



Excellence in Compliance Testing

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## **Certification Exhibit**

**FCC ID: HSW-2492  
IC: 4492A-2492**

**FCC Rule Part: 15.247  
IC Radio Standards Specification: RSS-210**

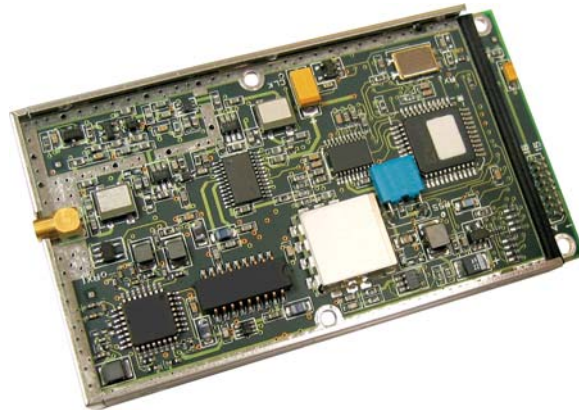
**ACS Project Number: 11-0123**

**Manufacturer: Cirronet, Inc.  
Model: WIT2492**

## **Manual**

# WIT2492

2.4GHz Spread Spectrum Wireless Industrial Transceiver



## Integration Guide



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CIRRONET™

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## Important Regulatory Information

**RFM/Cirronet WIT2492 - FCC ID: HSW-2492, IC ID: 4492A-2492**

**Note:** This unit has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense.

### FCC s MPE Requirements

**Information to user/installer regarding FCC s Maximum Permissible Exposure (MPE) limits.**

**Notice to users/installers using the following fixed antennas, with Cirronet RF products:**

<p><i>Cushcraft 15dBi Yagi, Mobile Mark 14dBi Corner Reflector, Mobile Mark 9dBi Corner Reflector</i></p>	<p><i>The field strength radiated by any one of these antennas, when connected to Cirronet RF products, may exceed FCC mandated RF exposure limits. FCC rules require professional installation of these antennas in such a way that the general public will not be closer than 2 m from the radiating aperture of any of these antennas. End users of these systems must also be informed that RF exposure limits may be exceeded if personnel come closer than 2 m to the apertures of any of these antennas.</i></p>
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**Notice to users/installers using the following mobile antennas, with Cirronet RF products:**

<p><i>Mobile Mark 9dBi omni-directional, MaxRad 5dBi whip, Cirronet Patch antenna, Ace 2dBi dipole, Mobile Mark 2dBi Stub</i></p>	<p><i>The field strength radiated by any one of these antennas, when connected to Cirronet RF products, may exceed FCC mandated RF exposure limits. FCC rules require professional installation of these antennas in such a way that the general public will not be closer than 20 cm from the radiating aperture of any of these antennas. End users of these systems must also be informed that RF exposure limits may be exceeded if personnel come closer than 20 cm to the apertures of any of these antennas.</i></p>
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**The WIT2492 may be used in Portable applications only under the following conditions:**

- 1) **When operated in Remote mode where the transmitted duty cycle less than or equal to 5.6%, the WIT2492 may use any type-approved antenna with up to 6 dBi of gain. Antenna gains exceeding 6dBi are strictly prohibited.**
- 2) **When operated in Base mode where the transmitted duty cycle less than or equal to 12.85%, the WIT2492 may use any type-approved antenna with up to 2 dBi of gain. Antenna gains exceeding 2dBi are strictly prohibited.**

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## Labeling and Notices

### Labeling:

A clearly visible label is required on the outside of the user's (OEM) enclosure stating the following:

"Contains FCC ID: HSW-2492"

"Contains IC: 4492A-2492"

### Notices:

WARNING: This device operates under Part 15 of the FCC rules. Any modification to this device, not expressly authorized by RFM, Inc., may void the user's authority to operate this device.

FCC NOTICE: This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IC Notice - This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter, IC: 4492A-2492, has been approved by Industry Canada to operate with the antenna types listed later in this manual with the maximum permissible gain and required antenna impedance for each antenna type indicated.

