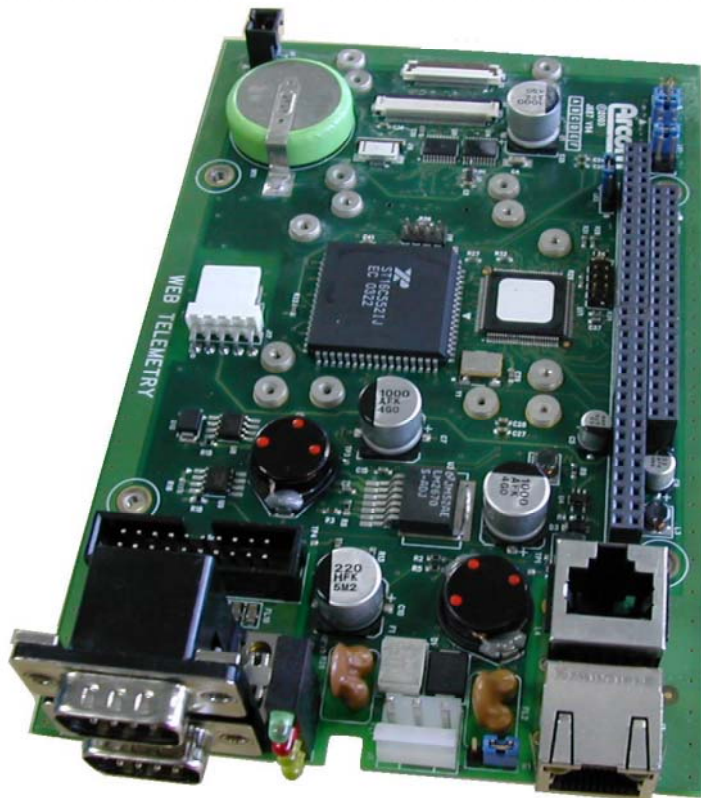# W-E-B Telemetry

(Wireless Embedded Baseboard for Telemetry)

Technical Manual

Arcom

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Definitions

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Revision History

Manual	PCB	Date	Comments
Issue A	V1 Issue 3	15th December 2005	First full release of Manual

Arcom operates a company-wide quality management system which has been certified by the British Standards Institution (BSI)

Contents

About this manual

This manual provides detailed information about the W-E-B Telemetry board. It explains, with examples, how to get the most from this product.

Conventions

Symbols

The following symbols are used in this guide:

Symbol	Explanation
	Note - information that requires your attention.
	Tip - a handy hint that may provide a useful alternative or save time.
	Caution – proceeding with a course of action may damage your equipment or result in loss of data.
	Jumper fitted.
	Jumper not fitted.

Related documents

In addition to this manual, you can obtain useful information from a variety of sources including:

- Motorola iO1500 iDEN Modem Module
- Motorola iO200 WiDEN Modem Manual
- Sony Ericsson GR47/48 Modem Manual
- SIEMENS MC35i Modem Manual
- Trimble GPS Receiver Manual
- SM-837/1900: RM3-900/1900 Antennas
- Antennas

Introduction

The W-E-B Telemetry (Wireless Embedded Baseboard for Telemetry) board is a rugged, modular platform for applications in telemetry and telematics. The board makes it easy to integrate three essential features of any new asset monitoring solution - wireless modem, GPS receiver and complete power supply solution to power your system.

Features

- Wide DC input voltage range (10V to 30V).

- Automotive transient and surge protected.

- Supply reverse voltage protected.

- Input power and ignition sensing circuitry.

- 8 / 16bit PC/104 bus interface.

- On board 5V supply, delivers up to 2.5A (for host CPU and expansion modules).

- On board 3.6V supply, delivers up to 2.5A (for breakout and wireless modules).

- On board ±12V supply, delivers up to 250mA (for breakout and PC/104).

- Extended temperature range lithium back-up battery for GPS module.

- Dual 16C550 compatible UART provides serial link to wireless modules directly from PC/104 bus.

- EMC filtered breakout for two 16C550 serial ports.

- Breakout for 10/100 Base-T Ethernet (with integrated activity and speed LEDs).

- Direct Plug 'n' Go connection for Siemens MC35i OEM modem module.

- Direct Plug 'n' Go connection for Sony Ericsson GR47/48 OEM modem module.

- Direct Plug 'n' Go connection for Motorola iDEN iO1500 OEM modem module.

- Direct Plug 'n' Go connection for Motorola WiDEN iO200 OEM modem module.

- Direct Plug 'n' Go connection for Trimble Lassen SQ GPS module.

- 3 user definable status LEDs.

- Integrated SIM (Subscriber Identity Module) card connector.

