Popoto Modem

PMM3511 OEM Board
Interface Control Document

delResearch LLC

Document Versions

Version	Purpose	Author	Sw Ver	Date
1.00	Initial draft	Jim DellaMorte		4/20/2021
1.01	Fixed Ducer Connector	Jim DellaMorte		6/18/2021

Contents

1 PMM3511 OEM Interface Description

1.1 Popoto Digital Interface

1.1.1 Overview

The Popoto Digital Interface (PDI) is a single connector which provides access to the most commonly used interfaces in the Popoto Modem system. These interfaces include RS-232, RS-422, 10/100 Ethernet, Board On/Off control, and PPS input signal.

1.1.2 PDI Hardware Components

PDI is connected to using a Molex Microfit connector (P/N 0430251400) or equivalent. This connector is sold as a shell plus discrete pins. While Molex produces many different pins for use with the MicroFit series, the best pins for use with Popoto Modems are Molex part number 0462355001. These pins are gold plated, rated for 250 mating cycles, and have a low insertion force. They are suitable for use with 20-24Ga wire. These pins can be crimped using one of Molex hand crimp tools such as the 0638190000. Alternately, if the expense of the crimp tool is cost-prohibitive for small prototype or limited production runs, pre-crimped wires are available from suppliers such as Digikey.
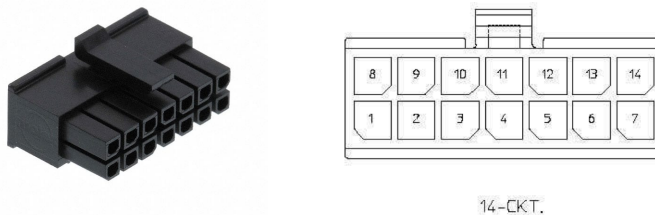

Figure 1.1: PDI User-Side Molex Connector. Interfacing to the PDI is accomplished with a Molex Microfit shell P/N 0430251400 and either Pre-pinned jumper wires, or Molex socket crimps.
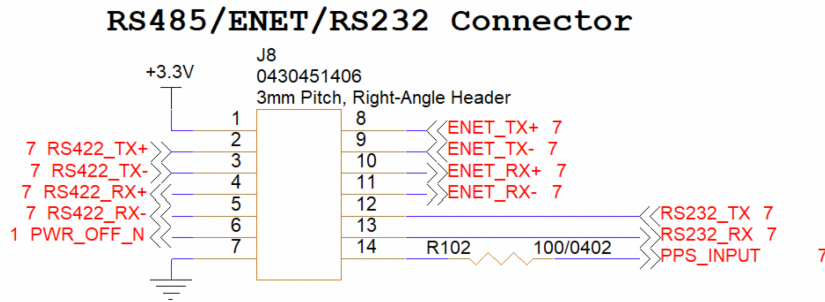
Figure 1.2: PDI Schematic connections.

1.1.3   Electrical Connections

Figure 1.2 shows the electrical connections for the the PDI interface. Pins labeled RS-422 are UART signals that comply with EIA-RS-422 interface standards. Default UART signaling parameters are 115200N81. Pins labeled with RS-232 are UART signals that comply with EIA-RS-232 electrical interface standards. UART signaling parameters for the RS-232 port default to 115200N81. PowerOFFN allows the unit to be powered off by connecting this signal to ground. ENET Signals are 10 100 Ethernet signals. As the Popoto board has on-board magnetics, these signals are standard 10 100 BaseT Ethernet signals. PpsInput is a 3.3V logic level input signal that is used for PPS input for clock discipline.

Table 1.1: PDI Components and Part Numbers

Part Number	Manufacturer	Description
0430251400	Molex	Microfit 14 position connector Receptacle 3.0MM
0462355001	Molex	Microfit 20-24Ga gold plated, lubricated sockets
0638190000	Molex	Microfit Hand Crimp tool
0797580010	Molex/Digikey	Precrimped Microfit leads

