



Generic Serial Interfaces

Teldat-Dm 705-I

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Chapter 1 Synchronous Serial Interface Configuration

1.1 Assigning the Synchronous Serial Interface

To assign a synchronous serial interface to a determined device connector, enter the **SET DATA-LINK SYNC** command at the general configuration menu (*Config*>). Should the device have more than one connector, you will be prompted for name identifying the required connector. Contrariwise, the synchronous serial interface will be assigned to the only corresponding type of connector in the device.

```
Config>set data-link sync
Config>
```

```
Config>set data-link sync serial0/0
Config>
```

You can verify that the interface has been correctly assigned by listing all the interfaces in the device:

```
Config>list devices

Interface      Connector      Type of interface
ethernet0/0    LAN1           Quicc Ethernet
serial0/0      SERIAL0/WAN1  Synchronous Serial Line
atm0/0         DSL1           ATM
bri0/0         BRI/ISDN1     ISDN Basic Rate Int
x25-node       ---           Router->Node
ppp1          ---           Generic PPP
Config>
```

```
Config>list devices

Interface      Connector      Type of interface
ethernet0/0    LAN1           Fast Ethernet interface
serial0/0      SERIAL0/WAN1  Synchronous Serial Line
serial0/1      SERIAL1/WAN2  X25
serial0/2      SERIAL2/WAN3  X25
bri0/0         BRI/ISDN1     ISDN Basic Rate Int
x25-node       ---           Router->Node
ppp1          ---           Generic PPP
Config>
```

Once the interface has been assigned you can begin the configuration process. However in order for changes to take effect and monitoring of the said interface can take place, you need to save the configuration and restart the device.

```
Config>save
Save configuration (Yes/No)? y

Building configuration as text... OK
Writing configuration... OK on Flash (not saved in SmartCard)
Config>

*restart
Are you sure to restart the system(Yes/No)? y
  Done

Restarting. Please wait .....
```

1.2 Configuration Commands

1.2.1 Accessing the Synchronous Serial Interface Configuration prompt

The synchronous serial line configuration commands must be entered at the configuration prompt associated to them (*serialX/X SYNC config*>). Use the **NETWORK <interface_name>** command (within the general configuration prompt *Config*>) to access the *SYNC config*> prompt where <interface_name> is the name of the synchronous serial interface you wish to configure.

```
Config>network serialX/X

-- Interface Synchronous Serial Line. Configuration --
serialX/X SYNC config>
```

Once you have accessed the synchronous serial line configuration prompt, you can enter the commands described below:

Command	Function
? (HELP)	Lists the available commands or their options.
<i>DCE-EXTERNAL-CLOCK</i>	This uses an external clock reference in DCE mode.
<i>DEVICE-MODE</i>	Configures device mode (DCE, DTE, AUTO).
<i>DTE-INTERNAL-CLOCKS</i>	In DTE mode, this uses internally generated clocks.
<i>ECHO</i>	The transmitter resends all received data.
<i>ENCODING</i>	Sets NRZI or NRZ encoding.
<i>IDLE</i>	Configures the inactivity character.
<i>IGNORE-CD</i>	Ignores the CD signal state.
<i>IGNORE-CTS</i>	Ignores the CTS signal state.
<i>IGNORE-DSR</i>	Ignores the DSR signal state.
<i>INVERT-TXC</i>	Configures the transmission clock polarity.
<i>LIST</i>	Displays the values associated to the distinct interface parameters.
<i>LOOPBACK</i>	The transmitter is internally connected to the receiver.
<i>MTU</i>	Configures the maximum frame size (MTU).
<i>NO</i>	Undoes command modifications.
<i>OPEN-CD</i>	Disconnects the CD signal from the device's internal hardware.
<i>RXC-AS-TXC</i>	Configures the reception clock as the transmission clock.
<i>SPEED</i>	Configures the line speed.
<i>TRANSMIT-DELAY</i>	Configures the transmit delay.
<i>TRANSPARENT-MODE</i>	Configures the interface in transparent mode.
<i>TRANSPARENT-MODE-AUTOSYNC</i>	Activates the automatic resynchronization in transparent mode.
<i>TRANSPARENT-MODE-SYNC</i>	Configures the 16-bit synchronization work in transparent mode.
<i>TX-SYNCHRONIZED-TO-RX</i>	Synchronizes the transmitter with the receiver.
<i>TXC-AS-RXC</i>	Configures the transmission clock as the reception clock.
<i>V24</i>	Configures the driver in V24 mode.
<i>V35</i>	Configures the driver in V35 mode.
<i>WARNING-TEST-TIMEOUT</i>	Sends a warning if the <i>echo</i> or <i>loopback</i> modes are active.
<i>X21</i>	Configures the driver in X21 mode.
<i>EXIT</i>	Exits the synchronous serial interface configuration prompt.

In addition to the above commands, there are other commands common to all the device interfaces. These commands are described in the common interfaces configuration manual (Dm 772-I Common Configuration Interfaces).

1.2.2 ? (HELP)

The ? (HELP) command lists the valid commands at the programmed router level. This command can also be used after a specific command in order to list the available options.

Syntax:

```
serialX/X SYNC config>?
```

Example:

```
serialX/X SYNC config>?
 dce-external-clock      Use an external clock reference
 description             Enter interface description
 device-mode             Configures device mode (DCE, DTE, AUTO)
 dte-internal-clocks     DTE with internal clocks
```


echo	Transmitter resends received data
encoding	Set NRZI or NRZ encoding
idle	Configure the inactivity character
ignore-cd	Ignore CD signal state
ignore-cts	Ignore CTS signal state
ignore-dsr	Ignore DSR signal state
invert-txc	Invert the transmit clock (DTE only)
list	List interface configuration
loopback	Transmitter is connected internally to the receiver
mtu	Configure the MTU
no	Set default config
open-cd	Disconnect CD signal from internal hardware
rx-as-txc	Configure receive clock as transmit clock
shutdown	Change state to administratively down
speed	Configure the line speed
transmit-delay	Configure the transmit delay
transparent-mode	Configures totally transparent mode
transparent-mode-autosync	Configures automatic synchronization in transparent mode
transparent-mode-sync	Configures transparent mode 16 bit SYNC char
tx-synchronized-to-rx	Transmitter synchronized to receiver
tx-as-rxc	Configure transmit clock as receive clock
update	Update a level indicator
v24	Configure driver in V24 mode
v35	Configure driver in V35 mode
warning-test-timeout	Send a warning if echo or loopback mode
x21	Configure driver in X21 mode
exit	

serialX/X SYNC config>

1.2.3 DCE-EXTERNAL-CLOCK

The **DCE-EXTERNAL-CLOCK** command permits you to configure an external clock to use as a reference in serial interfaces operating in DCE mode and pertain to the PCI card which has 3 WAN interfaces. The clock reference frequency should be a whole multiple of the speed configured for the interface through the **SPEED** command.

You need to specify the external clock frequency which then serves as a clock reference.

Default is deactivated.

Syntax:

```
serialX/X SYNC config>dce-external-clock <external-clock-freq>
```

Example:

```
serialX/X SYNC config>dce-external-clock 512000
serialX/X SYNC config>
```

1.2.4 DEVICE-MODE

Configures the mode of the serial interface: DCE, DTE and AUTO.

This command cannot be used in the routers that do not have a configurable serial interface.

The configurable modes are:

DCE: Forces the interface to act like a DCE. This is the default mode for serial interfaces on our routers.

DTE: Forces the interface to act like a DTE. The DCE-DTE adaptor cable must be connected.

AUTO: The serial port will act as DCE or DTE depending on whether the DCE-DTE adaptor cable is used.

Syntax:

```
serialX/X SYNC config>device-mode auto
serialX/X SYNC config>device-mode DCE-forced
serialX/X SYNC config>device-mode DTE-forced
```

Example:

```
serialX/X SYNC config>device-mode DCE-forced
serialX/X SYNC config>
```

1.2.5 DTE-INTERNAL-CLOCKS

The **DTE-INTERNAL-CLOCKS** command permits you to configure the interface so when it behaves as DTE, it uses internally generated clocks. This means it ignores the transmission and reception clocks received by the DCE. This command is essential when setting a DTE interface in **loopback** mode as the external clocks do not arrive in this said mode.

By default this is deactivated.

Syntax:

```
serialX/X SYNC config>dte-internal-clocks
```

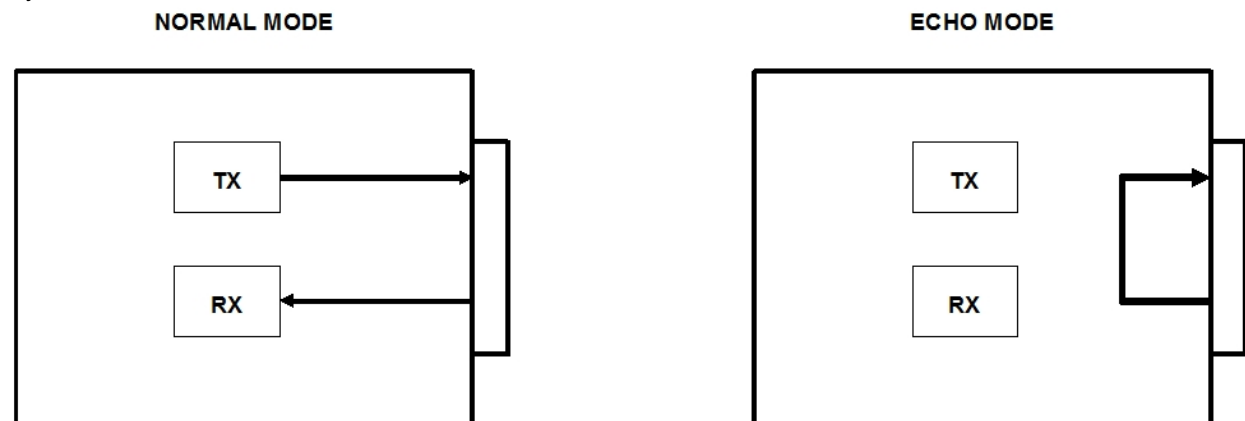
Example:

```
serialX/X SYNC config>dte-internal-clocks
serialX/X SYNC config>
```

1.2.6 ECHO

The **ECHO** command configures the interface in **echo** mode so the transmitter resends everything it receives from the receiver. The interface behaves as a mirror. This operating mode permits you to check all the analog part of the interface through an external device that inserts and verifies patterns.

By default this is deactivated.



Syntax:

```
serialX/X SYNC config>echo
```

Example:

```
serialX/X SYNC config>echo
serialX/X SYNC config>
```

1.2.7 ENCODING

Configures the line encoding to be used. The possible values are: NRZ (*Not Return to Zero*) and NRZI (*Not Return to Zero Inverted*). The default is NRZ.

Syntax:

```
serialX/X SYNC config>encoding <type>
```

Example 1:

```
serialX/X SYNC config>encoding nrz
serialX/X SYNC config>
```

Example 2:

```
serialX/X SYNC config>encoding nrzi
serialX/X SYNC config>
```

1.2.8 IDLE

Configures the inactivity state of the HDLC frames in transmission. This parameter is used to determine the type of padding data sent when there are no packets to transmit. The possible values are: FLAG (continuous transmission of 0xFE) and MARK (continuous transmission of 0xFF). Default value is FLAG.

Syntax:

```
serialX/X SYNC config>idle <type>
```

Example 1:

```
serialX/X SYNC config>idle flag
serialX/X SYNC config>
```

Example 2:

```
serialX/X SYNC config>idle mark
serialX/X SYNC config>
```

1.2.9 IGNORE-CD

The command makes the device software ignore the CD signal status when declaring the interface UP or DOWN. This is very useful in cases where you are working with devices which do not deliver this signal or that only activate when transmitting. With the driver in the DTE mode, the CD signal corresponds to the CD signal delivered by the DCE. When the driver is in DCE mode, the CD signal corresponds to the RTS signal sent by the DTE.

By default this is deactivated.

