

## Chapter 13

# Configuring DS0 Bundles

The NMC-RX application supports DS0 bundles on the following modules:

CT3, CT1, and CE1

Topic	Page
Overview	155
Creating DS0 Bundles	157

### Overview

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DS0 bundles are aggregates of digital signal level 0 (DS0) timeslots that define the bandwidth available to carry data over a fractional T1 (FT1) channel. The bundle can have 1 to 31 DS0 timeslots.

T1 networks transmit data at 1.544 Kbps. The digital signal supporting the T1 carrier is digital signal level 1 (DS1). Each DS1 is an aggregate of 24 or 31 DS0s. DS0 is used in transmitting digital signals at 64 Kbps over a single channel on a T1 carrier. See Table 39 for a comparison of the three modules that can be configured with DS0 bundles.

**Table 39: Digital Signals**

Module Type	DS3s	DS1s	DS0s
CT3	3	28	24
CT1	0	24	24
CE1	0	20	31



**NOTE:** The DS0s column indicates the number of DS0 bundle timeslots for each DS1.

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## Terminology

Table 40 provides information about some of the terms used in this discussion of digital signals and T-carriers.

**Table 40: Terminology**

Term	Meaning
Bandwidth	Transmission capacity of the network medium, measured in bits per second (bps); the difference between the highest and lowest frequencies in a given range
Carrier	Specified frequency that can be modulated to convey information
Digital signal	Signal in which information is represented by discrete states (rather than by a continuous stream as in analog signals)
Framing type	Method for distinguishing digital channels that have been time-division multiplexed together
HDLC	High-Level Data Link Control (HDLC); a bit-oriented synchronous data link-layer protocol. It specifies a data encapsulation method on synchronous serial links using frame characters and checksums.
Ones density	Insertion of a binary 1 whenever eight successive zeros (0s) are transmitted to maintain the presence (referred to as density) of 1s in a binary string

## T-Carriers

T-carriers are digital wide-area network (WAN) data transmission facilities. This section discusses the T-carriers T1 and T3.

### T1

T1 transmits digital signal level 1 (DS1) formatted data at 1.544 Mbps through the telephone-switching network, using AMI or B8ZS coding. The corresponding European (CCITT) carrier is E1 with a data rate of 2.048 Mbps. Fractional T1, a subset of T1, provides T1 benefits at less cost by allowing you to use a fraction of a T1 line's capability. (This fraction is a DS0 bundle.)

### Fractional T1

Fractional T1 (FT1) is a subchannel on a T1 line. It is a fraction of a T1's data-carrying capacity. A T1 line contains 20, 24, or 28 channels, each with a data transfer capacity of 64 Kbps.

FT1 allows you to rent any number of DS0 timeslots in each channel. The transmission method and speed of transfer remain the same. Overhead bits and framing are still used, but the channels that are not rented simply contain no data. DS0 bundling is the method used to define the bandwidth for an FT1 subchannel.

### T3

T3 transmits digital signal level 3 (DS3) formatted data at 44.736 Mbps through the telephone-switching network. The corresponding European (CCITT) carrier is E3 with a data rate of 34.368 Mbps. T3 transmits only over a CT3 module.

## Digital Signal Levels

Digital signal levels define the data rate (often referred to as speed) of transmitting data over a single channel. This section discusses DS0, DS1, and DS3 digital signal levels.

### DS0

Digital signal level 0 (DS0) is the basic unit used in transmitting digital signals at 56 Kbps or 64 Kbps over a single channel on a T1 carrier; 64 Kbps is currently the standard rate. However, you may need to use 56 Kbps for older devices.

### DS1

Digital signal level 1 (DS1) is a framing specification used in transmitting digital signals at 1.544 Mbps on a T1 carrier (in the United States) or at 2.108 Mbps on an E1 carrier (in Europe).

### DS3

Digital signal level 3 (DS3) is a framing specification used in transmitting digital signals at 44.736 Mbps on a T3 carrier (in the United States) or at 34.368 Mbps on an E3 carrier (in Europe).

## Creating DS0 Bundles

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To set the bandwidth you want on an FT1 subchannel, you can aggregate DS0 timeslots into bundles of different sizes. Any bundle of DS0s takes on the characteristics of a single fast T1 channel.

To create a DS0 bundle:

1. In the Instance Explorer, select the module you want to configure (CT1, CE1, or CT3), and then:

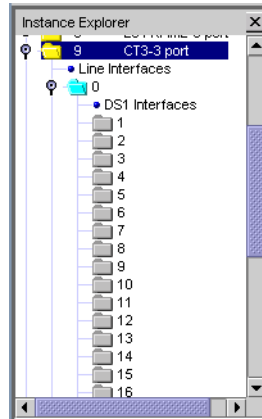
For a CT1 or CE1 module, double-click the module.

