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Application Note: WMTS-MODULE

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Last revised: 10-Mar-05

The following information is intended for Philips internal use only. It is a guide for the incorporation of the WMTS-MODULE into Philips patient monitoring medical devices. Interested Philips engineers should contact the Wireless ER Manager for additional information and referral to specific design specialists.

This document is an internally controlled document under the Philips Quality System.

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2 Introduction

The WMTS-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.

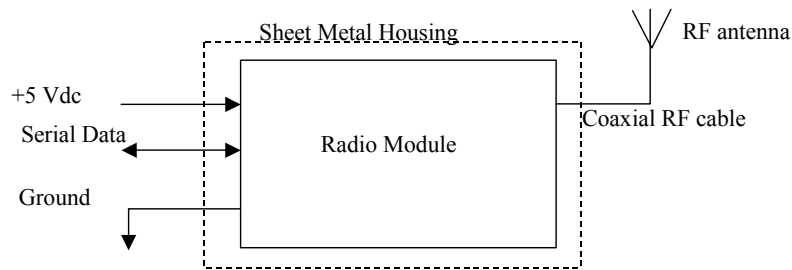


Figure 1: WMTS-MODULE Block Diagram

3 Host Interface

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

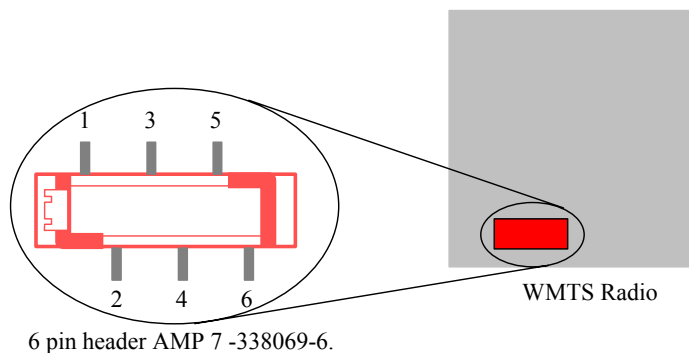


Figure 2: WMTS-MODULE Interface Host Connector

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

4 Serial Connection

4.1 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 levels, 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

4.2 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.

5 WMTS-MODULE RF Shielding.

The module contains all necessary RF shielding. The host device does not need to provide additional shielding.

6 WMTS-MODULE Mounting Considerations.

The module is self-contained and can be mounted anywhere using the supplied threaded pem nuts. No special heat sinking considerations are required. There are no orientation constraints.

7 RF Input/Output, Antenna

The WMTS Radio Module is only approved for use with the antenna specified by Philips, part number M4842-61300. This antenna cannot be replaced with an antenna of a different type. The RF input and output of the WMTS-MODULE is matched to 50 ohms. A coaxial cable brings the RF outside the metal enclosure. This cable uses a unique non standard connector manufactured by JST (JST part number AYUI-1S-12676-221). The coaxial cable connects to a JST to reversed TNC adapter made by Amphenol (Amphenol part number 031-6101) where the antenna plugs in. The antenna is made by Radial to Philips' specifications (Philips specifications number A-M4842-61300-1, rev A).

7.1 RF Transmitter Specifications

The following table summarizes general transmitter specifications (Table 3). For complete details (including details on the receiver section) refer to ES-M4840-90108:

1. Frequency ranges:	Bands: 1395 - 1400 MHz and 1427 - 1432 MHz
2. RF Output Power	8 dBm +2/-3dB, 6.3 mW (3.2 mW to 10 mW), into Antenna load. Calibrated into 50 ohms.
3. RF Output Power control	a) Transmitter chain gain shall be calibrated at time of manufacture (env temp 25+/-5deg.C). b) Over power algorithm deployed to prevent excess power and also includes temperature compensation.
4. Transceiver frequency accuracy	+/-15KHz relative to channel frequency, includes temperature compensation & aging effects.
5. Reference Frequency Calibration	<4ppm
6. Modulation type	FSK with Root Raised Cosine filtering (1M60Q7D)

Table 3: WMTS Radio Module, Transmitter Specifications

8 Fault Conditions

8.1 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 source lower than 4.75Vdc or higher than 5.25 vdc can cause the regulator section to shut down ceasing operation of the radio module.

8.2 Excessive Signal Level on Serial Input

The data input signal levels must be observed as specified in Table 2. Driving the input data line over 5 vdc can cause damage to the radio module input buffers, causing interruption of data transfer.

8.3 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 for products incorporating the WMTS-MODULE

Products which incorporate this device will be labeled “Contains PQC-WMTS-MODULE”, and their accompanying documentation will also advise the user concerning frequency coordination (47 CFR 95.1109), as follows:

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