

Ethernet / RS-232 Adapter

Version 1.1

Ethernet / RS-232 Adapter
for Technosoft Intelligent
Drives



T E C H N O S O F T

DSP Motion Solutions

**Technical
Reference**

Preliminary

TECHNOSOFT

Ethernet / RS-232 Adapter Technical Reference

P091.038.Ethernet.UM.0112

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Read This First

About This Manual

This book is a technical reference manual for the **ETHERNET / RS-232 ADAPTER**. It describes the **ETHERNET / RS-232 ADAPTER** setup configuration and communication settings.

Notational Conventions

This document uses the following conventions:

- The Technosoft Motion Language will be referred to as TML

Information about Cautions

This book may contain cautions.

CAUTION ! This is an example of a caution statement.
A caution statement describes a situation that could potentially cause harm to you, or to the **ETHERNET / RS-232 ADAPTER**.

Related Documentation from Technosoft

MotionChip™ II TML Programming (part no. P091.055.MCII.TML.UM.xxxx) describes in detail TML basic concepts, motion programming, functional description of TML instructions for high level or low level motion programming, communication channels and protocols. Also give a detailed description of each TML instruction including syntax, binary code and examples.

MotionChip II Configuration Setup (part no. P091.055.MCII.STP.UM.xxxx) describes the MotionChip II operation and how to setup its registers and parameters starting from the user application data. This is a technical reference manual for all the MotionChip II registers, parameters and variables.

Help of the EasyMotion Studio software platform – describes how to use the EasyMotion Studio – the complete development platform for ETHERNET / RS-232 ADAPTER which support all new features added to revision H of firmware. It includes: motion system setup & tuning wizard, motion sequence programming wizard, testing and debugging tools like: data logging, watch, control panels, on-line viewers of TML registers, parameters and variables, etc.

If you Need Assistance ...

If you want to ...	Contact Technosoft at ...
Visit Technosoft online	World Wide Web: http://www.technosoftmotion.com/
Receive general information or assistance (see Note)	World Wide Web: http://www.technosoftmotion.com/ Email: contact@technosoftmotion.com
Ask questions about product operation or report suspected problems (see Note)	Fax: (41) 32 732 55 04 Email: hotline@technosoftmotion.com
Make suggestions about, or report errors in documentation (see Note)	Mail: Technosoft SA Buchaux 38 CH-2022 Bevaix, NE Switzerland

Note: You need to register your Ethernet / RS-232 Adapter, in order to get free assistance and support. Use the License No. on your Registration Card for EasyMotion Studio.

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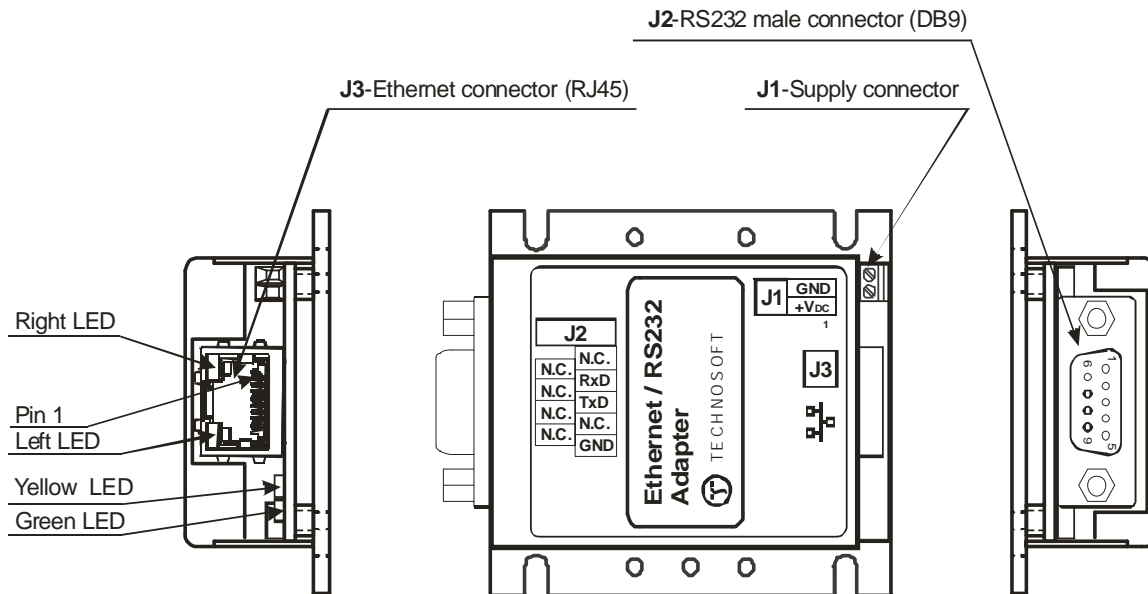
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1. Key Features

- Ethernet / RS-232 Adapter compatible with all Technosoft intelligent drives
- RS232 connector: DB9 male; Ethernet connector: RJ45 female
- RS232 communication: up to 115 kbps, Technosoft serial protocol
- Ethernet communication:
 - 10 BASE-T / 100 BASE-TX, auto-sensing, full/half duplex
 - TCP/UDP Socket Services
 - DHCP support
- Power supply: 12-48 V, reverse polarity protection
- ESD protection for serial and supply signals
- Yellow LED signaling host-to-drive connection status
- Green LED signaling host-to-drive traffic status
- Compact size: 65 x 58 x 24 mm
- Operating ambient temperature: 0-40°C

