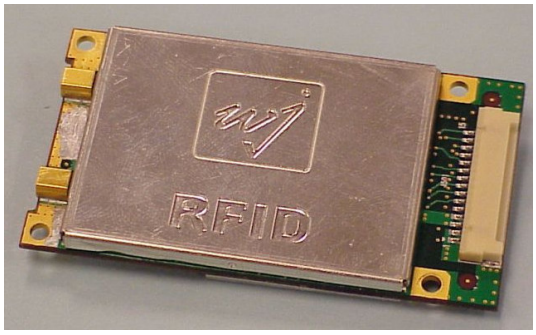
WJM1000

Next Generation RFID Reader Module

Based on WJC200 Gen2 RFID reader chipset

Key Features

- **Multi-protocol support: ISO 18000-6C (Gen2) & ISO 18000-6B**
- **Dynamic RF output power: 10 dBm to 24 dBm range**
- **Two antenna port for added flexibility**
- **Power saving modes to extend battery life**
- **Special printer commands to enable high throughput tag/label fulfillment**
- **WJC200 Gen2 reader chipset based design**



Applications:

- Printers
- Item-level RFID
- Mobile & handheld devices

WJ Communications' WJM1000 UHF RFID module is designed to enable OEMs, VARs and System Integrators to integrate RFID UHF Gen2 capability into new and existing short range applications such as printers and Mobile /handheld devices. By leveraging WJ's WJC200 Gen2 chipset, the WJM1000 enables cost effective, compact RFID-enabled devices. The WJM1000 extends industry leading features including Gen2 dense reader environment (DRE) . The WJM1000 reader module's simple but powerful command set allows for fast creation of custom applications via an open-source DLL and API. The WJM1000 printer-commands, includes Single API command for optimized, high throughput fulfillment of Gen2 labels/tags, increases printer throughput while minimizing overheard.

The WJM1000 can be set to transmit a range of output powers, providing increased flexibility to enable optimal settings for fulfillment of labels/tags inside a printer. The module operates over the North American UHF frequency band (902-928 MHz) and includes the RF, digital circuitry and embedded firmware required for ISO18000- 6C (UHF Gen2) and ISO 18000-6B international standards. 3.3V CMOS level serial communications and 4 GPIO lines are available on a 15-pin connector. Mounting holes provide fast and easy mechanical integration. WJ's free demo software offers quick evaluation of the module without software development.

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Absolute Maximum Rating*

Parameter	Rating	Units
ESD Protection (per ISO 7816-1)	2	KV
Maximum Voltage	6	V
Operating Case Temperature	-20 to +55	℃
Storage Temperature	-40 to +65	℃

*Operation of this device above any of these parameters may cause permanent damage.

Specifications

Operating Conditions: Vcc = 5.0 VDC, T_{AMB} = 25℃, 50 Ω System.

Symbol	Parameter	Min	Typ	Max	Units
*f*RFID	RF Frequency—UHF Operation	902		928	MHz
*D*RATE	Data Rate	40		40	KHz
*f*CH	Channel Spacing		500		kHz
CH	Frequency Hopping Channels		50		Channels
V_{CC}	Supply Voltage @ 550 mA, Connected to System	+4.50	+5.0	+5.50	V
$I_{PEAK\ OP}$	Peak Operating Current*			550	mA
$P_{TX\text{-}Max}$	Maximum Transmit Power	10		24	dBm
P_{RANGE}	Power Control Range		15		dB
	Step Size		1		dB
S*f*	Frequency Stability			±10	ppm

*Peak operating current for 250mW CW output power; Average operating current draw is significantly less than CW peak current.

