MultiModem™ GSM/GPRS

External Wireless Modem
Data/Fax/Voice

MTCBA-G-F1
MTCBA-G-F2

User Guide

MultiTech® Systems

User Guide for MultiModem GSM/GPRS
External Data/Fax/Voice Wireless Modem
Models MTCBA-G-F1 & MTCBA-G-F2

P/N S000304F, Revision F

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Revision	Date	Description
A	05/01/03	Initial Release
B	09/17/03	Revise package contents list & powering drawing.
C	01/20/04	Revise package contents, add RS232 Connector pinout diagram.
D	04/12/04	Revise package contents and features lists.
E	07/13/04	Revise network access info
F	12/30/04	Revise package contents list & powering drawing and add 2 cable drawings.

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Chapter 1: Product Description and Specifications

Product Description

The Multi-Tech MultiModem GSM/GPRS is an external data/fax/voice wireless modem. It also supports mobile originated short message service (SMS) and mobile-terminated SMS. Designed for global use, it offers standards-based multi-band GSM/GPRS Class 10 performance. This ready-to-deploy, standalone modem allows developers to add wireless communication to products with a minimum of development time and expense. The MultiModem GSM/GPRS is based on industry-standard open interfaces, is fully type approved, and can be desktop or panel mounted.

Package Contents

Basic Package

- one modem
- two holding bridles (mounting brackets)
- one fused power cable

Bundled Package

- All Basic package items except the fused power cable, plus
- one RS232 15-to-9 pin cable
- one antenna
- four adhesive-backed rubber feet for table-top mounting
- one universal power supply with power cord
- one product CD
- one Quick Start Guide

Interfaces

The Wireless MultiModem has several interfaces:

- LED function indicating operating status
- External antenna (via SMA connector)
- Serial and control link (via 15 pins SUB D)
- Power supply (via 2.5mm miniature power jack)
- SIM card holder

Parts to be Supplied by Wireless Service Provider

- Subscriber Identity Module (SIM) configuration chip
  The SIM contains information specific to your wireless account and its features.

Parts to be Supplied by End User

- mounting screws (screw shaft diameter = .17” max.)
- antenna (Basic Package)

The *bundled* Wireless MultiModem is shipped with an antenna suited for it. If the antenna supplied does not meet your application requirements (for size, shape, mounting style, etc.), you must supply an antenna yourself. In general, the antenna used must be both of the correct frequency and of a style appropriate to the application. See the *Antenna/RF Specifications* section below.

Antenna/RF Specifications

	GSM 850	EGSM 900
Frequency RX	869 to 894 MHz	925 to 960 MHz
Frequency TX	824 to 849 MHz	880 to 915 MHz
RF Power Stand	2W at 12.5% duty cycle	2W at 12.5% duty cycle
Impedance	50 ohms	
VSWR	<2	
Typical Radiated Gain	0 dBi on azimuth plane	

	GSM 1800	GSM 1900
Frequency RX	1805 to 1880 MHz	1930 to 1990 MHz
Frequency TX	1710 to 1785 MHz	1850 to 1910 MHz
RF Power Stand	1W at 12.5% duty cycle	1W at 12.5% duty cycle
Impedance	50 ohms	
VSWR	<2	
Typical Radiated Gain	0 dBi on azimuth plane	

AT Command Info

AT commands for the GSM/GPRS wireless modem are published in a separate Reference Guide included on the product CD and posted on the Multi-Tech web site.

IP commands for GSM/GPRS modems are also published in a separate Reference Guide included on the product CD and posted on the Multi-Tech web site.

Phone Number for the Wireless Modem

- Every wireless modem will have its own unique phone number.
- The wireless modem's phone number may simply be told to the subscriber or be on the SIM or both. Wireless provider implementations may vary.

Network Access

The network access arrangements to be specified in Windows Dial-Up Networking (of the computer that the wireless modem is serving) will vary according to the type of wireless service used.

- For GSM-without-GPRS, a circuit-switched data connection is used. The user can set up DUN to make a conventional V.32 modem connection to any terminating modem at the other end. The phone number specified in DUN can be one supplied by the wireless service provider or another phone number related to a different dialup modem service (e.g., a dialup modem service phone number from any commercial or private dialup network).
- For GSM-with-GPRS, a single DUN number is generally used by all of a wireless provider's subscribers throughout its area of coverage (regional, nationwide, continental, etc.). Rather than being a literal phone directory number, as in conventional DUN, this is a code that gives the modem Internet access.

Features

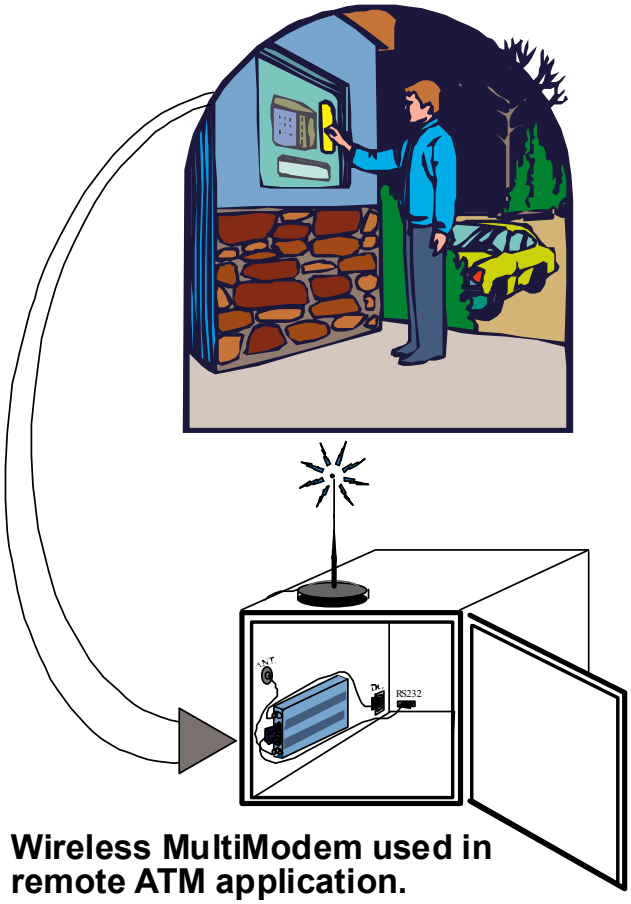
- GPRS Class 10 operation
- Dual-band 850/1900 or 900/1800 GSM/GPRS
- GSM Class 1 and Class 2 Group 3 FAX
- Desktop or panel mounting
- Short Message Services including text and PDU, point-to-point, cell broadcast
- 14.4K GSM circuit switched data
- SMA antenna connector and SIM socket
- Serial interface supports DTE speeds to 115.2K
- AT command compatible
- MNP2 V.42bis data compression
- Numerous LEDs provide operational status
- ME + SIM phone book management
- Fixed dialing number
- SIM Toolkit Class 2
- SIM, network and service provider locks
- Real time clock
- Alarm management
- UCS2 character set management
- Packet data up to 85K bps
- Embedded TCP/IP stack
- Circuit-switched data (GSM) up to 14.4K bps transparent and non-transparent

