

# AXEL Platine Terminal

## AX3000 Models 80WMS

### *USER'S MANUAL*

February 2015 - Ref.: AX3E/1236-WMS-2

The reproduction of this material, in part or whole, is strictly prohibited. For additional information, please contact:

**AXEL**

14 Avenue du Québec  
Bât. K2 EVOLIC - BP 728  
91962 Courtabœuf cedex - FRANCE  
Tel.: 33 1.69.28.27.27  
Fax: 33 1.69.28.82.04  
Email: [info@axel.com](mailto:info@axel.com)

The information related to firmware 1236d in this document is subject to change without notice. AXEL assumes no responsibility for any errors that may appear in this document.

All trademarks and registered trademarks are the property of their respective holders.

© - 2013-2015 - AXEL - All Rights Reserved.

## TABLE OF CONTENT

<b>INTRODUCTION .....</b>	<b>1</b>
<b>1 - INTRODUCTION TO THE AX3000 .....</b>	<b>3</b>
1.1 - ULTRA THIN CLIENT TECHNOLOGY .....	4
<i>No Operating System.....</i>	4
<i>No Embedded Applications.....</i>	4
<i>No Local Management.....</i>	5
1.2 - DESIGNED FOR MULTIPOINT .....	5
<b>2 - INITIAL POWER-ON .....</b>	<b>7</b>
2.1 - MULTIPOINT SET-UP .....	8
2.2 - AUTO-CONFIGURATION .....	9
2.2.1 - <i>Stage 1: Checking the Network .....</i>	10
2.2.2 - <i>Stage 2: Sending DHCP requests .....</i>	10
2.2.3 - <i>Stage 3: Sending requests to AxRM.....</i>	10
a) Determining the TCP port .....	11
b) Determining IP address .....	11
2.2.4 - <i>Stage 4: Receiving the firmware download .....</i>	12
2.2.5 - <i>Stage 5: Receiving the configuration file .....</i>	12
<b>3 - INTERACTIVE SET-UP .....</b>	<b>15</b>
3.1 - SETTING NETWORK ENVIRONMENT .....	17
3.1.1 - <i>General Parameters .....</i>	18
a) The Terminal Name .....	18
b) The Terminal Comment .....	18
3.1.2 - <i>Ethernet Interface .....</i>	19
a) Static or Dynamic IP Address .....	20
b) DNS Protocol .....	21
c) Router Management .....	22
3.1.3 - <i>Server Management .....</i>	23
3.1.4 - <i>SSL Security .....</i>	24
3.2 - GENERAL SETTINGS.....	25
3.2.1 - <i>The Keyboard and the Mouse .....</i>	26
3.2.2 - <i>The Screen .....</i>	27
a) Graphical Environment.....	27
b) Screen Saver .....	28
c) Touch Screen.....	28

3.2.3 - <i>Local Desktop</i> .....	30
a) Theme .....	30
b) TaskBar .....	31
3.2.4 - <i>Audio</i> .....	31
a) Audio Device .....	31
b) Sound Alerts.....	32
3.2.5 - <i>Global RDP</i> .....	32
a) USB Port Redirection .....	32
b) Keyboard Nationality .....	34
3.2.6 - <i>Time Settings</i> .....	34
a) Internal Clock .....	35
b) Time Redirection .....	35
c) Automatic Reboot.....	36
3.2.7 - <i>Terminal Remote Control</i> .....	37
a) Remote Control .....	37
b) Telnet Set-Up .....	37
3.2.8 - <i>Password</i> .....	38
a) Setting the Password .....	38
b) Entering Set-Up.....	38
3.3 - THE MULTIPOINT SESSION .....	39
3.3.1 - <i>Connection Properties</i> .....	40
3.3.2 - <i>Authentication</i> .....	41
3.3.3 - <i>Display Parameters</i> .....	42
3.3.4 - <i>Additional Parameters</i> .....	42
3.3.5 - <i>Redirected Resources</i> .....	43
a) Declaring a Redirected Printer .....	44
b) Declaring a Redirected COM/LPT Port .....	46
c) Redirecting Resources within the RDP session .....	47
3.3.6 - <i>Performance</i> .....	49
3.4 - USB MANAGEMENT .....	51
3.4.1 - <i>Specifications</i> .....	51
3.4.2 - <i>Connecting a USB Keyboard</i> .....	52
3.4.3 - <i>Connecting a USB Barcode Reader</i> .....	52
3.4.4 - <i>Connecting a Mouse</i> .....	52
3.4.5 - <i>Connecting a HUB</i> .....	52
3.4.6 - <i>Connecting a Printer</i> .....	52
a) Logical Port Attachment .....	52
b) Releasing a Logical Port .....	53
3.4.7 - <i>Connecting a USB-RS232 Adaptor</i> .....	54
a) Overview .....	54
b) Configuration.....	55
3.4.8 - <i>Connecting a Mass Storage Device</i> .....	55

3.4.9 - <i>Connecting a USB Audio Device</i> .....	56
3.4.10 - <i>Connecting a Touch Screen</i> .....	57
3.4.11 - <i>Listing Connected USB Devices</i> .....	57
3.5 - <b>PRINTER MANAGEMENT</b> .....	57
3.5.1 - <i>Setting Up the Printer Port</i> .....	57
a) <i>Setting USB Logical Ports</i> .....	57
b) <i>Setting Network Printers</i> .....	58
3.5.2 - <i>RDP redirection</i> .....	58
3.5.3 - <i>LPD Service</i> .....	60
a) <i>Setting-Up the Terminal</i> .....	60
b) <i>Setting-Up the MultiPoint Server</i> .....	60
3.5.4 - <i>'rtty' Service</i> .....	61
a) <i>Setting-up the Terminal</i> .....	61
b) <i>Setting-Up the MultiPoint Server</i> .....	61
3.6 - <b>OTHER FUNCTIONS</b> .....	62
3.6.1 - <i>Tuning</i> .....	62
3.6.2 - <i>Auto-Configuration</i> .....	62
3.6.3 - <i>Factory Settings</i> .....	63
3.6.4 - <i>Local Store</i> .....	63
<b>4 - USING THE AX3000</b> .....	<b>65</b>
4.1 - <b>SWITCHING ON THE AX3000</b> .....	66
4.2 - <b>LOCAL DESKTOP</b> .....	66
4.2.1 - <i>'XP Style' Taskbar</i> .....	67
4.2.2 - <i>'Classical' Taskbar</i> .....	68
4.3 - <b>MULTIPOINT SESSION</b> .....	69
4.3.1 - <i>Creating a Session</i> .....	69
4.3.2 - <i>Authenticating</i> .....	70
4.3.3 - <i>Checking the SSL Certificate</i> .....	70
4.3.4 - <i>Closing the Session</i> .....	71
4.3.5 - <i>USB Port Redirection</i> .....	71
4.4 - <b>SPECIAL FEATURES</b> .....	72
4.4.1 - <i>Getting Session Information</i> .....	72
4.4.2 - <i>Locking the Screen</i> .....	73
4.4.3 - <i>USB Port Redirection Function</i> .....	74
4.5 - <b>REBOOTING OR TURNING OFF THE AX3000</b> .....	75
4.6 - <b>AX3000 HOT-KEYS</b> .....	76
<b>5 - ADMINISTRATION</b> .....	<b>77</b>
5.1 - <b>LOCAL ADMINISTRATION</b> .....	78
5.1.1 - <i>Handling a Configuration File with a Memstick</i> .....	78
a) <i>Obtaining and Storing the Configuration File</i> .....	78

b) Send a Configuration File to the Terminal.....	79
5.1.2 - <i>Updating the Firmware</i> .....	80
a) From a MemStick.....	80
b) With bootp/tftp Protocols.....	81
5.1.3 - <i>The Ping Command</i> .....	81
5.1.4 - <i>Connection Management</i> .....	81
a) Global Connection List.....	82
b) "TCP Server" and "TCP Client" Connection Information.....	83
5.1.5 - <i>Ethernet Interface Management</i> .....	85
a) State.....	85
b) DHCP/DNS.....	86
c) Statistic.....	87
5.1.6 - <i>USB Statistics</i> .....	88
5.2 - REMOTE ADMINISTRATION.....	89
5.2.1 - <i>AxRM: The Axel Management Software</i> .....	89
5.2.2 - <i>VNC Remote Control</i> .....	90
5.2.3 - <i>Interactive Telnet Set-Up</i> .....	90
5.2.4 - <i>Batch Remote Set-Up</i> .....	91
a) Header.....	92
b) Substitution Commands.....	92
b) End of File.....	93
<b>APPENDIX</b> .....	<b>95</b>
A.1 - USING THE INTERACTIVE SET-UP.....	96
A.1.1 - <i>Entering the Set-Up</i> .....	96
A.1.2 - <i>Navigation</i> .....	96
a) The Horizontal General Menu.....	97
b) Vertical Menus.....	97
c) Dialog Boxes.....	98
A.1.3 - <i>Enter Data</i> .....	98
A.1.4 - <i>Special Notation</i> .....	99
A.1.5 - <i>Exiting the set-up</i> .....	99
A.2 - NETWORK OVERVIEW.....	99
A.2.1 - <i>Ethernet Addresses</i> .....	99
A.2.2 - <i>IP Address</i> .....	100
A.2.3 - <i>Router</i> .....	100
A.3 - THE DHCP PROTOCOL.....	103
A.3.1 - <i>Overview</i> .....	104
A.3.2 - <i>Setting-Up the AX3000</i> .....	104
A.3.3 - <i>Using the AX3000</i> .....	104
A.3.4 - <i>Errors</i> .....	105
a) Boot Time Failure.....	105

b) Re-negotiation Failure.....	105
A.4 - THE DNS PROTOCOL.....	106
A.4.1 - Overview .....	106
A.4.2 - Resolving a Name.....	107
a) Resolution Strategy.....	107
b) Resolution Method .....	108
c) Messages Displayed on the AX3000 Screen .....	110
A.4.3 - Publishing the Terminal Name .....	111
a) By the DHCP Server .....	111
b) By the terminal .....	111
A.5 - SETTING-UP AXEL DHCP OPTIONS .....	112
A.5.1 - Overview .....	113
A.5.2 - Adding an Axel option with the Microsoft DHCP Server.....	113
A.5.3 - 'axrmserv' option: auto-configuration.....	114
A.6 - GOING FURTHER.....	115
A.6.1 - Reload Factory Settings.....	115
A.6.2 - General Level: Advanced Parameters .....	116
a) Network Menu .....	116
b) Keyboard/Screen Menu .....	117
c) Mass Storage Devices Menu.....	117
A.6.3 - Session Level: Enhanced Parameters .....	118
a) The 'TCP port' Parameter .....	119
b) The 'mss' and 'Window' Parameters.....	119
c) The 'Time to Live' Parameter .....	119
d) The 'TCP port Assignment' Parameter .....	119
e) The 'Nagle's Algorithm' Parameter .....	120
f) The 'Keepalive' Parameter.....	120
g) 'Additional Time-Out for Reconnection (sec)' Parameter.....	121
A.6.4 - Setting the IP Address by a PING Command .....	121
A.6.5 - RDP Sessions: Microsoft Keyboard Codes.....	122
A.7 - HARDWARE AND FIRMWARE INFORMATION .....	124
A.7.1 - Hardware Information.....	124
A.7.2 - Firmware Information .....	125





# INTRODUCTION

This manual provides details on terminal operation, maintenance and set-up.

The manual is organized into the following chapters and appendices:

Chapter 1: Introduction to the AX3000

Chapter 2: First Boot Time

Chapter 3: Interactive set-up

Chapter 4: Using the AX3000

Chapter 5: Remote Administration

Appendices:

The following appendices give more detailed information:

- A.1 - Using the AX3000 interactive set-up
- A.2 - Network overview (Ethernet address, IP address and routers)
- A.3 - DHCP protocol
- A.4 - DNS protocol
- A.5 - Axel DHCP Option
- A.6 - Going further...
- A.7 - Hardware and firmware information

**- 1 -**

**INTRODUCTION TO THE AX3000**

*This chapter introduces the main features of AXEL Thin Clients.*

## **1.1 - ULTRA THIN CLIENT TECHNOLOGY**

The main benefits of "Ultra Thin Client" technology are:

### **No Operating System**

The innovative Ultra Thin Client technology from Axel uses ALL the hardware resources for specific thin-client functions and not simply to host an operating system. These functions are:

- Screen refresh/resolution performance
- High robustness and availability
- No memory fragmentation
- Totally virus proof
- Instant boot

### **No Embedded Applications**

Embedded applications in a terminal are a source of problems, consider the following:

- Application of regular security upgrades and patches
- Support and tracking of successive versions of applications
- After an upgrade more memory may be required to run new version
- Integrity of functionality: ie two 'identical' terminals may behave very differently depending on installed applications and their versions.

**No Local Management**

By not having an operating system the set up is massively simplified.

- No file system or registry,
- No management of user accounts,
- New parameter settings are effective immediately (i.e. no need for reboot),
- No backup or restore file issues (in the event of reversing a failed software upgrade).

Despite its advanced technology the Axel terminal is managed like a traditional terminal. The set-up is designed to be equally accessible from the terminal or remotely over the network (by telnet or VNC).

**1.2 - DESIGNED FOR MULTIPOINT**

The AX3000 model 80WMS had been designed to be used with a MultiPoint Server. A unique quick configuration mode allows the thin client to install itself with no human interaction required at all!

Settings can be manually customized either from the terminal or remotely.



**- 2 -**  
**INITIAL POWER-ON**

*This chapter describes the 'MultiPoint Set-Up' feature and the 'Auto-Configuration' service.*

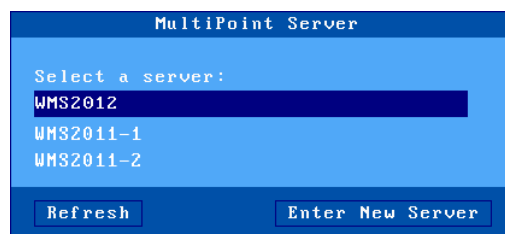
When the terminal is switched on up for the very first time two configuration methods are available:

- **MultiPoint Set-Up**: a unique dialog box allows the terminal to be set-up in few seconds for typical use.
- **Auto-Configuration**: used in conjunction with AxRM, this function allows the terminal to automatically receive new firmware and/or a configuration.

At any time pressing **<Ctrl><Alt><Esc>** will enter MultiPoint Set-Up. Pressing a second time **<Ctrl><Alt><Esc>** will enter Terminal Set-Up.

## 2.1 - MULTIPPOINT SET-UP

The 'MultiPoint' set-up is a unique Axel feature. This allows the Axel thin client to be configured by selecting the name of the MultiPoint server from a list. For example:



**Note 1:** To build this list, an IP address (given by a DHCP server) is needed.



**Note 2:** this list contains MultiPoint server names who responded in less than 3 seconds to multicast requests sent on UDP port 3702. An empty list may indicate no server is installed on the same subnet as the thin client or requests are blocked by a firewall.

The [Refresh] button allows the list to be built again. The delay to collect data is now 5 seconds.

The [Enter New Server] button allows the server name (or IP address) to be manually entered.

Confirming this box configures the thin client with a dynamic IP address (obtained by DHCP) and an RDP session with a high user experience (32bpp, audio, theme...).

**Note:** to enter the full interactive set-up (see Chapter 3) press <Ctrl><Alt><Esc> instead of confirming this dialog box.

## 2.2 - AUTO-CONFIGURATION

The Auto-Configuration feature allows a brand new 'out of the box' terminal to be sent a specific firmware and/or configuration file without any human intervention. There are also options to specify various terminal specific parameters, for example an IP address and terminal name etc.

For more information on AxRM's activity in the auto-configuration process, see the manual "Axel Remote Management - Version 3", available from [www.axel.com](http://www.axel.com).

The auto-configuration process:

- Is automatically initiated when power is applied to a brand new terminal or if the terminal is reset to factory defaults - see A.10.1 appendix.
- may be started at each boot time. For more information see Chapter 3.6.2.

The stages are:

- Checking the network (link),

- DHCP request sent to obtain a terminal IP address and other parameters (optional),
  - Terminal contacts the AxRM server,
  - Firmware file sent (if required), followed by a reboot,
  - Configuration file sent, followed by a reboot.
- (Total process takes less than two minutes)

### **2.2.1 - Stage 1: Checking the Network**

When the terminal is powered up the network connection is tested. The terminal displays 'Checking Network Link'. If a network connection is detected, a message 'Auto-Conf' is shown. The terminal passes to stage 2.

```
Auto-conf.
```

### **2.2.2 - Stage 2: Sending DHCP requests**

To obtain an IP address (and possibly of other parameters) a DHCP request is sent. If a DHCP server is available its IP address is shown in the status line:

```
Auto-conf. / DHCP: aaa.bbb.ccc.ddd /
```

The terminal passes to stage 3

### **2.2.3 - Stage 3: Sending requests to AxRM**

After obtaining an IP address via DHCP negotiation the terminal must start communicating with the AxRM server.

This presents a challenge because the terminal must determine both the IP address and the TCP port of the AxRM server.

The recommended way is to configure the DHCP server to send this information in addition to the AX3000 IP address. This information (IP address and port) can easily be entered into the DHCP server by using the vendor ID fields. "Axel DHCP option".

For more information about "Axel DHCP option" please consult the Appendix A.6.

**a) Determining the TCP port**

If DHCP sends a port number this is used.

If no value is received a default value of port 80 is used.

**b) Determining IP address**

Method 1:

If the IP address or DNS name is given by the DHCP server (through Axel DHCP option) then this is the information the terminal uses to locate the AxRM server.

Method 2:

If DHCP does not supply these values the terminal will try to resolve a 'hardwired' DNS name "axrmserv".

If the name is resolved the terminal can find the AxRM server. The name axrmserv must be configured within DNS to resolve to the IP address of the AxRM PC. A DNS alias can be used to allow the AxRM PC to have two names, i.e. its original name AND axrmserv.

Method 3:

If "axrmserv" cannot be resolved, as a final attempt the terminal assumes AxRM resides on the same PC as the DHCP server.

Method 4:

Only used when the location (IP address or name) and the TCP port of the AxRM machine are specified within the AX3000 Set-Up. See Chapter 3.6.2. (This is not viable for setting up brand new terminals, as required AxRM PC data to be already entered in the terminal setup)

The IP address of the AxRM server and the location method used is shown on the status line:

```
Auto-Conf. / DHCP: aaa.bbb.ccc.ddd / AxRM (1): www.xxx.yyy.zzz:nnnn.....
```

The terminal sends an 'auto-configuration' request to AxRM every 5 seconds. If no response is received after 10 attempts the terminal starts the mechanism again, i.e. from stage 1.

This loop stops when either AxRM responds or if a user presses any key on the keyboard, causing the normal interactive quick setup to run.

#### **2.2.4 - Stage 4: Receiving the firmware download**

A dialog box on the terminal screen provides the status. From this stage the mechanism cannot be aborted.

Note that firmware downloading may not have been specified by AxRM, in which case the procedure passes directly to stage 5.

The dialog box is as shown:

```

Auto-Configuration
Network Detection ..... 100BT FullDuplex
IP Address ..... 192.168.1.200
DHCP Server ..... 192.168.1.165
AxRM Server ..... 192.168.1.12:8080
Firmware Update ..... in progress
Config Update .....
Reboot .....
Auto-Conf. / DHCP : 192.168.1.165 / AxRM (1) : 192.168.1.12:8081...

```

After having received the firmware the terminal reboots automatically and re-runs stages 1, 2 and 3 before passing on to stage 5.

#### **2.2.5 - Stage 5: Receiving the configuration file**

This is the dialog box shown when receiving the configuration file:

```

Auto-Configuration
Network Detection ..... 100BT FullDuplex
IP Address ..... 192.168.1.200
DHCP Server ..... 192.168.1.165
AxRM Server ..... 192.168.1.12:8080
Firmware Update ..... TCP.XX.1236b.3TD
Config Update ..... in progress
Reboot .....
Auto-Conf. / DHCP : 192.168.1.165 / AxRM (1) : 192.168.1.12:8081...

```

**Note:** if the firmware is updated the new version is displayed. After the configuration file is received the terminal reboots:

```
Auto-Configuration
Network Detection ..... 100BT FullDuplex
IP Address ..... 192.168.1.200
DHCP Server ..... 192.168.1.165
AxRM Server ..... 192.168.1.12:8080
Firmware Update ..... TCP.XX.1236b.3TD
Config Update ..... OK
Reboot ..... in progress

Auto-Conf. / DHCP : 192.168.1.165 / AxRM (1) : 192.168.1.12:8081...
```

The terminal is now ready for use.



**- 3 -**  
**INTERACTIVE SET-UP**

*This chapter describes AX3000 installation using the interactive set-up procedure.*

The following can be used to enter the AX3000 interactive set-up:

- Pressing <Ctrl><Alt><Esc> twice from the terminal
- Using Remote Control from AxRM. (See Chapters 5.2.1 and 5.2.2)
- Using Telnet from another terminal/PC. (See Chapter 5.2.3)

**Note:** the set-up can be password-protected, in which case the password must be entered to access the quick set-up dialog box. For more information, see Chapter 3.2.7.

