MTX TERMINALS

MTX-HSDPA-EU3 TERMINAL

CINTERION WIRELESS MODULES
Approved Distributor

Integrators Manual

Enhace your M2M application into 3G network

Powered by CINTERION EU3 HSDPA-UMTS Wireless Module

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Important information

This technical description contains important information for start up and use of the MTX-HSDPA-EU3 Terminal.

Read it carefully before you start working with the MTX-HSDPA-EU3 Terminal.

The warranty will be void should damage occur due to non-compliance with these instructions for use.

We cannot accept any responsibility for consequential loss.

Service and Support

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Information about MTX-HSDPA-EU3 product and accessories is available on the following web site:
http://www.matrix.es/MTX-Terminals

FTP server: (ask for user & password)
ftp://ftp.matrixelectronica.eu/mtx-terminals/

Or contact your local distributor / sales agent:

REVISION INFORMATION

EDITION VERSION 1.0   First Release: April 8th, 2011

1. INTRODUCTION

1.1 Description

When your application needs to receive data up to 3.6 Mbps download or transmit up to 386Kbps, the MTX-HSDPA-EU3 terminal is the solution based on HSDPA technology.

The HSPA (High Speed Downlink Packet Access) is a transmission standard based on the UMTS network which allows a download speed of up to 3.6 Mbit/s. The technology therefore enables services like broadband internet and e-mail access, high-speed download of large data files and streaming of videos or music.

The MTX-HSDPA-EU3 is a complete terminal that encapsulates everything you need in one compact plug-and-play unit. The integration is almost not needed because has its own SIM card reader and a USB port, minimizing the need for further hardware components.

The MTX-HSDPA-EU3 is controlled via AT commands and standard interfaces such as USB 2.0 full speed and NDIS driver.

When UMTS-HSDPA network operation is not present, the MTX-HSDPA-EU3 can operate in EDGE class 10 max. 236,8 kpbs (DL), max. 118 kbps (UL) or in GPRS class 10: max. 85.6 kbps (DL), max. 42.8 kbps (UL)

The MTX-HSDPA-EU3 can also work in simple CSD data transmission (GSM data rate 14.4 kpbs, V.110, UMTS data rate 57.6 kpbs V.120) as well Short Messaging (SMS), and FAX specifications. It has also an analogue interface and capable to make a voice communication call.

MTX-HSDPA-EU3 is manufactured with SMD Technologies with the ISO 9001 & IS0 14001 Quality certifications and it is RoHs / WEEE compliant.

A full list of antennas, cables and supplies accessories are available.

The MTX-HSDPA-EU3 terminal is powered by an internal SIEMENS Wireless Module EU3

*Note!.*Some of the functions described inside this Technical Description are only possible when the SIM-Card is inserted

ORDERING INFORMATION & VERSION

ORDERING CODE : 199.801.090
Hardware Release 2.01
Firmware Version: 01.014
Module inside: EU3-E

1.2 Highlights

General features:

• HSDPA 3.6 Mbps
•Tri-Band UMTS/HSDPA(WCDMA/FDD) 850/1900/2100 MHz
•Quad-Band GSM 850/900/1800/1900 MHz
• EDGE (E-GPRS) multi-slot class 10
• GPRS multi-slot class 10
• UMTS/HSDPA 3GPP release 5
• GSM 3GPP release 99
• Output power:
     - Class 4 (2 W) for GSM900
     - Class 3 (0.25 W) for UMTS
     - Class E2 (0.5 W) for EDGE900
     - Class E2 (0.4 W) for EDGE1800
     - Class 1 (1 W) for GSM1800
• Control via AT commands
(Hayes 3GPP TS 27.007 and 27.005)
• Power consumption:
     - Power down 50 µA
     - Average Supply Current < 970mA
(HSDPA data transfer)
• Temperature range
     - Normal Operation: -30°C to +65°C
     - Restricted Operation: -30°C to +75°C
     - Storage: -40°C to +85°C
• Dimensions. Excluding connectors: 78,1 x 66,8 x 37,2 mm
• Weight: < 190 g
• Supply voltage range: 6 ... 30 V

Interfaces:

• FME M 50 Ohm antenna connector
• USB 2.0 full speed interface
• Operating status LED bi-color
• SIM card interface 3 V, 1.8 V
• Plug-in power supply and on/off interfaces
• Handset audio interface

Specification for HSDPA data transmission:
• HSDPA: max. 3.6 Mbps (DL),
max. 384 kbps (UL)
• UE CAT [1-6], 11, 12 supported
• Compressed mode according to 3GPP TS25.212

Specification for UMTS data transmission:
• UMTS: max. 384 kbps (DL),
max. 384 kbps (UL)

Specification for EDGE data transmission:
• EDGE class 10: max. 236,8 kpbs (DL),
max. 118 kbps (UL)
• Mobile station class B
• Modulation and coding écheme MCS 1-9

Specification for GPRS data transmission:
• GPRS class 10: max. 85.6 kbps (DL),
max. 42.8 kbps (UL)
• Mobile station class B
• Full PBCCH support
• Coding schemes CS 1-4

Specification for CSD data transmission:
• GSM data rate 14.4 kpbs, V.110
• UMTS data rate 57.6 kpbs V.120
• RLP (Non-transparent mode)

Specification for SMS:
• Point-to-point MO and MT
• SMS cell broadcast
• Text and PDU mode

Specification for voice:
• Triple-rate codec for HR, FR and EFR
• GSM & 3GPP: Adaptive multi-rate AMR
• DTMF supported
• CEPT supervisory tones supported

Special features:
• Improved power-saving modes
• NDIS/USB driver for Microsoft® Windows® XP
• Customer IMEI as variant
• Firmware update via USB

1.3 Main Features and Services

The MTX-HSDPA-EU3 performs a set of telecom services (TS) according to GSM standard phase 2+, ETSI and ITU-T. The services and functions of the MTX-HSDPA-EU3 are implemented by AT commands issued over the USB interface.

1.3.1 Types of Mobile Station

The MTX-HSDPA-EU3 is a UMTS/HSDPA and also GSM/GPRS bands mobile station with the characteristics shown in the table below.

Feature	Implementation
General	
Frequency bands	Dual-Band UMTS/HSDPA (WCDMA/FDD) 900/2100 MHz Dual-Band GSM 850/900/1800/1900 MHz
GSM class	Small MS
Output power (according to Release 99)	Class 4 (+33dBm ±2dB) for EGSM900 Class 1 (+30dBm ±2dB) for GSM1800 Class E2 (+27dBm ± 3dB) for GSM 900 8-PSK Class E2 (+26dBm +3 /-4dB) for GSM 1800 8-PSK Class 3 (+24dBm +1/-3dB) for UMTS 2100, WCDMA FDD BdI
Power supply	5V < VCC < 32V
Physical	Dimensions: 78,1 x 66,8 x 37,2 mm Weight: approx. 190g
RoHS	All hardware components fully compliant with EU RoHS Directive
HSDPA features	
3GPP Release 5	3.6 Mbps, UL 384 kbps UE CAT. [1-6], 11, 12 supported Compressed mode (CM) supported according to 3GPP TS25.212
UMTS features	
3GPP Release 4	PS data rate – 384 kbps DL / 384 kbps UL CS data rate – 64 kbps DL / 64 kbps UL
GSM / GPRS / EGPRS features	

Data transfer	GPRS
	    • Multislot Class 10
	    • Full PBCCH support
	    • Mobile Station Class B
	    • Coding Scheme 1 – 4
	EGPRS
	    • Multislot Class 10
	    • EDGE E2 power class for 8 PSK
	    • Downlink coding schemes – CS 1-4, MCS 1-9
	    • Uplink coding schemes – CS 1-4, MCS 1-9
	    • BEP reporting
	    • SRB loopback and test mode B
	    • 8-bit, 11-bit RACH
	    • PBCCH support
	    • 1 phase/2 phase access procedures
	    • Link adaptation and IR
	    • NACC, extended UL TBF
	    • Mobile Station Class B
	CSD
	    • V.110, RLP, non-transparent
	    • 9.6 kbps

Feature	Implementation
SMS	Point-to-point MT and MO Cell broadcast Text and PDU mode
Audio	Audio speech codecs GSM: AMR, EFR, FR, HR 3GPP: AMR One ringing melody supported CEPT supervisory tones supported DTMF supported 6 audio modes: Approval, Router, Handset, Headset, Speakerphone and Transparent mode 9 ringing melodies supported CEPT and ANSI supervisory tones supported
Software	
AT commands	AT-Hayes GSM 07.05 and 07.07, Siemens AT commands for RIL compatibility (NDIS/RIL)
Microsoft™ compatibility	RIL / NDIS / USB drivers for Windows Mobile™
SIM Application Toolkit	SAT Class C
Firmware update	Firmware update from host application over USB.
Interfaces	
USB	Supports a USB 2.0 Full Speed (12Mbit/s) device interface.
Wakeup Control	Signal pin to wake up an inactive USB Host into an active state.
Status	Bi-colour LED to indicate network connectivity status.
Audio	1 analog interface
UICC interface	Supported chip cards: SIM / UICC 3V, 1.8V
Antenna	50 Ohms. External antenna can be connected via FME M antenna connector
Module interface	Mini USB-B connector
Power on/off, Reset	
Power on/off	Switch-on by hardware pin TURN_ON Switch-off by hardware pin TURN_OFF Switch-off by AT command
Reset	Orderly shutdown and reset by AT command
Emergency off	Emergency off by hardware pin TURN_OFF

1.3.2 Short Message Service

The wireless modem supports the following SMS services:

• Sending; MO (mobile-originated) with both PDU (protocol data unit) and text mode supported
• Receiving; MT (mobile-terminated) with both PDU and text mode supported
• CBM (cell broadcast message); a service in which a message is sent to all subscribers located in one or more specific cells in the GSM network (for example, traffic reports)
• SMS status report according to 3GPP TS 23.40

1.3.3 Voice Calls

The wireless modem offers the capability of MO (mobile originated) and MT (mobile terminated) voice calls, as well as supporting emergency calls. Multi-party, call waiting and call divert features are available. Some of these features are network operator specific.

