



MTi 133-1

V34 33 600 b/s
INDUSTRIAL MODEM

**SWITCHED TELEPHONE NETWORK
LEASED LINE**

USER GUIDE

DOC. ref. : 9010109-04

**If you have questions about the modem Mti 133-1 or need assistance,
contact ETIC Telecommunications at the following address :**

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MANUFACTURER IDENTIFICATION	
COMPANY NAME	ETIC TELECOMMUNICATIONS
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PRODUCT IDENTIFICATION	
NATURE	PSTN OR LEASED LINE MODEM
TYPE	V34
COMMERCIAL REFERENCES	MT1133-100EUR and variants

ETIC TELECOMMUNICATIONS declare under their entire responsibility that the products described above are in compliance with the following essential requirements (especially those of Directive 1999/5/EC) :

Article 3.1a :

The protection of the health and the safety of the user : EN60950 and EN41003.

Article 3.1b :

The protection requirements with respect to electromagnetic compatibility : EN50082-2.

Article 3.3 :

Compatibility requirements with respect to networks : CTR21 and CTR15.



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PRODUCT OVERVIEW

The Mti 133-1 has been designed for asynchronous data transmission up to 33600b/s on the telephone network or 2 wire leased line. Its characteristics make it well suited to the remote management and maintenance of industrial equipment.

Models

The tables below describe the key-features of each modem reference.

	MTI133-	100XXX	101XXX	102XXX	103XXX
Supply voltage VDC		9 to 40	9 to 40	9 to 16	9 to 40
PSTN (telephone network)		•	•	•	•
Leased line (2 wires)		•	•		•
RS232 + AT commands		•	•	•	•
V42 error detection correction		•	•	•	•
V42 b compression		•	•	•	•
Relay call command		•	•		•
Low power				•	
Extended operating T° range				•	
RS485 interface		•			
RS422 interface			•		•
Microswitch configuration		•	•		•

	MTI133-	100XXX	101XXX		103XXX
Supply voltage VDC		40 to 60	40 to 60		40 to 60
PSTN (telephone network)		•	•		•
Leased line (2 wires)		•	•		•
RS232 + AT commands		•	•		•
V42 errors detection / correction		•	•		•
V42 b compression		•	•		•
Relay call command		•	•		•
Low power					
Extended operating T° range					
RS485 interface		•			
RS422 interface			•		•
Microswitch configuration		•	•		•

XXX = EUR for models in compliance with European specifications.
INT for models in compliance with American specifications.

Product overview

Product description

6 L.e.d.s to check the functioning state of the modem:

RD Characters received from the line.

TD Characters transmitted to the line.

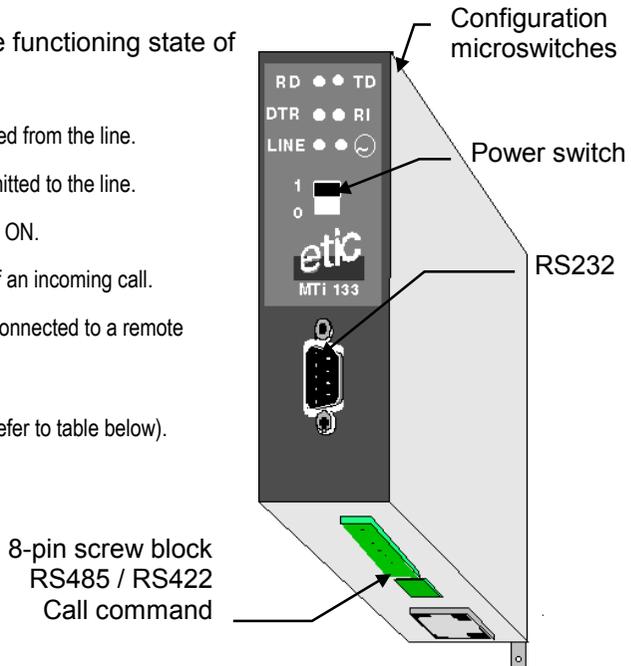
DTR The DTR circuit is ON.

RI Flashes in case of an incoming call.

LINE The Mti 133-1 is connected to a remote modem.



Power indicator (refer to table below).



Power switch		
Switch on/off	All models except MTi133-102	Mti133-102
Position 1	Switched on (Power indicator on)	The modem is off-line. It draws 10 micro-A as long as it remains off-line. All the L.e.d.s are off.
Position 0	Switched off	

Worldwide operations

The products whose reference finish with INT (e.g. MTi133-100INT) are operational in most countries.

The products whose reference finish with EUR (e.g. MTi133-100EUR) are in compliance with the European norm.

PLC compatibility

The Mti 133 has been designed to operate with the PLCs of most worldwide manufacturers.

The corresponding configurations and the pinouts of required cables are available on demand in the application notes and downloadable from our web site..

N.B.: The MTI133-1 is compatible with all modems on the market.

Configuration

The product is configured with microswitches and, for advanced parameters, if necessary, with ETIC ModemView software which is delivered with the MTI133.

RS232, RS485 and RS422 serial interfaces

All MTI133-1 models are equipped with an RS232 serial interface (9-pin connector on the front panel) and, depending on the model, with an RS485 or RS422 serial interface (8-pin screwblock at the bottom of the modem).

Using the modem without control signals

In numerous applications, like remote maintenance, the PLC does not need to dial since only the incoming call is required.

The MTI133-1 has been designed to be suited to this kind of use. Only Rx and Tx transmission signals are required.

Call commands

The calls are set by AT commands or by a relay call command.

The modem is equipped with an automatic device sensing the character rate and frame (auto-baud).

Moreover, a digital output lets you know that the modem is switched on.



TECHNICAL DATASHEET

Dimensions :	H=115 x L=38 x D=96 mm
Power-supply :	9 to 40 or 40 to 60 Volts DC depending on model
Consumption :	« low power » models : MTI133-102XXX 10 micro-A off-line - 100 milli-A on-line at 24 VDC Other models : 100 milli-A at 24 VDC.
Operating T° range :	« low power » models : MTI133-102 : -20°C to +60 °C Other models : 0°C to +55°C
Transmission rates:	33 600 b/s V34 28 800 b/s V32b 14 400 b/s V32 2400 bits/s V22 bis 1200 bits/s V22 300 bits/s V21
Error correction :	V42 and MNP2-4
Compression :	V42bis
Transmission level :	Transmission level set by AT call command Transmission : 0 to -15 dBm (default : -10 dBm) Reception : -6 to -43 dBm
Dialing :	Pulse or DTMF Q23
Serial interface :	150 to 38400 b/s 7 or 8 bits / 1 start bit / 1 or 2 stop bits Parity None / odd / even Auto-baud
Configuration :	AT commands
Call reception :	Automatic reply
Dial commands :	AT and digital input call command
Electrical safety :	EN60950, EN 41003, CEI950, CEI1131
EMC :	EN 50082-2
Lightning and transients :	EN61000-4-5
Telephone network:	European norm CTR21 for the models whose ref. finish with EUR. USA Specifications for the models whose reference finish with INT.
Leased line:	European norm CTR15 for the models whose ref. finish with EUR. USA specifications for the models whose reference finish with INT.

warning !

The unit must not be opened when connected to the line, the DTE or the power-supply.

1 Surge protection device

The electronic board in the MTi 133-1 is equipped with telephone line surge protection devices providing the modem with a large resistance ; however if the modem is to be used on telephone lines exposed to large surges (sites with high risks of lightning), it is preferable to connect supplementary surge protection devices between the modem and the telephone line as well as upstream from the electrical power source.

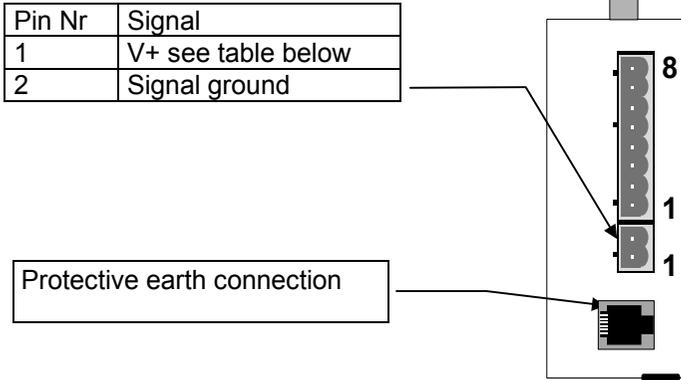
2 Earth connection

The MTi 133 is equipped with a protective earth connection. It should not be used unless that earth connector is connected to the earth.

