INSTRUCTION MANUAL

A representative version of the user's manual follows:

Exhibit 8

HTM1200 PCIe Half Mini HSPA Card

User Manual

DOCUMENT CONTROL NUMBER:

Version No.: 1.0

Date: 4/9/2010

1. Introduction

1.1 Revision History

Revision	Date	Author	Description
1.0	Apr 2010	Customer Operations	Initial Draft

1.2 Purpose

This document is a user manual for HTM1200 half mini PCIe HSPA Datacard. HTM1200 supports multi-mode (2G/3G) with HSDPA/HSUPA capabilities.

1.3 Scope

This document describes: the platform architecture, the hardware / software interactions, Technical/Electrical Specifications.

1.4 Target Audience

This document is intended to provide a usage specification for the teams involved in and an introduction to the platform for product integration teams.

1.5 *Abbreviations*

AES	Advanced Encryption Standard
AGPS	Assisted Global Positioning System
AMR-NB	Adaptive Multi-Rate Narrow Band
AMR-WB	Adaptive Multi-Rate Wide Band
AP	Applications Processor
BP	Baseband Processor
DES	Data Encryption Standard
DTM	Dual Transfer Mode
DUN	Dial Up Networking
EDGE	Enhanced Data rate for GSM Evolution
EFR	Enhanced Full Rate
FM	Frequency Modulation
FPS	Frames-Per-Second
FR	Full Rate
GEA	GSM Encryption Algorithm
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile communications
HR	Half Rate
HS	High Speed
HSDPA	High-Speed Downlink Packet Access
HSUPA	High-Speed Uplink Packet Access
IMEI	International Mobile Equipment Identity
IMS	IP Multimedia Subsystems
IPC	Inter Processor Communications
NAND	Not AND (electronic logic gate)
OHA	Open Handset Alliance
OMA	Open Mobile Alliance
OTG	On-The-Go
PCI	Peripheral Component Interconnect
PMIC	Power Management IC
RF	Radio Frequency
SAM	Stand Alone Modem
SDRAM	Synchronous Dynamic Random Access Memory
SIM	Subscriber Identity Module
UEA	UMTS Encryption Algorithm
UICC	Universal Integrated Circuit Card
USB	Universal Serial Bus
USIM	Universal SIM
W3G	Wrigley3G (Motorola 3G baseband processor)
WCDMA	Wideband Code Division Multiple Access
WLAN	Wireless Local Area Network
WWAN	Wireless Wide Area Network

2. Product Overview

HTM1200 is a half mini data card supporting tri-band HSPA and quad-band EDGE/GPRS, with data rates of up to 7.2Mbps downlink and 5.76Mbps uplink. It complies with PCIe Mini CEM spec, version 1.2.

HTM1200 is based on a custom 3G baseband processor that was developed by Motorola. Other main hardware components on this platform are the RF transceiver from Infineon, the Power Management IC, the RF analog front end and Power amplifiers.

HTM1200 uses USB signals on PCIe interface to connect with a PC, netbook or MID. HTM1200 uses 3.3V power supply on PCIe interface for power up.
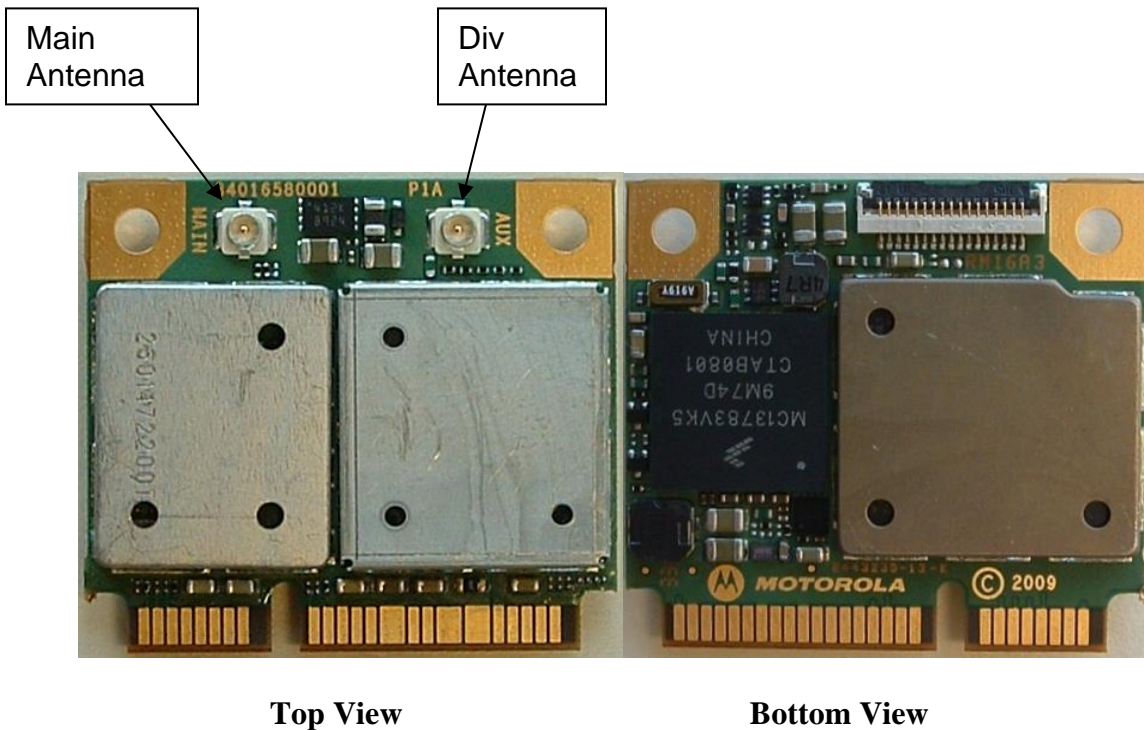

Main Antenna

Div Antenna

Top View   **Bottom View**

Figure 1 -HTM 1200 Half Mini PCIe card (Top and Bottom views)

3. Hardware Architecture
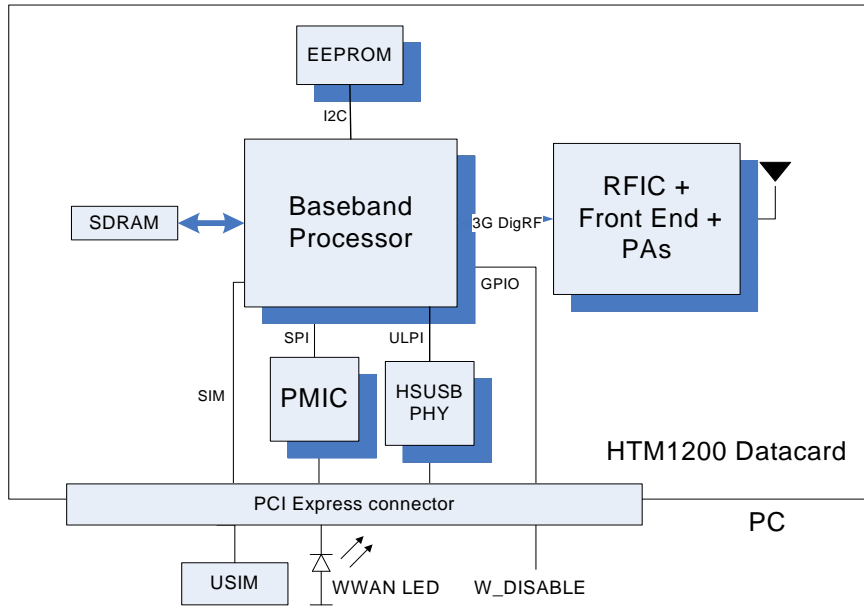
Figure 2 HTM1200 high level block diagram

4. Software Architecture

The HTM1200 Data Card software architecture is based on:

- Linux kernel running on the ARM9 application processor of the W3G.

