



MOBL-D2

Technical Manual

Document #9186, rev. H14



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Technical Support

Carefully recheck your system before calling Technical Support. Run as many tests as possible; the more information you can provide, the easier it will be for Technical Support staff to help you solve the problem. For additional technical assistance, try the following:

Technical Support telephone: +1-303-426-4521

E-mail Technical Support: support@octagonsystems.com

Applications Notes (via web): www.octagonsystems.com

Revision History

Revision	Reason for Change	Date
A12	Initial production release	04/12
B12	Notes regarding shock isolators added.	04/12
C12	Cradle mounting outline added. Grounding requirements added. Minor text corrections	10/12
D12	Update general notes.	11/12
E13	Update CE certification and power cable req.	03/13
F13	Update to Digital IO specification	04/13
G13	Clarify PCI104 expansion options; Clarify fusing in Installation section; Add Display Caution on pg.5	07/13
H14	Add GPS Battery Backup Jumper	03/14

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MOBL-D2 Functional Overview

Description

The Octagon MOBL-D2 is a 32-bit X86-class computer in a ruggedized enclosure. The connectors and interfaces are located on an external panel for easy access.

The MOBL-D2 provides the following external interfaces: GPS, Wireless LAN (optional), Wireless WAN (optional); each with front panel antenna connections. A rugged Display connection is provided with audio output and a USB connection for devices such as touch-screen controllers. Similar rugged connectors are also provided for Communications (Serial & USB), Ethernet, and Digital I/O & CAN Bus as well as external power. External power can range from 9 VDC to 36 VDC.

Internally the MOBL-D2 has a Compact Flash socket, a PCI-104 interface, a Mini PCI socket (Wireless LAN), and a Mini PCI Express socket (Wireless WAN). The MOBL-D2 can be used in a stand-alone mode or expanded through the PCI-104, Mini PCI, or Mini PCI Express interfaces.

CAUTION - Display

Connecting or disconnecting the MOBL-D2 from the display (hot-swapping) while the MOBL-D2 is under power may cause serious damage to the system. The MOBL-D2 must be shut down completely before making this change.

NOTE: Turning off the display with its own power button is NOT sufficient as it does not disconnect the power circuit between the MOBL-D2 and the display.

To power down the MOBL-D2, turn the ignition switch off. Allow two minutes for the automatic shut-down sequence to complete. The LED on the display will go off signaling the completion.

MOBL-D2 Major Hardware Features

The Vortex86MX processor has a clock speed of 800 MHz, integral graphics and memory controller supplied with 1 GB of DDR2 SDRAM soldered to the CPU board.

An optional Compact Flash drive if ordered with the system is installed for fixed disk storage.

A Fifty Channel GPS receiver offers location and timing information. The receiver supports 3.3V powered as well as passive antennas.

A rear panel USB port with tethered cover is provided for maintenance, diagnostics, updates, or other temporary use without the need to disconnect front-panel dedicated cables to access a USB port.

The case of the MOBL-D2 is integrally coupled to the major heat producing components, which significantly reduces internal heating. No cooling fan is required.

Internal Functional Expansion

The PCI-104 interface accepts industry-standard PCI-104 boards. PCI-104 expansion boards are available from several manufacturers. The CPU card also incorporates a Mini PCI and a Mini PCI Express slot for radios or other communication devices. The Mini PCI Express slot supports only USB interface devices such as Wireless WAN cards, no PCI Express bus is presented to the socket.

Robust Internal Power Supply

The MOBL-D2 accepts a DC input voltage which can be powered from fixed supplies, vehicle batteries or train power systems. The internal power supply has a very robust front end, and is also reverse polarity protected. The input range is from 9 to 36 VDC.

MOBL-D2 major software features

AMIBIOS BIOS

The MOBL-D2 has an AMIBIOS BIOS optimized for the device and embedded installations.

Boot Sequence

The MOBL-D2 can be configured to boot from Compact Flash, a network resource, or from a USB device such as a floppy drive, hard drive, flash device, or a CD-ROM. A USB or network boot allows software installation without opening the case.

