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Configuration of the CDC Protocol

This chapter discusses configuration of the CDC protocol on a BANDIT device's serial ports. See the following sections:

Note: See the Protocols Module for a full list of protocols.

9.1 CDC Protocol

The Control Data Corporation (CDC) Protocol can be used in a Supervisory Control and Data Acquisition (SCADA) network. CDC is used principally to control Remote Terminal Units (RTUs) in utility networks. The CDC protocol has a variable number of bits per transmission block.

Note: For information about working with RTUs, see *Support for SCADA RTUs*.

The BANDIT products support CDC Type I and Type II. The BANDIT encapsulates CDC transmissions inside Frame Relay frames. CDC is configured on a serial port and is routed, via the Global Paths Table, over Frame Relay.

9.2 CDC Data Transport

As shown in Table 9-1:

- When the serial port is configured as DCE:
  - CDC transports (as input) the state of Transmitted Data (TD) while Request to Send (RTS) is on.
  - CDC transports (as output) the state of Received Data (RD) while Carrier Detect (CD) is on.
- When the serial port is configured as DTE:
  - CDC transports (as input) the state of Transmitted Data (TD) while Request to Send (RTS) is on.
  - CDC transports (as output) the state of Transmitted Data (TD) while Request to Send (RTS) is on.

Top Doc
Doc List
Module TOC

Table 9-1. CDC Data Transport

Serial Port	On	Input	Output
DCE	RTS	TD	
	CD		RD
DTE	RTS	TD	TD

9.3 Configuring the CDC Protocol

1 Press **Enter** to get the BANDIT device's attention.

Note: For login details, see *Starting the ELIOS Software*.

❖ After a successful login, the welcome screen is displayed.

```
WELCOME TO ENCORE Product, ELIOS Version:16055.0206
Copyright ENCORE NETWORKS Inc., 2002-2006.
```

❖ Then the Main Menu is displayed.

```
Main Menu
----------
1) QuickStart Config Builder

2) Typical Configurations
3) Advanced Configurations
4) Tools

V) View Current Unit Status
L) Load Factory Defaults
P) Load Plug and Play Defaults
W) Write Configuration
R) Reset Unit
X) eXit Session
S) Statistics
Y) sYstem Administration

Enter Choice :
```

2 On the Main Menu, select **Advanced Configurations**.

❖ The Advanced Configurations Menu is displayed.

```
Advanced Configurations
-----------------------
1) Physical Configurations
2) Data Configurations
3) Local Address
4) Routing
5) Global Paths

Enter Choice :
```

3 On the Advanced Configurations Menu, select **Data Configurations**.

❖ The Logical Port Protocol Menu is displayed.

- Sample BANDIT III screen

```
Logical Port Protocol      Attached To                  Port Interfaces
-------------------------------------------------------------------------
C) Comm/Supervisor        Comm/Sup                      DCE
M) Point-to-Point         MODEM                         INTERNAL
L) EtherNet               DHCP Server  192.168.10.1    ETHERNET
W) EtherNet               DHCP Client  0.0.0.0         ETHERNET
S) Point-to-Point         SERIAL                        V.24/RS232 DTE
O) UNDEFINED              E&M
E) Point-to-Point         EXPANSION                     CSU/DSU
B) RDU/IDU Ports...
1) Ports 1 to 20
2) Ports 21 to 40
3) Ports 41 to 60
4) Ports 61 to 75

Enter Port :
```

- Sample VSR-1200 screen

```
Logical Port Protocol
---------------------
C) Comm/Supervisor        Comm/Sup                      DCE
M) Point-to-Point         MODEM                         INTERNAL
L) EtherNet               No DHCP                      ETHERNET
W) EtherNet               DHCP Client  0.0.0.0         ETHERNET
D) EtherNet               No DHCP                      ETHERNET
A) RDU Ports...
B) RDU Ports...
P) More Ports...

Enter Port :
```

Note: The VSR-1200's serial ports are located on its RDUs. Because the VSR-1200 can support two RDUs, the sets of ports for each RDU are listed on separate lines.

