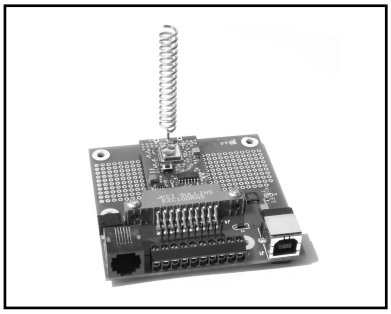
IM1800

Transceiver Interface Module

- ***Application Interface Module for the DM1800 Transceiver Modules***
- ***USB Host Computer Interface with Virtual Serial Port Driver***
- ***Choice of USB or External DC Power Sources***
- ***Supports Analog and Logic Inputs and a Logic Output***

The IM1800 is designed as an application interface module for the DM1800 series transceivers. The IM1800 can be powered from either its USB interface or from an external DC power input. The IM1800 USB interface is supported by a host computer virtual serial port driver. In addition, the IM1800 provides terminal block connections for an analog input, a logic input and a logic output. Direct connections to the DM1800 transceiver module UART are also provided on the IM1800 terminal block.



Absolute Maximum Ratings

Rating	Value	Units
VIN	-0.3 to +10.2	V
All Other Input/Output Connections	-0.3 to +4.0	V
Non-Operating Ambient Temperature Range	-40 to +85	°C

Electrical Characteristics

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Digital Output Source Current				0.5		mA
Digital Output Sink Current				1		mA
Serial Port Data Rate				9.6		kb/s
Power Supply Input Voltage Range	VIN		+3		+10	V
Regulated Power Supply Output Voltage, VIN +3.3 to +10 V	VOUT			+3.0		Vdc
Current Available for External Circuitry					10	mA
Ambient Operating Temperature	T_A		0		70	°C

IM1800 Applications

The IM1800 is a companion interface board for the DM1800 series transceiver modules. It has two uses:

First, the IM1800 can be used as a general purpose interface for DM1800 series transceiver modules. For this application, the IM1800 provides a captured screw I/O terminal block, a virtual serial port USB interface, and a choice of USB, coaxial plug or terminal block for the DC power supply input. For DM1800 base stations and field nodes, the IM1800 supports serial communications through the virtual serial port USB interface, or by direct connection to the UART on the DM1800 module.

Second, the IM1800 can be used as a development platform for applications where a DM1800 series transceiver will be installed a customer's board. In addition to the features listed above, the IM1800 provides a connector strip for jumpering a flat cable to a customer's board (or for a logic analyzer/oscilloscope connection), and a "bread board" area for building and testing interface circuits.

Power Supply Options

The IM1800 will accepts an external DC power supply voltage in the range of 2.6 to 14 V (3.1 to 14 V for extended temperature operation). This voltage is routed to the 3 Vdc regulator on the DM1800 transceiver (see description of J2-3 on Page 3 for VOUT characteristics). The external power supply voltage can be connected to VIN on terminal block J2 or to the coaxial power connector J6. The IM1800 can also be powered from the USB connector J1. When the IM1800 is powered from the USB connector, no connection should be made to the VIN terminal on terminal block J2 or to the coaxial power connector J6.

Serial Port Options

The IM1800 provides direct connections to the DM1800 transceiver module UART on terminal block J2. Note that the DM1800 UART I/O is 3 V CMOS logic. Alternately, the serial port on a DM1800 can be interfaced through the serial port-USB bridge IC on the IM1800. Only one interface should be used at a time; the other serial interface should remain unconnected. The IM1800 virtual serial port USB interface is based on the Silicon Labs CP2101 IC. The CP2101 drivers can be downloaded from www.silabs.com. After the correct driver has been installed on a host PC, the USB interface will appear as a serial port.

Bread Boarding Area

Referring to Figure 1, the IM1800 bread boarding area is supplied with ground connections on eyelet Row 10 (vertical row of eyelets on right side), VOUT on eyelet Row 3, and VIN on eyelet Row 2. VOUT and the I/O signals from the DM1800 are also provided in two locations on Row 1. Refer to the table on Pages 3 and 4 for details. Note that the DM1800 can provide up to 10 mA for supplying external circuitry. Additional power can be provided by adding a 3 V regulator in the bread boarding area and running it from VIN. *Take caution not to operate circuitry from VIN that directly interfaces the DM1800 I/O signals to avoid damaging the DM1800 and/or IM1800.* Note that any components placed on the bread boarding area directly under where the DM1800 module plugs in must be no taller than 0.1 inch.

I/O and Power Supply Precautions

Note that all analog and digital input signals must be within the range of 0 to VOUT. Applying a signal outside of this range may damage the DM1800 and/or IM1800. External DC power supplies must be in the range of 2.6 to 14 V. Suitable external power supplies include batteries and transformer isolated, regulated DC power supplies. Be cautious when using unregulated "wall transformer" DC supplies. The output voltage of these unregulated supplies can be much higher than the nameplate value when powering low current loads.