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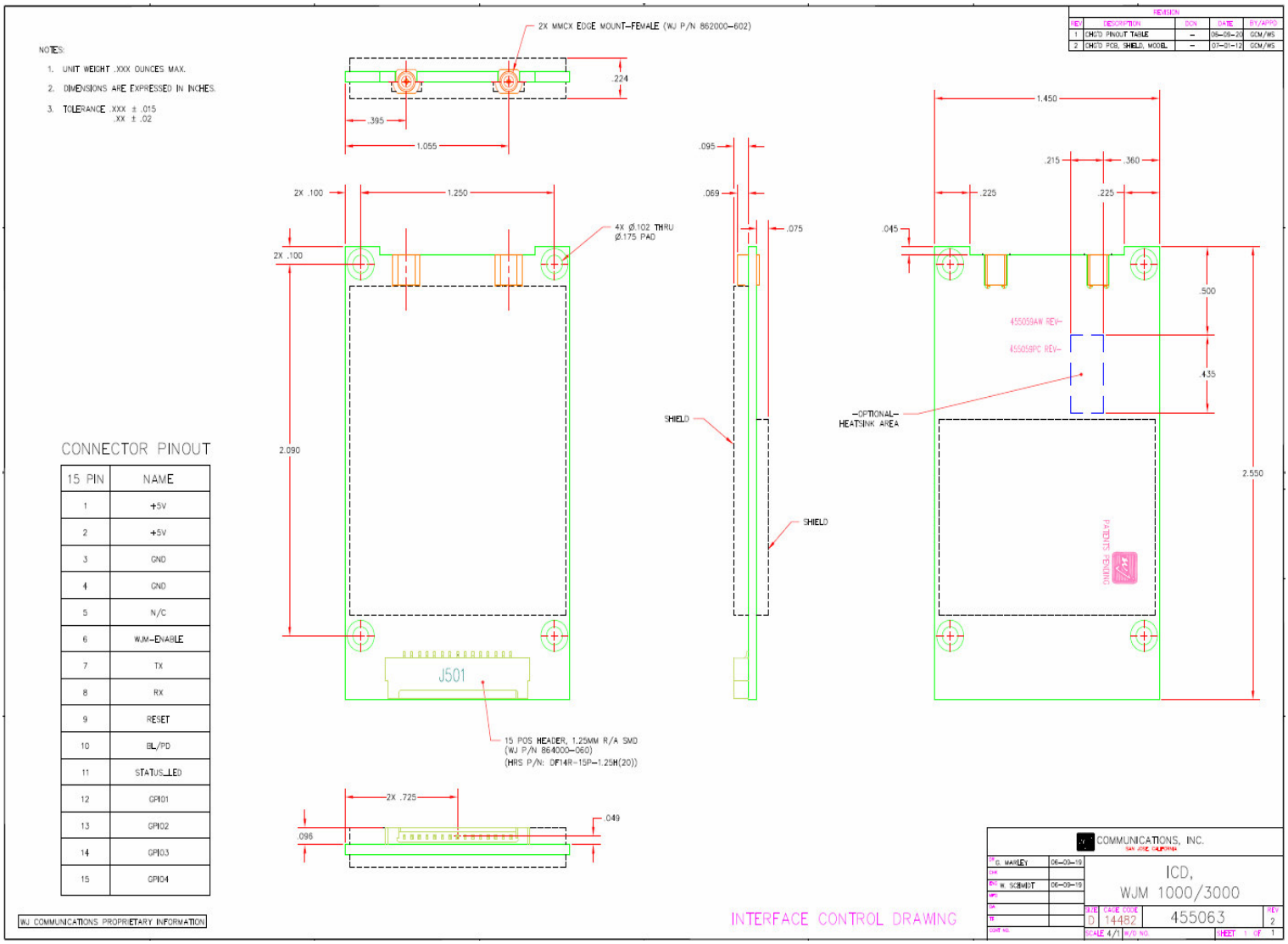
Protocol Support

Protocol	ID Read	ID Write	Data Read	Data Write	Password Write	Lock	Kill
ISO 18000-6B	X	X	X	X	X	X	
ISO-18000-6C (EPC Class1 Gen2)	X	X	X	X	X	X	X

WJM1000 Mechanical Specifications



Interface Connector Pin out

Pin #	Name	Description
1, 2	+5.0 V	Power Supply. +5.0V ± 0.5 V @ 550 Milliamps
3,4	GND	Power Supply Ground Return
5	N/C	*No Connect*
6	WJM_EN	Active High Power Enable. Grounding this pin shuts off entire module. Minimum logic high voltage is +2.5V. 5V tolerant. Low impedance driver or a pull up resistor less than 2K required.
7	TX	3.3V CMOS logic-level UART transmit pin
8	RX	5V tolerant CMOS logic-level UART receive pin
9	nRESET	5V tolerant Active Low Reset Pin. When held low, WJM draws current but will not respond to commands. If nBL/nPD is held low as nRESET is brought high, the WJM enters Bootloader mode. If nBL/nPD is held high as nRESET is brought high, the WJM application starts.
10	nBL/nPD	5V tolerant Active Low Bootloader/PowerDown pin. This pin serves two functions. 1) If this pin is low at the rising edge of nRESET (including power-on), the Bootloader is activated for writing a new Firmware application (FW). If it is high, FW starts. 2) Once FW starts, bringing this pin low enables sleep mode. The module will not respond to API commands in sleep mode. Keep it high for normal operation.
11	STATUS_LED	3.3V logic-level 3-state output: Logic high: OK Tri-State: Sleep Mode Logic low: Error *This has not been implemented in FW.*
12	GPIO1	Currently FW configures these pins as outputs, they display various debug and status signals to LEDs. If unused they can be left un-connected. *Specific uses for these pins have not been finalized.*
13	GPIO2	
14	GPIO3	
15	GPIO4	

