and arrange for repair or replacement. When referring to this equipment for any reason, the model number, serial number and purchase order number should be included.

Malfunction

If the unit fails to operate, or any fault develops, **Mars Labs** should be notified, giving full details of the difficulty, including model number and serial number. Upon receipt of this information, **Mars Labs** will provide service data and shipping instructions.

This warranty is expressly in lieu of all other obligations or liabilities on the part of **Mars Labs**, which neither assumes nor authorizes any person to assume for it any other liability in connection with the sale of its equipment. Contact:

> Mars Labs
> 29 C Street
> Laurel, MD
> 20707
> (301) 470-3278
> email: Support@MarsLabs.com

Notes & Known Issues

This section under development