XC-31, XC-310, XC-4100

User MANUAL
Version 1.2

Table des matières

I.Introduction

I.1 - XC-31- 310 - 4100 serial ports server's serie

A serial ports server provides real COM ports on the Ethernet network. You can use modems, barcodes readers or any serial device on the Ethernet network.

Thanks to the Mux mode, you can also establish a communication between to serial equipments through an asynchronous link. You can, for example, use a terminal on your Xcell to manage a PLC located on a remote Xcell.

Serial ports server's family is composed by the following products :

ƒ XC-31 provides 2 asynchronous ports (RS232C) and one Ethernet port.
ƒ XC-310 provides 4 or 8 asynchronous ports (RS232C or RS422/485A) and one Ethernet port.
ƒ XC-4100 provides 4, 8, 12 or 16 asynchronous ports (RS232C or RS422/485A) and one Ethernet port.

I.2 - Furnished features

You will find the following features with any Xcell :

ƒ A document titled "Getting started with Xcell server/router".
ƒ Xcell Technology CD-ROM contains RemoteCOM drivers, Rawtty drivers and a few usefull softs. Please read the readme.html file for more information.
ƒ A DTE DB25 cable (ref F00132) and a DTE DB9 cable (ref F00142). These cables are PC COM port compatible - RS232C).
ƒ A power supply cable.
ƒ A 5V power supply (XC-31 and XC-310 only)

I.3 - Symbolics

In all pictures of this documentation, we will use the following symbols :

	WAN Link		**Printer**
	Ethernet Network		**Modem**
	Lan link		**Aquisition de données**
	Work		**Portable computer**
	Serial port server function / Raw Mode		**Gateway**
	Terminal server function		**Remote access router function**
	Mux Mode function		**Server**

II.Xcell overview

II.1 - XC-32

XC-31 provides 2 asynchronous ports. Thanks to the "raw" function of Xcell, you can connect printers or any other serial equipment (bar-code reader, data acquisition system, a.s.o...).
Just run on your Unix server the "rawtty" application (or RemoteCom on Windows NT and 95) to redirect the in and out data flow of the specified communication port ('COMx' or '/dev/ttyx' following the operating system) to one of XC-310 port.

Thanks to the Mux mode, you can also establish a communication between to serial equipments through an asynchronous link. You can, for example, use a terminal on your Xcell to manage a PLC located on a remote Xcell.

II.2 - XC-320

XC-310 supports the same functions as XC-31 but provides 4 or 8 asynchronous ports.

II.3 - XC-4200

XC-4100 supports the same functions as XC-310 but provides 4, 8, 12 or 16 asynchronous ports. XC-4100 also uses the XC-4 architecture.
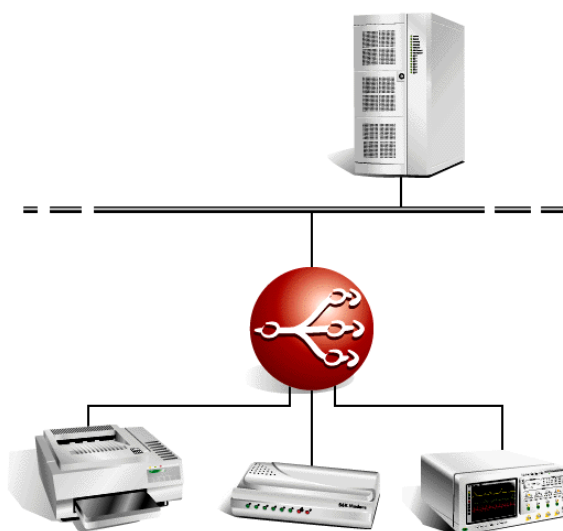
Figure 1 - Using of Xcell to connect serial equipments.

III.Installation

This chapter details the first steps to install XC-31, XC-310, XC-4100

III.1 - Indicating LEDS of XC-31

XC 31

The top face of XC-is composed by a line of five LEDS

Designation	Color	State	Meaning
Setup - Locate	Red	On	Setup mode activated
		Off	Normal mode
		Clignotement	Locate function activated
Link	Red	On	No presence of the network
		Off	Presence of the network
TxD	Green		Data transmission To the network
RxD	Green		Data reception from the network
Power	Green	On	Xcell is on
		Off	Xcell is off

III.2 - Indicating LEDS of XC-310

XC 310

The front panel of XC-310composed by a line of five LEDS

Designation	Color	State	Meaning
Setup	Red	On	Setup mode activated
		Off	Normal mode
		Blinking	Locate function activated
LAN Link	Red	On	No presence of the network
		Off	Presence of the network
LAN Tx	Green		Data transmission from the network
LAN Rx	Green		Data reception from the network
Power	Green	On	Xcell is on
		Off	Xcell is off

III.3 - indicating LEDS of XC-4100

XC 4100

The front panel of XC-4100 is composed by a line of seven LEDS.

Designation	Color	State	Meaning
Setup	Red	On	Setup mode activated
		Off	Normal mode
		Blinking	Locate function activated
Sync - Fan fault	Orange	On	One synchrone interface actived at least
		Off	No synchrone interface activated
		Blinking	Fan fault
Isdn-Fan fault	Green	On	One isdn interface activated at least
		Off	No isdn interface activated
		Blinking	Fan fault
Link	Red	On	No presence of the network
		Off	Presence of the network
Tx	Orange		Data transmission from the network
Rx	Green		Data reception from the network

III.4 - Ports and interfaces of XC-31

The rear face of XC-31 displays the followings elements :

ƒ 1 power supply connector.
ƒ 1 Ethernet port 10baseT.
  The front face of XC-31 displays the following elements :
ƒ 2 asynchronous ports RS232C/V24 noted "Serial 1
  The port n°1 is the console port in setup mode

III.5 - Ports and interfaces of XC-310

The rear face of XC-310 displays the followings elements :

ƒ 1 power supply connector.
ƒ 1 Ethernet port 10baseT.
ƒ 4 or 8 asynchronous ports (RS232C/V24 or RS422/485A)
The port n°1 is the console port in setup mode

III.6 - Ports and interfaces of XC-4100

The rear face of XC-4100 displays the followings elements :

ƒ 1 power supply connector.
ƒ 1 Ethernet port 10baseT.
ƒ 1 on/off button

The front face of XC-4100 displays the following elements :

ƒ 4, 8, 12 or 16 asynchronous ports (RS232C/V24 or RS422/485A)
ƒ 1 asynchronous port noted "Serial 1/Console".
ƒ 1 port "Serial 2"

III.7 - Cautions

The opening of the box is strictly reserved to persons authorized by Decision Europe.
Manipulation of the open box is forbidden.

III.7.1 - Cleaning XC

ƒ Remove the power supply cable from the rear panel
ƒ Please use watertown.

Caution : do not use chemical products which can damage the box paint (Alcohol, trichlo,..)

ƒ Please be sure the box is completely dry before powering on.

III.7.2 - Note

III.7.2.1 - About XC-31

Security of this equipment is guaranteed only if you use the furnished power supply or an equivalent model.

Cables must only be plug at very low security voltages (VLSV).

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.

III.7.2.2 - General note

The hardware and software described in this document may change without warning.

The information in this document may change without warning. Xcell Technology reserves itself the right to revise this publication without having to provide notification for such revisions. Aslong as reasonable precautions have been taken, Xcell Technology assumes no responsibility for errors that may appear in this document.

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IV.Configuration

IV.1 - Introduction

The three ways to configure your Xcell are :

ƒ With an asynchronous terminal (or a terminal emulator) connected to one of its serial ports.
ƒ From another network host using Telnet protocol.
ƒ From a web browser (Netscape, Internet Explorer,...).

Before using Telnet or HTTP protocols, you just need to fix Xcell IP address. This can be made with Xcell administrator or with a terminal.

IV.2 - Entering IP address

IV.2.1 - Entering IP address from Xcell administrator

Xcell administrator enables you to locate and setup all Xcells of your LAN.
To search for all Xcells on your LAN, click on "Adminstration" then on "Explorer". A window like this one must appears on your screen :
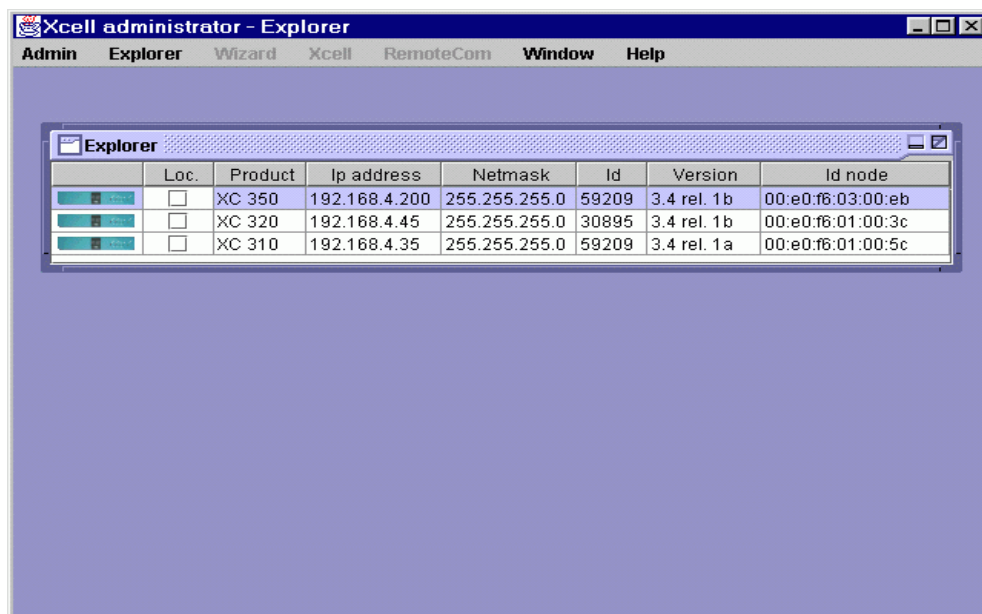
To change Xcell's IP address, click on "IP address" cell and type new IP adress.

