Teldat Router

SDLC Protocol

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Chapter 1
Introduction

1. The SDLC Protocol

SDLC configuration commands are available at the *SDLC # Config>* prompt, where # identifies the interface you specify with the **NETWORK** command. Changes made to the **Teldat 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 monitoring command *do not* become part of the router's non-volatile configuration.

When the **Teldat 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 ELS (Event Logging System) messages relating to router activities and performance.

> ***¡ WARNING!***
>
> ***The SDLC Interface currently DOES NOT support secondary mode function.***

Chapter 2
Configuration

1. Configuration Commands

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

1. At the prompt (*), enter **PROCESS 4** or just **P 4**. This takes you to the *Config>* prompt.

```
*P 4
Config>
```

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

2. Subsequently, enter the **NETWORK** command 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>
```

Command	Function
? (HELP)	List the configuration commands or lists any parameters associated with that command.
DISABLED	Prevents SDLC sessions being established with any SDLC link station in the interface.
FRAME-SIZE	Configures the maximum frame length that can be sent over the interface.
HALF-DUPLEX	Configures the link for half-duplex operations.
IDLE	Configures the idle transmission state for SDLC framing.
INTER-FRAME	Permits insertion of a delay between transmitted frames.
LIST	Displays information configured for an SDLC link station.
MODULO	Specifies the range of sequence numeration to be used in the link.
MULTIPOINT	Configures the SDLC link as a multipoint link.

NAME	Establishes a name for 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	Configure 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.
SNRM-RETRIES	Configures the number of times an SNRM (E) is retransmitted without receiving a response before abandoning the retries.
SNRM-TIMEOUT	Configures the period of time waited for a UA response before re-transmitting an SNRM (E).
SPEED	For the internal clock, this command specifies the reception and transmission clocks speed.
STATION	Defines the parameters of the stations connected to the link.
XID-RETRIES	Configures the maximum number of times an XID or TEST frame must be sent before abandoning this.
XID-TIMEOUT	Configures the maximum wait time permitted for an XID or TEST frame response.
EXIT	Permits you to exit the SDLC configuration environment.

1.1. ? (HELP)

Use the **?** (HELP) command to list the available commands that are available from the current prompt level. You can also enter a **?** after a specific command name to list its options.

Syntax:

```
SDLC # Config> ?
```

Example:

```
SDLC # Config> ?
DISABLED          Disable link
FRAME-SIZE        Max frame size
HALF-DUPLEX       Half duplex mode
IDLE              Set idle mode
INTER-FRAME       Inter frame delay time
LIST
MODULO            Link modulo
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
SNRM-RETRIES      SNRM retries allowed
SNRM-TIMEOUT      SNRM response wait timeout
SPEED             Link speed
STATION           Configure station parameters
XID-RETRIES       XID/TEST retries allowed
XID-TIMEOUT       XID/TEST response wait timeout
EXIT
SDLC # Config>
```

1.2. DISABLED

Syntax:

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

This is used to control the SDLC link operation. This prevents connections with any of the remote stations defined in the link from establishing. The interface is active by default.

· *DISABLED*

Syntax:

```
SDLC # Config> DISABLED
```

This is used to deactivate the SDLC link. This prevents connections with any of the remote stations defined in the link from establishing. The interface is activated by default.

Example:

```
SDLC # Config> DISABLED
SDLC # Config>
```

· *NO DISABLED*

Syntax:

```
SDLC # Config> NO DISABLED
```

This is used to activate the SDLC link and permit connections to be established with any of the defined remote stations.

Example:

```
SDLC # Config> NO DISABLED
SDLC # Config>
```

1.3. FRAME-SIZE

Syntax:

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

Configures the maximum size of the frames that can be transmitted and received in the data link. The permitted values are from 576 to 18.000. The default value 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.

Example:

```
SDLC # Config> FRAME-SIZE
Frame size in bytes (576 - 18000) [2048] ?
SDLC # Config>
```

1.4. HALF-DUPLEX

Syntax:

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

Configures the SDLC line to operate in the adequate duplex mode. By default, the line operates in full-duplex.

· *HALF-DUPLEX*

Syntax:

