

User Guide

GenPac 92c



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Document history

Revision	Modifications	Author	Date
000	CREATION + CREATION UK	F. LE BRETON / M. REEVES	27/06/07

The main modifications in this document compared to its previous version, are easily identifiable on a monitor by means of the blue text.

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Presentation

Supervision applications such as remote-maintenance or diagnosis in the "machine-to-machine" market segment have always called upon leading-edge technologies combining robustness, reliability and long-life.

The GenPac 92c is high-technology product in a compact and robust case.

The CE, CB and FCC conformities allow connexions to be made via Public Subscribe Telephone Networks (PSTN) throughout the world.

The GenPac 92c is a reliable and robust industrial product integrating a watchdog, power supply supervision and telephone line over-voltage protection.

This document describes the modem and provides the following information:

- General presentation,
- Functional description,
- Available basic services,
- Installation and use (first level),
- User-level trouble shooting,
- Recommended accessories.

For further information, please refer to the following documents:

- Commands List
- Application Notes
- Release Notes
- Client support (Hot-Line)

Warning

- TO AVOID ALL RISK OF ELECTROCUTION, DO NOT OPEN THE UNIT
- THE UNIT CONTAINS NO USER REPAIRABLE COMPONENTS
- THE UNIT MUST BE RETURNED TO THE MANUFACTURER FOR ANY REPAIRATION
- THE UNIT MUST NOT BE CONNECTED DIRECTLY TO THE MAINS SUPPLY. PLEASE USE A SUITABLE EXTERNAL POWER SUPPLY.
- TO ENSURE ELECTROMAGNETIC CONFORMITY, THE RS232/USB AND POWER SUPPLY CABLES SHOULD BE NO LONGER THAN 3 METRES IN LENGTH.

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1 References

1.1 Reference documents

ERCO&GENER Commands List:
EG_GenPac92c_995_CL_xxx_UK

Software update procedure:
EG_GenPac92c_995_UP_xxx_UK

1.2 Abbreviations

A	Ampere
AC	Alternative Current
ACM	Accumulated Call Meter
AT	Attention (prefix for modem commands)
CB	Certification Body
CLK	Clock
CMOS	Complementary Metal Oxide Semiconductor
CS	Coding Scheme
CTS	Clear To Send
dB	Decibel
dBc	Decibel relative to the Carrier power
dB_i	Decibel relative to an Isotropic radiator
dB_m	Decibel relative to one milliwatt
DC	Direct Current
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DCS	Digital Cellular System
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi-Frequency
DTR	Data Terminal Ready
EEPROM	Electrically Erasable Programmable Read-Only Memory
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
ESD	ElectroStatic Discharges
ETSI	European Telecommunications Standards Institute
FCC	Federal Communication Commission
FR	Full Rate
FTA	Full Type Approval
GCF	Global Certification Forum
GND	GrouND
HR	Half Rate
I	Input
IEC	International Electrotechnical Commission
I/O	Input / Output
LED	Light Emitting Diode
LL	Lease Line
MAX	MAXimum
Micro Fit	Family of connectors from Molex
MIN	MINimum

MNP	Microcom Networking Protocol
NOM	NOMinal
O	Output
OEM	Original Equipment Manufacturer
Pa	Pascal (for speaker sound pressure measurements)
PC	Personal Computer
PCL	Power Control Level
PDP	Packet Data Protocol
PSTN	Public Subscriber Telephone Network
RFI	Radio Frequency Interference
RI	Ring Indicator
RJ	Registered Jack
RTC	Réseau Téléphonique Commuté
RTS	Request To Send
RX	Receive
S/N	Serial Number
SRAM	Static RAM
TBR	Technical Basis for Regulation
TX	Transmit
TYP	TYPical
USB	Universal Serial Bus
V	Volt

2 Packing

2.1 Contents

The GenPac 92c is supplied with:

- GenPac 92c packing case,
- GenPac 92c modem,
- Telephone cable with RJ11 4/6 and piggyback RJ45 connectors,
- RS232 serial cable with 9-pin Sub-D male and female connectors,
- USB 2.0 cable with type A male and type B male connectors,
- 2-wire power supply cable,
- Instructions Sheet.



2.2 Packing case

Packing case external dimensions:

- Width: 163 mm,
- Height: 66 mm,
- Length: 295 mm.

An identification label is attached to the top of the packing case. It contains:

- The product reference (GenPac 92c),
- 9-digit serial number and bar code,
- CE and DEEE marks.



Identification label dimensions:

- Height: 37 mm,
- Length: 70 mm.

2.3 Modem labels

The label attached to the underside of the GenPac 92c contains:

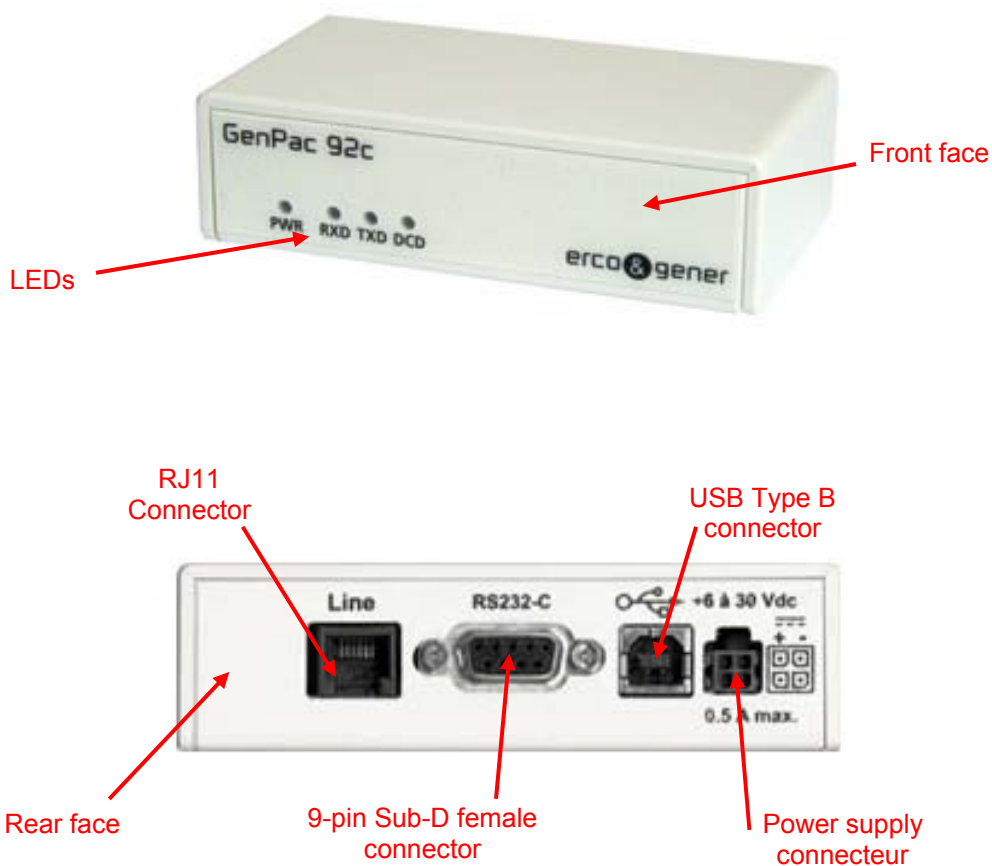
- The ERCO&GENER logo,
- The product name,
- Modem serial number,
- CE, DEEE (Crossed wheelie-bin) and RoHS marks,
- Power supply range (VDC).



3 General Presentation

3.1 Description

Description of the GenPac 92c modem:

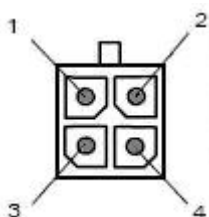


3.2 External connections

3.2.1 Connections

3.2.1.1 4-pin Micro Fit power supply connector

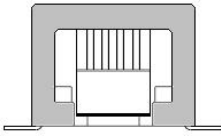
This connector allows the connection of an external DC supply to the GenPac 92c.



Pin N°	Signal
1	+VDC
2	GND
3	NC
4	NC

3.2.1.2 RJ11 telephone connector

This connector allows the GenPac 92c to be connected to a telephone line.

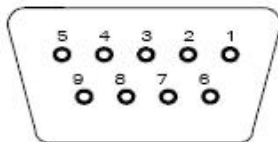


Component	Characteristics
Jack RJ11	Manufacturer : MOLEX
	RJ11 4/6 CMS

WARNING: The telephone line must be connected to the 2 centre pins on the RJ11 connector.

3.2.1.3 9-pin Sub HD female connector

This connector provides the RS232 serial link.

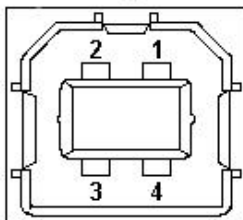


Pin N°	Description	Circuit (V24 – RS232C)	I/O
1	Data Carrier Detect	109 – DS – DCD	O
2	Data reception	104 – RD – RXD	O
3	Data transmission	103 – ED – TXD	I
4	Data Terminal Ready	108/2 – TDP – DTR	I
5	Signal Ground	102 – TS – GND	-
6	Data Set Ready	107 – PDP – DSR	O
7	Request To Send	105 – DPE – RTS	I
8	Clear To Send	106 – PAE – CTS	O
9	Ring Indicator	125 – IA – RI	O

3.2.1.4 USB connector

The standard type B USB connector is used for the USB 2.0 connexion (Full Speed compatible).