**Note:** the following keystrokes are available in the set-up (for more information see Appendix A.1):

- <Enter>: if the current field is a button perform a click. Else jump to the 'default' button of the box ([OK], [Next]...)
- <Spacebar>: click button, toggle yes/no and open a list
- <Esc>: cancel current field or select [Cancel] button
- <Tab> or <↓>: next field
- <Shift><Tab> or <↑>: previous field



### 3.1 - SETTING NETWORK ENVIRONMENT

The network settings are available through the **[Configuration]-[Network]** menu:

Configuration	Diagnostics	Upgrade
Network	>	General Parameters
Terminal	>	Ethernet Interface >
Multipoint Session		Servers
Ports	>	SSL Security
-----		
Advanced	>	
-----		
Exit		

This chapter covers the AX3000 network configuration:

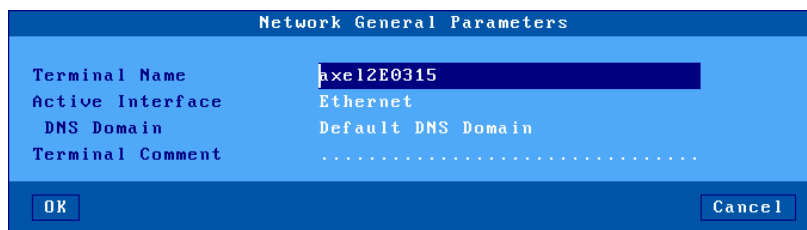
- **General Parameters:** the terminal identification and the interface activation
- **Ethernet Interface:** static or dynamic IP address, DNS protocol and router management
- **Servers:** manages the server list.
- **SSL Security:** tune the SSL certificate verification.

**Note:** more information is given in the following appendices:

- Appendix A.2: Ethernet addresses, IP addresses, net masks and routers,
- Appendix A.3: DHCP protocol,
- Appendix A.4: DNS protocol.

### 3.1.1 - General Parameters

To set the AX3000 interface and the terminal identification select the **[Configuration]-[Network]-[General Parameters]** menu. The dialog box below is displayed:



Network General Parameters	
Terminal Name	axel2E0315
Active Interface	Ethernet
DNS Domain	Default DNS Domain
Terminal Comment	.....

#### a) The Terminal Name

A terminal name is mandatory – though need not be used. By default the terminal name is set to 'axel' suffixed by the last part of the MAC Ethernet address. For example 'axel200002'. This ensures all terminals have a unique default name.

The same name is given to the default connection name for RDP or ICA connections, though this can be changed.

If the terminal name is to be used as a DNS name (i.e. registered to a DNS server) an extension is required. This extension is called "DNS domain". For example 'paris.axel.fr'.

Registering an entry with the DNS server requires an FQDN. (Fully Qualified Domain Name) If the "DNS Domain" parameter is empty, the "Default DNS Domain" (supplied by the DHCP server) will be used. If "Default DNS Domain" is empty, the name won't be registered.

The name registration can be performed by the DHCP server or by the terminal itself. For more information see the next chapter and the appendix A.4.3.

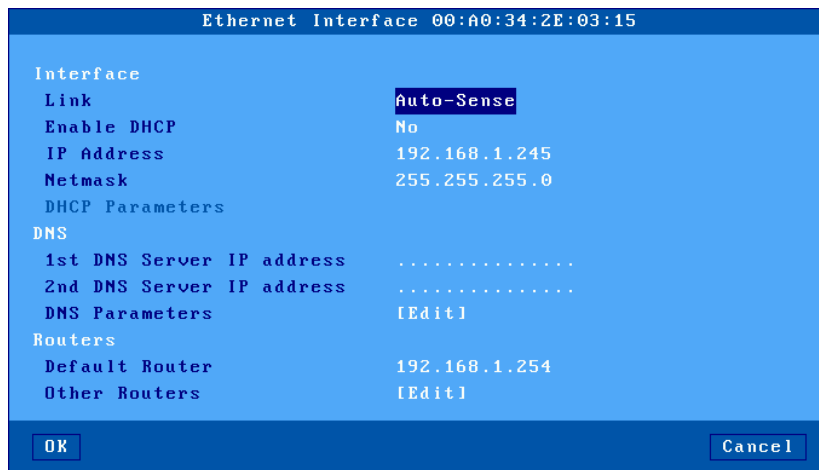
#### b) The Terminal Comment

This character string allows a terminal description to be entered. This

description will be obtained by the Axel Remote Management software (AxRM) during the 'discover' operation. This comment will allow the terminal to be easily located within the database.

**3.1.2 - Ethernet Interface**

To set the Ethernet interface properties select the **[Configuration]-[Network]-[Ethernet Interface]-[IP Parameters]** menu. The dialog box below is displayed:



**Note:** the Ethernet address is displayed as the title box

The "**Link**" parameter is set by default as auto-sense. Available modes are:

- Auto-sense,
- 10BT HalfDuplex,
- 10BT FullDuplex,
- 100BT HalfDuplex,
- 100BT FullDuplex.

The next sub-chapters deal with:

- The interface setting (static or dynamic IP address)
- The DNS protocol.
- The router management,

#### **a) Static or Dynamic IP Address**

The DHCP protocol allows the terminal's IP address (and other parameters) to be obtained at the boot time.

When "**Enable DHCP**" is set to "**Yes**", the **IP Address**' field is not available and the DHCP settings are set through the "**DHCP Parameters**" option. Press <Space> to display the dialog box:

DHCP Parameters	
DHCP Option List	
Netmask	Yes
Default Router	Yes
DNS Server	Yes
Default DNS Domain	Yes
NTP Server	Yes
Other Parameters	
Lease Time (minutes)	720
Release IP addr. when shutdown	Yes
Client Identifier	.....
User Class Identifier	.....
Trace Mode	No
Check IP address	No

The DHCP Option List allows certain parameters to be automatically assigned by DHCP.

Other parameters are:

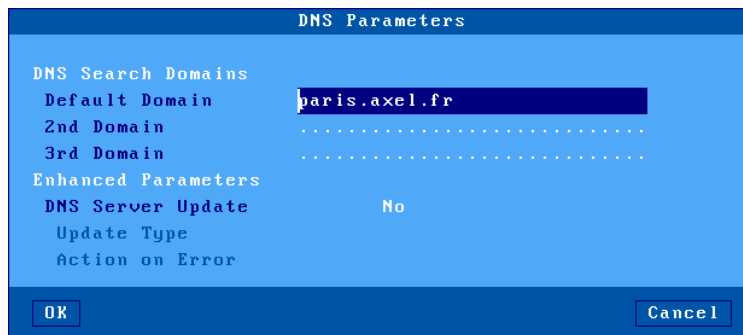
- **Lease Time (minutes):** lease time value requested by the AX3000 from the DHCP server. Depending on the DHCP server settings this parameter may be ignored. The AX3000 automatically renews the lease when it expires.
- **Free IP address when shutdown:** by default when the terminal is shutdown a command to release the IP address is sent to the DHCP server. Set this option to 'no' to change that.
- **Client Identifier:** allows the terminal to be identified not only by the Ethernet address (useful to control IP address assignment). (VINCENT – I don't understand this but it doesn't sound right)
- **User Class Identifier:** allows the DHCP server to assign settings in regards of a class of device.
- **Trace Mode:** in the event of problems this mode allows the data exchanged between the AX3000 and the DHCP server to be displayed on the screen. The trace data is displayed directly on the AX3000 screen (i.e. messages may 'pollute' the AX3000 display at any time).
- **Check IP Address:** the AX3000 checks its allocated IP address is not already in use.

#### ***b) DNS Protocol***

To resolve a name, the AX3000 sends DNS requests to a DNS server. The IP address of this DNS server must be known. The AX3000 set-up procedure allows two DNS servers to be entered.

**Note:** if 'DNS Servers' is selected the "DHCP Option List" these two parameters are supplied by DHCP and cannot be accessed here.

Other DNS settings are available through the "DNS Parameters" option. The dialog box below is displayed:



Parameters are:

- **DNS Search Domains:** a DNS domain is used to resolve a server name or to register the terminal name (see Appendix A.4).  
**Note:** if the 'Default DNS Domain' is selected in the "DHCP Option List", the 'Default Domain' parameter cannot be accessed.
- **DNS Server Update:** sets the method used for publishing the terminal name:
  - **No:** the terminal name is not published.
  - **By the DHCP server** (available only if the DHCP protocol is enabled): the terminal name is registered by the DHCP server. Requirement: the DDNS function (Dynamic DNS) must be supported by the DHCP server. See Appendix A.4.3.
  - **By the terminal:** the terminal updates the DNS server. In this case the parameter "Action on Error" controls the terminal's behavior in the event of an error during the DNS server update (see Appendix A.4.3).

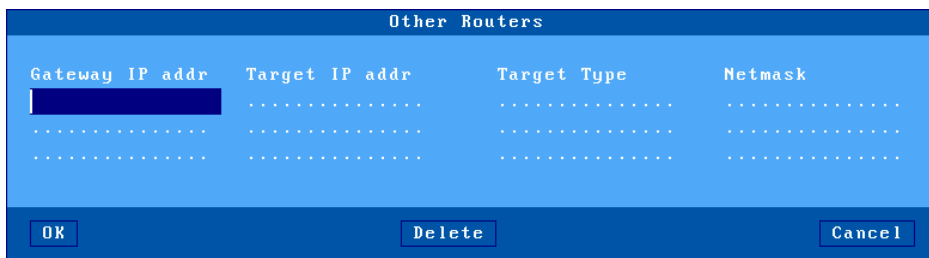
### **c) Router Management**

A router is either a special electronic device, or a suitably configured computer, which enables data to be sent across two or more distinct physical networks.

One router can be nominated as the 'default router' and then used to access any network. Use of a default router simplifies site network administration. The default router is only identified by its IP address.

**Note:** If the 'Default Router' is selected in the "DHCP Option List", this field cannot be accessed.

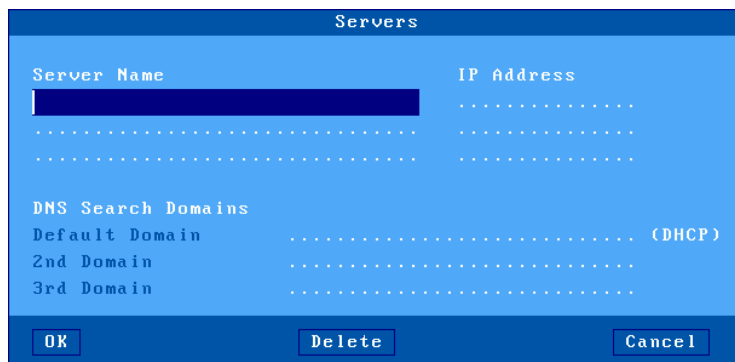
However additional routers can also be declared, to reach specific destination servers or networks. Select 'Other Routers'. The following dialog box is displayed:



- Any such router must be identified with 3 parameters:
- The router's IP address,
  - The target IP address (destination),
  - The target type: server or network (in this last case, a netmask allows sub-netting)

**3.1.3 - Server Management**

To configure the server table, select the **[Configuration]-[Network]-[Servers]** menu. A dialog box as shown below is displayed:



The server definition depends on whether DNS is enabled:

- **No DNS:** a server is identified by both an alphanumeric character string beginning with a letter AND an IP address.
- **With DNS:** a server is defined only by its name. This name can be either a full name (wms2011.servers.axel.com) or an incomplete name (wms2011). Its IP address is resolved later. (See Appendix A.4)

**Add a Server:** move the highlight cursor to a vacant line and enter the name and either its IP address or DNS name.

**Delete a Server:** select the server and press [Delete].

**Change a Server:** move the highlight cursor over the name or IP address of the server and enter the new value.

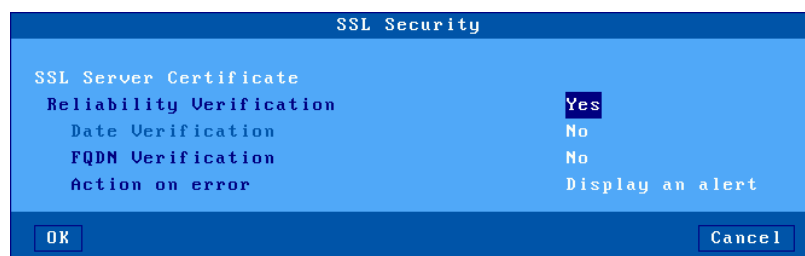
**Note:** the default DNS domains, previously defined through the DNS box are displayed for information (they can not be modified).

### **3.1.4 - SSL Security**

When an SSL connection is established it is advisable to check the server certificate.

This requires a CA certificate to be installed in the AX3000 Local Store. See Chapter 3.6.4.

To configure the terminal SSL security policy, select the **[Configuration]-[Network]-[SSL Security]** menu. A dialog box as shown below is displayed:



The '**Reliability Verification**' option forces the server certificate to be checked



against the terminal's local CA certificates when an SSL connection is established. (HTTPS or NLA). For this check to be possible there must be at least one CA certificate stored in the terminal's local store (see chapter 3.6.4). A check is made between the terminal's local CA certificates and the server's certificate.

With this setting enabled there are two further optional checks.

- **Date Verification** (requires an NTP time server to be configured - See Chapter 3.2.6): A check is made to confirm the connection request is initiated between the 'Valid After' and 'Valid Before' dates of the server certificate.
- **FQDN Verification**: A check is made against the server's FQDN or IP address as given in the certificate's 'Common Name' parameter

The "Action on Error" option sets the terminal's behavior when an SSL non-compliant situation is met (See Chapter 4.3.3).

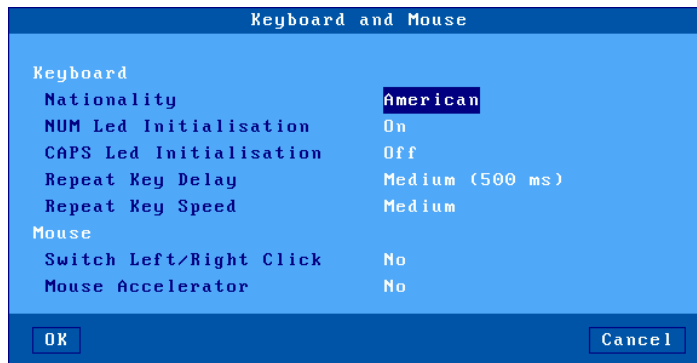
### 3.2 - GENERAL SETTINGS

The terminal general settings are available through the **[Configuration]-[Terminal]** menu:

Configuration	Diagnostics	Upgrade
Network	>	
Terminal	>	Keyboard/Mouse
Multipoint Session		Screen
Ports	>	Local Desktop
-----		Audio
Advanced	>	Global RDP
-----		Time Settings
Exit		Remote Control
		Password

### 3.2.1 - The Keyboard and the Mouse

Select the **[Configuration]-[Terminal]-[Keyboard/Mouse]** menu:



Keyboard parameters (PS/2 or USB):

- **Nationality**: select the nationality from a list
- **'NUM' Led Initialization**: this led lights when the AX3000 is switched on
- **'CAPS' Led Initialization**: this led lights when the AX3000 is switched on
- **Repeat Key Delay**: sets the duration of a key being held down before it starts to auto-repeat (values: no, low, medium or high).
- **Repeat Key Speed** (enabled only if the automatic repeat is set): select the automatic repeat speed when a key is held down (values: low, medium or high).

Mouse parameters (PS/2 or USB):

- **Switch Left/Right Click**: mouse button reversal
- **Mouse Accelerator**: can be helpful with wide screens.

### 3.2.2 - The Screen

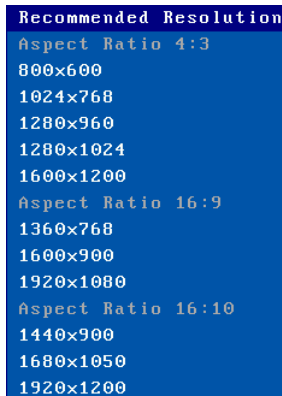
Select the **[Configuration]-[Terminal]-[Screen]** menu:



#### a) Graphical Environment

Parameters are:

- **Resolution:** the default value of the monitor is automatically detected and used, although this can be overridden:



- **Orientations:** possible values are 'Landscape', 'Portrait (Flipped)' and 'Portrait'. Depending on the resolution and the number of colors, these 2 last values may be not available.
- **Colors:** available values are 16bpp, 24bpp and 32bpp.
- **Monitor Information:** this dialog box gives information about the monitor (manufacturer, recommended resolution, available resolutions...).

**Note:** when exiting the dialog box the graphical settings may be tested.

### ***b) Screen Saver***

Parameters are:

- **Screen Saver:** this function automatically either blacks out the monitor display (after a certain time of inactivity) or allows the screen to be locked during the AX3000 use:
  - No: function disabled.
  - Yes: function enabled. The display is restored when either the keyboard is used or data is received from the server.
  - Yes keyboard only: The display is only restored when the keyboard is used.
- **Display logo:** a logo can be displayed during the screen saver. This is either the logo displayed at the terminal boot-up or the logo stored in the AX3000 Local Store. See Chapter 3.6.4.
- **Energy Star Power Saver** (available only if the screen saver feature is enabled): this saves monitor power consumption.
- **Password** (available only if the screen saver feature is set): the lock screen feature is only available if a password is entered. For more information about the lock screen feature, see Chapter 4.4.2.
- **Delay (minutes)** (available only if the screen saver feature is set): delay before the monitor is turned off or locked.

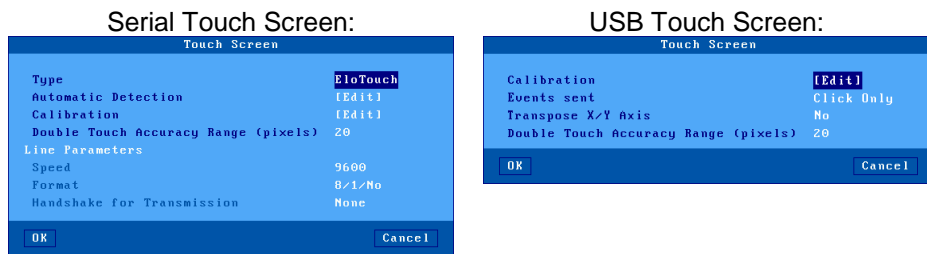
### ***c) Touch Screen***

"Touch screen events" are automatically remapped into "mouse events". No additional drivers or settings are required on the server (Windows, Unix/Linux, AS/400...).

Touch screen parameters:

- **Port:** serial touch screen port (Aux1, Aux2...)

For a USB touch screen this parameter is disabled  
 - **Settings:** the box depends on the touch screen type (serial or USB):



**Type** (serial touch screens only): select the touch screen manufacturer: ELOTouch, MicroTouch or Liyitec.

**Automatic Detection** (serial touch screens only): automatically obtain the set-up parameters from the touch-screen. To detect these settings the Axel terminal scans a range of baud rates and data formats. When these match the touch screen settings the serial line parameters are updated.

**Calibration:** display a dialog box for calibration. (Follow the instructions and touch the screen where '\*'s are displayed).

**Events sent** (USB touch screens only): two modes are available:  
 - **Click Only:** a 'mouse click' event is sent when the screen is touched  
 - **All:** in addition of the click event, 'mouse motion' events are sent until the screen is untouched.

**Transpose X/Y Axis** (USB touch screens only): select 'yes' or 'no'.

**Double Touch Accuracy Range (pixels):** this parameter defines a zone size which allows double-click to be emulated. A double-click event will be sent when the screen is touched twice (in a period less than 0.5 seconds) and when the two impacts are located in the same zone (less than X pixels).

**Note:** the touch screen functions properly only after the calibration has been performed.

After calibration touch screen events are automatically remapped to 'left click'

mouse events.

### **3.2.3 - Local Desktop**

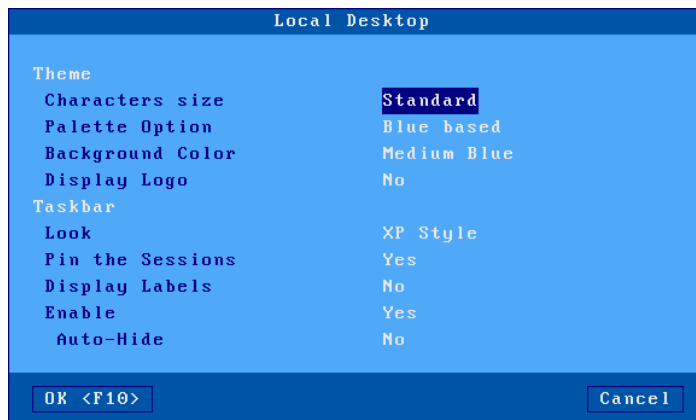
When no session is connected a specific screen is displayed. This is the 'Local Desktop'.

The terminal local desktop configuration provides:

- The theme (colors, logo, character size...),
- The taskbar settings.

The use of the local desktop is described in Chapter 4.2.

Select the **[Configuration]-[Terminal]-[Local Desktop]** menu:



#### **a) Theme**

The theme settings are:

- **Character Size:** standard or double.
- **Palette Option:** four templates are available.
- **Background Color.**
- **Display logo:** a logo can be displayed. This is either the Axel logo displayed at the terminal boot-up or a customer's logo loaded in the AX3000 Local Store. See Chapter 3.6.4.

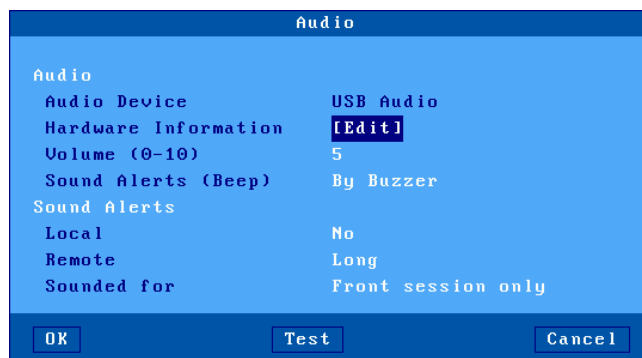
### b) TaskBar

An optional taskbar can be enabled. It's located on the bottom of the screen. The taskbar options are:

- **Look:** the XP style (default) improves the user experience. The 'Classical' style offers compatibility with legacy firmware revisions,
- **Pin the Sessions** (only for XP style): by default the MultiPoint session icon is displayed only when it's connected. When this option is enabled, the icon is displayed whatever the connection status.
- **Display Labels** (only for XP style): when this option is enabled, the MultiPoint session label is displayed with the icon.
- **Enable:** this option allows the taskbar to be enabled/disabled. But the taskbar is always displayed with the Axel desktop (when no session is displayed)
- **Auto-hide:** when the taskbar is enabled, two possible values:
  - **Yes:** the taskbar is hidden. It's shown when the mouse cursor is left 2 seconds on the bottom of the screen.
  - **No:** the taskbar is always displayed (taskbar height is taken from the current session height).

