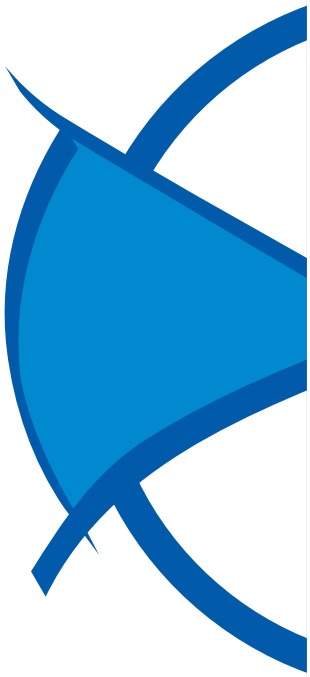
Cod 7D1062 rev. 2.0 del 03/99

User's Manual

LEONARDO56

External RS232
External USB
Internal ISA Card
PC Card



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PREFACE

The contents of this booklet may be modified without prior permission.
Every possible care has been taken in testing and putting together all the documentation contained in this booklet, however Digicom can not take any responsability brought by the use of this booklet.
The following installation rules should be respected in order to have the best working order of the equipment and for the user's safety.

ENVIROMENTAL CONDITIONS

For all devices:

ENVIROMENTAL TEMPERATURE	RELATIVE HUMIDITY
from 0 to + 45°C	from 20 to 80% n.c.

Rapid changes of temperature or humidity should be avoided (0,03°C/min).
This equipment, including cables, should be installed in an area free from:

- Dust, humidity, heat from direct sun light.
- Objects which irradiate heat. These could cause damage to the container or other problems.
- Objects which produce a strong electtromagnetic field (loudspeakers, etc.)
- Liquids or chemical corrosive substances.

GENERAL WARNINGS

For all equipment powered directly from mains power

POWER SUPPLY	220-240 Volt single phase 50 Hz
ISOLATION CLASSIFICATIONS	only those indicated on the equipment label
NOMINAL CURRENTS	only those indicated on the equipment label

To avoid electric shock, the equipment should never be opened. Ask qualified personnel help.
Disconnect the power cable from the wall outlet when the equipment is not to be used for a long period. To disconnect the cable pull it by the plug, never pull it by the cable itself.
If there should be liquid or object penetration in the equipment, disconnect the power cable and call a qualified personl for testing.

CLEANING THE TERMINAL

Use a clean and soft cloth. Wet the cloth with water or natural detergent if it is necessary to remove any stains. Never use chemical products such as petrol or solvents.

VIBRATIONS OR DROPPING

Caution against vibrations and dropping

WARNING
This is a class A product.
In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

1. GENERALITY

1

This operating manual describes the installation procedures and the main features of the Leonardo 56 modem family. Leonardo 56 is the perfect modem fax sulution for applications that require ultra high speed and reliability over a remote user analog line: the ideal solution for data, and fax, communication for professional, office or the home user.
This operating manual is for the following modem: **Leonardo 56 external RS232 & USB** (PC or Macintosh), **Leonardo 56 internal ISA card** (PC) and **Leonardo PC Card** (PC and Macintosh). See the details of the installation procedure of your enviromental in the installation chapter.

DEAR CUSTOMER,

Your Leonardo 56 complies with the 56Kbps standard according to the **ITU-TV.90** regulation for data communication up to 56000 bps.

The V.90 standard, like the K56Flex, has an unbalanced connection speed. It means that you have a connection where data are received at the maximum speed of 56000 bps and sent at the maximum speed of 33.600 bps.
The unbalance, due to the technical limitations of the analog telephone lines, allows to carry out connections with top performances in applications of Internet access or remote access.
In order to reach the connection speed of 56000 bps, according to the 56K technology, one of the two modems must be connected to a digital network (usually ISDN or *64 in G703/G7047). In fact, the modems of the Services Provider (Internet POP or access servers) are special ones, like "Central Site Modem"(CSM).
The maximum speed, when receiving data, in users connections over analog line is 33.600 bps.

ADDITIONAL AT COMMAND FOR 56K

Your Leonardo 56 has been tested with the most popular Communication software running on PC or Macintosh platforms: the correct initialisation string to enable 56K speed is:

AT+MS=12,1,300,56000,1,0

1.1. PRODUCT PACKAGE CONTENTS

- 1 User manual
- 1 Digicom modem: Desktop (external) or ISA card (internal) or PC card (PCMCIA)
- 1 Cable to connect the modem to the telephone line
- 1 Cable to connect the modem to your PC or Macintosh (for the external version only)
- 1 Floppy diskette or CD ROM containing Modem Drivers
- 1 Package of Data/fax communication software

