AutomationDirect.com

User Manual

MDM-TEL

CONTACT INITIALIZED

Industrial Telephone Modem

Contents at a Glance

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CE

Class I, Division 2,
Groups A, B, C, and D
Hazardous Locations

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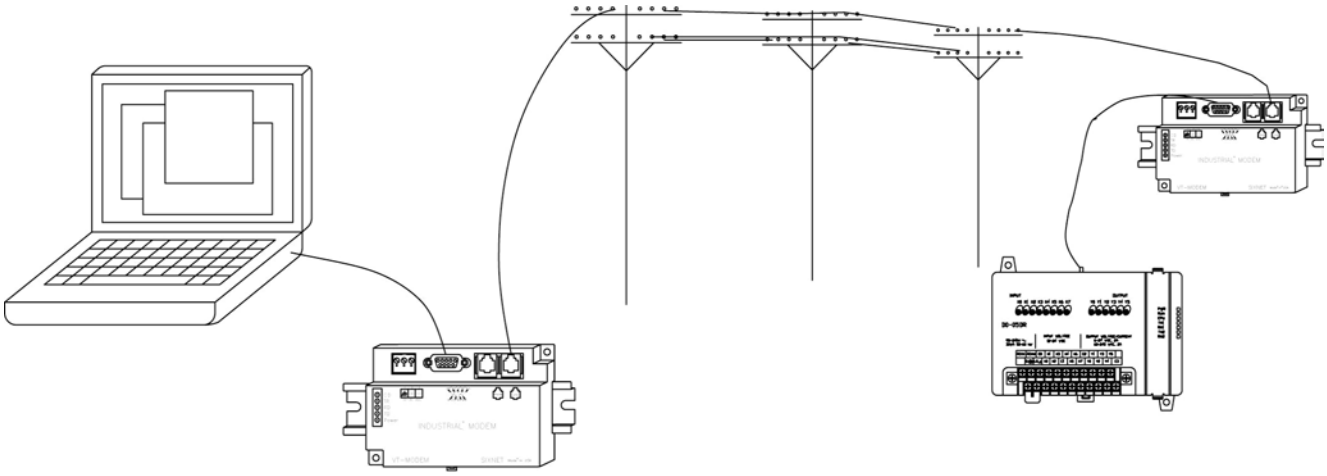
Section 1 Overview

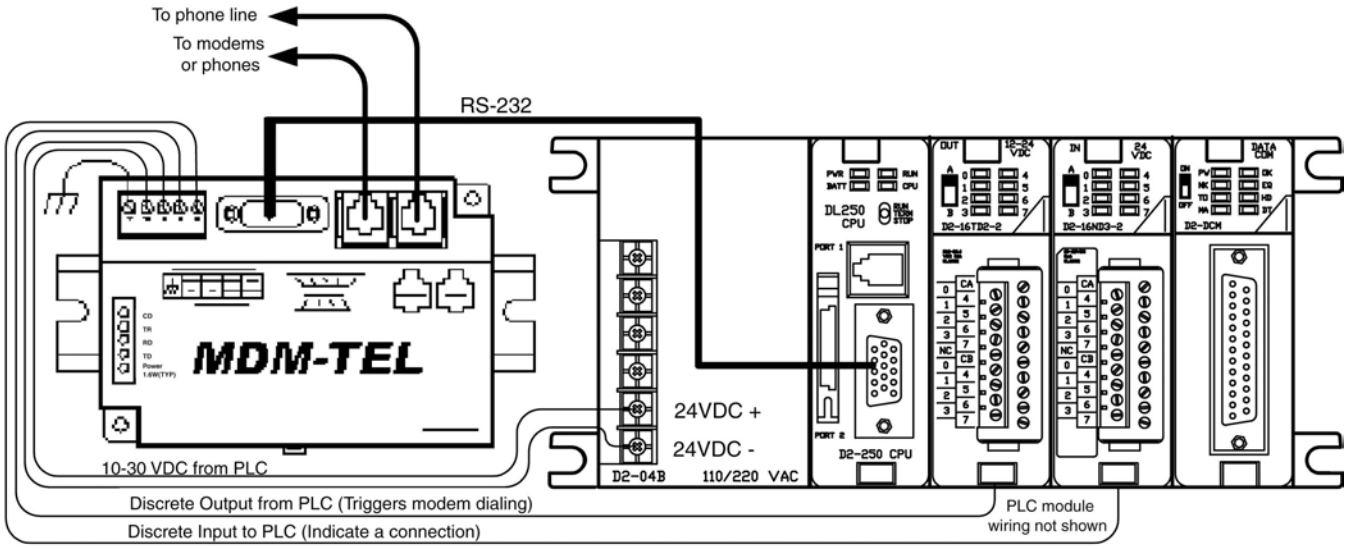
This rugged industrial telephone modem has been designed for operation in electrical enclosures installed in harsh environments. This industrial modem supports all standard Hayes AT commands, Fax Class 1 and Class 2 commands and S-registers, and therefore can be set-up as an external modem on any PC. The industrial modem is compatible with any telecommunications or dial-up networking software.

The industrial modem allows easy access to PLCs, RTUs, I/O equipment, industrial computers, remote weather stations, pagers, and many other devices via standard analog PSTN-provided dial-up telephone connections. The modem may be DIN-rail or panel mounted, adjacent to other DIN-rail components, inside of new or existing enclosures. Most Windows software can communicate through the industrial modem, to perform file transfers, diagnostics, program debugging and many other operations.



The industrial modem allows communication to remote sites for data retrieval or diagnostics.

Note: The industrial modem communicates over analog phone lines only.



The industrial PLC Contact Initialized Modem has the ability to dial out based on an alarm contact closure or PLC discrete output.

Industrial Contact Initialized Modem

The contact initialized action is triggered by a switch closure or PLC output signal. When the self-dial input is energized, the modem dials a pre-stored phone number and optionally identifies itself by way of a pre-stored ASCII message. Flexible features allow this modem to perform retries or even connect to an alternate number until it has verified that a connection has been established. The call will terminate when either:

- The computer completes its polling and hangs up
- The self-dialing discrete input is turned off
- A telephone line problem disrupts the call.

