GPRS/GSM IP Communicator

Conettix ITS-DX4020-G

BOSCH

en Installation and Operation Guide

Table of Contents

1   Introduction

1.1   Trademarks

– Microsoft, Windows 2000, XP, Vista, and Windows 7 are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
– Molex is a registered trademark of Molex Incorporated.

1.2   Technical Specifications

Electrical	
Current (operating)	– **Standby:** 65 mA – **Alarm:** 200 mA
Operating Voltage	12 VDC nominal
Maximum Wire Resistance for Control Panel Connections	1.6 ohms
Maximum Wire Distance	– **0.64 mm (22 AWG):** 30.5 m (100 ft) – **1.02 mm (18 AWG):** 61 m (200 ft)
Ripple/Noise	200 mVpp maximum
PSTN FSX Port	17 V minimum supplied
Radio	GSM Quad band radio; 850 MHz and 1900 MHz – **Europe:** 900 MHz and 1800 MHz – **North America:** 850 MHz and 1900 MHz
Terminals	All terminals are power-limited. Separate power-limited wiring from non-power-limited wiring by 6.4 mm (0.25 in).
Environmental	
Environment	Indoors
Relative Humidity	5% to 93% non-condensing
Temperature (operating)	-10°C to +55°C (+14°F to +131°F)
Mechanical	
Dimensions (H x W x D)	133 mm x 80 mm x 23 mm (5.2 in. x3.1 in. x 1 in.)
Antenna	– Magnetic base omni-directional antenna – 2.5 m (8.2 ft) cable with SMA connector
SIM Card	3V/1.8V SIM (compliant with GSM 11.12 recommendation)
USB	Mini-B connector (cable not included)
Accessories	
AE1 Standard Enclosure	Standard gray enclosure made of 1.0 mm cold-rolled steel. Includes a keyed lock. The dimensions are 35.6 cm x 31.8 cm x 7.6 cm (14 in. x 12.5 in. x 3 in.).
AE2 Standard Enclosure	Standard red enclosure made of 1.0 mm cold-rolled steel. Includes a keyed lock. Measures 35.6 cm x 31.8 cm x 7.6 cm (14 in. x 12.5 in. x 3 in.).
AE4 Large Enclosure	Large red enclosure made of 1.2 mm coldrolled steel. Includes a keyed lock. Measures 52.7 cm x 38.1 cm x 10.8 cm (20.7 in. x 15 in. x 4.25 in.).
D2203 Enclosure	Grey steel enclosure measuring 37 cm x 34 cm x 8.9 cm (14.6 in. x 13.4 in. x 3.5 in.). Includes a lock and accepts an optional tamper switch.

D8103 Enclosure	Grey steel enclosure measuring 41 cm x 41 cm x 9 cm (16 in. x 16 in. x 3.5 in.).
D8109 Fire Enclosure	Red steel enclosure measuring 40.6 cm x 40.6 cm x 8.9 cm (16 in. x 16 in. x 3.5 in). UL Listed. Includes a lock and key set.

1.3   Certifications and Approvals

The ITS-DX4020-G is designed to comply with the following certifications and approvals:

Agency	Certification
Australia	A-Tick Approved
CE	– EN60950 Safety – EN50130-4 Electromagnetic Compatibility – EN55022 Radiated/Conducted Emissions
FCC	FCC, Part 15 Radiated/Conducted Emissions
NIST	FIPS 197 Certificate No.
PTCRB	Approved
CSFM	Approved
UL	– UL 365, Police Station Burglar Alarm Units and Systems – UL 864, UL Commercial Fire Alarm Signaling – UL 985, Household Fire Warning System Units – UL 1023 Household Burglar-alarm System Units – UL 1610, Central Station Burglary

1.4   Control Panel Compatibility

- DS7200V2 Series (firmware version 2.10 or later)
- DS7400XiV4 (firmware version 4.10 or later)
- FPD-7024 Fire Alarm Control Panel
- Easy Series (firmware version 3.0 or later)
- GV2 Series (firmware version 7.07 or 7.08[1]
- GV3 Series

Refer to your control panel's documentation for programming instructions. When programming the ITS-DX4020-G, follow your control panel's DX4020 network programming instructions.

2   Overview

The ITS-DX4020-G enables two-way IP or dialed communication over a commercial GPRS / GSM network. Typical applications are event reporting to a central monitoring station and remote access to Bosch intrusion control panels. For a list of compatible control panels, refer to *Section 1.4 Control Panel Compatibility, page 6*.

For installations using a PSTN receiver, the ITS-DX4020-G uses GSM to dial the receiver and communicate using Contact ID.

2.1   System Overview
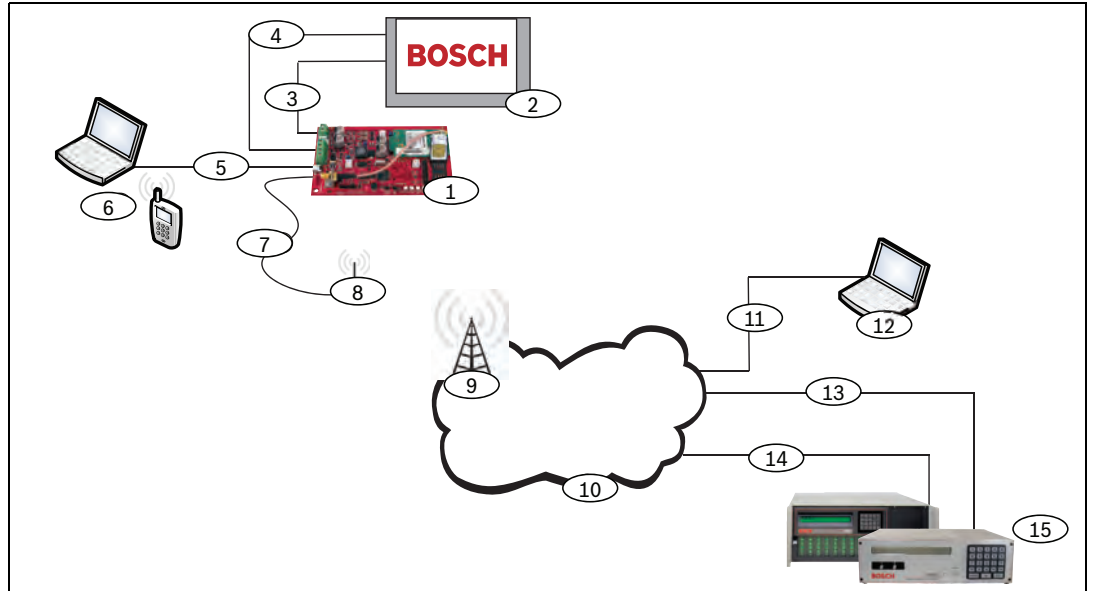
Figure 2.1   System Overview

Callout	Description
1	ITS-DX4020-G GPRS/GSM Communicator
2	Compatible Control Panel (refer to *Section 1.4 Control Panel Compatibility, page 6*)
3	Control Panel Dialer Connection (optional)
4	Control Panel Bus and Power Connection
5	USB Type A (host)-to-USB Mini B (device) Cable (not included)
6	Local PC or SMS-capable Cell Phone for Configuration
7	Antenna Cable
8	Magnetic Base Antenna
9	Base Station on Wireless Carrier's Network
10	Internet, WAN, Ethernet, or PSTN network
11	Remote PC's Network Connection
12	Remote PC Running Remote Programming Software (RPS)
13	Ethernet Connection
14	PSTN Connection
15	Conettix D6600 with Serial Network Adapter or Conettix D6100i Receiver

2.2   Device Overview

Figure 2.2 shows an overview of the ITS-DX4020-G printed circuit board (PCB).
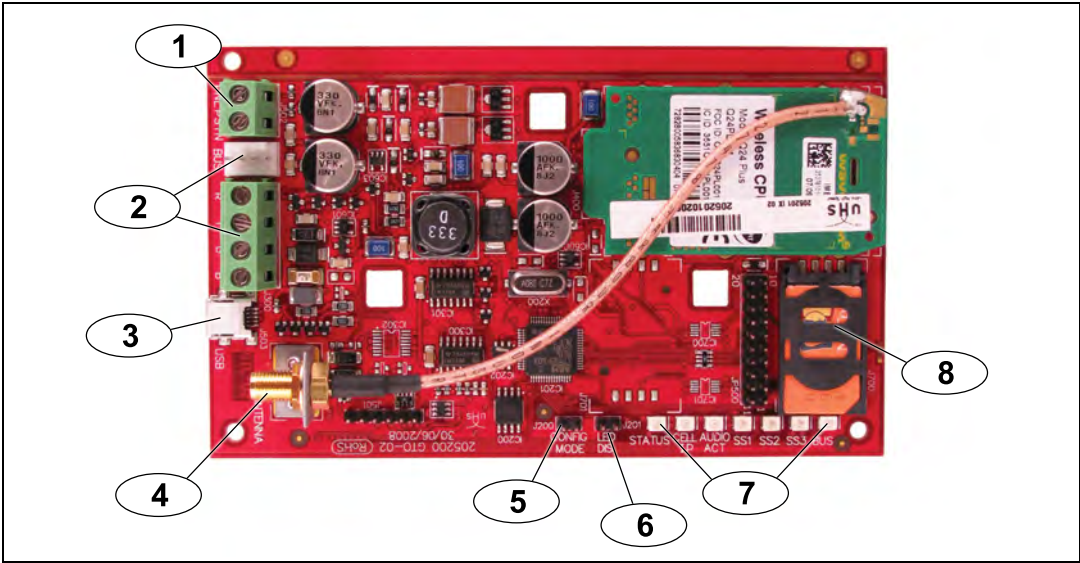
Figure 2.2   ITS-DX4020-G PCB Overview

Callout	Description
1	PNL/PSTN terminals (for GSM/PSTN Mode) Refer to *Section 2.3 Modes of Operation, page 9*. PNL = Panel PSTN = Public Switched Telephone Network
2	Molex connector and bus terminals (for IP over GPRS Mode) Refer to *Section 2.3 Modes of Operation, page 9*.
3	Mini-B USB Port
4	ANTENNA Connector
5	CONFIG MODE (J200) Jumper Pins
6	LED DIS (J201) Jumper Pins (LED Disable Jumper Pins)
7	Diagnostic LEDs. Refer to *Table 7.2, Page 44*, for more information.
8	SIM card in card holder

NOTICE!

To conserve power, disable the diagnostic LEDs by placing a jumper plug across the LED DIS jumper pins. Refer to *Figure 2.2* for more information.

2.3   Modes of Operation

> **(i)** **NOTICE!**
> The IP over GPRS Mode requires a data plan enabled SIM from a cellular provider.

The ITS-DX4020-G supports two modes of operation. Refer to *Table 2.1* for a description of each mode.

IP over GPRS (General Packet Radio Services) Mode
Overview:
This mode provides a wireless IP connection over the GPRS network.   The control panel supervises the communication path through the ITS-DX4020-G either by control panel heartbeats, or by periodic test reports.
Wiring connections:
Connect the bus terminals on the control panel and the ITS-DX4020-G.   Refer to *Figure 3.3, Page 14*.
Supported control panels:
Refer to *Section 1.4 Control Panel Compatibility, page 6*.

Table 2.1   IP over GPRS Mode of Operation

PSTN (Contact ID) over GSM
Overview:
This mode:
–   Provides a GSM dial-out option for installation sites where GPRS service is not available or a Conettix receiver is not available   –   Supports only the Contact ID reporting format
NOTICE: For control panels that detect a dial tone before dialing, disable dial tone detection. The ITS-DX4020-G supplies phone voltage of 22 - 25 VDC and US dial tone frequencies (350 Hz+ 440 Hz).
Wiring connections:
Connect the R (Ring) and T (Tip) phone terminals from the control panel to the PNL/PSTN terminals on the ITS-DX4020-G.   Refer to *Figure 3.4, Page 15*
Supported control panels:
All. Refer to *Section 1.4 Control Panel Compatibility, page 6*.

Table 2.2   PSTN (Contact ID) over GSM Mode

Dual Wireless Mode (Default Mode)
Overview:
This mode combines the IP over GPRS and PSTN (Contact ID) over GSM modes.
Wiring connections:
–   Connect the bus terminals on the control panel and the ITS-DX4020-G.   –   Connect the R (Ring) and T (Tip) phone terminals from the control panel to the PNL/PSTN terminals on the ITS-DX4020-G.   Refer to *Figure 3.5, Page 16*.
Supported control panels:
Easy Series (firmware version 3.0 or later).

2.4 Configuration Options

You can configure the ITS-DX4020-G using one of two methods:

– Short Message Service (SMS). Refer to *Section 4.1 Use Short Message Service (SMS) to Configure the ITS-DX4020-G, page 18*.

– USB user interface. Refer to *Section 4.2 Use USB to Configure the ITS-DX4020-G, page 21*.

You can configure in one of three different modes, depending on the control panel. For a list of modes allowed by the different control panels, refer to *Table 4.1, Page 18*.

NOTICE!

The configuration options provide temporary connections to the ITS-DX4020-G for configuration purposes only. They are not intended for long-term, or permanent, connection.

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3   Installation

3.1   Installation Prerequisites

Before you install the ITS-DX4020-G, ensure that the following prerequisites are met:

–   Before installing the ITS-DX4020-G in an existing system, inform the operator and local authority.
–   Before installing the ITS-DX4020-G, disconnect all system power (AC and standby battery).
–   If you are mounting the ITS-DX4020-G in a separate enclosure, ensure that all external wiring does not exceed 1.6 ohms: 30.5 m (100 ft) of 0.64 mm (22 AWG) or 61 m (200 ft) of 1.02 mm (18 AWG) wire. Refer to *Section 1.2 Technical Specifications, page 5*, for optional enclosures (if required).
–   Separate power-limited wiring from non-power-limited wiring by 6.4 mm (0.25 in).
–   Contact the central monitoring station for destination IP address and port number settings. Provide the central monitoring station with the poll rate setting.