- Native services running on top of the Linux kernel in the user space.

- Hardware specific adapters, drivers and software stacks.

- A 3GSM Single Core Modem architecture running on the C55x+ DSP of the W3G.

The following diagram shows a high level overview of the software partitioning architecture:

Figure 3 - Software Partitioning Architecture Overview

5. HTM1200 Data Card Feature Summary

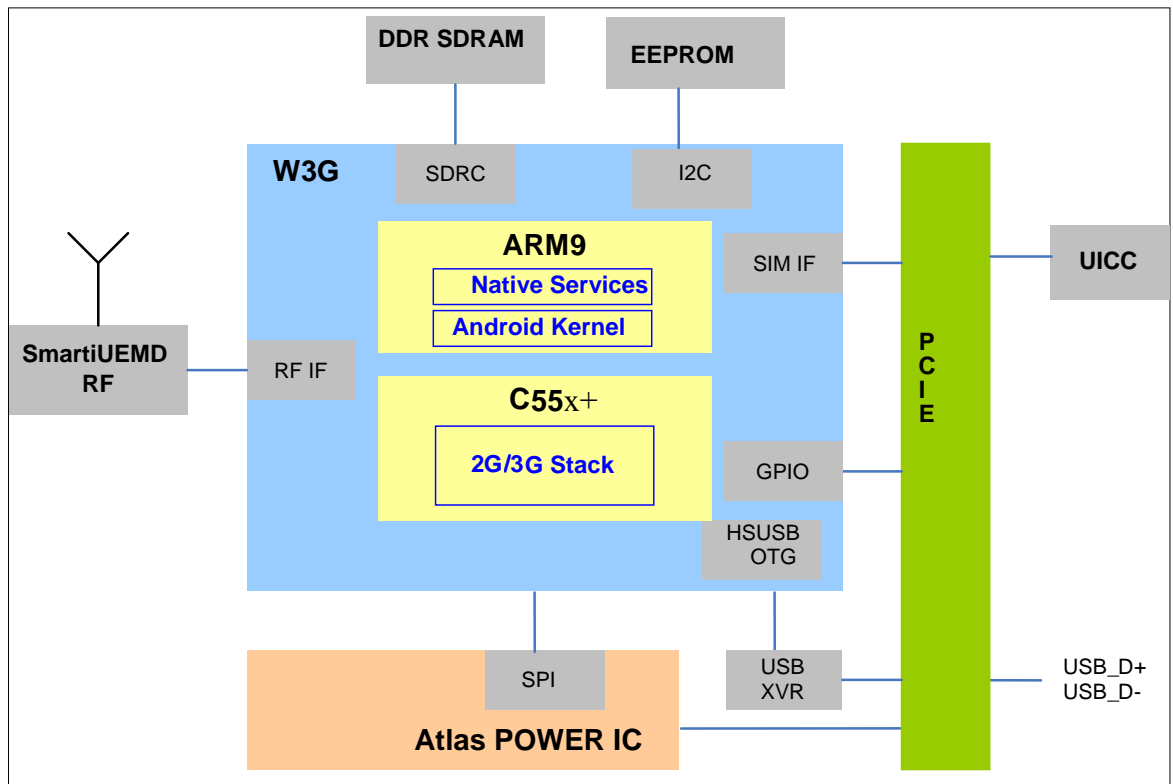Key capabilities for the data card and associated features of the platform are listed below. The following summary describes some of the platform capabilities.

5.1 Hardware Revision: P1B

5.2 2G

- 3GPP Release 6 compliant
- Quad-band GSM 850/900/1800/1900 MHz
- GPRS Class 12
- EDGE Class 12, 236 kbps (UL and DL)
- A5/1-3 and GEA/1-3 Encryption
- DARP (Downlink Advanced receiver Performance)
- GSM Power Class 4 (+33 dBm for 850/900MHz), Power Class 1 (+30dBm for 1800/1900MHz)
- EDGE Power Class E2 (+27dBm for 850/900MHz and +26dBm for 1800/1900MHz)
- Sensitivity: -108dBm typical, nominal conditions

5.3 3G

- 3GPP Release 6 compliant
- Frequency Bands
    - o 2100/900 MHz (Supported)
    - o 2100/1900/850 MHz (Supported)
- WCDMA 384kbps uplink (UL) – 384kbps downlink (DL)
- HSDPA 7.2 Mbps
- HSUPA 1.46 / 2 / 5.76 Mbps
- UEA01, UEA02, UIA1, UIA2 Encryption
- 3G Rx Diversity in 2100 band
- Advanced Receiver Type 3i
- Power Class 3 (23 dBm)
- Sensitivity: -110dBm typical, nominal conditions

5.4 External Memory

- 32MB DDR memory is packaged on baseband processor
- 512Kb EEPROM is used to store phasing data

5.5 System Requirements

- Linux Android Kernel (K29) in the ARM9 of the W3G
- RTXC in the C55x+ of the W3G

5.6 Security

- High Assurance Boot with Multiple Super Root Key Support
- MD5, SHA-1, SHA-256, 3DES, AES 128, RC4, RSA
- Subsidy Lock
- IMEI Protection

5.7 Connectivity

- SIM or UICC (SIM and USIM)
- USB client 2.0 HS Support (PC connectivity)
- 3GDigRF RF interface version 3.07

5.8 Power Up and Host Boot Mechanism

The main power management function is performed by Power management IC (Atlas), which receives its voltage input from the PCIe interface. 3.3V on PCIe interface supplies power to PMIC. Atlas manages all data card power.

When power is applied to the data card, the W3G ROM will attempt to enumerate with the host. If the host if not ready, it will try again to enumerate with the host every 3 seconds. After successful enumeration, the host will download bootloader to the device. After the download, the bootloader will re-enumerate as flash interface. The firmware application is sent to the bootloader which downloads it to RAM and runs. The firmware application will then enumerate with 2 ACM interfaces and 2 ECM interfaces. Description of the interfaces is provided in section 8.1.2

5.9 Power Consumption

Following table shows HTM1200 data card power consumption.

Typical Power	
Input Supply	3.3V DC
HSDPA 7.2Mbps download + HSUPA 5.76Mbps @ 0dBm	1.3W
HSDPA 7.2Mbps download + HSUPA 5.76Mbps @ 23dBm	2.5W
EDGE 4RX 200kbps	0.65W
Idle Mode 3G (K=7, DRX length = 1.28s)	< 20mW
Idle Mode 2G (DRX2)	< 20mW

6. Mechanical Specifications

6.1.1 Electrical Specification

HTM1200 powers up using 3.3V supply on PCIe interface. The supply voltage should be within ±9% of 3.3v.