Configuring and Ordering Your System

Hard Drive Options

The MOBL-D2 uses an optional Compact Flash device or external USB drive(s).

The internal Compact Flash socket looks like a hard drive to the system. This socket accepts Type I or Type II Compact Flash devices. The Compact Flash feature is CF 3.0 compliant, DMA capable, and supports true IDE mode. Octagon Systems only recommends industrial grade, error-correcting Compact Flash of the quality available with the system.

Expansion Options

The MOBL-D2 can be used in a stand-alone mode or expanded through the Mini PCI, Mini PCI Express (USB functions only) and PCI-104 interfaces.

Slot 0 goes to the mini-PCI socket and the PCI-104 stack.

Slot 1 is dedicated to the PCI-104 stack.

Slot 2 is dedicated to USB.

If you are not using the mini-PCI, you can plug in two PCI-104 cards. If you are using the mini-PCI, you can plug in only one PCI-104 card mapped to Slot 1 (only).

Operating Systems

Octagon Systems can preinstall some operating systems, including drivers for the standard features such as digital I/O and COM ports. Octagon Systems has drivers for Windows XP and Linux for the standard MOBL-D2 features, as well as for Octagon System expansion cards.

Installation

Recommended Installation Practices

The MOBL-D2 is designed to operate in difficult environments. Proper installation will help ensure product longevity and adherence to the product standards.

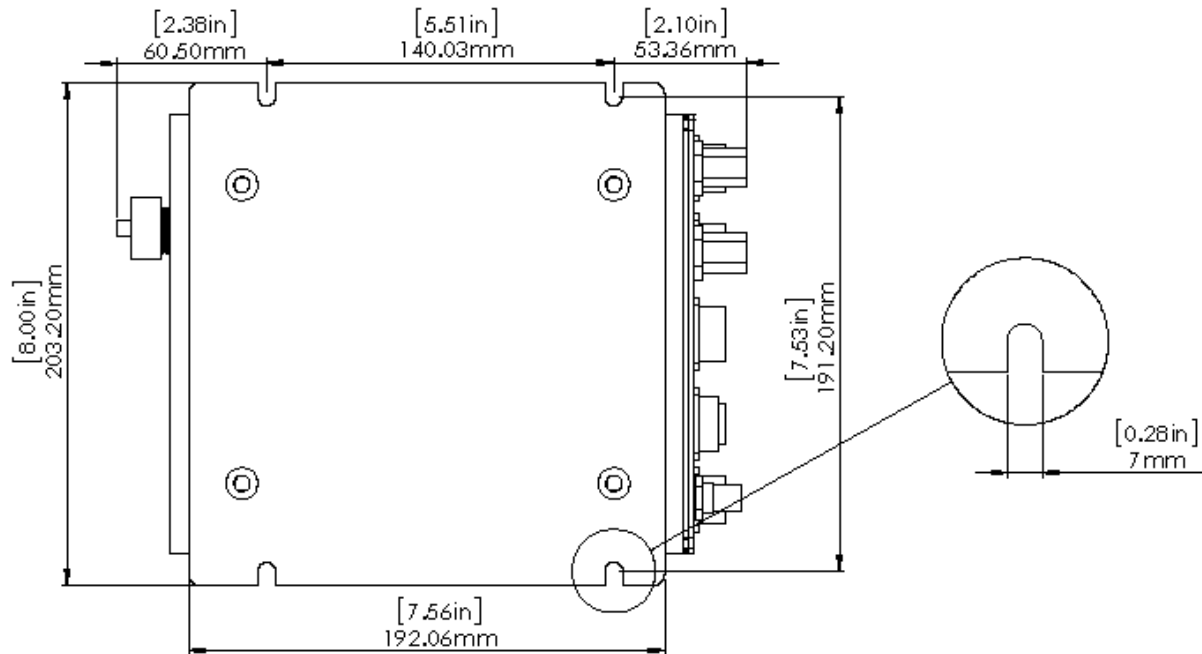
1. System **MUST** be grounded through the ground stud on the rear of the enclosure. A minimum 8AWG or 8.36mm² stranded wire must connect this stud to a suitable chassis grounding point.
2. The back endplate of the MOBL-D2 can be removed for access to the Compact Flash. The bolts require a 4 mm hex wrench.