NOTICE!
Depending on the SIM card used, first-time registration of the SIM card might take up to 3 minutes to complete. During this time, the signal levels displayed by the signal strength LEDS might fluctuate.

3.2   Insert the SIM Card
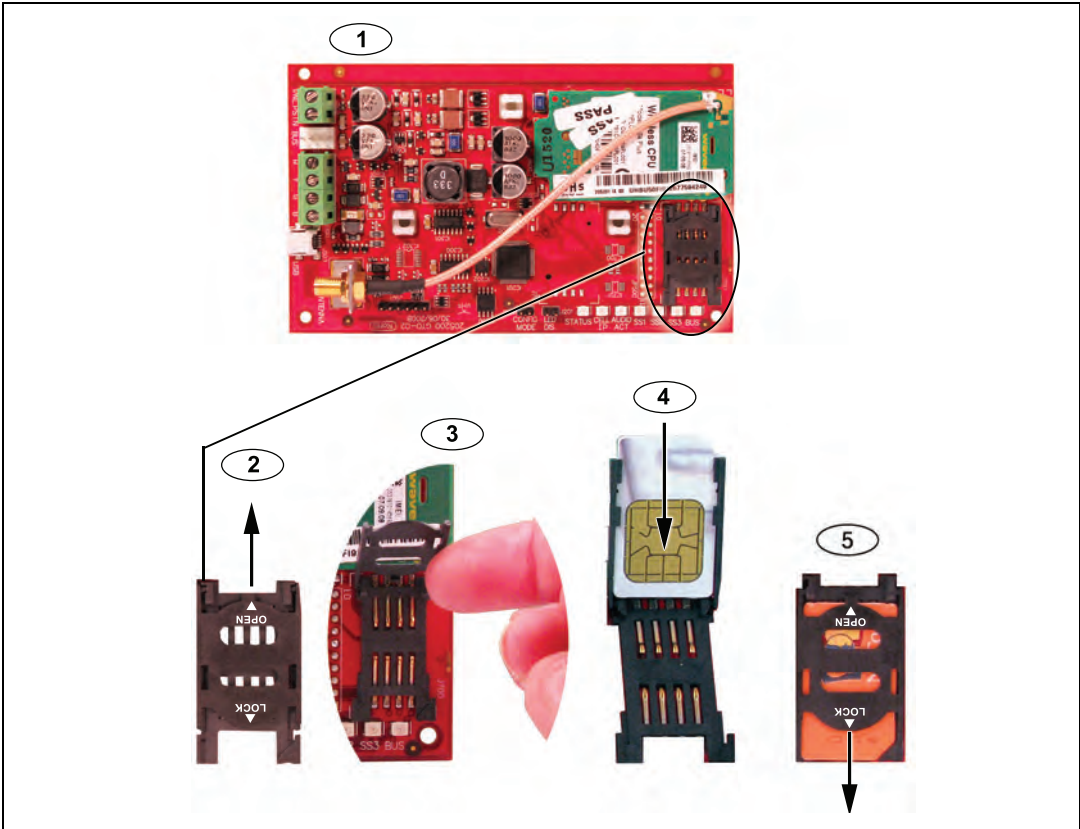
Figure 3.1   SIM Card and Card holder Overview

Callout	Description
1	SIM card orientation
2	SIM card holder door unlock instruction
3	SIM card holder door open instruction
4	SIM card insert instruction
5	SIM card holder door close and lock instruction

1. Hold the ITS-DX4020-G communicator as shown in *Figure 3.1*.
2. Slide the SIM card holder door upward to unlock it.
3. Lift the SIM card holder door.

NOTICE!

The SIM card holder door does not open very far. Do not force the door open beyond its normal range of motion.

4. Insert the SIM card into the guides on the card holder door.
    The notched edge is away from the hinge, and the contacts are positioned as shown in *Figure 3.1*.
5. Close the card holder door, and then slide the door away from the hinge to lock it.

3.3   Mount the ITS-DX4020-G in the Control Panel Enclosure

Refer to *Figure 3.2, Page 13*.

1. Mount the ITS-DX4020-G into the control panel's enclosure using the supplied mounting screws.

   Use any of the standard three-hole mounting patterns on the control panel's enclosure. If necessary, remove the three knockouts.If necessary, use the D137 Mounting Bracket (not supplied) to mount the ITS-DX4020-G on the control panel enclosure.

2. Place the magnetic antenna in the vertical position on the top of the control panel enclosure or other metal surface.

ⓘ **NOTICE!**

The antenna must be placed on a magnetic metal surface for proper operation.

For best performance, ensure that the surface area extends 10 cm (4 in.) or more in all directions around the antenna.

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3. Connect the antenna cable to the ITS-DX4020-G.
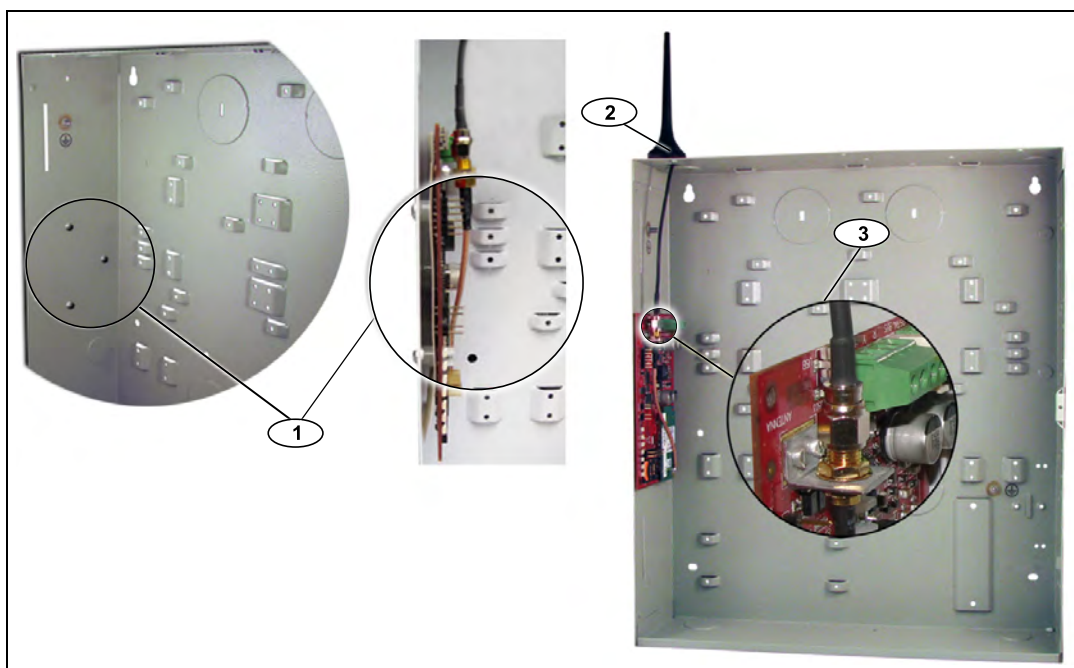
Figure 3.2   Sample Mounting Location in Control Panel Enclosure

Callout	Description
1	Sample mounting location and ITS-DX4020-G mounted at that location with supplied mounting screws
2	Magnetic antenna (mount on top of the enclosure or other metallic surface); route the antenna cable through the enclosure knockout
3	ANTENNA connector on ITS-DX4020-G

3.4   Connect the ITS-DX4020-G to the Control Panel

Depending on the selected mode of operation, refer to *Figure 3.3* below, or *Figure 3.4*, *Page 15* for wiring connections.

> **i**
>
> **NOTICE!**
> The bus terminals are shown in only one order. Terminal order is specific to control panel type. Refer to the control panel documentation for more information.

For more information on the modes of operation, refer to *Section 2.3 Modes of Operation, page 9*.
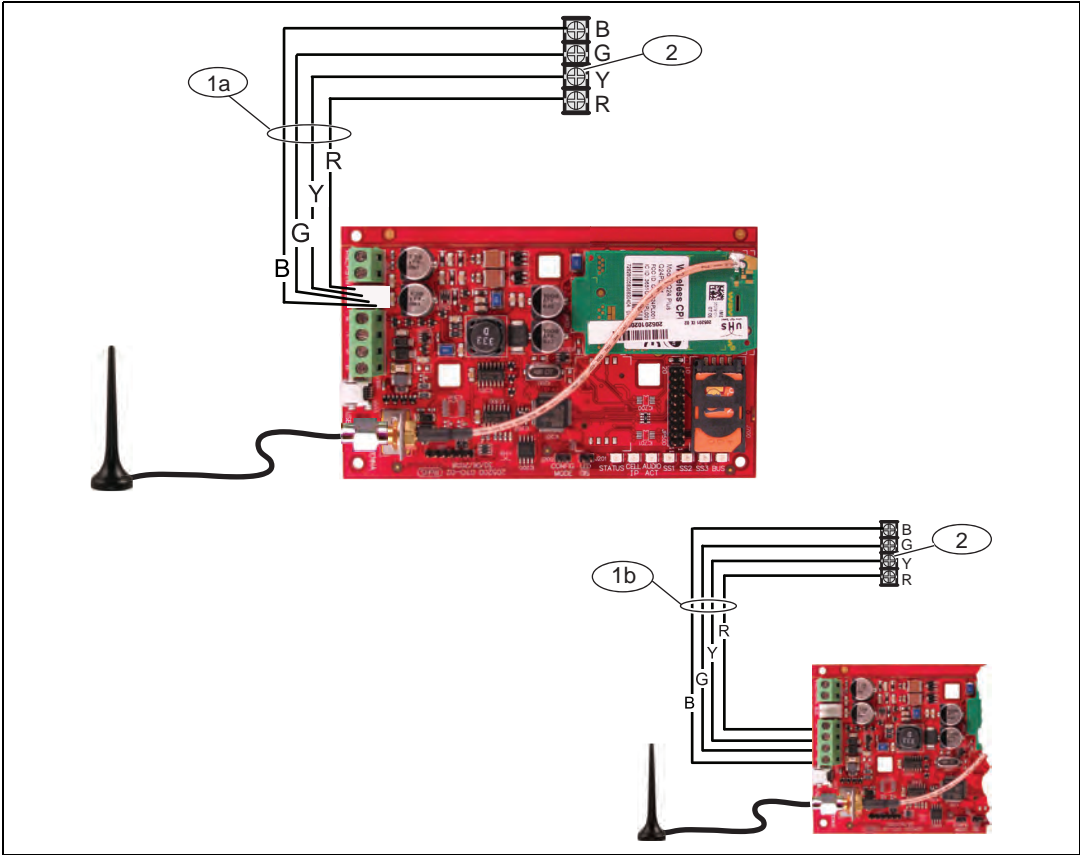
Figure 3.3   Connections for IP over GPRS Mode

Callout	Description
1a	Bus connection from ITS-DX4020-G to the control panel using the supplied Molex cable
1b	Bus connection from the ITS-DX4020-G to the control panel using the bus power terminals
2	Bus power terminals on the control panel
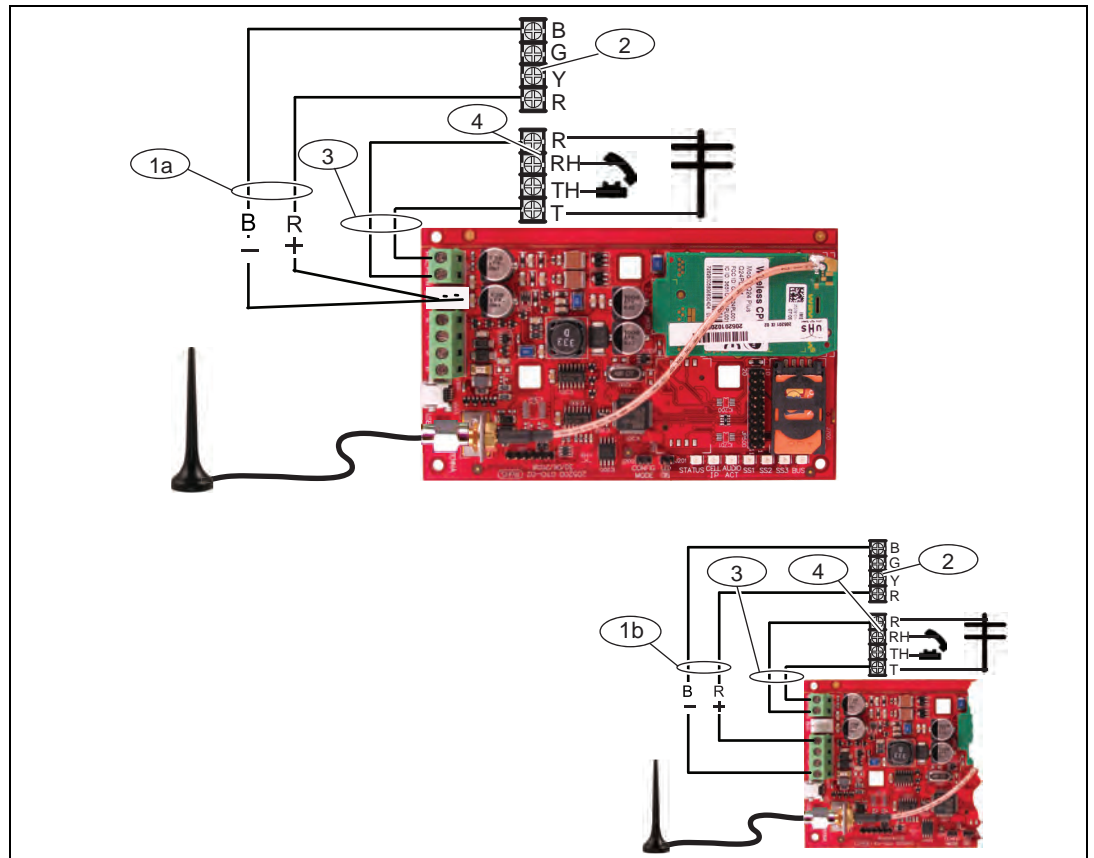
Figure 3.4   Connections for PSTN (Contact ID) over GSM Mode