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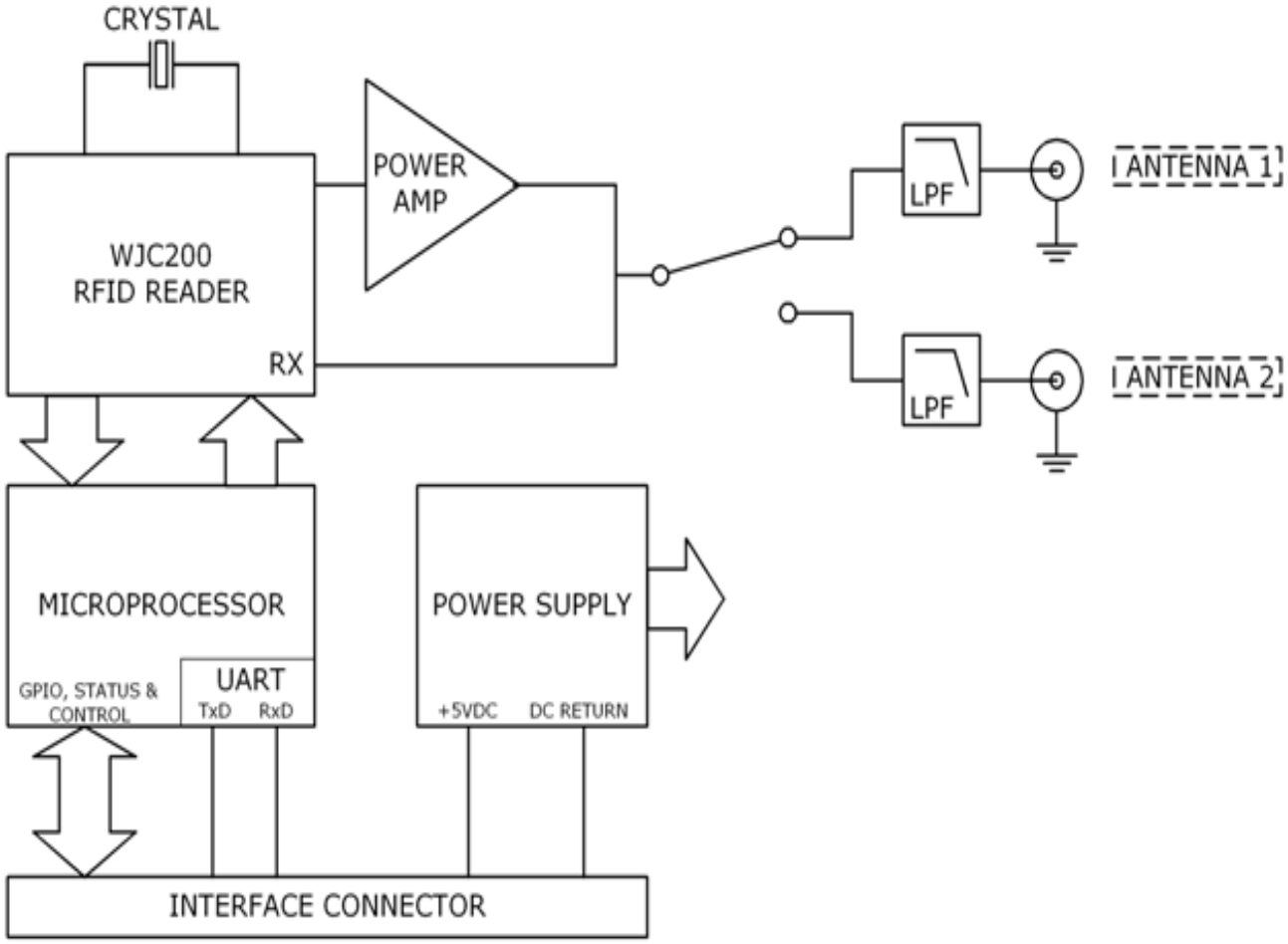
WJM1000 System Block Diagram