Application Overview

Application Types

With circuit switched data rates up to 14.4K bps, the MultiModem GSM/GPRS is targeted at applications that periodically need to send or receive data over a wireless network. It is an ideal solution for:

Appliances
ATM Terminals
Automotive
Data Collection
Gas Pumps
Industrial and Medical Remote Monitoring Systems
Remote Diagnostics
Remote Metering
Security Systems
Vending/Gaming Machines
Other devices requiring wireless connectivity.
Note: The Wireless MultiModem must be mounted with at least 8 inches (20 cm) of clearance from the human body.



Wireless MultiModem used in remote ATM application.

Benefits/Features in Applications

Short Development Time. The MultiModem GSM/ GPRS can make your existing and next generation device, machine, or system, communication-ready without requiring any hardware changes to its design. It actually provides faster time-to-market because it relieves the burden and expense of obtaining network and RF approvals. This complete, ready-to-deploy wireless modem allows you to enhance your product while you focus on developing its core features.

Voice Features. The MultiModem GSM/GPRS provides telephony and Dual Tone Multi Frequency (DTMF) functionality. It also allows for emergency calls as well as echo cancellation and noise reduction (option), and full rate, enhanced Full Rate and Half Rate (FR/EFR/HR).

Short Message Services. The MultiModem GSM/GPRS offers SMS features such as text and PDU, point-to-point (MT/MO) and cell broadcast.

Compatible Supplementary Services. The MultiModem GSM/GPRS is compatible with supplementary services such as call forwarding, call barring, multiparty, call waiting and call hold, calling line identification, advice of charge, USSD, closed user group and explicit call transfer.

Management Features. The MultiModem GSM/GPRS provides advanced management features including phone book management, fixed dialing number, and real time clock and alarm management.

Industry-standard Modem Commands. The MultiModem GSM/GPRS provides industry-standard AT-style commands for ease of integration into your existing software application.

Industrial Chassis. The MultiModem GSM/GPRS is packaged in a rugged, water resistant, industrial chassis. The chassis has an RS-232 DE-15 Voice/Data interface connector and a permanent screw-type power connector. It also has an SMA antenna connector. The chassis can be side-mounted on a panel or top-mounted on a desktop or other surface. A set of LEDs indicates the modem's operational status.

Packet-Switched Data. The MultiModem GSM/GPRS supports GPRS Class 10 packet-switched cellular data. This enables mobile Internet functionality by allowing interworking between the existing Internet and the cellular network at speeds up to 85K bps. Any service that is used over the fixed Internet today – File Transfer Protocol (FTP), web browsing, chat, e-mail, telnet -- is available over the cellular network, as well. The MultiModem GSM/GPRS supports PBCCH and coding schemes CS1 to CS4, and is compliant with SMG31bis.

Circuit-Switched Data (CSD). The MultiModem GSM/GPRS also supports GSM circuit-switched cellular data connections. Circuit-switched data connections support speeds up to 14.4K bps, Class 1 and Class 2 Group 3 fax, as well as MNP2 V.42bis compression. CSD cellular wireless connections are ideal for applications that require a quick wireless replacement of an existing point-to-point analog dial-up connection. They integrate seamlessly with your current application requiring little infrastructure change.

Internet-Enabled. The MultiModem GSM/GPRS includes an embedded TCP/IP protocol stack to bring Internet connectivity to any device. Using the embedded Internet protocols and the wirless connection to an IP network, it sends and receives data over the Internet. It can also serve a single web page in response to a web browser request.

Functions – GSM Modes

MODE	DESCRIPTION
Standard	Dual Band Extended GSM 900 MHz Class 4 (2W) and GSM 1800/1900 MHz Class 1 (1W)
Interface	Serial interface RS232. V.24/V.28 Autobauding function. AT command set based on V.25ter and GSM 07.05 & 07.07
SMS	Mobile Originated (MO) and Mobile Terminated (MT) SMS Mode Text & PDU point to point. Cell broadcast in accordance with GSM 07.05.
Data	Asynchronous 2400, 4800, 9600 and 14400 bps. Data Transparent and Non Transparent modes. In Non Transparent Mode only: 300, 1200, 1200/75 baud rates are available. Mode 3.1 KHz (PSTN) and V110 (ISDN).
Fax	2400/4800/7200/9600 bps Fax GSM teleservice 62 in Transparent Mode. Class 2. Group 3 compatible.
GPRS	Class 10. Coding schemes: CS1 to CS4.