6.1.2 Mechanical Specification

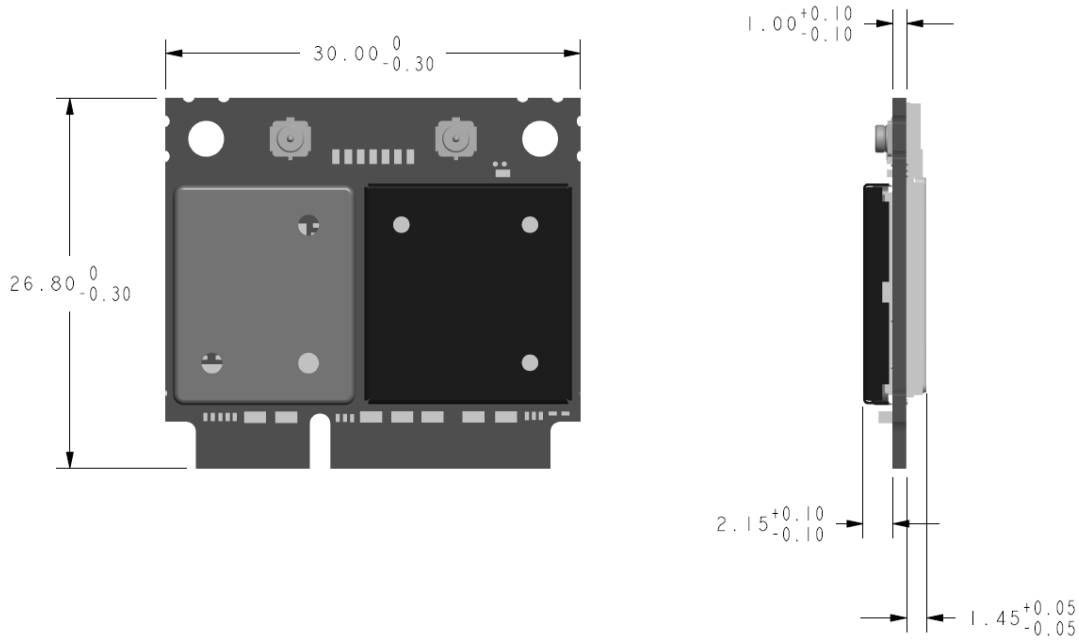Physical dimensions of the card are: 30mm x 26.8mm x 4.60mm (Double sided)
Weight: 5g

Figure 4: HTM1200 Mechanical Specification

6.1.3 Thermal Specification

Operating temperature range for HTM1200 is -10°C to +65°C.

7. Data Card Interfaces

7.1.1 PCIe Interface

HTM1200 connects with netbook, notebook or MID using PCIe interface. HTM1200 uses USB interface on PCIe interface. Electrically the PCI Express card will be seen as a USB device since it uses standard USB2.0 connection. Power is supplied by motherboard. A SIM connector must be provided on the host device for user authentication.

A Radio disable (W_Disable) signal is connected from PC to the card; this allows the user to be able to power down or power up the data card. The card controls one of the PC's LED to indicate RF activity has been disabled or enabled.

To summarize main characteristics of PCIe are as follows:
- Standard USB interface
- 3.3V power supply from motherboard is used. Voltage should be with in ±9% of 3.3V.
- Max current in worst case scenario is 1.1A averaged over 1sec, 2.75A averaged over 100µs.
- W_DISABLE is used to power down and power up HTM1200.
- PC WWAN LED is controlled by HTM1200.

The following table shows signals on PCIe interface.

PIN Number	PCIe Spec	HTM1200 data card	Pin Number	PCIe spec	HTM1200 data card
51	Reserved		52	+3.3Vaux	+3.3Vaux
49	Reserved		50	GND	GND
47	Reserved		48	+1.5V	
45	Reserved		46	LED_WPAN#	
43	GND	GND	44	LED_WLAN#	
41	+3.3Vaux	+3.3Vaux	42	LED_WWAN#	LED_WWAN#
39	+3.3Vaux	+3.3Vaux	40	GND	GND
37	GND	GND	38	USB_D+	USB_D+
35	GND	GND	36	USB_D-	USB_D-
33	PETp0		34	GND	GND
31	PETn0		32	SMB_DATA	
29	GND	GND	30	SMB_CLK	
27	GND	GND	28	+1.5V	
25	PERp0		26	GND	GND

23	PERn0		24	+3.3Vaux	+3.3Vaux
21	GND	GND	22	PERST#	
19	Reserved		20	W_DISABLE#	W_DISABLE#
17	Reserved		18	GND	GND
15	GND	GND	16	UIM_VPP	
13	REFCLK+		14	UIM_RESET	SIM_RESET
11	REFCLK-		12	UIM_CLK	SIM_CLK
9	GND	GND	10	UIM_DATA	SIM_DATA
7	CLKREQ#		8	UIM_PWR	SIM_PWR
5	COEX2	COEX2	6	1.5V	
3	COEX1	COEX1	4	GND	GND
1	WAKE#		2	3.3Vaux	+3.3Vaux

Table 1 – HTM1200 52-pin PCI Express connector pinout

7.1.2 SIM Interface

A standard ISO7816 SIM interface has been used on the card. SIM card is connected to the SIM controller on ARM9.

SIM card slot must be provided by PC manufacturer. SIM signals are routed through PCIe interface. SIM signals are shown in section 7.1.1.

SIM card must not be removed when the data card is powered up.

8. Hardware Installation

8.1 HTM1200 Data Card Installation

This chapter describes physical installation of data card and configuration of HTM1200 3G data card.

An extender board is used to convert half mini 3G data card to a full mini card. The extender board is attached to 3G data card as shown in the picture below.

Top View   **Bottom View**

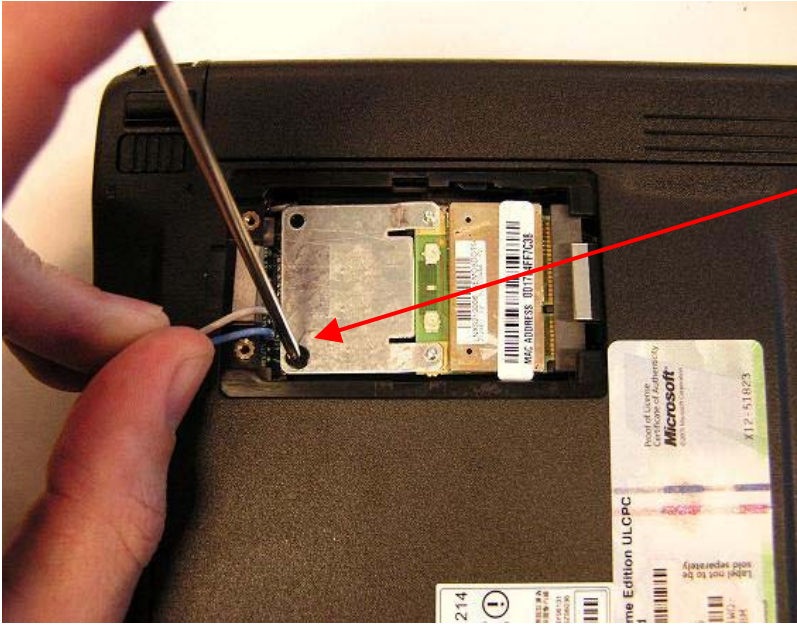Locate an available Mini PCIE V2 card slot in computer.

Mini-PCIe Card
Slot

To ensure proper installation, insert the card into the slot at a 45° angle as shown in the picture below.



The HTM1200 must be pushed down and securely fastened in the MINI-PCIe V2 slot by the means provided by the laptop vendor (screw or clip).

Vendor Screw
Fastener for Full
Mini-PCIe slot.

