AXEL Platine Terminal

Ethernet TCP/IP Models

Installing on OS/400

Preliminary

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- 1 -
INTRODUCTION

This chapter introduces the AX3000 concept.

1.1 - NOTE

The AX3000 are equipped with an Ethernet TCP/IP interface, then the AS/400 must be also equipped with an Ethernet board.

The TCP/IP package must be also included in the OS/400 Operating System (this is a standard feature from OS/400 V3Rx).

The following pages describe the installation and the use of TCP/IP AX3000. This procedure assumes that an OS/400 TCP/IP package has been correctly installed.

1.1 - OVERVIEW

The TCP/IP AX3000 support the following features:

1) 'Terminal' Feature
Each TCP/IP AX3000 can operate as up to eight concurrent and independent virtual terminals. With this virtual terminal capability, an AXEL Platine terminal can provide multiple connections across a network. Each virtual terminal can be:

- connected to any TCP/IP networked host,
- set, using independent parameters (emulation, function keys, colour video attributes, etc.).

2) 'Print Server ' Feature
The AX3000 also has a built-in network print server. This embedded TCP/IP print server allows a printer, connected to any of the auxiliary ports (serial or parallel) of the AX3000, to be seen as a system printer by any network user.

3) 'Terminal Server ' Feature
The AX3000 provides two bi-directional auxiliary serial ports. These serial ports can be automatically controlled by the embedded rtelnet service to attach serial terminals. No additional software is needed.

These three features are described in Chapters 2, 3 and 4.

The appendix of this manual describes others features such as the status line, the TCP/IP protocol tuning and the statistic environment.

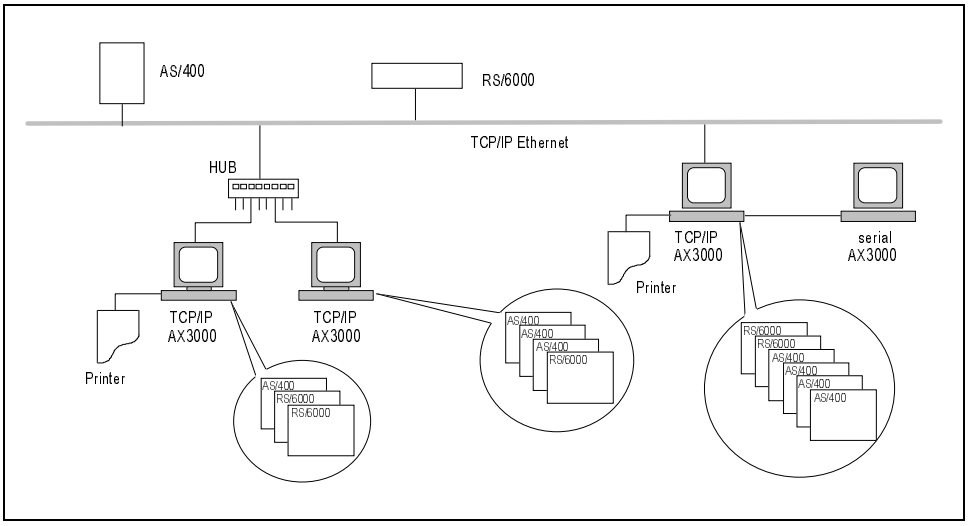
1.3 - EXAMPLE CONFIGURATION

In the next page, an AS/400, a RS/6000 and three Ethernet TCP/IP AX3000 and a serial AX3000 are shown.

Each TCP/IP AX3000 can access the both operating systems through the AX3000 multi-connection feature.

Each printer, attached to the TCP/IP AX3000, can be addressed by all network users. These printers are seen as system printers (lpd protocol) by the AS/4000 and the RS/6000.

The serial AX3000, attached to a serial port of a TCP/IP AX3000 is totally handled by the terminal server embedded in the TCP/IP AX3000.



Example configuration

Note: to install a TCP/IP AX3000 on IBM AIX, refer to the manual *Installing under UNIX*.

- 2 -
TERMINAL FEATURE

This chapter provides the general information needed to install and configure TCP/IP AX3000 on an Ethernet network.

2.1 - SETTING-UP THE AX3000

The main steps to install a TCP/IP AX3000 are:
- define the network environment,
- set the multi-session configuration,
- select the underline attribute method.

2.1.1 - Network Environment

The network environment (IP address, hosts and routers) is set through the TCP/IP AX3000 Set-Up.