2. Connectors and Connection Diagrams

2.1. Adapter Drawing



2.2. J1 - Supply Connector pinout

Pin	Pin name	Type	Description
1	+V _{DC}	I	Supply – positive terminal: 12...48V
2	GND	-	Ground

2.3. J2 - RS-232 Connector pinout

Pin	Pin name	Type	Description
1	N.C.		Not Connected
2	RxD	I	Receive Data
3	TxD	O	Transmit Data
4	N.C.		Not Connected
5	GND	-	Ground
6	N.C.		Not Connected
7	N.C.		Not Connected
8	N.C.		Not Connected
9	N.C.		Not Connected

2.4. J3 - RJ45 Ethernet Connector pinout

Pin	Pin name	Type	Description
1	TX+	O	Transmit Data +
2	TX-	O	Transmit Data -
3	RX+	I	Differential Ethernet Receive Data +
4	N.C.	-	Not Connected
5	N.C.	-	Not Connected
6	RX-	I	Differential Ethernet Receive Data -
7	N.C.	-	Not Connected
8	N.C.	-	Not Connected

2.5. LED's description

LEDs status		Description
Left LED	Right LED	
Off	Off	No Link
Off	Solid Amber	100BASE-T Half Duplex Link
Off	Blinking Amber	100BASE-T Half Duplex; Activity
Off	Solid Green	100BASE-T Full Duplex Link
Off	Blinking Green	100BASE-T Full Duplex; Activity
Solid Amber	Off	10BASE-T Half Duplex Link
Blinking Amber	Off	10BASE-T Half Duplex; Activity
Solid Green	Off	10BASE-T Full Duplex Link
Blinking Green	Off	10BASE-T Full Duplex; Activity

LED	Description
YELLOW LED	The yellow LED turns on when a host / PC connects to the drive via the adapter.
GREEN LED	The green LED turns on during traffic between the drive and the host.

3. Ethernet Communication Setup

3.1. Set the IP address and the network settings of the Ethernet adapter

The Ethernet / RS-232 Adapter support both dynamic and static IP addresses. The DHCP and Auto IP are enabled by default. Contact your network administrator to obtain the IP address assigned by the DHCP server.

The IP settings of the Ethernet adapter can be set / changed in 2 ways:

- using the PC serial communication and **HyperTerminal** utility (or other equivalent tool)
- using the Ethernet communication and **Telnet** utility (only when the IP address is known)

3.1.1. Set/change the IP settings using the PC serial communication

1. Connect your PC to the Ethernet / RS-232 Adapter through a 9-wire standard serial cable: female-female, non-inverting (e.g. one-to-one).