The contact initialized feature enables field-installed equipment to establish a telephone link based upon a simple switch closure. This modem adds "dial upon alarm" intelligence to any remote site. This modem is ideal for:

DIALING UPON ALARM FROM ANY PLC

This modem establishes a connection based upon a coil output from any PLC. Once a connection has been established, the PLC's system (programming) port is connected to the computer at the other end of the phone link and may be polled by that computer as if the computer had initiated the call. When the modem connects to the central computer, it identifies itself so the computer can download the appropriate I/O driver and interrogate the PLC.

SENDING A MESSAGE BASED UPON A SWITCH CONTACT

Locations that do not have PLCs (or other intelligence) can originate calls to alert you to low tank levels, over temperature conditions, or other alarms. Simply connect the appropriate alarm contact to the modem's input. The modem will dial the pre-stored phone number and deliver a stored ID message to the computer at the receiving end; this ID message can be up to 32 characters long.

SETUP WIZARD

A modem setup utility is provided on the Industrial Modem CD to help you quickly configure the modem. In most applications, no knowledge of modem AT commands or S register contents is necessary. Pre-configured profiles, for common situations, are provided for your convenience.

Section 2 Performance Specifications

Telephone Port	
Max. Data Rate	33.6 kbps (V.34)
Compatibility	V.34, V.32 bis, V.32, V.22, V.22A/B, V.23, V.21, Bell 212A
Data Compression	V.42bis/MNP 5
Error Correction	V.42/MNP 2-4
Max Fax Modem Rate	14.4 kbps (V.33)
Fax Modem Compatibility	Group 3 (V.33, V.17, V.29, V.27ter, V.21 ch. 2)
Ringer Equivalent	0.3
Line Jack	RJ11
Phone Jack	RJ11
RS232 Port	
Max. RS232 Rate	115.2 kbps (Kilobaud)
RS232 Signal Support	TXD, RXD, CTS, RTS, DCD, DTR, DSR, RI, GND
RS232 Connector	DB9 female
Command Set	All standard AT and S register commands including Class 1 and Class 2 Fax commands
Status LEDs	
CD (Carrier detect)	The modem has detected a carrier on the phone line (a remote modem has been detected).
TR (Data Terminal Ready)	The PC (or other device) has established a connection to the modem and is ready.
RD (Receive Data)	Flashes as data is received from the phone line.
TD (Transmit Data)	Flashes as data is sent out the phone line.
Power	On when power is present.
General Characteristics	
Input Power	10 - 30 VDC
Input Current Normal / Low Power	97mA @ 24VDC (normal) / 64mA @ 24 VDC (low power)
Operating Temperature	-30 ° to 70 ° C
Storage Temperature	-40 ° to 85 ° C
Humidity	5 to 95% RH (non-condensing)
Mounting	DIN rail or panel mount
Dimensions	3.23 W x 4.75L x 1.35H inches (8.2 W x 12.1 L x 3.4H cm)
PLC Discrete I/O Interface	
Trigger Input (From PLC)	Connects to PLC output. Starts auto-dialing upon transition from OFF to ON. Modem will stay connected while input is ON.
Voltage Range	9 to 30 VDC
Input Current	6.5 mA at 24 VDC
Max. OFF Voltage	5 VDC
On-line Output (To PLC)	Output is ON as long as a connection exists (carrier detect).
Output Characteristics	Sourcing – switches supply power
Max. Output Current	100 mA

Section 3 Modem Mounting

This industrial modem snaps onto a standard DIN rail (DIN EN 50022), or can be mounted to a flat panel using #6 or #8 screws. See Figure 3-1. The modem can be installed in any orientation, adjacent to other DIN rail components or in any convenient location within the enclosure. The modem should be installed within 6 feet of the device it will be connected to.

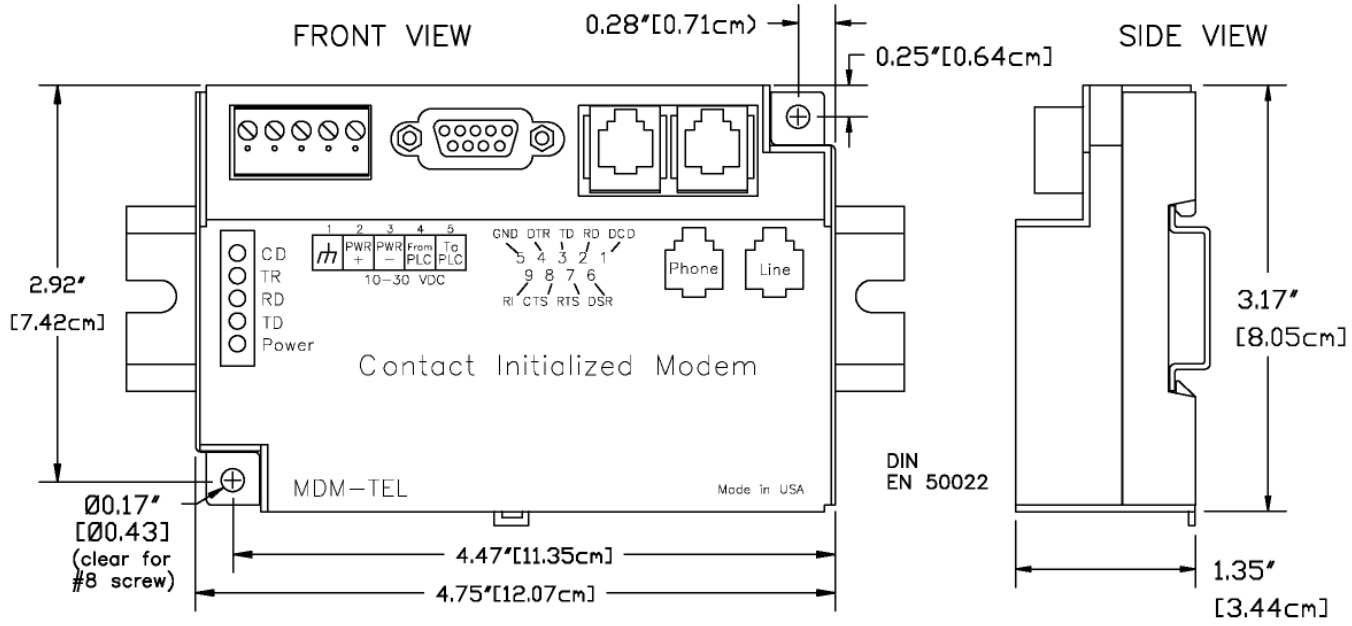


Figure 3-1: MODEM DIMENSIONS

For DIN rail mounting, hook the top, rear of the modem onto the top edge of the DIN rail. Using a small flat head screwdriver, pull down on the spring-loaded tab on the bottom of the modem and push the modem back against the rail. Reverse these steps to remove the modem. See Figure 3-2 below.