IV.2.2 - Entering IP address from a terminal

Use a terminal (9600 bauds, 8 bits, no parity) connected on Xcell's Console part.
The Setup mode can be selected after Xcell startup. When the Setup LED blinks, press three times on '@' :

The terminal screen should display the following message :

```
ROOT>>
```

Now, you have access to a classic line shell (with a vt100, vt220, ansi terminal). Data input errors may be corrected by using 'left arrow ', 'right arrow' and 'backspace' keys. The 'up arrow' and 'down arrow' keys re-edit the last command.
You can now enter IP address and the network where your Xcell is connected, with the following commands :

IFCONFIG IP <interface> <IP_address>
ROUTE ADD NET <interface> <destination> <gateway> <netmask>

Example :

```
ROOT>> ifconfig ip eth0 192.168.1.11
Ok!
ROOT>> route add net eth0 192.168.1.0 0.0.0.0 255.255.255.0
Ok!
```

To save your configuration parameters, it is necessary to write it in permanent memory (FLASH-EPROM). Enter the **save** command to do achieve this :

```
ROOT>> save
Status: Done.

ROOT>>
```

IV.3 - HTTP Configuration (Netscape, Internet Explorer)

Xcell can be configured in text mode (Console, Telnet) or in graphic mode (HTTP).
The following pages of this manual excusively deal with a text mode configuration.
However, all text mode commands have their equivalents in graphic mode.
To set up parameters in graphic mode, you just need a web browser (Netscape, Internet Explorer), and to enter Xcell's IP address in URL field :
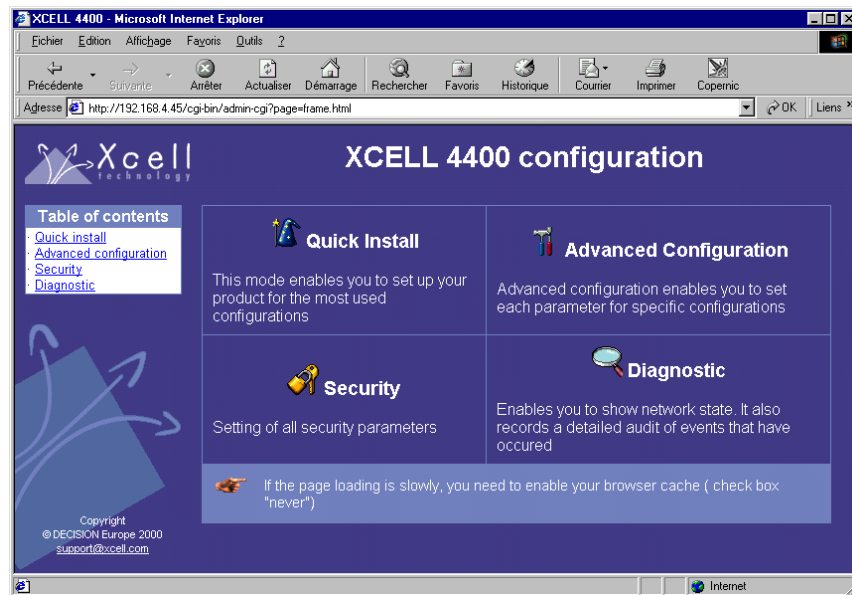
Click on GO, and open a session under the name root. Default password is root.
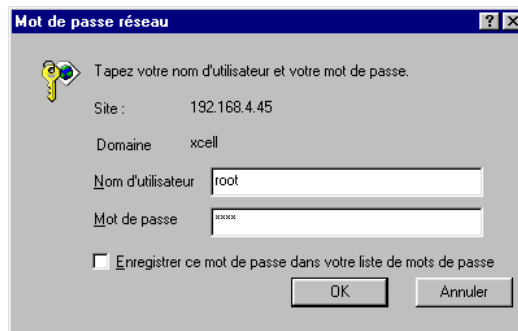
Now you can configure your Xcell.
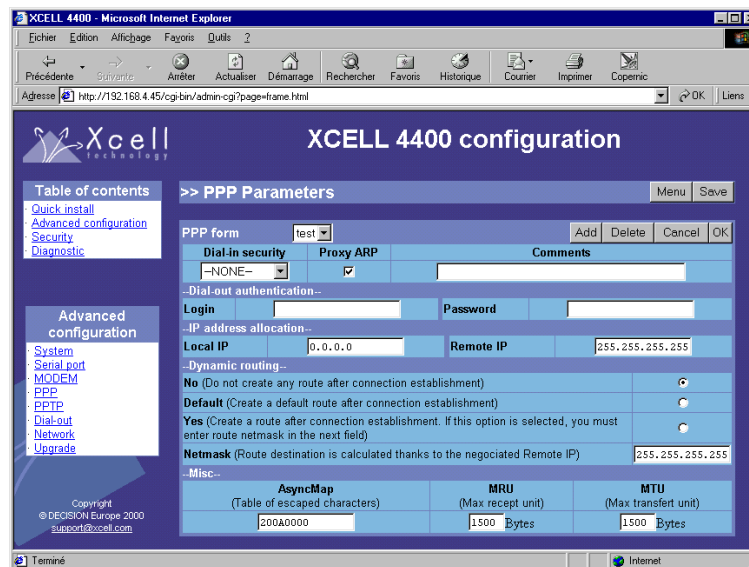
IV.4 - Network interface

IV.4.1 - Identification

To correctly initialize the network connection, use the **ifconfig** command to enter the following parameters :

ƒ *IP address*. The location of your Xcell on the network. This address consists in four numbers separated by dots (.), valid values for each of the four numbers are whole numbers between 1 and 254, for example "*192.168.2.3*".
ƒ *Network mask* (netmask). It is a number similar to IP address, which determines what address is specified by the network and what place on this network is specified by your Xcell. For an IP address "*192.168.2.3*", if you enter *255.255.255.0*" as a mask value, this means that your network address is "*192.168.2.0*".
ƒ *The maximal transfer unit system* (MTU). On an Ethernet system the MTU value is commonly established at 1500.
ƒ *Broadcast address*. By default, this address is the one of the system with 255 in place of the machine address. For a network address "*192.168.2.0*", broadcast address will be "*192.168.2.255*".

By default, network mask is configured at "*255.255.255.0*" (class C) and the MTU at 1500 (Ethernet). Only in some particular cases, you have to change these values.

IV.4.2 - Route checking with PING command

In order to check if Xcell is can be reached inside the network, you can run the ping command :

```
ROOT>> ping 192.168.1.20              machine IP address on the
network
PING 192.168.1.20 (192.168.1.20): 56 data bytes
64 bytes from 192.168.1.20: icmp_seq=0 ttl=255 time=0.6 ms
64 bytes from 192.168.1.20: icmp_seq=1 ttl=255 time=38.2 ms
64 bytes from 192.168.1.20: icmp_seq=2 ttl=255 time=2.7 ms
64 bytes from 192.168.1.20: icmp_seq=3 ttl=255 time=2.7 ms
64 bytes from 192.168.1.20: icmp_seq=4 ttl=255 time=2.8 ms

--- 192.168.1.20 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 0.6/9.4/38.2 ms

ROOT>
```

IV.4.3 - Routing table

Before sending an IP frame, Xcell consults its routing table in order to find an entry indicating the route to use.

In the following example, terminals connect to server thanks to Xcell.

Note that the server is to be found on the sub-network *192.168.1.0* at the address *192.168.1.2* and that Xcell belongs to the sub-network *192.168.2.0* at the address *192.168.2.2*. A bridge helps to the interconnection of the two sub-networks :
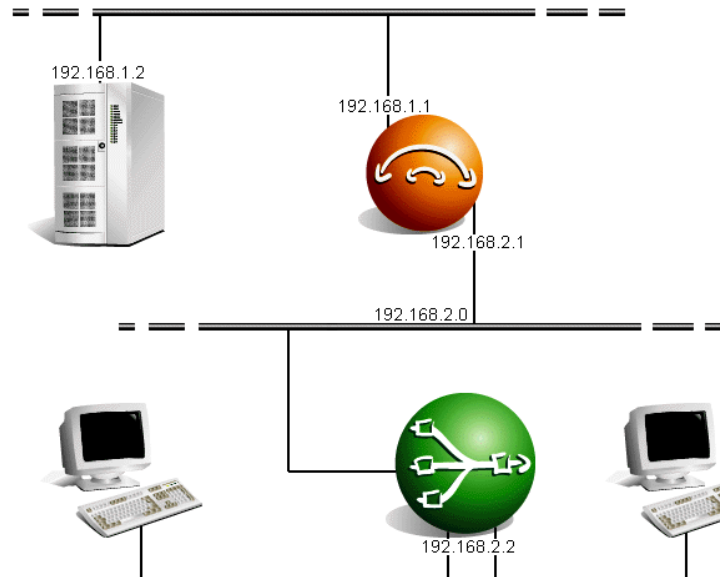
Figure 2 - Network example to make a routing table

To send IP frames to server, you must necessarily inform Xcell that these frames run through the *192.168.2.1* router.

There are three manners for this :

The first consists in informing Xcell that all IP frames intended for the *192.168.1.2* server have to be sent to the *192.168.2.1* router :

```
ROOT>> route add host eth0 192.168.1.2 192.168.2.1 255.255.255.255
Ok!
ROOT>> route static
Kernel routing table
Destination    Gateway        Genmask            Typ     Iface
192.168.1.2    192.168.2.1    255.255.255.255    host    eth0
```

The second consists in informing Xcell that all IP frames intended for the *192.168.1.0* network have to be transmitted to the *192.168.2.1* router :

```
ROOT>> route add net eth0 192.168.1.0 192.168.2.1 255.255.255.0
Ok!
ROOT>> route static
Kernel routing table
Destination    Gateway        Genmask            Typ     Iface
192.168.2.0    0.0.0.0        255.255.255.0      net     eth0
```

```
192.168.1.0   192.168.2.1   255.255.255.255   net     eth0
```

The third, (and most often used manner) consists in informing Xcell that, if the routing table does not contain any entry corresponding to the IP frame to send, then this one will be sent (by default) to the *192.168.2.1* router :

```
ROOT>> route add net eth0 0.0.0.0 192.168.2.1 0.0.0.0
Ok!
ROOT>> route static
Kernel routing table
Destination    Gateway         Genmask          Typ     Iface
192.168.2.0    0.0.0.0         255.255.255.0    net     eth0
0.0.0.0        192.168.2.1     0.0.0.0          net     eth0
```

IV.5 - Asynchronous interfaces

IV.5.1 - Software settings

Configuration of a serial port can be done with **serial** command :
You must enter individually each parameter :

```
ROOT>> serial speed 9600  4
ROOT>> serial csize 8  4
ROOT>> serial parity none  4
ROOT>> serial stopb 1  4
```

Port 4 can then be setup to 9600 bauds, without parity control, with a 8 bits data width and one stop bit.
To set the port speed of ports 3, 6 and 7 to 19200 bps, type the following command :

```
ROOT>> serial speed 19200 3 6 7
```

To set all ports to 38400 bps, enter the following command :

```
ROOT>> serial speed 38400 all
```

To set all ports but ports 3 and 5 to 4800 bps, enter :

```
ROOT>> serial speed 4800 all 3 5
```

You can see, at every time, all current ports parameters with the following command :

```
ROOT>> serial show all
```

IV.5.2 - Asynchronous port mode

Each asynchronous port can work in one of the following modes (regardless of the other ports configurations) :

Terminal mode	Connection of an asynchronous terminal (Telnet).
Printer mode	Connection of a printer (LPD).
Raw mode	Connection of a passive equipment (RemoteCOM or rawTTY).
PPP mode	Connection of a remote host to a network or remote networks interconnection. (asynchronous PPP).
Rtelnet mode	Access through a TCP/IP network to an equipment or to an operating system not equiped with the TCP/IP protocol.