Specifications

General Specifications	
Power Requirements	5 V to 32VDC; 400mA Average @5V, 1A Peak @ 5V
Mechanical Dimensions & Weight	4.3" w x 2.4" h x 0.94" d; 4.1 oz. (11 cm x 6.1 cm x 2.4 cm; 115 g)
Connectors & Fasteners	**Antenna Connection type**: SMA jack **Serial Connector**: 15-pin RS232 SUB D female (DE15S) **Pins**: RS232 link, audio link, BOOT, RESET **Power Connector**: 2.5mm miniature power jack **SIM receptacle**: (standard)
Operating Temperatures	-30 to +70°C
Certifications	CE Mark EMC: FCC Part 2, 15, 22, 24, EN 55022 & EN 55024 Safety: UL 60950, EN 60950

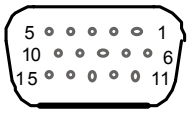
Electrical Characteristics	
Switching the GSM modem on/off	The device is permanently powered (when connected to the power supply).
Voltage Range	Voltage range : 5 to 32V DC GND : 0V
Overvoltage and Undervoltage	Correct operation of the Wireless MultiModem in communication mode is not guaranteed if input voltage falls below 5V.

Input/output electrical characteristics for external connections

Parameters	GSM/GPRS 850/900 Typ.			GSM/GPRS 1800/1900 Typ.			Unit
Input Supply Voltage	5	13.2	32	5	13.2	32	V
Input peak supply current in comm. mode at P_{max}	1	.4	.2	1	.4	.2	A
Input average supply current in comm. mode at P_{max}	360	150	75	300	125	70	mA
Input average supply current in idle mode	30	10	10	30	10	10	mA

LED Indicators	
TD. Transmit Data.	Lit when modem is transmitting data.
RD. Receive Data.	Lit when modem is receiving data.
CD. Carrier Detect.	Lit when data connection has been established.
LS. Line Status.	**Continuous "on" state** indicates that the wireless modem is not registered on the network. **Flashing state** indicates registration on network. **Off state**. Modem is off (not ready) or in download mode.
TR. Terminal Ready.	Commonly called "Data Terminal Ready." This is a readiness signal from the PC.
PWR. Power.	Indicates presence of DC power when lit.

RS232 15-Pin Connector Pinout



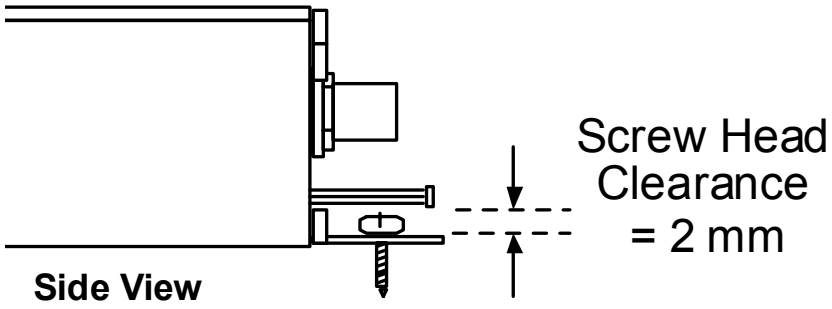
	PIN	EIA	CCIT	Designation
RS 232	1	DCD	109	Data Carrier Direct
	6	RX	104	Receive Data (out)
	2	TX	103	Transmit Data
	8	DTR	108.2	Data Terminal Ready
	9	GND		Signal Ground
	7	DSR	107	Data Set Ready
	12	RTS	105	Request to Send
	11	CTS	106	Clear to Send
	13	RI	125	Ring Indicator
Audio	4	MICROPHONE (+)		
	5	MICROPHONE (-)		
	10	SPEAKER (+)		
	15	SPEAKER (-)		
Boot	3	BOOT		For factory use only.
Reset	14	RESET		To reset, connect to GND momentarily. Open for normal operation.

Chapter 2: Installation

Mechanical Mounting

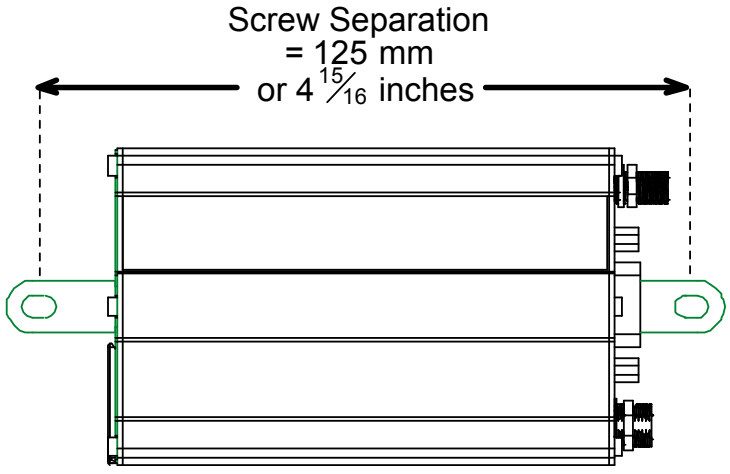
To mount the Wireless MultiModem, do the following:

1. Obtain mounting screws (two are needed) that are appropriate for the surface on which you will mount the MultiModem. The mounting screw on the connector end of the unit must have a screw-head no thicker than 2 mm. The allowable thickness is limited because the screw must fit beneath the RS232 cable. The allowable thickness of the other screw-head is not limited in this way.



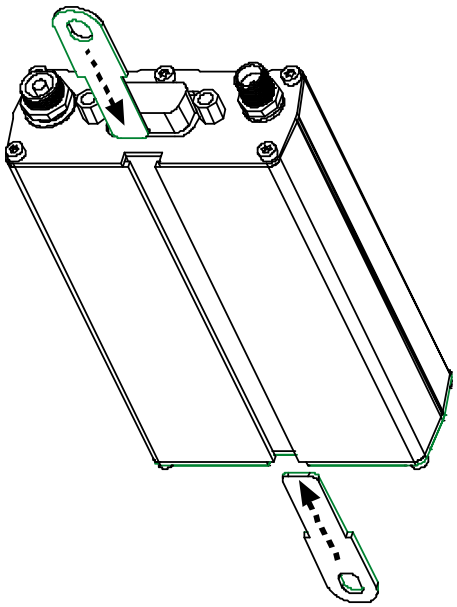
For example, one might use two 6-32 self-tapping screws 5/8” in length to mount the unit in a truck to the wall of the cab behind the passenger’s seat.