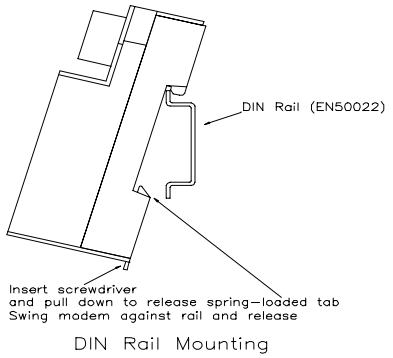


Figure 3-2: DIN RAIL MOUNTING

Section 4 Electrical Connections

RS232 Connections:

Use a straight-through or equivalent serial cable to connect the modem's RS232 female port (DB9 cable male end) to the RS232 male port on a PC or other "Data Terminal Equipment" (DTE) device (DB9 cable female end). Figure 4-1 details the pin-out of a straight-through serial communications cable suitable for connecting a DCE device (MDM-TEL) to a DTE device (PC, PLC or other device). A suitable DB9 RS-232 cable is provided with the MDM-TEL modem.

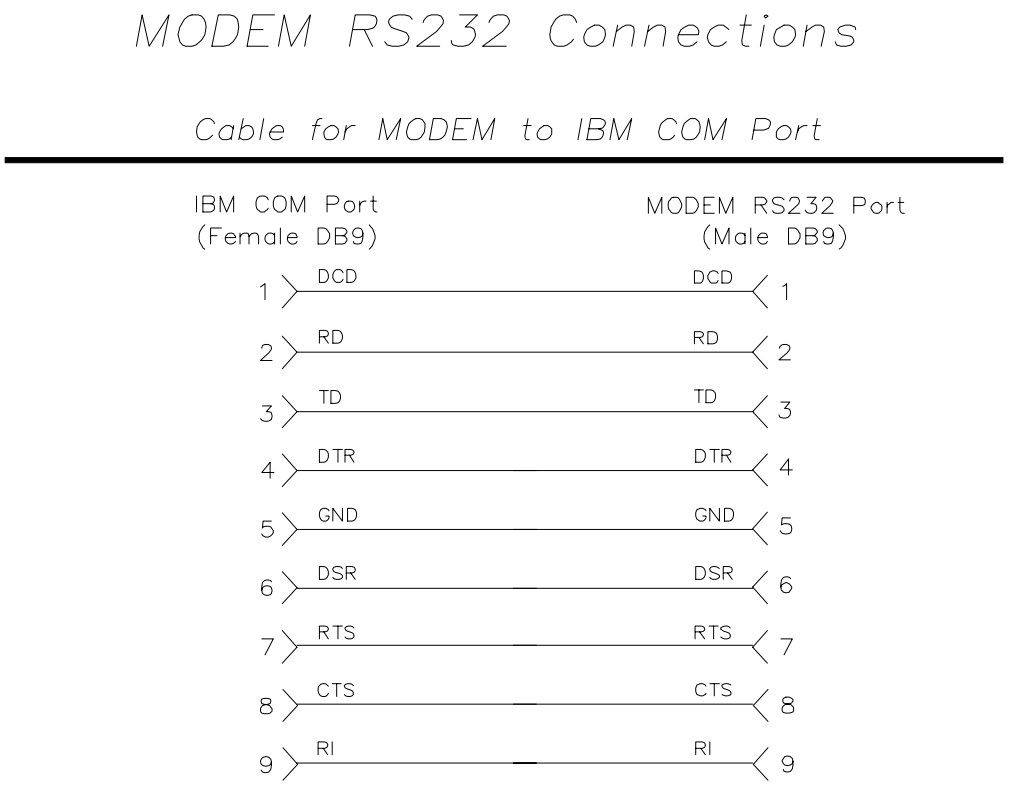


Figure 4-1: MODEM CABLE WIRING

(Standard DB9 Cable)

NOTE: A suitable serial cable has been provided with the MDM-TEL. The provided null modem adapter is not required for normal serial communications between the MDM-TEL and a PC.

Automation*Direct* cables for connecting ***Direct***LOGIC PLC's to the MDM-TEL modem are shown in Fig 4-2. The null modem adapter supplied with the modem is required when using these cables. The pinouts for custom cables between ***Direct***LOGIC PLC's and the MDM-TEL modem are detailed in the MDM-TEL Application Note provided on the MDM-TEL CD and available from www.automationdirect.com. For other devices or PLC's, please refer to the product documentation for its cable pinouts.

	DL05	DL06 port 2	D2-240 port 2	D2-250 port 2	D2-DCM	D3-350 port 2	D3-DCM	D4-450 port 1	D4-450 port 2	D4-DCM
D2-DSCBL	X		X						X	
D2-DSCBL-1		X		X						
D3-DSCBL-2					X	X	X	X		X

AutomationDirect does not recommend using modems on ***Direct***Logic ports not listed in the above chart due to telecommunication timing irregularities.

FIG 4-2

NOTE: A null modem adapter **must** be installed on the MDM-TEL for RS-232 communication between a ***Direct***LOGIC PLC and the MDM-TEL modem using the standard Automation*Direct* PLC cables indicated in Fig 4.2. A slim-profile null modem adapter is provided.

Industrial Modem Power, Phone Line, I/O connections:

DC Power Wiring
Connect 10 - 30 VDC to the industrial modem as shown in Figure 4-3. The modem can usually be powered from the same source as other devices in the enclosure. All the screw terminals should be tightened to a maximum of 3.48 in-lbs.

