



## **SDLC Protocol**

**bintec Dm706-I**

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## I Related Documents

bintec Dm772-I Common Configuration for Interfaces

# Chapter 1 Introduction

## 1.1 The SDLC Protocol

SDLC configuration commands are available at the *SDLC # Config>* prompt, where # identifies the interface specified through the **network** command. Changes made to the router configuration do not take effect immediately, but become part of the router's non-volatile configuration memory when the router restarts.

Conversely, SDLC monitoring commands entered within the SDLC monitoring module take effect immediately. However, changes made with the monitoring command *do not* become part of the router's non-volatile configuration.

When the router restarts, the configuration stored in non-volatile configuration memory replaces the effects of monitoring commands.

Monitoring consists of the following actions:

- Monitoring the protocols and network interfaces currently used by the router.
- Making real time changes to the SDLC configuration without permanently affecting the router's non-volatile configuration memory.
- Displaying Event Logging System (ELS) messages on router activities and performance.



### Warning

The SDLC Interface DOES NOT currently support secondary mode function.

## Chapter 2 Configuration

### 2.1 Configuration Commands

To enter the configuration process, carry out the following steps:

- (1) At the prompt (\*), run **process 4** or **P4**. This takes you to the *Config>* prompt.

```
*P 4
Config>
```

If the *Config>* prompt does not immediately appear, press *enter* again.

- (2) Subsequently, run **network** followed by the number or the name of the previously configured SDLC interface. This is generically known as #.

```
Config>NETWORK #
SDLC # Config>
```

If, for example, the interface is number 3, the screen should look like this:

```
Config>NETWORK 3
SDLC 3 Config>
```

There are certain commands that are common for all interfaces. These commands are described in the manual on how to configure common interfaces (bintec Dm772-I Common Configurations for Interfaces).

Command	Function
? (HELP)	Lists the configuration commands or lists any parameters associated with that command.
DEVICE-MODE	Configures device mode (DCE, DTE, AUTO).
DISABLED	Prevents SDLC sessions from being established with any SDLC link station in the interface.
HALF-DUPLEX	Configures the link for half-duplex operations.
IDLE	Configures the idle transmission state for SDLC framing.
INTER-FRAME	Inserts a delay between transmitted frames.
LIST	Displays information configured for an SDLC link station.
MODULO	Defines the range of sequence numbers to be used in the link.
MTU	Configures the maximum frame length that can be sent over the interface.
MULTIPOINT	Configures the SDLC link as a multipoint link.
NAME	Gives a name to the link being configured.
NO	Deactivates certain configuration parameters.
NRZI	Configures the codification scheme for SDLC transmission as NRZI.
POLL-DELAY	Configures the delay interval between each poll sent to the interface.
POLL-RETRIES	Configures the number of times that the interface retries to poll the remote SDLC link station before deciding that the link station is disconnected and closing the connection.
POLL-TIMEOUT	Configures the amount of time that the router waits for a poll response before poll timeout.
ROLE	Establishes the interface behavior with the remote stations.
RTS-HOLD	Configures the period during which the RTS signal is maintained active.
SLOW-POLL	Configures the amount of time a secondary station is expelled from a poll queue when it does not respond within a multipoint environment.
SNRM-RETRIES	Configures the number of times an SNRM (E) is retransmitted without receiving a response before abandoning the retries.
SNRM-TIMEOUT	Configures the waiting period for a UA response before re-transmitting an SNRM (E).
SPEED	For the internal clock, this command specifies the reception and transmission clock speeds.
STATION	Defines the parameters of the stations connected to the link.
V24	This command is available in serial interfaces pertaining to the PCI 3 card with 3

	serial lines. This sets the driver behavior as V24.
V35	This command is available in serial interfaces pertaining to the PCI 3 card with 3 serial lines. This sets the driver behavior as V35.
XID-RETRIES	Configures the maximum number of times an XID or TEST frame must be sent before abandoning this.
XID-TIMEOUT	Configures the maximum waiting time for an XID or TEST frame response.
EXIT	Exits the SDLC configuration environment.

## 2.1.1 ? (HELP)

Lists all the commands available at the current prompt level. You can also type `?` after a specific command name to list its options.

**Syntax:**

```
SDLC # Config>?
```

**Example:**

```
SDLC # Config>?
DEVICE-MODE      Configures device mode (DCE,DTE,AUTO)
DISABLED         Disable link
HALF-DUPLEX      Half duplex mode
IDLE             Set idle mode
INTER-FRAME      Inter frame delay time
LIST
MODULO           Link modulo
MTU             Sets the interface maximum transmit unit
MULTIPOINT       Multipoint mode
NAME            Link name
NO
NRZI            NRZI encoding
POLL-DELAY       Inter poll delay time
POLL-RETRIES     Poll retries allowed
POLL-TIMEOUT     Poll response wait timeout
ROLE            Link role
RTS-HOLD         RTS hold duration
SLOW-POLL        Slow poll wait timeout
SNRM-RETRIES     SNRM retries allowed
SNRM-TIMEOUT     SNRM response wait timeout
SPEED           Link speed
STATION          Configure station parameters
V24             Configure driver in V24 mode
V35             Configure driver in V35 mode
XID-RETRIES      XID/TEST retries allowed
XID-TIMEOUT      XID/TEST response wait timeout
EXIT
SDLC # Config>
```

## 2.1.2 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. 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. A DCE-DTE adapter cable must be connected.
- AUTO: The serial port will act as DCE or DTE depending on whether the DCE-DTE adapter cable is used.

**Syntax:**

```
SDLC # Config>device-mode auto
SDLC # Config>device-mode DCE-forced
SDLC # Config>device-mode DTE-forced
```

**Example:**

```
SDLC # Config>device-mode DCE-forced
SDLC # Config>
```



## 2.1.3 [NO] DISABLED

Controls SDLC link operation. The *disabled* command deactivates the SDLC link, thus preventing connections with any of the remote stations defined in the link from being established. The *no disabled* command activates the SDLC link and allows connections to be established with any of the defined remote stations. Default is enabled. If there are open connections, the system will prompt a question asking for confirmation to close them all.

*Syntax:*

```
SDLC # Config>[NO] DISABLED [yes]
```

- optional parameter **yes** allows the device to run an operation without prompting the user to confirm first. If this parameter is set to **yes**, no such confirmation is required. If not, the device prompts the user for confirmation.

**Command history:**

Release	Modification
11.01.06	The "[yes]" option was added as of version 11.01.06

## 2.1.4 [NO] HALF-DUPLEX

Configures the SDLC line to operate in half-duplex mode. When the command is deactivated (*no half-duplex*), the SDLC line and begins to operate in full-duplex mode. By default, the line operates in full-duplex.