Canadian ICES-003 - This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of Industry Canada.

Le present appareil numerique n'emet pas de bruits radioelectriques dépassant les limites applicables aux appareils numeriques de Classe B prescrites dans le reglement sur le brouillage radioelectrique edicte par Industrie Canada.

### **Canadian Department of Communications Industry Canada (IC) Notice**

Canadian Department of Communications Industry Canada (IC) Notice

This apparatus complies with Health Canada's Safety Code 6 / IC RSS 102.

"To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors may be subject to licensing."

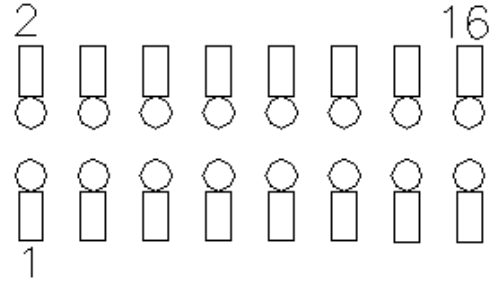
## 1. INTRODUCTION

The WIT2492 radio transceiver provides reliable wireless connectivity for either point-to-point or multipoint applications. Frequency hopping spread spectrum technology ensures maximum resistance to noise and multipath fading and robustness in the presence of interfering signals, while operation in the 2.4GHz ISM band allows license-free use and worldwide compliance. A simple serial interface supports asynchronous data up to 921600 bps. An on-board 3 KB buffer and an error-correcting over-the-air protocol provide smooth data flow and simplify the task of integration with existing applications.

- Multipath fading impervious frequency hopping technology with 43 frequency channels (2401-2475 MHz).
- Supports point-to-point or multipoint applications.
- Meets FCC rules 15.247 and ETS 300.328 for worldwide license-free operation.
- Superior range to 802.11 wireless LAN devices.
- Transparent ARQ protocol w/3KB buffer ensures data integrity.
- Digital addressing supports up to 64 networks, with 62 remotes per network.
- Low power 3.3v CMOS signals
- Built-in data scrambling reduces possibility of eavesdropping.
- Nonvolatile memory stores configuration when powered off.
- Smart power management features for low current consumption.
- Dynamic TDMA slot assignment that maximizes throughput.
- Simple serial interface handles both data and control at up to 921600 bps.
- Fast acquisition typically locks to hopping pattern in 2 seconds or less.
- Selectable 10 mW or 100 mW transmit power.
- Support for diversity antenna.

## 4. MODEM INTERFACE

Electrical connection to the WIT2492 is made through a 16-pin male header on the modem module. The signals are 3.3 volt signals and form an RS-232 style asynchronous serial interface.



The table below provides the connector pinout.

Pin	Signal	Type	Description
1	GND	-	Signal and chassis ground
2	TXD	Input	Transmit data. Input for serial data to be transmitted. In Control Mode also used to transmit modem commands to the modem.
3	RXD	Output	Receive data. Output for received serial data. In Control Mode, also carries receive modem status from the modem.
4	$\overline{\text{CFG}}$	Input	Configuration selector. Used to switch between Control and Data Modes. Normally, CFG will be set for Data Mode. An internal 10K pull-up enables Data Mode if this signal is left unconnected. Control Mode is also accessible by transmitting an escape sequence immediately after wake up or power up.  (0v) 1 = Control Mode (3.3v) 0 = Data Mode
5	$\overline{\text{RTS}}$	Input	Request to send. Gates the flow of receive data from the radio to the user on or off. In normal operation this signal should be asserted. When negated, the WIT2492 buffers receive data until RTS is asserted.  (0v) 1 = Receive data (RxD) enabled (3.3v) 0 = Receive data (RxD) disabled.
6	SLEEP	Input	Sleeps/wakes radio transceiver. In sleep mode all radio functions are disabled consuming less than 50 $\mu$ A. At wake up, any user programmed configuration settings are refreshed from non-volatile memory, clearing any temporary settings that may have been set.  (3.3v) 1 = Sleep Radio (0v) 0 = Wake Radio
7	$\overline{\text{DCD}}$	Output	Data carrier detect. For remotes, indicates the remote has successfully acquired the hopping pattern of the base station.  (0v) 1 = Carrier detected (synchronized) (3.3v) 0 = No carrier detected (not synchronized)
8	$\overline{\text{CTS}}$	Output	Clear to send. Used to control transmit flow from the user to the radio.  (0v) 1 = Transmit buffer not full, continue transmitting (3.3v) 0 = Transmit buffer full, stop transmitting
9	-	-	Reserved for future use. Do not connect.
10	$\overline{\text{Reset}}$	Input	Resets the radio.
11-15	-	-	Reserved for future use. Do not connect.
16	VCC	-	Positive supply. Min 3.3 v, 5.0 v nominal, 10.0 v max.