For the inter-connection of audio, the wireless modem offers balanced analogue input and output lines. The wireless modems support HR, FR, EFR and AMR vocoders.

1.3.4 Data

The wireless modem supports the following data protocols:
- HSDPA: 3.6 Mbps DL / 384 kbps UL
- UMTS 384 kbps DL / 384 kbps UL
- GPRS (General Packet Radio Service)

The wireless modem is a Class B terminal, multislot class 10.
- EGPRS Multislot Class 10
- CSD (Circuit Switched Data) 9.6 kbps

1.3.5 OPERATION MODES

The table below briefly summarizes the various operating modes referred to in the following chapters.

Mode	Function	
Normal operation	GSM / GPRS / UMTS / HSDPA SLEEP	Power saving mode set automatically when no call is in progress and the USB connection is suspended by host or not present.
	GSM IDLE	Software is active. Once registered to the GSM network, paging with BTS is carried out in order to achieve synchrony with the GSM network. The repetition rate depends on the parameter BSPA_Multiframe. The module is ready to send and receive.
	GSM TALK/ GSM DATA	Connection between two subscribers is in progress. Power consumption depends on the GSM network coverage and several connection settings (e.g. DTX off/on, FR/EFR/HR, hopping sequences and antenna connection). The following applies when power is to be measured in TALK_GSM mode: DTX off, FR and no frequency hopping, otherwise same as for IDLE measurements.
	GPRS IDLE	Module is attached and ready for GPRS data transfer, but no data is currently sent or received.
	GPRS DATA	GPRS data transfer in progress. Power consumption depends on net-work settings (e.g. power control level), uplink / downlink data rates and GPRS configuration (e.g. used multislot settings).
	EGPRS DATA	EGPRS data transfer in progress. Power consumption depends on net-work settings (e.g. power control level), uplink / downlink data rates and EGPRS configuration (e.g. used multislot settings).
	UMTS / HSDPA IDLE	Module is attached and ready for UMTS / HSDPA data transfer, but no data is currently sent or received.
	UMTS TALK/ UMTS DATA	UMTS data transfer in progress. Power consumption depends on net-work settings (e.g. TPC Pattern) and data transfer rate.
	HSDPA DATA	HSDPA data transfer in progress. Power consumption depends on net-work settings (e.g. TPC Pattern) and data transfer rate.
Power Down		The internal power section is shut down. The SW on the module is not active. The interfaces are not accessible.

Average power consumption

Parameter	Description	Conditions	Min	Typ	Max	Unit
IBATT+	OFF State supply current	POWER DOWN		50		µA
	Average GSM / GPRS supply current1	SLEEP (USB Suspend) @DRX=9		2.2		mA
		SLEEP (USB Suspend) @DRX=5		2.7		mA
		SLEEP (USB Suspend) @DRX=2		3.9		mA
		IDLE (USB active) @DRX=2		70		mA
		Voice Call GSM900; PCL=5		290		mA
		GPRS Data transfer GSM900; PCL=5; 1Tx/4Rx		310		mA
		GPRS Data transfer GSM900; PCL=5; 2Tx/3Rx		410		mA
		EDGE Data transfer GSM900; PCL=5; 1Tx/4Rx		250		mA
		EDGE Data transfer GSM900; PCL=5; 2Tx/3Rx		300		mA
		Voice Call GSM1800; PCL=0		240		mA
		GPRS Data transfer GSM1800; PCL=0; 1Tx/4Rx		270		mA
		GPRS Data transfer GSM1800; PCL=0; 2Tx/3Rx		340		mA
		EDGE Data transfer GSM1800; PCL=0; 1Tx/4Rx		230		mA
		EDGE Data transfer GSM1800; PCL=0; 2Tx/3Rx		280		mA
IBATT+	Peak current during GSM transmit burst	VOICE Call GSM900; PCL=5		1.95	2.7	A
		VOICE Call GSM1800; PCL=0		1.2	2.1	A
	Average WCDMA supply current	SLEEP (USB Suspend) @DRX=9		2.0		mA
		SLEEP (USB Suspend) @DRX=8		2.4		mA
		SLEEP (USB Suspend) @DRX=6		3.7		mA
		Idle (USB active) @ DRX=6		70		mA
		UMTS Data transfer Band I @+23dBm		650	750	mA
		HSDPA Data transfer Band I @+23dBm		610		mA
		UMTS Data transfer Band VIII @+23dBm		630		mA
		HSDPA Data transfer Band VIII @+23dBm		640	740	mA

1. With an impedance of Z_{LOAD}=50Ohm at the antenna connector
2. Without neighbouring cells; without t3212 timer occurance
3. Under total mismatch conditions at antenna connector

1.3.6 Air Interface

Parameter	Conditions	Min.	Typical	Max.	Unit
HSDPA / UMTS connectivity	Band I, VIII				
UMTS Frequency range Uplink (UE to Node B)					
	UMTS 900 Band VIII	880		915	MHz
	UMTS 2100 Band I	1920		1980	MHz
UMTS Frequency range Downlink (Node B to UE)					
	UMTS 900 Band VIII	1930		1990	MHz
	UMTS 2100 Band I	2110		2170	MHz
Receiver Input Sensitivity @ ARP	UMTS 850 Band V		-109		dBm
	UMTS 1900 Band II		-107		dBm
	UMTS 2100 Band I		-108		dBm
RF Power@ ARP with 50Ohm Load	UMTS 850 Band V	+21	+23	+25	dBm
	UMTS 1900 Band II	+21	+23	+25	dBm
	UMTS 2100 Band I	+21	+23	+25	dBm
GPRS coding schemes	Class 10, CS1 to CS4				
EGPRS	Class 10, MCS1 to MCS9				
GSM Class	Small MS				
GSM Frequency range Uplink (MS to BTS)	GSM 850	824		849	MHz
	E-GSM 900	880		915	MHz
	GSM 1800	1710		1785	MHz
	GSM 1900	1850		1910	MHz
GSM Frequency range Downlink (BTS to MS)	GSM 850	869		894	MHz
	E-GSM 900	925		960	MHz
	GSM 1800	1805		1880	MHz
	GSM 1900	1930		1990	MHz
Static Receiver input Sensi-tivity @ ARP	GSM 850	-102	-108		dBm
	E-GSM 900	-102	-108		dBm
	GSM 1800	-102	-107		dBm
	GSM 1900	-102	-107		dBm
	E-GSM 900	31	32	35	dBm
	GSM 1800	28	29.25	32	dBm
	GSM 1900	28	29.25	32	dBm

| Parameter	Conditions	Min.	Typical	Max.	Unit
RF Power@ ARP with 50Ohm Load (GSM; 1 TX)	GSM 850	31	32	35	dBm
RF Power@ ARP with 50Ohm Load (GPRS; 1 TX)	GSM 850		32		dBm
	E-GSM 900		32		dBm
	GSM 1800		29.25		dBm
	GSM 1900		29.25		dBm
RF Power@ ARP with 50Ohm Load (EGPRS; 1 TX)	GSM 850		27		dBm
	E-GSM 900		27		dBm
	GSM 1800		26		dBm
	GSM 1900		26		dBm
RF Power@ ARP with 50Ohm Load (GPRS; 2 TX)	GSM 850		30.50		dBm
	E-GSM 900		30.50		dBm
	GSM 1800		27.75		dBm
	GSM 1800		27.75		dBm
RF Power@ ARP with 50Ohm Load (EGPRS; 2 TX)	GSM 850		25		dBm
	E-GSM 900		25		dBm
	GSM 1800		24		dBm
	GSM 1900		24		dBm