*Syntax:*

```
SDLC # Config>[NO] HALF-DUPLEX
```

## 2.1.5 IDLE

Configures the idle transmission state for the SDLC framing. As a default, the flag option transmits continuous flags (7E hex) between frames.

*Syntax:*

```
SDLC # Config>IDLE FLAG | MARK
```

### 2.1.5.1 IDLE FLAG

Configures the idle transmission state for SDLC framing. The flag option transmits continuous flags (7E hex) between frames.

*Syntax:*

```
SDLC # Config>IDLE FLAG
```

*Example:*

```
SDLC # Config>IDLE FLAG
SDLC # Config>
```

### 2.1.5.2 IDLE MARK

Configures the idle transmission state for SDLC framing. The mark option sends 1s between frames.

*Syntax:*

```
SDLC # Config>IDLE MARK
```

*Example:*

```
SDLC # Config>IDLE MARK
SDLC # Config>
```

## 2.1.6 INTER-FRAME

Allows a delay between transmitted frames. This command guarantees a minimum delay between frames making them compatible with older and slower devices at the other end that transmit in serial mode. Default is 0. This value passes in units of 5.12 microseconds.

### Syntax:

```
SDLC # Config>INTER-FRAME <delay>
```

### Example:

```
SDLC # Config>INTER-FRAME
Transmit Delay [0]?
SDLC # Config>
```

## 2.1.7 LIST

Run the **list** command in the SDLC configuration process to display configuration information on one or all SDLC link stations.

### Syntax:

```
SDLC # Config>LIST ?
LINK
STATION
```

### 2.1.7.1 LIST LINK

Displays information on the SDLC interface.

### Example:

```
SDLC # Config>LIST LINK
Link configuration for:      LINK_1  (Enabled)

Default role:  PRIMARY      Type:      POINT-TO-POINT
Duplex:        FULL         Modulo:     8
Idle state:    FLAG         Encoding:  NRZ
Clocking:      INTERNAL     Frame size: 2048
Speed:         64000        Cable:     DCE

Timers:  XID/TEST response: 0.5 sec
         SNRM response:    2.0 sec
         Poll response:    0.5 sec
         Inter-poll delay: 0.2 sec
         Slow poll      :   5.0 sec
         RTS hold delay:  DISABLED
         Inter-frame delay: DISABLED

Counters:  XID/TEST retry  4
           SNRM retry     6
           Poll retry     10
SDLC # Config>
```

The meaning of each field is as follows:

<i>Link configuration</i>	Name and status of SDLC link stations in the router's configuration.
<i>Default role</i>	Link option used for link stations configured by default. You can modify this option using the <b>add remote-secondary</b> command.
<i>Type</i>	Type of link, either Multipoint or Point to Point.
<i>Duplex</i>	Duplex configuration, HALF or FULL.
<i>Modulo</i>	Sequence number range to use on the link: MOD 8 (0-7) or MOD 128 (8-127).
<i>Idle state</i>	Bit pattern (FLAG or MARK) transmitted on the line when the interface is not transmitting data.
<i>Encoding</i>	Configures the SDLC transmission encoding scheme as NRZ (Non-Return to Zero) or NRZI (Non-Return to Zero Inverted).
<i>Clocking</i>	Interface clock, both external and internal.
<i>Frame size</i>	Maximum frame size that can be sent over the interface.
<i>Speed</i>	Link speed expressed in bits/sec when the clock is internal.
<i>Cable</i>	Type of behavior at a physical level. The values are DTE and DCE and only serve for information purposes as these depend on the physical driver installed or the cable used.

<i>Timers</i>	All the timers listed below have a 100ms resolution.
<i>XID/TEST response</i>	Length of time the router waits for an XID or TEST response before retransmitting the XID or TEST frame. A value of 0 indicates that the router will continue to retry indefinitely.
<i>SNRM response</i>	Maximum time that the router will wait for a UA response before the station re-transmits an SNRM (E).
<i>Poll response</i>	Maximum waiting time for a response from any polled station before retrying.
<i>Inter-poll delay</i>	Amount of time the router, configured as the primary station, will wait after receiving a response, before polling the next station.
<i>Slow poll</i>	Amount of time the router, configured as the primary station within a multipoint environment, removes a non-responding secondary station, from the polling to prevent performance degradation.
<i>RTS hold delay</i>	Amount of time that the primary router waits, once the frame has been transmitted, before dropping an RTS. This parameter is specific to half-duplex operations.
<i>Inter-frame delay</i>	Minimum time (in 5.12 microsecond time units) that the router will wait between transmitting frames.
<i>Counters:</i>	
<i>XID/TEST retry</i>	Maximum number of times the router sends a XID or TEST frame without receiving a response before timing out. A value of 0 indicates that the router will continue to retry indefinitely.
<i>SNRM retry</i>	Maximum number of times the router will send an SNRM (E) frame without receiving a response before timing out. A value of 0 indicates that the router will continue to retry indefinitely.
<i>Poll retry</i>	Maximum number of times the router polls the station without receiving a response before timing out. A value of 0 indicates that the router will continue to retry indefinitely.

### 2.1.7.2 LIST STATION <name> | <address> | ALL

Displays information for the specified SDLC link station on the interface, or for all link stations.

*Example:*

```
SDLC # Config>LIST STATION C1
Address Name      Status  Max BTU  Rx      Window  Role
-----
C1      SDLC_C1  ENABLED  2048    7        7      NEGOTIABLE
SDLC # Config>
```

*Example:*

```
SDLC # Config>LIST STATION ALL
Address Name      Status  Max BTU  Rx      Window  Role
-----
C1      SDLC_C1  ENABLED  2048    7        7      NEGOTIABLE
C2      SDLC_C2  ENABLED  2048    7        7      NEGOTIABLE
C3      SDLC_C3  ENABLED  2048    7        7      SECONDARY
SDLC # Config>
```

The meaning of each field is as follows:

<i>Address.</i>	Address of the SDLC link station.
<i>Name</i>	Name of the SDLC link station.
<i>Status</i>	Status of the SDLC link station. Possible states are ENABLED or DISABLED.
<i>Max BTU</i>	Frame size limit of the remote station. It must not be larger than the maximum Basic Transmission Unit (BTU) packet size configured with the set link frame-size command. The default is 521 bytes.
<i>Rx Window</i>	Size of the receive window.
<i>Tx Window</i>	Size of the transmit window.
<i>Role</i>	Role of the remote link station, either SECONDARY (Type 2.0) or NEGOTIABLE (Type 2.1).

## 2.1.8 MODULO

Specifies the range of the numerical sequence that can be used in the link. This command is used to modify the reception and transmission window sizes. Default is 8.