Telephone Cable
Connect analog phone lines to the RJ11 jacks as appropriate. One RJ-11 jack is provided to connect directly to a telephone (optional) and the second RJ-11 jack functions as the connection to the telephone network.

PLC Self-Dial I/O Connections
Connect a 10-30VDC signal to the 'From PLC' (trigger input) terminal. An OFF to ON transition of this signal starts the auto-dialing sequence. The modem will call and remain connected while the signal is ON. When the signal goes false, the modem will terminate the connection or the call in progress.

The 'To PLC' (on-line output) terminal will go ON (ON = user supplied VDC input) when a modem-to-modem connection has been established and the proper 'Acknowledge Message' has been received.

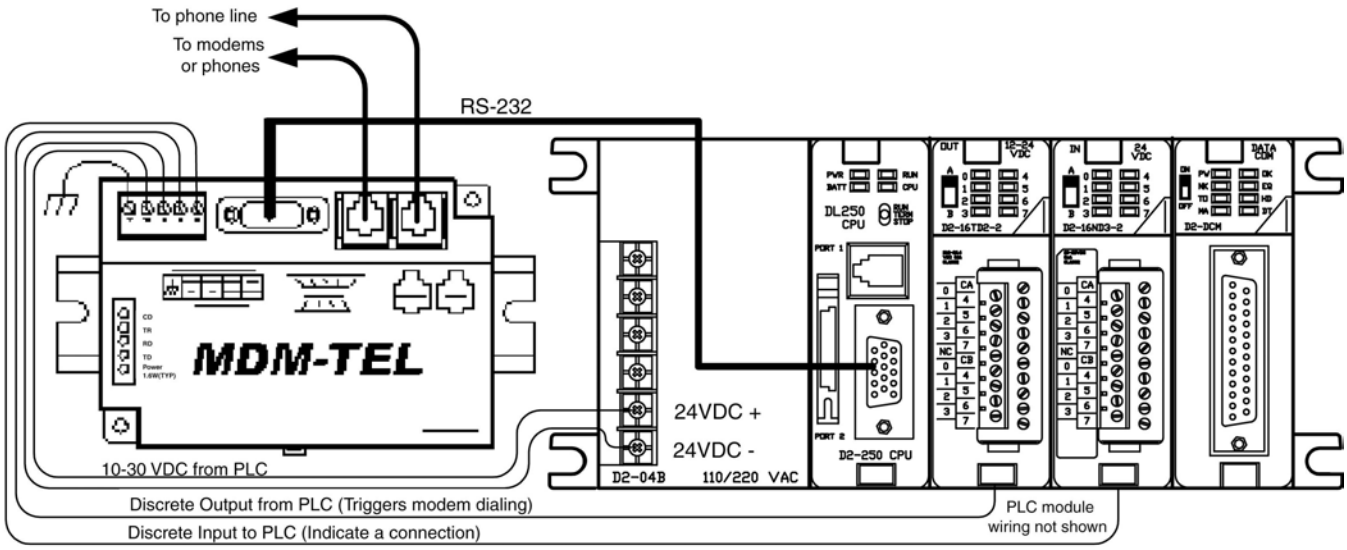


Figure 4-3: INDUSTRIAL MODEM WIRING

Section 5 Modem Configuration

Configuration as an External Modem on a PC:

The Modem can be connected directly to a PC. The modem will need to be "installed" in Windows prior to use. Here are instructions on how to install the modem in both Windows 95, 98, NT, 2000 and Windows XP.

Modem Installation in Windows 95/98/NT/2000/XP

Plug and Play method (recommended):

1) With the PC off, connect DC power and the telephone line to the modem. Connect a communications cable (STRAIGHT-THROUGH or equivalent) between the modem and the PC. Turn on the PC. During the boot-up process, Windows should detect the modem and display the New Hardware Found dialog box.
2) Make the selection "Select from a list of alternative drivers".
3) The Select Device dialog will be displayed. In the column labeled Manufacturers, select "Standard Modem Types". In the column labeled Models, select "Standard 28800 bps Modem". Click OK. Windows will then complete the boot-up process. (The standard Windows driver is used for the Industrial Modem. Although the modem supports baud rates to 33,600 bps, the selections in Windows are limited to 28800 bps.)
4) To verify that the modem has been installed, select Start → Settings → Control Panel, and then double click the Modems icon. The modem should be listed as "Standard 28800 bps Modem".

Here is an alternate modem installation procedure (use if the PC is already powered up):

1) Connect the DC power, communications cable (STRAIGHT-THROUGH or equivalent) and telephone line as described above.
2) Select Start → Settings → Control Panel, and then double click the Modems icon.
3) The Install New Modem dialog box will appear. Do not select the "Don't detect my modem, I will select it from a list". Instead, click Next and allow Windows to search the COM ports and detect the modem.
4) Windows should find a modem called Standard Modem. Click Next and Windows will complete installation of the Standard Modem. (Alternately, click Change and select "Standard Modem Types" from the Manufacturers list, and "Standard 28800 bps Modem" from the Models list.)
5) To verify that the modem has been installed, select Start → Settings → Control Panel, and then double click the Modems icon. The modem should be listed as either a "Standard Modem" or a "Standard 28800 bps Modem" depending on the steps followed above.
6) Upon re-booting the machine, Windows may still find the modem as new hardware. If this happens, select "Do not install a driver (Windows will not prompt again)".

Modem Installation in Windows NT

1) Select Start → Settings → Control Panel, and then double click the Modems icon.
2) The Install New Modem dialog box will appear. Do not select the "Don't detect my modem, I will select it from a list". Instead, click Next and allow Windows to search the COM ports and detect the modem.
3) Windows should find a modem called Standard Modem. Click Next and Windows will complete installation of the Standard Modem. (Alternately, click Change and select "Standard Modem Types" from the Manufacturers list, and "Standard 28800 bps Modem" from the Models list.)
4) To verify that the modem has been installed, select Start → Settings → Control Panel, and then double click the Modems icon. The modem should be listed as either a "Standard Modem" or a "Standard 28800 bps Modem" depending on the steps followed above.

Once the industrial modem has been added to your Windows 95, 98, NT or XP system, it is ready for use.

If you are using a PLC or other device, refer to the documentation for that device as necessary.