W-E-B Telemetry 'at a glance'

Base Address selector link

iO200 Push To Talk

8/16bit PC1/104 interface

Ethernet pass through connector

Ethernet LEDs

Ethernet breakout connector

DC input connector

iO1500 interface

MC35i interface

iO200 SIM card interface

Power and user LEDs

Dual stack DB9 connector (serial port breakouts)

3V lithium battery connector

3V lithium backup battery

Auxiliary power

Serial ports pass through connector

iO200 antenna

iO200 GPS antenna

iO200 CELL antenna

iO200 interface

SIM card interface

GR47/47 interface

GPS interface

Handling your board safely

Anti-static handling

> This board contains CMOS devices that could be damaged in the event of static electricity discharged through them. At all times, please observe anti-static precautions when handling the board. This includes storing the board in appropriate anti-static packaging and wearing a wrist strap when handling the board.

Batteries

> The W-E-B Telemetry board contains a Lithium battery to maintain the configuration of the GPS unit, if present.

> Do not short circuit the batteries or place on a metal surface where the battery terminals could be shorted. During shipment the battery is isolated from the boards circuitry and should be connected before using the board. Please refer to the link section of this manual for details.

> Dispose of used batteries according to the manufacturer's instructions and local ordinances. Do not incinerate, crush or otherwise damage the batteries.

> The batteries are non-rechargeable. There is a danger of explosion if a lithium battery is recharged or incorrectly replaced.

> The Lithium battery on the W-E-B Telemetry base board has a life expectancy of 5 years. This battery should only be replaced by qualified service personnel.

Packaging

> Please ensure that should a board need to be returned to Arcom, it is adequately packed, preferably in the original packing material. If the original packing material is not available, return the board in an anti-static bag contained within a box that provides suitable protection.

Electromagnetic compatibility (EMC)

> The W-E-B Telemetry board is classified as a component with regard to the European Community EMC regulations, it is the responsibility of the end user to ensure that systems using the board are compliant with the appropriate EMC standards.

> Arcom EMC tests of the W-E-B Telemetry board have shown that the RF emissions of the board are well below standard international EMC limits and that it is unlikely to contribute significantly to the RF emissions spectrum of any system in which it is used.

> The optional wireless modules catered for by the W-E-B Telemetry board all have full regulatory approval from the appropriate agencies.

Detailed hardware description

The following section provides a detailed description of the functions offered by the W-E-B Telemetry board. This information may be required during development.
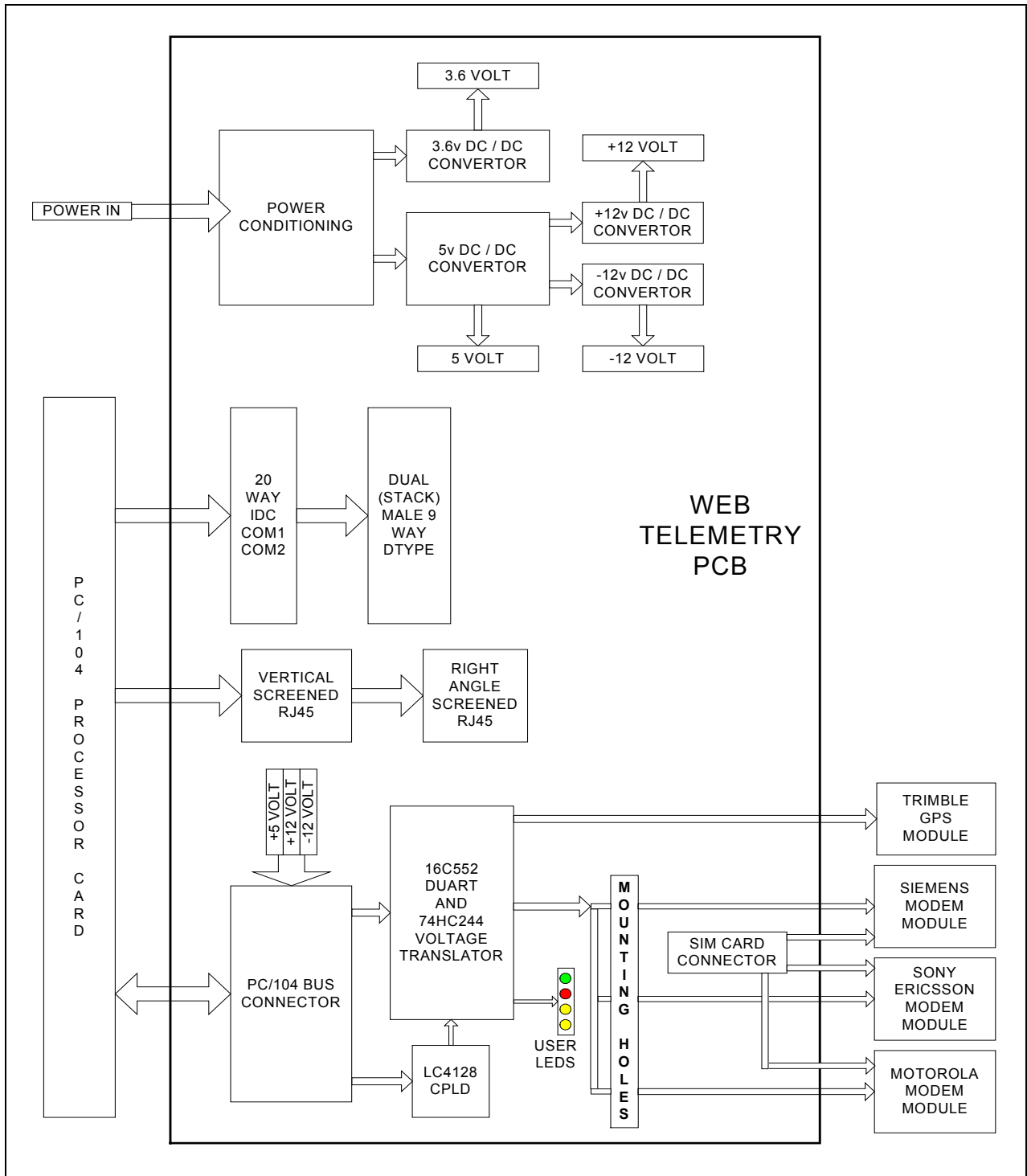
W-E-B Telemetry block diagram