*Syntax:*

```
SDLC # Config>MODULO 8 | 128
```

**Note**

When this value is changed, the size of the reception and transmission windows is invalidated.

**2.1.8.1 MODULO 8**

The valid window size for modulo 8 ranges from 0 to 7. When the connection begins, an SNRM and non-extended SDLC frame headers are used.

*Syntax:*

```
SDLC # Config>MODULO 8
```

*Example:*

```
SDLC # Config>MODULO 8
```

```
SDLC # Config>
```

**2.1.8.2 MODULO 128**

The valid window size for module 128 ranges from 8 to 127. When the connection begins, an SNRME (instead of SNRM) and extended SDLC frame headers are used.

*Syntax:*

```
SDLC # Config>MODULO 128
```

*Example:*

```
SDLC # Config>MODULO 128
```

```
SDLC # Config>
```

**2.1.9 MTU**

Configures the maximum size of the frames that can be transmitted and received in the data link. Permitted values range from 576 to 18.000. Default is 2.048.

The remote secondary station's maximum frame value cannot exceed the value of the link frame size. Should this occur, the router would automatically match this value to that set by the link. Subsequently an SRE message is generated advising the user of the change produced in the value of the remote station's maximum frame.

*Syntax:*

```
SDLC # Config>MTU <frame-size>
```

*Example:*

```
SDLC # Config>MTU
```

```
Frame size in bytes (576 - 18000) [2048] ?
```

```
SDLC # Config>
```

**2.1.10 [NO] MULTIPOINT**

Specifies the link behavior as Multipoint or Point-to-Point. Through this, you can connect and control various stations with the same link. Default is Point-to-Point.

*Syntax:*

```
SDLC # Config>[NO] MULTIPOINT
```

**2.1.11 NAME**

Specifies a name for the link you are configuring. The aim of this parameter is merely informative.

*Syntax:*

```
SDLC # Config>NAME <name>
```

*Example:*

```
SDLC # Config>NAME
Enter link name: [LINK_1]?
SDLC # Config>
```

## 2.1.12 [NO] NRZI

Configures SDLC transmission encoding scheme as NRZI (Non-Return to Zero Inverted) or as NRZ (Non Return to Zero). Default is NRZ.

The NRZI codification is valid when generating the transmission or reception clocks from the received frames is necessary. In NRZ mode, when the frames are very long and a considerable number of zeros are continuously transmitted, the clock circuits may desynchronize and not generate the correct speed.

*Syntax:*

```
SDLC # Config>[NO] NRZI
```

## 2.1.13 POLL-DELAY

Configures the time period between each poll sent to the interface. This timer means that transmission is carried out more slowly or quickly and ensures that congestion is not caused in older devices (which cannot support a high data flow). This time is expressed in seconds, but fractions of seconds can be configured. Default is 0.2 seconds.

*Syntax:*

```
SDLC # Config>POLL-DELAY <delay>
```

*Example:*

```
SDLC # Config>POLL-DELAY
Enter delay between polls [0.2]?
SDLC # Config>
```

## 2.1.14 POLL-RETRIES

Configures the number of times the interface will try to poll the SDLC remote link station before deciding that the station is disconnected and closing the connection. Default is 10.

*Syntax:*

```
SDLC # Config>POLL-RETRIES <number>
```

*Example:*

```
SDLC # Config>POLL-RETRIES
Enter poll retry count (0 = forever) [10]?
SDLC # Config>
```

## 2.1.15 POLL-TIMEOUT

Configures the amount of time the router waits for a poll response before timing out. This time is expressed in seconds, but fractions of seconds can be configured. Default is 0.5 seconds.

*Syntax:*

```
SDLC # Config>POLL-TIMEOUT <time>
```

*Example:*

```
SDLC # Config>POLL-TIMEOUT
Enter poll timeout [0.5]?
SDLC # Config>
```

## 2.1.16 ROLE

Defines the link behavior mode with respect to the SDLC protocol. By default, the interface behaves as a primary SDLC link station.

*Syntax:*

```
SDLC # Config>ROLE NEGOTIABLE | PRIMARY
```

### 2.1.16.1 ROLE NEGOTIABLE

The interface is configured to negotiate its behavior under SDLC.

*Syntax:*

```
SDLC # Config>ROLE NEGOTIABLE
```



#### Note

The SDLC interface only negotiates as primary (not as secondary).

*Example:*

```
SDLC # Config>ROLE NEGOTIABLE
SDLC # Config>
```

### 2.1.16.2 ROLE PRIMARY

The interface is configured to behave as a PRIMARY link station.

*Syntax:*

```
SDLC # Config>ROLE PRIMARY
```

*Example:*

```
SDLC # Config>ROLE PRIMARY
SDLC # Config>
```

## 2.1.17 RTS-HOLD

Configures the time during which the RTS signal is maintained active. This option is for half-duplex mode and has no effect in full-duplex mode. The time is expressed in seconds, but fractions of seconds can be configured. Default is 0 (disabled).

*Syntax:*

```
SDLC # Config>RTS-HOLD <time>
```

*Example:*

```
SDLC # Config>RTS-HOLD
Enter RTS hold duration after transmit complete [0.0]?
SDLC # Config>
```

## 2.1.18 SLOW-POLL

Configures the amount of time during which the router will not execute polling over stations that do not respond when the interface is operating in multipoint mode. As a result, interface performance is not affected by the response wait time linked to stations that do not reply. This time is expressed in seconds. You can configure fractions of seconds. Default is 5.0 seconds.

*Syntax:*

```
SDLC # Config>SLOW-POLL <time>
```

*Example:*

```
SDLC # Config>SLOW-POLL
Enter slow poll timeout [5.0]?
```

```
SDLC # Config>
```

### 2.1.19 SNRM-RETRIES

Configures the number of times an SNRM (E) is retransmitted without response before giving up. Default is 6.

*Syntax:*

```
SDLC # Config>SNRM-RETRIES <number>
```

*Example:*

```
SDLC # Config>SNRM-RETRIES
Enter SNRM retry count (0 = forever) [6]?
SDLC # Config>
```

### 2.1.20 SNRM-TIMEOUT

Configures the waiting time for an UA response before retransmitting an SNRM (E). This time is expressed in seconds, but fractions of seconds can be configured. Default is 2.0 seconds.

*Syntax:*

```
SDLC # Config>SNRM-TIMEOUT <time>
```

*Example:*

```
SDLC # Config>SNRM-TIMEOUT
Enter SNRM response timeout [2.0]?
SDLC # Config>
```

### 2.1.21 SPEED

In an internal clock, this command specifies the reception and transmission clock speed. Values can range between 0 and 64 Kbps. Default is 64000 bits/sec.

