



Mobile Data Computer Version 4.1

General Description

The Mobile Data Computer (MDC) Version 4.1 has several improvements over the previous versions.

- 384KB of RAM
- 512KB of FLASH memory
- Variable supply voltage output on com port 1 (2.7 to 11.5V)
- J-1708 capability
- Future J-1850 capability (Pending)
- Enhanced backlight
- Differential GPS input (pin 1 com 2)
- More PC card addressing (up to 32 MB)
- Built in odometer signal conditioner
- Improved audio switching matrix
- Software selectable pull up or pull down on VEHI4
- Optional 16 channel GPS receiver with available WAAS compatibility
- Optional Internal DSP modem (up to 9600 bps)
- Optional Economy 8 channel GPS receiver
- Optional internal wireless modem (Spread Spectrum, 1xRTT, Mobitex, Datatac, or iDEN)

Compliance

- "e" mark
- FCC part 15, Class A
- Industry Canada RSS-210
- UL/CSA 60950 Safety of Information Technology Equipment

Key Specifications

- Supply Voltage

Typical	12 V
Min	9 V
Max	18 V
- Current Consumption

Standby	5.5 mA
Typical ¹	250 mA
Maximum ²	1.0 A
- Operating Temperature³

Min	-30 °C
Max	60 °C

Standard Features

- 240X64 Transflective Backlit Graphical LCD Display
- 5 Analog Inputs
- 4 Digital I/Os
- Covert Microphone
- Internal Smart Card and Magnetic Card Reader

Optional Features

- Internal GPS – Requires Active GPS Antenna
- PCMCIA SRAM Memory
- Internal Wireless Data Modems
- 4800 – 9600 bps Modem⁴

1. LCD heater off, GPS, DSP, no modem, no PC card, full backlight, 12V Power. Does not include peripheral devices connected to interface ports of the MDC.
2. LCD heater on, GPS, DSP, no modem, no PC card, full backlight, 18V Power. Does not include peripheral devices connected to interface ports of the MDC.
3. Operating the MDC beyond the given temperature specifications is not recommended and may reduce lifespan. MDC should be mounted low on the dashboard to prevent temperature extremes.
4. For use with conventional 2-way radio systems.

WARNING

MENTOR ENGINEERING INC. RESERVES THE RIGHT TO CHANGE CIRCUITRY AND SPECIFICATIONS WITHOUT NOTICE AT ANY TIME. PLEASE ENSURE YOU HAVE THE MOST RECENT REVISION OF THIS DOCUMENT.

NOTE

OPERATION AT TEMPERATURES OUTSIDE THE RECOMMENDED RANGES IS NOT RECOMMENDED. TEMPERATURE RANGES ARE A LIMITATION OF THE BATTERY AND LCD DISPLAY.

NOTE

ONLY USE MENTOR ENGINEERING APPROVED CABLES FOR INSTALLATION PURPOSES. REFER TO THE HARDWARE INSTALLATION MANUAL FOR ADDITIONAL INFORMATION.

MDC Rear View



Figure 0-1 – Rear MDC Connections

COM Port 1

PIN NO.	NAME	I/O Type	MIN	TYP	MAX	UNIT	DESCRIPTION
1	~PRG	Digital In	0		5	V	Puts the MDC into programming mode when held low during power-up.
2	TX1	RS232 Out	+/-5	+/-7	+/-9	V	Transmits to external device at RS232 levels.
3	RX1	RS232 In	+/-3		+/-15	V	Receives RS232 data from an external device.
4	DTR1	RS232 In	+/-3		+/-15	V	Data Terminal Ready.
5	GND			0		V	Ground.
6	DSR1	RS232 Out	+/-5	+/-7	+/-9	V	Data Set Ready.
7	V_ADJ	Adjustable Vout	2.67		11.5	V	Software adjustable variable power supply output.
8	VEXT	Voltage Out	9	12	18	V	This voltage is typically within 1 V of the MDC supply voltage.
					800	mA	Maximum current supply to all peripheral devices connected on COM1, 2, 3, and Keyboard. ¹