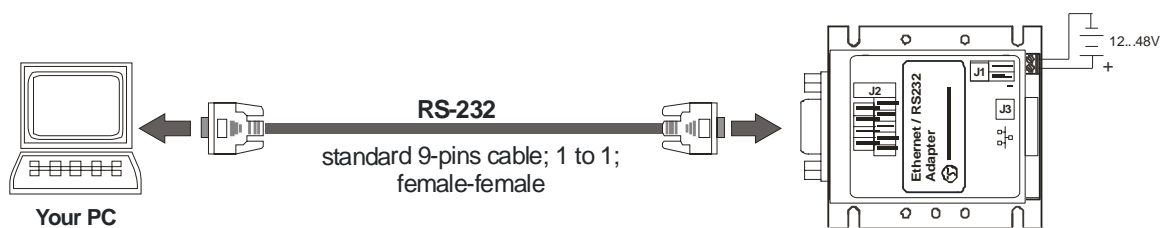
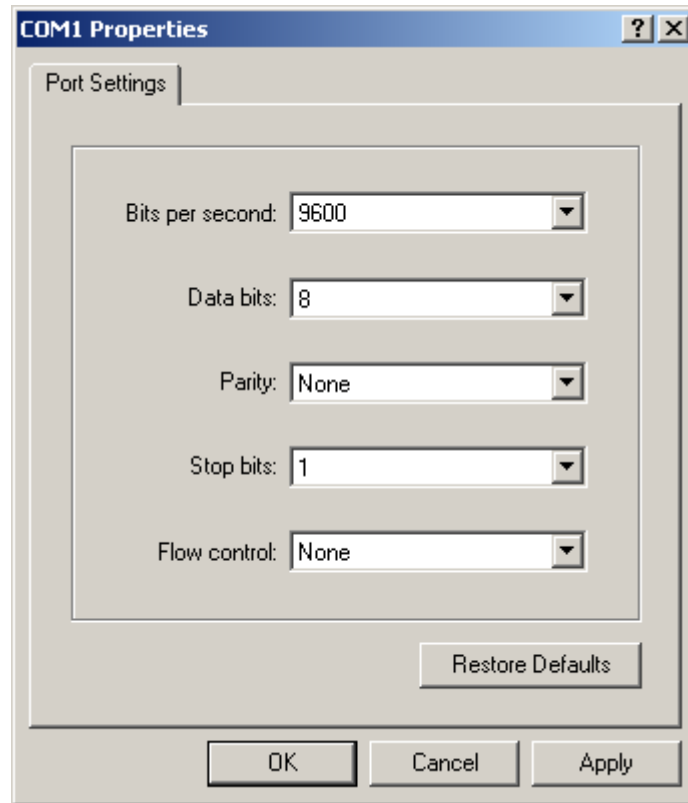
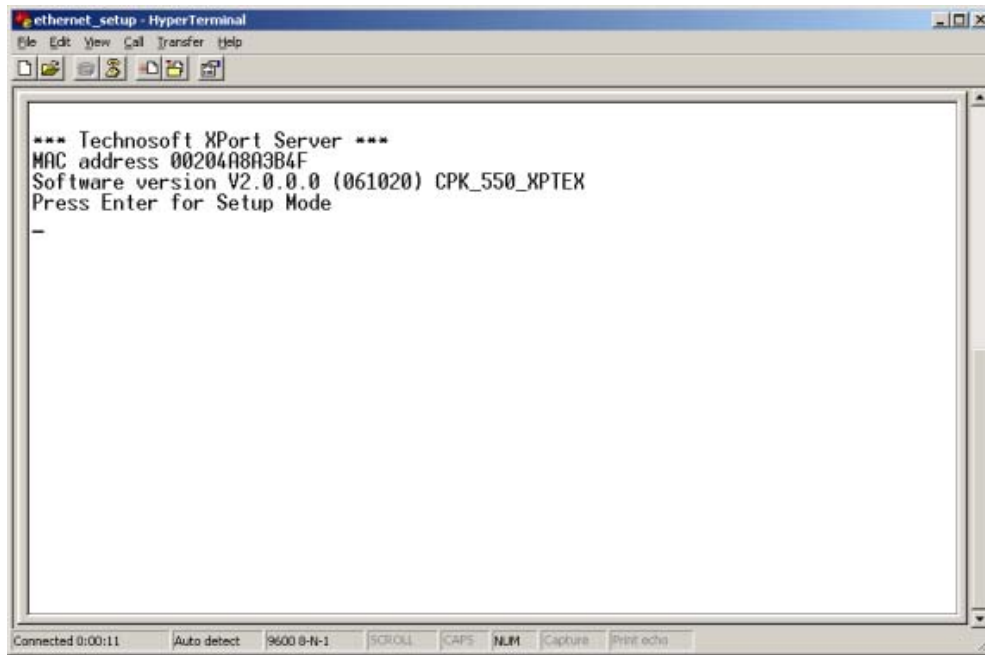


Figure 3.1. Multiple-axis CAN network connected to LAN Network

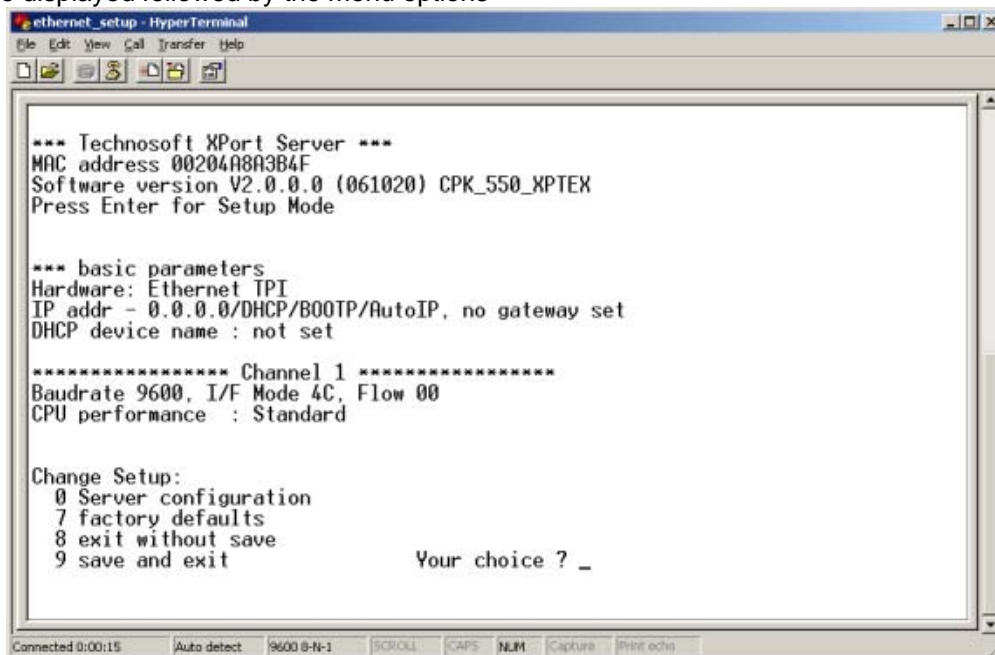
2. From **Windows Start**, select **Programs | Accessories | Communications | HyperTerminal** to launch Microsoft Windows **HyperTerminal** tool.
3. Configure the **HyperTerminal** with 9600 baud, 8-Bit character size, 1 stop bit, no parity and no flow control.



