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# iTegno 3832 GPRS Modem

## Hardware User Guide

*(For firmware version AB\_02\_00\_30N\_DEF003)*

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## Document Information

Revision	Date	Document History	Associated Firmware Version
1.0	11 April 2008	Initial Release	AB_02_00_30N_DEF003

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## 1 INTRODUCTION

iTegno 3832 GPRS Modem is designed for reliable communication over GPRS and GSM for corporate and industrial usage. It provides the wireless communication link for applications such as remote data monitoring and acquisition. This durable and high performing modem can be deployed in myriad Machine-to-Machine (M2M) applications including fleet management, automated meter reading, vending and retail, security and surveillance, industrial systems, information display, etc.

This manual provides an overview of the operation of iTegno 3832. It includes technical information on configuring the modem using a Windows-based PC via the PC's serial port.



## 1.1 Abbreviations

The following abbreviations are used in this document:

DC – Direct Current

V – Voltage

LED – Light Emitting Diode

DTE – Data Terminal Equipment (Refers to the host terminal/application in control)

DCE – Data Communication Equipment (Refers to the device controlled by the host)

## 1.2 References

S/N	Document	Our Reference	File
1	AT Commands Guide	02000C13	iTegno 38XX ATC Guide_v1.0

## 2 PACKAGING

### 2.1 Standard Package

The standard package consists of:

- iTegno 3832 GPRS modem with RS-232 Cable
- External Antenna
- Power Adaptor



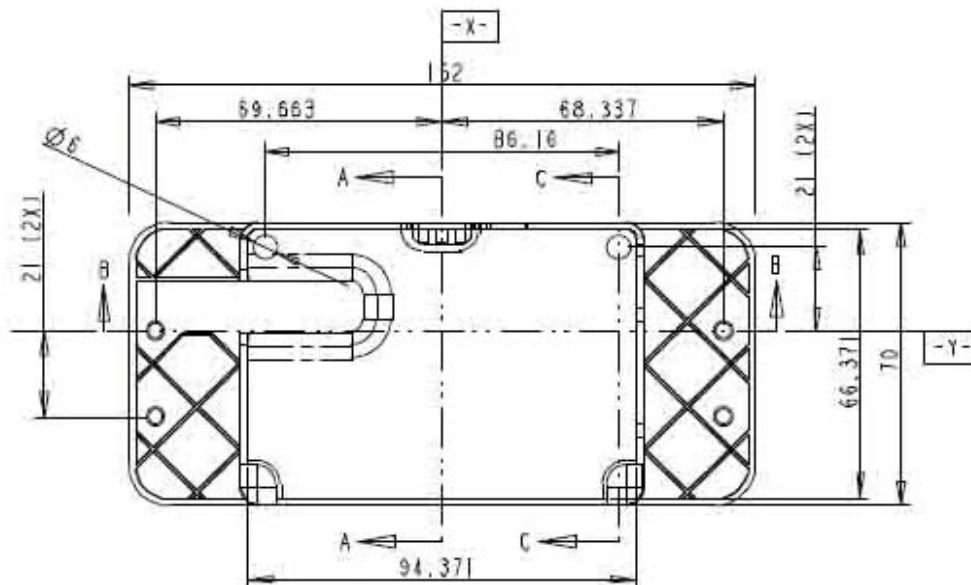


## 2.2 Mounting Bracket (Optional Item)

Mounting bracket for iTegno 3832 is sold separately.



Mounting Bracket with iTegno 3832



Mounting Bracket Dimension

## 2.3 Power Adapter

The modem requires a regulated DC input voltage of 5V to operate. A minimum current of 750mA should be provided to ensure optimal operation. The power adaptor provided is a universal switching-mode power supply, operating at input voltage of 90VAC to 255VAC and output voltage of 5VDC with 1.0A DC load.