## 9. APPENDICES

### 9.1. Technical Specifications

#### 9.1.1 Ordering Information

WIT2492M4 OEM Module, Serial connector pins down - Standard  
 WIT2492S4 OEM Module, Serial connector pins up

#### 9.1.2. Power Specifications

Vcc Input Range: 3.3v to 10.0v  
 Operating Temperature Range: -30°C to +70°C

Current Consumption (Max transmit power, 230.4Kbps I/O)

Mode	Remote	Base Station
Sleep	50µA	N/A
Standby	20mA	N/A
Typical Average	50mA	80mA
Peak (Tx)	80mA	100mA

#### 9.1.3. RF Specifications

FCC Certification	Part 15.247, no license required
ETSI (European) Certification	EN 300.328, no license required
Rated RF Power	+18 dBm (+20 dBm effective radiated)
Line-of-site Range	6/10 of a mile w/2dB dipole
Frequency Range	2401 – 2480MHz
Number of Channels	43 US; Canada, France,
Receiver Sensitivity	-90dBm
Channel Data Rate	921.6Kbps
IF Adjacent Channel Rejection	>55dB

#### 9.1.4. Mechanical Specifications

Weight	35g
Dimensions (including shield)	80.2 x 46.5 x 8.6mm (refer to section 7.6 for mechanical drawing)
RF Connector:	
WIT	Huber/Suhner: 85 MMCX 50-0-1
Mating	Huber/Suhner: 11 MMCX-50-2-3 (straight) Huber/Suhner: 16 MMCX-50-2-2 (rt. angle)
Data/Power Connector:	
WIT	Samtec: DIS5-108-51-L-D
Mating	Samtec: CLP-108-02-G-D (PCB mount) Samtec: FFSD-08 (IDC cable)

## 9.2. Serial Connector Pinouts

Signal	WIT2492M/S4 OEM Pinout	HN-510 DB9 Pinout
GND	1	5
TXD	2	3
RXD	3	2
CFG	4	-
RTS	5	7
SLEEP	6	4
DCD	7	1
CTS	8	8

**Note: The WIT2492M4 is the standard part number and has the serial connector pins pointing down allowing connection to a mother board without using a cable. WIT2492S4 has the serial connector pins pointing up.**

The HN-510 is wired as a DCE device and as such can be connected to DTE devices such as PCs with a straight-through cable. When connecting a HN-510 to a DTE device, a “null modem” cable is required. To effect a null modem cable, cross-wire TXD and RXD and connect ground. The HN-510 can operate with just these three wires connected. However, as the WIT2492 does not support software flow control, there will be no flow control in this mode. If the DTE device fails to respond, connect DCD from the HN-510 to the DTR and RTS inputs to activate the DCE device whenever the WIT2492 asserts carrier.

When connecting to the WIT2492M/S4, make sure that all of the inputs (TXD, CFG, RTS and SLEEP) are terminated for proper operation.

## 9.3. Approved Antennas

The WIT2492M/S4 is designed to ensure that no antenna other than the one fitted shall be used with the device. The end user must permanently affix the antenna by using an adhesive on the coupling such as *Loctite*, or ensure the antenna has a unique coupling. The table below lists the antennas which can be purchased directly from Cirronet. Contact Cirronet Technical Support with any questions.