4 On the Logical Port Protocol Menu, select a serial port.

❖ If you selected a serial port other than **RDU Ports**, the serial port's Logical Port Attribute Menu is displayed. Go to Step 6.

Top Doc
Doc List
Module TOC

```
Logical Port Attribute Menu
---------------------------
1) Protocol         : Point-to-Point
2) Global Paths
3) Undefine Current Logical Port

Enter Choice :
```

❖ If you selected **RDU Ports**, the following menu is displayed.

```
Logical Port Protocol      Attached To                  Port Interfaces
-------------------------------------------------------------------------
1) UNDEFINED              RDU 1 Port 1
2) UNDEFINED              RDU 1 Port 2
3) UNDEFINED              RDU 1 Port 3
4) UNDEFINED              RDU 1 Port 4
5) UNDEFINED              RDU 1 Port 5
6) UNDEFINED              RDU 1 Port 6
7) UNDEFINED              RDU 1 Port 7
8) UNDEFINED              RDU 1 Port 8
9) UNDEFINED              RDU 1 Port 9
A) UNDEFINED              RDU 1 Port 10
B) UNDEFINED              RDU 1 Port 11
C) UNDEFINED              RDU 1 Port 12

Enter Port :
```

5 Select an RDU port.

❖ The port's Logical Port Attribute Menu is displayed.

```
Logical Port Attribute Menu
---------------------------
1) Protocol         : CDC
2) Global Paths
3) Undefine Current Logical Port

Enter Choice :
```

6 Do one of the following:

a If the port's protocol is **CDC**, select **Protocol**.

```
Logical Port Attribute Menu
---------------------------
1) Protocol         : CDC
2) Global Paths
3) Undefine Current Logical Port

Enter Choice :
```

Top Doc
Doc List
Module TOC

❖ The CDC Parameters Menu is displayed. Go to Step 9.

```
CDC Parameters : RDU 1 Port 1
-------------------------------
1) CDC Type : TRANSPARENT
2) CDC Mode : NONE
3) Spoof Timeout : 300 (ms)
4) Speed : 1200
5) GPT Name :
6) Priority : Immediate
7) Connection ID :  1
8) Max Buffer Length : 0(Default)
9) Delay : 0 (ms)
A) Byte Stuffing : 4 (8-bit characters)
B) Bit Stuffing : Do not stuff

Enter Choice :
```

b If the port's protocol is **Undefined**, go to Step 7.

```
Logical Port Attribute Menu
---------------------------
1) Protocol         : UNDEFINED
2) Global Paths
3) Undefine Current Logical Port

Enter Choice :
```

c If the port uses a protocol other than CDC, select **Undefine Current Logical Port**.

```
Logical Port Attribute Menu
---------------------------
1) Protocol         : Frame Relay
2) Global Paths
3) Undefine Current Logical Port

Enter Choice : 3
```

❖ The Logical Port Attribute Menu is redisplayed, with the protocol undefined. Continue to Step 7.

```
Logical Port Attribute Menu
---------------------------
1) Protocol         : UNDEFINED
2) Global Paths
3) Undefine Current Logical Port

Enter Choice :
```

Top Doc
Doc List
Module TOC

7 On the Logical Port Attribute Menu, select **Protocol**.

❖ The Logical Port Protocol Selection Menu is displayed.

```
Logical Port Protocol Selection Menu
------------------------------------
1) Frame Relay
2) Point-to-Point (PPP)
3) PPPoE(PPP over Ethernet)
4) MultiLink PPP
5) X.25+
6) SDLC Routing
7) SDLC 1490 Configuration
8) Bit Sync Encapsulation
9) Asynchronous Encapsulation
A) Serial Line IP (SLIP)
B) Async Burroughs Poll/Select
C) Sync Burroughs Poll/Select
D) Bisync
E) Telnet Terminal
F) XXX PAD
G) X.42 Spoofing
H) Lottry Host
I) Lottry Terminal
J) CDC

Enter Choice :
```