To Remove a Modem

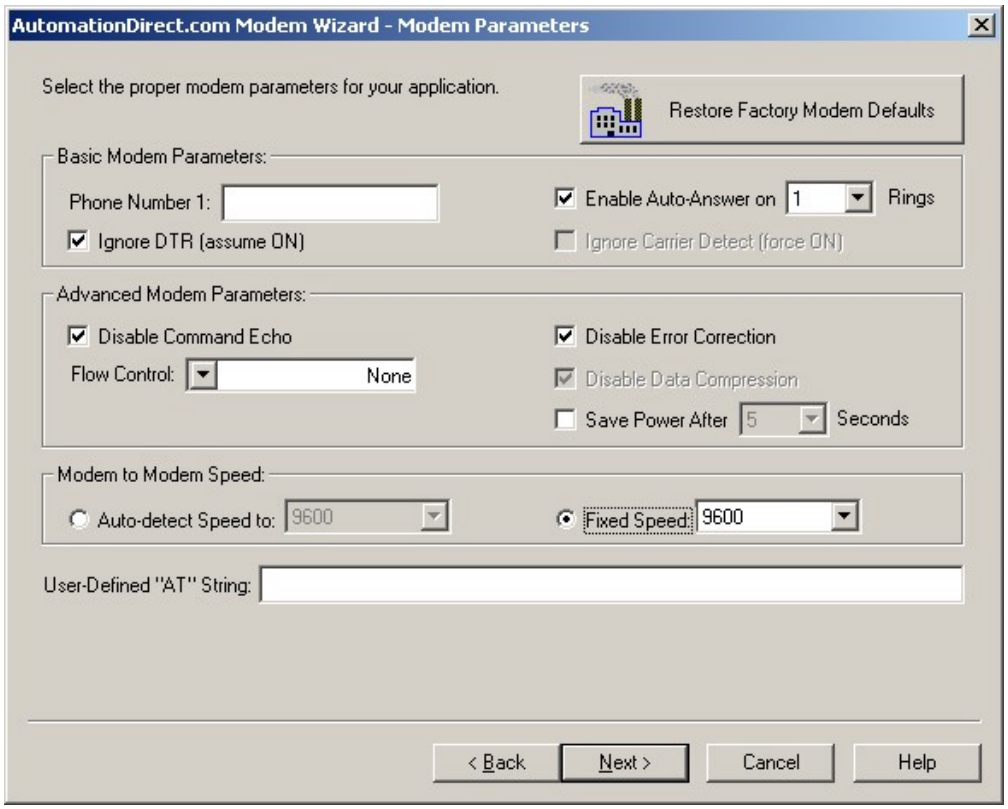
If it ever becomes necessary to re-install the modem for any reason, select Start → Settings → Control Panel, and then double click the System icon. Next, click the Device Manager tab. The list should display a Modems icon. Double click the Modems icon. Highlight the modem to be removed and then click the Remove button. To reinstall the modem, follow the installation steps as previously described.

Configuring Using the Setup Wizard:

It is highly recommended that the Setup Wizard be used for modem configuration. Simply check the appropriate boxes, choose the appropriate communication settings from the drop down lists, and load the configuration into the modem. This utility does not require user knowledge of AT commands and S-registers.

Refer to the online help system in the Setup Wizard for instructions and application notes.

Note:
The Setup Wizard must be used to configure the parameters of the industrial modem. See MDM-TEL application note for details on configuring the MDM-TEL for ***Direct***LOGIC PLC's.



Setting the Modem's Serial Port Baud Rate for the PLC

The industrial modem has an automatic baud rate detection feature that lets the modem recognize commands through its serial port at any supported baud rate. When auto-detect is selected, if the modem is connected to a device that does not send commands or data unless spoken to (such as most PLCs), then the modem will pass information from the phone line to its serial port at the last auto-detected baud rate.

The industrial modem is defaulted at the factory for 9600-baud. To change this setting, connect the modem to a PC. Start the Setup Wizard and choose the baud rate that matches the PLC's baud rate. Then choose the appropriate settings and write the configuration to the modem. Exit the Setup Wizard and reconnect the modem to the PLC. (Be sure to cycle power to the modem.) Call the modem and verify that the PLC is responding to commands.

Limiting the Phone Line Connection Speed for Reliability

Typically, when a modem-to-modem connection is established, the two modems negotiate and connect at the fastest possible phone line speed that is within the capability of both modems. The quality of the phone line connection (during the negotiation) will be taken into account. If both modems are of a modern design, the phone line speed can be 33.6K bits per second (or higher, using data compression). Note that this phone line speed is independent of the DTE (serial port) speed, though some older modems require that the phone line speed and DTE speed be the same.

In practice the quality of any phone line changes continually, and frequent data errors may occur. The probability of errors usually increases as the phone line speed increases. Therefore, it is often desirable to restrict the phone line speed to a rate that will provide good performance and yield reliable data. It is also commonplace to restrict the phone line speed to maintain compatibility when replacing an older modem with an industrial modem.

By default, the modem will permit any phone line speed up to 115.2 kbps when data compression is enabled. If you experience intermittent or unreliable communication, try setting the modem-to-modem speed (in the Setup Wizard) to a lower value, to restrict the phone line speed. (Remember to load the new configuration to the modem.)

Industrial Modem Profile Summary

Here is a summary of the active configuration, user profile 0, user profile 1 and the factory defaults when the modem is shipped.

Each time the modem is powered up; first the factory default settings (as listed in Section 6) are loaded into the active configuration. Next, the designated user stored profile is loaded into the active configuration. User profile 0 is loaded by default (see the &Y command in Section 6) and it contains all factory defaults with the exception that it is set to auto answer (register S0=1), and ignore the DTR signal (&D0).

The User profile 1 contains all normal factory defaults (as listed in Section 6).

