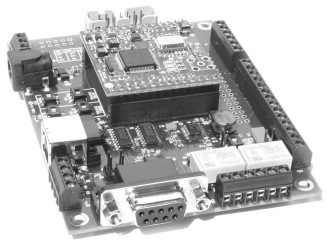
IM2200

Transceiver Interface Module

- ***Interface Module for the DM2200 Series Transceiver Modules***
- ***Provides choice of USB, RS232 or UART Serial Interfaces***
- ***Provides choice of USB, Regulated or Unregulated DC Power Sources***
- ***Supports Analog and Digital Inputs plus Digital and Relay Outputs***

The IM2200 is designed as an application interface module for the DM2200 series transceiver modules. The IM2200 provides a choice of three serial interfaces, including a direct connection to the DM2200 UART, plus RS232 and USB. The IM2200 also supports three power supply choices including unregulated DC, regulated DC, and USB. In addition, the IM2200 provides terminal blocks for the connection of analog inputs, logic inputs, logic outputs, and isolated relay contact outputs.



Absolute Maximum Ratings

Rating	Value	Units
PWR and VNREG Connections	-0.3 to +16.0	V
All Other Input/Output Connections	-0.3 to +4.0	V
Non-Operating Ambient Temperature Range	-40 to +85	^{o}C

Electrical Characteristics

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Digital Output Source Current, 1K load				1		mA
Digital Output Sink Current, 1K load				1.2		mA
Serial Port Default Data Rate				19.2		kb/s
Internal Power Supply Input Voltage Range			3.7		14.0	Vdc
External Power Supply Voltage Range	V_{DD}		2.9		3.7	Vdc
External Power Supply Voltage Ripple					10	mV_{P-P}
Operating Ambient Temperature Range	T_A		-40		+85	^{o}C

IM2200 Applications

The IM2200 is a companion interface board for the DM2200 (and DM2100) series transceiver modules. The IM2200 provides three basic functions:

First, the IM2200 routes DC power to the DM2200 and/or the IM2200 circuitry. If the external power is regulated (including battery power of the correct voltage range), the IM2200 can route this power directly to the DM2200 and/or IM2200 power busses. If the external power is unregulated, the IM2200 can route this power to the on-board regulators on the DM2200 and/or the IM2200. Unregulated power can be input to either connector J1 or Terminal Block TB1, Pin 1 (TB1-1). Regulated power is input on TB1-2. The outer ring of J1 and TB1-3 are power supply ground returns.

Second, the IM2200 routes the serial I/O pins from the DM2200 to terminal block TB3, Pins 1-4. In addition, the IM2200 can provide two optional serial interfaces - RS232 and USB. The RS232 connector is J2, and the USB connector is J3.

Third, the IM2200 routes the general-purpose I/O pins on the DM2200 to Terminal Block TB4 and the auxiliary digital I/O pins to Terminal Block TB5. In addition, general-purpose I/O pins GP4 and GP5 can each optionally drive a Form-C relay if set as a logic output and a jumper is placed on JMP3 and JMP4 respectively.

Power Supply Options

Switches SW1 and SW2 control power to the IM2200 circuitry, and switches SW4 and SW3 control power to the DM2200. SW2 is the ON/OFF switch to the IM2200 circuitry. This switch is ON when the switch rocker is set to the side of the switch *with the white dot*. SW1 selects either the regulated DC power input or the unregulated DC power input for the IM2200 circuitry. The regulated power input is selected when the switch rocker is set to the side of the switch *with the white dot*. Regulated input power is applied to terminal block TB1. The positive input is connected to TB1-1, and the negative input is connected to terminal TB1-3. *Note the input voltage range for the regulated input is 2.9 to 3.7 Vdc, with a maximum power supply ripple of 10 mV$_{P-P}$.* When SW1 is set to select unregulated power (rocker set to the side of the switch *without the white dot*), power can be taken from the USB connector J3, or from an unregulated power supply connected to coaxial power connector J1, or from an unregulated power supply connected to the VNREG input (positive lead) on TB1. *Note the input voltage range for an unregulated power supply is 3.7 to 14.0 Vdc.*

