Terminus CDMA864D Hardware User Manual

JANUS REMOTE COMMUNICATIONS

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2 REFERENCES

2.1 Telit Document List

Please refer to Telit's website at ***www.telit.com*** for the latest information on the CC864-DUAL module.

2.1.1 CC864 Hardware User Guide

2.1.2 CC864 Software User Guide

2.1.3 AT Commands Reference Guide

3 OVERVIEW

3.1 Introduction

The Terminus CDMA864D is a self-contained, dual-band CDMA/1xRTT terminal device designed to provide a comprehensive solution to application problems for our M2M customers. It utilizes the proven technology of the Telit CC864-DUAL module for its core communications engine as well as the Dual-Mode GPS receiver (standalone and gpsOne) for the added flexibility of GPS.

3.2 Functional Description

3.2.1 Connectors

Antenna Connectors

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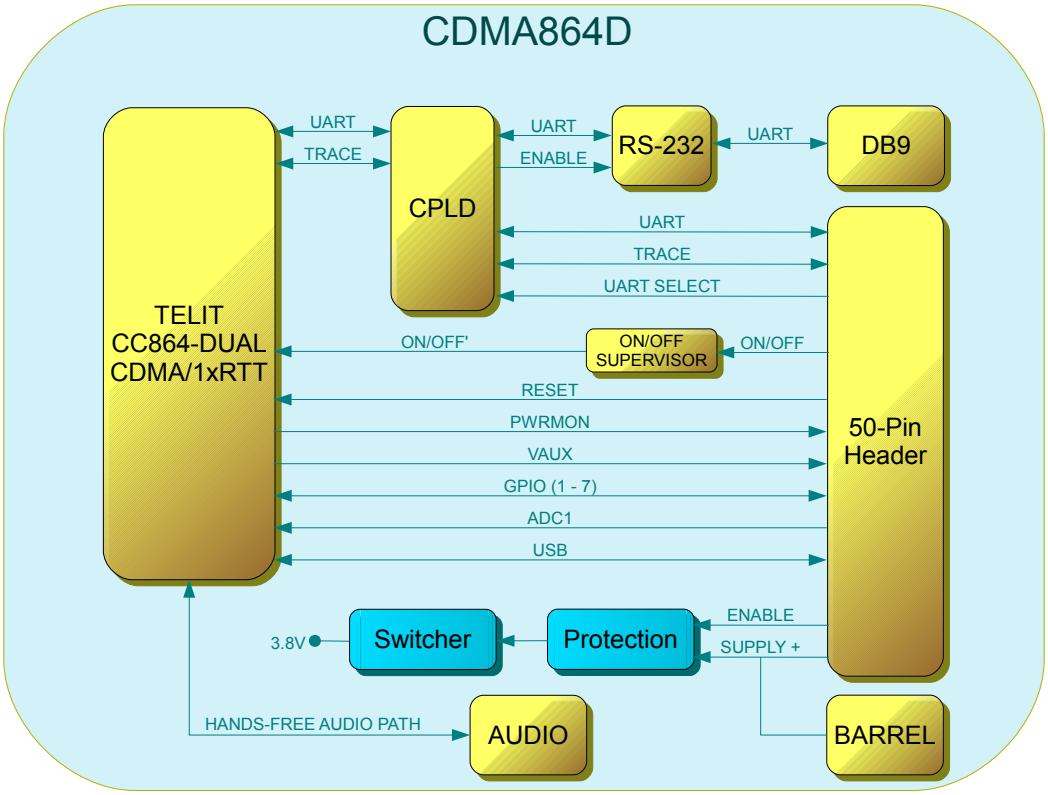
3.2.2 Block Diagram



3.3 Features

3.3.1 CDMA Features

- Dual-band CDMA 800 / 1900 MHz
- Air interface IS-95A/B and CDMA 2000
- 1xRTT Data up to 153.6Kbps (full duplex)
- TCP/IP stack access via AT commands
- Over-the-Air firmware management
- Voice and SMS (MO / MT)
- Full voice support includes Supplementary Services
- Output power
  - 24.3 dBm (270mW)
- Sensitivity:
  - -108 dBm (typ.) @ 800 MHz
  - -108 dBm (typ.) @ 1900 MHz
- Operational temperature range: -30°C to 80°C
- Dimensions: 2.5 x 1.4 x 0.415”
- Internal switching regulator
  - Input Voltage range: 7 to 18Vdc (12.0Vdc Nominal)
  - Supply disable via terminal input pin
- Cellular and GPS available via Murarta GSC miniature RF connector
- GPS
  - Stand-alone GPS available at AT command interface
  - GpsOne® (User and Control plane)
  - NMEA Data
  - GPS fix on Demand
  - Dedicated GPS antenna connection with active antenna support

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4 INTERFACES

4.1 Serial Interface Connector

4.1.1 Description

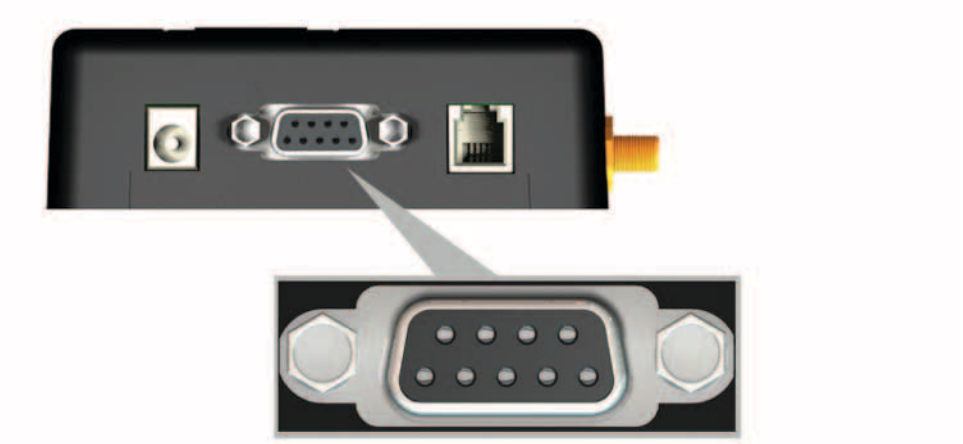
The Terminus serial interface is an RS-232 port that supports both EIA/TIA-232 and V.28/V.24 communications protocols. It accepts a standard RS-232 Sub-D, 9-pin male plug. Communications settings for this port are as follows:

- Baud Rate: 115.2kbps
- Bits: 8
- Stop Bits: 1
- Parity: none
- Hardware Handshaking: Yes