Syntax:

```
serialX/X SYNC config>ignore-cd
```

Example:

```
serialX/X SYNC config>ignore-cd
serialX/X SYNC config>
```

1.2.10 IGNORE-CTS

The command makes the device software ignore the CTS signal status when declaring the interface UP or DOWN. This is very useful in cases where you are working with devices which do not deliver this signal or that only activate when transmitting. With the driver in the DTE mode, the CTS signal corresponds to the CTS signal delivered by the DCE. When the driver is in DCE mode, the CTS signal corresponds to the CD signal sent by the DTE.

By default this is deactivated.

Syntax:

```
serialX/X SYNC config>ignore-cts
```

Example:

```
serialX/X SYNC config>ignore-cts
serialX/X SYNC config>
```

1.2.11 IGNORE-DSR

The command makes the device software ignore the DSR signal status when declaring the interface UP or DOWN. This is very useful in cases where you are working with devices which do not deliver this signal or that only activate when transmitting. With the driver in the DTE mode, the DSR signal corresponds to the DSR signal delivered by the DCE. When the driver is in DCE mode, the DSR signal corresponds to the DTR signal sent by the DTE.

By default this is deactivated.

Syntax:

```
serialX/X SYNC Config>ignore-dsr
```

Example:

```
serialX/X SYNC Config>ignore-dsr
```

```
serialX/X SYNC Config>
```

1.2.12 INVERT-TXC

Enables transmission clock inversion. To configure this parameter, the associated driver must be in DTE mode. Contrariwise, an error message will be displayed indicating that this parameter cannot be configured. By default this parameter is disabled.

Syntax:

```
serialX/X SYNC config>invert-txc
```

Example 1:

```
serialX/X SYNC config>invert-txc
serialX/X SYNC config>
```

Example 2:

```
serialX/X SYNC config>invert-txc
CLI Error: Only available on DTE mode
CLI Error: Command error
serialX/X SYNC config>
```

1.2.13 LIST

The **LIST** command displays a list with the value associated to each of the synchronous serial interface configuration parameters on the screen. Example 1 corresponds to a base board interface and example two to a PMC daughter interface which has 3 WAN interfaces.

Syntax:

```
serialX/X SYNC config>list
```

Example 1:

```
serialX/X SYNC config>list
Maximum Frame size           : 2048
Encoding                     : NRZ
Idle                         : FLAG
Clocking                     : EXTERNAL
Cable                        : DTE
Line speed (bps)             : 64000
Transmit delay (sec)         : 0
Invert TxClock               : NO
Loopback                     : DISABLED
Echo                         : DISABLED
DTE with internal clocks     : DISABLED
Ignore-cd                    : DISABLED
Ignore-cts                   : DISABLED
Ignore-dsr                   : DISABLED
Open-cd                      : DISABLED
serialX/X SYNC config>
```

Example 2:

```
serialX/X SYNC config>list
Maximum Frame size           : 2048
Encoding                     : NRZ
Idle                         : FLAG
Clocking                     : EXTERNAL
Cable                        : v.24
Line speed (bps)             : 64000
Transmit delay (sec)         : 0
Invert TxClock               : NO
Loopback                     : DISABLED
Echo                         : DISABLED
DTE with internal clocks     : DISABLED
Ignore-cd                    : DISABLED
```

```
Ignore-cts           : DISABLED
Ignore-dsr           : DISABLED
Open-cd              : DISABLED
serialX/X SYNC config>
```

1.2.14 LOOPBACK

This command permits you to set the interface in **loopback** mode. In this mode the interface disconnects from the device exterior and the interface transmitter directly connects to its receiver. In this way, the interface behaves as if it had a mirror in its external connector.

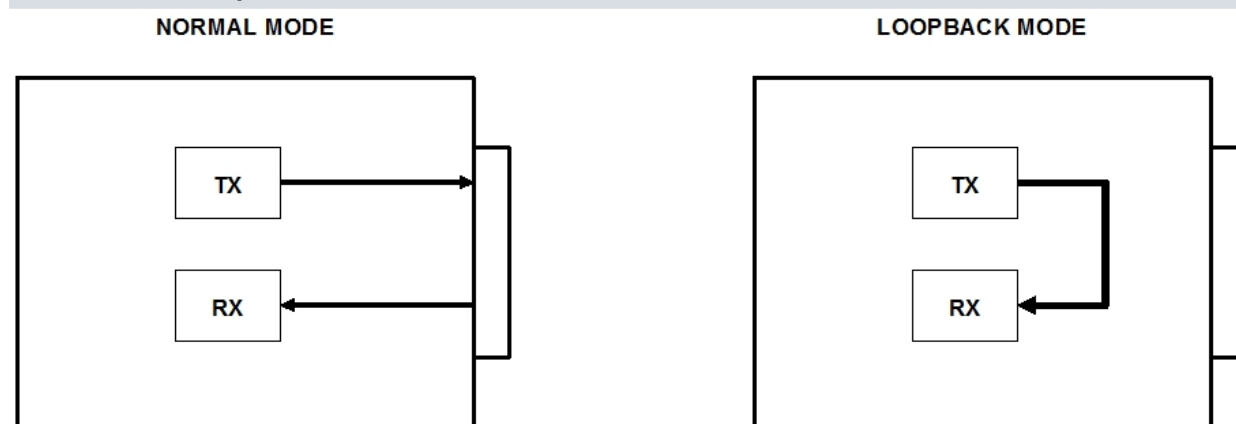
By default this is deactivated.

Syntax:

```
serialX/X SYNC config>loopback
```

Example:

```
serialX/X SYNC config>loopback
serialX/X SYNC config>
```



1.2.15 MTU

Configures the maximum frame size in bytes which can be transmitted by the interface (also known as MTU). Default value is 2048 bytes.

Syntax:

```
serialX/X SYNC config>mtu <size>
serialX/X SYNC config>
```

Example:

```
serialX/X SYNC config>mtu 2048
serialX/X SYNC config>
```

1.2.16 NO

Disables a command. Deletes the configured information, establishing the default value for a parameter.

Syntax:

```
serialX/X SYNC config>no ?
dce-external-clock    Use an external clock reference
description            Enter interface description
dte-internal-clocks   DTE with internal clocks
echo                  Transmitter resends received data
encoding              Set NRZI or NRZ encoding to its default value
idle                  Set the inactivity character to its default value
ignore-cd             Ignore CD signal state
invert-txc            De-invert the transmit clock
loopback              Transmitter is connected internally to the receiver
mtu                   Set MTU to its default value
open-cd               Disconnect CD signal from internal hardware
shutdown              Change state to administratively down
```

speed	Set the line speed to its default value
tx-synchronized-to-rx	Transmitter synchronized to receiver
update	Update a level indicator
warning-test-timeout	Send a warning if echo or loopback mode

Example:

```
serialX/X SYNC config>no speed
serialX/X SYNC config>
```

1.2.17 OPEN-CD

This command permits you to disconnect the device's internal hardware CD signal. This command is useful so in DTE mode you can transmit when operating with a DCE which does not activate the CD signal and only activates the CTS signal.

By default this is deactivated.

Syntax:

```
serialX/X SYNC config>open-cd
```

Example:

```
serialX/X SYNC config>open-cd
serialX/X SYNC config>
```

1.2.18 RXC-AS-TXC

This command is only available in DTE mode. Here you can configure the serial port so it uses the receive clock as a transmit clock.

By default this is deactivated.

Syntax:

```
serialX/X SYNC config>rx-c-as-txc
```

Example:

```
serialX/X SYNC config>rx-c-as-txc
serialX/X SYNC config>
```

1.2.19 SPEED

Configures the physical line speed in bps. Default value is 64000 bps.

Syntax:

```
serialX/X SYNC config>speed <speed>
```

Example:

```
serialX/X SYNC config>speed 64000
serialX/X SYNC config>
```

1.2.20 TRANSMIT-DELAY

Configures the transmission delay in seconds which is applied to packets transmitted by the interface. Default value is 0 seconds.

Syntax:

```
serialX/X SYNC config>transmit-delay <delay>
```

Example:

```
serialX/X SYNC config>transmit-delay 0
serialX/X SYNC config>
```

1.2.21 TRANSPARENT-MODE

This command configures the serial port to operate in transparent mode instead of in HDLC mode. In transparent mode, the serial port synchronizes with a 16-bit synchronization word defined by the user. Once this has been synchronized, it begins to receive and transmit frames whose size has been configured through the MTU command. The serial port does not resynchronize except if the aut synchronization has been activated using the *transparent-mode-autosync* command.

By default this is deactivated.

Syntax:

```
serialX/X SYNC config>transparent-mode
```

Example:

```
serialX/X SYNC config>transparent-mode
serialX/X SYNC config>
```

1.2.22 TRANSPARENT-MODE-AUTOSYNC

Through this command the resynchronization feature for the serial port is activated in cases when it is operating in transparent mode. A byte is defined that corresponds to half of the last byte of the synchronization word and half of the first byte that follows it in each frame. This feature is only effective if the frames are always headed by the synchronization word plus these four bits.

By default this is not configured..

Syntax:

```
serialX/X SYNC config>transparent-mode-autosync <hex 00..ff>
```

Example:

```
serialX/X SYNC config>transparent-mode-autosync 48
serialX/X SYNC config>
```

1.2.23 TRANSPARENT-MODE-SYNC

This command is used to define the 16 bit synchronization Word that the serial port uses in transparent mode to synchronize with the frames. Normally this value is the frame headers which are sent by the serial port, if you want the serial port to receive frame by frame. In order to put together more frames, a frame size is defined, which must be consistent, with the *mtu* command

By default 0 is the equivalent of not being defined.

Syntax:

```
serialX/X SYNC config>transparent-mode-sync <hex 00..ffff>
```

Example:

```
serialX/X SYNC config>transparent-mode-sync fff4
serialX/X SYNC config>
```

1.2.24 TX-SYNCHRONIZED-TO-RX

Through this command you can synchronize transmission with the reception. Data sent begins with an exact multiple of 8 bit periods after the received data.

By default this is deactivated.

Syntax:

```
serialX/X SYNC config>tx-synchronized-to-rx
```

Example:

```
serialX/X SYNC config>tx-synchronized-to-rx
serialX/X SYNC config>
```

1.2.25 TXC-AS-RXC

This command is only available in DTE mode. Here you can configure the serial port so it uses the transmit clock as a receive clock.

By default this is deactivated.

Syntax:

```
serialX/X SYNC config>txc-as-rxc
```

Example:

```
serialX/X SYNC config>txc-as-rxc
serialX/X SYNC config>
```

1.2.26 V24

Configures the driver so it operates complying with the V24 norm.

This command is only available in serial interfaces pertaining to a PCI card with 3 WAN interfaces as these are the only ones that permit you to change the type of standard through configuration.

By default the driver is configured to operate complying with the V24 norm.

Syntax:

```
serialX/X SYNC config>v24
```

Example:

```
serialX/X SYNC config>v24
serialX/X SYNC config>
```

1.2.27 V35

Configures the driver so it operates complying with the V35 norm.

This command is only available in serial interfaces pertaining to a PCI card with 3 WAN interfaces as these are the only ones that permit you to change the type of standard through configuration.

By default the driver is configured to operate complying with the V24 norm.

Syntax:

```
serialX/X SYNC config>v35
```

Example:

```
serialX/X SYNC config>v35
serialX/X SYNC config>
```

1.2.28 WARNING-TEST-TIMEOUT

Through this command, you activate periodic trap sending through SNMP, which tells you if the interface is in *echo* mode or *loopback* mode or both. The time period is configurable and the value should be between 0 and 3550 seconds. A 0 value deactivates this command.

By default, this is deactivated.

Syntax:

```
serialX/X SYNC config>warning-test-timeout <period>
```

Example:

```
serialX/X SYNC config>warning-test-timeout 10
serialX/X SYNC config>
```


1.2.29 X21

Configures the driver so it operates complying with the X21 norm.

This command is only available in serial interfaces pertaining to a PCI card with 3 WAN interfaces as these are the only ones that permit you to change the type of standard through configuration.

By default the driver is configured to operate complying with the V24 norm.

Syntax:

```
serialX/X SYNC config>x21
```

Example:

```
serialX/X SYNC config>x21
serialX/X SYNC config>
```

1.2.30 EXIT

The **EXIT** command returns you to the previous prompt level.