SW3 is the ON/OFF switch to the DM2200 circuitry. This switch is ON when the switch rocker is set to the side of the switch *with the white dot*. SW4 selects either the regulated DC power input or the unregulated DC power input for the DM2200 circuitry. The regulated power input is selected when the switch rocker is set to the side of the switch *with the white dot*. Regulated input power is applied to terminal block TB1. The positive input is connected to TB1-1, and the negative input is applied to terminal TB1-3. When SW4 is set to select unregulated power (rocker set to the side of the switch *without the white dot*), power can be taken from the USB connector J3, or from an unregulated power supply connected to coaxial power connector J1, or from an unregulated power supply connected to the VNREG input (positive lead) on TB1. Switch SW5 selects the power source for the relays. The regulated power input is selected when the switch rocker is set to the side of the switch *with the white dot*. The on board regulator for the relays is selected when the switch rocker is set to the side of the switch *without the white dot*.

Serial I/O Options

The IM2200 can route the serial port lines (CMOS logic levels) from the DM2200 to terminal block TB3. In addition, the DM2200 serial port lines can be routed through an RS232 converter to connector J2 (use a standard modem extension cable), or through a Silicon Labs CP2101 USB IC to connector J3. Serial port options are selected on the IM2200 by placing jumpers on jumper blocks JMP1 and JMP2 as follows:

JMP1	JMP2	Serial Option
open	open	RS232
short	open	USB
open	short	UART (CMOS logic levels)

The CP2101 drivers for USB operation can be downloaded from the Silicon Labs web site, www.silabs.com. After the correct drivers have been installed, the USB interface will appear as a serial port on the host computer.

Note: care must be taken that analog or logic inputs applied to the IM2200 stay within the voltage range of 0 to VDDM (voltage at TB5-1).

Connector and Terminal Block Descriptions (unlisted pins have no connection)

Pin	Name	Description
J1-1	VNREG	This pin is an optional input to the IM2200 on-board voltage regulator. The minimum input voltage to this pin is 3.7 V, and the maximum input to this pin is 14.0 V. See the IM2200 Applications section of this data sheet for power input selection details. Caution: applying a voltage outside of the specified operating range can damage the IM2200 and any radio module plugged into it.
J1-2	GND	This pin is connected to ground.
J2-1	DCD	This pin is simulated RS232 carrier detect. It is connected to Pins J2-4 and J2-6.
J2-2	TXD	This pin is the RS232 serial data output.
J2-3	RXD	This pin is the RS232 serial data input.
J2-4	DTR	This pin is simulated RS232 data terminal ready. It is connected to Pins J2-1 and J2-6.
J2-5	GND	This pin is connected to ground.
J2-6	DSR	This pin is simulated RS232 data set ready. It is connected to Pins J2-1 and J2-4.
J2-7	CTS	This pin is the RS232 serial data flow control input.
J2-8	RTS	This pin is the RS232 serial data flow control output.
J3-1	VBUS	This pin is USB VBUS.
J3-2	D-	This pin is USB D-.
J3-3	D+	This pin is USB D+.
J3-4	GND	This pin is connected to ground.
J3-5	GND	This pin is connected to ground.
J3-6	GND	This pin is connected to ground.
J4-1	GND	This pin is connected to ground.
J4-2	VIN	This pin is the input to the DM2200 on-board voltage regulator. The minimum input voltage to this pin is 3.1 V, and the maximum input to this pin is 14.0 V. See the IM2200 Applications section of this data sheet for power input selection details. Caution: applying a voltage outside of the specified operating range can damage the DM2200 radio module.
J4-3	VREN	This pin is the enable input for the DM2200 on-board regulator. It is connected to J4-2.
J4-4	VDDM	This pin is connected to the DM2200 positive power supply buss. When the DM2200 is powered from its on-board regulator, this pin can provide up to 5 mA of current at 3.0 Vdc (total current supplied by all pins connected to the 3 Vdc buss must not exceed 5 mA). The external load must not impress more than 10 mV peak-peak ripple on the supply buss. If the DM2200 on-board regulator is disabled, the DM2200 can be powered through this pin by an external 2.9 to 3.7 Vdc source applied to TB1-1 (maximum ripple 10 mV peak-peak). Caution: applying a voltage outside of the specified operating range can damage the DM2200 radio module.
J4-5	TD0	This pin is only used for factory programming the DM2200. It is routed on the IM2200 to J6-1.
J4-6	TDI	This pin is only used for factory programming the DM2200. It is routed on the IM2200 to J6-3.
J4-7	TWS	This pin is only used for factory programming the DM2200. It is routed on the IM2200 to J6-5.
J4-8	TCK	This pin is only used for factory programming the DM2200. It is routed on the IM2200 to J6-7.
J4-9	RST	This pin is only used for factory programming the DM2200. It is routed on the IM2200 to J6-11.
J4-10	CFG0	This pin is an auxiliary digital I/O pin. The default configuration of this pin is a digital output. It is routed on the IM2200 to TB5-2.
J4-11	CFG1	This pin is an auxiliary digital I/O pin. The default configuration of this pin is a digital output. It is routed on the IM2200 to TB5-3.