3 Fuse

The MTi 133 includes an automatically resetting fuse able to protect the electrical power source against an overcurrent caused by a short circuit in the modem.

4 Power-supply connection



Reference	Supply voltage range (V+)
MTI133-100XXX MTI133-101XXX MTI133-103XXX	9 to 40 VDC (2.5 W consumption)
MTI133-102XXX	9 to 16 VDC 10 microA off-line at 12 VDC 2.5 W on-line consumption
MTI133-110XXX MTI133-111XXX MTI133-113XXX	40 to 60 VDC (2.5 W consumption)

A power supply module mounting on a DIN rail or for a wall plug is available in our catalogue.

5 Serial interface connection

5.1. RS232C connection (all models)

Only one interface can be used at a time : RS232, RS485 or RS422

The 9-pin RS232 connector on the front panel can be used for configuration, « AT » call control and data transmission. The terminal must not be located more than ten meters away from the modem and the cable should preferably be shielded.

Pin Nr	Circuits		Designation	Terminal- Modem
1	CD	109	Carrier detect	←
2	RX	104	Data reception	←
3	TX	103	Data transmission	⇒
4	DTR	108	Data terminal ready And call command	⇒
5	SG	102	Signal ground	
6	DSR	107	Data set ready	←
7	RTS	105	Request to send	⇒
8	CTS	106	Clear to send	←
9	RI	125	Incoming call (RING)	←

The **DTR signal** enables the terminal to clear the call or to inform the modem that it is connected.

In the case of the MTi133-102XXX « Low Power » model, this signal enables the terminal to switch on the modem either to command a call or to accept an incoming call (refer to OPERATIONS section).

The **DTR signal** also permits to command a call to a number stored in the modem without resorting to an AT call command (refer to OPERATIONS section).

The **DSR signal** indicates that both modems are connected.

The **CD signal** indicates that the modem has detected the carrier.

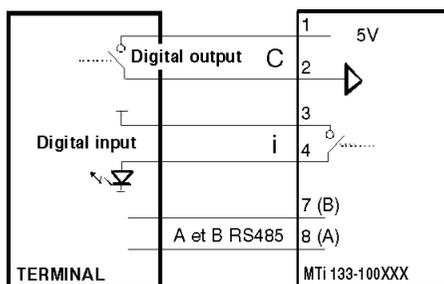
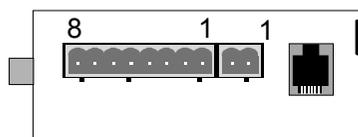
The **RI signal** indicates an incoming call.

!!! When used with FACTORY PROFILE 1, the modem will only need the RX, TX and SG signals to function.

5.2. RS485 (MTi133-100XXX and MTi133-110XXX)

The MTi133-100XXX and MTi133-110XXX are equipped with an RS485 interface, a « C » digital input for call commands and an « I » digital output indicating that the communication has been established. These signals are available on the 8-pin screw block.

8 pins screw block			
Pin Nr	Signal	Terminal-modem	Function
1-2	C	⇒	« C » digital Input Closed when the DTE is ready Can be used to set a call (OPERATIONS section)
3-4	i	⇐	« I » digital output Closed when the modem is connected. relay 0.5 A / 24 VDC
5 and 6	-		Not connected
7	B RS485		RS485 interface Not isolated
8	A RS485		Protected against transients



- RS485 interface

The RS485 interface permits point-to-point or multi-drops data transmission.

The interface is polarized inside the modem.

If adapting the line reveals necessary, it must be carried out **at each end** of the line with a 120 Ω resistor connected between A and B.

- **Call command through “C” auxiliary contact pair**

The modem’s “C” digital input enables the equipment connected to it to set a call to a number stored in the modem and to clear the call. “C” must be closed to set a call.

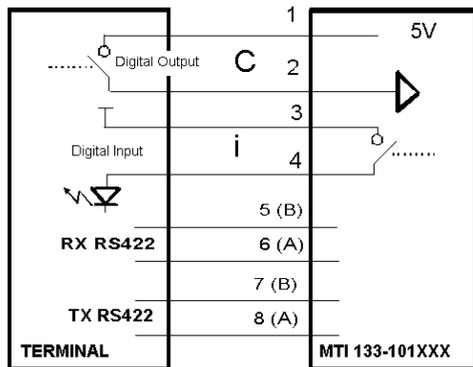
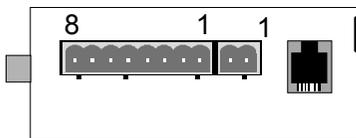
The “C” digital input is protected but not isolated; it must be cabled according to the diagram above.

The “I” digital output indicates that the modem is connected to the line. “I” is closed when the modem is on-line.

5.3. RS422 (MTi133-101XXX and MTi133-111XXX)

The MTi133-101XXX and MTi133-111XXX are equipped with a 4-wire RS422 interface, a “C” digital input for call commands and an “I” digital output indicating the connection. These signals are available on the 8-pin screw block.

8 pins screw block			
Pin Nr	Signal	Terminal-Modem	Function
1-2	C	⇒	« C » digital Input Closed when the DTE is ready Can be used to set a call (OPERATIONS section)
3-4	i	⇐	« I » digital output Closed when the modem is on-line. 0.5 A / 24 VDC
5	RX B RS422	⇐	RS422 interface Not isolated Protected against transients
6	RX A RS422	⇐	
7	TX B RS422	⇒	
8	TX A RS422	⇒	



- RS422 interface

The RS422 interface permits point-to-point or multi-drops data transmission.

The interface is polarized inside the modem.

If adapting the line is necessary, it must be carried out **at each end** of the line with a 120 Ω resistor connected between A and B.

- Call command through “C” auxiliary contact pair

The modem’s “C” digital input enables the equipment connected to it to set a call to a number stored in the modem and to clear the call (refer to OPERATIONS section).

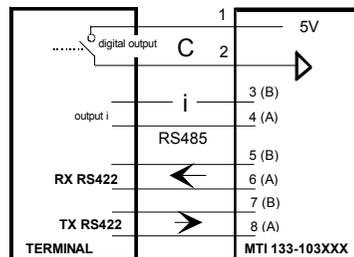
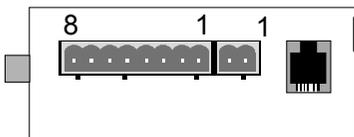
The “C” digital input is protected but not isolated; it must be cabled according to the diagram above.

The “I” digital output indicates that the modem is connected to the line. “I” is closed when the modem is on-line.

5.4. RS422 (MTi133-103XXX and MTi133-113XXX)

The MTi133-103XXX and MTi133-113XXX are equipped with an RS422 interface, a “C” digital input for call commands and an RS485 “I” digital output indicating the connection. These signals are available on the 8-pin screw block.

8 pins screw block			
Pin Nr	Signal	Terminal-Modem	Function
1-2	C	⇒	« C » digital Input Closed when the DTE is ready Can be used to set a call (OPERATIONS section)
3	i (B)	⇐	RS485 « I » output Closed when the modem is on-line.
4	i (A)	⇐	0.5 A / 24 VDC
5	RX B RS422	⇐	RS422 interface Not isolated Protected against transients
6	RX A RS422	⇐	
7	TX B RS422	⇒	
8	TX A RS422	⇒	



- RS422 interface

The RS422 interface permits point-to-point or multi-drops data transmission.

The interface is polarized inside the modem.

If adapting the line is necessary, it must be carried out at the end of each line and outside the modem.

- Call command through “C” auxiliary contact pair

The modem’s “C” digital input enables the equipment connected to it to set a call to a number stored in the modem and to clear the call.

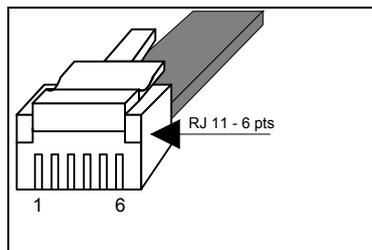
The “C” digital input is protected but not insulated; it must be cabled according to the diagram above.

The “I” digital output indicates that the modem is connected to the line. “I” is closed when the modem is on-line.

6 Telephone line connection

6.1. Telephone plug

Telephone plug	
Signal	Pin Nr
Line 1	3
Line 2	4



6.2. Country in which the product can be used

The MTi133 is available in compliance with European or American requirements.

A european reference is identified by the “EUR” code at the end of the product reference.(ex : MTi133-100EUR); the product is delivered with a standard RJ11 telephone cable and a national plug adapted to the country’s PSTN.