W-E-B Telemetry board footprint

The board is 100mm (3.93") by 155mm (6.10") and is 1.6mm (63 thou) thick.

Power supply requirements

The board is designed to accept a 10V to 30V DC power supply, nominally 12V DC.

Power conditioning

The input supply lines are protected using re-settable surface mount fuses. These fuses can only be reset by power cycling the board.

The PCB also provides protection for reverse voltage and transient voltages to comply with ETSI EN 301 489-1 V1.4.1, ISO 7637-1 and ISO 7637-2.

On board EMC filtering minimizes conducted noise.

Switch mode power supplies

On board DC/DC converters provide the necessary power rails:

- +5V, 2.5A max.
- +3.6V, 2.5A max.
- +12V, 250mA max.
- -12V, 150mA max.
- +1.8V, 100mA max (see Sony Ericsson modem module).

Network interface

A 10/100Base-T Ethernet connector is mounted on the front edge of the PCB to allow direct mounting to a front panel. The RJ45 connector incorporates activity and speed LEDs. The network connection is provided by the PC/104 processor card and is connected to the board by a standard RJ45 cable.

Serial interface

A dual port male DB9 connector is mounted on the front edge of the PCB to allow direct mounting to a front panel. The RS-232 serial connection is provided by the PC/104 processor card and is connected to the board by a standard 20-way IDC ribbon cable.

PC/104 bus support

The board includes an 8bit PC/104 slave interface conforming to IEEE996.1. The module includes a 16bit connector to accommodate connections for additional interrupt lines.

Power supervisory circuit

A supervisory circuit monitors the DC input supply. This signal creates an interrupt (*Power Fail*) to indicate an occurrence of the DC supply voltage falling below 8V DC.

The number of interrupt resources required is minimized by concatenating several interrupts into a single signal. This interrupt is concatenated with the *Ignition Sense* interrupt.

Ignition sense circuit

A supervisory circuit monitors an auxiliary (Ignition) input supply. This signal creates an interrupt (*Ignition Sense*) to indicate an occurrence of the DC supply voltage falling below 8V DC and rising above 8V DC.

The number of interrupt resources required is minimized by concatenating several interrupts into a single signal. This interrupt is concatenated with the *Power Fail* interrupt.

Dual UART 16C552

Two on board 16C550 compatible serial ports support optional wireless modules, whilst a parallel port supports digital I/O.

Modem ON / OFF control signal

When power is initially applied to the board, the modem modules are in a low power/off state. Toggle the ON / OFF control signal to turn the modules on. The ON/OFF signal is provided by the parallel port (bit 3). The address of this signal is Base address (as selected at LK1) +10H.

To turn the modem module on, follow these steps:

1   Apply power to the board.

2   Write a '1' to bit 3 of parallel port. The status of the signal is `{on}`.

3   Wait 10ms then write a '0' to bit 3 of parallel port. The status of the signal is `{off}`.

4   Wait 600ms, then write a '1' to bit 3 of parallel port. The status of the signal is `{on}`.

To turn the Motorola modem module off, write a '0' to bit 3 of parallel port, (off).

To turn the Sony Ericsson / Siemens modem module off, follow these steps:

1   Write a '1' to bit 3 of parallel port. The status of the signal is `{on}`.

2   Wait 10ms, then write a '0' to bit 3 of parallel port. The status of the signal is `{off}`.

3   Wait 1000ms, then write a '1' to bit 3 of parallel port. The status of the signal is `{on}`.

Status LEDs

Four status LEDs are provided, in a traffic light stacked arrangement. This is positioned on the front edge of the PCB to allow direct mounting to a front panel:

- A green LED provides visual confirmation of power.

- A red LED and two yellow LEDS are user controlled.

The LEDs are accessed through the parallel port (bit 0 red; Bit 1 yellow; Bit 2 yellow). The address of these LEDs is Base address (as selected at LK1) +10H.