For example, to program the first five Xcell ports in each of these modes, commands would respectively be :

```
ROOT >> serial mode term 1
Ok!
ROOT >> serial mode printer 2
Ok!
ROOT >> serial mode raw 3
Ok!
ROOT >> serial mode ppp 4
Ok!
ROOT >> serial mode rtelnet 5
Ok!
```

IV.5.3 - Type of control

A port can be configured in *local control* or in *modem control*. In *modem control*, Xcell will ignore state of the DCD signal for this port. On the other hand, in *modem control*, Xcell will propose to open a session only if the DCD is active. Moreover, if the DCD signal becomes inactive, Xcell will close all the open sessions on this port.
To configure port 3 in *local control*, enter:

```
ROOT>> serial linectrl local 3
```

To use a modem on port 2, you have to setup the port with this command :

```
ROOT>> serial linectrl modem 2
```

IV.5.4 - Flow control

Flow control can have four different values :

Soft control	XON/XOFF. Sending of XON(11H) and XOFF(13H) characters.
Hard control	RTS/CTS. Signal shift.
Soft and hard control	XON/XOFF and RTS/CTS. This kind of flow control is used when one want to connect a serial printer on a port.
No control	No flow control will be performed.

For example, to set up the first four ports of Xcell in each of these flow control modes, you have to enter the following commands :

```
ROOT>> serial flowctrl soft 1
Ok!
ROOT>> serial flowctrl hard 2
Ok!
ROOT>> serial flowctrl softhard 3
Ok!
ROOT>> serial flowctrl none 4
Ok!
```

IV.5.5 - Automatic disconnection of a Modem

If there is no data traffic during a determined deplay on port where the modem is connected, Xcell can decide to disconnect the modem (DTR signal deasserted).
For example, to disconnect the modem installed on port 3 if this one is not used during 2 mn, use the following command :

```
ROOT>> serial timeout 120 3
```

To disable this option, please set a delay of 0 second.

WARNING !! This automatic disconnection is sometimes managed directly by the modem.

IV.5.6 - Association of a modem form to a port

To use a modem on a port, you have to associate a modem form to this part. A modem form contains configuration parameters for the modem (see IV-8 Management of a modem connection).
To associate a modem form named "*gen33600*" to port 1, enter :

```
ROOT>> serial modem gen33600 1
```

IV.5.7 - AutoUser mode

AutoUser mode enables Xcell to launch automatically a session on the specified port for a certain user. To configure Xcell's port 1 in AutoUser mode for a user named "*Paul*", enter :

```
ROOT>> serial autouser paul 1
```

CAUTION !! You must definitely not define any password for the session lauching to be automatical. (see IV.7 - Creation of a user.).

To come back to usual mode on port 1, enter :

```
ROOT>> serial autouser none 1
```

Consult reference manual for more details about commands that are dealt with in this chapter.

IV.6 - Saving and restoring Xcell configuration

IV.6.1 - Saving in FLASH memory

All parameters are conserved by Xcell in RAM, up to the next Xcell boot. If you want to conserve all your parameters, you must write them in FLASH memory. Make this operation with the following command :

```
ROOT>> save
Status: done.

ROOT>>
```

IV.6.2 - Saving a configuration copy

You can save a Xcell configuration copy on a remote machine ; thanks to the TFTP (trivial file transfer protocol) protocol. Xcell parameters will be sent via TFTP to a file previously created on the remote machine.
Proceed as follows :
Create an empty file on your TFTP server, example with the following UNIX command :

echo -n > /tmp/xcell.conf
chmod 666 /tmp/xcell.conf

Indicate to Xcell the IP address of the server where the file will be staved, as well as the name of this file and start the transfer :

```
ROOT>> system config server 192.168.1.1
ROOT>> system config path "/tmp/xcell.conf"
ROOT>> system config store
```

To restore configuration file, execute the next command :

```
ROOT>> system config load
```

CAUTION !! The loaded configuration is stocked in RAM. Save it in FLASH memory with the **save** command :

```
ROOT>> save
Status: Done.

ROOT>>
```

IV.7 - Audit

Audits generate some usefull information to control Xcell's activity or to analyse configuration errors. These information are displayed in real time or redirected a file. Audit commands enable you to set type and level of captured information, as well as the displaying mode of information.

IV.7.1 - Audit on a remote machine

To create an audit on a remote machine, use the **audit add** command with following parameters :

AUDIT ADD <syslog | trap> <remote IP> <level> <type>

ƒ **Syslog / Trap** : if you use syslog option , information will be sent to syslogd daemon of the specified remote machine. If your machine does not run syslogd daemon, you must install one.
If you use an smtp administration soft, you can display Xcell's audit thanks to the trap option.

ƒ **Remote IP** : It is the IP address of the remote machine on which you will display Xcell's audit.

ƒ **Level** : It is preciseness level of audit messages. These differents levels are

warning	Minimum (displaying of errors messages).
notice	Like **warning** level but there is messages about Xcell's activity.
info	Like **notice** level with more detailled messages about running process.
debug	All existing messages with maximum details.

Type : It defines type of messages that you want to see in audit. These differents types are

system	Messages about system parameters (DHCP, RADIUS, save, ...).
async	Messages about asynchronous ports.
net	Messages about network
all	All preceeding types.

IV.7.2 - Audit on your console

To create audit on your console, use the **audit add console** command in this way :

AUDIT ADD console <level> <type>

Audit will display in your current session's window. You will still be able to enter commands with this shell.
Level and type parameters do not change.

IV.7.3 - Audit in a file

To send auditin a file, use the **audit add buffer** command in this way :

AUDIT ADD buffer <level> <type>

Level and type parameters do not change.

You will be able to show this file thanks to **audit view** and **audit last** commands. The **audit view** command enables you to show the entire audit file.

```
ROOT>> audit view
```

With the **audit last** command, you can display the last lines of the audit file :

```
ROOT>> audit last 10
```

In this example, you will show the ten last lines of the audit file.

IV.7.4 - List of created audits

The **audit show** command enables you to display the list of declared audits. Example :

```
ROOT>> audit show
buffer   0.0.0.0
debug    : async
warning :net system

console  0.0.0.0
warning : all
```

IV.7.5 - Delete audit

To delete an audit, use one of the following commands :

AUDIT DELETE <syslog | trap> <remote IP> <level> <type>
AUDIT DELETE <buffer | console> <level> <type>

IV.7.6 - Start/stop audit

When you create an audit with the **audit add** command, it is immediatly actived. But you must restart a console audit after any reboot of your Xcell. This can be made thanks to the **audit start** command :

```
ROOT>> audit start
Ok!
```

To stop a console audit, use the audit stop command :

```
ROOT>> audit stop
Ok!
```

V.Rawtty and RemoteCOM

V.1 - Introduction

Rawtty and RemoteCOM enable a server to use an Xcell asynchronous port as one of its own ports. To perform this operation, you just have to install a driver on server and to setup a few parameters on your Xcell.

V.2 - RemoteCOM

RemoteCOM is a driver for Windows systems which enables you to redirect COM ports on Xcell. RemoteCOM is made to manage flow control signals (DTR, DSR and DCD).

V.2.1 - RemoteCOM under Windows 95/98

V.2.1.1 - Setting up the XC-31- 310 - 4100

Only flow control parameter must be set on the Xcell.
Configuration example with Telnet console :

First, display current ports configuration :

```
 ROOT>> serial show all
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName Rtelnet
Time0
1    raw  9600  soft     local 8  none 1                2001     0
2    raw  9600  soft     local 8  none 1                2002     0
```

If you want to set hard flow control on ports 1 and 2, enter :

```
ROOT>> serial flowctrl hard 1 2
```

Then, reset ports with new parameters :

```
ROOT>> reset port 1 2
```

Display ports configuration again to see if new parameters are well set :

```
ROOT>> serial show all
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName RtelnetTime0
1    raw  9600  hard     local 8  none 1                2001      0
```

```
2    raw  9600  hard     local 8  none 1              2002      0
```

Speed, parity, csize and stop bit are send by RemoteCOM to the Xcell.
RemoteCOM transmits DTR signal and recepts states of DCD and DSR signals.

V.2.1.2 - Installation of RemoteCOM driver

1 - To install RemoteCom driver, open Windows's control panel.

ƒ Click on "*Add new hardware*"
ƒ Ask "*No*" to Windows's automatic detection.
ƒ Click on "*Others*".
ƒ Then click on "*Have disk*" and find the way to the path in which you have make a copy
   of RemoteCOM driver (remcom.inf).
ƒ Restart Windows after the installation of the first RemoteCOM port.

2 - Choosing COM port number.

When your system is restarted :

ƒ In the control panel, click on "system" and device control tab.
ƒ Click on "*RemoteCOM(tm)*" in the menu "*Ports(COM&LPT)*" and choose the COM
   port's number associated to the RemoteCOM port.
ƒ Click on "*Refresh*", the "*RemoteCOM(tm)*" label will changes in "*COMx*".
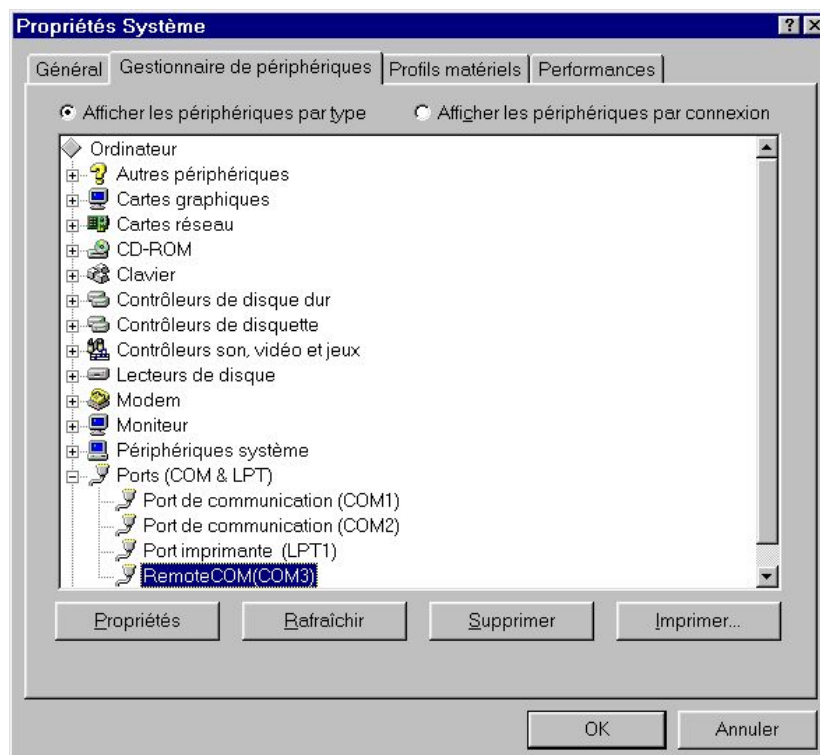
3 - RemoteCOM configuration.