Table 1.2: PDI Electrical Pinout

Pin Number	I/O	Pin Name	Notes
1	O	3.3V	3.3V out when unit is powered up
2	O	RS 422 Tx +	Connect to Rx+ on Host
3	O	RS 422 Tx -	Connect to Rx- On Host
4	I	RS 422 Rx+	Connect Tx+ on Host
5	I	RS 422 Rx-	Connect to Tx- on Host
6	I	PowerSwitch	Short to ground to power down unit
7	-	Gnd	Digital Ground
8	O	Ethernet Tx+	T568A Green White T568B Orange White
9	O	Ethernet Tx-	T568A Green T568B Orange
10	I	Ethernet Rx+	T568A Orange & White T568B Green & White
11	I	Ethernet Rx-	T568A Orange T568B Green
12	O	RS-232 TX	Connect RX on Host
13	I	RS-232 RX	Connect to Tx On Host
14	I	PPS Interrupt	PPS interrupt for optional time Sync Max Voltage 3.3V for PMM3511 5V for PMM5021

1.1.4   Digital Interfaces

Popoto Modems have 3 additional digital interfaces beyond the PDI port. These interfaces are used to connect to external devices, or to provide alternate digital connection schemes for a host controller.

1.1.4.1   TTL Uart

The TTL UART port is used for connecting Popoto to a local controller over a short distance. The TTL UART port is a 5 pin Molex picoblade connector. Figure 1.3 shows the schematic connections on the TTL-UART port. In order to enable the 3.3V uart port, pins one and 2 of J6 must be shorted together. Doing this disables the RS-232 level translator, and thereby disables the RS232 port on the PDI connector.

Table 1.3: Popoto TTL UART Parts

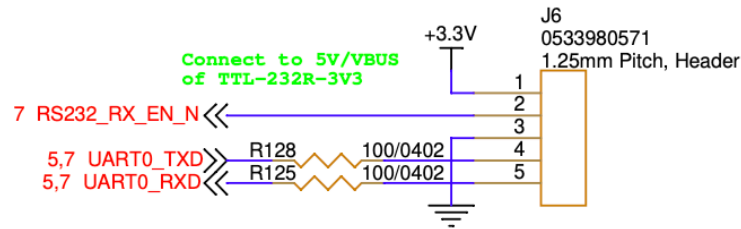| Part Number	Manufacturer	Description
0510210500	Molex	Picoblade 5 position connector Receptacle
0500798000	Molex	Picoblade 26-28Ga sockets
2002181900	Molex	HAND TOOL FOR PICO-BLADE 26-32AW
2149202214	Molex	Precrimped Picoblade 150mm 26Ga

UART (3.3V) Port Connector

Figure 1.3: Popoto TTL Uart Plug. This port allows 3.3V Logic level uart connections

Table 1.4: Popoto 3.3V Uart Port

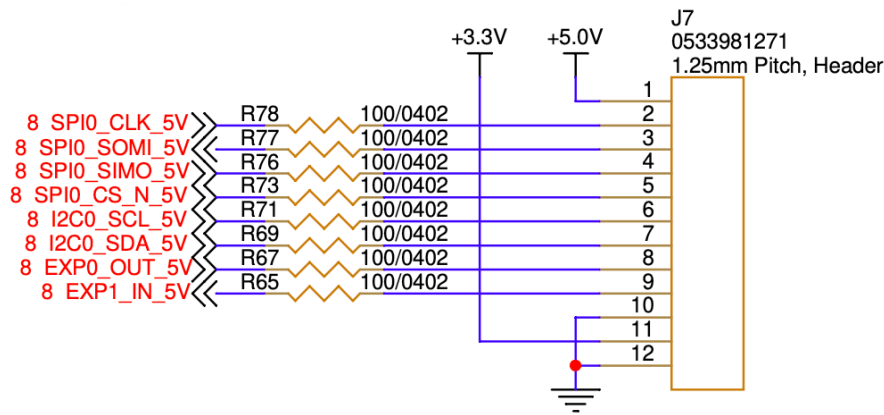| Pin Number	I/O	Pin Name	Notes
1	P	V+	+3.3V
2	I	V+	RS232_EN_N Tie this pin high (short to pin 1) to enable the 3.3V UART port
3	G	GND	Ground
4	O	UART0_TXD	Popoto UART Output
5	I	UART0_RXD	Popoto UART Input

Figure 1.4: Popoto Expansion Header. This connector allows access to I2C, SPI and General purpose I/O from the Popoto Modem.