Write a '1' to the appropriate bit to turn the LED off.

Write a '0' to the appropriate bit to turn the LED on.

Optional modules

The optional modem modules are secured to the board via four 2mm * 12mm long posidrive screws and four 4mm long spacers.

These parts are included with the PCB.

Trimble GPS module

The board supports a Trimble "Lassen SQ" GPS module, which is an eight-channel low power device. The interface to the GPS module is via port 0 of the UART. The physical address of this port is base address and uses IRQ6 as the default interrupt.

The GPS module is located on the secondary side of the PCB. It is shown in the following photograph:

Sony Ericsson GPRS module

For worldwide cellular operations the W-E-B Telemetry board supports a Sony Ericsson GR47 / GR48 modem module. Mounting positions, RTC supply and module interface connector are all provided. A SIM card connector for the modem module is also provided on the secondary side of the board. The module's Real Time Clock back-up function is provided by a 1.8V battery-backed power supply.

The interface to the Modem is via port 1 of the UART.

The physical address of this port is base address +08H and uses IRQ15 as the default interrupt.

The Sony Ericsson GPRS module is shown in the following photograph:

Siemens GPRS module

For worldwide cellular operations the board supports a Siemens MC35i modem module. Mounting positions and module interface connector are all provided. A SIM card connector for the modem module is also provided on the secondary side of the board.

The interface to the Modem module is via port 1 of the UART.

The physical address of this port is base address +08H and uses IRQ15 as the default interrupt.

The Siemens GPRS module is shown in the following photograph:

Motorola iDEN module

For American cellular operations the board supports a Nextel (Motorola) modem module. Mounting positions and module interface connector are all provided.

The interface to the Modem module is via port 1 of the UART.

The physical address of this port is base address +08H and uses IRQ15 as the default interrupt.

The Motorola iDEN module is shown in the following photograph:

Motorola WiDEN module

The PCB also supports a Nextel (Motorola) WiDEN module. Mounting positions and module interface connector are all provided. The interface to the modem module is via port 1 of the UART.

The physical address of this port is base address +08H and uses IRQ15 as the default interrupt.
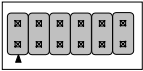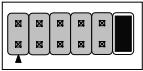
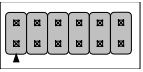The Motorola WiDEN module is shown in the following photograph:

Board configuration

Jumpers

LK1 – Base address & IRQ selector

Link	Description
	Modem IRQ = IRQ15. GPS IRQ = 6. Parallel port IRQ = 12.
	Modem IRQ = IRQ11. GPS IRQ = 6. Parallel port IRQ = 12.

Link	Description
	Base address of W-E-B Telemetry PCB set to 0x3E0.
	Base address of W-E-B Telemetry PCB set to 0x0.
	Base address of W-E-B Telemetry PCB set to 0x180.

LK2 – GSM module select

Link	Description
	Siemens modem module fitted.
	Sony Ericsson modem module fitted.

W1 – Ignition Sense enable

Link	Description
	Ignition Sense enabled.
	Ignition Sense disabled.

Equipment you will need

Supplied equipment

The W-E-B Telemetry package includes the following components:

- W-E-B Telemetry board.
- W-E-B Telemetry CD, including documentation.

What you will need

In addition to the W-E-B Telemetry package, you will need the following hardware:

- Power supply.
- Modem module with network connection (optional).
- Trimble GPS module (optional).
- Antennas.
- RS-232 null modem cable.
- Test computer with RS-232 communication port and Ethernet.
- Processor card with PC/104 bus support conforming to IEEE996.1.

The board has been designed for applications using Arcom's low power PC/104 processor boards, such as the XScale based VIPER and VULCAN, or x86 compatible PEGASUS and AIM104-386EX.

Memory map

Address	Function
180h – 187h	Chip select for Trimble GPS module.
188h – 18Fh	Chip select for Modem module.
190h – 194h	Chip select for UART & parallel port.

The 180h address indicated above is the default address and is set at time of manufacture. See Jumpers, page 17, for information about changing the physical base address.

Ports and connectors

There are 21 connectors for accessing external devices:

Connector	Function	See page…
J1	DC input supply.	21
J2	Ethernet output.	21
J3	Siemens interface.	21
J4	Ethernet input.	21
J5	Lithium battery.	22
J6	Serial COMS input.	23
J7	Sony Ericsson interface	24
J8	SIM card connector.	25
J9	Ethernet LED interface.	25
J10	iO200 antenna interface.	25
J11	iO200 CELL antenna interface.	26
J12	iO200 GPS antenna interface.	26
J17	Auxiliary power output.	26
J18	iO200 PTT interface.	27
J19	iO200 SIM interface.	27
P2	iO1500 interface.	27
P3	GPS interface.	28
P4	PLD program interface.	29
P5	Serial COMS output.	23
P60, 61	PC/104 bus connectors.	29
P62	iO200 interface.	30

J1 (Power connection)

Mating connector: Molex 09-91-0300

Mating crimp: Molex 08-50-0106.