An international reference is identified by the « INT » code at the end of the product reference.(ex : MTi133-100INT). One of its advantages is that it is operational in most countries worldwide. The product is delivered with a standard RJ11 telephone cable.

!!! For the countries not using the RJ11 type of plug, a National telephone plug must be connected to the cable. National telephone plugs for most countries are available in our catalogue.

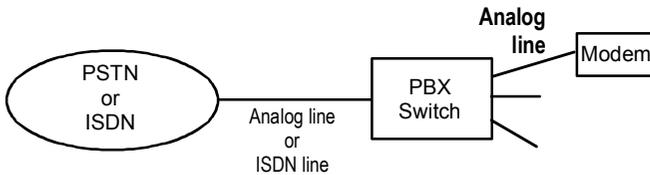
6.3. Line type

Whatever the reference, the modem connects to an **analog** telephone line.

6.4. Installation behind a PBX

The PBX can be either analog or digital like an ISDN PBX.

However, the line to which the MTI133 is connected must be an analog line.



7 Leased line connection

7.1. Line type

The modem provides full duplex transmission on a 2 wire line.

The line can be a leased line provided by a Telecom Provider.

It can also be a 2 wire shielded twisted pair (private line).

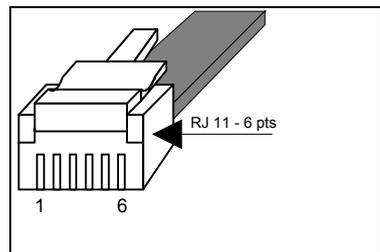
7.2. Line cable

The cable to connect the modem to the line is delivered with the modem.

The RJ11 plug of the line cable has to be connected to the RJ11 “line connector” at the bottom of the modem.

The 2 free wires have to be connected to the line.

Line plug	
Signal	Pin Nr
Line 1	3
Line 2	4



8 Desktop Installation

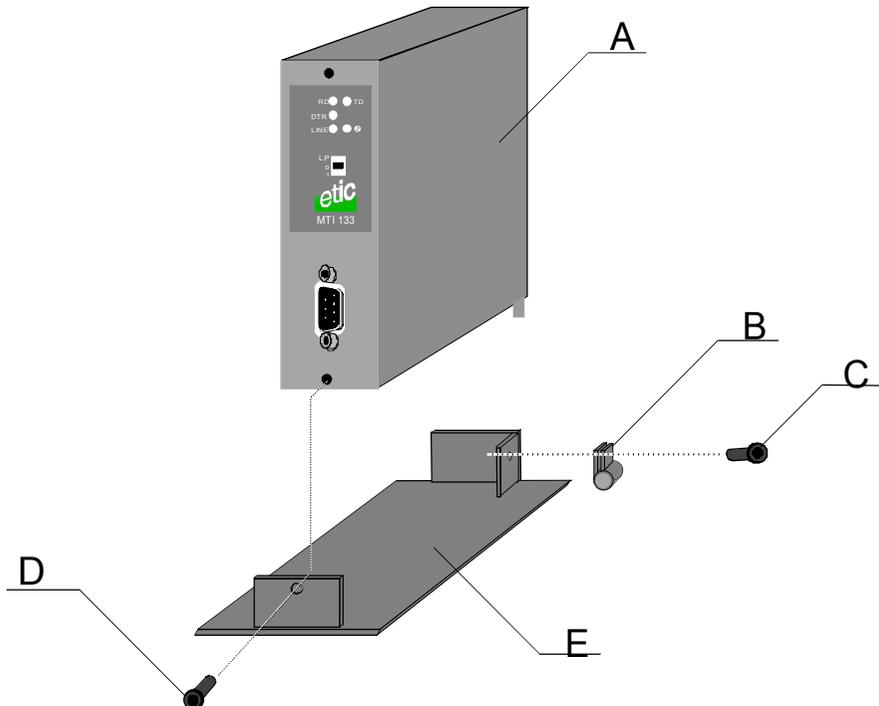
The desk kit (ref : KIT12) permits use of the MTI133-1 on a desk, especially when it is to be connected to a PC.

The kit includes

- an RS232 normal DTE to DCE cable (pin1 to pin1, pin2 to pin2,...)
- a wall plug adaptor
- a mounting base and a hex head key

To fix the modem on the desk, connect the cables as described above, then

- Remove screw D with the hex head key,
- remove screw C and cable clip B from the mounting base (E),
- thread the cables through cable clip B,
- fix the modem on the mounting base (E) with screw D,
- fix cable clip B on the mounting base (E) with screw C.





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1 Overview

Profiles

The Mti133-1 stores 4 parameter tables :

2 default “factory profiles” which cannot be modified : FACTORY PROFILE 0 and FACTORY PROFILE 1.

2 “user profiles” which can be modified : USER PROFILE 0 and USER PROFILE 1.

Modem configuration using the micro switches

The MT133 (except MT133-102) provides 12 micro switches on the top of the box.

The micro switches permit

- To select between PSTN and leased line operations (sw 1 and 2)
- To set the main parameters (sw. 3 to 11)
- To select the FACTORY PROFILE 1 or the USER PROFILE 1 in addition (Sw. 12).

Thus, using a PC to configure the MT133 is not necessary when the modem is used on the PSTN only for incoming calls or on a leased line.

Modifying a parameter using AT commands

If necessary the parameters of the USER PROFILE1, which comes in addition to the micro switches, can be modified.

First, the micro switches use has to be cancelled (sw 1 and 2 OFF).

The parameters can then be modified using AT commands and stored in USER PROFILE 1.

The use of the micro switches can then be restored (Sw. 1 and 2 in the right position) and the USER PROFILE 1 selected (sw. 11 OFF).

Using the MT133 like a usual “PC modem”

If the MT133 is controlled by a PC or any unit able to issue AT commands, and if it used on the PSTN, using the microswitches becomes unnecessary.

The microswitches can be ignored placing the microswitches 1 and 2 OFF.

2 Parameter profiles

The Mti133-1 stores 4 parameter tables :

2 default “factory profiles” which cannot be modified : FACTORY PROFILE 0 and FACTORY PROFILE 1.

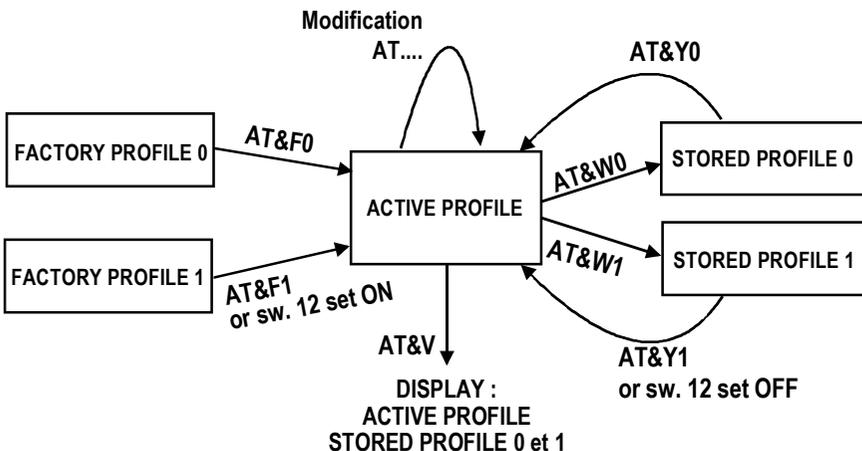
2 “user profiles” which can be modified : USER PROFILE 0 and USER PROFILE 1.

If the microswitches are enabled, the « FACTORY PROFILE 1 » or the « STORED PROFILE 1 » can be selected with sw. 12, in addition to the switches values.

If the microswitches are disabled (sw.1 and 2 OFF), any profile can be selected (AT&F0 and AT&F1 for FACTORY PROFILES 0 and 1 - AT&Y0 and AT&Y1 for STORED PROFILES 0 and 1).

The selected profile is then designated as the “active profile”. It can be modified and stored into « STORED PROFILES 0 or 1».

The active profile and the “Stored profiles 0 and 1” can be displayed using the AT&V command.



3 Microswitches

3.1. Description

Network	Sw. 1	Sw. 2
Telephone network (PSTN)	ON	ON
Leased line (calling)	OFF	ON
Leased line (called)	ON	OFF
“AT” configuration and operations (micro-switches are ignored)	OFF	OFF

Note :

If sw 1 and 2 are ON, the modem can be used on the PSTN ; switches 3 to 12 are taken into account.

If sw 1 and 2 are OFF, parameters of the user profiles can be modified with AT commands, or the modem can be controlled like a usual PC modem.

