CHAPTER 5

System Reports

The system reports communicate the operating and call processing status of the system to the host. These reports fall into three categories—configuration control, system status, and resource control.

The system reports consist of a string of bytes immediately following the Network Header. Refer to Chapter 3, “Message Structure Overview.” Although the format of the reports varies, they all begin with a Function Identifier. Table 5-1 shows the report type and Function ID for each system report.

Table 5-1 System Reports and Function Identifiers

Function ID	Report Name	Report Type
$80	Resource Allocation	System Status
$81	Hardware Allocation	System Status
$82	Card Status	System Status
$83	Port Status	System Status
$D0	MF Digit	Resource Control
$D1 (Standard)	DTMF Digit	Resource Control
$D1 (Enhanced)	DTMF Digit	Resource Control
$D2	Permanent Signal Condition	Resource Control
$D3	Port Status	System Status
$D4	Spoken Digit	Resource Control
$D6	Resource Limitation	System Status
$D9	Card Status	System Status
$DA	Outgoing Port Change of State	Resource Control
$DB	Incoming Port Change of State	Resource Control
$DC	Active/Standby Mode	Configuration Control
$DD	Inpulse Rule Complete	Resource Control
$DE	Voice Port Status	Resource Control
$EA	ISDN Port Change of State	Resource Control
$ED	ISDN Inpulse Rule Complete	Resource Control
$F0	Alarm Condition	System Status

This chapter is divided into sections—one for each report—and arranged according to each report's Function ID.

The description for each report contains the following information:

- Report Type—Indicates if this is a Configuration Control, System Status, or Resource Control report.
- Destination VCA (Virtual Communications Address)—Specifies the Network Header Destination VCA byte value for this report.
- Description—Contains a brief overview of the actions that can be accomplished with this report.
- Action Causing Report Generation—Lists system commands or conditions that could cause this report.
- Format—Shows an example of the report with each byte identified and defined.
- Examples—Shows sample reports with a byte-by-byte analysis.

Each byte in a report is a hexadecimal (base 16) number. Most reports require you to convert this hexadecimal number into binary (base 2) or decimal (base 10) numbers to interpret the byte. A Decimal-Hexadecimal-Binary conversion table is provided in Appendix B.

Byte offset values under the Format heading are counted from the initial byte of the Network Header (byte offset 0 to 3). Interpret these values according to the following list.

Byte Offset	Meaning
a	A single byte.
a and b	Two consecutive bytes.
a to c	All consecutive bytes between a and c.
a/b	The second nibble of byte a and all of byte b.
a to n	A variable number of consecutive bytes between a and n, inclusive.
n + 1	A byte that follows a variable.

Note Unless otherwise stated, all MF processing described in this chapter applies to both MF and MFCR2 processing.

Resource Allocation ($80) Report

Report Type

System Status

Destination VCA

Same as Source VCA of command requesting this report.

Description

The Resource Allocation ($80) report returns a bit map containing the status of each port within a given range and specified resource group. This report takes the same form as the Request Resource Allocation ($80) command, with the port information attached. The $80 report shows if a port is of the specified resource group and whether it is on line or off line. Ports in the maintenance busy state are reported as being off line. This report does not specify if the port is idle or busy. Each status byte contains information on four adjacent ports.

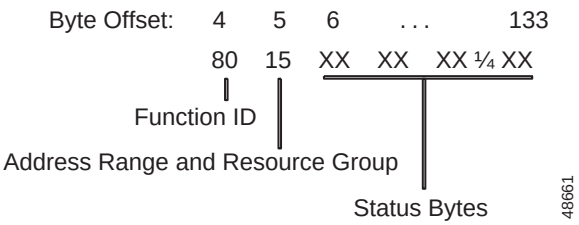
Action Causing Report Generation

The $80 report is generated in response to an $80 command. If the resource group for which the report is requested is empty, the report is returned with the $01 network status byte—message processing was successful—but without any $80 report status bytes attached.

Format

Figure 5-1 shows byte formatting for this report.

Figure 5-1 $80 Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Address Range and Resource Group (byte offset 5)—Specifies the range of port addresses and resource group shown in this report; convert byte from hexadecimal to binary and interpret the bits as follows.

```
RRGGGGGG
```

RR—Specifies the address range.

00—Ports $00 to $1FF (0 to 511).

01—Ports $200 to $3FF (512 to 1023).

10—Ports $400 to $5FF (1024 to 1535).

11—Ports $600 to $7FF (1536 to 2047).

GGGGGG—Specifies the resource group; convert binary to decimal for group number (1 to 63).

Status Bytes (byte offsets 6 to 133)—Each report contains 128 Status Bytes; each Status Byte contains information for four adjacent ports. Ports are counted from lowest address to highest address within the requested range. Convert the byte from hexadecimal to binary and interpret the bits in pairs as described below.

Bit pair = 00—Port is not in this resource group.

01—Port is in this resource group but off line (port has been deactivated via the system administration Card Maintenance screen, busied out from the distant end, or resides on a card that is out of service).

10—Reserved (no meaning in this report).

11—Port is in this resource group and on line.

Examples

Example 5-1 $80 Report

The report below is in response to an $80 command.

```
04 05 06 07 08 09...nn
80 15 00 00 FF C1...55
```

Function ID = 80 (Resource Allocation)

Address Range and Resource Group = 00010101

RR = 00 (ports $00 - $1FF)

GGGGGG = 010101 (resource group 21)

Status Byte 1 = 00000000

Ports $0 to $3 not in group 21

Status Byte 2 = 00000000

Ports $4 to $7 not in group 21

Status Byte 3 = 11111111

Ports $8 to $11 in group 21 and on line

Status Byte 4 = 11000001

Port $12—Group 21, and on line

Port $13—Not in group 21

Port $14—Not in group 21

Port $15—In group 21 but off line

Status Byte 128 = 01010101

Port $1FC—Port in group 21 but off line

Port $1FD—Port in group 21 but off line

Port $1FE—Port in group 21 but off line

Port $1FF—Port in group 21 but off line

Example 5-2 $80 Report

The report below is in response to a Request Resource Allocation command for a resource group that is not defined in the database.

```
04 05
80 60
```

Function ID = 80 (Resource Allocation)

Address Range and Resource Group = 11000000

RR = 11 (ports $600 to $7FF)

GGGGGG = 000000 (resource group 0)

Hardware Allocation ($81) Report

Report Type

System Status

Destination VCA

Same as source VCA of command requesting this report.

Description

The Hardware Allocation ($81) report returns a bit map of ports within a given range. The report contains 66 bytes. The first two bytes contain the Function ID and Address Range information. The next 64 bytes contain hardware address information, with each byte representing 8 port addresses.

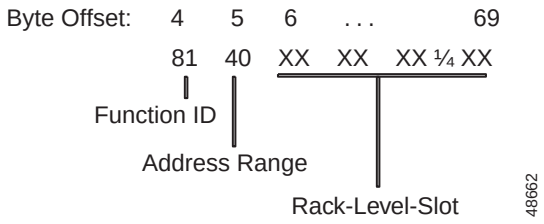
Action Causing Report Generation

The $81 report is generated in response to a Request Hardware Allocation ($81) command.

Format

Figure 5-2 shows the byte formatting for this report.

Figure 5-2 $81 Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Address Range (byte offset 5)—Specifies the port address range for which the report was generated. Interpret the byte according to the following list.

00—Ports $00 to $1FF (0 to 511).

40—Ports $200 to $3FF (512 to 1023).

80—Ports $400 to $5FF (1024 to 1535).

C0—Ports $600 to 7FF (1536 to 2047).

Rack-Level-Slot (byte offset 6 to 68)—Each report contains 64 rack, level, slot (R-L-S) bytes; each byte contains 8 port addresses worth of information. Interpret the bytes according to Table 5-2.

Table 5-2 R-L-S Byte Interpretation

Hexadecimal Values	R-L-S Range
$01 to $14	1-1-2 to 1-1-21
$15 to $29	1-2-1 to 1-2-21
$2A to $3E	1-3-1 to 1-3-21
$3F to $53	2-0-1 to 2-0-21
$54 to $68	2-1-1 to 2-1-21
$69 to $7D	2-2-1 to 2-2-21
$7E to $92	2-3-1 to 2-3-21

Example

Example 5-3 $81 Report

The report below gives the R-L-S locations for ports in the address range $200 to $3FF. Port addresses $220 to $237 correspond to a card in R-L-S location 1-2-2, and port addresses $2E0 to $2F8 correspond to a card in R-L-S location 1-3-9. All other port addresses in this range are not allocated. Because they are T1 cards, they have 24 port addresses assigned to them.

```
81 40 00 00 00 00 16 16 16 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
32 32 32 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00
```

No status bytes attached.

Card Status ($82) Report

Report Type

System Status

Destination VCA

Same as Source VCA of command requesting this report.

Description

The Card Status ($82) report informs the host of the status of a card. The card location is represented both by the port address and the physical rack, level, and slot (R-L-S) address. The report includes the status of the card and the type of the card.

One $82 report is generated for each card specified in a Card Status ($82) command. In the case of a multispan card, an $82 report is generated for each span in the slot.

The $82 report takes the form of a command returned with a $01 network status byte.

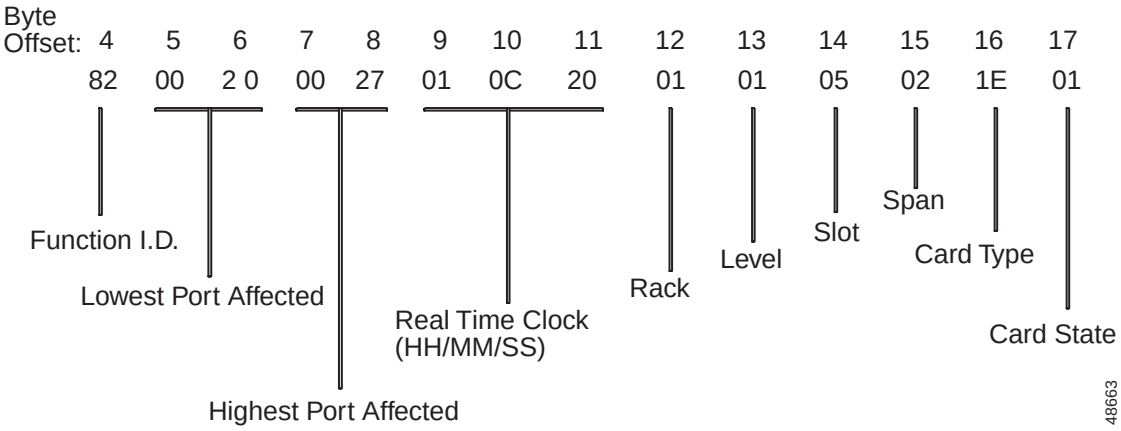
Action Causing Report Generation

The system's response to the $82 command is a separate $82 report for each card specified in the $82 command from the host. In the case of a multispan card, a separate $82 report is generated for each interface.

Format

Figure 5-3 shows the byte formatting for this report.

Figure 5-3 $82 Report Format



Function ID (byte offset 4)—Byte immediately following the network header; uniquely identifies the report from the system.

Lowest Port Affected (byte offsets 5 and 6)—Hexadecimal representation of the first port address on the card for which the report is sent. This is also useful in identifying the span for which the report is sent in the case of a multispan card. This field is set to $00 if the card is not found in the database.

Highest Port Affected (byte offsets 7 and 8)—Hexadecimal representation of the last port address on the card for which the report is sent. This is also useful in identifying the span for which the report is sent in the case of a multispan card. This field is set to $00 if the card is not found in the database.

Real Time Clock (byte offset 9 to 11)—Time represented in the format Hours:Minutes:Seconds; hours, minutes, and seconds are represented separately in hexadecimal.

Rack-Level-Slot Code (byte offsets 12 to 14)—Specifies the rack, level, and slot in which the card is located. Valid values are:

- 1 or 2—Rack.
- 0 through 3—Level.
- 1 to 21 (0 through 15 in hexadecimal)—Slot.

Convert the decimal value of the slot into hexadecimal for encoding. For multispan cards (4xE1/T1), if the query has a zero as the span specifier, (representing all four interfaces), there will be four responses, one for each interface. In this case, the $82 reports contain the same R-L-S for all the spans, but the lowest and highest ports affected are differentiated. The span specifier indicates the span for which the report is generated.

Span Code (byte offset 15)—Represents the interface (span) number for a multi-span card, for which the report is generated. The value is 1 for a single-span card status report.

Card Type (byte offset 16)—Type of the card for which the report is generated. This field is set to $00 if the card is not found in the database. The possible values of the field, if the card is present in the database, are as follows:

0x1—Subscriber Line Interface Card (SLIC-2)

0x3—E+M Trunk Card (E+M)

0x4—T1 Trunk Card (T1)

0x5—Digital Tone Generator (DTG)

0x6—Digital Voice Card (DVC)

0x8—DTMF Receiver Card 8 Port (DRC-8)

0xA—MF Receiver Card (MRC)

0xB—Direct Inward Dial Card (DID-2)

0xC—Universal Trunk Card (UTC-2)

0xD—Network Bus Controller (NBC)

0xE—Bus Repeater Card (BRC)

0xF— Digital Conference Card (DCC)

0x11—Speech Recognition Card (SRC)

0x12—Call Progress Analyzer (CPA)

0x13—Primary Rate Interface (PRI)

0x14—E1 Interface Card (E1)

0x15—MFCR2 Transceiver Card (MFCR2)

0x16—DTMF Receiver Card 24 Port (DRC-24)

0x17—DTMF Receiver Card 48 Port (DRC-48)

0x18—Integrated Play/Record Card 8 Port (IPRC-64)

0x19—Primary Rate Interface/NFAS (PRI/N)

0x1A—DPNSS E1-PRI (DPNSS)

0x1B—DASS2, Network Termination E1-PRI (NTDASS2)

0x1E—Four Span T1 Interface Card (4xT1)

0x1F—Four Span E1 Interface Card (4xE1)

0x20—Integrated Prompt/Record Card 8 Port (IPRC-8)

0x21—Integrated Prompt/Record Card 128 Port (IPRC-128)

0x22—MVDC-T1

0x23—MVDC-PRI

0x24—Net5 ISDN

0x27—Drop and Insert Card

0x28—Subrate Switch Card

0x29—J1 ISDN

0x46—Interface Controller Card/T1

0x47—Interface Controller Card/E1

0x50—Service Platform Card/DTMF

0x51—Service Platform Card/CPA

0x52—Service Platform Card/MFC

0x53—Service Platform Card/MFCR2

0x54—Service Platform Card/TONE

0x55—Service Platform Card/OUTP

0x56—Service Platform Card/CNF

0x60—Interface Controller Card/PRINI2

0x61—Interface Controller Card/PRI5ESS

0x62—Interface Controller Card/PRI4ESS

0x63—Interface Controller Card/PRINTI

0x64—Interface Controller Card/PRINTT

0x70—Interface Controller Card/PRI NET5

0x71—Interface Controller Card/PRI DPNSS

Card State (byte offset 17)—Card states are defined as follows:

00—Card not defined in database

01—Active

02—Maintenance

03—Diagnostic

04—Out of service

05—Standby

06—Camped on

07—Card in diagnostics mode with remote loopback

08—Card in diagnostics mode with payload loopback

FF—Unknown

Example

Example 5-4 $82 Report

The following $82 command requests the status of the cards 1, 1, 6 and 1, 1, 7.

```
04 050607 08 091011 12
82 010106 00 010107 02
```

Function ID = 82 (Card Status)

Starting RLS = 1, 1, 6

Span = all spans

Ending RLS = 1, 1, 7

Span = spans 1 and 2

The following two $82 reports are generated for the command in Example 5-4:

- First report:

  ```
  04 0506 0708 091011 12 13 14 15 16 17
  82 0020 003F 010C20 01 01 06 01 19 01
  ```

  Function ID = 82 (Card Status)

  Lowest Port Affected = 0020

  Highest Port Affected = 003F

  Real Time Clock = 1:12:32 am ($01 = 1; $0C = 12; $20 = 32)

  R-L-S = 1,1,6

Span = 1 (single span card)

Card Type = 19 (PRI/N card)

Card State = 01 (Active)

- Second report:

```
04 0506 0708 091011 12 13 14 15 16 17
82 0040 005F 010C20 01 01 07 01 1F 02
```

Function ID = 82 (Card Status)

Lowest Port Affected = 0040

Highest Port Affected = 005F

Real Time Clock = 1:12:32 am ($01 = 1; $0C = 12; $20 = 32)

RLS = 1,1,7

Span = 1 (span # 1)

Card Type = 1F (4 span E1 card)

Card State = 02 (Maintenance)

- Third report:

```
04 0506 0708 091011 12 13 14 15 16 17
82 0060 007F 010C20 01 01 07 02 1E 02
```

Function ID = 82 (Card Status)

Lowest Port Affected = 0060

Highest Port Affected = 007F

Real Time Clock = 1:12:32 am ($01 = 1; $0C = 12; $20 = 32)

RLS = 1,1,7

Span = 2 (span # 2)

Card Type = 1E (4 span E1 card)

Card State = 02 (Maintenance)

Port Status ($83) Report

Report Type

System Status

Destination VCA

Same as source VCA of the command requesting this report.

Description

The Port Status ($83) report informs the host of the status of a range of ports. The command, for which the report is generated, forms the leading portion of the report. This leading portion is followed by a series of port status report elements, each of which is three bytes long. The first two bytes specify the port address; the third byte specifies the call processing status of the port.

If the port range for which the status report is requested is such that one $83 report cannot accommodate all the port status report elements, the report is split into as many $83 reports as necessary. Such fragments are distinguished from each other through a continuity bit.