4. Hold the **x** key down on your keyboard.
5. Power-on the Ethernet / RS-232 Adapter and wait until the **HyperTerminal** displays the **Press Enter for Setup Mode** message.



6. To enter in the setup mode, **press Enter within 5 seconds**. The adapter basic parameters are displayed followed by the menu options



7. Select **0** and press Enter. You will be prompted to insert the following information:

- IP address of the Ethernet / RS-232 Adapter. It must be a unique value in your network
- IP address of your gateway
- Netmask – the number of bits for host part from IP address
- A password for Ethernet adapter configuration via Telnet

Remarks

- Contact your network administrator to obtain the valid values for the adapter IP address, gateway IP address and for the netmask.
- In order to enable automatic assignment of IP address and network settings by a DHCP server, follow steps:
 - set the **IP Address** to **0.0.0.0**,
 - type **N** for **Set Gateway IP Address (N)?** question
 - type **0** for **Netmask**.
 In this case you will be prompted to assign also a DHCP name to the adapter.

8. Select **9** to save the settings and reboot the Ethernet adapter.

```

ethernet_setup - HyperTerminal
File Edit View Call Transfer Help

IP Address : (000) 192.(000) 168.(000) 19.(000) 22
Set Gateway IP Address (N) ? N
Netmask: Number of Bits for Host Part (0=default) (0)
Change telnet config password (N) ? N

*** basic parameters
Hardware: Ethernet TPI
IP addr 192.168.19.22, no gateway set

***** Channel 1 *****
Baudrate 9600, I/F Mode 4C, Flow 00
CPU performance : Standard

Change Setup:
 0 Server configuration
 7 factory defaults
 8 exit without save
 9 save and exit
Your choice ? 9

Parameters stored ...
  
```

3.1.2. Set/change the IP settings using the Ethernet communication

1. Connect the Ethernet / RS-232 Adapter to the network or directly to your PC, using an UTP cable equipped with RJ45 connectors.

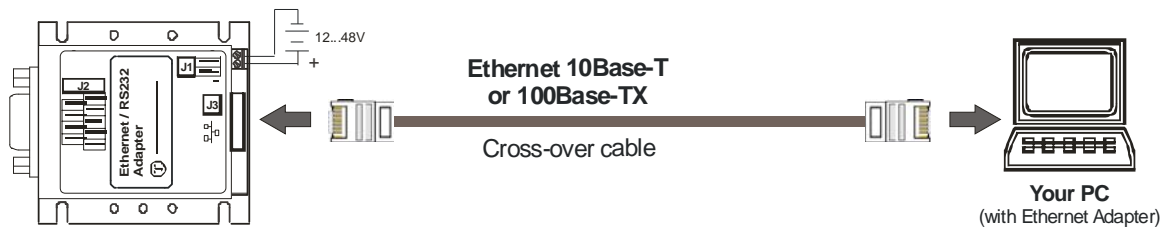


Figure 3.2. Direct Ethernet connection of PC to Ethernet / RS-232 Adapter

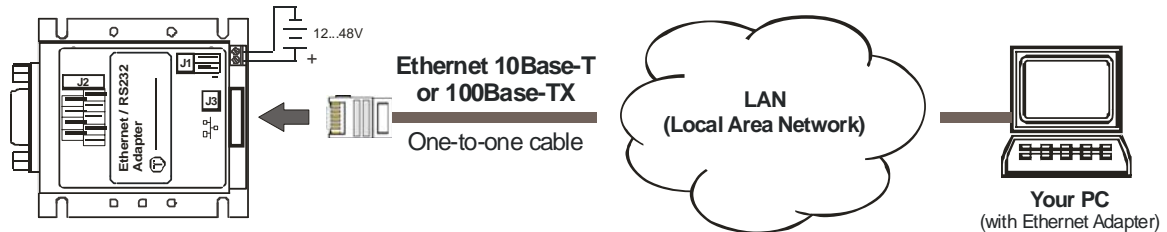
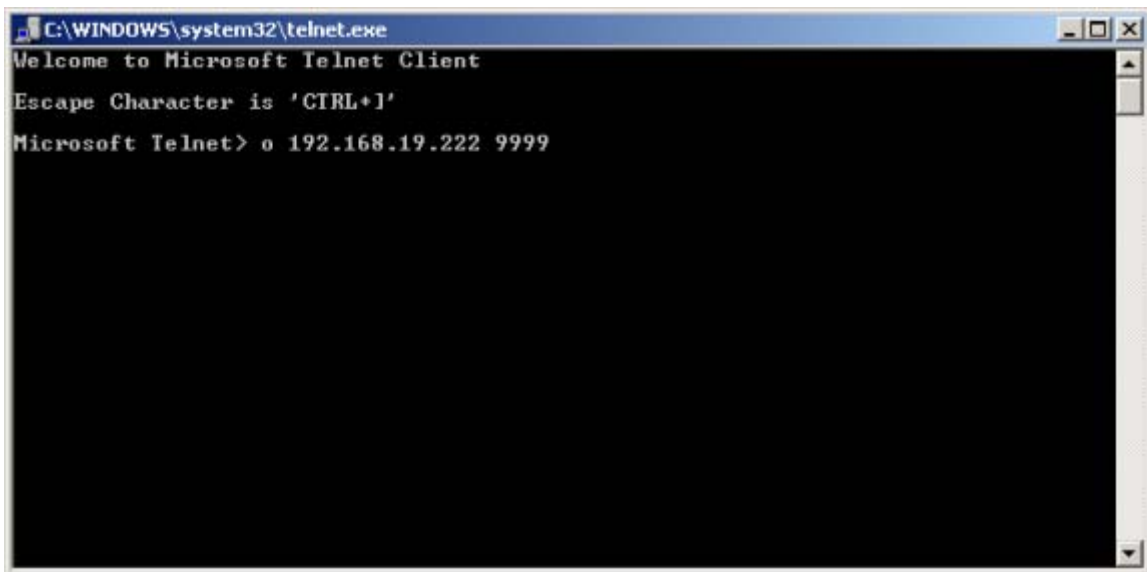