### 3.2.4 - Audio

Select the **[Configuration]-[Terminal]-[Audio]** menu:



#### a) Audio Device

When an audio device is detected its type is displayed (USB Audio). In this case

the following options are available:

- **Hardware Information:** miscellaneous information.
- **Volume:** setting-up the volume (0=mute).
- **Sound Alerts:** selecting the output device: buzzer or audio device.

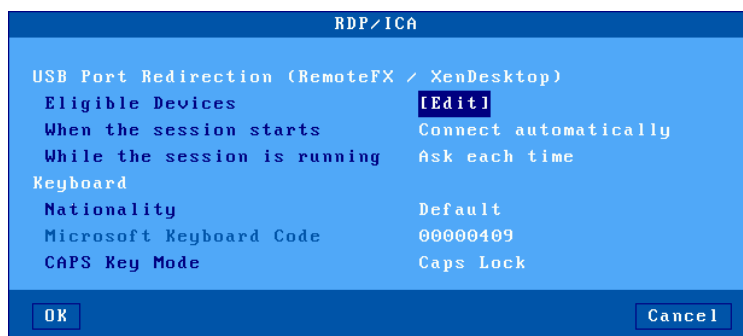
### **b) Sound Alerts**

A sound alert is a bell sound. Two types of sound alerts are available. For each one, the beep can be disabled or the duration can be set. (Values: no, short, long or very long.):

- **Local:** following an unexpected operation the terminal sounds a beep.
- **Remote:** the beep is requested by the server (escape sequence).
- **Sounded for:** set if the remote alert is played for "**Front session only**" or for "**Any session**".

### **3.2.5 - Global RDP**

Select the **[Configuration]-[Terminal]-[Global RDP]** menu:



### **a) USB Port Redirection**

The USB Port Redirection feature allows the thin client to act as a gateway between the USB device and the Windows server. The entire USB device management is provided by the Windows server.

**Note:** this only works when the thin client is connected a MultiPoint 2012 Server.

The "**Eligible Devices**" dialog box allows a subset of USB devices of a certain

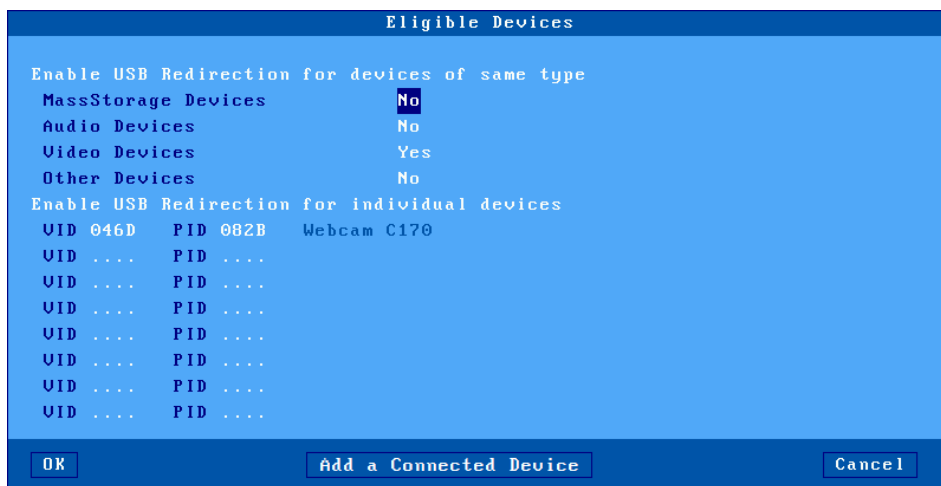


class to be selected for the USB Port Redirection feature. See next page.

The "**When the session starts**" and "**While the session running**" options are described in Chapter 4.3.5.

**Note:** enable USB Port Redirection option in the MultiPoint session profile.

**Dialog box to select eligible USB devices:**



A set of USB devices can be selected by **their types**:

- Mass Storage devices (memory sticks, hard drives, CD/DVD reader...)
- Audio devices
- Video devices (webcam)
- Other devices (not a mass storage, an audio or a video device. For example a scanner)

Alternatively a USB device can be selected by its identifier: Vendor ID and Product ID. These values can be manually entered or automatically obtained from a device currently connected by clicking the [Add a Connected Device] button.

**Note:** if a 'Product ID' value is 0, all the products of the associated 'Vendor ID' value will be eligible.

**b) Keyboard Nationality**

When the nationality of the keyboard is not listed by the terminal setup, a country specific Microsoft keyboard code can be specified. This code is used when an RDP/ICA session is established and allows any keyboard nationality to be negotiated and supported by the terminal.

**Note:** The country code is only applied after a Windows connection is established – so is not available at the terminal setup level.

The RDP Keyboard parameters are:

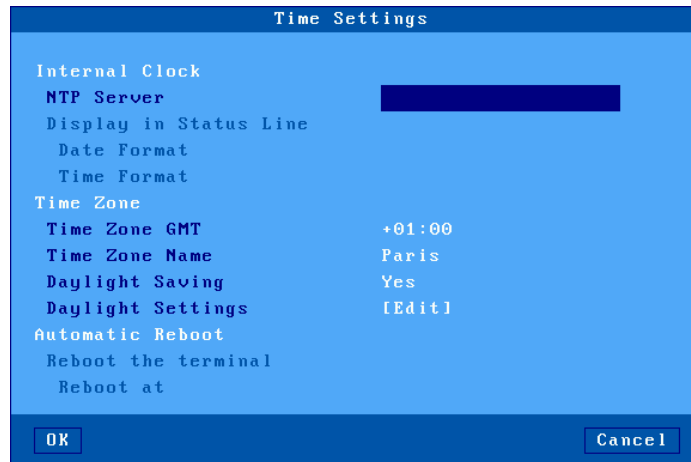
- **Nationality:** two possible values:
  - **Default:** the keyboard nationality is given by the [Configuration]-[General]-[Keyboard] menu. This setting is used by default for Windows sessions, and if listed and selected no further action is required. (This same nationality is used for character based sessions and terminal setup menus)
  - **Custom:** for nationalities not listed a custom keyboard nationality can be entered. (Microsoft Keyboard Code parameter)
- **Microsoft Keyboard Code:** enter the required keyboard code value. See Appendix A.6.5 for valid values.
- **CAPS Key Mode:** select "Shift Lock" or "Caps Lock".

**3.2.6 - Time Settings**

The time management is used for:

- Displaying date and time within the local taskbar.
- Updating modification/creation file time (memory stick support)
- Automatic terminal reboot
- SSL Certificates verification

Select the **[Configuration]-[Terminal]-[Time settings]** menu:



#### **a) Internal Clock**

Unlike a PC, there is no local clock (with battery) in Axel terminals. To provide a local clock we have introduced support for a time client (NTP protocol). This allows the time to be obtained when the terminal is powered on.

Enter the time server IP address (or the DNS name). This information can be automatically obtained via the DHCP protocol. (See Chapter 3.1.2).

The date and time can be displayed within the terminal taskbar. The following option allows the display formats to be selected:

- **Date Format:** 'JJ/MM/AA' or 'MM/JJ/AA'
- **Time Format:** 'HH:MM' or 'hh:MM'. (For the second format the time is displayed 'modulo 12' with PM or AM after.)

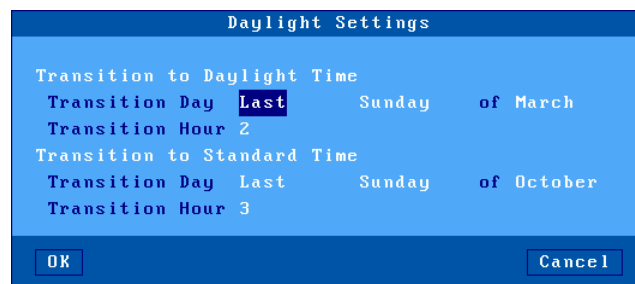
#### **b) Time Redirection**

The terminal negotiates its own local time zone. This allows different 'local times' to be displayed on terminals in different geographic regions?

**Note:** the time zone redirection function must be enabled on the Windows 2003 server. See Chapter 5.5.6.

The time zone parameters are:

- **Time Zone GMT:** positive or negative offset from GMT.
- **Time Zone Name:** a non-empty character string (Greenwich by default).
- **Daylight Saving:** enabling daylight saving function.
- **Daylight Settings:** The following dialog box is displayed:



Enter the following parameters for each transition time:

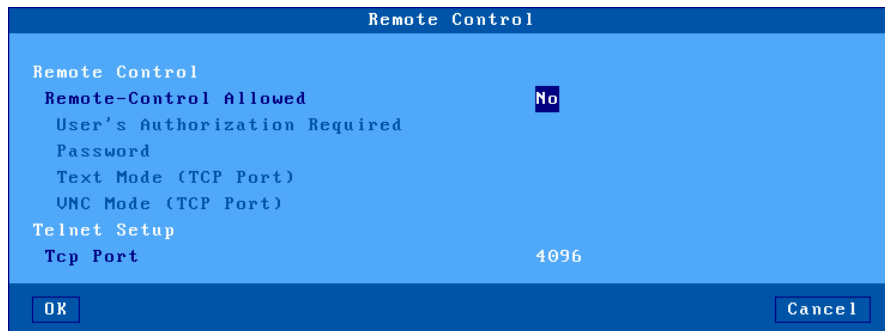
- **Transition Day:** day number, day and month. (For example: Last Sunday of March for daylight time.)
- **Transition Hour:** enter the hour without minute. (For example: 2 is 02:00.)

### c) Automatic Reboot

When a NTP server is set, the terminal can be automatically rebooted (every day or a specific day). This can be used with the auto-configuration feature.

### 3.2.7 - Terminal Remote Control

Select the menu **[Configuration]-[Terminal]-[Remote Control]**:



#### a) Remote Control

This functionality allows an administrator to remotely take control of a terminal. The administrator can passively watch the users screen or actively take control with his own keyboard for various support or administration purposes.

The parameters are:

- **Remote-Control Allowed:** yes or no.
- **User's Authorization Required:** possible values are:
  - No
  - Mandatory
  - Yes, automatically accepted
  - Yes, automatically refused

**Note:** for the two last values the **Time-out (sec)** option is available
- **Text Mode (TCP Port):** remote control only for terminal set-up.
- **VNC Mode (TCP Port):** global remote control
- **Password (optional):** this password will be requested when the connection is established.

For more information, refer to Chapter 5.2.2.

#### b) Telnet Set-Up

This functionality allows the terminal set-up to be addressed by a telnet client.

The single parameter is the TCP port (4096 by default).

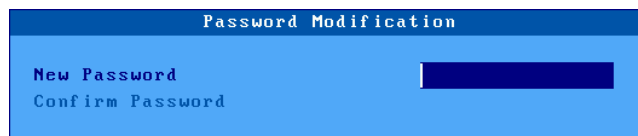
For more information, refer to Chapter 5.2.3.

### **3.2.8 - Password**

Access to the set-up menus can be controlled by a password.

#### ***a) Setting the Password***

Select the **[Configuration]-[Terminal]-[Password]** dialog box to set, change or delete the set-up password:



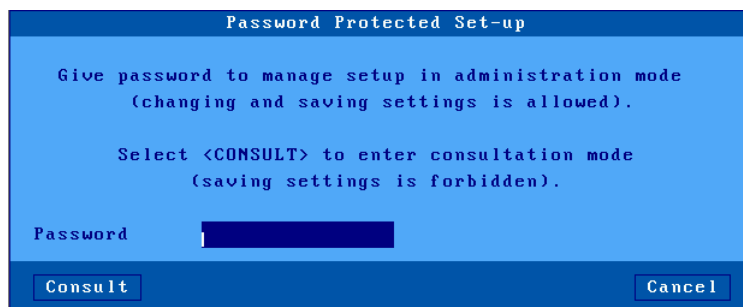
The screenshot shows a dialog box titled "Password Modification". It has two input fields: "New Password" and "Confirm Password". The "New Password" field contains a redacted password, and the "Confirm Password" field is empty.

Enter the following parameters:

- **Enter a new password:** enter a new password of maximum five characters, or press <CR> if no password is required or to delete existing password.
- **Retype password:** re-enter the identical password.

#### ***b) Entering Set-Up***

If the set-up is password protected, the following dialog box will be displayed the next time access is attempted:



The screenshot shows a dialog box titled "Password Protected Set-up". It contains the following text: "Give password to manage setup in administration mode (changing and saving settings is allowed). Select <CONSULT> to enter consultation mode (saving settings is forbidden).". Below the text is a "Password" input field with a redacted password. At the bottom, there are two buttons: "Consult" and "Cancel".

Three operations are permitted:

- enter the password to access the set-up
- Press <Esc> or select the [Cancel] button to exit set-up mode
- Select the [Consult] button to access the set-up without using the password. All set-up operations will be permitted but **it will not be possible to save the modifications.**

The Consultation mode is not offered if the "Administrator Hot Key disabled" option is set to "No". (See Appendix A.6.2)

**IMPORTANT:** if the password is not known, the super password 'yaka' can be used. (Only from the local interactive set-up and only if "Administrator Hot Key disabled" is set to "No". See Appendix A.6.2.)

### 3.3 - THE MULTIPOINT SESSION

To set a Microsoft MultiPoint session, enter the AX3000 Set-Up and select the **[Configuration]-[MultiPoint Session]** menu. The following box is displayed:

MultiPoint Session	
Connection Parameters	
Session Type	Microsoft TSE/RDS
Server	[REDACTED]
Connection Properties	[Edit]
Authentication	[Edit]
Session Parameters	
Display Parameters	[Edit]
Additional Parameters	[Edit]
Redirected Resources	[Edit]
Performance	[Edit]
[OK] [Reset] [Cancel]	

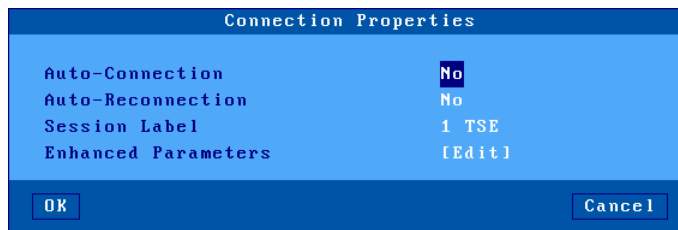
Set the following parameters:

- **Server:** enter the MultiPoint server name (or IP address)
- **Connection Properties:** see Chapter 3.3.1.
- **Authentication:** set the "Automatic Logon" function and/or the "Auto-Run" function. See Chapter 3.3.2.
- **Display Parameters:** see Chapter 3.3.3.

- **Additional Parameters:** a dialog box, which lets certain RDP parameters be changed. See Chapter 3.3.4.
- **Redirected Resources:** see Chapter 3.3.5.
- **Performances:** a dialog box, which lets certain parameters be changed. For more information, see Chapter 3.3.6.

### **3.3.1 - Connection Properties**

The following box is displayed:



These parameters are:

- **Auto-Connection:** if this parameter is set to 'yes', the connection will be automatically established when the AX3000 is powered. Otherwise, the user can click the MultiPoint session icon to establish the connection.
- **Auto-Reconnection:** if this parameter is set to 'yes', a new connection is automatically established after a disconnection. Otherwise, the user can click the MultiPoint session icon to establish a new connection.
- **Session Label:** this character string (11 characters max.) is used to identify the session within the local desktop or in the taskbar.
- **Enhanced parameters:** see Appendix A.6.3.



### 3.3.2 - Authentication

The following box is displayed:

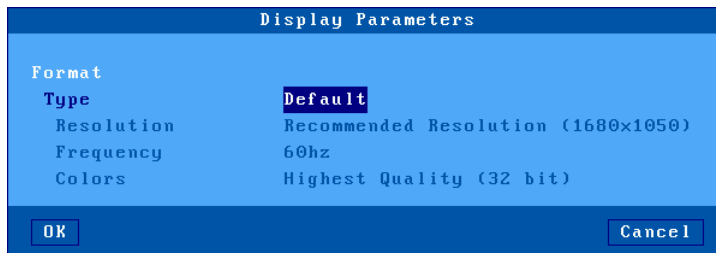
Authentication	
<b>Logon</b>	
Retain last logon details	Yes
Username	.....
Automatic Logon	
Password	
Domain	.....
Local authentication	No
<b>Application</b>	
Autorun	No
Command	.....
Working Directory	.....
OK <F10> Cancel	

These parameters are:

- **Retain last logon details:** this parameter allows the username and domain fields of the Login screen to be automatically set-up.
- **Username:** default value for the username field of the Login screen.
- **Automatic Logon:** set this parameter to 'Yes' to get an automatic logon.
- **Password:** available only if 'Automatic Logon' is set to 'Yes'.
- **Domain:** default value for the Windows domain field of the Login screen.
- **Local Authentication:** enabling this parameter allows a secure NLA connection to be correctly supported by using a local authentication box (username/password/domain).
- **Auto Run:** by default the Terminal Services connection offers a Windows desktop. To automatically launch a program set this parameter to 'Yes' and complete the following fields.
- **Command** (available only if 'Auto-Run' is set to 'yes'): the program path and file name of the program to be launched.  
Example: %SystemRoot%\system32\cmd.exe
- **Working Directory** (available only if 'Auto-Run' is set to 'yes'): sets program working directory.  
Example: D: \

### 3.3.3 - Display Parameters

The following box is displayed:



This box allows display settings (resolution, number of colors and frequency) to be set. The availability of these parameters depends of the **Type** value:

- **Default:** these three parameters are issued from general settings (see Chapter 3.2.2). When general settings are modified, these three parameters are automatically updated with new values.
- **Customized:** the three parameters are independent from general settings.

### 3.3.4 - Additional Parameters

The following box is displayed:



These parameters are:

- **Default Security Level:** values are:
  - RDP: the terminal offers standard RDP security layer. If this is denied by the server, the SSL/TLS or SSL/TLS+NLA security layer is offered.
  - SSL/TLS: the terminal offers both the traditional and the SSL/TLS security layers.
  - SSL/TLS+NLA: the terminal offers both the traditional and the SSL/TLS+NLA security layers.
- **Encryption:** encryption levels are:
  - Low Level: only one-direction encrypted connections are accepted. (Data sent by Windows is encrypted).
  - Medium Level: both-direction and one-direction encrypted connections are accepted.
  - High Level: only both-direction encrypted connections are accepted.
- **Connection Name:** this character string identifies the AX3000 within the Windows Operating System. By default this name is the terminal name (see Chapter 3.1.1).
- **Console Mode:** when set to 'yes', the RDP connection will take remote control of the Windows Server main console.
- **Optimized Screen Refresh:** smooth video playback especially for flash type content (ie Youtube).
- **RemoteFX (32bpp/LAN):** this operating mode available only for a 32bpp connection with the 'Network Speed' sets to 'LAN'.
- **<Ctrl><Alt><Del>:** the two modes for this keystroke are:
  - Local: the keystroke is handled by the AX3000 and is used for shutdown the terminal (see Chapter 4.8)
  - Remote: the keystroke is handled by the Windows server (for example opening the task manager).
- **<Scroll Lock> & <Pause>:** enable or disable these two keys
- **Audio Redirected to Buzzer:** this mode allows system beep to be sounded by a terminal with no audio USB device.

### 3.3.5 - Redirected Resources

The redirected resources mechanism allows one or more local resources to be 'published' to the Windows server. These resources are available only for the terminal's user. They are created on the Windows server when the connection is

established and removed when the session is disconnected.

The redirected resources mechanism allows one or more locally attached peripherals to be 'published' to the Windows server. These resources are available only for the terminal's user. They are created on the Windows server when the connection is established and removed when the session is disconnected.

The following local resources are supported:

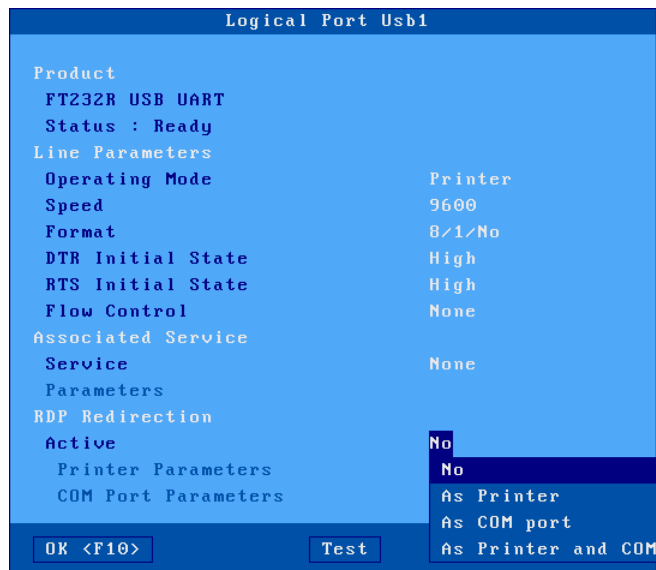
- **Printers:** before being redirected each printer must be declared at the 'physical connection port' level. See first sub-section a) then c).
- **Mass storage devices:** see sub-section c).
- **Smartcard readers:** see sub-section c)
- **COM/LPT ports** before being redirected each port must be declared at the physical port level. See first sub-section b) then c).
- **USB ports:** a set of eligible USB devices must be first defined (see Chapter 3.2.5). Then see sub-section c)

#### ***a) Declaring a Redirected Printer***

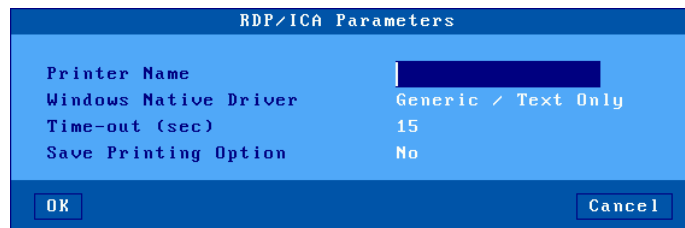
At the connection time a redirected printer will be automatically added to the Windows spooler. It will be removed when the session disconnects.