4.1.2 Pin-Out

Pin	Description	I/O	Signal Type
1	Carrier Detect (CD)	OUTPUT	RS-232
2	Received Data (RxD)	OUTPUT	RS-232
3	Transmitted Data (TxD)	INPUT	RS-232
4	DTE Ready (DTR)	INPUT	RS-232
5	Signal Ground	N/A	N/A
6	DCE Ready (DSR)	OUTPUT	RS-232
7	Request to Send (RTS)	INPUT	RS-232
8	Clear to Send (CTS)	OUTPUT	RS-232
9	Ring Indicator (RI)	OUTPUT	RS-232

4.1.3 Signal Interface Description



6) DSR 7) RTS 8) CTS 9) RI
1) CD 2) RxD 3)TxD 4) DTR 5) GND

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4 Interfaces continued

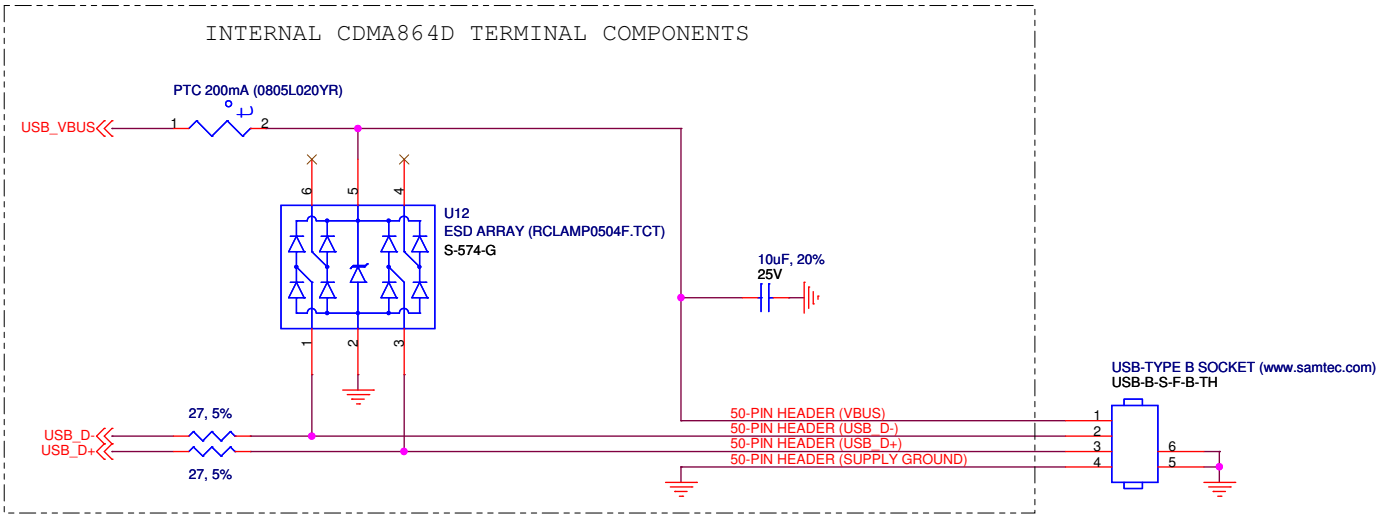
4.2 USB Interfaces:

4.2.1 USB Port

The CDMA864D Terminal includes an integrated universal serial bus (USB) transceiver, compliant with USB 2.0 specifications and supporting the USB Full-Speed (12 Mb/s) mode. The CMDA864D includes all active and passive components to implement the USB function and the user only need add a USB connector external to the Terminal.

Note: You must have access to the USB interface in order to locally update radio firmware for the embedded CDMA module.

4.2.2 USB Connection Diagram



4.3 Power Supply

4.3.1 Description

The Terminus Power Supply jack accepts input voltages from 7 to 18 VDC and requires a nominal current sourcing capacity of 5W (maximum 10W). This jack accepts a barrel type plug with a receptacle for a 2.1mm center conductor.

The Terminus is equipped with protection circuitry to prevent reverse voltage, as well as help with protection from transients.

The Terminus can withstand a reverse voltage of-60V and a peak voltage of 80V. The circuitry is set to clip any input greater than 26V to a safe level. Any input above 26V will read for a set period, and if before 20 mS it hasn't returned to safe level, the over-voltage protection will activate and turn off the output.

To re-enable the output, power must be cycled or the ENABLE_SUPPLY pin (pin 39) must be pulled low at least 100 µS and then released.

4.3.2 Pin Out

Pin	Description
Center Pin	Supply (+)
Outer Conductor	Supply (-)

4.3.3 Power Supply Interface

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4 Interfaces continued

4.4 Audio Interface

4.4.1 Description

The Terminus audio interface is designed to accommodate a telephone handset with a 4P4C modular plug. The input circuit supports a balanced, low-impedance microphone and can supply a bias voltage of 3.0 VDC. Its characteristics are as follows:

Hands Free Audio Input Circuit (Mic)

- Line Coupling: AC
- Line Type: Balanced
- Coupling Capacitor: ≥100nF
- Differential Input Resistance: 20kΩ
- Differential Input Voltage: ≤1,03 Vpp@ HFMICG = 0 dB)
- Microphone Gain: TDB/step, 7 steps total

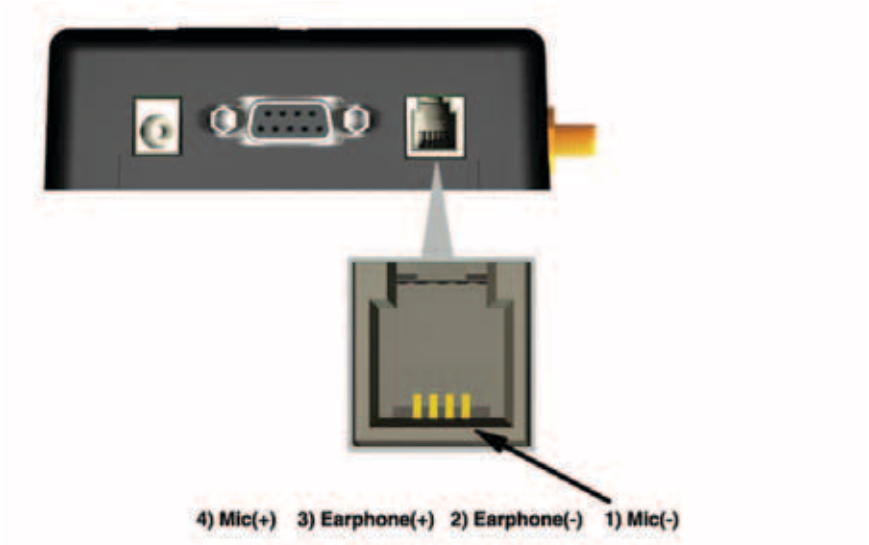
Hands Free Audio Output Circuit (Earpiece or Speaker)

- Line Coupling: TBD
- Line Type: TBD
- Output Load Resistance: TBD
- Frequency Response: TBD
- Differential Output Voltage: TBD
- Software Volume Control: TBD step, 6 steps total (AT#HFRECG)

4.4.2 Pin-Out

Pin	Description
1	Microphone (-)
2	Earphone (-)
3	Earphone (+)
4	Microphone (+), 3.0Vdc nominal supplied by Terminus to power handset.