```
SDLC # Config> HALF-DUPLEX
```

Configures the SDLC line to operate in half-duplex mode.

Example:

```
SDLC # Config> HALF-DUPLEX
SDLC # Config>
```

· *NO HALF-DUPLEX*

Syntax:

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

Deactivates the half-duplex mode in the SDLC line and begins to operate in full-duplex mode.

Example:

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

1.5. IDLE

Syntax:

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

Configures the idle transmission state for the SDLC framing. Default is the flag option which emits continuous flags (7E hex) between frames.

· IDLE FLAG

Syntax:

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

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

Example:

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

· IDLE MARK

Syntax:

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

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

Example:

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

1.6. INTER-FRAME

Syntax:

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

Permits a delay to be inserted between transmitted frames. This command guarantees a minimum delay between frames making them compatible with older and slower devices at the other end which transmit in serial mode. The default value is 0.

This value passes in units of 5.12 microseconds.

Example:

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

1.7. LIST

Use 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
```

a) 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
          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:

Link configuration	The name and status of SDLC link stations in the router's configuration.
Default role	The link option used for link stations configured by default. You can modify this option using the add remote-secondary command.
Type	The type of link, either Multipoint or Point to point.
Duplex	Duplex configuration, HALF or FULL.
Modulo	The sequence number range to use on the link: MOD 8 (0-7) or MOD 128 (0-127).
Idle state	The bit pattern (FLAG or MARK) transmitted on the line when the interface is not transmitting data.
Encoding	Configures the SDLC transmission encoding scheme as NRZ (Non-Return to Zero) or NRZI (Non-Return to Zero Inverted).
Clocking	Interface clock, both external and internal.
Frame size	The maximum frame size that can be sent over the interface.
Speed	Link speed expressed in bits/secs when the clock is internal.
Cable	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.
Timers	All the timers listed below have a 100ms resolution.
XID/TEST response	The time the router waits for an XID or TEST response message before re-transmitting the XID or TEST frame. A value of 0 indicates that the router continues to retry indefinitely.
SNRM response	The maximum time the router waits for a UA response message before the station retransmits SNRM (E).
Poll response	The maximum time to wait for a response from any polled station before retrying.
Inter-poll delay	The amount of time the router (configured with a primary role) waits after receiving a response, before polling the next station.

RTS hold delay — The amount of time that the primary router waits when the RTS drops once the frame has been transmitted. This parameter is specific to half-duplex operations.

Inter-frame delay — The minimum amount of time (in 5.12 microsecond time units) that the router waits between transmitting frames.

Counters:

XID/TEST retry — The 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 continues to retry indefinitely.

SNRM retry — The 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.

Poll retry — The maximum number of times the router polls the station without receiving a response before timing out. A value of 0 indicates that the router continues to retry indefinitely.

b) 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  Tx 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   Tx 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:

Address. — The address of the SDLC link station.

Name — The name of the SDLC link station.

Status — The status of the SDLC link station, the possible states are ENABLED or DISABLED.

Max BTU — The 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.

Rx Window — The size of the receive window.

Tx Window — The size of the transmit window.

Role — The role of the remote link station, either SECONDARY (Type 2.0) or NEGOTIABLE (Type 2.1).

1.8. MODULO

Syntax:

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

Specifies the sequence numeration range to use in the link. This command is used to modify the reception and transmission window sizes. Default value is 8.