The pin assignments for the power connection are as follows:

Pin	Signal name
1	Negative
2	Positive
3	I (Ignition)

J2 (Ethernet LAN connection) and J4 (Ethernet from processor card)

The pin assignments for J2 and J4 connections are as follows:

Pin	Signal name
1	Transmit +
2	Transmit -
3	Receive +
4	Reserved
5	Reserved
6	Receive -
7	Reserved
8	Reserved

J3 (Siemens modem interface)

Mating cable: FFC0.50A40/0070L5.0-5.0-10.0-10.0SABB.

Manufacturer: Tyco.

The UART connected to this interface is a 5V device. A buffer is used as a voltage translator. This buffer is powered by VOUT.

The pin assignments for J3 connections are as follows:

Pin	Signal name	Pin	Signal name
1	+3.6VDC	2	+3.6VDC
3	+3.6VDC	4	+3.6VDC
5	+3.6VDC	6	Ground (0v)
7	Ground (0v)	8	Ground (0v)
9	Ground (0v)	10	Ground (0v)
11	NC	12	NC
13	+VOUT	14	NC
15	ON/OFF	16	MDM DSR
17	MDM RI	18	MDM RXD
19	MDM CTS	20	MDM RTS
21	MDM DCD	22	MDM TXD
23	NC	24	SIMPRES
25	SIMRST	26	SIMDATA
27	SIMCLK	28	SIMVCC
29	SIMGND	30	+VBAT
31	NC	32	NC
33	NC	34	NC
35	NC	36	NC
37	NC	38	NC
39	NC	40	NC

J5 (Lithium battery output)

Mating connector: Molex 50-57-9702.

Mating crimp: Molex 16-02-0104.

The pin assignments for J5 connection are as follows:

Pin	Signal name
1	+3.6v
2	0v

J5 is directly connected to the lithium battery.

Any equipment connected to J5 must include battery protection equipment (current limit resistor, reverse voltage protection).

P5 (COM0 & COM1, RS-232)

Pin assignments for the serial ports are as follows.

Pin	Signal name	Pin	Signal name
1T	DCD1	1B	DCD0
2T	RXD1	2B	RXD0
3T	TXD1	3B	TXD0
4T	DTR1	4B	DTR0
5T	Ground (0v)	5B	Ground (0v)
6T	DSR1	6B	DSR0
7T	RTS1	7B	RTS0
8T	CTS1	8B	CTS0
9T	RI1	9B	RI0

J6 (COM0 & COM1 from processor card)

Mating Connector: 3M Ref number 3421-6600

Pin assignments for the serial ports are as follows:

Pin	Signal name	Pin	Signal name
1	DCD0	2	DSR0
3	RXD0	4	RTS0
5	TXD0	6	CTS0
7	DTR0	8	RI0
9	Ground0 (0v)	10	No connect
11	DCD1	12	DSR1
13	RXD1	14	RTS1
15	TXD1	16	CTS1
17	DTR1	18	RI1
19	Ground1 (0v)	20	No connect

J7 (Sony Ericsson modem interface)

Pin assignments for the Sony Ericsson modem interface are as follows:

Pin	Signal name	Pin	Signal name
1	+3.6VDC	2	Ground (0v)
3	+3.6VDC	4	Ground (0v)
5	+3.6VDC	6	Ground (0v)
7	+3.6VDC	8	Ground (0v)
9	+3.6VDC	10	Ground (0v)
11	NC	12	Ground (0v)
13	NC	14	ON/OFF
15	SIMVCC	16	SIMPRES
17	SIMRST	18	SIMDATA
19	SIMCLK	20	NC
21	NC	22	NC
23	NC	24	NC
25	VBAT	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	MDM DSR
33	NC	34	+VOUT
35	NC	36	MDM RI
37	MDM DTR	38	MDM DCD
39	MDM RTS	40	MDM CTS
41	MDM TXD	42	MDM RXD
43	NC	44	NC
45	NC	46	+VOUT
47	NC	48	NC
49	NC	50	NC
51	NC	52	NC
53	NC	54	NC
55	NC	56	NC
57	NC	58	NC
59	NC	60	NC

J8 (SIM card connector)

Pin assignments for the SIM card are as follows:

Pin	Signal name
1	Vcc
2	Reset
3	Clock
4	Data
5	N.C
6	Ground (0v)
7	Switch N.O
8	Switch Com

J9 (Ethernet LEDs)

Mating connector: Neltron 2418HJ-02-PHD.

Mating connector crimps (x3):   Neltron 2418TJ-PHD

Pin assignments for the Ethernet LEDs are as follows:

Pin	Signal name
1	N.C
2	100 BaseT
3	N.C
4	10 BaseT
5	N.C
6	Activity

J10 (iO200 modem antenna interface)

Pin assignments for the U.FL style connector are as follows:

Pin	Signal name
Center pin	RF Signal
Ring	RF Ground

J11 (iO200 modem CELL antenna interface)

Pin assignments for the U.FL style connector are as follows:

Pin	Signal name
Center pin	RF Signal
Ring	RF Ground

J12 (iO200 modem GPS antenna interface)

Pin assignments for the U.FL style connector are as follows:

Pin	Signal name
Center pin	RF Signal
Ring	RF Ground

J17 (Auxiliary power)

Mating connector: Molex 22 01 2055.