ƒ In the device control tab, click on "*RemoteCOM(COMx)*" in the menu
   "*Ports(COM&LPT)*".
ƒ Click on "*properties*", then change Xcell's IP address and Xcell's port number.
ƒ Example : *Xcell 192.168.4.23, port 7*.
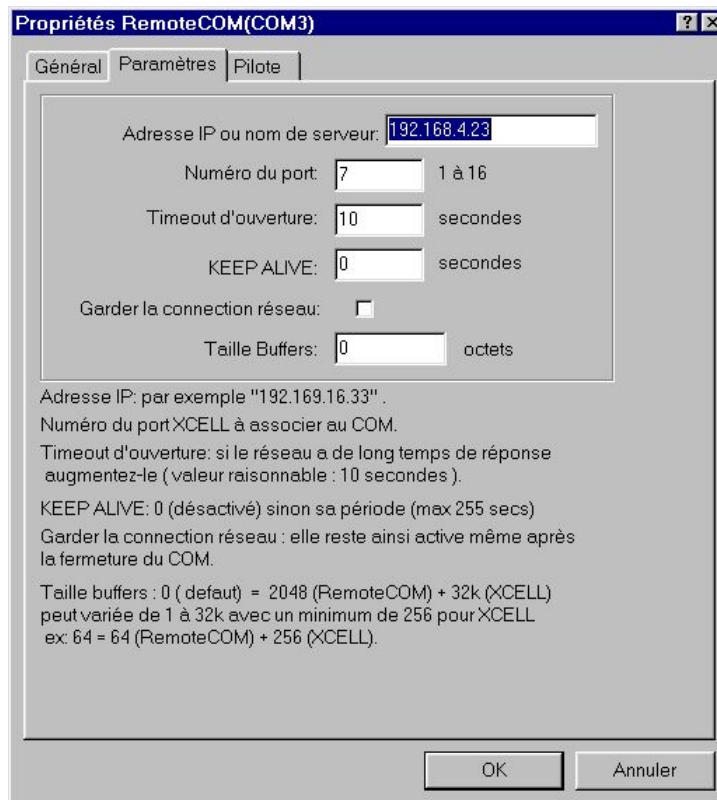
4 - Using RemoteCom.

You can audit RemoteCOM activity using the RemoteCOM application (icon in the task
bar).

ƒ Click on RemoteCOM icon.
ƒ Click on "Status".
ƒ Displaying of connections and associated COM ports.
ƒ Displaying of connections/disconnections and errors (log file).
ƒ Displaying of transmitted/received datas in real time.
ƒ Displaying of active datas.
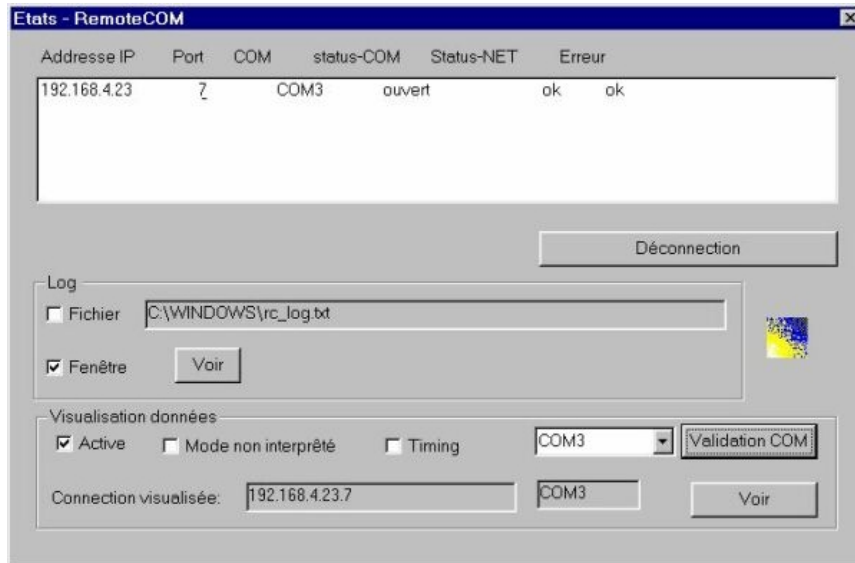
5 - Installing another RemoteCOM port

ƒ Control panel.
ƒ Add new hardware.
ƒ Ask "No" to Windows's automatic detection.
ƒ Click on "Ports(COM & LPT)".
ƒ Choose DECISION EUROPE ->;RemoteCOM(tm).
ƒ Restart your system.
ƒ Return to step 2 Choosing COM port number.

6 - Troubleshooting.

ƒ Check if Xcell is visible on the network. (using ping or telnet).
ƒ Check configuration and state of Xcell's port.
ƒ Read the log file.

V.2.2 - RemoteCOM under Windows NT system

V.2.2.1 - Setting up the XC-31- 310 - 4100

Only flow control parameter must be set on the Xcell.
Configuration example with Telnet console :

First, display current ports configuration :

```
ROOT>> serial show all
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName RtelnetTime0
1    raw  9600  soft     local 8  none 1                2001     0
2    raw  9600  soft     local 8  none 1                2002     0
```

If you want to set hard flow control on ports 1 and 2, enter :

```
ROOT>> serial flowctrl hard 1 2
```

Then, reset ports with new parameters :

```
ROOT>> reset port 1 2
```

Display ports configuration again to see if new parameters are well set :

```
ROOT>> serial show all
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName Rtelnet
Time0
1    raw  9600  hard      local 8  none 1              2001    0
2    raw  9600  hard      local 8  none 1              2002    0
```

Speed, parity, csize and stop bit are send by RemoteCOM to the Xcell.
RemoteCOM transmits DTR signal and recepts states of DCD and DSR signals.

V.2.2.2 - Installation of RemoteCOM driver

RemoteCOM for WINNT is composed of :

ƒ A service module: RemoteCOM(service).
ƒ A driver : RemoteCOM(driver).
ƒ A program for setup, audit and control of RemoteCOM service.

WARNING : Do not mistake RemoteCOM service and RemoteCOM driver (that is also a service). This one is automatically started and stopped by RemoteCOM service.

To install RemoteCOM, click on the "Setup" file of the installation disk/path.

ƒ Restart your system.
ƒ In the "*Start*" menu, click on :
ƒ *Programs ->*; *RemoteCOM ->*; *RemoteCOM Administration*.
ƒ Click on "*Edit*" in the main menu.
ƒ Create : select "*Create*".
ƒ Enter XC's IP address (ex : *192.168.4.23*) , XC's port number (ex : *7*), WINDOWS device (ex : *COM3*) and connection's parameters.
ƒ Change : select "*View&Modify*".
ƒ Delete : select "*Delete*".
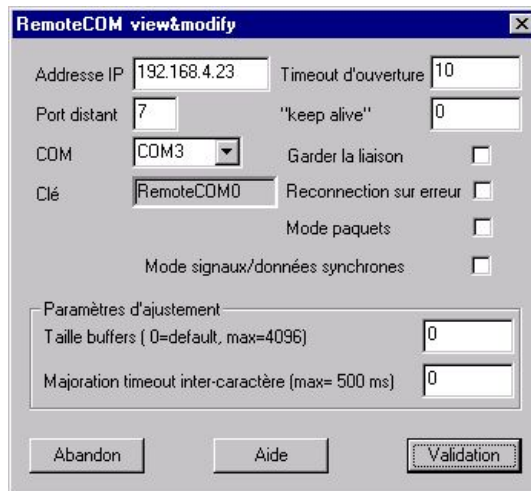
Opening timeout : Default parameter is 10 secondes (rarely modified).
WARNING : You must add some timeouts created by the network. Results of the connection trie can come after the open timeout delay.

Keepalive : Enables you to detect any error on the network link.
0 means that KEEPALIVE is stopped. A too small value uselessly overloads the network (15 seconds is a "good" value).

Keep the connection : The network connection will be established at start of RemoteCOM service. The port will not be used by another station.

Restart connection if error : Automatically restart connection (with a delay of 10 seconds) after a disconnection performed by remote Xcell. RemoteCOM will try to restart connection every 10 seconds.

Packet mode : Synchronise application that is use RemoteCOM with data flow. The "data transmitted"(EV_TXEMPTY in WaitCommEvent()) label is right only when transmitted data have really been send by the remote port.
The "COMSTAT.cbOutQue" field in ClearCommError() is updated in the same way.
Note : With FAX CLASS 1 modem, this mode (used with a buffer size of 128 bytes) make possible reception and transmission of FAX.

Signals/data synchronised mode : Activate this mode to transmit all signals (TX, RX, RTS,CTS,DTR,DSR,DCD) synchronised with data. You must not activate flow control to use this mode.

Buffers size :   1 to 4096 octets
Default size is 2048 (value 0 or 2048).
In some cases, application seems to have send all data but these data are in buffers. If the application stops the connection before all data have been transmitted, you can reduce buffers size to fix this problem.

Overhelming of inter-character timeout : 0 to 500 milliseconds.
The Network cut data into several packets. Then, characters of a same "logical" frame (ex: reply message of a modem) can be divide and received with an higher delay than delay of a standard COM port. If you use inter characters timeout option of windows's COM

ports, you may have to use this option too.

WARNING : Any modification will be effective after a restart of RemoteCOM service. If RemoteCOM service is already running, you must stop and restart it.
In the main menu, click on "Service", then click on "Start" (or "Stop" and "Start").

Note : When you have just finished RemoteCOM installation, RemoteCOM service is disable.
The first time you will restart your system, RemoteCOM will warn you and then you will be able to choose the activation mode of RemoteCOM service.

You can change service activation mode service at any time with WINNT services control panel.

V.2.2.3 - Displaying RemoteCOM service status

Click on Service -> *parameters*

ƒ Select COM port you want display.
ƒ Check log box if you want keep information in a file.
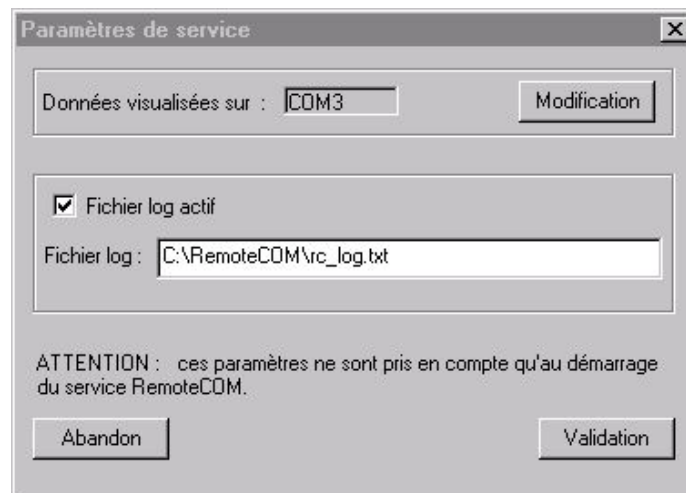
ƒ Be sure that RemoteCOM is not used by any application.
ƒ Click on Service ->*Stop*
ƒ Click on Service ->Start to reset RemoteCOM with new parameters.