8 On the Logical Port Protocol Selection Menu, select **CDC**.

❖ The CDC Parameters Menu is displayed.

```
CDC Parameters : RDU 1 Port 1
-------------------------------
1) CDC Type : TRANSPARENT
2) CDC Mode : NONE
3) Spoof Timeout : 300 (ms)
4) Speed : 1200
5) GPT Name :
6) Priority : Immediate
7) Connection ID :  1
8) Max Buffer Length : 0(Default)
9) Delay : 0 (ms)
A) Byte Stuffing : 4 (8-bit characters)
B) Bit Stuffing : Do not stuff

Enter Choice :
```

9 Configure parameters as described in Step 10 through Step 20.

10 On the CDC Parameters Menu, select **CDC Type**.

❖ The CDC Type Menu is displayed.

```
CDC Type : SERIAL
------------------------
1) Transparent
2) Fragmented

Enter Choice :
```

Note: **Transparent** and **Fragmented** refer to the way the CDC bits are packaged for transmission.

a If you want the CDC bits to be transmitted as they are, without being regrouped or otherwise changed, select **Transparent**.

❖ The CDC bit transmissions will remain intact inside Frame Relay. The CDC Parameters Menu is redisplayed, showing the selection.

b If it is okay for the CDC transmissions to be fragmented and reassembled, select **Fragmented**.

❖ The CDC bit transmissions will be repackaged to fit inside the Frame Relay frames. The CDC Parameters Menu is redisplayed, showing the selection.

11 Select **CDC Mode**.

❖ The CDC Mode Menu is displayed. This allows the BANDIT device to emulate a terminal device (also called spoofing as a terminal device).

Note: Spoofing does not send data transparently. To send transparent transmissions, the CDC Mode must be **None**.

```
CDC Mode : SERIAL
------------------------
1) Master
2) Slave
3) None

Enter Choice :
```

a If you want this BANDIT device to emulate a **Master** (host) terminal or **Slave** (client) terminal, select that option.

❖ The BANDIT spoofs the selected role. The CDC Parameters Menu is redisplayed, showing the selection.

b If you do not want this BANDIT device to spoof as a terminal unit, select **None**.

❖ The BANDIT device will not spoof CDC transmissions. The CDC Parameters Menu is redisplayed, showing the selection.

12 On the CDC Parameters Menu, select **Spoof Timeout**.

This parameter applies only to a device acting as a master for spoofed transmissions.

❖ The following prompt is displayed.

```
Enter wait time in ms(10,20,..ms)[300]:
```

a Type the number of milliseconds the BANDIT device waits for a response before the connection times out.

❖ The CDC Parameters Menu is redisplayed, showing the selected value.

13 On the CDC Parameters Menu, select **Speed**.

❖ The Menu to Configure Asynchronous Clock Speed is displayed.

```
Configure Asynchronous Clock Speed
----------------------------------
1) 50
2) 110
3) 200
4) 300
5) 600
6) 1200
7) 2400
8) 4800
9) 9600
A) 19200
B) 38400
C) 48000
D) 57600
E) 115200
F) 230400

Enter Choice :
```

a Select the proper speed for the connection.

❖ The CDC Parameters Menu is redisplayed, showing the selected speed.

14 On the CDC Parameters Menu, select **GPT Name** (Global Path Type Name).

❖ The following prompt is displayed.

```
Enter Path Name (1 to 15 Characters): cdc
```

a Type a name for the path—for example, **cdc**.

Note: Path names are case-sensitive. **CDC**, **Cdc**, and **cdc** are considered different names. For details of global paths, see *Defining Global Paths*.

❖ One of the following occurs:

- If the Global Path exists, it is accepted and the CDC Parameters Menu is redisplayed. Go to Step 15.
- If the Global Path does not exist, the following message is displayed.

```
Path Name Does Not Exist In GPT Table.

To Add Global Path Entry, Press 'Y'or <enter>.  Press Escape Otherwise.
```

b To create the path, press **Y**.

❖ The Menu of Global Path Types is displayed.

```
Global Path Types
-----------------
1) X25 SVC
2) X25 PVC
3) Frame Relay PVC
4) Port Type
5) IP/UDP
6) FR Multicast Path

Enter Choice : (1 to 6)[1] :
```

c The BANDIT products carry the CDC protocol over Frame Relay. Select **Frame Relay PVC**.

❖ The following prompt is displayed.

