Generic Serial Interfaces

bintec Dm705-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, run **set data-link sync** 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>
```

Verify 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, begin the configuration process. However, to activate the changes and let interface monitoring begin, 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*>). Run the **network <interface-name>** command (general configuration prompt *Config*>) to access the *synch 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, enter the commands described below:

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

Run **dce-external-clock** to configure an external clock to use as a reference in serial interfaces operating in DCE mode, which pertain to a PCI card with 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 routers that do not have a configurable serial interface.

The configurable modes are:

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

DTE: Forces the interface to act as 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

Run **dte-internal clocks** 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 external clocks do not arrive in this mode.

Default is deactivated.

Syntax:

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

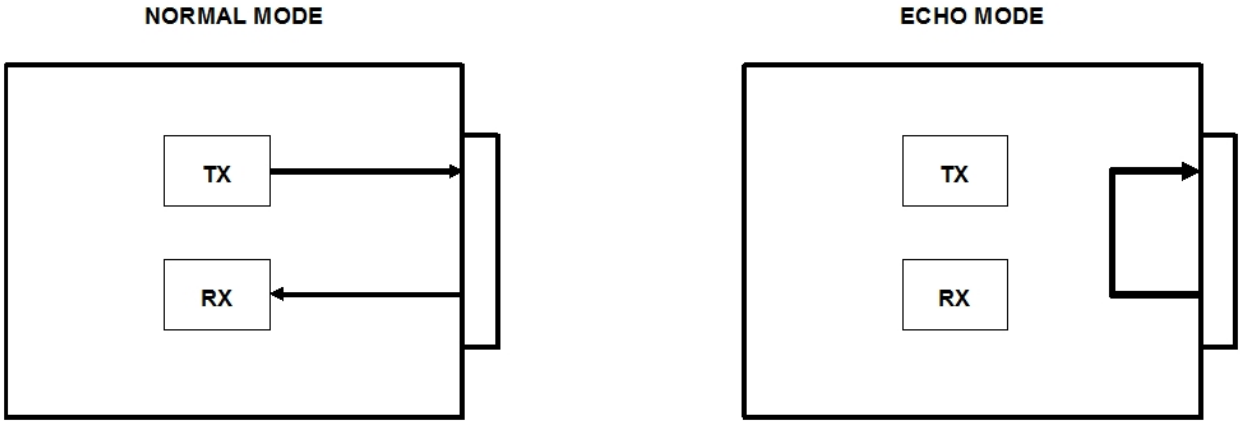
Example:

```
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 lets you 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. Possible values are: NRZ (*Not Return to Zero*) and NRZI (*Not Return to Zero Inverted*). 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. Possible values are: FLAG (continuous transmission of 0xFE) and MARK (continuous transmission of 0xFF). Default 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

This command makes the device software ignore the CD signal status when declaring the interface UP or DOWN. This is very useful when you are working with devices that 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.

Default 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 when you are working with devices that 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.

Default 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 when you are working with devices that 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.

Default 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. Otherwise, an error message will be displayed indicating that this parameter cannot be configured. Default 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

Sets the interface in **loopback** mode. In this mode, the interface disconnects from the device exterior and the interface transmitter directly connects to its receiver (the interface behaves as if it had a mirror in its external connector).

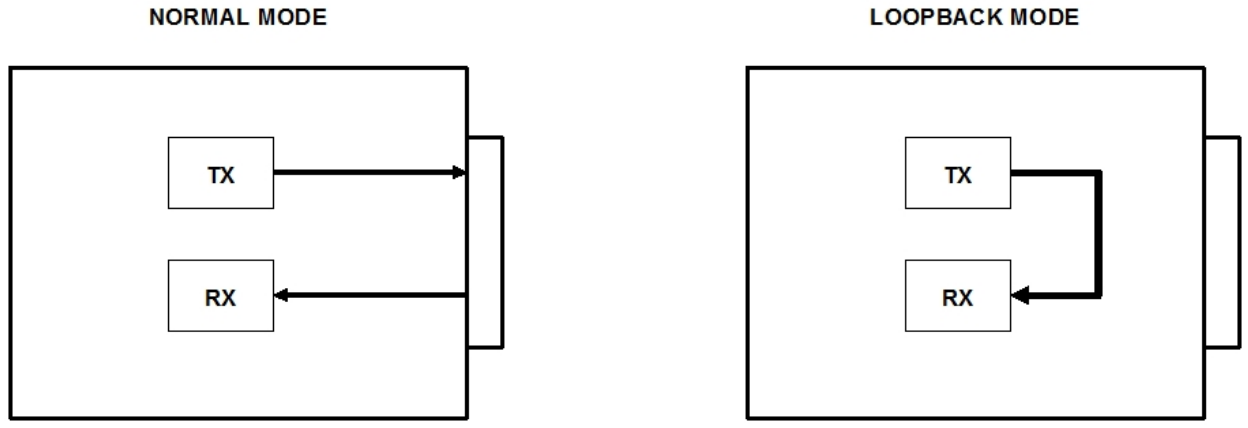
Default is deactivated.