1.2. PRODUCT FEATURES

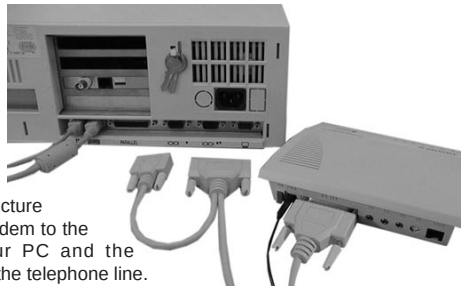
- Computer speed: up to 115.200 bit/s
- Data modem modes for: V.90, K56flex™,V.34, V.32bis, V.32, V.22bis, V.22, V.21, V.23 (1200/75).
- Fax modem modes: 9600/4800bps, V.29/V.27 Group 3 and 14.400bps V.17.
- Enchanced AT commands set with autobaud for the data mode up to 115.200 bit/s.
- Class 1 fax command set
- Non volatile memory directory for user profiles
- Auto dial and autoanswer
- Tone and pulse dialing
- Error Correction: MNP 4/10 and V.42
- Data Compression: MNP 5 and V.42bis

2. INSTALLATION

2

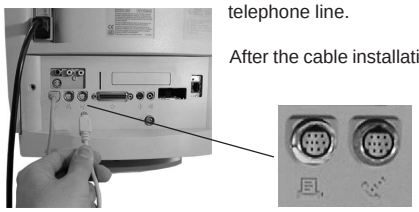
2.1. HARDWARE INSTALLATION

2.1.1. LEONARDO 56 EXTERNAL RS232



See the following picture to connect your modem to the COM port of your PC and the telephone cable to the telephone line.

See the following picture to connect your modem to the GEO port of your Macintosh® and the telephone cable to the telephone line.



After the cable installation, connect the AC adapter to the main power supply outlet and switch ON the power switch on the rear panel. Check that the green LED PWR indicator light is on.

For the next step see the section Software Installation.

2.1.2. LEONARDO 56 EXTERNAL USB

See the following pictures to connect your modem to the USB port of your Computer and the telephone cable to the telephone socket of the modem.

After the cable installation switch on your Computer and check that the green LED PWR indicator light is on.

For the next step, see the section Software Installation.

2.1.3. LEONARDO 56 INTERNAL ISA BUS

Caution: Before removing the cover of any computer, turn-off and unplug the mains power cord.

Remove the computer's cover according to the computer manual.
Select any available ISA bus slot.
The internal modem can work in an 8 or 16 bit slot. Remove the slot cover and save the screw.
Carefully insert the modem into the selected slot.
Secure the bracket with the screw saved earlier.
Replace the computer cover and plug in your computer.
Connect the telephone cable to the telephone line.

For the next step see the section Software Installation.

2.1.4. LEONARDO 56 PC CARD-PCMCIA

The Leonardo 56 PC Card is compliant with any PCMCIA 2.0 socket.
Insert the card in the PCMCIA slot of your computer the correct way up.
The way up sign is on the modem sticker.
Connect the telephone cable to the telephone line.
For the next step see the section Software Installation.

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2.2. SOFTWARE INSTALLATION

- **WINDOWS® 95/98/NT4.0 DRIVER**

Before starting with the software installation, please read the file Readme.txt present on the Floppy Disk or the CD ROM included with the modem package. In this file you can read more details about the driver installation for the different versions of Windows® 95/98 and also the latest release notes or driver upgrades not available at the time of printing this manual.

- **MACINTOSH® Driver ARA/Open Transport**

Make a copy of the Leonardo driver file from the Floppy Disk or the CD ROM to your hard disk in the folder Modem Script (System Folder- Extension-Modem Script).

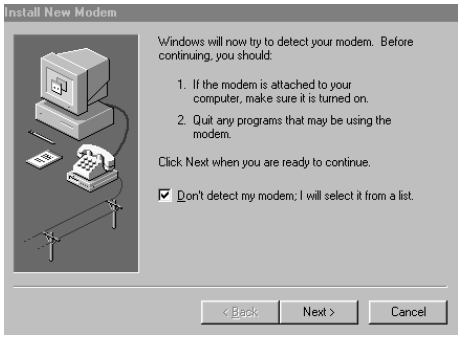
Your Leonardo driver is present in the modem list and available for any application that uses ARA/Open Transport.
Remember to select the correct communication port in the application in accordance with the hardware installation.

- **OTHER DRIVERS**

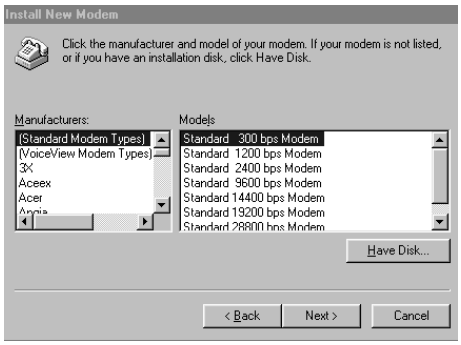
For other Operating Systems, see the installation procedures on the Floppy Disk or the CD ROM included with the modem package.

2.2.1. WINDOWS® 95/98/NT4.0 EXTERNAL OR INTERNAL VERSION

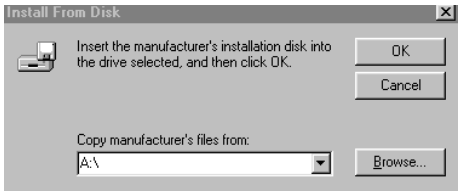
1. Run Windows®95/98/NT4.0
2. Select from the START icon : Settings-Control Pannel- Modem- Add



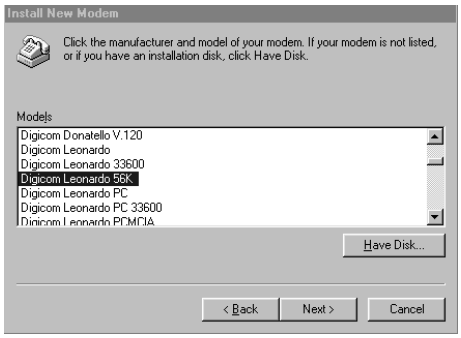
3. From the window Install New Modem put a tick in the box “Don’t detect my modem: I will select it from a list” and select the button: Next.