If the modem has to be connected to a leased line, one modem has to be configured as “calling” (sw.1 OFF and sw.2 ON) and the other one as “called” (sw.1 ON and sw.2 OFF).

SERIAL INTERFACE DATA RATE	Sw. 3	Sw. 4	Sw. 5
38400 b/s	ON	ON	ON
19200 b/s	OFF	ON	ON
9600 b/s	ON	OFF	ON
4800 b/s	OFF	OFF	ON
2400 b/s (V22b modulation is forced)	ON	ON	OFF
1200 b/s (V22 modulation is forced)	OFF	ON	OFF
1200 b/s (V23 modulation is forced)	ON	OFF	OFF
300 b/s (V21 modulation is forced)	OFF	OFF	OFF

CHARACTER FRAMES	Sw. 6	Sw. 7
8 bits – parity odd – 1 stop (8O1)	ON	ON
8 bits – parity even – 1 stop (8E1)	OFF	ON
8 bits – parity none – 1 stop (8N1)	ON	OFF
7 bits – parity odd – 1 stop (7O1)		
7 bits – parity even – 1 stop (7E1)		
Reserved	OFF	OFF

LINE MODULATION	Sw. 8	Sw. 9
V32 modulation	ON	ON
V32 bis modulation	OFF	ON
V34 modulation	ON	OFF
Reserved	OFF	OFF

ERROR CORRECTION	Sw. 10
V42 enabled	ON
V42 disabled	OFF

RS485 filtering	Sw. 11
The RS485 / RS422 is disabled when the modem is not connected to a remote modem	ON
The RS485 / RS422 is enabled even if the modem is not connected to a remote modem	OFF

Note : If AT commands have to be issued through the RS485 / RS422 interface, the switch 11 has to be set OFF.

ADDITIONAL PARAMETERS SELECTION	Sw.12
FACTORY PROFILE 1	ON
STORED PROFILE 1 (can be modified with AT commands)	OFF

3.2. Additional parameters

If the microswitches are enabled, and if some parameters which cannot be selected with the microswitches have to be modified, the procedure is as follows :

Step 1 : Disable micro switches

Microswitches 1 and 2 OFF

Step 2 : Open the “Modem View” software

Note : “Hyperterminal” can be used instead of Modem View

Step 3 : Select a profile

FACTORY PROFILE 0 : AT&F0
 FACTORY PROFILE 1 : AT&F1
 STORED PROFILE 0 : AT&Y0
 STORED PROFILE 1 : AT&Y1

Step 4 : Modify parameters

Use AT commands
 Check the result with the AT&V command

Step 5 : Save into the « STORED PROFILE 1 »

Type the AT&W1 command

Step 6 : Select the « STORED PROFILE 1 »

Microswitch 12 OFF

Step 7 : Restore the use of microswitches

Microswitches 1 and 2 in the right position :

Network	Sw. 1	Sw. 2
Telephone network (PSTN)	ON	ON
Leased line (calling)	OFF	ON
Leased line (called)	ON	OFF



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1 AT commands

The data terminal controls the modem (configuration and calls) with AT commands.

They can be used either through the RS232 or RS485 / RS422 interfaces but if they are used through the RS485 / RS422 interface, the microswitch 11 has to be set OFF.

1.1. Overview

Each command begins with the prefix AT followed by a suffix which is the command itself.

Each command character transmitted to the modem entails an echo if ATE1 has been entered, or not if ATE0 has been entered (Factory profile 1 value).

Each command must be terminated with the CARRIAGE RETURN character (↵).

Each command entails a result code if ATQ0 has been entered, or not if ATQ1 has been entered (Factory profile 1 value).

A result code can appear in digits if ATV0 has been entered, or in words if ATV1 has been entered (Factory profile 1 value).

Each ATSn=X..X command automatically entails the updating of the registers (Sn) which determine the modem's functioning.

Registers can be written and read.

Command	Syntax	Result code
Command the modem	AT<suffix><parameter>	OK or ERROR
Example	AT&W1	OK
Write register n	ATSn=<value>	OK or ERROR
Example	ATS0=2	OK
Read register n	ATSn?	<value>
Example	ATS0?	002

Commands and registers are listed in the appendix.

1.2. « Command » and « data » modes

The interface between the terminal and the modem can be either in COMMAND or in DATA mode.

In COMMAND mode, the modem executes the AT commands sent by the terminal.

In DATA mode, the modem transmits transparently all the data to the telephone network.

- **Off-line COMMAND mode**

After being switched on, the terminal must set the DTR signal or the « C » digital input. In return, the modem sets the CTS signal.

The modem enters COMMAND mode and constantly waits for an AT command (a configuration or dial command) from the data terminal or for an incoming call.

If the MTI133-1 detects a configuration command, it will execute it.

If it detects a call command or an incoming call, it will establish the connection.

- **DATA mode**

Once connected to another modem through the network, the modem transmits the “CONNECT XXXX” result code, sets the DSR, CTS and CD signals and closes the « I » digital output.

The modem enters DATA mode : All datas are transmitted by the data terminal to the telephone network and vice versa and no other AT command can be transmitted to the MTI133-1.

- **On-line COMMAND mode**

When the modem has established a connection, and has entered DATA mode, it is possible to interrupt the data transmission in order to issue further commands to the modem.

To achieve this, the terminal sends the modem a sequence of three ASCII programmable characters (escape sequence) specified by register S2. No character must follow the reception of the last character of the escape sequence during a period controlled by the S12 register.

If the sequence is accepted by the modem, it answers OK (or 0) and enters the on-line COMMAND mode where it accepts AT commands again.

The terminal can send a configuration command or clear the call by sending the ATH0 command to the modem.

Switching from DATA to COMMAND mode can be forbidden by assigning a decimal value higher than 128 to the escape character (register S2).

On-line mode switching is banned by default (Factory profile 1); the stored escape character is 255.

1.3. Dial commands

Dial number <TT...T> ATD<TT...T >

Dial the number stored in the directory line n (n=0 to 3) ATDS=n

Clear the call : +++ (result code OK) then ATH0

The modem must detect the carrier of the called modem and connect within the time assigned by the S6 and S7 registers.

If the modem receives a character while the call is being processed, the call will not be aborted.

The dial command may include the following characters :

- 0-9 0 to 9 DTMF digits.
- * The « star » digit (tone dialing only).
- # The « gate » digit (tone dialing only).
- A-D A, B, C, D DTMF digits.
- L Re-dial last number.
- P Select pulse dialing; pulse dials the numbers that follow until the ASCII code "T" is encountered. Affects current and subsequent dialing.
- T Select tone dialing; tone dials the numbers that follow until the ASCII code "P" is encountered. Affects current and subsequent dialing.
- ! Flash; the modem will go on-hook for a time defined by the value of S29.
- W Wait for dial tone. If dial tone is not detected within the time specified by S6, the modem will abort the call, return on-hook and generate an error message.
- , Dial pause (comma); the modem will pause for a time specified by S8 before dialing the digits following the comma.

If the MTi 133 is installed behind a switchboard (or PBX) it is preferable to insert the "W" character after the access prefix to the public network in order to instruct the modem to wait for the public dial tone.

Instead of the "W" character, one or several « , » digits (comma) can be used to cause a two-second pause replacing the waiting for the public dial tone.

Example : ATD0W0476042001 or ATD0,0476042001
 where 0 is the access digit to a public line

2 Calling using AT commands

This paragraph describes how to operate the modem with the default « **factory profile 1** ».

2.1. Outgoing Call

Setting a call through the RS485 or RS422 interface

AT commands can be used either through the RS232 or RS485 / RS422 interfaces; however, if they are used through the RS485 / RS422 interface, the microswitch 11 has to be set OFF.

Serial interface data rate

If microswitches are enabled (Sw. 1 and 2 set ON), AT commands have to be issued at the data rate and frame as indicated by switches 3 to 7.

If microswitches are disabled (Sw 1 and 2 set OFF), the “autobauding” function is enabled. The AT command can be set at any data rate and frame.

Character echo and result codes

To avoid any disruption on the PLC network, no echo and no result codes are transmitted from the modem to the terminal through the serial interface.

However character echo can be restored with the ATE1 command, and result codes with the ATQ0 command.

Initialization command

If microswitches are enabled (Sw. 1 and 2 set ON), the initialization conditions are set automatically.

If microswitches are disabled (Sw 1 and 2 set OFF), an initialization command can be transmitted to the modem before the dial command or assembled with the dial command.