Pin	Name	Description
J4-12	CFG2	This pin is an auxiliary digital I/O pin. The default configuration of this pin is a digital output. It is routed on the IM2200 to TB5-4.
J4-13	CFG3	This pin is a software reset pin. Logic high is normal operation. Logic low invokes software resets. It is routed on the IM2200 to TB5-5.
J4-14	GND	This pin is connected to ground.
J5-1	GND	This pin is connected to ground.
J5-2	RXD	This pin is the DM2200 serial data input (CMOS). It is routed on the IM2200 to TB3-1.
J5-3	TXD	This pin is the DM2200 serial data output (CMOS). It is routed on the IM2200 to TB3-2.
J5-4	CTS	This pin is the DM2200 serial data flow control input (CMOS). It is routed on the IM2200 to TB3-4.
J5-5	RTS	This pin is the DM2200 serial data flow control output (CMOS). It is routed on the IM2200 to TB3-3.
J5-6	GP0/RSSI	This pin is a general purpose I/O pin on the DM2200 dedicated to monitoring the RSSI circuit output. It should always be configured as an analog-to-digital converter input. The RSSI signal can also be monitored externally at this pin. It is routed on the IM2200 to TB4-1.
J5-7	GP1	This pin is a general purpose I/O pin on the DM2200. It is routed on the IM2200 to TB4-2. The default configuration of this pin is a digital input. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a pulse counting input, a digital output, or an analog-to-digital converter input.
J5-8	GP2	This pin is a general purpose I/O pin on the DM2200. It is routed on the IM2200 to TB4-3. The default configuration of this pin is a logic input. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital output or an analog-to-digital converter input.
J5-9	GP3	This pin is a general purpose I/O pin on the DM2200. It is routed on the IM2200 to TB4-4. The default configuration of this pin is a digital input. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital output or an analog-to-digital converter input.
J5-10	GP4	This pin is a general purpose I/O pin on the DM2200. It is routed on the IM2200 to TB4-5. The default configuration of this pin is a digital output. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital input or an analog-to-digital converter input. If this pin is unused, it may be reconfigured for a logic low output to minimize current. In this case, the pin must be left unconnected.
J5-11	GP5	This pin is a general purpose I/O pin on the DM2200. It is routed on the IM2200 to TB4-6. The default configuration of this pin is a digital output. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital input, or an analog-to-digital converter input.
J5-12	GP6	This pin is a general purpose I/O pin on the DM2200. It is routed on the IM2200 to TB4-7. The default configuration of this pin is an analog-to-digital converter input. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital input or digital output.
J5-13	GP7	This pin is a general purpose I/O pin on the DM2200. It is routed on the IM2200 to TB4-8. The default configuration of this pin is an analog-to-digital converter input. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital input or digital output.
J5-14	GND	This pin is connected to ground.
J6-1	TD0	This pin is only used for factory programming of the DM2200. It must be left unconnected in normal operation.
J6-3	TD1	This pin is only used for factory programming of the DM2200. It must be left unconnected in normal operation.
J6-4	VDDM	This pin is only used for factory programming of the DM2200. It must be left unconnected in normal operation.
J6-5	TWS	This pin is only used for factory programming of the DM2200. It must be left unconnected in normal operation.
J6-7	TCK	This pin is only used for factory programming of the DM2200. It must be left unconnected in normal operation.
J6-9	GND	This pin is connected to ground.
J6-11	RST	This pin is only used for factory programming of the DM2200. It must be left unconnected in normal operation.