- BANDIT III screen

```
Enter Port Number  (S(SERIAL),E(EXPANSION),R = IDU/IDU Ports,1-75):
```

- VSR-1200 screen

```
Enter Port Number  (R = RDUs Ports,1-480):
```

d Type the port to associate with this path—for example, one of the following—and press the **Enter** key:

◆ the Serial port
◆ the Expansion port (if the expansion slot holds a card with a serial port)
◆ an RDU or IDU port
◆ a Logical Port

❖ One of the following prompts is displayed:

◆ If you indicated the Serial port, the Expansion port, or a Logical Port, the following prompt is displayed. Go to Substep f.

```
Enter FR DLCI Number (16-1007) :
```

- If you indicated an RDU port or an IDU port, the following prompt is displayed.

```
Enter IDU/RDU Port:
```

e Type the RDU port number or the IDU port number, and press **Enter**.

❖ The following prompt is displayed.

```
Enter FR DLCI Number (16-1007) :
```

f Type the Frame Relay DLCI to associate with this path, and press **Enter**.

Note: Get DLCI assignments from your Frame Relay carrier.

❖ The following message is displayed.

```
GPT Entry added.
```

❖ Then the CDC Parameters Menu is redisplayed.

Note: If the Logical Port Attribute Menu is displayed, select **Protocol** to return to the CDC Parameters Menu.

```
Logical Port Attribute Menu
---------------------------
1) Protocol         : cdc
2) Global Paths
3) Undefine Current Logical Port

Enter Choice : 1
```

If a higher-level menu is displayed, select the appropriate item on the menu to return to serial port's Logical Port Attribute Menu; then select **Protocol** to return to the CDC Parameters Menu.

```
CDC Parameters : SERIAL
------------------------------
1) CDC Type : TRANSPARENT
2) CDC Mode : NONE
3) Spoof Timeout : 300 (ms)
4) Speed : 1200
5) GPT Name :
6) Priority : Immediate
7) Connection ID :  0
8) Max Buffer Length : 0(Default)
9) Delay : 0 (ms)
A) Byte Stuffing : 4 (8-bit characters)
B) Bit Stuffing : Do not stuff

Enter Choice : 6
```

15 On the CDC Parameters Menu, select **Priority**.

❖ The Menu to Enter Priority is displayed.

```
Enter Priority ( default = High )
    for outgoing traffic on DLCI 65535, port: SERIAL
          (1) Immediate
          (2) High
          (3) Medium
          (4) Low
Enter Choice :
```

Note: You must select a priority on this menu. If you press the **Escape** key to exit the menu, the following message is displayed.

```
*** ILLEGAL Choice ***
```

a Select the priority for the CDC packets.

❖ A message similar to the following is displayed.

```
Priority set to High for DLCI 65535 on port: SERIAL
```

❖ Then the CDC Parameters Menu is redisplayed.

16 On the CDC Parameters Menu, select **Connection ID**.

❖ The following prompt is displayed.

```
Enter Connection Id (1 to 256):
```

This parameter allows you to select the port on the remote unit to receive transmissions of CDC traffic. You can use this option to allow multiple CDC transmission paths over a single Frame Relay connection.

a Type a number to identify the port on the remote device, and press **Enter**.

❖ The CDC Parameters Menu is redisplayed.

17 On the CDC Parameters Menu, select **Max Buffer Length**.

❖ The following prompt is displayed.

```
Please Enter max buffer size in bytes, (0 = port default, 2047 = Whole Frame)[0]:
```

The maximum buffer length is the fragment size.

a Type the size for the maximum buffer (or type **0** to send the whole frame, regardless of size), and press **Enter**.

❖ The CDC Parameters Menu is redisplayed.

18 On the CDC Parameters Menu, select **Delay**.

❖ The following prompt is displayed.

```
Enter wait time in ms( 0 = no wait, 65535 = till end, 1,2,..ms)[0]:
```

In the CDC protocol, **Delay** is used if the CDC type is **Fragmented**. It refers to the time to wait before sending fragments.

The **Delay** values have the following meanings:

- The value **0** means to send a fragment immediately.
- The value **65535** means to wait for all fragments, then to send the transmission.
- Other values indicate the number of milliseconds to wait while collecting fragments to send.

a Type the time to wait while collecting fragments, and press **Enter**.