Before being redirected a printer must be declared at the connection port' level. The available ports are: USB logical ports and network printers.

Select the dialog box of the 'Printer port' (menu **[Configuration]-[Ports]-[xxx]**).  
 For example, the Usb1 port:



Set the 'Active' parameter to 'As Printer' or 'As Printer and COM'. Then select 'Printer Parameters'. The following box is displayed:



These parameters are:

- **Printer Name:** name of the Windows printer

- **Windows Native Driver:** printer driver name. It is ESSENTIAL that the value entered here matches the printer driver name exactly as installed on the server. If the match is not exact Windows will not be able to connect the printer to the driver and the printer will not be added to the Windows spooler.
- **Time-out (sec):** in event of a printer error (no paper, off-line, etc.), this is the delay before the terminal reports the error to Windows.
- **Save Printing Option:** when the default printer configuration is modified (on the server side), this option allows the terminal to store this configuration (in the AX3000 Local Store). See Chapter 3.6.4.

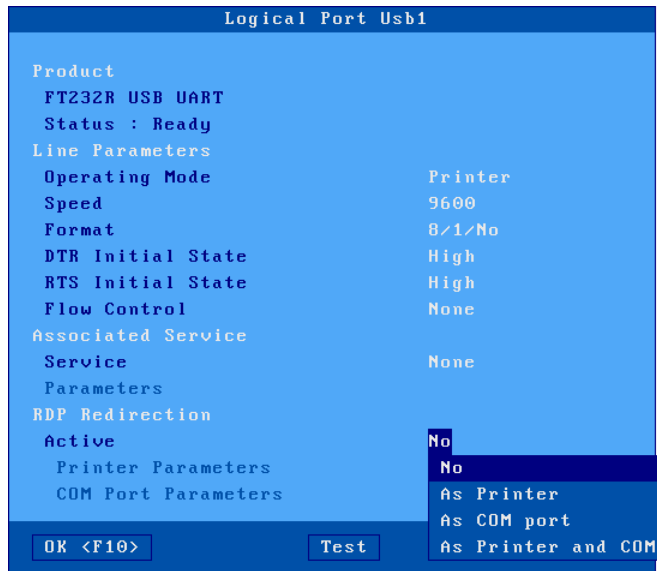
The printer declaration is completed. For the redirection procedure, consult the sub-section c).

#### ***b) Declaring a Redirected COM/LPT Port***

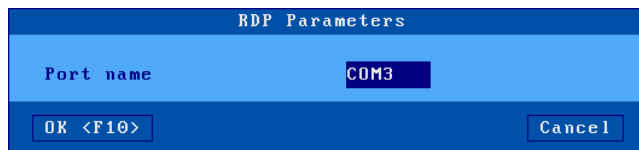
On a connection a redirected COM/LPT port will be automatically added to the Windows server resources. It will be removed on disconnection. Maximum two ports can be redirected.

Before being redirected a COM Port must be declared at 'USB logical ports' level.

Select the dialog box of the 'COM port' (menu **[Configuration]-[Ports]-[xxx]**).  
 For example, the Usb1 port:



Set the 'Active' parameter to 'As COM port' or 'As Printer and COM'. Then select 'COM Port Parameters'. The following box is displayed:



These parameters are:

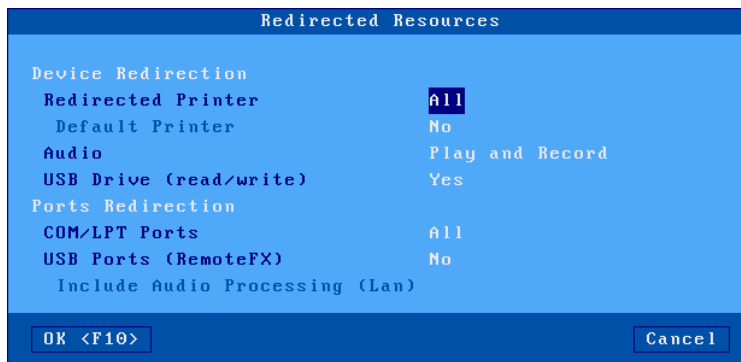
- **Port Name:** redirect COM port name (from COM1 to COM255).

The COM port declaration is completed. For the redirection procedure, consult the next sub-section.

**c) Redirecting Resources within the RDP session**

To redirect resources within a session select the session profile box (menu

[**Configuration**]-[**Sessions**]-[**Session X**]). Within this box, select 'Redirected Resources'. The following box is displayed:



These parameters are:

- **Redirected Printer:** printer(s) are selected through a list. This list is composed by the following items:
  - All
  - None
  - **Printer Name (port):** these are the RDP/ICA printer name(s). This allows the selection of only one printer to be redirected.
- **Default printer:** set (or not) a printer as the default printer.
- **Audio:** set (or not) the 'classic' audio redirection ('play' or 'play and record'). The audio quality (and the amount of audio data) can be customized in the bandwidth option. See next chapter.
- **USB Drive:** set (or not) the mass storage device redirection. The 'Access Permission' value reminds the selected mode (see Appendix A.6.2).
- **Redirected COM/LPT Port:** COM port(s) are selected through a list. This list is composed by the following items:
  - All
  - None
  - **xxx (port):** these are the COM/LPT port name(s). This allows the selection of only one port to be redirected.
- **USB Ports (Remote FX):** set (or not) the USB Port Redirection (only with MultiPoint 2012 server). For more information about 'Eligible Devices' see Chapter 3.2.5.



- **Include Audio Processing (Lan):** this options allows the audio to be handled by the USB Port Redirection. And no more by the 'classic' redirection (see above). This is only permitted for a session with the 'Network Speed' sets to 'LAN' (See next chapter).

### 3.3.6 - Performance

The following box is displayed:



The first option allows the 'Connection Speed' to be set. The value will set by default some User Experience options. All these features can be enabled/disabled. To enable a feature set it to "x":

- **Desktop Background:** the AX3000 operator is allowed to select a desktop background.  
Note: the background feature must be also allowed by the Windows server.
- **Show contents of window while dragging:** the AX3000 operator can choose to display the contents of windows while resizing or dragging.
- **Menu and window animation:** the AX3000 operator is allowed to select the animation function.

- **Themes:** the AX3000 operator is allowed to select a theme (i.e. a desktop appearance) other than the Windows Classic Theme.
- **Font Smoothing.**
- **Desktop Composition** (only available with RemoteFX - See Chapter 3.3.4): allows a full aero experience (translucent windows, flip 3D, preview in the taskbar...).

The 'Bandwidth' parameters are:

- **Bitmap Cache:** enabling the bitmap cache allows the AX3000 to store images (icon, buttons, etc) locally. This can both improve the AX3000 performance and decrease network traffic. Three values:
  - No: no cache
  - Yes: the cache is reset each time a new session is established
  - Yes, persistent: the cache is not reset when a session is closed. This could allow bandwidth to be saved for the next session.
- **Offscreen Cache** (available only if "Optimized Screen Refresh" is disabled - See Chapter 3.3.4): enabling the offscreen cache allows the AX3000 to store images in a 'non visible' part of the VGA memory. This parameter can be enabled for a single session. This can both improve the AX3000 performance and decrease network traffic.
- **Compression Client->Server:** this allows Windows to send compressed data. Possible values are: 'no', 'yes, V5.2', ' yes, V6.0' and ' yes, V6.1 '. This last value allows all the supported compression types (V5.2, V6.0 and V6.1) to be advertised.
- **Compression Server->Client:** this allows to reduce the volume of data sent by the client to the server.
- **Mouse Traffic:** the options are:
  - All (default): all mouse events (clicks and position) are sent to the server.
  - Click: only the click events are sent to the server. This reduces the data flow. But the mouse cursor is not updated in real time. This mode can significantly reduce bandwidth.
- **Mouse Sensitivity:** This setting varies the sample rate of the mouse. If the sensitivity is increased the mouse movement will be more fluid, but also network activity is increased as the sample rate is increased.
- **Audio Quality:** the bandwidth depends on the audio quality. For remote connections prefer a low quality.

- **32bpp Image Quality:** with the 'medium' and 'high' quality, NScodec will be used (this will reduce significantly the bandwidth). With the 'Maximum' a legacy codec is used.

## 3.4 - USB MANAGEMENT

### 3.4.1 - Specifications

Technical specifications:

- Maximum supported speed: high-speed (480 Mbits)
- Maximal consumption: 500 mA (total current draw for all ports)

**Important Note:** power hungry non-computing USB devices must not be connected to the terminal (fans, lights...) as they have the potential to draw too much current and cause damage to the terminal.

The following USB devices are supported:

- Keyboard,
- Barcode reader,
- Mouse,
- HUB,
- Printer,
- USB-RS232 adaptor,
- Touch Screen
- Mass storage device (memory stick, hard drives, CD/DVD readers...),
- Audio device.

Other USB devices are detected but not supported.

USB devices are hot-pluggable and are dynamically detected by the Axel terminal.

Maximum number of connected USB devices:

- Two keyboards and barcode readers,
- Two mice,
- Two HUBs,
- Four printers or USB-RS232 adaptors,

- One touch screen
- One mass storage device,
- One audio device.

### **3.4.2 - Connecting a USB Keyboard**

The USB keyboard is automatically detected by the Axel terminal.

The USB keyboard settings (nationality, LED initialization...) are displayed and can be changed in the AX3000's General Parameters. For more information see Chapter 3.2.1.

**Note:** multiple keyboards (USB and/or PS2) can be connected. The same settings are used for both and they can be used simultaneously.

### **3.4.3 - Connecting a USB Barcode Reader**

The USB barcode reader is automatically detected by the Axel terminal. A barcode reader is treated as a keyboard. See previous chapter.

### **3.4.4 - Connecting a Mouse**

A USB mouse is automatically detected by the Axel terminal. No specific settings are required.

**Note:** multiple mice (USB and/or PS2) can be used simultaneously.

### **3.4.5 - Connecting a HUB**

A USB HUB is automatically detected by the Axel terminal. No specific settings are required.

### **3.4.6 - Connecting a Printer**

#### ***a) Logical Port Attachment***

When a USB printer is connected for the first time to the Axel terminal a logical port is associated. Four logical ports are available: Usb1, Usb2, Usb3 and Usb4.

The associated logical ports are listed in the menu **[Configuration]-[Ports]-[USB Logical Ports]**. To get information of a USB printer, select its logical port. For example:



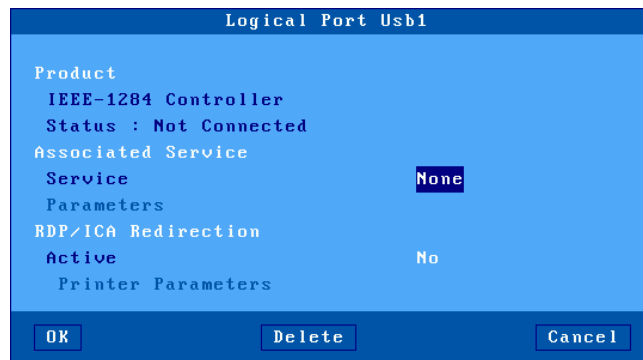
This association is maintained even if the printer is powered off, disconnected or connected to the other USB port.

Releasing a logical port is a manual operation (see Chapter below 'Releasing a Logical Port').

#### ***b) Releasing a Logical Port***

A logical port must be manually released. This operation can be performed only when the USB device is no longer connected.

In the menu **[Configuration]-[Ports]-[USB Logical Ports]** select the logical port. The following box is displayed:



Select the [Delete] button to release the logical port.

The released logical port is removed from the list of the associated ports and is now available for the next USB device.

### **3.4.7 - Connecting a USB-RS232 Adaptor**

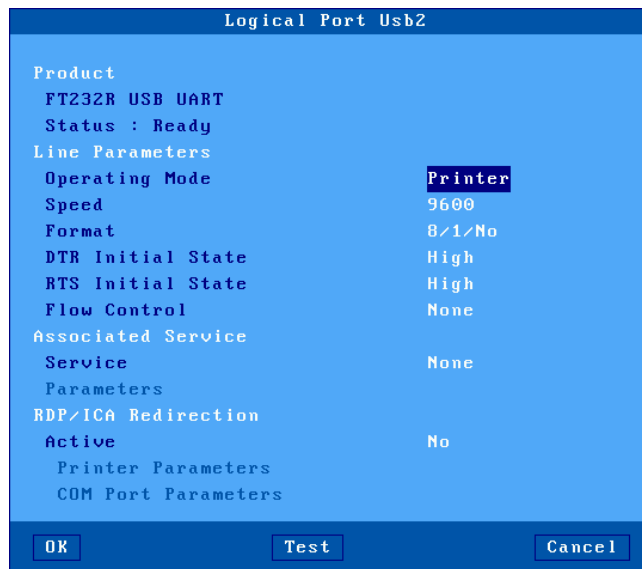
#### ***a) Overview***

A USB-RS232 adaptor is normally a cable with USB connector at one end and one or more serial connectors (DB9 or DB25) at the other end. This allows serial devices to be connected when no native serial ports are available.

This technology is sometimes embedded in USB devices. For example touch screens or card readers. These devices have a USB connector but are based on serial technology and are seen as serial ports.

### b) Configuration

A logical USB port is allocated to the USB-RS232 adaptor. (See attaching and releasing operations in the Chapter 3.4.6). For example:



This USB logical port allows the adaptor to be configured: line parameters (baud rate, format...), service and RDP redirection.

### 3.4.8 - Connecting a Mass Storage Device

**Note:** only available with the firmware option MSC.

Most USB mass storage devices fall in one of the categories below:

- memory sticks,
- hard drives,
- CD/DVD readers,
- floppy disks,
- memory card readers,
- digital cameras.

The main difference between these devices is the type of file system (i.e the

format in which the data is stored).

**IMPORTANT:** only mass storage devices formatted in FAT12, FAT16, FAT32 and ISO9660 are supported.

For your information the following table lists the most common file systems for each device type (√: supported by a PC or Axel, ○: supported only by a PC):

USB Mass Storage Device	FAT	NTFS	exFAT	ISO 9660	UDF	PIMA	Other
Memory Sticks	√	○	○				
Hard Drive	√	○	○				
CD/DVD Readers				√	○		
Floppy Disk	√						
Digital Cameras	√					○	○
Memory Card Readers	√						

File systems generally used on most common storage devices

Mass storage devices must be setup at two levels:

- General: see Chapter 3.2.5
- Session: see Chapter 3.3.5

**Note:** The taskbar (see Chapter 3.2.3) gives an indicator showing when the device is being accessed

**It's strictly forbidden to remove a device currently in use as the file system could be damaged and the integrity of the storage device lost.**

### **3.4.9 - Connecting a USB Audio Device**

The USB audio device is automatically detected by the Axel terminal.

The use of an audio device is enabled/disabled at RDP session level. See Chapter 3.3.5.



### **3.4.10 - Connecting a Touch Screen**

A USB touch screen may be seen by the terminal:

- Either as a pointer device
- Or as an USB-RS232 adaptor. In this case a logical USB port is automatically created (see Chapter 3.4.7).

In both cases, to set-up the touch screen, select the menu **[Configuration]-[Terminal]-[Screen]**. For more information see Chapter 3.2.2.

### **3.4.11 - Listing Connected USB Devices**

To list all connected USB devices (supported or not) select the menu **[Diagnostic]-[USB]**. For more information see Chapter 5.1.6.

## **3.5 - PRINTER MANAGEMENT**

### **3.5.1 - Setting Up the Printer Port**

Two types of ports are available for peripheral devices:

- **USB logical ports:** a USB logical port is automatically created when a USB printer is connected. Four USB logical ports are available (see Chapters 3.4.6 and 3.4.7).
- **Network Printers:** a TCP logical port (Net1 or Net2) allows a network printer (or a network print server) to be addressed in the same way as a local printer.

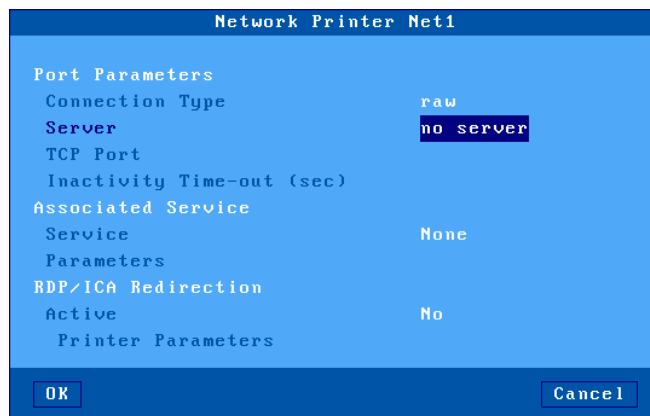
#### ***a) Setting USB Logical Ports***

When connecting a USB printer or a USB-RS232 adaptor a USB logical port is automatically created. This logical port (menu **[Configuration]-[Ports]-[USB Logical Ports]-[UsbX]**) allows the printer to be set-up.

For more information, see Chapters 3.4.6 and 3.4.7.

**b) Setting Network Printers**

Select the **[Configuration]-[Ports]-[Network Printers]-[NetX]**:



The following parameters can be set:

- **Connection Type**: always 'raw'
- **Server**: select the server (i.e. network printer) from a list.
- **TCP Port**: usual value is 9100.
- **Inactivity Time-out (sec)**: the session is automatically disconnected after this inactivity delay.
- **Associated Service**: see next chapters.
- **RDP Redirection**: see next chapters.

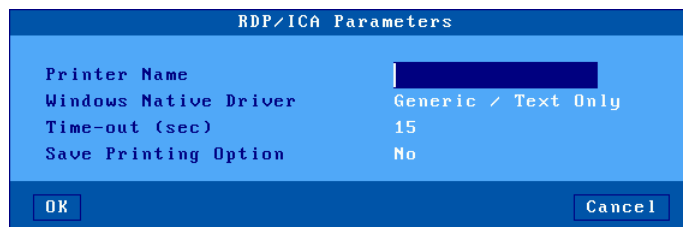
**3.5.2 - RDP redirection**

At the RDP connection time a redirected printer will be automatically added to the Windows spooler. It will be removed when the session disconnects.

Select the dialog box of the 'Connection port' (menu **[Configuration]-[Ports]-[xxx]**). For example, the Usb1 Logical Port:



Set the 'Active' parameter to 'As Printer'. Then select 'Printer Parameters'. The following box is displayed:



These parameters are:

- **Printer Name:** name of the Windows printer
- **Windows Native Driver:** printer driver name. It is ESSENTIAL that the value entered here matches the printer driver name exactly as installed on the server. If the match is not exact Windows will not be able to connect the printer to the driver and the printer will not be added to the Windows spooler.
- **Time-out (sec):** in event of a printer error (no paper, off-line, etc.), this is the delay before the terminal reports the error to Windows.
- **Save Printing Option:** when the default printer configuration is modified (on the server side), this option allows the terminal to store this configuration (in the AX3000 Local Store). See Chapter 3.4.7.

The printer declaration is completed. For the redirection procedure, consult the Chapter 3.3.5.

### **3.5.3 - LPD Service**

The embedded LPD print server allows the terminal printer to be accessed as a standard system printer.

An LPD printer requires two parameters:

- The AX3000's IP address or FQDN name if DHCP/DNS is used,
- An identifier for the printer port.

#### ***a) Setting-Up the Terminal***

To set the LPD service on a port, select the **[Configuration]-[Ports]-[xxx]-[yyy]** dialog and enter the following parameters:

- **Service:** select lpd.
- **Parameters:** the following dialog box is displayed:

lpd Parameters	
Printer Port Name	het1
NL=CR+NL Filter	No
Enhanced Parameters	[Edit]
Pre-print String	.....
Post-print String	.....
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

- **Printer Port Name:** this is the port identifier.
- **NL=CR+NL Filter:** set it to 'no',
- **Enhanced parameters:** see Appendix A.6.3,
- **Pre-print String:** character string sent before the print job.
- **Post-print String:** character string sent after the print job (for example "\0C" is a form feed)

#### ***b) Setting-Up the MultiPoint Server***

On the MultiPoint side, a printer must be added. This printer type is 'local' and it's attached to "TCP/IP Standard" port with the LPR protocol. The two needed parameters are the terminal IP address and the terminal printer port name.

### 3.5.4 - 'rtty' Service

The rtty service allows the terminal printer to be accessed as a network printer.

A network printer requires two parameters:

- The AX3000's IP address,
- A TCP port number.

#### a) Setting-up the Terminal

To set the rtty service on the port, enter the following parameters in the **[Configuration]-[Ports]-[xxx]** dialog box:

- **Service:** select rtty.
- **Parameters:** the following box is displayed:



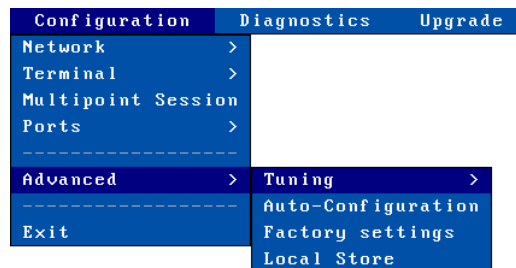
- **Port TCP:** listening port. Usually 9100.
- **NL=CR+NL Filter:** set to 'No'
- **Always Accept New Connection:** set the AX3000 behavior when an rtty connection is already established and a second connection rtty is received.
- **Enhanced parameters:** see Appendix A.6.3.
- **Pre-print String:** character string sent before the printing.
- **Post-print String:** character string sent after an the printing (for example "\0C" is a form feed)

#### b) Setting-Up the MultiPoint Server

On the MultiPoint side, a printer must be added. This printer type is 'local' and it's attached to "TCP/IP Standard" port with the RAW protocol. The two needed parameters are the terminal IP address and the terminal TCP port.