Callout	Description
1a	Power connection from ITS-DX4020-G to the control panel (12 VDC only) using the supplied Molex cable
1b	Power connection from ITS-DX4020-G to the control panel (12 VDC only) using the bus terminals
2	Bus terminals on the control panel
3	PNL/PSTN connection from ITS-DX4020-G to the control panel
4	Phone terminals on the control panel (connect to the Ring [R] and Tip [T] terminals)
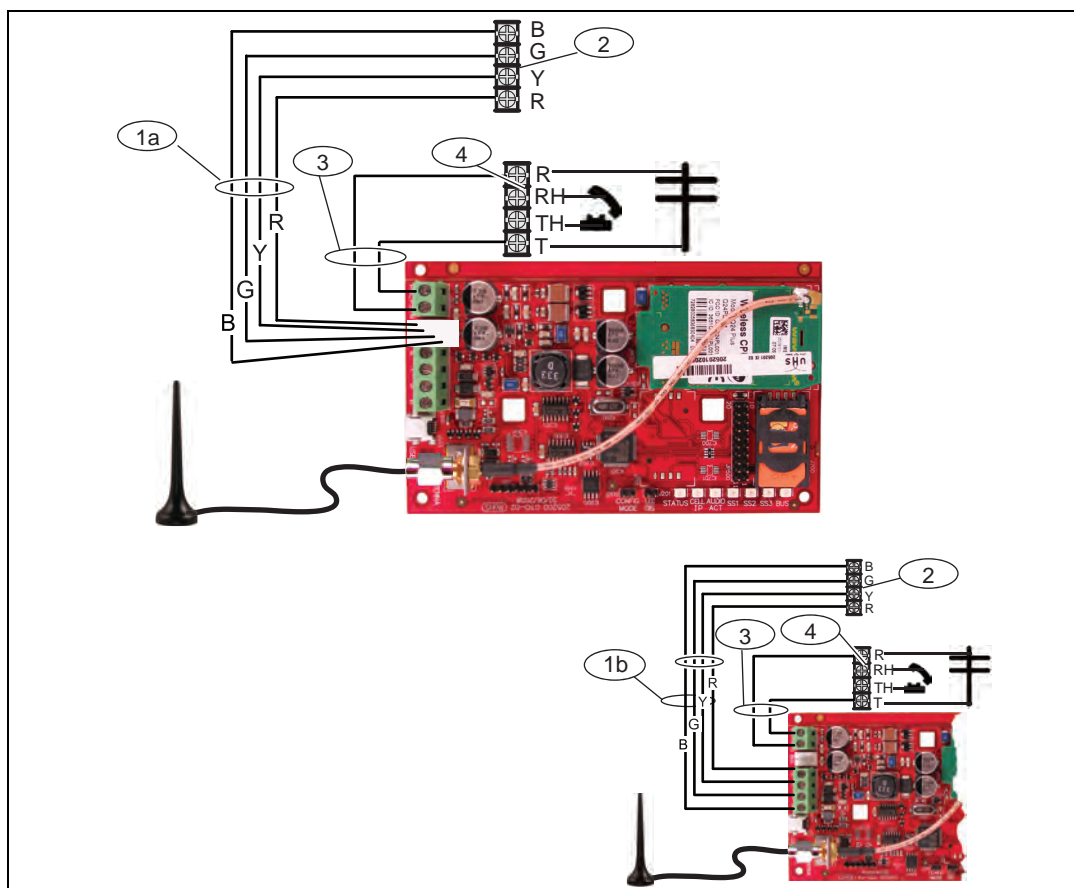
Figure 3.5 Connections for Dual Wireless Mode

Callout	Description
1a	Bus connection from ITS-DX4020-G to the control panel using the supplied Molex connector
1b	Bus connection from ITS-DX4020-G to the control panel using the supplied Molex connector using the bus power terminals
2	Power terminals on the control panel
3	PNL/PSTN connection from ITS-DX4020-G to control panel
4	Phone terminals on the control panel (connect to the Ring [R] and Tip [T] terminals)

3.5   Check Signal Strength

Apply power to the ITS-DX4020-G and wait 30 sec. Depending on the SIM card used, first-time registration might take up to 3 minutes to complete. If any LEDs have a double flash, refer to *Table 7.2, Page 44* and proceed when the double-flash problem is resolved.

Check the signal strength LEDs (SS1, SS2, and SS3):

–   If the signal strength is good or higher (refer to *Table 3.1, Page 17*), proceed to *Section 4 Configuration, page 18*.

–   If the signal strength is unacceptable or lower (refer to *Table 3.1, Page 17*), check the installation site for possible causes of signal interference.

Refer to *Table 3.1* for signal strength levels.

		LED		
Signal Strength		**SS1**	**SS2**	**SS3**
Unacceptable: no reading available (modem is resetting or registering)	✗	Off	Off	Off
Attempting to register on the GSM network.	✗	Flash	Off	Off
Unacceptable: < -89 dBm	✗	On	Off	Off
Marginal: -89 dBm to -83 dBm	✗	On	Flash	Off
Good: -83 dBm to -77 dBm	✔	On	On	Off
Very good: -77 dBm to -69 dBm	✔ ✔	On	On	Flash
Excellent: > -69 dBm	✔ ✔ ✔	On	On	On

Table 3.1   Signal Strength Levels

4   Configuration

The ITS-DX4020-G supports configuration by either SMS or USB connection. You can configure up to two different modes, depending on the control panel. For a list of modes allowed by the different control panels, refer to *Table 4.1, Page 22*.

Control Panel	GPRS (IP)	PSTN (Contact ID) over GSM ╪	DUAL
Easy Series	✔	✔	✔
DS7240V2 Series	✔	✔	
DS7400xiV4	✔	✔	
FPD-7024	✔	✔	
GV2 Series	✔		
GV3 Series	✔	✔	

Table 4.1   Modes Allowed by Control Panel

> **NOTICE!**
> When using the PSTN (Contact ID) over GSM mode on a GV3 Series control panel, ensure that the "C" character is dialed before the central station's phone number. The "C" character disables dial tone detection after the first DTMF digit is dialed.

> **NOTICE!**
> Bosch recommends that when using GSM mode, always enter a 10-digit phone number in the control panel. This is because the SIM card might have originated in a different area code from the installation location.

> **NOTICE!**
> When using the PSTN (Contact ID) over GSM mode, the control panel must be set up for DTMF (tone) dialing only.

4.1   Use Short Message Service (SMS) to Configure the ITS-DX4020-G

The ITS-DX4020-G supports configuration by SMS. You can send the SMS via mobile phone to the ITS-DX4020-G. The SMS string follows a specific format. If the configuration message exceeds 160 characters, you must send multiple messages. Refer to *Section 4.1.2 Compose the Configuration SMS, page 19* for details.

When the ITS-DX4020-G receives the final valid part of an SMS message, it accepts the configuration. The ITS-DX4020-G waits as long as the CONFIG MODE jumpers are shorted together with the supplied jumper plug.

> **NOTICE!**
> To allow the receipt of SMS data, the CONFIG MODE jumper pins must be shorted together with the supplied jumper plug. Refer to *Table 4.6*, *Page 21*, for LED activity.
> If the CONFIG MODE jumper pins are not shorted together, incoming SMS data is discarded.

4.1.1   Enter CONFIG MODE

Ensure that the CONFIG MODE jumper pins are shorted together with the supplied jumper plug. The STATUS, CELL IP, and AUDIO ACT LEDs start a scrolling pattern.

4.1.2 Compose the Configuration SMS

Use the appropriate SMS template for the selected mode of operation, and compose the configuration SMS message on your mobile phone. SMS can contain only 160 characters. Refer to *Section Multiple SMS Messages (for Messages Longer than 160 Characters), page 20* for instructions for sending a multiple SMS configuration.

The templates below contain only the essential configuration IDs. For additional configuration IDs, refer to *Table 4.9, Page 30*.

NOTICE!

Separate each ID or value pair with a line feed (<LF>), a carriage return (<CR> or

< ↵ ENTER>), or a semi-colon <;>. Because of phone and carrier differences, Bosch recommends using semi-colons to create and send SMS messages (for example, **%1;1=4020G;10=Airnet1;14=88;17=2;!**). To allow spanning of configuration across multiple messages, each SMS starts with the sequence number followed by the command line separator.

Any of these characters is acceptable to separate command lines. Refer to your cellular phone's documentation for available characters.

Refer to *Table 4.1, Page 18* for information about the modes allowed for your control panel.

IP over GPRS Mode

ID	Description	Sample SMS
%1	SMS sequence number 1[1]	%1 1=4020G 10=basic.m2m 14=88 17=2 !
1=	Current password (4 to 15 characters); **default = 4020G**	
10=	GPRS access point name (APN); 1 to 63 characters	
14=	– 13 or 14 (DS7400XiV4) – 88 (GV2 Series, GV3 Series) – 92 (GV3 Series) – **134** (DS7200V2 Series, Easy Series) – 250 (FPD-7024)	
17=	Communication path: – 1 = Both **(default)** – 2 = IP over GPRS – 3 = PSTN (Contact ID) over GSM	
!	End of configuration	
[1] The % symbol starts the SMS configuration message content. Any data before the % symbol is discarded. The % symbol is followed directly by the sequence number of the message (1 to 3).		

Table 4.2 IP over GPRS Mode and Dual Wireless Mode SMS Configuration

PSTN (Contact ID) over GSM Mode

ID	Description	Sample SMS
%1	SMS sequence number 1	%1 1=4020G 14=0 17=3 !
1=	Current password (4 to 15 characters); **default = 4020G**	
14=	Control panel bus address 0 to set it to PTSN (Contact ID) over GSM mode	
17=	Communication path: – 1 = Both **(default)** – 2 = IP over GPRS – 3 = PSTN (Contact ID) over GSM[1]	
!	End of configuration	
[1]Select **3 (PSTN (Contact ID) over GSM)** for PSTN over GSM Mode		

Table 4.3 PSTN (Contact ID) over GSM Mode SMS Configuration

Multiple SMS Messages (for Messages Longer than 160 Characters)

ID	Description	Sample SMS
%1<LF>	SMS sequence number 1	%1 1=4020G 2=secret123 3=123456,4343 10=basic.m2m 11=user@telco.com 12=password 15=1 16=01020304050607080910111213141516
1=4020G<LF>	Current password	
2=secret123<LF>	New password (case sensitive)	
3=123456,4343<LF>	PUK and new PIN to set in SIM	
10=basic.m2m<LF>	(Access Point Name) APN	
11=user@telco.com<LF>	GPRS username	
12=password<LF>	GPRS password	
15=1<LF>	Enable AES encryption	
16=01020304050607080910 111213141516<LF>	Sample AES key	

Table 4.4 Double SMS Example, Part 1

ID	Description	Sample SMS
%2<LF>	SMS sequence number	%2 14=134 !
14=134<LF>	Option bus address	
!	End of configuration	

Table 4.5 Double SMS Example, Part 2

4.1.3 Send the Configuration SMS

1. Send the configuration SMS to the SIM card phone number. The transmission might take several minutes. Because the CONFIG jumper is on, the ITS-DX4020-G waits for an SMS until a message is received.
2. Observe the LEDs on the ITS-DX4020-G.
   When all of the LEDs start a scrolling pattern, the ITS-DX4020-G is successfully configured. Refer to *Table 4.6* for more information.

		LED State						
	Condition	**STATUS**	**CELL IP**	**AUDIO**	**SS1**	**SS2**	**SS3**	**BUS**
1	No control panel authorization received.	→	→	→	GSM Signal Strength			Off
2	Installer is authorized for Configuration mode, or authorization is not required.	→	→	→	GSM Signal Strength			On
3	Received invalid SMS.	→	→	→	Flash	Flash	Flash	Flash
4	Received valid SMS authorizing configuration.	→	→	→	→	→	→	→
Key: → = Scrolling LEDs, from left to right.								

Table 4.6   Configuration Mode (J200 Jumper Installed) LED States

NOTICE!

If the LEDs indicate an invalid SMS, remove the configuration jumper and then repeat the steps in *Section 4.1.1 Enter CONFIG MODE, page 18*.

If the LEDs continue to indicate an invalid SMS, the configuration SMS might be incorrect. Ensure that your configuration SMS contains the correct information, or use the USB connection to configure the ITS-DX4020-G.

4.1.4 Exit from CONFIG MODE

1. Remove the jumper plug from the CONFIG MODE jumper pins.
   The ITS-DX4020-G restarts.

2. Check the status of the CELL IP LED to see if the ITS-DX4020-G can communicate with the central station receiver.
   Refer to *Table 4.7* for more information.

CELL IP LED State	Status
Off	The ITS-DX4020-G is not connected to the GPRS network.
Flash	The ITS-DX4020-G is connected to the GPRS network, but it is not connected to the central station receiver.
On	The ITS-DX4020-G is connected to the central station receiver through the GPRS network.