Press **<Ctrl><Alt><∗>** to enter the TCP/IP Set-Up (Use the **[Session]→[Quit]** menu to save modifications and exit the set-up).

a - AX3000 IP Address

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

To enter the AX3000 IP address use **[Network]→[IP AX3000]**.

Note: the AX3000 IP address can also set through the RARP protocol when the AX3000 is powered on for the first time.

b - The Hosts

A host is accessed by the AX3000 through the TELNET and TCP/IP protocols.

To add a new host, use **[Network]→[Add Host]** and enter the following parameters:

- **Hostname**: the name of the host (any alphanumeric character string beginning with a letter).
- **IP Address**: host IP address.
- **Telnet Port**: the TCP port used by the telnet service on OS/400. Generally, this is the TCP port 23.

To cancel a host assignment, use **[Network]→[Drop Host]**. You will be presented with a sub-menu listing all currently declared hosts. Select the one to be dropped, from this sub-menu list, and press **<RETURN>**.

c - The Routers

Depending on the network topology, the AX3000 and the host may be installed on different physical networks and linked through one or several routers. In this configuration, **any router** that is to be declared in the Network menu of the TCP/IP Set-Up **must belong to the same physical network** as the AX3000.

To add a new router, use **[Network]→[Add Route]** and enter the following parameters:

- **Gateway Address**: router IP address. This router must be connected to the same network as the terminal.
- **Host IP Address**: IP address of the host to be reached.
- **Mask**: logical mask on the host IP address. The default value of this mask distinguishes the host segment from the network segment of the IP address.

Note: the router list must always include the router named **'default'**. If this router name is cancelled in error, it will be generated again, automatically, when the Platine terminal is next switched-on.

To cancel a router assignment, use **[Network]→[Drop Route]**. You will be presented with a sub-menu listing all currently declared routers. Select the one to be dropped, from this sub-menu list, and press **<RETURN>**.

2.1.2 - Multi-session Configuration

The main steps to configure the AX3000 multi-session feature are:
- set the maximum session number: TCP/IP Set-Up,
- associate a host to each session: TCP/IP Set-Up,
- set each session terminal parameters (emulation, function keys, etc.): Terminal Set-Up.

a - Session Number

The Platine terminal controls up to 8 screens simultaneous. This number of screens has to be shared between:
- the **number of sessions** (i.e. number of simultaneous connections),
- the **number of Pages/Session**.

For example: 8 sessions with 1 page per session, 4 sessions with 2 pages per session, etc.

Press **<Ctrl><Alt><*>** to enter the TCP/IP Set-Up and select **[Terminal]→[Sessions]**. Then enter the number of session and the number of page/session.

Note: it is impossible to modify these two parameters when one or more telnet sessions are active.

Select **[Session]→[Quit]** to save these modifications and exit the set-up.

b - Associate sessions

Any available AX3000 session can be associated automatically with one of the declared hosts. When the session is accessed, the connection to the selected host is automatically made. This saves making the connection manually each time and provides a convenient, dedicated link between each session and its corresponding host.

Press **<Ctrl><Alt><*>** to enter the TCP/IP Set-Up.

To set an association, select **[Terminal]→[Add View]** and enter the following parameters:

- **View** enter the view number (from 1 to 8)
- **Hostname** enter the name of a host (which must have been previously declared in the 'Network' menu through the 'Add Host' option).
- **TERM** enter the TERM value (vt220 for OS/400 and hft-c for IBM AIX).
- **Status Label** This field appears when the status line is enabled. Enter the label associated with this session. If no label is entered, the default value is the hostname.
- **PowerOn Connect** **'y'**: the connection will be automatically established when the Platine is powered on.
  'n': Press <Alt><Fx> to establish the connection.
- **Auto Reconnect** **'y'**: a new connection is automatically established after a disconnection (<Ctrl><D>).
  'n': Press <Alt><Fx> to establish a new connection.

Operation of the AX3000 with Session/Host facilities is described in Chapter 2.2.

To cancel an association, use **[Terminal]→[Drop View]**. You will be presented with a sub-menu listing all currently declared association. Select the one to be dropped, from this sub-menu list, and press **<RETURN>**.