## 3.6 - OTHER FUNCTIONS

Select the [Configuration]-[Advanced] menu:



### 3.6.1 - Tuning

This box offers special terminal operating parameters. Usually the default values are suitable.

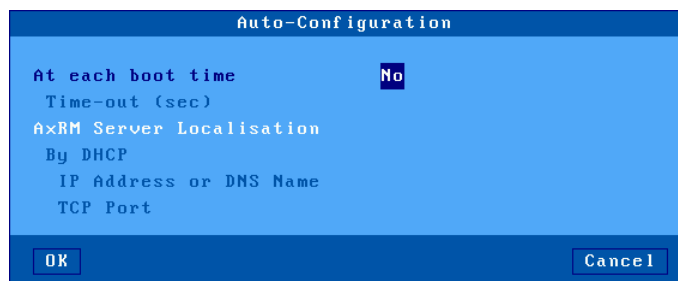
For more information see Appendix A.6.2.

### 3.6.2 - Auto-Configuration

The Auto-Configuration function lets a terminal check if new firmware and/or new configuration files are available.

This function is automatically started when the terminal is powered-on for the very first time. See Chapter 2.2.

Additionally this function can also be set to run each time the terminal boots:



The 'time-out' parameter is the maximum number of seconds allowed for the terminal to load a new firmware/configuration. If nothing is received in this time the terminal boots up using existing current settings.

Two methods are available for the terminal to locate the AxRM server (IP address and TCP port):

- **Static:** the IP address (or the name) and the TCP port are entered
- **Dynamic** (only if DHCP is already used to get the terminal IP address): the IP address and TCP port are given through the DHCP protocol (see Chapter 2.2.3 for more information).

For more information about Auto-Configuration stages, refer to Chapter 2.2.

### **3.6.3 - Factory Settings**

This allows, after confirmation, terminal factory settings to be reloaded. **The current configuration is lost.** See Appendix A.6.1.

### **3.6.4 - Local Store**

The AX3000 Local Store allows the following types of object to be stored:

- TSE License: sent by a TSE/RDS Microsoft server
- Printer Properties: sent by a TSE/RDS Microsoft server when printer redirection is enabled. See Chapter 3.3.5.
- Logo: JPEG picture. (Only one logo can be stored.)
- Personal certificate: PFX, PEM and P12 types are supported.
- Root certificate (CA): PEM and CER types are supported.

The dialog box below shows an example of AX3000 Local Store:

Local Store (96Kb)		
Type	Size	Information
Logo	8411	JPEG 320x133
Personal Certificate	2116	UserAxel
CA Certificate	975	AxelCA

Exit                      Clear All                      Add object

**Adding objects:** "TSE License" and "Printer properties" are issued by the TSE server. Logos and certificates can be copied from a memory stick by clicking the

**[Add object]** button or transferred over the network by using AxRM (Axel software management). For more information, please consult the manual *Axel Remote Management V3*.

**Removing objects:** an object can be removed by pressing <Del>. The entire local store can be cleared in a single operation by clicking the button **[Clear All]**. These operations can also be performed with AxRM.



**- 4 -**  
**USING THE AX3000**

*This chapter covers use of the AX3000.*

## 4.1 - SWITCHING ON THE AX3000

The following operations are performed when the terminal is turned-on:

- **Boot:** initialization, network detection...
- **Auto-configuration** (optional): checks over the network if a new firmware/configuration is available. If yes the terminal reboots again for the new firmware/configuration to take effect (for more information see Chapter 2.2)
- **Auto-Connection:** the RDP session is opened automatically if the 'auto-connection' parameter is set to 'yes'. See Chapter 4.3.1.
- **Local Desktop:** if no screen session is connected, the terminal Local Desktop is displayed. See next Chapter.

## 4.2 - LOCAL DESKTOP

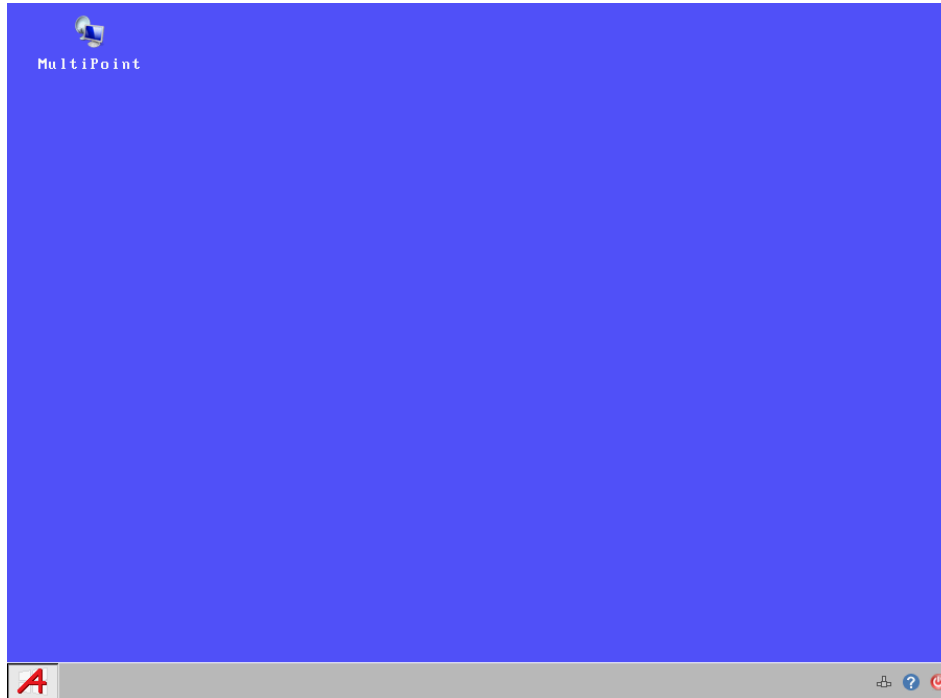
The local desktop is displayed when there are no current active sessions or if the 'Desktop' icon (in the left of the taskbar) had been clicked.

The local desktop appearance depends on the taskbar style (see Chapter 3.2.3).

The local desktop is organized as:

- The main area contains the MultiPoint session icon
- The taskbar is displayed on the bottom of the screen.

For example:



Possible actions:

- Click the MultiPoint icon to open the session.
- Click a taskbar icon. See next chapters.

#### **4.2.1 - 'XP Style' Taskbar**












From the left to the right the aspect of this taskbar is:

- A 'Desktop' icon to come back to the Local Desktop
- The icon of the MultiPoint session if connected (with the label if the 'Display label' option is enabled – See Chapter 3.2.3).  
**Note:** the icon can be always displayed (even when not connected) if the 'Pin the Sessions' option is enabled – See Chapter 3.2.3.
- Notification icons (See Table 1)
- Date and time (See Chapter 3.2.6)

Example:



**Table 1** – Axel Notification Icons ('XP Style' taskbar)









	Turning off - See Chapter 4.5
	Getting terminal information (Firmware/Hardware)
	The network status. In event of problem: 
	Disconnecting the MultiPoint session. See Chapter 4.2.5.
	USB drive status. Only displayed if a USB drive is attached.
	-  : read in progress
	-  : write in progress
	-  : media not present or unsupported format
	Attaching or detaching USB devices (when the USB Port redirection is enabled).
	Set Portrait/Landscape mode - See Appendix A.8.2

#### **4.2.2 – 'Classical' Taskbar**

From the left to the right the aspect of this taskbar is:

- A 'Desktop' icon to come back to the Local Desktop
- The label of the MultiPoint session with a connection indicator (green when connected).
- Notification icons (See Table 2)
- Date and time (See Chapter 3.2.6)

**Table 2** - Axel Notification Icons ('Classical' taskbar)

	Turning off - See Chapter 4.5
	Getting terminal information (Firmware/Hardware)
	The network status In event of problem: 
	Disconnecting the MultiPoint session. See Chapter 3.2.2.
	USB drive status. Only displayed if a USB drive is attached
- 	: read in progress
- 	: write in progress

## 4.3 – MULTIPOINT SESSION

### 4.3.1 - Creating a Session

Click the MultiPoint icon or the taskbar to open the session.

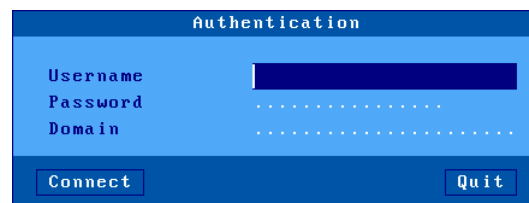
First, the terminal checks if the server is actually a MultiPoint server. This takes few seconds. In this probe fails, the session is aborted and the following error message is displayed:



**Note:** This error is displayed because the server didn't reply to UDP requests (multicast on port 3702) in less than 5 seconds. This indicates the server is not installed on the same subnet as the thin client or requests are blocked by a firewall.

### **4.3.2 - Authenticating**

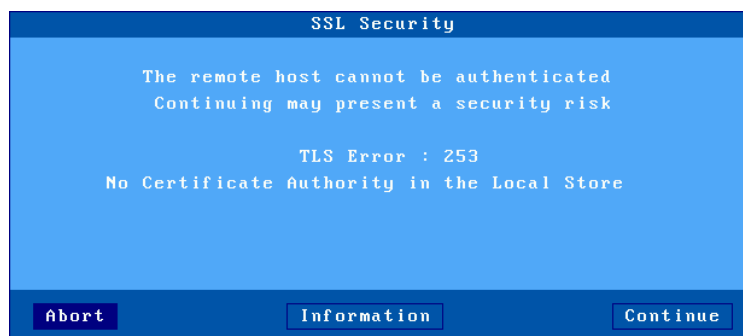
When opening a session a local authentication box may be displayed. For example when opening a NLA-secured session:



### **4.3.3 - Checking the SSL Certificate**

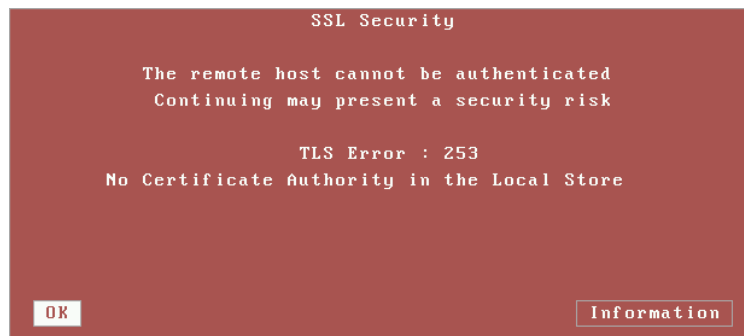
When an SSL connection is established, the SSL server certificate may be checked. (Only if a CA certificate is installed in the AX3000 Local Store - See Chapter 3.1.4.)

When the server certificate is not valid a dialog box is displayed. For example:



This box lets the user choose to [Abort] or [Continue].

The [Continue] button is available only if the 'Action on Error' option (see Chapter 3.1.4) is set to 'display an alert'. If this option is set to 'refuse the connection', the dialog box looks like the following and the connection is blocked:



In both cases the **[Information]** button displays the SSL server name and additional information about the server certificate.

#### **4.3.4 - Closing the Session**

Generally the session is closed from the 'Start' menu of Microsoft desktop. But a session can be disconnected by one of following ways:

- **<Ctrl><Alt><D>**. This keystroke is locally processed by the AX3000 and works regardless the operating system.
- The taskbar "yellow key" icon

If the user closes the session the behavior of the terminal depends on how the '**auto-reconnection**' parameter is set for the current session. If this parameter is set to '**yes**', a new connection is immediately and automatically established within the current session. Else the terminal Local Desktop is displayed.

#### **4.3.5 - USB Port Redirection**

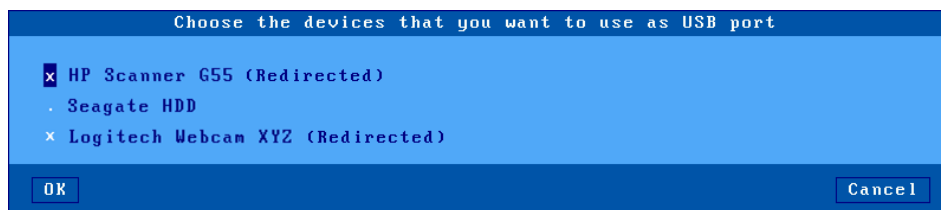
Note: the USB Port Redirection is only available with a session connected to a MultiPoint 2012 server.

When the session is established, the USB redirection is controlled by the 'When the session starts' option (See [Configuration]-[Terminal]-[Global RDP] menu -

See Chapter 3.2.5).

The 'When the session starts' values are:

- Ignore: no eligible device is redirected.
  - Connect automatically: all eligible devices are redirected.
  - Ask each time: a box showing all eligible devices is displayed. The user can tick (x) or untick (.) a device for starting or stopping the redirection
- For example:



**Note:** if the 'While the session is running' option is set, this box is also displayed when a device is plugged during the use of the session.

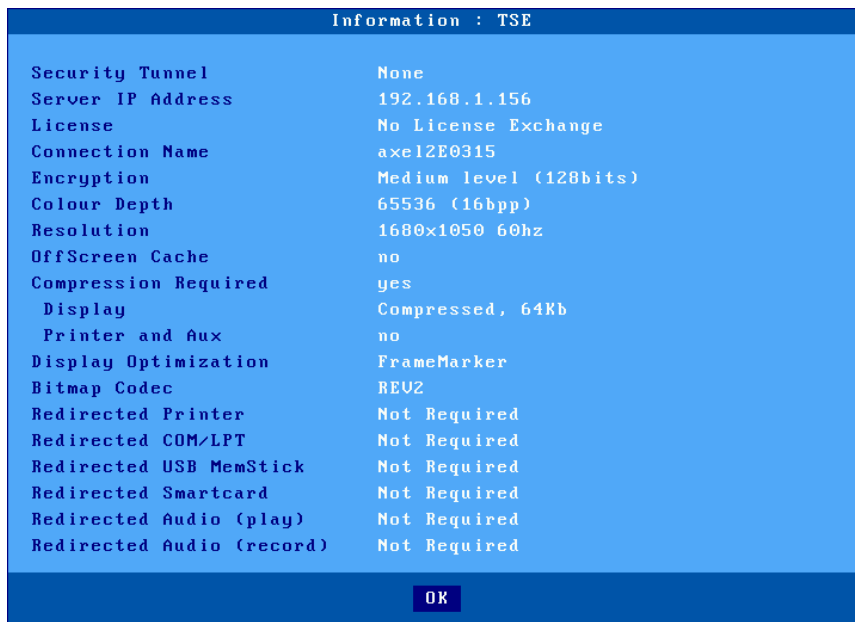
## 4.4 - SPECIAL FEATURES

### 4.4.1 - Getting Session Information

Press <Ctrl><Alt><i> to get information about current session.



The content of the box depends on the session type. For example from an RDP session:



#### **4.4.2 - Locking the Screen**

For security reasons, it might be useful for the AX3000 operator to lock the screen rather than logging out.

**Note:** the lock screen means the AX3000 screen is blanked but the current sessions are still connected and active. There is no way to enter the AX3000 Set-Up or to switch the session. The only way to regain control is to enter the proper password.

The lock screen feature is associated with the screen saver function and must be enabled through the AX3000 Set-Up (see Chapter 3.2.2).

Two methods are available to lock a screen:

- **Automatically:** when the terminal is idle (keyboard or screen) for a certain time, the AX300 blacks out the monitor display. The display is automatically restored as soon as a key is pressed. A dialog box allowing the screen to be unlocked after password is entered is displayed.
- **Manually:** the <Ctrl><Alt><S> keystroke allows the screen to be locked immediately.

An unlock-screen dialog box is displayed. Two operations are possible:

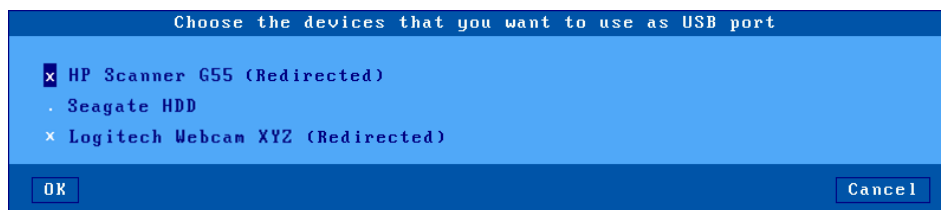
- Entering the password to unlock the screen. Two passwords can be used: the screen saver password and the set-up password (see Chapter 3.2.8).
- Resetting the AX3000. If the password is forgotten, the only way is selecting the [Shutdown] button. After power-cycling it, the AX3000 administrator will be able to modify or remove the screen saver password.

**Note:** For the highest level of security we recommend setting the terminals 'Set-Up' password. (See Chapter 3.2.8)

#### **4.4.3 - USB Port Redirection Function**

Press <Ctrl><Alt><U> to display a dialog box where the USB Port Redirection can be started/stopped per device.

The following shows a typical box:



**Note:** this box is only displayed if the USB Port Redirection is enabled within the MultiPoint session profile.

All eligible devices are listed with the information about the current redirection status. The user can tick (x) or untick (.) a device to start or stop the redirection.

**Note:** this box may be also displayed when the MultiPoint session is established

(if the 'When the option starts' is set to 'Ask each time'). It also displayed when a USB device is plugged when the MultiPoint session is in used if the 'While the session is running' option is set to 'Ask each time'. See Chapters 3.2.5 and 4.3.5.

## 4.5 - REBOOTING OR TURNING OFF THE AX3000

In addition of the on/off switch, an AX3000 shutdown function is available. Press **<Ctrl><Alt><Del>** or click the red icon on the terminal taskbar.

A dialog box allows the next step to be selected:

- [Shutdown] button
- [Reboot] button

For the "Shutdown" choice, a few seconds later, the user is informed that the AX3000 may be turned off.

## 4.6 - AX3000 HOT-KEYS

The AX3000 hot-keys are listed in the following table. (These hot-keys are locally processed by the AX3000 and independent of emulation).

<b>PC-Keyboard</b>	<b>Action</b>
<Ctrl><Alt><Esc>	Enters the AX3000 'MultiPoint' Set-Up
<b>&lt;Ctrl&gt;&lt;Alt&gt;&lt;S&gt;</b>	Locks the screen.
<b>&lt;Ctrl&gt;&lt;Alt&gt;&lt;D&gt;</b>	Closes the RDP session
<b>&lt;Ctrl&gt;&lt;Alt&gt;&lt;Del&gt;</b>	Shuts down the AX3000.
<b>&lt;Ctrl&gt;&lt;Alt&gt;&lt;i&gt;</b>	Information about the current session.
<b>&lt;Ctrl&gt;&lt;Alt&gt;&lt;X&gt;</b>	Opens the connection box (see Chapter 5.1.2)
<Ctrl><Alt><BackTab>	Switch to 'text mode' set-up
<Ctrl><Alt><U>	USB Port Redirection

**Note:** keystrokes written in bold can be disabled. See Chapter A.6.2.

**- 5 -  
ADMINISTRATION**

*This chapter describes the embedded AX3000 tools.*

## **5.1 - LOCAL ADMINISTRATION**

The AX3000 interactive set-up provides the following administration features:

- Using a memory stick to transfer a configuration file
- Updating the terminal firmware (memstick or network)
- Ping command
- Connection management
- Interface information
- USB device list

### **5.1.1 - Handling a Configuration File with a Memstick**

A configuration file is a text file. It can list some or all AX3000 set-up parameters.

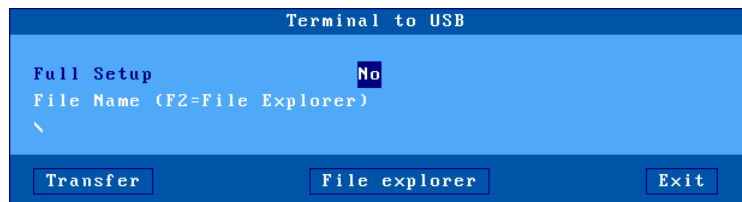
For more information about the configuration file format, see the Chapter 5.2.4.

The configuration file management can also be done remotely. See Chapter 5.2.

#### ***a) Obtaining and Storing the Configuration File***

The configuration file can be obtained from a pre-configured.

Select the **[Upgrade]-[Config File]-[Terminal to USB]** menu from the AX3000 set-up. The following box is displayed:



When **'Full Set-Up'** option is selected, all non-used terminal parameters will be included (as comments) in the configuration file.

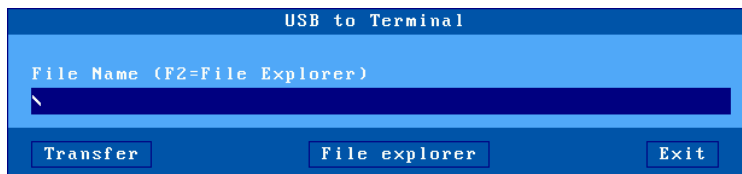
The configuration filename can be manually entered or located with the [File Explorer] button.

Click the [Transfer] button to launch the operation.

#### ***b) Send a Configuration File to the Terminal***

A configuration file can be sent to the terminal.