2. Typically, the unit is mounted against a flat surface into which holes can be drilled. The mounting holes (center-to-center) must be separated by 125mm or 4 -15/16 inches.



Drill the mounting holes at the desired mounting location (if applicable).

3. Slide the mounting bridles into the corresponding slots on the backside of the MultiModem chassis.

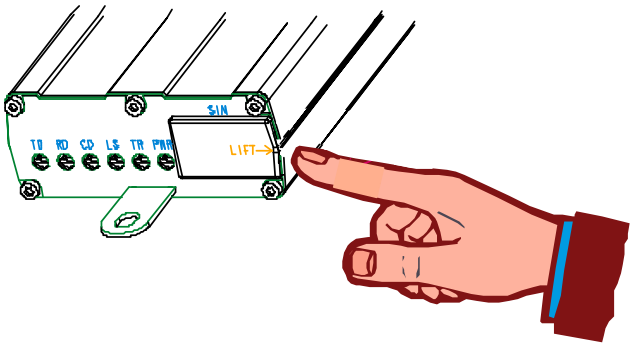


4. Attach the MultiModem with two screws to the mounting surface at the desired location on the equipment.

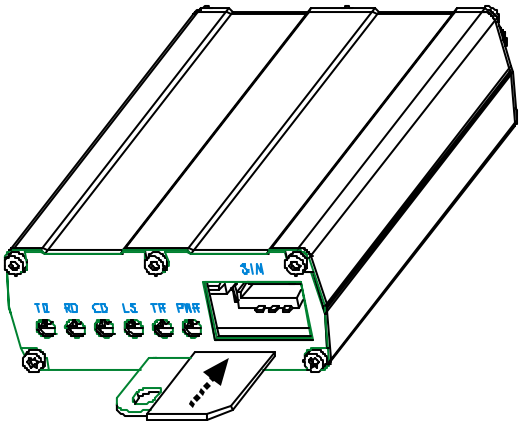
Electrical Installation & Configuration

The wireless MultiModem requires the power supply connection to begin operation. It also requires a SIM card (Subscriber Identity Module) to operate on a GSM network. To install the modem, do the following:

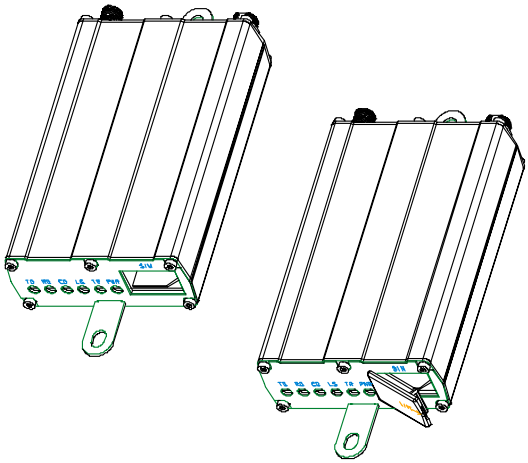
1. Using your fingernail or a small wedging tool (e.g., a small screwdriver), pry off the SIM cover.



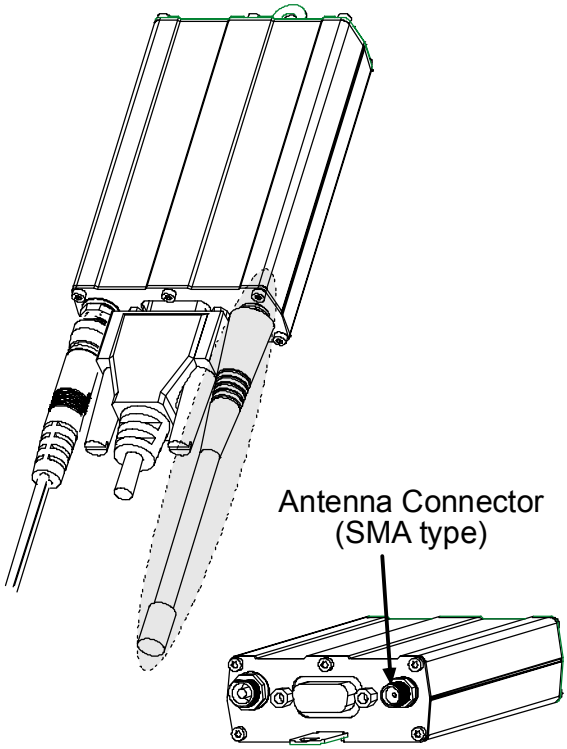
2. Insert the SIM card into the holder.



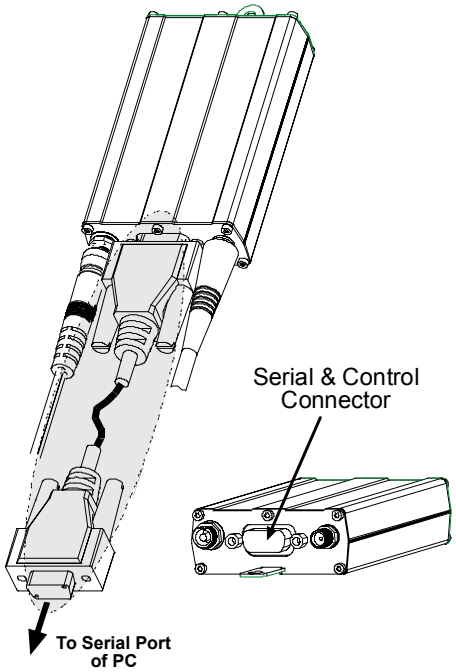
3. Verify that the SIM card fits into the holder properly and then replace the cover.