Up to 82 port status report elements can be in one $83 report, considering that the maximum length of the report is 256 bytes.

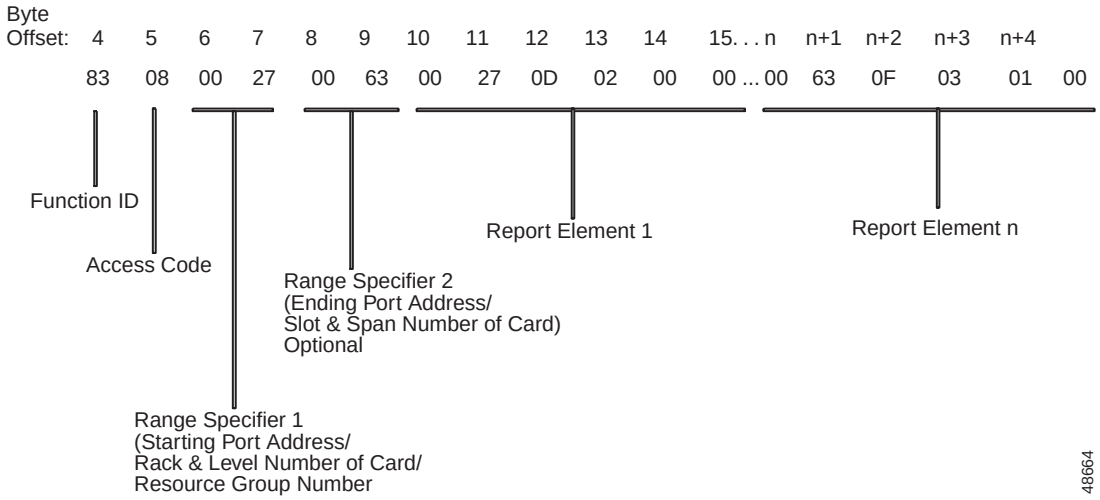
Action Causing Report Generation

The $83 command generates the $83 report. If the $83 command is successfully processed, the network status byte is set to $01.

Format

Figure 5-4 shows the byte formatting for this report.

Figure 5-4 $83 Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Access Code (byte offset 5)—Copied from the Port Status ($83) command for which the report is being generated. Only bit C is modified, if required.

A port address range can be specified in different ways. The access code specifies the way in which the port address range is chosen.

```
C000 AGR0
```

C—Specifies fragments of an $83 report.

C = 1—This is a fragment of a $83 report in response to a $83 command and more fragments will be sent.

C = 0—This is the last or only fragment of the $83 report

A—Specifies the port address range.

A = 1—If port address range is specified.

A = 0—If the port address range is not specified.

G—Specifies the resource group.

G = 1—A resource group is specified.

G = 0—A resource group is not specified.

R—Specifies R-L-S-S information.

R = 1—R-L-S of the card is specified, with the span information.

R = 0—No R-L-S-S information is specified.

Range Specifier 1 (byte offsets 6 and 7)—Copied from the $83 command for which the report is being generated.

Range Specifier 2 (byte offsets 8 and 9)—This is an optional field in $83 reports. Copied from the $83 command for which the report is being generated.

Report Element 1 (byte offsets 10 to 14)—If Range Specifier 2 is not present, the first Report Element starts at byte offset 8. This forms the single report element containing the port status report for one port. Other similar report elements follow.

The first two bytes (byte offsets 10 and 11) specify the port address; the third byte (byte offset 12) specifies the call processing state of the port. Table 5-3 lists the possible port call processing major states.

Table 5-3 Report Element Content—Port Call Processing Major States

Hexadecimal Value	Major Call Processing State
0	CP_IDLE
1	CP_WAIT
2	CP_WWINK
3	CP_DIAL
4	CP_STAB
6	CP_WANS
7	CP_DCON
9	CP_GARD
0xB	CP_FEXC
0xC	CP_WTIM
0xD	CP_MBUSY
0xE	CP_MFWT
0xF	CP_SETUP
0x10	CP_PRIMARY
0x11	CP_RDR
0x12	CP_MF
0x13	CP_ATT
0x14	CP_DIAG
0x15	CP_DISC
0x16	CP_HOST
0x17	CP_FDIG
0x18	CP_DIG
0x19	CP_INPULSE
0x1A	CP_DTMF
0x1B	CP_TALK
0x1C	CP_TONE
0x1D	CP_CONF
0x1E	CP_MON
0x1F	CP_OUTPULSE
0x20	CP_WTONE
0x21	CP_SPEECH

Table 5-3 Report Element Content—Port Call Processing Major States (continued)

Hexadecimal Value	Major Call Processing State
0x22	CP_SELFTEST
0x23	CP_WTFSUP
0x24	CP_ANALYZE
0x25	CP_RECORD
0x26	CP_CPAMON
0x27	CP_DONECOLLECT
0x28	CP_DELAY
0x29	CP_WAITACK
0xFE[1]	CP_OOS
0xFF[2]	CP_NOTINDB

1. If the card containing the port is OOS.
2. If the card containing the port is not defined in DB.

Byte offset 13 indicates the supplementary state of the port with respect to the major state of the port. Table 5-4 lists the possible port call processing supplementary states.

Table 5-4 Report Element Content—Port Call Processing Supplementary States

Major State	Hexadecimal Value	Supplementary Call Processing State
Reorder	0x01	RDR_FBUSY
	0x02	RDR_QUIET
	0x04	RDR_DONE
TNK wait	0x01	WT_DTMF
	0x02	DIALING
	0x03	WT_DIAL
	0x04	WT_SPC
	0x04	WT_ANNC
	0x08	WT_BEEP
	0x10	SPC_ATT
	0x10	WT_TALK
	0x20	WT_PSC
	0x40	WT_TIM
	0x80	WT_MF
Guard	0x00	GD_NORMAL
	0x01	GD_WTRLS
	0x02	GD_WTRLSH

Table 5-4 Report Element Content—Port Call Processing Supplementary States (continued)

Major State	Hexadecimal Value	Supplementary Call Processing State
Diagnostic/maintenance busy	0x00	DIAG_IDLE
	0x01	DIAG_CMAINT
	0x02	DIAG_PATH
	0x03	DIAG_OEND
	0x04	DIAG_AUTO
	0x05	DIAG_INTRN
	0x06	DIAG_TEST
Conference port	0x01	CF_1WAY
	0x02	CF_2WAY
	0x04	CF_SET
	0x08	CF_ACK
	0x10	CF_RSRV
Receiver enabling	0x01	DLY_TIME
	0x04	DLY_WINK
	0x08	DLY_ANS
	0x10	DLY_ANN
Dialing	0x00	D_UNK
Outpulse rule	0x01	DIAL_DIG
	0x02	WAIT_SUP
	0x03	WAIT_TM
	0xFE[1]	CARD_OOS_STATE
	0xFF[2]	NOT_INDB_STATE

1. If the card containing the port is OOS.
2. Card containing the port is not defined in DB.

Byte offset 14 indicates the ISDN state of the port. Table 5-9 lists the possible values of the port call processing ISDN major states.

Table 5-5 Report Element Content—Port Call Processing ISDN Major States

Hexadecimal Value	ISDN Major State
0x00	PT_ACTIVE
0x01	PT_OOS_NE
0x02	PT_OOS_FE
0x03	PT_MAINT_NE
0x04	PT_MAINT_FE
0x05	PT_DCHAN
0x06	PT_OOS_FE_MAINT_NE

Table 5-5 Report Element Content—Port Call Processing ISDN Major States (continued)

Hexadecimal Value	ISDN Major State
0xFD[1]	PT_NON_CNTRLD
0xFE[2]	PT_OOS_STATE
0xFF[3]	PT_NOT_INDB

1. If the card containing the port is not ISDN controlled.
2. If the card containing the port is OOS.
3. Card containing the port is not defined in DB.

Byte offset 15 indicates the ISDN sub-state of the port. Table 5-6 lists the possible port call processing ISDN supplementary states.

Table 5-6 Report Element Content—Port Call Processing ISDN Supplementary States

Hexadecimal Value	ISDN Supplementary State
0x00	ISDN_IDLE
0x01	O_INITED
0x02	O_OVRLP
0x03	O_PRCEED
0x04	O_ACTIVE
0x05	O_DELIVRD
0x0B	I_CPRSNT
0x0C	I_OVRLP
0x0D	I_PRCEED
0x0E	I_CONNECT
0x0F	I_DELIVRD
0x10	I_ACTIVE
0x14	DISC_IND
0x15	DISC_REQ
0x16	DISC_RLS
0x80	ISDN_WAIT
0xFD[1]	PORT_NON_CNTRLD
0xFE[2]	PORT_OOS
0xFF[3]	PORT_NOT_INDB

1. If the card containing the port is not ISDN controlled.
2. If the card containing the port is OOS.
3. Card containing the port is not defined in DB.

Example

Example 5-5 $83 Report

The following command requests status reports for ports $27 and $28. The command specifies the range through port addresses:

```
04 05 0607 0809
83 08 0027 0028
```

Main command segment elements are as follows:

Function ID = 83 (Port Status)

Access Code = 0000 1000 (C000 AGRS)

C = 0; A = 1 (Address Range specified); G = 0; R = 0;

Starting Port Address = 0027

Ending Port Address = 0028

The following report is generated for the command in Example 5-5.

```
04 0506 0708 091011121314 15161718192021
83 0800 2700 2800270D02FD FD002800000000
```

Function ID = 83 (Port Status)

Access Code = 0000 1000 (C000 AGRS)

C = 0 (Only fragment); A = 1 (Address Range specified);

G = 0; R = 0; S = 0;

Starting Port Address = 0027 (Copied from command)

Ending Port Address = 0028 (Copied from command)

Port Address = 0027 (Report Element 1)

Port Status = 0D (CP_MBUSY)

Supplementary State = 02 (DIAG_PATH)

ISDN State = fd (Unknown)

ISDN Sub-state (Unknown)

Port Address = 0028 (Report Element 2)

Port Status = 00 (CP_IDLE)

Supplementary State = 00 (IDLE)

ISDN State = 00 (PT_ACTIVE)

ISDN Sub-state (ISDN Idle)

MF Digit ($D0) Report

Note Unless otherwise stated, the MF processing described in this section applies to both MF and MFCR2 processing.

Report Type

Resource Control

Destination VCA

$40

Description

The MF Digit ($D0) report transfers MF digit collection information from the system to the host. Report indicates if the digit report is valid and the incoming port from which the digits were collected. If a collection error occurred, the present state of the Controlling Port (CP_SETUP or forced to idle) is also indicated. This report can be included as a report segment in an Inpulse Rule Complete ($DD) report.

The report indicates if garbled MF digits were detected by the receiver. A garbled MF digit is declared if one of the following conditions exists:

- Twist is greater than 8 dB.
- A single tone of the tone pair for all or part of the digit is present.
- More than two tones are present.

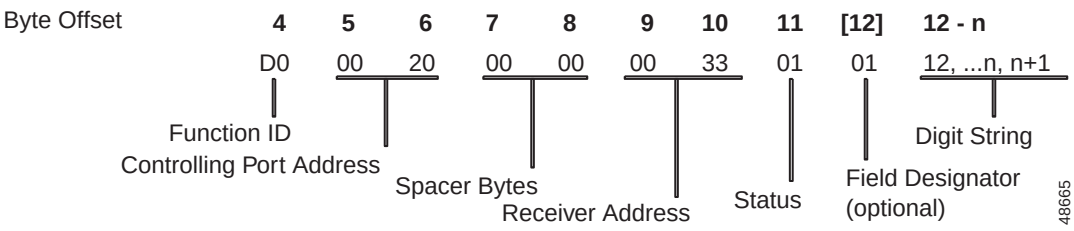
Action Causing Report Generation

The $D0 report is generated in direct response to an MF Collection Control command ($68), or as a result of inpulse rule processing. In MF processing, KP and ST are stripped from the digit report by the system. In MFCR2 processing, Group I-15 digits are stripped from the digit report by the system.

Format

Figure 5-5 shows the byte formatting for this report.

Figure 5-5 $D0 Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies this report from the system.

Controlling Port Address (byte offsets 5 and 6)—Hexadecimal representation of the incoming port from which the digits were collected. Omitted if the report is included as a segment in a $DD report.

Spacer Bytes (byte offsets 7 and 8)—Reserved for future enhancements; always returned as 00 00. Omitted if the report is included as a segment in a $DD report.

Receiver Address (byte offsets 9 and 10)—Hexadecimal representation of the MF/MFCR2 receiver port processing the incoming digits.

Status (byte offset 11)—In MF processing, this byte indicates the status of the digit report; convert byte from hexadecimal to binary and interpret the bits as described below.

```
VS000XYZ
```

V—Specifies if the report from the MF receiver was garbled (digit on time > 6 seconds).

V = 0—Report not garbled.

V = 1—Report garbled.

S—If a collection error occurred (garbled digit, collection timer fired), specifies if the Controlling port has been forced to idle or placed into CP_SETUP.

S = 0—Controlling port forced to idle; V or Y is set to 1.

S = 1—Controlling port placed into CP_SETUP state to await further host action; V or Y is set to 1.

X—Specifies if MF receiver was available when initially requested.

X = 0—MF receiver available on initial request.

X = 1—MF receiver not available on initial request.

Y—Specifies if MF digit collection timer fired (KP not received within 15 seconds, ST not received within 30 seconds, or off time > 6 seconds).

Y = 0—MF digit collection timer did not fire.

Y = 1—MF digit collection timer fired.

Z—Specifies if this report contains a valid MF digit string.

Z = 0—Not a valid MF digit report.

Z = 1—Valid MF digit report.

In MFCR2 processing, this byte also indicates the status of the digit report. However, only the Y and Z bytes are converted from hexadecimal to binary as described below.

```
000000YZ
```

Y—Specifies if MFCR2 digit collection timer fired after 30 seconds.

Y = 0—MFCR2 digit collection timer did not fire.

Y = 1—MFCR2 digit collection timer fired.

Z—Specifies if this report contains a valid MFCR2 digit string.

Z = 0—Not a valid MFCR2 digit report.

Z = 1—Valid MFCR2 digit report.

Optional Field Designator/Digit String (byte offsets 12 to n)—When the "Enable Digit Field Reporting" feature is enabled from either Data Base Administration Menu or Maintenance Menu of the System Administrator database, the byte at offset 12 indicates into what field the system stores the reported digits (refer to the *Cisco VCO/4K System Administrator's Guide*). Possible byte values are as follows:

00—ANI Field.

01—Field 1.

02—Field 2.

03—Field 3.

04—Field 4.

05—Not stored in any field.

Digit String (byte offsets 12 + n to n)—Collected MF digits; digits represented are from 1 to 9, and 0 ($A). Each nibble in the hexadecimal byte represents a single digit. The Digit String always ends with an $F. The KP, ST, ST1, ST2, and ST3 digits are stripped from the digit string before the report is sent. If the "Enable Digit Field Reporting" feature is not enabled, then the Digit String bytes begin at byte offset 12. The Optional Field Designator and Digit String are included only when Z = 1 in the MF Status byte.

Examples

Example 5-6 $D0 Report

The following report shows an MF receiver port at address $34 used to collect three MF digits (1, 2, 3) from the incoming port at address $18. The "Enable Digit Field Reporting" feature has not been enabled.

```
04 0506 0708 0910 11 12 13
D0 0018 0000 0034 01 12 3F
```

Main command segment elements are as follows:

Function ID = D0 (MF Digit)

Controlling Port Address = 0018

Spacer Bytes = 00 00

MF Receiver Address = 0034

MF Status = 00000001

V = 0 (report not garbled)

S = 0 (no meaning since V and Y = 0)

X = 0 (MF receiver available on initial request)

Y = 0 (MF digit collection timer did not fire)

Z = 1 (valid MF digit string collected)

Digit String = 123 (F marks end of string)

Example 5-7 $D0 Report

The report below shows the MF digit collection was aborted due to a timeout. The controlling port at address $021 was placed into CP_SETUP state to await further host action. No digits are reported.

```
04 0506 0708 0910 11
D0 0021 0000 0034 42
```

Main command segment elements are as follows:

Function ID = D0 (MF Digit)

Controlling Port Address = 0021

Spacer Bytes = 00 00

MF Receiver Address = 0034

MF Status = 01000010

V = 0 (report not garbled)

S = 1 (Controlling Port in CP_SETUP due to collection timeout)

X = 0 (MF receiver available on initial request)

Y = 1 (MF digit collection timer fired)

Z = 0 (no valid MF digit string collected)

No digit string attached

DTMF Digit ($D1) (Standard) Report

Report Type

Resource Control

Destination VCA

$40

Description

The DTMF Digit ($D1) (Standard) report transfers DTMF/DP digit collection information from the system to the host. The report indicates whether the digit report is valid and the line or trunk from which the digits were collected. If a timeout occurs, any digits collected up to that point are returned. This report can also indicate if one of the following conditions occurred:

- Report is generated for first digit receipt
- Voice prompt being presented was aborted
- Timeout occurred while waiting for supervision
- Digit field overflow (for append of collected digits) occurred
- Receiver port was not available at first request (hunting only)

This report can be included as a report segment in an Inpulse Rule Complete ($DD) report.