4.4.3 Signal Description



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4 Interfaces continued

4.5 Embedded Interface

4.5.1 Description

The Embedded Interface is a 50 pin dual row header that allows a user to access many of the available ports and features of the Terminus through a single interface. The connector is located on the bottom of the unit such that it can be integrated with an application PC board. A ribbon cable with a tabbed header connector such as the Samtec HCSD-25-D-1 can also be used. This interface can be functionally divided up into the following groups: General Purpose I/O interface, the ADC interface and Terminus Control interface. The pin designations and specifications for this interface are shown below.

4.5.2 Pin-Out

PIN	DESCRIPTION	I/O	SIGNAL TYPE	PULL	NOTE
5,7,9,11,13,15,17,19,21,23,25,40,42,44,46,48,50	SUPPLY GROUND	-	-	-	-
41,43,45,47,49	SUPPLY +	-	-	-	-
39	SUPPLY ENABLE	INPUT	-	UP (SUPPLY +)	-
35	RESET	INPUT	-	UP	1
33	ON/OFF	INPUT	-	UP	1
31	PWRMON	OUTPUT	2.6V CMOS	-	-
29	UART SELECT	INPUT	3.3V CMOS	UP	1
37	VAUX	OUTPUT	ANALOG 2.6V	-	-
38	GPIO1	BI-DIR	2.6V CMOS	-	-
36	GPIO2	BI-DIR	2.6V CMOS	-	-
34	GPIO3	BI-DIR	2.6V CMOS	-	-
32	GPIO4	BI-DIR	2.6V CMOS	-	-
30	GPIO5	BI-DIR	2.6V CMOS	-	-
28	GPIO6	BI-DIR	2.6V CMOS	-	-
26	GPIO7	BI-DIR	2.6V CMOS	-	-
27	ADC1	INPUT	ANALOG	-	-
24	DCE Ready (DSR)	OUTPUT	3.3V CMOS	-	2
22	Clear to Send (CTS)	OUTPUT	3.3V CMOS	-	2
20	Ring Indicator (RI)	OUTPUT	3.3V CMOS	-	2
18	Carrier Detect (CD)	OUTPUT	3.3V CMOS	-	2
16	DTE Ready (DTR)	INPUT	3.3V CMOS	-	2
14	Request to Send (RTS)	INPUT	3.3V CMOS	-	2
12	Received Data (RxD)	OUTPUT	3.3V CMOS	-	2
10	Transmitted Data (TxD)	INPUT	3.3V CMOS	-	2
8	TRACE TX	OUTPUT	3.3V CMOS	-	-
6	TRACE RX	INPUT	3.3V CMOS	-	-
4	USB D+	BI-DIR	5.0V CMOS	-	-
2	USB D-	BI-DIR	5.0V CMOS	-	-
3	USB ID (FUTURE USE)	-	-	-	3, 4
1	USB VBUS	-	-	-	-

Notes:

1.) It is required that this input be controlled by an Open Collector/Drain output. Do not use an external pull-up resistor, a pull-up is included internal to the Terminus.

2.) According to V.24, the RXD and TXD signals are referred to from the perspective of the application. Therefore, these signals are referred to in the opposite direction for the module. Transmitted Data (TxD) is an input and Received Data (RxD) is and Output.

3.) Not currently implemented. USB On The Go, Analog input used to sense whether a peripheral device is connected and determine the peripheral type; a host or a peripheral.

4.) Do not connect.

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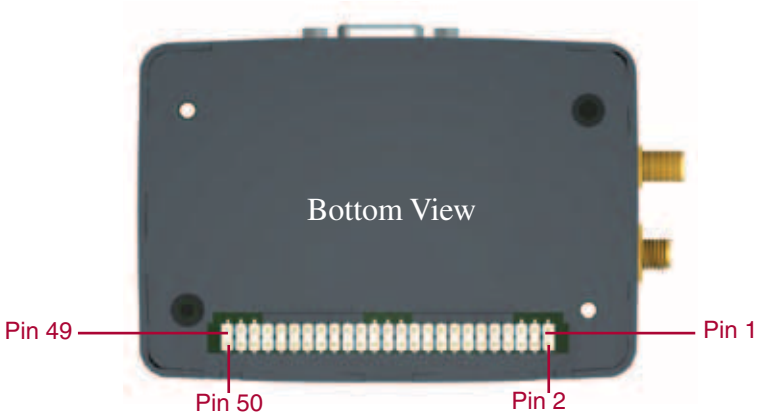
4.5.3 Signal Description



4.5.4 Signal Details

4.5.4.1 General Purpose Input / Output

Terminus GPIO are configurable as input, output, and special function. Configuration is controlled by the Customer specific application via AT commands sent on the UART interface. The following table describes GPIO configuration options.

GPIO	Configuration	Alternate Function
1	Input / Output	
2	Input / Output	
3	Input / Output	
4	Input / Output	
5	Input / Output	RFTX monitor output
6	Input / Output	alarm output
7	Input / Output	buzzer output

4.5.4.2 Trace TX/RX

The diagnostics monitoring port, used for debug and firmware updates of the radio.

RX_TRACE	In	RX Data for debug monitor
TX_TRACE	Out	TX Data for debug monitor

4.5.4.3 Analog to Digital Converter

ADC	Description
1	Analog to Digital Converter Input

4.5.4.4 Reset Pin

RESET PIN:

Input Logic State	Description
High-Z	Terminus Active State
0	Terminus Reset State

Notes: 1. It is required that this input be controlled by an Open Collector/Drain output. Do not use an external pull-up resistor, a pull-up is included internal to the Terminus.

2 The RESET pin is offered as a means to reset the Terminus when and if the Terminus becomes unresponsive. The RESET pin is not intended to be used as a means of turning the Terminus off. Use the ON/OFF pin to turn the Terminus on or off.