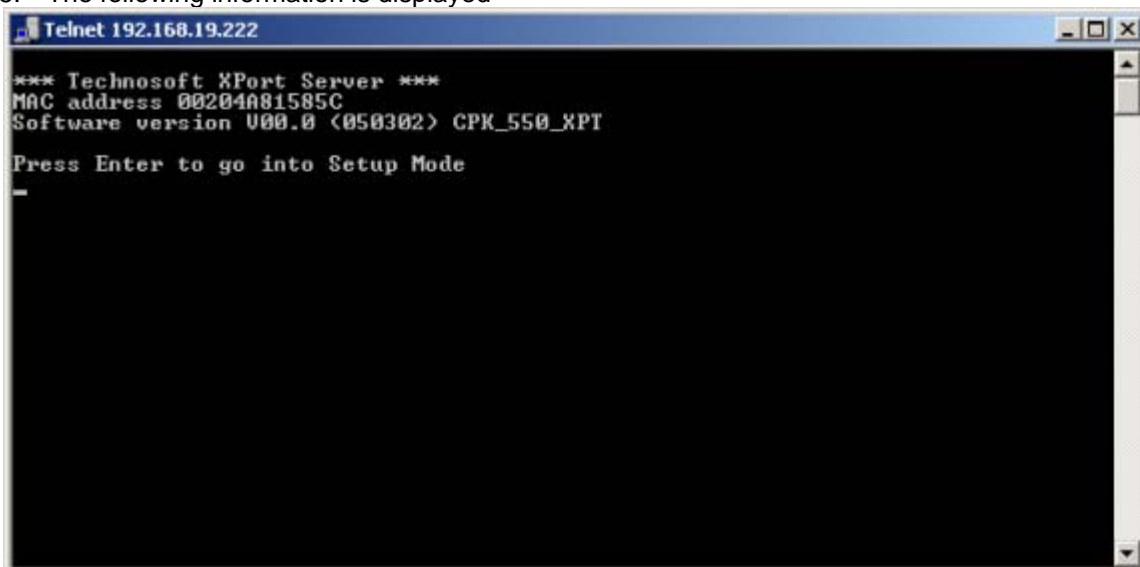
Figure 3.3. Ethernet connection of PC to Ethernet / RS-232 Adapter via LAN

2. Power On the Ethernet / RS-232 Adapter
3. From Windows **Start** menu, select **Run** and type **telnet** to launch Microsoft Telnet Client
4. At its prompt type the following command:
 - o **x.x.x.x 9999**

where **x.x.x.x** is the programmed IP of the Ethernet / RS-232 Adapter
and **9999** is the Ethernet / RS-232 Adapter configuration port



5. The following information is displayed

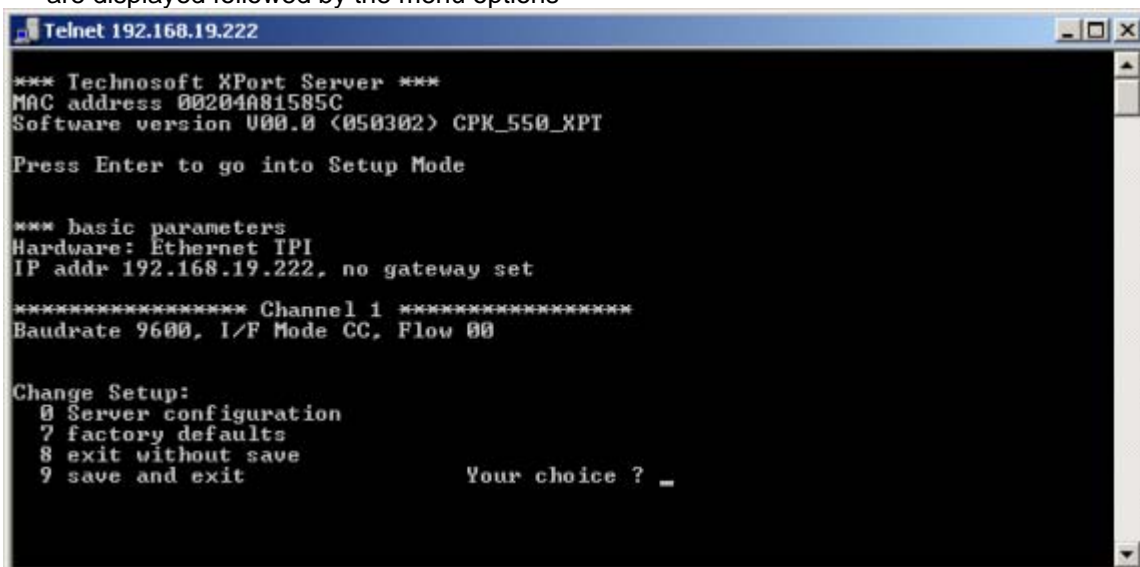


```
Telnet 192.168.19.222

*** Technosoft XPort Server ***
MAC address 00204A81585C
Software version 000.0 (050302) CPK_550_XPT

Press Enter to go into Setup Mode
_
```