Select **[Session]→[Quit]** to save these modifications and exit the set-up.

c - Session Terminal Parameters

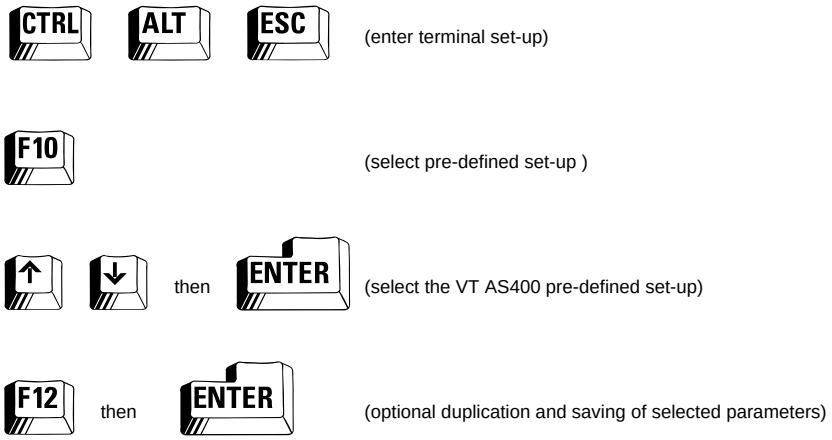
Each AX3000 provides up to 8 independent virtual terminals. Multi-connection lets any AX3000 user run up to 8 simultaneous working sessions (on different hosts, if required). Virtual terminals have independent set-up parameters (emulation, function keys, video attributes, etc.). For example, an **ANSI RS6000** emulation can be used on one view while a **VT AS400** emulation is being used on another.

The set-up of parameters for each virtual terminal is done with the AX3000 Terminal Set-Up (**<Ctrl><Alt><Esc>**).

Note: Terminal Set-Up should be entered only during an active session.

The **pre-defined set-up** feature automatically initiates main terminal parameters for the corresponding session. If necessary, each individual terminal parameter (number of lines, columns, function keys, etc.) can be modified individually.

The dedicated OS/400 predefined set-up is VT AS400. A session involves the following steps:



If all sessions will use identical settings, those of one active session can be duplicated automatically to **ALL** other sessions, by a propagation option invoked by **<F12>**.

Note: modifications to this setting will affect current sessions immediately. Other sessions will not be modified until they are activated.

For a detailed description of the Terminal Set-Up refer to the *User's Guide.*

2.1.3 - Underline Attribute

Generally a software running on OS/400 doesn't use the colour mode. It uses only monochrome attributes (reverse video, bold, blinking and underline).

The reverse video attribute, the bold attribute and the blinking attribute are supported by all VGA monitors. But, the underline attribute is only supported by **monochrome VGA monitors** (this attribute can not be used with a colour VGA monitor).

Then, how can get the underline attribute with a colour VGA monitor ?

a - Using the Monitor as a Monochrome Monitor

This method allows to get all the monochrome attributes.

The monitor must be set as a monochrome monitor and then all AX3000 sessions are monochrome (and the AX3000 colouring mode is not available).

To set the VGA monitor, enter the Terminal Set-up (**<Ctrl><Alt><Esc>**) and set the '`Screen`' field to '`Monochrome`'.

Press **<F12>** then **<CR>** to save these modifications and exit the set-up.

b - Using the Colouring Mode

The AX3000 provides the colouring mode. This mode allows to set foreground colours and background colours for monochrome attributes (normal, reverse video and underline) and for semi-graphic characters.

The benefit of this method is the colouring mode is dedicated to a session. Then, you can get, on a same AX3000, coloured sessions with different colours and sessions using the native colours of a software.

To enable and set the colouring mode of a session, enter the Terminal Set-Up (**<Ctrl><Alt><Esc>**) and press **<F5>** (Operating Mode). Within this set-up screen, select the '`Colouring Mode`' field and press **<Space>** to enable the mode. Then press **<Return>** to select colours.

Within this set-up screen, use **<↑>** and **<↓>** to select a colouring attribute and the **<SPACE>** key to change the colour (foreground and background). **<+>** and **<->** keys are used to select the colour (8 colours for the background, 16 colours for the foreground).

Note: set different background colours for normal attribute and underline attribute.

Use the **<Esc>** key to return to the previous set-up screen. Then press **<F12>** and **<CR>** to saves these modifications and exit the set-up.

c - Using underline attribute in colour mode

An AX3000 set-up parameter allows to use the underline attribute in colour mode. But, using the underline attribute in colour mode disables the bold attribute.