❖ The CDC Parameters Menu is redisplayed.

Top Doc
Doc List
Module TOC

```
CDC Parameters : SERIAL
------------------------------
1) CDC Type : TRANSPARENT
2) CDC Mode : NONE
3) Spoof Timeout : 300 (ms)
4) Speed : 1200
5) GPT Name :
6) Priority : High
7) Connection ID :  0
8) Max Buffer Length : 0(Default)
9) Delay : 0 (ms)
A) Byte Stuffing : 4 (8-bit characters)
B) Bit Stuffing : Do not stuff

Enter Choice : A
```

19 On the CDC Parameters Menu, select **Byte Stuffing**.

In the BANDIT's CDC protocol, byte stuffing refers to post-transmission delay (time delay of output); it marks the end of a transmission.

❖ The following prompt is displayed.

```
Enter Bytes to Stuff( 0 = no stuffing, 1,2,..255, characters)[4]:
```

a Do one of the following:

- To use byte stuffing in CDC transmissions, type the number of bytes (characters) to send after each transmission, and press **Enter**.
- To transmit without byte stuffing, type **0** and press **Enter**.

❖ The CDC Parameters Menu is redisplayed.

```
CDC Parameters : SERIAL
------------------------------
1) CDC Type : TRANSPARENT
2) CDC Mode : NONE
3) Spoof Timeout : 300 (ms)
4) Speed : 1200
5) GPT Name :
6) Priority : High
7) Connection ID :  0
8) Max Buffer Length : 0(Default)
9) Delay : 0 (ms)
A) Byte Stuffing : Do not stuff
B) Bit Stuffing : Do not stuff

Enter Choice : B
```

20 On the CDC Parameters Menu, select **Bit Stuffing**.

Top Doc
Doc List
Module TOC

In the BANDIT's CDC protocol, bit stuffing refers to pre-transmission delay (time delay of input); it marks the beginning of a new transmission.

❖ The following prompt is displayed.

```
Enter Bytes to Stuff( 0 = no stuffing, 1,2,..255, bits)[0]:
```

a Do one of the following:

- To use bit stuffing in the CDC transmissions, type the number of bits to send before each transmission, and press **Enter**.
- To transmit without bit stuffing, press **0** and press **Enter**.

❖ The CDC Parameters Menu is redisplayed.

21 When you have finished configuring the CDC Parameters Menu, press the **Escape** key until you reach the Advanced Configurations Menu.

22 If you wish to view the Global Paths Table, on the Advanced Configurations Menu, select **Global Paths**.

❖ The Global Paths Table is displayed.

Note: In the following sample display, "RDU Port 3" refers to IDU Port 3 on a BANDIT III with IDU ports.

```
Entry  Path Name    PathType  Port        DLCI
-----  ----------   --------  ------      -----
  1     cdc         FR PVC    RDU Port 3    16

 Entry  Path Name   PathType  Port
 -----  ----------  --------  ----
  2     DMZ         PORT TYPE DMZ
  3     LAN         PORT TYPE LAN
  4     WAN         PORT TYPE WAN
  5     MODEM       PORT TYPE MODEM

Add, Modify, or Delete an Entry? (Enter A, M, or D):
```

23 Do one of the following:

a If you wish to add a record, type **a** and follow the screen instructions.

b If you wish to modify a record, type **m** and follow the screen instructions.

c If you wish to delete a record, type **d** and follow the screen instructions.

d When you have finished with the Global Paths Table, press the **Escape** key.

❖ The following message is displayed.

```
Global Path Table Handling Complete
```

❖ Then the Advanced Configurations Menu is redisplayed.

24 When you have finished reviewing the CDC configuration, press the **Escape** key until you reach the Main Menu.

25 On the Main Menu, to save the configuration, select **Write Configuration**.

❖ The CDC configuration is saved.

Note: For details, see *Saving (Writing) a Configuration*.

26 To use the new configuration, select **Reset Unit**.

❖ The BANDIT device uses the saved configuration.

Note: For details, see *Resetting the Device*.