3. RESET state must be held for at least 200ms before returning to active state.

4.5.4.5 ON/OFF Pin

ON/OFF PIN:

Input Logic State	Description
High-Z	Terminus turned ON or OFF after Input returns to this state.
0	Toggle Terminus ON or OFF

Notes: 1. It is required that this input be controlled by an Open Collector/Drain output. Do not use an external pull-up resistor, a pull-up is included internal to the Terminus.

2. The ON/OFF pin is offered as a means to power-on and power-down the Terminus. When the Terminus powers-down it informs the cell tower that it is powering down and will not be communicating with the tower any more. This is considered a controlled power-down.

3. After toggling the power state of the Terminus, wait until PWRMON indicates chosen state before toggling the power state again.

4. Optionally the Terminus may be powered-down with the use of AT commands.

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4.5.4.6 PWRMON Pin

PWRMON PIN:

Output Logic State	Description
0	Terminus powered-down
1	Terminus powered-on

Notes:

1. Used in conjunction with ON/OFF pin to control power-on and power-down state.

4.5.4.7 VAUX

A regulated power supply output is provided in order to supply small devices from the module itself. This output is active when the module is on, and shuts off when the module is shut down.

	MIN	TYP.	MAX
Output voltage	2.62V	2.65V	2.68V
Output current			150mA

4.5.4.8 UART_SEL Pin

UART_SEL PIN:

Input Logic State	Description
1	Terminus UART interface routed to DB9 connector (Internally pulled high)
0	Terminus UART interface routed to EMBEDDED connector

4.5.4.9 SUPPLY ENABLE

SUPPLY_ENABLE:

Input Logic State	Description
1	Power circuit enabled (internally pulled high))
0	Power circuit disabled

Note: Used if an overvoltage or overcurrent fault has occured.

4.6 LED Status Indicators

4.6.1 Description

The LED Status Indicators are located on the top of the housing near the end where the antenna jacks are. There are 2 LED indicators; Cellular Status and Application Status.

4.6.2 Cellular LED Status (Yellow)

LED Status	Device Status
Permanently Off	Device Off
Fast Blinking (Period 1s, t_{on} 0.5s)	Net search/ Not registered/Turning Off
Slow Blinking (Period 3s, t_{on} 0.3s)	Registered, Full Service
Permanently On	A call is active

4.6.3 Application (Green)

LED Status	Device Status
OFF	User Defined AT#GPIO=21,0,1
ON	User Defined AT#GPIO=21,1,1

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4 Interfaces continued

4.7 RF Interface

4.7.1 Description

There are two RF interfaces on the Terminus – the cellular antenna jack and the GPS antenna jack. The specifications and requirements for these are as follows:

4.7.2 Cellular Antenna

4.7.2.1 Cellular Antenna Interface:

Type:
SMA - FEMALE

Pin	Description
Center Pin	Cellular Signal
Outer Conductor	SIGNAL Ground

4.7.2.2 Cellular Antenna Specifications

Parameter	Descriptions
Frequency range (CDMA)	Tx: 824MHz – 849 Mhz Rx: 869Mhz – 894 MHz
Frequency range (PCS)	Tx: 1850 MHz – 1910 MHz Rx: 1930 MHz – 1990 MHz
Frequency range (GPS)	1575.42 MHz
Impedance	50 Ohm
Recommended VSWR	< 2
Radiation Pattern	Omni-directional
Polarization	Vertical

4.7.2.3 Sprint Certified Antenna

Janus Remote Communications Part Number **ANT-0073-G**

Frequency:	824-894 MHz, 1850-1990 MHz
Gain:	3 dBi
VSWR:	2:1 Max
Impedance:	5W Max
Operating Temperature:	-40°C to 85°C
Length:	6.75” with 90° angle; 7.75” when straight

4.7.2.4 Cellular Antenna Installation Guidelines

1. Install the antenna in a place covered by the Cellular signal.
2. The Antenna must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operated in conjunction with any other transmitting antenna.
3. Antenna shall not be installed inside metal cases.
4. Antenna shall be installed according to manufacturer instructions.

Caution: DO NOT OVER-TIGHTEN ANTENNAS. Do not exceed 5 in.lbs force as over-tightening may damage the unit.

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4 Interfaces continued

4.8 GPS Antenna

4.8.1 GPS Antenna Interface

Type:

MCX - FEMALE

Pin	Description
Center Pin	GPS Signal, 3.4 to 4.2 Vdc nominal supplied from Terminus to power active antenna.
Outer Conductor	Signal ground

.

4.8.2 GPS Active Antenna Specifications:

Parameter	Value
Frequency range	1575.42 MHz (GPS L1)
Bandwidth	± 1.023 MHz
Gain	1.5 dBi < Gain < 4.5 dBi
Impedance	50 ohm
Amplification	12 dB – 16 dB
Supply voltage	Must accept from 3 to 5 VDC
Current consumption	20 mA Typical (40 mA max)

4.8.3 GPS Antenna Installation Guidelines

1. Install the antenna with a clear sky view.
2. Antenna shall not be installed inside metal cases.
3. Antenna shall be installed also according to Antenna manufacturer instructions.

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5 Technical Specifications

5.1 Electrical Specifications

5.1.1 I/O Level Specification

Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit	Note
VIN (DIGITAL INPUTS)	-0.3	-	2.9	Volt	
VIN (ANALOG INPUT)	-0.3	-	2.6	Volt	
Storage Temperature	-40	-	85	°C	
Recommended Operating Temperature	-30	-	85	°C	
Supply (+) Referenced to Supply(-)	5	-	24	V	

Operation of the device at these or any other conditions beyond those listed under Recommended Operating Conditions is not implied. Exposure to Absolute Maximum Rating conditions for extended periods of time may affect device reliability.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit	Note
Temperature	-30	-	80	°C	8
Supply (+) Referenced to Supply (-)	7	-	18	Volt	1
VAUX Output	2.62	-	2.65	Volt	2

Recommended Operating Conditions - Interface Levels (2.6V CMOS)

Parameter	Min	Typ	Max	Unit
Input Voltage High - Vih	1.69	-	2.9	Volt
Input Voltage Low - Vil	0.3	-	0.91	Volt
Output Voltage High - Voh	2.15	-	2.6	Volt
Output Voltage Low - Vol	0	-	0.45	Volt

Typical Current Source/Sink capability = 1mA/1uA

Recommended Operating Conditions – Interface Levels (3.3V CMOS)

Parameter	Min	Typ	Max	Unit
Input Voltage High - Vih	2.0	-	3.9	Volt
Input Voltage Low - Vil	-0.3	-	0.8	Volt
Output Voltage High - Voh	2.7	-	3.5	Volt
Output Voltage Low - Vol	-	-	0.4	Volt

Typical Current Source/Sink capability = 1mA/1uA

Recommended Operating Conditions - RESET pin

Parameter	Min	Typ	Max	Unit
Input Voltage High - Vih_rst	2.0	-	2.6	Volt
Input Voltage Low - Vil_rst	0	-	0.2	Volt

It is required that this input be controlled by an Open Collector/Drain output. Do not use an external pull-up resistor, a pull-up is included internal to the Terminus.