Mating connector crimps (x5):   Molex 08 50 0032.

Pin assignments for the auxiliary power are as follows:

Pin	Signal name
1	+5v
2	+3.6v
3	+12v
4	Ground (0v)
5	-12v

J18 (iO200 modem Push To Talk - PTT)

Mating connector: Molex 22 01 2055.

Mating connector crimps (x5):   Molex 08 50 0032.

Pin assignments for PTT are as follows.

Pin	Signal name
1	Speaker out
2	Microphone in
3	PTT Switch
4	+5v
5	Ground (0v)

J19 (iO200 modem SIM card interface)

Mating cable: FFC0.50A06/0050L5.0-5.0-10.0-10.0SABB

Manufacturer: Tyco.

Pin assignments for the SIM card interface are as follows:

Pin	Signal name
1	RESET
2	VCC
3	Ground (0v)
4	DATA
5	Ground (0v)
6	CLOCK

P2 (iO1500 modem interface)

Mating cable: FFC0.50A30/0050L5.0-5.0-10.0-10.0SABB.

Pin assignments for the iO1500 modem interface are as follows:

Pin	Signal name	Pin	Signal name
1	DMTXD	2	MDM RXD
3	MDM DTR	4	MDM DCD
5	GND	6	MDM RTS

continued…

Pin	Signal name	Pin	Signal name
7	MDM CTS	8	MDM DSR
9	MDM RI	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	+VOUT
17	ON/OFF	18	PROG
19	+3.6VDC	20	+3.6VDC
21	+3.6VDC	22	+3.6VDC
23	+3.6VDC	24	NC
25	NC	26	Ground (0v)
27	Ground (0v)	28	Ground (0v)
29	Ground (0v)	30	Ground (0v)

P3 (GPS interface)

The UART connected to this interface is a 5V device. A buffer is used as a voltage translator. VOUT is used to power this buffer.

The modem is a DCE device software.

Pin assignments for the GPS interface are as follows:

Pin	Signal name
1	GPS TX
2	Ground (0v)
3	GPS RX
4	PPS
5	N.C
6	N.C
7	+3.6v
8	VBAT

P4 (PLD Program Header)

Mating connector:　　Lattice program.

Cable:　　　　　　　Available only from Lattice Semiconductors.

Pin assignments for the PLD header are as follows:

Pin	Signal name
1	Ground (0v)
2	SDO
3	/ISPEN
4	MODE
5	SDI
6	CLK
7	N.C
8	N.C
9	+5V
10	Ground (0v)

P60,61 PC/104 bus connectors)

Pin assignments for the PC/104 bus are as follows:

Pin	Row A	Row B	Row C	Row D
0		-	Ground	Ground
1	/IOCHCK	Ground	/SBHE	/MEMCS16
2	D7	RSTDRV	LA23	/IOCS16
3	D6	+5V	LA22	IRQ10
4	D5	IRQ9	LA21	IRQ11
5	D4	N.C	LA20	IRQ12
6	D3	DRQ2	LA19	IRQ15
7	D2	-12V	LA18	IRQ14
8	D1	/ENDXFR	LA17	/DACK0
9	D0	+12V	/MEMR	DRQ0
10	IOCHRDY	KEY	/MEMW	/DACK5
11	AEN	/SMEMW	D8	DRQ5

Pin	Row A	Row B	Row C	Row D
12	A19	/SMEMR	D9	/DACK6
13	A18	/IOW	D10	DRQ6
14	A17	/IOR	D11	/DACK7
15	A16	/DACK3	D12	DRQ7
16	A15	DRQ3	D13	+5V
17	A14	DACK1	D14	MASTER
18	A13	DRQ1	D15	Ground
19	A12	/REFRESH	KEY	Ground
20	A11	SYSCLK	-	-
21	A10	IRQ7	-	-
22	A9	IRQ6	-	-
23	A8	IRQ5	-	-
24	A7	IRQ4	-	-
25	A6	IRQ3	-	-
26	A5	/DACK2	-	-
27	A4	TC	-	-
28	A3	BALE	-	-
29	A2	+5V	-	-
30	A1	OSC	-	-
31	A0	Ground	-	-
32	Ground	Ground	-	-

P62 (iO200 modem interface)

Pin assignments for the iO200 modem interface are as follows:

Pin	Signal name	Pin	Signal name
1	SPKR POS	2	SPKR NEG
3	MIC POS	4	MIC NEG
5	ON/OFF	6	HOST WAKE UP
7	RESERVED	8	FIRMWARE UPLOAD EN
9	RESERVED	10	OPTION SELECT 1

continued…

Pin	Signal name	Pin	Signal name
11	OPTION SELECT 2	12	RESERVED
13	RESERVED	14	VOUT
15	RED STATUS LED	16	GREEN STATUS LED
17	CTS2	18	RTS2
19	TXD2	20	RXD2
21	RI	22	CDI
23	CTS	24	RTS
25	DTR	26	DSR
27	TXD1	28	RXD1
29	RESERVED	30	RESERVED
31	VBAT	32	Ground (0v)
33	VBAT	34	Ground (0v)
35	VBAT	36	Ground (0v)
37	VBAT	38	Ground (0v)
39	VBAT	40	Ground (0v)

The UART connected to this interface is a 5v device, a buffer is used as a voltage translator. VOUT is used to power this buffer

The modem is a DCE device.

Antenna considerations

The antenna must be mounted like any other cellular or land mobile radio antenna. For vehicle applications the best position is usually the center of the vehicle roof, which provides a fairly symmetric ground plane.

Use this information to help assist you in selecting the appropriate antenna for your product

Antenna safety

The following statement from the American National Standards Institute (ANSI) specifies the safety criteria that integrators must use when designing products with radiating elements:

"The design of the integrated product must be such that the location used and the other particulars of the antenna comply with the ANSI guidelines concerning Radio Frequency Energy Exposure and with any other nationally recognized radio frequency standards that may be applicable thereto."

For mobile operation with an external antenna, the modem module must be installed in a manner that provides a minimum separation distance of 300mm (12") or more between the antenna and all persons, in order to satisfy FCC RF exposure requirements for mobile transmitting.

These safety precautions must be observed during all phases of operation. Manufacturers of cellular terminal equipment are advised to convey the following safety information:

- When in a hospital or health care facility, observe the restrictions on the use of mobiles. Observe the guidelines posted; medical equipment may be sensitive to RF energy.

- Switch off cellular equipment before boarding an aircraft. Make sure it cannot be turned on inadvertently. The operation of wireless appliances in an aircraft is forbidden.

- Do not operate cellular equipment in the presence of flammable gases or fumes. Switch off cellular equipment when near petrol stations, fuel depots, chemical plants or where blasting operations are in progress. Operation of electrical equipment in potentially explosive atmospheres can constitute a safety hazard.

ESD protection

In order to protect the modem modules against ESD damage it is recommended that only rubber-coated antennas are used.

Antenna performance

Typically, the network operator sets the antenna network requirements.

Appendix A - Contacting Arcom

Arcom sales

Arcom's sales team is always available to assist you in choosing the board that best meets your requirements. Contact your local sales office or hotline.

Sales office US

Arcom
7500W 161st Street
Overland Park
Kansas
66085
USA

Tel: 913 549 1000
Fax: 913 549 1002

E-mail: us-sales@arcom.com

Sales office UK

Arcom
Clifton Road
Cambridge
CB1 7EA
UK

Tel: 01223 411 200
Fax: 01223 410 457
E-mail: sales@arcom.co.uk

Comprehensive information about our products is available from our web sites: www.arcom.com and www.arcom.co.uk.

While Arcom's sales team can assist you in making your decision, the final choice of boards or systems is solely and wholly the responsibility of the buyer. Arcom's entire liability in respect of the boards or systems is as set out in Arcom's standard terms and conditions of sale. If you intend to write your own low level software, you can start with the source code on the disk supplied. This is example code only to illustrate use on Arcom's products. It has not been commercially tested. No warranty is made in respect of this code and Arcom shall incur no liability whatsoever or howsoever arising from any use made of the code.

Technical support

Arcom has a team of technical support engineers available to provide a quick *and free* response to your technical queries.

Technical support US

Tel: 913 549 1010

Fax: 913 549 1001

E-mail: us-support@arcom.com

Technical support UK

Tel: +44 (0)1223 412 428

Fax: +44 (0)1223 403 409

E-mail: euro-support@arcom.com

Appendix B - Technical specifications

W-E-B Telemetry

Power

Input power:	10 - 30V DC.
Overvoltage/reverse voltage protection:	100V DC.
Ignition sense input:	12V DC protected.
Power consumption:	8 Watts (excluding GPS).
	Trimble SQ GPS (GPS module only): 100 mW@3.3V. Trimble SQ GPS (w/ embedded antenna): 133 mW@3.3V.

Environmental

Humidity:	5% to 95% RH (non-condensing).	
Temperature:	Operating:	-30°C to +65°C.
	Storage:	-20°C to +85°C.
Weight:	0.83 kg (1.83 lbs) excluding optional cards.	

