



R2 Signaling Tones and Pulse Code Modulation Line Signaling

This chapter describes the R2 signaling tones generated and detected by the MFCR2 transceiver cards, and the R2 pulse code modulation (PCM) 2-bit line signaling transmitted and received by E1 spans.

Forward and Backward Signaling Tones

Table 2-1 through Table 2-4 provide R2 signaling information based on ITU Q.441 as it applies specifically to the China telephone network.



Note

All R2 tones are -8.86 dBm per component.

Table 2-1 R2 Signaling Group 1 Forward Signals

Token Data Field	Designation	Frequencies	Digit Meaning	KA ¹	KC ²	KE ³
1	G-I-1	1380 + 1500 Hz	Digit 1	Regular	Not applicable	Not applicable
2	G-I-2	1380 + 1620 Hz	Digit 2	Immediate Meter		
3	G-I-3	1500 + 1620 Hz	Digit 3	Immediate Printer		
4	G-I-4	1380 + 1740 Hz	Digit 4	Spare		
5	G-I-5	1500 + 1740 Hz	Digit 5	Free		
6	G-I-6	1620 + 1740 Hz	Digit 6	Spare		
7	G-I-7	1380 + 1860 Hz	Digit 7	Spare		
8	G-I-8	1500 + 1860 Hz	Digit 8	Priority Regular		
9	G-I-9	1620 + 1860 Hz	Digit 9	Spare		
10	G-I-10	1740 + 1860 Hz	Digit 0	Priority Free		

Table 2-1 R2 Signaling Group I Forward Signals (continued)

Token Data Field	Designation	Frequencies	Digit Meaning	KA ¹	KC ²	KE ³
11	G-I-11	1380 + 1980 Hz	Not Applicable	Spare	Spare	H
12	G-I-12	1500 + 1980 Hz		Spare	ATME	Spare
13	G-I-13	1620 + 1980 Hz		Test	T	T
14	G-I-14	1749 + 1980 Hz		Spare	Priority	Spare
15	G-I-15	1860 + 1980 Hz	End of Number	Spare	Satellite	Not applicable

1. Calling party category.
2. Call category used between toll exchanges; used to indicate a priority call or a test call.
3. Call category from toll to local, or local to local; used to indicate a test call.

Table 2-2 R2 Signaling Group II (KD¹) Forward Signals

Token Data Field	Designation	Frequencies	Meaning
1	G-II-1	1380 + 1500 Hz	Semiautomatic toll operators call
2	G-II-2	1380 + 1620 Hz	Toll automatic call
3	G-II-3	1500 + 1620 Hz	Local call
4	G-II-4	1380 + 1740 Hz	Local priority call
5	G-II-5	1500 + 1740 Hz	Operators check the calling party's number in SA call
6	G-II-6	1620 + 1740 Hz	Test call
7	G-II-7	1380 + 1860 Hz	Not applicable
8	G-II-8	1500 + 1860 Hz	
9	G-II-9	1620 + 1860 Hz	
10	G-II-10	1740 + 1860 Hz	
11	G-II-11	1380 + 1980 Hz	
12	G-II-12	1500 + 1980 Hz	
13	G-II-13	1620 + 1980 Hz	
14	G-II-14	1740 + 1980 Hz	
15	G-II-15	1860 + 1980 Hz	

1. Calling party call category.

Table 2-3 R2 Signaling Group A Backward Signals

Token Data Field	Designation	Frequencies	Meaning
1	A-1	1140 + 1020 Hz	Send next digit ($n+1$)
2	A-2	1140 + 900 Hz	Start from first digit
3	A-3	1020 + 900 Hz	Number complete, change over to reception of Group-B signals
4	A-4	1140 + 780 Hz	Network congestion
5	A-5	1020 + 780 Hz	Vacant number
6	A-6	900 + 780 Hz	Send KA and calling party's number ¹
7	A-7	1140 + 660 Hz	Not applicable
8	A-8	1020 + 660 Hz	
9	A-9	900 + 660 Hz	
10	A-10	780 + 660 Hz	
11	A-11	1140 + 540 Hz	
12	A-12	1020 + 540 Hz	
13	A-13	900 + 540 Hz	
14	A-14	780 + 540 Hz	
15	A-15	660 + 540 Hz	

1. First A-6 is an instruction to send KA signal. Successive A-1s are to send the calling party's identity as G-I signals.

Table 2-4 R2 Signaling Group B (KB) Backward Signals

Token Data Field	Designation	Frequencies	When KD=1, 2, or 6	When KD = 3 or 4
1	B-1	1140 + 1020 Hz	Idle	Idle
2	B-2	1140 + 900 Hz	Busy, local duty	Spare, using called party control or first party control
3	B-3	1020 + 900 Hz	Busy, toll duty	Spare
4	B-4	1140 + 780 Hz	Congestion	Called subscriber busy or equipment congestion
5	B-5	1020 + 780 Hz	Vacant number	Vacant Number
6	B-6	900 + 780 Hz	Spare	Called subscriber idle using calling party control

Table 2-4 R2 Signaling Group B (KB) Backward Signals (continued)

Token Data Field	Designation	Frequencies	When KD=1, 2, or 6	When KD = 3 or 4
7	B-7	1140 + 660 Hz	Not applicable	Not applicable
8	B-8	1020 + 660 Hz		
9	B-9	900 + 660 Hz		
10	B-10	780 + 660 Hz		
11	B-11	1140 + 540 Hz		
12	B-12	1020 + 540 Hz		
13	B-13	900 + 540 Hz		
14	B-14	780 + 540 Hz		
15	B-15	660 + 540 Hz		

Pulse Code Modulation Line Signaling

Table 2-5 describes the 2-bit, channel-associated PCM line signaling used by systems equipped with E1 spans. This digital R2 signaling complies with *Shenzhen Specification NTP-8445, May 1990, Appendix D*. Forward signals are used by originating or outgoing ports, while backward signals are generated by incoming ports. For more information on E1 cards, refer to the *Cisco VCO/4K Card Technical Descriptions*.

Table 2-5 R2 Pulse Code Modulation Line Signaling

Signal	Exchange Signaling			
	Forward		Backward	
	Af	Bf	Ab	Bb
Idle	1	0	1	0
Seize	0	0	1	0
Seize Acknowledge	0	0	1	1
Answer	0	0	0	1
Flash (for 600 ms)	1	0	0	1
Called Party Clear	0	0	1	1
Called Party Reanswer (before time-out)	0	0	0	1
Calling Party Clear (before called party)	1	0	0	1
Calling Party Clear (after called party)	1	0	1	1
Release Guard	1	0	1	0
Blocking	1	0	1	1