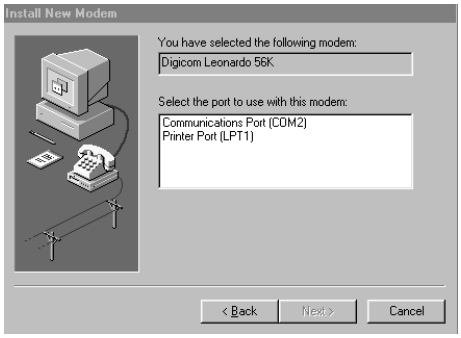
4. From the new window Install New Modem click the button Disk



5. Insert the Floppy disk or the CD ROM in the appropriate drive and from the window : Install from disk check that the correct driver letter appears showing where your Floppy/ CD ROM is inserted (eg. A or D), then click the button OK



6. From the list select the driver to use (e.g. Digicom Leonardo 56) and click Next



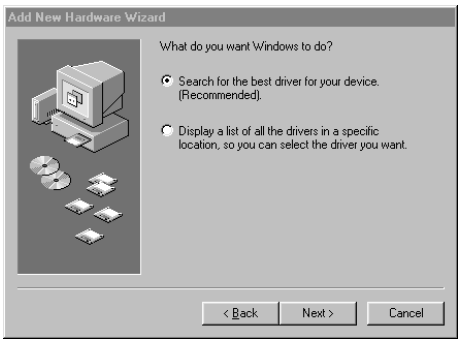
7. Select the COM port where your modem is connected, then clik Next and then Finish.

Your modem is installed and ready to make the first connection.

2.2.2. WINDOWS® 95/98/NT4.0 EXTERNAL USB VERSION

1. Start Windows®.
   After the modem connection, Windows® will automatically detect the new device.

2. In the window “Add Nex Hardware Wizard” select “Next”.



3. Select “Search for the best driver for your device” and press “Next”.
4. In the followinf window select “Floppy disk driver.

5. Press “Next, select on the floppy the directory of your operating system (USB98 or USB95).

6. Go on with the installation and press “Next”.

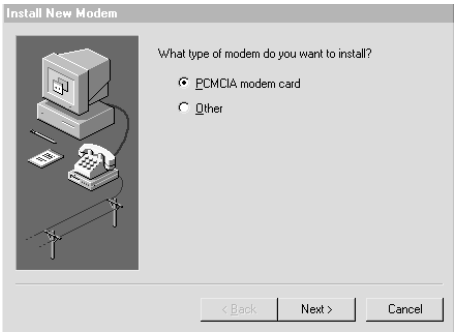
7. Press “Finish” to terminate the installation.

Your modem is now installed among the modems Windows® will use for the connections. It will be possible to select it from the list in the Windows® setup menus (Hyperterminal, Remote Access, etc.)

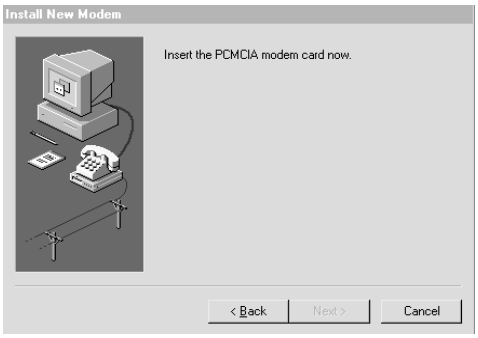
2.2.3. WINDOWS® 95/98/NT4.0 PC VERSION

The installation of the driver for the PC Card (PCMCIA) is a little bit different for WIN95/98 release 4.00.950 or 4.00.950A or 4.00.950B.
In this section is described the procedure for NT4.0 and WIN95/98 version 4.00.950B.
If you have different WIN95/98 release or a totaly different OS, please take the correct information from the Floppy Disk or the CDROM packaged with the modem.

1. Run Windows®95/98/NT4.0
2. Select from the START icon : Settings-Controll Pannel- Modem- Add. From the new window select Modem PCMCIA and then click Next.



3. Insert the PC Card into the PCMCIA slot of your PC paying attention insert the card the correct way up (see the indication on the PC Card sticker).
4. Insert the Floppy disk or the CD ROM in the drive and from the window: Install from disk check that the correct driver letter appears where your Floppy/CD ROM is inserted (eg. A or D), then click the button Finish.



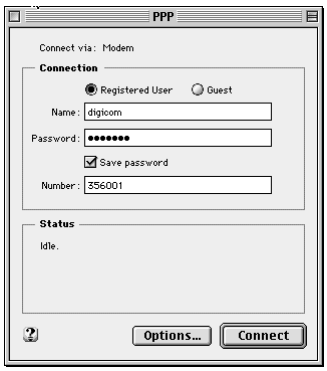
Your modem is installed and ready to make the first connection.

