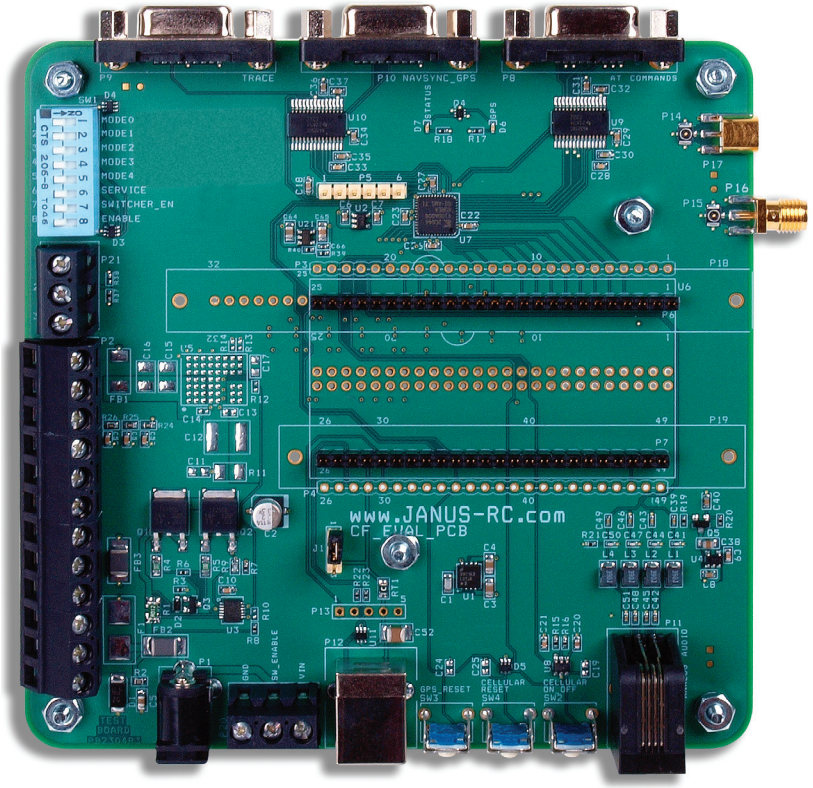
Terminus Plug-In Modules
Evaluation Kit User Guide



JANUS REMOTE COMMUNICATIONS

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INTRODUCTION

The following document describes the functions of the evaluation board for the Terminus Plug-In series of cellular communication terminals. This guide, along with the Plug-In Modules Hardware User guide, allows all features of the terminal to be evaluated before your PCB goes into CAD.

Be advised that there is an evaluation kit for each of the Plug-In Modules available on the Janus website. These kits supply all the accessories required to evaluate the chosen terminal.

INTERFACES

Power Supply

The Evaluation Board requires 5VDC to power the evaluation PCB and Terminus module. The evaluation board has two power supply connection options: center positive barrel connector or terminal block direct wire connection.

The Evaluation Board is equipped with protection circuitry to prevent reverse voltage, as well as help with protection from transients. The board can withstand a reverse voltage of 60V and a peak voltage of 80V. The circuitry is set to clip any input greater than 6V to a safe level.

Any input above 6V will read for a set period, and if before 20 mS has not 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 SWITCHER_EN pin (DIP pos. 7) must be pulled low at least 100 µS and then released.

Power supply requirement:

Voltage:	5Vdc ± 5%
Power:	10W peak

RS-232 Serial Ports

The Evaluation board for the Plug-In terminals has three RS-232 serial ports.

AT COMMAND PORT:

This port is available to send AT commands to GSM, CDMA, UMTS, EV-DO, and HSPA+ terminals. Please refer to the Terminus Plug-In User Guide for serial port details for the specific terminal you are evaluating.

Typical Port Settings:

Baud:	115200
Data bits:	8
Parity:	None
Stop Bits:	1
Hardware Handshaking:	CTS/RTS

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RS-232 SERIAL PORTS continued...

TRACE PORT:

This port is used by the GSM865CF and HSPA910CF terminals and is used for debug and local firmware upgrades of the GSM modules radio firmware. This port is not needed for Python script upload, however, during development of Python scripts this port should be used to receive debug 'print' statements. Hardware handshaking is not available on this port.

Port Settings:

Baud:	115200
Data bits:	8
Parity:	None
Stop Bits:	1
Hardware Handshaking:	N/A

NAVSYNC MS20 GPS NMEA PORT:

This port is used exclusively by the GSM865CF terminal and is used to communicate with the MS20 GPS module. The MS20 GPS module is populated on the GSM865CF by option. Refer to Hardware User Guide for ordering information. Hardware handshaking is not available on this port.

Port Settings:

Baud:	9600
Data bits:	8
Parity:	None
Stop Bits:	1
Hardware Handshaking:	N/A

USB SERIAL PORTS:

The evaluation board for the Plug-In Terminus family allows access to virtual COM ports and modem ports via the USB. All of the Plug-In Terminus units support the USB interface except the GSM865CF. To use this interface during development you will need to download the USB drivers from the Janus website ***(www.janus-rc.com)***. *Please note that in order for proper power on sequencing, the main power must be activated first. The USB VCC line must be disconnected until the device is on, otherwise it may not power up correctly or properly install the USB drivers.*

CDMA864CF, EVDO910CF, CDMA910CF, UMTS864CF USB Ports

AUXILLARY PORT:

This port is available to send AT commands to GSM, CDMA and UMTS terminals. Please refer to the Plug-In User Guide for serial port details for the specific terminal you are evaluating.

Typical Port Settings:

Baud:	115200
Data bits:	8
Parity:	None
Stop Bits:	1
Hardware Handshaking:	CTS/RTS

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USB Serial Ports continued...

TRACE PORT:

This port is used for debug and local firmware upgrades of the cellular modules radio firmware. Hardware handshaking is not available on this port.

Port Settings:

Baud:	115200
Data bits:	8
Parity:	None
Stop Bits:	1
Hardware Handshaking:	N/A

TELIT GPS NMEA PORT:

This port is used to communicate with Telit's integrated GPS hardware. Please refer to Telit AT command guide for available settings and features to implement this port in your hardware design. Hardware handshaking is not available on this port.

Port Settings:

Baud:	115200
Data bits:	8
Parity:	None
Stop Bits:	1
Hardware Handshaking:	N/A

HSPA910CF USB Ports

The HSPA910CF will show several virtual COM ports after the drivers are installed. These are USB0 through USB6, along with a modem for applications like Dial Up with Windows. This allows for applications like simultaneous AT commands, voice calls, and Python tracing.

These ports can be configured in various ways depending on the user's application, but by default USB0 and USB3 are AT command ready after enumeration.

Typical Port Settings:

Baud:	115200
Data bits:	8
Parity:	None
Stop Bits:	1
Hardware Handshaking:	N/A

You will want to reference HSPA910CF Ports Arrangements 4f.pdf for full details on using the AT#PORTCFG command.