USB type B

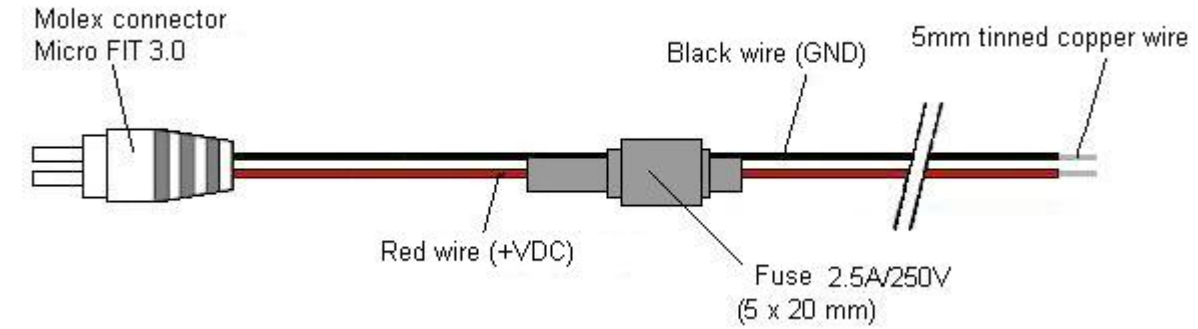


Pin N°	Description
1	Supply +5V (VBUS) 500mA max.
2	Data (D-)
3	Data (D+)
4	Ground (GND)

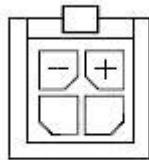
3.2.2 Cables

3.2.2.1 2-wire Micro FIT power supply cable

This cable provides power to the modem.



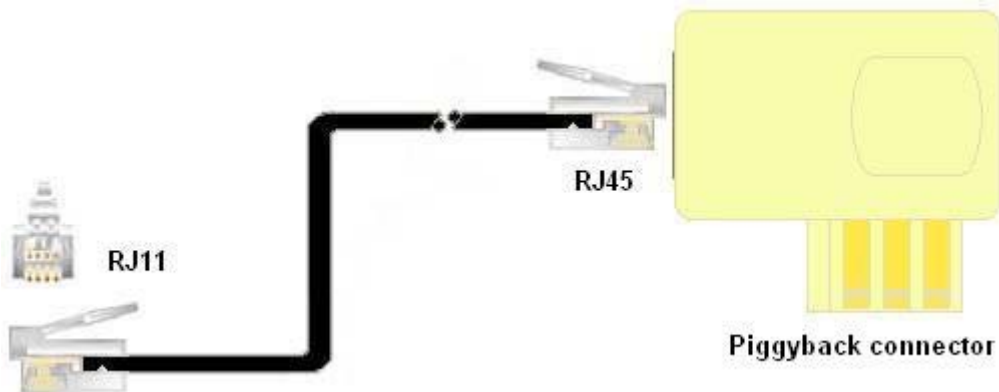
View from cable side



Component	Characteristics
4-pin Micro FIT connector	Type : MOLEX
Cable	Length ≈ 1.5m
Wire	Tinned copper 24 x 0.2 mm
	Surface area : 0.75 mm ²

3.2.2.2 Telephone cable

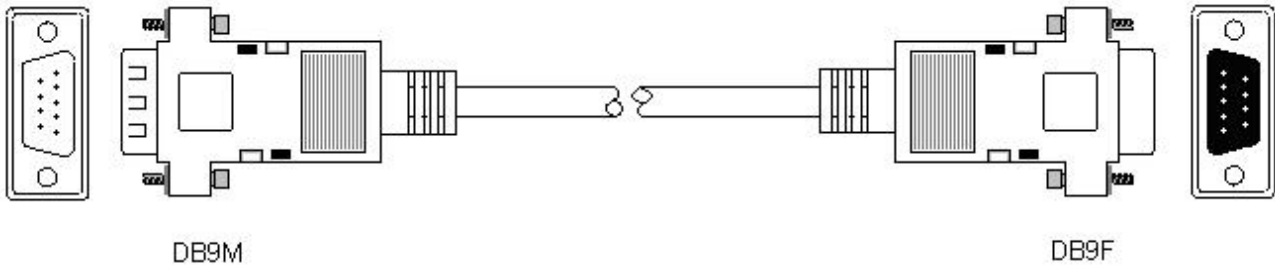
The GenPac 92c modem is connected to a telephone line by means of the cable supplied with the unit. This cable has a piggyback connector which is inserted into the wall plug in place of the telephone plug. The telephone is then plugged into the female part of the piggyback connector.



Component	Characteristics
Telephone connector	RJ45 piggyback plug with 6 contacts
RJ11 connector	4/6
Cable	Length ≈ 3 m
	Méplat 4-wire insulated

3.2.2.3 RS232 cable

This 9-pin Sub D male/female straight cable allows the GenPac 92c to communicate via the RS232 port with a communications terminal.

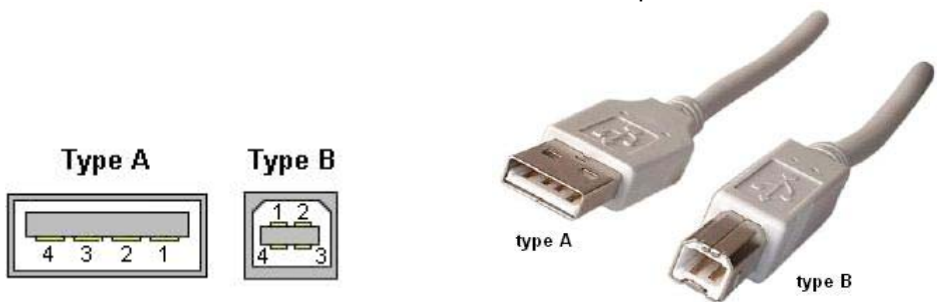


Component	Characteristics
9-pin Sub D male/female straight cable	Manufacturer : ASSMANN
	Length ≈ 2m
	9-wires
	Screw fixings

Pin N°	Description	Circuit (V24 – RS232C)	I/O
1	Data Carrier Detect	109 – DS – DCD	O
2	Data reception	104 – RD – RXD	O
3	Data transmission	103 – ED – TXD	I
4	Data Terminal Ready	108/2 – TDP – DTR	I
5	Signal Ground	102 – TS – GND	-
6	Data Set Ready	107 – PDP – DSR	O
7	Request To Send	105 – DPE – RTS	I
8	Clear To Send	106 – PAE – CTS	O
9	Ring Indicator	125 – IA – RI	O

3.2.2.4 USB 2.0 cable with type A male and type B male connectors

This cable allows the GenPac 92c to communicate via the USB port with a communications terminal.



Pin N°	Description
1	Supply +5V (VBUS) 500mA max.
2	Data (D-)
3	Data (D+)
4	Ground (GND)

Component	Characteristics
Cable USB 2.0	Manufacturer: INGELEC
	Length ≈ 2m
	USB type A Male USB type B Male

4 Characteristics and Services

The GenPac 92c is a multi-speed modem intended for the asynchronous transmission of binary data over the Public Subscriber Telephone Network (PSTN).

This compact and robust product is part of the cased range of products available from ERCO & GENER.

The modem's characteristics and available services are summarised in the table below:

Characteristics	
Standard	PTSN Avis V21, Bell 212A & Bell 103, V22, V22 Bis, V23, V32, V32 Bis, V34, V90, V92 Asynchronous transmission Data format 10 or 11 bits Auto adaptation: 300 bps to 230400 bps
Services	Error correction MNP4, V42 Data compression MNP5, V42 Bis Flow control: software and hardware Caller identification Power supply supervision Audio and visual communication indication Telephone line over-voltage protection
Interfaces	DC external power supply 6 to 30VDC RS232 V24 serial interface via 9-pin female Sub-D USB interface: Full Speed compatible via USB 2.0 type B RJ11 : PTSN 4 LED indicators: PWR / TX / RX / DCD Buzzer AT commands (Hayes)

5 Using the Modem

5.1 Starting with the modem

5.1.1 Configuring the modem

The default settings for the GenPac 92c serial link are:

- Data speed: **auto-adaptation (300 to 230400 bps)**,
- Data bits: **auto-adaptation (7 bits with even parity or 8 bits without parity or 8 with parity)**,
- Stop bits: **1**,
- Modulation: **auto-adaptation in reply (300 to 33600 bps)**.

The modem's configuration may be obtained at any moment in command mode by entering the command **AT&V**. The modem will return a table with the current active parameters:

Response
AT&V ACTIVE PROFILE: B1 E1 L1 M1 N0 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S0 &T5 &X0 &Y0 S00:000 S01:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:050 S08:002 S09:006 S10:014 S11:085 S12:050 S18:000 S25:005 S26:001 S36:007 S38:020 S46:138 S48:007 S95:000 STORED PROFILE 0: B1 E1 L1 M1 N0 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S0 &T5 &X0 S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:085 S12:050 S18:000 S36:007 S40:104 S41:195 S46:138 S95:000 STORED PROFILE 1: B1 E1 L1 M1 N0 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S0 &T5 &X0 S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:085 S12:050 S18:000 S36:007 S40:104 S41:195 S46:138 S95:000 TELEPHONE NUMBERS: 0= 1= 2= 3= OK

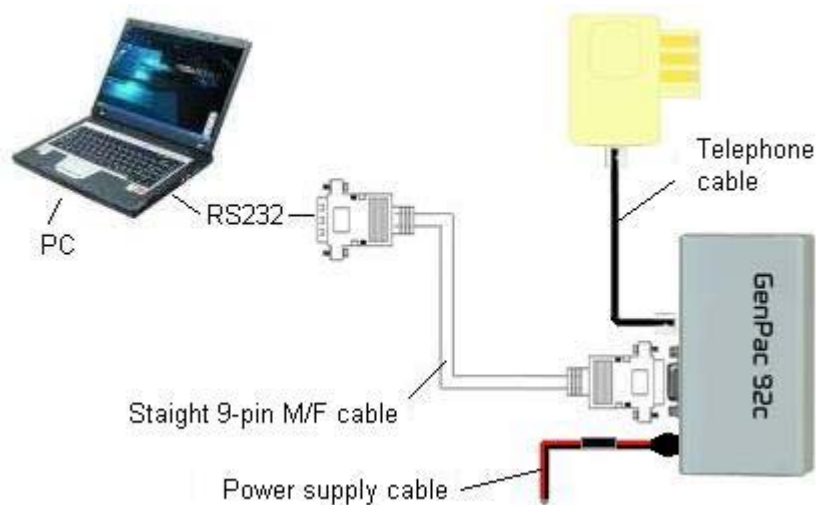
5.1.2 Installation of the modem

To install the modem via a Port COM RS232 or USB, it is advisable to use the accessories provided with the modem by ERCO & GENER.