Action Causing Report Generation

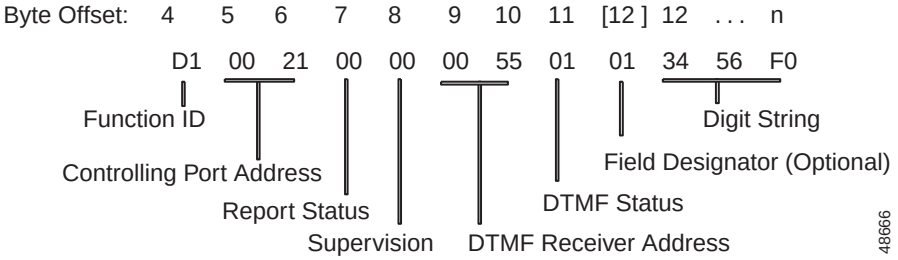
The $D1 report is generated in direct response to a DTMF Collection Control ($67) command, or as a result of inpulse rule processing. No distinction is made between DTMF or DP digits. If first digit reporting was specified by the host in the DTMF Collection Control ($67) command, digit collection produces two reports: the first report indicates it is a first digit report and contains only one digit; the second is a valid digit report with all collected digits, including the first digit that was previously reported.

An exception to first digit reporting is when the first digit entered is a single-digit end of string code ($F). In this case, the first digit report is returned with bit settings in the DTMF Status byte (offset 11) indicating a first digit report without a valid digit string (V = 1 and Z = 0).

Format

Figure 5-6 shows the byte formatting for this report.

Figure 5-6 $D1 (Standard) Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies this report from the system.

Controlling Port Address (byte offsets 5 and 6)—Hexadecimal representation of the line/trunk from which the digits were collected. Omitted if report included as a segment in a $DD report.

Report Status (byte offset 7)—Indicates if an event condition is reflected in this report, such as voice prompt abort or outgoing port detached when the first digit is detected, collection was aborted because expected supervision was not detected, or digit field overflow occurred. Omitted if the report is included as a segment in a $DD report. Convert the byte from hexadecimal to binary and interpret the bits as described below.

```
0VDTA000
```

V—Specifies if a voice prompt was aborted when the user entered the first digit.

V = 0—No prompt abort performed.

V = 1—Prompt aborted on first digit detection; no effect to digit collection.

D—Specifies if the outgoing port was detached from the call when the user entered the first digit.

D = 0—No outgoing detach performed.

D = 1—Outgoing port detached on first digit detection.

T—Specifies if digit collection was aborted because the supervision timer fired; type of supervision expected indicated in the Supervision byte (offset 8).

T = 0—Supervision timer did not fire.

T = 1—Digit collection aborted on supervision timeout; receiver removed from call.

A—Specifies if the digits collected and appended to one of the controlling port's digit fields did not fit into the field.

A = 0—No digit field overflow.

A = 1—Digit field overflow; excess digits discarded.

Supervision (byte offset 8)—When T = 1 in the Report Status byte, indicates the type of supervision that was expected but not received before the supervision timer fired. If T = 0, this byte is set to $00. Omitted if report included as a segment in a $DD report. Interpret byte according to the following list.

01—Wink expected but not received.

02—Answer expected but not received.

DTMF Receiver Address (byte offsets 9 and 10)—Hexadecimal representation of the DTMF receiver port processing the incoming digits. For SLIC, DID, and UTC ports, this address is the same as the Controlling Port Address.

DTMF Status (byte offset 11)—Indicates the status of the digit report; convert byte from hexadecimal to binary and interpret the bits as described below.

```
0T0VWXYZ
```

T—Specifies if the interdigit timer fired.

T = 0—Interdigit timeout did not fire.

T = 1—Interdigit timer fired.

V—Specifies a first digit report.

V = 0—Not a first digit report.

V = 1—First digit report. If Z = 1, only one digit is reported in a string. If Z = 0, no digit is reported (first digit was a single-digit end-of-string character).

W—Specifies if DTMF receiver was available when initially requested.

W = 0—DTMF receiver available on initial request.

W = 1—DTMF receiver not available on initial request.

X—Specifies if the DTMF digit collection timer fired.

X = 0—DTMF digit collection timer did not fire.

X = 1—DTMF digit collection timer fired.

Y—Specifies if the first digit timer fired before the first DTMF digit was received.

Y = 0—DTMF first-digit collection timer did not fire.

Y = 1—DTMF first-digit collection timer fired.

Z—Specifies if this report contains a valid DTMF digit string.

Z = 0—No DTMF digits reported.

Z = 1—DTMF digits reported.

Optional Field Designator/Digit String (byte offset 12 to n) – When the “Enable Digit Field Reporting” feature is enabled from either Data Base Administration Menu or Maintenance Menu of the System Administrator database, the byte at offset 12 indicates into what field the system stores the reported digits (refer to the *Cisco VCO/4K System Administrator's Guide*). Possible values are as follows:

00—ANI Field.

01—Field 1.

02—Field 2.

03—Field 3.

04—Field 4.

05—Not stored in any field.

Digit String (byte offsets 12 + n to n)—The DTMF digits collected; digits represented are from 1 to 9, and 0 ($A), plus the special characters * ($B) and # ($C). The digit string always ends with an $F. Each nibble in the hexadecimal byte represents a single digit. If the “Enable Digit Field Reporting” feature is not enabled, then the Digit String bytes begin at byte offset 12. The Optional Field Designator and Digit String are included only when Z = 1 in the DTMF Status byte.

Examples

Example 5-8 $D1 (Standard) Report

The following report shows a DTMF receiver at address $52 collected seven DTMF digits (1 to 7) from the port at address $18. The “Enable Digit Field Reporting” feature has not been enabled.

```
04 0506 07 08 0910 11 12 131415
D1 0018 00 00 0052 01 12 34567F
```

Function ID = D1 (DTMF Digit)

Controlling Port Address = 0018

Report Status = 00000000

V = 0 (no voice prompt abort performed)

D = 0 (no outgoing detach performed)

T = 0 (no supervision timer fired)

A = 0 (no digit field overflow)

Supervision = 00 (supervision timer is not set in the $67 command or the timer did not fire)

DTMF Receiver Address = 0052

DTMF Status = 00000001

T = 0 (interdigit timer did not fire)

V = 0 (not a first digit report)

W = 0 (DTMF receiver available on initial request)

X = 0 (DTMF digit collection timer did not fire)

Y = 0 (DTMF first-digit collection timer did not fire)

Z = 1 (DTMF digit string reported)

Digit String = 1234567 (F marks end of string)

Example 5-9 $D1 (Standard) Report

The following report shows that a DTMF receiver at address $52 was enabled to collect digits from the port at address $18. One digit was received before the DTMF interdigit timer fired, so there is only one digit in this report. The “Enable Digit Field Reporting” feature has not been enabled.

```
04 0506 07 08 0910 11 12
D1 0018 00 00 0052 41 9F
```

Function ID = D1 (DTMF Digit)

Controlling Port Address = 0018

Report Status = 00000000

V = 0 (no voice prompt abort performed)

D = 0 (no outgoing detach performed)

T = 0 (no supervision timer fired)

A = 0 (no digit field overflow)

Supervision = 00 (supervision timer is not set in the $67 command or the timer did not fire)

DTMF Receiver Address = 0052

DTMF Status = 01000001

T = 1 (interdigit timer fired)

V = 0 (not a first digit report)

W = 0 (DTMF receiver available on initial request)

X = 0 (DTMF digit collection timer did not fire)

Y = 0 (DTMF first-digit collection timer fired)

Z = 1 (DTMF digit string reported)

Digit String = 9 (F marks end of string)

Example 5-10 $D1 (Standard) Report

The following report shows a DTMF receiver at address $35 has received the first digit of a string and is reporting it to the host. A voice prompt was aborted when the first digit was received. The “Enable Digit Field Reporting” feature has not been enabled.

```
04 0506 07 08 0910 11 12
D1 0021 40 00 0052 11 5F
```

Function ID = D1 (DTMF Digit)

Controlling Port Address = 0021

Report Status = 01000000

V = 1 (voice prompt aborted when the first digit was received)

D = 0 (no outgoing detach performed)

T = 0 (no supervision timer fired)

A = 0 (no digit field overflow)

Supervision = 00 (supervision timer is not set in the $67 command or the timer did not fire)

DTMF Receiver Address = 0052

DTMF Status = 00010001

T = 0 (interdigit timer fired)

V = 1 (first digit report)

W = 0 (DTMF receiver available on initial request)

X = 0 (DTMF digit collection timer did not fire)

Y = 0 (DTMF first-digit collection timer fired)

Z = 1 (DTMF digit string reported)

Digit String = 5 (F marks end of string)

DTMF Digit ($D1) (Enhanced) Report

Report Type

Resource Control

Destination VCA

$40

Description

The DTMF Digit ($D1) (Enhanced) report transfers DTMF/DP digit collection information from the system to the host. The report indicates if the digit report is valid and the line or trunk from which the digits were collected. If a timeout occurs, any digits collected up to that point are returned. This report can also indicate if one of the following conditions occurred:

- Report is generated for first digit receipt,
- Voice prompt being presented was aborted.
- Timeout occurred while waiting for supervision.
- Digit field overflow (for append of collected digits) occurred.
- Receiver port was not available at first request (hunting only).

This report can be included as a report segment in an Inpulse Rule Complete ($DD) report.

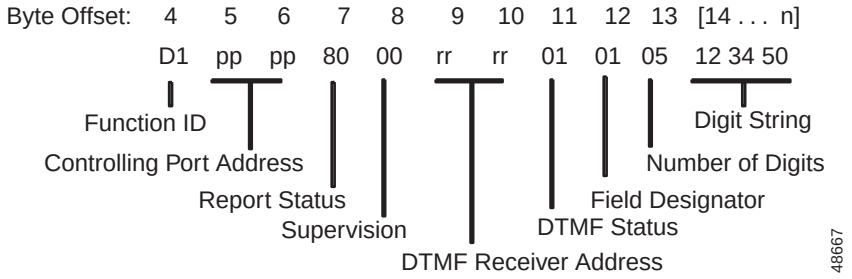
Action Causing Report Generation

The $D1 (Enhanced) report is generated in direct response to the 4th-column DTMF option being enabled, or as a result of inpulse rule processing. No distinction is made between DTMF or DP digits. If first digit reporting was specified by the host in the DTMF Collection Control ($67) command, digit collection produces two reports: the first report indicates it is a first digit report and contains only one digit; the second is a valid digit report with all collected digits, including the first digit that was previously reported.

Format

Figure 5-7 shows the byte formatting for this report.

Figure 5-7 $D1 (Enhanced) Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies this report from the system.

Controlling Port Address (byte offsets 5 and 6)—Hexadecimal representation of the line/trunk from which the digits were collected. Omitted if report included as a segment in a $DD report.

Report Status (byte offset 7)—Indicates the status of the digit report. Also, indicates if an event condition is reflected in this report, such as voice prompt abort or outgoing port detached when first digit detected, collection was aborted because expected supervision was not detected, or digit field overflow occurred. Omitted if the report is included as a segment in a $DD report. Convert the byte from hexadecimal to binary and interpret the bits as follows.

```
0VDTA000
```

V—Specifies if a voice prompt was aborted when the user entered the first digit.

V = 0—No prompt abort performed.

V = 1—Prompt aborted on first digit detection; no effect to digit collection.

D—Specifies if the outgoing port was detached from the call when the user entered the first digit.

D = 0—No outgoing detach performed.

D = 1—Outgoing port detached on first digit detection.

T—Specifies if digit collection was aborted because the supervision timer fired; the type of supervision expected is indicated in the Supervision byte (offset 8).

T = 0—Supervision timer did not fire.

T = 1—Digit collection aborted on supervision timeout; receiver removed from call.

A—Specifies if the digits collected and appended to one of the controlling port's digit fields did not fit into the field.

A = 0—No digit field overflow.

A = 1—Digit field overflow; excess digits discarded.

Supervision (byte offset 8)—When T = 1 in the Report Status byte, indicates the type of supervision that was expected but not received before the supervision timer fired. If T = 0, this byte is set to $00. Omitted if the report is included as a segment in a $DD report. Interpret the byte according to the following list:

01—Wink expected but not received.

02—Answer expected but not received.

DTMF Receiver Address (byte offsets 9 and 10)—Hexadecimal representation of the DTMF receiver port processing the incoming digits. For SLIC, DID, and UTC ports, this address is the same as the Controlling Port Address.

DTMF Status (byte offset 11)—Specifies that this report follows the enhanced report format; convert byte from hexadecimal to binary and interpret the bits as described below.

```
ET0VWXYZ
```

E—Specifies that this report is an enhanced DTMF digit report that is capable of reporting fourth-column DTMF digits.

E = 0—This report follows the old style report format.

E = 1—This report follows the enhanced report format.

T—Specifies if the interdigit timer fired.

T = 0—Interdigit timeout did not fire.

T = 1—Interdigit timer fired.

V—Specifies a first digit report.

V = 0—Not a first digit report.

V = 1—First digit report. If Z = 1, only one digit is reported in the string. If Z = 0, no digit is reported (first digit was a single-digit end-of-string character).

W—Specifies if DTMF receiver was available when initially requested.

W = 0—DTMF receiver available on initial request.

W = 1—DTMF receiver not available on initial request.

X—Specifies if DTMF digit collection timer fired.

X = 0—DTMF digit collection timer did not fire.

X = 1—DTMF digit collection timer fired.

Y—Specifies if the first digit timer fired before the first DTMF digit was received.

Y = 0—DTMF first-digit collection timer did not fire.

Y = 1—DTMF first-digit collection timer fired.

Z—Specifies if this report contains a valid DTMF digit string.

Z = 0—No DTMF digits reported.

Z = 1—DTMF digits reported.

Field Designator/Digit String (byte offset 12) – When the “Enable Digit Field Reporting” feature is enabled from the System Features screen of the System Configuration menu, this byte indicates into what field the system stores the reported digits (refer to the *Cisco VCO/4K System Administrator's Guide*). This byte is always present; if the feature is disabled, or if Z = 0 in the DTMF Status byte, then this byte is set to $05. Possible values are as follows:

00—ANI Field.

01—Field 1.

02—Field 2.

03—Field 3.

04—Field 4.

05—Not stored in any field.

Number of Digits (byte offset 13)—Specifies the number of digits contained in this report. This byte is set to $00 if Z = 0 in the DTMF status byte to indicate that there are no digits to be reported.

Digit String (byte offsets 14 – n)—The remaining bytes contain the DTMF digits collected. Digits are represented as 0 to 9, A to D, E (*), and F (#). Each byte in the digit string contains two digits. If the report contains an odd number of digits, the last nibble is set to $0; there is no digit string terminator.

The Digit string is included only when Z = 1 in the DTMF status byte to indicate that there are digits to be reported.

Examples

Example 5-11 $D1 (Enhanced) Report

The following report shows that a DTMF receiver at address $52 collected seven DTMF digits (1 to 7) from the port at address $18. The “Enable Digit Field Reporting” feature has not been enabled.

```
04 05060708 09 10 1112 13 14 15 16
D1 00180000 00 52 9107 12 34 56 70
```

Function ID = D1 (DTMF Digit)

Controlling Port Address = 0018

Report Status = 00000000

V = 0 (no voice prompt abort performed)

D = 0 (no outgoing detach performed)

T = 0 (no supervision timer fired)

A = 0 (no digit field overflow)

Supervision = 00 (supervision timer is not set in the $67 command or the timer did not fire)

DTMF Receiver Address = 0052

DTMF Status = 10000001

E = 1 (enhanced DTMF digit report)

T = 0 (interdigit timer did not fire)

V = 0 (not a first digit report)

W = 0 (DTMF receiver available on initial request)

X = 0 (DTMF digit collection timer did not fire)

Y = 0 (DTMF first-digit collection timer did not fire)

Z = 1 (DTMF digit string reported)

Digit String = 1234567 (0 marks end of byte)

Example 5-12 $D1 (Enhanced) Report

The following report shows that a DTMF receiver at address $52 was enabled to collect digits from the port at address $18. One digit was received before the DTMF interdigit timer fired, so there is only one digit in this report. The “Enable Digit Field Reporting” feature has not been enabled.

```
04 05060708 09 10 1112 13
D1 00180000 00 52 C101 90
```

Function ID = D1 (DTMF Digit)

Controlling Port Address = 0018

Report Status = 00000000

V = 0 (no voice prompt abort performed)

D = 0 (no outgoing detach performed)

T = 0 (no supervision timer fired)

A = 0 (no digit field overflow)

Supervision = 00 (supervision timer is not set in the $67 command or the timer did not fire)

DTMF Receiver Address = 0052

DTMF Status = 11000001

E = 1 (enhanced DTMF digit report)

T = 1 (interdigit timer fired)

V = 0 (not a first digit report)

W = 0 (DTMF receiver available on initial request)

X = 0 (DTMF digit collection timer did not fire)

Y = 0 (DTMF first-digit collection timer fired)

Z = 1 (DTMF digit string reported)

Digit String = 9 (0 marks end of byte)

Example 5-13 $D1 (Enhanced) Report

The following report shows that a DTMF receiver at address $35 has received the first digit of a string and is reporting it to the host. A voice prompt was aborted when the first digit was received. The “Enable Digit Field Reporting” feature has not been enabled.

```
04 05060708 09 10 1112 13
D1 00214000 00 52 9101 50
```

Function ID = D1 (DTMF Digit)

Controlling Port Address = 0021

Report Status = 01000000

V = 1 (voice prompt aborted when first digit received)

D = 0 (no outgoing detach performed)

T = 0 (no supervision timer fired)

A = 0 (no digit field overflow)

Supervision = 00 (supervision timer is not set in the $67 command or the timer did not fire)

DTMF Receiver Address = 0052

DTMF Status = 10010001

E = 1 (enhanced DTMF digit report)

T = 0 (interdigit timer fired)

V = 1 (first digit report)

W = 0 (DTMF receiver available on initial request)

X = 0 (DTMF digit collection timer did not fire)

Y = 0 (DTMF first-digit collection timer fired)

Z = 1 (DTMF digit string reported)

Digit String = 5 (0 marks end of byte)

Permanent Signal Condition ($D2) Report

Report Type

Resource Control

Destination VCA

$44

Description

The Permanent Signal Condition ($D2) report informs the host that a line or trunk port has not released within 30 seconds of a release by the system. The report is also sent when a line/trunk that was in Permanent Signal Condition (PSC) goes back on hook.