Syntax:

```
serialX/X SYNC config>exit
```

Example:

```
serialX/X SYNC config>exit
Config>
```

Chapter 2 Synchronous Serial Interface Monitoring

2.1 Monitoring Commands

2.1.1 Accessing the Synchronous Serial Interface Monitoring prompt

The synchronous serial line monitoring commands must be entered at the monitoring prompt associated to them (*serialX/X SYNC+*). Use the **NETWORK <interface_name>** command (within the general monitoring prompt, +) to access this prompt where **<interface_name>** is the name of the synchronous serial interface you wish to monitor.

```
+network serialX/X
-- Synchronous Serial Line Monitor --
serialX/X SYNC+
```

Once you have accessed the synchronous serial line monitoring prompt, you can enter the commands described below:

Command	Function
?(HELP)	Lists the available commands or their options.
CLEAR	Clears the statistics associated to the synchronous serial interface.
UPDATE-SPEEDLINE	Updates the measuring of DTE line speed.
EXIT	Exits the synchronous serial interface monitoring prompt.

2.1.2 ? (HELP)

The ? (HELP) command lists the valid commands at the programmed router level. This command can also be used after a specific command in order to list the available options.

Syntax:

```
serialX/X SYNC+?
```

Example:

```
serialX/X SYNC+?
clear          Delete all the statistics
update-speedline  Update DTE speedline
exit
serialX/X SYNC+
```

2.1.3 CLEAR

The **CLEAR** command permits you to delete (zeroize) all the statistics associated to the specified synchronous serial interface.

Syntax:

```
serialX/X SYNC+clear
```

Example:

```
serialX/X SYNC+clear
serialX/X SYNC+
```

2.1.4 UPDATE-SPEEDLINE

This command is used to newly measure the line speed (clock rate) over synchronous serial interfaces working in DTE mode. The line speed measurement functionality is available for V35 and V24 interfaces.

Syntax:

```
serialX/X SYNC+update-speedline
```

Example:

```
serialX/X SYNC+update-speedline
serialX/X SYNC+
```

Results are displayed in the monitoring information shown by the *device serialX/X* command in the main monitoring menu.

Command history:

Release	Modification
11.00.03	New command added.

2.1.5 EXIT

The **EXIT** command returns you to the previous prompt level.

Syntax:

```
serialX/X SYNC+exit
```

Example:

```
serialX/X SYNC+exit
+
```

2.2 Monitoring the Synchronous Serial Interface from the General Menu

All the statistics associated to a specific synchronous serial interface can be viewed from the general monitoring prompt (+). Additionally you can view other information such as the state of the serial line signals, the type of driver, the line speed and the time elapsed since the last port reset. For this enter the **DEVICE <interface_name>** command at this prompt where **<interface_name>** is the name of the specified interface.

Syntax:

```
+device serialX/X
```

Example:

```
+device serial10/0

Interface          CSR      Vect      Auto-test  Auto-test  Maintenance
                  FA200A00  5e        valids    failures   failures
serial10/0

Driver type:      DCE
Line speed:      64.000 Kbps
Last port reset:  1 day, 49 minutes, 49 seconds ago

      Circuit  Nicknames  State
      -----  -
      105      RTS       ON
      106      CTS       ON
      107      DSR       ON
      108      DTR       ON
      109      DCD       ON

Input frame errors:
CRC error          =          0  alignment (byte length) =          0

missed frame      =          0  too long (> 02062 bytes) =          0

aborted frame     =          0  DMA/FIFO overrun       =          0

Output frame counters:
DMA/FIFO underrun errs =          0  Output aborts sent     =          0
+
```

Chapter 3 Serial Interface Configuration

3.1 Assigning the Asynchronous Serial Interface

To assign an asynchronous serial interface to a determined device connector, enter the **SET DATA-LINK ASYNC** command at the general configuration menu (*Config>*). Should the device have more than one connector, you will be prompted for the name identifying the required connector. Contrariwise, the asynchronous serial interface will be assigned to the only corresponding type of connector in the device.

```
Config>set data-link async
Config>
```

```
Config>set data-link async serial0/0
Config>
```

You can verify that the interface has been correctly assigned by listing all the interfaces in the device:

```
Config>list devices

Interface      Connector      Type of interface
ethernet0/0    LAN1           Quicc Ethernet
serial0/0      SERIAL0/WAN1  Asynchronous Serial Line
atm0/0         DSL1           ATM
bri0/0         BRI/ISDN1     ISDN Basic Rate Int
x25-node       ---           Router->Node
ppp1           ---           Generic PPP
Config>
```

```
Config>list devices

Interface      Connector      Type of interface
ethernet0/0    LAN1           Fast Ethernet interface
serial0/0      SERIAL0/WAN1  Asynchronous Serial Line
serial0/1      SERIAL1/WAN2  X25
serial0/2      SERIAL2/WAN3  X25
bri0/0         BRI/ISDN1     ISDN Basic Rate Int
x25-node       ---           Router->Node
ppp1           ---           Generic PPP
Config>
```

The types of serial connectors that the Asynchronous interface supports are as follows:

- serialx/x
- uart0/0 over a previously configured CONF port.

The functionality of using the CONF port as an Asynchronous interface is a special case. This port normally functions as a local console and presents a series of limitations which you can perceive when configuring it. You can see which parameters are not operative for these types of port in the configurable parameters.

Once the interface has been assigned you can begin the configuration process. However in order for changes to take effect and monitoring of the said interface can take place, you need to save the configuration and restart the device.

```
Config>save
Save configuration (Yes/No)? y

Building configuration as text... OK
Writing configuration... OK on Flash
Config>

*restart
Are you sure to restart the system(Yes/No)? y
  Done

Restarting. Please wait .....
```

3.2 Configuration Commands

3.2.1 Accessing the Asynchronous Serial Interface Configuration prompt

The asynchronous serial line configuration commands must be entered at the configuration prompt associated to them (*serialX/X ASYNC Config >*). Use the **NETWORK <interface_name>** command (within the general configuration prompt *Config>*) to access this prompt where **<interface_name>** is the name of the asynchronous serial interface you wish to configure.

```
Config>network serialX/X

-- Interface Asynchronous Serial Line. Configuration --
serialX/X ASYNC Config>
```

or

```
Config>network uart0/0

-- Interface Asynchronous Serial Line. Configuration --
uart0/0 ASYNC Config>
```

The specific commands for the asynchronous serial interface are described below:

Command	Function
? (HELP)	Lists the available commands or their options.
CHAR-MASK	Control characters detection mask.
DATA-BITS	Sets the number of bits per character.
DEVICE-MODE	Configures device mode (DCE, DTE, AUTO).
ECHO	The transmitter resends the received data.
ENABLE-RTS	Enables the RTS signal functionality in DTE mode.
HDW-CTRL	Enables the hardware flow control.
IGNORE-CD	Ignores the CD signal state.
IGNORE-CTS	Ignores the CTS signal state.
IGNORE-DSR	Ignores the DSR signal state.
LIST	Displays the values associated to the distinct interface parameters.
LOOPBACK	The transmitter is internally connected to the receiver.
MAX-IDLE	Indicates the maximum number of IDLE characters.
MTU	Sets the maximum frame size (MTU).
NO	Undoes command modifications.
OPEN-CD	Disconnects the CD signal from the device's internal hardware.
PARITY	Sets number character parity.
RAW-LINE	The data frames in the line do not have either headers or tails.
SPECIAL-CHAR1	Defines special character 1.
SPECIAL-CHAR2	Defines special character 2.
SPEED	Sets line speed.
STOP-BITS	Sets number of stop bits per character.
TERMINATION-RESISTOR	Enables/disables the termination resistor in RS-485.
V24	Configures the driver in V24 mode.
V35	Configures the driver in V35 mode.
WARNING-TEST-TIMEOUT	Sends a warning to indicate if the <i>echo</i> or <i>loopback</i> modes are active.
X21	Configures the driver in X21 mode.
EXIT	Exits the asynchronous serial interface configuration prompt.

In addition to the above commands, there are other commands common to all the device interfaces. These commands are described in the common interfaces configuration manual (Dm 772-I Common Configuration Interfaces).

3.2.2 ? (HELP)

The ? (HELP) command lists the valid commands at the programmed router level. This command can also be used after a specific command in order to list the available options.

Syntax:

```
serialX/X ASYNC Config>?
```

Example:

```
serialX/X ASYNC Config>?
char-mask          Set control character mask
data-bits          Set number of bits per character
description        Enter interface description
device-mode        Configures device mode (DCE,DTE,AUTO)
echo               Transmitter resends received data
enable-rts         Enable RTS signal in DTE mode
hdw-ctrl           Enable hardware flow control
ignore-cd          Ignore CD signal state
ignore-cts         Ignore CTS signal state
ignore-dsr         Ignore DSR signal state
list               List configuration
loopback           Transmitter is connected internally to the receiver
max-idle           Set maximum number of idle characters
mtu                Set frame size
no                 Negate a command or set its defaults
open-cd            Disconnect CD signal from internal hardware
parity             Set character parity
raw-line           Line with frames without header and tail
shutdown           Change state to administratively down
special-char1      Set special character 1
special-char2      Set special character 2
speed              Set speed
stop-bits          Set number of stop bits per character
termination-resistor Set a resistor at the end of the wires RS-485
update             Update a level indicator
v24                Configure driver in V24 mode
v35                Configure driver in V35 mode
warning-test-timeout Send a warning if echo or loopback mode
x21                Configure driver in X21 mode
exit               Return to previous menu
serialX/X ASYNC Config>
```

For cases involving the CONF Port (uartX/X):

```
uart0/0 ASYNC Config>?
data-bits          Set number of bits per character
description        Enter interface description
list               List configuration
max-idle           Set maximum idle characters
mtu                Set the interface maximum transmit unit
no                 Negate a command or set its defaults
parity             Set character parity
shutdown           Change state to administratively down
speed              Set speed
stop-bits          Set number of stop bits per character
update             Update a level indicator
exit               Return to previous menu
uart0/0 ASYNC Config>
```

3.2.3 CHAR-MASK

Through this command you can specify the mask allowing you to acknowledge the control characters. Through the **SPECIAL-CHAR1** and **SPECIAL-CHAR2** commands, it's possible to the two control characters. The bits set to 1 in the mask define the compared bits and set to 0, the unimportant bits.

Mask default value is 0xC0FF.

This command is not supported in CONF interfaces.

Syntax:

```
serialX/X ASYNC Config>char-mask <mask>
```

Example:

```
serialX/X ASYNC Config>char-mask C0FF  
serialX/X ASYNC Config>
```

3.2.4 DATA-BITS

Configures the number of data bits. The possible values are 5, 6, 7 and 8. Default value is 8.

Syntax:

```
serialX/X ASYNC Config>data-bits <number>
```

Example:

```
serialX/X ASYNC Config>data-bits 8  
serialX/X ASYNC Config>
```



Note

Please note that if you wish to mount a PPP interface over an asynchronous serial interface, the number of data bits must be 8 (mandatory).

3.2.5 DEVICE-MODE

Configures the mode of the serial interface: DCE, DTE and AUTO.

This command cannot be used on the routers that do not have a configurable serial interface.

The configurable modes are:

DCE: Forces the interface to act like a DCE. This is the default mode for serial interfaces on our routers.

DTE: Forces the interface to act like a DTE. The DCE-DTE adaptor cable must be connected.

AUTO: The serial port will act as DCE or DTE depending on whether the DCE-DTE adaptor cable is used.