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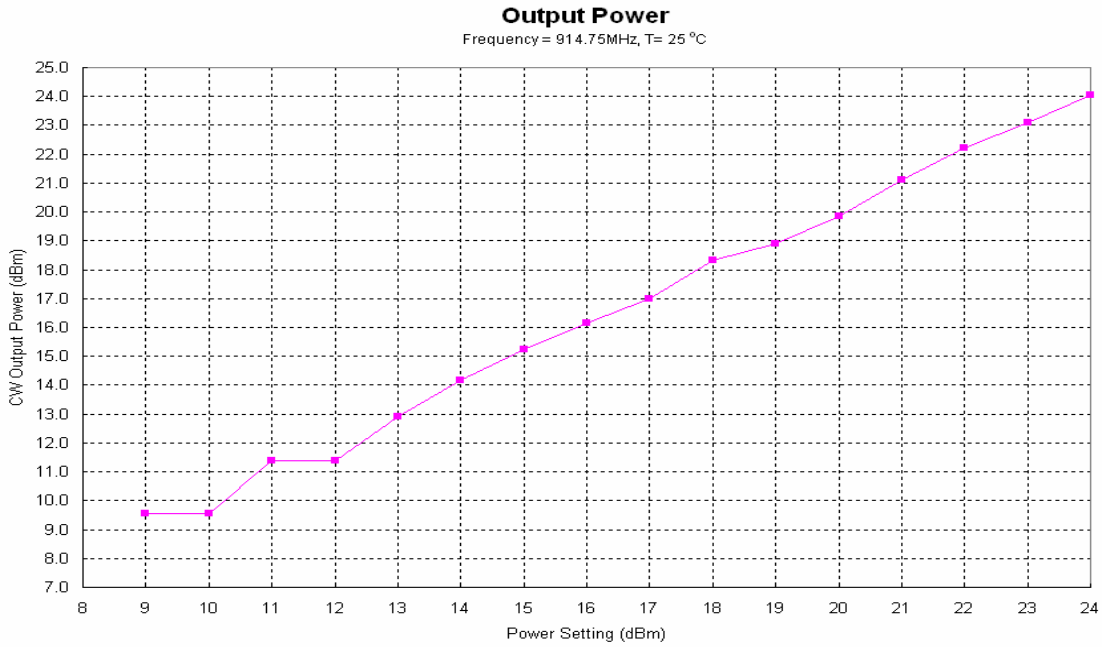
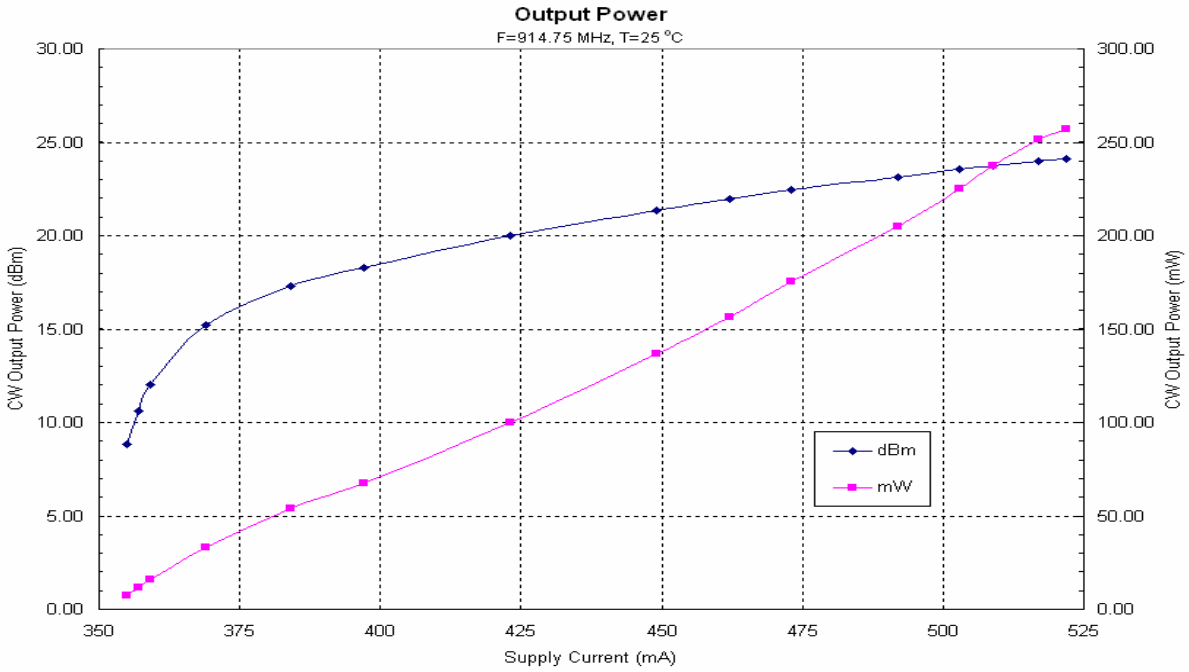
WJM1000 Performance Data



