



## SocketModem<sup>®</sup> EDGE

MTSMC-E1 Device Guide

## SocketModem EDGE Device Guide

S000547, Version A

MTSMC-E1, MTSMC-E1-V

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### Revisions

Revision	Date	Description
A	12/05/12	Initial release.

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# Chapter 1 – Device Overview

## Description

The SocketModem® EDGE embedded cellular modem delivers enhanced data speeds when compared to GPRS by utilizing EDGE technology. It allows users to connect to the Internet and send and receive data up to three times faster than possible with an ordinary GSM/GPRS network making it ideal for highly data-intensive applications. Based on industry-standard open interfaces, the SocketModem EDGE cellular modem is equipped with quad-band GSM, which means it can be used worldwide on all existing GSM networks.

## Product Build Options

Product	Description	Region
MTSMC-E1	Quad Band SocketModem EDGE Modem Class 12	Global
MTSMC-E1-V	Quad Band SocketModem EDGE Modem Class 12 with Voice	Global
<b>Developer Kit</b>		
MTSMI-UDK	Universal Developer Kit	Global

### Notes:

These units ship without network activation. To connect them to the cellular network, you need a cellular account. For more information, refer to Account Activation for Cellular Devices in the Universal Socket Developer's Guide.

Voice builds include microphone and speaker pins.

All builds can be ordered individually or in 50-packs.

The complete product code may end in .Rx. For example, MTSMC-E1.Rx, where R is revision and x is the revision number.