Connect the provided laptop antennas to the UFL connectors on the HTM1200 card. The UFL connectors will snap down when properly connected to the HTM1200. If the Main and Aux antennas are specified by the computer manufacturer then the antennas must be connected accordingly.
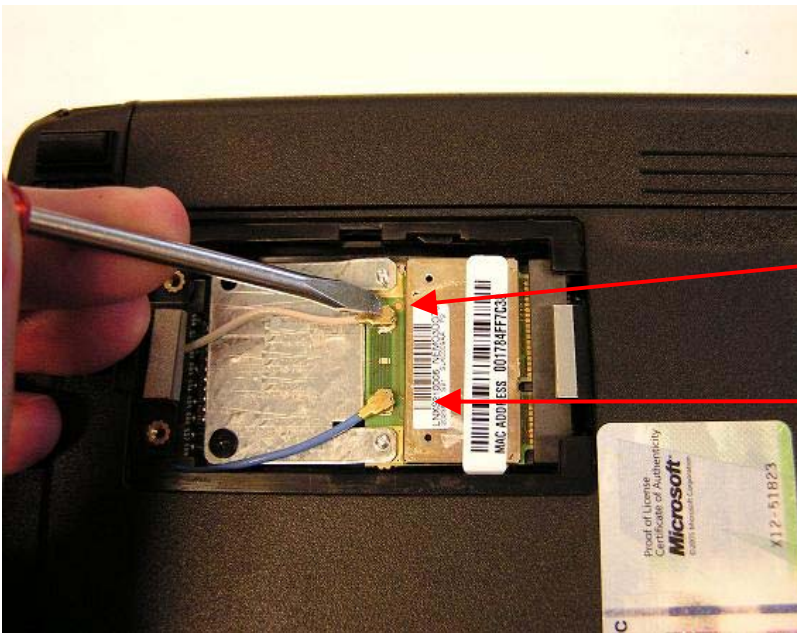
Aux Antenna
Lead

Main Antenna
Lead

9. Data Card Driver Package

HTM1200 data card drivers are available for download from Motorola Extranet compass site. The driver package is available for Windows XP and Windows 7 operating systems in 32-bit and 64-bit format. The driver package is an msi (Microsoft Installer) package which includes USB driver and host boot service.

9.1 Windows XP / Windows7 32-bit

9.1.1 Driver Installation

This driver is compatible with Windows XP and Windows7. AT commands must be sent to the modem using ACM port. Details of driver configuration are shown in section 8.1.2

If HTM1200 data card is inside the host device, power down the data card until successful installation of the driver. If the host device (PC) has previous revision of Motorola Datacard drivers, run C:\Program Files\Common Files\Motorola Shared\Mot3GDatacard\Motorola Driver Installer.exe, clean the driver and uninstall before installing the new driver.
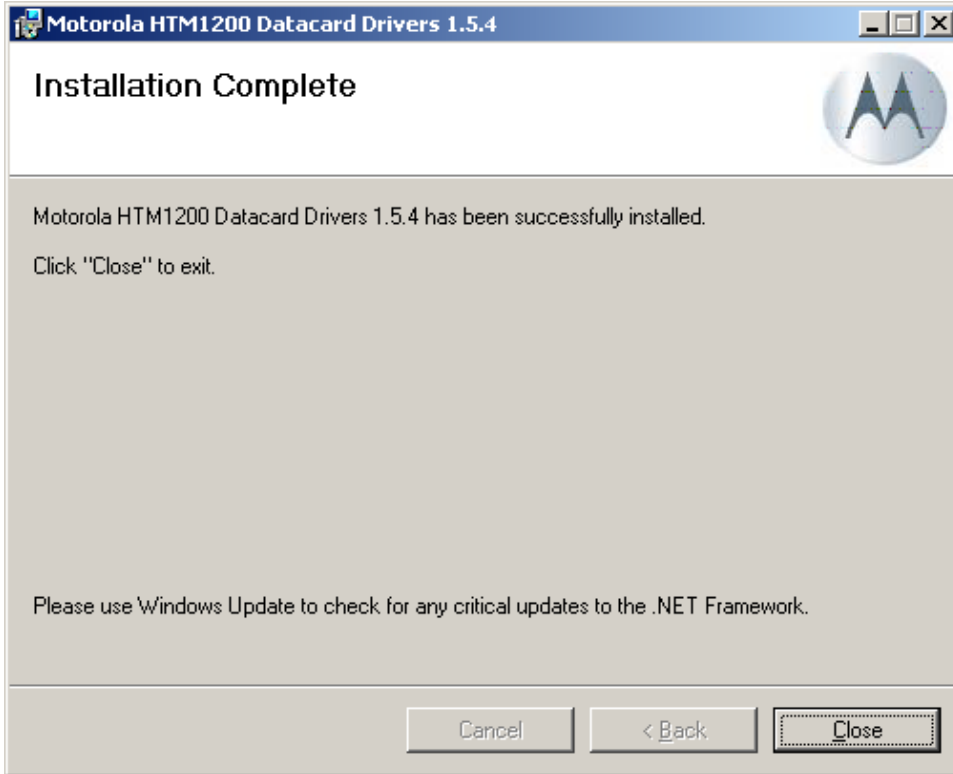
Double click on "Motorola_HTM1200_Datacard_Drivers_1.5.4_MotoConnectCard_1.2.5.msi" to start installation. Installation window opens, and click 'Next' on the window.
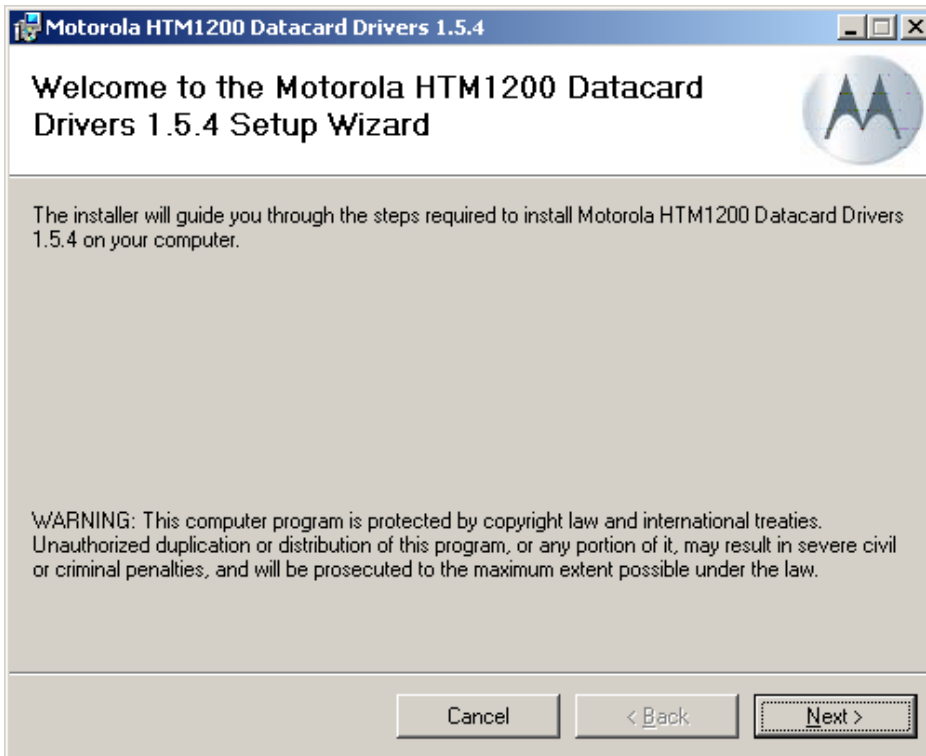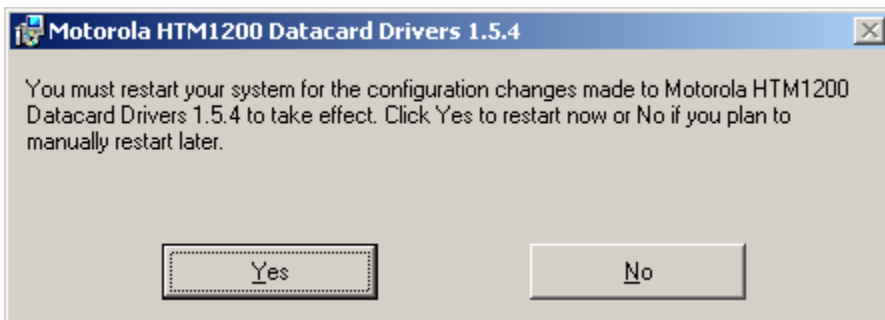
Agree to license terms, click on 'Next'.
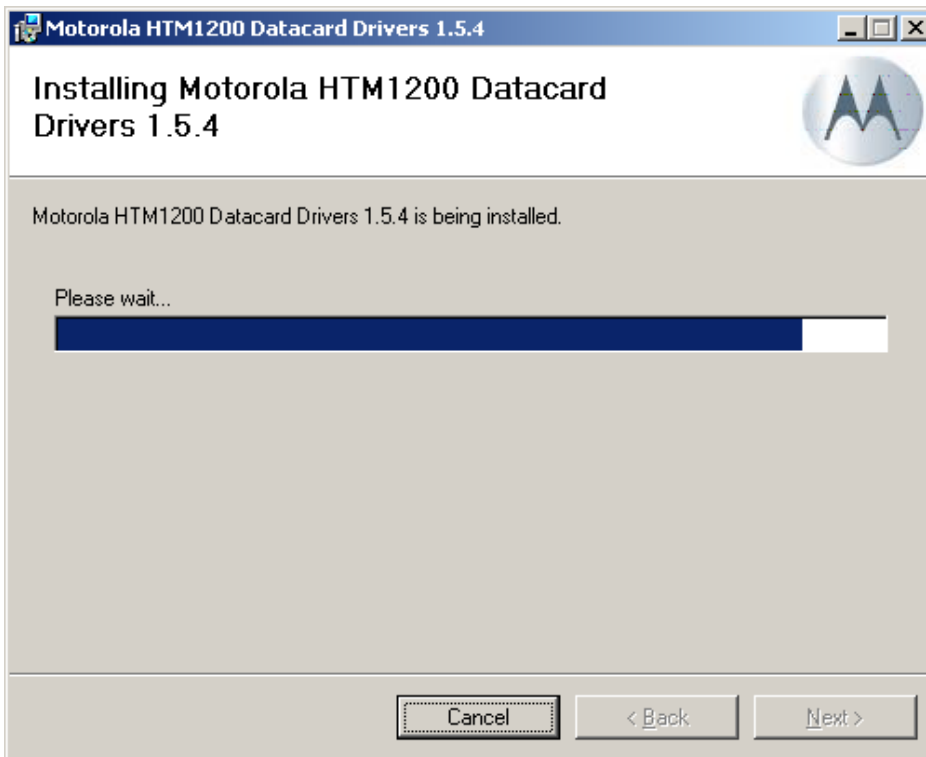
Installation complete message comes up. Click Close to exit.