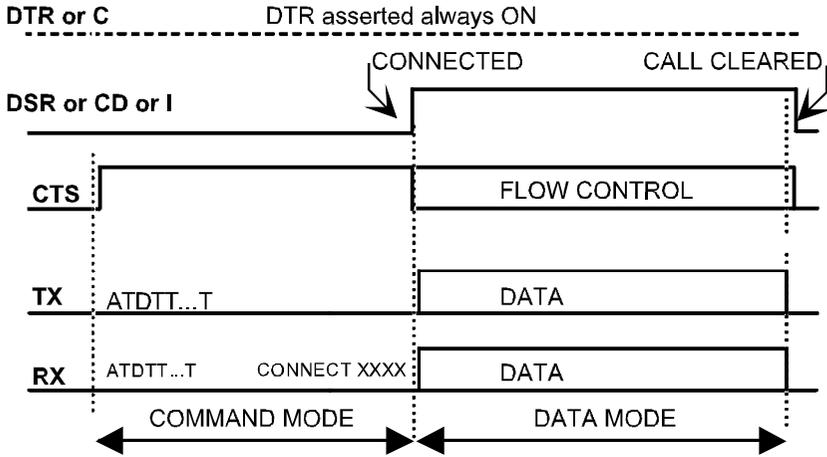
Call command

Example : AT&F0 and then ATD33476042005
 or AT&F0D33476042005



Call progress

The modem dials the required number, activates the DSR and CD signals and closes the “I” digital output as soon as the connection is established.



2.2. Incoming call

Note : if the modem is used only for incoming calls, it is advised to enable microswitches (sw. 1 and 2 set ON); the data rate an character frame will be set by the switches instead of being set by an AT command.

Using the RS485 / RS422 interface

The call can be received on the RS232 or on the RS485 / RS422 interface.

If it is received through the RS485 / RS422 interface, it is advised to set the sw. 11 to ON.

Serial interface data rate and character frame

If micro switches are enabled, the data rate and character frame are set by switches 3 to 7.

If micro switches are disabled, the data rate and character frame are set by any AT command (autobaud function).

Character echo

To avoid any disruption on the PLC network, no character echos are sent to the terminal through the serial interface. However character echo can be restored with the ATE1 command.

Result codes

To avoid any disruption on the PLC network, no result codes are transmitted to the terminal through the serial interface. Thus the “RING” message is not transmitted to the terminal (PLC...) when it detects the ring. Neither is the CONNECT message transmitted when the modem is connected. Result codes can be restored with the ATQ0 command.

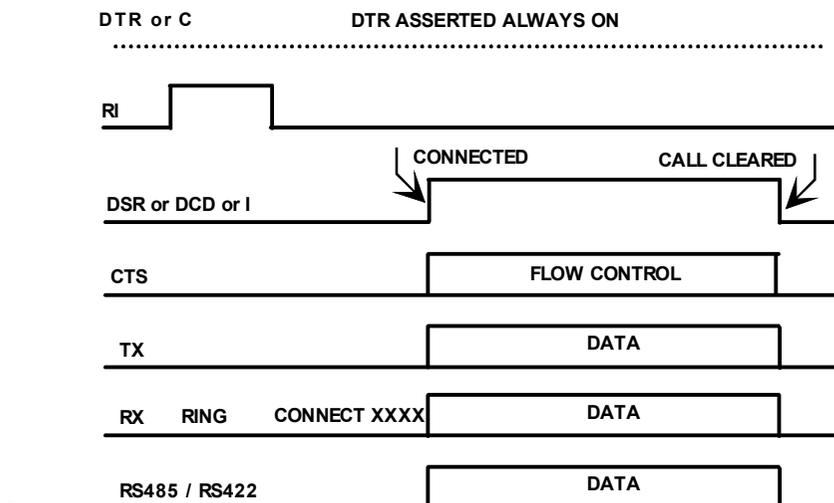
Incoming call detection

When the MTi 133 detects the ring, it closes the RI RS232 signal. It answers the call automatically after 2 ring tones (S0 default value), and opens the RI RS232 signal.

The number of ring tones before answering the call can be modified using the ATS0 command. This can be important if a telephone set has to be connected to the same telephone line.

Communication

Once connected, the modem enables the DSR, CTS and CD signals, closes the “I” digital output and then manages the flow control.



2.3. Call termination

The “FACTORY PROFILE 1” provides a possibility of immediate use of the modem in almost all cases ; **however, in the counterpart, the call can only be terminated by the remote modem or by switching off the local one.**

Other possibilities to clear the call are available; nevertheless, the configuration of the modem has to be modified :

Call termination by the terminal with the DTR or “C” signal

The terminal can clear the call by opening the RS232 DTR signal or the “C” digital input of the modem.

Beforehand, the AT&D2 command must be issued and saved.

Call termination using the +++ATH0 command

The terminal can clear the call by transmitting the escape sequence +++ (result code OK) followed by the ATH0 command.

Beforehand, this function must be authorized by programming an escape character (ATS2=43 to program the escape character “+” with a decimal value of 43).

Call termination in case of serial interface inactivity

The modem can clear the call if no data has been received from the serial interface for a time superior to the value stored in register S30 (the 000 default value means that the function is not valid).

3 Using the DTR or C signal to set a call

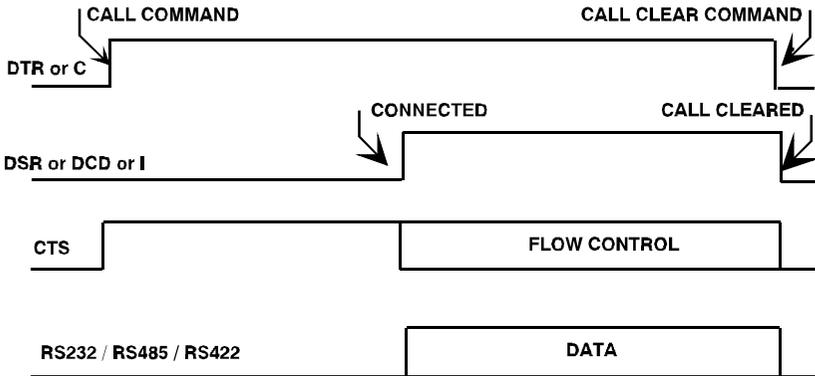
Instead of using the AT commands, the data terminal can command the call to a number stored in the modem by closing the DTR signal or the « C » digital input of the modem.

This method is particularly helpful when a PLC is connected to the modem with the RS485 serial interface and is unable to command a call by an AT command, or when the user wants to command the call with a manual switch.

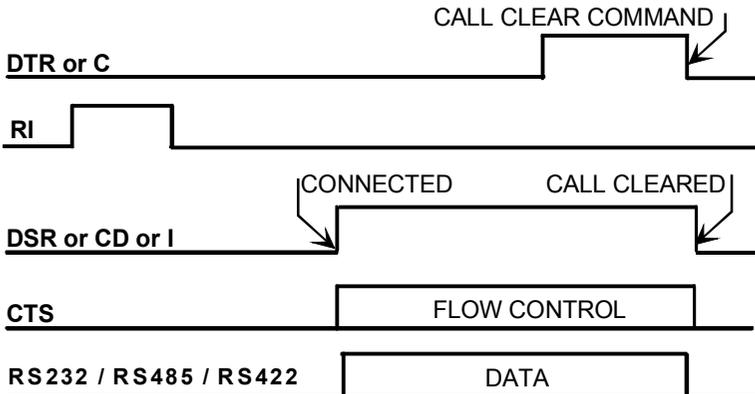
3.1. Configuring the modem

Enable AT commands	Sw 1 and 2 OFF
Open Modem View software or Hyperterminal	
Select the Factory profile Nr 1	AT&F1
Select the call command with the DTR or “C” signal instead of AT commands	AT&D1
Store the number to dial (TT...T)	AT&Z0=TT...T
Store into the stored profile 1	AT&W1
Select the stored profile 1	Sw12 OFF
Enable microswitches	Sw 1 and 2 ON

3.2. Outgoing call



3.3. Incoming call



4 Operations with the « LOW POWER » model

4.1. Overview

The MTi133-102XXX is designed especially for use in battery or solar powered systems.

It can be put off-line between two communications and only draws 10 micro-Amp in this state.

The only available interface is the RS232 interface (no RS485 or RS422 interface).

No call by relay call command is possible.

The power switch has to be permanently switched on (position 1).