ACTIVE CONFIGURATION:
B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D0 &G0 &J0 &K3 &Q5 &R1 &S0 &T5 &X0 &Y0
S00:001 S01:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:050 S08:002 S09:006
S10:014 S11:095 S12:050 S18:000 S25:005 S26:001 S36:007 S37:000 S38:020 S44:020
S46: 138 S48:007 S95:000

STORED PROFILE 0:
B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D0 &G0 &J0 &K3 &Q5 &R1 &S0 &T5 &X0
S00:001 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000
S36:007 S37:000 S40:104 S41:195 S46:138 S95:000

STORED PROFILE 1:
B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S0 &T5 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000
S36:007 S37:000 S40:104 S41:195 S46:138 S95:000

FACTORY DEFAULTS:
B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S0 &T5 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000
S36:007 S37:000 S40:104 S41:195 S46:138 S95:000

Section 6 AT Command Summary

The industrial modem supports the AT commands, Fax Class 1 and Class 2 commands listed in this Section. The modem contains a set of factory default settings, which can always be restored by the user. (See the &F command.) The modem also provides two user profiles (profile 0 and profile 1) which hold settings as set and saved by the user. (See the &W command.) The settings currently in use by the modem are generally referred to as the active configuration.

Notes:
The Industrial Modem parameters can only be set using the Setup Wizard, which is provided. Refer to the on-line help in the Setup Wizard for more information.

The following tables only summarize the supported AT commands. The valid parameters and default settings for each AT command are documented in the online help system of the Setup Wizard.

Command	Function
A/	Re-execute Last Command; do not proceed by AT command and do not follow with a carriage return.
A	Go off hook and Answer A Call
AT=x	Write value x to last selected register.
AT?	Report the value of last selected register.
Bn	Set data standard to CCITT(Europe et. al.) or Bell Mode(U.S., Canada) for connections at 300 or 1200 bps.
Cn	Carrier Control (parameter = 1 only)
Dn	Dial (originate a call); typical usage: ATDT5551212 to tone dial number. ATDS=n to dial nth stored number.
E	Echo command to monitor when typed
Fn	Not available.
Hn	Disconnect (Hang up)
In	Identification; reports product code, name, ROM and firmware data, etc.
Ln	Speaker Volume (not available)
Mn	Speaker Control (not available)
Nn	Automode Enable; enabled allows connection at highest possible modem speed, disabled fixes speed according to register S37.
On	Return To On-line Data Mode
P	Set Pulse Dial Default.
Qn	Quiet Results Codes Control; when enabled, result codes are reported to the monitor.
Sn	Establishes S Register n as the last register accessed
Sn-x	Write value x to S Register n.
Sn?	Reports the value of S Register n.
T	Set Tone Dial Default
Vn	Set Result Code Format to terse or verbose.
Wn	Connect Message Control sets the format of the connect messages.
Xn	Extended results code
Yn	Long space disconnect

Zn	Perform Soft Reset and Restore stored user configuration profile 0 or 1.
&Cn	RLSD (DCD) Option; set DCD signal to indicate presence of carrier or forces DCD signal on at all times.
&Dn	DTR Option; set how modem interprets the DTR signal.
&Fn	Restore factory configuration profile 0 or 1.
&Gn	Select guard tone
&Jn	Telephone jack control
&Kn	Set Flow Control
&Mn	Asynchronous/synchronous mode selection
&Pn	Select pulse dial make/break ratio
&Qn	Asynchronous/synchronous mode selection
&Rn	RTS/CTS option sets how the modem controls the CTS signal
&Sn	DSR Override sets how the modem controls the DSR signal
&Tn	Test & diagnostic settings
&V	Display current configuration, stored user profiles and stored telephone numbers
&V1	Display last connection statistics
&Wn	Store current active configuration in one of the two user profiles
&Xn	Select synchronous clock source
&Yn	Designate a default-reset profile. This profile will be active after a hard reset
&Zn=x	Store phone number; n = 0 to 3 and x = dial string
%E	Enable/disable line quality monitor and autoretrain or fallback/fail forward
%L	Report line signal level
%Q	Report line signal quality
%7	Plug and Play Serial Number
%8	Plug & Play Vendor ID, Prod. No.
\Kn	Break Control sets how the modem responds to a break signal
\Nn	Sets the Operating Mode of the modem: direct, normal, reliable or auto reliable
\Vn	Single Line Connect Message Enable
+MS	Select Modulation allows control of the modulation the modem uses to negotiate a connection
+Hn	Enable/Disable RPI and DTE Speed
-SDR	Enable/disable distinctive ring
**	Download to flash memory
%Cn	Enable/Disable Data Compression (MNP5, V42bis or both)
\An	Select Max MNP Block Size
\Bn	Transmit Break to Remote sets the length of break signal sent to remote modem (in non error correction mode)
)Mn	Enable Cellular Power Level Adjust (only included for compatibility and performs no function)
*Hn	Link Negotiation Speed (only included for compatibility and performs no function)
-Kn	MNP Extended Services
-Qn	Enable Fallback to V.22bis/V.22 (only included for compatibility and performs no function)
-SEC=n	Enable/Disable MNP10-EC
@Mn	Initial Cellular Power Level Setting (only included for compatibility and performs

	no function)
:E	Compromise Equalizer Enable (only included for compatibility and performs no function)
*B	Display Blacklisted Numbers
*D	Display Delayed Numbers
*NCn	Country Select
FAX CLASS 1:	
+FCLASS=n	Service Class
+FAE=n	Data/Fax Auto Answer
+FRH=n	Receive Data with HDLC Framing
+FRM=n	Receive Data
+FRS=n	Receive Silence
+FTH=n	Transmit Data with HDLC Framing
+FTM=n	Transmit Data
+FTS=n	Stop Transmission and Wait
FAX CLASS 2:	
+FCLASS=n	Service Class
+FAA=n	Adaptive Answer
+FAXERR	Fax Error Value
+FBOR	Phase C Data Bit Order
+FBUF?	Buffer Size (Read Only)
+FCFR	Indicate Confirmation to Receive
+FCON	Facsimile Connection Response
+FCIG	Set the Polled Station Identification
+FCIG:	Report the Polled Station Identification
+FCR	Capability to Receive
+FCSI:	Report the Called Station ID
+FDCC=	DCE Capabilities Parameters
+FDCS:	Report Current Session
+FDCS=	Current Session Results
+FDIS:	Report Remote Capabilities
+FDIS=	Current Session Parameters
+FDR	Begin or Continue Phase C Receive Data
+FDT=	Data Transmission
+FDTC:	Report the Polled Station Capabilities
+FET:	Post Page Message Response
+FET=n	Transmit Page Punctuation
+FHNG	Call Termination with Status
+FK	Session Termination
+FLID=	Local ID String
+FLPL	Indicate a Document for Polling
+FMDL?	Identify Model
+FMFR?	Identify Manufacturer
+FPHCTO	Phase C Time Out
+FPOLL	Indicates Polling Request