*Syntax:*

```
SDLC # Config>SPEED <speed>
```

*Example:*

```
SDLC # Config>SPEED
Internal Clock Speed [64000]?
SDLC # Config>
```

### 2.1.22 STATION

Creates, modifies and deletes the possible stations that can connect to the SDLC interface.

*Syntax:*

```
SDLC # Config>NO STATION <address>
SDLC # Config>STATION <address> DEFAULT
SDLC # Config>STATION <address> [NO] DISABLED | FRAME-SIZE <long-frame> | NAME <name> | ROLE <NEGOTIABLE | SECONDARY> | RX-WIN
```

#### 2.1.22.1 STATION <address> DEFAULT

Adds or creates a remote station that initializes with the default values. When this command is not used, the router, by default, will add a remote station to ensure that the SDLC interface operates correctly. However, this command must be used if you wish to combine link stations T2.0 and T2.1 in the same multipoint line. The SDLC address must be specified in hexadecimal.

*Syntax:*

```
SDLC # Config>STATION <address> DEFAULT
```

*Example:*

```
SDLC # Config>STATION C1 DEFAULT
SDLC # Config>
```

### 2.1.22.2 NO STATION <address>

Suppresses or eliminates a specific remote station (remote station address) from the SDLC configuration. You must specify the SDLC address in hexadecimal.

*Syntax:*

```
SDLC # Config>NO STATION <address>
```

*Example:*

```
SDLC # Config>NO STATION C1
SDLC # Config>
```

### 2.1.22.3 STATION <address> DISABLED

Prevents an SDLC session from establishing with the remote-end station previously created and specified by means of its hexadecimal address. By default, the station is active.

*Syntax:*

```
SDLC # Config>STATION <address> DISABLED
```

*Example:*

```
SDLC # Config>STATION C1 DISABLED
SDLC # Config>
```

### 2.1.22.4 STATION <address> NO DISABLED

Allows an SDLC session to be re-established using the deactivated remote-end station previously created and specified by means of its hexadecimal address.

*Syntax:*

```
SDLC # Config>STATION <address> NO DISABLED
```

*Example:*

```
SDLC # Config>STATION C1 NO DISABLED
SDLC # Config>
```

### 2.1.22.5 STATION <address> FRAME-SIZE

Modifies the maximum frame size that can be received by a previously-defined remote station.

*Syntax:*

```
SDLC # Config>STATION <address> FRAME-SIZE <frame-size>
```



#### Note

The maximum frame size must not exceed the size of the link frame configured through the **configure link frame size** command. If it does, the router automatically sets the maximum frame size complying with the size of the link frame and sends the following message:

```
SDLC.054: nt 3 SDLC/0 Stn c4 - MaxBTU too large for link - adjusted (4.096-2.048)
```

*Example:*

```
SDLC # Config>STATION C1 FRAME-SIZE 576
SDLC # Config>
```

### 2.1.22.6 STATION <address> NAME

Changes the name of an SDLC remote station. A maximum of 8 characters are allowed.

*Syntax:*

```
SDLC # Config>STATION <address> NAME <name>
```

*Example:*



```
SDLC # Config>STATION C1 NAME HOST-C1
SDLC # Config>
```

### 2.1.22.7 STATION <address> ROLE NEGOTIABLE

Indicates that the SDLC remote station is capable of negotiating its behavior in the link. Default is secondary station.

*Syntax:*

```
SDLC # Config>STATION <address> ROLE NEGOTIABLE
```



#### Note

The SDLC interface can only negotiate as primary (not as secondary). This means remote stations negotiate behavior as secondary stations.

*Example:*

```
SDLC # Config>STATION C1 ROLE NEGOTIABLE
SDLC # Config>
```

### 2.1.22.8 STATION <address> ROLE SECONDARY

Indicates that the SDLC remote station is going to behave as a secondary station.

*Syntax:*

```
SDLC # Config>STATION <address> ROLE SECONDARY
```



#### Note

The SDLC interface can only negotiate as primary (not as secondary). This means remote stations negotiate behavior as secondary stations.

*Example:*

```
SDLC # Config>STATION C1 ROLE SECONDARY
SDLC # Config>
```

### 2.1.22.9 STATION <address> RX-WINDOW

Modifies the maximum number of frames that the router can receive before sending a response to the remote station. This value depends on the value introduced in the **modulo** command. When this is 8, the default value is 7 (allowed values range between 1 and 7). When it's 128, default is 127 (allowed values range between 9 and 127).

*Syntax:*

```
SDLC # Config>STATION <address> RX-WINDOW <>window>
```



#### Note

When the value in MODULO is changed, the sizes of the transmission and reception windows are invalidated.

*Example:*

```
SDLC # Config>STATION C1 RX-WINDOW 5
SDLC # Config>
```

### 2.1.22.10 STATION <address> TX-WINDOW

This command modifies the maximum number of frames that the router can transmit without needing to receive a response from the remote station. This value depends on the value introduced in the **modulo** command. When this is 8, the default value is 7 (allowed values range between 1 and 7). When it's 128, default is 127 (allowed values range between 9 and 127).

*Syntax:*

```
SDLC # Config>STATION <address> TX-WINDOW <>window>
```

**Note**

When the value in MODULO is changed, the sizes of the transmission and reception windows are invalidated.

*Example:*

```
SDLC # Config>STATION C1 TX-WINDOW 5
SDLC # Config>
```

### 2.1.23 V24

For SDLC interfaces pertaining to the PCI card, this configures the driver norm as V24.

*Syntax:*

```
SDLC # Config>V24
```

*Example:*

```
SDLC # Config>V24
SDLC # Config>
```

### 2.1.24 V35

For SDLC interfaces pertaining to the PCI card, this configures the driver norm as V35.

*Syntax:*

```
SDLC # Config>V35
```

*Example:*

```
SDLC # Config>V35
SDLC # Config>
```

### 2.1.25 XID-RETRIES

Configures the maximum number of times an XID frame or TEST is sent before giving up. Default is 4.

*Syntax:*

```
SDLC # Config>XID-RETRIES <number>
```

*Example:*

```
SDLC # Config>XID-RETRIES
Enter XID and TEST retry count (0 = forever) [4]?
SDLC # Config>
```

### 2.1.26 XID-TIMEOUT

Sets the maximum waiting time for an XID or TEST frame response before retransmitting. This time is expressed in seconds, but fractions of seconds can be configured. Default is 2.0 seconds.

*Syntax:*

```
SDLC # Config>XID-TIMEOUT <time>
```

*Example:*

```
SDLC # Config>XID-TIMEOUT
Enter XID and TEST frame response timeout [2.0]?
SDLC # Config>
```

### 2.1.27 EXIT

Returns to the previous prompt level.

