

# **R2 Signaling Examples**

This chapter provides examples of R2 signaling performed with the following call control elements:

- Inpulse rules
- · Outpulse rules
- Host commands and reports

Two examples discuss R2 digit collections on incoming trunks (calls coming into the VCO/4K); a third example describes R2 digit outpulsing on outgoing trunks (calls originating at the VCO/4K). Each example begins with a brief explanation of the scenario, followed by a graphic representation of the call flow. These diagrams illustrate system processing and information flow between the VCO/4K and host, and between the VCO/4K and connected equipment (network registers). Direction of the information flow is indicated by arrows under the message data.

### Example #1—Incoming Call Using Inpulse Rules

Example #1 illustrates a simple R2 digit collection scenario after an incoming seize on the system E1 circuit at port address \$00 41. A New Zealand specific inpulse rule is executed to perform R2 digit collection on this circuit. The rule generates a wink signal when an MFCR2 transceiver is enabled to alert the network register to send the R2 signals.

The inpulse rule performs the following general tasks:

- Collects an unspecified number of called party number digits and stores them in Field 1. A-1 (send next digit) signals prompt the network register for each new digit. When an I-15 digit is received, the system sends an A-5 (send calling category) digit.
- Collects the calling party's category (1 digit) and stores it in Field 2. After the digit is received, the system sends another A-5 (send calling subscriber's identity) digit.
- Collects the calling party's number (7 digits) and stores them in the ANI field. A-5 (send calling subscriber's identity) signals prompt the network register for each new digit. After the seventh digit is collected, the system sends an A-6 (set up speech conditions) digit.

At the end of this example, the system establishes speech conditions with the connected equipment (network register) and generates an Inpulse Rule Complete (\$DD) report to the host. The processing flow for this example is shown in Figure 4-1 to Figure 4-3. In this example, the New Zealand specific inpulse rule for the incoming circuit has been defined as inpulse rule #1 (shown below).

### Inpulse Rule #1

- REP EACH
- MFCR2
- WINK ENAB
- END CHAR 5
- CLR CHAR 1
- DIGITS 0
- IP FIELD 1
- END CHAR 5
- CLR CHAR 5
- DIGITS 1
- IP FIELD 2
- END CHAR 6
- CLR CHAR 5
- IP ANI 7

For information on inpulse rule tokens, refer to the Cisco VCO/4K System Administrator's Guide.

Host	VCO	Connected Equipment
		Seize
	The system detects seize on the incoming port, reports event to host and searches database to determine COS and default inpulse rule.	
DF 40 00	00 DB 0B 80 00 41 00 00 00	
	Begin inpulse rule.	
	Link MFCR2 transceiver.	
	Wink	
	Collect called party number (9677958) until I-1 digit is received and store digits in Field 1.	
		I-9 (Digit 9)
	A-1 (Send next digit)	<b>&gt;</b>
		I-6 (Digit 6)
	A-1 (Send next digit)	<b>&gt;</b>
		I-7 (Digit 7)
	A-1 (Send next digit)	
		I-7 (Digit 7)
	A-1 (Send next digit)	<b>&gt;</b>
		I-9 (Digit 9)
	A-1 (Send next digit)	<b>&gt;</b>
	4	I-5 (Digit 5)
	A-1 (Send next digit)	<b>&gt;</b>
	4	I-8 (Digit 8)

### Figure 4-1 Processing Flow for Example #1, Part 1 of 3

Host	VCO	Connected Equipment
	•	I-15 (End of digits)
DF 40 00 00	Called party's number reported to host D0 00 42 00 00 08 00 01 05 96 77 95 8	
	Request calling party's category	
	A-5 (send calling category)	
	•	II-4 (coin telephone)
_DF 40 00 00	Calling party's category digit (II-4) collected and stored in field 2 Called party's number reported to host D0 00 42 00 00 08 00 01 05 4F	
4	A-5 (Send calling subscriber's identity)	
	Collect calling party's number (4948683) and store in ANI field.	
		I-4 (Digit 4)
	A-5 (Send calling subscriber's identity)	
		I-9 (Digit 9)
	A-5 (Send calling subscriber's identity)	
	•	I-4 (Digit 4)
		23657

### Figure 4-2 Processing Flow for Example #1, Part 2 of 3



#### Figure 4-3 Processing Flow for Example #1, Part 3 of 3

## Example #2—Incoming Call Using \$68 Host Command

Example #2 also illustrates a simple R2 digit collection scenario on an incoming E1 circuit (port address \$00 42). However, all R2 digit collections in this scenario are initiated by host command; no inpulse rule processing is used. Three MF Collection Control (\$68) commands perform the following actions:

- Collect an unspecified number of called party number digits until I-15 digit is received, then send an A-5 (send calling category) digit.
- Collect the calling party's category (1 digit) and then request the calling subscriber's identity by sending another A-5 (send calling subscriber's identity) digit.
- Collect an unspecified number of calling party's number digits until I-15 digit is received, then send an A-6 (set up speech conditions) digit.

Each digit collection is reported to the host via an MF Digit (\$D0) report.

At the end of this example, the system establishes speech conditions with the connected equipment (network register). The processing flow for this example is shown in Figure 4-4 to Figure 4-6.

Refer to the *Cisco VCO/4K Standard Programming Reference* or the *Cisco VCO/4K Extended Programming Reference* for complete descriptions of the \$68 command and \$D0 report.