Syntax:

```
serialX/X ASYNC Config>device-mode auto  
serialX/X ASYNC Config>device-mode DCE-forced  
serialX/X ASYNC Config>device-mode DTE-forced
```

Example:

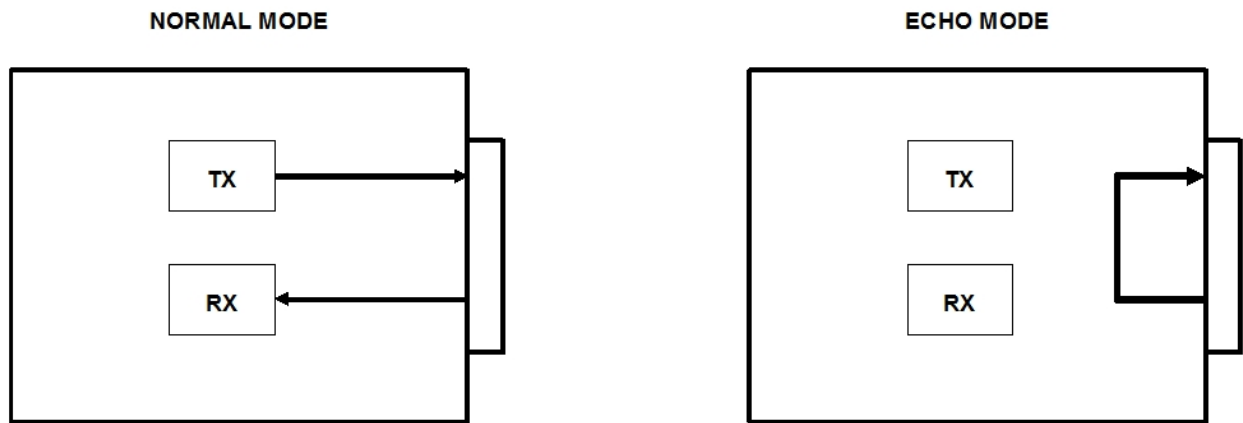
```
serialX/X ASYNC Config>device-mode DCE-forced  
serialX/X ASYNC Config>
```

3.2.6 ECHO

The **ECHO** command configures the interface in **echo** mode so the transmitter resends everything it receives from the receiver. The interface behaves as a mirror. This operating mode permits you to check all the analog part of the interface through an external device that inserts and verifies patterns.

By default this is deactivated.

This command is not supported in CONF interfaces.



Syntax:

```
serialX/X ASYNC Config>echo
```

Example:

```
serialX/X ASYNC Config>echo
serialX/X ASYNC Config>
```

3.2.7 ENABLE-RTS

Through this command you enable the RTS signal functionality in DTE mode. Once the signal is enabled, this activates provided that the device has data available in the transmission buffer.

By default the RTS signal is always active, provided that the interface is enabled.

This command is not supported in CONF interfaces.

Syntax:

```
serialX/X ASYNC Config>enable-rts
```

Example:

```
serialX/X ASYNC Config>enable-rts
serialX/X ASYNC Config>
```

3.2.8 HDW-CTRL

This command activates the hardware flow control so if the device is behaving as DTE, transmission is controlled by the CTS signal: transmission cannot occur until the CTS signal is active. It's also a good idea to execute the **ENABLE-RTS** command in order to enable RTS signal functionality.

By default, the hardware flow control is disabled.

This command is not supported in CONF interfaces.

Syntax:

```
serialX/X ASYNC Config>hdw-ctrl
```

Example:

```
serialX/X ASYNC Config>hdw-ctrl
serialX/X ASYNC Config>
```

3.2.9 IGNORE-CD

The command makes the device software ignore the CD signal status when declaring the interface UP or DOWN. This is very useful in cases where you are operating with devices which do not deliver this signal or that only activate when transmitting. With the driver in the DTE mode, the CD signal corresponds to the CD signal delivered by the DCE. When the driver is in DCE mode, the CD signal corresponds to the RTS signal sent by the DTE.

By default this is deactivated.

This command is not supported in CONF interfaces.

Syntax:

```
serialX/X ASYNC Config>ignore-cd
```

Example:

```
serialX/X ASYNC Config>ignore-cd
serialX/X ASYNC Config>
```

3.2.10 IGNORE-CTS

The command makes the device software ignore the CTS signal status when declaring the interface UP or DOWN. This is very useful in cases where you are operating with devices which do not deliver this signal or that only activate when transmitting. With the driver in the DTE mode, the CTS signal corresponds to the CTS signal delivered by the DCE. When the driver is in DCE mode, the CTS signal corresponds to the CD signal delivered to the DTE.

By default this is deactivated.

This command is not supported in CONF interfaces.

Syntax:

```
serialX/X ASYNC Config>ignore-cts
```

Example:

```
serialX/X ASYNC Config>ignore-cts
serialX/X ASYNC Config>
```

3.2.11 IGNORE-DSR

The command makes the device software ignore the DSR signal status when declaring the interface UP or DOWN. This is very useful in cases where you are operating with devices which do not deliver this signal or that only activate when transmitting. With the driver in the DTE mode, the DSR signal corresponds to the DSR signal delivered by the DCE. When the driver is in DCE mode, the DSR signal corresponds to the DTR signal delivered by the DTE.

By default this is deactivated.

This command is not supported in CONF interfaces.

Syntax:

```
serialX/X ASYNC Config>ignore-dsr
```

Example:

```
serialX/X ASYNC Config>ignore-dsr
serialX/X ASYNC Config>
```

3.2.12 LIST

The **LIST** command displays a list with the value associated to each of the asynchronous serial interface configuration parameters on the screen. Example 1 corresponds to a base board interface and example two to a PMC daughter interface which has 3 WAN interfaces.

Syntax:

```
serialX/X ASYNC Config>list
```

Example 1:

```
serialX/X ASYNC Config>list

Maximum Frame size      : 2048
Cable                   : DCE
Line speed (bps)       : 57600
Data bits               : 8
Parity                  : NONE
Stop bits               : 1
Loopback                : DISABLED
Echo                   : DISABLED
Hardware flow control   : DISABLED
```

```

Special character 1      : 0x7e
Special character 2      : 0x8000
Control character mask   : 0xc0ff
Maximum idle characters  : 0
Ignore CD signal         : DISABLED
Disconnect CD signal     : DISABLED
Ignore DSR signal        : DISABLED
Ignore CTS signal        : DISABLED
Raw line                 : DISABLED
Enable RTS signal        : DISABLED
serialX/X ASYNC Config>

```

Example 2:

```

serialX/X ASYNC Config>list

Maximum Frame size      : 2048
Cable                   : v.24
Line speed (bps)        : 57600
Data bits                : 8
Parity                  : NONE
Stop bits               : 1
Loopback                : DISABLED
Echo                   : DISABLED
Hardware flow control    : DISABLED
Special character 1      : 0x7e
Special character 2      : 0x8000
Control character mask   : 0xc0ff
Maximum idle characters  : 0
Ignore CD signal         : DISABLED
Disconnect CD signal     : DISABLED
Ignore DSR signal        : DISABLED
Ignore CTS signal        : DISABLED
Raw line                 : DISABLED
Enable RTS signal        : DISABLED
serialX/X ASYNC Config>

```

Example 3:

```

uartX/X ASYNC Config>list

Maximum Frame size      : 2048
Cable                   : DCE
Line speed (bps)        : 115200
Data bits                : 8
Parity                  : NONE
Stop bits               : 1
Maximum idle characters  : 4
uartX/X ASYNC Config>

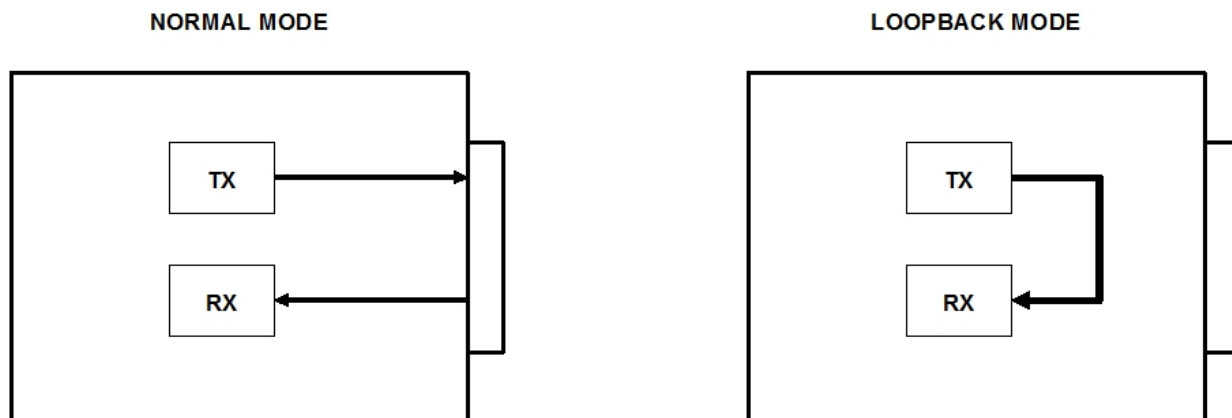
```

3.2.13 LOOPBACK

This command permits you to set the interface in **loopback** mode. In this mode the interface disconnects from the device's exterior and the interface transmitter directly connects to its receiver. In this way, the interface behaves as if it had a mirror in its external connector.

By default this is deactivated.

This command is not supported in CONF interfaces.

**Syntax:**

```
serialX/X ASYNC Config>loopback
```

Example:

```
serialX/X ASYNC Config>loopback
serialX/X ASYNC Config>
```

3.2.14 MAX-IDLE

Through this command, you can specify the maximum number of *IDLE* characters the receiver can take delivery of, from the point where the last data character is obtained before processing a frame. If at any point this maximum number of *IDLE* characters is surpassed, the received frame is processed.

Default value is 0, i.e. when the first *IDLE* character is received, the obtained frame is processed.

Syntax:

```
serialX/X ASYNC Config>max-idle <number>
```

Example:

```
serialX/X ASYNC Config>max-idle 10
serialX/X ASYNC Config>
```

3.2.15 MTU

Configures the maximum frame size in bytes which can be transmitted by the interface (also known as MTU). Default value is 2048 bytes.

Syntax:

```
serialX/X ASYNC Config>mtu <size>
```

Example:

```
serialX/X ASYNC Config>mtu 2048
serialX/X ASYNC Config>
```

3.2.16 NO

Disables a command. Deletes the configured information, establishing the default value for a parameter.

Syntax:

```
serialX/X ASYNC Config>no ?
  char-mask      Set control character mask
  data-bits      Set number of bits per character
  description    Enter interface description
  echo          Transmitter resends received data
  enable-rtts   Enable RTS signal in DTE mode
  hdw-ctrl      Enable hardware flow control
  ignore-cd     Ignore CD signal state
  ignore-cts    Ignore CTS signal state
  ignore-dsr    Ignore DSR signal state
```

loopback	Transmitter is connected internally to the receiver
max-idle	Set maximum idle characters
mtu	Set frame size
open-cd	Disconnect CD signal from internal hardware
parity	Set character parity
raw-line	Line with frames without header and tail
shutdown	Change state to administratively down
special-char1	Set special character 1
special-char2	Set special character 2
speed	Set speed
stop-bits	Set number of stop bits per character
termination-resistor	Set a resistor at the end of the wires RS-485
update	Update a level indicator
warning-test-timeout	Send a warning if echo or loopback mode

Case for a CONF interface:

```
uart0/0 ASYNC Config>no ?
  data-bits      Set number of bits per character
  description    Enter interface description
  max-idle       Set maximum idle characters
  mtu            Set the interface maximum transmit unit
  parity         Set character parity
  shutdown       Change state to administratively down
  speed          Set speed
  stop-bits      Set number of stop bits per character
  update         Update a level indicator
uart0/0 ASYNC Config>
```

Example:

```
serialX/X ASYNC Config>no speed
serialX/X ASYNC Config>
```

3.2.17 OPEN-CD

This command permits you to disconnect the device's internal hardware CD signal. This command is useful so in DTE mode you can transmit when operating with a DCE which does not activate the CD signal and only activates the CTS signal.

By default this is deactivated.

This command is not supported in CONF interfaces.

Syntax:

```
serialX/X ASYNC Config>open-cd
```

Example:

```
serialX/X ASYNC Config>open-cd
serialX/X ASYNC Config>
```

3.2.18 PARITY

Sets the parity type. The possible values are: EVEN, MARK, NONE (if you do not wish to use parity), ODD and SPACE. The default value is NONE.

This command doesn't support the MARK and SPACE values in CONF interfaces.

Syntax:

```
serialX/X ASYNC Config>parity <type>
```

Example:

```
serialX/X ASYNC Config>parity none
serialX/X ASYNC Config>
```

3.2.19 RAW-LINE

This command indicates to the device that the frames transmitted and received by the interface do not have either MAC headers or tails of any type, they only contain data. This command is essential so the MTU defined through the **FRAME-SIZE** command does not take the headers into account.

By default, this is deactivated.

This command is not supported in CONF interfaces.