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 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

Disconnects the device's internal hardware CD signal. This command is useful in DTE mode so you can transmit when operating in DCE, which activates the CTS signal (but not the CD).

Default 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. Configures the serial port so it uses the receive clock as a transmit clock.

Default is deactivated.

Syntax:

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

Example:

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

1.2.19 SPEED

Configures the physical line speed in bps. Default 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 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

Configures the serial port to operate in transparent mode instead of HDLC. 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 unless auto-synchronization has been activated (**transparent-mode-autosync**).

Default 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

Activates the resynchronization feature for the serial port when it is operating in transparent mode. A byte is defined, which 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 trames are headed by the synchronization word plus these four bits.

Default 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 that 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

Default is 0 (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

Synchronizes transmission with reception. Data sent begins with an exact multiple of 8 bit periods after the received data.

Default 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. This configures the serial port so it uses the transmit clock as a receive clock.

Default 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 let you change the type of standard through configuration).

Default is driver 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 let you change the type of standard through configuration).

Default is driver 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

Activates 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.

Default 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 let you change the type of standard through configuration).

Default is driver 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

Run **exit** to return 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+*). Run **network <interface-name>** (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, 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 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

Run **clear** 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 operating in DTE mode. The line speed measurement feature 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 by running **device serialX/X** from the main monitoring menu.

Command history:

Release	Modification
11.00.03	New command added.

2.1.5 EXIT

Run **exit** to return 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 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 lapsed since the last port reset. To do this, run **device<interface-name>** at the prompt (where **<interface_name>** is the name of the specified interface).