+FPTS:	Page Transfer Status
+FREV?	Identify Revision
+FSPL	Enable Polling
+FTSI:	Report the Transmit Station ID
Caller ID:	
#CID=0	Disable Caller ID
#CID=1	Enable Caller ID with Formatted Presentation
#CID=2	Enable Caller ID with Unformatted Presentation
AudioSpan and DSVD:	
-SMS=	Select AudioSpan/DSVD Mode
-SSE=	Enable/Disable DSVD
-SQS=	Select AudioSpan Modulation
Synchronous Access Mode:	
+ES	Enable/Disable Synchronous Access Mode in the client or central site modem
+ESA	Configures the Operation of the Synchronous Access Submode
+ITF	Selects Transmit Flow Control Thresholds
Voice/Audio:	
#BDR	Select Baud Rate (Turn Off Autobaud)
#CLS	Select Data, Fax, or Voice
#MDL?	Identify Model
#MFR?	Identify Manufacture
#REV?	Identify Revision Level
#SPK=	Speakerphone Setting
#TL	Audio Output Transmit Level
#VBQ?	Query Buffer Size
#VBS	Bits per Sample
#VBT	Beep Tone Timer
#VCI?	Identify Compression Method
#VGT	Set Playback Volume in the Command State
#VLS	Voice Line Select
#VRA	Ringback Goes Away Timer (Originate)
#VRN	Ringback Never Came Timer (Originate)
#VRX	Voice Receive Mode
#VSD	Enable Silence Deletion (No Function, Command Response Only)
#VSK	Buffer Skid Setting
#VSP	Silence Detection Period (Voice Receive)
#VSR	Sampling Rate Selection
#VSS	Silence Detection Tuner (Voice Receive)
#VTD	DTMF/Tone Reporting
#VTM	Enable Timing Mark Placement
#VTS	Generate Tone Signals
#VTX	Voice Transmit Mode

Section 7 S Register Summary

Note:
The following tables only summarize the supported S-registers. A description for each S-register may be found in the online help system of the Setup Wizard.

Register	Function	Range	Units	Default
S0	Number of rings required before modem auto answers	0-255	rings	0
S1	Ring counter increments each time a ring is detected	0-255	rings	0
S2	Escape character	0-255	ASCII	43
S3	Carriage return character	0-127	ASCII	13
S4	Line feed character	0-127	ASCII	10
S5	Backspace character	0-255	ASCII	8
S6	Maximum time to wait after going off-hook to dial when blind dialing	2-255	sec	2
S7	Maximum time to wait for carrier after dialing before hanging up	1-255	sec	50
S8	Pause time for dial delay modifier	0-255	sec	2
S9	Carrier detect response time; duration that carrier must be present for modem to consider it a valid connection	1-255	0.1s	6
S10	Carrier loss disconnect time; carrier must be absent for this time for modem to consider it a lost connection	1-255	0.1s	14
S11	DTMF tone duration	50-255	0.001s	95
S12	Escape prompt delay; this delay must be present after receipt of the last character of the escape sequence(before receipt of any other character) for the escape sequence to be recognized	0-255	0.02s	50
S13	Reserved	-	-	-
S14	General bit mapped options indicates the status of the following options: echo, quiet mode, results codes, tone/pulse and originate/answer	-	-	138(8Ah)
S15	Reserved	-	-	-
S16	Test mode bit mapped options (&T)	-	-	0
S17	Reserved	-	-	-
S18	Test timer –length of test initiated by &Tn command	0-255	s	0
S19	AutoSync Bit Mapped Options	-	-	0
S20	AutoSync HDLC Addr or BSC Sync Char	0-255	-	0
S21	V24/general bit mapped options indicates the status of the following options: CTS(&Rn), DTR(&Dn), DCD(&Cn), DSR(&Sn), long space disconnect(Yn)	-	-	52(34h)
S22	Speaker/results bit mapped options indicates the status of the following options: speaker control(Ln), volume(Mn), results codes(Xn)	-	-	117(75h)
S23	General Bit Mapped Options	-	-	58(3Ah)
S24	Sleep inactivity timer sets the length of time that the modem	0-255	s	0

	will operate in normal mode without activity on the phone or RS232 port before entering sleep mode			
S25	Delay to DTR (CT108) off sets time modem ignores DTR signal before taking action specified by &Dn	0-255	s/0.01s	5
S26	RTS-to-CTS (CT105 to CT106) delay if &R0 is set	0-255	0.01s	1
S27	General Bit Mapped Options for sync/async control(&Mn/&Qn), leased line control(&Ln), clock select(&Xn), Bell/CCITT mode(Bn)	-	-	73(49h)
S28	General Bit Mapped Options indicates options for pulse dialing(&Pn), MNP Link negotiation speed(*Hn)	-	-	0
S29	Flash Modifier Time sets the length of time the modem will go on hook if the flash dial modifier(!) is encountered in the dial string	0-255	10 ms	70
S30	Inactivity timer sets the length of time the modem will remain on line if no data is sent or received	0-255	10s	0
S31	General Bit Mapped Options	-	-	194(C2h)
S32	XON character	0-255	ASCII	17(11h)
S33	XOFF character	0-255	ASCII	19(13h)
S34-S35	Reserved	-	-	-
S36	LAPM Failure Control used when register S48=128	-	-	7
S37	Desired Line Connection Speed (when N1 is set)	-	-	0
S38	Delay before forced hang-up (time delay between the receipt of H command to disconnect and the actual disconnect operation	0-255	s	20
S39	Flow control bit mapped options	-	-	3
S40	General bit mapped options	-	-	104(68h)
S41	General bit mapped options	-	-	195(C3h)
S42-S45	Reserved	-	-	-
S46	Enable/Disable Data Compression	-	-	138
S48	V.42 Negotiation Control	-	-	7
S82	LAPM Break Control	-	-	128(40h)
S86	Call Failure Reason Code; when the No Carrier result code is issued, the reason for the failure is written to this register	0-255	-	-
S91	PSTN transmit attenuation level	0-15	dBm	10
S92	Fax transmit attenuation level	0-15	dBm	10
S95	Result code messages control	-	-	0

Section 8 Maintenance Information

Troubleshooting Tips

Default LED Indications

The Industrial Modem has the following LEDs.