2.2.4. MACINTOSH® - MODEM INSTALLATION FOR ARA OPEN TRANSPORT

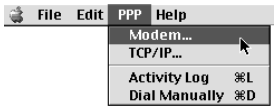
Be sure you have on your Mac the Open Transport drivers for your modem. Install them by copying the files from the ARA/OT folder (they are on the driver supplied with the modem) into the "**System Folder: Extensions: Script Modem**".

From Control Panel select **PPP**.

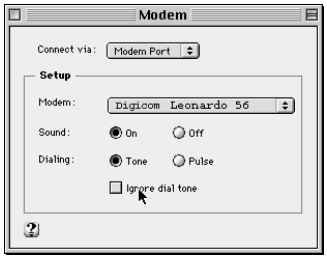
Select Registered User, insert usert ID and password and the number to be called.



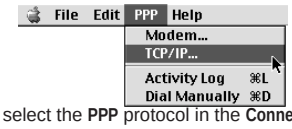
From the bar menu select **PPP** and then **Modem**...



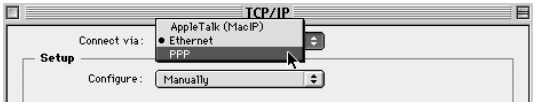
Select the serial port to be used and your modem from the list.



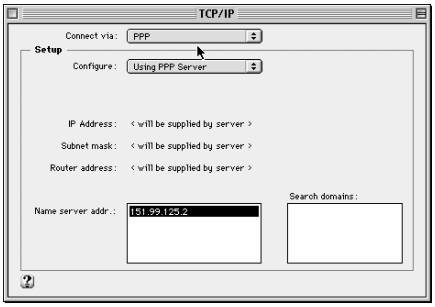
From the bar menu select **PPP** and then **TCP/IP**...



In the next window select the **PPP** protocol in the **Connect via field**:



The fields concerning the parameters used for the connection in PPP will appear.
Eventually insert the parameters supplied by your provider (DNS etc.)



3. MODEM AT COMMAND SET

3

The modem support AT commands set to define the configuration, initiate or terminate modem communication, test the modem and the communication link. The modem will work in two basic operations: **command mode** and **data mode**.
Command mode is when the modem is not connected to another modem, therefore “Off Line” or in a idle condition. In this mode the modem will accept commands beginning with AT prefix. Data mode is when the modem is connected to another modem, that is an “On Line” condition or functioning. In this mode all the characters sent from computer are interpreted as data and they are sent to the remote modem. You may switch from data to command mode by entering an escape sequence. The default escape sequence is +++ this must have at least one second before and after being keyed. To go back into data mode simply type ATO.

Data Length
Each caracter of the AT command must be an ASCII code with any of the following format combinations:

START BIT	DATA BIT	PARITY	STOP BIT	TOT
1	7	1	1	10
1	8	0	1	10
1	7	0	2	10
1	8	1	1	11

The modem will accept even, odd, mark, or space.

3.1. AT COMMAND SET DESCRIPTION

AT Attention

All the characters following the letters ‘AT’ are commands. In AT command mode the modem automatically detects the computer speed and parity format. The modem will response using the same speed and parity format of AT command.

ATA Answer incoming data call

Cause the modem to go off hook and attempt a handshake in answer mode.

A/ Repeat last command

Cause the modem to repeat the last AT command. This command is neither preceded by AT not followed by CR.

ATB CCITT/BELL Mode

B0	CCITT mode.
B1	Bell Mode.

ATD Dial Command

0:9	Dial number
*	DTMF digits
#	DTMF digits
A-D*	DTMF digits
P	pulse dial
T	tone dial
S=n	Dial one of the four stored phone numbers (n=0-3) in the modem non volately memory (See &z Command)
!	flash
W	wait for dial tone
@	wait for five seconds of silence
,	pause
L	recall the last number dialed
;	return to Command state. Added to the end of the dial string, this causes the modem to return to the command state after it processes the portion of the dial string preceding the ";". The modem will enter call progress only after an additional dial command is issued without the ";" terminator.
^	Toggle calling tone

ATE Commands Echo

E0	Commands echo disable.
E1	Commands echo enable.

ATF Select Line Modulation

This command is supported only for compatibility. No function is performed. Refer to +MS command to select modulation.

ATH DISCONNECTION

H0	Modem disconnects
H1	Modem connects to the line and remain in command mode for the time defined in S7.

ATI IDENTIFICATION

I0	Maximum line speed
I1	Product type
I2	Checksum firmware

I3	Product name
I4	Firmware release
I5	Country Code active

ATL SPEAKER VOLUME

L1	Low speaker volume.
L2	Medium speaker volume.
L3	High speaker volume.

ATM SPEAKER CONTROL

M0	Speaker always off.
● M1	Speaker on until carrier is detect.
M2	Speaker always on.
M3	Speaker off during dialing and on until carrier is detect.

ATN AUTOMODE ENABLE

N0	Automode detection is disabled (equivalent to setting AT+MS=X,0).
● N1	Automode detection is enabled (equivalent to setting AT+MS=X,1).