The installer will ask for a system restart. Please close all other applications and click on the "Yes" button to restart the system. After installing the driver PC must be restarted before powering up HTM1200.

9.1.2 Host Boot Service

When the driver is installed host boot service starts automatic. The service is called Moto Connect Card Service. Hostboot service is installed at C:\Program Files\Motorola\MCC\HostBoot.

9.1.3 Connecting to Live Network in Windows XP/Windows7

Dial up networking can be used to setup live network connection.

Open device manager, right click on Motorola 3G HTM1000 Modem under modems and choose properties. Click on 'Advanced' tab and enter the initialization command: AT+CGDCONT = 1,"IP","APN". Where APN is the access point name. APN information must be obtained from the carrier that is supplying SIM card. Then click on 'OK' on the window to save settings.
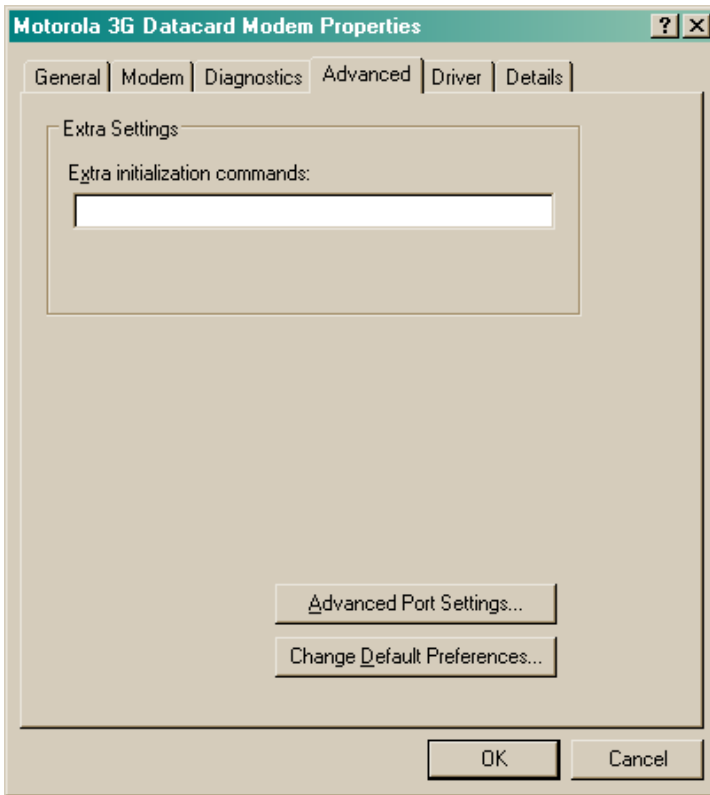

By default the radio is turned off (Airplane Mode). Radio can be turned on by sending an AT command to the Modem. Open HyperTerminal and connect to the modem using Modem port. To turn 'ON' the radio send AT command AT+CFUN=1. This will enable radio. If an LED is connected to WWAN_LED pin, LED will turn ON when the radio is turned 'ON'; this is an indication to ensure that the radio is ON.

Use the following steps to setup dial up connection. From Start→Settings→network Connections open New Network Connection wizard and setup a new dial up network connection.
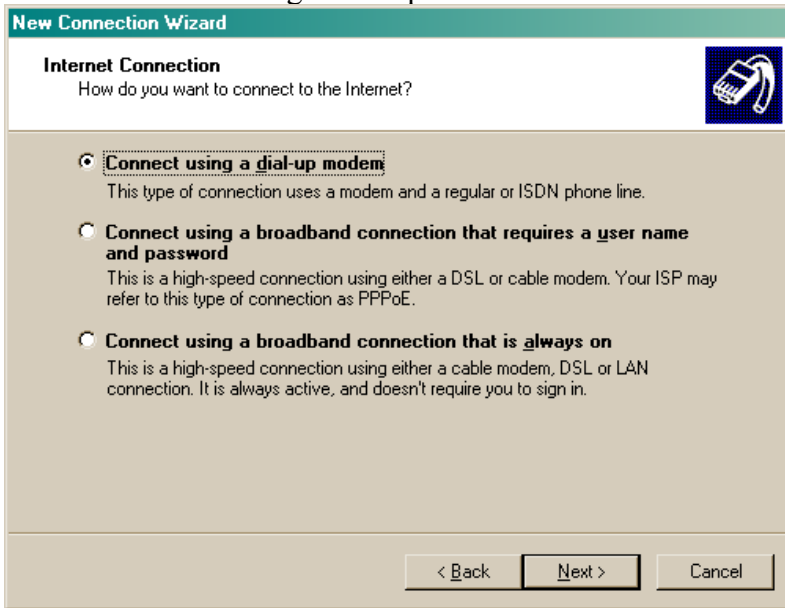