Description	Gain	Manufacturer	Type
15dBi Yagi	15dB	Cushcraft	Yagi
14dBi Corner Reflector	14dB	Mobile Mark	Corner Reflector
9dBi Omni-directional	9dB	Mobile Mark	Dipole (omni)
9dBi Corner Reflector	9dB	Mobile Mark	Corner Reflector
6dBi Cirronet Patch	6dB	Cirronet/RFM	Planar Patch
5dBi Whip	5dB	MaxRad	Dipole (omni)
2dBi Cirronet Patch	2dB	Cirronet/RFM	Planar Patch
2dBi Stub	2dB	Mobile Mark	Dipole (omni)

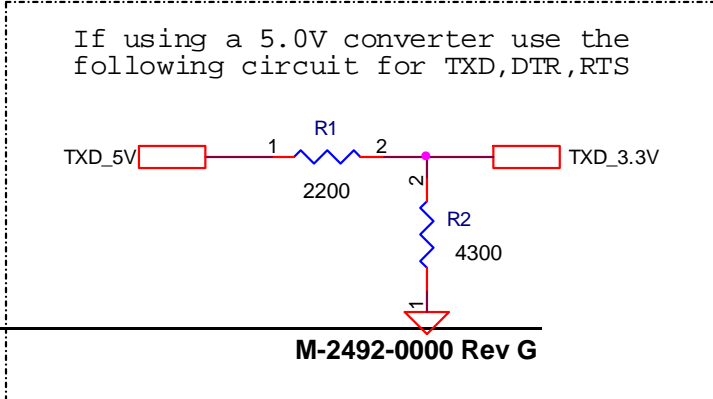
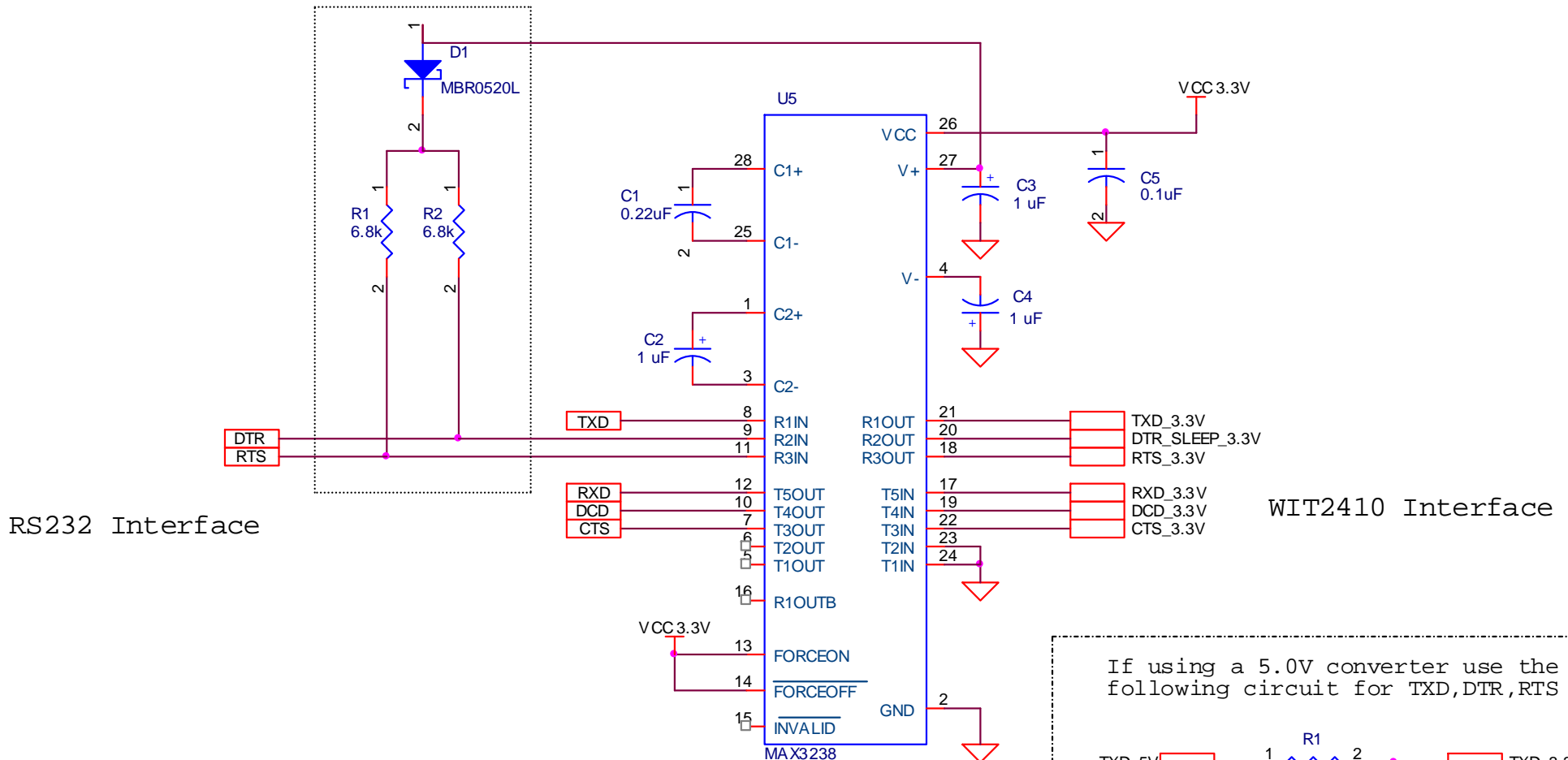