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5 Technical Specifications

5.1 Electrical Specifications continued

USB Transceiver Specifications

Parameter	Comments	Min	Typ	Max	Unit
	USB_VBUS				
Supply Voltage		4.5	5.0	5.25	V
Supply Current			11.7	15	mA
Termination Voltage	An internal supply voltage V_{TRM}	3.0	3.3	3.6	V
	USB_D+, D-				
Input sensitivity (differential)	ID+ - D-I	0.2			V
Output Voltage					
Logic LOW	R, = 1.5kΩ to 3.6V		0.3	V	
Logic HIGH	R, = 15kΩ to GND, 1_O=1mA		2.8	3.6	V
Input Voltage					
Logic LOW	R, = 1.5kΩ to 3.6V			0.3	V
Logic HIGH	R, = 15kΩ to GND, 1_O=1mA	3.0		3.6	V
Internal pull-up resistor	V_{TRM} to D+, V_{TRM} to D-	1.425	1.5	1.575	kΩ
Internal pull-down resistor	D+ to GND, D- to GND	14.3	15	24.8	kΩ

Recommended Operating Conditions - ADC1 pin

Parameter	Min	Typ	Max	Unit
Input Voltage Range	0	-	2.5	Volt
AD Conversion	-	-	8	Bits
Conversion Time	-	-	15.4	µS

5.1.2 Terminus Electrical Specifications

Power Supply	Min	Typ	Max	Unit	Note
Voltage Range	7	12	18	Vdc	
Average Current (Registered, Power Savings) with GPS disabled		11	-	mA	
Average Current (Registered, No Traffic) with GPS disabled	-	28	-	mA	
Average Current (Max level, 23-24 dBm) with GPS disabled	-	220	-	mA	
Average Current (Min level, -50 dBm) with GPS disabled	-	100	-	mA	
Power	-	-	10	Watts	

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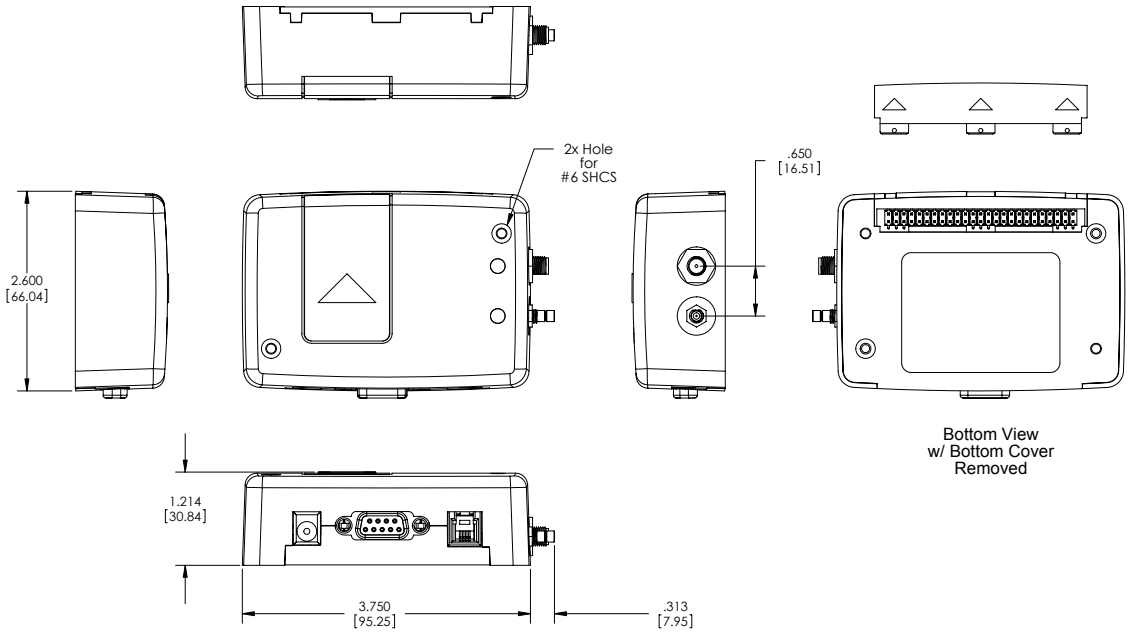
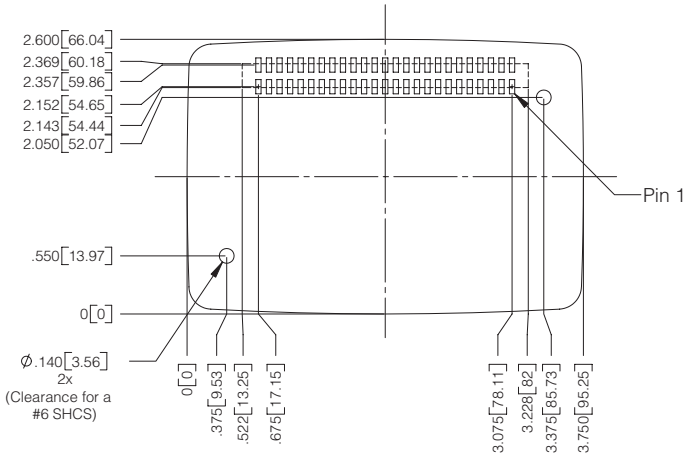
5 Technical Specifications continued