6. To enter in the setup mode, **press Enter within 5 seconds**. The adapter basic parameters are displayed followed by the menu options



```
Telnet 192.168.19.222

*** Technosoft XPort Server ***
MAC address 00204A81585C
Software version 000.0 (050302) CPK_550_XPT

Press Enter to go into Setup Mode

*** basic parameters
Hardware: Ethernet TPI
IP addr 192.168.19.222, no gateway set

***** Channel 1 *****
Baudrate 9600, I/F Mode CC, Flow 00

Change Setup:
0 Server configuration
7 factory defaults
8 exit without save
9 save and exit

Your choice ? _
```

7. Select **0** and press Enter. You will be prompted to insert the following information:

- IP address of the Ethernet adapter. It must be a unique value in your network
- IP address of your gateway
- Netmask – the number of bits for host part from IP address
- A password for Ethernet adapter configuration via Telnet

Remarks

- Contact your network administrator to obtain the valid values for the adapter IP address, gateway IP address and for the netmask.
- In order to enable automatic assignment of IP address and network settings by a DHCP server, follow steps:
 - set the **IP Address** to **0.0.0.0**,
 - type **N** for **Set Gateway IP Address (N)?** question
 - type **0** for **Netmask**.In this case you will be prompted to assign also a DHCP name to the adapter.

A screenshot of a Telnet window titled "Telnet 192.168.19.222". The window shows a command-line interface with the following text:

```
9 save and exit                Your choice ? 0
IP Address : <192> 192.<168> 168.<019> 19.<222> 52
Set Gateway IP Address <N> N
Netmask: Number of Bits for Host Part <0=default> <0>
Change telnet config password <N> N

*** basic parameters
Hardware: Ethernet IPI
IP addr 192.168.19.52, no gateway set

***** Channel 1 *****
Baudrate 9600, I/F Mode CC, Flow 00

Change Setup:
 0 Server configuration
 7 factory defaults
 8 exit without save
 9 save and exit                Your choice ? 9

Parameters stored ...
```

8. Select **9** to save the settings and reboot the Ethernet adapter.

4. Set EasyMotion Studio for communication via Ethernet

The following picture presents how can be connected the multiple-axis CAN network to a LAN network. The AxisID of drive connected to Ethernet / RS-232 Adapter can have any value from 1 to 255.

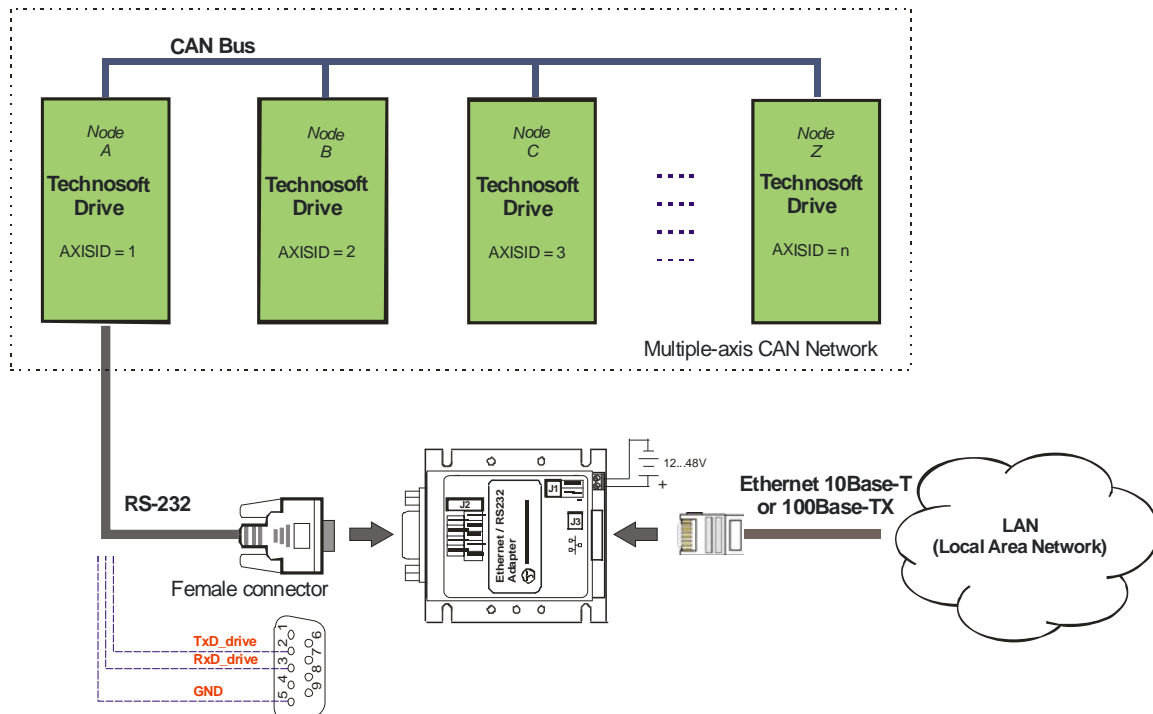


Figure 4.1. Multiple-axis CAN network connected to LAN Network

Steps to follow:

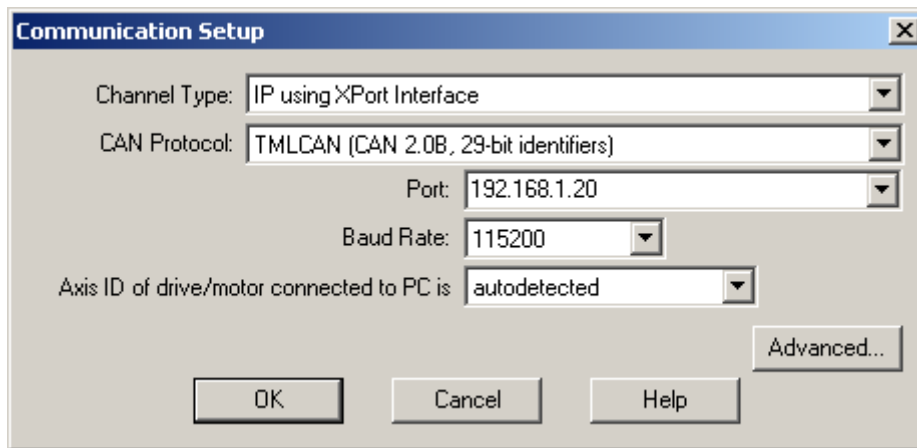
1. Set the AxisID for each Technosoft drive/motor. Connect all drives/motors in the multiple-axis CAN network if you have more than one drives/motors.

The drives/motors axis ID is set at power on using the following algorithm:

- a. If the setup table is valid, with the value read from the EEPROM setup table containing all the setup data.
- b. If the setup table is invalid, with the last axis ID value read from a valid setup table.
- c. If there is no axis ID set by a valid setup table, with the value read from the hardware switches/jumpers for AxisID setting. If the drive/motor has no hardware switches/jumpers for axis ID setting, with the default axis ID value which is 255.

Remark: When the TechnoCAN communication protocol is used, the maximum number of drives in the network is 31 (the AxisIDs of the drives/motors and PC are interpreted as modulo 32). For example, the drives with AxisID “2” and “34” appears as duplicated AxisIDs (both identified as AxisID “2”), which is not allowed in a CAN network.

2. Power-off all your drives/motors and the Ethernet / RS-232 Adapter.
3. Make the RS-232 serial connection of the Ethernet / RS-232 Adapter to one drive/motor from the CAN network, through a standard RS-232 serial cable, 9-pins, male-female, non-inverting (e.g. one-to-one). If the connection of a standard serial cable to the drive/motor is not possible, a 3-wires cable must be manufactured. Check the drive/motor user manual for drive/motor serial connection.
4. If the drive/motor supports also RS-485 communication, set the RS-232/RS-485 switch (or jumper) to the RS-232 position.
5. Power-on the drives/motors and the Ethernet / RS-232 Adapter.
6. Select menu command “**Communication | Setup**” in EasyMotion Studio software.



7. Select **IP using XPort interface** at **Channel Type**.
8. Select the **CAN Protocol** between the drives/motors connected in the CAN-bus network, the drive connected to the Ethernet / RS-232 Adapter acting as a retransmission relay. You can choose either **TMLCAN (CAN2.0B, 29-bit identifier)** or **CANopen or TechnoCAN (CAN2.0A, 11bit identifier)**.
9. At “**Port**”, set the IP address (or the DNS name) of the Ethernet / RS-232 Adapter.
10. Select the desired baud rate for serial communication between the adapter and drive/motor from **Baud Rate** list.

Set the **Axis ID of the drive/motor connected to PC**. The default option is **autodetected** enabling **EasyMotion Studio** to detect automatically the axis ID of the drive connected to the serial port of the Ethernet / RS-232 Adapter. The **autodetected** feature is available just if you have a firmware compatible on the drive/motor.

The firmware which does not support the **autodetected** feature can be identified from his code. These are:

- The firmware with code that starts with 1 – examples: F100A, F125C, F150G, etc., or
- The firmware with code that starts with 0 or 9 and has a revision letter below H – examples: F000F, F005D, F900C

Remark: When the TechnoCAN communication protocol is used, the maximum number of drives in the network is 31 (the AxisIDs of the drives/motors and PC are interpreted as modulo 32). For example, the drives with AxisID “2” and “34” appears as duplicated AxisIDs (both identified as AxisID “2”), which is not allowed in a CAN network.