#### 9.4. Technical Support

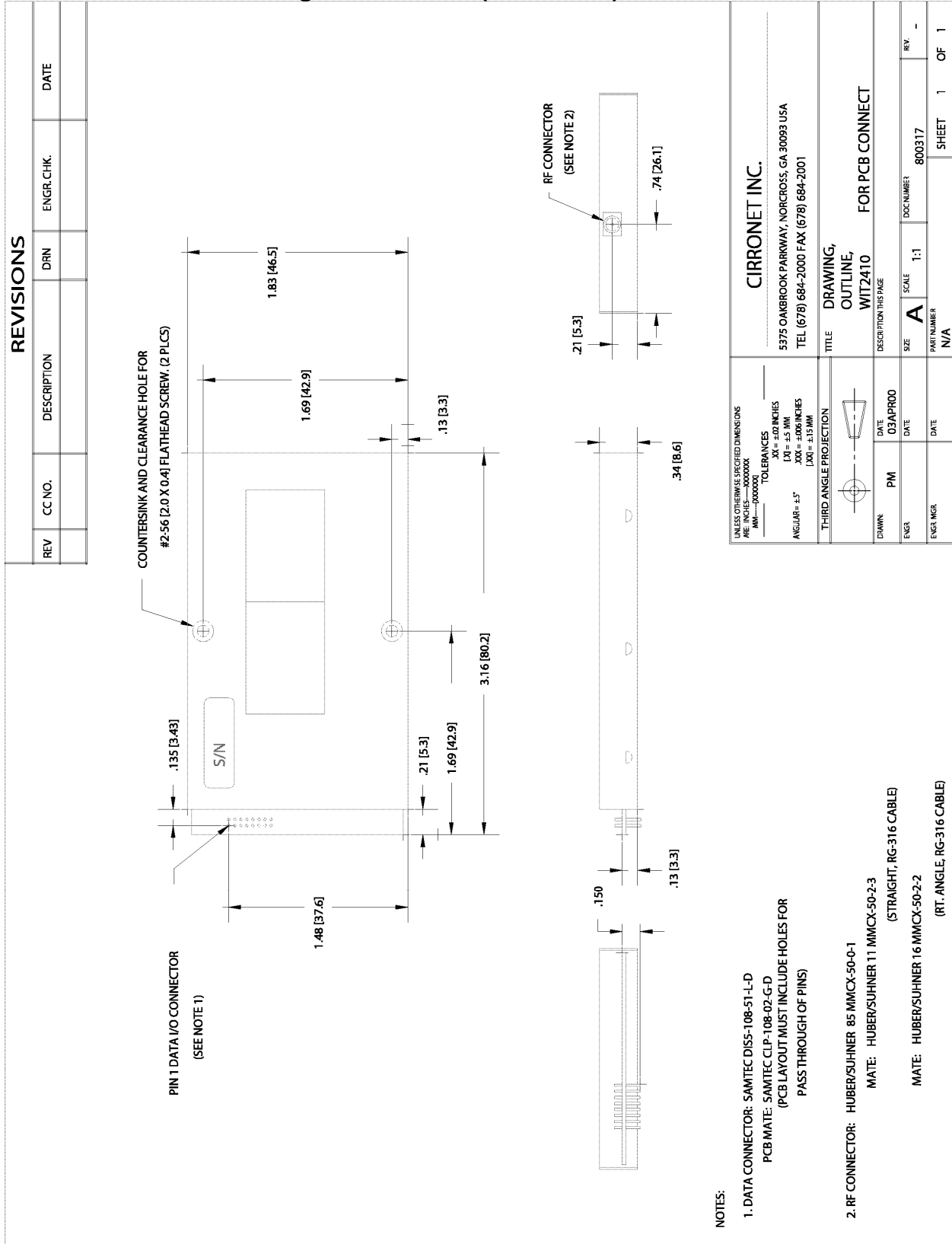
For technical support call RFM/Cirronet™ at (678) 684-2000 between the hours of 8:30AM and 5:30PM Eastern Time.