Table 4.7   CELL IP LED Status

4.2 Use USB to Configure the ITS-DX4020-G

You can use a USB connection from a laptop or desktop PC to the ITS-DX4020-G to configure the ITS-DX4020-G on-site.

Before you can access the USB user interface, you must install the **ITS-DX4020-G.inf** file on the target PC or laptop. The **ITS-DX4020-G.inf** file is available on the supplied CD-ROM. You need to install this file only once on the target PC or laptop.

If the ITS-DX4040-G CD-ROM is not available:

1. From your Internet browser, go to **http://www.boschsecurity.com** to open the Bosch Web site.

2. Select the web site for your region and country.

3. In the **Online Catalogs** section on the left, click the **Intrusion Alarm Systems** link.

4.   Under the **Intrusion Alarm Systems Products** heading, scroll to the **Conettix - Information Transport Solutions** section. Click the **Show product section** link.

5.   Click the **Conettix IP** link.

6.   Scroll to the **ITS-DX4020-G GPRS/GSM IP Communicator** section. Click the section title to open the product page.

7.   Under the product image, click the **Software** tab.

8.   Click **OK** to accept the license agreement.

9.   To the right of **ITS-DX4020-G inf**, click on the language link (for example, **en**).
      The **File Download** dialog box opens.

10.   Click **Save** to save the file to the target PC or laptop.

4.2.1   Install the USB Driver

NOTICE!

If the target PC or laptop has only one USB port, you need to install the USB driver only once. If the target PC or laptop has multiple USB ports, you must install the USB driver each time the ITS-DX4020-G is connected to a new USB port.

1.   Ensure that the CONFIG MODE jumper pins are shorted together with the supplied jumper plug.
      Refer to *Figure 2.2*, *Page 8*.

2.   Supply power to the ITS-DX4020-G (12 VDC).

3.   Connect the ITS-DX4020-G to the target PC or laptop, using a USB-to-mini-USB (5-pin mini-B connector) cable (not supplied).
      The **Found New Hardware Wizard** opens.

Figure 4.1   Found New Hardware Wizard Main Page

4.   Select **Install from a list or specific location (Advanced)**, and click **Next**.

5.   On the resulting **Please choose your search and installation options** page, select the **Search for the best driver in these locations** option button.

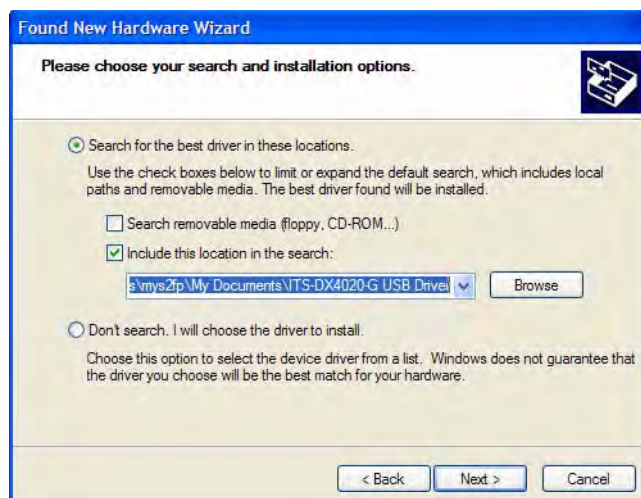**Figure 4.2** Please Choose Your Search and Installation Options Page

6. Select the **Include this location in the search** checkbox, and then click **Browse**. The **Browse for Folder** dialog box opens.
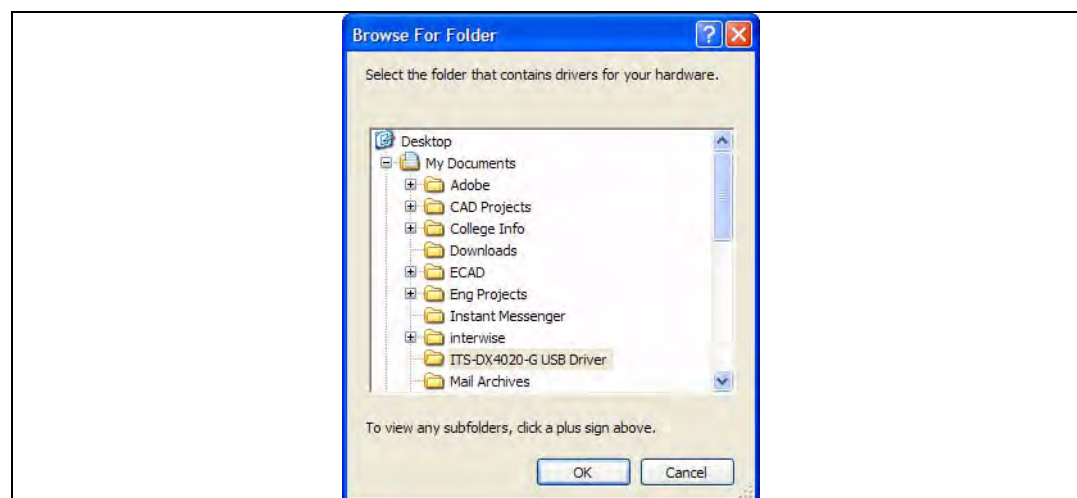

Figure 4.3 Browse for Folder Dialog Box

7. Navigate to and highlight the downloaded **ITS-DX4020-G.inf** file. Click **OK** and then click **Next**.
   The **Found New Hardware Wizard Finish** page appears.

Figure 4.4   Found New Hardware Wizard Finish Page

8.   Click **Finish** to complete the installation of the ITS-DX4020-G USB driver.

4.2.2   Install a Communication Program

To use a USB connection from a laptop or desktop PC to the ITS-DX4020-G to configure the
ITS-DX4020-G, you must use a Microsoft communication program.

–   **Windows XP and Earlier:** The Microsoft Windows XP and 2000 installation automatically
     installs HyperTerminal, a Microsoft communication program, when Windows installs. If
     HyperTerminal is not installed, install it from the Windows XP or Windows 2000
     installation disc, or install Tera Term from the ITS-DX4020-.
–   **Windows Vista and Windows 7:** Windows Vista and Windows 7 installations do not
     install a communication program when the operating system installs. Install Tera Term
     from the ITS-DX4020-G CD.

When you perform the installation, follow the prompts in the installation wizard, but on the
Select Components page of the wizard, select **Compact installation** from the drop-down list.
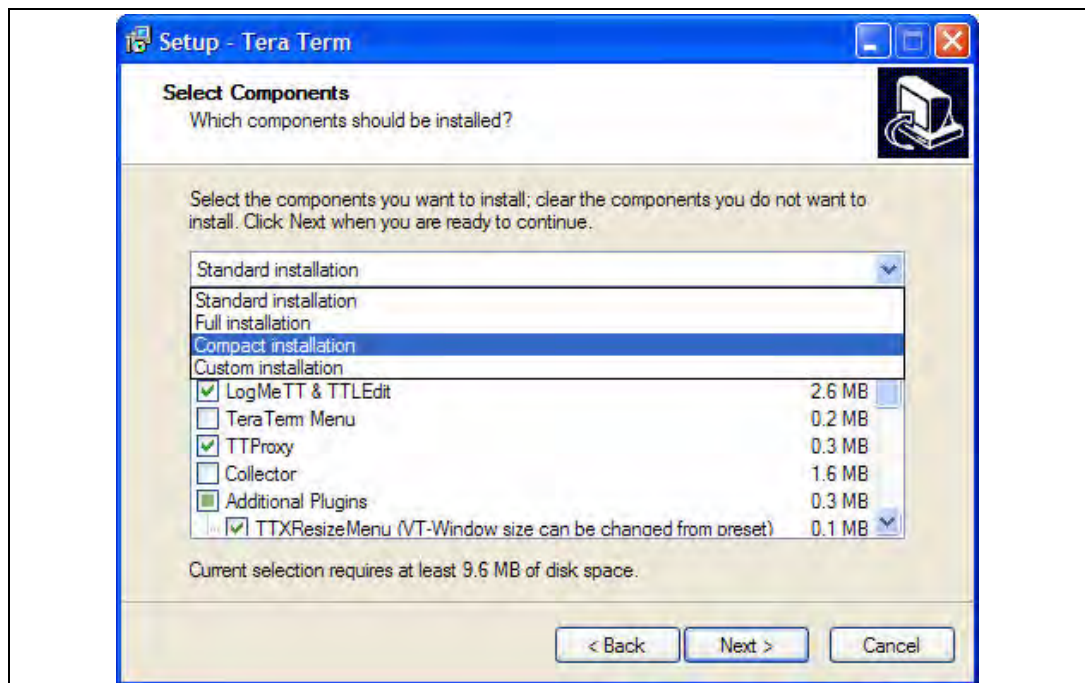Refer to *Figure 4.5*, *Page 24*.

Figure 4.5   Setup - Tera Term Wizard's Select Components Page

4.2.3 Log Into the USB Interface

NOTICE!
To allow for USB configuration, the CONFIG MODE jumper pins must be shorted together with the supplied jumper plug. Refer to *Table 4.6*, *Page 21*, for LED activity.
If the CONFIG MODE jumper pins are not shorted together, you can only view configuration data.

1. Ensure that the USB-to-mini-USB cable is connected to the ITS-DX4020-G and the target PC or laptop.
2. Short the CONFIG MODE jumper pins with the supplied jumper plug.
3. From Windows, start a terminal session by doing one of the following:
   – If you are using Windows XP or earlier, launch Hyper Terminal by selecting **Start**>**(All) Programs>Accessories>Communications>Hyper Terminal**.
   – In you are using Windows Vista or Windows 7, launch Tera Term by selecting **Start>(All) Programs>Tera Term>Tera Term**.
4. Set up a connection on the new virtual serial COM port (for example, Port: COM4: ITS-DX4020-G [COM4]) using the following settings:
   – **Baud rate:** 9600
   – **Data bits:** 8
   – **Parity:** None
   – **Stop bits:** 1
   – **Flow control:** None

   To determine which COM port is used by the ITS-DX4020-G:

   a. From your desktop, click **Start.**
   b. Right-click **My Computer**, and select **Properties**.
   c. Select the **Hardware** tab, and click the **Device Manager** button.
   d. In the **Device Manager** list, scroll to **Ports (COM & LPT)**.
   e. Open the **Ports (COM & LPT)** node.

      If the ITS-DX4020-G is connected to the computer, it appears in this list with its COM port assignment next to it.

      If the ITS-DX4020-G is **not** connected to the computer, or the USB driver is not installed, the ITS-DX4020-G **does not** appear in this list.
5. After the connection is established, press [Enter].
   The ITS-DX4020-G USB login window opens.
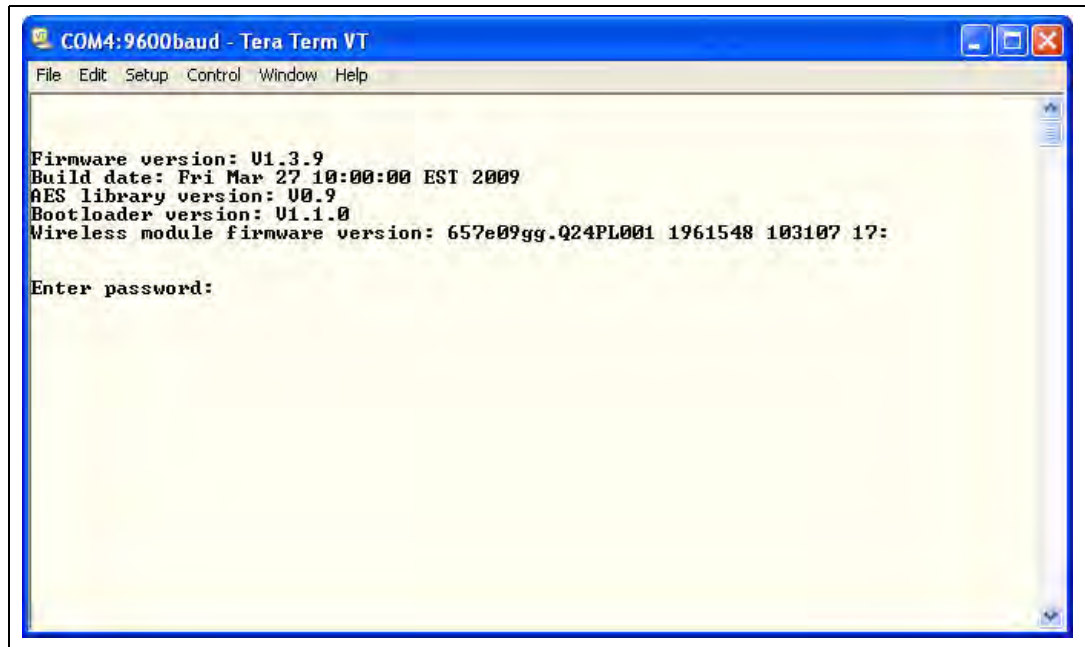
Figure 4.6 ITS-DX4020-G USB Login Window

NOTICE!

The ITS-DX4020-G USB login window shows the firmware version. The procedures in this installation and operation guide require software version 1.3.15 or later. Refer to *Section 6 Firmware Upgrade, page 36* for firmware upgrade instructions.

6. Enter the password to log on. The default password is **4020G** (all uppercase).
   The user interface allows three attempts to enter the password correctly. After three failed attempts, you must reset the ITS-DX4020-G by removing the jumper plug from the CONFIG MODE jumpers, and then repeat *Steps 3* through *6*.
7. Press [Enter] to continue. The USB main menu opens. Refer to *Figure 4.7*, *Page 27*.