Select the **[Upgrade]-[Config File]-[USB to Terminal]** menu from the AX3000 set-up. The following box is displayed:



The configuration filename can be manually entered or located with the [File Explorer] button.

Click the [Transfer] button to launch the operation.

**IMPORTANT:** the terminal will automatically reboot after this operation.

### 5.1.2 - Updating the Firmware

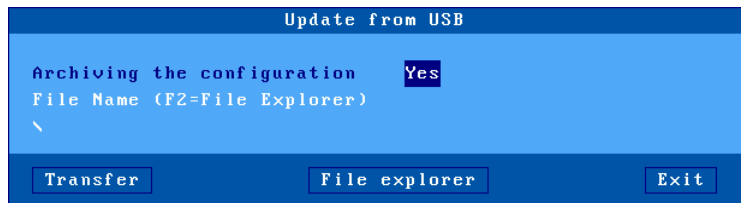
The terminal firmware can be updated. This can be done:

- Remotely with the AxRM software. See Chapter 10.
- From a USB memstick.
- With the bootp/tftp protocol.

All Axel products have an 'FK' (Firmware key) number. **It is important that the firmware file and Axel hardware have the same FK number.** If not the update will fail.

#### a) From a MemStick

Select the **[Upgrade]-[Firmware]-[Update from USB]** menu from the AX3000 set-up. The following box is displayed:



When '**Archiving the configuration**' option is selected, before the firmware upgrade, the configuration file will be stored at the memstick root (the filename is the terminal MAC address).

The firmware filename can be manually entered or located with the [File Explorer] button.

Click the [Transfer] button to launch the operation.

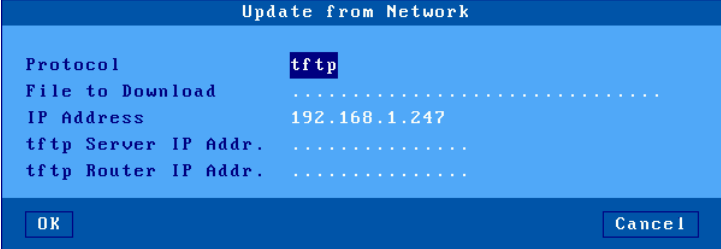
**IMPORTANT:** the terminal will automatically reboot after this operation.

The configuration is not sent automatically to the terminal after the firmware update.



### ***b) With bootp/tftp Protocols***

Select the **[Upgrade]-[Firmware]-[Update from Network]** menu from the AX3000 set-up. The following box is displayed:



Update from Network	
Protocol	tftp
File to Download	.....
IP Address	192.168.1.247
tftp Server IP Addr.	.....
tftp Router IP Addr.	.....

Firmware can be updated in one of two ways:

- **tftp** protocol: the operator must enter the location of the firmware file.
- **bootp and tftp** protocol: this is an automatic procedure. The necessary parameters will already be available from a bootp server.

Note: AxRM can act as a bootp/tftp server

**IMPORTANT:** the terminal will automatically reboot to perform this operation.

### **5.1.3 - The Ping Command**

The ping command is used to check for the presence of a live TPC/IP device. Select the **[Diagnostics]-[Ping]** dialog from the AX3000 set-up, then select the server name from the list or enter the IP address or the DNS name of the server.

### **5.1.4 - Connection Management**

Connection failures are often caused by incorrect settings.

**a) Global Connection List**

Select the **[Diagnostics]-[Connections]** dialog to check the status of all defined connections:

Connections						
SESSIONS						
#	Type	State	Server	Host IP Addr.	Port	Miscellaneous
1	TSE	Connected	.....	192.168.1.213	3389	.....
AUXILIARY PORTS						
Port	Service	State	Other Information			
Net1	None	Closed				
Net2	None	Closed				
Usb1	None	Closed				

Refresh      Close Connections      Exit

**Note:** 'outside' the set-up, use <Ctrl><Alt><X> displays this box.

For each session, the following information is displayed:

- **No:** session number.
- **Type:** always TSE
- **State:** the possible values are:
  - Established: the session is connected,
  - Closed: the session has ended,
  - Syn sent: connection request in progress,
  - Time Wait: connection close in progress.
- **Server** and **IP Addr Host:** the associated host.
- **Port:** the TCP port used for the session.
- **Configuration:** the associated pre-defined configuration.

For each auxiliary port, the following information is displayed:

- **Port:** Usb1, ..., Usb4, Net1 and Net2
- **Service** and **Other:** information about the associated network service:
  - lpd: printer port name and optional filter,
  - rty: TCP port and optional filter.
- **State:** see above for the possible values.

A connection can be manually closed by selecting the [CLOSE CONNECTION] button.

**Note:** to refresh the information displayed, select the [REFRESH] button.

**b) "TCP Server" and "TCP Client" Connection Information**

To go further with connection information, two additional statistics dialog boxes are available:

- **TCP server:** contains information about connections where the AX3000 is acting as a server (lpd, rty and rcmd).
- **TCP client:** contains information about connections where the AX3000 is acting as a client (telnet, tty, rdp, ica and vnc).

These statistics show the following:

- Information about connections
- Values of counters

These dialog boxes are accessed by the [Diagnostics]-[Statistics]-[TCP xxx]-[yyy] menu.

Example of a TCP/IP client box:

TCP/Client Statistics						
Who	Type	State	Local Socket	Remote Socket	Rcv-Q	Snd-Q
S1	Rdp	Connected	192.168.1.210:2568	192.168.1.213:3389	0	0

Description of the information given within this box:

- **Who:** AX3000 resource involved in the connection: S1 (session 1).
- **Type:** network service being used (Rdp, ldp or tty).
- **State:** the possible values are:
  - Established: the session is connected,
  - Closed: the session has ended,
  - Syn sent: connection request in progress,
  - Time Wait: connection close in progress.
- **Local Socket:** IP address and TCP port for the AX3000.
- **Remote Socket:** IP address and TCP port for the host.
- **Rcv-Q:** number of bytes received by the AX3000 and not yet processed
- **Snd-Q:** number of bytes not yet sent to the host

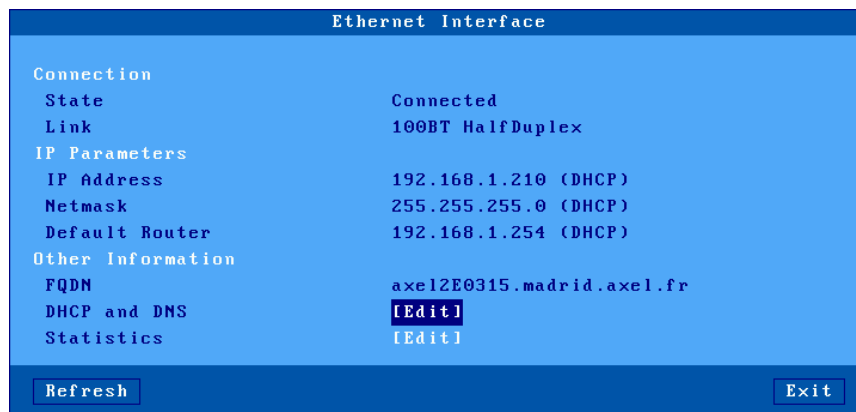
Example of a counter box:

TCP/Client Statistics			
GENERAL		ERRORS	
Sent Connection Requests	0	Bad CRC	0
Sent Reset Frames	0	Bad Length	0
Received Broadcasts	0		
Refresh		Exit	

### 5.1.5 - Ethernet Interface Management

#### a) State

The following information is displayed when selecting the **[Configuration]-[Network]-[Ethernet Interface]-[State]** menu:



Ethernet Interface	
Connection	
State	Connected
Link	100BT HalfDuplex
IP Parameters	
IP Address	192.168.1.210 (DHCP)
Netmask	255.255.255.0 (DHCP)
Default Router	192.168.1.254 (DHCP)
Other Information	
FQDN	axel2E0315.madrid.axel.fr
DHCP and DNS	[Edit]
Statistics	[Edit]
[Refresh]	[Exit]

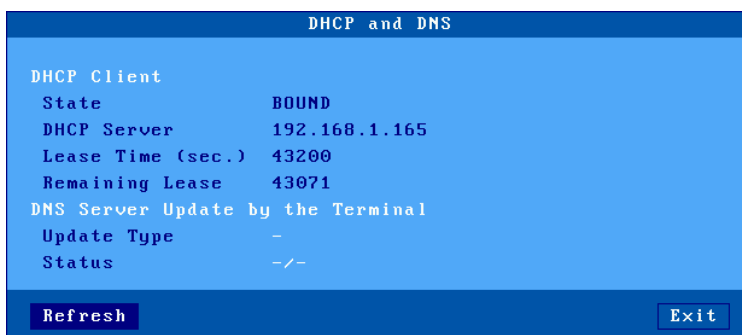
**Note:** this information is automatically updated every 5 seconds. To force an update use the [Refresh] button.

In the above dialog box, the following information is given:

- **Link:** speed and type the network interface (useful when set in auto-sense mode).
- **IP parameters:** IP address, netmask and default router
- **FQDN:** terminal full name

**b) DHCP/DNS**

The DHCP/DNS box is the following:



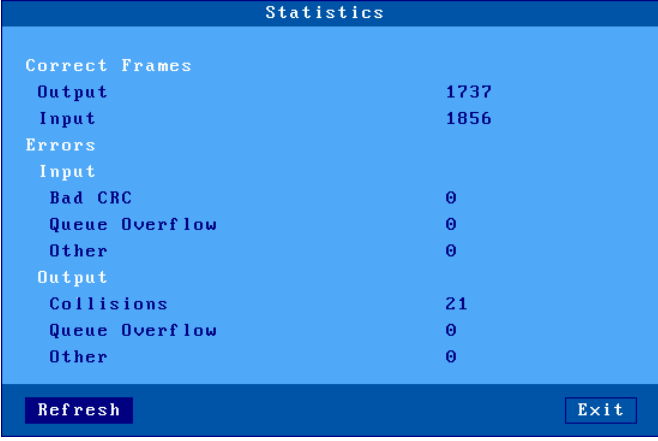
In the above dialog box, the following information is given:

- **State**: the current DHCP state. The possible states are:
  - **selecting**: searching a DHCP server (broadcast)
  - **requesting**: requesting an IP address from the DHCP server which answered 'selecting'
  - **bound**: search has been successfully completed (IP address has been set)
  - **free**: DHCP protocol is not enabled or DHCP protocol failed
  - **renewing**: renewing the leased IP address to the DHCP server which answered 'selecting'
  - **rebinding**: renewing the leased IP address to any DHCP server (broadcast)
- **DHCP Server**: IP address of the DHCP server.
- **Lease Time (seconds)**: amount of time of the leased IP address. For BOOTP protocol, the value is 'infinity'.
- **Remaining Lease**: remaining time before lease expires. For BOOTP protocol, the value is 'infinity'.
- **Update Type**: information about the DNS server update when updated by the terminal. Main values are:
  - **None**: no update
  - **Direct / Reverse**: both types are done by the terminal.
  - **Direct / Reverse (by DHCP)**: direct update done by the terminal and reverse update done by the DHCP server

- **Status:** the possible update values are:
  - **None:** no update (not requested)
  - **Done:** update succeeded
  - **Failed:** update failed
  - **Pending:** update in progress
  - **Dhcp:** update done by the DHCP server (the terminal had been informed to forgive the update)

### c) *Statistic*

The statistics box is the following:



The screenshot shows a window titled "Statistics" with a blue background. It displays network statistics in a monospaced font. The data is organized into sections: "Correct Frames", "Errors", and "Collisions". Each section lists a category and its corresponding count. At the bottom of the window, there are two buttons: "Refresh" and "Exit".

Statistics	
Correct Frames	
Output	1737
Input	1856
Errors	
Input	
Bad CRC	0
Queue Overflow	0
Other	0
Output	
Collisions	21
Queue Overflow	0
Other	0

**Correct Frames:** "Output" and "Input" are the number of correct frames (transmitted and received)

**Errors:** this section gives the type and the number of errors. No errors should be shown in a good working environment/healthy network.

### 5.1.6 - USB Statistics

The **[Diagnostics]-[USB]** menu lists the connected USB devices. For example



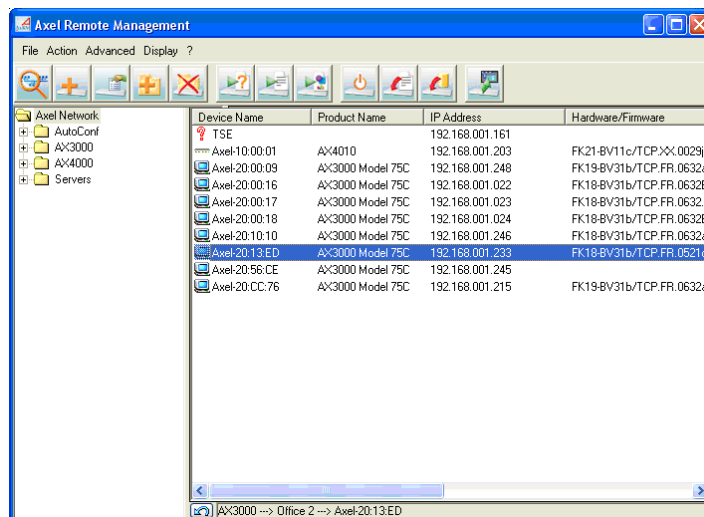
For each line the number is the USB physical port number. The associated label is given by the USB product itself. If the USB product is supported, more information can be obtained by clicking the product name.



## 5.2 - REMOTE ADMINISTRATION

### 5.2.1 - AxRM: The Axel Management Software

A Windows administration utility (AxRM or Axel Remote Management) is available at no charge from the Axel Web site (<http://www.axel.com>):



The AxRM software allows system administrators to manage and configure Axel TCP/IP products remotely over a network. The remote Axel device is selected by its IP address or network name. (The software can also assign an IP address to a newly installed terminal that has not had an IP address set)

AxRM is an abbreviation for Axel Remote Management software.

AxRM is used for:

- Obtaining hardware and firmware revision levels
- Obtaining Ethernet and serial line configuration
- Obtaining network and device statistics
- Obtaining set-up configuration
- Rebooting the peripheral
- Remotely configuring a peripheral
- Downloading firmware,

- Entering the interactive set-up via a telnet client.

It is also possible:

- To build and manage a terminal database,
- To compile a list (batch) of commands to run consecutively,
- To download a firmware through BOOTP,
- To set IP addresses by using the device MAC address.
- Repair terminals that have lost their firmware (bootp error)

For more information about the AxRM utility, read the manual "*Axel Remote Management - Administration Software for Axel Terminals and Office Servers*".

### **5.2.2 - VNC Remote Control**

This functionality allows an administrator to remotely take control of a terminal. The administrator can passively watch the users screen or actively take control with his own keyboard for various support or administration purposes.

To set-up the remote control function, select the menu **[Configuration]-[Terminal]-[Remote Control]**. For more information, please refer to Chapter 3.2.7.

Use AxRM to take the control of the terminal. See Chapter 5.2.1.

### **5.2.3 - Interactive Telnet Set-Up**

The AX3000 interactive set-up can be accessed through a telnet session. A specific TCP port is used.

The default value of this TCP port is 4096. This value can be changed. See Chapter 3.2.7.

We strongly advise using AxRM to open the telnet setup. But any telnet client could be used with the correct arguments as below

- ANSI emulation (with color support)
- TERM value: ansi
- Screen size: 80x25
- Scrolling mode disabled

**Notes:**

- To disable the telnet set-up, set the TCP port to 0.
- When the telnet set-up is running, the set-up is also displayed on the target terminal. The keyboard of the target terminal is locked.
- The AX3000 telnet server supports the keepalive mechanism (value 3 minutes). In event of network incident, the set-up will be automatically ended and the keyboard of the target terminal will be unlocked.

**5.2.4 - Batch Remote Set-Up**

A configuration file can list some or all AX3000 set-up parameters.

A configuration file can either be:

- Created with a text editor or
- Obtained by a remote administration command on an AX3000 already set-up.

The configuration file begins with the header label (BEGIN\_AX\_SETUP) and ends with the trailer label (END\_AX\_SETUP).

Example:

```
BEGIN_AX_SETUP V1.1
# this is a comment
tcp_host1_name=vangogh
...
END_AX_SETUP
```

**Note:** lines beginning with '#' are treated as comments and ignored.

When a configuration file is obtained from an AX3000, the inactive parameters (undefined hosts, print server unused, coloring mode disabled, etc) are commented out.

**a) Header**

```

BEGIN_AX_SETUP V1.1
#####
#           TCP/IP AX3000 Platine Terminal           #
#                                                    #
# Ethernet address: 00:A0:34:20:27:10                #
# Firmware: FK18.BV2.1a/TCP.FR.0826a.STD           #
# 08354                                             #
#####
#
RESET_CMOS

```

**Note:** the RESET\_CMOS command allows all the set-up parameters (except the AX3000 IP address) to be reset. This line can be deleted or set as a comment.

**b) Substitution Commands**

```
axname_encoding_string=      (yes | no)
```

Enabling "axname\_encoding\_string" allows some set-up parameters to contain 'substitution commands'. This allows variables such as the terminal name and the session number. The substitution is done when a set-up file is sent to the terminal.

☺: this function is useful when multiple terminals are configured with the same set-up file, but each terminal requires certain unique parameters.

**Notes:**

- It works only through the remote set-up function. (It's not available with the interactive set-up).
- Some set-up parameters are not supported by this function: the terminal name, the passwords, the pre and post-printing sequences and the transparent mode sequences.

The substitution commands are:

- <\$> is the parameter "ethernet\_axname"

- <#> is the screen session number (1 to 6) or the port session number (AUX1=1, AUX2=2, PARALLEL=3, USB1=4, USB2=5, USB3=6, USB4=7, NET1=8, NET2=9).
- <\$(X,Y)> is an "ethernet\_axname" sub-string (start X, length Y).

**Notes:**

- If X is greater than the "ethernet\_axname" length, the substring is empty.
- If X+Y is greater than the "ethernet\_axname" length the substring is truncated.
- In event of syntax error the substitution is not done.

**Example:** if the terminal name is "axel201234":

```
TERM<$(7,4)>          => TERM1234
TERM<$(7,10)>         => TERM1234
TERM<$(20,7)>          => TERM
TERM<$(20,A)>         => TERM<$(20,A)>
<$(1,2)><$(7,4)><#>    => ax1234-2 (ex.: session 2 or AUX2)
```

**b) End of File**

The configuration file must be ended with the following trailer label:

```
END_AX_SETUP
```



**APPENDIX**

The following appendices give information about:

- A.1 - Using the AX3000 interactive set-up
- A.2 - Network overview (Ethernet address, IP address and routers)
- A.3 - DHCP protocol
- A.4 - DNS protocol
- A.5 - AXEL DHCP Option
- A.6 - Going further...
- A.7 - Hardware and firmware information

## **A.1 - USING THE INTERACTIVE SET-UP**

### **A.1.1 - Entering the Set-Up**

The following can be used to enter the AX3000 interactive set-up:

- Using <Ctrl><Alt><Esc> from the terminal
- Using the AxRM remote control command. See Chapter 5.2.
- Using Telnet to access the terminal remotely. See Chapter 5.2

**Note:** the set-up can be password-protected, in which case the password must be entered to access the quick set-up dialog box. For more information, see Chapter 3.2.8.

### **A.1.2 - Navigation**

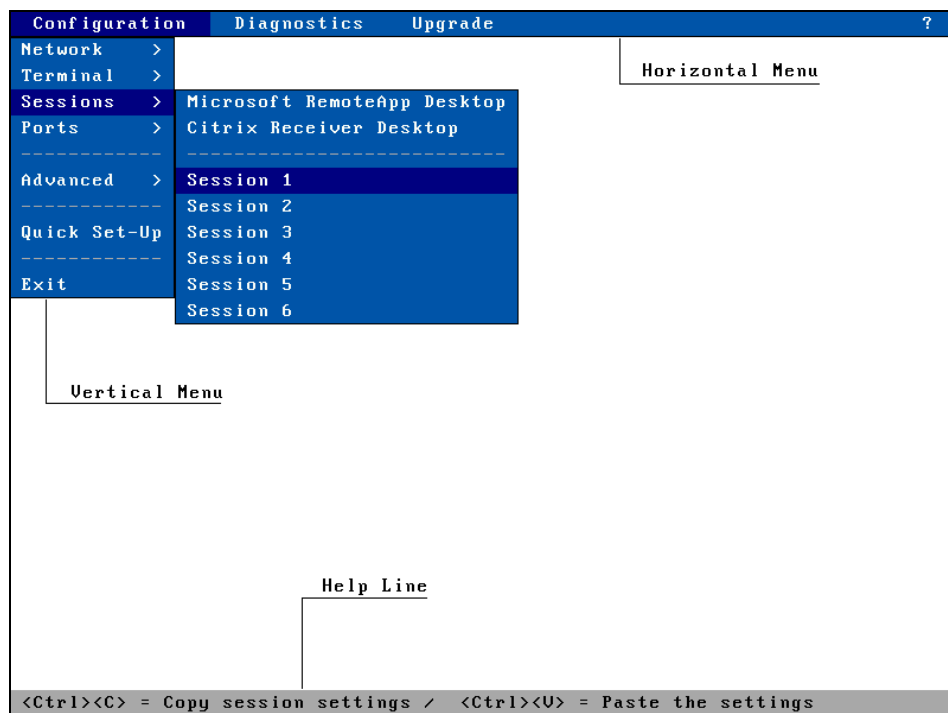
The AX3000 set-up comprises a horizontal general menu, with drop down vertical menus.



The mouse cannot be used within the telnet session.

A help line is located in the bottom of the screen.

The AX3000 set-up screen appears as follows:



**a) The Horizontal General Menu**

Move through the menu with horizontal arrow keys. A different vertical menu will be displayed automatically as each item is traversed.