1.3.8 SIM Card

The MTX-HSDPA-EU3 supports an external SIM card through the integrated SIM holder. Both 3V and 1.8V SIM technology is supported. Older, 5V SIM technology is not supported

2. MECHANICAL DESCRIPTION

2.1 Overview

The pictures below show the mechanical design of the module along with the positions of the different connectors and mounting holes. The module case is made of durable PC/ABS plastic.
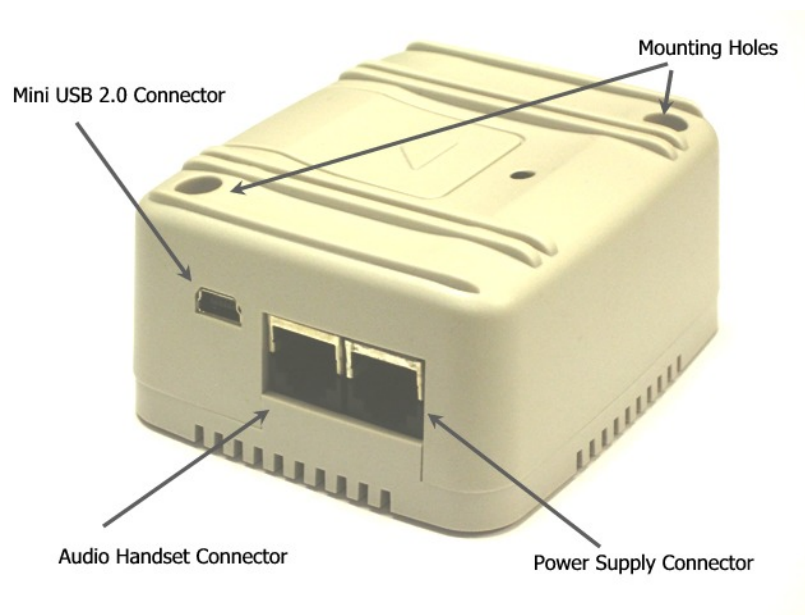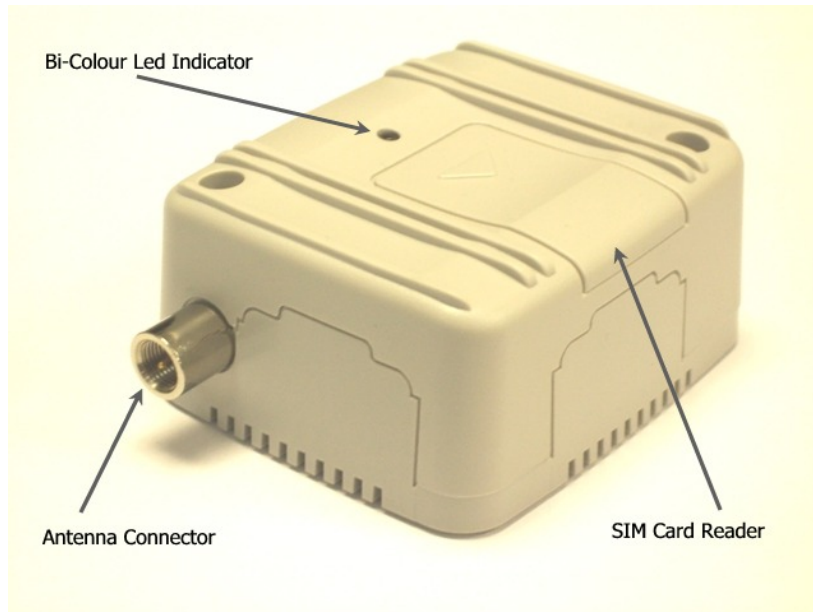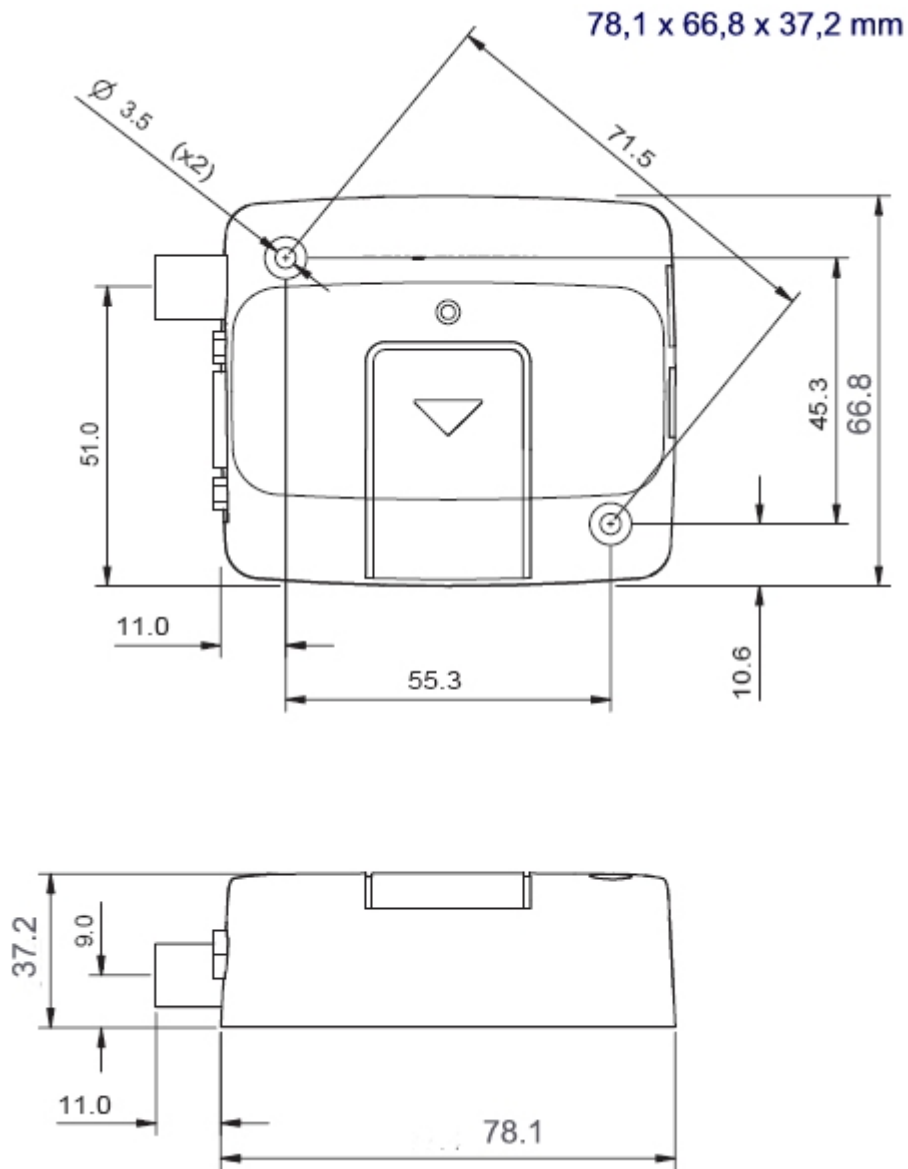
2.2. Dimensions

Figure 5. Dimensions of the MTX-HSDPA-EU3 terminal in mm

3. ELECTRICAL DESCRIPTION

All electrical connections to the module are protected in compliance with the standard air and contact Electrostatic Discharge (ESD).

The module uses the following industry standard connectors:
- USB port
- RJ12 6-way (power supply connector)
- RJ12 4-way (handset connector)
- SIM card reader
- FME male coaxial jack (antenna connector)

3.1 Power Connector

An RJ12 6-way connector, as shown and described below, serves means of supplying and controlling d.c. power to the modem.

The supply voltage, VCC, required by the modem is in the range 6-32V d.c. The power supply has to be a single voltage source of POWER=6V...30V capable of providing a peak during an active transmission. The uplink burst causes strong ripples (drop) on the power lines.

Application of the supply voltage does not switch the modem on. To do so an additional active-high control signal, TURN_ON, must applied for > 0.2s.

A second active-high control signal, TURN_OFF, can be used to switch modem off when applied for 1 - 2 seconds, or can be used to perform hardware reset when applied for > 3.5s.
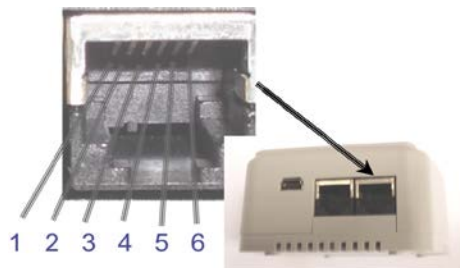
PIN:	Signal	Dir	Limits	Description
1	VCC	Input	6 - 32 V DC	Positive power input
2	Not connected	-		
3	TURN_OFF	Input	6 – 32 V	Active high control line used to switch off or reset the modem VIH > 5V, VIL < 2V Power off: t >10ms
4	TURN_ON	Input	6 – 32 V	Active high control line used to switch on the modem VIH > 5V, VIL < 2V Power on: t > 0.2s
5	VDDLP	I/O		Backup the RTC from an external capacitor or a battery (rechargeable or non-chargeable).
6	GND	Input		Negative power (ground)

Note. VCC and GND are reverse polarity and overvoltage protected.