Syntax:

```
+device serialX/X
```

Example:

```
+device serial0/0
                                  Auto-test   Auto-test     Maintenance
Interface            CSR    Vect      valids    failures        failures
serial0/0       FA200A00      5e           0           0               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, run **set data-link async** 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. Otherwise, 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 an asynchronous interface supports are as follows:

- serialx/x.

- uart0/0 over a previously configured CONF port.

The function 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, so the changes take effect and monitoring can take place, 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*>). Run **network<interface-name>** (general configuration prompt *Config*>) to access said 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 *echo* or *loopback* 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 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 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

Specifies the mask in order to acknowledge the control characters. Use the **special-char1** and **special-char2** commands to enable the two control characters. Bits set to 1 in the mask define the compared bits, and, when set to 0, the unimportant bits.

Mask default is 0xCOFF.

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. Possible values are 5, 6, 7 and 8. Default 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: if you 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 serial interface mode: DCE, DTE and AUTO.

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

Configurable modes are:

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

DTE: Forces the interface to act as 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 or not.

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:

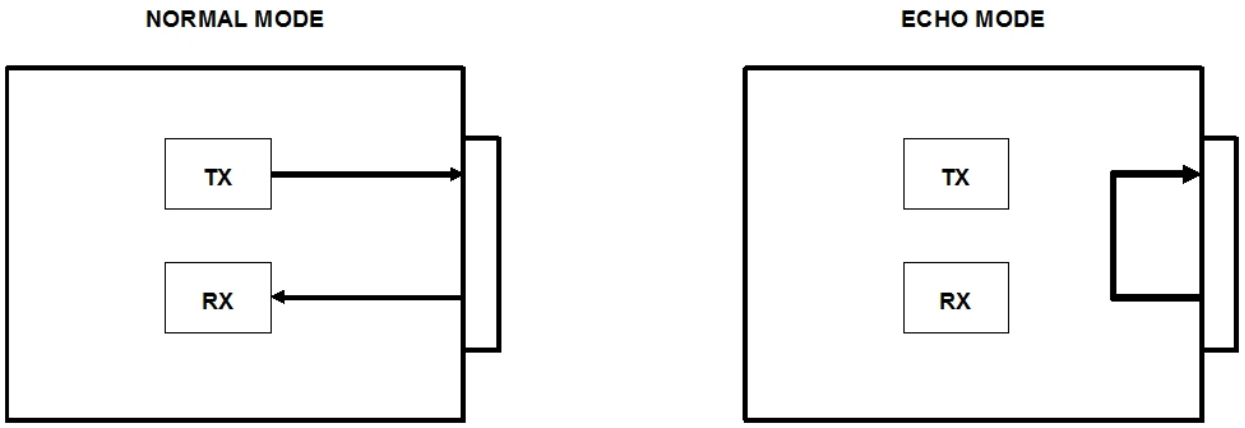
```
serialX/X ASYNC Config>device-mode DCE-forced
serialX/X ASYNC Config>
```

3.2.6 ECHO

Run **echo** to configure the interface in **echo** mode, so the transmitter resends everything it receives from the receiver (the interface behaves as a mirror). This operating mode lets you check all the analog part of the interface through an external device that inserts and verifies patterns.

Default 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

Enables the RTS signal functionality in DTE mode. Once the signal is enabled it activates (provided the device has data available in the transmission buffer).

Default is always activated (provided 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

Activates the hardware flow control. If the device behaves as DTE, transmission is controlled by the CTS signal (signal transmission cannot occur until the CTS signal is active). It's a good idea to run **enable-rts** to enable RTS signaling.

Default is hardware flow control 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 when you are operating with devices that do not deliver this signal or, only activate when transmitting. When the driver is in DTE mode, the CD signal corresponds to the CD signal delivered by DCE. When the driver is in DCE mode, the CD signal corresponds to the RTS signal sent by the DTE.

Default 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 when you are operating with devices that do not deliver this signal or only activate when transmitting. When the driver is in DTE mode, the CTS signal corresponds to the CTS signal delivered by DCE. When the driver is in DCE mode, the CTS signal corresponds to the CD signal delivered by the DTE.

Default 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 when you are operating with devices that do not deliver this signal or, only activate when transmitting. When the driver is in DTE mode, the DSR signal corresponds to the DSR signal delivered by DCE. When the driver is in DCE mode, the DSR signal corresponds to the DTR signal delivered by the DTE.

Default 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:

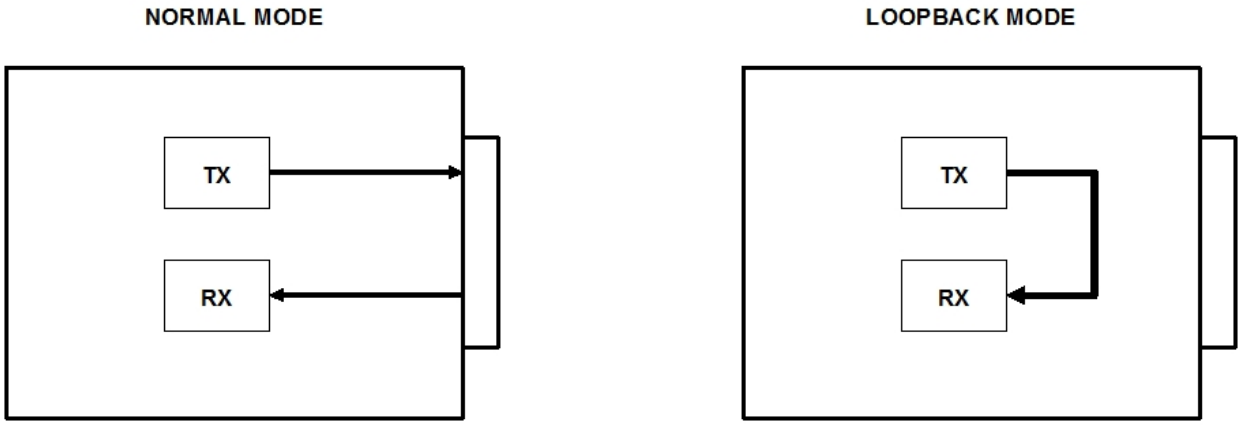
```
uartX/X ASYNC Config>list

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

Configures 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 (the interface behaves as if it had a mirror in its external connector).