To continue click 'Next'

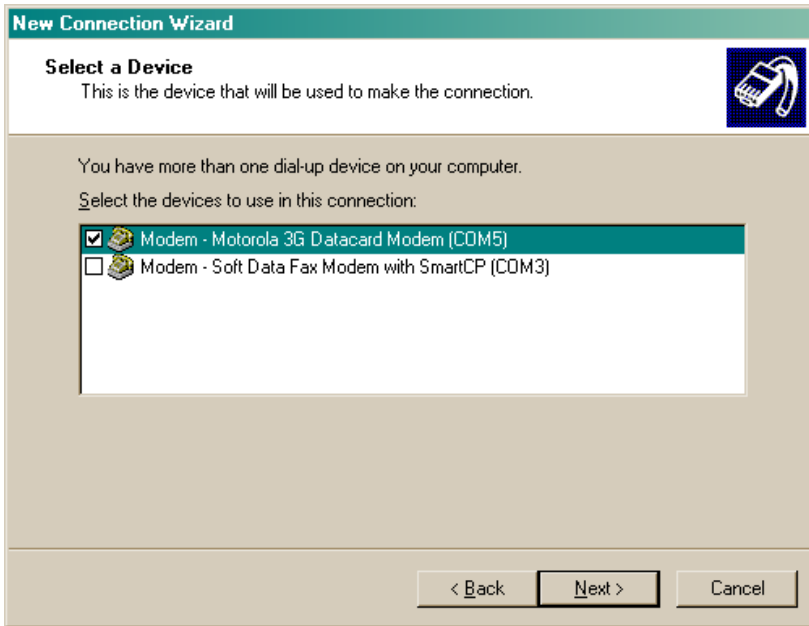Choose "connect to the Internet" and click on 'Next'
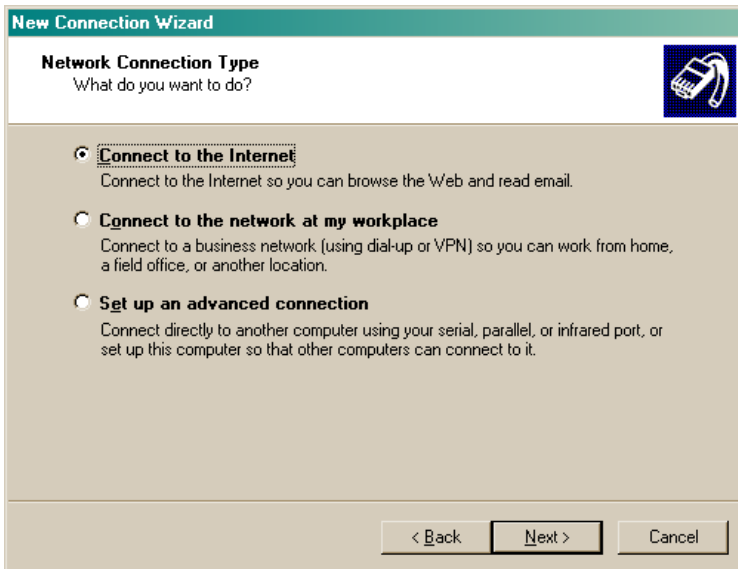
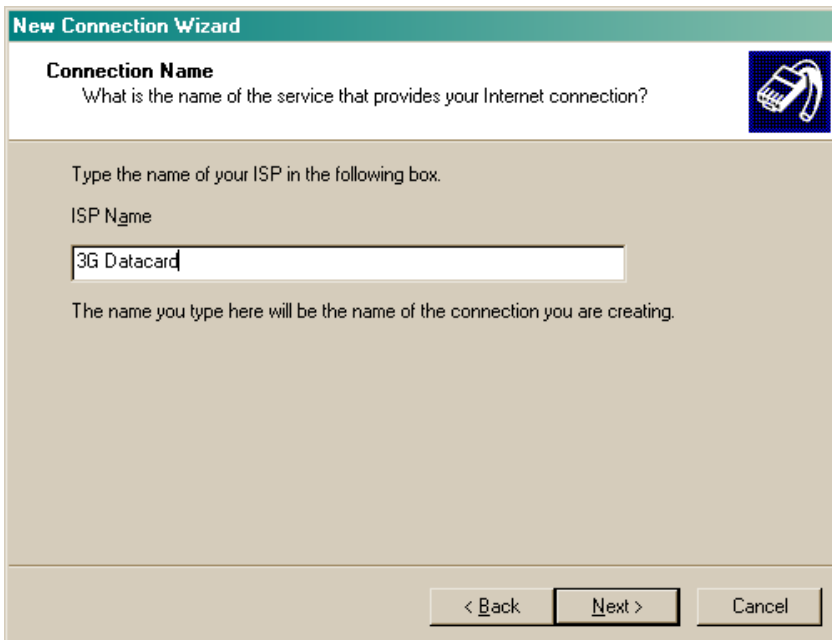Choose to 'Set up the connection manually" and click on 'Next'

Choose 'Connect using a dial-up modem" and click on 'Next'

Choose Motorola 3G Datacard Modem and click 'Next'

Enter a name for ISP and click 'Next'

Enter phone number for data connection. The dial up number is provided by the carrier and the number could vary from carrier to carrier. Typically the dial in number is *99# or *99***1#. Enter the dial up number and click on 'Next'

New Connection Wizard

Phone Number to Dial
What is your ISP's phone number?

Type the phone number below.

Phone number:

```
*99#
```

You might need to include a "1" or the area code, or both. If you are not sure
you need the extra numbers, dial the phone number on your telephone. If you
hear a modem sound, the number dialed is correct.

< Back   Next >   Cancel

New Connection Wizard

Connection Availability
You can make the new connection available to any user or only to yourself.
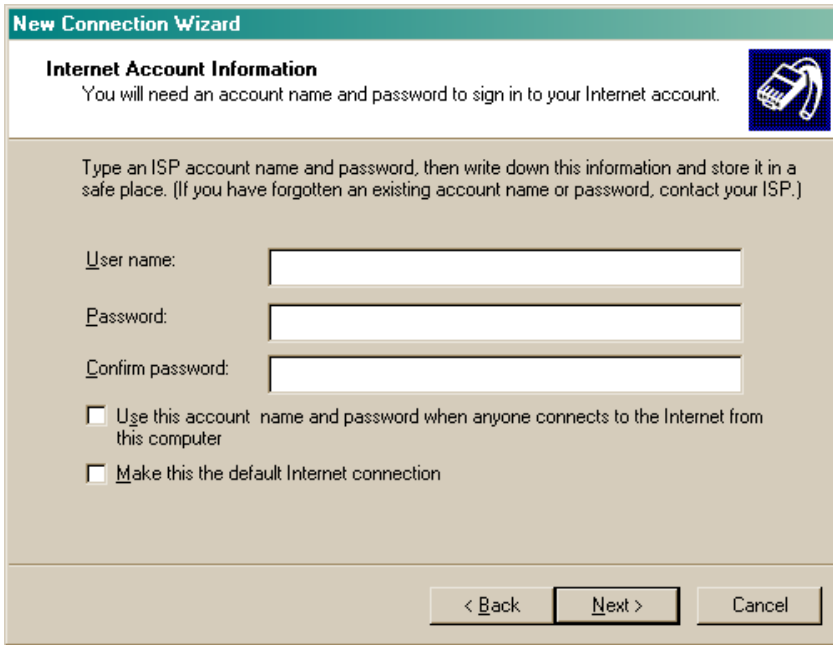
A connection that is created for your use only is saved in your user account and is not
available unless you are logged on.