5.1.2.1 Installing the modem on a RS232 COM port

The accessories provided with the modem are:

- a straight 9-pin male / 9-pin female Sub D cable,
- the telephone cable,
- the external power supply cable with in-line fuse and Micro FIT connector.



Installation of a GenPac 92c on a RS232 COM port

It is advisable to perform the operations below in the following order:

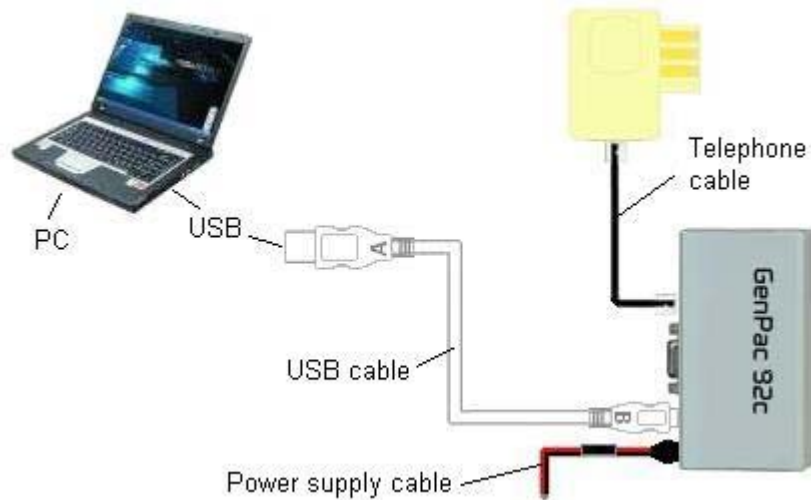
- Connect the V24 link to the DTE (PC) via the 9-pin M/F straight cable.
- Connect the modem to the telephone wall socket via the telephone cable.
- Connect the modem to a regulated external power source via the power supply cable.

The modem is now ready to be configured via Terminal (type HyperTerminal in Windows).

5.1.2.2 Installing the modem on a USB port

The accessories provided with the modem are:

- USB Full Speed type A Male and type B Male cable,
- telephone cable,
- external power supply cable with in-line fuse and Micro FIT connector.



Installation of a GenPac 92c on a USB port

It is advisable to perform the operations below in the following order:

- Connect only the telephone cable to modem and the telephone wall socket.
- For installation of the drivers and the powering up of the modem refer to the following paragraph.

5.1.2.3 Installing USB / Modem drivers

It is necessary to use the drivers available on our web site when using and installing the modem via a USB port.

The installation of the drivers is achieved in two parts: installation of the USB Driver (FT232R USB UART) and then the Modem Driver (Analogue Modem).

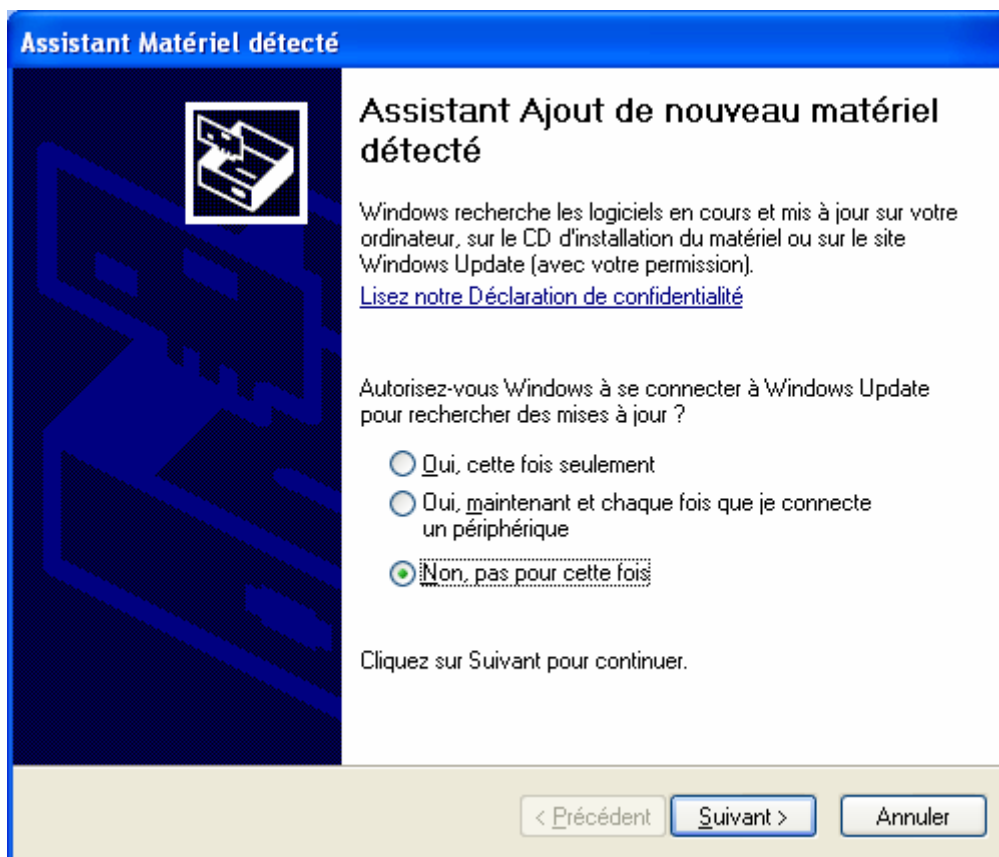
According to the various installations already made for USB drivers on the PC, the installation of USB Driver for GenPac 92c may not be automatic and necessary. Only the installation of the Driver Modem will be required.

Download and extract the file containing the drivers into a directory on the PC's hard disk (example: C:\Drivers_GenPac_92c).

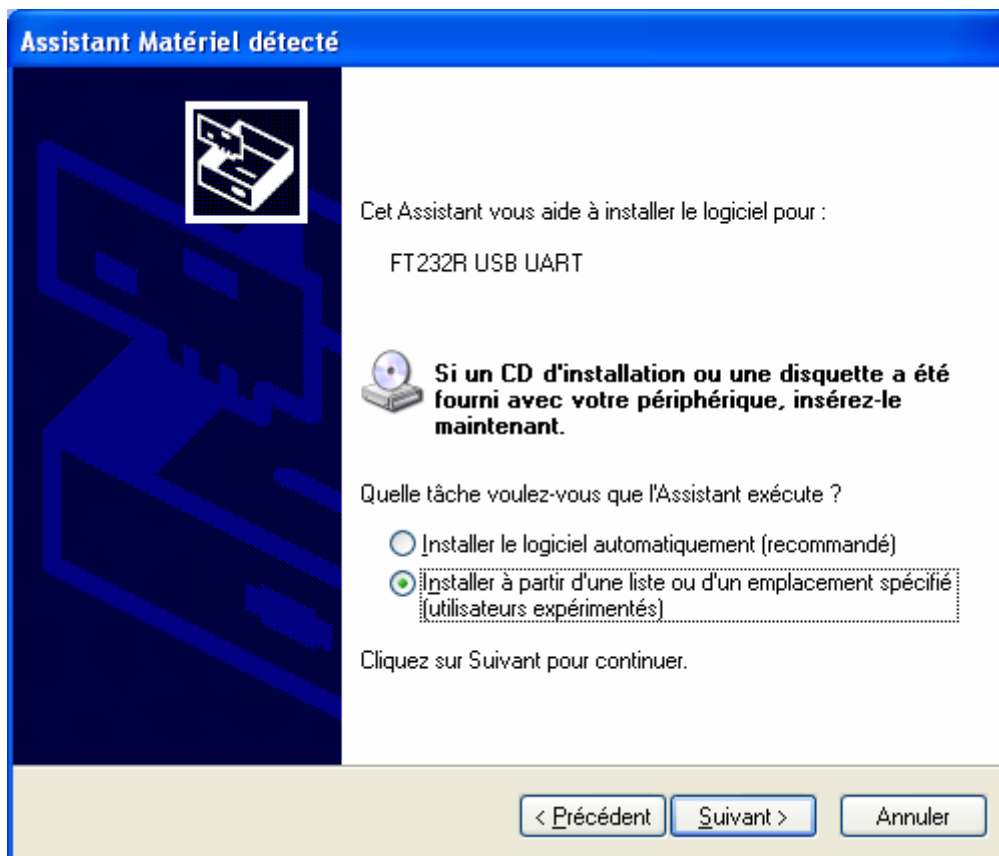
It is advisable to perform the operations below in the following order:

- Connect the modem to a regulated external power source via the power supply cable.
- Connect the USB cable to a DTE (PC).