Action Causing Report Generation

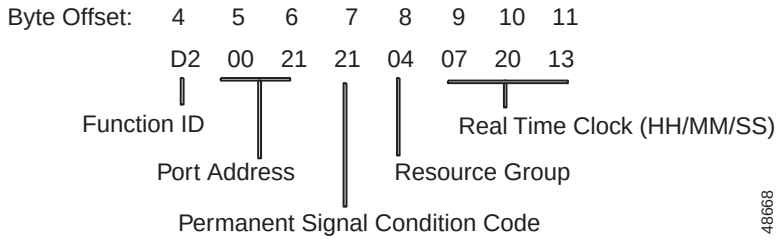
The $D2 report is generated if the system has tried to release a line/trunk and that port is still off hook after 30 seconds of inactivity. It is generated with a PSC code of $00 when line/trunk finally does release. When port goes on hook, this report may be accompanied by an Incoming Port Change of State ($DB) or Outgoing Port Change of State ($DA) report, depending upon the settings in the Incoming Port Control ($6A) or Outgoing Port Control ($69) command used in the call. Refer to Chapter 4, “System Commands,” for more information.

The $D2 reports are never generated for ports with a class of service = A.

Format

Figure 5-8 shows the byte formatting for this report.

Figure 5-8 $D2 Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Port Address (byte offsets 5 and 6)—Hexadecimal representation of the port for which this report was generated.

Permanent Signal Condition Code (byte offset 7)—Specifies the reason this report was sent. If this byte = $00, the port has gone back on hook and the PSC no longer exists. Convert the byte from hexadecimal to binary and interpret the bits as follows:

```
ABCDEFGH
```

A—Specifies if Permanent Signal processing started because one end of a stable call disconnected (on hook/hung up).

A = 0—PSC was not due to on hook.

A = 1—PSC was due to on hook.

B—Specifies if Permanent Signal processing started due to an error condition, outgoing port supervision error, port out of service, card out of service.

B = 0—PSC was not due to error condition.

B = 1—PSC was due to error condition.

C—Specifies if Permanent Signal processing was started because the host did not respond to an initial call report (host setup timing feature enabled).

C = 0—Host timeout was not responsible for PSC.

C = 1—Host timeout was caused PSC by not responding to initial call report.

D—Specifies if Permanent Signal Condition processing was started because host command released port or caused a forced disconnect.

D = 0—Host command was not responsible for PSC

D = 1—Host command caused PSC.

E—Specifies if Permanent Signal processing was started because there are no available MF receivers to satisfy a command or inpulse rule.

E = 0—MF receiver resource limitation was not responsible for PSC.

E = 1—PSC was caused by MF receiver resource limitation.

F—Specifies if PSC processing was started because of a system internal problem.

F = 0—System internal problem was not responsible for PSC.

F = 1—PSC was caused by a system internal problem.

G—Specifies if PSC processing was started because of garbled MF digits or an MF collection timeout.

G = 0—PSC was not caused by MF garbled digits/timeout.

G = 1—PSC was caused by MF garbled digits or timeout.

H—Indicates if a PSC exists.

H = 0—PSC was cleared; all other Permanent Signal Condition Code bits should also = 0.

H = 1—PSC was exists; reason for PSC specified in other Permanent Signal Condition Code bits.

Resource Group (byte offset 8)—Specifies the resource group number to which the port belongs; convert byte from hexadecimal to decimal for the group number (1 to 63 inclusive).

Real Time Clock (byte offset 9 to 11)—24-hour system clock indicating the time the status change occurred; hours, minutes, and seconds are represented separately in hexadecimal. Convert each byte from hexadecimal to decimal for the time.

Examples

Example 5-14 $D2 Report

Assume an incoming port was linked to an outgoing port in resource group 5 and at address $0028. When the incoming port went back on hook to end the call, the outgoing port did not release within 30 seconds. The following report shows a PSC for the outgoing trunk.

```
04 0506 07 08 091011
D2 0028 81 05 121E00
```

Function ID = D2 (Permanent Signal Condition)

Port Address = 0028

Permanent Signal Condition Code = 10000001

A = 1 (other port that was on hook hung up)

B = 0 (PSC was not due to an error)

C = 0 (host was not responsible for the PSC)

D = 0 (host command was not responsible for the PSC)

E = 0 (MF Receiver limitation was not responsible for the PSC)

F = 0 (System internal problem was not responsible for the PSC)

G = 0 (MF garbled digits/timeout was not responsible for the PSC)

H = 1 (PSC exists)

Resource Group = 5

Real Time Clock = 6:30:00 pm ($12 = 18; $1E = 30; $00 = 00)

Example 5-15 $D2 Report

The following report indicates that the outgoing port in Example 5-14 released, clearing the PSC.

```
04 0506 07 08 091011
D2 0028 01 05 122911
```

Function ID = D2 (Permanent Signal Condition)

Port Address = 0028

Permanent Signal Condition Code = 00000001

A = 0 (PSC was not due to on hook)

B = 0 (PSC was not due to an error)

C = 0 (host was not responsible for the PSC)

D = 0 (port was not responsible for the PSC)

E = 0 (MF Receiver limitation was not responsible for the PSC)

F = 0 (System internal problem was not responsible for the PSC)

G = 0 (MF garbled digits/timeout was not responsible for the PSC)

H = 1 (PSC was cleared)

Resource Group = 5

Real Time Clock = 6:41:17 pm ($12 = 18; $29 = 41; $11 = 17)

System Port Status ($D3) Report

Report Type

System Status

Destination VCA

$40

Description

The System Port Status ($D3) report informs the host of an attempted change in the status of a system resource port. The attempted change can be the result of the following:

- Activating or deactivating a port using the system administration Card Maintenance screen **P** command (refer to the *Cisco VCO/4K System Administrator's Guide*).
- Activating or deactivating a port using the Change Port Status ($90) command.
- Setting a voice path between ports using the system administration Set Up Paths screen and Port Reset screen (refer to the *Cisco VCO/4K System Administrator's Guide*).
- Detecting an inward seize for a port with COS = O or COS = 2 and internal COS = U; port is busied out by connected equipment.
- Using the Auto Makebusy feature; port is busied out after the specified number of supervision errors (1 to 255) have been detected for it (refer to the *Cisco VCO/4K System Administrator's Guide*).

Action Causing Report Generation

This report is generated when a change occurs in the operating status of an individual resource port on a system card. Status changes can be caused by an action at the system administrative console, an internally detected fault, or a host command.

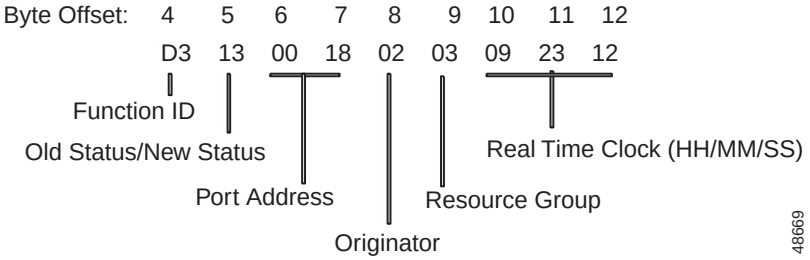
A report indicating a port's availability may be returned from a card in active, maintenance, diagnostic, or maintenance busy mode. When the card is in standby mode or out of service, the port cannot be used for a call and no $D3 reports are generated for the port.

Any $D3 report generated for the first port on the DTG card will always indicate no status change (this port is not supported and remains deactivated at all times). Also, port status changes applied to DTG ports are only performed on the ports residing on the active tone card. Although the ports on the standby tone card are assigned the same logical addresses as the ports on the active card, the $D3 report represents the status of the active tone card port.

Format

Figure 5-9 shows the byte formatting for this report.

Figure 5-9 $D3 Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Old Status/New Status (byte offset 5)—Specifies the status of the port before the change occurred and the present status of the port. Convert the byte from hexadecimal to binary and interpret the bits as follows.

```
MMMMNNNN
```

MMMM—Specifies the status of the port before the change occurred.

MMMM = 0001—Resource was unavailable (out of service).

MMMM = 0011—Resource was on line and available.

NNNN—Specifies the current status of the port.

NNNN = 0001—Resource is currently unavailable (out of service).

NNNN = 0011—Resource currently on line and available.

Port Address (byte offsets 6 and 7)—Hexadecimal representation of port address for which the report is generated.

Originator (byte offset 8)—Specifies whether the change in status was originated by the system or the host and the reason for the change. Interpret the byte as follows:

01—Reason for change unknown; caused by host.

02—Reason for change unknown; caused by system.

12—Port busied out with the system administration Card Maintenance screen.

22—Port busied out with the system administration Set Up Paths screen.

32—Port busied out from distant end.

42—Port busied out because auto makebusy error threshold reached.

52—Port busied out due to internal card error (currently SRC only).

61—Port status changed by host ($90) command.

Resource Group (byte offset 9)—Specifies the resource group number to which the port belongs; convert byte from hexadecimal to decimal for the group number (1 to 63).

Real Time Clock (byte offsets 10 to 12)—A 24-hour system clock indicating the time the status change occurred; hours, minutes, and seconds are represented separately in hexadecimal. Convert each byte from hexadecimal to decimal for the time.

Examples

Example 5-16 $D3 Report

The following report indicates that the port at address $18, in resource group 3, is currently available due to a change originated by the system.

```
04 05 0607 08 09 101112
D3 13 0018 02 03 092312
```

Function ID = D3 (System Port Status)

Old Status/New Status = 00010011

MMMM = 0001 (resource was unavailable)

NNNN = 0011 (resource is currently on line and available)

Port Address = 0018

Originator = 02 (port was returned to service by the system)

Resource Group = 3

Real Time Clock = 9:35:18 am ($09 = 9; $23 = 35; $12 = 18)

Example 5-17 $D3 Report

The following report indicates that the port at address $21, in resource group 3, is currently unavailable because it has been busied out from the distant end.

```
04 05 0607 08 09 101112
D3 31 0021 32 03 0D2D00
```

Function ID = D3 (System Port Status)

Old Status/New Status = 00110001

MMMM = 0011 (resource was on line and available)

NNNN = 0001 (resource is currently unavailable)

Port Address = 0021

Originator = 32 (port was busied out from distant end)

Resource Group = 3

Real Time Clock = 1:45:00 pm ($0D = 13; $2D = 45; $00 = 00)

Spoken Digit ($D4) Report

Report Type

Resource Control

Destination VCA

$40

Description

The Spoken Digit ($D4) report transfers spoken digit collection information from the system to the host. The report indicates the following:

- Valid digit report.
- A wait-for-supervision time out.
- Incorrect supervision was received.
- A collection timer expired.

If a timeout occurs, any digits collected up to that point are reported.

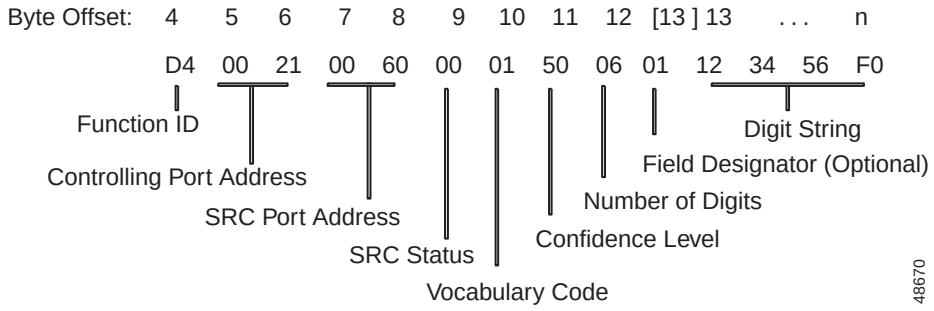
Action Causing Report Generation

The $D4 report is generated in response to a Speech Collection Control ($6E) command.

Format

Figure 5-4 shows the byte formatting for this report.

Figure 5-10 $D4 Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Controlling Port Address (byte offsets 5 and 6)—Hexadecimal representation of the circuit address to which the SRC port is attached.

SRC Port Address (byte offsets 7 and 8)—Hexadecimal representation of the SRC port processing the digits.

SRC Status (byte offset 9)—Indicates the status of the digit report; convert byte from hexadecimal to binary and interpret the bits as described below.

```
00WSCIFD
```

W—Specifies if a supervision event other than what was expected was received. When W = 1, no digits are included in the report because the command specified to wait for supervision before enabling the SRC.

W = 0—Unexpected supervision event was not received.

W = 1—Unexpected supervision event was received; no digit string attached.

S—Specifies if no supervision event was detected before the wait for supervision timer fired; no digits are included in the report because the command specified to wait for supervision before enabling the SRC.

S = 0—The wait for supervision timer did not fire.

S = 1—The wait for supervision timer fired; no digit string attached.

C—Specifies if the field timer fired before all expected digits were received.

C = 0—Field timer did not fire.

C = 1—Field timer fired; digit string may be attached.

I—Specifies if the interdigit timer fired before all expected digits were received; at least one digit is reported in the digit string attached.

I = 0—Interdigit timer did not fire.

I = 1—Interdigit timer fired; digit string is attached.

F—Specifies if first digit timer fired before the first digit was received; no digits are included in this report.

F = 0—First digit timer did not fire.

F = 1—First digit timer fired; no digit string attached.

D—Specifies if valid digits were collected; digit string attached.

D = 0—Digit collection invalid; no digit string attached.

D = 1—Digit collection valid; digit string attached.

Vocabulary Code (byte offset 10)—Indicates if the SRC collected a digit string (0 to 9 and “oh”) or a word (yes or no). Interpret the byte as follows:

00—Digit string collected.

01—Word collected.

Confidence Level (byte offset 11)—Hexadecimal representation calculated by the SRC to represent the degree to which it believes the information contained in the report to be accurate. Convert to decimal for the per cent confidence level (0 to 99%, with 0 indicating no indication was received and 99 indicating almost complete accuracy).

Number of Digits (byte offset 12)—Hexadecimal representation of the number of digits included in the attached digit string. If 00, no digit string attached and this is the final byte of the report.

Optional Field Designator/Digit String (byte offset 12)—When the “Enable Digit Field Reporting” feature is enabled from either the Data Base Administration Menu or Maintenance Menu of the System Administrator database, the byte at offset 12 indicates into what field the system stores the reported digits or words (refer to the *Cisco VCO/4K System Administrator's Guide*). Possible values are as follows:

00—ANI Field.

01—Field 1.

02—Field 2.

03—Field 3.

04—Field 4.

05—Not stored in any field.

Digit String (byte offsets 13 to n)—The spoken digits/word collected. Digits are nibble packed; each nibble in the hexadecimal byte represents a single digit/word. When the Vocabulary Code = 00, digits are represented from 1 to 9, and 0 ($A). When the Vocabulary Code = 01, possible values are “Yes” (1) and “No” (0). The digit string always ends with an $F. If the “Enable Digit Field Reporting” feature is not enabled, then the Digit String bytes begin at byte offset 12. The Optional Field Designator and Digit String are included only when D = 1 in the SRC Status byte.

Examples

Example 5-18 $D4 Report

The following report indicates that the SRC port at port address $29 has collected seven spoken digits with an 84% confidence level. The “Enable Digit Field Reporting” feature has not been enabled.

```
04 0506 0708 09 10 11 12 13 141516
D4 0060 0029 01 00 84 07 62 54A5AF
```

Function ID = D4 (Spoken Digit)

Controlling Port Address = 0060

SRC Port Address = 0029

SRC Status = 00000001

W = 0 (unexpected supervision event not received)

S = 0 (wait for supervision timer did not fire)

C = 0 (field timer did not fire)

I = 0 (interdigit timer did not fire)

F = 0 (first digit timer did not fire)

D = 1 (digit collection valid; digit string attached)

Vocabulary Code = 00 (digit string collected)

Confidence Level of Collection = 54 (84 percent, decimal)

Number of Digits = 07

Spoken Digits Collected = 6254A5A (F marks end of digit string)

Example 5-19 $D4 Report

The following example shows a typical $D4 report for a “Yes” or “No” speech recognition attempt on an SRC port located at port address $2A. The “Enable Digit Field Reporting” feature has not been enabled.

```
04 0506 0708 09 10 11 12 13
D4 0062 002A 01 01 63 01 1F
```

Function ID = D4 (Spoken Digit)

Controlling Port Address = $0062

SRC Port Address = 002A

SRC Status = 00000001

W = 0 (unexpected supervision event not received)

S = 0 (wait for supervision timer did not fire)

C = 0 (field timer did not fire)

I = 0 (interdigit timer did not fire)

F = 0 (first digit timer did not fire)

D = 1 (digit collection valid; digit string attached)

Vocabulary Code = 01 (word collected)

Confidence Level of Collection = $63 (99%, decimal)

Number of Digits = 01

Spoken Digits Collected = 1F (“Yes” was recognized)

Resource Limitation ($D6) Report

Report Type

System Status

Destination VCA

$44

Description

Use the Resource Limitation ($D6) report to inform the host when a resource limitation condition has been detected or cleared. When the condition is detected, the system informs the host there are no units in a specific resource group available to satisfy an allocation request (resource control command, inpulse rule, outpulse rule, etc.). This report is sent only the first time a limitation condition is detected for a resource group. No subsequent limitation condition reports are sent until after the condition has cleared. If the report is generated in response to a resource control command, the original command packet with the appropriate status ($1F in the network status byte) is returned.