CAUTION!

When replacing the back cover ensure the threads on the bolts are properly aligned before tightening. Do not over tighten. Torque to 1.1 N-M (10 in-lbs.) Failure to follow these precautions could strip the internal threads.

3. There are no internal repairable components. Field repair is not covered by the Octagon warranty.
4. Do not over-tighten the antenna or GPS connectors.
5. The MOBL-D2 includes a standard vibration and shock dampening mounting plate. The mounting plate must be secured to a surface with four ¼ inch or 6mm bolts or screws.
6. The power supply cable should be as large a gauge and as short in length as practicable.
7. The MOBL-D2 is protected against transient voltages common in mobile applications. It is recommended that external in-line fuses be used on both input power lines, V_IN and GND_EXT. Octagon recommends standard, fast acting fuses with a rating not to exceed 5A.
8. Proper ESD precautions and method must be followed when installing, servicing, or otherwise handling the MOBL-D2.
9. The USB signals are USB 2.0 with a maximum cable length of 5M. Cables with built-in repeaters are available commercially if a longer cable length is required.
10. The MOBL-D2 is rated for 12V to 24V nominal, but accepts 9V to 36V.
11. The MOBL-D2 contains several switching regulators with an inrush requirement of 10A. The external supply must be capable of supplying this inrush current so as to not “starve” the startup of the internal supplies. If the power supply is mounted remotely to the MOBL-D2, the wiring gauge must be adjusted to prevent excessive drop during startup.
12. Contact Octagon Systems Technical Support for proper disassembly / access to internal options & expansion.

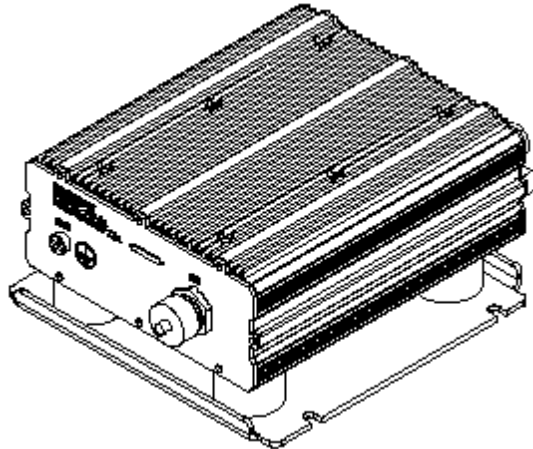
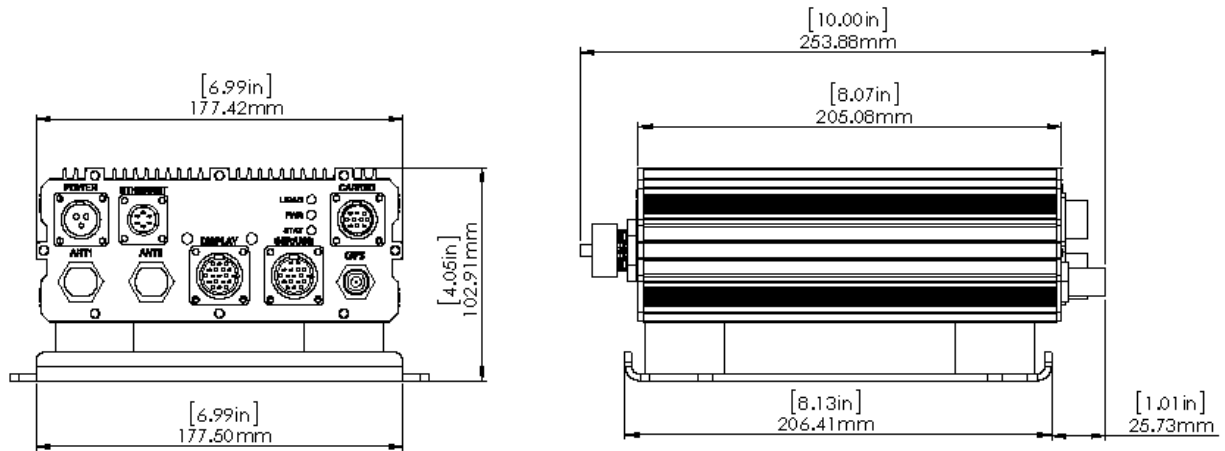
Figure 1 - Mounting hole and system dimensions [inches] mm – Standard mounting plate



CAUTION!

