

DOCUMENT NAME

Application Note: WMTS-ITS2 1.4 GHz Radio Module

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1. Introduction

The Module is a serial network adapter designed to be used with specialized medical devices manufactured by Philips Medical Systems (Figure 1). It enables the host medical device to wirelessly establish bi-directional communication with other remote devices using the Philips' WMTS infrastructure.

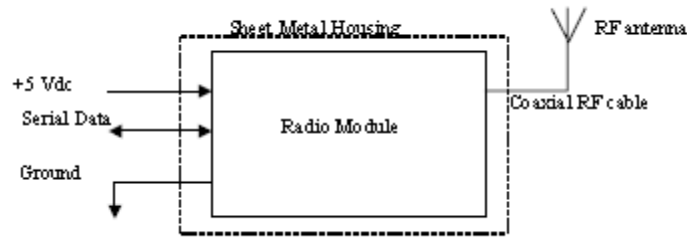


Figure 1: Module Block Diagram

2. Host Interface

The Module interfaces to the host through a single I/O connector (Figure 2). Via this connector the host supplies DC power, signal ground and modulating data to the radio Module. The communication between the host device and the Module is a two wire asynchronous serial interface (Table 1).

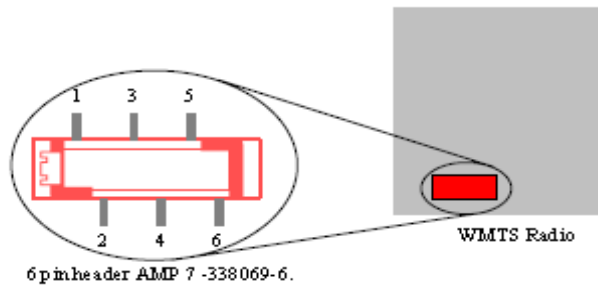


Figure 2: WMTS-MODULE Interface Host Connector

Figure 2: Module Interface Host Connector

Pin	Name	I/O	Function
1	Ground		First of two ground connections for the module.
2	ITS_Tx	OUT	Serial data to host.
3	ITS_Rx	IN	Serial data from host.
4	Ground		Second of two ground connections for the module.
5	+5 vdc		+ 5 vdc +/- 5%, Sinks 35 mA average, 280 mA Peak during radio Tx/Rx
6	Not Connected		

Table 1: Host Connector pin assignment

3. Serial Connection

Serial Specification:

The interface to the Host is a serial communication link (Table 2):

- Flow Control: Tx, Rx; no hardware flow control
- Baud Rate: 115.2 kbaud;
- Parity: No parity bit
- Bits: 8 bits of data, plus 1 Start/Stop bits
- Logic Levels: TTL, 5 volt tolerant

	Logical Zero	Logical One	Conditions
	LOW	HIGH	
ITS_Tx	0.1 V max		100uA sink
	0.55V max		24mA sink
		2.9V min	100uA load
		2.3V min	24mA load
ITS_Rx	0.6V max	2.2V min	-

Table 2: Serial Lines, Electrical DC Characteristics

Maximum User Data Rate:

The maximum user data rate that the radio supports is 12 kbits/second in each direction. This maximum over the air data rate is fixed by design and cannot be modified by the user.

4. RF Shielding

The host device does not need to provide additional shielding.

5. Module Mounting Considerations

The Module is self-contained and can be mounted anywhere using the supplied threaded pems nuts. Not special heat sinking considerations are required. There are not orientation constraints.

6. RF Input/Output, Antenna

The Module is approved for use, with only the antennas specified by Philips and listed here:

- Dipole Whip Philips Part Number M4842-61300
- Tri-Band Philips Part Number M3002-66493
- Dual-Band Philips Part Number M8100-66490

These antennas may not be replaced with antennas of a different type. However, antennas of equivalent type with equal or lower gain to the listed antennas may be used. The RF input and output of the Module is matched to 50 ohms. The Module has a coaxial cable with which allows for the connection of the RF to the antenna by way of a non-standard connector manufactured by JST. For the dipole whip, the connection is JST-to-reversed-TNC adaptor made by Amphenol at the point where the antenna connects.

7. RF Transmitter Specifications

The following table summarizes general transmitter specifications (Table 3).

1. Frequency ranges:	Bands: 1395 - 1400 MHz and 1427 - 1432 MHz
2. RF Output Power	8 dBm +2/-1.5dB (4.5 mW to 10 mW, nominal 6.3 mW), into Antenna load, calibrated into 50 Ohms UFL connector port.
3. RF Output Power control	a) Transmitter chain gain shall be calibrated at time of manufacture (env temp 25+/-5deg.C). b) Power control algorithm deployed to prevent excess power and also includes temperature compensation.
4. Transceiver frequency accuracy during normal operation	<+60/-100KHz relative to channel frequency, includes temperature compensation & aging effects.
5. Reference Frequency Accuracy	10ppm max over operating temperature
6. Modulation type	GFSK, Gaussian Frequency Shift keying (1M40Q7D)

8. Fault Conditions

Over / Under Voltage

The input voltage from the DC power source to the Module must remain between the values specified in Table 1. Operating the radio Module from a voltage lower than 4.75 V dc or higher than 5.25 V dc can cause the regulator to shut down ceasing operation of the Module.

Excessive Signal Level on Serial Input

The data input signal levels must adhere to levels specified in Table 2. Driving the input data line over 5V dc can cause damage to the Module input buffers, causing interruption of data transfer.

Excessive Data Rate on Serial Input

The host serial communication data rate is fixed at 115.2 kbaud. Clocking data at different baud rates will result in incorrect data transfer. The maximum host/user over the RF link data rate is 12 kbps. Attempting to send data at a faster rate will result in data buffer overrun and data loss.

9. Accompanying Documentation Products Incorporating the Module

Products which incorporate this device will be labeled, “Contains FCC ID: PQC-WMTS-ITS2,” and their accompanying documentation shall prominently display the following:

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.

The documentation will also include the following text regarding frequency coordination:

Operation of this equipment requires the prior coordination with a frequency coordinator designated by the FCC for the Wireless Medical Telemetry Service.