Pin	Name	Description
TB1-1	VREG	This pin is connected to the IM2200 positive power supply buss. When the IM2200 is powered from the on-board regulator, this pin can provide up to 5 mA of current at 3.0 Vdc (total current supplied by all pins connected to the 3 Vdc buss must not exceed 5 mA). The external load must not impress more than 10 mV peak -peak ripple on the supply buss. The IM2200 can also be powered through this pin by an external 2.9 to 3.7 Vdc source (maximum ripple 10 mV peak-peak). See the IM2200 Applications section of this data sheet for power input selection details. Caution: applying a voltage outside of the specified operating range can damage the IM2200 and any radio module plugged into it.
TB1-2	VNREG	This pin is an optional input to the IM2200 on-board voltage regulator. The minimum input voltage to this pin is 3.7 V, and the maximum input to this pin is 14.0 V. See the IM2200 Applications section of this data sheet for power input selection details. Caution: applying a voltage outside of the specified operating range can damage the IM2200 and any radio module plugged into it.
TB1-3	GND	This pin is connected to ground.
TB2-1	R1NC	This pin is connected to the normally-closed contact of relay 1. To use relay 1, define GP4 on the DM2200 as a logic output and install a jumper on the JMP3 jumper block on the IM2200. The relay contacts are rated at 1 A. Maximum recommended voltage on the relay contacts is 12 VAC or 12 Vdc.
TB2-2	R1CM	This pin is the common contact of relay 1.
TB2-3	R1NO	This pin is connected to the normally-open contact of relay 1.
TB2-4	R2NC	This pin is connected to the normally-closed contact of relay 2. To use relay 2, define GP5 on the DM2200 as a logic output and install a jumper on the JMP4 jumper block on the IM2200. The relay contacts are rated at 1 A. Maximum recommended voltage on the relay contacts is 12 VAC or 12 Vdc.
TB2-5	R2CM	This pin is the common contact of relay 2.
TB2-6	R2NO	This pin is connected to the normally-open contact of relay 2.
TB3-1	DRX	This pin is routed to the DM2200 serial data input (CMOS).
TB3-2	DTX	This pin is routed to the DM2200 serial data output (CMOS).
TB3-3	DRTS	This pin is routed to the DM2200 serial data flow control output (CMOS).
TB3-4	DCTS	This pin is routed to the DM2200 serial data flow control input (CMOS).
TB4-1	VDDM	This pin is connected to the DM2200 positive power supply buss. When the DM2200 is powered from its on-board regulator, this pin can provide up to 5 mA of current at 3.0 Vdc (total current supplied by all pins connected to the 3 Vdc buss must not exceed 5 mA). The external load must not impress more than 10 mV peak-peak ripple on the supply buss. If the DM2200 on-board regulator is disabled, power to this pin is provided by an external 2.9 to 3.7 Vdc source applied to TB1-1 (maximum ripple 10 mV peak-peak).
TB4-2	GP0	This pin is routed to a general purpose I/O pin on the DM2200 that is dedicated to monitoring the RSSI circuit output. It should always be configured as an analog-to-digital converter input. The RSSI signal can also be monitored externally at this pin.
TB4-3	GP1	This pin is routed to a general purpose I/O pin on the DM2200. The default configuration of this pin is a digital input. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a pulse counting input, a digital output or an analog-to-digital converter input.
TB4-4	GP2	This pin is routed to a general purpose I/O pin on the DM2200. The default configuration of this pin is a digital input. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital output or an analog-to-digital converter input.
TB4-5	GND	This pin is connected to ground.
TB4-6	VDDM	This pin is connected to the DM2200 positive power supply buss. When the DM2200 is powered from its on-board regulator, this pin can provide up to 5 mA of current at 3.0 Vdc (total current supplied by all pins connected to the 3 Vdc buss must not exceed 5 mA). The external load must not impress more than 10 mV peak-peak ripple on the supply buss. If the DM2200 on-board regulator is disabled, power to this pin is provided by an external 2.9 to 3.7 Vdc source applied to TB1-1 (maximum ripple 10 mV peak-peak).
TB4-7	GP3	This pin is routed to a general purpose I/O pin on the DM2200. The default configuration of this pin is a digital input. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital output or an analog-to-digital converter input.