Note: the IM1800 is equipped with a programming connector compatible with a Microchip MPLAB® ICD 2. Except in special circumstances, however, all DM1800 transceiver modules are shipped pre-programmed. *Reprogramming a pre-programmed DM1800 transceiver module will void the warranty and any regulatory certifications of the module.*

Connector and Terminal Block Descriptions

Pin	Name	Description
J1-1	VBUS	This is the USB VBUS. The IM1800 and its DM1800 transceiver module can be powered from this supply.
J1-2	D-	This is the USB D- signal.
J1-3	D+	This is the USB D+ signal.
J1-4	GND	This is a signal and power supply ground for the USB connector.
J1-5	GND	This is a signal and power supply ground for the USB connector.
J1-6	GND	This is a signal and power supply ground for the USB connector.
J2-1 J3-1 J4-1	GND	This is a signal and power supply ground.
J2-2 J3-2 J4-2	VIN	This is the power supply positive input. The allowed input voltage range is +3 to +10 V.
J2-3 J3-3 J4-3 R1-7 R1-28	VOUT	When the IM1800 VIN is in the range of +3.0 to +3.3 V, VOUT is in the range of +2.7 to +3.0 V. When the IM1800 is in the range of +3.3 to +10 V, VOUT is regulated at +3.0 Vdc. Up to 10 mA can be supplied for powering external circuits such as thermistor-resistor networks. External circuitry must not impress more than 10 mV_{p-p} ripple on the regulated output voltage.
J2-4 J3-4 J4-4 R1-6 R1-27	BIND	This is connected to a logic input on the microcontroller, and is configured with a weak pull-up. When this pin is momentarily grounded (to J1-1 or J1-10, the module is placed into the bind mode, allowing this module to be associated with other modules to form a network.
J2-5 J3-5 J4-5 R1-5 R1-26	DIGITAL IN	This is connected to a logic input on the microcontroller, and is configured with a weak pull-up, allowing both logic signals and contact closures referenced to J-1 or J-10 to be read. The value of this input is sent over the RF channel as a response to an RF command. The input voltage range on this pad is 0 to VOUT. Applying a voltage outside of this range may damage the module.
J2-6 J3-6 J4-6 R1-4 R1-25	ANALOG IN	This is connected to the input to the microcontroller's 10-bit analog-to-digital (ADC) converter. The ADC input range is 0 to VOUT, and the input voltage range on this pad is 0 to VOUT. Applying a voltage outside of this range may damage the module. The reading is sent over the RF channel as a response to an RF command.
J2-7 J3-7 J4-7 R1-3 R1-24	DIGITAL OUT	This is connected to a logic output on the microcontroller through a 1 kilohm resistor, which provides short-circuit protection. The value of this output is set or read over the RF channel as a response to an RF command.
J2-8 J3-8 J4-8 R1-2 R1-23	SERIAL RX	This is connected to the module's serial data input (UART). Data to this input is received at 9.6 kb/s, using 8 data bits, no parity, and one stop bit. The input voltage range on this pad is 0 to VOUT. Applying a voltage outside of this range may damage the module.
J2-9 J3-9 J4-9 R1-1 R1-22	SERIAL TX	This is the connected to the module's serial data output (UART) through a 1 kilohm resistor, which provides short-circuit protection. Data from this output is sent at 9.6 kb/s, using 8 data bits, no parity, and one stop bit.
J2-10 J3-10 J4-10	GND	This is a signal and power supply ground.
J5-1	Vpp/~MCLR	This is the programming connector microcontroller reset and programming voltage pulse input.

Pin	Name	Description
J5-2	VDD	This is the programming connector positive voltage input.
J5-3	GND	This is the programming connector ground.
J5-4	PGD	This is the programming connector data input.
J5-5	PGC	This is the programming connector clock input.
J5-6	-	This pin is not connected.
J6-1	VIN	This is the coaxial power plug positive VIN input. VDD on J5-2 is disconnected when J6-1 is used.
J6-2	GND	This is the coaxial power plug ground.

CAUTION: Electrostatic Sensitive Device. Observe precautions when handling.