Item	Specifications
Rated Input Voltage	AC100V - 240V
Frequency Rated	50-60 Hz
Input Rated Current	200mA RMS Max
Output Voltage	+5VDC
Output Current	1.0A

## 2.4 External GSM Antenna

### 2.4.1 Characteristics

Item	Specifications
Antenna frequency range	Quad Band GSM 850/ EGSM900/ DCS1800/ PCS1900
Impedance	50 Ohms
DC impedance	0 Ohms
Antenna Interface	MMCX connector (Female)

### 2.4.2 Performance

Voltage Standing Wave Ratio Performance Summary				
Frequencies	880MHz	960MHz	1710MHz	1880MHz
VSWR	1.09	1.66	1.27	1.17

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## 3 HARDWARE INTERFACE

### 3.1 Overview

The general interfaces are shown in the figure below:



**Modem Interface Overview**

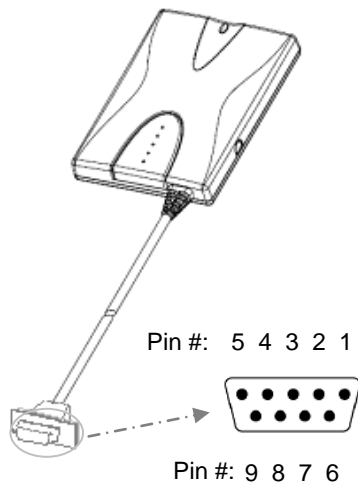
### 3.2 Status Indicator

The status indicator indicates the operational status of the modem. The table below describes the modem's operational status in various LED light status:

LED Light Status	Modem Status
LED ON permanently	Modem is switched on but is not registered on the network.
LED ON and flashing slowly	Modem is switched on and registered to network. However, there is no active communication in progress.
LED ON and flashing quickly	Modem is switched on and registered to network with an active communication in progress.
LED OFF	Modem is switched off.

### 3.3 Serial Link Interface Cable

The iTegno 3832 communicates with other devices via the RS-232 serial link cable. The diagram below shows the pin assignment of the DB9 connector.



Pin #	Signal	I/O	Description
1	DCD	O	RS-232 Data Carrier Detect
2	RXD	O	RS-232 Receive Serial Data
3	TXD	I	RS-232 Transmit Serial Data
4	DTR	I	RS232 Data Terminal Ready
5	Ground	-	Signal Ground (SG)
6	DSR	O	RS232 Data Set Ready
7	RTS	I	RS232 Request To Send
8	CTS	O	RS232 Clear To Send
9	RI	O	RS232 Ring Indicator

#### RS-232 DB9 Pin Assignments

Based on the conventions for DCE-DTE connection, the modem communicates with the DTE using the following signals:

Pin TXD: DTE sends data to the modem TXD pin.

Pin RXD: DTE receives data from the modem RXD pin.

The default RS-232 link settings for the modem are:

<b>Item</b>	<b>Settings</b>
Baud Rate:	115200 bps
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	Hardware

### **3.4 Power Supply Interface**

The modem DC IN terminal is a 2-pole DC Power Jack.

The power supply rating is:

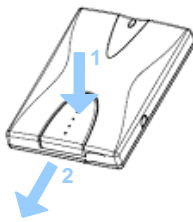
<b>Power Supply</b>	<b>Voltage</b>
Minimum Voltage Input:	5V
Maximum Voltage Input:	32V

A regulated 5VDC input voltage is recommended for operating the modem. Any over-voltage power supplied to the modem may result in permanent damage to the modem.

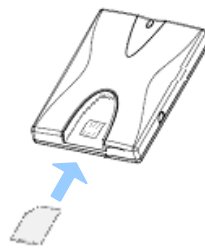
## 3.5 SIM Cover and SIM Tray

The following steps describe the insertion of SIM Card to the Modem.

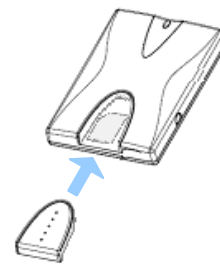
**Step 1.** Gently press down and slide out the SIM cover as shown.