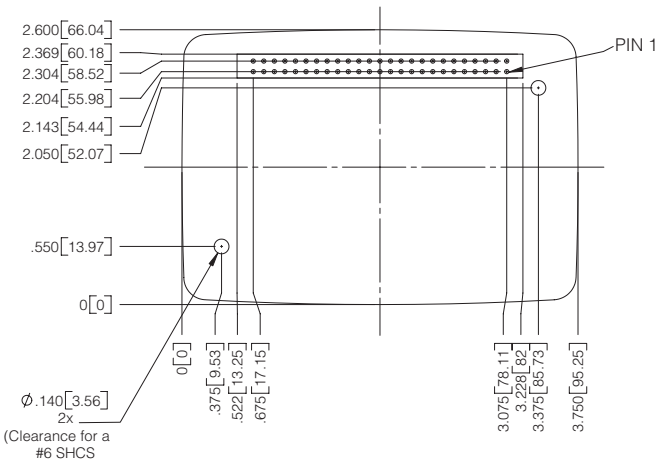
5.2 CDMA864D Mechanical Dimensions



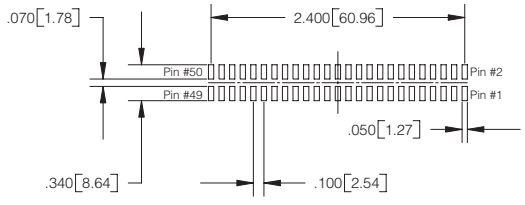
Bottom View
w/ Bottom Cover
Removed



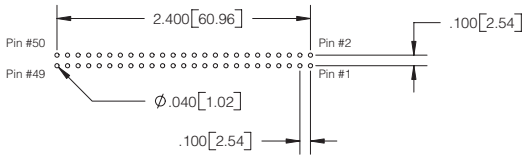
Mechanical Dimensions
(Top View)



Mechanical Dimensions
(Top View)



Pad Dimensions for
recommended connector,
Samtec P/N SSW-125-22-S-D-VS
(Top View)



Hole Dimensions for
recommended connector,
Samtec P/N SSQ-125-01-S-D
(Top View)

Recommended Surface Mount Footprint

Recommended Thru-Hole Footprint

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6. AT COMMAND GUIDELINES

The basic AT commands used to control Terminus operation are defined in this section. Please refer to Telit AT Command Guide for detailed command definition.

6.1 AT Command Format

A command line is a string of characters sent from a DTE or emulation software to the Terminus while the modem is in a command state. A command line has a prefix, a command, and a terminator. Each command line must begin with the character sequence AT and must be terminated by a carriage return and line feed (ie ASCII Carriage Return <13> and ASCII LineFeed <10>). Commands entered in upper case or lower case are accepted, but both the A and T must be of the same case, i.e., “AT” = ASCII 065, 084 or “at” = ASCII 097, 116. The command is a string of commands restricted to printable ASCII characters (032 - 126). Standardized commands start with a “+” character and proprietary commands can start with one of the following characters, “@”, “#”, “$” or “*”. Space characters (ASCII 032) in a command are ignored and control characters other than defined terminator characters CR (ASCII 013) and LF (ASCII 010) in the command string will cause an ERROR result code. The default terminator is the ASCII <CR> character followed by the ASCII <LF> character. The command line interpretation begins upon receipt of the carriage return and line feed characters.

If a syntax error is found anywhere in a command line command, the remainder of the line will be ignored and the ERROR result code will be returned.

Most commands entered with parameters out of range will not be accepted and the ERROR response will be returned to the DTE or emulation software.

Commands will only be accepted by the modem once the previous command has been fully executed, which is normally indicated by the return of an appropriate result code.

6.2 AT Command Example

Example AT Commands

AT$QCMIPP=1	// select NAI Profile 1
AT&P0<cr><lf>	//save profile

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7. OPERATION

7.1 Setting Up a Terminal Emulator for use with the Terminus

7.1.1 To interface with the Terminus connect the Serial Interface RS-232 port to a PC and use a terminal emulation program such as Microsoft® Hyperterminal. Set the interface parameters as follows:

- Baud Rate: 115.2 kbps
- Bits: 8
- Stop Bits: 1
- Parity: None
- Hardware Handshaking: Yes

7.1.2 Test Terminal Emulator Setup

- Enter AT<cr> from terminal and wait for OK

Note that Autobaud is not supported on the CDMA864D Terminus. While utilizing the RS-232 port, if you wish to change the baud rate on the module you must use AT+IPR. You must also change the rate in the host UART (i.e. HyperTerminal) to match the new baud rate. If these do not match you will not be able to send AT commands to the module through the serial port.

7.2 Powering ON/OFF

7.2.1 The Terminus is turned ON automatically once DC power is applied. If the Terminus is turned OFF using one of the methods described below, it can be turned back ON again through one of two methods:

- Pull ON/OFF signal (pin 33 of 50 pin straight header) to ground, then release.
- Press the ON/OFF switch, then release

The Terminus is fully operational after 4 seconds. Logging onto a network may take longer than this and is outside the control of the Terminus.

7.2.2 There are three ways to switch OFF the Terminus as described below.

- Use the appropriate AT command (AT#SHDN)
- Pull ON/OFF signal to ground, then release
- Press ON/OFF switch (SW1), then release

7.3 Setting Up Service

7.3.1 Sprint Provisioning

7.3.1.1 Sprint Account Set-up

Contact Sprint or Sprint MVNO to set-up a service contract.

You will need to have the following information to set-up service.

Product Model Number:	CDMA864D V2.00
Product Manufacture:	Janus Remote Communications
MEID #:	Issue AT command: AT#MEID?

Contact information
Contact: Dave Jahr, Janus Remote Communications
djahr@janus-rc.com
630-499-2121

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7.3.1 Sprint Provisioning continued

7.3.1.2 Verify Provisioning

After receiving verification that your service has been activated you will need to verify that your Terminal has been provisioned. To determine if your Terminal has been provisioned to work with the Sprint network you need to review the current profile settings.

Issue AT command:

AT$QCMIPGETP

Response:

Profile:0 Enabled
NAI:A1000009D010CA@hcm.sprintpcs.com
Home Addr:0.0.0.0
Primary HA:68.28.15.12
Secondary HA:68.28.31.12
MN-AAA SPI:1234
MN-HA SPI:1234
Rev Tun:1
MN-AAA SS:Set
MN-HA SS:Set

A terminal not provisioned will have the following characteristics.

Profile:0 Enabled
NAI: YOUR_TERMINALS_MEID@hcm.sprintpcs.com

A terminal provisioned will have the following characteristics.

Profile :1 Enabled
NAI: YOUR_COMPANY_NAME@sprintpcs.com

Upon power up, the module will attempt to provision itself if not already done. It will continue to attempt this until it is successful.

7.3.2 Verizon Provisioning

7.3.2.1 Verizon Account Set-up

Contact Verizon or Verizon MVNO to set-up a service contract.
You will need to have the following information to set-up service.

1. Product Model Number: CDMA864D V3.00
2. Product Manufacture: Janus Remote Communications
3. MEID #: Issue AT command: AT#MEID?