Click on Status -> *View in the main menu*
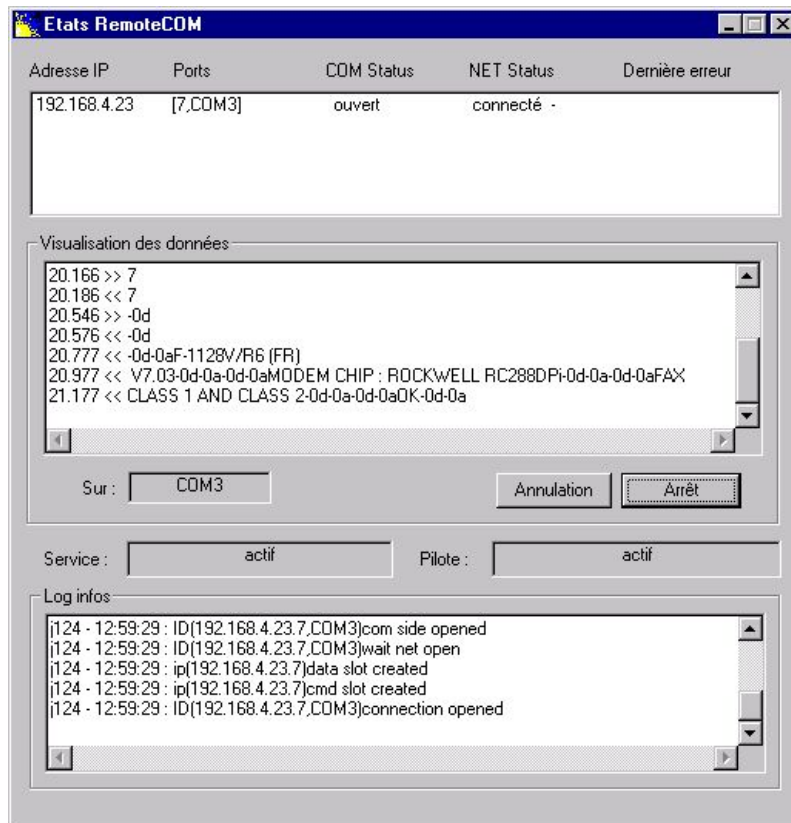
V.3 - Rawtty

V.3.1 - Server configuration

Installation example for a rawTTY device driver on UNIX SCO Open Server :

```
#./install.sh

Xcell rawTTY installation
Xcell IP address ? ? : 192.168.1.42
>;>;192.168.1.42 Ok [RET,ÆOÆ] Non [æNÆ] DEL-exit ? O

PORTS in RAW mode (ex: 1 2 7 (enter) ) ? : 5 6
>;>; ( 5 6 ) Ok [RET,ÆOÆ] Non [æNÆ] DEL-exit ? O

kernel relinking is running (...)

Ok

INFO:
- REBOOT your system to update
- default logins are off
ttys names are : /dev/tag
use the SCO command : enable to active the logins
```

```
ex: enable tag01 tag02 tag07
```

V.3.2 - Setting up the XC

On Xcell, you must setup the corresponding port(s) in "*raw*" mode:

```
ROOT>> serial mode raw  5 6
ROOT>> serial speed 9600  5 6
ROOT>> serial parity none  5 6
ROOT>> serial csize 8  5 6
ROOT>> serial stopb 1  5 6
ROOT>> reset port  5 6
```

V.3.3 - rawtty, rawclose

On a UNIX server, with **rawtty** and **rawclose** commands , you can adjust some parameters of the "Rawtty" function.
WARNING !! These two commands must not be used when the Driver has been installed !
The syntax of the **rawtty** command is :

rawtty [-keepalive <;delay>;] [-v1] [-d] [-u username] [-c] device xcell_IP port_num

Keepalive helps to regularly check Xcell's physical presence on the network.
A request is carried out every <delay>; second(s), to check if the connection is still valid. If there is no answer within this time range, connection is cut down.

ƒ "-*v1*" option enables to use command with Xcell versions previous to the 3.2 version.
ƒ "-*d*" option enables to enter in debug mode.
ƒ "-*u*" option enables to create a device under another user account.
ƒ "-*c*" option enables to cancel created device, (ex: /dev/raw1), at the end of the rawtty process.

Two commands enable to increase or to decrease delay of the connected keepalive :
The first command increase keepalive delay with one second.

```
kill -USR1 pid_rawtty
```

The second decrease keepalive delay with one second.

```
kill -USR2 pid_rawtty
```

Example for a UNIX server:

```
rawtty /dev/raw4  192.168.1.12  5 &
```

The **rawclose** command enables to force to close port declared in "rawtty". Syntax:

```
rawclose server_IP_address   port_number
```

Example :

```
rawclose 192.168.1.12 5
```

VI.Mux mode

VI.1 - Introduction

Mux mode enables you to establish an asynchronous link from end to end through an IP network.

To make this possible, data (composed by characters and changes of signal's states) are separated into packets. These packets are then transmitted, thanks to TCP or UDP transfert's protocols, from one serial port to the other.

VI.2 - TCP Mux

The TCP protocol warrants retransmission of lost or mistaken data and manages packets. This mode must be used in most of the cases.

To configure this connection, you must set the '*client*' port in mux mode and the '*server*' port in raw mode.

VI.3 - UDP Mux

To transmit the data flow that forwards the asynchronous link from one end of the network to the other, we must change this data flow in a characters flow mixed with codes which match with signal's states. Packaging of data and forwarding of an IP network can generate delays between characters and changes of signal states if they are in different packets. It means that out data flow and in data flow can have mismatching chronogrammes. It can disrupt the good running of some serial transmission's protocols like ones used in industrial environment.

Thanks to a measured delay between in data flow and out data flow, UDP mux mode enables most of transmission's protocols to use a connection through an IP network. To configure this connection, you must set both ports in *mux_dg* mode.

VI.4 - Example n°1: Remote management of a PLC by a technician

VI.4.1 - Description

A technician wants to manage a PLC located on a remote TCP/IP network thanks to a terminal (or a terminal emulator).
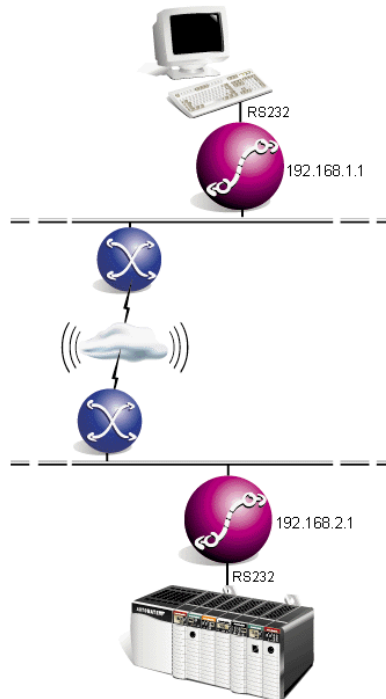
VI.4.2 - Configuration of client's side XC

```
ROOT>> serial mode mux 1
Ok!
ROOT>> mux ip 192.168.2.1 1
Ok!
ROOT>> mux port 1 1
Ok!
ROOT>> mux dsrredirect none 1
Ok!
ROOT>> mux ctsredirect none 1
Ok!
ROOT>> mux show 1
Port Mode Sync Flush KAlive Remote( IP, port)DCD->DSR->CTS->debug
----------------------------------------------------------------------
1    mux  No   Yes   0       192.168.2.1 1    none none none  No

ROOT>> serial show 1
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName RtelnetTimeO
----------------------------------------------------------------------
1    mux  9600  soft     local 8  none 1               2001    0
```

VI.4.3 - Configuration of server's side XC

```
ROOT>> serial mode raw 1
Ok!
ROOT>> mux dsrredirect none 1
Ok!
ROOT>> mux ctsredirect none 1
Ok!
ROOT>> mux show 1
Port Mode Sync Flush KAlive Remote( IP, port)DCD->DSR->CTS->debug
-------------------------------------------------------------------
1    raw  No   Yes   0       0.0.0.0      0     none none none  No

ROOT>> serial show 1
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName RtelnetTimeO
-------------------------------------------------------------------
1    raw  9600  soft     local 8  none 1              2001    0
```

VI.5 - Example n°2: Remote management of a PLC by more than one technician (solution 1)

VI.5.1 - Description

Two technicians each have a terminal and they want to manage, one after the other, a PLC located on a remote TCP/IP network.
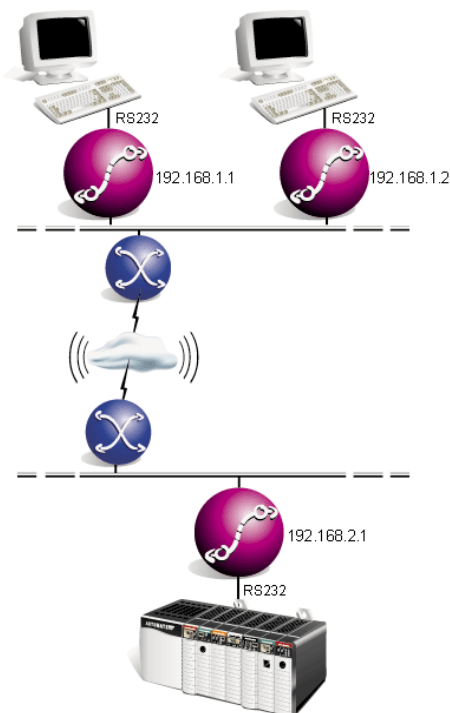
VI.5.2 - Solution

You cannot establish two mux TCP connections to the same destination port at the same time.
To solve this problem, we will establish each mux TCP connection only when technician's terminal will be powered.
The technician must power off his terminal to permit the other technician to manage the PLC.
When a terminal is powered, there is at least one signal activated (RTS for a terminal or DTR for a terminal emulator). You just have to link this signal to serial port's DCD entry of Xcell and to configure management of DCD signal by Xcell (serial linectrl modem). TCP connection will be established only if terminal is powered. This connection will be stopped if DCD signal is not on (terminal is off).
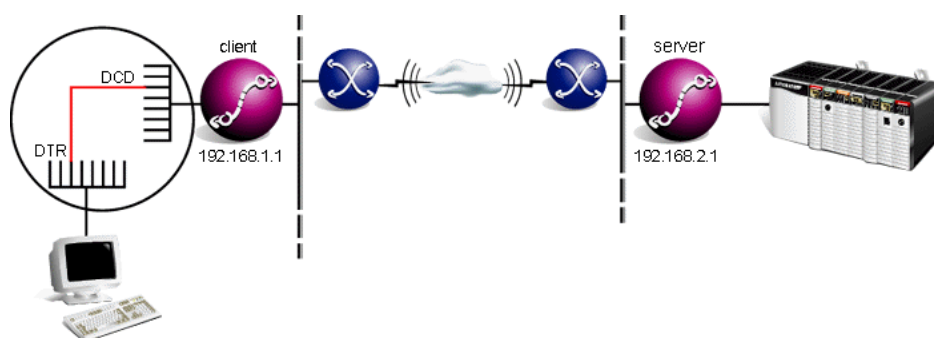
VI.5.3 - Configuration of client's side Xcell