**Step 2.** Insert SIM Card with the metallic part facing down and the clipped corner in the left.



**Step 3.** Replace SIM Cover accordingly.



**Inserting the SIM Card**

## 3.6 GSM Antenna Interface

The GSM Antenna interface is an MMCX (Female) connector.

To attach the external antenna to the modem, align it with the MMCX connector and press down until a “click” sound is heard.

## 4 GETTING STARTED

### 4.1 Setting up the modem

*Step 1: Prepare the SIM Card.*

Before using the modem, you must contact a network operator to get a personal SIM card. Do acquire the GPRS APN, User-ID and Password from your network operator.

*Step 2: Insert SIM card into the modem.*

Please refer to Chapter 3.5 "SIM Cover and SIM Tray" for more information.

*Step 3: Connect the antenna to the modem.*

Please refer to Chapter 3.6 "GSM Antenna Interface" for more information.

*Step 4: Connect the modem communication interface to your device.*

Connect the modem serial link interface to your device. Please refer to Chapter 3.3 "Serial Link Interface Cable" for more details. For connection to a PC, connect the modem serial connector directly to the PC serial COM port.

*Step 5: Power up the modem.*

Plug in the power adaptor to the modem's power jack. Plug the power adaptor to a suitable main power socket. The status indicator LED will light up instantly. The modem is now ready for use.

*Step 6: Communicate with the modem.*

The modem is ready to communicate with your device. From your device, send **AT<Enter>** command to the modem. If device receives an **OK** response from modem, the communication is successfully established.

The following are some other AT command examples you can use:

<b>AT+CPIN?</b>	To check whether SIM Lock is enabled.
<b>AT+CPIN=xxxx</b>	To enter a PIN code if SIM lock is enabled.
<b>AT+CSQ</b>	To query and verify the current received signal strength.
<b>AT+CREG?</b>	To check on modem registration to the network.

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**AT+CGMR** To query for modem firmware version number.

Please refer to the iTegno 38XX AT Commands Guide for more information on communicating with the modem using AT Commands.

## 4.2 Interfacing Modem with HyperTerminal Software

This section suggests examples for some basic functions using HyperTerminal:

1. Sending Short Messages (SMS)
2. Reading Short Messages (SMS)

### 4.2.1 Configuring HyperTerminal for Modem

#### Step 1

Connect the iTegno 3832 GPRS Modem to the PC COM Port and run the HyperTerminal program.

From the Taskbar, click [Start], followed by “All Programs” → Accessories → Communications → HyperTerminal”.



#### Step 2

You will be prompted to enter a description for the new connection. Enter a name for the connection (e.g. “iTegno Modem”) and click [OK] to continue.



### Step 3

In the “Connect to” dialog box, select the PC COM port number, which is connected to the modem, and click [OK] to continue.

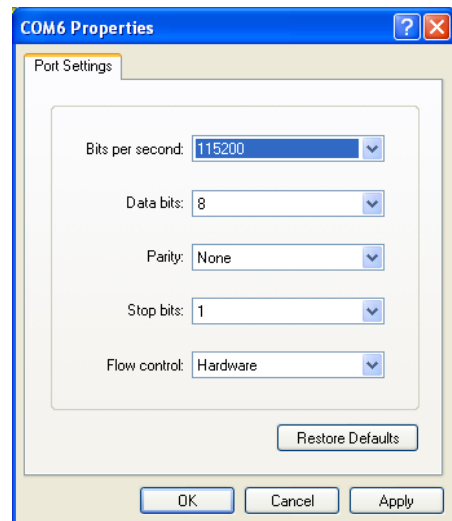


### Step 4

In the next prompted dialog box, enter the COM port settings which are configured in the modem and click [OK] to continue.