1.1.4.2 Expansion Header

Figure 1.4 shows the schematic diagram of the expansion header. This header is used to access peripherals from the Popoto Modem when running applications locally on the SOC. It supports a General Purpose input and General Purpose output pin, as well as SPI and I2C interfaces. Signals from this connector are used for PTT and volume control in SSB mode(PMM5021). This connector is a 12 Pin Picoblade connector, and the parts required for its use are listed in Table 1.5

Table 1.5: Popoto Expansion Header Parts

Part Number	Manufacturer	Description
0510211200	Molex	Picoblade 12 position connector Receptacle
0500798000	Molex	Picoblade 26-28Ga sockets
2002181900	Molex	HAND TOOL FOR PICO-BLADE 26-32AW
2149202214	Molex	Precrimped Picoblade 150mm 26Ga

1.1.4.3 MCU Expansion Header

The MCU Expansion header allows interface to the Popoto wake up processor. The Popoto wakeup processor is a mixed signal device. This device has Analog inputs, as well as digital I/O at 1.8V. This port is expecially useful for monitoring signals while the main processor is in Deep sleep mode. Use of this port requires special firmware support from Popoto Modem. If you require access to these signals for your application, please reach out to info@popotomodem.com.

1.1.4.4 Micro USB Port

The Micro USB port is a standard USB OTG port as configured by the Popoto Modem Linux Operating system. This port is extremely flexible, allowing both host and peripheral connections. If you have need for the Micro USB port, please contact Popoto Modem at info@popotomodem.com.

1.2 PMM3511 Specific Interfaces

1.2.1 Power

Power is provided to the PMM3511 OEM Boardset via connector J4 on the Analog Board. This connector is a 2 Pin COMBICON PTSM connector with a V+ and Ground pin. Acceptable input voltages are between 18.5 and 40 Volts. Table 1.7 and Figure 1.5 show the connections required for powering the PMM3511. Table 1.6 shows the parts required for attaching to the power connector on the PMM3511.

Table 1.6: PMM3511 Power Plug Components

Part Number	Manufacturer	Description
1778832	Phoenix 2 position connector Receptacle	

Table 1.7: PMM3511 Power Connector Pinout

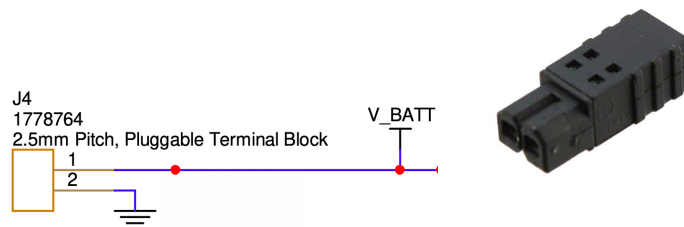| Pin Number	I/O	Pin Name	Notes
1	P	V+	12-40 Volts 40 Watts
2	G	GND	Ground

Figure 1.5: PMM3511 Power Connectors and pinout.

1.2.1.1 Board Revisions 40+

Power is provided to the PMM3511 OEM Boardset via connector J4 on the Analog Board. This connector is a 2 Pin Molex Microfit connector with a V+ and Ground pin. Acceptable input voltages are between 12.5 and 40 Volts. Table 1.9 and Figure 1.6 show the connections required for powering the PMM3511. Table 1.8 shows the parts required for attaching to the power connector on the PMM3511.

Table 1.8: PMM3511 Power Plug Components for board revisions 40 and higher

Part Number	Manufacturer	Description
0436500209	Molex	Microfit 2 position connector Receptacle (on board)
0436500200	Molex	Microfit 2 position connector Housing (mating Connector)
0462355001	Molex	Microfit 20-24GA Lubricated Gold Socket (mating Connector)

Table 1.9: PMM3511 Power Connector Pinout

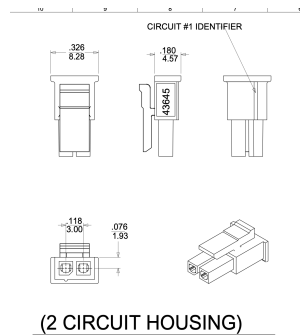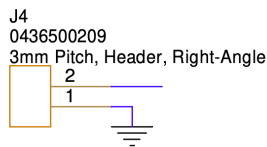| Pin Number	I/O	Pin Name	Notes
1	G	GND	Ground
2	P	V+	12-40 Volts 40 Watts

Figure 1.6: PMM3511 Rev 40+ Power Connectors and pinout.