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

· MODULO 8

Syntax:

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

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

Example:

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

· MODULO 128

Syntax:

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

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

Example:

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

1.9. MULTIPOINT

Syntax:

```
SDLC # Config> [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. The default behavior is Point-to-Point.

· MULTIPOINT

Syntax:

```
SDLC # Config> MULTIPOINT
```

Specifies the link behavior as Multipoint. Through this you can connect and control various stations with the same link.

Example:

```
SDLC # Config> MULTIPOINT
SDLC # Config>
```

· *NO MULTIPOINT*

Syntax:

```
SDLC # Config> NO MULTIPOINT
```

Specifies the link behavior as Point-to-Point.

Example:

```
SDLC # Config> NO MULTIPOINT
SDLC # Config>
```

1.10. NAME

Syntax:

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

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

Example:

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

1.11. NRZI

Syntax:

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

Permits you to configure the SDLC transmission encoding scheme as NRZI (Non-Return to Zero Inverted) or as NRZ (Non Return to Zero). NRZ is the default.

· *NRZI*

Syntax:

```
SDLC # Config> NRZI
```

Configures the SDLC transmission encoding scheme as NRZI (Non-Return to Zero Inverted). This codification is valid when it is necessary to generate the transmission or reception clocks from the received frames. 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.

Example:

```
SDLC # Config> NRZI
SDLC # Config>
```

· *NO NRZI*

Syntax:

```
SDLC # Config> NO NRZI
```

Configures the SDLC transmission encoding scheme as NRZ (Non-Return to Zero).

Example:

```
SDLC # Config> NO NRZI
SDLC # Config>
```

1.12. POLL-DELAY

Syntax:

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

Configures the time period between each poll sent to the interface. This timer permits the transmission to be carried out more slowly or quicker and ensures that congestion is not caused in older devices which cannot support a high data flow. This time is expressed in seconds and fractions of seconds can be configured. The default value is 0.2 seconds.

Example:

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

1.13. POLL-RETRIES

Syntax:

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

Configures the number of times that the interface will try to poll the SDLC remote link station before deciding that the station is disconnected and closes the connection. The default value is 10.

Example:

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

1.14. POLL-TIMEOUT

Syntax:

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

Configures the amount of time the router waits for a poll response before timing out. This time is expressed in seconds and fractions of seconds can be configured. The default value is 0.5 seconds.

Example:

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

1.15. ROLE

Syntax:

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

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

· *ROLE NEGOTIABLE*

Syntax:

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

The interface is configured to negotiate its behavior under SDLC.

> ***Note: The SDLC interface only negotiates as primary. It does not negotiate as secondary.***

Example:

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

· *ROLE PRIMARY*

Syntax:

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

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

Example:

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

1.16. RTS-HOLD

Syntax:

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

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 and fractions of seconds can be configured. The default value is 0 (disabled).

Example:

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

1.17. SNRM-RETRIES

Syntax:

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

Configures the number of times an SNRM (E) is re transmitted without receiving a response before giving up. The default value is 6.

Example:

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

1.18. SNRM-TIMEOUT

Syntax:

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

Configures the time to wait for an UA response before re transmitting an SNRM (E). This time is expressed in seconds and fractions of seconds can be configured. The default value is 2.0 seconds.

Example:

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

1.19. SPEED

Syntax:

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

For internal clock. This command specifies the reception and transmission clock speed. The range of values is between 0 and 64 Kbps. Default value is 64000 bits/secs.

Example:

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

1.20. STATION

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-WINDOW <window> | TX-WINDOW <window>
```

Through the STATION command, you can create, modify and delete the possible stations that can connect to the SDLC interface.

· *STATION <address> DEFAULT*

Syntax:

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

This command is used to add or create a remote station and initializes with the default values. In cases where 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.

Example:

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

· *NO STATION <address>*

Syntax:

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

This command is used to suppress or eliminate a specified remote station (remote station address) from the SDLC configuration. You must specify the SDLC address in hexadecimal.

Example:

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

· *STATION <address> DISABLED*

Syntax:

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

Prevents the establishment of an SDLC session with the previously created remote end station specified by its hexadecimal address. By default the station is active.

Example:

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

· *STATION <address> NO DISABLED*

Syntax:

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

Re-admits the establishment of an SDLC session with the previously created and deactivated remote end station specified by its hexadecimal address.

