Hosted and Stand Alone TeleRouter Operation

Once TeleRouter is enabled, you can configure it to operate in both hosted and unhosted environments. In a hosted environment, TeleRouter operates in conjunction with a host computer to perform switching actions. The system responds to all messages received over the host communication links. The overlay interprets dialed digit information and routes calls based on instructions established by the user. This configuration offloads a portion of the call processing overhead from the host, allowing the system to be used for multiple applications.

In a unhosted environment, the system responds only to instructions from the TeleRouter overlay. Host communication links are not established in this configuration and all routing actions are initiated by TeleRouter.

Hosted Configuration

TeleRouter can be used to assume responsibility for some or all call routing based on pattern matching, reducing the demands of host processing. The host can still perform routing for specific call scenarios as it normally would using the Incoming Port Control ($6A) and Outgoing Port Control ($69) commands (or other actions using additional resource control commands). The host receives all status reports, and is informed of routing actions performed by TeleRouter through two reports. The first report, an Inpulse Rule Complete ($DD) report, indicates that an inpulse rule containing a ROUTE [Tx] token was executed. The $DD report informs the host that TeleRouter has assumed control of the call associated with the report. This report differs slightly from the standard $DD report format; a bit setting in the Segment Control byte (offset 9) indicates if routing was performed. A Routing Action ($D5) report notifies the host of the resulting routing action performed by TeleRouter.

Routing Action ($D5) Report

Report Type

Resource Control

Destination VCA

$40

Description

The Routing Action ($D5) report notifies the host of routing actions performed by TeleRouter. This report is generated only when TeleRouter is functioning in the hosted configuration. It indicates the success or failure of the routing action, specifies the type of action performed, and identifies the two ports linked by the routing path.
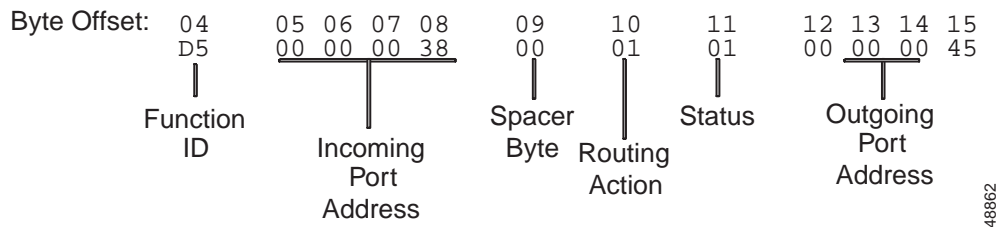
Action Causing Report Generation

The $D5 report is generated in response to a digit-matching attempt by TeleRouter. Because digit-matching is initiated by a ROUTE [Tx] inpulse rule token, the $D5 report always follows an Inpulse Rule Complete ($DD) report. The $DD report indicates whether an inpulse rule or outpulse rule was executed as part of the routing action. This report allows the host the track resource allocation by specifying the incoming and outgoing resources linked by the routing action.

Format

Figure 2-1 shows the byte formatting for this report.

Figure 2-1 $D5 Report Format

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

Incoming Port Address (byte offsets 5 to 8)—Hexadecimal representation of the incoming port address over which digits were received for call routing.

Spacer Byte (byte offset 9)—Reserved for future enhancements; always = $00.

Routing Action (byte offset 10)—Indicates whether an inpulse or outpulse rule was processed during routing. Interpret the byte as follows:

00—Outpulse rule executed ($69 command processed).

01—Inpulse rule executed ($6A command processed).

Status (byte offset 11)—Specifies successful completion of the routing action or the cause for failure. Corresponds to network status byte (NSB) values. Refer to *Cisco VCO/4K System Messages* to interpret NSB values. Refer to the *Cisco VCO/4K Extended Programming Reference* for additional NSB values and more detailed descriptions.

Outgoing Port Address (byte offsets 12 to 15)—Hexadecimal representation of the outgoing port address that was linked to the controlling port as a result of the routing action. These bytes will be $0000 when the Routing Action byte is set to $01, indicating that an inpulse rule was executed.

Examples

Example 2-1 $D5 Report

The following report indicates a successful routing action. The incoming port at address $0038 has been routed to the outgoing port at address $0045.

```
04 05060708 09 10 11 12131415
D5 00000038 00 00 01 00000045
```

Function ID = D5 (Routing Action)

Incoming Port Address = $0038

Spacer Byte = $00

Routing Action = $00 (outpulse rule executed)

Status = $01 (routing action successful)

Outgoing Port Address = $0045

Example 2-2 $D5 Report

The following report indicates that TeleRouter executed an inpulse rule on the incoming port at port address $0038. The status byte indicates that the inpulse rule execution was successful although no actual routing was performed.

```
04 05060708 09 10 11 12131415
D5 00000038 00 01 01 00000000
```

Function ID = D5 (Routing Action)