Note: Default settings for the modem are:

Item	Settings
Baud Rate:	115200 bps
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	Hardware

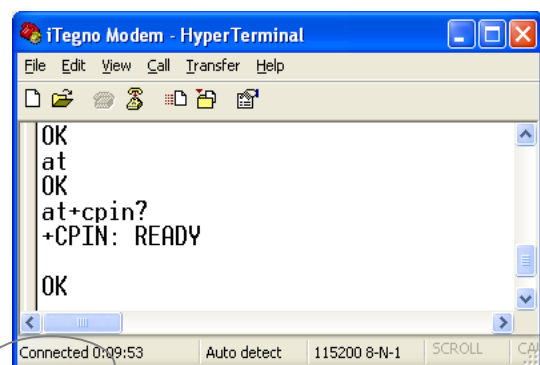


### Step 5

The “Connected” text in HyperTerminal status bar indicates that the PC is ready to communicate with the modem.

Perform a simple check on the connection between HyperTerminal and the modem:

- **AT<Enter>**
- An **OK** response (displayed on HyperTerminal) indicates that the connection is successfully established.



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## 4.2.2 Sending Short Messages (SMS)

### Step 1

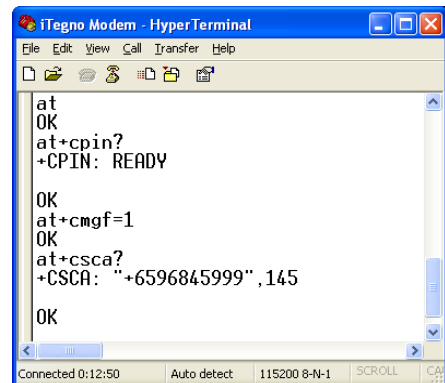
Set short message format as Text mode.

**AT+CMGF=1<Enter>**

### Step 2

Check whether SMS center (SMSC) number is set to SIM card.

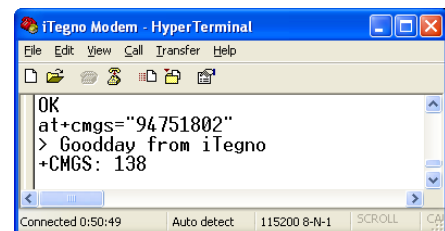
**AT+CSCA?<Enter>**



```
iTegno Modem - HyperTerminal
File Edit View Call Transfer Help
at
OK
at+cpin?
+CPIN: READY

OK
at+cmgf=1
OK
at+cscA?
+CSCA: "+6596845999",145

OK
Connected 0:12:50 Auto detect 115200 8-N-1 SCROLL CA
```



```
iTegno Modem - HyperTerminal
File Edit View Call Transfer Help
OK
at+cmgs="94751802"
> Goodday from iTegno
+CMGS: 138
Connected 0:50:49 Auto detect 115200 8-N-1 SCROLL CA
```

### Step 3

Send a message to a phone number.

**AT+CMGS= "Phone number"<Enter>**

>Goodday from iTegno<Ctrl-Z>

### Step 4

Wait for **+CMGS** for the result of sending SMS.

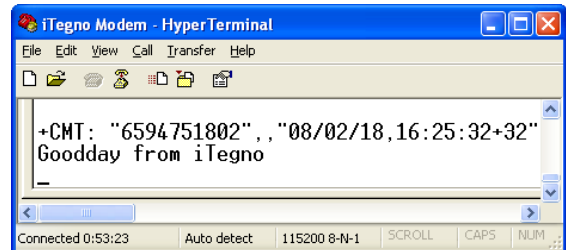
**+CMGS: <mr>** indicates that the SMS has been sent successfully.

## 4.2.3 Receiving Short Messages (SMS)

### Step 1

Set short message format as Text mode.

**AT+CMGF=1<Enter>**



### Step 2

Set modem to forward received SMS to the HyperTerminal directly.

**AT+CNMI=2,2,0,0,0<Enter>**

### Step 3

Save the current settings.

**AT&W<Enter>**

New incoming SMS will be displayed on HyperTerminal.