Make a cable with terminal's RTS (or DTR) signal linked on serial port's DCD signal.

```
ROOT>> serial mode mux 1
Ok!
ROOT>> serial linectrl modem 1
Ok!
ROOT>> mux ip 192.168.2.1 1
Ok!
ROOT>> mux port 1 1
Ok!
ROOT>> mux dsrredirect none 1
Ok!
ROOT>> mux ctsredirect none 1
Ok!
ROOT>> mux show 1
Port Mode Sync Flush KAlive Remote( IP, port)DCD->DSR->CTS-> debug
----------------------------------------------------------------
1    mux   No   Yes   0      192.168.2.1 1   none  none none  No

ROOT>> serial show 1
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName RtelnetTimeO
----------------------------------------------------------------
```

```
1    mux  9600  soft      modem 8  none 1              2001    0
```

VI.5.4 - Configuration of server's side Xcell

```
ROOT>> serial mode raw 1
Ok!
ROOT>> mux dsrredirect none 1
Ok!
ROOT>> mux ctsredirect none 1
Ok!
ROOT>> mux show 1
Port Mode Sync Flush KAlive Remote( IP, port)DCD->DSR->CTS->debug
----------------------------------------------------------------
1    raw  No   Yes   0       0.0.0.0     0    none   none  none  No

ROOT>> serial show 1
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName RtelnetTimeO
----------------------------------------------------------------
1    raw  9600  soft     local 8  none 1              2001    0
```

VI.6 - Example n°3: Remote management of a PLC by more than one technician (solution 2)

VI.6.1 - Description
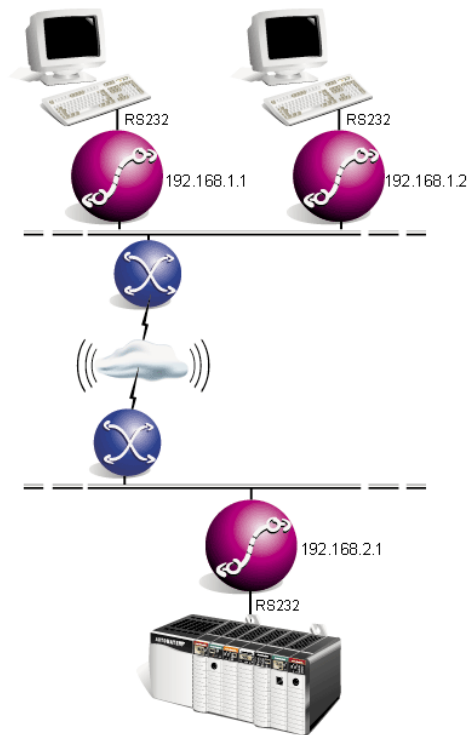
VI.6.2 - Solution

The solution above needs that the technician powers off his terminal to allow another technician to manage the PLC. If the first technician forgets to power off his terminal, the PLC is not reachable for the second technician. Another solution is to automatically break the unused connection after a specified timeout.
Connection will be automatically relaunched when the technician will type any character on his keyboard.

On client's side Xcell :

ƒ Link terminal's DTR signal and DCD signal of serial port n°1(make a cable).
ƒ Activate DTR signal on port n°1 (**mux defaultdtr yes 1**).
ƒ Configure management of DCD signal by Xcell (**serial linectrl modem** 1).
ƒ Configure Xcell to wait a character before launching the connection (**serial quick no** 1).
ƒ Specify the timeout delay of the unused connection (**serial timeout** 180 1).

On server's side Xcell :

ƒ Be sure that DTR signal state on client Xcell will not be changed by DSR signal state of server Xcell (**mux dsrredirect none** 1).
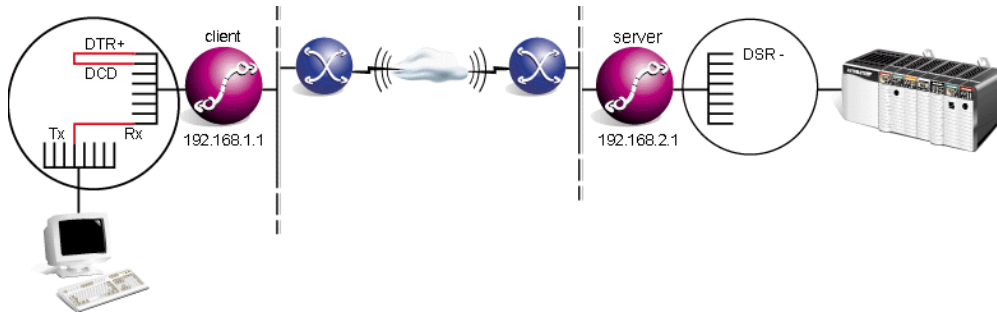
Two conditions must be satisfied to establish the connection :

ƒ **DCD signal on** : DTR is on and is linked to DCD of the serial port, the condition will ever be satisfied. But we must be sure that no change of client XC's DTR signal's state occurs. It is the reason why we stop redirection of DSR signal (mux dsrredirect none 1).
ƒ **Receive a character** : thanks to the serial quick no command, Xcell will wait for a character on its serial port before establishing the connection.

VI.6.3 - Configuration of client's side Xcell

```
ROOT>> serial mode mux 1
Ok!
ROOT>> serial linectrl modem 1
Ok!
ROOT>> serial timeout 180 1
Ok!
ROOT>> serial quick no 1
Ok!
ROOT>> mux defaultdtr yes 1
Ok!
ROOT>> mux ip 192.168.2.1 1
Ok!
ROOT>> mux port 1 1
Ok!
ROOT>> mux dsrredirect none 1
Ok!
ROOT>> mux ctsredirect none 1
Ok!
ROOT>> mux show 1
Port Mode Sync Flush KAlive Remote( IP, port) DCD-> DSR-> CTS->
debug
-----------------------------------------------------------------------
---
1    mux  No   Yes   0      192.168.2.1 1    none   none   none  No

ROOT>> serial show 1
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName RtelnetTimeO
-----------------------------------------------------------------------
1    mux  9600  soft      modem 8  none 1              2001     180
```

### VI.6.4 - Configuration of server side's XC

```
ROOT>> serial mode raw 1
Ok!
ROOT>> mux dsrredirect none 1
Ok!
ROOT>> mux ctsredirect none 1
Ok!
ROOT>> mux show 1
Port Mode Sync Flush KAlive Remote( IP, port) DCD->DSR->CTS->debug
------------------------------------------------------------------
1    raw  No   Yes   0       0.0.0.0     0    none   none  none  No

ROOT>> serial show 1
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName RtelnetTimeO
------------------------------------------------------------------
1    raw  9600  soft      local 8  none 1                2001    0
```

VI.7 - Example n°4: Remote management of a PLC by more than one technician (solution 3)

VI.7.1 - Description
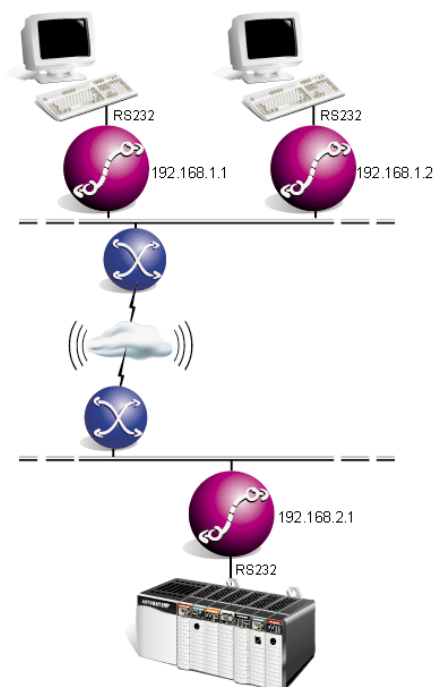
VI.7.2 - Solution

The solution above assign the PLC to a technician for a minimum of 3 minutes, even if his terminal is off.
This solution have all advantages of the two preceeding solutions. Access to the PLC will be assigned to the first technician who will try to establish the connection. If the technician power off his terminal, the PLC will be immediatly accessible to the second technician. One the other hand, if the technician forgets to power off his terminal, the PLC will be accessible to the second technician after 3 minutes.

On client's side Xcell :

ƒ Link DTR (or RTS) signal of the terminal to DSR signal of serial port n°1 (make a cable).
ƒ Enable redirection of DSR signal to DTR signal of server Xcell (**mux dsrredirect dtr** 1).
ƒ Link DTR signal and DCD signal of serial port n°1 (make a cable).
ƒ Activate DTR signal of serial port n°1 (**mux defaultdtr yes** 1).
ƒ Configure management of DCD signal by Xcell (**serial linectrl modem** 1).
ƒ Configure Xcell to wait a character before launching the connection (**serial quick no** 1).
ƒ Specify the timeout delay of the unused connection (**serial timeout** 180 1).

On server's side Xcell :

ƒ Link DTR signal and DSR signal of serial port n°1 (make a cable).
ƒ Activate DTR signal of serial port n°1 (mux defaultdtr yes 1).
ƒ Enable redirection of DSR signal to DTR signal of client Xcell (mux dsrredirect dtr 1).

DSR signals of client and server's Xcell must absolutly be activated at startup. If DSR signal on client's side Xcell is not activated at startup, Xcell can't establish the initial connection.
Moreover, an undetermined DSR signal on server's side Xcell can force client Xcell to break initial connection before this connection can be established.
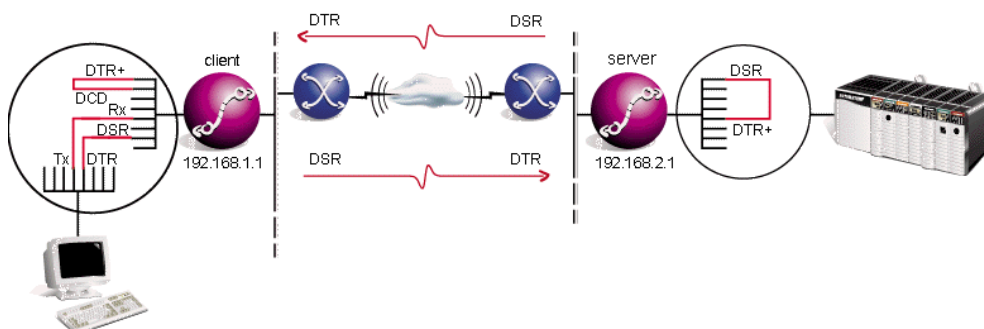
State of DTR (or RTS) signal on the terminal will be applied to DCD on client Xcell. This Xcell will be able to establish or break the connection matching with terminal state (on or off).
Others parameters (**serial quick yes** and **serial timeout 180**) allow to start the

connection only if Xcell is receive a character.