Do NOT remove, loosen, or tighten the screws attaching shock isolators to the mounting plate shown above. Accidental damage to the shock isolators may result. Refer any damaged mounting system to qualified repair personnel.

Figure 2 – MOBL-D2 case dimensions [inches] mm, standard mounting plate



CAUTION!

Do NOT attempt to separate case from mounting plate. Accidental damage to the shock isolators may result. Refer any damaged mounting system to qualified repair personnel.

Using the MOBL-D2

Power

The MOBL-D2 is rated for 12V to 24V nominal, but accepts 9V to 36V. The external power cable must be at least 18 gauge. Octagon Systems also recommends the use of a solid core ferrite bead, such as Fair-Rite P/N 2661102002, or equivalent “snap-on” ferrite (Fair-Rite P/N 0461164181) to maintain CE certification integrity. The Ignition Detect signal controls the power management Suspend and Resume functions; this signal should be connected to the vehicle ignition, or tied to VIN if unused.

Ethernet

The MOBL-D2 provides one 10/100Base-T Ethernet port. The port supports the IEEE 802.3 Ethernet standard. The Ethernet ports use PCI interrupts as assigned by the operating system. Note that you must have the correct Ethernet driver installed to be able to use the Ethernet port. The Ethernet driver is available on the Octagon Systems web site.

Audio

The MOBL-D2 provides a monaural line output, included in the display connector. The default configuration is a line level (1V P-P) output.

GPS

The front panel contains a TNC GPS connector. The GPS receiver is a standard feature of the MOBL-D2 system. The GPS is connected to the CPU through an internal USB interface. The receiver supports industry standard NMEA messages, as well as the UBX packet protocol. Jumper W1 provides the ability to connect the RTC battery to the GPS receiver for maintaining GPS last fix when input power is removed. The protocol specifications are available from the Octagon Systems Technical Support.

ANT1, ANT2

There are 2, N type antenna connectors, provided for optional wireless communication modules. Numerous communication formats are implemented with add-on cards such as PCI-104 and Mini PCI. An internal cable connects the card to the appropriate external connector.

USB

The MOBL-D2 provides two USB 2.0 ports on the front panel- one in the Display connector, and one in the Serial/USB connector. Additionally there is a third USB connector provided on the rear panel of the MOBL-D2. This port includes a tethered cover or cap which must be securely placed over the connector when not in use. This rear USB connector is **NOT DESIGNED FOR DEDICATED CONNECTION WHEN INSTALLED**, but intended for service, maintenance, or diagnostic functions. Peripherals (**other than the Display connector**) can be connected and disconnected while power is applied to the system. The system is capable of booting from external USB storage devices and CD/DVD drives. **NOTE:** The MOBL-D2 cannot boot from USB devices connected to the rear USB port.

Serial Communication

The MOBL-D2 has three serial ports. COM1 and COM4 are 2-wire (plus ground) RS-232 interfaces. COM2 is not installed. COM 3 is a 2 wire RS-485 interface.

Note: COM port numbers used in this manual refer to the standard I/O base address assignments as follow: COM1 = 0x3F8, COM3 = 0x3E8, COM4 = 0x2E8. COM2 is not used in the MOBL-D2 hardware. **Be aware that operating systems may assign port numbers in a different order**, such as 1, 2, and 3. Identification of the hardware ports can be done by checking the address of the I/O resource associated with each COM port by the OS.

VGA

The VIDEO connector has standard VGA signals. Display resolution up to 1280x1024 is supported.