1.2.2 Analog Interfaces

The Analog interfaces to the PMM3511 can be found on the analog board. This board has the + shaped aluminum heatsink, and can be seen in Figure 1.7
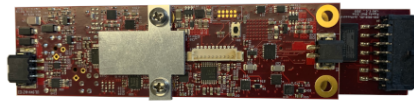
Figure 1.7: The PMM3511 Analog board

1.2.2.1 Transducer Connections: Board Revisions 00 - 30

The Transducer is connected to the Popoto Modem PMM3511 by a 3 Pin Phoenix Connector labelled J9. This connector provides access to the Transmit power amplifier output and the highly sensitive analog input.. In its default configuration with the Popoto 25-30Khz transducer, no additional matching networks are required. See Figure 1.8 for the pinout for this connector.
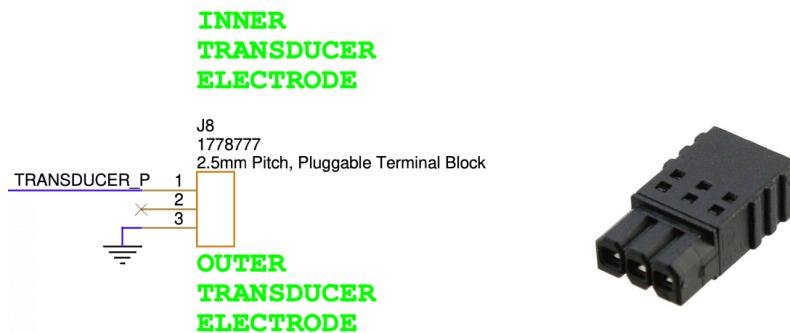

Figure 1.8: PMM3511 Transducer connector and pinout for board revisions 00-30.

Table 1.10: PMM3511 Transducer Connector Pinout

Pin Number	I/O	Pin Name	Notes
1	O	TRANSDUCER_OUT_P	Positive transducer connection.
2	X	NC	
3	G	Ground_N	Ground Terminal

Table 1.11: PM3511 Transducer Plug Parts

Part Number	Manufacturer	Description
1778845	Phoenex	3 Pin Combicon plug

1.2.2.2 Transducer Connections: Board Revisions 40+

The Transducer is connected to the Popoto Modem PMM3511 by a 3 Pin Molex Microfit connector labelled J9. This connector provides access to the Transmit power amplifier output and the highly sensitive analog input.. In its default configuration with the Popoto 25-30Khz transducer, no additional matching networks are required. See Figure 1.9 for the pinout for this connector.
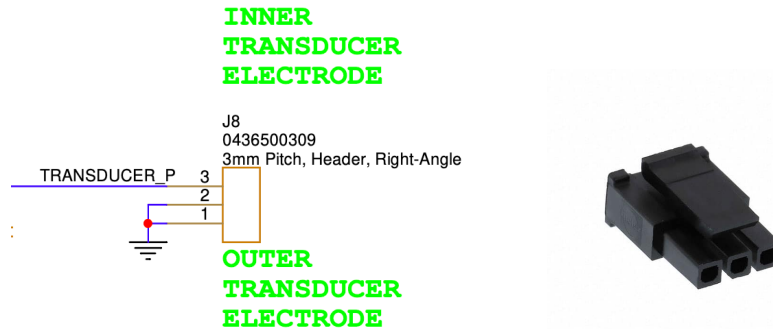

Figure 1.9: PMM3511 Transducer connector and pinout for board revisions 40+.

Table 1.12: PMM3511 Transducer Connector Pinout

Pin Number	I/O	Pin Name	Notes
1	G	Ground_N	Ground Terminal
2	G	Ground_N	Ground Terminal
3	I/O	TRANSDUCER_P	Positive transducer connection.

Table 1.13: PM3511 Transducer Plug Parts

Part Number	Manufacturer	Description
0436500309	Molex	Microfit 3 position connector Receptacle (on board)
0436500300	Molex	Microfit 3 position connector Housing (mating Connector)
0462355003	Molex	Microfit 26-30GA Lubricated Gold Socket (mating Connector)