3.2 Audio Connector

A 6-way 4-poles RJ connector, as shown below, allows a telephone handset to be plugged into the modem, giving access to the microphone and earpiece signals. The connector may also be used to drive other analogue audio sub-systems or devices.

The audio interface provides one analog input for a microphone and one analog output for an earpiece.
• The microphone input and the earpiece output are balanced.
• For electret microphones a supply source is implemented.
• The MTX-HSDPA-EU3 is pre-configured to work with a range of handsets, the audio interface is flexible and its performance can be configured, using AT commands, to match a particular handset or audio subsystem.

Audio handset connection.
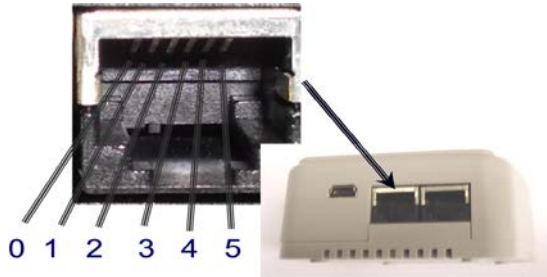
Audio signal descriptions are listed below:

Pin	Signal	Dir	Description
0	Not connected		
1	MICN	I	Microphone negative input
2	EPN	O	Earpiece negative output
3	EPP	O	Earpiece positive output
4	MICP	I	Microphone positive input
5	Not connected		

A power supply for electret microphones is already feeded to MICP connection.
Microphone signals are fed via the MICP and MICN pins to an analog-to-digital converter (ADC) and the DSP. The DSP application core calculates e.g. digital gains, sidetone, echo cancellation or noise suppression depending on the current configuration of the audio path. The processed speech samples are passed to the speech encoder.
Received samples from the speech decoder are passed to the digital-to-analog converter (DAC) after post processing (frequency response correction, adding sidetone etc.). The loudspeaker signal is routed via EPP and EPN pins.

In order to support different types of equipment, the audio interface can be configured with different audio modes via the AT^SNFS command. The electrical characteristics of the voiceband part vary with the audio mode. For example, sending and receiving amplification, sidetone paths, noise suppression etc. depend on the selected mode and can be set with AT commands.

The default audio mode (AT^SNFS=1) is intended to be used with the audio interface. This default configuration is optimized for the Votronic HH-SI-30.3/V1.1/0 handset and used for type approving the Siemens reference configuration. Audio mode 1 has fixed parameters that cannot

be modified.

3.3 MAIN Serial RS232 Interface Port   ASC0

The modem supports a standard RS232 serial interface (EIA/TIA 574) via its 9 pin Sub-D connector, shown below.


```
1 DCD    4 DTR    7 RTS
2 RD     5 GND    8 CTS
3 TD     6 DSR    9 RI
```
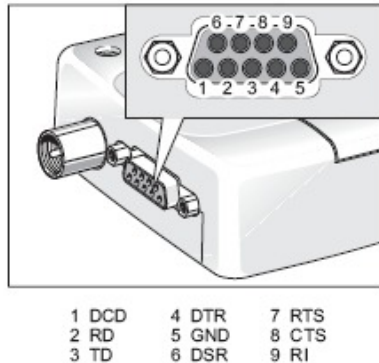
MTX-HSDPA-EU3 Terminal is designed for use as a DCE. (data circuit-terminating equipment) based on the conventions for DCE-DTE connections it communicates with the customer application (DTE- data terminating equipment) using the following signals:
- Port TxD @ application sends data to TXD of MTX-63I/65I Terminal
- Port RxD @ application receives data from RXD of MTX-63I/65I Terminal

The RS-232 interface is implemented as a serial asynchronous transmitter and receiver conforming to ITU-T V.24 Interchange Circuits DCE. It is configured for 8 data bits, no parity and 1 stop bit and can be operated at fixed bit rates from 300bps to 460,800bps.

Autobauding supports bit rates from 1,2bps to 460,800bps. Hardware handshake using the /RTS and /CTS signals and XON/XOFF software flow control are supported.

In addition the modem control signals DTR, DSR, DCD and RING are available. The MODEM control signal RING (Ring Indication) can be used to indicate, to the cellular device application, that a call or Unsolicited Result Code (URC) is received.

The electrical characteristics of the serial port signals are shown below:
Note: Outputs at 3kOhm load

Pin	Signal	Dir	Voltage levels	Description
1	DCD	O	Min ±5V	Data carrier detect
2	RD 0	O	Min ±5V	Received data
3	TD 0	I	VILmax = 0.6V VIHmin = 2.4V VImax = ±25V	Transmitted data
4	DTR	I	VILmax = 0.6V VIHmin = 2.4V VImax = ±25V	Data terminal ready
5	GND	-	0V	Ground connection
6	DSR	O	Min ±5V	Data set ready
7	RTS	I	VILmax = 0.6V VIHmin = 2.4V VImax = ±25V	Request to send
8	CTS	O	Min ±5V	Clear to send

|							
	9	RI	O	Min ±5V		Ring indicator	

Features
• Includes the data lines TXD0 and RXD0, the status lines RTS0 and CTS0 and, in addition, the modem control lines DTR0, DSR0, DCD0 and RING0.

• ASC0 is primarily designed for controlling the GSM engine with AT commands.

• Full Multiplex capability allows the interface to be partitioned into three virtual channels, yet with CSD and fax services only available on the first logical channel.

• The DTR0 signal will only be polled once per second from the internal firmware of MTX-63I/65I.

• The RING0 signal serves to indicate incoming calls and other types of URCs (Unsolicited Result Code). It can also be used to send pulses to the host application, for example to wake up the application from power saving state. To configure the RING0 line use following AT Command: AT^SCFG.

• By default, configured for 8 data bits, no parity and 1 stop bit. The setting can be changed using the AT command AT+ICF and, if required, AT^STPB. .

• ASC0 can be operated at fixed bit rates from 300 bps to 460800 bps.

• By default, serial speed is 115200bps

• Autobauding is not compatible with multiplex mode.

• Supports RTS0/CTS0 hardware flow control and XON/XOFF software flow control.

3.7 Expansion I/O port

MTX-HSDPA includes expansion Input/Outputs port on the 15 pin high density connector. The MTX-65I supports a   range of configurable I/Os plus SPI bus.
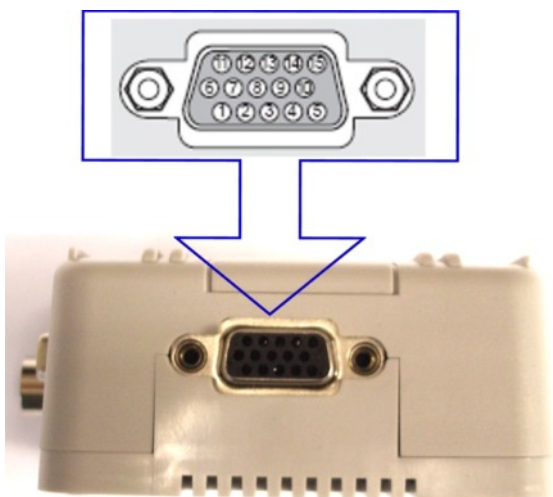
1. Do not use	6. Do not use	11. GPIO 2
2. Not connected	7. Not connected	12. GPIO 4
3. TD1	8. Not connected	13. ADC 2
4. GPIO 1	9. Vout	14. GND
5. GPIO 3	10. Do not use	15. ADC 1

3.3 Mini USB Connector

The USB 2.0 interface allows the connectivity to all relevant PCs and control boards in office and industrial environments. The USB interface is a USB 2.0 full speed (12Mbit/s) interface for AT-C modem functionality between the MTX-HSDPA-EU3 Terminal and a host controller e.g. a PC.

It can be operated on a USB 2.0 Full Speed or High Speed root hub (a PC host), but not on a generic USB 2.0 High Speed hub which translates High Speed (480 Mbit/s/) to Full Speed (12 Mbit/s).

The USB I/O-pins are capable of driving the signal at min 3.0V. They are 5V I/O compliant. To properly connect the module's USB interface to the host a USB 2.0 compatible connector is required. Furthermore, the USB modem driver delivered with MTX-HSDPA-EU3 must be installed as described below.

The USB cannot be used as power supply of MTX-HSPA-EU3 terminal. It is mandatory to use an external power supply for MTX-HSDPA-EU3. See accessories section.