**b) Vertical Menus**

Move through vertical menus with vertical arrow keys. Confirm the selected command by pressing <Enter> or <Spacebar>.

**Note:** the symbol '>', beside a vertical menu item, indicates that it is a sub-menu.

### **c) Dialog Boxes**

Use the <Tab> or <↓> to move to next field or button. Use the <Shift><Tab> or <↑> to move to previous field or button.

Two types of fields are distinguished in a dialog box:

- Button: press <Enter> or <Spacebar> to perform the associated action.
- Parameter: two types of value occur:
  - A free value (numeric or character string): the data capture mode is automatically enabled (see the next chapter).
  - A discrete value: press <Spacebar> to show the permitted values or to display a list of values. Move through lists with vertical arrow keys; confirm the selected value by pressing <Enter>. Press <Esc> to cancel.

**Note:** pressing <Enter> on a 'Parameter' field allows the default button ([OK], [Next]...) to be selected.

#### **A.1.3 - Enter Data**

When a 'free value' parameter field is selected, a value must be entered (it cannot be selected from a list).

**Note:** to indicate 'free value' mode, the cursor blinks at the beginning of the field.

During this mode the following keys are enabled:

- <Tab>, <↓>, <Shift><Tab>, <↑>: valid the value and move to the next/previous field.
- <Esc>: abandon your changes
- <←> and <→>: move the cursor within the character string
- <Home> and <End>: move the cursor directly to the beginning or the end of the string
- <Del>: delete the character at the cursor position
- <Backspace>: delete the character before the cursor position
- <Insert>: one of two editing modes (Insertion/Overwrite)

To enter characters with an ASCII code lower than 20 hexadecimal, use a backslash (\) before the hexadecimal value. For instance, the 'Esc z' sequence can be encoded by '\1Bz'.

**Note:** when the character string is longer than the length of the field, two indicators are displayed at the left and at the right of the field.

#### **A.1.4 - Special Notation**

The set-up is a sequence of menus and sub-menus. Define an action by the path followed through the set-up tree (hierarchy), using the following notation:

**[item1]-[item2]-[action]**

For example, to perform the above **action**, select **item1** in the main menu, then select **item2** in the sub-menu.

#### **A.1.5 - Exiting the set-up**

To exit the set-up, select **[Configuration]-[Quit]**.

If changes have been made while in the set-up, a dialog box appears:

- Select [Yes] to save the modifications and exit the set-up. The new AX3000 settings will then be stored in NVRAM (non-volatile memory).
- Select [No] to abandon your changes and exit the set-up.

## **A.2 - NETWORK OVERVIEW**

### **A.2.1 - Ethernet Addresses**

AX3000 terminals (like other devices equipped for Ethernet networking) have a unique hardware address which is issued by the manufacturer and cannot be modified. This address is in the form of six hexadecimal bytes, separated by colons:

AX3000 Ethernet address format:

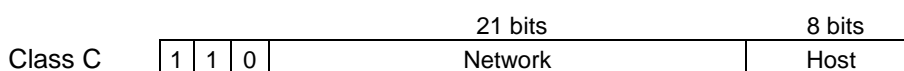
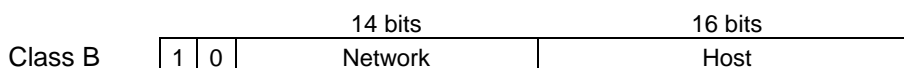
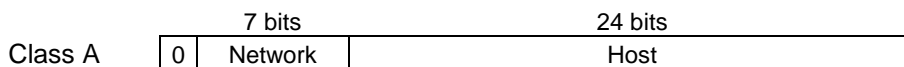
00:A0:34:xx:xx:xx

Select the '?' command in the horizontal menu of the AX3000 set-up to see the AX3000 Ethernet address.

### A.2.2 - IP Address

Every device connected to an Ethernet network must have a single 32-bit address which encodes both the network and the host ID. Internet addresses (sometimes called «IP addresses») are usually written as four decimal numbers separated by decimal points ( '.' character).

There are three main classes of IP address:



Thus every IP address occupies 4 bytes and contains both:

- A network address, and
- A host address.

**Note:** all devices attached to the same network must have the same class and the same network address. Each must have a **different** host address.

For example: an AX3000 connected, over a network, to a host with an IP address 192.1.168.40 (class C: three bytes for the Network address) must have the three first bytes of its address set to 192.1.168. The fourth byte cannot be equal to 40.

### A.2.3 - Router

Depending on the network topology, the AX3000 and the host may be installed on different physical networks and linked through one or several routers.

Two types of router can be used to access remote networks:

- A default router: this router knows how to reach many remote networks.
- Specific routers: in charge of one remote network.

The default router is only identified by an IP address.

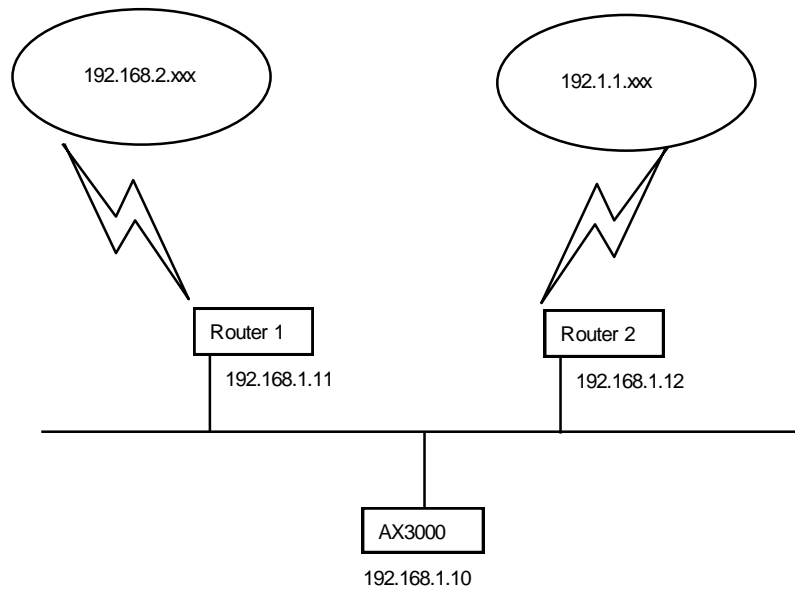
The specific routers are identified by the following parameters:

- **Router IP address:** this router must be connected to the same network as the AX3000.
- **Destination IP Address:** IP address of the host or the network to be reached.
- **Destination Type:** two values:
  - **Host:** the destination is a single host,
  - **Network:** the destination is a whole local network (the class mask is applied to this IP address).

**Notes:**

- At the AX3000 level, the routing algorithm uses a specific router to reach the destination. If no specific router fits, the default router is used.
- The AX3000 doesn't support ICMP REDIRECT requests (dynamic routers are not supported).

**Example 1:** router 1 is used to reach the 192.168.2.xxx network and router 2 is used to reach the 192.1.1.xxx network:

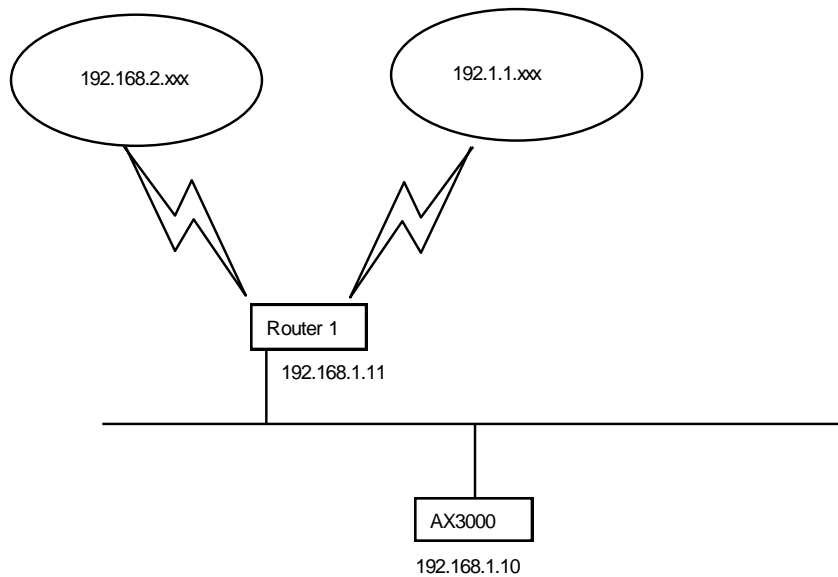


The AX3000 route table will show the following:

Other Routers			
Gateway IP addr	Target IP addr	Target Type	Netmask
192.168.1.11	192.168.2.0	Network	255.255.255.0
192.168.1.12	192.1.1.0	Network	255.255.255.0
.....	.....	.....	.....

OK                      Delete                      Cancel

**Example 2:** router 1 is used to reach both networks (192.168.2.xxx and 192.1.1.xxx):



The AX3000 route table is:



### A.3 - THE DHCP PROTOCOL

DHCP (Dynamic Host Configuration Protocol) is an industry standard protocol that lets a DHCP server (Unix, Windows, AS/400, etc.) allocate temporary IP addresses and other network parameters to terminals and PCs when they are powered on. This can greatly simplify managing large networks.

### **A.3.1 - Overview**

Here is a brief description of Axel's implementation DHCP:

- At boot time the AX3000 broadcasts DHCP requests to find the DHCP server.
- If a DHCP server is found and correctly set-up, an IP address, and subsequently other parameters are given to the AX3000.
- Before accepting the IP address the AX3000 can be set to check that the IP address given really is free (ARP protocol).
- The IP address offered is given temporarily. This duration is called the 'Lease Time'.
- If a lease time has been entered through the AX3000 Set-Up, this lease time is offered to the DHCP server, which may or may not accept this value.
- The AX3000 is expected to renew its lease before the lease expires. Once the lease has expired the AX3000 is no longer permitted to use the assigned IP address.
- Generally an IP address is dynamically assigned out of a pool of IP addresses. However static IP addresses can be associated to AX3000s (for instance when the AX3000's print server is used). This association is performed either by using the AX3000 Ethernet address or by using a 'Client Identifier' (which is a character string entered through the AX3000 Set-Up).
- The DHCP protocol can be considered as a superset of the BOOTP protocol. IP addresses can also be offered to AX3000s by a BOOTP server (in this case the 'lease time' is infinite).
- The AX3000 DHCP client protocol is compliant with RFCs 1533 and 1541.

This section deals only with the AX3000 DHCP protocol use. To set-up and enable a DHCP server please read your operating system's manual.

### **A.3.2 - Setting-Up the AX3000**

DHCP protocol is set through either the AX3000 Quick Set-Up or the AX3000 Interactive Set-up. For more information, see Chapters 2 and 3.

### **A.3.3 - Using the AX3000**

If the DHCP protocol is enabled the AX3000 automatically requests an IP



address on boot, the message 'DHCP in progress' is displayed on the bottom of the screen.

**Note:** the search can be aborted by entering the set-up.

If a DHCP (or BOOTP) server is available an IP address is given after a few seconds. This dialog box is then cleared and the AX3000 follows its normal behavior: either the set-up idle is displayed (no automatic session is set) or an automatic connection is opened.

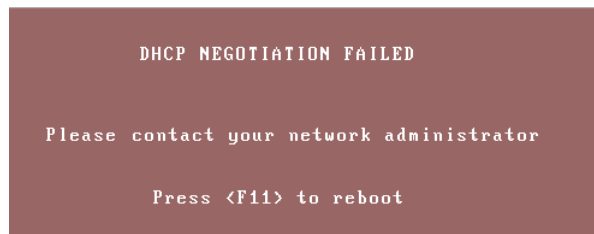
Further 'lease time' re-negotiations are totally invisible to the AX3000 user. Only error messages are displayed (see next chapter).

**Note:** enter the set-up to find out the AX3000 IP address or other parameters offered by the DHCP server.

#### **A.3.4 - Errors**

##### **a) Boot Time Failure**

The AX3000 automatically searches for a DHCP server on booting. If after 30 seconds no DHCP (or BOOTP) server answers the following dialog box is displayed:



At this stage two options are available:

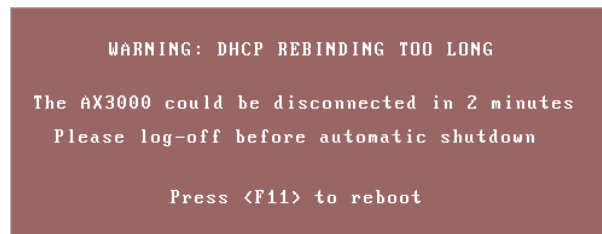
- <F11>: rebooting the AX3000 to run the DHCP search again.
- <Ctrl><Alt><Esc>: entering the set-up to modify AX3000 settings.

##### **b) Re-negotiation Failure**

The lease time must be regularly re-negotiated (except if the IP address has

been offered by a BOOTP server).

If a re-negotiation fails the following dialog box is displayed:



This indicates that in two minutes the AX3000 will be no longer be permitted to use the leased IP address and the session will be terminated

If after these two minutes, the re-negotiation has still failed, an error box is displayed and all current sessions (telnet, tty, lpd, etc.) are closed (i.e. lost). And the terminal is shutdown.

**Note:** the AX3000 Trace Mode allows a trace of data exchanged between the AX3000 and the DHCP server (see Chapter 3.1). This is useful to diagnose problems.

## A.4 - THE DNS PROTOCOL

The DNS protocol (Domain Name System) allows names to be 'resolved' by the AX3000. Resolving is retrieving an IP address associated with a name.

### A.4.1 - Overview

A domain (computer network) can be considered as a tree, with branches (nodes) such as hubs, switches, routers, print servers etc, and leafs, for example PCs, terminals and printers.

The domain system makes no distinction between the use of interior nodes and the leafs, and this documentation uses the term "nodes" to refer to both. (I.e.

any network resource).

Each node has a name (**Label**) which must be unique to other nodes at the same level, but not necessarily unique within the whole network.

**Label syntax:**

- Permissible characters are letters (a..z to A..Z), numbers (0..9) and the hyphen (-).
- A Label must begin by a letter and be ended by a letter or a number.
- The resolution is not case-sensitive.

The domain name of a node is the list of the labels on the path from the node to the root of the tree. A dot is used to separate each label. Two types of host names can be distinguished within the AX3000:

- **A full name:** one or more dots are included in the name.  
Example: "www.axel.com"
- **An incomplete name:** no dots are used. The resolution procedure concatenates another character string to this name (the default DNS domain name). For more information see Chapter 3.1.2.  
Example: "as400" is concatenated with "servers.axel.com" to create a full name of "as400.servers.axel.com"

A host name is only resolved if the IP address is needed. (I.e. to open a session or to ping).

**Note:** a name is resolved for each connection attempt, even if its IP address has been obtained by a previous resolution.

#### **A.4.2 - Resolving a Name**

##### ***a) Resolution Strategy***

To resolve a name, a DNS request is sent by the AX3000. A DNS request contains the destination DNS server IP address and the name to be resolved.

To resolve a name possibly more than one DNS request is needed (if one or more default DNS domains are defined). The resolution process is stopped either when the AX3000 receives a positive response from a DNS server (success: an IP address is associate to this name) or when all the DNS requests

has been sent and no positive response has been received (failure: the name is not resolved).

The order of the requests sent to resolve a hostname is called the resolution strategy.

The resolution strategy depends on both:

- Whether or not a domain name is declared,
- Whether the name to resolve is complete.

If no default DNS domain is defined in the AX3000 Set-Up, the resolution is done with the name itself regardless of whether the name is full or not.

If one or more default DNS domains are defined, the resolution strategy depends on the name:

- Full name: the resolution is first done with this name. If unsuccessful new resolutions are performed by concatenating the full name with the defined DNS domains.
- Incomplete Name: the resolutions are first done with the defined default DNS domains. If unsuccessful a new resolution is performed with this incomplete name.

**Example of name resolutions:** looking at the host table in Chapter 3.1.3 the name resolution attempts are:

- **as400**: this is not a full name, the resolution is first made with the first DNS domain (as400.servers.axel.com). Then, in event of failure, with the second DNS domain (as400.terminals.axel.com). Then, in event of failure, the resolution is made with the name itself (as400).
- **linux**: an IP address is associated. No DNS resolution.
- **www.axel.com**: this is a full name. The resolution is first made with the name itself (www.axel.com). Then, in event of failure, the resolution is made with the first DNS domain (www.axel.com.servers.axel.com). Then, in event of failure, with the second DNS domain (www.axel.com.terminals.axel.com).

### ***b) Resolution Method***

To resolve a name, the AX3000 sends DNS requests to the DNS server(s).

If a DNS server sends back a positive response, then the IP address is found and the resolution operation is completed. If not two cases of failure are possible:

- **Receiving a negative response:** the name is not known by this DNS server. The AX3000 will retry with a new DNS request or with the second DNS server.
  - **No response (time-out):** after a few seconds the DNS server has not sent back a response. The AX3000 resends the same request to the DNS server.
- Note:** after 4 time-out errors on the same DNS server, this server is "removed" from the resolution operation.

**Note:** if a response previously considered as a time-out error is received, this response is treated as a valid response (positive or negative).

The AX3000 requests a **recursive search** to the DNS servers (and not iterative search). This means that the DNS server must search itself for a DNS server which is able to resolve the required name.

The resolution operation depends on the number of DNS servers. These are the steps for a one-server resolution and a two-server resolution.

**One DNS Server:**

- 1 - A DNS request is sent to the server.
- 2 - In event of no response, this request is sent again (4 times max.).
- 3 - In event of negative answer, the resolution is aborted.
- 4 - If other requests can be sent (default DNS domains are defined), go back to step 1.

**Two DNS Servers:**

- 1 - A DNS request is sent to the server 1.
- 2 - In event of no response from server 1, this request is sent to the server 2.
- 3 - In event of no response from server 2, go back to step 1 (4 times max.).
- 4 - In event of negative answer from any server, the resolution is aborted.
- 5 - If other requests can be sent (using default DNS domains are defined), go back to step 1.

Example: looking at the screen shots of the Chapter 3.1, these are the DNS

requests sent to resolve "as400" with 2 DNS servers and 2 default DNS domains (of course this process is stopped if one DNS server sends back a positive response):

- "as400.servers.axel.com" to DNS server 1
- "as400.servers.axel.com" to DNS server 2
- "as400.terminals.axel.com" to DNS server 1
- "as400.terminals.axel.com" to DNS server 2
- "as400" to DNS server 1
- "as400" to DNS server 2

### ***c) Messages Displayed on the AX3000 Screen***

To open a session the AX3000 must resolve the host name (if no IP address has been associated through the set-up).

This is a screen-shot example when the resolution successes:

```
Connecting to as400.servers.axel.com:23 (Telnet)...
Session number 1
Resolving...
Resolved: 192.168.1.180
Connected
```

**Explanation:** the AX3000 attempts to resolve "as400.servers.axel.com". The resolution process returns the IP address which is 192.168.1.180.

In the event of a problem, the "Resolved: a.b.c.d" message is replaced by an error message. For example:

```
Connecting to as400.servers.axel.com:23 (Telnet)...
Session number 1
Resolving...
Srv: domain not found
Press <Ctrl><Alt><Shift><D> to close this session
```

**Error messages:** error messages reported by the DNS server begins with Srv. Error messages from the terminal begin with "Loc". The main messages are:

- **Srv: domain not found:** the name doesn't exist within this domain.
- **Srv: refused query:** the DNS servers refuses to respond to the request. This could be due to a DNS server security function.

- **Loc: no DNS server defined:** no DNS server has been defined through the AX3000 Set-Up.
- **Loc: name syntax error:** the syntax of the name to resolve is not correct (for example two consecutive dots: as400.servers).
- **Loc: timeout:** no DNS server responds
- **Loc: no memory:** due to a temporary memory overload, the AX3000 can not process the name resolution. Retry later.

When the resolution fails, the session must be manually closed. This is done by pressing <Ctrl><Alt><Shift><D>.

#### **A.4.3 - Publishing the Terminal Name**

The terminal name may be registered with the DNS server. This can be done by the DHCP server or by the terminal itself.

##### ***a) By the DHCP Server***

**Important:** the DHCP server must support the DDNS (Dynamic DNS) function.

To register the terminal name by the DHCP server:

- Enable the DHCP protocol
- Set "DNS Server Update" to "by the DHCP server"

Because the DNS server is updated by the DHCP server the information about the type ("direct" or "direct / reverse") and the result (success or failure) of the DNS update is not returned to the terminal.

##### ***b) By the terminal***

The terminal can register itself. The terminal behavior depends on the value of "DNS Server Update" option:

- **By the terminal:** the terminal updates the DNS server only if the DHCP server is agreed.
- **By the terminal (forced):** whatever the DHCP server information, the terminal updates the DNS server (use carefully).

According to the option 'Update Type', the terminal updates "direct (A)" or "Direct (A) and Reverse (PRT)" DNS server records.

For a "Direct (A)" update, two entries are added in the DNS server database:

- A "Host" type entry, containing the terminal IP address,
- A "Text" type entry, containing the terminal signature.

**Note:** the DNS server will be updated only if the terminal name is a full name: ended by a DNS domain (i.e. FQDN).

For a "Reverse (PRT)" update, one entry is added: a "Pointer" type entry, containing the terminal's full name.

**Note:** the signature allows the terminal to check its "Host" type entry. If the check fails (i.e. no associated signature or wrong associated signature) the terminal's behavior during the DNS server update depends on the value of the set-up parameter "**Action on Error**" (see Chapter 3.1):

- **Display an error:** a red dialog box is displayed. The user may reboot the terminal or enter the set-up.
- **Continue the update:** the entries ("Host", "Text" and "Pointer") are overwritten.
- **Cancel the update:** the DNS update is aborted but the terminal is available for use.