4.2.4   USB Main Menu
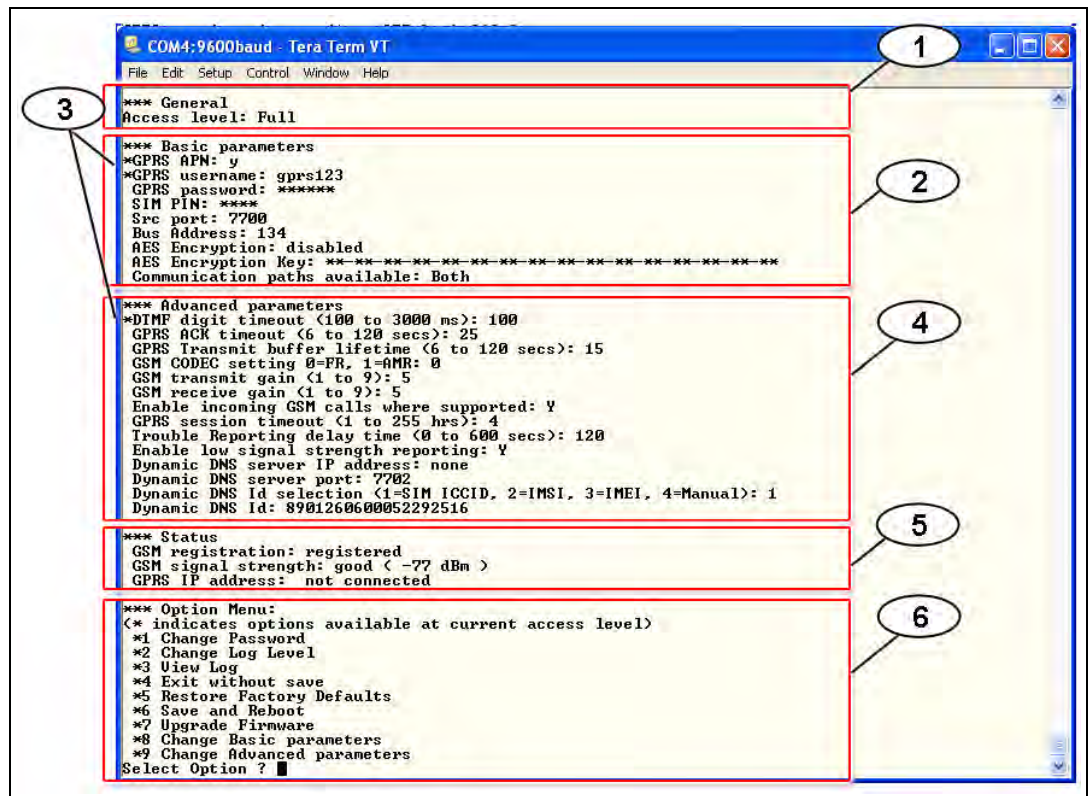
Figure 4.7   USB Main Menu

Callout	Description
1	Current access level
2	Current settings for basic parameters
3	Asterisk (*) preceding the Basic or Advanced configuration items indicates a change made to a configuration item during current session.
4	Current settings for advanced parameters
5	Current device status
6	USB option menu. Refer to *Section 4.2.5 USB Option Menu, page 27*.

The USB main menu appears:

–   after a user enters a password successfully

–   every time the user presses [Enter] without first selecting an option from the main screen, or

–   upon returning from a sub-menu.

The main menu shows all current configuration settings first. An asterisk in front of a Basic or Advanced configuration item indicates a setting change during the current session.

The content of the main menu scrolls continuously. When a user performs a new action, any resulting response from the user interface appears at the end of the menu.

4.2.5   USB Option Menu

For a description of the USB option menu items, refer to *Table 4.8*, *Page 28*.

To see the USB option menu, refer to *Figure 4.7*, *Page 27*.

At a configuration screen, items are presented one at a time with the current value inside [ ] brackets. If you press [Enter] without entering a new value, the current value is unchanged.

To go to a specific menu option, enter the appropriate menu item number and press [Enter].

Option	Press to Select	Description
1 Change password	1	To change the login password, enter the old password first, and then enter the new password twice. The second entry confirms the new password. Passwords must be 4-15 characters long, and are case-sensitive. 0-9, A-Z, a-z, and special characters are allowed.
2 Change log level	2	Change the debugging level shown on the View Log screen.
3 View log	3	View the debugging log for diagnostic purposes. Press any key to exit.
4 Exit without Save	4	Return to the USB interface login screen. Press [Y] (for Yes) to exit without saving. All configuration changes that were made are lost and are replaced with the previous values.
5 Restore Factory defaults	5	Select to restore all factory default values. When prompted, remove the plug from the CONFIG jumper pins to restart the ITS-DX4020-G. **Warning:** All fields are cleared and the factory default values are restored.
6 Save and Reboot	6	Select to save all changed values (changed values are preceded by an asterisk [*]). Press [Y] (for Yes). When prompted, remove the plug from the CONFIG jumper pins to restart the ITS-DX4020-G.
7 Upgrade Firmware	7	Select this option to upgrade the firmware in the ITS-DX4020-G. Refer to *Section 6 Firmware Upgrade, page 36*.
8 Change Basic parameters	8	To change a basic parameter: 1. Press the [Enter] key repeatedly until the cursor is on the desired parameter. 2. Enter the desired value. If you do not enter a new value at the prompt, the previous value is retained. After all Basic parameters are reviewed, the USB main menu reappears, indicating changed values with asterisks (*). Refer to *Table 4.9*, *Page 30* for basic parameters.
9 Change Advanced parameters	9	To change an advanced parameter: 1. Press the [Enter] key repeatedly until the cursor is on the desired parameter. 2. Enter the desired value. If you do not enter a new value at the prompt, the previous value is retained. After all Advanced parameters are reviewed, the USB main menu re-appears, indicating changed values with an asterisk (*). Refer to *Table 4.9*, *Page 30* for advanced parameters.

Table 4.8   USB Option Menu Items

> **NOTICE!**
> *Table 4.9* shows all parameters available through SMS or USB configuration.
> Shaded rows are required parameters. Values in **bold** are default settings.

ID	Parameter	Values	Description
1	Current Password	4 to 15 characters **(4020G)**	Mandatory and case sensitive. **NOTICE!** Remember all passwords. Forgotten passwords cannot be recovered, and the unit must be returned.
2	New Password	4 to 15 characters	New password, as desired. Case sensitive.
3	SIM PUK,PIN	Maximum 10 numeric digits each	Sets a new PIN into the SIM and the ITS-DX4020-G.
4	SIM PIN	4 numeric digits	Sets the PIN in the ITS-DX4020-G to match your SIM card PIN.
10	GPRS APN	1 to 63 characters **(Airnet1)**	Access point name.
11	GPRS username	1 to 63 characters	User name for wireless service provider (not always required).
12	GPRS password	1 to 63 characters	Password for wireless service provider (not always required).
13	Src port	1 to 65535 characters **(7700)**	Sets the source port for the ITS-DX4020-G.
14	Bus Address	– 0 (PSTN [Contact ID]) – 13 or 14 (DS7400XiV4) – 88 (GV2 Series, GV3 Series) – 92 (GV3 Series) – **134** (DS7200V2 Series, Easy Series) – 250 (FPD-7024)	Sets the control panel bus address for communication with the control panel.
15	AES Encryption	**0 = Disabled** 1 = Enabled	Security encryption on or off. The setting must match the encryption settings in the receiver.
16	AES Encryption Key	32 characters max. 0-9, A-F, a-f allowed	The AES Encryption Key must match the encryption key in the receiver.
17	Communication paths available	– **1 = Both** – 2 = IP over GPRS – 3 = PSTN (Contact ID) over GSM	Select which communication path the ITS-DX4020-G will use.
18	Destination Port	1 to 65535 characters (7700)	Sets the port of the receiver for panels that do not support a destination port (DS7400XiV4). This setting appears in the USB interface menu only when address 13 or 14 is selected.
50	DTMF digit timeout	100 to 3000 ms **(500 ms)**	Acceptable time between dialed DTMF digits from the control panel.
51	GPRS ACK timeout	6 to 600 sec **(70 sec)**	The GPRS session restarts if no response occurs by the time the entered time expires.
52	GPRS Transmit buffer lifetime	6 to 120 sec **(15 sec)**	Length of time the control panel messages remain in the in the ITS-DX4020-G buffer before they are discarded.
53	GSM CODEC setting	– **0 = Full Rate (FR)** – 1 = Adaptive Multi-rate (AMR)	Set to Full Rate when GSM is used.
54	GSM transmit gain	0 to 10 **(5)**	Gain on transmitted GSM signals.
55	GSM receive gain	0 to 10 **(5)**	Gain on received GSM signals.

ID	Parameter	Values	Description
56	Enable incoming GSM calls where supported	– 0 = Disabled – **1 = Enabled**	Enable or disable the ability to receive incoming GSM calls. This parameter is only available when using the Easy Series control panel. Refer to *Section 2.2 Device Overview, page 8*, for more information.
57	GPRS session timeout	1 to 255 hrs **(4 hrs)**	If no IP over GPRS communication occurs within the GPRS session timeout period, the ITS-DX4020-G sends a message to keep the current session alive, ensuring that the network path is active. To avoid connectivity delays, set the GPRS session timeout to fewer hours than your carrier's session expiration period to avoid connectivity delays.
58	Trouble reporting delay time	0 to 65535 sec **(120 sec)**	When low signal strength, SIM card missing, or unable to register on the network is detected for longer than the time entered in this parameter, the ITS-DX4020-G stops responding on the bus to indicate a Trouble condition to the control panel. No information is sent to the control panel. The next attempt by the control panel to poll, or send a message to the ITS-DX4020-G, fails. The control panel then creates a trouble condition. When signal strength is detected, it must remain restored for the amount of time entered in this parameter before the ITS-DX4020-G sends signals again.
59	Enable low signal strength reporting	– 0 = Disabled – **1 = Enabled**	When enabled, the ITS-DX4020-G sends a trouble signal to the control panel if the signal strength falls to an unacceptable level. Restoring signal strength to an acceptable level resets this condition. For proper operation, the signal strength must be at a minimally an acceptable level. Refer to *Table 4.9, Page 30* for UL 864 requirements.
61	Dynamic DNS Server IP Address	7 to 15 characters **("none")**	Enter an IP address using the standard IP address format (for example, 10.10.10.1). Select "none" to disable the dynamic DNS server update.
62	Dynamic DNS Server Port	1 to 65535 **(7702)**	Enter a DNS server port number, if applicable.
63	Dynamic DNS ID Selection	– **1 = SIM ICCID** – 2 = ID is SIM IMSI – 3 = ID is modem IMEI – 4 = ID is manually entered	Select a DNS ID method.
64	Dynamic DNS ID	2 to 20 characters	Must conform to RFC952 and RFC1123 name format. NOTICE! This field is required only if parameter 63 is set to 4.

Table 4.9 SMS and USB Configuration Parameters

4.3   Polling Configurations

Plan carefully when selecting the control panel poll time, ACK wait times, control panel retries, ITS-DX4020-G GPRS ACK timeouts, and D6x00 Receiver poll and ACK wait times. Having the wrong or improper settings could cause trouble conditions when the network carrier performs maintenance, and increased data volumes that could effect your monthly cost. Your settings for these parameters determine how the system works, but depend on the security level needed.

4.3.1   High Security Application (bank, jewelry store, UL fire, and so on)

Polling times are typically less than 20 min. Path integrity is critical, and short interruptions in network service are indicated at the premise and central station. The following High Security Application recommendation assumes the ITS-DX4020-G is the primary communication device with no backup.

Control Panel Settings
– **Poll Rate:** 60 sec
– **ACK Wait:** 13 sec
– **Retry Count:** 5

ITS-DX4020-G Settings
– **GPRS ACK Timeout:** ACK wait (13) x Retry Count (5) + ACK Wait (13) = 78 sec
– **GPRS Session Timeout:** Must be greater than control panel poll time (60 sec) + GPRS ACK timeout (78 sec). The minimum GPRS session timeout setting is 1 hour; the default 4 hour setting is acceptable.

D6x00 Receiver Settings
– **Control Panel Poll Rate:** 60 sec
– **ACK Wait:** 78 sec

4.3.2 Medium Security Application

Polling times are typically 1 to 4 hours. Path integrity is important, and short interruptions in network service might be indicated at the premise and central station. The following Medium Security Application recommendation assumes the ITS-DX4020-G is the primary communication device with no backup.

Control Panel Settings
– **Poll Rate:** 3 hours
– **ACK Wait:** 300 sec (5 min)
– **Retry Count:** 5

ITS-DX4020-G Settings
– **GPRS ACK Timeout:** ACK wait (300 sec) x 2 = 600 sec
 By setting the GPRS ACK timeout less than the retry count, the ITS-DX4020-G can reconnect to the network if the carrier dropped the connection or for short maintenance interruption outages.
– **GPRS Session Timeout:** Must be greater than control panel poll time (3 hours) + ACK wait (5 min) x Retry Count (5) + ACK Wait (5 min) = 3 hours and 30 min. The GPRS session timeout default setting of 4 hours is acceptable.

> **NOTICE!**
> If you use a control panel poll rate of 4 hours, change the default GPRS session timeout to 5 hours. Ensure that your SIM service provider's session timeout is greater than 5 hours. Check the information that came with the SIM card. If the carrier's session timeout is less than your GPRS session timeout, the communication path is dropped by the carrier and the event message is not received until a new connection is made, delaying your event messages from being delivered when expected. To ensure the communication path is not dropped, set the poll rate to less than the carrier timeout (for example, 2 hours).