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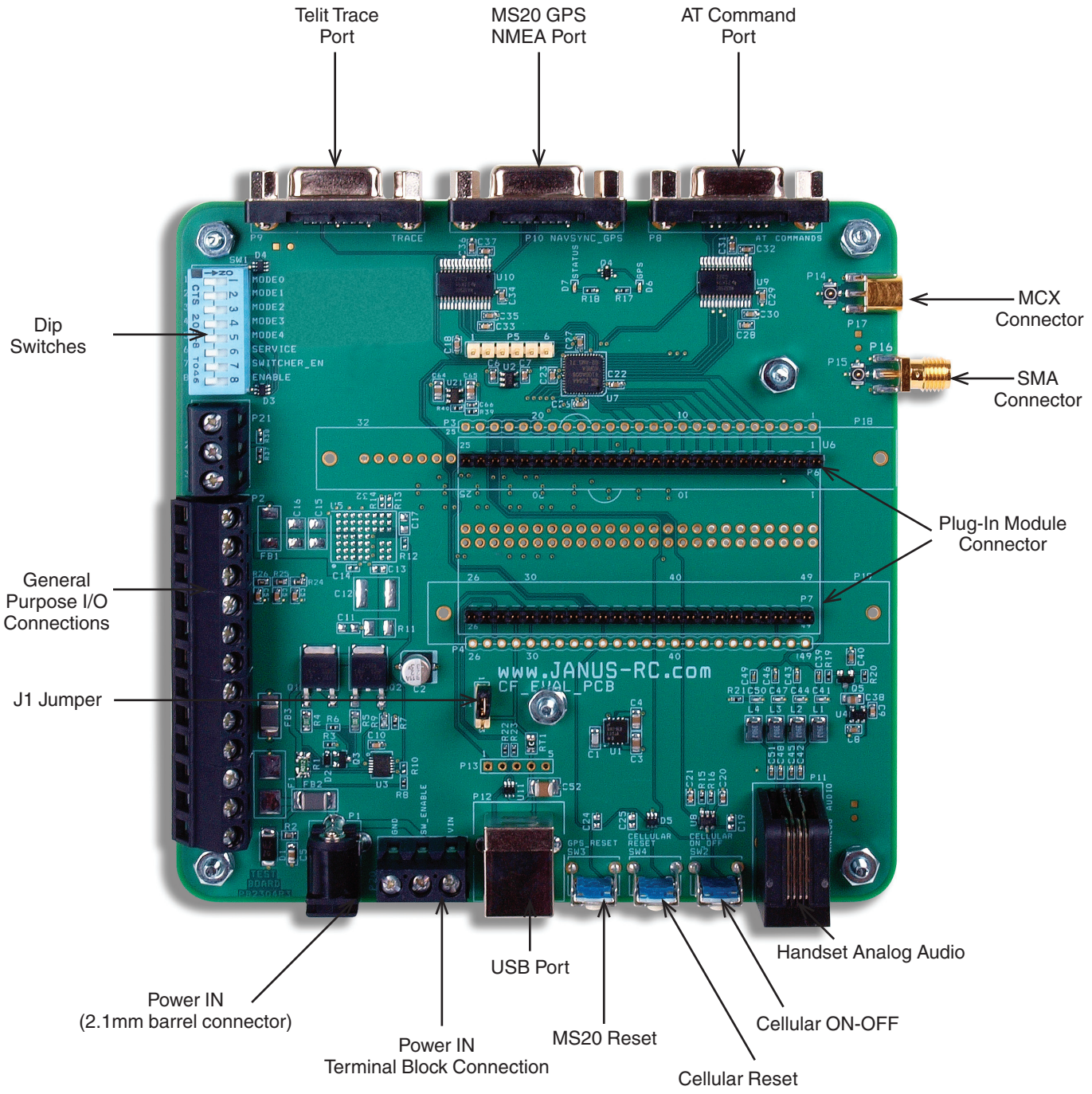
EVALUATION KIT BOARD DETAILS



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GENERAL PURPOSE I/O:

The Evaluation board for the Plug-In series terminals expose the following I/O via terminal block wire connection.

CMOS GPIO	1 through 7
ADC	1 & 2
DAC	1
VAUX	I/O Reference Voltage

Please refer to Hardware user guide before making connection to any of these I/Os. Each module has specific requirements for these I/O.

SWITCHES:

DIP SWITCHES:

The evaluation board has an 8 position DIP switch that allows selection of various modes of operation. Please refer to table below for definition of switch functions:

Name	Function Description	Active Position
MODE0	Disables the RS-232 Line Drivers. This allows for direct connection to CMOS UART I/O. Tri-States all Evaluation board I/Os directly connected to the Plug-In Terminus. This allows the module to be shutdown and not reverse bias the terminals I/O.	ON
MODE1	Cross connect of the TRACE and NAVSYNC_GPS signals for Null Modem configuration. This functionality is used specifically on the GSM865CF for the Python GPS Demo.	ON
MODE2	Not implemented	N/A
MODE3	Not implemented	N/A
MODE4	Not implemented	N/A
SERVICE	For use with the GSM865CF Enabling this switch allows local radio Firmware update via the Trace Serial Port.	N/A
SWITCHER_EN	Enable input of the Evaluation Board	OFF
ENABLE	Enable input of the Plug-In terminal	OFF

All switches should be in the off position in order to turn-on Plug-In terminal and send AT commands via the RS-232 serial port.

PUSH BUTTON SWITCHES:

The evaluation board has three push buttons to control the state of the Plug-In terminal populated on the board.

GSM ON_OFF:

Used to toggle the on off state of the Plug-In terminal. On power up, the Evaluation PCB will toggle ON-OFF triggering the terminal to power up. To turn the terminal on or off, press the switch for two seconds and release.

GSM RESET:

Used to recover operation of Plug-In terminal in case of unexpected error resulting in the inability of the application to communicate with the terminal.

MS20 GPS RESET:

This switch is used exclusively by the GSM865CF terminal and is used to reset the GPS module in case of unexpected error resulting in the inability of the application to communicate with the GPS receiver.

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RF CONNECTORS

The evaluation board comes equipped with RF connectors to interface Plug-In terminal with Cellular and GPS antennas. The Plug-In terminals have their RF connections exposed via Murata GSC connectors. The evaluation kits come with the terminals Cellular and GPS interfaces connected via a GSC-to-GSC RF patch cable to the Evaluation board.

SMA TO MURATA GSC CONNECTOR:

The SMA connector allows for a standard cellular antenna to be attached directly to the evaluation board.

MCX TO MURATA GSC CONNECTOR:

The MCX connector allows for a standard active GPS antenna to be attached directly to the evaluation board.

EVALUATION BOARD POWER JUMPER SELECTION

The power supply that supplies power to the evaluation boards active components can be selected from two different sources.

For ease of connection, the evaluation boards active components can be powered from the main power supply input. In this configuration it is not possible to evaluate the current consumption of the Plug-In Module without also including the active components of the evaluation board.

In order to evaluate the power consumption of the Plug-In modules without the added consumption of the evaluation boards active components, the evaluation board must be powered via the USB terminal.

J1 Jumper Selection:

Shunt Location	Evaluation Board Power Supply Source
Pin1 <-> Pin 2	Evaluation Boards active components powered from main supply connector.
Pin3 <-> Pin 2	Evaluation Boards active components powered from USB connector.

Note:

If the USB configuration is used, please note that only the evaluation board and a majority of it's components will be powered by the USB. The attached CF module and evaluation board protection circuitry will not be and will still need to draw it's power from the main "Power In" screw terminals or barrel jack. The protection circuitry will add a draw of roughly 1.5mA.

Also note that in order for proper power up operation, the USB power should be attached after the main supply is already attached and powered.

In order to take full advantage of the Pin 2-3 positioning for USB enabled Plug-In Terminus modems on the v3.xx evaluation boards, some minor hardware modifications need to be made. Please contact Janus for additional information.

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GSM865CF GETTING STARTED

This will take you through the initial steps required that will allow AT Commands to be sent to the GSM865CF Plug-In module.

Step 1

Please confirm that you have these items, and that your Evaluation Board is correctly set:

Power supply with 2.1mm barrel connector termination
6' RS232 cable
USB to Serial adapter cable
Jumper Shunt
Cellular Antenna
GSC to GSC patch cable(s)

Make sure that the DIP switches on the Evaluation Board are all set to OFF.

Step 2

If not done already, plug the GSM865CF Plug-In Module into the connectors at the center of the Evaluation Board, being sure to align the pins properly. Take note that to make the alignment easier, the two connectors are of different lengths.

Step 3

Cellular: Use one of the included GSC to GSC patch cables and attach one end to P5 on the GSM865CF and the other end to P15 of the evaluation board. Then attach the cellular antenna to the SMA edge mount connector of the evaluation board.

GPS (if applicable): Use one of the included GSC to GSC patch cables and attach one end to P4 on the GSM865CF and the other end to P15 on the evaluation board. Then attach the GPS antenna to the MCX edge mount connector of the evaluation board.

Step 4

Connect the RS232 cable to the AT COMMAND port, labeled P8. Connect the other end to an available serial port on your PC, or an available USB port by use of the serial to USB adapter.

Step 5

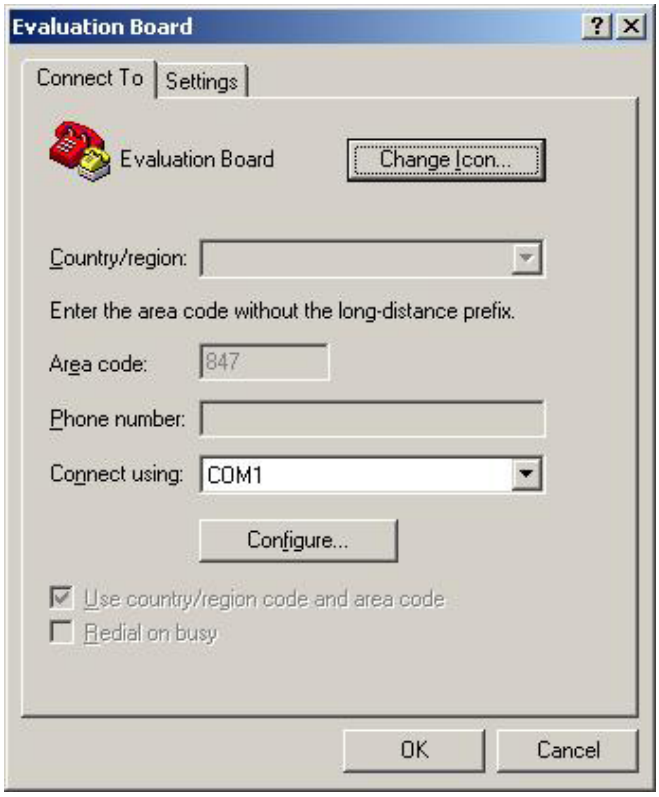
Place jumper shunt across Pin 1 and Pin 2 of Jumper J1.