3.4 Antenna Connector

The antenna connector allows transmission of radio frequency (RF) signals between the modem and an external customer-supplied antenna. The modem is fitted with a 50Ω, FME male coaxial jack.
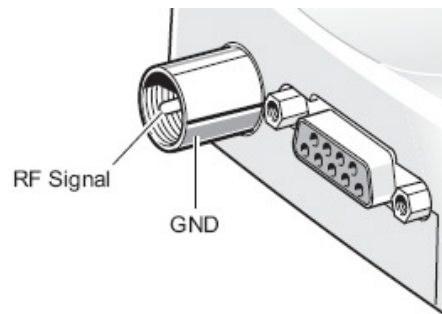
The external antenna must be matched properly to achieve best performance regarding radiated power, DC-power consumption, modulation accuracy and harmonic suppression.

3.5. SIM card reader

The MTX-HSDPA-EU3 Terminal is fitted with a SIM card reader designed for 1.8V and 3V SIM cards. It is the flip-up type which is lockable in the horizontal position and is accessed through a removable panel as shown below.
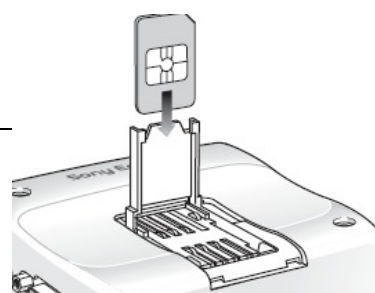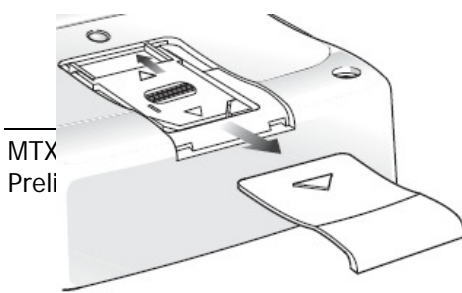
The card holder is a five wire interface according to GSM 11.11. It has a SIM card detector switch to detect whether or not the SIM card drawer is inserted.

Removing and inserting the SIM card during operation requires the software to be reinitialized. Therefore, alter reinserting the SIM card it is necessary to restart MTX-HSDPA-EU3 Terminal.

The full operation of the MTX-HSDPA-EU3 relies on a SIM card being inserted. Some MTX-HSDPA-EU3 functionality may be lost if you try to operate the control terminal without a SIM card.

3.6 Real Time Clock

The MTX-HSDPA-EU3 contains a real time clock (RTC) to maintain accurate timekeeping and to enable "time stamping" of messages.

The RTC could be powered with the signal VRTC present in pin 5 of the POWER CONNECTOR. See section 3.1.

The user must connect this pin to an external energy device like a battery or super-capacitor to provide back-up power to maintain the RTC. Example: If using a 300mF supercap the RTC can be maintain for at least 12 hours.

The internal Real Time Clock of MTX-HSDPA-EU3 is supplied from a separate voltage regulator in the analog controller which is also active when MTX-HSDPA-EU3 is in POWER DOWN status.

In addition, you can use the VRTC pin on the connector to backup the RTC from an external capacitor or a battery (rechargeable or non-chargeable). The capacitor is charged by the BATT+ line of internal EU3. If the voltage supply at BATT+ is disconnected the RTC can be powered by the capacitor.

The size of the capacitor determines the duration of buffering when no voltage is applied to MTX-HSDPA-EU3, i.e. the larger the capacitor the longer MTX-HSDPA-EU3 will save the date and time. A serial 1kΩ resistor placed on the board next to VDDLP limits the charge current of an empty capacitor or battery.

The following figures show various sample configurations.
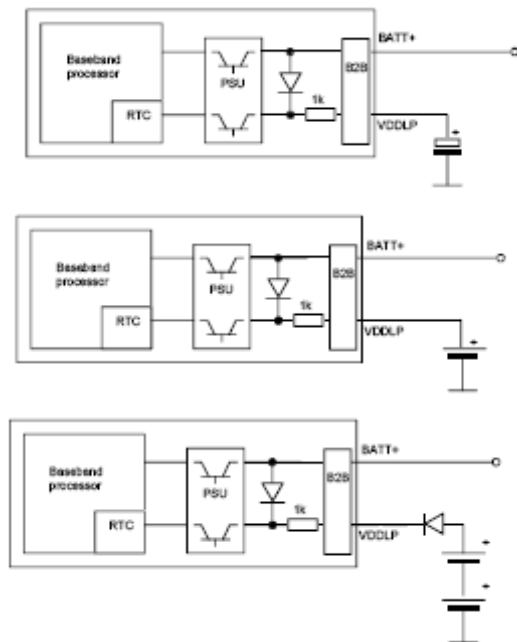
The MTX-HSDPA-EU3 can accommodate this battery or super-cap inside, and the MTX-HSDPA-EU3 can be ordered with this special option by request. Please contact gsmsupport@matrix.es about this request.

3.7. Software Updates

It is possible and sometimes necessary to update the MTX-HSDPA-EU3 software.
Updates must be carried out by an approved technician.
Please contact your supplier for details Service/Programming

4. OPERATION

4.1 Switching On the Modem

There is ONE way to switch on the modem, once power is applied:
• assert TURN_ON high for > 0.4s;

The modem is fully operational after 4 seconds. Logging onto a network may take longer than this and is outside the control of the modem.

The modem can be configured to start up at the time power is applied by permanently tying power connector signals TURN_ON (pin 4) and VCC (pin 1) together.

4.2 Switching Off the Modem

There are 2 ways to switch off (power down) the modem as described below:

• Either use the AT^SMSO command; RECOMMENDED.
The AT^SMSO command lets the MTX-HSDPA-EU3 Terminal log off from the network and allows the software to enter into a secure state and safe data before disconnecting the power supply. The mode is referred to Power-down mode. In this mode only the RTC stays active.

• Or assert TURN_OFF, pin 3 of power supply connector, high for >1 seconds. A delay of up to 10s is experienced as the modem logs off the network.

4.3 Operating States/LED

The modem has a dual color LED, which displays the operating status of the Terminal. Both LEDS are provided for signalling the module's network connectivity status -STATUS0 to signal the GSM connectivity and STATUS1 to signal the UMTS connectivity.

This status function has to be activated with AT^SLED=1. This command is **VOLATILE**; it lost the configuration when terminal is shut down. Please ensure to write it at configuration & initialization string.

In following table is showed the different operating status of the LEDS:

GREEN LED connected to STATUS0 line:
> • Lights steadily when the ME is registered to the GSM network and either awake or in power saving state.
> • Flashes at 1Hz and 50% duty cycle (0.5s on, 0.5s off) when the ME is awake and not registered to any network.
> • Flashes at 0.25 Hz and appr. 50% duty cycle (2s on, 2s off) when the ME is in power saving state and not registered to any network.
> When the ME is in power saving state and not registered, the flashing frequency may be less than 0.25Hz and the duty cycle may vary, for example between 45% and 55%. These variations are due to transitions from awake state to power saving state which may occur at the beginning of an LED flashing period (eg. at the beginning of a 1Hz or 0.25Hz flashing period). In the worst case, the LED will indicate a transition from awake to power saving after 4s.
> • **While the STATUS0 signal is active the STATUS1 signal is inactiv**e.

YELLOW LED connected to STATUS1 line:
> • Lights steadily when the ME is registered to the UMTS network.
> • Is off when the ME is not registered to the UMTS network.
> • **While the STATUS1 signal is active the STATUS0 signal is inactive.**

5. EU3 AT COMMAND INTERPRETER

After successful installation of the EU3 driver package, the physical USB interface of the module is represented in the operating system by two virtual interfaces, each assigned to a virtual COM port of its own:

• Modem interface:

This interface is referred to as "Modem" if queried with AT^SQPORT. In the quick reference tables it is named USB0-MDM. In Windows XP, it will show up as "Siemens HSDPA USB Modem" in the Windows Device Manager, under Modems. The COM port number automatically assigned by Windows during the installation can be gathered from the Modems property page.

The modem interface is intended particularly for data transmission (HSDPA, GPRS, CSD or FAX) established over a dial-up connection. Using AT commands on this interface is not recommended, except for data call related commands like ATD or ATO.

URCs relevant for data calls (RING, NO CARRIER) are issued on the modem interface, all other URCs normally only on the application interface.

• Application interface:

This port is referred to as "Application" if queried with AT^SQPORT. In the quick reference tables it is named USB0-APP. In Windows XP, it will show up as "Siemens HSDPA USB Com Port" in the Windows Device Manager, under Ports (COM&LPT), along with the COM port number automatically assigned by Windows.

The application interface is designed especially for controlling the EU3, i.e. for entering AT commands, receiving URCs, or sending and receiving short messages. It cannot be used as data interface for HSDPA, GPRS, CSD or FAX.

Please note that URCs are normally indicated only on this interface, no matter which of the two interfaces was used to send the AT commands for activating their presentation. This URC management scheme is the default configuration recommended for a typical MTX-HSDPA-EU3 application.