Power Management

The MOBL-D2 system hardware and BIOS support APM power management functions.

The Ignition Detect signal on the Power connector controls the power management Power on and Shutdown functions; this signal should be connected to the vehicle ignition. If not used, the Ignition Detect signal must be tied to VIN to allow the system to start.

Operation when the ignition terminal is connected to vehicle ignition, or a “switched” power source is as follows: The system will remain in “soft off” – a very low power state as long as Ignition remains low. When Ignition is raised to VIN system startup is initiated, after a short delay to ensure Power and Ignition are stable*. Disconnecting Ignition, or connecting to ground will signal the operating system to shut down – however the system remains on, drawing power from the VIN terminal until shutdown occurs and the system returns to soft off. Failure of the operating system to shutdown in a reasonable time* will result in a forced soft off state.

Shutting down the operating system while ignition is connected to power levels (high state) will cause the system to enter a standby low power state indicated by a yellow power LED on the front panel, and will remain as long as ignition is applied. Removal and reapplication of voltage to the ignition lead will restart the system.

If ignition should be removed long enough to initiate shutdown, but returns before shutdown of the operating system is complete, the system will automatically restart.

*The Ignition Minimum Time and Force Off Timeout are programmable with a configuration utility available from Octagon Systems (contact tech support), however these are initially set to 3 seconds and 180 seconds respectively by the factory.

Digital I/O

The MOBL-D2 provides one digital output. When activated, provides a ground for external devices connected to the vehicle voltage. When inactive it appears as an open. The line can withstand voltages up to 100V when in the off state and can sink 100 mA when active.

The output line will provide 1A peak repetitive for 50mS for driving incandescent lamps switching on at a rate of one per second, at a 50% duty cycle with a 50mA lamp. The output line has inductive load protection with a 1A, 100V diode.

The MOBL-D2 also provides four digital inputs. The inputs detect a positive voltage with an input range of 0 to V_In(Power Supply). The input is inactive when open (less than 100mA) and active when connected to a positive voltage of 4-36VDC.

Note that drivers written by Octagon Systems indicate a binary value of 0 when the input is open/inactive, and 1 when active.

Status LEDs

The MOBL-D2 has 3 status LEDs:

- LAN indicates LAN link (green) and activity (yellow).
- STAT is a user controlled bi-color status LED. Accessing the LED registers is accomplished through operating system drivers. Contact Octagon Systems for driver availability and/or a Board Support Package for your Operating System.
- PWR is a Power indicator, indicating On (Green) or Standby (Yellow) state of the power supply.

Technical specifications

CPU, FSB and SDRAM

The DM&P Vortex86MX processor has a clock speed of 800MHz and is equipped with 1 GB of DDR2 SDRAM.

BIOS

AMIBIOS

On-board Flash

512 KB flash, contains system BIOS.

Hard Drive

The MOBL-D2 accepts a Compact Flash drive, on the primary IDE channel. The Compact Flash socket accepts industrial Type I or Type II compact flash devices. The MOBL-D2 may also be expanded with external USB drives.

USB

Two external ports are available from the front panel, and one diagnostic/service port on the rear panel. All ports are USB 2.0 compliant.

Serial I/O

Two dedicated 2-wire RS-232 interfaces, one dedicated 2-wire RS-485 interfaces.
IEC1000, level 3, ESD protection specification

- Contact discharge ± 6 kV
- Air-gap discharge ± 8 kV

Up to 115.2K baud

Digital I/O

One digital output, 100ma current sink.

Four voltage detecting digital inputs – external current limit resistor not required.

Ethernet

One 10/100Base-T port, supporting IEEE 802.3.

Real Time Clock

AT compatible with battery backup.

Keyboard and Mouse Ports

Supports USB keyboard and mouse.

Video

The MOBL-D2 supports VGA display up to 1280x1024 pixel resolution.

Expansion

PCI-104, up to 2 cards (refer to page 21 for slot availability).

Mini PCI, one slot.

Mini PCI Express (aka PCI Express Mini-Card) slot supporting only USB functions, one slot.