For the resource limitation to clear, the system informs the host that resources in a group for which a $D6 report was generated have been successfully allocated for three consecutive requests.

Action Causing Report Generation

The $D6 report is generated for the first occurrence in a specific group until the condition clears. A limitation condition is declared in response to a host resource control command, inpulse rule processing, or outpulse rule processing when all resources of the type requested are busy or otherwise unavailable. The command must specify to hunt a resource group instead of requesting a specific port address.

For the Conference Control ($6D) command, this report is generated when all ports in the conference resource group are busy or unavailable.

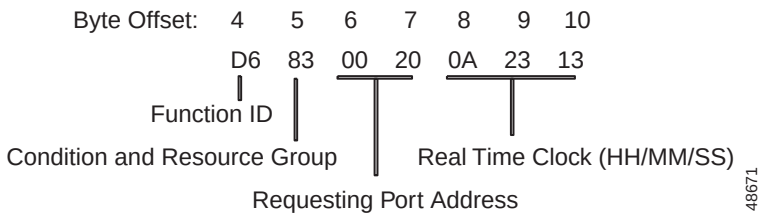
For internal service circuits (DRCs, MRCs, DVCs, IPRCs, DCCs, and CPAs), if no group exists that contains the resource type requested, this report is not sent.

This report is also generated after three consecutive successful allocations have occurred from a resource group for which allocation attempts have previously failed.

Format

Figure 5-11 shows the byte formatting for this report.

Figure 5-11 $D6 Command Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Condition (byte offset 5)—Specifies whether a limitation condition is present and the resource group for which the request was made. Convert the byte from hexadecimal to binary and interpret the bits as follows.

```
C0GGGGGG
```

C—Specifies if a limitation condition is present.

C = 0—Limitation condition is clear.

C = 1—Limitation condition is present; resource unavailable.

GGGGGG—Specifies the resource group; convert binary to decimal for group number (1 to 63).

Requesting Port Address (byte offsets 6 and 7)—Hexadecimal representation of the port specified in the resource control command, inpulse rule, or outpulse rule for which a resource was requested. For a conference control command, this byte is the hexadecimal representation of the conference number for which the port was requested. If the port address is in the range $80 00 to $80 FF. The requesting port is a virtual port.

Real Time Clock (byte offsets 8 to 10)—A 24-hour system clock indicating the time the $D6 report was generated. Hours, minutes, and seconds are represented separately in hexadecimal. Convert each byte from hexadecimal to decimal for the time.

Examples

Example 5-20 $D6 Report

The following report indicates that all ports in resource group 3 are unavailable. This report is sent the first time an allocation attempt fails for this group until the condition has cleared.

```
04 05 0607 080910
D6 83 0020 0A2313
```

Function ID = D6 (Resource Limitation)

Condition and Resource Group = 10000011

A = 1 (limitation condition present)

GGGGGG = 3 (resource group 3)

Requesting Port Address = 0020

Real Time Clock = 10:35:19am ($0A = 10; $23 = 35; $13 = 19)

Example 5-21 $D6 Report

The following report indicates that the limitation condition reported in Example 5-20 has cleared (three consecutive allocations from this group have been successfully performed).

```
04 05 0607 080910
D6 03 0038 0A3522
```

Function ID = D6 (Resource Limitation)

Condition and Resource Group = 00000011

A = 0 (limitation condition cleared)

GGGGGG = 3 (resource group 3)

Requesting Port Address = 0038

Real Time Clock = 10:53:34am ($0A = 10; $35 = 53; $22 = 34)

System Card Status ($D9) Report

Report Type

System Status

Destination VCA

$40

Description

The System Card Status ($D9) report informs the host of a change in the status of a system resource card. The card location is represented both by the port address and the physical rack, level, slot (R-L-S) address.

Action Causing Report Generation

The $D9 report is generated when a change occurs in the operating status of a system card. Status changes can be caused by an action at the System Administration console, a host command, or physical removal and/or replacement of the card. The report is also sent for each card in the system as it comes on line after a system boot.

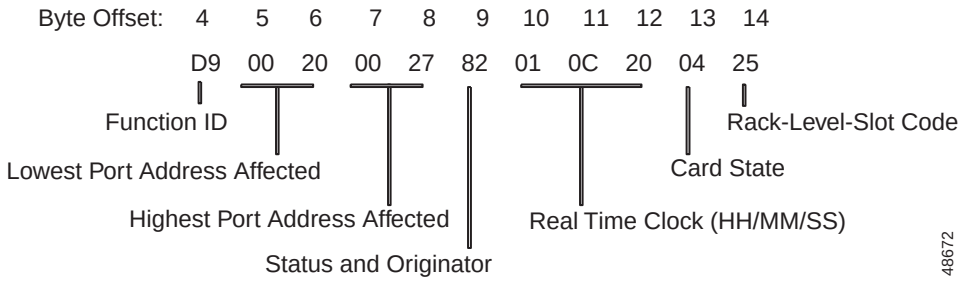
For T1, the card is reported as on line when the carrier and remote carrier alarms clear. If either the carrier alarm or remote carrier alarm reoccurs, the card is reported as being off line.

For DVC and IPRC, the card is reported as on line when the card download is complete.

Format

Figure 5-12 shows the byte formatting for this report.

Figure 5-12 $D9 Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Lowest Port Address Affected (byte offsets 5 and 6)—Hexadecimal representation of the first port address on the card for which the report is sent.

Highest Port Address Affected (byte offsets 7 and 8)—Hexadecimal representation of the last port address on the card for which the report is sent.

Status and Originator (byte offset 9)—Specifies if the card is on line or off line, if the card was just added to or deleted from the database, and whether the change in status was originated by the system or the host. Convert the byte from hexadecimal to binary and interpret the bits as follows:

```
LDA000SH
```

L—Specifies if card is on line or off line.

L = 0—Card is on line.

L = 1—Card is off line.

D—Specifies if card was just deleted from the database.

D = 0—Card is not deleted from the database.

D = 1—Card was just deleted from the database.

A—Specifies if card was just added to the database.

A = 0—Card is not added to the database.

A = 1—Card was just added to the database.

S—Specifies if the change was due to some action by the system (such as an alarm/error condition or change made via system administration).

S = 0—System was not responsible for the change.

S = 1—System originated the change.

H—Specifies if the change was due to some action by the host computer.

H = 0—Host was not responsible for the change.

H = 1—Host originated the change.

Real Time Clock (byte offsets 10 to 12)—A 24-hour system clock indicating the time the status change occurred. Hours, minutes, and seconds are represented separately in hexadecimal. Convert each byte from hexadecimal to decimal for the time.

Card State (byte offset 13)—Indicates the present status of the card for which the report is generated. Interpret this byte as follows:

00—Card is in an unknown state.

01—Card is in the active state.

02—Card is in the maintenance state.

03—Card is in the diagnostic state (not valid for BRC).

04—Card is in the out of service state.

05—Card is in the standby state (valid for BRC and DTG only).

06—Card is in the camped on state. An attempt was made to place the card into the diagnostics state with the system administration Card Maintenance screen. The card remains in this state until further system administration action. Refer to the *Cisco VCO/4K System Administrator's Guide* for more information.

Rack-Level-Slot Code (byte offset 14)—Specifies the rack, level, and slot in which the card is located. Convert the byte from hexadecimal to binary and interpret as follows:

```
LLLSSSSS
```

LLL—Rack and level on which the card is located; interpret as follows:

001—Rack 1, Level 1.

010—Rack 1, Level 2.

011—Rack 1, Level 3.

100—Rack 2, Level 0.

101—Rack 2, Level 1.

110—Rack 2, Level 2.

111—Rack 2, Level 3.

SSSSS—Slot number in which the card is located. Convert the value from binary to decimal for the slot number (1 to 21).

Note For a multispan card, the command includes a port range of 24 channels. If the card is removed or deleted, the report is issued multiple times.

Examples

Example 5-22 $D9 Report

The following report indicates that the card at rack 1, level 1, slot 5 was taken out of service through a System Administration console command.

```
04 0506 0708 09 101112 13 14
D9 0020 0027 82 010C20 04 25
```

Function ID = D9 (System Card Status)

Lowest Port Address Affected = 0020

Highest Port Address Affected = 0027

Status and Originator = 10000010

L = 1 (card off line)

D = 0 (card not deleted from database)

A = 0 (card not added to database)

S = 1 (system originated change)

H = 0 (host not responsible for change)

Real Time Clock = 1:12:32 am ($01 = 1; $0C = 12; $20 = 32)

Card State = 04 (card out of service)

Rack-Level-Slot Code = 00100101

LLL = 001 (rack 1, level 1)

SSSSS = 5 (Slot 5)

Example 5-23 $D9 Report

The following report indicates that the card at rack 2, level 0, slot 20 was added to the system database but is still off line.

```
04 0506 0708 09 101112 13 14
D9 0018 001F A2 142D00 04 94
```

Function ID = D9 (System Card Status)

Lowest Port Address Affected = 0018

Highest Port Address Affected = 001F

Status and Originator = 10100010

L = 1 (card off line)

D = 0 (card not deleted from database)

A = 1 (card added to database)

S = 1 (system originated change)

H = 0 (host not responsible for change)

Real Time Clock = 8:45:00 pm ($14 = 20; $2D = 45; $00 = 00)

Card State = 04 (card out of service)

Rack-Level-Slot Code = 10010100

LLL = 100 (rack 2, level 0)

SSSSS = 20 (Slot 20)

Outgoing Port Change of State ($DA) Report

Note Unless otherwise stated, the MF processing described in this section applies to both MF and MFCR2 processing.

Report Type

Resource Control

Destination VCA

$40

Definition

In MF processing, the Outgoing Port Change of State ($DA) report informs the host of a change in the hardware state of an outgoing system port. Note that in-band signaling is only detected during outpulse rule processing when a CPA port is attached. This report can also be issued to indicate that an outpulse rule has successfully completed for the outgoing port.

Supervision errors are indicated by the appropriate value in the Change byte. The Change byte also indicates when a rehunt of an outgoing port is performed. When a rehunt occurs, the new outgoing port is indicated in byte offsets 14 and 15.

For the system to generate this report indicating outpulse rule completion, a REP END token must be contained in the outpulse rule.

In MFCR2 processing, this report indicates the final backward supervision tone detected to the host as part of the R2 signaling on outgoing trunks. This tone is indicated in the Answer Supervision Code (byte offset 9). Values of 33 xx indicate the backward supervision tone, where xx indicates the Group-A or Group-B tone (the tone meaning is subject to the context of the call).

The supervision template (byte offset 13) indicates the number of the outpulse rule used during MFCR2 outpulsing.

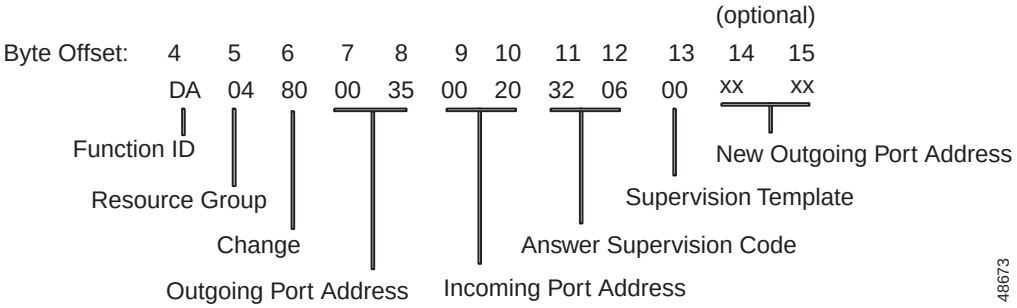
Action Causing Report Generation

The $DA report is generated in response to a change in the hardware state of an outgoing port or the end of outpulse rule processing (REP END in outpulse rule).

Format

Figure 5-13 shows the byte formatting for this report.

Figure 5-13 $DA Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Resource Group (byte offset 5)—Specifies the resource group number to which the port belongs; convert byte from hexadecimal to decimal for the group number (1 to 63).

Change (byte offset 6)—Type of change detected. The following list provides a general indication of the change that occurred for the outgoing port.

01—Call attempt failed (FAIL token in answer supervision template).

02—Outgoing port rehunt performed due to supervision error; new outgoing port address supplied in byte offsets 14 and 15 (ERROR token in answer supervision template).

04—Outpulse rule processing has completed for this port; rule number specified in byte offset 11 (REP END in outpulse rule).

05—Outpulse rule processing aborted (QUIT token in answer supervision template).

08—Supervision detected outside of a rule (prior to executing a supervision control outpulse rule token or after the token is satisfied).

10—Supervision detected during rule processing (REP, OKREP or ANSREP token in answer supervision template).

20—Supervision error detected; no rehunt performed (ERROR token in answer supervision template).

40—Port became inactive (on hook).

80—Port became active (went off hook or REP, OKREP or ANSREP token in answer supervision template).

Outgoing Port Address (byte offsets 7 and 8)—Hexadecimal representation of the address of the port for which the state change was detected.

Incoming Port Address (byte offsets 9 and 10)—Hexadecimal representation of the incoming port address to which this outgoing port was connected.

Answer Supervision Code (byte offset 11 and 12)—For Change = 01, 02, 05, 08, 10, 20, or 80, indicates the type of answer supervision activity present on this outgoing port. If Change = 40, these bytes are set to 00 00. If Change = 04, byte offset 11 contains the number of the outpulse rule processed; byte offset 12 is set to 00.

Table 5-7 lists the standard supervision codes for MF/MFCR2 processing.

Table 5-7 Standard Supervision Codes for MF/MFCR2 Processing

Code	Meaning
30 01	Simultaneous seizure at both ends of a trunk (glare condition).
30 02	Attempt made to answer a non-ringing port.
30 04	Supervision timer expired.
30 05	No current on line.
31 01	Reorder tone detected.
31 02	Busy signal detected.
31 03	Ringback detected.
31 04	Dial tone detected.
31 05	SIT tones detected.
31 06	Pager cue tone detected.
31 07	ISUP tone detected.
31 08	ISUP tone cessation.
32 01	Grace time completed.
32 02	Ringback cessation.
32 03	Wink detected.
32 04	Hook flash detected.
32 06	True answer detected.
32 07	Voice detected.
32 08	Voice cessation.
32 09	Outgoing port returned to CP_SETUP.

Table 5-8 lists the R2 backward signaling codes for MFCR2 processing.

Table 5-8 R2 Backward Signaling Codes for MFCR2 Processing

Code	Backward Tone Detected
33 00	A-10/B-10
33 01	A-1/B-1
33 02	A-2/B-2
33 03	A-3/B-3
33 04	A-4/B-4
33 05	A-5/B-5
33 06	A-6/B-6
33 07	A-7/B-7
33 08	A-8/B-8
33 09	A-9/B-9
33 0B	A-11/B-11

Table 5-8 R2 Backward Signaling Codes for MFCR2 Processing (continued)

Code	Backward Tone Detected
33 0C	A-12/B-12
33 0D	A-13/B-13
33 0E	A-14/B-14
33 0F	A-15/B-15

Supervision Template (byte offset 13)—For MFCR2 processing, this byte indicates the outpulse rule used for R2 outdialing.

For MF processing, this byte indicates whether the outgoing port is considered answered (ANS condition token processed in answer supervision template or FINAL SUP [xx] outpulse rule token satisfied), and specifies the number of the answer supervision template used. The byte is set to 00 for call failures and supervision errors. Convert the byte from hexadecimal to binary and interpret the bits as follows:

```
A0NNNNNN
```

A—Indicates whether the outgoing port is considered answered.

A = 0—Outgoing port is not considered answered.

A = 1—Outgoing port is considered answered.

NNNNNN—Specifies the answer supervision template used. Convert the value from binary to decimal for the template number. When this value is zero, either the A template or W template was used. If the $DA report indicates the port is either on-hook or off-hook and A = 0, the W (wink) template was applied. If the $DA report indicates the port is off-hook and A = 1, the A (answer) template was applied.

New Outgoing Port (byte offset 14 and 15)—For Change = 02, indicates new Outgoing Port selected by the system as a result of a rehunt operation (outgoing supervision error encountered). The type of error is indicated in the Answer Supervision Code bytes. Not included unless Change = 02.