Step 6

Plug in your power supply to the 2.1mm barrel connector on the board, labeled P1. After roughly 2 seconds you should see the STATUS LED, labeled D7, start blinking. This lets you know that the Plug-In Module is powered and functioning.

Step 7

Open HyperTerminal and start a new session. Use the drop down box to select the COM port that your serial cable is plugged into.



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Step 7 continued

Then select “Configure,” and select these settings:

Bits per second: 115200

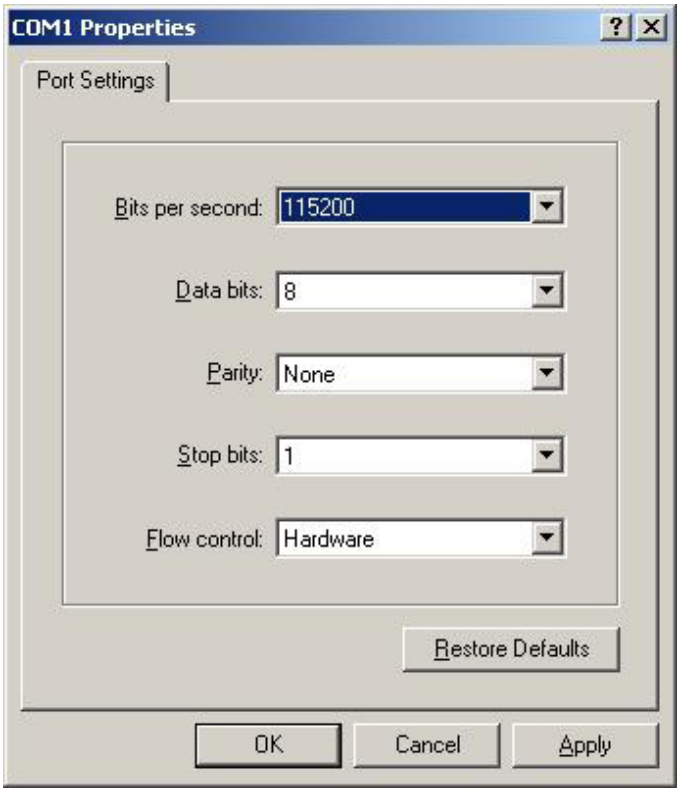
Data bits: 8

Parity: None

Stop bits: 1

Flow control: Hardware

Then press “OK.”



Step 7

Click on the “Call” button in HyperTerminal to make the connection. In the window you should now be able to send AT commands. To make sure you have a proper connection, type “AT” into the window, and press Enter. You should receive a response of “OK”.

If you do not receive that response, go back and check to make sure you’ve selected the correct COM port, as well as the settings.

If you receive an OK, your connection is successful and you are now able to communicate with the module. Please refer to http://www.janus-rc.com/terminuscf.html for a link to the proper Telit documentation.

The “Telit Module Software User Guide” will give step by step instructions on setting up voice and data calls, SMS messages, and socket connections.

The “Telit AT Reference Guide” is a full list of supported AT commands and their functions.

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CDMA864CF GETTING STARTED

This will take you through the initial steps required that will allow AT Commands to be sent to the CDMA864CF Plug-In module. This example uses the USB interface, but alternatively a serial connection to the AT Command DB9 for this may be faster and more suitable for you.

Step 1

Please confirm that you have these items, and that your Evaluation Board is correctly set:

Power supply with 2.1mm barrel connector termination
3' USB cable
Jumper Shunt
Cellular Antenna
GSC to GSC patch cable

Make sure that the DIP switches on the Evaluation Board are all set to OFF.

Step 2

If not done already, plug the CDMA864CF Plug-In module into the connectors at the center of the Evaluation Board, being sure to align the pins properly. Take note that to make the alignment easier, the two connectors are of different lengths.

Step 3

Cellular: The CDMA864CF has a short cable with a SMA end; simply attach the cellular antenna to the end of that cable.

GPS (if applicable): Use one of the included GSC to GSC patch cables and attach one end to the top GSC connector on the CC864-D module, and the other end to P15 on the evaluation board. Then attach the GPS antenna to the MCX edge mount connector of the evaluation board.

Step 4

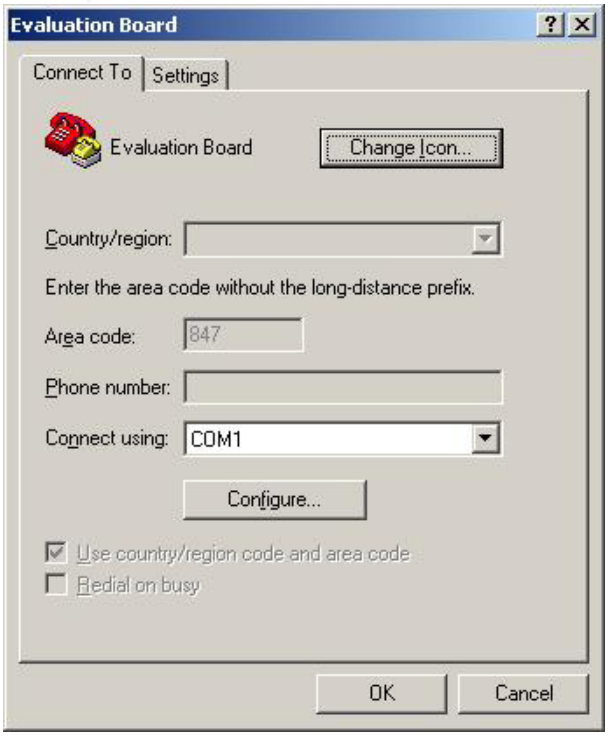
Place jumper shunt across Pin 1 and Pin 2 of Jumper J1.

Step 5

Plug in your power supply to the 2.1mm barrel connector on the board, labeled P1. After roughly 2 seconds you should see the STATUS LED, labeled D7, start blinking. This lets you know that the Plug-In module is powered and functioning.

Step 6

Connect the USB cable to the USB port on the Evaluation Board. Connect the other end to an available USB port on your PC.



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Step 7

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 CDMA864CF. Please refer to http://www.janus-rc.com/terminuscf.html for the proper drivers before continuing.

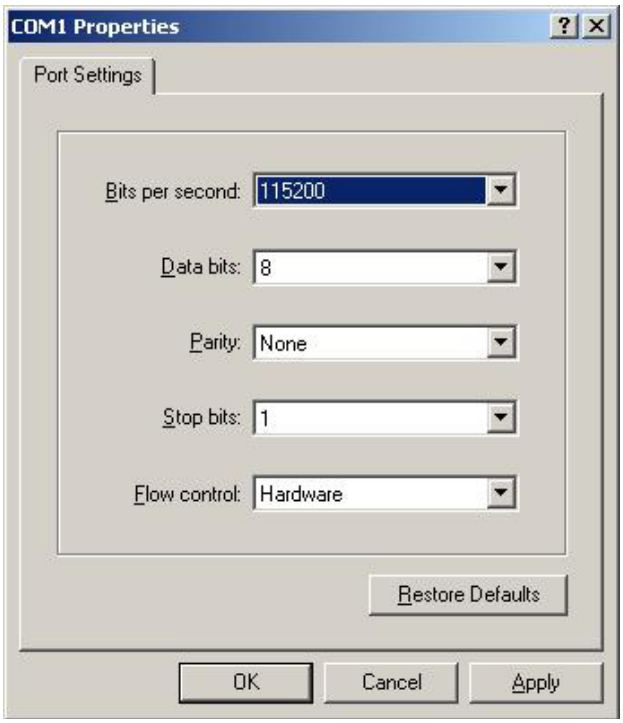
Step 8

Open HyperTerminal or a similar terminal emulator and start a new session. Use the drop down box to select the COM port that corresponds to the Telit Auxiliary Port.

Then select “Configure,” and select these settings:

Bits per second: 115200
Data bits: 8
Parity: None
Stop bits: 1
Flow control: Hardware

Then press “OK.”



Step 8

Click on the “Call” button in HyperTerminal to make the connection. In the window you should now be able to send AT commands. To make sure you have a proper connection, type “AT” into the window, and press Enter. You should receive a response of “OK”.

If you do not receive that response, go back and check to make sure you’ve selected the correct COM port, as well as the settings.

If you receive an OK, your connection is successful and you are now able to communicate with the module. Please refer to http://www.janus-rc.com/terminuscf.html for a link to the proper Telit documentation.

The “Telit Module Software User Guide” will give step by step instructions on setting up voice and data calls, SMS messages, and socket connections.

The “Telit AT Reference Guide” is a full list of supported AT commands and their functions.