VI.7.3 - Configuration of client's side Xcell

```
ROOT>> serial mode mux 1
Ok!
ROOT>> serial linectrl modem 1
Ok!
ROOT>> serial timeout 180 1
Ok!
ROOT>> mux defaultdtr yes 1
Ok!
ROOT>> mux ip 192.168.2.1 1
Ok!
ROOT>> mux port 1 1
Ok!
ROOT>> mux ctsredirect none 1
Ok!
ROOT>> mux show 1
Port Mode Sync Flush KAlive Remote( IP, port)DCD->DSR->CTS-> debug
--------------------------------------------------------------------
1    mux   No    Yes    0       192.168.2.1 1   none   dtr   none   No

ROOT>> serial show 1
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName RtelnetTimeO
--------------------------------------------------------------------
1    mux   9600  soft       modem 8  none 1                 2001     180
```

VI.7.4 - Configuration of server's side XC

```
ROOT>> serial mode raw 1
Ok!
ROOT>> mux ctsredirect none 1
Ok!
ROOT>> mux defaultdtr yes 1
Ok!
ROOT>> mux show 1
Port Mode Sync Flush KAlive Remote( IP, port)DCD->DSR->CTS->debug
--------------------------------------------------------------------
1    raw   No    Yes    0       0.0.0.0      0    none dtr   none   No

ROOT>> serial show 1
Port Mode Speed FlowCtrl LineC Cs Par. Stop ModemName RtelnetTimeO
--------------------------------------------------------------------
1    raw   9600  soft       local 8  none 1                 2001      0
```

VII.Advanced functions

VII.1 - DHCP

VII.1.1 - Definition

DHCP is a client-server protocol that aimed at a dynamical attribution of the IP addresses to the machines of a network.
At the starting point, each network machine sends a request to the DHCP server and is given an IP address. Xcell integrates a DHCP client that enables it to get an IP address from a DHCP server.
A problem occurs at the networks interconnection: the DHCP requests are frames that do not go through the routers. Consequently, for two connected networks to use the same DHCP server, the router must play the part of a DHCP relay; that is to say that it must pick the DHCP requests up and transmit them back to the DHCP server.

Xcell from the network *192.168.2.0* will transmit the DHCP requests from the two machines back to the DHCP server (*192.168.1.1*). Both interconnected networks can thus use the same DHCP server.

VII.1.2 - DHCP client

Xcell holds a DHCP client function. If a DHCP server is active on your network, Xcell can receive its IP address and many others parameters from the DHCP server. In factory configuration, Xcell boots with the DHCP mode active. The system **dhcp client mode** command enables you to select the running mode of DHCP client.

SYSTEM DHCP MODE <dhcp | bootp | none>

The **bootp** mode enables Xcell to act as a BOOTP client (Bootstrap Protocol). This protocol, which is the predecessor of DHCP protocol, supports less options than DHCP. To deactivate XC's DHCP client, use the **none** option.

Xcell does not know the DHCP server IP address. It broadcast is request on the LAN to join the DHCP server. If you want to specify a particular DHCP server IP address, just use the **system dhcp server** command.
Example :

```
ROOT>> system dhcp server 192.168.10.1
```

If you want to go back to the broadcast method, enter the following command :

```
ROOT>> system dhcp server 255.255.255.255
```

When Xcell is booting (if the DHCP client is active), it sends its DHCP request on the LAN and waits for a reply. If it does not receive a reply after 30 seconds, Xcell assumes that the request fails. Then, Xcell use IP address and other parameters saved in flash memory. To modify the reply timeout, use the **dhcp clent timeout** command.

Example :

```
ROOT>> system dhcp timeout 60
```

WARNING !! To validate DHCP commands, you must save new parameters in flash memory. The next time Xcell will boot, it will use these new parameters.

VII.1.3 - DHCP relay

Xcell holds the function of DHCP relay. To activate this function, you just have to use the **system dhcp relay** command. This syntax command is the following :

DHCP RELAY <server1/server2> <IP adress>
If the IP address of your DHCP server is 192.168.1.1, the following command will activate XC's DHCP relay :

```
ROOT>>dhcp relay server 1 192.168.1.1
```

Note that you can enter IP address of a second DHCP server. In this case, Xcell will retransmit DHCP requests to both servers and will take care of the first reply that it will receive.

To launch the DHCP relay, enter :

```
ROOT>>dhcp relay enable yes
```

To stop the DHCP relay, enter:

```
ROOT>>dhcp relay enable no
```

VIII.Technical specifications

	XC-31	XC-310	XC-4100
LAN ETHERNET			
10 base T	Yes (1)	Yes	Yes
10 base FL Multimode	Yes (1)		
ASYNCHRONOUS			
Numbers of ports	2	4,8	4,8,12,16
RS232C Interface	Yes (1)	Yes (1)	Yes (1)
RS422/485A Interface	Yes (1)	Yes (1)	Yes (1)
Overvoltage	15kV ESD		
Signals	XON / XOFF, RTS / CTS, DTR, DSR, DCD		
Speed	440 kbd		
Cabling	RJ45 (Option DB25M/DB9)		
SECURITY			
Embedded Firewall	Yes	Yes	Yes
Time range	Yes	Yes	Yes
HTTPS SSLV2-V3	Yes (3)	Yes (3)	Yes
Secured Remote COM	SSL V3 - DES 40 ou 56 bits, RC4 40 ou 128 bits, RSA 512 ou 1024 bits		
ADMINISTRATION			
HTTP	Yes	Yes	Yes
SNMP MIBII, MIB Xcell	Yes (2)	Yes (2)	Yes
Java	Yes	Yes	Yes
DHCP client, relay	Yes (2)	Yes (2)	Yes
Telnet Console	Yes	Yes	Yes
Serial ports (I / O)	Yes	Yes	Yes
MISCELLEANEOUS			
Protocols	IP, TCP, UDP, ICMP, ARP, Finger, TFTP, Telnet, RTelnet, DHCP, BOOTP, HTTP, SNMP, Syslog		
RemoteCOM	2	4,8	4,8,12,16
Mux mode	Yes	Yes	Yes

GENERAL			
Memory	8 Mo	16 Mo	
Timer WatchDog	Yes	Yes	Yes
CPU	32 bits - 40 Mhz	32 bits- 133 Mhz	
Size	69*135*27 mm	220*166*31 mm	446*187*44 mm
Power supply	Externe, 100V à 240V - 47 à 63 Hz -13 max		Interne, 85V à 265V - 47 à 68 Hz 30W max
Certifications	EN55022B, CISPR22, EN60950, EN41003, CISPR24		

(1) : Or
(2): Basical version available
(3) : Basical version available without HTTPS

IX.Cabling

IX.1 - RJ45 connector

PIN	Circuit
1	CTS
2	TxD
3	Ground
4	RxD
5	DCD
6	DTR
7	RTS
8	DSR

Figure 8 - RJ45 Front view
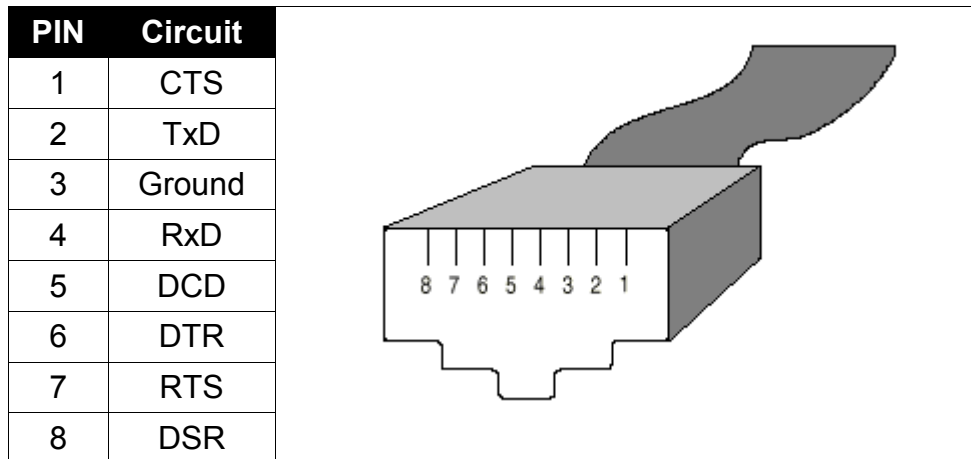
IX.2 - Xcell (DTE) to DTE equipment

With RTS/CTS flow control

DTE	RJ45		DB25	DB9	DTE
RxD	4	←	2	3	TxD
TxD	2	→	3	2	RxD
RTS	7	→	5	8	CTS
CTS	1	←	4	7	RTS
Ground	3	—	7	5	Ground
DSR	8	←	20	4	DTR
DCD	5	←	8	1	DCD
DTR	6	→	6	6	DSR
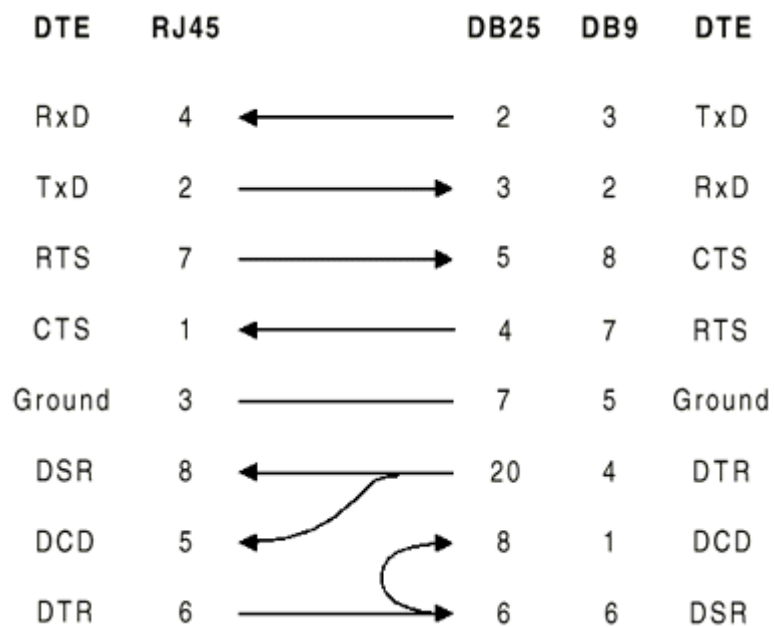
IX.3 - Xcell (DTE) to asynchronous terminal (DTE)