The type ("direct" or "direct / reverse") and the result (success or failure) of the DNS update are returned to the terminal and are available in the terminal set-up. See chapter 9.3.

## A.5 - SETTING-UP AXEL DHCP OPTIONS

In addition to the standard options (IP addresses, DNS server...), the DHCP server can be used to communicate manufacturer specific information: this allows to set "**Axel DHCP options**".

For example, Axel's auto-configuration feature (see chapter 2.1) requires the terminal to know the network location of the machine running the management tool (AxRM). This information can be given to terminals using this DHCP feature.



### **A.5.1 - Overview**

A DHCP server has various options numbered as follows:

- From 1 to 223: reserved options. For example, option 3 gives the list of routers and 15 lists DNS servers.
- From 224 to 254: private options. Available for manufacturer use.

The Axel options are contained within the range of numbers from 231 to 240. The 'type' is always 'character string'. The format of the entry is as follows:

- Entry starts with a keyword followed by one or more parameters.
- The symbol ":" is used as separator.

☺: In contrast to some implementations Axel uses a 'keyword' rather than a specific number. The actual number (231 to 240) is irrelevant so any non-conflicting number in this range can be used.

For more information on the Axel options see chapter A.6.3.

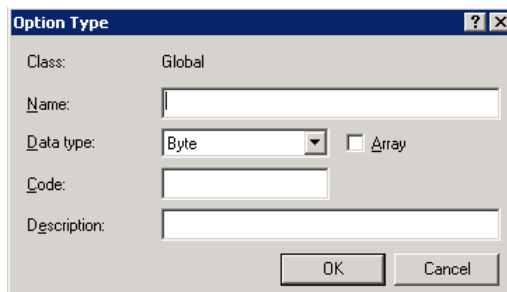
### **A.5.2 - Adding an Axel option with the Microsoft DHCP Server**

To add an Axel DHCP option with Microsoft's DHCP server see below:

1 - Launch the DHCP utility.

Right click on the IP address of the DHCP server and select 'Set Predefined Options' and select 'Add'

2 - The following dialog box is displayed:



The screenshot shows a dialog box titled "Option Type" with a standard Windows window control bar (minimize, maximize, close). The dialog contains the following fields and controls:

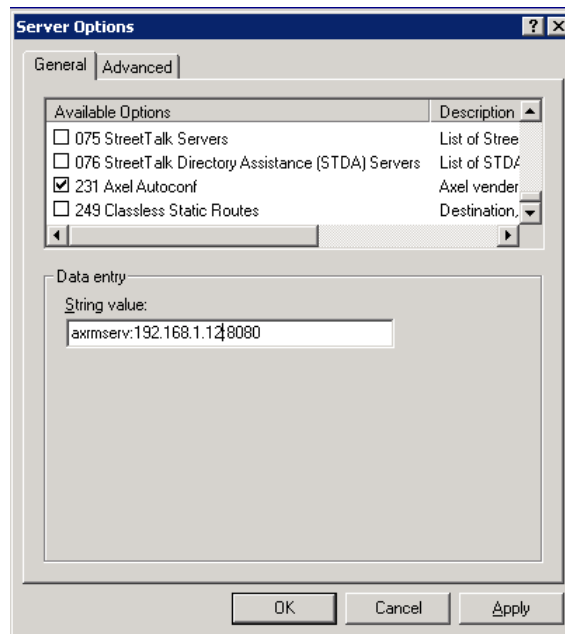
- Class:** A label followed by the text "Global".
- Name:** A label followed by an empty text input field.
- Data type:** A label followed by a dropdown menu currently showing "Byte" and an unchecked checkbox labeled "Array".
- Code:** A label followed by an empty text input field.
- Description:** A label followed by an empty text input field.
- Buttons:** "OK" and "Cancel" buttons are located at the bottom right of the dialog.

Complete the fields as follows:

- Name = (User definable) for example 'Axel Autoconf'
- Data Type = (mandatory) string
- Code = (User definable) select unused number between 231 and 240
- Description = (User definable) for example "Axel vender option for auto-configuration".

Click 'OK' to exit this box and 'OK' again to exit the former box.

3 - In the left panel select 'Server Options' then right click 'Configure Options' Within the available options 'tick' the new Axel entry and enter IP and TCP port details as below as 'string value'. For example:



**Note:** the changes take immediately effect.

### **A.5.3 - 'axrmserv' option: auto-configuration**

The axrmserv option always the network location of the AxRM server to be

broadcast.

The format is as follows:

axrmserver:param1:param2

The parameters are:

- The IP address or DNS name of the AxRM server
- The TCP port AxRM is listening on

Having two parameters is not mandatory nor is the order important. For example you may only need to enter the IP address if the default port 80 is being used.

The table below gives examples:

	AxRM Network Location	
	IP address	TCP port
axrmserver:mypc:82	"mypc" DNS resolution	82
axrmserver:82	The IP address will be given by the method 2 or 3 (see chapter 2.1).	82
axrmserver:192.168.0.1	192.168.0.1	80

## A.6 - GOING FURTHER...

### A.6.1 - Reload Factory Settings

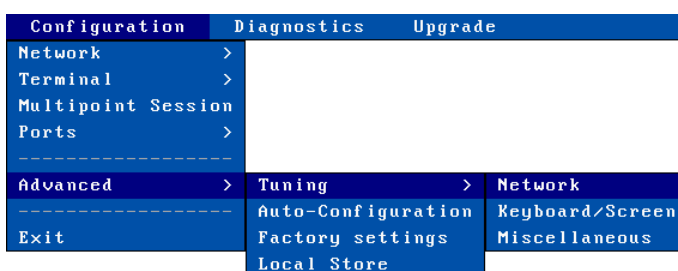
The menu **[Configuration]-[Advanced]-[Factory Settings]** allows, after confirmation, terminal factory settings to be reloaded. **The current configuration is lost.**

On next boot, the Quick Set-Up will be displayed and the Auto-Configuration service will be started (see Chapter 2).

### A.6.2 - General Level: Advanced Parameters

This chapter describes special AX3000 operating parameters. Usually the default values are suitable.

All these general parameters are located in sub-menus from **[Configuration]-[Advanced]-[Tuning]**:



#### a) Network Menu



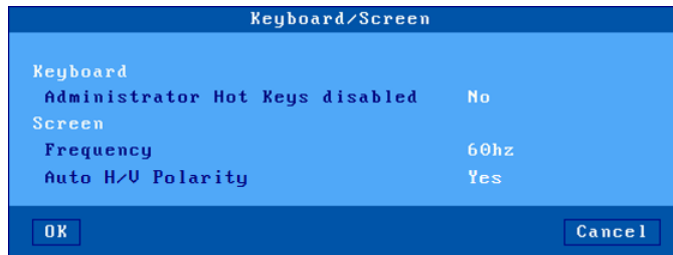
**IP Address Set by Ping:** this parameter allows or disables the AX3000 IP Address to be set by a ping command. See Appendix A.6.4.

**Allow Network Discover:** by default, SNMP requests are supported by Axel terminals. This allows terminals to be discovered by AxRM (the Axel administration software). This parameter can be used to disabled the SNMP support.

**DNS Trace Mode:** turn on/off DNS trace messages.

**MTU:** set the Maximum Transfer Unit value (Ethernet layer).

**b) Keyboard/Screen Menu**



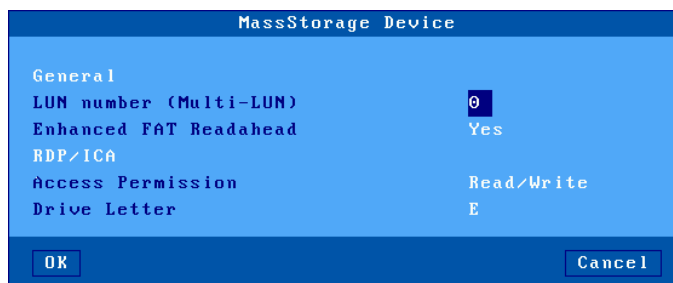
**Administrator Hot-Keys disabled:** this parameter allows certain AX3000 hot-keys to be disabled, possibly useful if the terminal is installed in public places. For example, this prevents a user from invoking <Ctrl><Alt><Del> function. For more information, see Chapter 4.6.

**Note:** when this parameter is set to 'yes', the "consultation mode" and the "super password" don't allow the set-up to be entered.

**Frequency:** by default the Frequency is set to 60Hz. An alternate value is available: 75Hz.

**Auto H/V Polarity:** by default, the horizontal & vertical sync polarities for the 'recommended' resolution are detected when the thin client is powered on (EDID protocol). This can be disabled and 'hard-coded' values are used.

**c) Mass Storage Devices Menu**



**LUN Number:** some USB drives may be formatted in multi-LUN mode (multiple partitions). But the Axel Thin Client handles only a single LUN. This option

allows the LUN number to handle to be selected. (If the LUN Number is too high, the LUN #0 will be used).

**Enhanced FAT Readahead:** this option allows performances to be increased. It could be disabled.

External USB mass storage devices (memory sticks, hard drives, CD/DVD readers...) are redirected to the Windows/Citrix server and are seen as local drives

The USB drive parameters are:

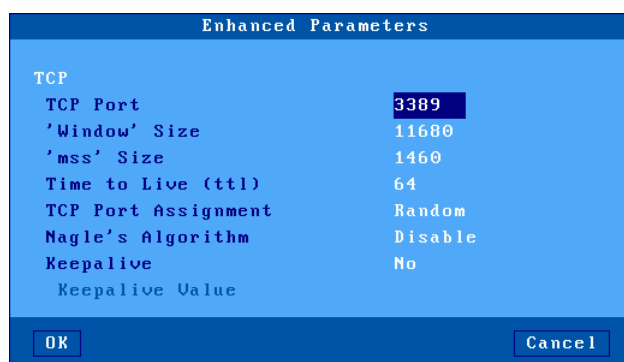
- **Access Permission:** 'Read Only' and 'Read/Write'
- **Driver Letter:** mnemonic given to the Windows server.

**Important:** this box allows "global" parameters to be set-up. It is necessary to also enable/disable USB drive redirection for the MultiPoint session (see Chapter 3.3.5).

### **A.6.3 - Session Level: Enhanced Parameters**

Each session (screen or printer port) offers enhanced parameters. These parameters are available through the "Connection Properties" box (depending on the session type this box is located in the **[Sessions]-[Session x]** menu or the **[Aux. Ports]-[xxx]** menu).

This is an example of the dialog box:



**Notes:**

- The available parameters depend on both the connection type (screen or printer port) and the associated protocol.
- New values are used for the next TCP/IP connection (no need to power-cycle the AX3000).

**a) The 'TCP port' Parameter**

This parameter is the server TCP port on which the session is connected. The default values 3389.

**b) The 'mss' and 'Window' Parameters**

These two parameters are the AX3000 resources allocated to telnet and tty screen sessions for receiving network data:

- **mss** (maximum segment size) is the largest segment of TCP data. This size is negotiated with the server at the connection time.
- **window** is the reception windows size (i.e. the size of the buffer on which the TCP data is stored).

It is not advisable to modify these two values unless the input data flow is not continuous (i.e. the data flow pauses and resumes regularly during scrolling).

**c) The 'Time to Live' Parameter**

This parameter controls the 'to live' time of the datagram to prevent it being looped forever due to routing errors. Routers decrement the TTL of every datagram as it traverses from one network to another. When its value reaches 0 the packet is dropped.

This parameter doesn't impact the AX3000 performance.

**d) The 'TCP port Assignment' Parameter**

The AX3000 resources (screen sessions and auxiliary ports) are identified by numeric values called TCP ports.

The TCP port assignment can be either random or fixed. The default value depends on the current network service.

The random method means the AX3000 TCP ports are different after every re-boot. On booting the AX3000 generates a new base value. This value (x) is

between 1024 and 3072. For each session a range of 8 TCP ports is given: session 1 = (x...x+7), session 2 = (x+8...x+15)... When a connection is established the next port of the associated range is used. After 8 connections, the same TCP port of a range is re-used.

The main benefit of this method is that if the AX3000 is suddenly powered off (power cut for example), at the next boot time, the connections are immediately accepted by the server. (i.e. the sessions are hooked on different sockets because the TCP ports are different). However this does create 'phantom' sessions, as the initial sessions are still active from the server's perspective, and must be killed by the server.

This can be done with the 'keepalive' process, manually killing or rebooting.

In some situations it may be beneficial to have always the same TCP port for an AX3000 resource (to avoid phantom sessions or to identify connections). This is the fixed port assignment. With this method the AX3000 resources are always:

- session 1 = 1024,
- net1 = 1035, net2 = 1036,
- usb1 = 1037, ... ,usb4 = 1040

#### ***e) The 'Nagle's Algorithm' Parameter***

The Nagle's Algorithm controls behavior of the output network dataflow of a TCP/IP device. This algorithm allows the number of datagrams sent by the AX3000 to decrease. However a certain latency may be noticeable due to the caching of data before transmission.

This algorithm is disabled to prioritize performance. However some operating systems require this function to be enabled.

#### ***f) The 'Keepalive' Parameter***

The keepalive is a mechanism that allows the AX3000 to regularly check its TCP/IP connection status.

In event of network incident, the AX3000 is able to detect this incident and to close the related TCP/IP connections. This mechanism is also useful when DSL connections are used (the AX3000 IP address is reset on time per day).

By default the keepalive function is disabled.



The keepalive function is set in minutes

**Note:** with ISDN routers (which automatically drop the phone line) this regular data flow will prevent the router from hanging-up. In this scenario the keepalive can cause expensive phone bills.

**g) 'Additional Time-Out for Reconnection (sec)' Parameter**

When the MultiPoint session is set in 'auto-reconnection' mode, the reconnection is attempted immediately after the disconnection.

If needed, this option allows this reconnection to be delayed.

**A.6.4 - Setting the IP Address by a PING Command**

The administrator can remotely assign an initial IP address to a brand new terminal, or remotely change an existing IP address.

The procedure is to manually modify the ARP table of your computer (Unix, Linux, Windows...). An ARP table entry is composed of IP addresses and Ethernet MAC addresses. The command below associates an arbitrary IP address to the terminal's hard coded MAC address. The MAC address is printed on the base of each terminal. With its updated ARP table your computer is able to access the AX3000. To set the new IP address the terminal must be pinged a multiple times.

**Using under Windows:**

☺: Windows administration s/w (AxRM or Axel Remote Management) is available free on the Axel Web site. See Chapter 5.2.

ARP table modification (Ethernet address notation, '-' are used as separators instead of ':'). The command is:

```
C:\> arp -s a.b.c.d xx-xx-xx-xx-xx-xx
```

Run one or more ping commands (4 ping requests are sent by ping command):

```
C:\> ping a.b.c.d
```

**Note:** if required this function can be disabled by setting the 'IP Addr. Set by Ping' parameter to 'no'. For more information, refer to Appendix A.6.2.

### **A.6.5 - RDP Sessions: Microsoft Keyboard Codes**

For RDP session a Microsoft keyboard code can be specified (see Chapter 3.2.5).

The following table lists the available keyboard codes:

<b>Keyboard Nationality</b>	<b>Code</b>	<b>Keyboard Nationality</b>	<b>Code</b>
Afrikaans	0436	Icelandic	040F
Albanian	041C	Indonesian	0421
Arabic - United Arab Emirates	3801	Italian - Italy	0410
Arabic - Bahrain	3C01	Italian - Switzerland	0810
Arabic - Algeria	1401	Japanese	0411
Arabic - Egypt	0C01	Korean	0412
Arabic - Iraq	0801	Latvian	0426
Arabic - Jordan	2C01	Lithuanian	0427
Arabic - Kuwait	3401	Macedonian (FYROM)	042F
Arabic - Lebanon	3001	Malay - Malaysia	043E
Arabic - Libya	1001	Malay – Brunei	083E
Arabic - Morocco	1801	Maltese	043A
Arabic - Oman	2001	Marathi	044E
Arabic - Qatar	4001	Norwegian - Bokml	0414
Arabic - Saudi Arabia	0401	Norwegian - Nynorsk	0814
Arabic - Syria	2801	Polish	0415
Arabic - Tunisia	1C01	Portuguese - Portugal	0816
Arabic - Yemen	2401	Portuguese - Brazil	0416
Armenian	042B	Raeto-Romance	0417
Azeri - Latin	042C	Romanian - Romania	0418
Azeri - Cyrillic	082C	Romanian - Moldova	0818
Basque	042D	Russian	0419
Belarusian	0423	Russian - Moldova	0819
Bulgarian	0402	Sanskrit	044F
Catalan	0403	Serbian - Cyrillic	0C1A
Chinese - China	0804	Serbian - Latin	081A
Chinese - Hong Kong SAR	0C04	Setsuana	0432

Chinese - Macau SAR	1404	Slovenian	0424
Chinese - Singapore	1004	Slovak	041B
Chinese - Taiwan	0404	Sorbian	042E
Croatian	041A	Spanish - Spain	0C0A
Czech	0405	Spanish - Argentina	2C0A
Danish	0406	Spanish - Bolivia	400A
Dutch - Netherlands	0413	Spanish - Chile	340A
Dutch - Belgium	0813	Spanish - Colombia	240A
English - Australia	0C09	Spanish - Costa Rica	140A
English - Belize	2809	Spanish - Dominican Republic	1C0A
English - Canada	1009	Spanish - Ecuador	300A
English - Caribbean	2409	Spanish - Guatemala	100A
English - Ireland	1809	Spanish - Honduras	480A
English - Jamaica	2009	Spanish - Mexico	080A
English - New Zealand	1409	Spanish - Nicaragua	4C0A
English - Philippines	3409	Spanish - Panama	180A
English - South Africa	1C09	Spanish - Peru	280A
English - Trinidad	2C09	Spanish - Puerto Rico	500A
English - United Kingdom	0809	Spanish - Paraguay	3C0A
English - United States	0409	Spanish - El Salvador	440A
Estonian	0425	Spanish - Uruguay	380A
Farsi	0429	Spanish - Venezuela	200A
Finnish	040B	Southern Sotho	0430
Faroese	0438	Swahili	0441
French - France	040C	Swedish - Sweden	041D
French - Belgium	080C	Swedish - Finland	081D
French - Canada	0C0C	Tamil	0449
French - Luxembourg	140C	Tatar	0444
French - Switzerland	100C	Thai	041E
Gaelic - Ireland	083C	Turkish	041F
Gaelic - Scotland	043C	Tsonga	0431
German - Germany	0407	Ukrainian	0422
German - Austria	0C07	Urdu	0420
German - Liechtenstein	1407	Uzbek - Cyrillic	0843
German - Luxembourg	1007	Uzbek - Latin	0443
German - Switzerland	0807	Vietnamese	042A
Greek	0408	Xhosa	0434

Hebrew	040D
Hindi	0439
Hungarian	040E

Yiddish	043D
Zulu	0435

**Note:** this list can be found on the MSDN Microsoft site:

<http://msdn.microsoft.com/library/default.asp?url=/library/en-us/script56/html/882ca1eb-81b6-4a73-839d-154c6440bf70.asp>

## A.7 - HARDWARE AND FIRMWARE INFORMATION

To obtain the terminal's firmware and hardware revisions, use one of the following:

- Use the AxRM utility,
- Enter the AX3000 interactive set-up, and select '?',

### A.7.1 - Hardware Information

The AX3000 hardware information is **FKx-BVyyy**:

- **FKx** is the circuit board code (FK stands for Flash Key)
- **BVyyy** is the boot code version (the boot code is the non-erasable part of the flash memory)

There are currently five different generations of hardware in the field:

- FK3, FK5 & FK11: models 55, 55E and 56
- FK7: models 65
- FK13: models 65 and 65E
- FK14: models 65/65E (PS/2 mouse)
- FK15: models 60/60E
- FK16: 75/75B/75E
- FK17: models 65B (10/100BaseT)
- FK18, FK19 & FK40: models 75C
- FK20 & FK45: models 65C
- FK30 & FK31: models 70W
- FK35 & FK36: models 70F
- FK41: models 75D
- FK51: models 85

- FK52: models 85B
- FK55: models 80F
- FK56: models 80G
- FK57: models 80WMS

**Note:** the correct firmware file must be downloaded for your AX3000 hardware. Example: if FK14 firmware file is downloaded into FK11 hardware, the download process will fail.

### **A.7.2 - Firmware Information**

The firmware version is **FCT.NA.yywwi:WMS**

- **FCT** is the AX3000 operating mode (always TCP)
- **NA** is the firmware nationality (code is ISO compliant). The main nationalities are:
  - XX: International (except for the following countries)
  - BR : Brazil
  - CZ : Czechoslovakia
  - DK : Denmark
  - EE : Estonia
  - FI : Finland
  - FR : France
  - GR : Greece
  - BR: Brazil
  - IS : Iceland
  - PL : Poland
  - PT : Portugal
  - RU : Russia
  - SI : Slovenia
  - SK : Slovakia
  - TR : Turkey
- **yywwi** is the year and the week number of the firmware creation following by an alphabetical index (for instance: 1236b).
- **WMS** stands for 'Windows MultiPoint Server'.

**Note:** three parameters depend on the firmware nationality:

- The set-up message nationality (FR: French messages, other: English messages),
- The possible presence of a national keyboard and associated character set. For instance, the Turkish environment (keyboards and character set) is only available with the 'TR' firmware.
- The default keyboard nationality (FR: France, XX: North American, TR: Turkey, etc).



## PERSONAL NOTES

A large, empty rectangular box with a thin black border, intended for writing personal notes. The box is centered on the page and occupies most of the lower half of the document.

AXEL

14 Avenue du Québec  
Bât. K2 EVOLIC - BP 728  
91962 Courtabœuf cedex - FRANCE  
Tel.: 33 1.69.28.27.27 - Fax: 33 1.69.28.82.04 - Email: [info@axel.com](mailto:info@axel.com)