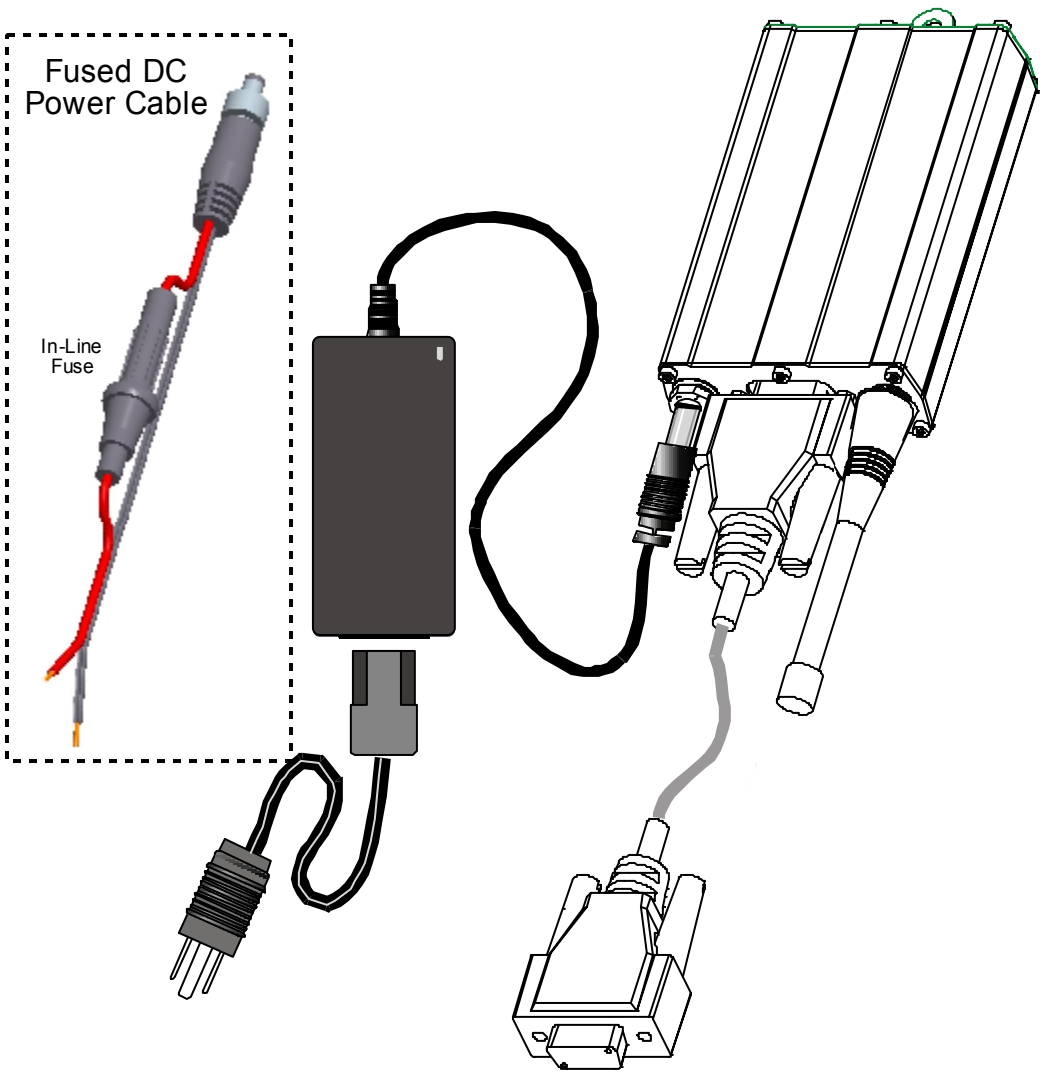
4. Connect a suitable antenna to the SMA connector (see specifications on page 5).



5. Connect both sides of the serial and control cable (15-pin Sub D connector on the modem side).



6. Plug the power supply cable into the wireless MultiModem.



7a. ***For standard transformer power supply***. Connect the AC cord receptacle into the transformer block. Connect the AC cord plug into the mains power outlet.

7b. ***For optional direct-DC powering***. Connect the direct-DC power supply cable into the DC power source on the vehicle or machine in which you are mounting the MultiModem. Be sure the GND connection is correct. Connect red wire to + (positive) and black wire to – (negative).

Note: For automotive application: according to the type of application, you can use permanent "+" or key-switched "+".

Connect the power supply to its source (for example, in a mobile situation, to the vehicle's DC fuse/terminal block).

8. Activate the power supply.

Mobile Phonetools

For initial configuration of your wireless device, Multi-Tech offers a Windows® based mobile Phone Tools application.

To load mobile Phone Tools, click on the mobile Phone Tools icon on your system CD and follow the on-screen prompts.

Direct Modem Installation

To install the Wireless MultiModem directly into the computer's Windows OS so it is independent of the mobile Phonetools program, use the "Add Modem" command or equivalent for your OS. During this installation, you will need to browse to the MultiModem's INF file (using the “Have Disk” option in the installation process). This INF file is in the root directory of the Product CD.

Verifying Signal Strength

The Wireless MultiModem establishes a call if the signal is sufficiently strong. To verify the signal strength, do the following:

1. Using the **HyperTerminal** program at the computer to which the Wireless MultiModem is connected, type the AT command AT+CSQ. A value for the received signal strength will be returned.
2. Verify the result with the following chart:

Signal Strength Verification	
Value of signal strength (AT+CSQ response) (RSSI)	Signal strength
10 - 31	Sufficient
0 - 9	Weak or Insufficient
99	Insufficient

Verifying Network Registration

In this procedure, you will verify that the Wireless MultiModem has been registered on the wireless network. To do so, you will use the common communications program **Hyperterminal**.

1. Using the **Hyperterminal** program at the computer to which the Wireless MultiModem is connected, type the AT command AT+CREG?. A value for the modem's network registration status will be returned.

2. Verify the result with the following chart:

Network Registration Verification	
Value	**Network Registration Status**
0, 1	Yes
0, 5	Yes (registered roaming)

Note: If the modem is not registered, perform the procedure for verifying signal strength to determine the strength of the received signal.