If you need to operate the MTX-HSDPA-EU3 from both interfaces at a time, bear in mind that both are handled by the same AT command interpreter. As a result, AT commands entered on both interfaces are not executed in parallel but sequentially, one after the other. So, an AT command issued on one interface will be buffered on this interface to be executed after the other interface has completed processing earlier AT command(s). The buffered command string is not echoed, but will be indicated when executed.

When a dial-up connection is established over the modem interface, the application interface can be used simultaneously for any control functions. This eliminates the need for the user to enter AT commands, such as +++ and ATO, to switch back and forth between command and online mode when working on one interface only. Yet, it should be noted that the dial-up connection disables the echo on both interfaces, due to the initialization strings typically set by modems. The echo can be re-activated by executing ATE1.

6 SAFETY AND PRODUCT CARE

Please read the information in this section and the information in "Installation of the Modem", before starting your integration work!

6.1. Safety instructions

PLEASE READ THESE SAFETY INSTRUCTIONS AND KEEP A COPY OF THEM.
• Always ensure that use of the modem is permitted. The modem may present a hazard if used in proximity to personal medical electronic devices. As a rule, the modem must not be used in hospitals, airports or planes.

• Never use the modem at a gas station, refueling point, blasting area or in any other environment where explosives may be present.

• Operating the modem close to other electronic devices, such as antennas, television sets, and radios may cause electromagnetic interference.

• This product is intended to be used with the antenna or other radiating element at least 20cm away from any part of the human body. In applications where this rule cannot be applied, the application designer is responsible for providing the SAR measurement test report and declaration.

• You are responsible for observing your country's safety standards, and where applicable, the relevant wiring rules.

6.2. General precautions

The MTX-HSDPA-EU3 Terminal as a stand alone item is designed for indoor use only. To use outside it must be integrated into a weatherproof enclosure. Do not exceed the environmental and electrical limits as specified in "Technical Data".

• Avoid exposing the modem to lighted cigarettes, naked flames or to extreme hot or cold temperature.

• Never try to dismantle the modem yourself. There are no components inside the modem that can be serviced by the user. If you attempt to dismantle the modem, you may invalidate the warranty.

• The MTX-HSDPA-EU3 Terminal must not be installed or located where the surface temperature of the plastic case may exceed 85°C.

• All cables connected to the MTX-HSDPA-EU3 Terminal must be secured or clamped, immediately adjacent to the modem's connectors, to provide strain relief and to avoid transmitting excessive vibration to the modem in the installation

• Ensure the d.c. cable, supplying power to the MTX-HSDPA-EU3 Terminal, does not exceed 3 meters.

• To protect power supply cables and meet the fire safety requirements when the unit is powered from a battery or a high current supply, connect a fast 1.25A fuse in line with the positive supply.

• Do not connect any incompatible component or product to the MTX-HSDPA-EU3 Terminal.

Note! MTX-HSDPA-EU3 distributors and sales offices may refuse warranty claims where evidence of product misuse is found.

6.3. SIM card precautions

Before handling the SIM card in your application, ensure that you are not charged with static electricity. Use proper precautions to avoid electrostatic discharges.

• When the SIM card hatch is opened, the SIM card connectors lie exposed under the SIM card holder.

Caution! Do not touch these connectors! If you do, you may release an electrical discharge that could damage the modem or the SIM card.

• When designing your application, the SIM card's accessibility should be taken into account. We always recommend that you have the SIM card protected by a PIN code. This will ensure that the SIM card cannot be used by an unauthorized person.

6.4. Antenna precautions

If the antenna is to be mounted outside, consider the risk of lightning. Follow the instructions provided by the antenna manufacturer.

• Never connect more than one modem to a single antenna. The modem can be damaged by radio frequency energy from the transmitter of another modem.

• Like any mobile station, the antenna of the modem emits radio frequency energy. To avoid EMI (electromagnetic interference), you must determine whether the application itself, or equipment in the application's proximity, needs further protection against radio emission and the disturbances it might cause. Protection is secured either by shielding the surrounding electronics or by moving the antenna away from the electronics and the external signals cable.

• The modem and antenna may be damaged if either come into contact with ground potentials other than the one in your application. Beware, ground potential are not always what they appear to be.

6.5. Radio Frequency (RF) exposure and SAR

Your wireless modem device is a low-power radio transmitter and receiver (transceiver). When it is turned on, it emits low levels of radio frequency energy (also known as radio waves or radio frequency fields).

Governments around the world have adopted comprehensive international safety guidelines, developed by scientific organizations, e.g. ICNIRP (International Commission on Non-Ionizing Radiation Protection) and IEEE (The Institute of Electrical and Electronics Engineers Inc.), through periodic and thorough evaluation of scientific studies. These guidelines establish permitted levels of radio wave exposure for the general population. The levels include a safety margin designed to assure the safety of all persons, regardless of age and health, and to account for any variations in measurements.

Specific Absorption Rate (SAR) is the unit of measurement for the amount of radio frequency energy absorbed by the body when using a transceiver. The SAR value is determined at the highest certified power level in laboratory conditions, but the actual SAR level of the transceiver while operating can be well below this value. This is because the transceiver is designed to use the minimum power required to reach the network.

The MTX-HSDPA-EU3 wireless modem device has been approved for applications where the antenna is located >20cm from the body. In all other configurations the integrator is responsible for meeting the local SAR regulations.

Integrators of the MTX-HSDPA-EU3 wireless modem device are responsible for ensuring that they meet the SAR regulatory requirements of the countries in which they intend to operate the device, and that their documentation contains the relevant SAR declaration, certification information, and user guidance as appropriate.

6.6. Personal Medical Devices

Wireless modem devices may affect the operation of cardiac pacemakers, hearing aids and certain other implanted equipment. If a minimum distance of 15 cm (6 inches) is maintained between the MTX-HSDPA-EU3 terminal radiating antenna and a pacemaker, the risk of interference is limited. If the integrator's application is likely to be situated in the vicinity of personnel, a suitable warning should be contained in the equipment manual to this effect.

7. INSTALLATION OF THE MODEM

This chapter gives you advice and helpful hints on how to integrate the MTX-HSDPA-EU3 Terminal into your application from a hardware perspective.

7.1 Where to install the modem

There are several conditions which need to be taken into consideration when designing your application as they might affect the modem and its function. They are:

7.1.1 Environmental conditions

The modem must be installed so that the environmental conditions stated in the Technical Data chapter, such as temperature, humidity and vibration are satisfied.
Additionally, the electrical specifications in the Technical Data section must not be exceeded.

7.1.2 Signal strength

The modem has to be placed in a way that ensures sufficient signal strength. To improve signal strength, the antenna can be moved to another position. Signal strength may depend on how close the modem is to a radio base station. You must ensure that the location at which you intend to use the modem, is within the network coverage area. Degradation in signal strength can be the result of a disturbance from another source, for example an electronic device in the immediate vicinity. More information about possible communication disturbances can be found in section 7.3.5.

When an application is completed, you can verify signal strength by issuing the AT command AT+CSQ. See "AT+CSQ Signal Strength".

Tip! Before installing the modem, use an ordinary mobile telephone to check a possible location for it. In determining the location for the modem and antenna, you should consider signal strength as well as cable length.

7.1.3 Connections of components to MTX-HSDPA-EU3 Terminal

The integrator is responsible for the final integrated system. Incorrectly designed or installed, external components may cause radiation limits to be exceeded. For instance, improperly made connections or improperly installed antennas can disturb the network and lead to malfunctions in the modem or equipment.

7.1.4 Network and Subscription

Before your application is used, you must ensure that your chosen network provides the necessary telecommunication services. Contact your service provider to obtain the necessary information.
• If you intend to use SMS in the application, ensure this is included in your (voice) subscription.
• Consider the choice of the supplementary services

7.2 How to install the modem

7.2.1 Power supply

• Use a high-quality power supply cable with low resistance. This ensures that the voltages at the connector pins are within the allowed range, even during the maximum peak current.
• When the unit is powered from a battery or a high current supply, connect a fast 1.25A fuse in line with the positive supply. This protects the power cabling and modem.

7.2.2 Securing the modem

Before securing the modem take into account the amount of additional space required for the mating connectors and cables that will be used in the application.
• Where access is restricted, it may be easier to connect all the cables to the modem prior to securing it in the application.
• Securely attach the MTX-HSDPA-EU3 Terminal modem to the host application using two 3mm diameter pan-head screws

7.3 Antenna

7.3.1 General
The antenna is the component in your system that maintains the radio link between the network and the modem. Since the antenna transmits and receives electromagnetic energy, its efficient function will depend on:
• the type of antenna (for example, circular or directional);
• the placement of the antenna;
• communication disturbances in the vicinity in which the antenna operates.
In the sections below, issues concerning antenna type, antenna placement, antenna cable, and possible communication disturbances are addressed. In any event, you should contact your local antenna manufacturer for additional information concerning antenna type, cables, connectors, antenna placement, and the surrounding area.