***Syntax:***

```
SDLC # Config>EXIT
```

***Example:***

```
SDLC # Config>EXIT  
Config>
```

# Chapter 3 Monitoring

## 3.1 Monitoring Commands

To enter the SDLC monitoring process, carry out the following steps:

- (1) At the (\*) prompt, enter **process 3** or **P3**. This takes you to the monitoring prompt +.

```
*P 3
+
```

- (2) At the (+) prompt, enter **network** and the number that identifies the interface associated with the previously configured SDLC device. This is generically denominated #.

```
+network #
SDLC Console
SDLC- #+
```

If, for example, the interface were 3, the screen would look like this:

```
+network 3
SDLC Console
SDLC-3+
```

Command	Function
? (HELP)	Lists the monitoring commands or any parameter associated with that command
ADD	Adds a remote-secondary station.
CLEAR	Clears the link and remote station counters.
DATA	Establishes a connection with an SDLC link station and sends a test frame.
DELETE	Deletes a remote-secondary station.
DISABLE	Prevents connections to an SDLC link station.
ENABLE	Enables connections to an SDLC link station.
LIST	Displays configured information for an SDLC link station.
SET	Configures a specific interface and information for the remote-secondary station.
TEST	Performs an echo test on a remote-secondary station.
EXIT	Exits the SDLC monitoring environment.

### 3.1.1 ? (HELP)

Lists the commands that are available at the current prompt level. You can also type ? after a specific command to list its options.

Syntax:

```
SDLC- #+?
```

Example:

```
SDLC- #+?
add      Adds a remote-secondary station
clear    Clears the link and remote station counters
data     Establishes a connection with an SDLC link station and sends a
         test frame
delete   Deletes a remote-secondary station
disable  Prevents connections to a SDLC link station
enable   Permits connections to a SDLC link station
list     Lists configuration information of a SDLC link station
set      Configures a specific interface and a remote-secondary station
test     Performs an echo test on a remote-secondary station
exit
SDLC- #+
```

### 3.1.2 ADD

Adds a remote secondary station. When you do not use this command, the router will, by default, add a remote secondary station to ensure that the SDLC interface operates correctly. However, this command must be used if you wish to combine link stations T2.0 and T2.1 over the same multipoint line. By default, the router is considered a primary station.

**Syntax:**

```
SDLC- #+add station ?
<hex 1..fe>      Station address
```

If the remote station does not exist:

```
SDLC- #+add station <address> ?
default          Create a new station
disabled         Disable station
frame-size       Max frame size
name             Station name
role             Station role
no
rx-window        Receive window
tx-window        Transmit window
<cr>

SDLC- #+ add station <address> role ?
negotiable       Station role negotiable
secondary        Station role secondary

SDLC- #+ add station <address> no ?
disabled         Enable station
```

**Example:**

```
SDLC- #+add station c1 rx-window 4 tx-window 5 frame-size 256 name STAT1 role secondary disabled
SDLC- #+add station 45 default rx-window 6
```

The meaning of each field is as follows:

<i>default</i>	Creates a new remote secondary station.
<i>name</i>	Name given to the SDLC station (maximum of 8 characters).
<i>frame size</i>	Maximum packet size that can be sent to, or received from, the remote link station. This value cannot be greater than the one specified for the link through <b>set link frame-size</b> .
<i>rx-window</i>	Maximum number of frames that the router can receive without sending a response.
<i>tx-window</i>	Maximum number of frames that the router can transmit without sending a response.
<i>role</i>	Indicates whether the remote secondary end station you are adding will be a negotiable (T2.1) or secondary (T2.0) node on a multipoint line.
<i>disabled</i>	Prevents the formation of an SDLC session in the remote secondary station.
<i>no disabled</i>	Enables connections to a specific remote secondary station.

### 3.1.3 CLEAR

Deletes the link and remote station counters.

**Syntax:**

```
SDLC- #+clear ?
link          Deletes link counters
station       Deletes remote stations counters

SDLC- #+clear station ?
<1..8 chars>  Secondary Link Station name or 'ALL'
```

**Example 1:**

```
SDLC- #+clear link
```

**Example 2:**

```
SDLC- #+clear station c1
```

### 3.1.4 DATA

Establishes a connection with an SDLC link station and sends a test frame.

*Syntax:*

```
SDLC- #+data ?
<0..7>    LS Index
```

### 3.1.5 DELETE

Suppresses a specific remote secondary station (remote station name or address). Run **sdlc list station all status** to list the existing sessions.

*Syntax:*

```
SDLC- #+delete station ?
<1..8 chars>    Secondary Link Station name
```

*Example:*

```
SDLC- #+delete stat c9
SDLC- #+
SDLC- #+delete stat SDLC_C1
```

### 3.1.6 DISABLE

Prevents connections from being created with an SDLC link station.

*Syntax:*

```
SDLC- #+disable ?
link      In any SDLC link stations on the interface
station   In the specific remote-secondary end station
```

#### 3.1.6.1 DISABLE LINK

Prevents the establishment of SDLC sessions in any SDLC link stations on the interface. When used in the monitoring environment, the **disable remote secondary** command also terminates all existing connections on the link.

*Example:*

```
SDLC- #+disable link
SDLC- #+
```

#### 3.1.6.2 DISABLE STATION

Prevents the establishment of an SDLC session in the remote secondary end station specified (remote secondary name or address). When used in the monitoring environment, the **disable remote secondary** command also terminates any existing SDLC sessions.

*Syntax:*

```
SDLC- #+disable station ?
<1..8 chars>    Secondary Link Station name
```

*Example:*

```
SDLC- #+disable station c1
```

### 3.1.7 ENABLE

Enables connections to SDLC link stations.

*Syntax:*

```
SDLC- #+enable ?
link      Permits subsystems in the router to access SDLC features
```

```
station      Permits connections to a specific remote-secondary end station
```

### 3.1.7.1 ENABLE LINK

Allows subsystems in the router (e.g. DLSw) to access SDLC features.

*Example:*

```
SDLC- #+enable link
SDLC- #+
```

### 3.1.7.2 ENABLE STATION

Allows connections to a specified remote-secondary end station (link station name).

*Syntax:*

```
SDLC- #+enable station ?
<1..8 chars>      Secondary Link Station name
```

*Example:*

```
SDLC- #+enable station c1
```

## 3.1.8 LIST

Displays statistics specific to the data link layer and the interface.

*Syntax:*

```
SDLC- #+list ?
link      Lists SDLC link information
station   Lists SDLC remote station information
SDLC- #+LIST ?
```

### 3.1.8.1 LIST LINK

Displays information on the SDLC interface.