Operating Systems

Driver support for Windows XPe and Linux. Optional pre-installed Linux or XPe available.

Power Input

9 - 36 VDC input. 7W typical, exclusive of expansion.

Environmental Specifications

Operating temperature	-30° to +71°C
Non-operating temperature	-55° to 95°C, non-operating
Relative humidity	5% to 95% non-condensing
Shock	20g, 3 axis per MIL-STD 810F, Test Method 516.5, Functional shock test (4.5.2) 20g peak
Vibration	Per MIL-STD 810F, Test Method 514.5, Annex A Category 20 for ground vehicles
EMI	CE Class A Radiated and Conducted Emissions

Antenna Connectors

2 N Type Female connectors for wireless options
1 TNC connector for a GPS antenna (3V antenna power available)

Size and Weight

255 mm (D) x 180 mm (W) x 103 mm (H) (10.0 in x 7.1 in x 4.1 in) including mounting and connectors

1.8 kg (4 lbs)

Mating Connectors

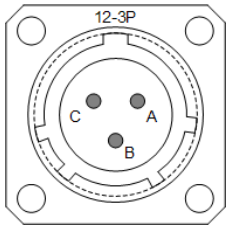
Table 1 – MOBL-D2 Mating Connectors

External Connectors		
Connector	Function	Mating Connector
GPS	GPS antenna	TNC-F, 50 Ω
ANT1	Wireless Accessory (optional)	N-F, 50 Ω
Cellular	Wireless WAN (optional)	N-F, 50 Ω
Power	Power Input	PT06E12-3SSR or similar
Display	Video, Audio, USB	PT06E14-19PSR or similar
Ethernet	LAN	PT06E10-6PSR or similar
Serial/USB	COM ports, USB	PT06E14-18PSR or similar
DIG/CAN	Digital I/O & CAN Bus	PT06E12-10PSR or similar

External Connector Pin-outs

The following descriptions are as seen from the outside of the faceplate.

Table 2 - Power Connector Pin-Out

Signal Name	Pin #	PT02E1203P 
V_IN (Voltage IN)	A	
GND_EXT (Ext Gnd)	B	
IGNITION	C	

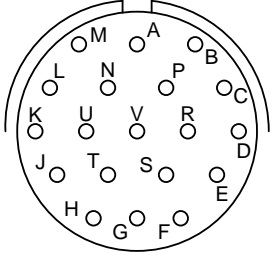
Mating Connector PT06E12-3SSR

The external power cable must be at least 18 gauge for cables of 0.75M or shorter. For longer cables, use 16 gauge or larger. The Ignition Detect signal controls the power management Suspend and Resume functions; this signal should be connected to the vehicle ignition.

Table 3 - Display Connector Pin-Out

Signal Name	Pin #	Pin #	Signal Name
Display Power —	A	L	BLUE shield
Display Power +	B	M	H Sync
Audio LINE in	C	N	Reserved
Audio LINE out	D	P	V Sync
GND Audio	E	R	GND USB0
RED	F	S	USB0 +5V
RED shield	G	T	USB0 D —
GREEN	H	U	USB0 D +
GREEN shield	J	V	SHIELD
BLUE	K		

PT02E1419S
(rear view)

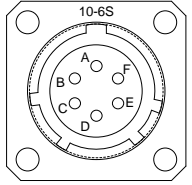


Mating Connector PT06E14-19PSR

Table 4 - Ethernet Connector Pin-Out

Signal Name	Pin #	Pin #	Signal Name
LAN Rx+	A	D	LAN Tx —
LAN Rx-	B	E	LAN Tx+
Shield ground	C	F	Reserved

PT02E106S

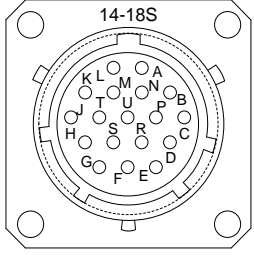


Mating Connector PT06E10-6PSR

Table 5 - Serial/USB Connector Pin-Out

Signal Name	Pin #	Pin #	Signal Name
COM3 RX	A	K	I ² C GND
COM3 TX	B	L	COM1 RXD
COM GND	C	M	COM1 TXD
USB1 +5V	D	N	COM2 RxD*
USB1 Data+	E	P	COM2 TxD*
USB1 Data-	F	R	COM GND
USB1 GND	G	S	COM4 +
I ² C CLK	H	T	COM4 -
I ² C DATA	J	U	COM GND