Create this connection for:

(•) Anyone's use

( ) My use only

< Back   Next >   Cancel

Now you are ready to connect to live network. Double click on 3G Data Card icon on the desktop. 3G Data Card connection window appears as shown below.

Click on properties and ensure that 3G HTM1000 modem is chosen for connection. Click on 'OK' on Properties window and then Click on 'Dial' on 3G LGA module window.

The following window appears which shows dial up connection.
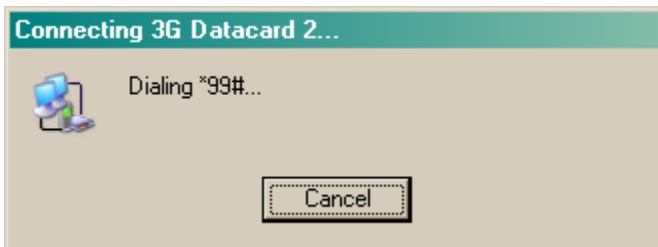
Once network connection is established, IP address of the connection can be verified by typing 'ipconfig" in command window.

9.2 Windows XP / Windows7 64-bit

9.2.1 Driver Installation

This driver is compatible with Windows XP and Windows7.

If HTM1200 data card is inside the host device, power down the data card until successful installation of the driver. If the host device (PC) has previous revision of

Motorola Datacard drivers, run C:\Program Files\Common Files\Motorola
Shared\Mot3GDatacard\Motorola Driver Installer.exe, clean the driver and uninstall
before installing the new driver.
Double click on
"Motorola_HTM1200_Datacard_Drivers_1.5.5_MotoConnectCard_1.2.5_x64.msi" to start
installation. Follow instructions from section 14.1.1 to complete driver installation.

9.2.2 Host Boot Service

When the driver is installed host boot service starts automatic. The service is called Moto
Connect Card Service. Hostboot service is installed at C:\Program Files
(x86)\Motorola\MCC\HostBoot.

9.2.3 Connecting to Live Network in Windows XP/Windows7

Dial up networking can be used to setup live network connection. Follow instructions
from section 14.2.3.

9.3 Windows 7 Mobile Broadband x86 and x64

9.3.1 Driver Installation

Double click on "Motorola_Mobile_Broadband_Driver_0.9.0.exe" to start installation. The
executable stops existing services (MCC and MotoMBService) before installing the new
driver. The executable extracts driver files and starts installation. Installation window opens,
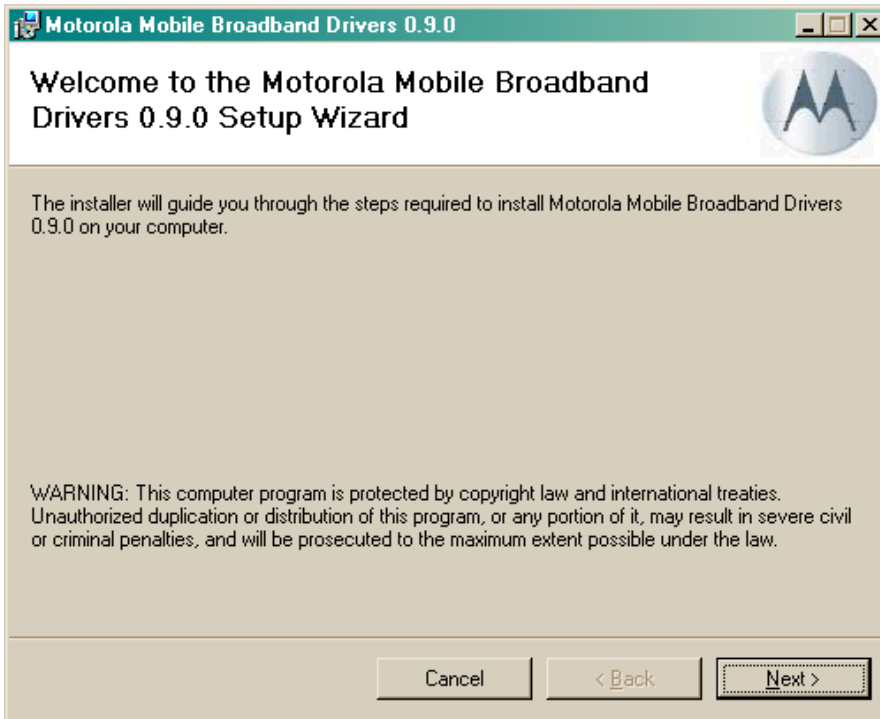and click 'Next' on the window.

Figure 5 Windows 7 x86 and x64 installation

Agree to license terms, click on 'Next'.
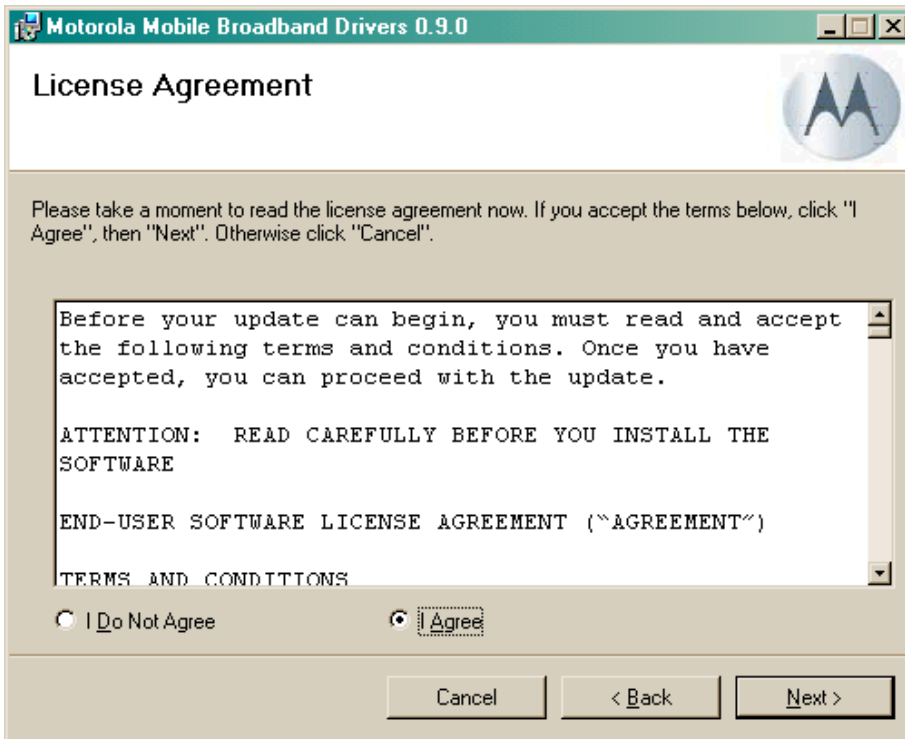
Figure 6 License Agreement
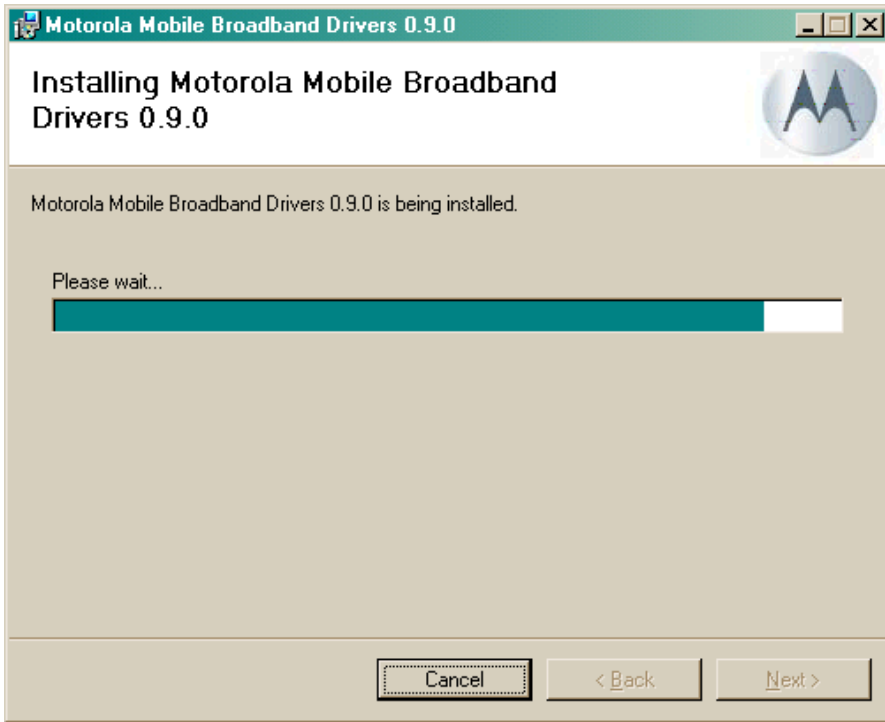
Figure 7. Driver Installation in Progress