*Syntax:*

```
SDLC- #+list link ?
configuration  Lists SDLC configuration information
counters       Lists SDLC counters
```

#### 3.1.8.1.1 LIST LINK CONFIGURATION

Displays information for the SDLC interface. The information given is identical to that generated with **list link** in the configuration environment.

*Example:*

```
SDLC- #+list link configuration
Link configuration for:      LINK_1  (Enabled)

Default role:  PRIMARY      Type:      POINT-TO-POINT
Duplex:        FULL         Modulo:     8
Idle state:    FLAG         Encoding:  NRZ
Clocking:      INTERNAL     Frame size: 2048
Speed:         64000        Cable:      DCE

Timers:  XID/TEST response:  0.5 sec
          SNRM response:     2.0 sec
          Poll response:     0.5 sec
          Inter-poll delay:  0.2 sec
          Slow poll      :    5.0 sec
          RTS hold delay:   DISABLED
          Inter-frame delay: DISABLED

Counters:  XID/TEST retry    4
```

```

SNRM retry      6
Poll retry      10
SDLC- #+

```

### 3.1.8.1.2 LIST LINK COUNTERS

Displays information on the SDLC counters since the last **router** restart or since the last time the counters were re-started.

*Example:*

```

SDLC- #+list link counters
Link counters for: LINK_1 (DISABLED)

      I-Frames  I-Bytes  Re-Xmit  UI-Frames  UI-Bytes
      -
Send      0        0        0          0          0
Recv      0        0          0          0          0

      RR        RNR        REJ
      -
Send      0        0        0
Recv      0        0        0

SDLC- #+

```

The meaning of each field is as follows:

<i>I-Frames</i>	Total number of information frames received and sent.
<i>I-Bytes</i>	Total number of information bytes received and sent.
<i>Re-Xmit</i>	Total number of retransmitted frames.
<i>UI-Frames</i>	Total number of Unnumbered Information frames received and transmitted.
<i>UI-Bytes</i>	Total number of Unnumbered Information bytes received and transmitted.
<i>RR</i>	Total number of RR (Receive Ready) frames received and transmitted.
<i>RNR</i>	Total number of RNR (Receive Not Ready) frames received and transmitted.
<i>REJ</i>	Total number of Rejects received and transmitted.

### 3.1.8.2 LIST STATION

Displays the stations of the SDLC system.

*Syntax:*

```

SDLC- #+list station ?
<1..8 chars>    Secondary Link Station name or 'ALL'

```

#### 3.1.8.2.1 LIST STATION ALL / <name> / <address> STATUS

Displays status for a specific SDLC link station (link station name) on the interface.

*Syntax:*

```

SDLC- #+list station ALL ?
status    Lists SDLC link station status

SDLC- #+list station <name | address> ?
status    Lists SDLC link station status
counters  Lists SDLC counters

```

*Example:*

```

SDLC- #+list station ALL status

Address  Name      Status  Max BTU  Rx  Window  Role
-----
A0       SDLC_A0    IDLE    2048     7   7        NEGOTIABLE
C1       SDLC_C1    IDLE    2048     7   7        SECONDARY
C2       SDLC_C2    DISABLED 2005     7   7        NEGOTIABLE
C3       SDLC_C3    DISABLED 2009     7   7        NEGOTIABLE

```



```
SDLC- #+
```

Or:

*Example:*

```
SDLC- #+list station C2 status
```

Address	Name	Status	Max BTU	Rx	Window	Role
C2	SDLC_C2	DISABLED	2005	7	7	NEGOTIABLE

```
SDLC- #+
```

The meaning of each field is as follows:

**Address** The address of the SDLC link station.

**Name** The character string name defining the SDLC link station.

**Status** The status of the SDLC link station. Possible values are:

Enabled: Active, but not assigned.

Idle: Assigned but not being used as yet.

Connected: Connected.

Discnected: Disconnected.

Connecting: Connection establishment in progress.

Discnectng: Disconnection in progress.

Recovering: Attempting to recover from a temporary data link error.

Disabled: Disabled.

**Max BTU** Frame size limit of the remote station. This frame size must not be larger than the maximum basic transmission unit (BTU) packet size configured with the set link frame size command.

Default is 521 bytes.

**Rx Window** Size of the receive window.

**Tx Window** Size of the transmission window.

### 3.1.8.2.2 LIST STATION <name> / <address> COUNTERS

Displays the frame transmit and receive counters for the remote-secondary station specified.

*Syntax:*

```
SDLC- #+list station <name | address> ?
  status      Lists SDLC link station status
  counters    Lists SDLC counters
```

*Example:*

```
SDLC- #+list station C1 counters
```

```
Counters for: SDLC_C1 , address C1 (ENABLED)
```

	I-Frames	I-Bytes	Re-Xmit	UI-Frames	UI-Bytes	XID-Frames
Send	569	88870	0	0	0	0
Recv	345	4804		0	0	0

  

	RR	RNR	REJ	TEST	SNRM	DISC
Send	4779	0	0	1	1	0
Recv	4443	0	0	1	0	0

  

	UA	DM	FRMR
Send	0	0	0
Recv	1	0	0

```
SDLC- #+
```

The meaning of each field is as follows:

<i>I-Frames</i>	Total number of information frames received and sent.
<i>I-Bytes</i>	Total number of information bytes received and sent.
<i>Re-Xmit</i>	Total number of retransmitted frames.
<i>UI-Frames</i>	Total number of Unnumbered Information frames received and transmitted.
<i>UI-Bytes</i>	Total number of Unnumbered Information bytes received and transmitted.
<i>XID-Frames</i>	Total number of Exchange Identification frames received and transmitted.
<i>RR</i>	Total number of Receive Ready frames received and transmitted.
<i>RNR</i>	Total number of Receive Not Ready frames received and transmitted.
<i>REJ</i>	Total number of Rejects received and transmitted.
<i>TEST</i>	Total number of Test frames received and transmitted.
<i>SNRM</i>	Total number of Set Normal Response Mode frames received and transmitted.
<i>DISC</i>	Total number of Disconnect frames received and transmitted.
<i>UA</i>	Total number of Unnumbered Acknowledgment frames received and transmitted.
<i>DM</i>	Total number of Disconnected Mode frames received and transmitted.
<i>FRMR</i>	Total number of Frames Reject received and transmitted.

### 3.1.9 SET

When used in the SDLC monitoring environment, the **set** command allows you to dynamically configure specific information for all SDLC link stations (or only one) without affecting the router's non-volatile configuration memory.

You can only issue the **set** command on disabled stations. You can only issue **set link** on a disabled link. All time values are in seconds, with a 0.1 second resolution.

*Syntax:*

```
SDLC- #+set ?
  link      Configures specific information for all SDLC link stations
  station   Configures specific information for one SDLC link station
```

#### 3.1.9.1 SET LINK

Configures specific information for all SDLC link stations.