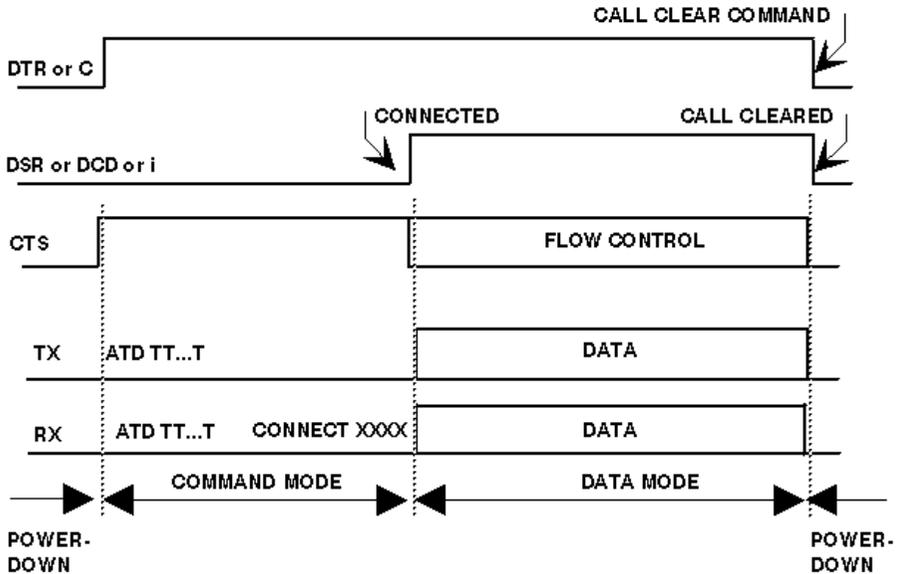
!!! When off-line, the L.E.D.s are off to avoid power consumption.

4.2. Configuring the modem

Select factory profile Nr 1	AT&F1
The DTR signal enables the terminal to wake up the modem	AT&D2
Store into the stored profile 0	AT&W
Select the stored profile 0 for operations at next power on	AT&Y
Switch the modem off and back on	Power switch on 0 then 1

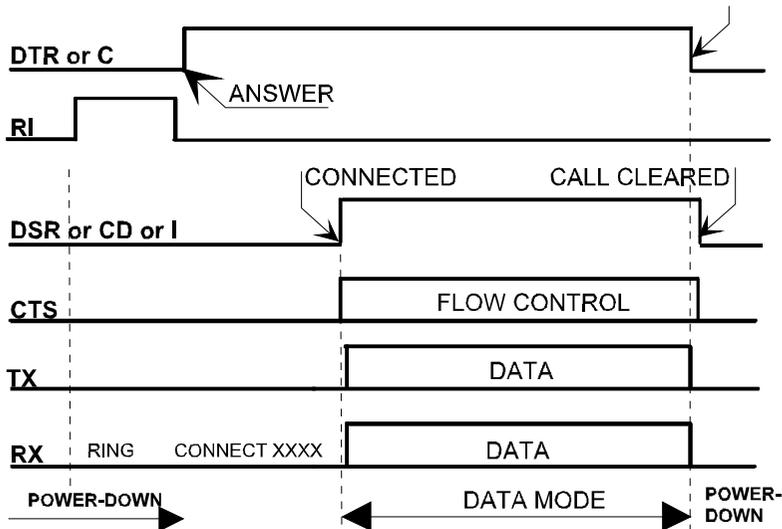
4.3. Outgoing call

The terminal must switch on the modem by using the DTR signal. The MTi 133 wakes up and is ready to accept a dial command from the terminal.



4.4. Incoming call

When it detects the ring signal on the telephone line, the MTi 133 informs the terminal by setting the Ri RS232 signal. In return, the terminal must set the DTR signal to wake-up the modem; the MTi 133 will automatically accept the incoming call and establish the connection.

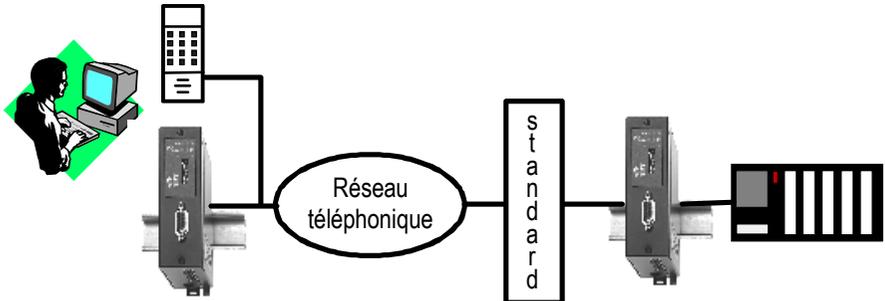


4.5. Clearing the call and going back to off-line state

The terminal clears the call, turning the DTR signal off. The MTi 133 will automatically switch to off-line mode.

5 If the modem is installed behind a manual PBX

Often the modem to be called is installed on a secondary line of a PBX. Moreover a receptionist might have to intervene manually to reach that line.



In such a case the following operations have to be carried out.

- Connect a telephone in parallel to the modem of the PC.
- Open ModemView (or Windows HYPERTERMINAL) at the appropriate data rate and character frame.

Or

- Configure the application to be connected so as to make it transmit the ATD characters to the modem (Etic's application notes contain instructions according to the make of the PLC).
- Call the company's PBX by dialing manually with the telephone and request to be transferred to the line with the modem.
- Enter ATD (with Modemview or HYPERTERMINAL) as soon as the modem answers, or connect the application as you usually do.
- Hang up immediately.

6 Leased line operations

The microswitches have to be set as follows :

First modem : Select Leased line « calling modem»	Sw1=ON and SW2=OFF
Second modem : Select Leased line « called modem»	Sw1=OFF and SW2=ON
Both modems :	
Set the data rate and characters frame	Sw. 3 to 7
Set the line modulation	Sw. 8 and 9
Enable the V42 errors correction protocol if necessary	Sw10=ON
Select the factory profile 1 in addition	Sw12 = ON



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APPENDIX

- APPENDIX 1 : AT commands**
- APPENDIX 2 : S registers**
- APPENDIX 3 : Micro switches**

APPENDIX 1 : AT COMMANDS

ATA	Answer (see register S0)
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ATBn	modulation selection	F0	F1
B0	CCITT	X	X
B1	Bell		

ATDSn CrLf	Dial the number stored in the directory line n 0<n<3
-------------------	---

ATDtt..t	Dial command
-----------------	---------------------

ATEn	Command echo	F0	F1
E0	Disables the echo of characters.		X
E1	Enables the echo of characters.	X	

ATH0	Disconnect command
	<p>This command can only be understood by the modem if the interface is switched to the COMMAND / On-line mode by transmitting the escape character three times to the modem.</p> <p>The choice of the escape character is to be programmed in the S2 register.</p> <p>Example : +++ ATH0</p>

ATI	Country code recognition	F0	F1
5	<p>This command can be used only for country code recognition.</p> <p>The modem returns the code of the country in which the modem can be installed.</p> <p>On delivery the returned code is 092.</p>	092	092

ATL	Speaker volume	F0	F1
0	Low volume		
1	Low volume (default)	X	
2	Medium volume		
3	High volume		X

ATM	Speaker control	F0	F1
0	Speaker is always OFF		
1	Speaker is ON during the incoming or outgoing call and OFF when receiving carrier	X	X
2	Speaker is always ON		
3	Speaker ON during incoming call / OFF otherwise		

ATN	Detection of modulation on the line	F0	F1
0			
1	Automode detection of modulation on the telephone line. Do not modify.	X	X

ATP	Pulse dialing
------------	----------------------

ATQn	Quiet result code control	F0	F1
Q0	The modem sends a result code after an AT command or a data transmission to the remote modem. The result code can be in words or digital according to the ATV value. The content of the result code depends on the ATX command. IMPORTANT : On the RS485 interface, all result codes are made quiet in order to avoid disturbing the functioning of the PLC network on which the MTI133 is generally connected.	X	
Q1	The modem sends no result code.		X

ATT	Tone dialing
------------	---------------------

ATVn	Result code forms	F0	F1
V0	Digital result codes		
V1	Word result codes	X	X

ATWn	Modification of « CONNECT » result codes	F0	F1
	This command modifies the significance of the data rate information following the CONNECT result code after selecting the ATX4 command.		
W0	The result code only contains the data rate on the serial interface.	X	X
W1	The result code contains the on-line data rate, the correction protocol and the data rate on the serial interface.		
W2	The result code only contains the on-line data rate.		