Note: see also "AUTOMODE" parameter in AT+MS command

ATO RETURN ON LINE

O0	On line state when during connection the modem is in command mode.
O1	Like previous plus equalaizer retrain.

ATP SET PULSE DIAL DEFAULT

This command forces pulse dialing.

ATQ QUIET RESULT CODES

Q0	Display result codes.
Q1	No result code (quiet).

ATS READ/WRITE A REGISTER

Sn=x	Write value x to S Register n.
Sn?	Read value at S Register n.

ATT SET TONE DIAL DEFAULT

This command forces tone DTMF dialing.

ATV VERBOS RESULT CODE

V0	Result code display as digit (short form).
V1	Result code display as words (extention form).

RESULT CODE SHORT & EXTENDED FORM SUMMARY

SHORT	EXTENDED
0	OK
1	CONNECT
2	RING0
3	NO CARRIER
4	ERROR
5	CONNECT 1200
6	NO DIALTONE
7	BUSY
8	NO ANSWER
10	CONNECT 2400
11	CONNECT 4800
12	CONNECT 9600
13	CONNECT 7200
14	CONNECT 12000
15	CONNECT 14400
59	CONNECT 16800
16	CONNECT 19200
61	CONNECT 21600
62	CONNECT 24000
63	CONNECT 26400
64	CONNECT 28800
91	CONNECT 31200
84	CONNECT 33600
17	CONNECT 38400
19	CONNECT 115200
22	CONNECT 1200TX/75RX
23	CONNECT 75TX/1200RX
40	CARRIER 300
44	CARRIER 1200/75
45	CARRIER 75/1200
46	CARRIER 1200
47	CARRIER 2400
48	CARRIER 4800
49	CARRIER 7200
50	CARRIER 9600
51	CARRIER 12000
52	CARRIER 14400
53	CARRIER 16800
54	CARRIER 19200

SHORT	EXTENDED
55	CARRIER 21600
56	CARRIER 24000
57	CARRIER 26400
58	CARRIER 28800
78	CARRIER 31200
79	CARRIER 33600
66	COMPRESSION: CLASS 5
67	COMPRESSION: V42 bis
69	COMPRESSION: NONE
76	PROTOCOL: NONE
77	PROTOCOL: LAP
80	PROTOCOL: ALT
150	CARRIER 32000
151	CARRIER 32000
152	CARRIER 36000
153	CARRIER 38000
154	CARRIER 40000
155	CARRIER 42000
156	CARRIER 44000
157	CARRIER 46000
158	CARRIER 48000
159	CARRIER 50000
160	CARRIER 52000
161	CARRIER 54000
162	CARRIER 56000
165	CONNECT 32000
166	CONNECT 34000
167	CONNECT 36000
168	CONNECT 38000
169	CONNECT 40000
170	CONNECT 42000
171	CONNECT 44000
172	CONNECT 46000
173	CONNECT 48000
174	CONNECT 50000
175	CONNECT 52000
176	CONNECT 54000
177	CONNECT 56000

Note: The commands in the above list can be followed by \ARQ message

ATW REPORT AT CONNECTION

W0	When connected the modem displays: CONNECT and the digital rate.
W1	When connected the modem displays: Line Speed,Error Correction Protocol (if any),Digital rate
W2	When connected the modem displays: CONNECT and line speed.

ATX DIAL TONE DETECTION

X0	Busy and dial tone detect disable. OK and ERROR code enable.
X1	Busy and dial tone detect disable. OK and CONNECT xxxxx code enable.
X2	Dial tone enable only. OK, NO DIAL TONE and CONNECT xxxxx enable.
X3	Busy tone enable only. OK, BUSY and CONNECT xxxxxx enable.
X4	Busy and dial tone enable OK, BUSY, NO DIAL TONE and CONNECT xxxxx enable.

ATY BREAK DISCONNECTION

Y0	Disable long space disconnect.
Y1	Enable long space disconnect. In non-error correction mode or in buffer mode, the modem will send a long space of four seconds prior to going on-hook. In error correction mode, the modem will send respond to the receipt of a long space (a break signal greater than 1,6 seconds) by going on-hook.

ATZ RESET AND LOAD USER PROFILE

Z0	Reset and load user profile 0.
Z1	Reset and load user profile 1.

AT+MS= MODULATION FORMAT

This extended-format command selects the modulation, optionally enables or disable automode, and optionally specifies the lowest and highest rates using one to four subparameters. the command format is:

AT+MS=[mod],[automode],[min_rate],[max_rate]

# [mod]	= modulation type
# [automode]	= automode enable or disable
# [min_rate]	= min line speed
# [max_rate]	= max line speed

- **Modulation type** (see the below table)

MOD	MODULATION	POSSIBLE RATE bps
0	V.21	300
1	V.22	1200
2	V.22bis	2400 or 1200
3	V.23	1200
9	V.32	9600 or 4800
10	V.32bis	from 14400 to 4800
11	V.34	from 33600 to 2400
12	V.90	from 56000 to 28800
56	K56Flex	from 56000 to 32000
64	Bell 103	300
69	Bell 212	1200

- **Automode**: see the ATN command
- **Line speed min/max**: These parameters permit to define, within a modulation standard, the minimum and maximum connection rate.
  The command AT+MS? show the currently modem configuration, the default value is: 12,1,300,56000,1,0

Some configuration examples

- Modem set up with automode enable and connection speed within 300 bps to 56000 bps:

  AT+MS=12,1,300,56000,1,0

  The modem make the connection at the maximum speed available if the data speed from the computer is egual or greater than the max rate (56.000bps).
  If the computer speed is less of the max rate, the modem make the connection at the computer speed.
- Modem set up in V.34 with automode desable and speed fix at 33.600

  AT+MS=11,0,33600,33600

  In this case the modem make the connection only if the computer speed is egual or greater than 33.600 bps.