Contact information

Contact: Dave Jahr, Janus Remote Communications
djahr@janus-rc.com
630-499-2121

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7.3.2 Verizon Provisioning continued

7.3.2.2 Verizon Provisioning

- Issue the following command and ensure you have a “2” in the bolded/red location:
  09.01.0**X**x
  AT+CGMR

- Ensure the module is registered on the network.
  Enter AT+CREG? and wait for response +CREG: 0,1

- Verify profile :0 is selected and enabled.
  Enter AT$QCMIPP? and verify response $QCMIPP: 0
  Enter AT$QCMIPEP? and verify response $QCMIPEP: 1

This profile is required to be active during Verizon provisioning.

- Send command “ATD*22899;” and wait for response OK
  Wait for response #OTASP:0
  Wait for response #OTASP:1
  Wait for response #OTASP:2

If you receive a response #OTASP:5, or do not receive #OTASP:1 and #OTASP:2, the provisioning has failed somewhere. Please verify that your account has been set up, activated, and that you have been given an MDN and MSID for your module’s MEID/ESN.

- Send command AT#SGACT=1,1 and wait for a response #SGACT:XXX.XXX.XXX.XXX
- Wait 10-15 seconds and send command AT#SGACT=1,0. Wait for response OK.
  Please Note that AT#SGACT=1,1 being entered with a proper IP address response is required to complete provisioning on Verizon. Do not skip this step.

7.3.3 CrossBridge Provisioning

7.3.3.1 CrossBridge Account Set Up

Contact CrossBridge to set-up a service contract.
You will need to have the following information to set-up service.

1. Product Model Number: CDMA864D V2.00
2. Product Manufacture: Janus Remote Communications
3. MEID #: Issue AT command: AT#MEID?

Contact information

Contact: Dave Jahr, Janus Remote Communications
djahr@janus-rc.com
630-499-2121

When the ESN has been activated, you should receive information on the module, which includes the following:

1. The module’s 10 digit MDN.
2. The module’s 10 digit MSID.
3. The module’s NAI, in a form similar to <MSID>@spp106.dl.sprintpcs.com.
4. The password associated to the NAI <pw>.
5. The Primary Home Address <pha>
6. The Secondary Home Address <sha>
7. The HA-SS

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7.3.3.2 CrossBridge Provisioning

- Ensure the module is registered on the network.
  AT+CREG? and wait for response +CREG: 0,1

- Set the MDN and MSID values:
  Issue command AT#ENG=9:<MDN>
  Wait for response OK.
  Issue command AT#ENG=10<MSID>
  Wait for response OK.

  Issue command AT#MODEM?
  Wait for response AT#MODEM: <mdn>, <msid>
  Verify the values have been set correctly.

- Select and disable NAI profile 0:
  Issue command AT$QCMIPP=0
  Wait for response OK.
  Issue command AT$QCMIPEP=0
  Wait for response OK.

- Select and enable NAI profile 1:
  Issue command AT$QCMIPP=1
  Wait for response OK.
  Issue command AT$QCMIPEP=1
  Wait for response OK.

- Enable mobile IP:
  Issue command AT$QCMIP=2
  Wait fore response OK.

- Enter NAI for profile 1:
  Issue command AT$QCMIPNAI=<nai>,1
  Wait for response OK

- Enter Home Address:
  Issue command AT$QCMIPHA=0.0.0.0,1
  Wait for response OK.

- Enter the Primary Home Address:
  Issue command AT$QCMIPPHA=<pha>,1
  Wait for response OK

- Enter the Secondary Home Address:
  Issue command AT$QCMIPSHA=<sha>,1
  Wait for response OK

- Enter the AAA Server Security Parameter Index:
  Issue command AT$QCMIPMASPI=1234,1
  Wait for response OK

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7.3.3.2 CrossBridge Provisioning continued

- Enter the Home Agent Security Parameter Index:
  Issue command AT$QCMIPMHSPI=1234,1
  Wait for response OK

- Enter the MN-AAA Shared Secret:
  Issue command AT$QCMIPMASS=<pw>,1
  Wait for response OK

- Enter the MN_HA Shared Secret:
  Issue command AT$QCMIPMHSS=oursecretmnhakey,1
  Wait for response OK

- Enable Reverse Tunneling:
  Issue command AT$QCMIPRT=1,1
  Wait for response OK

- Display the current NAI profile 1 settings and verify all values are correct:
  Issue AT command AT$QCMIPGETP
  Response should be similar to below:

  Profile:1 Enabled
  NAI: <MSID>@spp106.dl.sprintpcs.com
  Home Addr:0.0.0.0
  Primary HA:<pha>
  Secondary HA:<sha>
  MN-AAA SPI:1234
  MN-HA SPI:1234
  Rev Tun:1
  MN-AAA SS:Set
  MN-HA SS:Set

  Passwords will not be displayed, but if a value has been entered and saved it will be displayed as “Set.” If you see them displayed as “Unset” go back and enter the value again.

- Perform a reset:
  Issue command AT$SPRESET
  Wait for response OK, the module will be operational again in approximately 10 seconds.

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7. OPERATION continued

7.4 Making a Voice Call

7.4.1 Voice call mode allows you to use a telephone handset to communicate with a properly equipped subscriber unit.

- To set the call mode to voice enter AT+FCLASS=0<cr> and wait for response OK
- For proper audio operation, verify that AT#CAP=0
- To dial the phone number enter ATD “8885551234”; <cr>
- To disconnect the call enter ATH<cr>

7.5 Sending an SMS

7.5.1 SMS (Select Message Service) mode allows you to send a text message (max 160 characters) to a SMS capable subscriber unit.

- To set the message mode to text enter AT+CMGF=1<cr>
  1. To set the message mode to text enter AT+CMGF=1<cr>
  2. Set the text mode parameters. This is recommended as it will allow functionality of SMS on all networks.
     - AT+CSMP=”callback_address”,4098,0,2
     - The callback_address is the number of the provisioned module.
  3. If you wish to save your CSMP settings for easy entry in the future use the following commands:
     - AT+CSAS
     - To retrieve the saved settings, enter AT+CRES
- To enter the receiving subscriber unit phone number and message enter:
  1. AT+CMGS=”8885551234”
  2. Wait for response”>” then enter message text
  3. Enter “ctrl z” <cr> to end message

7.6 Establishing a Socket Connection

(internet connectivity)

1. Ensure that NAI Profile 1 is selected.

Issue AT command:	AT$QCMIPP?
Expected Response:	$QCMIPP: 1
If response not expected issue AT command:	AT$QCMIPP=1

2. Ensure that NAI Profile 1 is enabled.

Issue AT command:	AT$QCMIPEP?
Expected Response:	$QCMIPEP: 1
If response not expected issue AT command:	AT$QCMIPEP=1

3. Enable Mobile IP

Issue AT command:	AT$QCMIP?
Expected Response:	$QCMIP:2
If response not expected issue AT command:	AT$QCMIP=2

4. Check if Context is active

Issue AT command:	AT#SGACT?