With DTR/DSR flow control

DTE	RJ45		DB25	DB9	DTE
RxD	4	←	2	3	TxD
TxD	2	→	3	2	RxD
RTS	7	→	6	6	DSR
CTS	1	←	20	4	DTR
Ground	3	—	7	5	Ground
DSR	8	←	4	7	RTS
DCD	5	←	8	1	DCD
DTR	6	→	5	8	CTS
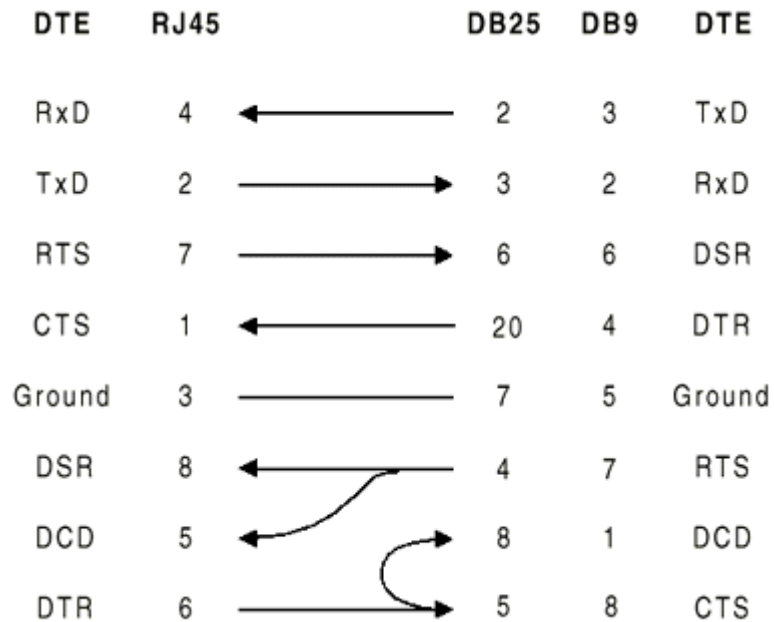
IX.4 - Xcell (DTE) to DCE equipment - RS232C (Modem)

DTE	RJ45		DB25	DB9	DCE
RxD	4	←	3	2	RxD
TxD	2	→	2	3	TxD
RTS	7	→	4	7	RTS
CTS	1	←	5	8	CTS
Ground	3	—	7	5	Ground
DSR	8	←	6	6	DSR
DCD	5	←	8	1	DCD
DTR	6	→	20	4	DTR
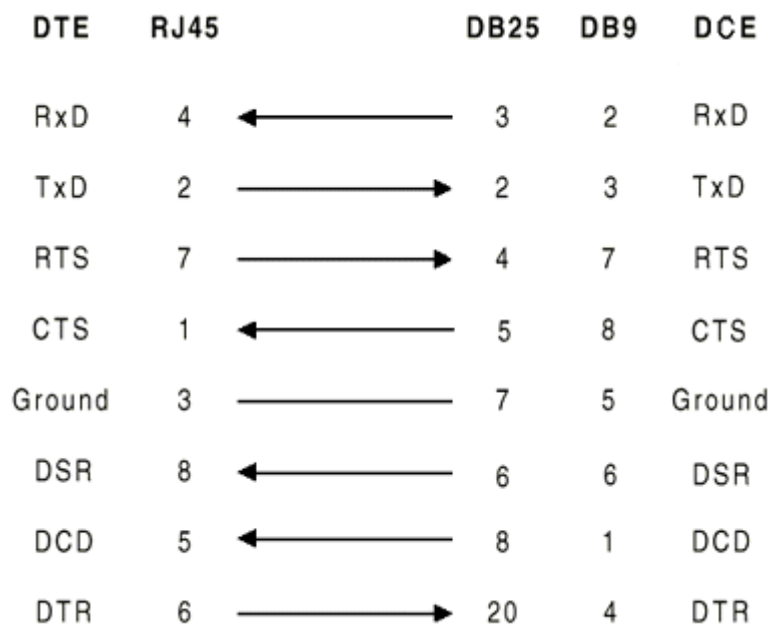
RJ45-DB25 Male - Comx 232 Reference : F00132	Update B
	19/08/98

RJ45 - DB9 Male - Comx 232 Reference : F00142	Update B
	19/08/98

IX.5 - Xcell (DTE) to DCE equipment - RS422A

```
RJ 45                          DB 25 Mâle

Tx+    1  ─────────────────►  2 TxD+   A

Tx-    2  ─────────────────►  14 TxD-  B

Rx+    3  ◄─────────────────  3 RxD+   A

Rx-    6  ◄─────────────────  16 RxD-  B

RTS+   4  ─────────────────►  4 RTS+   A

RTS-   5  ─────────────────►  19 RTS-  B

CTS+   7  ◄─────────────────  5 CTS+   A

CTS-   8  ◄─────────────────  13 CTS-  B

RJ 45
Shell     ─────────────────   1,DB25 Shell Gnd
```
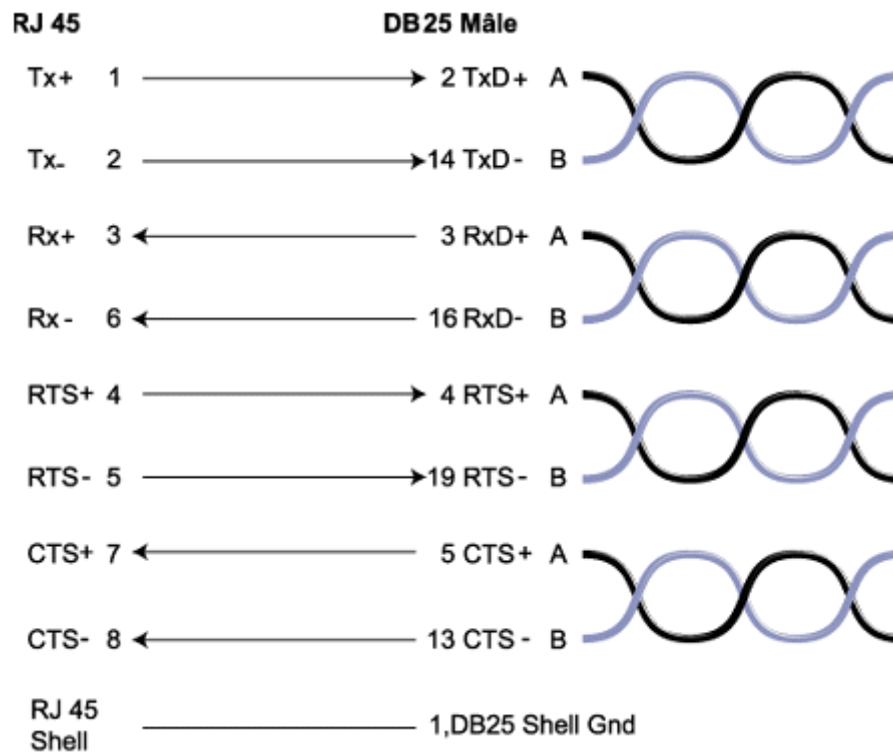
RJ45 - DB25 Male - Comx 422 Reference : F00172	Update C
	28/0699

RJ 45

DB 9 Mâle

Tx+ 1 ────────────→ 8 TxD+ A

Tx- 2 ────────────→ 9 TxD- B

Rx+ 3 ←──────────── 6 RxD+ A

Rx- 6 ←──────────── 7 RxD- B

RTS+ 4 ────────────→ 2 RTS+ A

RTS- 5 ────────────→ 3 RTS- B

CTS+ 7 ←──────────── 4 CRS+ A

CTS- 8 ←──────────── 5 CTS- B

RJ 45
Shell ────────────── 1,DB9 Shell   Gnd
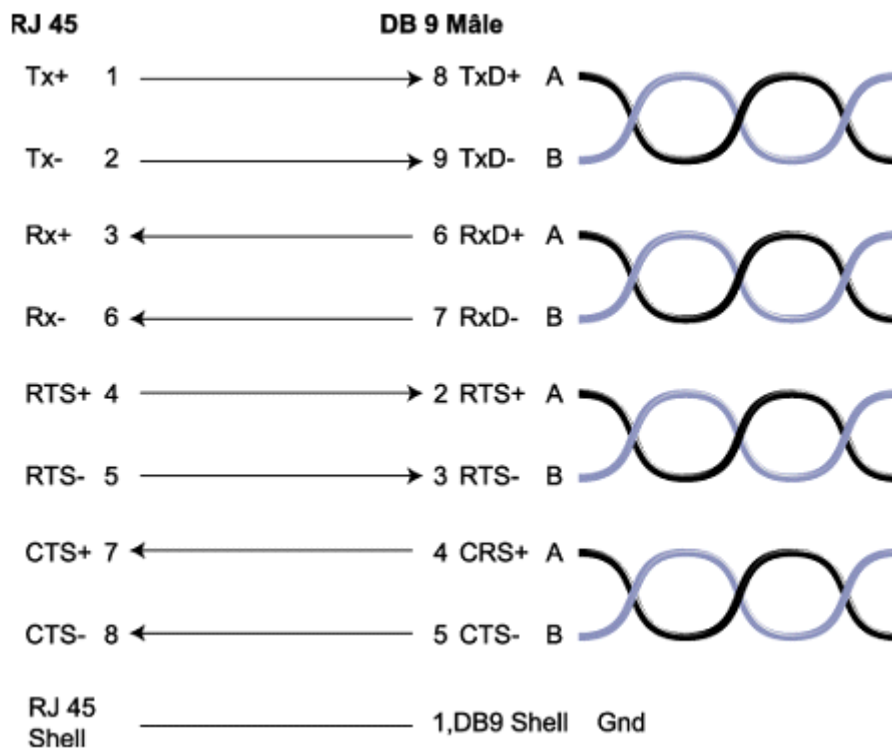
RJ45 - DB9 Male - Comx 422 Reference : F00162	Update C
	28/06/99

IX.6 - Xcell (DTE) to DCE equipment - RS485

RJ 45

DB 9 Mâle

Tx+ 1 ──────┐───────→ 8 TxD+/ RxD+ A

Tx- 2 ────┐─┼───────→ 9 TxD- / RxD- B

Rx+ 3 ←───┼─┘

Rx- 6 ←───┘

RJ 45
Shell ──────────────── 1,DB9 Shell   Gnd
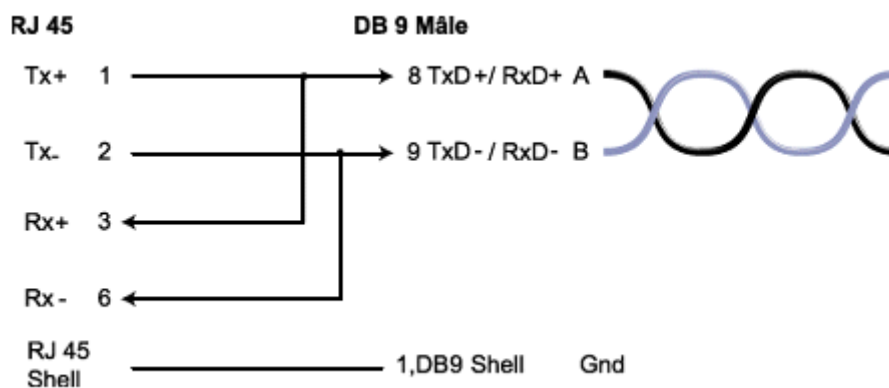
RJ45 - DB9 Male - Comx 485 Reference : F00181	Update A
	02/07/99