Default 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

Specifies 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, said maximum number of idle characters is surpassed, the received frame is processed.

Default 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 that can be transmitted by the interface (also known as MTU). Default 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-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
```

```
  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
```

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

Disconnects the device's internal hardware CD signal. This command is useful so in DTE mode you can transmit when operating in DCE. This only activates the CTS signal (not the CD signal).

Default 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. Default 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 tells the device that frames transmitted and received by the interface do not have MAC headers or tails, they only contain data. This command is essential so MTU defined through **frame-size** does not take the headers into account.

Default 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 commands define a special character for each. Said special character is used to delimit data frames. When a special character is received, the frame is given as received and processed. The mask defined through **char-mask** defines the classes of control characters.

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 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. Possible values are 1 and 2. Default 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 either end (characteristic impedance of a 2-wire line) to avoid signal echoes and the subsequent degradation. The RS-485 serial interfaces enable a 120 ohm termination resistor (through configuration).

Use **termination-resistor** to enable/disable the termination resistor. Default is disabled.

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 complies with the V24 norm.

This command is only available in serial interfaces pertaining to the PCI card with 3 WAN interfaces (these are the only ones can change the type of standard through configuration).

Default is driver configured to comply 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 complies with the V35 norm.

This command is only available in serial interfaces pertaining to the PCI card with 3 WAN interfaces (these are the only ones can change the type of standard through configuration).

Default is driver configured to comply 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

Activates periodic trap sending through SNMP, which tells you if the interface is in echo mode, 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.

Default 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 complies with the X21 norm.

This command is only available in serial interfaces pertaining to the PCI card with 3 WAN interfaces (these are the only ones can change the standard type through configuration).

Default is driver configured to comply with the V24 norm.

Syntax:

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

Example:

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

3.2.28 EXIT

Run **exit** to return 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+*). Run **network<interface-name>** (general monitoring prompt, +) to access said 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, 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 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

Use the **clear** command to delete (zeroize) all 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

Run **exit** to return 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 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 lapsed since the last port reset. To do this, enter **device <interface_name>** command where **<interface_name>** is the name of the specified interface.

Syntax:

```
+device serialX/X
```

Example:

```
+device serial0/0
                                    Auto-test   Auto-test     Maintenance
Interface            CSR    Vect      valids    failures        failures
serial0/0       FA200A00      5e           0           0               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 (interface doesn't have them).

Chapter 5 AT Commands Interface Configuration

5.1 Assigning the AT Commands Interface

Run **set data-link at** (general configuration menu *Config>*) to assign an AT commands interface to a determined device connector. If the device has 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 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:

- serialx/x

- uart0/0 over a preconfigured CONF port.

The use of the CONF port as an asynchronous interface is a special case. This port normally operates 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 said parameters.

Once the interface has been assigned, begin the configuration process. So any changes take effect and monitoring of said interface can take place, 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

Enter the AT commands interface configuration commands at the configuration prompt associated to them (*serialX/X AT config*>). Run **network <interface_name>** (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, 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 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. Default is none configured.

To delete additional commands that have been previously added, run **additional-control-command no-command**.

The **no additional-control-command** re-establishes the default value. Default is no additional AT command is transmitted.

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","bintecw.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,bintecw.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 specifies if the modem should be preconfigured (through **commands**) to carry out a call (**commands**), or, if the corresponding signal should be directly set to ON so the modem carries out a call to the internally configured number (*DRT*). Default is commands.

Run **no connection mode** to reestablish default (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. Default is “&R1”.

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

run **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. Possible values are 5, 6, 7 and 8. Default 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 enable 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. Default is “&C1”.

To delete the previously established DCD signal control command, and ensure that no command is used to that end, enter **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 specifies if dialing must be carried out through tones (*Tone*) or through pulses (*Pulse*). Default is *Tone.*

The **no dial-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

Run **disable** to disable the flow control option and 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. Default 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. Default 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. Default is “&S0”.

To delete the previously established DSR signal control command, and ensure that no command is used to that end, run 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. Default is “&D2”.