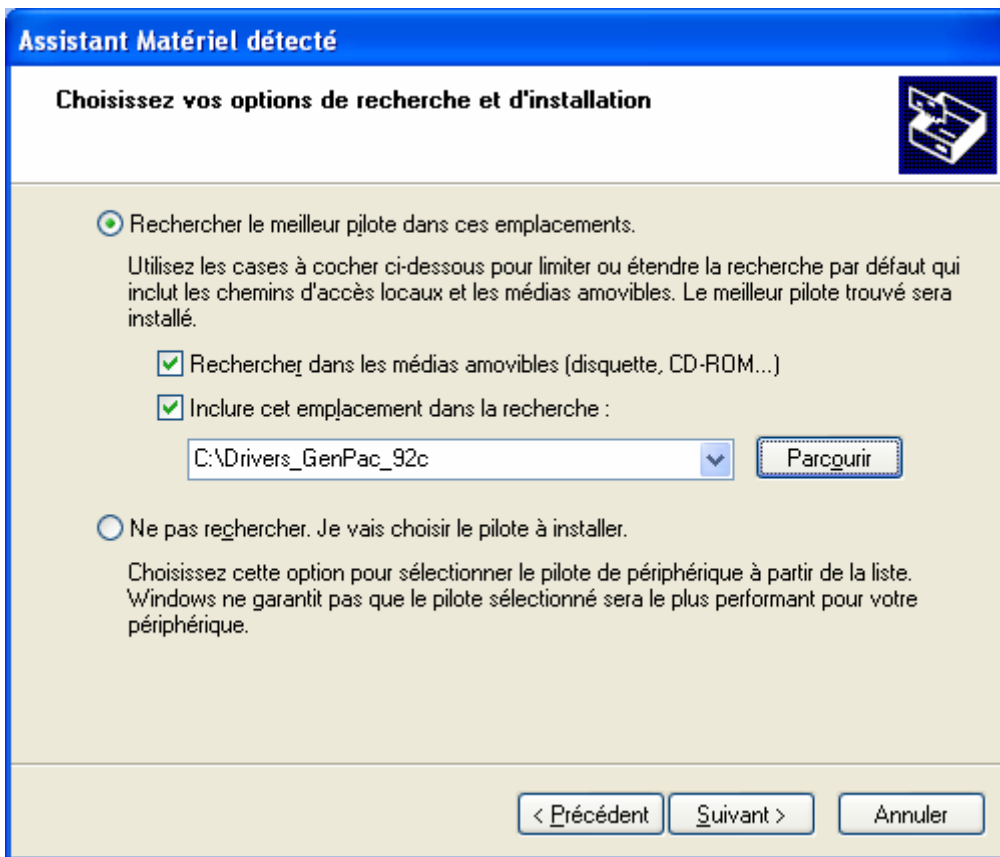
The following dialogue Windows will appear. It is recommended to following the instructions in the following order:



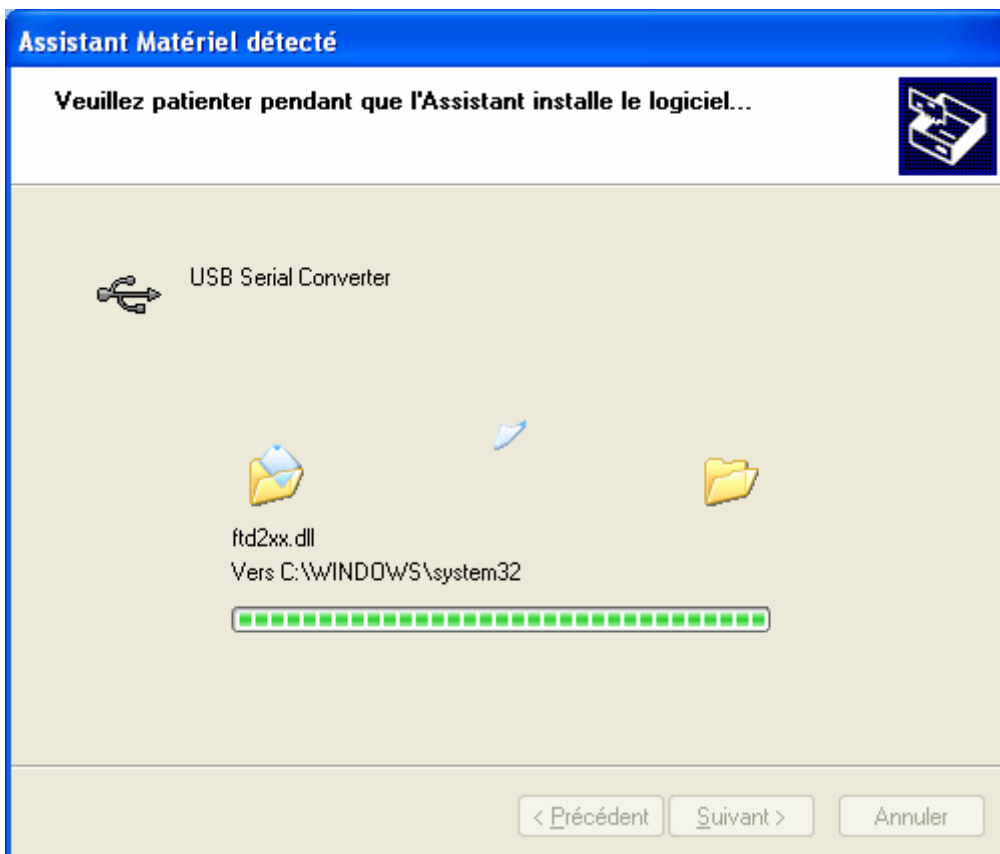
Valid with Next



Valid with Next



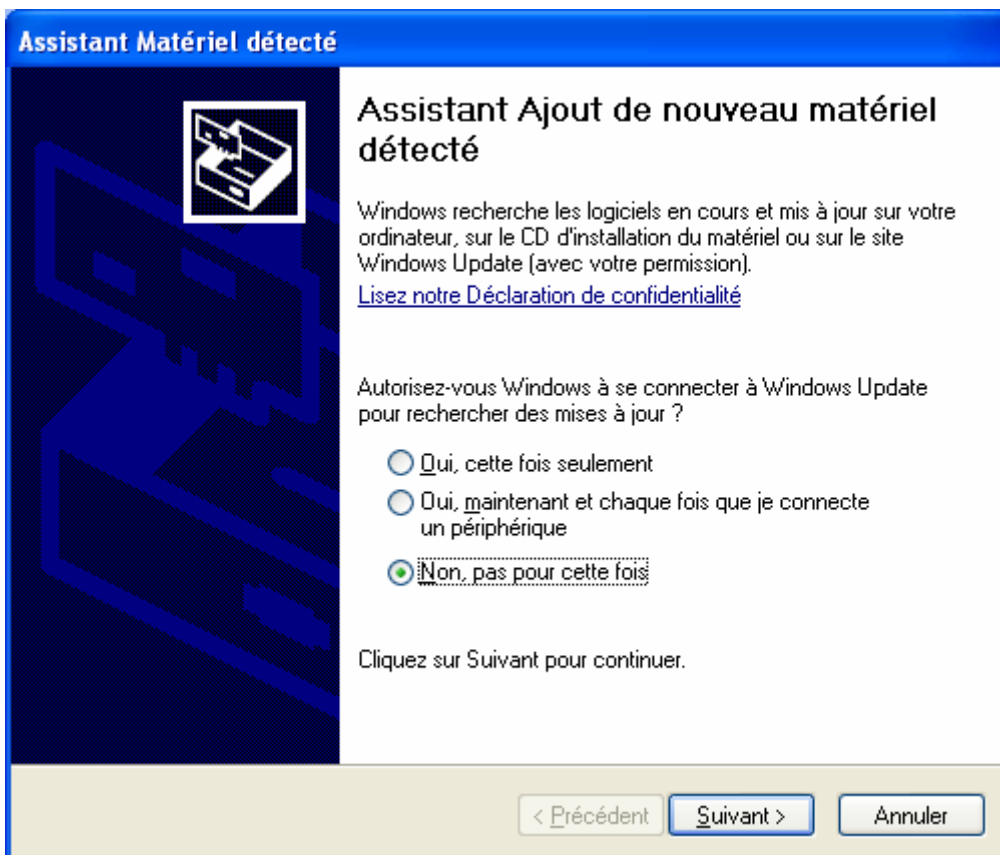
Valid with Next



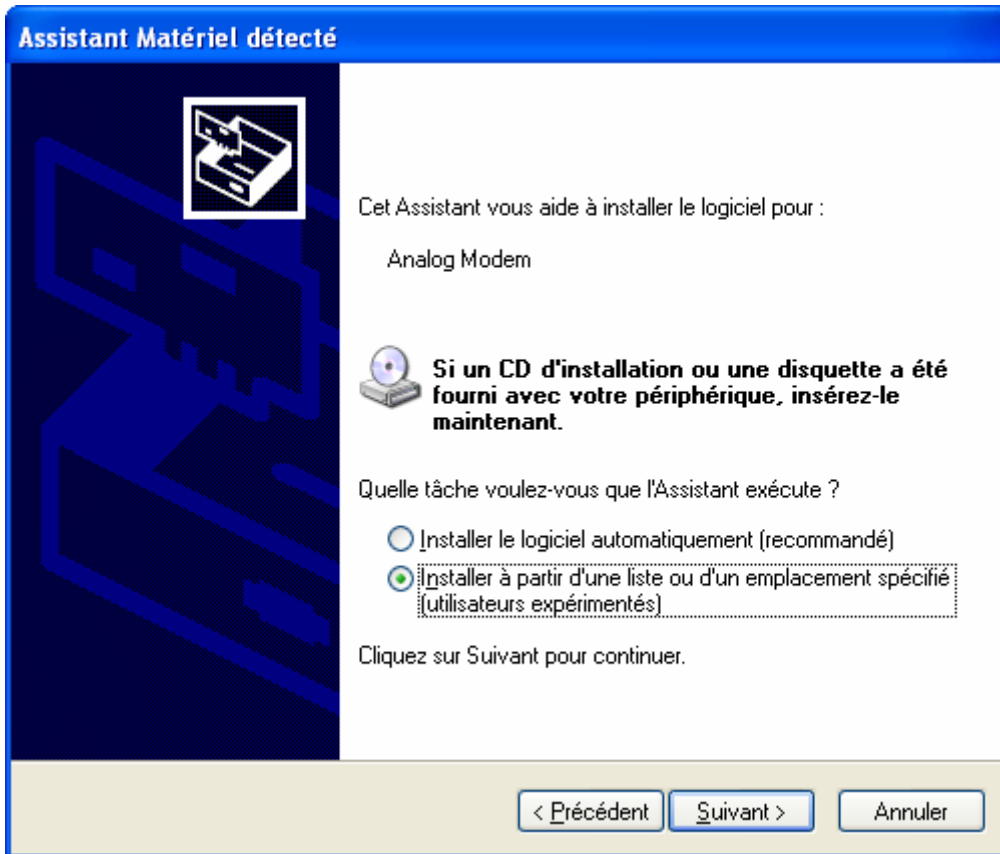
Wait whilst the installation completes



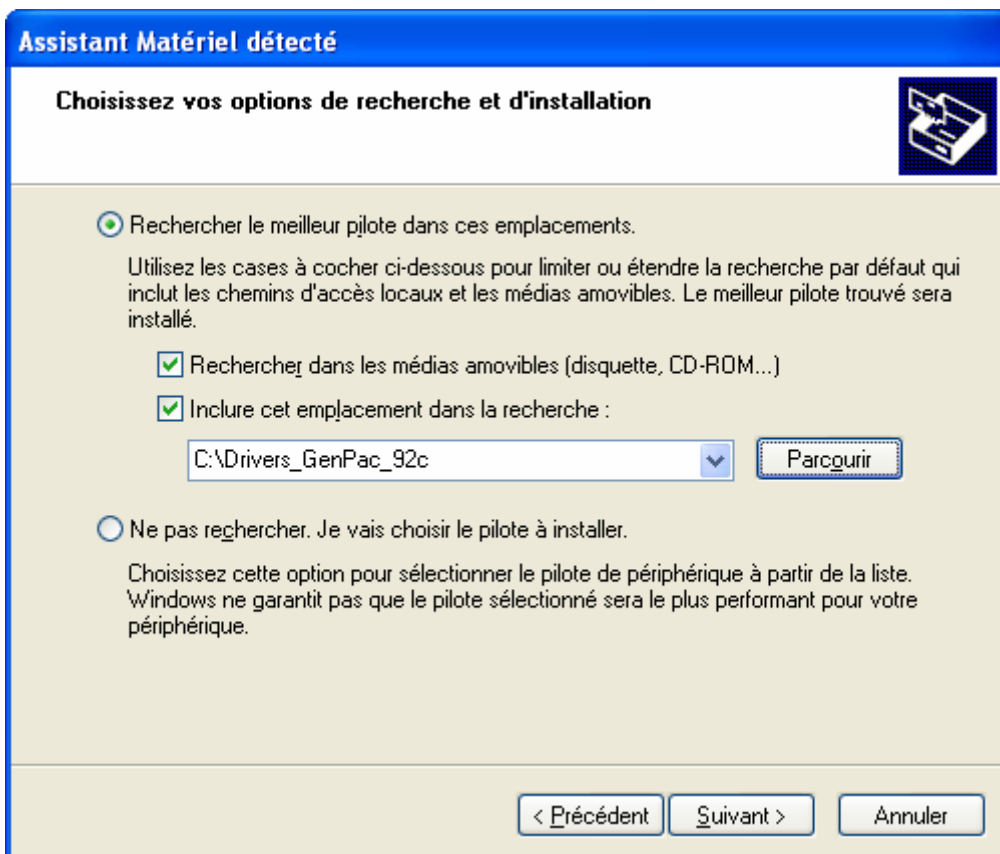
Valid with Finish. The installation of the USB Driver has completed. The installation of the Modem Driver will begin.