IM1800 I/O Pad Labels

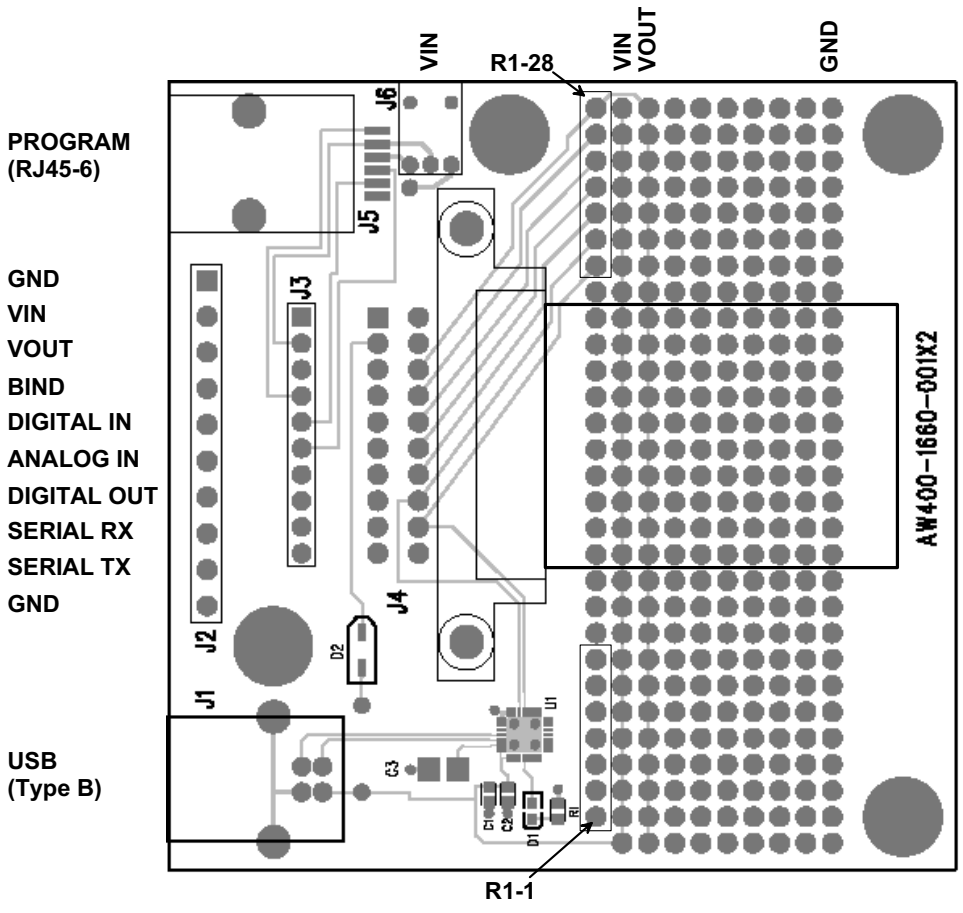


Figure 1

IM1800 Mounting Dimensions

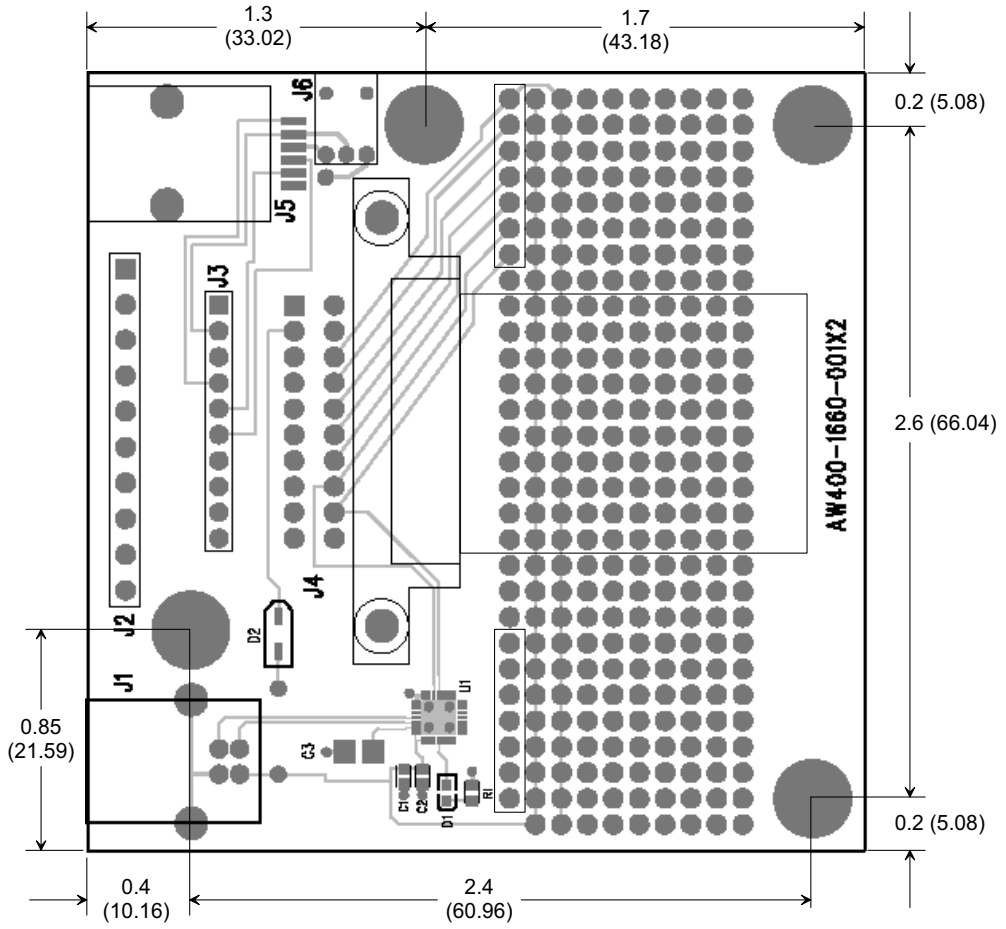


Figure 2

Note: Specifications subject to change without notice.

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