Testing the Configuration

Description	AT Commands	Response Returned	Comments
Enter PIN Code	AT+CPIN =1234	OK	PIN Code accepted
		+CME ERROR : 16	Incorrect PIN Code
		+CME ERROR : 3	PIN already entered (with +CMEE : 1 mode)
Module synchro checking	AT + CREG ?	CREG = <mode>, 1	modem synchronized on the network
		CREG = <mode>, 2	synchronization lost, re-synchronization attempt
		CREG = <mode>, 0	Modem not synchronized on network. No synchronization attempt
Receiving an incoming call		RING	
	ATA		Answer the call.
		OK	
Initiate a call	ATD1234;		Don't forget the ";" at the end for "voice" calls.
		OK	Communication established
		CME ERROR :11	PIN Code not entered (with +CMEE : 1 mode)
		CME ERROR :3	AOC credit (Advice of Charge tells the user how much a call will cost) has been exceeded or a communication is already established.
Initiate an emergency call	ATD112;	OK	Don't forget the ";" at the end for "voice" calls.
Communication loss		NO CARRIER	
Hang up	ATH		
		OK	
Store the parameters in non-volatile memory	AT&W		
		OK	The communications program has saved the configuration settings in non-volatile memory.

Chapter 3: Troubleshooting

Troubleshooting Examples

Situation A: The modem does not answer through the serial link

If the Wireless MultiModem does not answer through the serial link upon an attempted transmission of data or voice signals, see the table below for possible causes and solutions.

Solutions for 'no connection through serial link' situation		
If the modem returns …	Then ask …	Action
(nothing)	Is the modem powered correctly?	Provide a power supply in the range of 5 to 32Vdc.
	Is the serial cable properly connected to the modem and PC sockets?	Connect cable per step 5 of the "Electrical Installation and Configuration" procedure. Verify cable pinout per"RS232 15-Pin Connector Pinout" table, esp Rx & Tx connections. Verify reception & transmission.
	Is the communication program properly configured?	In communications program, verify that modem parameters have been set to the values shown here: Data bits = 8 Parity = none Stop Bits = 1 Baud = 115200 bps
	Is another program interfering with the communication program?	Close any such application program.

Situation B: The modem always returns «Error» when trying to issue a communication

If the Wireless MultiModem returns a message of error upon an attempted transmission of data or voice signals, see the table below for possible causes and solutions.

Solutions for “error” message situations		
If the modem returns	Then ask …	Action
Error	Is the modem registered on the network?	Follow “Verifying network registration" procedure to be sure modem is registered on network.
	Is the modem receiving an incoming call or is it already in communication?	End any communication using the **ATH** command.
	Does AT+CREG? return 0,1 (registered) or 0,5 (registered roaming)?	If not, check for adequate signal strength on network. Use AT+CSQ.
	Is the selected bearer type supported by the called party? Is the selected bearer type supported by the network?	In comm. program, type **AT+CMEE=1** to view the extended error codes (see “Error Results Codes" in the AT Command guide). Be sure called party and network support selected bearer type. Be sure that semi-colon (“;”) is typed immediately after the phone number in the AT command. e.g., ATD######;
	Is the received signal strong enough?	See “Signal Strength Verification”
	Is the antenna properly connected?	See “Antenna Specifications”

Situation C: The modem always returns «No carrier» when trying to issue a communication

Solutions for "no carrier" message		
If the modem returns …	Then ask …	Action
no carrier *(esp. for data communication)*	Is the selected bearer type supported by the called party? Is the selected bearer type supported by the network?	Type AT+CEER to view the extended error code (see "Error Results Codes" in the AT Command guide). Be sure that the selected bearer type is supported by the called party. Be sure that the selected bearer type is supported by the network. If no success, try bearer selection type: AT+CBST=0,0,3 Be sure SIM card is available for data/fax calls.
no carrier *(esp. for voice communication)*		Be sure that the semicolon character (";") is typed immediately after the phone number in the AT command. E.g., ATD######; type AT+CBST=0,0,3 Configure the SIM card for data/fax calls.
	Is the received signal strong enough?	See "Signal Strength Verification."
	Is the antenna properly connected?	See "Antenna/RF Specifications."

Chapter 4: Safety

Safety

General Safety

The modem is designed for and intended to be used in fixed and mobile applications. “Fixed” means that the device is physically secured at one location and is not able to be easily moved to another location. “Mobile” means that the device is designed to be used in other than fixed locations and generally in such a way that a separation distance of at least 20 cm (8 inches) is normally maintained between the transmitter’s antenna and the body of the user or nearby persons. The Modem is not designed for or intended to be used in portable applications (within 20 cm. or 8 in. of the body of the user) and such uses are strictly prohibited.

It is important to follow any special regulations regarding the use of radio equipment due in particular to the possibility of radio frequency, RF, interference. Please follow the safety advice given below carefully.

- Switch OFF your Wireless MultiModem when in an aircraft. The use of cellular telephones in an aircraft may endanger the operation of the aircraft, disrupt the cellular network and is illegal. Failure to observe this instruction may lead to suspension or denial of cellular telephone services to the offender, or legal action or both.
- Switch OFF your Wireless MultiModem when around gasoline or diesel-fuel pumps and before filling your vehicle with fuel.
- Switch OFF your Wireless MultiModem in hospitals and any other place where medical equipment may be in use.
- Respect restrictions on the use of radio equipment in fuel depots, chemical plants or where blasting operations are in progress.
- There may be a hazard associated with the operation of your Wireless MultiModem close to inadequately protected personal medical devices such as hearing aids and pacemakers. Consult the manufacturers of the medical device to determine if it is adequately protected.
- Operation of your Wireless MultiModem close to other electronic equipment may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers’ recommendations.

Vehicle Safety

- Do not use your Wireless MultiModem while driving, unless equipped with a correctly installed vehicle kit allowing ‘Hands-Free’ Operation.
- Respect national regulations on the use of cellular telephones in vehicles. Road safety always comes first.
- If incorrectly installed in a vehicle, the operation of Wireless MultiModem telephone could interfere with the correct functioning of vehicle electronics. To avoid such problems, be sure that qualified personnel have performed the installation. Verification of the protection of vehicle electronics should be part of the installation.
- The use of an alert device to operate a vehicle’s lights or horn on public roads is not permitted.