This method is a good way to get the underline attribute if the bold attribute is not used by the software running on the AX3000.

To get the underline attribute on a colour VGA monitor, press **<Ctrl><Alt><Esc>** to enter the Terminal Set-Up and set '`Enhanced Screen Operating Mode`' to '`Underline`'. Then set '`Enhanced Mode for this session`' to '`Yes`'

Press **<F12>** and **<CR>** to saves these modifications and exit the set-up.

Note: using this method with the colouring mode (see previous chapter) allows to get the underline attribute in colour mode. But, as the bold attribute is not available, only 8 foreground colours are available.

2.2 - USING THE AX3000

2.2.1 - Multi-session Feature

AXEL TCP/IP Platine terminals provide **multiple and concurrent connections.** This feature allows simultaneous access to multiple hosts and applications.

To switch between sessions, use the following keystroke combination:

Where **<Fx>** represents whichever of the **<F1>** to **<F8>** function keys corresponds to the session number required.

Notes: these keystrokes can be changed through the Terminal Set-Up (for more information refer to the *User's Guide*).

The association, of sessions with one or more hosts, provides automatic connections and makes the AX3000 very easy to use. Automatic connections are performed when the Platine terminal is turned-on and when switching from one session to another.

These Session/Host associations provide two major benefits:
- they enable users to make quick, automatic and faultless connections,
- they initialise connection parameters without the need to enter set-up.

When the AX3000 is turned-on, automatic connections are made for the sessions, if the **'PowerOn Connect'** parameter is set to **'y'** (yes).

If no session is set in this way, the Session/Host association list is displayed. For example:

```
session 1 → Site1  vt220
session 2 → Site1  vt220
session 3 → Site2  hft-c
```

Using the proper key sequence will then initiate a new, automatic connection to one of the hosts.

When switching from one session to another, using (**<Alt><Fx>**), an automatic connection is made to the host associated with the new session.

When the user closes the current session, the behaviour of the AX3000 depends on the '**Auto Reconnect'** parameter for the current session.

If this parameter is set to '**y**' (yes), a new connection is immediately and automatically established with the current session.

If this parameter is set to '**n**' (no), the AX3000 displays the first of the remaining active sessions. If there are no remaining active sessions (for example, when the disconnect capability has been invoked from the last active session), the Session/Host association list is displayed.

2.2.2 - Using Keyboard in VT AS400 Emulation

The VT AS400 predefined set-up allows to get 5250 functions on a PC/AT keyboard:

5250 Kbd	PC/AT Keyboard
<F1>	<F1>
...	...
<F12>	<F12>
<F13>	<Shit><F1>
...	...
<F24>	<Shift><F12>

5250 Kbd	PC/AT Keyboard
Print	<Print Screen>
Field Avance	<Tab>
Error Reset	<Ctrl left>
New line	<Shift><Return>
Field Backspace	<Shift><Tab>
Help	<Alt><Shift><F1>
Attention	<Alt><Pause>
System request	<Alt><Print Screen>
Duplicate	<Alt><+> (numeric keypad)
Field Minus	<Alt><-> (numeric keypad)
Erase input	<Alt><Home> (edition keypad)
Field Exit	<Alt><Del> (edition keypad)
Clear screen	<Alt><Space>
Test Request	<Alt><Esc>
Toggle indicators lights	<Alt><Tab>
Redraw screen	<Alt><Return>

- 3 -
PRINT SERVER FEATURE

This chapter provides the information needed to use printers attached to an AX3000

The `lpd` AX3000 service allows a **standard monitoring** of network printers.

Use of `lpd` is a two-stage process:
- OS/400 configuration.
- AX3000 Terminal Set-Up configuration,

3.1 - OS/400 CONFIGURATION

On OS/400, a network printer handled by lpd is called an 'outqueue'.

The method is to add remote outqueue. A remote outqueue configuration will include the AX3000 IP address and the name of the AX3000 auxiliary port.

The following example describes how to add an outqueue (called AXELOUTQ). This outqueue is associated to a printer attached the parallel port (called AXELPRN) of the AX3000 (IP address 192.168.1.241).