1. The current consumed by the MDC and all peripheral devices must not exceed 3A.

COM Port 2

PIN NO.	NAME	I/O TYPE	MIN	TYP	MAX	UNIT	DESCRIPTION
1	RTCM-RX ¹	RS232 Input	+/-3		+/-15	V	RS232 input for RTCM correction data. Connected directly to GPS receiver.
2	TX2	RS232 Output	+/-5	+/-7	+/-9	V	Transmits to external device at RS232 levels.
3	RX2	RS232 Input	+/-3		+/-15	V	Receives RS232 data from an external device.
4	DTR2	RS232 Input	+/-3		+/-15	V	Data Terminal Ready 2. It is possible, by changing a jumper, to bypass the RS232 circuit and have this line pulled up to Vcc through a pull-up resistor. COM 3 pin 7 would then control this line. ²
5	GND			0		V	Ground
6	DSR2	RS232 Output	+/-5	+/-7	+/-9	V	Data Set Ready 2.
7	VCC	Voltage Out	4.85	5	5.15	V	Internally generated 5V supply voltage. Not intended for high current applications (>250 mA).
8	VEXT	Voltage Out	9	12	18	V	This voltage is typically within 1 V of the MDC supply voltage.
					800	mA	Maximum current supply to all peripheral devices connected on COM1, 2, 3, and Keyboard. ³

1. The TX line on COM Port 3 cannot be used if you are using the RTCM-RX input

2. See schematic for more information.

3. The current consumed by the MDC and all peripheral devices must not exceed 3A.

COM Port 3

PIN NO.	NAME	I/O TYPE	MIN	TYP	MAX	UNIT	DESCRIPTION
1	DSR2	Digital Out	0		5	V	Data Set Ready 2. This value is the same as COM2 pin 6 except it is not converted to RS232 levels (and thus there is no associated RS232 inversion). It is normally not used. ¹
2	TX	RS232 Out	+/-5	+/-7	+/-9	V	Transmits to external device at RS232 levels. ²
3	RX	RS232 In	+/-3		+/-15	V	Receives RS232 data from an external device. ²
4	DTR3	RS232 In	+/-3		+/-15	V	Data Terminal Ready 3. ²
5	GND			0		V	Ground.
6	DSR3	RS232 Out	+/-5	+/-7	+/-9	V	Data Set Ready 3. ²
7	VCC	Voltage Out	4.85	5	5.15	V	Internally generated 5V supply voltage. Not intended for high current applications (>250 mA).
8	VEXT	Voltage Out	9	12	18	V	This voltage is typically within 1 V of the MDC supply voltage.
					800	mA	Maximum current supply to all peripheral devices connected on COM1, 2, 3, and Keyboard. ³

1. See schematics for more information.
2. It is possible, by changing a jumper, to keep this output at 0 to 5V (digital) levels. See schematics for more information.
3. The current consumed by the MDC and all peripheral devices must not exceed 3A.

Keyboard

PIN NO.	NAME	I/O TYPE	MIN	TYP	MAX	UNIT	DESCRIPTION
1	VCC	Voltage Out	4.85	5	5.15	V	Internally generated 5V supply voltage. Not intended for high current applications (<250 mA).
2	KBRD-RXD	Keyboard Input	0		5	V	Keyboard signal that can be inverted internally. Operates at digital signal levels.
3	VEXT	Voltage Out	9	12	18	V	This voltage is typically within 1 V of the MDC supply voltage.
					800	mA	Maximum current supply to all peripheral devices connected on COM1, 2, 3, and Keyboard. ¹
4	NC	-					No connection.
5	GND			0		V	Ground.
6	NC	-					No connection.

1. The current consumed by the MDC and all peripheral devices must not exceed 3A.

Radio Interface¹

PIN NO.	NAME	I/O TYPE	MIN	TYP	MAX	UNIT	DESCRIPTION
1	RAD-TXA	Audio Out Type I	-8		8	V	Transmit radio signal. See Audio Type I section in Appendix.
2	RAD-RXA	Audio In	0		4	V _{pp}	Audio signal input.
3	MIC-OUT	Audio Out			5.6	V _{pp}	Microphone output.
4	MIC-IN	Audio In	0		4	V _{pp}	Microphone input.
5	RAD-TXA1	Audio Out Type I	-8		8	V	Transmit radio signal. Typically inverted RAD-TXA signal to be used in differential output situations (i.e. 9600 bps). Helps to reject noise. See Audio Type I section in Appendix.
6	PTT	Open Drain Output Type I	0		18	V	See Open Drain Output Type I section in Appendix.
			0		175	mA	
7	RAD-03	Open Drain Output Type I	0		18	V	See Open Drain Output Type I section in Appendix.
			0		175	mA	
8	DTR-COMM ²	RS-232 Out	+/-5	+/-7	+/-9	V	RS232 output. <i>Leave disconnected when an internal data modem is being used.</i>
9	COS	Analog In Type I	0		18	V	This line divides the input voltage by three. See Analog Type I section in Appendix.
10	RAD-I1 / O1 ²	Analog In Type I / Open Drain Output Type I	0		18	V	When used as an input, this line divides the input voltage by three. See Analog Type I section in Appendix. When used as an output, refer to the Open Drain Output Type I section in the Appendix. <i>Leave disconnected when an internal data modem is being used.</i>