Output Power Vs Power settings



Output Power Vs Supply Current

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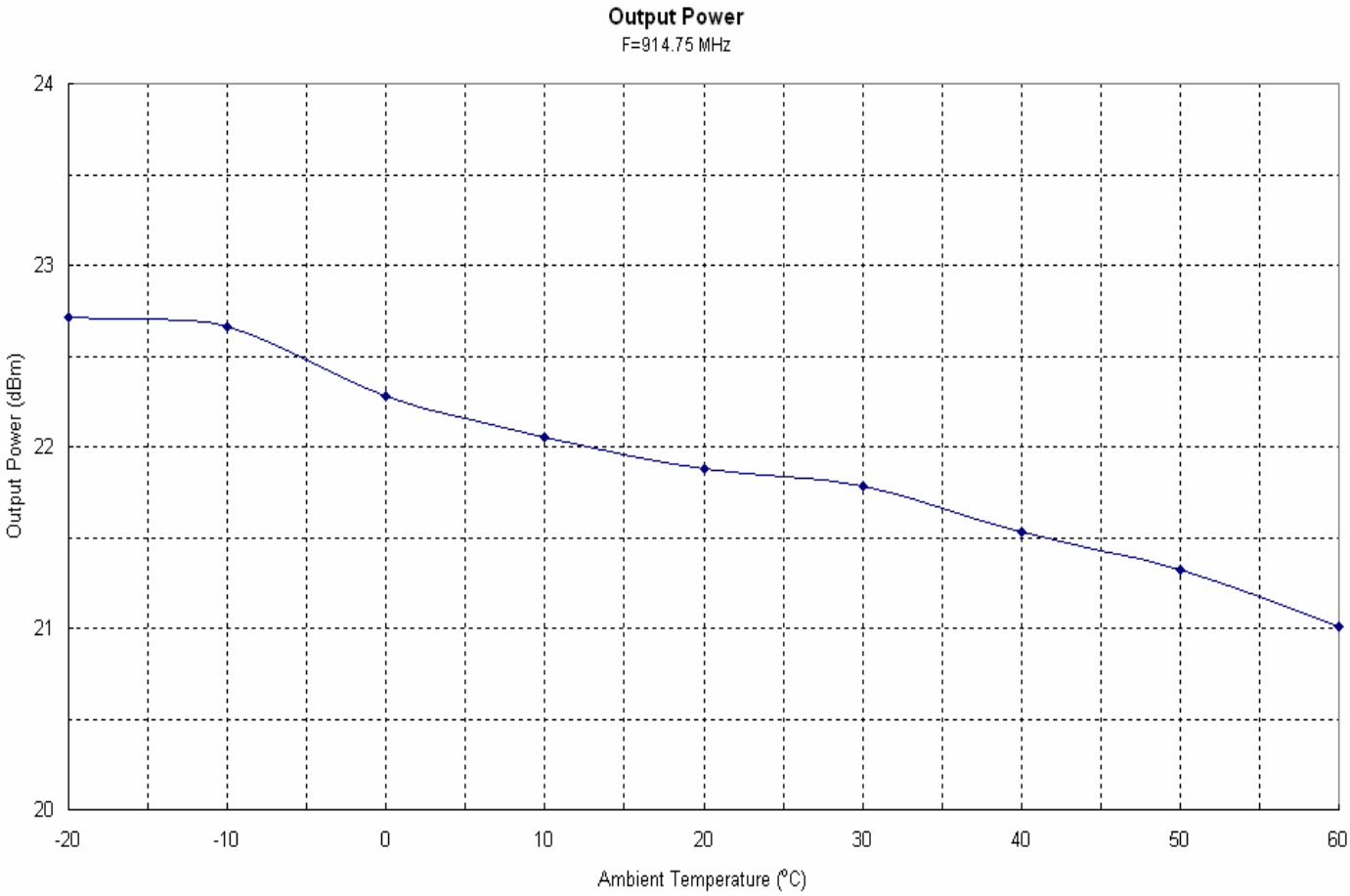

Output Power Vs Temperature

Interface Timing

Signal Name	Description	Minimum Time (microseconds)
t_{RESET}	RESET pulse width	800
t_{RESET_UART}	Delay between RESET and the start of TX/RX communications	400
$t_{RESET\_FW\_UART}$	Delay between RESET and the start of new firmware download	3000 (3 ms)
$t_{WJM\_EN\_UART}$	Delay between power-on via WJM_EN and the start of TX/RX communications	3000 (3 ms)
t_{PD_UART}	Delay between return from power-save state (BL/PD) and the start of TX/RX communications	400

Interface Timing Diagrams