Incoming Port Address = $0038

Spacer Byte = $00

Routing Action = $01 (inpulse rule executed)

Status = $01 (action successful)

Outgoing Port Address = $0000 (no outgoing port involved in action)

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:

• 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.
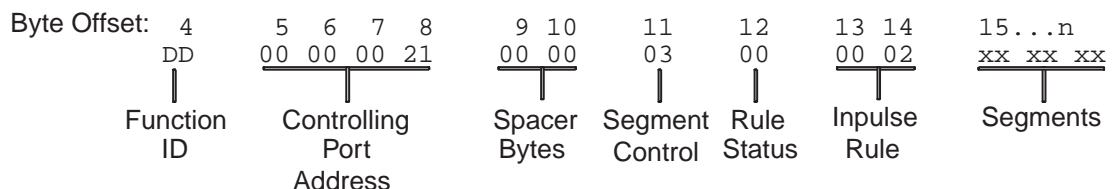
Action Causing Report Generation

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 2-2 shows the byte formatting for this report.

Figure 2-2 $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 to 8)—Hexadecimal representation of the port for which the inpulse rule is being executed.

Spacer Bytes (byte offsets 9 and 10)—Reserved for future enhancements; always returned as 00 00.

Segment Control (byte offset 11)—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 the inpulse rule executed specified REP EACH or REP NEXT, this byte will be $00, indicating there are no segments. Use REP END to include segments attached to the report.

```
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 was not aborted because of looping.

B = 1—Looping rule was aborted automatically by the VCO/4K (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 was 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 the inpulse rule specifies a REP EACH token, these bits are zero, indicating there are no segments attached.

Rule Status (byte offset 12)—Indicates whether the rule was 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 as follows:

```
AST00000
```

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 is unavailable.

– DTMF receiver is unavailable.

– Digit collection error or timeout (MF, DTMF, or DP).

– Voice port is unavailable.

– Host command was received.

– Port goes on hook (call abandon).

– Rule specifies digit collection but no DTMF or MF token is in rule.

– No outpulse channel available (when the rule includes a DO ORULE token).

– Looping rule was detected.

S = 0—Inpulse rule processing completed normally.

S = 1—Inpulse rule processing aborted.

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

Inpulse Rule (byte offsets 13 and 14)—Specifies the inpulse rule number executed. Convert hexadecimal to decimal to get the rule number.

Segments (byte offsets 15 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 2-3 $DD (Macro) 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 05060708 0910 11 12 1314 151617 18 1920 21 22232425 26 27282930
DD 00000028 0000 02 00 0003 000034 01 123F D1 00000052 01 1234567F
```

Function ID = DD (Inpulse Rule Complete)

Controlling Port Address = 00000028

Spacer Bytes = 0000

Segment Control = 02

```
00000010
```

A = 0 (inpulse rule processed for incoming port)

NNN = 2 (2 segments attached)

Rule Status = 00

```
00000000
```

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)

Inpulse Rule = 0003

Segment 1 is as follows:

Function ID = D0 (MF Digit)

Controlling Port Address = omitted

Spacer Bytes = omitted

MF Receiver Address = 00000034

MF Status = 01

```
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 = 123F (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 = 00000052

DTMF Status = 01

```
00000001
```

E = 0 (report follows the old style report format)

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 = 1234567F (F marks end of string)

End of segment 2.

Example 2-4 $DD (Macro) 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 05060708 0910 11 12 1314 15 16 17 1819 20 2122
DD 00000035 0000 02 80 0010 DB 80 D1 0035 05 442F
```

Function ID = DD (Inpulse Rule Complete)

Controlling Port Address = 00000035

Spacer Bytes = 0000

Segment Control = 02

```
00000010
```

A = 0 (inpulse rule processed for incoming port)

NNN = 2 (2 segments attached)

Rule Status = 80

```
10000000
```

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

S = 0 (inpulse rule processing has completed normally)

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

Inpulse Rule = 0010 (decimal 16)

Segment 1 is as follows:

Function ID = DB (Incoming Port Change of State)

Resource Group = omitted

Change = 80 (off hook)

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 = 00000035 (SLIC, DID, or UTC port with onboard receiver)

DTMF Status = 05

```
00000101
```

E = 0 (report follows the old style report format)

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 = 442F (F marks end of string)

End of segment 2

Stand Alone Configuration

Stand alone system operation is enabled when TeleRouter is the only interface defined using the Host Configuration utility. Instructions for enabling unhosted TeleRouter operation are located in Chapter 4, "System Configuration."

In the stand alone configuration, TeleRouter generates all routing instructions for the system based on the dialed digits and routing table information. TeleRouter interprets all internal reports and sets alarm conditions when necessary. In addition to the standard system software alarm conditions, two alarms specific to TeleRouter operation may be generated. These alarms are discussed in Chapter 5, "Maintenance."

Host communication links are not established when the system is configured for unhosted operation. No host messages will be received or acknowledged.