ATXn	Extended result codes	F0	F1
X0	Refer to table below		X
X1			
X2			
X3			
X4		X	

Result code		Explanation	X0	X1	X2	X3	X4
OK	0	Command accepted	X	X	X	X	X
CONNECT	1	Connection	X	X	X	X	X
RING	2	Indicates a ring signal	X	X	X	X	X
NO CARRIER	3	No detection of carrier or loss of carrier or busy line (ATX0 to 2) Or no dial tone (ATX0 and 1)	X	X	X	X	X
ERROR	4	Syntax error or impossible command	X	X	X	X	X
CONNECT XXXX	5, 9 to 19, 59, 61 to 64 84, 91	Connection of modems « XXXX » = DTE or DCE rate *	1	X	X	X	X
CONNECT 75TX/1200RX	22	Outgoing call	1	X	X	X	X
CONNECT 1200TX/75RX	23	Incoming call	1	X	X	X	X
NO DIAL TONE	6	No dial tone	3	3	X	X	X
BUSY	7	Busy remote line	3	3	3	X	X
NO ANSWER	8	No answer after the period of time set by the S7 timer	X	X	X	X	X
DELAYED	24	Nr delayed	4	4	4	4	X
BLACKLISTED	32	Nr forbidden	4	4	4	4	X
COMPRESSION: CLASS 5	66	MNP5 * compression	X	X	X	X	X
COMPRESSION: V42bis	67	V42bis * compression	X	X	X	X	X
COMPRESSION: NONE	69	No compression *	X	X	X	X	X
PROTOCOL: NONE	70	No error correction protocol *	X	X	X	X	X
PROTOCOL: LAPM	77	LAPM correction protocol *	X	X	X	X	X
CARRIER XXXX	40, 44 to 58 78, 79	On-line modulation *	X	X	X	X	X

ATY	Long space disconnection	F0	F1
Y0	Disables long space disconnection	X	
Y1	In non-error correction mode, the modem will send a long space prior to hanging up; the modem will respond to the receipt of a long space by hanging up. This command allows to avoid wrong characters detected by the remote modem on clearing the line.		X

ATZn	Soft reset and restore profile.
Z0	The modem resets and restores « STORED PROFILE 0 ».
Z1	The modem resets and restores « STORED PROFILE 1 ».

AT&Cn	DCD option	F0	F1
&C0	DCD remains ON at all times.		
&C1	DCD follows the state of the carrier.	X	X

AT&D	DTR option	F0	F1
&D0	<p>DTR is always assumed ON.</p> <p>This choice makes the modem operational without any control signal (only RX / TX / earth on RS232 or A and B on RS485).</p> <p>Outgoing call : An AT command can be issued without having closed the DTR signal or the digital input "C".</p> <p>Incoming call : Automatic connection without controlling any signal.</p> <p>Clearing the call :</p> <p>The call must be cleared by the remote modem or by switching off the local one or even with the +++ (OK) ATH0 sequence if the escape character has been programmed (ATS2=43).</p>		X
&D1	<p>Outgoing call : Closing the DTR signal or the relay call command entails the call to the number stored by the AT&Z0 command.</p> <p>Incoming call : Answering a call is automatic.</p> <p>Clearing the call : It can be done by opening the DTR signal and the relay call command.</p>		
&D2	<p>The DTR signal or the « C » digital input must be closed for the modem to accept AT commands.</p> <p>Outgoing call : Close the DTR signal or the "C" digital input before issuing an AT command.</p> <p>Incoming call : The DTR signal or the « C » digital input must be closed for an incoming call to be accepted.</p> <p>Clearing the call : It can be done by opening the DTR</p>	X	

AT&F	<p>Selects « FACTORY PROFILE 0 or 1 » as the usual configuration and saves it into the « ACTIVE PROFILE »</p> <p>N.B. : On delivery of the product, the active profile is « FACTORY PROFILE 1 »</p>
&F0	Stores « FACTORY PROFILE 0 » in the « active profile »
&F1	Stores « FACTORY PROFILE 1 » in the « active profile »

AT&K	Flow control	F0	F1
&K0	No flow control.		X
&K3	RTS / CTS flow control.	X	
&K4	XON / XOFF flow control.		

AT&Qn	On-line transmission	F0	F1
&Q0	Direct asynchronous transmission without buffering or error correction.		
&Q1 to &Q4	Do not use.		
&Q5	The modem will negotiate an error corrected link and will switch to asynchronous mode in case of a failure.	X	X
&Q6	Asynchronous transmission with buffering and without error correction.		

AT&Rn	RTS / CTS option	F0	F1
&R0	Synchronous mode : CTS tracks the state of RTS / Asynchronous mode : CTS ON or OFF only if required by flow control.		
&R1	Synchronous mode : CTS always ON / Asynchronous mode : CTS ON or OFF only if required by flow control.	X	X

AT&Sn	DSR option	F0	F1
&S0	DSR will remain ON at all times.	X	
&S1	DSR ON when the modem is connected, OFF otherwise.		X

AT&Tn	Test and diagnostics	F0	F1
&T0	Terminates test in progress. Clears S16.		
&T1	Initiates local analog loopback, V.54 loop type A. Sets S16 bit 0 at 1.		
&T2	Returns ERROR.		
&T3	Initiates local digital loopback, V.54 loop type 2. This command can only be issued when the modems are connected. Sets S16 bit 4 at 1.		
&T4	Enables digital loopback acknowledgment for remote request (loop 2). When the remote modem requests a loop 2, the local modem accepts the request and achieves the loop. Sets S23 bit 0 at 1.		
&T5	Disables digital loopback acknowledgment for remote request (loop 2). When the remote modem requests a loop 2, the local modem denies the request. Sets S23 bit 0 at 0.	X	X
&T6	Requests a remote digital loopback type 2 without self test. If no connection exists, ERROR is returned. Once on-line, the modem must be set on on-line COMMAND mode with the +++ escape command (result code OK). After the AT&T6 command , the modem returns CONNECT when the loop is achieved. The loop is terminated either via expiration of S18 or via the ATH0 command or if the looped modem hangs up. Sets S16 bit 4 at 1.		
&T7	Requests a remote digital loopback type 2 with self test. If no connection exists, ERROR is returned. In self test, a test pattern is looped back and checked by the modem. Transmits the result of the test (error rate) when terminated : after expiration of time-out S18 or with an AT&T0 or ATH0 command. Sets S16 bit 5 at 1.		
&T8	Do not use.		

AT&V	Displays current configuration and STORED PROFILES 0 and 1
-----------------	---

AT&Wn	Stores current configuration
&W0	Stores the ACTIVE PROFILE in STORED PROFILE 0.
&W1	Stores the ACTIVE PROFILE in STORED PROFILE 1.

AT&Yn	Designate a default reset profile
&Y0	Recalls STORED PROFILE 0 at power-on.
&Y1	Recalls STORED PROFILE 1 at power-on.

At&Zn=TT...T	To store a telephone number in the n line of the index n= 0 to 3
-------------------------	--

AT%C	Data compression Data compression will be enabled only if an error-corrected connection has already been requested (AT \ N3). Factory profile F0 includes V42 error correction (AT \ N3) and V42b data compression (AT \ N3). Factory profile F1 establishes a non error-corrected connection (AT \ N0), hence data compression is not enabled.	F0	F1
%C0	Disables data compression		X
%C1	Enables MNP5 data compression.		
%C2	Enables V42bis data compression.	X	
%C3	Enables MNP5 and V42bis data compression.		

AT%E	Enable/disable line quality monitor and auto-retrain or fallback	F0	F1
%E0	Disables line quality monitor and auto-retrain.		
%E1	Enables line quality monitor and auto-retrain.	X	X
%E2	Enables fallback in case of communication fault.		

AT%L	Line signal level
	Returns a value indicating the received signal level (e.g. 015= -15 dbm) Beforehand, enable the ON-LINE COMMAND mode with the +++ escape sequence.

AT%Q	Line signal quality
	This command is valid only if Line quality monitor is enabled with the AT%E1 or AT%E2 command. Beforehand, enable the ON-LINE COMMAND mode with the +++ escape sequence.
	Reports the line signal quality.