*Syntax:*

```
SDLC- #+set link ?
  modulo    Modifies the sequence numbers range
  name      Changes the link name
  poll      Modifies polls parameters
  role      Configures as an SDLC primary link station or the role interface
  rts-hold  Modifies RTS hold duration time after transmitting a frame
  snrm      Modifies SNRM parameters
  type      Modifies link type
  xid/test  Modifies XID/TEST parameters
```

##### 3.1.9.1.1 SET LINK MODULO

Dynamically changes the numerical sequence range to be used on the data link without affecting the SRAM configuration. MODULO 8 specifies a sequence number range of 0-7, and MODULO 128 specifies a range of 0-127. Default is 8.

*Syntax:*

```
SDLC-2+set link modulo ?
  8      MODULE 8 specifies a 0-7 sequence number range
  128    MODULE 128 specifies a 0-127 sequence number range
```

*Example:*

```
SDLC- #+set link modulo 8
```

```
SDLC- ##
```

**Note**

When you change this value, the transmit and receive window sizes become invalid.

Use the set remote command to change the receive-window and transmit-window sizes. Valid window sizes for modulo 8 are 0 to 7; valid window sizes for modulo 128 are 8 to 127.

**3.1.9.1.2 SET LINK NAME**

Dynamically changes the name of the link without affecting the SRAM configuration. A maximum of 8 characters may be entered. This parameter is for information purposes only.

**Syntax:**

```
SDLC- ##set link name ?
<1..8 chars>    Text
```

**Example:**

```
SDLC- ##set link name LINK_1
```

**3.1.9.1.3 SET LINK POLL**

Modifies poll parameters.

**Syntax:**

```
SDLC- ##set link poll ?
delay          Changes the delay between polls
retry          Retries to poll the remote SDLC link station
slow-poll      Time router expels a station that does not respond from the poll
               queue
timeout        Timeout waiting a poll response
```

**3.1.9.1.4 SET LINK POLL DELAY**

Dynamically changes the time delay between polls sent to the interface.

**Syntax:**

```
SDLC- ##set link poll delay ?
<0.0..6000.0>    Delay between polls
```

**Example:**

```
SDLC- ## set link poll delay 1.7
```

**3.1.9.1.5 SET LINK POLL RETRY**

Dynamically configures the number of times the interface retries to poll the remote SDLC link station before deciding the link station is deactivated and closing the connection.

**Syntax:**

```
SDLC- ## set link poll retry ?
<0..1000000>    Number of retries (0 = forever)
```

**Example:**

```
SDLC- ## set link poll retry 10
```

**3.1.9.1.6 SET LINK POLL SLOW-POLL**

Dynamically changes the amount of time that the router expels a station that does not respond from the poll queue.

**Syntax:**

```
SDLC- ##set link poll slow-poll ?
<0.0..6000.0>    Slow poll timeout
```

**Example:**

```
SDLC- #+set link poll slow-poll 5
```

### 3.1.9.1.7 SET LINK POLL TIMEOUT

Dynamically changes the amount of time the router waits for a poll response before timing out.

*Syntax:*

```
SDLC- #+set link poll timeout ?
<0.0..6000.0> Poll timeout
```

*Example:*

```
SDLC- #+set link poll timeout 1.3
```

### 3.1.9.1.8 SET LINK ROLE

Dynamically configures the interface as an SDLC primary link station (default) or the role of the interface without affecting the router's non-volatile configuration memory.



#### Note

The SDLC interface negotiates only as primary (not as secondary).

*Syntax:*

```
SDLC- #+set link role ?
negotiable Configures a negotiable node
primary Configures as an SDLC primary link station
```

### 3.1.9.1.9 SET LINK ROLE NEGOTIABLE

Configures a negotiable node.

*Example:*

```
SDLC- #+set link role negotiable
SDLC- #+
```

### 3.1.9.1.10 SET LINK ROLE PRIMARY

Configures a node as an SDLC primary link station.

*Example:*

```
SDLC- #+set link role primary
SDLC- #+
```

### 3.1.9.1.11 SET LINK RTS-HOLD

Dynamically changes RTS hold duration time after transmitting a frame without affecting the router's non-volatile configuration memory. This setting is for half-duplex mode. It has no effect on full-duplex mode.

*Syntax:*

```
SDLC- #+set link rts-hold ?
<0.0..6000.0> RTS hold duration
```

*Example:*

```
SDLC- #+set link rts-hold 2.5
```

### 3.1.9.1.12 SET LINK SNRM

Modifies SNRM parameters.

*Syntax:*

```
SDLC- #+set link snrm ?
retry Number of retransmission of an SNRM (E) without receiving a
      response
timeout Time waiting for a UA response before retransmitting an SNRM
```

### 3.1.9.113 SET LINK SNRM RETRY

Dynamically changes the number of times an SNRM (E) is retransmitted without receiving a response before giving up.

*Syntax:*

```
SDLC- #+set link snrm retry ?
      <0..1000000>      SNRM retry count
```

*Example:*

```
SDLC- #+ set link snrm retry 15
```

### 3.1.9.114 SET LINK SNRM TIMEOUT

Dynamically changes the time waited for an Unnumbered Acknowledgment (UA) response before retransmitting an SNRM.

*Syntax:*

```
SDLC- #+set link snrm timeout ?
      <0.0..6000.0>      SNRM response timeout
```

*Example:*

```
SDLC- #+set link snrm timeout 2.9
```

### 3.1.9.115 SET LINK TYPE

Dynamically changes the SDLC link to either a multipoint link or a point-to-point link without affecting the router's non-volatile configuration memory.

*Syntax:*

```
SDLC- #+set link type ?
      multipoint          SDLC multipoint link
      point-to-point      SDLC point to point link
```

### 3.1.9.116 SET LINK TYPE MULTIPOINT

SDLC multipoint link.

*Example:*

```
SDLC- #+set link type multipoint
SDLC- #+
```

### 3.1.9.117 SET LINK TYPE POINT-TO-POINT

SDLC point to point link.

*Example:*

```
SDLC- #+set link type point-to-point
SDLC- #+
```

### 3.1.9.118 SET LINK XID/TEST

Modifies XID/TEST parameters.

*Syntax:*

```
SDLC- #+set link xid/test ?
      retry      Retries of a XID or TEST frame
      timeout     Timeout waiting a XID or TEST frame response
```

### 3.1.9.119 SET LINK XID/TEST RETRY

Dynamically changes the maximum number of times an XID or TEST frame is resent before giving up.