Example:

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

· *STATION <address> FRAME-SIZE*

Syntax:

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

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

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 in accordance with the size of the link frame and emits 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>
```

· STATION <address> NAME

Syntax:

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

This command permits you to change the name of an SDLC remote station. A maximum of 8 characters are permitted.

Example:

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

· STATION <address> ROLE NEGOTIABLE

Syntax:

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

This command permits you to indicate that the SDLC remote station is capable of negotiating its behavior in the link. Default behavior is as secondary station.

Note: The SDLC interface can only negotiate as primary, it does not negotiate as secondary. Therefore the remote stations that negotiate behave as secondary stations.

Example:

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

· STATION <address> ROLE SECONDARY

Syntax:

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

This command permits you to indicate that the SDLC remote station is going to behave as a secondary station.

Note: The SDLC interface can only negotiate as primary, it does not negotiate as secondary. Therefore the remote stations that negotiate behave as secondary stations.

Example:

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

· STATION <address> RX-WINDOW

Syntax:

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

This command permits you to modify 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. In cases where this is 8, the default value is 7 and values permitted are between 1 and 7. In cases of 128, the default value is 127 and the permitted values are between 9 and 127.

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

Example:

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

· *STATION <address> TX-WINDOW*

Syntax:

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

This command permits you to modify 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. In cases where this is 8, the default value is 7 and values permitted are between 1 and 7. In cases of 128, the default value is 127 and the permitted values are between 9 and 127.

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

Example:

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

1.21. XID-RETRIES

Syntax:

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

Configures the maximum number of times that an XID frame or TEST is sent before giving up. The default value is 4.

Example:

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

1.22. XID-TIMEOUT

Syntax:

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

Configures the maximum permitted time to wait for a response for the XID frame or TEST before retransmitted it. This time is expressed in seconds and fractions of seconds can be configured. The default value is 2.0 seconds.

Example:

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

1.23. EXIT

Use the **EXIT** command to return to the previous prompt level.

Syntax:

```
SDLC # Config> EXIT
```

Example:

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

Chapter 3
Monitoring

1. Monitoring Commands

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

1. At the (*) prompt, enter **PROCESS 3** or just **P 3**. This takes you to the monitoring prompt +.

```
*P 3
+
```

2. At the (+) prompt, enter the **NETWORK** command, 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)	List the monitoring commands or lists 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	Permits 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.

1.1. ? (HELP)

Use the **?** (HELP) command to list the commands that are available from the current prompt level. You can also enter a **?** after a specific command name to list its options.

Syntax:

```
SDLC- #> ?
```

Example:

```
SDLC- #> ?
ADD
CLEAR Counters
DATA
DELETE
DISABLE
ENABLE
LIST
SET
TEST
EXIT
SDLC- #>
```

1.2. ADD

Use the **ADD** command to add a remote-secondary station. In cases where 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. The router is considered a primary station by default.

Syntax:

```
SDLC- #> ADD STATION <address>
```

Example:

```
SDLC- #> ADD STATION
Enter station address (in hex)[C5]?
Enter remote station name[SDLC_c5]?
Enter max packet size[2048]?
Enter receive window[7]?
Enter transmit window[7]?
Enable negotiable mode (Yes/No)?
SDLC- #>
```

Example:

```
SDLC- #> ADD STATION 5B
Enter remote station name[SDLC_5b]?
Enter max packet size[2048]?
Enter receive window[7]?
Enter transmit window[7]?
Enable negotiable mode (Yes/No)?
SDLC- #>
```

The meaning of each of the following fields is:

Enter station address	The remote station's SDLC address in the range 01-FE.
Enter remote station name	Name given to the SDLC station (maximum of 8 characters).
Enter max packet size	The maximum packet size that can be sent to or received from the remote link station. This value cannot be greater than that specified for the link with the **SET LINK FRAME-SIZE** command.
Enter receive window	The maximum number of frames that the router can receive without sending a response.
Enter transmit window	The maximum number of frames that the router can transmit without sending a response.
Enable negotiable mode	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.

1.3. CLEAR

Use the **CLEAR** command to delete the link counters and the remote stations counters.

Syntax:

```
SDLC- #> CLEAR ?
LINK
STATION <name> | <address>
SDLC- #>
```

Example:

```
SDLC- #> CLEAR LINK
SDLC- #>
```

Example:

```
SDLC- #> CLEAR STATION C5
SDLC- #>
```

1.4. DATA

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

Syntax:

```
SDLC- #> DATA <index>
SDLC- #>
```

1.5. DELETE

Use the **DELETE** command to suppress a specified remote-secondary station (remote station name or address). Use the SDLC **LIST STATION ALL** command to list the existing sessions.

Syntax:

```
SDLC- #> DELETE ?
STATION <name> | <address>
```

a) DELETE STATION

Example:

```
SDLC- #> DELETE STATION C1
SDLC- #>
```

1.6. DISABLE

Use the **DISABLE** command to prevent connections being created with an SDLC link station.

Syntax:

```
SDLC- #> DISABLE ?
LINK
STATION
```

a) DISABLE LINK

Prevents the establishment of SDLC sessions in any SDLC link stations on the interface.

When used in the monitoring environment, the disable command also terminates all existing connections on the link.

Example:

```
SDLC- #> DISABLE LINK
SDLC- #>
```

b) DISABLE STATION

Prevents the establishment of an SDLC session to the specified remote-secondary end station (remote secondary name or address).

When used in the monitoring environment, the disable remote-secondary command also terminates any existing SDLC sessions.

Example:

```
SDLC- #> DISABLE STATION C1
SDLC- #>
```

1.7. ENABLE

Use the **ENABLE** command to enable connections to SDLC link stations.

Syntax:

```
SDLC- #> ENABLE ?
LINK
STATION
```

a) ENABLE LINK

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

Example:

```
SDLC- #> ENABLE LINK
SDLC- #>
```

b) ENABLE STATION

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

Example:

```
SDLC- #> ENABLE STATION C1
SDLC- #>
```

1.8. LIST

Use the **LIST** command in the SDLC monitoring process to display statistics specific to the data link layer and the interface.

Syntax:

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

a) LIST LINK

Syntax:

```
SDLC- #> LIST LINK ?
CONFIGURATION
COUNTERS
```

· LIST LINK CONFIGURATION

Displays information for the SDLC interface. The information given is identical to that generated with the **LIST LINK** command 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
           RTS hold delay:       DISABLED
           Inter-frame delay:    DISABLED

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

· LIST LINK COUNTERS

Displays information for the SDLC counters since the last **Teldat Router** restart or since the last time the counters were restarted.

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

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

SDLC- #>
```

The meaning of each of the fields is as follows:

I-Frames	Total number of information frames received and sent.
I-Bytes	Total number of information bytes received and sent.
Re-Xmit	Total number of re transmitted frames.
UI-Frames	Total number of Unnumbered Information frames received and transmitted.
UI-Bytes	Total number of Unnumbered Information bytes received and transmitted.

RR Total number of RRs (Receive Ready) frames received and transmitted.

RNR Total number of RNRs (Receive Not Ready) frames received and transmitted.

REJ Total number of Rejects received and transmitted.

b) LIST STATION

Syntax:

```
SDLC- #> LIST STATION ?
ALL | <name> | <address> STATUS or ALL | <name> | <address>
<name> | <address> COUNTERS
```

· *LIST STATION ALL / <name> / <address> STATUS*

Syntax:

```
SDLC- #> LIST STATION ALL | <name> | <address> [STATUS]
```

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

Example:

```
SDLC- #> LIST STATION ALL

Address    Name      Status    Max BTU  Rx Window  Tx 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

Address    Name      Status    Max BTU  Rx Window  Tx Window     Role
-------  --------  ----------  -------  ---------  ---------  ----------
   C2    SDLC_C2    DISABLED      2005       7          7     NEGOTIABLE
SDLC- #>
```

The meaning of each of the fields 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 The 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.

The default is 521 bytes.

Rx Window The size of the receive window.

Tx Window The size of the transmission window.