AT+MS	Select modulation	F0	F1
AT+MS=11,1,300,33600	Automode	X	
AT+MS=3,1,1200,1200	V23		
AT+MS=0,1,300,300	V21		
AT+MS=1,1,1200,1200	V22		
AT+MS=2,1,2400,2400	V22bis		
AT+MS=9,1,4800,9600	V32		
AT+MS=10,1,4800,14400	V 32bis		X
AT+MS=11,1,2400,33600	V34		

AT\An	Maximum length of MNP5 frames	F0	F1
\A0	64 characters		
\A1	128 characters	X	
\A2	192 characters		X
\A3	256 characters		

AT\Bn	Break duration n 1 to 9 ; n=1 means 100 ms ; n=9 means 900ms.	F0	F1
		3	3
Action after a break has been received from the serial interface			
	<p>Non-error corrected connection : The duration of the transmitted break is conform to the value indicated by the command.</p> <p>Error corrected connection : The break is transmitted by the protocol without indication of duration.</p>		
Action after a break has been received from the line			
	<p>Non-error corrected and non-buffer connection : The duration of the break is transmitted to the terminal with the value indicated by the command.</p> <p>Data buffer connection without error correction : A 300 ms break is transmitted to the terminal.</p>		

AT\K	Break transmission	F0	F1
Action after a break has been received from the serial interface			
IK0	Enters the on-line COMMAND mode. No break is transmitted to the remote modem.		
IK1	Clears data buffers and sends break on-line.		
IK2	Enters the on-line COMMAND mode. No break is transmitted to the remote modem.		
IK3	Sends break immediately.		
IK4	Enters the on-line COMMAND mode. No break is transmitted to the remote modem.		
IK5	Sends break in sequence.	X	X
Action after a break has been received from the line			
IK0	Clears data buffers and sends break to DTE.		
IK1	Clears data buffers and sends break to DTE.		
IK2	Sends the break immediately to DTE.		
IK3	Sends the break immediately to DTE.		
IK4	Sends the break in sequence to DTE.		
IK5	Sends the break in sequence to DTE.	X	X

AT\Nn	Buffers and error correction	F0	F1
IN0	Data buffer connection without error correction (forces &Q6).		
IN1	Non-error corrected and non-buffer connection (forces &Q0).		
IN2	The modem will first attempt a V42 connection and then an MNP connection if necessary ; Failure to make a reliable connection results in the modem hanging up (forces &Q5 ; S36=4 ; S48=7).		
IN3	The modem will first attempt a V42 connection and then an MNP connection if necessary ; Failure to make a reliable connection results in the modem making a data buffer connection without error correction (forces &Q5 ; S36=7 ; S48=7).	X	X
IN4	The modem will attempt a V42 connection; Failure to make a reliable connection results in the modem hanging up (forces &Q5 ; S48=0).		
IN5	The modem will attempt an MNP connection; Failure to make a reliable connection results in the modem hanging up (forces &Q5 ; S36=4 ; S48=128).		

AT*B	Blacklisted numbers Returns the list of blacklisted numbers to the DTE.
-------------	---

AT*D	Delayed numbers Returns a list of the delayed numbers together with the delay associated with each (Hr, min,sec).
-------------	---

APPENDIX 2 : S REGISTERS			
Nr	Function	Factory profile	
		0	1
S0	Nr of ring tones before auto-answer S0=0 inhibited auto-answer ; the DTE must activate the DTR signal and send the ATA command.	2	2
S2	Escape character (+)	43	255
S3	Carriage return character	13	13
S4	Line feed character	10	10
S5	Backspace character	8	8
S6	Wait time for dial tone before blind dialing after W character(seconds)	4	4
S7	Wait time for carrier after dial (seconds)	50	50
S8	Pause time for dial delay when detecting the « , » modifier (seconds)	2	2
S9	Carrier detect response time (1/10 seconds)	6	6
S10	Lost carrier to hang up delay (1/10 seconds)	14	14
S11	DTMF tone duration	95	95
S12	Escape prompt delay (1/50 seconds)	50	50
S16	Loop status	0	0
S18	Sets the length of time that the modem conducts a loop or a test (seconds) after an AT&T command has been issued. At the end of the delay time, the modem cancels the loop or test in progress and returns to COMMAND mode. If value 0 is assigned, the test will not terminate automatically ; the AT&T0 or ATH0 command will have to be issued.	0	0
S19 to S23	Reserved	0	0
S24	Sleep inactivity timer	0	0
S25	Delay to DTR or C OFF (1/100 s)	5	5
S26	RTS toCTS delay (1/100 s)	1	1
S29	Flash dial modifier time (1/100 s)	0	0
S30	Disconnect inactivity timer (multiples of 10 seconds) (0=disabled)	0	0
S32	Sets the value of the XON character (ASCII decimal)	17	17
S33	Sets the value of the XOFF character (ASCII decimal)	19	19
S 36	Reaction upon an LAPM failure	7	7

APPENDIX 2 (continued) : S REGISTERS			
Nr	Function	Factory profile	
		0	1
S37	Desired line connection speed		
	S37=0 If N0 command is active, the modem connects at the last used line connection speed. If N1 command is active, the modem connects at 33600 b/s	X	
	S37=1 to 3 V21 - 300 b/s		
	S37=4 Reserved		
	S37=5 V22- 1200 b/s		
	S37=6 V22bis – 2400 b/s		
	S37=7 V23 – 1200 and 75 b/s		
	S37=8 V32bis/V32- 4800 b/s		
	S37=9 V32bis/V32- 9600 b/s		
	S37=10 V32bis - 12000 b/s		
	S37=11 V32bis – 14400 b/s		X
	S37=12 V32bis - 7200 b/s		
S38	Buffer clearing delay (seconds) before forced hang up (DTR off or ATH). Active only if an error corrected connection already exists. If value 255 is assigned, the delay will be ignored ; the forced hang up command will be executed only when no more data is received or remains to be sent.	20	20
S46	V42 bis compression	138	138
S48	Protocol type	7	7
S86	Call failure reason code	0	0
S91	Transmit attenuation level compared with 0 dbm nominal level	10	10
S95	Extended result codes	0	0
	Bit0 CONNECT result code indicates DCE speed instead of RS232 speed	0	0
	Bit1 Append ARQ to CONNECT XXXX result code in error-correction mode	0	0
	Bit2 Enable CARRIER XX result code	0	0
	Bit3 Enable PROTOCOL XXXX result code	0	0
	Bit4 Reserved	0	0
	Bit5 Enable COMPRESSION XXXX result code	0	0
	Bit 6/7 Reserved	0	0

APPENDIX 3 : MICRO SWITCHES

Network	Sw. 1	Sw. 2
Telephone network (PSTN)	ON	ON
Leased line (calling)	OFF	ON
Leased line (called)	ON	OFF
“AT” configuration and operations (micro-switches are ignored)	OFF	OFF

Note :

If sw 1 and 2 are ON, the modem can be used on the PSTN ; switches 3 to 12 are taken into account.

If sw 1 and 2 are OFF, parameters of the user profiles can be modified with AT commands, or the modem can be controlled like a usual PC modem.

If the modem has to be connected to a leased line, one modem has to be configured as “calling” (sw.1 OFF and sw.2 ON) and the other one as “called” (sw.1 ON and sw.2 OFF).

SERIAL INTERFACE DATA RATE	Sw. 3	Sw. 4	Sw. 5
38400 b/s	ON	ON	ON
19200 b/s	OFF	ON	ON
9600 b/s	ON	OFF	ON
4800 b/s	OFF	OFF	ON
2400 b/s (V22b modulation is forced)	ON	ON	OFF
1200 b/s (V22 modulation is forced)	OFF	ON	OFF
1200 b/s (V23 modulation is forced)	ON	OFF	OFF
300 b/s (V21 modulation is forced)	OFF	OFF	OFF

CHARACTERS FRAME	Sw. 6	Sw. 7
8 bits – parity odd – 1 stop (8O1)	ON	ON
8 bits – parity even – 1 stop (8E1)	OFF	ON
8 bits – parity none – 1 stop (8N1)	ON	OFF
7 bits – parity odd – 1 stop (7O1)		
7 bits – parity even – 1 stop (7E1)		
Reserved	OFF	OFF

LINE MODULATION	Sw. 8	Sw. 9
V32 modulation	ON	ON
V32 bis modulation	OFF	ON
V34 modulation	ON	OFF
Reserved	OFF	OFF

ERROR CORRECTION	Sw. 10
V42 enabled	ON
V42 disabled	OFF

RS485 filtering	Sw. 11
The RS485 / RS422 is disabled when the modem is not connected to a remote modem	ON
The RS485 / RS422 is enabled even if the modem is not connected to a remote modem	OFF

Note : If AT commands have to be issued through the RS485 / RS422 interface, the switch 11 has to be set OFF.

ADDITIONAL PARAMETERS SELECTION	Sw.12
FACTORY PROFILE 1	ON
STORED PROFILE 1 (can be modified with AT commands)	OFF



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