Syntax:

```
serialX/X ASYNC Config>raw-line
```

Example:

```
serialX/X ASYNC Config>raw-line
serialX/X ASYNC Config>
```

3.2.20 SPECIAL-CHAR1 and SPECIAL-CHAR2

These two commands permit you to define a special character for each. A special character is used to delimit data frames. When a special character is received, the frame is given as received and is processed. The mask defined through the **CHAR-MASK** command permits you to define the classes of control characters.

By default, special-char1 is 0x007E and special-char2 is 0x8000.

This command is not supported in CONF interfaces.

Syntax:

```
serialX/X ASYNC Config>special-charX <character>
```

Example:

```
serialX/X ASYNC Config>special-char1 00FE
serialX/X ASYNC Config>
```

3.2.21 SPEED

Configures the physical line speed in bps. Default value is 57600 bps.

Syntax:

```
serialX/X ASYNC Config>speed <speed>
```

Example:

```
serialX/X ASYNC Config>speed 57600
serialX/X ASYNC Config>
```

3.2.22 STOP-BITS

Configures the number of stop bits. The possible values are: 1 and 2. The default value is 1.

Syntax:

```
serialX/X ASYNC Config>stop-bits <number>
```

Example:

```
serialX/X ASYNC Config>stop-bits 1
serialX/X ASYNC Config>
```

3.2.23 TERMINATION-RESISTOR

The RS-485 buses that span long distances need to have 120 ohm at their ends (characteristic impedance of a 2-wire line) to avoid signal echoes and consequently degradation. The RS-485 serial interfaces enable through configuration a 120 ohm termination resistor

The TERMINATION-RESISTOR command enables/disables the termination resistor. By default the resistor is dis-

abled.

Syntax:

```
uartX/X ASYNC config>termination-resistor{ enable| disable }
```

Example:

```
uartX/X ASYNC config>termination-resistor enable
uartX/X ASYNC config>
```

This command is only available in hardware that supports 4-wire RS-485 with termination resistor control.

The termination resistor must be enabled if the device is at the end of the bus.

3.2.24 V24

Configures the driver so it operates complying with the V24 norm.

This command is only available in serial interfaces pertaining to the PCI card with 3 WAN interfaces as these are the only ones that permit you to change the type of standard through configuration.

By default the driver is configured to operate complying with the V24 norm.

Syntax:

```
serialX/X ASYNC Config>v24
```

Example:

```
serialX/X ASYNC Config>v24
serialX/X ASYNC Config>
```

3.2.25 V35

Configures the driver so it operates complying with the V35 norm.

This command is only available in serial interfaces pertaining to the PCI card with 3 WAN interfaces as these are the only ones that permit you to change the type of standard through configuration.

By default the driver is configured to operate complying with the V24 norm.

Syntax:

```
serialX/X ASYNC Config>v35
```

Example:

```
serialX/X ASYNC Config>v35
serialX/X ASYNC Config>
```

3.2.26 WARNING-TEST-TIMEOUT

Through this command, you can activate periodic trap sending through SNMP which tells you if the interface is in *echo* mode or *loopback* mode or both. The time period is configurable and the value should be between 0 seconds and 3550 weeks. A 0 value deactivates this command.

By default, this is deactivated.

This command is not supported in CONF interfaces.

Syntax:

```
serialX/X ASYNC Config>warning-test-timeout <period>
```

Example:

```
serialX/X ASYNC Config>warning-test-timeout 10
serialX/X ASYNC Config>
```

3.2.27 X21

Configures the driver so it operates complying with the X21 norm.

This command is only available in serial interfaces pertaining to a PCI card with 3 WAN interfaces as these are the only ones that permit you to change the type of standard through configuration.

By default the driver is configured to operate complying with the V24 norm.

Syntax:

```
serialX/X ASYNC Config>x21
```

Example:

```
serialX/X ASYNC Config>x21
serialX/X ASYNC Config>
```

3.2.28 EXIT

The **EXIT** command returns you to the previous prompt level.

Syntax:

```
serialX/X ASYNC Config>EXIT
```

Example:

```
serialX/X ASYNC Config>EXIT
Config>
```

Chapter 4 Asynchronous Serial Interface Monitoring

4.1 Monitoring Commands

4.1.1 Accessing the Asynchronous Serial Interface Monitoring prompt

The asynchronous serial line monitoring commands must be entered at the monitoring prompt associated to them (*serialX/X ASYNC+*). Use the **NETWORK <interface_name>** command (within the general monitoring prompt, +) to access this prompt where **<interface_name>** is the name of the asynchronous serial interface you wish to monitor.

```
+network serialX/X
-- Asynchronous Serial Line Console --
serialX/X ASYNC+
```

Once you have accessed the asynchronous serial line monitoring prompt, you can enter the commands described below:

Command	Function
? (HELP)	Lists the available commands or their options.
CLEAR	Clears the statistics associated to the asynchronous serial interface.
EXIT	Exits the asynchronous serial interface monitoring prompt.

4.1.2 ? (HELP)

The ? (HELP) command lists the valid commands at the programmed router level. This command can also be used after a specific command in order to list the available options.

Syntax:

```
serialX/X ASYNC+?
```

Example:

```
serial0/0 ASYNC+?
  clear    Delete all the statistics
  exit
serial0/0 ASYNC+
```

4.1.3 CLEAR

The **CLEAR** command permits you to delete (zeroize) all the statistics associated to the specified asynchronous serial interface.

Syntax:

```
serialX/X ASYNC+clear
```

Example:

```
serial0/0 ASYNC+clear
serial0/0 ASYNC+
```

4.1.4 EXIT

The **EXIT** command returns you to the previous prompt level.

Syntax:

```
serialX/X ASYNC+exit
```

Example:

```
serial0/0 ASYNC+exit
+
```


4.2 Monitoring the Asynchronous Serial Interface from the General Menu

All the statistics associated to a specific asynchronous serial interface can be viewed from the general monitoring prompt (+). Additionally you can view other information such as the state of the serial line signals, the type of driver, the line speed, the average throughput, the last throughput, the number of bits per character, the number of stop bits, the type of parity and the time elapsed since the last port reset. For this enter the **DEVICE <interface_name>** command where **<interface_name>** is the name of the specified interface.

Syntax:

```
+device serialX/X
```

Example:

```
+device serial0/0
Interface          CSR      Vect      Auto-test  Auto-test  Maintenance
                  FA200A00  5e        valids    failures   failures
serial0/0
Driver type       =      DCE
Speed (bps)       =      57600
Throughput (bps)  =      0
Last throughput (bps) =      0
Bits per character =      8
Stop bits         =      1
Parity selected   =      NONE
Last reset        = 12 minutes, 29 seconds ago

      Circuit  Nicknames  State
      -----  -
      105      RTS       ON
      106      CTS       ON
      107      DSR       ON
      108      DTR       ON
      109      DCD       ON
      125      RI        ---
      141      LL        OFF

Statistics:
Parity errors     =      0
Data errors       =      0
Overrun errors    =      0
+
```

The control signals state does not appear for the CONF interface because this interface doesn't have them.

Chapter 5 AT Commands Interface Configuration

5.1 Assigning the AT Commands Interface

To assign an AT commands interface to a determined device connector, enter the **SET DATA-LINK AT** command at the general configuration menu (*Config>*). Should the device have more than one connector, you will be prompted for the name of the interface corresponding to the required connector. Contrariwise, the AT commands interface will be assigned to the only corresponding type of connector in the device.

```
Config>set data-link at
Config>
```

```
Config>set data-link at serial0/0
Config>
```

You can verify that the interface has been correctly assigned by listing all the interfaces in the device:

```
Config>list devices
```

Interface	Connector	Type of interface
ethernet0/0	LAN1	Quicc Ethernet
serial0/0	SERIAL0/WAN1	AT COM
atm0/0	DSL1	ATM
bri0/0	BRI/ISDN1	ISDN Basic Rate Int
x25-node	---	Router->Node
ppp1	---	Generic PPP

```
Config>
```

```
Config>list devices
```

Interface	Connector	Type of interface
ethernet0/0	LAN1	Fast Ethernet interface
serial0/0	SERIAL0/WAN1	AT COM
serial0/1	SERIAL1/WAN2	X25
serial0/2	SERIAL2/WAN3	X25
bri0/0	BRI/ISDN1	ISDN Basic Rate Int
x25-node	---	Router->Node
token-ring3/0	SLOT3	Token Ring
ppp1	---	Generic PPP

```
Config>
```

The types of serial connectors that the Asynchronous interface supports are as follows:

- serial/x
- uart0/0 over a previously configured CONF port.

The functionality of using the CONF port as an Asynchronous interface is a special case. This port normally functions as a local console and presents a series of limitations which you can perceive when configuring it. You can see which parameters are not operative for these types of port in the configurable parameters.

Once the interface has been assigned you can begin the configuration process. However in order for changes to take effect and monitoring of the said interface can take place, you need to save the configuration and restart the device.

```
Config>save
```

```
Save configuration (Yes/No)? y
```

```
Building configuration as text... OK
```

```
Writing configuration... OK on Flash
```

```
Config>
```

```
*restart
```

```
Are you sure to restart the system(Yes/No)? y
```

```
Done
```

```
Restarting. Please wait .....
```

5.2 Configuration Commands

5.2.1 Accessing the AT Commands Interface Configuration prompt

The AT commands interface configuration commands must be entered at the configuration prompt associated to them (*serialX/X AT config*). Use the **NETWORK <interface_name>** command (within the general configuration prompt *Config*) to access this prompt where **<interface_name>** is the name of the AT commands interface you wish to configure.

```
Config>network serialX/X
-- Interface AT. Configuration --
serialX/X AT config>
```

Once you have accessed the AT commands interface configuration prompt, you can enter the commands described below:

Command	Function
? (HELP)	Lists the available commands or their options.
ADDITIONAL-CONTROL-COMMAND	Sets additional AT commands.
CONNECTION-MODE	Sets connection mode.
CTS-CONTROL-COMMAND	Sets AT command for CTS signal control.
DATA-BITS	Sets number of bits per character.
DCD-CONTROL-COMMAND	Sets AT command for DCD signal control.
DIAL-MODE	Sets dial mode.
DISABLE	Disables some features.
DSR-CONTROL-COMMAND	Sets AT command for DSR signal control.
DTR-CONTROL-COMMAND	Sets AT command for DTR signal control.
ENABLE	Enables some features.
FLOW-CONTROL-COMMAND	Sets AT command for flow control.
LIST	Displays the values associated to the distinct interface parameters.
MTU	Sets the maximum frame size (MTU).
NO	Undoes command modifications.
NUMBER-RINGS	Sets number of rings for auto answer.
PARITY	Sets character parity.
RING-TONE-LENGTH	Sets ring tone and silence lengths.
SPEED	Sets speed.
STOP-BITS	Sets number of stop bits per character.
V42-CONTROL-COMMAND	Sets AT command for V.42 comp. and error correct.
WAIT-TIME	Sets maximum connection time.
EXIT	Exits the AT commands interface configuration prompt.

In addition to the above commands, there are other commands common to all the device interfaces. These commands are described in the common interfaces configuration manual (Dm 772-I Common Configuration Interfaces).

5.2.2 ? (HELP)

The ? (HELP) command lists the valid commands at the programmed router level. This command can also be used after a specific command in order to list the available options.

Syntax:

```
serialX/X AT config>?
```

Example:

```
serialX/X AT config>?
additional-control-command Set additional AT commands
```

```

connection-mode      Set connection mode (Dial command or DTR)
cts-control-command  Set AT command for CTS signal control
data-bits            Set number of bits per character
dcd-control-command  Set AT command for DCD signal control
description          Enter interface description
dial-mode            Set dial mode (tone or pulse)
disable              Disable some features
dsr-control-command  Set AT command for DSR signal control
dtr-control-command  Set AT command for DTR signal control
enable              Enable some features
flow-control-command Set AT command for flow control
list                 List configuration
mtu                  Set frame size
no                   Set default config
number-rings         Set number of rings for auto answer
parity               Set character parity
ring-tone-length     Set ring tone and silence lengths
shutdown             Change state to administratively down
speed                Set speed
stop-bits            Set number of stop bits per character
update              Update a level indicator
v42-control-command Set AT command for V.42 comp/error correction
wait-time            Set maximum connection time
exit                Return to previous menu
serialX/X AT config>

```

5.2.3 ADDITIONAL-CONTROL-COMMAND

Establishes additional AT commands for modem configuration. A character string of up to 63 characters is admitted. None has been configured by default.