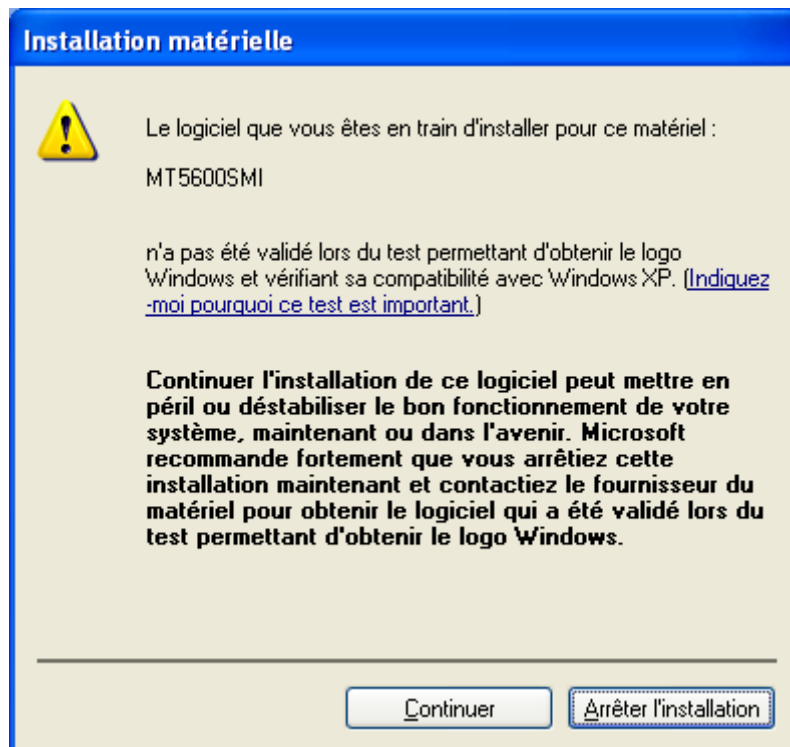
Valid with Next



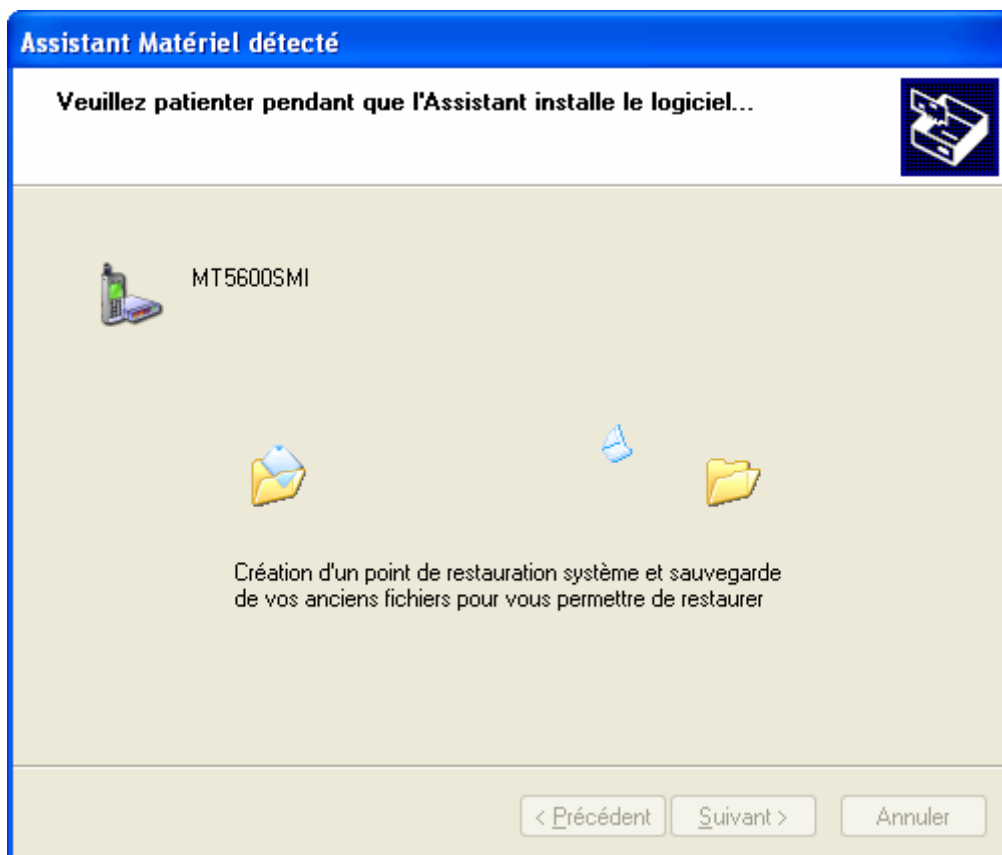
Valid with Next



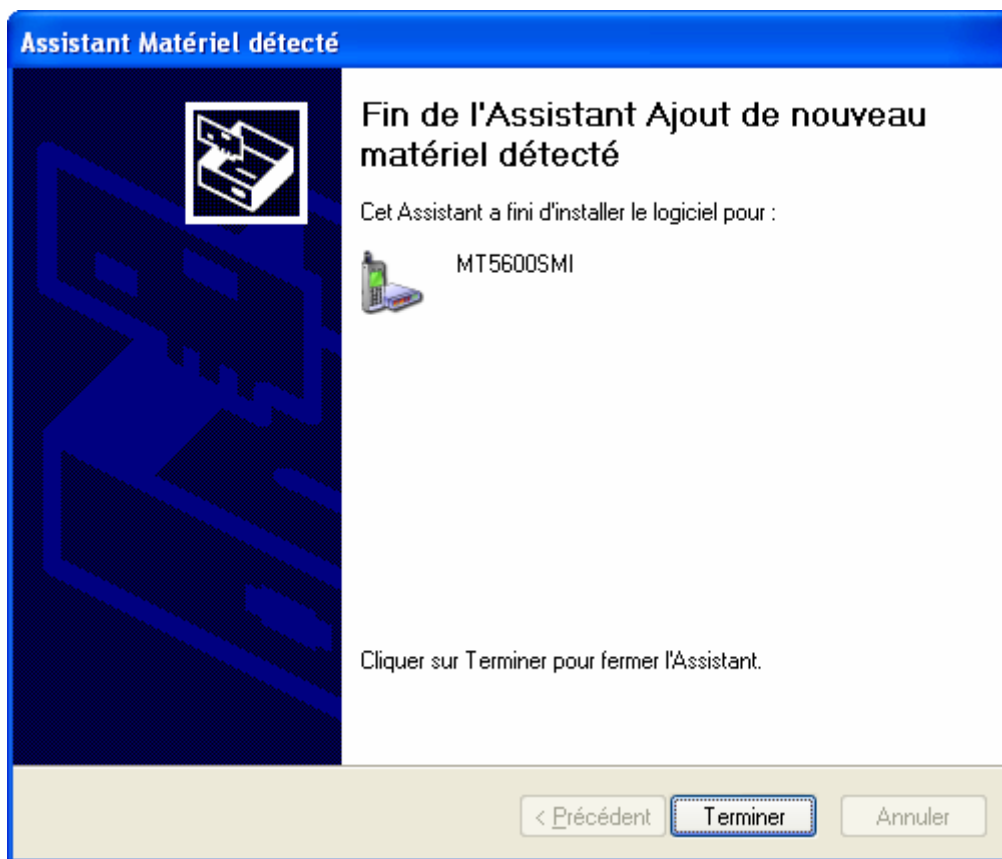
Valid with Next



Valid with Continue



Wait whilst the installation completes



Valid with Finish

The installation has completed correctly. The modem is now ready to be configured via a Terminal (Windows HyperTerminal).

5.1.3 Verify communication with the modem via RS232 or USB

To check the communication with the modem, connect the RS232 or USB link between the modem (DCE) and the PC (DTE). Configure, for example, the COM port of the DTE as follows:

- Data speed: **9600 bps**,
- Data bits: **8**,
- Parity: **None**,
- Stop bits: **1**,
- Flow control: **XON/XOFF**.

Using a communications tool such as Windows HyperTerminal, send the command **ATI4**. The GenPac 92c should reply **MultiTech Systems MT5600SMI ...** RS232 communication with the modem has been established.

Examples of AT commands that may be sent to the modem after validating the communication are shown below:

- **ATI4** : the modem returns the version of its firmware.
- **AT&V** : display the current register configuration.
- **AT+GCI?** : display the value of the configured country code.
- **ATA** : will go off-hook and set the reply carrier on the telephone line.
- **ATDxxxxxxxxxx** : indicates to the modem that it must dial a telephone number.
- **ATH** : hang-up the telephone line.

For further information about these AT commands and their associated parameters for the GenPac92c, refer to the "Commands List" from 'ERCO&GENER.

5.1.4 Verify telephone communication with the modem

To check the telephone communication with the modem, connect the RS232 or USB link between the modem (DCE) and the PC (DTE) and the telephone cable between the modem and wall socket. Configure, for example, the COM port of the DTE as follows:

- Data speed: **9600 bps**,
- Data bits: **8**,
- Parity: **Sans**,
- Stop bits: **1**,
- Flow control: **XON/XOFF**.

5.1.4.1 Outgoing call to a telephone set

Using a communication tool such as Windows HyperTerminal, send the command, **ATD0123456789** (where 0123456789 is replaced by a valid telephone number). The called telephone will ring.

If communication between the GenPac 92c and the telephone cannot be established:

- Check the telephone connexion between the RJ11 plug and the modem (DCE),
- Check the telephone connexion between the piggyback or RJ45 connector on the cable and the piggyback connector or RJ45 wall socket.

5.1.4.2 Outgoing call to a modem

Using a communication tool such as Windows HyperTerminal, send the command, **ATD0123456789** (where 0123456789 is replaced by a valid telephone number). The modem should return the message **Connect...**

If communication between the GenPac 92c and the remote modem cannot be established:

- Check the telephone connexion between the RJ11 plug and the modem (DCE),
- Check the telephone connexion between the piggyback or RJ45 connector on the cable and the piggyback connector or RJ45 wall socket.

5.1.4.3 Incoming call

Using a telephone (the caller) and a communication tool such as Windows HyperTerminal, when the GenPac 92c receives a call, the message **RING** is displayed and the modem automatically replies by going off-hook (if the register **SO** \neq 1, refer to the "Commands List" from 'ERCO&GENER).

If communication between the caller and the GenPac 92c cannot be established:

- Check the telephone connexion between the RJ11 plug and the modem (DCE),
- Check the telephone connexion between the piggyback or RJ45 connector on the cable and the piggyback connector or RJ45 wall socket.

WARNING: The complete validation of your installation can only be considered correct after have established a connexion with a remote modem and that correct data transfer has occurred.

5.1.5 Re-initialisation of the modem

The command **AT&F&W** will reload the default factory configuration into the GenPac 92c and save it. These commands may be sent in command mode.

WARNING: This command will result in the GenPac 92c being reset to its default factory configuration.

For further information about these AT commands and their associated parameters for the GenPac92c, refer to the "Commands List" from 'ERCO&GENER.

5.2 LED indicators

5.2.1 PWR

The state of the GenPac 92c is indicated by the PWR LED on the front face of the modem. The table below indicates the different states possible of the PWR LED:

PWR LED state	LED activity	GenPac 92c state
On	LED on	The GenPac 92c powered and ready to function.
Off	LED off	The GenPac 92c off.

5.2.2 TXD and RXD

The TXD and RXD LEDs on the front face of the modem give a visual indication of data transmission and data reception. In the idle mode these indicators are off.

5.2.3 DCD

The DCD LED on the front face of the modem shows the state of the connexion. In the idle mode this indicator is off.

5.3 Main AT Commands (HAYES)

The table below shows at a quick glance the main AT commands useful for the control of the modem.

For further information concerning the complete command set refer to the ERCO&GENER "Commands List".

Table: Main AT commands used with the modem.

Description	AT Command	Response	Interpretation
Get current firmware version	ATI4	MultiTech Systems MT5600SMI 5.02A Global OK	Firmware version
Get current configuration of registers	AT&V	ACTIVE PROFILE: B1 E1 L1 M1 N0 Q0 T V1 &R1 &S0 &T5 &X0 &Y0 S00:000 S01:000 S02:043 S07:050 S08:002 S09:006 S10:014 S11:085 S12:050 S38:020 S46:138 S48:007 S95:000 STORED PROFILE 0: B1 E1 L1 M1 N0 Q0 T V1 &R1 &S0 &T5 &X0 S00:000 S02:043 S06:002S11:085 S12:050 S18:000 S36:007 S40:104 S41:195 S46:138 S95:000 STORED PROFILE 1: B1 E1 L1 M1 N0 Q0 T V1&R1 &S0 &T5 &X0 S00:000 S02:043 S06:002 S11:085 S12:050 S18:000 S36:007 S40:104 S41:195 S46:138 S95:000 TELEPHONE NUMBERS: 0= 1= 2= 3= OK	Current register configuration
Get country code configuration	AT+GCI?	+GCI: FD OK	France by default
Answer an coming call	ATA	CONNECT xxxxx	Answer the incoming call
Make an outgoing call	ATDxxxxxx		Make an outgoing call
		CONNECT xxxxx	Communication established
Escape sequence	+++	OK	Escape sequence accepted
Hang up	ATH	OK NO CARRIER	Modem has hung up
Reinitialise the modem	AT&F&W	OK	Modem set to factory default configuration

5.4 Powering down the unit

There is no particular AT command to send to the GenPac 92c before powering down the modem.

To power down the modem it is advised to first disconnect the power supply cable and then the RS232 and telephone cables.

5.5 Updating the modem software

So as to be able to benefit from the latest functions of the GenPac 92c, a procedure is used which will upgrade the software in the modem.

This consists of downloading the software into the internal Flash memory via the RS232 serial link available on the 9-pin Sub D connector.

Please refer to the software update procedure document for a detailed description of this procedure.

6 Trouble Shooting

This section describes various problems and their solutions that may be encountered when using the modem.

Please consult the review on other problems in the FAQ's on the ERCO&GENER web site, section Support/FAQ.

6.1 RS232 (V24) Communication problem

If the modem does not respond to any of the AT commands via the RS232 then refer to the table below for a list of possible causes and solutions

Table: possible causes and solutions for RS232 communication problems

If the modem...	Check	Action
Returns nothing	Is the modem correctly powered?	Ensure that the modem is connected to an external regulated power source supply of the correct voltage range (see chapter 8.2.1).
	Is the serial cable connected at both ends (PC and Modem)?	Verify the connexion of the serial cable.
	Is the serial cable correctly cabled according to the table in chapter 3.2.1.3?	Cable the serial cable according to the table in chapter 3.2.1.3.
Returns nothing or random characters	Is the communications terminal correctly configured on the PC?	Ensure that the terminal configuration corresponds to that of the modem. Example: Speed = 9600 bps Data bits = 8 Parity = none Stop bits = 1 Flow control = XON/XOFF
	Is there another application using the same port thus creating a conflict?	Close the conflicting application.
	Is the modem echo deactivated?	Check that modem echo is activated with the command ATE1 (enable echo).

6.2 "ERROR" message

The modem returns the message "**ERROR**" (in response to an AT command) in the following cases:

- The COM port is not directed to the GenPac 92c modem but to another modem. Enter the command **ATI4**. The response should be **MultiTech Systems MT5600SMI...** All other responses indicate a dialog with another modem. Verify the COM port used in the communications application.
- The syntax of the AT command is incorrect. Re-enter the command. (Refer to the ERCO&GENER "Commands List".)
- The syntax of the AT command is correct, but with incorrect parameters. Check the parameter and re-enter the command. (Refer to the ERCO&GENER "Commands List".)