  AT+MS=9,1,300,9600

  The modem is able to make the handshake from V.32 (9600 bps) to V.21 (300 bps).
- Modem set up in V.32 with automode enable and speed with 300bps to 9600bps.

AT%C COMPRESSION CONTROL

%C0 Compression disable.
%C1 MNP5 enable only.
%C2 V42bis enable only.
● %C3 MNP% and V42bis enable.

AT%E AUTORETRAIN CONTROL

%E0 Autoretrain disable.
%E1 Autoretrain enable.
● %E2 Fallback/fallforward enable. Enable only in error corrector or buffer mode.

AT%L DISPLAY RECEIVE LEVEL IN DBM

Returns a value which indicates the received signal level.
For example, *009 = -9 dBm, 043 = -43 dBm.*

AT%Q LINE SIGNAL QUALITY

From 000 (good quality) to 127 (poor quality, disturbed signal).

AT&C CARRIER DETECT OPTION

&C0 Carrier detect always ON. When modem disconnect DCD (C109) goes OFF for 1 sec.; function 109 wink.
● &C1 Carrier detect is ON when remote carrier is present.

AT&D DATA TERMINAL READY OPTION

&D0 DTR signal is ignored.
&D1 Modem return to Command Mode upon detecting ON to OFF transition on DTR.
● &D2 Modem hangs up and disables auto-answer upon detecting ON to OFF transition on DTR.
&D3 Modem reset upon detecting ON to OFF transition on DTR.

AT&F FACTORY CONFIGURATION

&F0 Load factory configuration 0.
&F1 Load factory configuration 1.

AT&G GUARD TONE

● &G0 Disable Guard Tone.
&G2 Select 1800 Hz Guard Tone. Only in V.22 (1200 bps) and V.22 bis (1200 bps) modulations.

AT&K DATA FLOW CONTROL

- &K0 Flow control disable.
- ● &K3 Hardware flow control (RTS/CTS) enable (Default for data modem modes).
- &K4 Software flow control (Xon/Xoff) enable.
- &K5 Software flow control (Xon/Xoff) in trasparent mode enable.
- &K6 Hardware and software flow control enable (default for fax modem modes).

AT&P MAKE/BREAK RATIO

- ● &P0 39%-61% make/break ratio with 10 pulses per second.
- &P1 33%-67% make/break ratio with 10 pulses per second.
- &P2 39%-61% make/break ratio with 20 pulses per second.
- &P3 33%-67% make/break ratio with 20 pulses per second.

AT&Q OPERATING MODE SELECTION

- &Q0 Asyncronous direct mode.
- ● &Q5 Operations with error corrector. It is automatically selected with \N command (different fron 0 and 1).
- &Q6 Asynchronous with buffer enabled (AT/N0).

AT&R C106

- &R0 In asynchronous mode, C106 is controlled according to V25 handshake reccomandation.
- ● &R1 In synchronous mode, C106 follows the flow control.

AT&S C107 (DATA SET READY OPTION)

- ● &S0 DSR will remain ON all the time.
- &S1 DSR will became active after answer tone has been detected and inactive after the carrier has been lost.

AT&T TEST AND DIAGNOSTIC (LOOP)

To use AT&Tn commands the modem must be without error correction (AT\N0).

- &T0 Terminate test in progress.
- &T1 Local analog loopback.
- &T3 Local digital loopback.
- ● &T4 Grant Remote digital loopback test request by remote modem.
- &T5 Deny Remote digital loopback test request by remote modem.
- &T6 Remote digital loopback.
- &T7 Remote digital loopback with self-test.
- &T8 Local analog loopback with self-test.

AT&V VIEW ACTIVE AND STORED PROFILES

AT&W STORE ACTIVE PROFILE

&W0 Store active profile as Profile 0.
&W1 Store active profile as Profile 1.

AT&Y DEFINE DEFAULT PROFILE AFTER POWER ON

- &Y0 Use profile 0 after power on.
&Y1 Use profile 1 after power on.

AT&Z STORE THE X TELEPHONE NUMBER IN A N LOCATION

AT&Zn =X (n = from 0 to 3; X = dialing string from 0 to 35 numbers).

AT\A MNP BLOCK SIZE

\A0 Block size 64 chr.
- \A1 Block size 128 chr.
\A2 Block size 192 chr.
\A3 Block size 256 chr.

AT\B BREAK SIGNAL SIZE

\B1 to \B9 In non-error corrector mode, the modem will trasmit a break signal to the remote modem with a lenght in multiples of 100 ms according parameter specified. The command works in conjunction with the \K command. In error corrector mode, the modem will signal a break through the active error correction protocol, giving no indication of the length.