To add an outqueue, log in as superuser and enter the following command:

```
CRTOUTQ
```

Many parameters are needed to add an outqueue. The following describes only lpd specific parameters:

```
File d'attente en sortie . . . . > AXELOUTQ
  Bibliothèque . . . . . .
Taille maximale fichier spoule:
  Nombre de pages  . . . . . .
  Heure de début . . . . . .
  Heure de fin . . . . . .
            + si autres valeurs
Ordre des fichiers dans file . .
Système éloigné  . . . . . > *INTNETADR

File d'attente impr éloignée . . > AXELPRN

Editeurs à démarrage auto  . . .

File d'attente de messages . . .
  Bibliothèque . . . . . .
Type de connexion  . . . . . > *IP
Type de destination  . . . . . > *OTHER
Conversion de SCS en ASCII . . .
Type et modèle du constructeur
Adresse Internet . . . . . > '192.168.1.241'
Nb de séparateurs de travaux . .
Contrôle par opérateur . . . . .
File d'attente de données  . . .
  Bibliothèque . . . . . .
Droits à vérifier  . . . . . .
Droits . . . . . .
```

The next step is to start the outqueue. Enter the following command:

```
 STRRMTWTR
```

The outqueue is ready.

3.2 - SETTING-UP THE AX3000

Terminal Set-Up can be used to establish a print service on the auxiliary port (lpd) and to set communication parameters for the two serial ports.

From an active session, press **<Ctrl><Alt><Esc>** to enter Terminal Set-Up (according to the example, IP address 192.168.1.241).

3.2.1 - Print Service

Press **<F5>** to set the '**Terminal Mode**' set-up screen. The three following fields allow the network lpd service to be associated with the auxiliary ports:

- **AUX1 Port Service,**
- **AUX2 Port Service,**
- **Parallel Port Service.**

Use the arrow keys to select the auxiliary port, then press **<SPACE>**. In the following menu use the vertical arrows keys and **<RETURN>** to select lpd:

```
None
printd
rtty
lpd
rcmd
rtelnet
```

The following dialogue box appears:

```
Service : lpd
PRN Name: parallel
Filter  : NL=CR+NL
```

Within this dialogue box, use the vertical arrow keys to select a field, use **<SPACE>** to modify a field value and press **<RETURN>** to confirm.

The PRN Name field displays the auxiliary port name. According to the example set this name to AXELPRN (uppercase characters).

The printer model is set on OS/400 (adding the outqueue), then the AX3000 must transmit data without modification (no filter). So, set `Filter` to `none`.

3.2.2 - Serial Port Setting

When a serial port is used, it is necessary to set its operating mode and its communication parameters.

Press **<F3>** to set-up the AUX1 port or press **<F4>** to set-up the AUX2 port.

First, use the arrow keys to select the **Operating Mode** field and press **<SPACE>** to select the '**Printer'** value.

When an operating mode is selected, the communication parameters (baud rate, handshake, etc.) are automatically set. If necessary, any of these parameters can be modified to match the peripheral settings.

3.2.3 - Exit the Set-Up

Press **<F12>** then **<RETURN>** to saves these modifications and exit the set-up.

3.3 - PROBLEM SOLVING...

Access to the AX3000

Use the `PING` command to check the AX3000 can be accessed.

Check the AX3000 IP address is the same than the `Internet Address` parameter of the adding outqueue command.

Check the PRN Name (AX3000 set-up) is the same than the `File d'attente impr éloignée` parameter of the adding outqueue command (take care to uppercase characters).

Access to the OS/400

Check the site configuration by using the `GO TCPADM` command. Select the option 1 (TCP/IP configuration).

Within this screen, select option 10 (routers). An entry of this list must contained the name and the IP address of the OS/400.

Return to the previous screen and select option 12 (change local domain). The domain name must be set and the server name must be the name listed in option 10 (routers).

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TERMINAL SERVER FEATURE

This chapter provides the information needed to use serial terminals attached to a TCP/IP AX3000.

The AX3000 provides two bi-directional auxiliary serial ports. Various serial peripherals can be attached to these serial ports: bar code readers, printers, scales, etc.

With the embedded `rtelnet` service, serial terminals, attached to the TCP/IP AX3000, are automatically handled.

This feature must be declared through the two AX3000 set-up procedures: Terminal Set-Up and TCP/IP Set-Up.

4.1 - TERMINAL SET-UP

This set-up is used to define the network service associated with the auxiliary ports (`lpd`, `rcmd`, `rtelnet`, etc.), and to configure the serial ports.

Press **<Ctrl><Alt><Esc>** from an active session to enter Terminal Set-Up.