Examples

Example 5-24 $DA Report

The following report indicates that the outgoing port which is at address $35 and connected to the incoming port at address $20 has gone off hook. Answer supervision has been detected (SLIC, T1, E+M, or UTC only).

```
04 05 06 0708 0910 1112 13
DA 04 80 0035 0020 3206 00
```

Function ID = DA (Outgoing Port Change of State)

Resource Group = 4

Change = off hook ($80)

Outgoing Port Address = 0035

Incoming Port Address = 0020

Answer Supervision Code = 3206 (true answer detected - answered with reversal)

Supervision Template = 00 (no answer supervision template used)

Example 5-25 $DA Report

The following report indicates that the outgoing port which is at address $35 and was connected to the incoming port at address $20 has gone on hook.

```
04 05 06 0708 0910 1112 13
DA 04 40 0035 0020 0000 00
```

Function ID = DA (Outgoing Port Change of State)

Resource Group = 4

Change = on hook ($40)

Outgoing Port Address = 0035

Incoming Port Address = 0020

Answer Supervision Code = 00 00 (because Change = $40)

Supervision Template = 00 (no answer supervision template used)

Example 5-26 $DA Report

The following report indicates that a supervision error occurred on an outgoing port at address $35 that was being connected to the incoming port at address $20. The outgoing port ($35) is removed from the call and the incoming port ($20) is placed into CP_SETUP state (no rehunt performed). Answer supervision template #2 specifies detection of SIT tones as an error condition.

```
04 05 06 0708 0910 1112 13
DA 04 20 0035 0020 3105 02
```

Function ID = DA (Outgoing Port Change of State)

Resource Group = 4

Change = supervision error detected ($20) Outgoing Port Address = $0035

Incoming Port Address = 0020

Answer Supervision Code = 31 05 (SIT tones detected)

Supervision Template = 02 (answer supervision template used)

Example 5-27 $DA Report

The following report indicates that supervision was received outside of outpulse rule processing. The circuit at 00 35 is a T1 port.

```
04 05 06 0708 0910 1112 13
DA 04 08 0035 0020 3203 00
```

Function ID = DA (Outgoing Port Change of State)

Resource Group = 4

Change = supervision detected outside an outpulse rule ($08)

Outgoing Port Address = 0035

Incoming Port Address = 0020

Answer Supervision Code = 32 03 (wink detected)

Supervision Template = 00 (no answer supervision template used)

Example 5-28 $DA Report

The following report indicates that a supervision error caused the system to rehunt to replace the outgoing port at address $035. The new outgoing port is supplied in the final two bytes.

```
04 05 06 0708 0910 1112 13 1415
DA 04 02 0035 0020 3101 00 0038
```

Function ID = DA (Outgoing Port Change of State)

Resource Group = 4

Change = outgoing rehunt performed; new outgoing port in final two bytes

Outgoing Port Address = 0035

Incoming Port Address = 0020

Answer Supervision Code = 3101 (reorder signal detected)

Supervision Template = 00 (no answer supervision template used)

New Outgoing Port Address = 0038

Incoming Port Change of State ($DB) Report

Report Type

Resource Control

Destination VCA

$40

Definition

The Incoming Port Change of State ($DB) report informs the host of a change in the hardware state of an incoming system port. Also indicates if an outpulse rule has been processed for the incoming port. This report can be included as a report segment in an Inpulse Rule Complete ($DD) report.

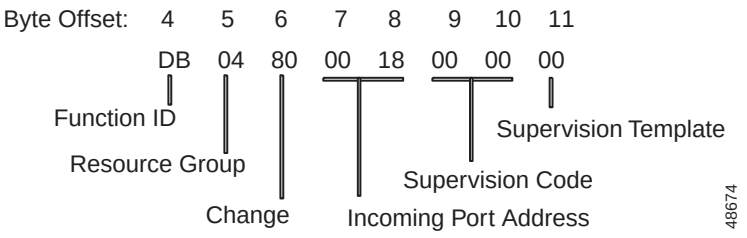
Action Causing Report Generation

The $DB report is generated in response to a change in the hardware state of an incoming port or completion of an outpulse rule.

Format

Figure 5-14 shows the byte formatting for this report.

Figure 5-14 $DB Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Resource Group (byte offset 5)—Specifies the resource group number to which the port belongs; convert byte from hexadecimal to decimal for the group number (1 to 63 inclusive). Omitted if the report is included as a segment in a $DD report.

Change (byte offset 6)—Type of change detected. Interpret the byte as follows:

01—Call attempt failed (FAIL token in answer supervision template).

02—Outgoing port rehunt was performed due to a supervision error; a new outgoing port address is supplied in byte offsets 14 and 15 (ERROR token in answer supervision template).

04—Outpulse rule processing has completed for this port; rule number is specified in byte offset 9 (REP END token in outpulse rule).

05—Outpulse rule processing was aborted (QUIT token in answer supervision template).

08—Supervision detected outside of a rule (prior to executing a supervision control outpulse rule token or after the token is satisfied).

10—Supervision was detected during rule processing (REP, OKREP or ANSREP token in answer supervision template).

20—Supervision error was detected; no rehunt performed (ERROR token in answer supervision template).

40—Port became inactive (on hook).

80—Port became active (went off hook or REP, OKREP or ANSREP token in answer supervision template).

Incoming Port Address (byte offsets 7 and 8)—Hexadecimal representation of the address of the port for which the state change was detected. Omitted if the report included as a segment in a $DD report.

Answer Supervision Code (byte offsets 9 and 10)—Specifies the supervision error or the number of the outpulse rule completed. If Change = 40, these bytes are set to 00 00. When Change = 01, 02, 05, 08, 10, 20, or 80, interpret the bytes as follows:

30 01—Simultaneous seizure at both ends of a trunk (glare condition).

30 02—Attempt made to answer a non-ringing port.

30 04—Supervision timer expired.

30 05—No current on line.

31 01—Reorder tone detected.

31 02—Busy signal detected.

31 03—Ringback detected.

31 04—Dial tone detected.

31 05—SIT tones detected.

31 06—Pager cue tone detected.

31 07—ISUP tone detected.

31 08—ISUP tone cessation.

32 01—Grace time completed.

32 02—Ringback cessation.

32 03—Wink detected.

32 04—Hook flash detected.

32 06—True answer detected.

32 07—Voice detected.

32 08—Voice cessation.

32 09—Outgoing port returned to CP_SETUP.

When Change = 04, byte offset 9 specifies the outpulse rule number completed; byte offset 10 is set to 00. Convert from hexadecimal to decimal for the rule number.

Supervision Template (byte offset 11)—Specifies the number of the answer supervision template used. The byte is set to 0 for call failures and supervision errors. Convert the byte from hexadecimal to binary and interpret the bits as follows:

```
A00NNNNNN
```

A—Indicates whether the outgoing port is answered.

A = 0—Outgoing port not answered.

A = 1—Outgoing port answered.

NNNNNN—Specifies the answer supervision template used. Convert from binary to decimal for the template number. When this value is zero, either the A template or W template was used. If an associated $DB report indicates the port is off-hook and A = 0, the W (wink) template was applied. If an associated $DB report indicates the port is off-hook and A = 1, the A (answer) template was applied.

Examples

Example 5-29 $DB Report

The following report indicates that the port at address $20 has gone off hook.

```
04 05 06 0708 0910 11
DB 04 80 0020 0000 00
```

Function ID = DB (Incoming Port Change of State)

Resource Group = 4

Change = off hook ($80)

Incoming Port Address = 0020

Supervision Code = 00 00

Supervision Template = 00 (no answer supervision template used)

Example 5-30 $DB Report

The following report indicates that the port at address $20 has gone on hook.

```
04 05 06 0708 0910
DB 04 40 0020 0000
```

Function ID = DB (Incoming Port Change of State)

Resource Group = 4

Change = on hook ($40)

Incoming Port Address = 0020

Supervision Code = 00 00

Supervision Template = 00 (no answer supervision template used)

Example 5-31 $DB Report

The following report indicates that the system attempted to answer a nonringing incoming port. This port must be a UTC circuit (only UTC ports report this condition).

```
04 05 06 0708 0910 11
DB 04 20 0020 3002 00
```

Function ID = DB (Incoming Port Change of State)

Resource Group = 4

Change = supervision error ($20)

Incoming Port Address = 0020

Supervision Code = 30 02

Supervision Template = 00 (no answer supervision template used)

Example 5-32 $DB Report

The following report indicates that an outpulse rule has completed processing for the port at $0020. The outpulse rule included a REP END to generate this report.

```
04 05 06 0708 0910 11
DB 04 04 0020 0500 00
```

Function ID = DB (Incoming Port Change of State)

Resource Group = 4

Change = Outpulse rule complete ($04)

Incoming Port Address = 0020

Supervision Code = Outpulse rule 5

Supervision Template = 00 (no answer supervision template used)

Active/Standby Mode ($DC) Report

Report Type

Configuration Control

Destination VCA

$40

Description

The Active/Standby Mode ($DC) report informs the host of a system boot, system initialization, or transfer in control between the active and standby sides of a redundant system. It also reports when a link between the host and the system becomes established. In a redundant system, both the active and standby sides report a transfer.

Action Causing Report Generation

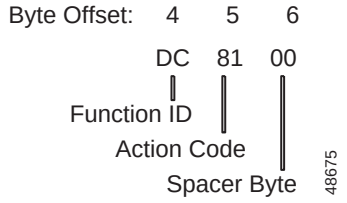
A $DC report is sent when system boots, system initialization is complete, or when a transfer of control occurs. Transfer could be caused by a Change Active Controllers ($C0 01) command or an event internal to the system.

The $DC report is also sent over a host-system link when that link becomes active. A report is sent by each link in the system. System reboot causes all links to reset.

Format

Figure 5-15 shows the byte formatting for this report.

Figure 5-15 $DC Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Action Code (byte offset 5)—Specifies why the report is sent, which side sent the report, and whether that side is active or standby. Convert the byte from hexadecimal to binary and interpret the bits as follows:

```
RI0000SM
```

R—Specifies the reason the report is sent, either system boot/data link established or a run-time transfer.

R = 0—Run-time transfer.

R = 1—System boot or data link established.

I—Specifies that system initialization is complete and the system can process calls.

I = 1—System initialization complete.

S—Specifies the side of the system from which the report originated.

S = 0 —Report is from system A side.

S = 1—Report is from system B side.

M—Specifies whether the system side originating the report is currently the active or standby side

M = 0—Reporting side is currently standby.

M = 1—Reporting side is currently active.

Spacer Byte (byte offset 6)—Reserved for future enhancements; always = $00.

Examples

Example 5-33 $DC Report

The following report indicates a system boot for a redundant system with a link on each side. When the system initially comes on line, the Alarm Arbiter Card (AAC) determines which processor is active (in this example, the A side). The first report shows the event from the A side, the second from the B side.

```
04 05 06
DC 81 00
```

Function ID = DC (Active/Standby Mode)

Action Code = 10000001

R = 1 (system has booted or link is established)

S = 0 (report is from the A side)

M = 1 (reporting side is currently active)

Spacer Byte = 00 (no meaning) DC 82 00

Function ID = DC (Active/Standby Mode)

Action Code = 10000010

R = 1 (system has booted or link is established)

S = 1 (report is from the B side)

M = 0 (reporting side is currently standby)

Spacer Byte = 00 (no meaning)

Example 5-34 $DC Report

The following reports reflect a change in active and standby sides initiated by a host command or an action at the administrative console or the Alarm Arbiter Card.

```
04 05 06
DC 00 00
```

Function ID = DC (Active/Standby Mode)

Action Code = 00000000

R = 0 (run-time transfer)

S = 0 (report is from the A side)

M = 0 (reporting side is currently standby)

Spacer Byte = 00 (no meaning)

```
04 05 06
DC 03 00
```

Function ID = DC (Active/Standby Mode)

Action Code = 00000011

R = 0 (run-time transfer)

S = 1 (report is from the B side)

M = 1 (reporting side is currently active)

Spacer Byte = 00 (no meaning)

Example 5-35 $DC Report

The following report indicates that one of the host-to-system links has just become active.

Note This report is not interpreted as a system reboot when received from only one link.

```
04 05 06
DC 81 00
```

Function ID = DC (Active/Standby Mode)

Action Code = 00000000

R = 1 (system has booted or link is established)

S = 0 (report is from the A side)

M = 1 (reporting side is currently active)

Spacer Byte = 00 (no meaning)

Inpulse Rule Complete (Macro) ($DD) Report

Report Type

Resource Control

Destination VCA

$40

Description

The Inpulse Rule Complete (Macro) ($DD) report informs the host that an inpulse rule has been processed. The content of the report is controlled by the type of reporting specified in the inpulse rule. If REP EACH is specified, the report will indicate only that inpulse rule processing has ended. If REP END is specified, the report is a macro containing Resource Control reports (segments) to represent all actions taken during inpulse rule execution. Resource report segments included in the macro can include the following:

- Incoming Port Change of State ($DB)
- DTMF Digit ($D1)
- MF Digit ($D0)

Segments are reported in the following order:

- Incoming Port Change of State ($DB)
- Digit report for field 1
- Digit report for field 2
- Digit report for field 3
- Digit report for field 4
- Digit report for field ANI (originating number field)

Digit segments follow the general format for their report, but the Controlling Port Address and Spacer bytes are omitted in MF collections, and the Controlling Port Address, Report Status and Supervision bytes are omitted in DTMF collections. Incoming Port Change of State segments contain only the function ID and Change Code.

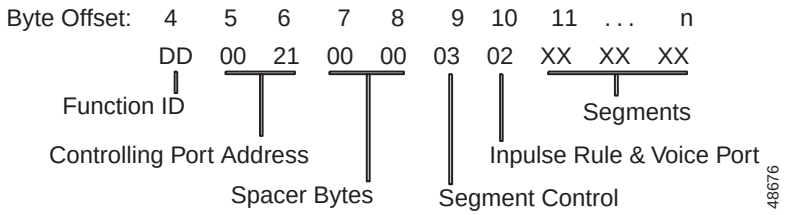
Action Causing Report Generation

This report is generated when inpulse rule processing is terminated. Termination can be caused by: the successful completion of the rule; an error in rule processing; a looping rule which only contains setup to reporting tokens; a host command overriding the rule; or by the controlling port going on hook.

Format

Figure 5-16 shows the byte formatting for this report.

Figure 5-16 $DD Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Controlling Port Address (byte offsets 5 and 6)—Hexadecimal representation of the port for which the inpulse rule is being executed.

Spacer Bytes (byte offsets 7 and 8) – Reserved for future enhancements; always returned as 00 00.

Segment Control (byte offset 9)—Specifies the number of segments included in this report, if the rule was processed for an incoming or outgoing port and if the TeleRouter overlay performed a routing action. Convert the byte from hexadecimal to binary and interpret the bits as described below. If inpulse rule executed specified REP EACH, this byte will be $00, indicating there are no segments.

```
ABC00NNN
```

A—Specifies if inpulse rule was processed for an incoming or outgoing port.

A = 0—Inpulse rule was processed for an incoming port.

A = 1—Inpulse rule was processed for an outgoing port.

B—Specifies if a looping rule was aborted.

B = 0—Rule not aborted because of looping.

B = 1—Looping rule was aborted automatically (S = 1 in byte offset 10).

C—Specifies if the TeleRouter overlay performed a routing action (ROUTE [Tx] token in inpulse rule).

C = 0—No routing performed.

C = 1—Routing action was performed by TeleRouter; a Routing Action ($D5) report follows the $DD report once the action is complete.

NNN—Specifies the number of segments included in this report; if inpulse rule specifies a REP EACH token, these bits are zero indicating there are no segments attached.

Inpulse Rule/Voice Port (byte offset 10)—Specifies the inpulse rule number executed, whether it completed normally or was aborted, whether rule was aborted due to outpulse channel exhaust (DO ORULE token in inpulse rule), and whether a voice port was available on the first attempt as required by that rule. Convert the byte from hexadecimal to binary and interpret the bits as follows:

```
ASTRRRRR
```

A—Specifies if a voice port was available when initially requested.

A = 0—Voice port was available on initial request.

A = 1—Voice port was not available on initial request.

S—Specifies if inpulse rule processing completed normally or was aborted; error conditions that can cause inpulse rule processing to abort are:

- MF receiver was unavailable.
- DTMF receiver was unavailable.
- Digit collection error or timeout (MF, DTMF, or DP).
- Voice port was unavailable.
- Host command was received.
- Port goes on hook (call abandon).
- Rule specifies digit collection but no DTMF or MF token was in rule.
- No outpulse channel was available (when rule includes DO ORULE token).
- Looping rule was detected.

S = 0—Inpulse rule processing completed normally.

S = 1—Inpulse rule processing was aborted.

T—When S = 1, specifies if rule was aborted because no outpulse channel was available; DO ORULE token was in rule.

T = 0—Rule was not aborted due to outpulse channel exhaust condition.

T = 1—Rule was aborted due to outpulse channel exhaust condition.

RRRRR—Specifies the inpulse rule that was executed; convert binary to decimal for the rule number (1 to 30).

Segments (byte offset 11 to n)—Resource report segments included in this macro; segment format follows that of the report the segment represents, with the following exceptions: the Controlling Port Address and Spacer Bytes are omitted in MF ($D0) collections, and the Controlling Port Address, Report Status and Supervision bytes are omitted in DTMF ($D1) collections, and Incoming Port Change of State ($DB) segments contain only the Function ID and Change Code.