D6x00 Receiver Settings
– **Control Panel Poll Rate:** 4 hours
– **ACK Wait:** 15 sec

> **NOTICE!**
> To set the control panel poll rate by the hour, ensure that the D6x00 Receiver has D6200CD V1.35 firmware or later.
> Because the Bosch D6x00 Receivers only have hours and seconds settings, the receiver would have to be set to 4 hours instead of 3 hours and 30 min. The receiver can only support up to 255 sec maximum for the ACK wait time.

4.3.3   Backup or Low Security Application (residential or other once-a-day reporting location)

Polling times are typically 12 to 24 hours. Path integrity is only tested once or twice a day, and short interruptions in network service are generally not indicated at the premise and central station. Using settings similar to the following allows the system to recover from short outages without causing trouble conditions at the premise. The following Backup or Low Security Application recommendation assumes the ITS-DX4020-G is the primary communication device with a different technology backup (PSTN or Wired IP).

Control Panel Settings
– **Poll Rate:** 24 hours
– **ACK Wait:** 300 sec (5 min)
– **Retry Count:** 10

ITS-DX4020-G Settings
– **GPRS ACK Timeout:** ACK wait (300 sec) x 2 = 600 sec
  By setting the GPRS ACK timeout less than the retry count, the ITS-DX4020-G has time to reconnect to the network if the carrier dropped the connection or for short maintenance interruption outages.
– **GPRS Session Timeout:** Must be greater than control panel poll time (24 hours) + ACK wait (5 min) x Retry Count (5) + ACK Wait (5 min) = 24 hours 55 min. This property's default 4 hour setting must change. Check with the SIM service provider to determine the maximum time allowed for a session. Your GPRS session timeout must be less than this value.

NOTICE!
Several SIM service providers only support up to 24 hour session timeout. Check the information that came with the SIM card. If the carrier's session timeout is less than your GPRS session timeout, the communication path is dropped by the carrier and the event message is not received until a new connection is made, delaying your event messages from being delivered when expected. To ensure the communication path is not dropped, set the poll rate to less than the carrier timeout (for example, 18 hours).

D6x00 Receiver Settings
– **Control Panel Poll Rate:** 25 hours
– **ACK Wait:** 15 sec

NOTICE!
The D6x00 Receiver must use D6200CD V1.35 or later to support hour selections.

NOTICE!
Signal outages can be caused by routine upgrades and maintenance of the mobile towers. On average, these outages can last from 1 to 15 minutes. One option to minimize the number of signal failures caused by these outages, reduce the poll rate setting in the control panel to half of the poll rate setting in the central station receiver.

4.4 SIM Card Data Usage

NOTICE!

The security level you need determines which SIM card data plan you should use. If you obtain a data plan for once-a-day test messages, but you set up polling for 60 sec, you will receive a larger-than-expected cellular bill. It is important that you chose a data plan that matches your application.

– **Poll Message or Event Message:** ~100 bytes
– **RPS Sessions:** This setting depends on the RPS tasks you perform (for example, full upload/download of programming data, history retrieval, diagnostics) and the number of times you access the control panel. On average, such usage could range from 10 kb to 100 kb.

Other factors such as the number of session timeouts received and so on will also increase the data usage.

Based on 60 sec polling and 5 events/day, you can expect to use ~5 MB of data per month not including RPS usage.

5   Testing

1. Configure the control panel for communication routes.
   Refer to your control panel's documentation for programming instructions.
2. Send a test alarm using the configured route(s), and verify receipt of the alarm at the central station.
3. If incoming GSM calling is enabled, initiate a phone call to the control panel.

5.1   GSM Trouble Indication

The ITS-DX4020-G module activates the phone voltage after GSM registration finishes. The module removes the phone voltage if it detects a communication problem when being used in PSTN (Contact ID) Over GSM Mode. If all trouble conditions restore, the phone voltage is automatically reapplied. This allows legacy control panels with phone line voltage monitors to support the module and display communication trouble signals. The removal and restoral of the phone voltage from a trouble condition is controlled by the trouble reporting delay time parameter.

The following conditions cause the phone voltage to be removed:

– SIM missing
– Low signal strength
– Not able to register on the GSM network

5.2   Firmware Version

Use the **LED DIS** function to determine the firmware version of the ITS-DX4020-G module without a USB connection. When you first install the LED Disable jumper, the LED flashes the firmware version as a series of three flashes (for example, 1 - 4 - 3 flashes signifies firmware version 1.4.3).

6   Firmware Upgrade

To upgrade the firmware in the ITS-DX4020-G, you must download the latest firmware file from the Bosch Web site to the target PC or laptop, and then use either Hyper Terminal or Tera Term to install the firmware file on the ITS-DX4020-G.

6.1   Download the Latest Firmware

1. From your Internet browser, go to **http://www.boschsecurity.com** to open the Bosch Web site.
2. Select the web site for your region and country.
3. In the **Online Catalogs** section on the left, click the **Intrusion Alarm Systems** link.
4. Under the **Intrusion Alarm Systems Products** heading, scroll to the **Conettix - Information Transport Solutions** section. Click the **Show product section** link.
5. CLick the **Conettix IP** link.
6. Scroll to the **ITS-DX4020-G GPRS/GSM IP Communicator** section. Click the section title to open the product page.
7. Under the product image, click the **Software** tab.
8. Click **OK** to accept the license agreement.
9. To the right of **ITS-DX4020-G bin**, click on the language link (for example, **en**). The **File Download** dialog box opens.
10. Click **Save** to save the file to the target PC or laptop.

6.2   Install the Firmware

6.2.1   Install the Firmware using Hyper Terminal

> (i) **NOTICE!**
> To install the firmware, the CONFIG MODE jumper pins must be shorted together with the supplied jumper plug. Refer to *Table 7.2*, *Page 44*, for LED activity.

Microsoft includes Hyper Terminal with the Windows XP operating system and earlier operating systems.
1. Ensure that the USB-to-mini-USB cable is connected to the ITS-DX4020-G and the target PC or laptop.
2. Short the CONFIG MODE jumper pins with the supplied jumper plug.
3. Start Hyper Terminal by selecting **Start>(All) Programs**>**Accessories**>**Communications**>**Hyper Terminal**.
4. Set up a connection on the new virtual serial COM port (for example, Port: COM4: ITS-DX4020-G (COM4) using the following settings:
    – **Baud rate:** 9600
    – **Data bits:** 8
    – **Parity:** None
    – **Stop bits:** 1
    – **Flow control:** None
    To determine which COM port is used by the ITS-DX4020-G:
    a. From your desktop, click **Start.**
    b. Right-click **My Computer**, and select **Properties**.
    c. Select the **Hardware** tab, and click the **Device Manager** button.
    d. In the **Device Manager** list, scroll to **Ports (COM & LPT)**.

    e.   Open the **Ports (COM & LPT)** node.

           If the ITS-DX4020-G is connected to the computer, it appears in this list with its COM port assignment next to it.

           If the ITS-DX4020-G is **not** connected to the computer, or the USB driver is not installed, the ITS-DX4020-G **does not** appear in this list.

5.   After the connection is established, press the [Enter] key.

      The ITS-DX4020-G USB login window opens. Refer to *Figure 6.1*, *Page 37*.
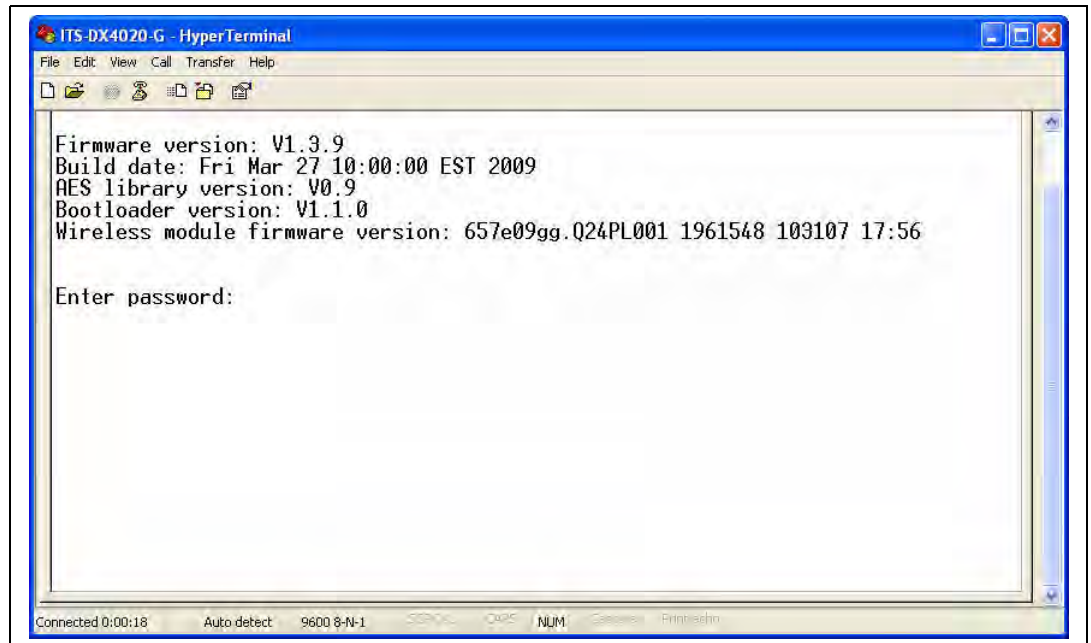

Figure 6.1   USB Login Window

6.   Enter the password to log on. The default password is **4020G** (all uppercase).

      The user interface allows three attempts to enter the password correctly. After three failed attempts, you must reset the ITS-DX4020-G by removing the jumper plug from the CONFIG MODE jumpers.

7.   Press [Enter] to continue. The USB main menu opens.

8.   Select option **7 Upgrade Firmware**.

9.   Press [Enter]. Hyper Terminal asks you to start the Xmodem transfer of the upgrade image file.

10.   From the menu bar, click **Transfer**>**Send File**.

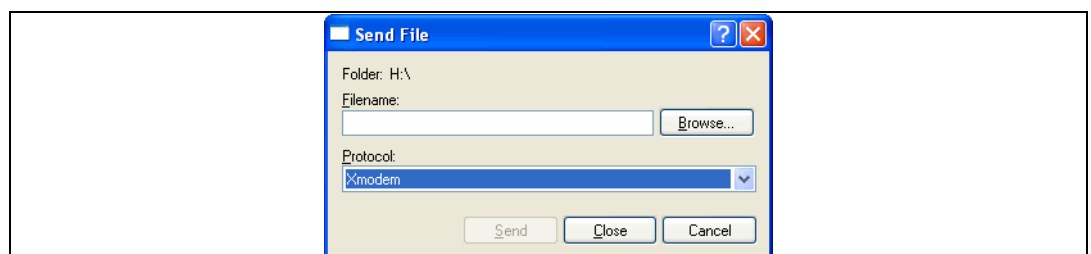   The **Send File** dialog box opens.

Figure 6.2   Hyper Terminal Send File Dialog Box

11.   Click **Browse**. Navigate to and highlight the downloaded ITS-DX4020-G binary file.

12.   In **Protocol**, select **Xmodem**.

13.   Click **Send** to start the firmware upgrade. The **Xmodem file send for ITS-DX4020-G** dialog box opens and indicates the upgrade progress. Refer to *Figure 6.3*, *Page 38*.
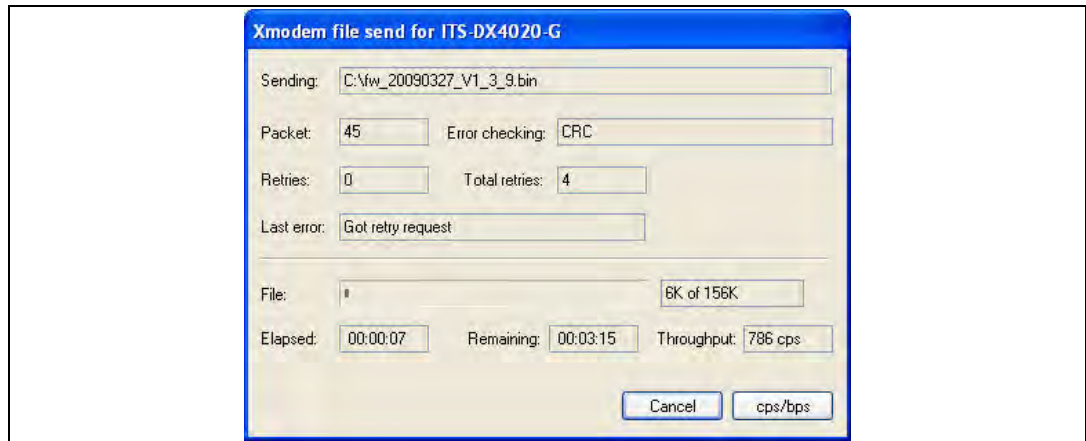
Figure 6.3 Xmodem File Send Progress Dialog Box

14. When the file transfer completes, HyperTerminal prompts you to continue. Press [Y] and then [Enter] to continue the upgrade.

15. When the firmware upgrade is complete, close Hyper Terminal, and remove the jumper plug from the CONFIG MODE jumpers on the ITS-DX4020-G. The ITS-DX4020-G restarts.

6.2.2 Install the Firmware using Tera Term

> **NOTICE!**
> The CONFIG MODE jumper pins must be shorted together with the supplied jumper plug to install firmware. Refer to *Table 7.2*, *Page 44* for LED activity.