AT\KN SET BREAK CONTROL

Controls the response of the modem to a break received from the DTE or the remote modem or the \B command according to the parameter supplied. The response is different in three separate states.

1) The first state is where the modem receives a break from the DTE when the modem is operating in data transfer mode.

\K0 Enter on-line command mode, no break sent to remote modem.
\K1 Clear data buffer and send break to remote modem.
\K2 Same as 0.
\K3 Send break to remote modem immediatly.
\K4 Same as 0.
- \K5 Send break to remote modem in sequence with trasmitted data.

2) The second case is where the modem is in the on-line command state (waiting for AT commands) during a data connection, and the \B is received in order to send a break to the remote modem.

\K0 Clear data buffer and send break to remote modem.
\K1 Same as 0.
\K2 Send break to remote modem immediatly.
\K3 Same as 2.
\K4 Send break to remote modem in sequence with data.
- \K5 Same as 4.

3) The third case is where a break is received from a remote modem during a non-error corrected connection.

\K0 Clear data buffers and sends break to the DTE.
\K1 Same as 0.
\K2 Send a break immediately to DTE.
\K3 Same as 2
\K4 Send a break in sequence with received data to DTE.
- \K5 Same as 4.

AT\N ERROR CORRECTION AND BUFFER CONTROL (MNP AND V42)

\N0 Selects normal speed buffered mode (disables error correction mode). Forces &Q6.
\N1 Serial interface selected. Selects direct mode and is equivalent to &M0, &Q0 mode operation. Forces &Q0.
\N2 Selects reliable (error correction) mode. The modem will first attempt a LAPM connection and then an MNP connection. Failure to make a reliable connection results in the modem hanging up. Forces &Q5.
- \N3 Selects auto reliable mode. This operates the same as \N2 except failure to make a reliable connection results in the modem falling back to the speed buffered normal mode.

\N4 Selects LAPM error corrector mode. Failure to make an LAPM error-correction connection results in the modem hanging up. Forces &Q5.
\N5 Selects MNP error corrector mode. Failure to make an MNP error-correction connection results in the modem hanging up. Forces &Q5.

Note: Error correction starting from V22 standard

3.1.1. MNP10 COMMAND

AT-K MNP10 SERVICE MANAGEMENT

-K0 Disable MNP10 service. The modem negotiates V42bis only.
● -K1 Enable MNP10 service using detection phase
-K2 Enable MNP10 service without using detection phase

3.1.2. CELLULAR MODE COMMAND

AT-SEC Select MNP10EC

Enable or disable automatic adjustment of the trasmit power level to accomodate the signalling requirements of cellular telephone equipment.

AT-SEC=0 Disable MNP 10EC. Transmission level is the one set in S91 register.

NOTE: The default is 1 in case the modem detects the cellular

AT-SEC=1,[tx_lev] Enable MNP10EC and set trasmit level [tx_lev] 0 to 30 (0dBm to-30dBm)

3.2. S REGISTERS

REG.	RANGE	UNIT	DEF.	DESCRIPTION
S0	0-255	Ring	0	Ring to answer on
S1	0-255	Ring	0	Ring count
S2	0-255	ASCII	43	Escape character
S3	0-127	ASCII	13	Carriage return character
S4	0-127	ASCII	10	Line Feed character
S5	0-127	ASCII	8	Back Space character
S6	0-255	1 sec.	4	Wait for dial tone
S7	0-60	1 sec.	60	Wait for data carrier
S8	0-255	1 sec.	2	Pause time for "," character
S9	0-255	100ms	6	Answer tone detection time
S10	0-255	100ms	14	Lost carrier to hang up delay
S12	0-255	20ms	50	Escape sequence code guard
S18	0-255	1 sec.	0	Test timer
S29	0-255	10ms	10	Flash time
S30	0-255	1 min	0	Inactivity timer on data (cannot be stored)
S32	0-255	ASCII	17	Xon character
S33	0-255	ASCII	19	Xoff character
S91	3-15	ASCII	10	Adjust transmission level
S92	3-15	ASCII	10	Adjust transmission level in fax mode
S95	0-255	ASCII	2	Connection messages management

3.2.1. SPECIAL S REGISTER DESCRIPTION

ATS9 DETECTION TIME FOR ANWER TONE

0 - 255	100ms	The modem after the dial doesn't wait for remote answer tone but starts with the handshake.

Default = 6

ATS10 CARRIER DETECT RESPONSE TIME

0-255	100ms	Sets the length of time, in thenths of a seconds, that the modem waits before hanging up after a loss of carrier.
255	10ms	The modem doesn't disconnect for a loss of carrier

Default = 14

ATS30 INACTIVITY DISCONNECT TIMER

0	The modem doesn't disconnect as no data is sent or received.
0-255	Sets the length of time, in tens of seconds, that the modem will stay online before disconnectiong when no data is sent or received. The timer is inoperative in synchronous mode.

Default = 0 (cannot be stored)

ATS91 ADJUST TRANSMISSION LEVEL IN SWITCHED LINE

-3-15	dB	This register checks the modem transmission level in switched line

Default=10

ATS92 ADJUST TRANSMISSION LEVEL IN FAX MODE

-3-15	dB	This register checks the modem transmission level in fax mode.