Pin	Name	Description
TB4-8	GP4	This pin is routed to a general purpose I/O pin on the DM2200. The default configuration of this pin is a digital output. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital input or an analog-to-digital converter input.
TB4-9	GP5	This pin is routed to a general purpose I/O pin on the DM2200. The default configuration of this pin is a digital output. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital input or an analog-to-digital converter input.
TB4-10	GND	This pin is connected to ground.
TB4-11	VDDM	This pin is connected to the DM2200 positive power supply buss. When the DM2200 is powered from its on-board regulator, this pin can provide up to 5 mA of current at 3.0 Vdc (total current supplied by all pins connected to the 3 Vdc buss must not exceed 5 mA). The external load must not impress more than 10 mV peak-peak ripple on the supply buss. If the DM2200 on-board regulator is disabled, power to this pin is provided by an external 2.9 to 3.7 Vdc source applied to TB1-1 (maximum ripple 10 mV peak-peak).
TB4-12	GP6	This pin is routed to a general purpose I/O pin on the DM2200. The default configuration of this pin is an analog-to-digital converter input. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital input or digital output.
TB4-13	GP7	This pin is routed to a general purpose I/O pin on the DM2200. The default configuration of this pin is a analog-to-digital converter input. The configuration of this pin can be changed by commands through the RF channel. Other configuration options include a digital input or digital output.
TB4-14	GND	This pin is connected to ground.
TB5-1	VDDM	This pin is connected to the DM2200 positive power supply buss. When the DM2200 is powered from its on-board regulator, this pin can provide up to 5 mA of current at 3.0 Vdc (total current supplied by all pins connected to the 3 Vdc buss must not exceed 5 mA). The external load must not impress more than 10 mV peak-peak ripple on the supply buss. If the DM2200 on-board regulator is disabled, power to this pin is provided by an external 2.9 to 3.7 Vdc source applied to TB1-1 (maximum ripple 10 mV peak-peak).
TB5-2	CFG0	This pin is an auxiliary digital I/O pin. The default configuration of this pin is a digital output. When configured as a digital input and left unconnected, this pin is set to a logic high by a pull-up resistor on the IM2200.
TB5-3	CFG1	This pin is an auxiliary digital I/O pin. The default configuration of this pin is a digital output. When configured as a digital input and left unconnected, this pin is set to a logic high by a pull-up resistor on the IM2200.
TB5-4	CFG2	This pin is an auxiliary digital I/O pin. The default configuration of this pin is a digital output. When configured as a digital input and left unconnected, this pin is set to a logic high by a pull-up resistor on the IM2200.
TB5-5	CFG3	This pin is a software reset pin. Logic high is normal operation. Logic low invokes software resets. When left unconnected, this input is set to a logic high by a pull-up resistor on the IM2200
TB5-6	GND	This pin is connected to ground.



CAUTION: Electrostatic Sensitive Device. Observe precautions when handling.