4.1.1 - Select the Network Service

Press **<F5>** to enter the '**Terminal Mode**' set-up screen. The 2 following fields allow `rtelnet` service to be associated with the serial ports:

- **AUX1 Port Service,**
- **AUX2 Port Service.**

Use the arrow keys to select the auxiliary port, then press **<SPACE>**. In the following menu use the vertical arrows keys and **<RETURN>** to select `rtelnet`:

```
None
printd
rtty
lpd
rcmd
rtelnet
tty
```

4.1.2 - Serial Port Setting

It is necessary to set the operating mode and the communication parameters of the selected serial port.

Press **<F3>** to set-up the AUX1 port or press **<F4>** to set-up the AUX2 port.

First, use the arrow keys to select the **Operating Mode** field and press **<SPACE>** to select the '**Bi-directional Peripheral'** value.

When an operating mode is selected, the communication parameters (baud rate, handshake, etc.) are automatically set. If necessary, any of these parameters can be modified to match the peripheral settings.

4.1.3 - Exiting the Set-Up

Press **<F12>** then **<RETURN>** to save these modifications and exit the set-up.

4.2 - TCP/IP SET-UP

When the `rtelnet` service is associated with one serial port, it is necessary to associate this port with a host (in the same way, a session is also associated with a host).

Press **<Ctrl><Alt><*>** to enter the TCP/IP Set-Up.

To add an association, select **[Terminal]→[Add AUX1]** (or **[Terminal]→[Add AUX2]**) and enter the following parameters.

- **Hostname** enter the name of a host (which must have been previously declared in the 'Network' menu through the 'Add Host' option).
- **TERM** enter the TERM value (vt220 for OS/400 and hft-c for IBM AIX).
- **PowerOn Connect** **'y'**: the connection will be automatically established when the Platine is powered on.
  'n': Press any key on the serial terminal keyboard to establish the connection.
- **Auto Reconnect** **'y'**: a new connection is automatically established after a disconnection (<Ctrl><D>).
  'n': Press any key on the keyboard of the serial terminal to establish a new connection.

To cancel an association, use **[Terminal]→[Drop View]**. You will be presented with a sub-menu listing all currently declared association. Select the one to be dropped, from this sub-menu list, and press **<RETURN>**.

Select **[Session]→[Quit]** to save these modifications and exit the set-up.

APPENDIX

This appendix describes additional AX3000 features.

A.1 - STATUS LINE

A status line (i.e. a 26th line) can be used to identify each session of the TCP/IP AX3000.

To enable or disable the status line, enter the AX3000 TCP/IP Set-Up and select **[Terminal]→[Status Line]**.

A status line label (10 characters maximum) is associated with each session. This label is either the name of the associated host or an user-defined label (refer to Chapter 2.1.2.b).

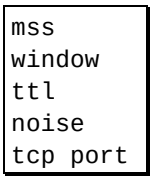
Note: the 26-line display can be not supported by certain monitors.

A.2 - TCP/IP PROTOCOL

The AX3000 uses five internal parameters to optimise the TCP/IP protocol to match the existing networking and applications environments.

Note: these parameters have factory-default settings. Familiarity with TCP/IP protocols is essential before attempting to modify them.

To read or modify these parameters, use the '**Protocol**' menu in the TCP/IP Set-Up:



A.2.1 - 'mss' Option

This option is used to set the 'Maximum Segment Size' parameter.

This parameter defines the maximum packet size (in bytes) of the TCP layer. By default, it is set to 512 bytes.

As the maximum size of the IP layer datagram (Maximum Transmission Unit) has been set to 1200 bytes, it is recommended that the value of the 'mss' option should not exceed 1200 bytes.

If too many frames are rejected on the network, the 'mss' option value may be decreased.

The new value will be used for the next connection made.

A.2.2 - 'window' Option

This parameter defines the size (in bytes) of the AX3000 TCP window. By default, it is set to 1000 bytes.

This value can be modified but must be higher than the 'mss' parameter.

If too many (received) frames are rejected by the AX3000, the 'window' parameter may be decreased.

The new value will be used for the next connection made.

A.2.3 - 'ttl' Option

This option is used to set the value of the 'Time To Live' parameter.

Depending on the network topology, the AX3000 can address a host via several sub-networks linked together with routers.

To prevent lost frames circulating, for ever, around the network, a limit is set to the maximum number of routers a frame can pass through. This parameter is called 'ttl' and set to 255 by default.