Host	vco	Connected Equipment	
Host initiates R2 digit collection on incoming port (\$00 42)			
00 DF 00	00 68 00 42 E8 00 15 40		
	Link MFCR2 transceiver		
	Begin collecting called party's number (4689716) until I-15 received, then request calling party's category (send A-5).		
		I-4 (Digit 4)	
	A-1 (Send next digit)		
		I-6 (Digit 6)	
	A-1 (Send next digit)		
	•	I-8 (Digit 8)	
	A-1 (Send next digit)	<b></b>	
	<b>۔</b>	I-9 (Digit 9)	
	A-1 (Send next digit)	<b></b>	
	<b>▲</b>	I-7 (Digit 7)	
	A-1 (Send next digit)	<b></b>	
	<b>▲</b>	I-1 (Digit 1)	
	A-1 (Send next digit)	<b>→</b>	
	•	I-6 (Digit 6)	
	A-1 (Send next digit)	<b></b>	
	•	I-15 (End of digits)	

Figure 4-4 Processing Flow for Example #2, Part 1 of 3

Host	vco	Connected Equipment
	Called party's number reported to host.	
■ DF 40 00 00	<u>D0 00 42 00 00 08 00 01 05 46 89 71 6</u> F	
	A-5 (Send calling category)	
00 DF 00 00	58 00 42 00 00 50 41 <b>-</b>	
	Collect calling party's category digits (II-2), then request calling subscriber's identity (send A-5).	II-2 (Priority subscriber)
DF 40 00 00	Called party's number reported to host.	
	A-5 (Send calling subscriber's identity)	<b></b>
00 DF 00 00 68 00 42 00 00 56 40		
	Begin collecting calling party's number (9673798) until I-15 received, then set up speech condition (send A-6).	LQ (Digit Q)
	A-5 (Send calling	
	subscriber's identity)	<b>&gt;</b>
	A-5 (Send calling subscriber's identity)	I-6 (Digit 6)
	•	► I-7 (Digit 7)

Figure 4-5	Processing Flow for Example #2, Part 2 of 3
J	



#### Figure 4-6 Processing Flow for Example #2, Part 3 of 3

### Example #3—Outgoing Call

Example #3 describes R2 digit outpulsing on an E1 circuit at port address \$00 40. This scenario involves both host command and outpulse rule processing. The host initiates the outpulsing using an Outgoing Port Control (\$69) command that populates the digit fields and specifies the outpulse rule to execute (refer to the *Cisco VCO/4K Standard Programming Reference* or the *Cisco VCO/4K Extended Programming Reference* for a command description).

The outpulse rule performs the following actions:

- Seizes out on the E1 trunk at port address \$00 40 and waits for a wink signal (executing the WAIT SUP W preconfigured answer supervision template documented in the *Cisco VCO/4K System Administrator's Guide*).
- Outpulses the first three digits of the called party's number (stored in Field 1) after wink signal is detected. The system responds to A-1 (send next digit) signals that request each new digit.
- Outpulses the calling party's category specified in the rule when an A-5 (send calling category) digit is received.
- Outpulses the calling party's number stored in the ANI field when another A-5 (send calling subscriber's identity) digit is received. The system responds to A-1 (send next digit) signals that request each new digit.
- Outpulses the remaining digits of the called party's number (stored in Field 1). The system responds to A-1 (send next digit) signals that request each new digit. An I-15 digit is sent once all digits have been outpulsed.

This rule is shown below.

### Outpulse Rule #1

- REP END
- SEIZE
- WAIT SUP W
- MFCR2
- OP CAT 6
- OP ANUM
- OP FIELD 1

At the end of this example, the system establishes speech conditions with the connected equipment (network register) and generates an Outgoing Port Change of State (\$DA) report to the host. The processing flow for this example is shown in Figure 4-8.

Refer to the *Cisco VCO/4K System Administrator's Guide* for more information on MFCR2, OP ANUM, OP FIELD [xx], and OP CAT [xx] outpulse rule tokens.

Host	vco	Connected Equipment	
Host initiates R2 signaling and populates digit fields			
00 DF 00 76 43 92	00 69 80 00 C0 40 81 27 6F 07 49 48 68 3F		
	Link MFCR2 transceiver port and begin to process outpulse rule #1.		
	Seize outward on outgoing port (SEIZE token).	SEIZE (port \$00 40)	
	Begin processing WAIT SUP W supervision template; wait for intermediate supervision.	WINK (Equipment ready to receive digits)	
	Wink detected; template processing ends.		
	Enable MFCR2 transceiver port and begin outpulse of first three digits of called party's number (764).		
	I-7 (Digit 7)		
		A-1 (Send next digit)	
	I-6 (Digit 6)		
		A-1 (Send next digit)	
	I-4 (Digit 4)		
		A-5 (Send calling category)	
	Outpulse calling party's category (II-6).		
	II-6 (Data subscribe)	<b>►</b>	
		A-5 (Send calling subscriber's identity)	
I		ى ا	

### Figure 4-7 Processing Flow for Example #3, Part 1 of 3

Host	vco		Connected Equipment
	Outpulse calling party's number (4948683).		A-5 (Send calling subscriber's number)
		I-4 (Digit 4)	
		4	A-5 (Send next digit)
		I-9 (Digit 9)	
		4	A-5 (Send next digit)
		I-4 (Digit 4)	<b></b>
		4	A-5 (Send next digit)
		I-8 (Digit 8)	<b></b>
			A-5 (Send next digit)
		I-6 (Digit 6)	
			A-5 (Send next digit)
		I-8 (Digit 8)	<b></b>
			A-5 (Send next digit)
		I-3 (Digit 3)	
	Outpulse remaining four digits of called party's		
	number (0020).	I-3 (Digit 3)	<b>▶</b>
		•	A-1 (Send next digit)
		I-9 (Digit 9)	<b>▶</b>
		4	A-1 (Send next digit)

Figure 4-8 Processing Flow for Example #3, Part 2 of 3



#### Figure 4-9 Processing Flow for Example #3, Part 3 of 3