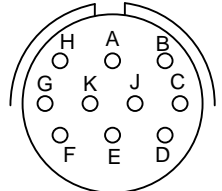
PT02E1418S
(rear view)



Mating Connector PT06E14-18PSR

*Not used by default

Table 6 - Multi I/O Pin-Out

Signal Name	Pin #	Pin #	Signal Name	PT02E1210S (rear view) 
CAN H	A	F	Digital IN 0	
CAN L	B	G	Digital IN 1	
CAN GND	C	H	Chassis GND	
Reserved	D	J	Digital in 2	
Digital Out 0	E	K	Digital in 3	

Mating Connector PT06E12-10PSR

Software and Hardware Development

Although Octagon Systems will build complete ready-to-install units, users will often need to first test different configurations and expansion modules. This chapter covers internal connectors and functions.

Opening and closing the MOBL-D2 box

The back endplate of the MOBL-D2 can be removed for access to the compact flash. The bolts require a 4 mm hex wrench.

Access to the SIM card socket (used with some cellular / wireless WAN options), and/or access to the expansion connectors requires removal of the front plate & CPU board as an assembly. Contact Octagon Systems Technical Support for complete instructions prior to disassembling the unit.

CAUTION! Octagon Disassembly Instructions Must Be Followed!
When replacing the front and back faceplates ensure the threads on the bolts are properly aligned before tightening. Do not over tighten. Torque to 1.1 N-M (10 in-lbs.) Failure to follow these precautions could strip the internal threads.

Table 6 - Internal Connectors and Sockets

J501	GPS Antenna (MMCX) – cabled to front panel	J502	USB Diagnostic / Service (Rear panel)
J503	RTC / CMOS Backup Battery	J504	Factory Use Only
J505	Factory Use Only	J509	Factory Use Only
XU501	Compact Flash Socket	XU502	SIM Card socket for WLAN options
XU503	Mini PCI Express socket (USB function only)	XU504	Mini PCI socket
SW501	Factory Use Only	SW502	Reset
J506	Factory Use Only	W1	GPS Battery Backup

USB

Connector J502 provides USB 2.0 port connector for the rear panel.

GPS

Placing jumper W1 from pins 1-2 connects the RTC battery to the GPS receiver. 2-4 disconnects the RTC battery from the GPS receiver. The RTC battery life will be reduced to ~ 9 months in the 1-2 position. The default position is: 2-4.

Mini PCI

Mini PCI is a standard for integrated peripherals for use in applications such as sealed-case PCs. Mini PCI is a small card that is functionally equivalent to a standard PCI expansion card.

Mini PCI Express

Mini PCI Express is a standard for integrated peripherals, sometimes referred to as PCI Express Mini-Card. The socket in the MOBL-D2 supports cards of this form-factor with USB functions only (PCI Express is not available with the standard CPU). Octagon offers several modules, such as GPRS or other Cellular communications devices which use this socket.

PCI-104

The PCI-104 connector allows you to interface expansion modules such as A/D converters, CardBus, wireless, serial ports, etc. Modules can be stacked to form a highly-integrated control system. The MOBL-D2 has room for two PCI-104 cards (see caution below). The PCI-104 expansion bus supports mastering devices. The deviations from the PCI-104 connector pin-out standards are shown below. Cards used on the PCI-104 stack are supplied with 5V only; -12V is not supplied.

The PCI-104 standard can be found at <http://www.pc104.org/>. Some MOBL-D2 signals and/or signal names do not match the specifications. Those signals are shown below. The PCI-104 specified signal is listed first, and the MOBL-D2 signal follows.

CAUTION!

Slot 0 goes to the mini-PCI socket and the PCI-104 stack.