9.5. Reference Design

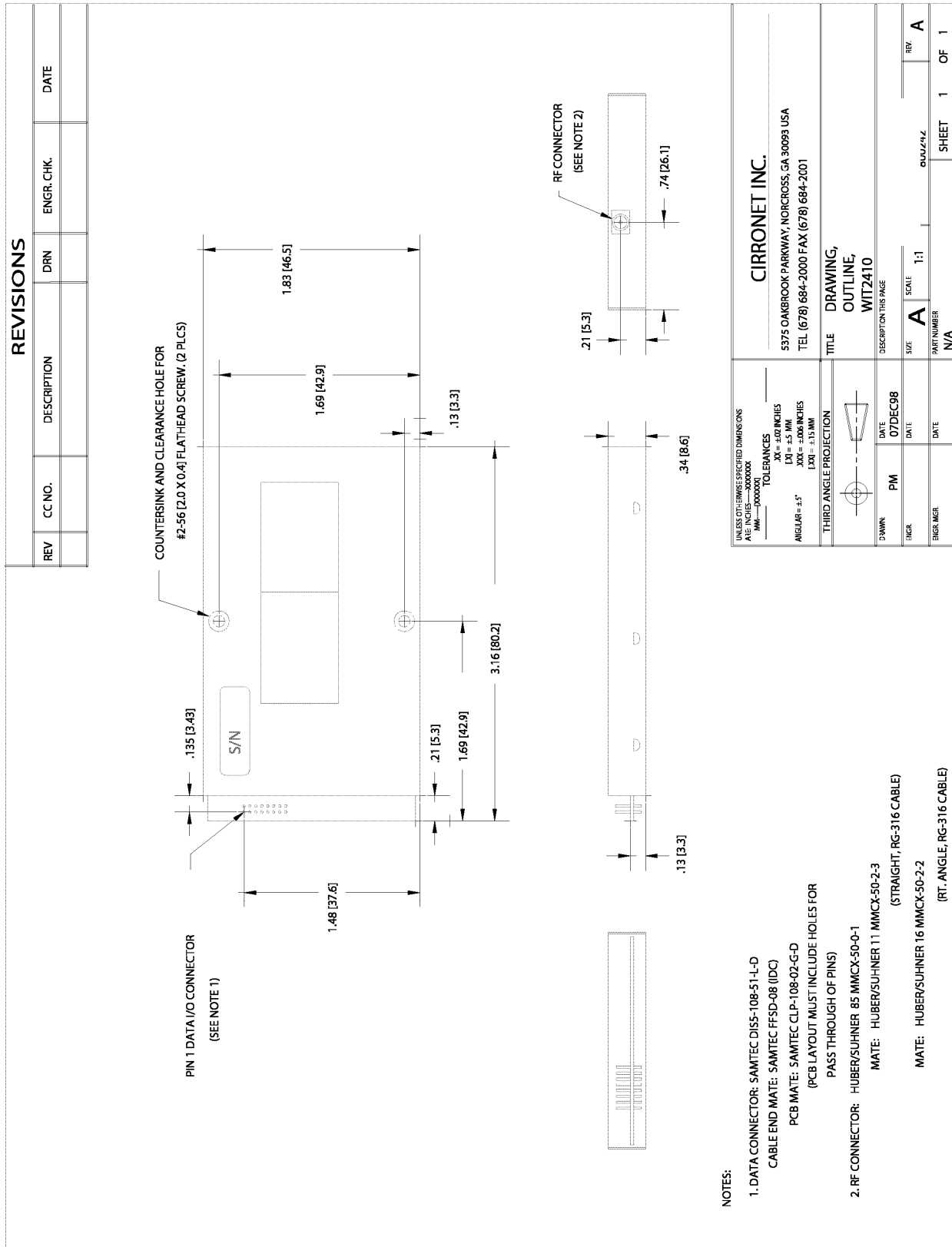
Optional pullups to keep  
RTS and DTR asserted  
when left unconnected