To delete the previously established DTR signal control command, and ensure that no command is used to that end, run the configuration command **drt-control-command no command**.

The **no drt-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

Run **enable** to enable the flow control option and 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 flow control. With this parameter enabled flow control will be available in the interface. Default is disabled.

Note

When the AT commands interface is being used as a base interface for a PPP interface, to ensure the flow control is operating correctly, the Asynchronous Control Character Map (ACCM) for said PPP interface must be configured with 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. Default is disabled.

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. Default is “&K3”.

To delete the previously established flow control command, and ensure that no command is used to that end, run **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

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 that can be transmitted by the interface (also known as MTU). Default 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 (if they are enabled) (*Automatic Answer* = *Enabled*). Default 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. Default 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

Configures 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. Default is 15 for tone and 30 for silence.

Note

We do not recommend that this parameter be modified unless you experience problems with the management or with “wakeup” 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 at the other end (e.g. if the modem is 56 Kbps, you should select 57600 bps). Default 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. Possible values are: 1 and 2. Default 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. Default is “&Q5”.

To delete the previously established V.42/V.42 bis control command, and ensure that no command is used to that end, run **v43-control-command no-command**.

The **no v42-control-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. Default 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

Run **exit** to return 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 **network <interface_name>** (general monitoring prompt +) to access said 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	Directly executes AT commands over the connected device.
BITRATE	Displays the effective reception/reception speed in the interface.
COMMAND	Enables command sending to the connected device.
DTROFF	Forces the interface DTR/108 into an inactive state (OFF).
DTRON	Forces the interface DTR/108 signal into an active state (ON).
LIST	Displays monitoring information on the AT commands interface.
BUFFER	Lists the commands captured in the commands monitoring buffer.
EXIT	Exits the AT commands interface monitoring prompt.

Important: 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 Dm747-I “GPRS Interface” and Dm757-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 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

Directly executes AT commands 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

Enables command sending 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 into an active state (ON).

Syntax:

```
serialX/X AT+dtron
```

Example:

```
serial0/0 AT+dtron
serial0/0 AT+
```

6.1.7 DTROFF

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

Syntax:

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

Example:

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

6.1.8 LIST

Run **list** 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

Run **exit** to return 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 lapsed since the last port reset. To do this, run **device <interface_name>** at said prompt where **<interface_name>** refers to the specified interface.

Example:

```
+device serial0/0
                                  Auto-test   Auto-test     Maintenance
Interface            CSR    Vect      valids    failures        failures
serial0/0       FA200A00      5e           0         274               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 but cannot 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*>). Run **network <interface_name>** (general configuration prompt *Config*>), to access 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 following commands:

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 various 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 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 trasmission
  list              List interface configuration
  loop-rx-clock     Uses receive clock for trasmission
  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. Possible values are: NRZ (*Not Return to Zero*) and NRZI (*Not Return to Zero Inverted*). Default 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. Possible values are: FLAG (continuous transmission of 0xFE) and MARK (continuous transmission of 0xFF). Default 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 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. The available commands for these cases are **internal-clock** and **loop-rx-clock.**

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 cases this command is available as well as **internal-clock**. This command is particularly useful for malfunctions, 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 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

Run **exit** to return 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+*). Run **network <interface_name>** (general monitoring prompt +), to access 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	Activates 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 to list the available options.

Syntax:

```
HSSI+?
```

Example:

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

8.1.3 SET

Run **set** to activate the HSSI interface signals. The following signals can be activated from monitoring: LA and LB (loop signals).

Syntax:

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

Example:

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

8.1.4 CLEAR

Run **clear** to to deactivate a previously activated option or return all the statistics associated to the specified HSSI interface to zero. This also lets you 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

Run **no** 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

Run **loopback** to activate the local loop in the HSSI interface.

Syntax:

```
HSSI+LOOPBACK
```

Example:

```
HSSI+LOOPBACK
HSSI+
```

8.1.7 LIST

Run **list** to display 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

Run **exit** to return 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 lapsed since the last port reset. To do this, run **device <interface_name>** from said prompt where **<interface_name>** is the name of the specified interface.

Example:

```
+DEVICE hssi2/0
                                  Auto-test   Auto-test     Maintenance
Interface            CSR    Vect      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
+
```