To delete additional commands which have been previously added, simply use the **ADDITIONAL-CONTROL-COMMAND NO-COMMAND** command.

The **NO ADDITIONAL-CONTROL-COMMAND** command re-establishes the default value. The default value is not transmitting any additional AT command.

Syntax:

```

serialX/X AT config>additional-control-command ?
no-command      No command for this action
<word>         Text

```

Example 1:

```

serialX/X AT config>additional-control-command +CGDCONT=9,"IP","Teldatw.es"
serialX/X AT config>list
Connection mode      = C  (Commands)
Dial mode            = T  (Tone)
DCD control command  = &C1
DSR control command  = &S0
DTR control command  = &D2
CTS control command  = &R0
V.42/v.42 bis command = &Q5
Flow control command = &K3
Additional AT commands = +CGDCONT=9,IP,Teldatw.es
Maximum Frame Size   = 2048
Number of rings      = 1
Ring tone length     = 15
Silence between tones = 30
Data bits            = 8
Parity                = NONE
Stop bits            = 1
Line Speed (bps)     = 57600
Local telephone      =
Wait time            = 45
Flow control option   = Disabled
Modem Auto detection = Disabled
serialX/X AT config>

```

Example 2:

```

serialX/X AT config>additional-control-command no-command
serialX/X AT config>list
    Connection mode           = C  (Commands)
    Dial mode                 = T  (Tone)
    DCD control command      = &C1
    DSR control command      = &S0
    DTR control command      = &D2
    CTS control command      = &R0
    V.42/v.42 bis command    = &Q5
    Flow control command     = &K3
    Additional AT commands   =
    Maximum Frame Size       = 2048
    Number of rings          = 1
    Ring tone length         = 15
    Silence between tones    = 30
    Data bits                 = 8
    Parity                   = NONE
    Stop bits                 = 1
    Line Speed (bps)         = 57600
    Local telephone          =
    Wait time                 = 45
    Flow control option      = Disabled
    Modem Auto detection     = Disabled
serialX/X AT config>

```

5.2.4 CONNECTION-MODE

Configures the connection mode. This parameter permits you to specify if the modem should be previously configured through commands in order to carry out the call (*Commands*), or if contrariwise the corresponding signal should be directly set to ON so that the modem carries out the call to the internally configured number (*DRT*). The default value is *Commands*.

The **NO CONNECTION-MODE** command reestablishes the default value(*Commands*).

Syntax:

```
serialX/X AT config>connection-mode { C | c | D | d }
```

Example:

```

serialX/X AT config>connection-mode C
serialX/X AT config>list
    Connection mode           = C  (Commands)
    Dial mode                 = T  (Tone)
    DCD control command      = &C1
    DSR control command      = &S0
    DTR control command      = &D2
    CTS control command      = &R0
    V.42/v.42 bis command    = &Q5
    Flow control command     = &K3
    Additional AT commands   =
    Maximum Frame Size       = 2048
    Number of rings          = 1
    Ring tone length         = 15
    Silence between tones    = 30
    Data bits                 = 8
    Parity                   = NONE
    Stop bits                 = 1
    Line Speed (bps)         = 57600
    Local telephone          =
    Wait time                 = 45
    Flow control option      = Disabled
    Modem Auto detection     = Disabled
serialX/X AT config>

```

5.2.5 CTS-CONTROL-COMMAND

Configures the CTS signal control command. The default value is “&R1”.

To delete the previously established CTS signal control command, and ensure that no command is used to that end, simply use the configuration command **CTS-CONTROL-COMMAND NO-COMMAND**.

The **NO CTS-CONTROL-COMMAND** command re-establishes the default value for this parameter (“&R1”).

Syntax:

```
serialX/X AT config>cts-control-command { no-command | <command> }
```

Example:

```
serialX/X AT config>cts-control-command &R1
serialX/X AT config>
```

5.2.6 DATA-BITS

Configures the number of data bits. The possible values are 5, 6, 7 and 8. Default value is 8.

The **NO DATA-BITS** command reestablishes the default value for this parameter (8).

Syntax:

```
serialX/X AT config>data-bits <number>
```

Example:

```
serialX/X AT config>data-bits 8
serialX/X AT config>
```



Note

Please note that if you wish to mount a PPP interface over an AT commands interface, the number of data bits must be 8 (mandatory).

5.2.7 DCD-CONTROL-COMMAND

Configures the DCD signal control command. The default value is “&C1”.

To delete the previously established DCD signal control command, and ensure that no command is used to that end, simply use the configuration command **DCD-CONTROL-COMMAND NO-COMMAND**.

The **NO DCD-CONTROL-COMMAND** command re-establishes the default value for this parameter (“&C1”).

Syntax:

```
serialX/X AT config>dcd-control-command { no-command | <command> }
```

Example:

```
serialX/X AT config>dcd-control-command &C1
serialX/X AT config>
```

5.2.8 DIAL-MODE

Configures the dialing mode. This parameter permits you to specify if dialing must be carried out through tones (*Tone*) or through pulses (*Pulse*). The default value is *Tone*.

The **NO DIAL-MODE** command reestablishes the default value for this parameter (*Pulse*).

Syntax:

```
serialX/X AT config>connection-mode { T | t | P | p }
```

Example:

```
serialX/X AT config>dial-mode T
```

```

serialX/X AT config>list
  Connection mode      = C  (Commands)
  Dial mode           = T  (Tone)
  DCD control command = &C1
  DSR control command = &S0
  DTR control command = &D2
  CTS control command = &R0
  V.42/v.42 bis command = &Q5
  Flow control command = &K3
  Additional AT commands =
  Maximum Frame Size  = 2048
  Number of rings     = 1
  Ring tone length    = 15
  Silence between tones = 30
  Data bits           = 8
  Parity              = NONE
  Stop bits           = 1
  Line Speed (bps)    = 57600
  Local telephone     =
  Wait time           = 45
  Flow control option = Disabled
  Modem Auto detection = Disabled
serialX/X AT config>

```

5.2.9 DISABLE

The **DISABLE** command permits you to disable the flow control option and the modem auto detection.

Syntax:

```
serialX/X AT config>disable { flow-ctrl-option | modem-auto-detection }
```

Example:

```

serialX/X AT config>disable ?
  flow-ctrl-option      Disable flow control
  modem-auto-detection  Disable automatic modem detection
serialX/X AT config>

```

5.2.9.1 DISABLE FLOW-CTRL-OPTION

Disables the flow control. With this parameter disabled flow control will not be available in the interface. The default value is disabled.

Syntax:

```
serialX/X AT config>disable flow-ctrl-option
```

Example:

```

serialX/X AT config>disable flow-ctrl-option
serialX/X AT config>

```

5.2.9.2 DISABLE MODEM-AUTO-DETECTION

Disables ring pattern detection. The default value is disabled.

Syntax:

```
serialX/X AT config>disable modem-auto-detection
```

Example:

```

serialX/X AT config>disable modem-auto-detection
serialX/X AT config>

```

5.2.10 DSR-CONTROL-COMMAND

Configures the DSR signal control command. The default value is "&S0".

To delete the previously established DSR signal control command, and ensure that no command is used to that end,

simply use the configuration command **DSR-CONTROL-COMMAND NO-COMMAND**.

The **NO DSR-CONTROL-COMMAND** command re-establishes the default value for this parameter (“&S0”).

Syntax:

```
serialX/X AT config>dsr-control-command { no-command | <command> }
```

Example:

```
serialX/X AT config>dsr-control-command &S0
serialX/X AT config>
```

5.2.11 DTR-CONTROL-COMMAND

Configures the DTR signal control command. The default value is “&D2”.

To delete the previously established DTR signal control command, and ensure that no command is used to that end, simply use the configuration command **DTR-CONTROL-COMMAND NO-COMMAND**.

The **NO DTR-CONTROL-COMMAND** command re-establishes the default value for this parameter (“&D2”).

Syntax:

```
serialX/X AT config>dtr-control-command { no-command | <command> }
```

Example:

```
serialX/X AT config>dtr-control-command &D2
serialX/X AT config>
```

5.2.12 ENABLE

The **ENABLE** command permits you to enable the flow control option and the modem auto detection.

Syntax:

```
serialX/X AT config>enable { flow-ctrl-option | modem-auto-detection }
```

Example:

```
serialX/X AT config>enable ?
  flow-ctrl-option      Enable flow control
  modem-auto-detection  Enable automatic modem detection
serialX/X AT config>
```

5.2.12.1 ENABLE FLOW-CTRL-OPTION

Enables the flow control. With this parameter enabled flow control will be available in the interface. This is disabled by default.



Note

In cases where the AT commands interface is being used as a base interface for a PPP interface, in order to ensure the flow control is operating correctly, the Asynchronous Control Character Map (ACCM) for the said PPP interface must be configured with the value 0x000A0000.

Syntax:

```
serialX/X AT config>enable flow-ctrl-option
```

Example:

```
serialX/X AT config>enable flow-ctrl-option
WARNING: ACCM must be set to 000A0000 in PPP LCP for this interface.
serialX/X AT config>
```


5.2.12.2 ENABLE MODEM-AUTO-DETECTION

Enables modem auto detection. With this parameter enabled, a call can be identified as a management call once the configured number of rings followed by the configured silence interval have been produced. This parameter is disabled by default.

Syntax:

```
serialX/X AT config>enable modem-auto-detection
```

Example:

```
serialX/X AT config>enable modem-auto-detection
serialX/X AT config>
```

5.2.13 FLOW-CONTROL-COMMAND

Configures the flow control command. The default value is “&K3”

To delete the previously established flow control command, and ensure that no command is used to that end, simply use the configuration command **FLOW-CONTROL-COMMAND NO-COMMAND**.

The **NO FLOW-CONTROL-COMMAND** command re-establishes the default value for this parameter (“&K3”).

Syntax:

```
serialX/X AT config>flow-control-command { no-command | <command> }
```

Example:

```
serialX/X AT config>flow-control-command &K3
serialX/X AT config>
```

5.2.14 LIST

The **LIST** command displays a list with the value associated to each of the AT commands interface configuration parameters on the screen.

Syntax:

```
serialX/X AT config>list
```

Example:

```
serialX/X AT config>list
Connection mode      = C  (Commands)
Dial mode            = T  (Tone)
DCD control command  = &C1
DSR control command  = &S0
DTR control command  = &D2
CTS control command  = &R0
V.42/v.42 bis command = &Q5
Flow control command = &K3
Additional AT commands =
Maximum Frame Size   = 2048
Number of rings      = 1
Ring tone length     = 15
Silence between tones = 30
Data bits            = 8
Parity               = NONE
Stop bits            = 1
Line Speed (bps)     = 57600
Local telephone      =
Wait time            = 45
Flow control option   = Disabled
Modem Auto detection = Disabled
serialX/X AT config>
```

5.2.15 MTU

Configures the maximum frame size in bytes which can be transmitted by the interface (also known as MTU). Default value is 2048 bytes.

Syntax:

```
serialX/X AT config>mtu <size>
```

Example:

```
serialX/X AT config>mtu 2048
serialX/X AT config>
```

5.2.16 NO

Disables a command. Deletes the configured information, establishing the default value for a parameter.

Syntax:

```
serialX/X AT config>no ?
  additional-control-command
  connection-mode
  cts-control-command
  data-bits
  dcd-control-command
  description           Enter interface description
  dial-mode
  dsr-control-command
  dtr-control-command
  flow-control-command
  mtu
  number-rings
  parity
  ring-tone-length
  shutdown             Change state to administratively down
  speed
  stop-bits
  update              Update a level indicator
  v42-control-command
  wait-time
```

Example:

```
serialX/X AT config>no speed
serialX/X AT config>
```

5.2.17 NUMBER-RINGS

Configures the number of rings that the modem must wait before accepting an incoming call, should these be enabled (*Automatic Answer = Enabled*). The default value is 1.

The **NO NUMBER-RINGS** command reestablishes the default value for this parameter.