Installation complete message comes up. Click Close to exit.
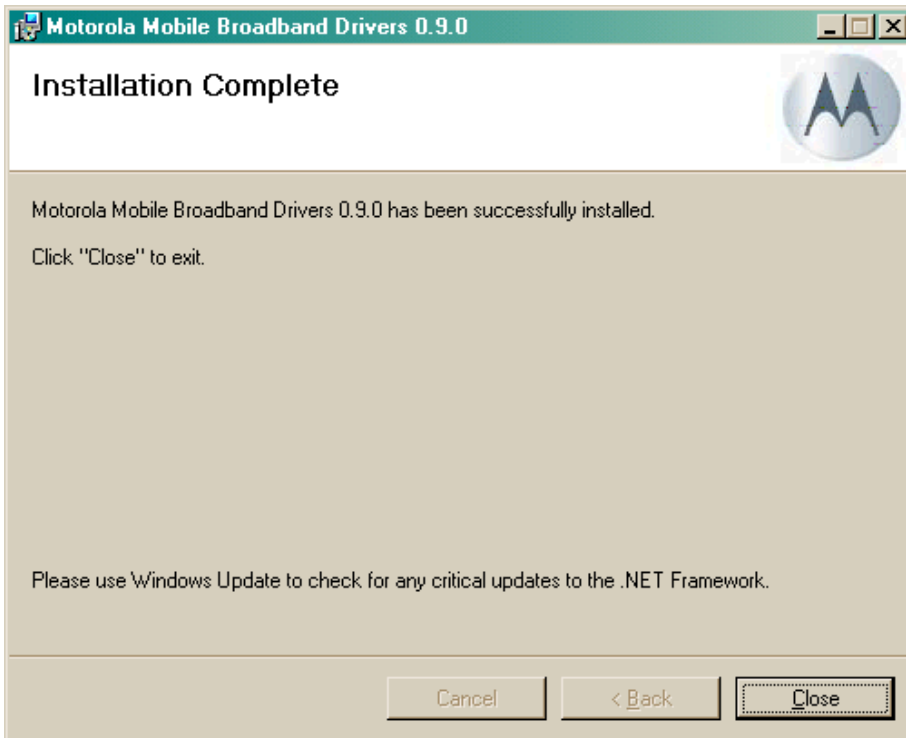
Figure 8 Driver Installation Complete

The installer will ask for a system restart. Please close all other applications and click on the "Yes" button to restart the system. After installing the driver PC must be restarted before connecting HTM1200.

Figure 9 Restart PC

9.3.2 Live network Connection

Live network connection can be established using MBB connection Manager.

Regulatory Requirements

The Federal Communications Commission (FCC) requires application for certification of digital devices in accordance with CFR Title 47, Part 2 and Part 15. This includes MPE calculation. As the mod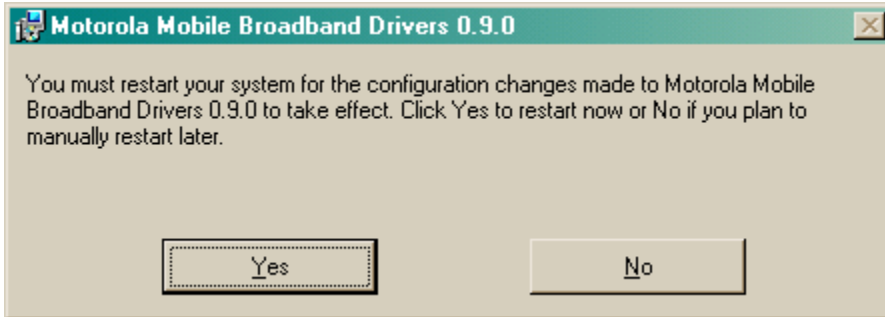em is not a standalone transceiver but is an integrated module, the modem cannot be tested by itself for EME certification. It is, however, the integrator's responsibility to have the completed device tested for EME certification.

Caution: Unauthorized repairs or modifications could result in permanent damage to the equipment and void your warranty and your authority to operate this device under Part 15 of the FCC Rules.

FCC Notice to Users

Motorola has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authority to operate the equipment. See 47 CFR Sec. 15.21. This device complies with part 15 of the FCC Rules and Class B digital apparatus requirements for ICES-003. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation. See 47 CFR Sec. 15.19(3).

The external label on the host device must include the following FCC ID information:
"This device contains TX FCC ID: IHDT56LV3"

If your mobile device or accessory has a USB connector, or is otherwise considered a computer peripheral device whereby it can be connected to a computer for purposes of transferring data, then it is considered a Class B device and the following statement applies:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can

radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

Precautions

Interface connector and some of the module circuits are not shielded. Be sure to take appropriate precautionary measures in order to avoid ESD while handling the module. ESD can damage the modules. Integrators need to design ESD protection on all external interfaces.

Antenna and Transmission Safety Precautions

User Operation

Do not operate your unit when a person is within 8 inches (20 centimeters) of the antenna. A person or object within 8 inches (20 centimeters) of the antenna could impair call quality and may cause the phone to operate at a higher power level than necessary.

Important: The unit must be installed in a manner that provides a minimum separation distance of 20 cm or more between the antenna and persons and must not be co-located or operate in conjunction with any other antenna or transmitter to satisfy FCC RF exposure requirements for mobile transmitting devices.

Important: To comply with the FCC RF exposure limits and satisfy the categorical exclusion requirements for mobile transmitters, the requirements described in the following section, "Antenna Installation" , must be met.

Antenna Installation

- The antenna installation must provide a minimum separation distance of 20 cm from users and nearby persons and must not be co-located or operating in conjunction with any other antenna or transmitter.
- Antenna installation should be done by a professional installer and should meet all FCC requirement as given in FCC part 15.
- The combined cable loss and antenna gain must not exceed +2.6 dBi (850 band). The combined cable loss and antenna gain must not exceed +3.0 dBi and total system output must not exceed 2.0W EIRP in the PCS (1900) band in order to comply with the EIRP limit of 24.232 (b). OEM installers must be provided with antenna installation instruction and transmitter operating conditions for satisfying RF exposure compliance.

Section 15.203 - Antenna Requirements

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to de-vices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.