GPS interface

General

Product:	Lassen™ SQ GPS receiver (Trimble).	
Characteristics:	L1 frequency (1575.42 MHz), C/A code (Standard Positioning Service), 8-channel, continuous tracking receiver, 32 correlators.	
Update rate:	TSIP @ 1 Hz; NMEA @ 1 Hz, TAIP @ 1HZ	
Accuracy:	Horizontal:	<6 meters (50%), <9 meters (90%).
	Altitude:	<11 meters (50%), <18 meters (90%).
	Velocity:	0.06 m/sec.
	PPS:	±95 nanoseconds.
Protocols:	TSIP at 9600 baud, 8 bits (selectable baud rate). NMEA 0183 v3.0 (selectable baud rate, 8 bits). TAIP.	
NMEA messages:	GGA, VTG, GLL, ZDA, GSA, GSV and RMC Messages selectable by TSIP command	

Acquisition

Reacquisition:	<2 sec (90%).
Hot start:	<14 sec (50%), <18 sec (90%).
Warm start:	<38 sec (50%), <45 sec (90%).
Cold start:	<90 sec (50%), <170 sec (90%).
Initialization:	Cold start requires no initialization. Warm start requires last position; time and almanac are saved in battery back-up memory. Hot start requires that the ephemeris also saved.
Dynamics:	Acceleration: 4g (39.2m/sec2) Motional jerk: 20m/sec3.
Operational limits:	Altitude <18000m or velocity <515m/s. (COCOM limit). Either limit may be exceeded, but not both.

Appendix C - Mechanical specifications

Mechanical dimensions (in mm) – primary side
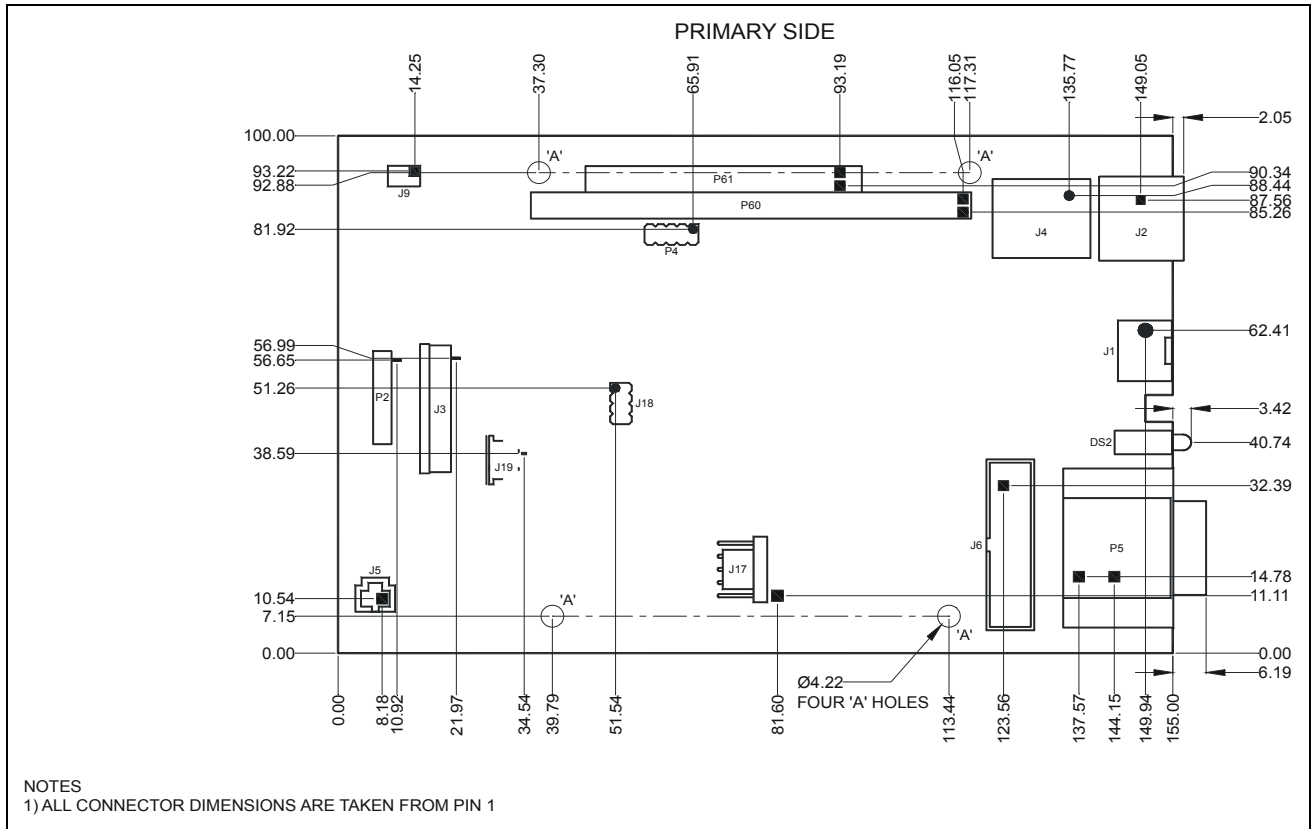
Mechanical dimensions (in mm) – secondary side

NOTES
1) ALL CONNECTOR DIMENSIONS ARE TAKEN FROM PIN 1

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