Syntax:

```
serialX/X AT config>number-rings <rings>
```

Example:

```
serialX/X AT config>number-rings 1
serialX/X AT config>
```

5.2.18 PARITY

Sets parity type. The possible values are: EVEN, MARK, NONE (if you do not wish to use parity), ODD and SPACE. The default value is NONE.

The **NO PARITY** command reestablishes the default value for this parameter.

This command doesn't support the MARK and SPACE values in CONF interfaces.

Syntax:

```
serialX/X AT config>parity <type>
```

Example:

```
serialX/X AT config>parity none
serialX/X AT config>
```

5.2.19 RING-TONE-LENGTH

Configure the tone and the silence duration for a ring signal. Given that the ring signal differs depending on the telephone network (generally in different countries), it may be necessary to modify these parameters. These parameters only affect the management function through AT. This is configured in tenths of seconds and the default value is 15 for the tone and 30 for the silence.



Note

We do not recommend that this parameter be modified unless you experience problems with the management or with “wake-up” via the modem. Should this occur, please check the values that need to be configured with the telephone company that provides this service.

Syntax:

```
serialX/X AT config>ring-tone-length <tone duration> <silence between tones>
```

Example:

```
serialX/X AT config>ring-tone-length 15 30
serialX/X AT config>
```

5.2.20 SPEED

Configures the physical line speed in bps. This value must be one of the following multiples of 1200: 2400, 4800, 9600, 19200, 38400 or 57600 bps. However, we recommend that this value be that immediately above the modem transfer speed with the other end. E.g. if the modem is 56 Kbps, you should select 57600 bps. The default value is 57600 bps.

The **NO SPEED** command reestablishes the default value for this parameter.

Syntax:

```
serialX/X AT config>speed <speed>
```

Example:

```
serialX/X AT config>speed 57600
serialX/X AT config>
```

5.2.21 STOP-BITS

Configures the number of stop bits. The possible values are: 1 and 2. The default value is 1.

The **NO STOP-BITS** command reestablishes the default value for this parameter.

Syntax:

```
serialX/X AT config>stop-bits <number>
```

Example:

```
serialX/X AT config>stop-bits 1
serialX/X AT config>
```

5.2.22 V42-CONTROL-COMMAND

Configures the V.42/V.42 bis control command. The default value is “&Q5”

To delete the previously established V.42/V.42 bis control command, and ensure that no command is used to that end, simply use the configuration command **V42-CONTROL-COMMAND NO-COMMAND**.

The **NO V42-CONTROL-COMMAND** command re-establishes the default value for this parameter (“&Q5”).

Syntax:

```
serialX/X AT config>v42-control-command { no-command | <command> }
```

Example:

```
serialX/X AT config>v42-control-command &Q5
serialX/X AT config>
```

5.2.23 WAIT-TIME

Configures the wait time in seconds for call establishment. The default value is 45 seconds.

The **NO WAIT-TIME** command reestablishes the default value for this parameter.

Syntax:

```
serialX/X AT config>wait-time <time>
```

Example:

```
serialX/X AT config>wait-time 45
serialX/X AT config>
```

5.2.24 EXIT

The **EXIT** command returns you to the previous prompt level.

Syntax:

```
serialX/X AT config>exit
```

Example:

```
serialX/X AT config>exit
Config>
```

Chapter 6 AT Commands Interface Monitoring

6.1 Monitoring Commands

6.1.1 Accessing the AT Commands Interface Monitoring prompt

The AT commands interface monitoring commands must be entered at the monitoring prompt associated to them (*serialX/X AT+*). Use the **NETWORK <interface_name>** command (within the general monitoring prompt **+**) to access this prompt where **<interface_name>** is the name of the AT commands interface you wish to monitor.

```
+network serialX/X

-- AT Console --
serialX/X AT+
```

Once you have accessed the AT commands interface monitoring prompt, you can enter the commands described below:

Command	Function
? (HELP)	Lists the available commands or their options.
AT-MODE	Permits direct execution of AT commands over the connected device.
BITRATE	Displays the effective reception/reception speed in the interface.
COMMAND	Permits sending commands to the connected device.
DTROFF	Forces the interface DTR/108 to an inactive state (OFF).
DTRON	Forces the interface DTR/108 signal to an active state (ON).
LIST	Displays monitoring information for the AT commands interface.
BUFFER	Lists the commands captured in the commands monitoring buffer.
EXIT	Exits the AT commands interface monitoring prompt.

We need to point out that the above commands are relative to the monitoring of AT commands over external modems. For further information on the monitoring commands associated to GPRS, CDMA or UMTS connections, please see manuals Dm 747-I "GPRS Interface" and Dm 757-I "PCMCIA-UMTS Interface".

6.1.2 ? (HELP)

The ? (HELP) command lists the valid commands at the programmed router level. This command can also be used after a specific command in order to list the available options.

Syntax:

```
serialX/X AT+?
```

Example:

```
serial0/0 AT+?
at-mode      Send AT commands directly to the module
bitrate      Bit rate monitor
buffer       Display saved commands and answers
command      Send AT command to the module
dtroff       Set DTR modem signal OFF
dtron        Set DTR modem signal ON
list         List interface parameters
exit
serial0/0 AT+
```

6.1.3 AT-MODE

Permits you to execute AT commands directly over the connected device.

Syntax:

```
serialX/X AT+at-mode
```

Example:

```

serial3/0 AT+at-mode
You are now entering AT command mode on interface serial3/0
Please type CTRL-C to exit AT command mode
at
OK
ati
33600

OK
ati3
Olicom GoCard 336 V2.10

OK
at&v
ACTIVE PROFILE:
B1 E1 L3 M0 N1 Q0 T V1 W1 X4 Y0 &C1 &D2 &G2 &J0 &K3 &Q5 &R0 &S0 &T5 &X0 &Y0
S00:000 S01:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:050 S08:002 S09:006
S10:014 S12:050 S14:138 S16:000 S18:000 S21:048 S22:115 S23:182 S24:060 S25:005
S26:001 S27:073 S28:000 S29:070 S30:000 S31:198 S32:017 S33:019 S36:007 S37:000
S38:020 S39:003 S40:104 S41:195 S46:138 S48:007 S82:128 S86:000 S95:032

STORED PROFILE 0:
B1 E1 L3 M1 N1 Q0 T V1 W1 X4 Y0 &C1 &D2 &G2 &J0 &K3 &Q5 &R1 &S0 &T5 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S12:050 S14:138 S18:000
S21:052 S22:119 S23:182 S24:060 S27:073 S28:000 S30:000 S31:198 S36:007 S37:000
S39:003 S40:104 S41:195 S46:138 S48:007 S95:032

STORED PROFILE 1:
B1 E1 L3 M1 N1 Q0 T V1 W1 X4 Y0 &C1 &D2 &G2 &J0 &K3 &Q5 &R1 &S0 &T5 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S12:050 S14:138 S18:000
S21:052 S22:119 S23:182 S24:060 S27:073 S28:000 S30:000 S31:198 S36:007 S37:000
S39:003 S40:104 S41:195 S46:138 S48:007 S95:032

TELEPHONE NUMBERS:
0=                               1=
2=                               3=
OK
AT command mode finished

*

```

6.1.4 BITRATE

Displays the effective reception/reception speed in the interface. This should not be confused with the configured line speed.

The listing carries out a change of line when maximum conditions are detected in one of the two monitored directions.

Syntax:

```
serialX/X AT+bitrate
```

Example:

```

serial0/0 AT+bitrate
-----
Interface serial3/0
-----
Current trx rate (bps) =          0   Current rcv rate (bps) =          0
Current trx rate (bps) =       16000   Current rcv rate (bps) =          400
Current trx rate (bps) =          300   Current rcv rate (bps) =       12000
serial0/0 AT+

```

6.1.5 COMMAND

Permits you to send commands to the device. The sending of AT commands to the modem is only available when the modem is not connected.

Syntax:

```
serialX/X AT+command <command>
```

Example:

```
serial0/0 AT+command at&v
at&v
at&v
ACTIVE PROFILE:
B1 E1 L3 M0 N1 Q0 T V1 W1 X4 Y0 &C1 &D2 &G2 &J0 &K3 &Q5 &R0 &S0 &T5 &X0 &Y0
S00:000 S01:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:050 S08:002 S09:006
S10:014 S12:050 S14:138 S16:000 S18:000 S21:048 S22:115 S23:182 S24:060 S25:005
S26:001 S27:073 S28:000 S2:070 S30:000 S31:198 S32:017 S33:019 S36:007 S37:000
S38:020 S39:003 S40:104 S41:195 S46:138 S48:007 S82:128 S86:000 S95:032

STORED PROFILE 0:
B1 E1 L3 M1 N1 Q0 T V1 W1 X4 Y0 &C1 &D2 &G2 &J0 &K3 &Q5 &R1 &S0 &T5 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S12:050 S14:138 S18:000
S21:052 S22:119 S23:182 S24:060 S27:073 S28:000 S30:000 S31:198 S36:007 S37:000
S39:003 S40:104 S41:195 S46:138 S48:007 S95:032

STORED PROFILE 1:
B1 E1 L3 M1 N1 Q0 T V1 W1 X4 Y0 &C1 &D2 &G2 &J0 &K3 &Q5 &R1 &S0 &T5 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S12:050 S14:138 S18:000
S21:052 S22:119 S23:182 S24:060 S27:073 S28:000 S30:000 S31:198 S36:007 S37:000
S38:020 S39:003 S40:104 S41:195 S46:138 S48:007 S82:128 S86:000 S95:032
OK
serial0/0 AT+
```

6.1.6 DTRON

Forces the interface DTR/108 signal to an active state (ON).

Syntax:

```
serialX/X AT+dttron
```

Example:

```
serial0/0 AT+dttron
serial0/0 AT+
```

6.1.7 DTROFF

Forces the interface DTR/108 signal to an inactive state (OFF).

Syntax:

```
serialX/X AT+dtroff
```

Example:

```
serial0/0 AT+dtrofF
serial0/0 AT+
```

6.1.8 LIST

The **LIST** command permits you to view the monitoring information associated to the AT commands interface in question.

Syntax:

```
serialX/X AT+list
```

Example:

```
serial0/0 AT+list
Dialers registered      = none
Current dialer registered = none
State                   = (0) INITIAL
Call request            = 0
Telephone number        =
Total connection time   = 0 seconds
Current connection time = 0 seconds
Time to establish connection = 0 sec
serial0/0 AT+
```

6.1.9 BUFFER

Lists the commands captured in the memory buffer used to store everything sent by the modem. This command is used to debug communication problems with the modem or with the internal modem.

Syntax:

```
serialX/X AT+buffer
```

Example:

```
serial0/0 AT+buffer
serial0/0 AT+
```

6.1.10 EXIT

The **EXIT** command returns you to the previous prompt level.

Syntax:

```
serialX/X AT+exit
```

Example:

```
serial0/0 AT+exit
+
```

6.2 Monitoring the AT Commands Interface from the General Menu

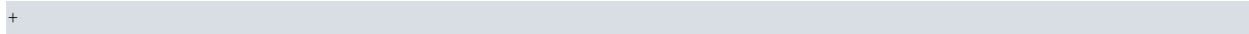
All the statistics associated to a specific AT commands interface can be viewed from the general monitoring prompt (+). Additionally you can view other information such as the state of the serial line signals, the type of driver (DTE), the line speed, the average throughput, the last throughput, the number of bits per character, the number of stop bits, the type of parity and the time elapsed since the last port reset. For this enter the **DEVICE <interface_name>** command at the said prompt where **<interface_name>** refers to the specified interface.

Example:

```
+device serial0/0

Interface          CSR      Vect      Auto-test  Auto-test  Maintenance
                  FA200A00  5e        valids    failures   failures
serial0/0
Interface DTE
Circuits:         105 106 107 108 109 125 141
Nicknames:        RTS CTS DSR DTR DCD RI  LL
State:            ON  ON  ON  ON  ON  --- ON

Speed (bps)       =      19200
Throughput (bps)  =      20181
Last throughput (bps) =      20400
Bits per character =           8
Stop bits         =           1
Parity selected   =         NONE
Parity errors     =           0
Data errors       =           0
Overrun errors    =           0
Last reset        =      0 seconds
```

Chapter 7 Configuring the HSSI Interface

7.1 HSSI Interface - Description

The HSSI (*High Speed Serial Interface*) is a type of high speed synchronous serial interface. This interface uses special connectors, while not being possible to define different types of connection (synchronous, asynchronous, AT commands) over these. This means the **SET DATA-LINK** command is not applicable in HSSI interface. The devices can only behave as DTE, or, in a special mode, as DTE with internal clock.