· LIST STATION <name> / <address> COUNTERS

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

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 of the fields is as follows:

I-Frames Total number of information frames received and sent.

I-Bytes Total number of information bytes received and sent.

Re-Xmit Total number of re transmitted frames.

UI-Frames Total number of Unnumbered Information frames received and transmitted.

UI-Bytes Total number of Unnumbered Information bytes received and transmitted.

XID-Frames Total number of Exchange Identification frame received and transmitted.

RR Total number of Receive Ready frames received and transmitted.

RNR Total number of Receive Not Ready frames received and transmitted.

REJ Total number of Rejects received and transmitted.

TEST Total number of Test frames received and transmitted.

SNRM Total number of Set Normal Response Mode frames received and transmitted.

DISC Total number of Disconnect frames received and transmitted.

UA Total number of Unnumbered Acknowledgment frames received and transmitted.

DM Total number of Disconnected Mode frames received and transmitted.

FRMR Total number of Frames Reject received and transmitted.

1.9. SET

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

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

Syntax:

```
SDLC- #> SET ?
LINK
STATION
```

a) SET LINK

Syntax:

```
SDLC- #> SET LINK ?
MODULO
NAME
POLL
ROLE
RTS-HOLD
SNRM
TYPE
XID/TEST
```

· *SET LINK MODULO*

Syntax:

```
SDLC- #> SET LINK MODULO
Valid values are: 8 128
```

Dynamically changes the range of sequence numbers 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 0-127. Default is 8.

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.

· *SET LINK NAME*

Syntax:

```
SDLC- #> 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.

Example:

```
SDLC- #> SET LINK NAME
Enter link name: [LINK_1]?
SDLC- #>
```

· *SET LINK POLL*

Syntax:

```
SDLC- #> SET LINK POLL ?
DELAY
RETRY
TIMEOUT
```

SET LINK POLL DELAY

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

Example:

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

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.

Example:

```
SDLC- #> SET LINK POLL RETRY
Enter poll retry count (0 = forever)[10]?
SDLC- #>
```

SET LINK POLL TIMEOUT

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

Example:

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

· *SET LINK ROLE*

Dynamically configures the interface as an SDLC primary lnk 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. It does not negotiate as secondary.***

Syntax:

```
SDLC- #> SET LINK ROLE ?
NEGOTIABLE
PRIMARY
```

SET LINK ROLE NEGOTIABLE

Example:

```
SDLC- #> SET LINK ROLE NEGOTIABLE
SDLC- #>
```

SET LINK ROLE PRIMARY

Example:

```
SDLC- #> SET LINK ROLE PRIMARY
SDLC- #>
```

· *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.

Example:

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

· *SET LINK SNRM*

Syntax:

```
SDLC- #> SET LINK SNRM ?
RETRY
TIMEOUT
```

SET LINK SNRM RETRY

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

Example:

```
SDLC- #> SET LINK SNRM RETRY
Enter SNRM retry count (0 = forever) [6]?
SDLC- #>
```

SET LINK SNRM TIMEOUT

Dynamically changes the time to wait for an Unnumbered Acknowledgments (UA) response before re transmitting an SNRM.

Example:

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

· *SET LINK TYPE*

Syntax:

```
SDLC- #> SET LINK TYPE ?
MULTIPOINT
POINT-TO-POINT
```

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.

SET LINK TYPE MULTIPOINT

Example:

```
SDLC- #> SET LINK TYPE MULTIPOINT
SDLC- #>
```

SET LINK TYPE POINT-TO-POINT

Example:

```
SDLC- #> SET LINK TYPE POINT-TO-POINT
SDLC- #>
```

· *SET LINK XID/TEST*

Syntax:

```
SDLC- #> SET LINK XID/TEST ?
RETRY
TIMEOUT
```

SET LINK XID/TEST RETRY

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

Example:

```
SDLC- #> SET LINK XID/TEST RETRY
Enter XID and TEST retry count (0 = forever) [4]?
SDLC- #>
```

SET LINK XID/TEST TIMEOUT

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

Example:

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

b) SET STATION

Syntax:

```
SDLC- #> SET STATION ?
ADDRESS
MAX-PACKET
NAME
RECEIVE-WINDOW
ROLE
TRANSMIT-WINDOW
```

· *SET STATION ADDRESS*

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

Example:

```
SDLC- #> SET STATION C1 ADDRESS
Enter station address (in hex) [C1]? CE
SDLC- #>
```

· SET STATION MAX-PACKET

The maximum size of the frame that a remote secondary station can receive. The default size is 521 bytes.

Note that you cannot set the maximum packet size 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.

Example:

```
SDLC- #> SET STATION C1 MAX-PACKET
Enter max packet size [2048]? 521
SDLC- #>
```

· SET STATION NAME

This command assigns a name to a remote SDLC station. A maximum of 8 characters may be entered.

Example:

```
SDLC- #> SET STATION C1 NAME
Enter remote station name [SDLC_C1]? Brad
SDLC- #>
```

· SET STATION RECEIVE-WINDOW

The maximum number of frames that can be received by the router before sending a response.

Example:

```
SDLC- #> SET STATION C1 RECEIVE-WINDOW
Enter receive window [7]? 4
SDLC- #>
```

· SET STATION ROLE

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

Syntax:

```
SDLC- #> SET STATION <name> / <address> ROLE ?
NEGOTIABLE
SECONDARY
SDLC- #>
```

SET STATION <name> / <address> ROLE NEGOTIABLE

Example:

```
SDLC- #> SET STATION C1 ROLE NEGOTIABLE
SDLC- #>
```

SET STATION <name> / <address> ROLE SECONDARY

Example:

```
SDLC- #> SET STATION C1 ROLE SECONDARY
SDLC- #>
```

· SET STATION TRANSMIT-WINDOW

The maximum number of frames that the router can transmit before receiving a response frame.

Example:

```
SDLC- #> SET STATION C1 TRANSMIT-WINDOW 6
Enter transmit window [7]?
SDLC- #>
```

1.10. TEST

Transmits a specified 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 <name> | <address> <#frames> <frame-length>
```

Example:

```
SDLC- #> TEST STATION C1
Number of frames to send [1]? 5
Frame length [265]?
Starting echo test -- press any key to abort
5 frames sent, 5 frames received, 0 compare errors, 0 timeouts
SDLC- #>
```

The meaning of each field is as follows:

Number of frames	Total number of frames to send.
Frame length	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.

1.11. EXIT

Use the **EXIT** command to return to the previous prompt level.

Syntax:

```
SDLC- #> EXIT
```

Example:

```
SDLC- #> EXIT
+
```

2. STATISTICS DISPLAY IN SDLC INTERFACES

You can use the **DEVICE** command to display statistics for SDLC devices without entering the SDLC monitoring module. To do this, enter the **DEVICE** command and an interface number at the (+) prompt, as shown:

Example:

```
+ DEVICE 3
                                  Auto-test  Auto-test  Maintenance
Ifc   Interface  CSR       Vect  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:

Ifc	Interface number assigned by software during initial configuration.
Interface	Type of interface.
CSR	Memory location of the control status register for the SDLC interface.
Vect	Interruption vector.
Auto-test valids	Number of times the SDLC interface passed its self-test.
Auto-test failures	Number of times the SDLC interface was unable to pass its self-test.
Maintenance failures	Number of maintenance failures.
Driver type	The interface is an RS-232 DCE.
V.24 circuit	Circuits in use on the V.24 circuit.
Nicknames	Names for the V.24 circuits.
State	State of V.24 circuits, signals, and pin assignments (ON or OFF).
Line speed	Normal speed for the line configured for the SDLC interface.
Last port reset	How long ago the port was last reset.
Input frame errors	Input frame error type (CRC error, too short, aborted, alignment, too long, DMA/FIFO overrun) and the total number of errors that have occurred.
Output frame counters	Total number of DMA/FIFO overruns and output aborts transmitted.