9.6.1. Mechanical Drawing – WIT2492M4 (Pins Down)



9.6.2. Mechanical Drawing – WIT2492S4 (Pins Up)



## 10. Warranty

Seller warrants solely to Buyer that the goods delivered hereunder shall be free from defects in materials and workmanship, when given normal, proper and intended usage, for twelve (12) months from the date of delivery to Buyer. Seller agrees to repair or replace at its option and without cost to Buyer all defective goods sold hereunder, provided that Buyer has given Seller written notice of such warranty claim within such warranty period. All goods returned to Seller for repair or replacement must be sent freight prepaid to Seller's plant, provided that Buyer first obtain from Seller a Return Goods Authorization before any such return. Seller shall have no obligation to make repairs or replacements which are required by normal wear and tear, or which result, in whole or in part, from catastrophe, fault or negligence of Buyer, or from improper or unauthorized use of the goods, or use of the goods in a manner for which they are not designed, or by causes external to the goods such as, but not limited to, power failure. No suit or action shall be brought against Seller more than twelve (12) months after the related cause of action has occurred. Buyer has not relied and shall not rely on any oral representation regarding the goods sold hereunder, and any oral representation shall not bind Seller and shall not be a part of any warranty.

**THE PROVISIONS OF THE FOREGOING WARRANTY ARE IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL (INCLUDING ANY WARRANTY OR MERCHANT ABILITY OR FITNESS FOR A PARTICULAR PURPOSE). SELLER'S LIABILITY ARISING OUT OF THE MANUFACTURE, SALE OR SUPPLYING OF THE GOODS OR THEIR USE OR DISPOSITION, WHETHER BASED UPON WARRANTY, CONTRACT, TORT OR OTHERWISE, SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID BY BUYER FOR THE GOODS. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS, LOSS OF DATA OR LOSS OF USE DAMAGES ARISING OUT OF THE MANUFACTURE, SALE OR SUPPLYING OF THE GOODS. THE FOREGOING WARRANTY EXTENDS TO BUYER ONLY AND SHALL NOT BE APPLICABLE TO ANY OTHER PERSON OR ENTITY INCLUDING, WITHOUT LIMITATION, CUSTOMERS OF BUYERS.**