Radio Interface continued

PIN NO.	NAME	I/O TYPE	MIN	TYP	MAX	UNIT	DESCRIPTION
11	DSR/RAD-I2 / O2 ²	Digital In Type I /Open Drain Output Type I	0		18	V	When used as an input, refer to Digital In Type I section in the Appendix. When used as an output, refer to the Open Drain Output Type I section in the Appendix. <i>Leave disconnected when an internal data modem is being used.</i>
12	CTS/RAD-I3 ²	Digital In Type I	0		18	V	Refer to Digital In Type I section in the Appendix. <i>Leave disconnected when an internal data modem is being used.</i>
13	TX_COMM ^{2,3}	RS-232 Out	+/-5	+/-7	+/-9	V	Transmits to external device at RS232 levels. This line may be converted to RS485 levels by changing Jumper JP1. <i>Leave disconnected when an internal data modem is being used.</i>
14	RX_COMM ^{2,3}	RS-232 In	+/-3		+/-15	V	Receives RS232 data from an external device. This line may be converted to RS485 levels by changing Jumper JP2. <i>Leave disconnected when an internal data modem is being used.</i>

1. Radio connector mates with Amp part number 1-87631-0.
2. Leave pins 8, 10, 11, 12, 13 and 14 disconnected when an internal wireless data modem is being used.
3. JP1 and JP2 cannot be changed independently. RS485 is a balanced interface. The DSP must be installed to make use of the MDCs RS485 capability. The RS485 interface has not yet been implemented.

Vehicle Interface¹

PIN NO.	NAME	I/O TYPE	MIN	TYP	MAX	UNIT	DESCRIPTION
1	VIN	Unregulated Voltage	9	12	18	V	MDC supply input. High current in.
2	J1850 BUS / 485-M (J1708)	J-1850 / RS-485	0 / -15	0 - 5	8.0 / 15	V	Transmits/receives J1850 signals / Inverting RS-485 Transceiver
3	485-P (J1708)	RS-485	-15	0 - 5	15	V	Non-inverting RS-485 Transceiver
4	HANDSET-TX	Audio In	0		4	Vpp	Audio signal input.
5	HANDSET-RX	Audio Out			5.6	Vpp	Audio signal output.
6	PA-TXA	Audio Out			5.6	Vpp	Audio signal output.
7	VEH-ODOM	Odometer In	0.4* 1		18 250**	Vpp Hz	Can be connected directly to a digital (0-5V) odometer signal or the odometer signal can be amplified and cleaned up within the MDC. Refer to the Odometer section in the Appendix.
8	VEH-I1	Analog In Type II	0		18	V	Refer to the Analog Input Type II section in the Appendix.
9	VEH-O1	Open Drain Output Type I	0		18 175	V mA	Refer to the Open Drain Output Type I section in the Appendix.
10	VEH-I2	Analog In Type II	0		18	V	Refer to the Analog Input Type II section in the Appendix.
11	VEH-O2	Open Drain Output Type I	0 0		18 175	V mA	Refer to the Open Drain Output Type I section in the Appendix.
12	VEH-I3	Analog In Type II	0		18	V	Refer to the Analog Input Type II section in the Appendix.
13	VEH-O3	Open Drain Output Type I	0 0		18 175	V mA	Refer to the Open Drain Output Type I section in the Appendix.
14	VEH-I4 / O4	Digital In Type II / Open Drain Output Type II	0		18	V	When used as an input refer to the Digital Input Type II section in the Appendix. When used as an output, refer to the Open Drain Output Type II section in the Appendix.
15	VEH-I5 / O5	Analog In Type II / Open Drain Output Type III	0		18	V	When used as an input refer to the Analog Input Type II section in the Appendix. When used as an output, refer to the Open Drain Output Type III section in the Appendix.
16	VEH-I6	Digital In	0		18	V	Refer to Ignition sense section in the Appendix.
17	GND			0		V	Ground. Can sink high currents.
18	GND			0		V	Ground. Can sink high currents.

1. Vehicle connector mates with Amp part number 1-87631-4.

* Odometer circuit sensitivity is dependant on frequency, Refer to the Odometer section in the Appendix.

** This is the ideal frequency range of the circuit, Refer to the Odometer section in the Appendix for extended frequency operation characteristics.