6.3 "NO DIALTONE" message

The modem returns the message "**NO DIALTONE**" following the command **ATDxxx**. This message can be returned in the following cases:

- The modem cannot find the telephone line: Check that the modem is connected to the wall socket (piggyback or RJ45) via the telephone cable.
- The modem cannot find the telephone line: Check that the telephone line is connected to the RJ11 connector on the modem.
- The telephone cable is connected but the wiring is incorrect: The modem requires only 2-wires to be connected as shown in the diagram below:



6.4 "NO CARRIER" message

The modem returns the message "**NO CARRIER**". This message can be returned in the following cases:

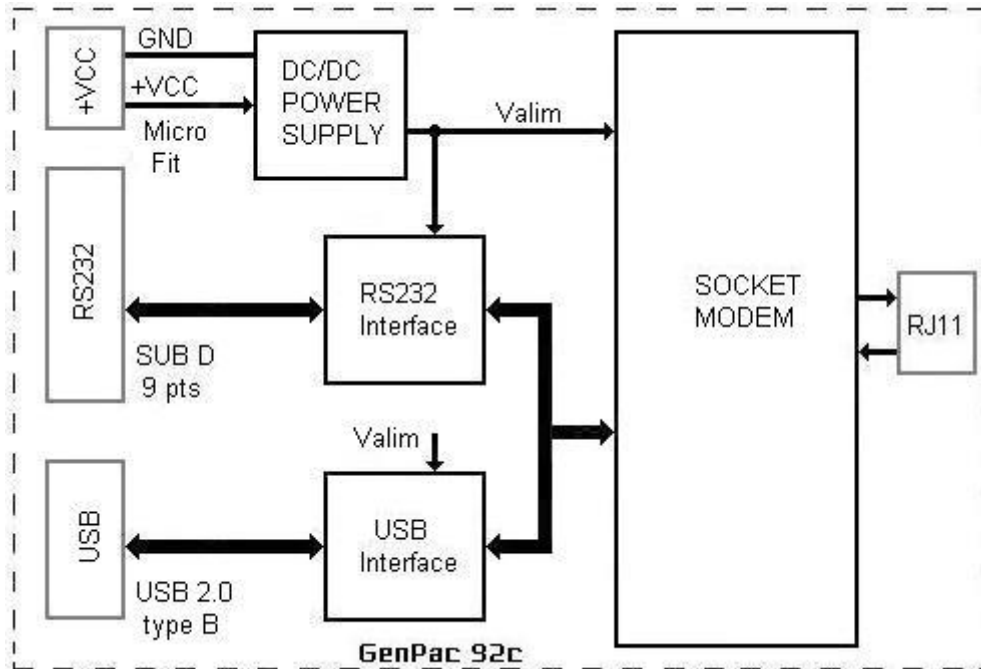
- The modem is not calling another modem: Check the telephone number being called.
- The modem is calling another modem but there is a problem with the line quality. Try another telephone line.
- The modem is calling another modem but there is a problem with the protocol. Check the protocols used by both modems.
- The remote line has been interrupted. Re-try the call.
- The called modem has hung-up and as such the carrier has been lost.

6.5 "BUSY" message

The modem returns the message "**BUSY**" following the command **ATDxxx**. This message is returned if the remote modem is occupied, i.e. already in communication.

7 Functional Description

7.1 Architecture



7.2 Power supply

7.2.1 General

The modem must be powered (+VCC) by an external regulated DC power source of between +6 and +30V via the Micro FIT connector.

The modem's various internal DC voltages are provided by an internal DC/DC converter.

7.2.2 Protection

It also has internal protection against power supply spikes of more than 30V.

Filter guarantees:

- Input/output EMI/RFI protection,
- Signal smoothing.

7.3 RS232 serial link

7.3.1 General

The GenPac 92c is an asynchronous serial modem having 10 or 11 data bits (start and stop bits included). The RS232 interface provides a level translation (TTL/V24) from the GenPac 92c (DCE) to a PC serial communications port (DTE).

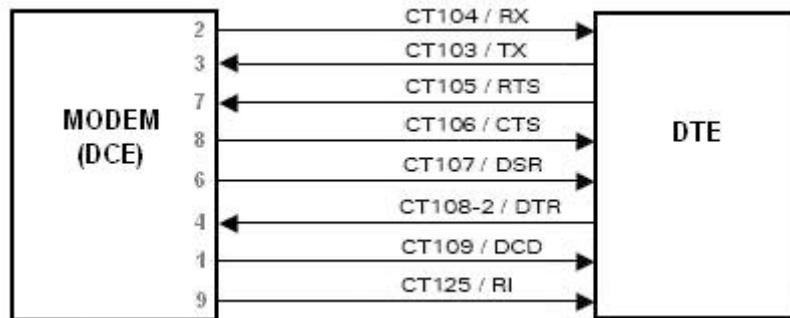
The RS232 interface is protected internally (ESD protection) against external electrostatic spikes.

Filter guarantees:

- Input/output EMI/RFI protection,
- Signal smoothing.

The following signals are available:

- TX data (CT103/TX)
- RX data (CT104/RX)
- Request To Send (CT105/RTS)
- Clear To Send (CT106/CTS)
- Data Terminal Ready (CT108-2/DTR)
- Data Set Ready (CT107/DSR)
- Data Carrier Detect (CT109/DCD)
- Ring Indicator (CT125/RI)



RS232 signals

The RS232 interface allows a certain amount of flexibility in the use of its signals. After configuration, the modem may operate in the 3-wire mode using only the TX, RX and GND signals.

7.3.2 Auto-baud mode

The auto-baud mode allows the modem to automatically detect the transmission speed used by the DTE. Only the following speeds will be detected: 300 to 230400 bps. Auto-baud detection cannot be guaranteed for speeds below or above these speeds.

Note: it is possible to fix the dialogue between the GenPac 92c and the DTE with the command **AT+IPR**. This function is explained in detail in the ERCO & GENER “Commands List”.
At power up the modem is in auto-baud mode by default.

7.3.3 Pins description

Signal	Pin number on Sub HD connector	I/O	RS232 standard	Description
CTXD/CT103	3	I	TX	Transmit serial data
CRXD/CT104	2	O	RX	Receive serial data
CRTS/CT105	7	I	RTS	Request To Send
CCTS/CT106	8	O	CTS	Clear To Send
CDSR/CT107	6	O	DSR	Data Set Ready
CDTR/CT108-2	4	I	DTR	Data Terminal Ready
CDCD/CT109	1	O	DCD	Data Carrier Detect
CRI/CT125	9	O	RI	Ring Indicator
CT102/GND	5			Ground

7.4 Telephone line interface

The telephone line interface assures isolation between the core of the Socket Modem and the external telephone line.

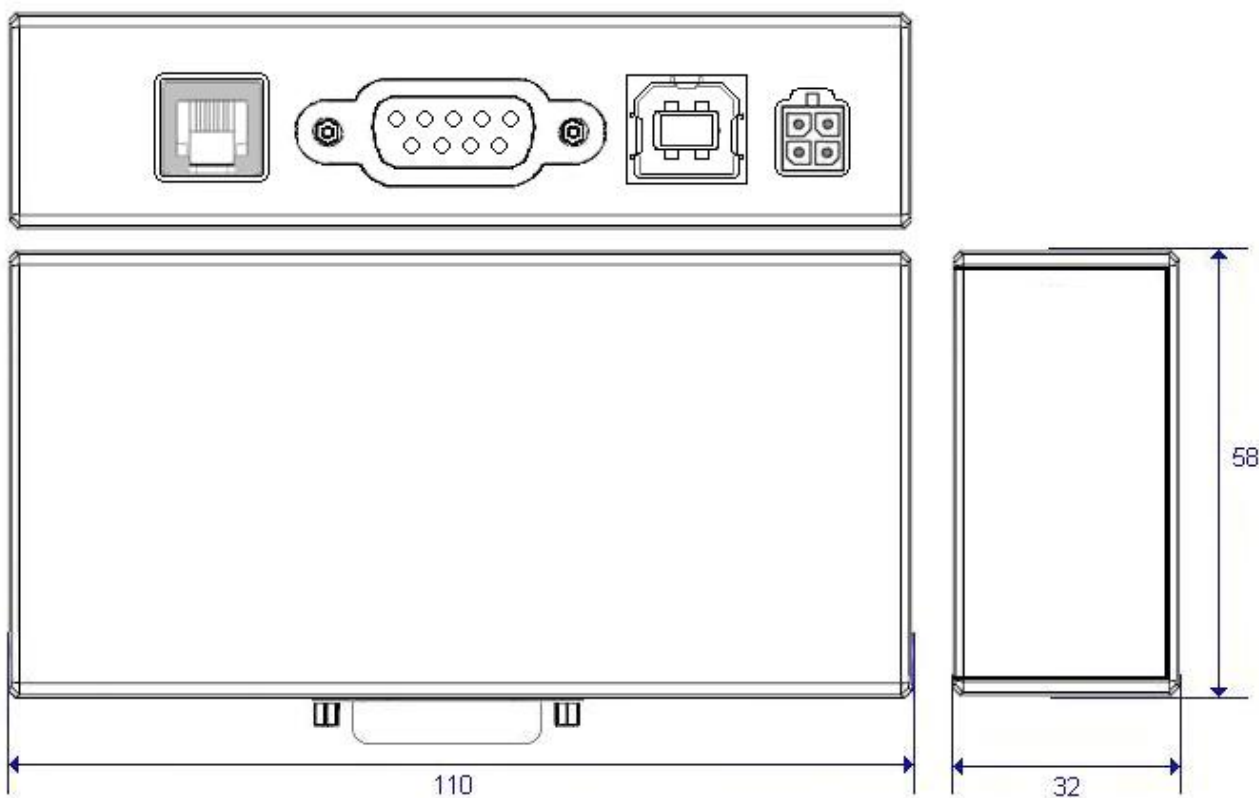
The 2 wires of the line are connected to the 2 centre contacts on the RJ11 connector on the GenPac 92c.