IM2200 Connector and Terminal Block I/O

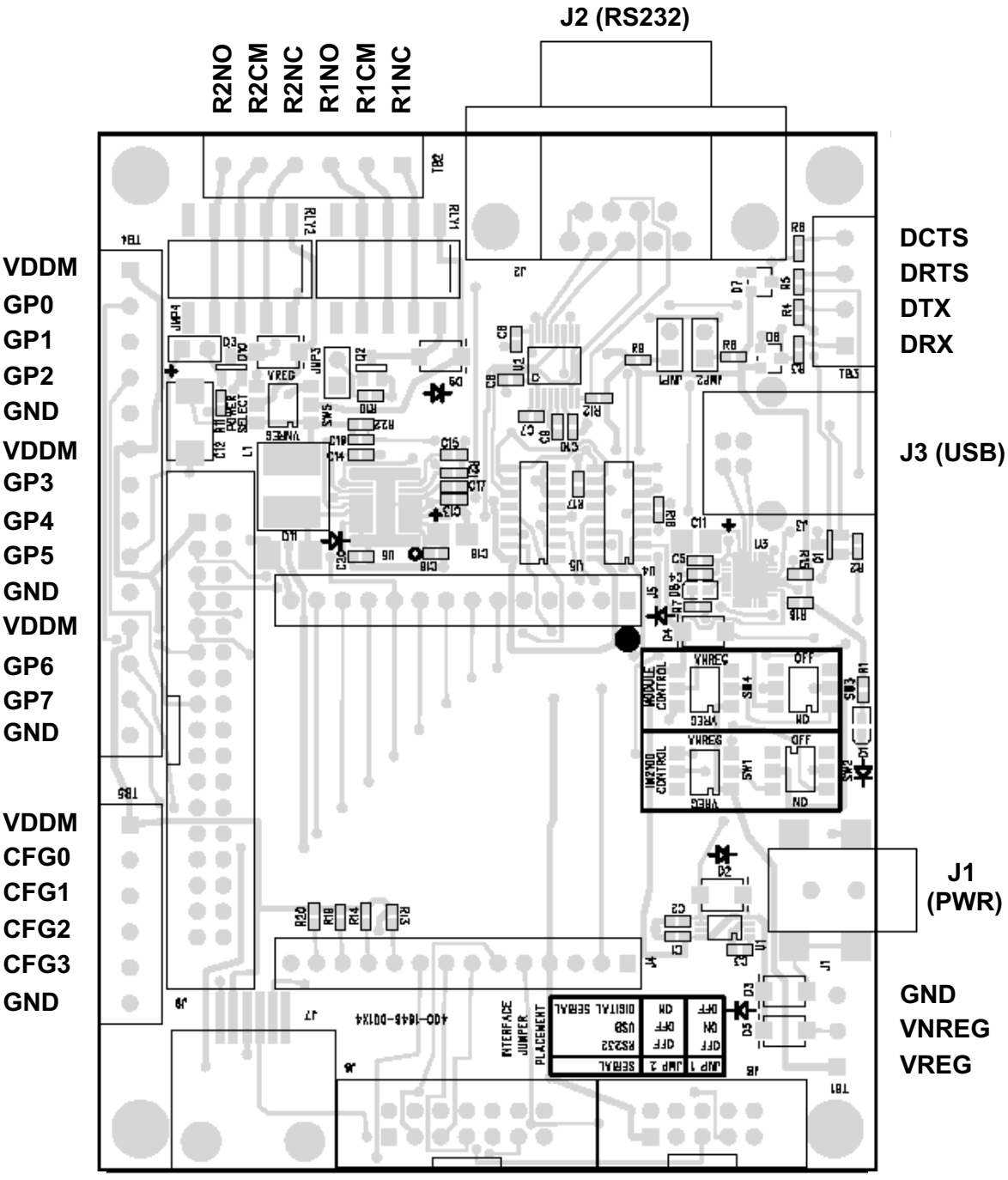


Figure 1

Note: Specifications subject to change without notice.

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