LED	Default Indication
Carrier Detect	This LED will come ON once a phone line connection has been established, and will remain on for as long as the connection is maintained.
Data Terminal Ready	This LED should be ON at all times.
Receive Data	This LED will come ON whenever characters are received through the phone line.
Transmit Data	This LED will come ON whenever the modem sends characters out the phone line.
Power LED	**Normal Indication**: This LED will be ON when power is applied to the modem. **Additional States**: A "Slow" blink indicates an invalid configuration. A "Fast" blink indicates that a self-dial is in process or that the modem is in "Configure Self-dialing Parameters' mode.

Note: The RD and TD LEDs indicate the flow of characters in and out of the phone line interface of the modem, and are not directly connected to the RS232 port.

Reconnecting Serial Cables

It is important to cycle (remove and then reapply) DC power to a modem each time the RS232 cable is disconnected and then reconnected. The serial port of the modem may not function properly if power is not cycled.

Resetting the modem

If it ever becomes necessary to completely reset the modem including both user profiles to the basic factory default settings, the following command can be issued:

AT&F&W&W1 [CR]

This command string will load the factory defaults into the active configuration (&F) and then save those settings into both user profile 0 (&W) and user profile 1 (&W1).

Note that after the modem is reset completely to the factory defaults, it will no longer be set to auto-answer, which is often necessary for the modem to work when connected to a remote device. Use the Setup Wizard to adjust these settings appropriately.

Section 9 Product Support and Additional Documents

FCC Requirements for Consumer Products

The Federal Communications Commission (FCC) has established rules, which permit this device to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin lines.

If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until repair has been made. If this is not done, the telephone company may temporarily disconnect service.

If you have problems with your telephone equipment after installing this device, disconnect the device from the line to see if it is causing the problem. If it is, contact your supplier or an authorized agent.

The telephone company may make changes in its technical operations and procedures; if such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the changes.

If the telephone company requests information on what equipment is connected to their lines, inform them of:

A) The telephone number that it is connected to,
B) The Ringer Equivalence Number 0.3
C) The USOC jack required RJ11, and
D) The FCC Registration Number 34579-MD-E

Items (b) and (d) are indicated on the label. The ringer equivalence number (REN) is used to determine how many devices can be connected to your telephone line, In most areas, the sum of the RENs of all devices on any one line should not exceed five (5.0). If too many devices are attached, they may not ring properly.

In the event of equipment malfunction, all repairs should be performed by our Company or authorized agent. It is the responsibility of users requiring service to report the need for service to our company or one of our authorized agents.

Automation*Direct*.com
3505 Hutchinson Road
Cumming, GA 30040
Phone: (770) 844-4200

Certification Notice for Equipment Used in Canada

The Canadian Department of Communications label identifies certified equipment. This certification means the equipment meats certain telecommunications-network protective, operation, and safety requirements. The Department does not guarantee the equipment will operate to the users satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the companies inside wiring associated with single-line individual service may be extended by means of a certified connector assembly (extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility – in this case, your supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. The precaution may be particularly important in rural areas.

Caution:

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician as appropriate.

The LOAD NUMBER (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop, which is used by the device to prevent overloading. The termination on a loop may consist of any combination of devices, subject only to the requirement that the total of the load numbers of all the devices does not exceed 100.

Federal Communications Commission And Canadian Department of Communications Radio Frequency Interference Statement

Class b Digital Device. This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or telephone reception, which can be determined by turning the equipment on and off. The user is encouraged to try and correct the interference by one of the following measures:

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

Caution:

Changes or modifications not expressly approved by the party responsible for compliance could void the users authority to operate the equipment.

To meet FCC requirements, shielded cables and power cords are required to connect this device to a personal computer or other Class B device.

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Regulatory Notices

Any European Country:
The Industrial Modem is in conformity with relevant regulatory standards following the provisions of European Council Directives: 73/23/EEC (Low Voltage Directive) and 89/336/EEC amended by 92/31/EEC (EMC Directive).

The Industrial Modem has been approved in accordance with Council Decision 98/482/EC for pan-European single terminal connection to the public switched telephone network (PSTN). However, due to differences between the individual PSTNs provided in different countries, the approval does not, of itself, give an unconditional assurance of successful operation on every PSTN network termination point.

Australia:
The Industrial Modem shall be connected to the Telecommunication Network through a line cord, which meets the requirements of Australian Communications Authority (ACA) Technical Standard TS008. An Australian Approved Power Supply or AC Adapter shall be utilized with the product.

AS/NZS3548:1995-
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 action.

Germany:
Diese als Endeinrichtung vorgesehen und muss an ein TAE mit F-Kodierung angeschlossen werden.
are terminal equipment, which must be connected to the PSTN using an F-coded connector/plug.

IEC950:1991-
The Industrial Modem shall be connected to Telecommunications Network through a line cord approved by the necessary authorities of the country. The Industrial Modem shall be utilized with a power supply approved by the necessary authorities of the country.

United Kingdom:
The Industrial Modem is intended for direct connection to the analogue Public Switched Telecommunications Network and is approved for use within the United Kingdom with following features:
-Modem facility
-Auto calling facility
-Auto answering facility
-DTMF signaling

CAUTION: The analogue telecommunications interface of the modem is intended to be connected to Telecommunication Network Voltage (TNV) circuits, which may carry dangerous voltages. If it is subsequently desired to open the host equipment for any reason, the telephone cord must be disconnected prior to effecting access to any internal parts, which may carry telecommunication network voltages.

Service can be facilitated through our office at:

Automation*Direct*.com
3505 Hutchinson Road
Cumming, GA 30040
Phone: (770) 844-4200