- Maintenance of GSM Modem

  Your Wireless MultiModem is the product of advanced engineering, design and craftsmanship and should be treated with care. The suggestions below will help you to enjoy this product for many years.
- Do not expose the Wireless MultiModem to any extreme environment where the temperature or humidity is high.
- Do not attempt to disassemble the Wireless MultiModem. There are no user serviceable parts inside.
- Do not expose the Wireless MultiModem to water, rain or spilt beverages. It is not waterproof.
- Do not abuse your Wireless MultiModem by dropping, knocking, or violently shaking it. Rough handling can damage it.
- Do not place the Wireless MultiModem alongside computer discs, credit or travel cards, or other magnetic media. The phone may affect the information contained on discs or cards.
- The use of accessories not authorized by Multi-Tech or not compliant with Multi-Tech's accessory specifications may invalidate the warranty of the Wireless MultiModem.
- In the unlikely event of a fault in the Wireless MultiModem, contact Multi-Tech Tech Support.

Your Responsibility

This Wireless MultiModem is your responsibility. Please treat it with care respecting all local regulations. It is not a toy. Therefore, keep it in a safe place at all times and out of the reach of children.

Try to remember your Unlock and PIN codes. Become familiar with and use the security features to block unauthorized use and theft.

Chapter 5: Warranty and Repairs

Multi-Tech Warranty Statement

Multi-Tech Systems, Inc., (hereafter "MTS") warrants that its products will be free from defects in material or workmanship for a period of two, five, or ten years (depending on model) from date of purchase, or if proof of purchase is not provided, two, five, or ten years (depending on model) from date of shipment.

MTS MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

This warranty does not apply to any products which have been damaged by lightning storms, water, or power surges or which have been neglected, altered, abused, used for a purpose other than the one for which they were manufactured, repaired by Customer or any party without MTS's written authorization, or used in any manner inconsistent with MTS's instructions.

MTS's entire obligation under this warranty shall be limited (at MTS's option) to repair or replacement of any products which prove to be defective within the warranty period or, at MTS's option, issuance of a refund of the purchase price. Defective products must be returned by Customer to MTS's factory — transportation prepaid.

MTS WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES, AND UNDER NO CIRCUMSTANCES WILL ITS LIABILITY EXCEED THE PRICE FOR DEFECTIVE PRODUCTS.

Repair Procedures for U.S. and Canadian Customers

In the event that service is required, products may be shipped, freight prepaid, to our Mounds View, Minnesota factory:

Multi-Tech Systems, Inc.
2205 Woodale Drive
Mounds View, MN 55112
Attn: Repairs, Serial # _____

A Returned Materials Authorization (RMA) is not required. Return shipping charges (surface) will be paid by MTS to destinations in U.S. and Canada.

Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), your telephone number, and if the product is out of warranty, a check or purchase order for repair charges.

For out of warranty repair charges, go to www.multitech.com/DOCUMENTS/Company/warranty/

Extended two-year overnight replacement service agreements are available for selected products. Please call MTS customer service at (888) 288-5470 or visit our web site at www.multitech.com/PARTNERS/Programs/orc/ for details on rates and coverage's.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department at (800) 972-2439 or email support@multitech.com. Please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at (800) 328-9717 or (763) 717-5631, or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

Repair Procedures for International Customers (Outside U.S.A. and Canada)

Your original point of purchase Reseller may offer the quickest and most economical repair option for your Multi-Tech product. You may also contact any Multi-Tech sales office for information about the nearest distributor or other repair service for your Multi-Tech product. The Multi-Tech sales office directory is available at www.multitech.com/PARTNERS/Channels/offices/

In the event that factory service is required, products may be shipped, freight prepaid to our Mounds View, Minnesota factory. Recommended international shipment methods are via Federal Express, UPS or DHL courier services, or by airmail parcel post; shipments made by any other method will be refused. A Returned Materials Authorization (RMA) is required for products shipped from outside the U.S.A. and Canada. Please contact us for return authorization and shipping instructions on any International shipments to the U.S.A. Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), your telephone number, and if the product is out of warranty, a check drawn on a U.S. bank or your company's purchase order for repair charges. Repaired units shall be shipped freight collect, unless other arrangements are made in advance.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department nearest you or email support@multitech.com. When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A., or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

Repair Procedures for International Distributors

International distributors should contact their MTS International sales representative for information about the repairs for their Multi-Tech product.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our International Technical Support department at +(763)717-5863. When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A. or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

Replacement Parts

SupplyNet, Inc., can supply you with replacement power supplies, cables and connectors for selected Multi-Tech products. You can place an order with SupplyNet via mail, phone, fax or the Internet at the following addresses:

Mail: SupplyNet, Inc.
614 Corporate Way
Valley Cottage, NY 10989
Phone: 800 826-0279
Fax: 914 267-2420

Email: *info@thesupplynet.com*

Internet: http://www.thesupplynet.com

Chapter 6: Reference Information

Wireless Modem Reference Information

General

GSM reference documents: GSM 03.40, GSM 03.45, GSM 04.11,GSM 04.21, GSM 05.08, GSM 07.01, GSM 07.02, GSM 07.05, GSM 07.07.