Slot 1 is dedicated to the PCI-104 stack.

Slot 2 is dedicated to USB.

If you are not using the mini-PCI, you can plug in two PCI-104 cards. If you are using the mini-PCI, you can plug in only one PCI-104 card mapped to Slot 1 (only).

Table 7 - PCI-104 signal deviations

PC-104-Plus		
Pin	Signal	MOBL-D2
A30	-12V	no connect
B30	REQ3	not used
C30	GRNT3	not used
D6	M66EN	Gnd

Accessories

Table 8 - Accessories

Product	Description	Octagon p/n
Quickstart Kit	Power supply & I/O cable kit	9338915X-QS (option when ordering system)
Cable, Power Input	3 lead cable with un-terminated end	8339
Quickstart AC/DC Power Supply	Provides power from AC line	7509101
Cable, Display	VGA / USB display cable	7508943
Cable, Tough-Touch	For connecting touch-screen	7509133
Cable, Serial/USB	I/O Breakout cable	7508945
Cable, LAN	RJ-45 to MOBL-D LAN cable	7508944
Cable, DIG/CAN	I/O Breakout cable	7508946
Compact Flash	Fixed Storage Medium.	Various options available, contact Octagon Sales.
Extended Range Wireless LAN	Mini-PCI Wireless LAN interface	Contact Octagon Sales

Warranty

Octagon Systems Corporation (Octagon) warrants that its standard hardware products will be free from defects in materials and workmanship under normal use and service for the current established warranty period. Octagon's obligation under this warranty shall not arise until Buyer returns the defective product, freight prepaid to Octagon's facility or another specified location. Octagon's only responsibility under this warranty is, at its option, to replace or repair, free of charge, any defective component part of such products.

Limitations on Warranty

The warranty set forth above does not extend to and shall not apply to:

1. Products, including software, which have been repaired or altered by other than Octagon personnel, unless Buyer has properly altered or repaired the products in accordance with procedures previously approved in writing by Octagon.
2. Products which have been subject to power supply reversal, misuse, neglect, accident, or improper installation.
3. The design, capability, capacity, or suitability for use of the Software. Software is licensed on an "AS IS" basis without warranty.

The warranty and remedies set forth above are in lieu of all other warranties expressed or implied, oral or written, either in fact or by operation of law, statutory or otherwise, including warranties of merchantability and fitness for a particular purpose, which Octagon specifically disclaims. Octagon neither assumes nor authorizes any other liability in connection with the sale, installation or use of its products. Octagon shall have no liability for incidental or consequential damages of any kind arising out of the sale, delay in delivery, installation, or use of its products.

Service Policy

1. If a product should fail during the warranty period, it will be repaired free of charge. For out of warranty repairs, the customer will be invoiced for repair charges at current standard labor and materials rates.
2. If a product returned for repairs is found to be free of defect, customer might be liable for the minimum current repair charge.

Returning a Product for Repair

1. The customer must call Tech Support at 1-303-426-4521 to determine if repair service is necessary.
2. If repair service is required, Tech Support will require the customer's name, address, telephone number, email address and a list of problems found.
3. Tech Support will forward this information to the RMA Administrator who will contact the customer to issue the RMA number.
4. The customer must carefully package the product in an antistatic container. Failure to package in antistatic packaging will VOID all warranties. Then package in a safe container for shipping.
5. Write the RMA number on the outside of the shipping container.
6. The customer pays for shipping to Octagon. Octagon pays for shipping back to the customer.
7. Other conditions and limitations may apply to international shipments.

Note PRODUCTS RETURNED TO OCTAGON FREIGHT COLLECT OR WITHOUT AN RMA NUMBER CANNOT BE ACCEPTED AND WILL BE RETURNED FREIGHT COLLECT.

Product Return Policies

Custom orders are non-cancelable and the product is non-returnable unless otherwise provided by contract.

Standard products may, at Octagon's option, be returned according to the standard restocking policy at the time of return.

Governing Law

This agreement is made in, governed by and shall be construed in accordance with the laws of the State of Colorado.

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