Examples

Example 5-36 $DD Report

The following report indicates that inpulse rule 3 was executed on the incoming port at address $28. Three MF digits (1, 2, 3) and seven DTMF digits were collected (1, 2, 3, 4, 5, 6, 7).

```
04 0506 0708 09 10 1112131415161718192021222324
DD 0028 0000 02 03 00003401123FD10052011234567F
```

Function ID = DD (Inpulse Rule Complete (macro))

Controlling Port Address = 0028

Spacer Bytes = 00 00

Segment Control = 00000010

A = 0 (Inpulse rule processed for incoming port)

NNN = 2 (2 segments attached)

Inpulse Rule/Voice Port = 00000011

A = 0 (voice port available on initial request)

S = 0 (Inpulse rule processing completed normally)

T = 0 (rule not aborted due to Outpulse Channel exhaust condition)

RRRRR = 3

Segment 1 is as follows:

Function ID = MF Digit ($D0)

Controlling Port Address = omitted

Spacer Bytes = omitted

MF Receiver Address = 0034

MF Status = 00000001

V = 0 (report not garbled)

S = 0 (no meaning since V and Y = 0)

X = 0 (MF receiver available on initial request)

Y = 0 (MF digit collection timer did not fire)

Z = 1 (valid MF digit string collected)

Digit String = 123 (F marks end of string)

END OF SEGMENT 1

Segment 2 is as follows:

Function ID = D1 (DTMF Digit)

Controlling Port Address = omitted

Report Status = omitted

Supervision = omitted

DTMF Receiver Address = 0052

DTMF Status = 00000001

T = 0 (interdigit timer did not fire)

V = 0 (not a first digit report)

W = 0 (DTMF receiver available on initial request)

X = 0 (DTMF digit collection timer did not fire)

Y = 0 (DTMF first-digit collection timer did not fire)

Z = 1 (DTMF digit string reported)

Digit String = 1234567 (F marks end of string)

END OF SEGMENT 2

Example 5-37 $DD Report

The following report indicates that the incoming port at address $35 went off hook and executed inpulse rule 16. During the execution of that rule, the system made two attempts before allocating a voice port (processing a SPEAK token). Three DTMF digits (4, 4, 2) were collected.

```
04 0506 0708 09 10 1112131415161718
DD 0035 0000 02 90 DB80D1003505442F
```

Function ID = DD (Inpulse Rule Complete (macro))

Controlling Port Address = 0035

Spacer Bytes = 00 00

Segment Control = 00000010

A = 0 (Inpulse rule processed for incoming port)

NNN = 2 (2 segments attached)

Inpulse Rule/Voice Port = 10010000

A = 1 (voice port was not available on initial request)

S = 0 (Inpulse rule processing completed normally)

T = 0 (rule was not aborted due to an Outpulse Channel exhaust condition)

RRRRR = 16

Segment 1 is as follows:

Function ID = Incoming Port Change of State ($DB)

Resource Group = omitted

Change = off hook ($80)

Incoming Port Address = omitted

Supervision Code = omitted

END OF SEGMENT 1

Segment 2 is as follows:

Function ID = D1 (DTMF Digit)

Controlling Port Address = omitted

Report Status = omitted

Supervision = omitted

DTMF Receiver Address = 0035 (SLIC, DID, or UTC port with onboard receiver)

DTMF Status = 00000101

T = 0 (interdigit timer did not fire)

V = 0 (not a first digit report)

W = 0 (DTMF receiver available on initial request)

X = 1 (DTMF digit collection timer fired

Y = 0 (DTMF first-digit collection timer did not fire)

Z = 1 (DTMF digit string reported)

Digit String = 442 (F marks end of string)

END OF SEGMENT 2

Voice Port Status ($DE) Report

Report Type

Resource Control

Destination VCA

$40

Description

The Voice Port Status ($DE) report indicates when all voice prompts specified in a Voice Port Control ($6C) command have completed. This reporting is controlled by a bit setting in the $6C command.

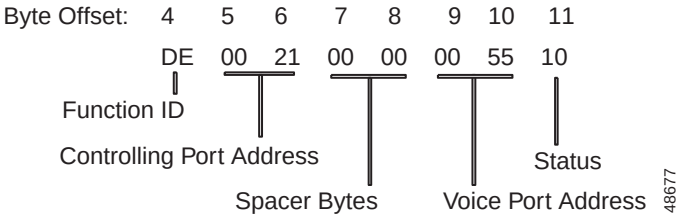
Action Causing Report Generation

The $DE report is generated when all voice prompts specified in a $6C command have completed if specified in the command.

Format

Figure 5-17 shows the byte formatting for this report.

Figure 5-17 $DE Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Controlling Port Address (byte offsets 5 and 6)—Hexadecimal representation of the incoming port to which the voice prompts were played.

Spacer Bytes (byte offsets 7 and 8)—Reserved for future enhancements; always returned as 00 00.

Voice Port Address (byte offsets 9 and 10)—Hexadecimal representation of the port used to present prompts.

Status (byte offset 11)—Indicates the status of the digit report. A byte value of 10 indicates that all specified voice prompts have been presented.

Example

Example 5-38 $DE Report

A $6C command specified to present five voice prompts and report to the host upon completion. The following report shows that all specified prompts have been presented.

```
04 0506 0708 0910 11
DE 0042 0000 0056 10
```

Function ID = DE (Voice Port Status)

Controlling Port Address = 0042

Spacer Bytes = 00 00

Voice Port Address = 0056

Status = all prompts presented ($10)

ISDN Port Change of State ($EA) Report

Report Type

Resource Control

Destination VCA

$40

Definition

Use the ISDN Port Change of State ($EA) report to inform the host of a change in the state of an ISDN call. Both the controlling and associated ports are represented. The port can be represented by B-channel, or by D-channel and Call ID.

In interworking scenarios, a pair of reports is produced when a port change of state affects both an ISDN port and a non-ISDN port. A non-ISDN port can be either the controlling port or the associated port. If the port is non-ISDN, the appropriate Incoming Port Change of State ($DB) or Outgoing Port Change of State ($DA) report is generated. Use the $EA report for ISDN-related events only.

The $EA report may be truncated if the network header segment, base report, and IEs exceed 255 bytes in length. No indication of truncation is provided to the host.

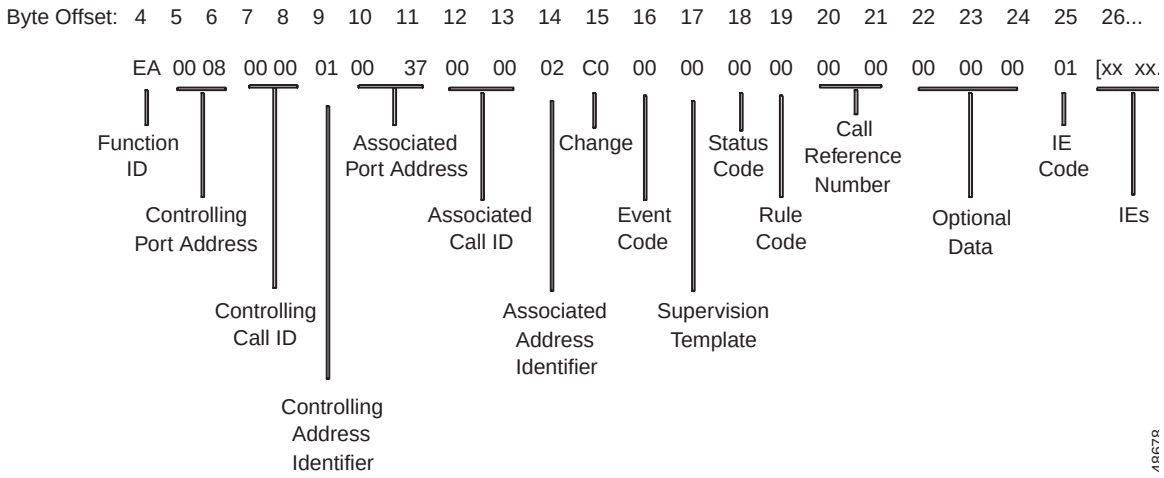
Action Causing Report Generation

The $EA report is generated in response to a change in the state of an ISDN call or B-channel.

Format

Figure 5-18 shows the byte formatting for this report.

Figure 5-18 $EA Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Controlling Port Address (byte offsets 5 and 6)—Hexadecimal representation of the controlling port circuit address for which the report is sent. If the Controlling Address Identifier (byte offset 9) is $01, these bytes represent the specific B-channel assigned to the call or a non-ISDN port. If the Controlling Address Identifier is $02, these bytes represent the D-channel; the Controlling Call ID is identified in byte offset 7 and 8.

Controlling Call ID (byte offsets 7 and 8)—Specifies the ISDN Call ID for the controlling port. Use Call ID only when the controlling port is specified by the D-channel. You must set the Controlling Address Identifier (byte offset 9) to $02.

Controlling Address Identifier (byte offset 9)—Specifies whether the controlling port is identified by D-channel and Call ID or by B-channel/non-ISDN port address. Interpret the byte as follows:

01—Controlling port specified by B-channel or non-ISDN port address; Controlling Call ID = 00 00 for non-ISDN port address.

02—Controlling port specified by D-channel and Call ID.

Associated Port Address (byte offsets 10 and 11)—Hexadecimal representation of the report's associated (outgoing) port circuit address. If the Associated Address Identifier (byte offset 14) is $01, these bytes represent the specific B-channel used. If the Associated Address Identifier is $02, these bytes represent the D-channel and Call ID.

Associated Call ID (byte offsets 12 and 13)—Specifies the ISDN Call ID for the associated (outgoing) port.

Associated Address Identifier (byte offset 14)—Specifies whether the associated (outgoing) port is identified by D-channel or by B-channel/non-ISDN port/resource group. Interpret the byte as follows:

00—No associated port.

01—Associated port specified by B-channel or non-ISDN port address; Call ID = 00 00 for non-ISDN port address.

02—Associated port specified by D-channel.

Change (byte offset 15)—Specifies the type of change detected. The following list indicates the change that occurred for the outgoing port.

00—No change; report was issued to report an ISDN D-channel message (contained in Event byte).

01—Call attempt failed (FAIL token in the ISDN supervision template or ISDN protocol violation).

02—Reserved for future enhancements.

04—Outpulse rule processing has completed for this port; rule number specified in byte offset 19 (REP END in outpulse rule).

05—Quit token was processed in an ISDN supervision template.

08—Supervision was detected outside of a rule.

10—Supervision was detected during rule processing (REP, OKREP, ANSREP, or PRPREP token in ISDN supervision template).

20—Supervision error was detected (ERROR token in ISDN Supervision Template).

40—Port became inactive.

80—Port became active (SETUP received and processed or REP, OKREP, ANSREP, or PRPREP token in ISDN Supervision Template).

Event Code (byte offset 16)—Specifies the D-channel message received. Codeset 0 Q.931 message coding is used for all event codes. Interpret the byte as follows:

00 — Failed call attempt (error in template processing or no D-channel message was processed).

01 — ALERTING message was received.

02 — CALL PROCEEDING message was received.

03 — PROGRESS message was received.

05 — SETUP message was received.

07 — CONNECT message was received.

0C — SETUP ACKNOWLEDGE message was received.

0F — CONNECT ACKNOWLEDGE message was received.

20 — USER INFORMATION message was received.

45 — DISCONNECT message was received.

46 — RESTART message was received.

4D — RELEASE message was received.

5A — RELEASE COMPLETE message was received.

62 — FACILITY message was received.

6E — NOTIFY message was received.

Note If the system receives a NOTIFY message from the network and the ISDN state is ACTIVE (10), the system passes the NOTIFY message to the host in bytes 26 to n. In all other states, the system ignores network NOTIFY messages.

79 — CONGESTION message was received.

FF — Timeout (in ISDN supervision template processing).

Supervision Template (byte offset 17)—Specifies whether the outgoing port is considered answered (ANS condition token processed in ISDN supervision template) and the number of the ISDN supervision template used. If no ISDN supervision template is being used, or call failures and errors occur, set the byte to 00. Convert the byte from hexadecimal to binary and interpret the bits according to the following descriptions:

```
A0NNNNNN
```

A—Indicates whether or not the Associated (outgoing) port is considered answered.

A = 0—Outgoing port not considered answered.

A = 1—Outgoing port considered answered.

NNNNNN—Specifies the ISDN supervision template used. Convert the value from binary to decimal for the template number.

Status Code (byte offset 18)—Indicates if an error was encountered. Interpret the byte as follows:

01—No error.

80—Inpulse rule processing was aborted.

81—RELEASE message was received over the D-channel; call has been abandoned.

82—RELEASE message was transmitted over the D-channel; call could not be processed.

83—B-channel was unavailable.

86—Not all requested IEs were present in the D-channel message.

87—Looping inpulse rule was detected; rule processing was aborted.

88—B-channel is in wrong call processing state for requested action.

89—DTMF collection failure or timeout.

8A—MF collection failure or timeout.

8B—D-channel failure.

8C—Glare condition was detected; outgoing port has released, incoming port in CP_SETUP state.

8F—Report has been truncated; report and IEs exceeded 255 bytes.

90—Digit collection timeout.

91—No digit collection mode was chosen in rule; digit collection failure.

A1—Host SETUP Timer fired; call has been cleared.

A2—Card or port in maintenance mode; call has been cleared.

A3—Looping outpulse rule was detected; rule processing was aborted.

A4—ISDN protocol violation.

C1—MF receiver was unavailable.

C2—DTMF receiver was unavailable.

C4—CPA port was unavailable.

C5—Outpulse channel was unavailable.

Rule Code (byte offset 19)—For Change = 04, indicates the number of the outpulse rule processed. Otherwise, this byte is 00.

Call Reference Number (byte offsets 20 and 21)—Indicates a call reference number that is reported to the host; call references are numbered sequentially.

Note Set the Enable Host Call Reference feature flag to Y in the System Features administration screen when using the Call Reference Number bytes to enable the reporting of a call reference number to the host. Refer to the *Cisco VCO/4K System Administrator's Guide* for further information on the Enable Host Call Reference feature and feature flag setting instructions.

Optional Data (byte offsets 22 to 24)—Reserved for future enhancements.

IE Code (byte offset 25)—Indicates the number of IEs included in this report. IE reporting is controlled by ISDN message templates. A value of $00 indicates that no IEs follow this byte. IEs are reported exactly as they were received from the D-channel.

IEs (byte offsets 26 to n)—For IE Code > 00, these bytes contain any IEs received over the specified D-channel. Each IE has either a multibyte or single-byte format. Figure 5-19 shows the multibyte format and Figure 5-20 shows the single-byte format.

Figure 5-19 Multibyte IE Format

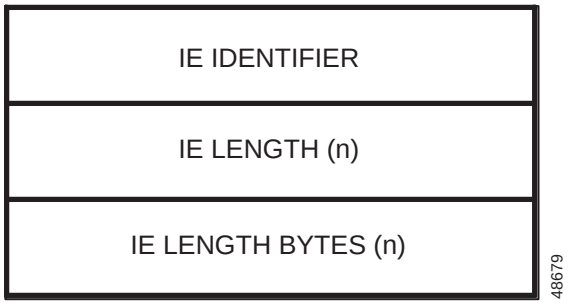


Figure 5-20 Single-Byte IE Format

Note Single-byte IEs have bit 8 set to 1.

ISDN Inpulse Rule Complete ($ED) Report

Report Type

Resource Control

Destination VCA

$40

Description

Use the ISDN Inpulse Rule Complete ($ED) report to inform the host that an inpulse rule has been processed either in response to a SETUP message received over the D-channel or for a specific B-channel. Digits collected in-band can also be included in this report. The content of the report is controlled by the type of reporting you specify in the inpulse rule and in the ISDN Receive Message Template. Information included in this report can include:

- DTMF Digit ($D1)
- MF Digit ($D0)
- Received IEs

Received IEs are reported in the same format as they were received.

Digit segments are presented in the following order:

- Digit report for field 1
- Digit report for field 2
- Digit report for field 3
- Digit report for field 4
- Digit report for field ANI (originating number field)

Digit segments follow the general format for their report, but the Controlling Port Address and Spacer Bytes are omitted in MF collections, and the Controlling Port Address, Report Status and Supervision bytes are omitted in DTMF collections.

This report may be truncated if the network header segment, base report, digit segments, and IEs exceed 255 bytes in length. Indication of truncation is provided as an Inpulse Rule Status byte value of 8F (byte offset 12-n).

Action Causing Report Generation

This report is generated when inpulse rule processing is terminated. Termination can be caused by:

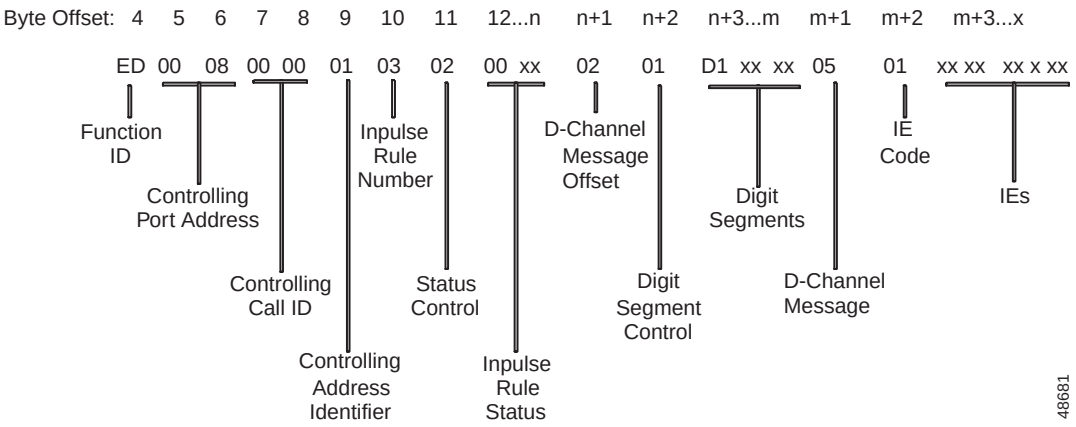
- Successful completion of the rule
- An error in rule processing
- A looping rule which only contains setup and reporting tokens

- A host command overriding the rule
- The controlling port being released

Format

Figure 5-21 shows the byte formatting for this report.

Figure 5-21 $ED Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header; uniquely identifies the report from the system.

Controlling Port Address (byte offsets 5 and 6)—Hexadecimal representation of the controlling port circuit address for which the report is sent. If the Controlling Address Identifier (byte offset 9) is $01, these bytes represent the specific B-channel assigned to the call or a non-ISDN port. If the Controlling Address Identifier is $02, these bytes represent the D-channel; the Controlling Call ID is identified in byte offset 7 and 8.