Response of #SGACT=1,0 indicates context is not active.

Issue AT command:	AT#SGACT=1,1

Note: If you activate context when already active you will receive and ERROR response.

5. Connect to GOOGLE http server via a TCPIP Socket Connection

Issue AT command:	AT#SD=1,0,80,www.google.com
Expected Response:	CONNECT

A response of CONNECT indicates you are connected to Google’s web site and the Terminals serial port is in DATA mode. Any data send via the AT command serial port is sent to Google’s server. Any data sent via Google’s server is received on the terminals AT command serial port.

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6. Exiting Data Mode

Issue the following escape sequence via the AT command port:	+++
Expected Response:	OK

7. Close Open Socket Connection

Issue AT command:	AT#SH=1
Expected Response:	OK

7.7 GPS

7.7.1 The CDMA864D can allow GPS data in 3 different ways, one of which requires the available USB. The mini breakout board allows easy access to the USB for that functionality.

Attach the mini breakout board to the Terminus CDMA864D until it is flush with the bottom of the terminal. Once in place, power up your Terminus and plug the USB cable into the mini USB connector (labeled P3).

1. You should see the following ports in the Windows™ Device Manager:
   Telit “Auxiliary Port
   Telit Diagnostics Interface
   Telit NMEA Port
   If these do not become available, or you see an error message, this means you need to install the USB drivers for the CDMA864D. Please refer to http://www.janus-rc.com/terminuscdma864d.html for the proper drives before continuing.

2. Open a Terminal window to either the Auxiliary Port of the default Communications Port. Then open a second Terminal window to the Telit NMEA Port.
3. Enter the following AT commands in the first Terminal window:
   Select Antenna Path:
   - Send command AT$GPSPATH=1<cr>
   - Wait for response OK

   Define Antenna Type:
   - Send command AT$GPSAT=1<cr>
   - Wait for response OK

   Enable NMEA Port:
   - Send command AT$GPSPORT=NMEA<cr>
   - Wait for response OK

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7.7 GPS

7.7.1 Instruction 3 continued

Configure Unsolicited NMEA Data:

- Send command AT$GPSNMUN=<engage><gga><gsa><gsv><rmc><vtg><cr>
- Select parameter “1” to enable or “0” to disable for your NMEA stream requirements
- Wait for response OK

Start NMEA Stream:

- Send command AT$GPSP=1<cr>
- Wait for response OK
- Wait for response OK #GPS_STATUS:1

In the second Terminal Window where the Telit NMEA Port is open, you will see the NMEA stream begin.

To end the NMEA Stream, Enter the following in the first Terminal window.

- Send command ATGPSP=0<cr>
- Wait for response OK
- Wait for response OK #GPS_STATUS:2

The NMEA stream will stop in the second Terminal window

7.7.2 GPS data can also be retrieved from the main COM port (UART) via the other 2 methods that do not require USB.

General commands for both methods 1 and 2:

Select Antenna Path:

1. Send command AT AT$GPSPATH=1<CR>

Define Antenna Type:

2. Send command AT$GPSAT=1<cr>

Method 1:

3. Send command AT$GPSP=1<cr>
4. Send command AT$GPSACP<cr>

$GPSACP can retrieve GPS data at any point when $GPSP=1

Method 2:

Configure Unsolicited NMEA Data:

3. Send command AT$GPSNMUN=<enable><gga><gsa><gsv><rmc><vtg><cr>

*<enable> MUST be 3 for NMEA over the UART

EXAMPLE: AT$GPSNMUN=3,1,1,1,1,1

4. Select parameter “1” to enable or “0” to disable for your NMEA stream requirements

Start NMEA Stream:

5. Send command AT$GPSP=1<cr>

End NMEA Stream

6. Send command AT$GPSP=0<cr>

7.8 Additional Instructions

On utilizing different commands for other applications than those described here, please refer to the following documents:

Telit AT Commands Reference Guide
Telit CC864 Software User Guide

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8 APPENDICES

8.1 Approvals

8.1.1 Carrier Approval

8.1.1.1 Sprint – July 2010

8.1.1.2 Verizon – May 2011

8.1.2 Module Approval

8.1.2.1 FCC

8.1.2.2 CDG 1 and 2

8.2 Safety Recommendations (for Information only)

8.2.1 General

Your Terminus CDMA864D terminal is based on the CDMA standard for cellular technology. This standard is universal and covers Europe, Asia, United States and Africa which is the most used telecommunication standard.

8.2.2 Antenna Care and Replacement

Do not use the Terminus with a damaged antenna.

Buy the antenna from an approved suppliers list. Using unauthorized antennas, modifications, or attachments could damage the Terminus and may violate local RF emission regulations or invalidate type approval.

Caution: *DO NOT OVER-TIGHTEN ANTENNAS. Refer to Section 4.6.2.4 for torque specifications.*

8.3 Abbreviations

ATerm	Definition
ADC	Analog-to-Digital Converter
CDMA	Code Division Multiple Access
DAC	Digital-to-Analog Converter
EVRC	Enhanced Variable Rate CODEC
GPIO	General Purpose Input/Output
GPS	Global Positioning System
HF	Hands-Free
I2C	Inter-Integrated Circuit
JDR	Jammer Detector
JTAG	Joint Test Action Group (ANSI/ICEEE Std. 1149.1-1990)
MT	Micro Telephone or Handset (MT or HS)
PCM	Pulse Coded Modulation
PDM	Pulse Density Modulation (in a DAC)
RTC	Real Time Clock
R-UIM	Removable User Identity Module
S-GPS	Simultaneous GPS
TGPIO	Telit General Purpose Input/Output
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
VAUX	Voltage Auxiliary
ZIF	Zero Intermediate Frequency

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8 APPENDICES

8.4 Ordering Information

Ordering Information	Terminus Description
CDMA864D	V2.0 Sprint Certified
CDMA864D	V3.0 Verizon Certified

8.5 Revision History

Revision	Revision Date	Note
A00	08/25/10	Advanced Released Manual
A01	12/14/10	Interface Updates
A02	05/17/11	Verizon certification
R00	10/05/11	Revision to 7.3 Setting up Service and updated from Advance to Released
R01	07/16/12	Edits to 7.3.2.2 and added 7.7 GPS

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