

## Chapter 13

# Configuring DS0 Bundles

This chapter describes how to configure DS0 bundles on the following modules:

- CT3
- CT1
- CE1

This chapter contains the following sections:

- Overview on page 171
- Creating DS0 Bundles on page 174

### Overview

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The NMC-RX application supports DS0 bundles on the following modules: CT3, CT1, and CE1.

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 that supports the T1 carrier is digital signal level 1 (DS1). Each DS1 is an aggregate of 24 or 31 DS0s. DS0 transmits digital signals at 64 Kbps over a single channel on a T1 carrier. See Table 40 for a comparison of the three modules that you can configure with DS0 bundles. The DS0 column indicates the number of DS0 bundle timeslots for each DS1.

**Table 40: Digital Signals**

Module Type	DS3	DS1	DS0
CT3	3	28	24
CT1	0	24	24
CE1	0	20	31

## Terminology

Table 41 describes some of the terms used in this discussion of digital signals and T-carriers.

**Table 41: Terminology**

Term	Description
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 are time-division multiplexed together
HDLC	High-Level Data Link Control (HDLC); a bit-oriented synchronous data link-layer protocol, which 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 WAN data transmission facilities. The following sections describe 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 Alternate Mark Inversion (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. FT1 is a fraction of the data-carrying capacity on a T1. A T1 line contains 20, 24, or 28 channels, each with a data transfer capacity of 64 Kbps.

FT1 lets you 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 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. The following sections provide information about DS0, DS1, and DS3 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

To set the bandwidth for 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.

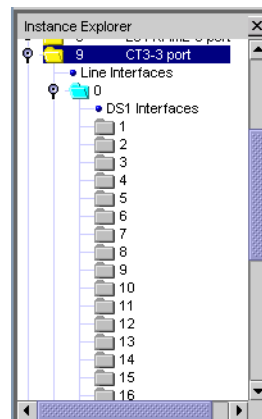
To create a DS0 bundle:

1. In the Instance Explorer, select the module that you want to configure (CT1, CE1, or CT3), and then:
  - For a CT1 or CE1 module, double-click the module.
 

A list of DS1 interfaces appears for the module.
  - For a CT3 module, navigate down to the DS1 Interfaces level.



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



2. For a CT3 module, select the DS1 interface for which you want to create a DS0 bundle, select Create, right-click, and select DS0 Bundle.

The Create DS0 Bundle dialog box appears. The following example is for a CT3 module.

The screenshot shows the 'Lab01 - Create DS0 Bundle' configuration window. The 'Location' section has 'Physical' set to 'Module: CT3-3 port, Slot: 11, Port: 0, DS1 Channel: 1'. The 'Name', 'Alias', and 'Ifindex' fields are empty. The 'Status' section has 'Operational' checked and 'Administrative' set to 'Up'. The 'HDLC Settings' section has 'CRC Checking Enabled' checked, 'Data Inversion' unchecked, and 'CRC Algorithm' set to '16 Bit'. The 'MTU' is 1024 and 'MRU' is 2048. The 'DS0 Bundle Time Slots' section shows 24 slots, all of which are empty. The 'DS0 Bundle Speed' is set to '64 kbps' and 'Allocated Bandwidth (kbps)' is empty. At the bottom, there are buttons for 'Apply Template...', 'Save As Template...', 'OK', and 'Cancel'.

3. Set the parameters (Table 42).

**Table 42: DS0 Bundle Parameters**

Parameter	Description
Name	Identifier for the interface; generated automatically
Alias	Description of the interface; 0–15 characters; default: blank
IfIndex	Identifier for 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	Number of DS0 bundle timeslots; 24 per DS1 channel on a CT3 or CT1 module; 31 per DS1 channel on a CE1 module; use to configure a T1 subchannel

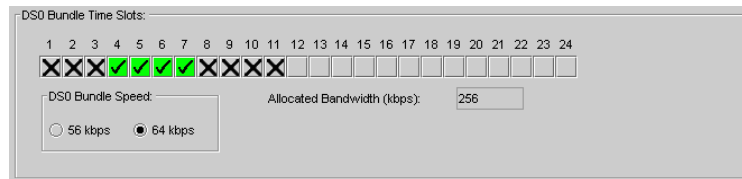
**Table 42: DS0 Bundle Parameters (continued)**

Parameter	Description
DS0 Bundle Speed	Speed that 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...	

- To configure the DS0 Bundle Time Slots parameters, click each timeslot that you want to include in the DS0 bundle.

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

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



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