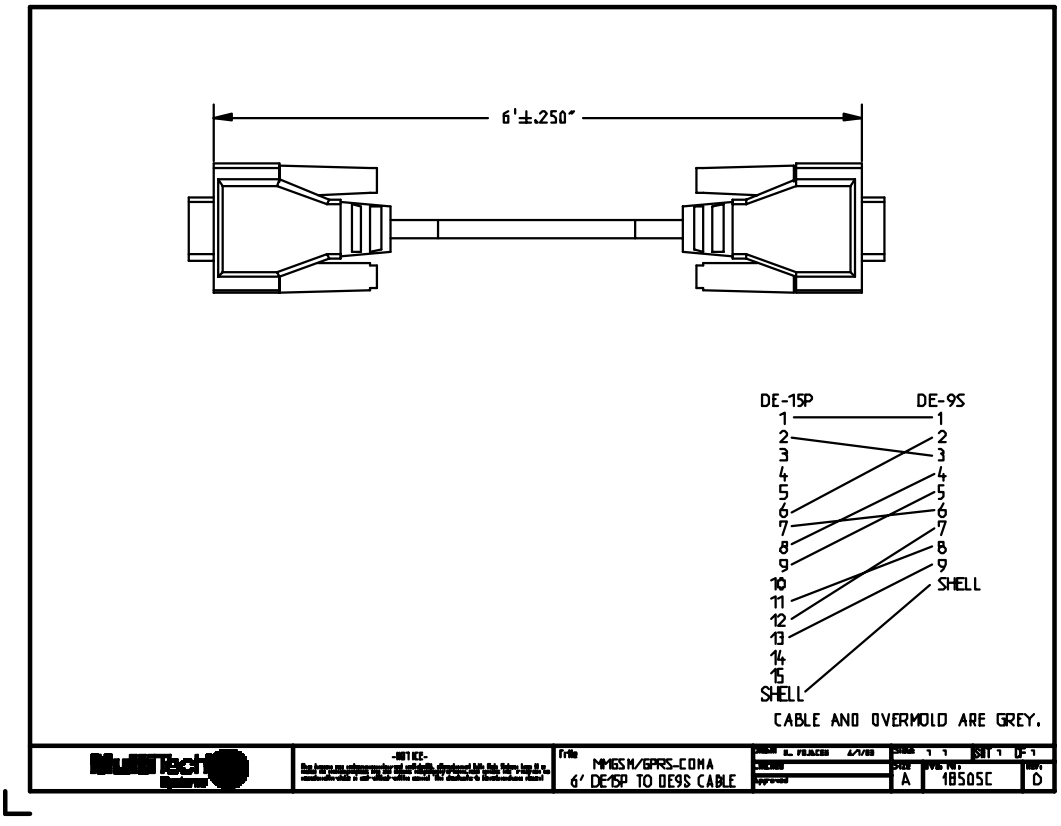
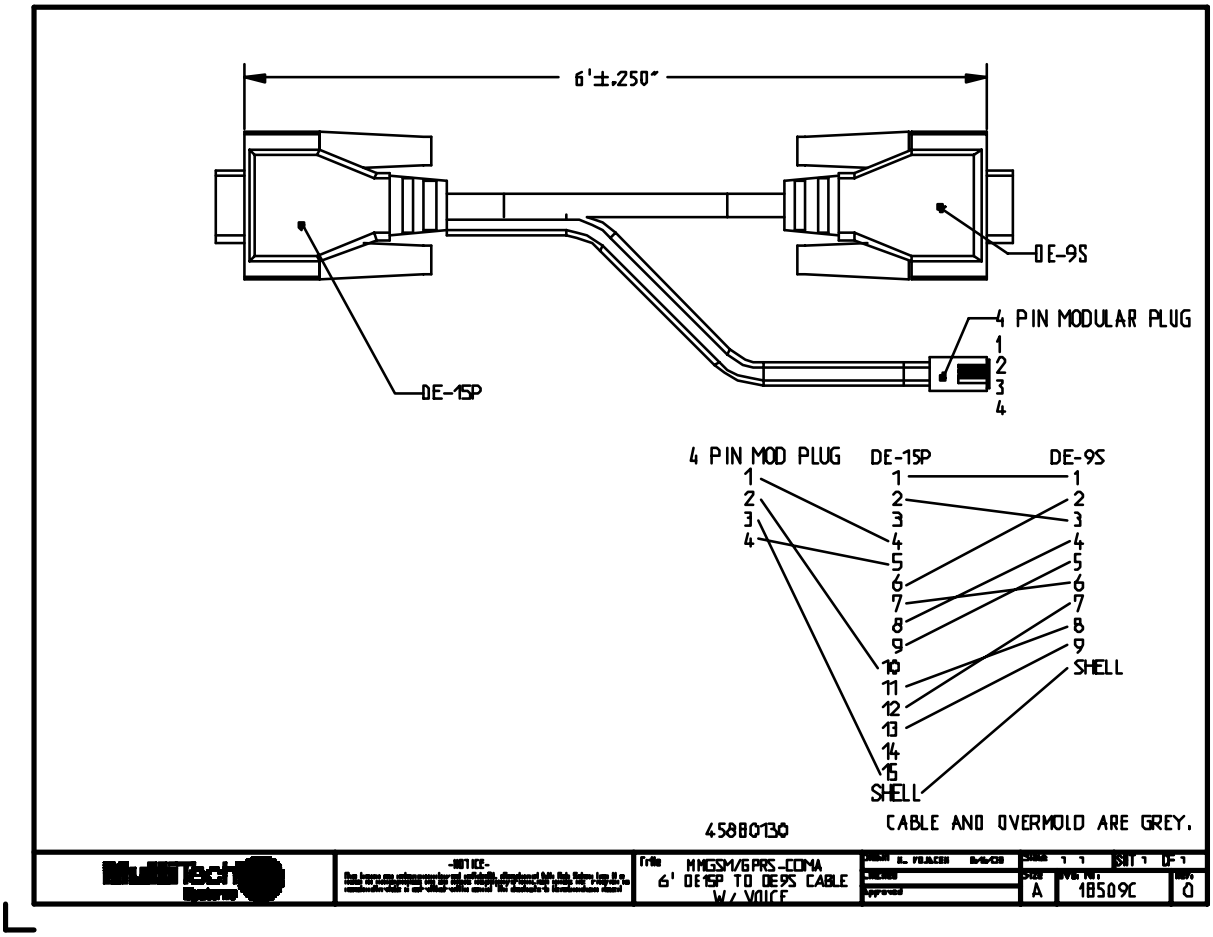
ETSI contact: ETSI Secretariat
F-06921 Sophia Antipolis Cedex, France
e-mail: secretariat@etsi.fr

Service: The AT commands manual is available on the Multi-Tech web site: http://www.multitech.com

Disclaimer

Wireless MultiModem specifications and manuals are subject to change without notice. MTS assumes no liability for damage incurred directly or indirectly from errors, omissions or discrepancies between the Wireless MultiModem and its manual.

Data Cable Diagram, Regular Wireless MultiModem



Data Cable Diagram, Wireless MultiModem with Voice