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UMTS864CF GETTING STARTED

This will take you through the initial steps required that will allow AT Commands to be sent to the UMTS864CF Plug-In module. This example uses the USB interface, but alternatively a serial connection to the AT Command DB9 for this may be faster and more suitable for you.

Step 1

Please confirm that you have these items, and that your Evaluation Board is correctly set:

Power supply with 2.1mm barrel connector termination
3' USB cable
Jumper Shunt
Cellular Antenna
GSC to GSC patch cable(s)

Make sure that the DIP switches on the Evaluation Board are all set to OFF.

Step 2

If not done already, plug the UMTS864CF Plug-In module into the connectors at the center of the Evaluation Board, being sure to align the pins properly. Take note that to make the alignment easier, the two connectors are of different lengths.

Step 3

Cellular: The UMTS864CF has a short cable with a SMA end; simply attach the cellular antenna to the end of that cable.

GPS (if applicable): Use one of the included GSC to GSC patch cables and attach one end to the top GSC connector on the UC864-G module, and the other end to P15 on the evaluation board. Then attach the GPS antenna to the MCX edge mount connector of the evaluation board.

Step 4

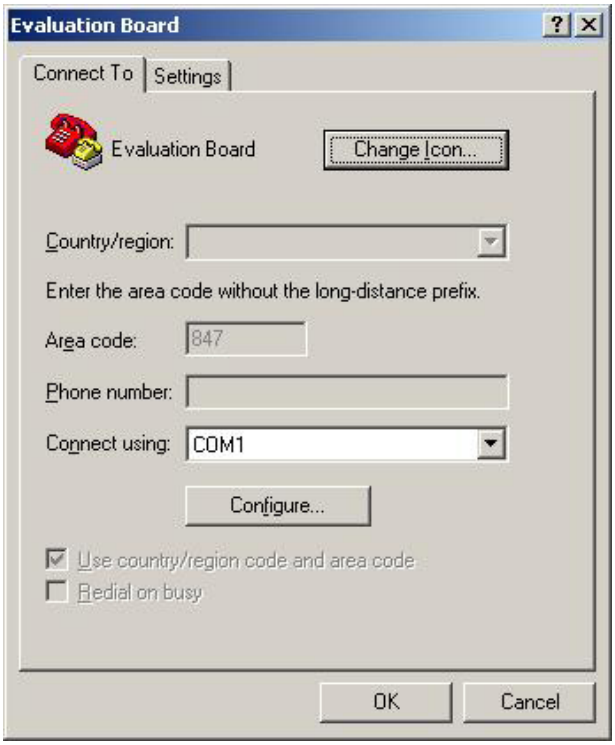
Place jumper shunt across Pin 1 and Pin 2 of Jumper J1.

Step 5

Plug in your power supply to the 2.1mm barrel connector on the board, labeled P1. After roughly 2 seconds you should see the STATUS LED, labeled D7, start blinking. This lets you know that the Plug-In module is powered and functioning.

Step 6

Connect the USB cable to the USB port on the Evaluation Board. Connect the other end to an available USB port on your PC.



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Step 7

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 UMTS864CF. Please refer to http://www.janus-rc.com/terminuscf.html for the proper drivers before continuing.

Step 8

Open HyperTerminal or a similar terminal emulator and start a new session. Use the drop down box to select the COM port that corresponds to the Telit Auxiliary Port.

Then select “Configure,” and select these settings:

Bits per second: 115200

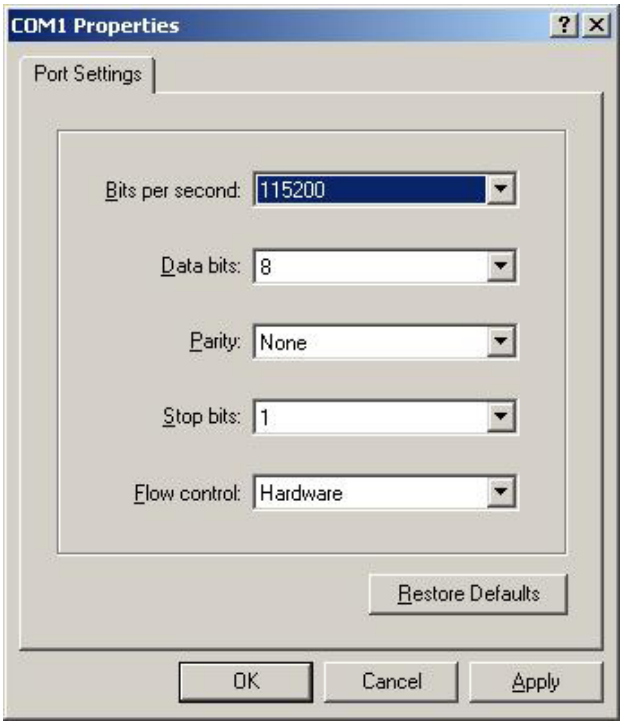
Data bits: 8

Parity: None

Stop bits: 1

Flow control: Hardware

Then press “OK.”



Step 9

Click on the “Call” button in HyperTerminal to make the connection. In the window you should now be able to send AT commands. To make sure you have a proper connection, type “AT” into the window, and press Enter. You should receive a response of “OK”.

If you do not receive that response, go back and check to make sure you’ve selected the correct COM port, as well as the settings.

If you receive an OK, your connection is successful and you are now able to communicate with the module. Please refer to http://www.janus-rc.com/terminuscf.html for a link to the proper Telit documentation.

The “Telit Module Software User Guide” will give step by step instructions on setting up voice and data calls, SMS messages, and socket connections.

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HSPA910CF GETTING STARTED

This will take you through the initial steps required that will allow AT Commands to be sent to the HSPA910CF Plug-In module. This example uses the USB interface, but alternatively a serial connection to the AT Command DB9 for this may be faster and more suitable for you.

Step 1

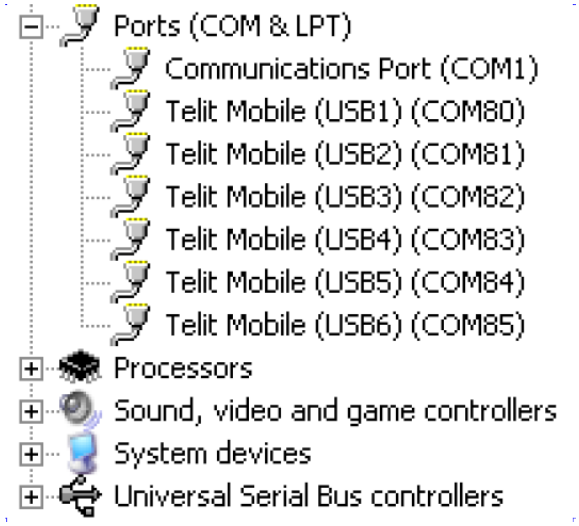
Please confirm that you have these items, and that your Evaluation Board is correctly set:

Power supply with 2.1mm barrel connector termination
3' USB cable
Jumper Shunt
Cellular Antenna
GSC to GSC patch cable(s)

Make sure that the DIP switches on the Evaluation Board are all set to OFF.

Step 2

If not done already, plug the HSPA910CF Plug-In module into the connectors at the center of the Evaluation Board, being sure to align the pins properly. Take note that to make the alignment easier, the two connectors are of different lengths.



Step 3

Cellular: Use one of the included GSC to GSC patch cables and attach one end to P5 on the HSPA910CF and the other end to P14 of the evaluation board. Then attach the cellular antenna to the SMA edge mount connector of the evaluation board.

GPS: Use one of the included GSC to GSC patch cables and attach one end to P6 on the HSPA910CF and the other end to P14 on the evaluation board. Then attach the GPS antenna to the MCX edge mount connector of the evaluation board.

Step 4

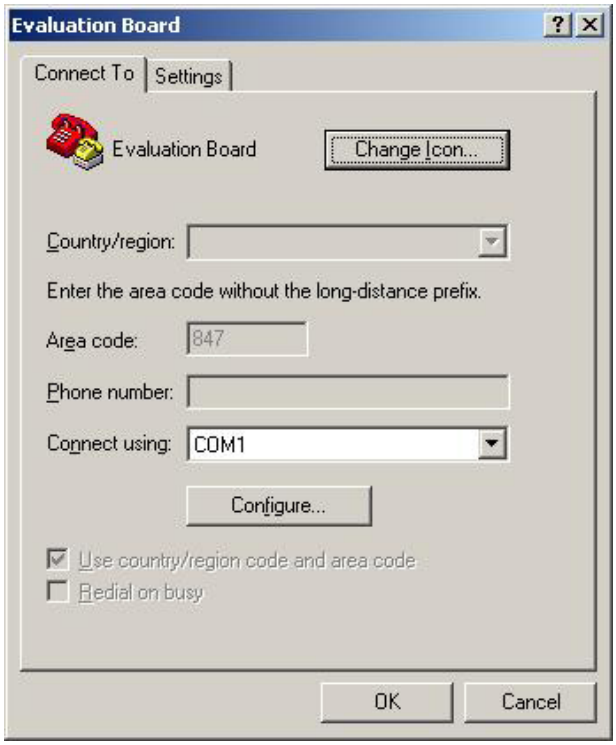
Place jumper shunt across Pin 1 and Pin 2 of Jumper J1.