For a CT3 module, navigate down to the DS1 Interfaces level.



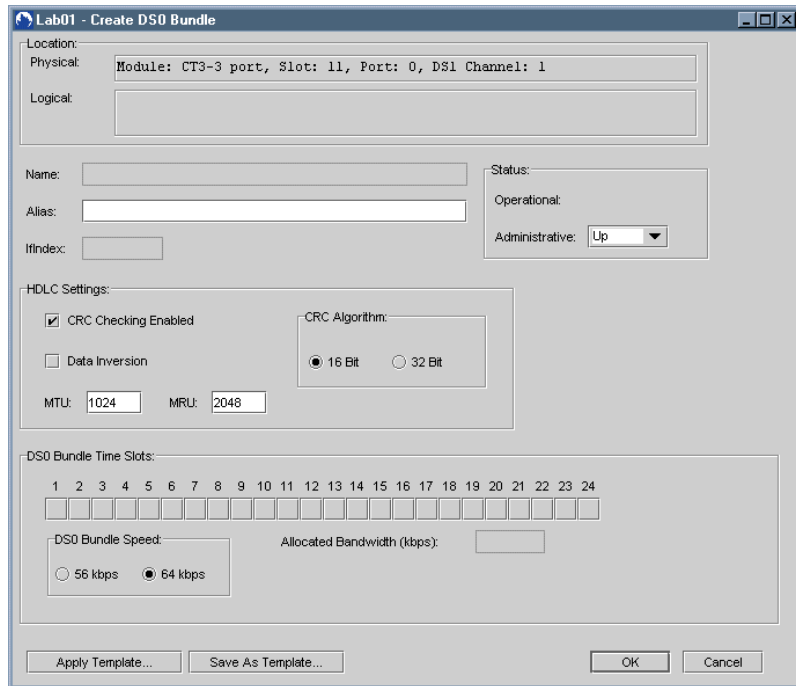
**NOTE:** The CT1 and CE1 modules do not have line interfaces.

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2. Select the DS1 interface for which you want to create a DS0 bundle, select Create, right-click, and click DS0 Bundle.

The Create DS0 Bundle dialog box appears. The following example is for a CT3 module. You can also create DS0 bundles for the CT1 and CE1 modules.



3. Set the parameters. See Table 41.

**Table 41: DS0 Bundle Parameters**

Parameter	Description
Name	Identifies the interface; generated automatically
Alias	Description of the interface; 0–15 characters; default: blank
IfIndex	Identifies the interface on the particular line interface; generated automatically
Operational	Current operational status of the interface
Administrative	Desired status of the interface: Up/Down; default: Up
HDLC Settings	Default template settings are automatically applied
CRC Checking Enabled	Cyclical redundancy check (CRC); an error-checking technique
Data Inversion	Provides <i>ones density</i> , a method for inserting 1s in the data stream. If you enable data inversion on your device, be sure it is also turned on at the other end of the line on the destination device.
CRC Algorithm	Cyclical redundancy check (CRC) can be set to 16 bits or 32 bits; default 16 bits
MTU	Maximum transmission unit; the largest size allowed for a data packet transmitted over a transmission line; range 4–32763; default 1024 bits
MRU	Maximum receive unit; the largest size allowed for a data packet received over a transmission line; range 4–32763; default 2048
DS0 Bundle Time Slots	24 per DS1 channel on a CT3 or CT1 module; 31 per DS1 channel on a CE1 module; use to configure a T1 subchannel
DS0 Bundle Speed	Speed you select determines the allocated bandwidth for each timeslot; default 64 Kbps
Allocated Bandwidth	Result of the number of DS0 bundle timeslots selected (1–31) times the DS0 bundle speed selected (56/64 Kbps)
Apply Template...	See <i>Chapter 9, Using Templates</i> .
Save As Template...	

- Configure the DS0 Bundle Time Slots parameters by clicking each timeslot that you want to comprise the DS0 bundle.

A check mark appears in each selected timeslot, and the slot changes to green.

To make up the bundle for the CT3 and CT1 modules, you can select any number of timeslots (1–24) in any sequence. For the CE1 module, you can select any number of timeslots (1–31) in any sequence. For example:

DS0 Bundle Time Slots:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

XXXX✓✓✓✓XXX

DS0 Bundle Speed:  56 kbps  64 kbps

Allocated Bandwidth (kbps): 256

In this example, the timeslots selected are 4, 5, 6, and 7. These slots make up the DS0 bundle. The bundle defines the FT1 subchannel's bandwidth for transmitting data. If you choose 64 Kbps as the DS0 bundle's speed, the bundle provides the FT1 with 384 Kbps allocated bandwidth: 6 timeslots x 64 Kbps. Any timeslots marked with X are unavailable for the bundle you are creating because they are in use by another bundle.