*Syntax:*

```
SDLC- #+set link xid/test retry ?
```

```
<0..1000000>    XID and TEST retry count (0 = forever)
```

*Example:*

```
SDLC- #+set link xid/test retry 0
```

### 3.1.9.1.20 SET LINK XID/TEST TIMEOUT

Dynamically changes the maximum wait time for an XID or TEST frame response.

*Syntax:*

```
SDLC- #+set link xid/test timeout ?
<0.0..6000.0>    XID and TEST frame response timeout
```

*Example:*

```
SDLC- #+set link xid/test timeout 2.6
```

### 3.1.9.2 SET STATION

Configures specific information for one SDLC link station.

*Syntax:*

```
SDLC- #+set station ?
<1..8 chars>    Secondary Link Station name
SDLC- #+ set station <direccion | nombre> ?
address          Modifies remote station SDLC address
max-packet       Modifies maximum frame size received
name             Assigns a name to a remote SDLC station
role             Modifies the remote station role
receive-window   Modifies the maximum number of frames received before
                  sending a response
transmit-window  Modifies the maximum number of frames transmitted before
                  receiving a response
```

#### 3.1.9.2.1 SET STATION ADDRESS

Changes the remote station's SDLC address within a 01 to FE range.

*Syntax:*

```
SDLC- #+set station <nombre | direccion> address ?
<hex 1..fe>    Value in the specified range
```

*Example:*

```
SDLC- #+set station c1 address 23
```

#### 3.1.9.2.2 SET STATION MAX-PACKET

Maximum size of the frame that a remote secondary station can receive. Default is 521 bytes. N.B. You cannot set a maximum packet size that is larger than the link frame size configured with the **set link frame size** command. If you do this, the router automatically resets the maximum packet size to the link frame size.

*Syntax:*

```
SDLC- #+set station <name | address> max-packet ?
<64..18000>    Value in the specified range
```

*Example:*

```
SDLC- #+set station c2 max-packet 521
```

#### 3.1.9.2.3 SET STATION NAME

Assigns a name to a remote SDLC station. A maximum of 8 characters may be entered.

*Syntax:*

```
SDLC- #+set station <name | address> name ?
<1..8 chars>    Text
```

*Example:*

```
SDLC- #+set station c8 name SDLC_8
```

### 3.1.9.2.4 SET STATION RECEIVE-WINDOW

Maximum number of frames the router can receive before sending a response.

*Syntax:*

```
SDLC- #+ set station c8 receive-window ?
<1..127>      Value in the specified range
```

*Example:*

```
SDLC- #+ set station c8 receive-window 4
```

### 3.1.9.2.5 SET STATION ROLE

Changes the role of the remote station. Possible values are: SECONDARY or NEGOTIABLE.

*Syntax:*

```
SDLC- #+ set station <name | address> role ?
negotiable      Configures a negotiable node
secondary       Configures a secondary node
```

### 3.1.9.2.6 SET STATION <name> / <address> ROLE NEGOTIABLE

Configures a negotiable node.

*Example:*

```
SDLC- #+set station C1 role negotiable
SDLC- #+
```

### 3.1.9.2.7 SET STATION <name> / <address> ROLE SECONDARY

Configures a secondary node.

*Example:*

```
SDLC- #+set station C1 role secondary
SDLC- #+
```

### 3.1.9.2.8 SET STATION TRANSMIT-WINDOW

Maximum number of frames the router can transmit before receiving a response frame.

*Syntax:*

```
SDLC- #+ set station c8 transmit-window ?
<1..127>      Value in the specified range
```

*Example:*

```
SDLC- #+ set station c8 transmit-window 3
```

## 3.1.10 TEST

Transmits a specific number of TEST frames to the specified remote-secondary link station and waits for a response. Use this command to test the integrity of the connection.



#### Note

Disable the specified link station before using this command.

*Syntax:*

```
SDLC- #+ test station ?
<1..8 chars>      Secondary Link Station name or 'ALL'
SDLC- #+test station <name | address> ?
```

```
<1..1000>    Number of frames to send
SDLC-2+test station <name | address> <#frames> ?
<1..18000>    Frame length
```

*Example:*

```
SDLC- #+ test station c2 12 12
Starting echo test -- press any key to abort
12 frames sent, 12 frames received, 0 compare errors, 0 timeouts
```

The meaning of each field is as follows:

<i>Number of frames</i>	Total number of frames to send.
<i>Frame length</i>	Length of the frame sent. This frame cannot be any larger than the maximum frame length of the remote-secondary station.

Cancel the test by pressing any key.

### 3.1.11 EXIT

Returns to the previous prompt level.

*Syntax:*

```
SDLC- #+exit
```

*Example:*

```
SDLC- #+exit
+
```

## 3.2 STATISTICS DISPLAY IN SDLC INTERFACES

Run **device** to display statistics for SDLC devices without entering the SDLC monitoring module. To do this, run **device** and an interface number at the (+) prompt, as shown:

*Example:*

```
+device 3

Ifc      Interface  CSR      Vect  Auto-test  Auto-test  Maintenance
valids   failures   failures
3        SDLC/1    80000000 9E     1          0          0

Driver type:  DCE

V.24 circuit:  105   106   107   108   109
Nickname:      RTS   CTS   DSR   DTR   DCD
State:         OFF   OFF   OFF   OFF   OFF

Line speed:    19.200 Kbps
Last port reset: 1 minute, 24 seconds ago

Input frame errors:
CRC error      = 0   Alignment (byte length) = 0
missed frame   = 0   too long (>02053 bytes) = 0
aborted frame  = 0   DMA/FIFO overrun          = 0

Output frame counters:
DMA/FIFO underrun errs = 0   Output abort frames   = 0
+
```

The meaning of each field is as follows:

<i>Ifc</i>	Interface number assigned by software during initial configuration.
<i>Interface</i>	Type of interface.
<i>CSR</i>	Memory location of the control status register for the SDLC interface.
<i>Vect</i>	Interruption vector.
<i>Auto-test valids</i>	Number of times the SDLC interface passed its self-test.
<i>Auto-test failures</i>	Number of times the SDLC interface was unable to pass its self-test.



<i>Maintenance failures</i>	Number of maintenance failures.
<i>Driver type</i>	The interface is an RS-232 DCE.
<i>V.24 circuit</i>	Circuits in use on the V.24 circuit.
<i>Nicknames</i>	Names for the V.24 circuits.
<i>State</i>	State of circuits, signals, and pin assignments (ON or OFF).
<i>Line speed</i>	Normal speed for the line configured for the SDLC interface.
<i>Last port reset</i>	Time lapsed since the port was last reset.
<i>Input frame errors</i>	Input frame error type (CRC error, too short, aborted, alignment, too long, DMA/FIFO overrun) and the total number of errors that have occurred.
<i>Output frame counters</i>	Total number of DMA/FIFO overruns and output aborts transmitted.