If you are using Microsoft Windows Vista or 7, you must download and install a communication utility, such as Tera Term, on the target PC or laptop.

1. Ensure that the USB-to-mini-USB cable is connected to the ITS-DX4020-G and the target PC or laptop.

2. Short the CONFIG MODE jumper pins with the supplied jumper plug.

3. Start Tera Term by selecting **Start>(All) Programs>Tera Term>Tera Term**.

4. Set up a connection on the new virtual serial COM port (for example, Port: COM4: ITS-DX4020-G [COM4]) using the following settings:
   – **Baud rate:** 9600
   – **Data bits:** 8
   – **Parity:** None
   – **Stop bits:** 1
   – **Flow control:** None

5. After the connection is established, press the [Enter] key.
   The ITS-DX4020-G USB login window opens. *Figure 6.4*, *Page 39*.
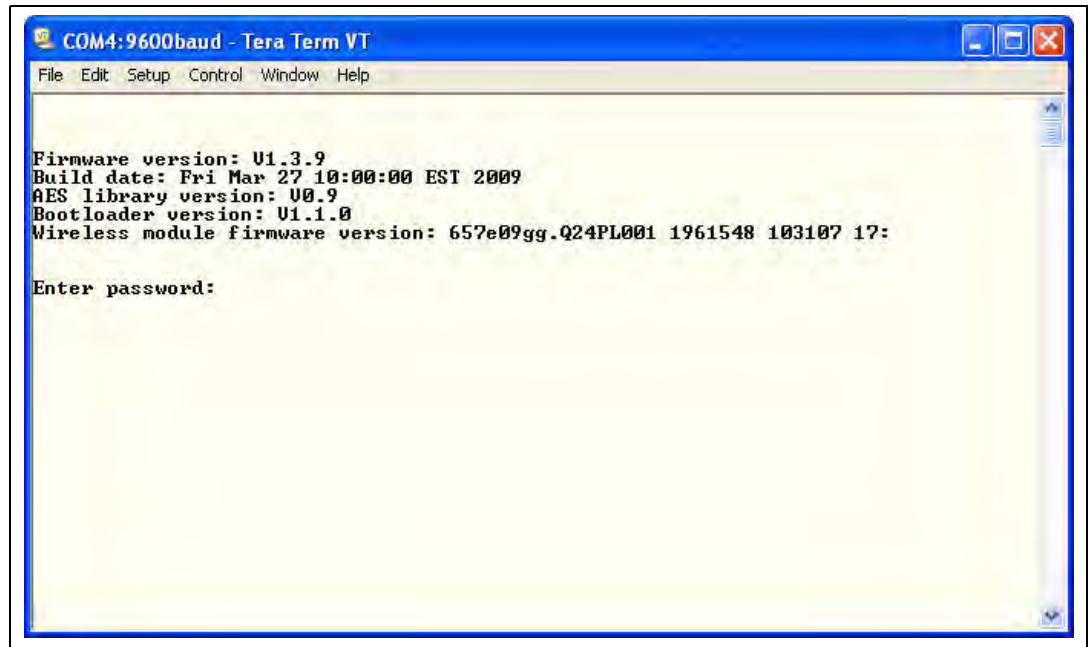
Figure 6.4   USB Login Window

6.   Enter the password to log on. The default password is **4020G** (all uppercase).
      The user interface allows three attempts to enter the password correctly. After three
      failed attempts, you must reset the ITS-DX4020-G by removing the jumper plug from the
      CONFIG MODE jumpers.

7.   Press the [Enter] key to continue. The USB main menu opens.

8.   Select option **7 Upgrade Firmware**.

9.   Press the [Enter] key. Tera Term asks you to start the Xmodem transfer of the upgrade
      image file.

10.   Select **File? Transfer>Xmodem>Send**.
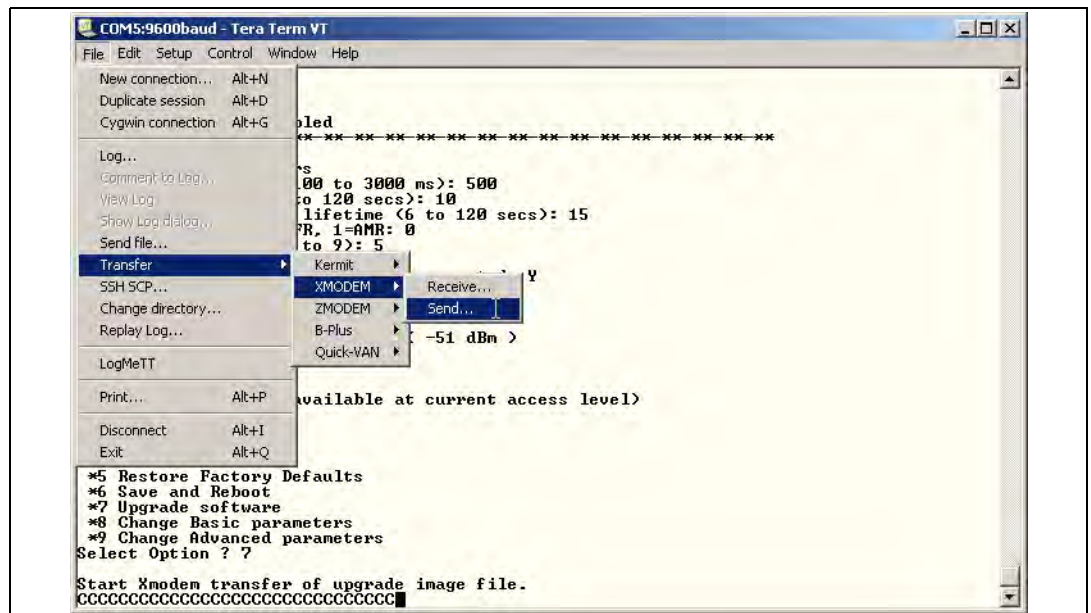
Figure 6.5   Tera Term File Menu Path

11.   In the **XMODEM Send** dialog box, use the **Look in:** menu to navigate to and select the
      location to which you downloaded the ITS-DX4020-G binary file. Refer to *Figure 6.6*,
      Page 40.

12. Click **Open** to start the firmware upgrade. The **Tera Term: XMODEM Send** dialog box opens and indicates the upgrade progress.
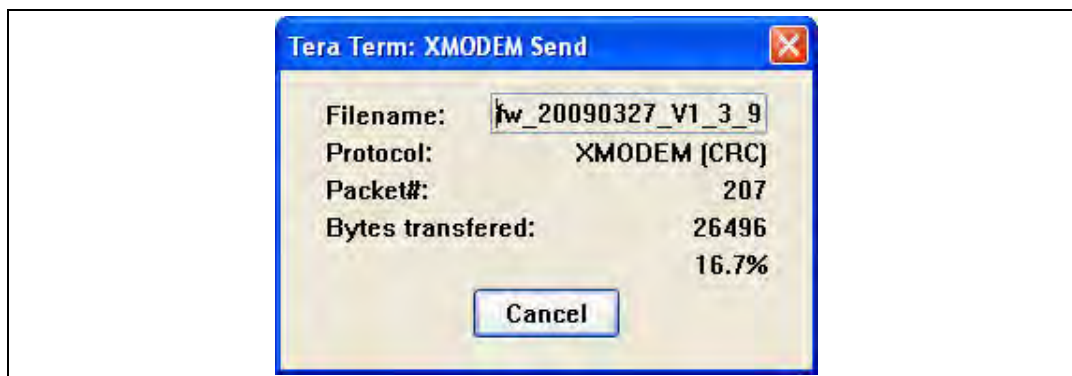
Figure 6.6   Tera Term XMODEM Send Dialog Box

13. When the file transfer completes, TeraTerm prompts you to continue. Press [Y] and then [Enter] to continue the upgrade.
14. When the firmware upgrade is complete, close Tera Term, and remove the jumper plug from the CONFIG jumpers on the ITS-DX4020-G. The ITS-DX4020-G restarts.

NOTICE!

During the firmware upgrade process, pauses in the data transfer are normal. During these pauses, the module processes other information. If the process stops for more than 1 min, restart the module and repeat the process.

7   Troubleshooting

7.1   Diagnostic LED Descriptions

LED	Function
STATUS	Indicates the overall health of the device. – **ON:** Normal operation. – **Flash:** A trouble condition exists. – **OFF:** No power to the device. When the LED DIS jumper pins are first shorted, the STATUS LED flashes the firmware version. After that, the STATUS LED flashes once every 4 sec to indicate that the ITS-DX4020-G is powered up.
CELL IP	Indicates the IP connection status. – **ON:** The ITS-DX4020-G is connected to the central station receiver through the GPRS network. – **Flash:** The ITS-DX4020-G is connected to the GPRS network, but not to the central station receiver. – **OFF:** The ITS-DX4020-G is not connected to the GPRS network.
AUDIO ACT	Indicates the PSTN connection status. – **ON:** The PSTN connection is currently in use (off-hook). – **OFF:** The PSTN connection is not in use (on-hook).
SS1, SS2, SS3	These LEDs indicate the wireless signal strength of the ITS-DX4020-G. Refer to *Table 3.1, Page 17* for more information.
BUS	Indicates bus connection status. – **ON:** Active communication exists between the ITS-DX4020-G and the control panel. – **Flash:** The ITS-DX4020-G is initializing, or a problem exists with the bus connection to the control panel. – **OFF:** The ITS-DX4020-G is not configured for bus communication.

Table 7.1   Diagnostic LED Functions

NOTICE!

If the ITS-DX4020-G is setup for GPRS (IP) communication and the STATUS LED is single flashing and the CELL IP LED is off for more than 2 minutes, do the following.
– Verify that the ITS-DX4020-G has proper signal strength
– Verify the APN, user name, and password provided by the carrier. If these are correct, check with the carrier to make sure your account is set up in their system. If a user name and password are required, verify with the carrier that these are correct in their system.

Refer to the LED descriptions shown in *Table 7.2*, *Page 44* before performing any troubleshooting procedures.

NOTICE!

When the LED DIS jumper is applied, the STATUS LED flashes at a slower 4 sec interval to save power. The flashes do not indicate a trouble condition.

| Operating Mode | LED State | | | | | | | Information or Troubleshooting Section |
	STATUS	CELL IP	AUDIO	SS1	SS2	SS3	BUS	
No LEDs visible	Off	Off	Off	Off	Off	Off	Off	*Section 7.2.1 The ITS-DX4020-G does not power on (no LEDs are lit)., page 45.*
Powering on and initialization mode	Double flash	Off	Off	Off	Off	Off	Off	*Section 7.2.2 Initialization, page 45.*
Action required	Double flash	Double flash	Off	Off	Off	Off	Off	*Section 7.2.3 Hardware, page 45.*
	Double flash	Off	Double flash	Off	Off	Off	Off	*Section 7.2.4 Firmware, page 45.*
	Double flash	Off	Off	Double flash	Off	Off	Off	*Section 7.2.5 Radio Registration, page 46.*
	Double flash	Off	Off	Off	Double flash	Off	Off	*Section 7.2.6 SIM Card, page 46.*
	Double flash	Off	Off	Off	Off	Double flash	Off	*Section 7.2.7 PIN Code, page 46.*
	Double flash	Off	Off	Off	Off	Off	Double flash	*Section 7.2.8 Control Panel Bus, page 47.*
Configuration mode (Jumper plug installed)	→	→	→	See *Signal strength indicators* section of table below.			Off	*Section 7.2.9 No Authorization, page 47.*
	→	→	→	See *Signal strength indicators* section of table below.			On	Ready and authorized to configure with either SMS or USB.
	→	→	→	Flash	Flash	Flash	Flash	*Section 7.2.10 Invalid Configuration SMS, page 47.*
	→	→	→	Double flash	Double flash	Double flash	Double flash	*Section 7.2.11 Firmware Upgrade In Process, page 48.*
	→	→	→	→	→	→	→	SMS configuration is successful. You can now remove the CONFIG jumper to save settings.
	Shifting flash*	Shifting flash*	Shifting flash*	Shifting flash*	Shifting flash*	Shifting flash*	Shifting flash*	Firmware upload in progress. Do not power down the module. The ITS-DX4020-G reboots automatically.

Key:

→ = Scrolling LEDs, from left to right.

⊗ = LED's status is not significant.

*Shifting flash = Every other LED flashes simultaneously, creating the shifting flash pattern.

	LED State							
Operating Mode	**STATUS**	**CELL IP**	**AUDIO**	**SS1**	**SS2**	**SS3**	**BUS**	**Information or Troubleshooting Section**
Normal operating mode (STATUS LED on steady)	On	Off	On or off	See *Signal strength indicators* section of table below.			On or Off	System normal. The ITS-DX4020-G is in PSTN (Contact ID) Over GSM Mode.
	On	On	On or off	See *Signal strength indicators* section of table below.			On	System normal. The ITS-DX4020-G is in IP Over GPRS Mode.
	On	$\otimes$	On	See *Signal strength indicators* section of table below.			On or Off	System normal. PSTN (Contact ID) Over GSM Mode is in use.
Transitional/ watch states	Flash	Flash	On or off	See *Signal strength indicators* section of table below.			On	No incoming IP packets. *Section 7.2.12 No Incoming IP Packets, page 48.*
	Flash	$\otimes$	On or off	See *Signal strength indicators* section of table below.			Flash	*Section 7.2.13 Control Panel Bus Problem, page 48.*
	Flash	$\otimes$	$\otimes$	Off	Off	Off	$\otimes$	*Section 7.2.14 Radio Initializing or No Signal Strength, page 49.*
	Flash	Off	$\otimes$	Flash	Off	Off	$\otimes$	*Section 7.2.15 GSM Network Registration, page 49.*
	Flash	$\otimes$	$\otimes$	On	Off	Off	$\otimes$	*Section 7.2.16 Unacceptable Signal Strength, page 49.*

Key:

$\rightarrow$ = Scrolling LEDs, from left to right.