## 5 Technical Specifications

### 5.1 General Features

Feature	Specification
Standard	<ul style="list-style-type: none"><li>• Quad-band: GSM 850/ EGSM900/ DCS1800/ PCS1900</li><li>• Compliant to ETSI GSM Phase 2+</li></ul>
Data	<ul style="list-style-type: none"><li>• Asynchronous, transparent and non-transparent</li><li>• Maximum speed: up to 14.4kbps</li><li>• Point-to-point (MO/MT)</li><li>• Text /PDU</li><li>• Cell Broadcast</li></ul>
GPRS	<ul style="list-style-type: none"><li>• Terminal Class B</li><li>• Multislot Class 10</li><li>• Data rates: Downlink – up to 85.6 kbps Uplink – up to 42.8 kbps</li></ul>
Fax	<ul style="list-style-type: none"><li>• Group 3</li><li>• Fax 2.0</li><li>• Max speed (kbps): up to 9.6kbps</li></ul>
Host Protocol	<ul style="list-style-type: none"><li>• AT Commands compliant to GSM 07.07, 07.05</li><li>• iWOW Proprietary AT Commands</li></ul>
Firmware Stack	<ul style="list-style-type: none"><li>• TCP/IP and UDP/IP</li><li>• MMS</li></ul>

### 5.2 Mechanical Characteristics

Feature	Specification
Dimension (mm)	94.2 x 66.0 x 14.5
Weight (g)	58
Lead-free	Yes
Cooling Mechanism	Internal Dual Flow Air Convection
Power Supply Interface	DC IN Terminal (2-pole DC Power Jack)
Communication Port	RS-232 interface cable Baud rates from 110 to 115200 bps
External Antenna Interface	MMCX connector (Female)

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### 5.3 Electrical Characteristics

Current Consumption				
Operating Mode	Conditions	Inom	I <sub>max</sub>	Units
Modem OFF/Backup		50	100	uA
Modem IDLE	DRX=6 (Ave) with SLEEP mode enabled	3	-	mA
GPRS DATA (3Rx/2Tx)	EGSM – PCL 5 (Ave)	420	460	mA
	DCS/PCS – PCL 0 (Ave)	380	420	mA

Above values taken at 25°C

Power Supply	
Operating Voltage Range	5V to 32V DC

SIM Interface	
SIM Card support	1.8V, 3V

### 5.4 RF Performance

Feature	Specifications
Frequency band	<ul style="list-style-type: none"> <li>GSM 850/ EGSM900/ DCS1800/ PCS1900</li> </ul>
Sensitivity	<ul style="list-style-type: none"> <li>GSM 850: -102dBm</li> <li>EGSM 900: -102dBm</li> <li>DCS 1800: -100dBm</li> <li>PCS 1900: -100dBm</li> </ul>
Output power	<ul style="list-style-type: none"> <li>GSM 850: Class 4, 2W (33dBm)</li> <li>EGSM 900: Class 4, 2W (33dBm)</li> <li>DCS 1800: Class 1, 1W (30dBm)</li> <li>PCS 1900: Class 1, 1W (30dBm)</li> </ul>

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## 5.5 Environmental Characteristics

Feature	Specifications
Operating temperature range	-20 °C to + 55 °C
Storage temperature range	-40 °C to +85 °C

## 6 TROUBLESHOOTING

This section suggests the possible solutions for common problems encountered when using the iTegno 3832 GPRS modem.

### 6.1 Is my modem powered up?

- Check whether the LED on the modem is lighted up. If it is not lighted up, check whether the modem is supplied with the correct voltage range (between 5V to 32VDC).

### 6.2 Is my SIM card SIM lock enabled?

- Use **AT+CPIN?** command to request for PIN Status, or
- **AT+CLCK="SC",0,"password"** to disable the SIM lock.

### 6.3 What is my SIM card PIN code?

If you have forgotten or lost your PIN code, or, you have not received such a code, please contact your network service provider for assistance.