8 Technical Characteristics

8.1 Mechanical

Dimensions	32 x 110 x 58 mm (excluding the connector)
Overall Dimensions	32 x 110 x 64 mm
Weight	≈ 128 grams (modem only)
Volume	205 cm ³ (max.)
Case	Material: Ps UL 94 VO 3mm – Colour Ral 9002
Ingress Protection	IP21

The illustration below indicates the dimensions (in mm) of the modem showing the clearances necessary for installation:



8.2 Electrical

8.2.1 Power supply

Table: Voltage range

Operating voltage range	+6VDC to +30VDC
-------------------------	-----------------

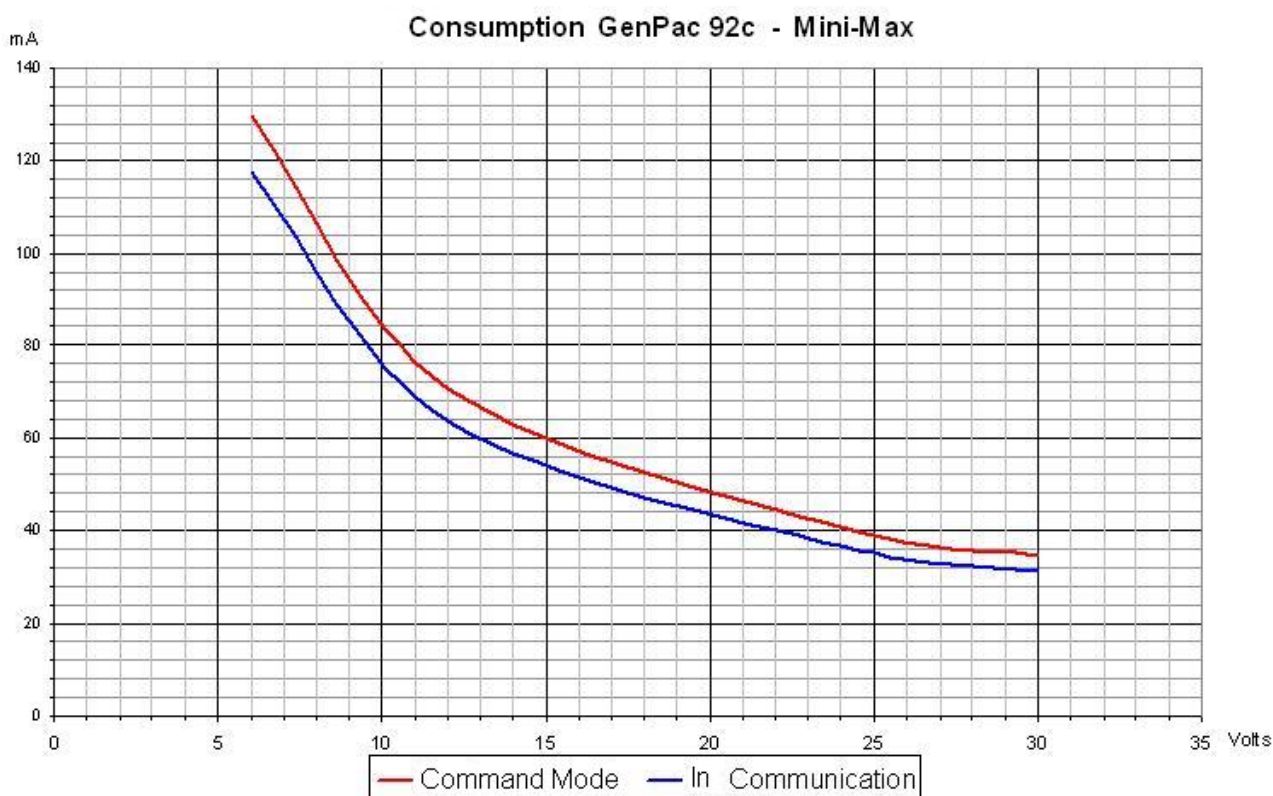


Table: power supply consumption (1*)

Average consumption (RS232 not connected)	Idle	In communication (in V34 with MNP4)
@ 6V	130mA	120mA
@ 12V	71mA	66mA
@ 24V	41mA	38mA
@ 30V	37.5mA	32mA

(1*) The power consumption may vary by 5% according to operating temperature range (0°C to +50°C) and type of interface used.

The table below indicates the consequences of power supply over-voltage and under-voltage on the modem:

Table: Effects of a power supply defect

If the voltage:	Then:
falls below 6V	Correct operation is not guaranteed.
goes above 30V	Risk of destruction of protection components.

8.2.2 RTC characteristics

The GenPac 92c is a certified according to required standards to be connected to Public Subscriber Telephone Networks (PSTN) throughout the world. (See the Conformity Certificate at the end of this document.)

8.2.2.1 Operation modes

The GenPac 92c is an asynchronous, full-duplex, 2-wire modem.

8.2.2.2 Speeds for different modulations

Table: Speeds for different modulations

Avis	Possible speeds
V34	2400, 4800, 7200, 9600, 12000, 14400, 16800, 19200, 21600, 24000, 26400 or 28800bits/s in full duplex
V32 Bis	4800, 7200, 9600, 12000 or 14400 bits/s in full duplex
V32	4800 or 9600 bits/s in full duplex
V22 Bis	1200 or 2400 bits/s in full duplex
V22	1200 bits/s in full duplex
V21	300 bits/s in full duplex
V23 Minitel	1200 bits/s on the main channel, 75 bits/s on the secondary channel (the modem performs a symmetrisation, the terminal functions at the same speed in both directions) in full duplex.

8.2.2.3 Carrier frequencies

Table: Carrier frequencies

Avis	Type	Carrier frequency
V34	Calling Modem Called Modem	Adaptive Adaptive
V32 bis and V32	Calling Modem Called Modem	f = 1800 Hz f = 1800 Hz
V22 bis and V22	Calling Modem Called Modem	f = 1200 Hz f = 2400 Hz + 1800 Hz
V21	Calling Modem level 0 Calling Modem level 1 Called Modem level 0 Called Modem level 1	f = 1180 Hz f = 980 Hz f = 1850 Hz f = 1650 Hz
V23 Minitel	1200 channel level 0 1200 channel level 1 75 channel level 0 75 channel level 1	f = 2100 Hz f = 1300 Hz f = 450 Hz f = 390 Hz

8.3 Environmental characteristics

To ensure the correct operation of the modem, the limits listed in the table below should be respected.

Table: Environmental characteristics

Operating temperature	0°C to +50°C
Storage temperature	-40°C to +85°C
Operating humidity without condensation	5% < HR < 80%
Storage humidity without condensation	5% < HR < 90%
Atmospheric pressure	normal

8.4 Standards / Conformities

This equipment conforms to the directive 99/05/CE concerning the pan-European connexion of a terminal to a Public Subscriber Telephone Network (PSTN). However, due to network differences between different countries, this conformity does not constitute an absolute guarantee of optimal functioning at all points on the PSTN.

The product conforms to the following requirements:

- ROHS Compliant 2002/95/EC Directive,
- 2002/96/CE DEEE (crossed out wheelie bin).

The GenPac 92c also conforms to Telecommunications, Security and EMC (see the conformity certificate at the end of this document).

The following mark is visible on the underside of the unit:



9 Security Recommendations

It is important to follow specific regulations concerning the use of your equipment.

This modem is under your responsibility. Treat it with care. It is not a toy. Install it in a secure place out of the reach of children.

The suggestions below will help you to look after and preserve this product for many years.

- Do not expose the modem to the extreme environments such as a high temperature or high humidity content.
- Do not use or store the modem in dusty or dirty places.
- Do not open or disassemble the modem. ALL WARRANTIES ARE VOID IF THE PRODUCT IS OPENED, ALTERED, AND/OR DAMAGED.
- Do not expose the modem to liquids. It is not impermeable.
- Avoid dropping, striking, or shaking the modem violently.
- Do not place the modem near computer disks, credit or voyage cards or other magnetic media. The information contained on the discs or the cards can be affected by the modem.
- The use of third party equipment or accessories, not made or authorized by ERCO&GENER can cancel the guarantee.

In certain countries, restrictions of use of the equipment may apply. Contact your nearest legally qualified local government representative for more information.

10 Recommended Accessories

The accessories recommended by ERCO&GENER for use with the modem GenPac 92c are shown on our Internet site in the section Products/Accessories. For more information, contact our sales department.

11 Client support

ERCO&GENER ensures customer support of all sold modems. As such you will have access to:

- The latest version of this document,
- The product's brief commercial description,
- Conformity certificates,
- Application notes.

Note: The optional support for Open AT development is also available (please consult us).

DECLARATION OF CONFORMITY

Manufacturer : ERCO & GENER

Address : Rue des petites Granges
Z.I. de Saint Lambert des Levées
B.P. 30163
49412 SAUMUR CEDEX – France

Website : <http://www.ercogener.com>

declares that the product :

Name : GenPac 92c Type : Modem

Telecom : TBR21 (January 1998)
TBR15

Safety : CEI 60950-1 : 2001

EMC : EN 55022 (98) /A1 (00) /A2 (03)
EN 61000-3-2 (00) /A2 (05)
EN 61000-3-3 (95) /A1 (01)
EN 61000-6-2 (05)
FCC Part 15 (06)



The corresponding markings appear under the appliance.

Saumur, June 06th 2007

Charles CHAUSSONNIER
Managing Director

A handwritten signature in blue ink, appearing to be 'Charles Chaussonnier'.