$\otimes$ = LED's status is not significant.

*Shifting flash = Every other LED flashes simultaneously, creating the shifting flash pattern.

	LED State							
Operating Mode	**STATUS**	**CELL IP**	**AUDIO**	**SS1**	**SS2**	**SS3**	**BUS**	**Information or Troubleshooting Section**
Signal strength indicators	⊗	⊗	⊗	Off	Off	Off	⊗	*Section 7.2.14 Radio Initializing or No Signal Strength, page 49 or Section 7.2.18 Wireless Reception Issues, page 50.*
	⊗	⊗	⊗	Flash	Off	Off	⊗	*Section 7.2.15 GSM Network Registration, page 49 or Section 7.2.18 Wireless Reception Issues, page 50.*
	⊗	⊗	⊗	On	Off	Off	⊗	*Section 7.2.16 Unacceptable Signal Strength, page 49.*
	⊗	⊗	⊗	On	Flash	Off	⊗	*Section 7.2.17 Marginal RF Signal, page 50.*
	⊗	⊗	⊗	On	On	Off	⊗	Good signal strength: -83 dBm to -77 dBm. No corrective action is required.
	⊗	⊗	⊗	On	On	Flash	⊗	Very good signal strength: -77 dBm to -69 dBm. No corrective action is required.
	⊗	⊗	⊗	On	On	On	⊗	Excellent signal strength: > -69 dBm. No corrective action is required.

Key:

→ = Scrolling LEDs, from left to right.

⊗ = LED's status is not significant.

*Shifting flash = Every other LED flashes simultaneously, creating the shifting flash pattern.

Table 7.2 ITS-DX4020-G LED Descriptions

7.2   Troubleshooting Procedures

7.2.1   The ITS-DX4020-G does not power on (no LEDs are lit).

Description:

The power wiring or power supply has a problem, or the LED DIS jumper is on, in which case only the STATUS LED blinks every 4 sec.

Solution:

1.   On the ITS-DX4020-G, check the voltage at the Power input pins R and B. The voltage should be 9.8 VDC to 14 VDC.
2.   Check the wiring between the ITS-DX4020-G and the control panel (refer to *Section 3.4 Connect the ITS-DX4020-G to the Control Panel, page 14*).
3.   Remove the jumper from the LED DIS, if it is on.
4.   If everything appears normal, replace the ITS-DX4020-G.

7.2.2   Initialization

Description:

STATUS LED double flashes until initialization is complete.

Solution:

1.   If the device stays in this state for more than 60 sec, check wiring between the ITS-DX4020-G and the control panel, and reboot the system.
2.   If the problem continues, make sure other LEDs are not double flashing as well. If so, refer to *Section 7.1 Diagnostic LED Descriptions, page 41*.
3.   If the problem continues, replace the ITS-DX4020-G.

7.2.3   Hardware

Description:

General hardware problem.

Solution:

1.   Reboot the system.
2.   Check for broken or overheated components and short circuits.
3.   On the ITS-DX4020-G, check the voltage at the Power input pins R and B terminals (between 9.8 and 14 VDC).
4.   If the problem continues, replace the ITS-DX4020-G.

7.2.4   Firmware

Description:

Corrupted flash or failed firmware upload.

Solution:

1.   Perform the Factory Defaulting procedure using the USB menu as described in *Table 4.8, Page 28*.
2.   Upgrade the firmware as described in *Section 6 Firmware Upgrade, page 36*.
3.   If the problem continues, replace the ITS-DX4020-G.

7.2.5 Radio Registration

Description:

Failed to register or reregister on the wireless network. This mode occurs if registration never occurred and 8 min has elapsed. This condition can also occur if only one tower is within range, and it is not functioning. The LEDs change state but the module continues to try re-establishing communications (this can be a recoverable condition).

Solution:

1. Check for RF signal strength by shorting the CONFIG MODE jumpers and reading the GSM Signal Strength LEDs as described in the *Signal strength indicators* section of *Table 7.2*, *Page 44*.
2. Bosch recommends connecting the module to the PC using USB so that you can determine if the module is GSM registered on the network, or if the signal strength is too low for the module to obtain a GPRS signal. For more information, refer to *Section 4.2.4 USB Main Menu, page 27*. If the signal strength is unacceptable, refer to *Section 7.2.18 Wireless Reception Issues, page 50*.
3. Replace the SIM card with a known good test card. If the signal strength is acceptable, confirm that the wireless service provider activated this account and the SIM card correctly.
4. If the problem continues, replace the ITS-DX4020-G.

7.2.6 SIM Card

Description:

SIM card problem.

Solution:

1. Check for the presence of a SIM in the holder.
2. Check for damage to the SIM card holder.
3. Remove and reseat SIM card in the holder, checking for worn contacts or looseness between the holder and the SIM card.
4. Reboot the system.
5. If the problem continues after rebooting the system, replace the SIM card. A new SIM card might require the ITS-DX4020-G to be reconfigured to the new card's parameters (if using a different carrier or provider).

7.2.7 PIN Code

Description:

Mismatched PIN code.

Solution:

– If the SIM card's PIN is unknown, review the information on the SIM card holder that the card was delivered in for additional information.
– If the SIM card's PIN is known, set the ITS-DX4020-G PIN (parameter #4) to match your SIM PIN. Set parameter #4 using the main USB menu (refer to *Section 4.2.4 USB Main Menu, page 27*.
– If the problem continues after rebooting the system, replace the SIM card with a different card. A new SIM card might require the ITS-DX4020-G to be reconfigured to the new card's parameters (if using a different carrier or provider).

7.2.8   Control Panel Bus

Description:

The module is either programmed to receive bus messages (any non-zero bus address) and is detecting no bus signals for the address to which it is programmed, or it was programmed with a bus address of zero and any signal is detected. This mode is displayed for 30 sec. The error automatically clears if condition is corrected at the control panel.

– The ITS-DX4020-G is programmed for bus operation but no bus is detected,
– The ITS-DX4020-G is programmed for the wrong bus address, or
– The control panel is not yet programmed.

Solution:

1. Check for complete bus wiring to the control panel.
2. The ITS-DX4020-G is programmed for a bus address but no bus signals are detected, or the module is programmed for a different bus address. Check the ITS-DX4020-G configuration file for the correct bus address to match the control panel.
3. The ITS-DX4020-G is programmed for "0", but bus signals are detected. This might also happen if the green and yellow wires intermittently touch a metal surface. Recheck the ITS-DX4020-G configuration file for the correct bus address to match the control panel. Disconnect the green and yellow wire if connected and prevent them from touching a metal surface, or each other.
4. Check the control panel's configuration settings to make sure the module is enabled.

7.2.9   No Authorization

Description:

The control panel is configured to require authorization before changing its configuration. This control panel authorization was not received. This scenario only effects the Easy Series control panel, and is effected when in EN mode and the authorization code has been changed.

Solution:

1. Ensure that control panel authorization is received before attempting configuration changes. If the LEDs remain in this state for longer than 5 sec after you enter the control panel authorization code, remove the CONFIG jumper to reboot the ITS-DX4020-G.
2. Check the control panel's authorization code (Easy Series control panels only).

7.2.10   Invalid Configuration SMS

Description:

Your wireless service provider account and communication channel are working correctly. The ITS-DX4020-G received an improperly formatted SMS message. The module does not accept another SMS message until the jumper is removed and replaced.

Solution:

1. Check the formatting of the SMS message.
   Refer to *Section 4.1.1 Enter CONFIG MODE, page 18*.
2. Verify that the password is correct.
3. Remove and replace the configuration jumper and try again.
4. If the format appears correct but the SMS is not accepted, try to send the SMS from a different phone or computer.

7.2.11   Firmware Upgrade In Process

Description:

The ITS-DX4020-G is actively replacing the current firmware with the newly received firmware. **Do not power the module off during this phase, or the module might become permanently damaged.**

Solution:

1.   If power was removed during the firmware upgrade process, attempt to upgrade the firmware as described in *Section 6 Firmware Upgrade, page 36*.
2.   If the firmware upgrade is not possible, replace the ITS-DX4020-G.

7.2.12   No Incoming IP Packets

Description:

A GPRS IP address was obtained, but no reply packets from the central station or RPS have been received. The ITS-DX4020-G has a valid data connection with the wireless service provider, but did not receive communication from the destination address.

Solution:

Initiate communication from the control panel and wait 5 min. Then, perform the following tasks:

–   **ITS-DX4020-G:**
   –   Check that the correct GPRS Access Point Name (APN) has been entered. Make sure there are no spaces in the APN. If you are unsure, re-enter the APN.
   –   If you are using AES encryption, verify that your key matches the receiver's key.
–   **Control Panel:**
   –   If your control panel is not using polling (polling = 0), generate an event to verify operation.
   –   Verify that the correct central station receiver IP address and port number are set.
   –   Check other specific control panel communication programming options.
–   **D6600 or D6100i Communication Receiver/Gateway:**
   –   Verify that the account is set up correctly in the receiver.
   –   If the account is set up, verify communications is enabled and resynchronize the account to make sure the control panel has the correct anti-substitution key.
   –   If this is the first installation (account at the receiver or if all accounts failed), check the network firewall.
–   **Wireless Service Provider:**
   –   Verify with the wireless service provider that a network outage did not occur.
   –   Verify that the wireless service provider's network firewall setup is correct.

7.2.13   Control Panel Bus Problem

Description:

The control panel bus was not detected at power up, or the unit is programmed for GSM (PSTN) mode and has detected the control panel bus wiring is connected to a device. This state only lasts 30 sec, and then changes to a double flash.

Solution:

1.   Check for complete bus wiring to the control panel. Refer to *Section 7.2.8 Control Panel Bus, page 47*.
2.   If in GSM mode, make sure the data bus wires are not connected or touching any metal surfaces.

7.2.14   Radio Initializing or No Signal Strength

Description:

No reading is available (for example, the radio is resetting).

Solution:

The installation location of the wireless antenna is not optimal, or the wireless service provider is experiencing technical difficulties.

1. Verify that you have the antenna attached to a metal surface and that there is a minimum of 4 in. (10 cm) from the base of the antenna in all directions.
2. Check the antenna connection at the module.
3. Install the CONFIG jumper so that you can monitor the GSM signal LEDs.
4. Relocate the antenna on a metal surface, such as the top of the control panel enclosure.
5. Check the signal on a mobile phone from the same carrier, if available.
6. If the signal on the phone is good, but the ITS-DX4020-G signal is not good, replace the antenna.
7. If the signal on the mobile phone and on the ITS-DX4020-G are bad, check for outages with the wireless service provider.
8. If there are no carrier outages, try using a SIM from a different carrier/service provider.

7.2.15   GSM Network Registration

Description:

The ITS-DX-4020-G is attempting to register on the GSM network. This issue occurs if the registration never occurred, and can last up to 8 min. After 8 min, the LEDs change to the double-flash Radio Registration state. This condition can also happen if only one tower is within RF range and it has an outage. The module continues to attempt to establish communications.

Solution:

1. Check for RF signal strength by shorting the CONFIG MODE jumpers and reading the real time GSM Signal Strength levels.
2. If the signal strength is unacceptable, refer to *Section 7.2.18 Wireless Reception Issues, page 50*.
3. Replace the SIM card with a known good test card. If the signal strength is acceptable, confirm that the wireless service provider activated this account and the SIM card correctly.
4. If the problem continues, replace the ITS-DX4020-G.

7.2.16   Unacceptable Signal Strength

Description:

The installation location of the wireless antenna is not optimal, or the wireless service provider is experiencing technical difficulties.
The installation location of the wireless antenna is critical to the signal strength received at the module. To reduce problems as conditions change, use the highest installation location possible. Bosch Security Systems, Inc. recommends a signal strength level of Good or higher for all installations. Refer to *Table 3.1, Page 17* for signal strength measurements.

Solution:

To improve the signal strength, perform the recommendations described in *Section 7.2.18 Wireless Reception Issues, page 50*.

7.2.17   Marginal RF Signal

Description:

Marginal signal strength: -89 dBm to -83 dBm. Bosch Security Systems, Inc. recommends trying to improve the signal further because this signal strength is near unacceptable levels. Poor weather and other environmental conditions can make this signal unacceptable. This signal level results in a trouble condition if the low signal strength setting for the ITS-DX4020-G is enabled.

Solution:

To improve the signal strength, try the recommendations described in *Section 7.2.18 Wireless Reception Issues, page 50*.

7.2.18   Wireless Reception Issues

Causes:

The wireless antenna is not installed in an optimal location, or the wireless service provider is experiencing technical difficulties.

Solution:

1.   Verify that you have the antenna attached to a metal surface, and that there is a minimum of 4 in. (10 cm) from the base of the antenna in all directions.
2.   Check the antenna connection at the module.
3.   Check the antenna connector is hand tight at the base.
4.   Install the CONFIG jumper to monitor the GSM signal LEDs.
5.   Relocate the antenna on a metal surface, such as the top of the control panel enclosure.
6.   Check the signal on an unlocked mobile phone from the same carrier, if available.
7.   If the signal on the phone is good, but the ITS-DX4020-G signal is not good, replace the antenna.
8.   If the signal on the mobile phone and on the ITS-DX4020-G are bad, check for outages with the wireless service provider.
9.   If there are no carrier outages, try using a SIM from a different carrier/service provider.