### 6.4 Unable to register to the network

- Check the modem status indicator. The LED should be blinking if the modem is registered to the network.
- Use **AT+CREG?** command to request for the registration status.
- Check the signal strength of the network using **AT+CSQ** command. You should receive a +CSQ response (+CSQ: <rsssi>, <ber>). If the rssi value is 99, it means the network is unknown or undetectable. The ideal rssi value should be 8 to 31. An rssi value less than 8 has weaker signal strength.



## 6.5 Cannot enter AT Commands or no communication between device and modem

- Check whether the modem is powered up.
- Check whether the SIM lock is turned on.
- Check whether the communication interface port is connected properly. Ensure that the RS-232 link interface from the modem interface cable is properly connected to your device's RS-232 connector.
- Check whether the port settings are correct. Ensure that both modem and your device are communicating with the same settings (such as baud rate, data bits, stop bits and parity). Note that the modem default port settings are:

Item	Settings
Baud Rate:	115200 bps
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	Hardware

- Try isolating your device by connecting the modem to a Windows-based PC with HyperTerminal and test the communication between the modem and PC. Please refer to Chapter 4.2 “Interfacing Modem with HyperTerminal Software” for the setup instructions.

## 6.6 Cannot send SMS using AT+CMGS command

- Check whether the modem is powered up.
- Check whether the SIM Lock is turned on.
- Check whether the modem is registered to the network.
- Try inserting the SIM card into a mobile phone and/or another modem to send an SMS. If the SMS cannot be sent, check with your network service provider on the status of the SIM card.
- Verify that the SMS Service Centre Number is correct using **AT+CSCA?** command.
- Ensure that the modem is set to text message mode. You may do so using **AT+CMGF=1** command. Please refer to Chapter 4.2.2 “Sending Short Messages (SMS)” for more information.

## 6.7 Cannot connect to GPRS

- Check whether the modem is powered up.
- Check whether the SIM Lock is turned on.
- Check whether the modem is registered to the network.
- Check whether the SIM card supports GPRS Service. You can verify it with the network service provider. If the SIM card supports GPRS service, check whether the APN settings are correct. Use **AT+CGDCONT?** command to query or assign the APN settings. Ensure that it is correct by confirming the APN with your network service provider.

## 7 SAFETY RECOMMENDATIONS

### 7.1 General Safety

It is very important to follow any regulations regarding the use of radio equipment especially due to the possibility of Radio Frequency (RF) interference.

Please follow the safety advice given below carefully:

- Switch off your GPRS Modem 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, legal action or both.
- Switch off your GPRS Modem when at a refuelling point.
- Switch off your GPRS Modem in hospitals and at 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 hazards associated with the operation of your GPRS Modem 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 GPRS Modem close to other electronic equipment may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers recommendations.

## 7.2 Vehicle Safety

If incorrectly installed in a vehicle, the operation of the GPRS Modem could interfere with the proper functioning of vehicle electronics. Ensure that only qualified personnel perform the installation to avoid such problems. Verification of the protection of vehicle electronics should form part of the installation.

## 7.3 Care and Maintenance

Your GPRS Modem 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 GPRS Modem to any extreme environment where the temperature or humidity is high.
- Do not attempt to disassemble the GPRS Modem. There are no user serviceable parts inside.
- Do not expose the GPRS Modem to water, rain or split beverages. It is not waterproof.
- Do not abuse your GPRS Modem by dropping, knocking, or violent shaking. Rough handling can damage it.
- Do not place the GPRS Modem alongside computer discs, credit or travel cards or other magnetic media. The information contained on discs or cards may be affected by the frequency emitted by the modem.
- The use of third party equipment and/or accessories, not made or authorised by iWOW Connections Pte Ltd may invalidate the warranty of iTegno 3832 GPRS Modem.

Do contact us in the unlikely event of a fault.

## 8 CONTACT US / SUPPORT

For online support (FAQs and drivers download), please visit [www.iTegno.com](http://www.iTegno.com).

For technical support, please contact our distributors/resellers or email us at [developers@iTegno.com](mailto:developers@iTegno.com).

For general enquiries please contact us at:

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