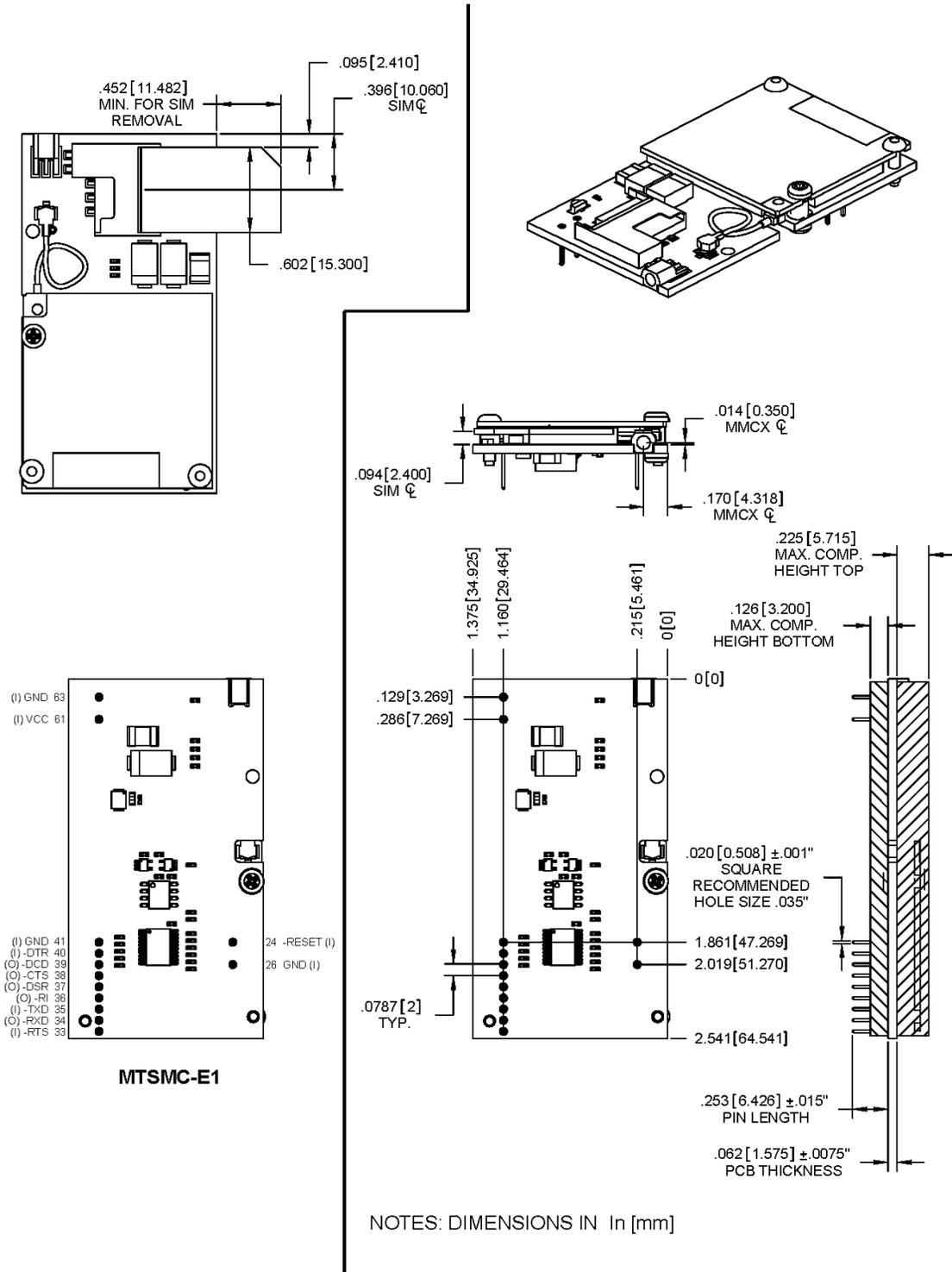
## Documentation

The following documentation is available by email to [oemsales@multitech.com](mailto:oemsales@multitech.com) or by using the Developer Guide Request Form on the [multitech.com](http://multitech.com) website.

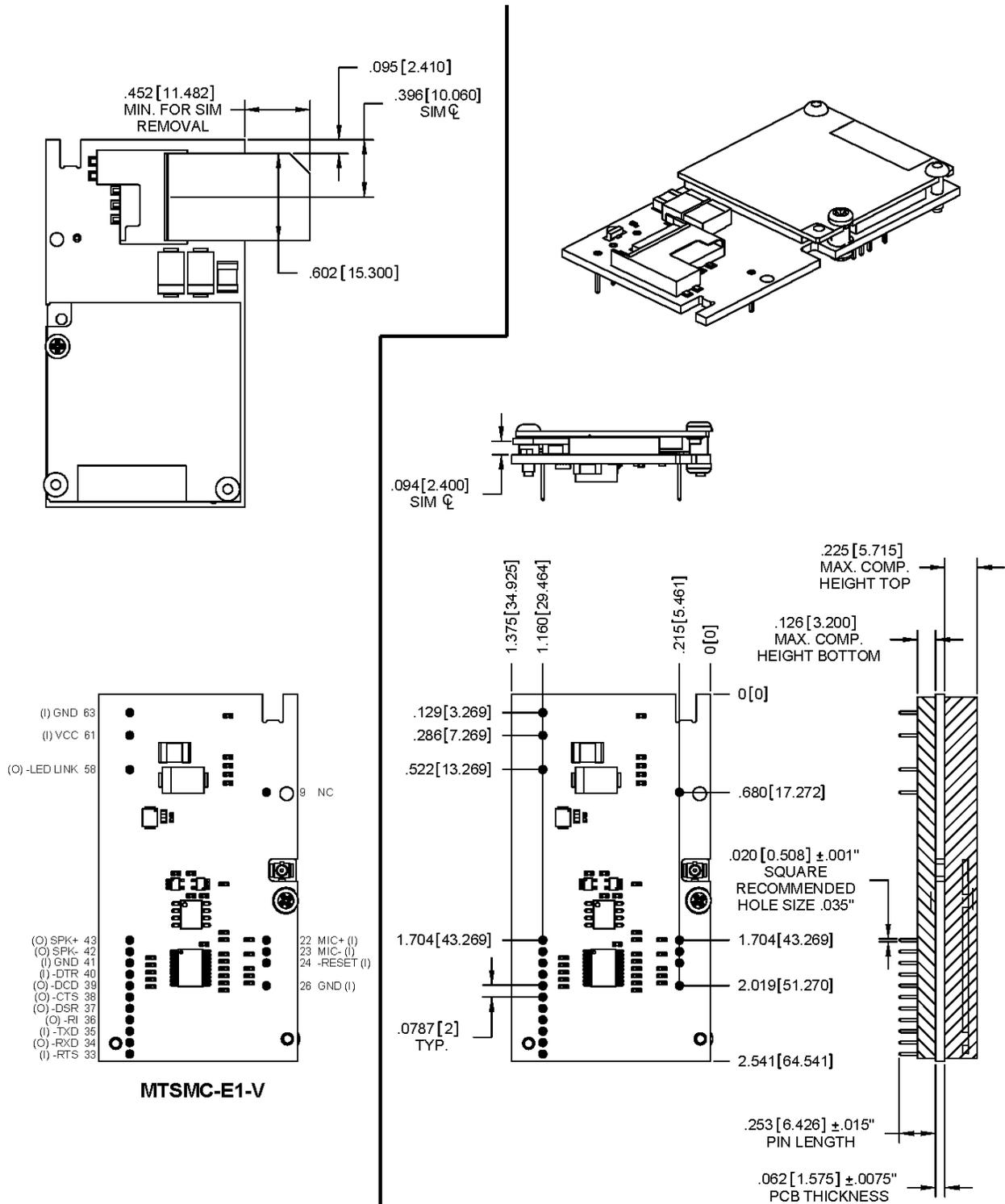
- **Device Guides** – This document. Provides model-specific specifications and developer information.
- **Universal Socket Developer Guide** – Provides an overview, safety and regulatory information, design considerations, schematics, and general device information.
- **AT Command Guide** – EDGE AT Command Guide S000371.