Step 5

Plug in your power supply to the 2.1mm barrel connector on the board, labeled P1. After roughly 2 seconds you should see the STATUS LED, labeled D7, start blinking. This lets you know that the Plug-In module is powered and functioning.

Step 6

Connect the USB cable to the USB port on the Evaluation Board. Connect the other end to an available USB port on your PC.



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Step 7

You should see the following ports in the Windows™ Device Manager:

USB1
USB2
USB3
USB4
USB5
USB6

If these do not become available, or you see an error message, this means you need to install the USB drivers for the HSPA910CF. Please refer to http://www.janus-rc.com/terminuscf.html for the proper drivers before continuing.

Step 8

Open HyperTerminal or a similar terminal emulator and start a new session. Use the drop down box to select the COM port that corresponds to the USB3.

Then select “Configure,” and select these settings:

Bits per second: 115200

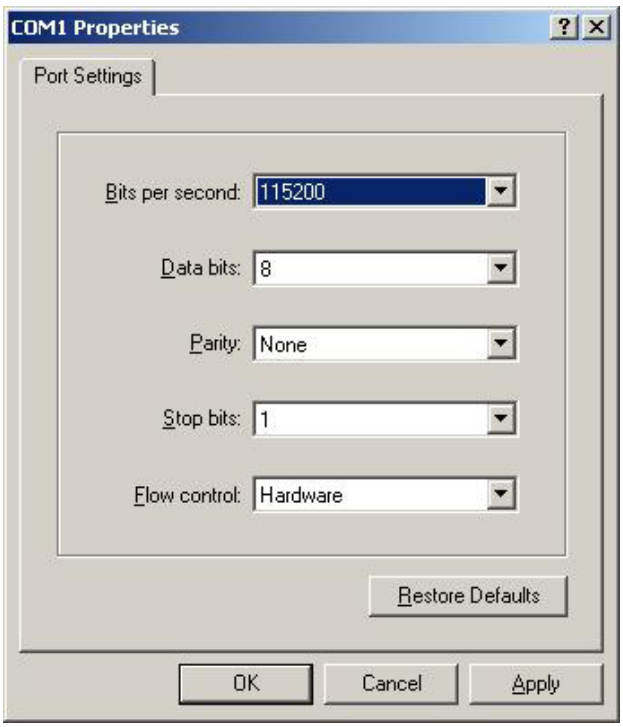
Data bits: 8

Parity: None

Stop bits: 1

Flow control: Hardware

Then press “OK.”



Step 9

Click on the “Call” button in HyperTerminal to make the connection. In the window you should now be able to send AT commands. To make sure you have a proper connection, type “AT” into the window, and press Enter. You should receive a response of “OK”.

If you do not receive that response, go back and check to make sure you’ve selected the correct COM port, as well as the settings.

If you receive an OK, your connection is successful and you are now able to communicate with the module. Please refer to http://www.janus-rc.com/terminuscf.html for a link to the proper Telit documentation.

The “Telit Module Software User Guide” will give step by step instructions on setting up voice and data calls, SMS messages, and socket connections.

The “Telit AT Reference Guide” is a full list of supported AT commands and their functions.

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EVDO910CF GETTING STARTED

This will take you through the initial steps required that will allow AT Commands to be sent to the EVDO910CF Plug-In Module. This example uses the USB interface, but alternatively a serial connection to the AT Command DB9 for this may be faster and more suitable for you.

Step 1

Please confirm that you have these items, and that your Evaluation Board is correctly set:

Power supply with 2.1mm barrel connector termination
3' USB cable
Jumper Shunt
Cellular Antenna
GSC to GSC patch cable(s)

Make sure that the DIP switches on the Evaluation Board are all set to OFF.

Step 2

If not done already, plug the EVDO910CF Plug-In Module into the connectors at the center of the Evaluation Board, being sure to align the pins properly. Take note that to make the alignment easier, the two connectors are of different lengths.

Step 3

Cellular: Use one of the included GSC to GSC patch cables and attach one end to P5 on the EVDO910CF and the other end to P15 of the evaluation board. Then attach the cellular antenna to the SMA edge mount connector of the evaluation board.

GPS: Use one of the included GSC to GSC patch cables and attach one end to P6 on the EVDO910CF and the other end to P15 on the evaluation board. Then attach the GPS antenna to the MCX edge mount connector of the evaluation board. .

Step 4

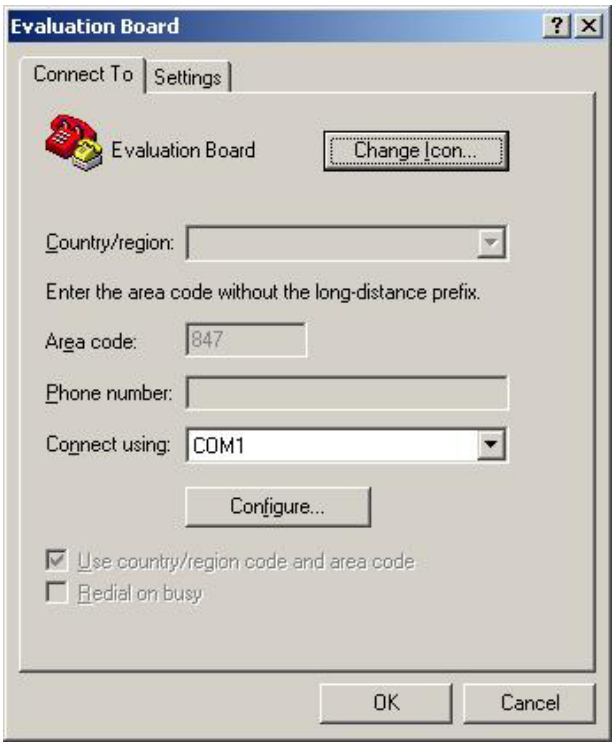
Place jumper shunt across Pin 1 and Pin 2 of Jumper J1.

Step 5

Plug in your power supply to the 2.1mm barrel connector on the board, labeled P1. After roughly 2 seconds you should see the STATUS LED, labeled D7, start blinking. This lets you know that the Plug-In module is powered and functioning.

Step 6

Connect the USB cable to the USB port on the Evaluation Board. Connect the other end to an available USB port on your PC.



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Step 7

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 EVDO910CF. Please refer to http://www.janus-rc.com/terminuscf.html for the proper drivers before continuing.

Step 8

Open HyperTerminal or a similar terminal emulator and start a new session. Use the drop down box to select the COM port that corresponds to the Telit Auxiliary Port.

Then select “Configure,” and select these settings:

Bits per second: 115200

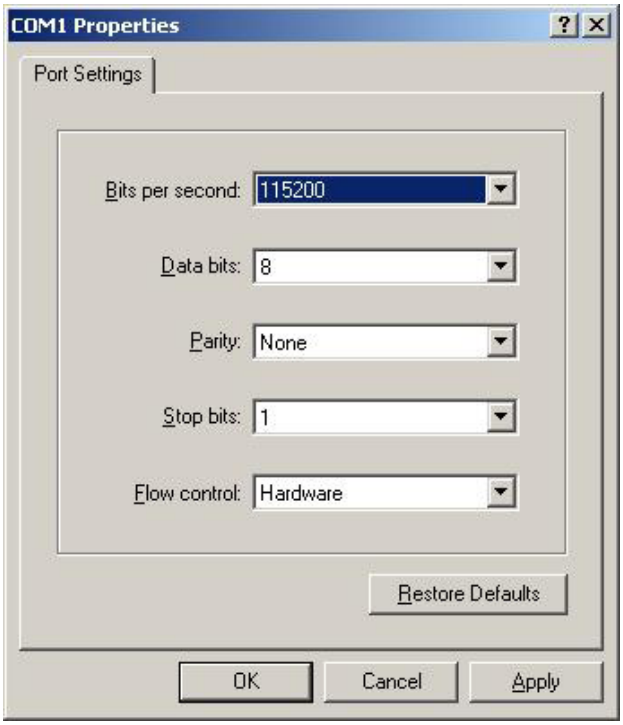
Data bits: 8

Parity: None

Stop bits: 1

Flow control: Hardware

Then press “OK.”



Step 9

Click on the “Call” button in HyperTerminal to make the connection. In the window you should now be able to send AT commands. To make sure you have a proper connection, type “AT” into the window, and press Enter. You should receive a response of “OK”.

If you do not receive that response, go back and check to make sure you’ve selected the correct COM port, as well as the settings.