Default=10

Note: Each change of S91 and S92 is automatically stored into the modem non volatile memory.

3.3. CONNECTION MESSAGE

After the handshake phase the modem gives a message indication to your Computer.
The syntax of these messages (when ATX1) is in according to the value of register S95 and the state of the ATWn command.
In the table bellow you can see the messages available:

S95	ATW0	ATW1	ATW2
0	CONNECT Dte	CARRIER Dce PROTOCOL: Prot. CONNECT Dte	CONNECT Dce
1	CONNECT Dce	CARRIER Dce PROTOCOL: Prot. CONNECT Dce	CONNECT Dce
2	CONNECT Dte/ARQ	CARRIER Dce PROTOCOL: Prot. CONNECT Dte/Arq	CONNECT Dce/ARQ
4	CARRIER Dce CONNECT Dte	CARRIER Dce PROTOCOL: Prot. CONNECT Dte	CARRIER Dce CONNECT Dce
8	PROTOCOL: Prot. CONNECT Dte	CARRIER Dce PROTOCOL: Prot. CONNECT Dte	PROTOCOL: Prot. CONNECT Dce
32	COMPRESSION: Comp. CONNECT Dte	CARRIER Dce PROTOCOL: Prot. COMPRESSION:Comp CONNECT Dte	COMPRESSION: Comp. CONNECT Dce

Dce = Line Speed
Dte = Interface Speed
Comp. = V.42bis - MNP5 - NONE
Prot. = V.42 - LAPM - NONE

COMMAND	DESCRIPTION
ATX	List of available messages
ATW	Answer message Format
ATS95	Connection message management

4. DIAGNOSTIC

4

This modem has a very powerful command set and facilities to test the modem itself, the telephone line and the remote side.
In this chapter you can find some simple procedures to implement the diagnostic features.

IMPORTANT
To activate the loop the modem must be set up without error correction (AT\N0).

4.1. LOCAL ANALOG LOOPBACK TEST (CCITT LOOP 3)

The target of this test is to verify the modem itself. When the modem is Off Line type the command: AT&T1.
This command forces the modem in local analog loop that means to be connected with itself. You can send single or characters strings or files and they are received from your computer. To exit from test condition type the escape sequence (+++) and then, when the response OK is displayed enter the command AT&T0.

4.2. LOCAL DIGITAL LOOPBACK TEST (CCITT LOOP 2 LOCAL)

The target of this test is to verify the COM port and the serial cable of your computer. When the modem is Off Line type the command: AT&T3.
This command forces the modem in local digital loop that means to connect send data and receive data before modulation processor.
You can send single or characters strings or files and they are received from your computer. To exit from test condition type the escape sequence (+++) and then, when the response OK is displayed enter the command AT&T0.

4.3. LOCAL ANALOG LOOPBACK WITH SELFTEST

The target of this test is to verify the modem itself using an internal test pattern When the modem is Off Line type the command: AT&T8.
This command forces the modem in local analog loop, sends a test pattern and check the receive stream. The duration of this test is defined from register S18.

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4.4. REMOTE DIGITAL LOPBACK

The target of this test is to verify the complete connection. When the modem is ON line with the remote type before the escape sequence (+++) and then, when the response OK is displayed enter the command AT&T6.
This command forces the remote modem in digital loop that means to connect the digital send data and receive data before the remote computer.
You can send single or characters strings or files and they are received from your computer. To exit from test condition type the escape sequence (+++) and then, when the response OK is displayed enter the command AT&T0.

4.5. REMOTE DIGITAL LOOPBACK WITH SELFTEST

The target of this test is to verify the complete connection using an internal test pattern When the modem is ON line with the remote type the escape sequence (+++) and then, when the response OK is displayed enter the command AT&T7.
This command forces the remote modem in digital loop and a test pattern and check the receive stream. The duration of this test is defined from register S18.

DECLARATION CE OF CONFORMITY

Digicom S.p.A. via Alessandro Volta 39 21010 Cardano al Campo -Varese-
declares that this product satisfies the basic requirements of Electromagnetic Compatibility and Safety of the below indicated Directive:

- **89/336/CEE** of 3 may 1989 with subsequent modifications (Directive 92/31/CEE of april 28, 1992, Directive 93/68/CEE of july 22,1993 and Directive 93/97/CEE of 29 october 1993).
- **73/23/CEE** of february 19, 1973 with subsequent modifications (Directive 93/68 ECC of july 22, 1993).

CHECK REPORT

The equipment has been successfully tested according to the check procedure indicated on the inside back cover of the user's manual. It is in conformity with the technical characteristics described in the users' manual supplied with the equipment.

WARRANTY

WARRANTY CLAUSES

- The equipment has a warranty which covers manufacturing and operating faults for the period indicated on the inside back cover of the user's manual.
- The warranty is to be considered freight forward and the goods must reach the address indicated below at customer's expences.
- Warranty means the substitution or repairing of fault products. Working hours used for repairing included in the warranty.
- The estetic and the separable parts are not included in the warranty.
- The warranty is not extended to equipments which have been subject to misuse, improper installation, electric discharge or repaired by unauthorized staff.


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