9. Press the **OK** button

If the communication works properly, you'll see displayed on the status bar (the bottom line) of the EasyMotion Studio the text “**Online**”, the axis ID of the drive/motor and the firmware version read from the drive/motor.

Remarks

- To access the Ethernet / RS-232 Adapter from a remote PC (a PC which is not in the same LAN as the Ethernet / RS-232 Adapter), the server's (or router's) port forwarding must be set to allow communication. The port numbers that must be forwarded are UDP/TCP: 1700 and UDP: 30689. Port forwarding allows remote computers to connect to a specific computer within a private local area network (LAN). For more information about port forwarding, refer to the instructions supplied with the router.
- On the remote PC, the server's (router's) IP address will be used in the Communication Setup dialogue in EasyMotion Studio software.

5. Ethernet Communication Troubleshoots

If the CAN-bus communication does not operate properly, EasyMotion Studio will issue an error message and you'll see displayed on the status bar (the bottom line) of the EasyMotion Studio the text "**Offline**".

1. If the error message starts with "**WinSock:** " the error is related to Ethernet communication. Click "**Cancel**" button, then check the following:
 - UTP cable connections
 - If the Ethernet adapter is correctly supplied
 - In **Communication | Setup** dialogue, if the address set at **Port** is identical with the one set with Microsoft Telnet Client
2. If the error message doesn't start with "**WinSock:** " the error is related to the serial RS-232 communication. To fix the problem see RS-232 Communication Troubleshoots from EasyMotion Studio Help.
3. If the communication operates usually but gives communication errors from time to time, in **Communication | Setup** click on **Advanced...** button and increase the **Receive timeout interval** parameter. Note that for this parameter, usually, the default value does not need to be modified.

After you fix the problem, execute menu command **Communication | Refresh** to restore the communication.

6. Electrical Specifications

Electrical characteristics:

All parameters were measured under the following conditions (unless otherwise specified):

$T_{amb} = 25^{\circ}\text{C}$, power supply (V_{DC}) = $24V_{DC}$;

Supply Input

Measured between $+V_{DC}$ and GND.		Min.	Typ.	Max.	Units
Supply voltage	Nominal values	12	24	48	V_{DC}
	Absolute maximum values, continuous	8		60	V_{DC}
Supply current	Normal operation, $V_{DC} = 24V$		60		mA
	Normal operation, $V_{DC} = 12V$		120		mA

RS-232

		Min.	Typ.	Max.	Units
Standards compliance		TIA/EIA-232-C			
Bit rate	Depending on software settings	9600		115200	Baud
ESD Protection	Human Body Model (100 pF, 1.5 k Ω)			± 15	KV
Input voltage	RX232 input	-25	-	+25	V
Output short-circuit withstand	TX232 output to GND	Guaranteed			

Ethernet

		Min.	Typ.	Max.	Units
Standards compliance		10 BASE-T, 100 BASE-TX			

Others

		Min.	Typ.	Max.	Units
Operating temperature		0		40	$^{\circ}\text{C}$
Dimensions	Length x Width x Height	65 x 58 x 24			mm
Weight			TBD		Kg
Storage temperature	Not powered	-40	85	$^{\circ}\text{C}$	
Humidity	Non-condensing	5	90	%RH	

7. Ethernet / RS-232 Adapter Dimensions

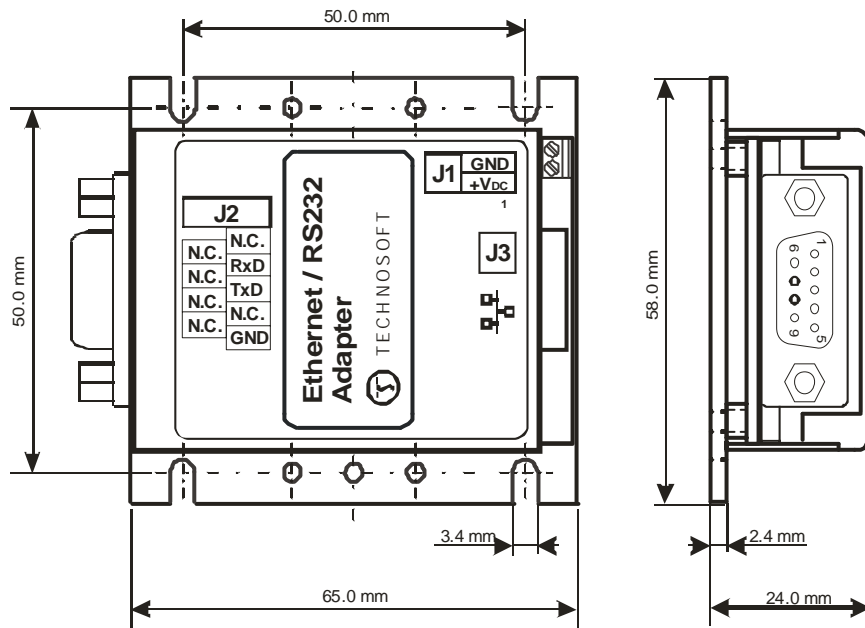


Figure 7.1. Ethernet / RS-232 Adapter dimensions



T E C H N O S O F T