# Chapter 2 – Mechanical Drawings

## MTSMC-E1 Build



# MTSMC-E1-V Voice Build



NOTES: DIMENSIONS IN In [mm]

# Chapter 3 – Specifications

## Technical Specifications

Category	Description
<b>General</b>	
Standards	EDGE: E-GPRS Class 12 GPRS: GPRS Class 12
Frequency Bands	Quad-band 850/900/1800/1900 MHz
<b>Speed, Format, Compression</b>	
Data Speed	Packet Data rates up to 240Kbps (modulation & coding scheme, MCS 1-9, Mobile station Class B) Circuit-switched data up to 14.4 Kbps non-transparent mode, asynchronous
Serial Speed	Serial interface supporting DTE speeds to 460 Kbps
<b>Physical Description</b>	
Weight	2.541" L x 1.375" W (64.541mm L x 34.92 mm W)
Dimensions	1 oz. (0.028 kg.)
<b>Connectors</b>	
Antenna Connector	MMCX
SIM Holder	Standard 1.8V or 3V SIM receptacle
<b>Environment</b>	
Operating Temperature	-30° to +70° C
Storage Temperature	-40° to +85° C
Humidity	20% to 90% non-condensing
<b>Power Requirements</b>	
Operating Voltage	5VDC
<b>IP</b>	
Supported IP Protocols	TCP, UDP, DNS, FTP, SMTP, POP3, HTTP
<b>Certifications, Compliance, Warranty</b>	
EMC Compliance	FCC Part 2, 15, 22, 24 EN 55022 EN 55024
Radio Compliance	FCC Part 22 FCC Part 24 RSS 132 RSS 133 EN 301 511 EN 301 489-1 EN 301 489-7 AS/ACIF S042.1 AS/ACIF S042.3
Safety Compliance	UL 60950-1 cUL 60950-1 IEC 60950-1 AS/NZS 60950:2000
Network Compliance	PTCRB
Warranty	Two years

**Notes:**

Radio performance may be affected by temperature extremes. This is normal. The radio is designed to automatically fallback in class and reduces transmitter power to avoid damage to the radio. When this occurs depends on the interaction of several factors, such as ambient temperature, operating mode, and transmit power.

## Mounting Hardware

#4 or M2/M3 hardware should be used for mounting the SocketModem to the board. Refer to the Mechanical Drawings for more information.

**Important:**

There are traces and vias around the tooling holes, so use nylon hardware if you are using the tooling holes to mount the SocketModems on the board.

## Device Reset

The SocketModem is ready to accept commands after a fixed amount of time ("X" Time) after power-on or reset.

Model	Time Constant	"X" Time	Minimum Reset Pulse <sup>1</sup>
MTSMC-E1	250 ms	3-15 seconds	500us

<sup>1</sup>The SocketModem may respond to a shorter reset pulse.

## Reset EDGE

The active low –RESET input resets the device logic and returns the device configuration to the original factory defaults of "stores values" in the NVRAM. The SocketModem is ready to accept commands after a fixed amount of time after power-on or reset.

## Pin 58

**Note:** Pin 58 may or may not be available on some SocketModems.

Pin 58 LED Mode	Operating Status	
OFF	Subscriber Carrier Mode is OFF or running in SLEEP or ALARM mode.	
600 ms ON/600ms OFF	No PIN entered, network search in progress, ongoing user authentication, or network login in progress.	
75 ms ON / 75 ms OFF / 75 ms ON 3 s OFF Flashing or Blinking	One or more EDGE contexts activated. Indicates EDGE data transfer: When a transfer is in progress, the LED goes on within 1 second after data packets were exchanged. Flash duration is approximately 0.5 s.	
ON	Depending on call type:	
	Voice Call:	Connected to remote party.
	Data Call:	Connected to remote party or parameter exchange while call is set up or disconnected.