You should also determine whether the antenna needs to be grounded or not. Your local antenna manufacturer might be able to design a special antenna suitable for your application.

7.3.2 Antenna type

Make sure that you choose the right type of antenna for the modem. Consider the following requirements:
• the antenna must be designed for the one of the frequency bands in use; please ask your network provider for more information:
- UMTS 850//1900/2100 MHz
- GSM 850/900/1800/1900 MHz;
• the impedance of the antenna and antenna cable must be 50Ω;
• the antenna output-power handling must be a minimum of 2W;

7.3.3 Antenna placement

The antenna should be placed away from electronic devices or other antennas. The recommended minimum distance between adjacent antennas, operating in a similar radio frequency band, is at least 50cm. If signal strength is weak, it is useful to face a directional antenna at the closest radio base station. This can increase the strength of the signal received by the modem. The modem's peak output power can reach 2W.

RF field strength varies with antenna type and distance. At 10cm from the antenna the field strength may be up to 70V/m and at 1m it will have reduced to 7V/m. In general, CE-marked products for residential and commercial areas, and light industry can withstand a minimum of 3V/m.

7.3.4 The antenna cable

Use 50Ω impedance low-loss cable and high-quality 50Ω impedance connectors (frequency range up to 2GHz) to avoid RF losses. Ensure that the antenna cable is as short as possible. The Voltage Standing-Wave Ratio (VSWR) may depend on the effectiveness of the antenna, cable and connectors. In addition, if you use an adapter between the antenna cable and the antenna connector, it is crucial that the antenna cable is a high-quality, low-loss cable. Minimize the use of extension cables, connectors and adapters. Each additional cable, connector or adapter causes a loss of signal power.

7.3.5 Possible communications disturbances

Possible communication disturbances include the following:
• **Noise** can be caused by electronic devices and radio transmitters.
• **Path-loss** occurs as the strength of the received signal steadily decreases in proportion to the distance from the transmitter.
• **Shadowing** is a form of environmental attenuation of radio signals caused by hills, buildings, trees or even vehicles. This can be a particular problem inside buildings, especially if the walls are thick and reinforced.
• **Multi-path fading** is a sudden decrease or increase in the signal strength. This is the result of interference caused when direct and reflected signals reach the antenna simultaneously. Surfaces such as buildings, streets, vehicles, etc., can reflect signals.
• **Hand-over** occurs as you move from one cell to another in the GSM network. Your mobile application call is transferred from one cell to the next. Hand-over can briefly interfere with communication and may cause a delay, or at worst, a disruption.

8. ACCESSORIES

The MTX-HSDPA-EU3 has been type approved together with a range of accessories including:
Power supply, all type of antennas (indoor, outdoor, high gain, etc...), cables and DIN adapter

Following is an example of this, please visit www.matrix.es/MTX-Terminals to see the full-range of accessories

8.1. POWER SUPPLY

8.1.1 AC Power Adaptor

OPANIEL TECHNOLOGIES http://www.opaniel.com/
Model S1512-1212

Input: 240VAC, 0.1A power adaptor, 50-60Hz mains lead
Euro plug option.
Output: 12V DC, 1.2A.
2m cable with RJ12 plug connector see below.
RJ12 plug proprietary pinout:
Pin 1 = Positive
Pin 2 = Not connected
Pin 3 = Not connected
Pin 4 = Positive
Pin 5 = Not connected
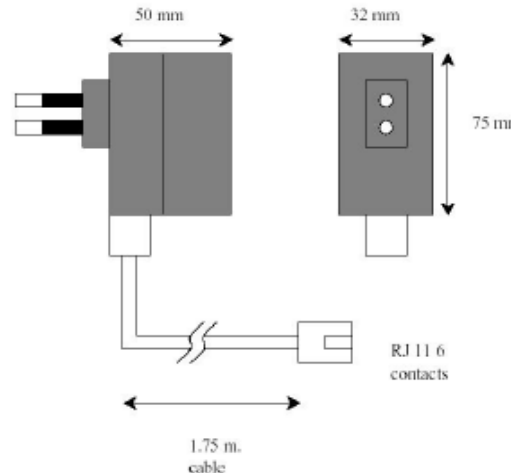Pin 6 = Negative

CE approved

ORDERING CODE: 901.004.167

8.1.2 DC cable

2,5m Fused DC Power Cable for GSM terminals
Fuse: Fast acting fuse ≥0.4A
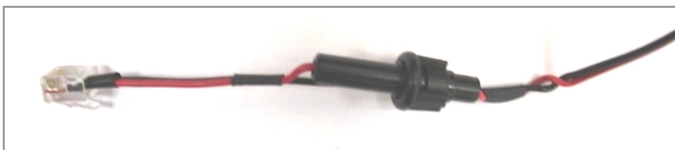
ORDERING CODE: 118.003.330

RJ12 plug proprietary pinout:
        Pin 1 = Positive RED
        Pin 2 = Not connected
        Pin 3 = Not connected
        Pin 4 = Positive RED
        Pin 5 = Not connected
        Pin 6 = Negative BLACK

8.2. ANTENNAS

8.2.1 Magnetic Dual Band Antenna (900/1800MHz)

OPANIEL TECHNOLOGIES http://www.opaniel.com
MTX-Antenna - Magnetic - MT43 - GSM & UMTS - -
Cable RG174 2,5 Meters
Gain 3 Db
FME F connector
ORDERING CODE: **118003212**

OPANIEL TECHNOLOGIES http://www.opaniel.com

Model: MTX-Antenna - Magnetic - 07 - GSM & UMTS
Cable RG174 2,5 Meters
Gain 2 dB
Whip lenth: 5 cm
FME F connector
ORDERING CODE: **118003216**

8.2.3 Patch Adhesive Antenna

OPANIEL TECHNOLOGIES http://www.opaniel.com

Model: MT803

Patch Antenna
Cable RG174 2,5 Meters
Gain 2,5 dB
Frequency: 900-1800-2200 Mhz

FME F CONNECTOR
MTX-Antenna - Adhesive - MT803 - GSM & UMTS - FME F - 2.5 m
ORDERING CODE: **118003306**

There is more antenna range of products, you can see in
http://www.opaniel.com/products/default.asp?IDP=2

8.3. CABLES

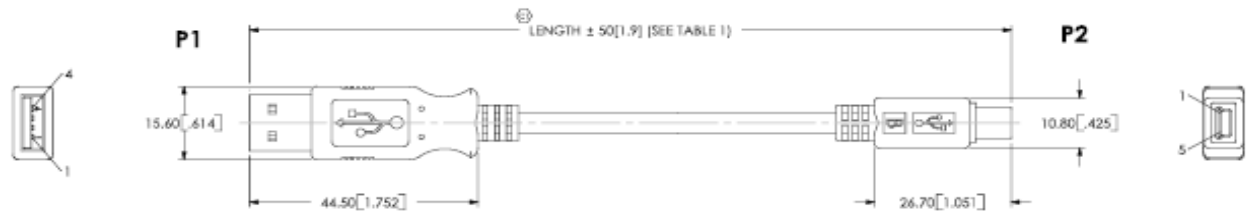### 8.3.1 USB CABLE

USB-A to Mini USB-B 1,5 meter length cable.

Ordering Code: 120.003.222
REF. USB-AM-MB-B-B-S-2

9. CONFORMITY ASSESSMENT

MATRIX ELECTRONICA S.L.
Alejandro Sanchez 109
28019 Madrid
Spain

Declare under our sole responsibility that the products
MTX-HSDPA-EU3 Terminal V2.0, containing Cellular Engine Siemens AG engine EU3 (Type S30960-N1050-A100) to which this declaration relates, are in conformity with the following standards and/or directives:

DIRECTIVES

Directive of the European Parliament and of the council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (in short referred to as R&TTE Directive 1999/5/EC). The product is labeled with the CE conformity mark.

Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

STANDARDS of EUROPEAN TYPE APPROVAL

3GPP TS 51.010-1: Digital cellular telecommunications system (Release 5); Mobile Station (MS) conformance specification

ETSI EN 301 511 V9.0.2: Global System for Mobile communications (GSM); Harmonized standard for mobile stations in the GSM 900 and DCS 1800 bands covering essential requirements under article 3.2 of the R&TTE directive (1999/5/EC) (GSM 13.11 version 7.0.1 Release 1998)

EN 301 908-01 V2.2.1 Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS) and User Equipment (UE) for IMT-2000 Third Generation cellular networks;
Part 1: Harmonized EN for IMT-2000, introduction and common requirements of article 3.2 of the R&TTE Directive
Part 2: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive

ETSI EN 301 489: Electro Magnetic Compatibility and Radio spectrum Matters (ERM); Electro Magnetic Compatibility (EMC) standard for radio equipment and services;
V1.4.1 Part 1: Common Technical Requirements ETSI EN 301 489-7 V1.2.1 (2000-09) V1.2.1 Part 7: Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS);
V1.2.1. Part 7: Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications Systems (GSM and DCS)
V1.2.1 Part 24: Specific conditions for IMT-2000 CDMA Direct Spread (UTRA) for Mobile and portable (UE) radio and ancillary equipment

IEC/EN 60950-1 (2001): Safety of information technology equipment (2000) EN 301 489-24 V1.2.1 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 24: Specific conditions for IMT-2000 CDMA Direct Spread (UTRA) for Mobile and portable (UE) radio and ancillary equipment

EN 301 908-01 V2.2.1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS) and User Equipment (UE) for IMT-2000 Third Generation cellular networks;
Part 1: Harmonized EN for IMT-2000, introduction and common requirements of article 3.2 of the R&TTE Directive
Part 2: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive 3GPP TS 34.124 Electromagnetic Compatibility

3GPP TS 34.124   Electromagnetic Compatibility (EMC) for mobile terminals and ancillary equipment.

3GPP TS 34.121   Technical Specification Group Radio Access Network; Terminal conform-ance specification; Radio transmission and reception (FDD)
3GPP TS 34.123   User Equipment (UE) conformance specification;
Part 1: Protocol con-formance specification.
Part 3: Abstract Test Suites.

The technical documentation relevant to the above equipment will be held at
MATRIX ELECTRONICA S.L.
Alejandro Sanchez 109
28019 Madrid
Spain

Madrid, 24th September 2007.
Mr. J. Vicente
Managing Board

10. ROHS STATEMENT

The MTX-HSDPA-EU3 is compliant with the 2002/95/EC Directive of   the
European Parliament and of the Council of 27 January 2003 on the
restriction of the use of certain hazardous substances in electrical and
electronic equipment (RoHS).

11. DISPOSAL OF OLD ELECTRICAL & ELECTRONIC EQUIPMENT (WEEE MARK)

This symbol, applied on our products and/or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of this product, please contact your local city office, household waste disposal service or the retail store where you purchased this product.

12. ABBREVIATIONS

Abbreviation	Explanations
CBM	Cell Broadcast Message
CBS	Cell Broadcast Service
CSD	Circuit Switched Data
DCE	Data Circuit Terminating Equipment
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
EFR	Enhanced Full Rate
EMC	Electro-Magnetic Compatibility
ETSI	European Telecommunication Standards Institute
FR	Full Rate
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communication
HR	Half Rate
HSCSD	High Speed Circuit Switched Data
ITU-T	International Telecommunication Union - Telecommunications Standardization Sector
ME	Mobile Equipment
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
PDU	Protocol Data Unit
RLP	Radio Link Protocol
RF	Radio Frequency
RTC	Real Time Clock
SIM	Subscriber Identity Module
SMS	Short Message Service
TA	Terminal Adapter
TE	Terminal Equipment
TS	Telecom Services

13. AT COMMAND SUMMARY

The AT standard is a line-oriented command language. AT is an abbreviation of ATtention and it is always used to start sending a command line from the terminal equipment (TE) to the terminal adaptor (TA). The command line consists of a string of alphanumeric characters. It is sent to the MTX-HSDPA-EU3 to instruct it to perform the commands specified by the characters.

The AT commands listed below are supported by the within the MTX-HSDPA-EU3. The AT command user manual can be downloading from MTX-HSDPA-EU3 web page: www.matrix.es/MTX-TERMINALS.

AT Command	Description
+++	Switch from data mode to command mode
AT&C	Set Data Carrier Detect (DCD) Line mode
AT&D	Set circuit Data Terminal Ready (DTR) function mode
AT&F	Set all current parameters to manufacturer defaults
AT&V	Display current configuration
AT+CACM	Accumulated call meter (ACM) reset or query
AT+CAMM	Accumulated call meter maximum (ACMmax) set or query
AT+CAOC	Advice of Charge information
AT+CBST	Select bearer service type
AT+CCFC	Call forwarding number and conditions control
AT+CCWA	Call Waiting
AT+CEER	Extended Error Report
AT+CFUN	Set phone functionality
AT+CGACT	PDP context activate or deactivate
AT+CGATT	PS attach or detach
AT+CGDATA	Enter data state
AT+CGDCONT	Define PDP Context
AT+CGEQMIN	3G Quality of Service Profile (Minimum acceptable)
AT+CGEQREQ	3G Quality of Service Profile (Requested)
AT+CGMI	Request manufacturer identification
AT+CGMM	Request model identification
AT+CGMR	Request revision identification of software status
AT+CGPADDR	Show PDP address
AT+CGQMIN	Quality of Service Profile (Minimum acceptable)
AT+CGQREQ	Quality of Service Profile (Requested)
AT+CGREG	GPRS Network Registration Status
AT+CGSMS	Select service for MO SMS messages
AT+CGSN	Request International Mobile Equipment Identity (IMEI)
AT+CGTFT	Traffic Flow Template
AT+CHLD	Call Hold and Multiparty
AT+CHUP	Hang up call

AT+CIMI	Request International Mobile Subscriber Identity (IMSI)
AT+CLCC	List current calls of ME
AT+CLCK	Facility lock
AT+CLIP	Calling Line Identification Presentation
AT+CMEE	Mobile Equipment Error Message Format
AT+CMGC	Send an SMS command
AT+CMGD	Delete short message
AT+CMGF	Select SMS message format
AT+CMGL	List SMS messages from preferred store
AT+CMGR	Read SMS messages
AT+CMGS	Send Short Message
AT+CMGW	Write Short Messages to Memory
AT+CMMS	More Messages to Send
AT+CMSS	Send short messages from storage
AT+CNMA	New Message Acknowledgement to ME/TE, only phase 2+
AT+CNMI	New short Message Indication
AT+CNUM	Read own numbers
AT+COLP	Connected Line Identification Presentation
AT+COPN	Read operator names
AT+COPS	Operator Selection
AT+CPAS	Mobile equipment activity status
AT+CPBF	Find phonebook entries
AT+CPBR	Read from phonebook
AT+CPBS	Select phonebook memory storage
AT+CPBW	Write into phonebook
AT+CPIN	PIN Authentication
AT+CPMS	Preferred SMS message storage
AT+CPUC	Price per unit and currency table
AT+CPWD	Change Password
AT+CR	Service reporting control
AT+CRC	Set Cellular Result Codes for incoming call indication
AT+CREG	Network registration
AT+CRLP	Select radio link protocol parameters for originated non-transparent data calls
AT+CRSM	Restricted SIM Access
AT+CSCA	SMS Service Center Address
AT+CSCB	Select Cell Broadcast Message Indication
AT+CSCS	Select TE character set
AT+CSIM	Generic SIM Access

AT+CSMP	Set SMS text Mode Parameters
AT+CSMS	Select Message Service
AT+CSQ	Signal quality
AT+CSSN	Supplementary service notifications
AT+CSTA	Select type of address
AT+ES	Synchronous Data Mode Configuration
AT+ESA	Synchronous access mode configuration
AT+GCAP	Request complete TA capabilities list
AT+GMI	Request manufacturer identification
AT+GMM	Request model identification
AT+GMR	Request revision identification of software status
AT+GSN	Request International Mobile Equipment Identity (IMEI)
AT+VTS	DTMF and tone generation
AT+WS46	Select wireless network
AT^SCFG	Extended Configuration Settings
AT^SCKS	Query SIM and Chip Card Holder Status
AT^SCSL	Customer SIM Lock
AT^SGAUTH	Set type of authentication for PDP-IP connections
AT^SLED	LED Feature
AT^SMSO	Switch off mobile station
AT^SNFS	Select audio hardware set
AT^SQPORT	Query Port Type
AT^SRTC	Ring tone configuration
AT^SUSB	USB Configuration
ATA	Answer a call
ATD	Mobile originated call to specified number
ATD*99#	Request GPRS service
ATD><mem><n>	Mobile originated call using specific memory and index number
ATD><n>	Mobile originated call from active memory using index number
ATD><str>	Mobile originated call from active memory using corresponding field
ATE	Enable command echo
ATH	Disconnect existing data connection
ATI	Display product identification information
ATL	Set monitor speaker loudness
ATM	Set monitor speaker mode
ATO	Switch from command mode to data mode
ATP	Select pulse dialing

ATQ	Set result code presentation mode
ATS0	Set number of rings before automatically answering a call
ATS10	Set disconnect delay after indicating the absence of data carrier
ATS3	Set command line termination character
ATS4	Set response formatting character
ATS5	Write command line editing character
ATS6	Set pause before blind dialing
ATS7	Set number of seconds to wait for connection completion
ATS8	Set number of seconds to wait for comma dialing modifier
ATT	Select tone dialing
ATV	Set result code format mode
ATX	Set CONNECT result code format
ATZ	Reset all current parameters to the default configuration

14. SALES CONTACT

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