Every frame transmitted by the AX3000 has a ‘ttl’ value set. Each time such a frame passes through a router, its 'ttl' value is decreased by one. When the 'ttl' value reaches zero, the frame is destroyed by the router.

The new value will be used for the next connection made.

A.2.4 - 'noise' Option

This option is used to set the value of the 'Threshold Noise Rejection' parameter for '10BaseT' Platine Terminals.

This 'Threshold Noise Rejection' represents the AX3000’s sensitivity to the signals of the network cable. The two available values are '**Low**' (default value) and '**High**'.

A 'High' threshold, sets an AX3000's high reception sensitivity. Then, in case of an unexpected attenuation of signals (due to a low quality wiring, a too long cable, etc.) this parameter allows the Platine to receive and process the network frames normally.

Note: it is recommended that this parameter be modified with caution, because the more sensitive the AX3000 is to data reception, the more sensitive it is to external interference.

This new value is used after the AX3000 is power-cycled (switched off and on again).

A.2.5 - 'tcp port' Option

A TCP/IP session (telnet, print server, terminal server) is identified by two parameters:

- AX3000 IP address (used in all sessions),
- TCP Port (different for each session).

For example: session 1 (192.168.1.241 / 1024)
session 2 (192.168.1.241 / 1025)

The TCP port number associated with a session can either be a predefined or a random value. This choice is made using the 'tcp port' option:

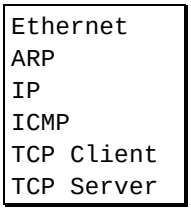
- **random** (default): when the AX3000 is switched on, a random **x** value is computed. The 14 TCP ports needed by the AX3000 are from x to x+13.
- **fixed**: The 14 TCP ports needed by the AX3000 are from 1024 to 1037.

This new value will be set after the AX3000 is power-cycled.

A.3 - STATISTICS

The Platine terminal monitors network performance from the time it is switched on. The logs record details of exchanged frames, rejected frames, etc.

Enter the TCP/IP Set-Up and select the '**statistics**' menu to access these logs:



These statistics are mainly intended for network administration tasks, such as error diagnosis or network optimisation. This manual only describes the Ethernet, the ARP and the TCP (Client and Server) options.

A.3.1 -'Ethernet' Option

This option provides statistics relating to the embedded AX3000 Ethernet controller. Out of 16 parameters, the main ones are:

- **intr**: number of interrupts received by the Platine terminal. Generally, one interrupt is raised for each received frame (but sometimes one interrupt is raised for multiple frames).
- **short**: number of received frames with a truncated (too short) header.
- **dribble**: number of received frames with an incorrect header.
- **crc**: number of received frames with an incorrect CRC.
- **good**: number of correct frames received.
- **unktype**: number of non-IP or non-ARP frames received (IPX frames, for example).
- **output**: total number of frames sent by the Platine terminal.
- **drop**: number of dropped frames (because the input queue overflows).
- **nomem**: number of dropped frames (because of shortage of memory).

A.3.2 - 'ARP' Option

This option is used to display statistics about 'ARP' requests (Address Resolution Protocol) which have been sent to, or received from, the Platine terminal. An ARP request is a request to determine the Ethernet number of a host, whose IP address has been given for a terminal-to-host connection.

- **received**: number of received ARP frames. This value is equal to the sum of the following parameters:
  - **replies**: number of responses to ARP requests sent from the Platine terminal,
  - **badtype**: wrong frames,
  - **request-in**: number of received ARP requests,
- **request out**: number of ARP requests sent from the Platine terminal.

The recognised '**IP Address/Ethernet Address**' associations are listed under these parameters.

A.3.3 - 'TCP Client' Option

This option is used to display statistics about telnet connections:

- **conout**: number of connection requests sent by the Platine terminal.
- **reset-out**, **runt** and **chksum-err:** miscellaneous errors.

- **bdcsts**: number of broadcast messages received by the Platine terminal.

Each current session is listed under these parameters.

A.3.4 - 'TCP Server' Option

This option is used to display statistics about connection requests from the print and tty servers:

- **conin**: number of connection requests received by the Platine terminal.
- **reset-out**, **runt** and **chksum-err:** miscellaneous errors.
- **bdcsts**: number of broadcast messages received by the Platine terminal.

Each opened printer or tty session is listed under these parameters.

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