## DC Electrical Characteristics

**Units:** Volts      5V DC Characteristics (VDD = 5V ± 0.25V) VDDMAX = 5.25V

Parameter	Minimum	Maximum
Digital Signal Input Low Level	0	0.8
Digital Signal Input High Level	2	5
Digital Signal Output Low Level	0	0.33
Digital Signal Output High Level	3.84	5
Reset (Low Active) Input Low Level	0	1.14
Reset (Low Active) Input High Level	2.7	5
Digital Input Capacitance	10pF	

### Absolute Maximum Rating

Voltage at any pin      0.0 V to +5.0

### Power Measurements

Multi-Tech Systems, Inc. recommends that you incorporate a 10% buffer into your power source when determining product load.

Input Voltage = 5.0 Volts	Sleep Mode	Typical	Maximum <sup>1</sup>	Peak <sup>2</sup> TX
<b>Basic and Voice Builds, MTSMC-E1 and MTSMC-E1-V</b>				
Current (AMPS)	0.010	0.128	0.675	1.500
Watts	0.050	0.640	3.200	

<sup>1</sup>**Maximum:** The continuous current during maximum data rate with the radio transmitter at maximum power.

<sup>2</sup>**Peak:** The peak current during a transmission burst period.

## Chapter 4 – FCC and Industry Canada Information

The following is device specific FCC and Industry Canada information. For additional approval and regulatory information, see the Universal Socket Developer Guide.

### FCC Grant Parts 22 and 24

<b>FCC Identifier</b>	AU792U09G17826
<b>Equipment Class</b>	PCS Licensed Transmitter
<b>Notes</b>	Edge Modem
<b>Approval</b>	Single Modular

FCC Rule Parts	Frequency Range (MHz)	Output Watts	Frequency Tolerance	Emission Designators
22H	824.2 – 848.8	1.738	181.0 Hz	300KGXW
22H	824.2 - 848.8	0.942	190.0 Hz	300KG7W
24E	1850.2 - 1909.8	0.85	191.0 Hz	300KGXW
24E	1850.2 - 1909.8	0.747	200.0 Hz	300KG7W

Output power listed is conducted.

This device contains functions that are not operational in U.S Territories; this filing is only applicable for US Operations.

The antenna installation and operating configurations of this transmitter, including antenna gain and cable loss, must satisfy MPE categorical exclusion requirements of 2.1091.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

## Industry Canada

<b>Certification Number/No. de Certification</b>	125A-0035
<b>Type of Radio Equipment/Type de Matériel</b>	Cellular Mobile GSM (824-849 MHz) Modular Approval PCS Mobile (1850-1910 MHz)
<b>Model/Modele</b>	MTSMC-E1, MTSMC-E1-V

Specification/ Cahier des Charges	Issue/ Édition	From Frequency/ De Fréquences	To Frequency/ À Fréquences	Emission Designation/ Designation D'émission	Minimum Power	Maximum Power
RSS132	2.0	848.8 M	848.8 M	249KGXW	1.738 mW	1.738 mW
RSS133	5.0	1.85 G	1.91 G	245KG7W	747 mW	747 mW
RSS132	2.0	824.2 M	848.8 M	243KG7W	942 mW	942 mW
RSS133	5.0	1.85 G	1.91 G	249KGXW	850 mW	850 mW

## Chapter 5 – Application Notes

### RF Performances

RF performances are compliant with the ETSI recommendation 05.05 and 11.10.

### Receiver Features

Category	Description
GSM 850 / E-GSM 900 Sensitivity	< -108 dBm
DCS 1800 / PCS 1900 Sensitivity	< -107 dBm

### Transmitter Features

Category	Description
Maximum output power (GSM 850/ E-GSM 900)	+33 dBm $\pm$ 2 dB
Maximum output power (DCS 1800 / PCS 1900)	+30 dBm $\pm$ 2 dB

### RF Connection and Antenna

The RF connector on the SocketModem is a MMCX standard type. See the Universal Socket Developer Guide for antenna details.

## Audio Interface Electrical Characteristics

### Speaker Output

Differential speaker output capable of driving 8 ohm load. 1.0945 Vpp (differential) typical.

### Microphone Input

Balanced microphone input: full scale input 1.1 Vpp.

## Microphone Inputs

**Note:** For Voice Build Only.

The MIC inputs are differential ones. They already include the convenient biasing for an electret microphone (0.5 mA and 2 Volts). This electret microphone can be directly connected on these inputs. The impedance of the microphone has to be around 2K. These inputs are the standard ones for a handset design.

The gain of the MIC inputs is internally adjusted. The gain can be tuned from 30dB to 51dB. The connection to the microphone is direct.