Controlling Call ID (byte offsets 7 and 8)—Specifies the ISDN Call ID for the controlling port.

Controlling Address Identifier (byte offset 9)—Specifies whether the controlling port is identified by D-channel and Call ID or by B-channel/non-ISDN port address. Interpret the byte as follows:

01—Controlling port was specified by the B-channel.

02—Controlling port was specified by the D-channel and Call ID.

Inpulse Rule Number (byte offset 10)—Specifies the inpulse rule number executed. Convert from hexadecimal to decimal for the inpulse rule.

Status Control (byte offset 11)—Specifies the number of Inpulse Rule Status bytes that follow. At least one Inpulse Rule Status byte is included in the report. The maximum number of status bytes allowed in a report is 10.

Inpulse Rule Status (byte offsets 12 to n)—Specifies whether the inpulse rule completed normally or was aborted due to error condition. Multiple status bytes can be included in a single report; the number of status bytes is indicated by the Status Control value. Interpret the bytes as follows:

01—No error.

81—RELEASE message was received over the D-channel; call has been abandoned.

82—RELEASE message was transmitted over the D-channel; call could not be processed.

83—B-channel was unavailable.

86—Not all requested IEs were present in the D-channel message.

87—Looping inpulse rule was detected; rule processing was aborted.

88—B-channel is in wrong call processing state for the requested action.

89—DTMF collection failure or timeout.

8A—MF collection failure or timeout.

8F—Report has been truncated; report and IEs exceeded 255 bytes.

A3—Looping outpulse rule was detected; rule processing was aborted.

A4—ISDN protocol violation.

C1—MF receiver was unavailable.

C2—DTMF receiver was unavailable.

C4—CPA port was unavailable.

C5—Outpulse channel was unavailable.

D-Channel Message Offset (byte offset n + 1)—Specifies the number of hexadecimal bytes until the D-Channel Message byte (offset m + 1). This byte always contains a value of at least $02 to account for a Digit Segment Control byte (assuming no Digit Segments are included in the report).

Digit Segment Control (byte offset n + 2)—Specifies the number of DTMF or MF Digit report segments that follow. If this byte = 00, no digit segments are included in this report.

Digit Segments (byte offset n + 3 - m)—Optional DTMF and MF Digit report segments included in this macro; segment format follows that of the report the segment represents, with the exclusion of the Incoming Port Address byte.

D-Channel Message (byte offset m + 1)—Specifies the received D-channel message. When Digit Segment Control = 00, this byte immediately follows it. Otherwise, it appears after the final digit segment. Interpret this byte as follows:

00—No D-channel message was processed (rule without D-channel processing).

01—ALERTING message was received.

02—CALL PROCEEDING message was received.

03—PROGRESS message was received.

05—SETUP message was received.

07—CONNECT message was received.

0C—SETUP ACKNOWLEDGE message was received.

0F—CONNECT ACKNOWLEDGE message was received.

20—USER INFORMATION message was received.

45—DISCONNECT message was received.

5A—RELEASE COMPLETE message was received.

62—FACILITY message was received.

6E—NOTIFY message was received.

Note If a NOTIFY message from the network is received by the system and the ISDN state is ACTIVE (10), the system passes the NOTIFY message to the host in bytes 26 through n. In all other states, the system ignores NOTIFY messages from the network.

79—CONGESTION message was received.

IE Code (byte offset m + 2)—Indicates the number of IEs included in this report. IE reporting is controlled by ISDN Message Templates. A value of $00 indicates that no IEs follow this byte. IEs are reported exactly as they were received from the D-channel.

IEs (byte offset m + 3 - x)—For IE Code > 00, these bytes contain any IEs received over the specified D-channel. Each IE has either a multibyte format or a single-byte format. Figure 5-22 shows the multibyte format and Figure 5-23 shows the single-byte format.

Figure 5-22 Multibyte IE Format

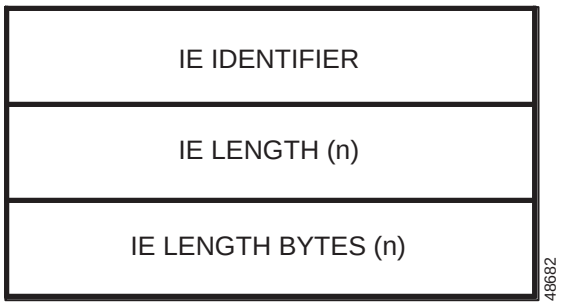


Figure 5-23 Single-Byte IE Format

Note Single-byte IEs have bit 8 set to 1.

Alarm Condition ($F0) Report

Report Type

System Status

Destination VCA

$44

Description

The Alarm Condition ($F0) report indicates the presence or clearance of a system alarm. Additionally, alarm severity and the number of occurrences is reported.

Action Causing Report Generation

The report is generated upon alarm detection (any occurrence), severity change, or clearance. Additionally, an alarm is set or cleared for:

- A host link (including the TeleRouter overlay); the additional data identifies the host link as defined from the system administration Host Configuration screen.
- A port interface or service circuit card; the additional data identifies the card's Rack-Level-Slot position.

Because multiple occurrences of one card alarm are normal during system initialization, reports of card alarms that were set during system initialization do not supply a card's physical location. Similar alarms are reported in one $F0 report; the number of occurrences reflects the number of cards for which the alarm was detected. When a card becomes active, an $F0 report is generated; use the additional data bytes to indicate the Rack, Level, Slot location, and the span number.

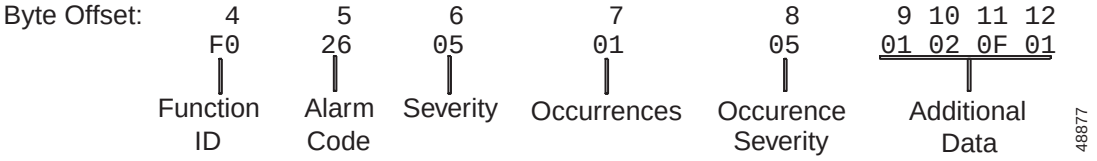
The No Alarm Reports During System Initialization feature lets you enable/disable Disable alarm reporting during system initialization. Y disables system alarm reports until the system comes into service; N enables the system alarm reports. Access the System Feature Configuration screen from the Main menu.

From the System Feature Configuration screen, define the alarm severity for the No Hosts alarm ($0B) as wether Major or Fatal. If the Fatal Alarm for No Hosts feature=Y, all failed host links cause the affected system controller to reset after system initialization.

Format

Figure 5-24 shows the byte formatting of this report.

Figure 5-24 $F0 Report Format



Function ID (byte offset 4)—Byte immediately following the Network Header that identifies the report.

Alarm Code (byte offset 5)—Identifies the reported alarm. The system alarms, their meanings, and severity levels are described in Table 5-9. For more information on system alarms, refer to the *Cisco VCO/4K System Administrator's Guide* and *Cisco VCO/4K System Messages*.

Table 5-9 System Alarm Messages

Value	Alarm Message	Alarm Severity
01	ALM001: Insufficient Timed IPC Memory	Minor
02	ALM002: Network Manager Failure	Fatal
03	ALM003: Host Manager Failure	Fatal
04	ALM004: Redundancy Manager Failure	Minor
0A	ALM010: Host Communications Failure	Minor
0B	ALM011: No Hosts Available	Major
0C	ALM012: ADLC Sub-System Failure	Major
0D	ALM013: Ethernet Sub-System Failure	Major
0E	ALM014: Overlay Sub-System Failure	Major
0F	ALM015: Resource Group Limitation Pending	Minor
10	ALM016: Resource Group Limitation Exists	Minor
11	ALM017: Internet Host Ping Failure	Major
14	ALM020: Start Record Exhaust	Major
15	ALM021: End Record Exhaust	Major
16	ALM022: D-Channel Pool Exhaust	Major
17	ALM023: NBC Does Not Respond	Fatal
18	ALM024: NBC DMA Output Failure	Fatal
19	ALM025: CP Transmit Overrun	Critical
1A	ALM026: No NBC In System	Critical
1B	ALM027: NBC Failure	Fatal
1C	ALM028: NBC Loss of Internal Sync.	Fatal
1D	ALM029: NBC Comm. Bus Failure	Minor
1E	ALM030: No Tone Card In System	Critical
1F	ALM031: Rack 1, Level 2 Failure	Critical
20	ALM032: Rack 1, Level 3 Failure	Critical
21	ALM033: Rack 2, Level 0 Failure	Critical

Table 5-9 System Alarm Messages (continued)

Value	Alarm Message	Alarm Severity
22	ALM034: Rack 2, Level 1 Failure	Critical
23	ALM035: Rack 2, Level 2 Failure	Critical
24	ALM036: Rack 2, Level 3 Failure	Critical
25	ALM037: Redundant Controller Failure	Minor
26	ALM038: PRI D-Channel Failure	Major
27	ALM039: PRI/T1/E1 Carrier Lost	Major
28	ALM040: PRI/T1/E1 Card Failure	Major
29	ALM041: PRI/T1/E1 Remote Alarm	Major
2A	ALM042: PRI/T1/E1 Out Of Frame	Major
2B	ALM043: PRI/T1/E1 Signaling Bit Alarm	Minor
2C	ALM044: PRI/T1/E1 Slip Maint. Threshold	Minor
2D	ALM045: PRI/T1/E1 OOF Maint. Threshold	Minor
2E	ALM046: PRI/T1/E1 BPV Maint. Threshold	Minor
2F	ALM047: Loss Of All Call Progress Analyzers	Minor
30	ALM048: Loss Of All Speech Recognizers	Minor
31	ALM049: Loss Of All MF Receivers	Minor
32	ALM050: Loss Of All DTMF Receivers	Minor
33	ALM051: Loss Of Announcement Capability	Minor
34	ALM052: Card Failure In System	Minor
35	ALM053: Fatal Host Alarm	Fatal
36	ALM054: Critical Host Alarm	Critical
37	ALM055: Major Host Alarm	Major
38	ALM056: Minor Host Alarm	Minor
39	ALM057: Aux-1 Host Alarm	Aux 1
3A	ALM058: Aux-2 Host Alarm	Aux 2
3B	ALM059: NFAS D-Channel Failure	Critical
3C	ALM060: Loss of All MFCR2 Transceivers	Minor
3D	ALM061: T1/E1 Blue Alarm	Minor
3E	ALM062: E1 CRC Error	Minor
3F	ALM063: Loss of All Subrate Functionality	Major
40	ALM064: Loss of Subrate Redundancy	Major
41	ALM065: Subrate Timeslot Threshold	Major
42	ALM066: Subrate Timeslot Exhausted	Major
43	ALM067: All Ports on Card Deactivated	Minor
44	ALM068: DS0 Port Slip Maintenance Threshold	Minor
45	ALM069: DS0 Port Loss of Clock	Major

Table 5-9 System Alarm Messages (continued)

Value	Alarm Message	Alarm Severity
46	ALM070: NBC Loss of External Synchronization	Major
47	ALM071: Wrong Hardware Installed	Major
48	ALM072: Interface Hardware Failure	Major
49	ALM073: Module Hardware Failure	Major
4A	ALM074: Loss of All SPC OUTPULSERS	Minor
4B	ALM075: No SPC Static Tone In System	Minor
4C	ALM076: Incoming Timing Changed to Internal	Minor
4D	ALM077: ICC Card Congestion Alarm	Minor
50	ALM080: Update Channel Failure	Minor
51	ALM081: UPD DMA Output Failure	Non-alarm event
52	ALM082: UPD Transmit Overrun	Minor
53	ALM083: UPD Receive Overrun	Minor
54	ALM084: UPD Receive Timeout	Non-alarm event
55	ALM085: UPD DMA Output Timeout	Non-alarm event
5A	ALM090: Printer Offline	Non-alarm event
5D	ALM093: Available Disk Space Less Than 30 MB	Major
5E	ALM094: Available Disk Space Less Than 15 MB	Major
5F	ALM095: Failed to Create 30 MB of Available Disk Space	Major
60	ALM096: Trace File Exceeded 1 MB Size	Major
61	ALM097: Log File Exceeded 1 MB Size	Major
64	ALM100: Queue Overflow	Fatal
65	ALM101: Queue Overflow	Critical
66	ALM102: Queue Overflow	Major
67	ALM103: Queue Overflow	Minor
68	ALM104: Queue Overflow	Non-alarm event
69	ALM105: Memory Allocation Failure	Fatal
6A	ALM106: Memory Allocation Failure	Critical
6B	ALM107: Memory Allocation Failure	Major
6C	ALM108: Memory Allocation Failure	Minor
6D	ALM109: Memory Allocation Failure	Non-alarm event
96	ALM150: Live Upgrade Start	Non-alarm event
97	ALM151: Live Upgrade Software Installed	Non-alarm event
98	ALM152: Optional S/W Configuration Initiated	Non-alarm event
99	ALM153: Rebooting Generic with New Release	Non-alarm event
9A	ALM154: Card Cutover Initiated	Non-alarm event
9B	ALM155: Live Upgrade Failed	Non-alarm event

Table 5-9 System Alarm Messages (continued)

Value	Alarm Message	Alarm Severity
9C	ALM156: Live Upgrade Successful	Non-alarm event
9D	ALM157: Live Upgrade Aborted by User	Non-alarm event

Severity (byte offset 6)—Indicates an alarm's severity. Possible severity levels are as follows:

00—Alarm has cleared.

01—Severity not applicable; nonalarmed event is being reported.

02—AUX 1 host alarm; set in response to a Set/Reset Host Alarm ($C0 03) command.

03—AUX 2 host alarm; set in response to a Set/Reset Host Alarm ($C0 03) command.

04—Minor alarm.

05—Major alarm.

06—Critical alarm.

07—Fatal alarm.

Occurrences (byte offset 7)—Indicates the number of alarm occurrences in hexadecimal. Convert to decimal for the number of occurrences.

Occurrence Severity (byte offset 8)—Indicates an alarm's occurrence severity. Possible severity levels are as follows:

00—Alarm has cleared.

01—Severity not applicable; nonalarmed event is being reported.

02—Aux 1 host alarm; set in response to a Set/Reset Host Alarm ($C0 03) command.

03—Aux 2 host alarm; set in response to a Set/Reset Host Alarm ($C0 03) command.

04—Minor alarm.

05—Major alarm.

06—Critical alarm.

07—Fatal alarm.

Additional Data Bytes (byte offsets 9 to 12)—Supplies additional information for the following alarm codes. Additional information bytes are not supplied for alarms set during system initialization processing. Refer to the “Action Causing Report Generation” section on page 5-82.

If byte offset 5 = 0A—Use byte offset 9 to indicate the host for which the alarm is being reported. In this case, possible values for byte offset 9 are as follows:

00—TeleRouter Overlay

08 to F—Host links configured from the Host Configuration screen. Refer to the *Cisco VCO/4K System Administrator's Guide* for more information.

If byte offset 5 = 26 to 2D, 33, or 34—Use byte offsets 9 to 12 to indicate the rack, level, and slot location, and the span number of the card for which the report is generated. Convert the bytes from hexadecimal to decimal for the physical location.

If byte offset 5 = 4C—The length of the $F0 report is truncated to nine byte offsets and byte offset 9 indicates the reason that the incoming timing source changed to internal clock timing. Possible values of byte offset 9, and their associated meanings, are as follows:

01—T1 card Slip Maintenance reached report was received.

02—PRI card Slip Maintenance reached report was received.

03—T1 card OOF condition present report was received.

04—PRI card OOF condition present report was received.

05—T1 card Loss of Carrier condition report was received.

06—PRI card Loss of Carrier condition report was received.

07—T1 card Remote Carrier Alarm Detected report was received.

08—PRI card Remote Carrier Alarm Detected report was received.

09—T1 card Signaling bit alarm report was received.

0A—T1 card OOF Maintenance Limit reached report was received.

0B—PRI card OOF Maintenance Limit reached report was received.

0C—NBC loss of synchronization—external reference.

0D—Change in T1 synchronization source. Host sent T1 Synchronization Control ($C0 02) command.

0E—NBC incoming reference signal is not present.

0F—NBC loss of synchronization—incoming reference.

10—NBC loss of incoming reference.

11—NBC external reference signal is not present.

12—NBC cannot synchronize on the external reference.

13—NBC cannot synchronize on the incoming reference.

14—ICC hardware change has been detected. Possibilities include the insertion or removal of an I/O module, or a mismatch between hardware type and configuration.

Note Byte 12 is optional and used for multispan cards only.

Examples

Example 5-39 $F0 Report

At system initialization, the following report is generated to indicate a card alarm set for 20 T1 cards as part of normal processing. This reporting assumes the No Alarm Reports During System Initialization feature is disabled (set to N).

```
04 05 06 07 08
F0 27 05 14 05
```

Function ID = F0 (Alarm Condition)

Alarm Code = 27 (ALM039: PRI/T1/E1 Carrier Loss)

Severity = 05 (Major)

Occurrences = 14 (20 occurrences)

Occurrence Severity = 05 (Major)

No Additional Data Bytes

Example 5-40 $F0 Report

The following report indicates the T1 card located at the R-L-S position 1,2,21 comes into service following system initialization (the card out of service condition is cleared). The location is indicated in the additional data bytes.

```
04 05 06 07 08 091011
F0 27 00 01 00 010215
```

Function ID = F0 (Alarm Condition)

Alarm Code = 27 (ALM039: PRI/T1/E1 Carrier Loss)

Severity = 00 (Alarm Cleared)

Occurrences = 01 (1 occurrence)

Occurrence Severity = 00 (Alarm Cleared)

Additional Data Bytes = 01 02 15 (1, 2, 21)