7.2 Configuration Commands

7.2.1 Accessing the HSSI Interface Configuration prompt

The HSSI interface configuration commands must be entered at the configuration prompt associated to it (*HSSI config*>). Use the **NETWORK <interface_name>** command (within the general configuration prompt *Config*>), to access the said prompt where <interface_name> is the name of the HSSI interface you wish to configure.

```
Config>networkhssiX/X
-- High Speed Serial Interface. Configuration --
hssiX/X HSSI config>
```

Once you have accessed the HSSI interface configuration prompt, you can enter the commands described below:

Command	Function
?(HELP)	Lists the available commands or their options.
ENCODING	Configures the NRZI or NRZ encoding.
IDLE	Configures the inactivity character.
INPUT-BUFFERS	Configures the number of buffers used at reception.
INTERNAL-CLOCK	Configures the internal oscillator as source for the reception clock.
LIST	Displays the values associated to the distinct interface parameters.
LOOP-RX-CLOCK	Configures the reception clock as source for the reception clock.
MTU	Configures the maximum frame size (MTU).
NO	Undoes a command.
SPEED	Configures the line speed.
EXIT	Exits the HSSI interface configuration prompt.

In addition to the above commands, there are other commands common to all the device interfaces. These commands are described in the common interfaces configuration manual (Dm 772-I Common Configuration Interfaces).

7.2.2 ? (HELP)

The ? (HELP) command lists the valid commands at the programmed router level. This command can also be used after a specific command in order to list the available options.

Syntax:

```
hssiX/X HSSI config>?
```

Example:

```
hssiX/X HSSI config>?
encoding          Set NRZI or NRZ encoding
frame-size       Configure the MTU
idle             Configure the inactivity character
input-buffers    Number of rx buffers
internal-clock   Uses external clock for transmission
list            List interface configuration
loop-rx-clock    Uses receive clock for transmission
no              Set default config
```

```
speed          Configure the line speed
exit
hssiX/X HSSI config>
```

7.2.3 ENCODING

Configures the line encoding to be used. The possible values are: NRZ (*Not Return to Zero*) and NRZI (*Not Return to Zero Inverted*). Default value is NRZ.

Syntax:

```
hssiX/X HSSI config>encoding <type>
```

Example 1:

```
hssiX/X HSSI config>encoding nrz
hssiX/X HSSI config>
```

Example 2:

```
hssiX/X HSSI config>encoding nrzi
hssiX/X HSSI config>
```

7.2.4 IDLE

Configures the inactivity state of the HDLC frames in transmission. This parameter is used to determine the type of padding data sent when there are no packets to transmit. The possible values are: FLAG (continuous transmission of 0xFE) and MARK (continuous transmission of 0xFF). Default value is FLAG.

Syntax:

```
hssiX/X HSSI config>idle <type>
```

Example 1:

```
hssiX/X HSSI config>idle flag
hssiX/X HSSI config>
```

Example 2:

```
hssiX/X HSSI config>idle mark
hssiX/X HSSI config>
```

7.2.5 INPUT-BUFFERS

Configures the number of buffers used at reception. Default value depends on the type of driver. We strongly recommend that this is **not** modified unless specifically indicated by the our technical team.

Syntax:

```
hssiX/X HSSI config>input-buffers <input_buffers>
```

Example:

```
hssiX/X HSSI config>input-buffers 40
hssiX/X HSSI config>
```

7.2.6 INTERNAL-CLOCK

Configures the internal oscillator as source for the transmission clock. Under normal operating conditions, the HSSI obtains the transmission clock from the ST line which is received from the remote end (DCE). In some cases it may be convenient to use another clock for transmission. For these said cases this command is available as well as the **LOOP-RX-CLOCK** command.

Syntax:

```
hssiX/X HSSI config>internal-clock
```

Example:

```
hssiX/X HSSI config>internal-clock
hssiX/X HSSI config>
```

7.2.7 LIST

The **LIST** command displays a list with the value associated to each of the specified HSSI interface configuration parameters on the screen.

Syntax:

```
hssiX/X HSSI config>list
```

Example:

```
hssiX/X HSSI config>list
Maximum Frame size      : 2048
Encoding                 : NRZ
Idle                     : FLAG
Clocking                 : EXTERNAL
Cable                    : DTE
Line speed (bps)        : 52428800
Input Buffers           : 40
hssiX/X HSSI config>
```

7.2.8 LOOP-RX-CLOCK

Configures the reception clock (received through RT) as source for the transmission clock. Under normal operating conditions, the HSSI obtains the transmission clock from the ST line which is received from the remote end (DCE). In some cases it may be convenient to use another clock for transmission. For these said cases this command is available as well as the **INTERNAL-CLOCK** command. This command is particularly indicated for cases of malfunctions where you wish to check if the clocks are being correctly received from the remote end.

Syntax:

```
hssiX/X HSSI config>internal-clock
```

Example:

```
hssiX/X HSSI config>internal-clock
hssiX/X HSSI config>
```

7.2.9 MTU

Configures the maximum frame size in bytes that can be transmitted by the interface (also known as MTU). Default value is 2048 bytes.

Syntax:

```
hssiX/X HSSI config>mtu <size>
```

Example:

```
hssiX/X HSSI config>mtu 2048
hssiX/X HSSI config>
```

7.2.10 NO

Disables a command. Deletes the configured information, establishing the default value for a parameter.

Syntax:

```
hssiX/X HSSI config>no ?
 encoding      Set NRZI or NRZ encoding to its default value
 idle         Set the inactivity character to its default value
 input-buffers Number of rx buffers
 internal-clock Uses external clock for transmission
 loop-rx-clock Uses receive clock for transmission
 mtu          Set MTU to its default value
 speed        Set the line speed to its default value
```

Example:

```
hssiX/X HSSI config>no speed
hssiX/X HSSI config>
```

7.2.11 SPEED

Configures the physical line speed in bps. This command is only valid if the interface is configured to obtain the internal oscillator transmission clock (**INTERNAL-CLOCK** command).

Syntax:

```
hssiX/X HSSI config>speed <speed>
```

Example:

```
hssiX/X HSSI config>speed ?
 50      Line speed (Mbps)
 25      Line speed (Mbps)
 6.25    Line speed (Mbps)
hssiX/X HSSI config>speed 50
hssiX/X HSSI config>
```

7.2.12 EXIT

The **EXIT** command returns you to the previous prompt.

Syntax:

```
hssiX/X HSSI config>exit
```

Example:

```
hssiX/X HSSI config>exit
Config>
```

Chapter 8 Monitoring the HSSI Interface

8.1 Monitoring Commands

8.1.1 Accessing the HSSI Interface Monitoring prompt

The HSSI interface monitoring commands must be entered at the monitoring prompt associated to it (*HSSI+*). Use the **NETWORK <interface_name>** command (within the general monitoring prompt +), to access the said prompt where *<interface_name>* is the name of the HSSI interface you wish to monitor.

```
+NETWORK hssiX/X
-- High Speed Serial Interface Monitor --
HSSI+
```

Once you have accessed the HSSI interface monitoring prompt, you can enter the commands described below:

Command	Function
?(HELP)	Lists the available commands or their options.
SET	Permits you to activate the HSSI interface signals.
CLEAR	Deletes the statistics associated to the HSSI interface or deactivates the HSSI interface signals.
NO	Deactivates a previously activated option.
LOOPBACK	Activates the local loop in the interface.
LIST	Displays the HSSI interface status.
BITRATE	Measures the current transmission and reception rate on the line.
EXIT	Exits the HSSI interface monitoring prompt.

8.1.2 ? (HELP)

The ? (HELP) command lists the valid commands at the programmed router level. This command can also be used after a specific command in order to list the available options.

Syntax:

```
HSSI+?
```

Example:

```
HSSI+?
SET
CLEAR
NO
LOOPBACK
LIST
BITRATE
EXIT
HSSI+
```

8.1.3 SET

The **SET** command permits you to activate the HSSI interface signals. The signals that can be activated from monitoring are the two loop signals: LA and LB.

Syntax:

```
HSSI+SET ?
LA
LB
HSSI+
```

Example:

```
HSSI+SET LA
HSSI+
```

8.1.4 CLEAR

The **CLEAR** command permits you to deactivate a previously activated option or return all the statistics associated to the specified HSSI interface to zero. This also permits you to deactivate some HSSI interface signals.

Syntax:

```
HSSI+CLEAR ?
LA
LB
STATS
HSSI+
```

Example:

```
HSSI+CLEAR STATS
HSSI+
```

8.1.4.1 CLEAR LA

Deactivates the LA loop signal.

8.1.4.2 CLEAR LB

Deactivates the LB loop signal.

8.1.4.3 CLEAR STATS

Deletes the statistics associated to the HSSI interface.

8.1.5 NO

The **NO** command permits you to deactivate a previously activated option.

Syntax:

```
HSSI+NO ?
LOOPBACK
HSSI+
```

8.1.5.1 NO LOOPBACK

Deactivates the local loop in the HSSI interface.

8.1.6 LOOPBACK

The **LOOPBACK** command activates the local loop in the HSSI interface.

Syntax:

```
HSSI+LOOPBACK
```

Example:

```
HSSI+LOOPBACK
HSSI+
```

8.1.7 LIST

The **LIST** command displays the status of the HSSI interface.

Syntax:

```
HSSI+LIST
```

Example:

```

HSSI+LIST
Board Type ..... HSSI 5V
gpdata: 0xf007
CA (I) ..... ON
TA (O) ..... ON
Clock (O) ..... Internal
Requested Loop (O) ..... No
LA (O) ..... OFF
LB (O) ..... OFF
LC (I) ..... OFF
TM (I) ..... OFF
Internal Clock Speed ... 52428800
HSSI+

```

8.1.8 BITRATE

The **BITRATE** command measures the current transmission and reception rate in the line. The rate is measured in intervals of 1 second, creating a new line each time a maximum historical is exceeded from the moment the command is activated. To end rate monitoring, hit any key.

Syntax:

```
HSSI+BITRATE
```

Example:

```

HSSI+BITRATE
                                     Interface hssiX/X
-----
Current trx rate (bps) = 945325   Current rcv rate (bps) = 543556
Current trx rate (bps) = 944380   Current rcv rate (bps) = 557271
Current trx rate (bps) = 903266   Current rcv rate (bps) = 586484
Current trx rate (bps) = 950413   Current rcv rate (bps) = 573092
Current trx rate (bps) = 975365   Current rcv rate (bps) = 548370
HSSI+

```

8.1.9 EXIT

The **EXIT** command returns you to the previous prompt.

Syntax:

```
HSSI+EXIT
```

Example:

```

HSSI+EXIT
+

```

8.2 Monitoring the HSSI Interface from the General Menu

All the statistics associated to the required HSSI interface can be viewed from the general monitoring prompt (+). Additionally you can view other information such as the state of the line signals, the type of driver, the line speed and the time elapsed since the last port reset. For this enter the **DEVICE <interface_name>** command from the said prompt where **<interface_name>** is the name of the specified interface.

Example:

```

+DEVICE hssi2/0
Interface      CSR      Vect      Auto-test  Auto-test  Maintenance
              F0100000  22        valids    failures   failures
hssi2/0       F0100000  22        1         0          0
Driver type:          DTE Internal Clock

Nicknames:  CA  TA  LA  LB  LC
State:      ON  ON  OFF OFF OFF
Line speed:          50.000 Mbps
Last port reset:     30 minutes, 45 seconds ago

```



```
Input frame errors:
CRC error          =          3  alignment (byte length) =          0
missed frame      =          0  too long (> 02064 bytes) =          0
aborted frame     =          0  DMA/FIFO overrun      =          0
overflow events   =          0  receive recoveries   =          0

Output frame counters:
DMA/FIFO underrun errs =          0  Output aborts sent   =          0
+
```