If you receive an OK, your connection is successful and you are now able to communicate with the module. Please refer to http://www.janus-rc.com/terminuscf.html for a link to the proper Telit documentation.

The “Telit Module Software User Guide” will give step by step instructions on setting up voice and data calls, SMS messages, and socket connections.

The “Telit AT Reference Guide” is a full list of supported AT commands and their functions.

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APPENDIX

SCHEMATICS:

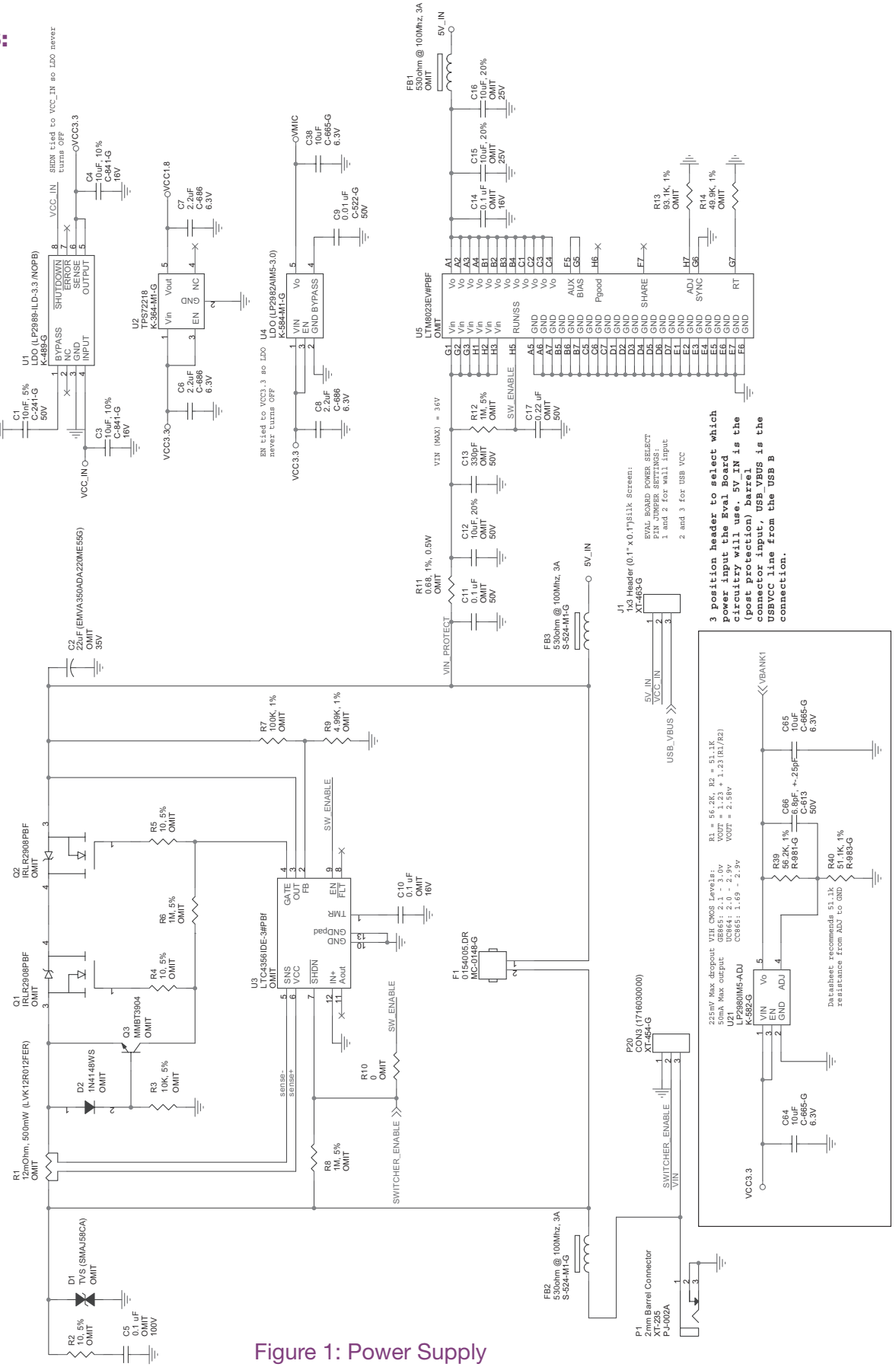

Figure 1: Power Supply

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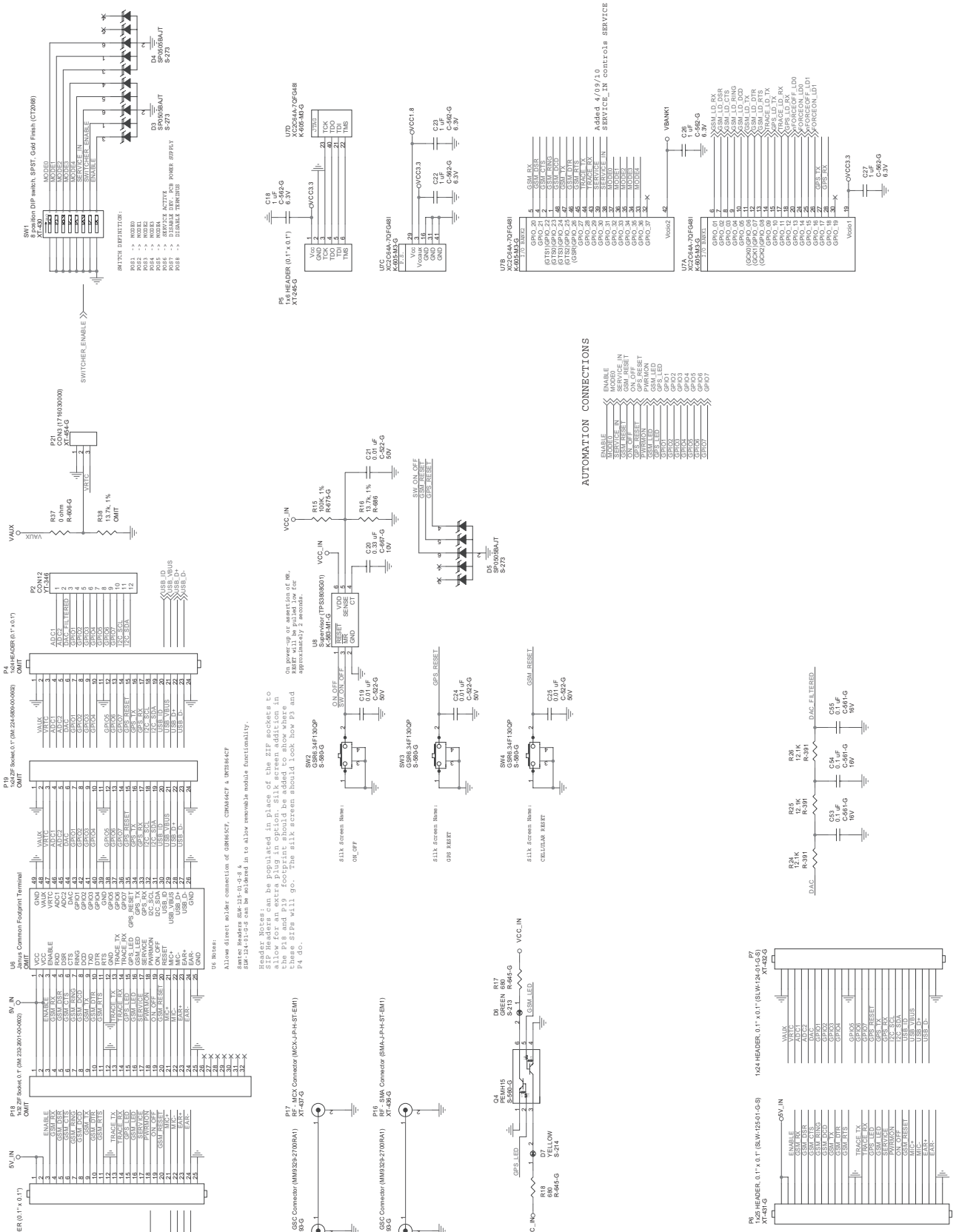

Figure 2: Main Circuit

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APPENDIX — SCHEMATICS continued:

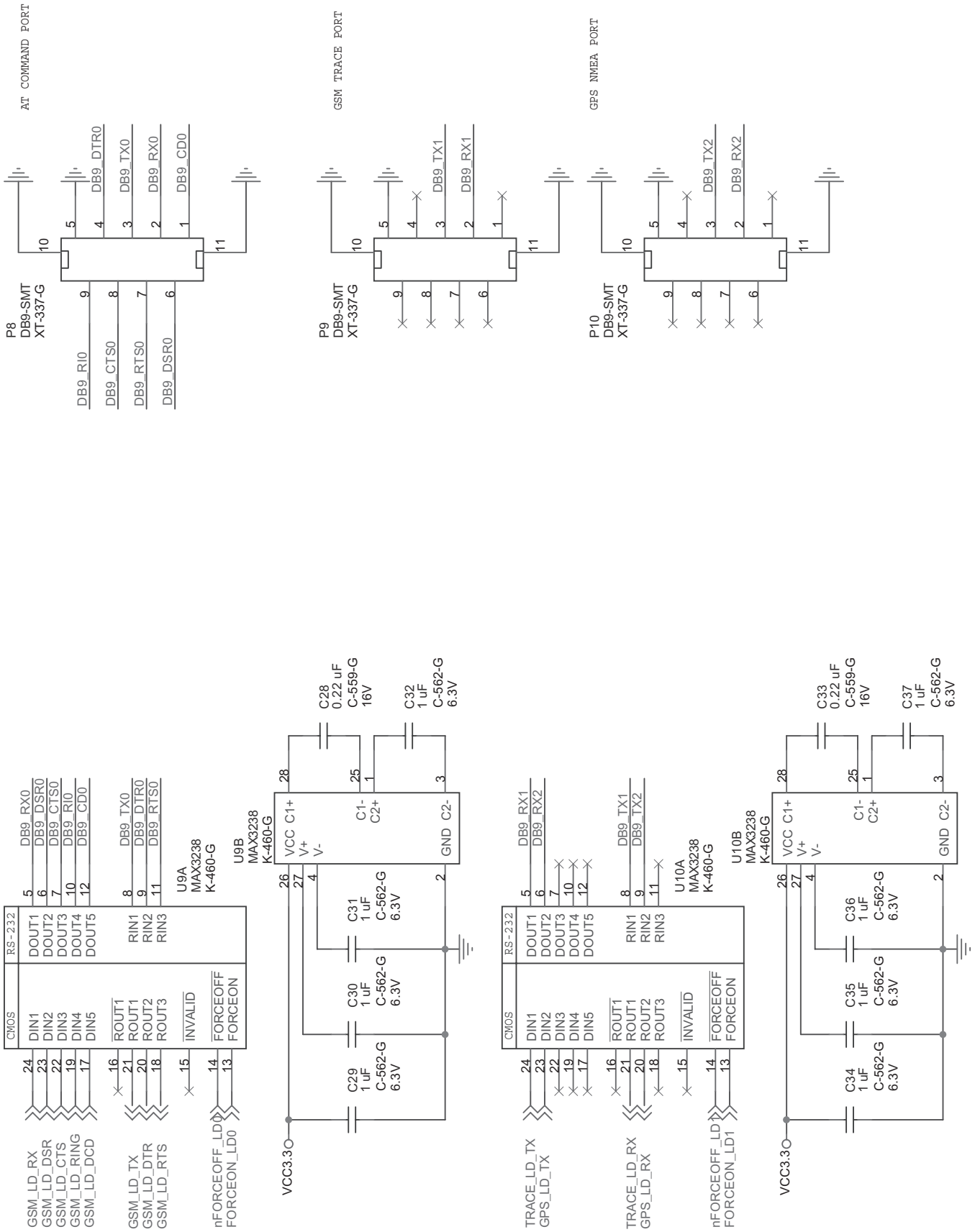

Figure 3: RS-232

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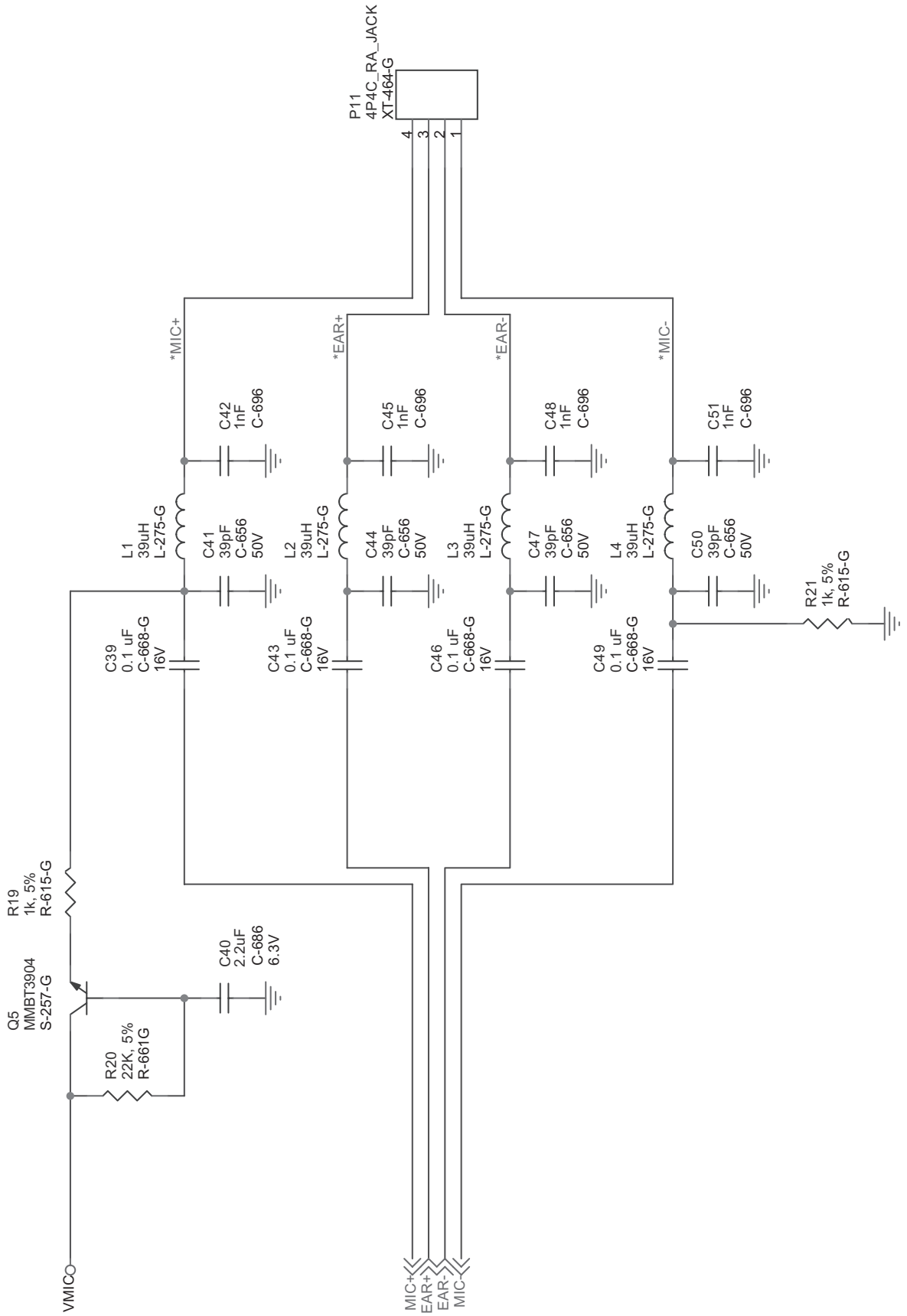

Figure 4: Handset Analog Audio

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APPENDIX — SCHEMATICS continued:

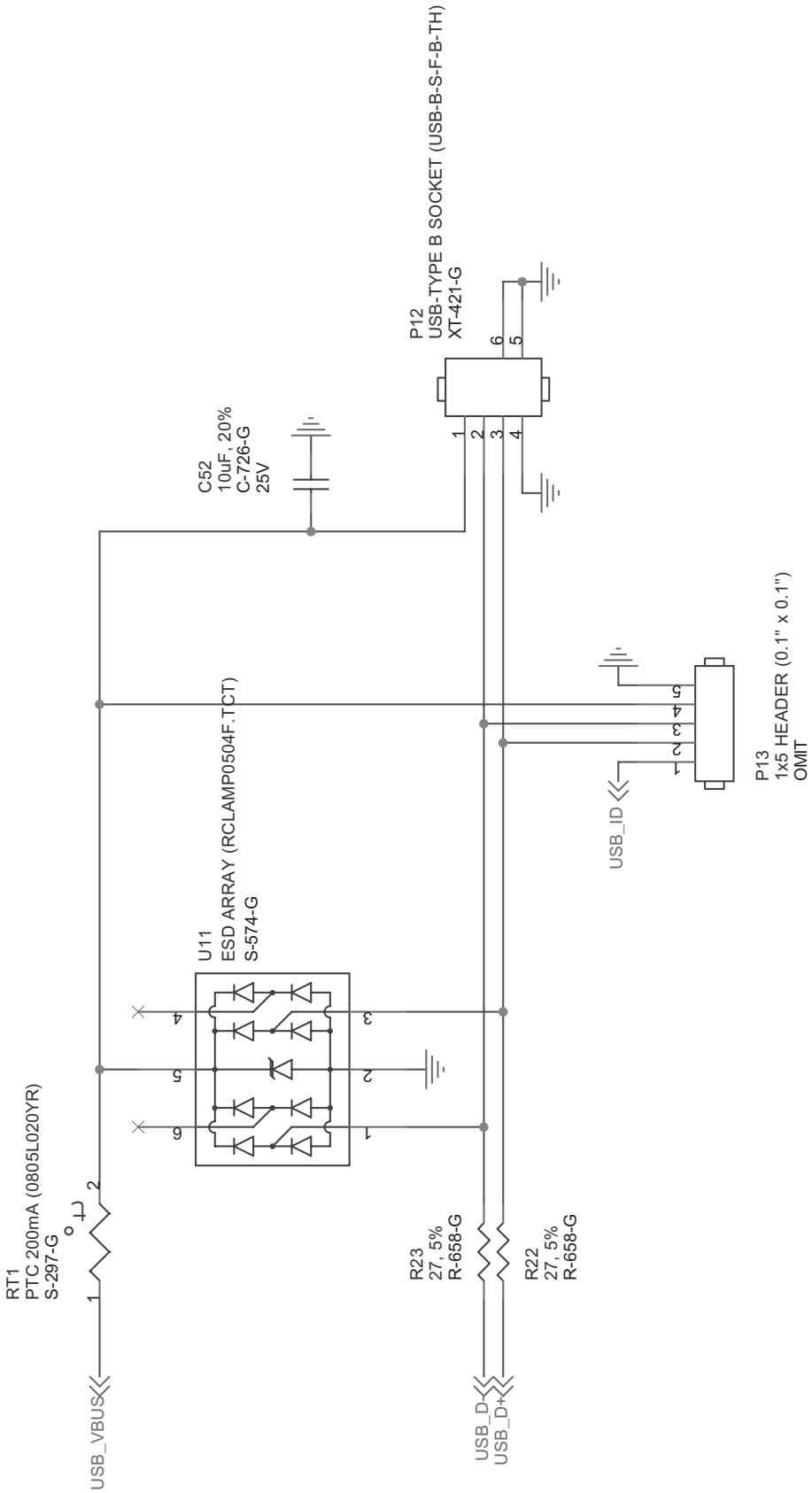

Figure 5: USB Port

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APPENDIX — SCHEMATICS continued:

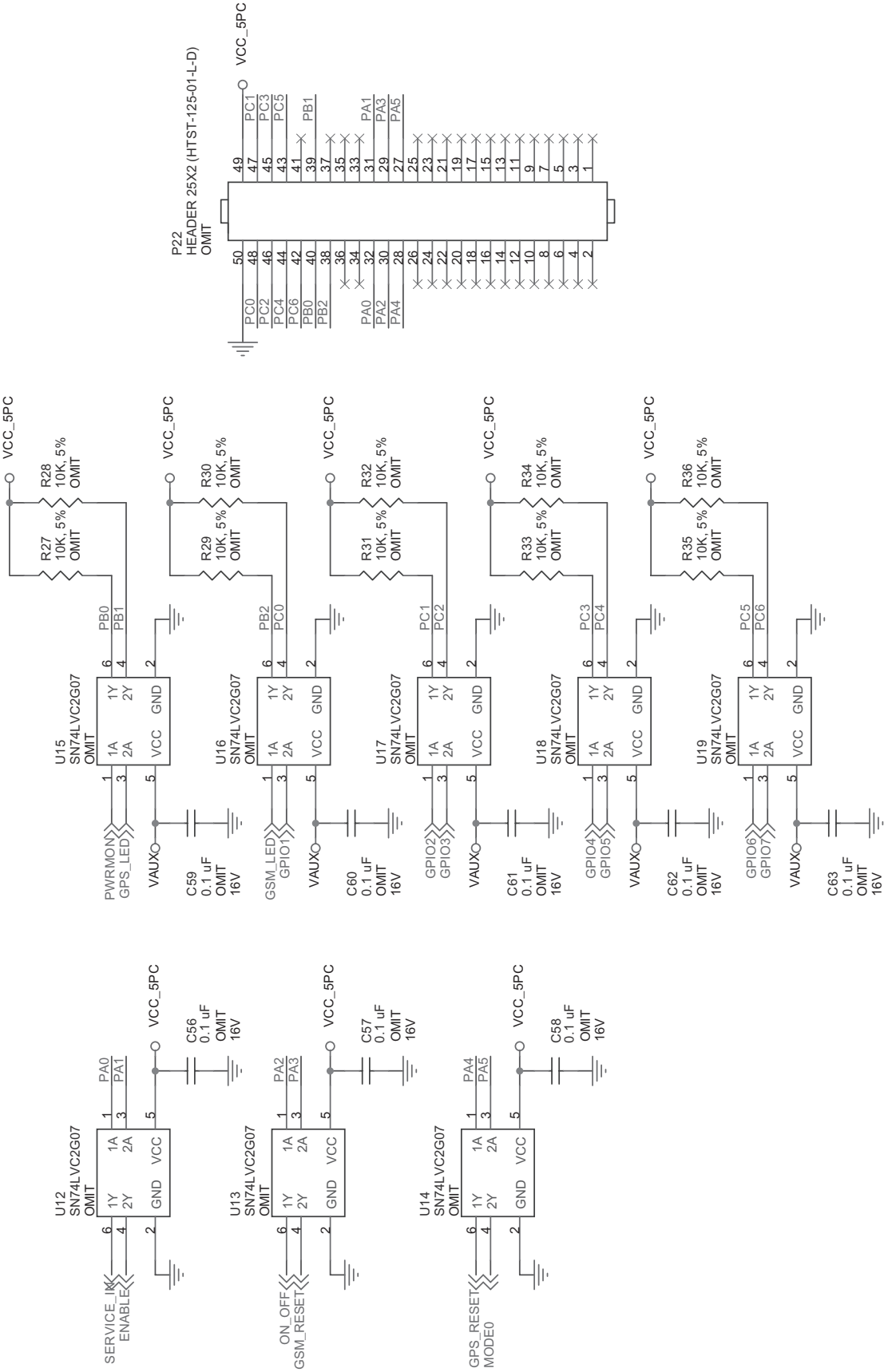

Figure 6: Factory Automation (not populated)

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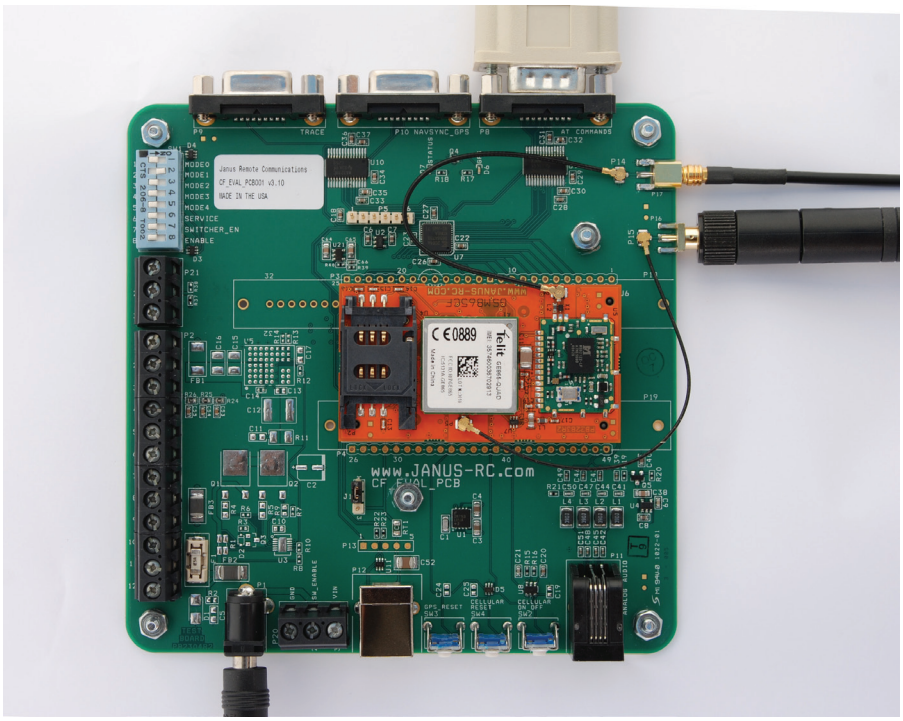

Revision	Revision Date	Note
A00	05/15/10	Preliminary Release
A01	06/28/10	Updates to Eval Board Descriptions & Specs
P00	01/17/12	Updated Power Supply Interfaces, Schematic, DIP Switches. Moved to Preliminary Status
P01	04/05/12	Added HSPA910CF Description and Specs
P02	11/15/12	Added EVDO910CF Description and Specs
P03	07/10/13	New Board Photo Update
P04	08/26/13	Updated Page 14 information - P15 should be P14 & Legal Statement

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