Circuit Associated Signaling Trunk Analysis – Part I

1. Introduction

This application note describes the signals, digits and digit sequences used in Circuit Associated Signaling (CAS) trunks. CAS trunks are trunks in which the voice frequency channel is used for both signaling (supervision, call setup and call takedown) and speech transmission. Part II of this application note describes detailed test procedures using common DS-1 test sets.

Three components are involved in troubleshooting and testing MF CAS trunk operation –

- Supervision
- Address Digits
- Signaling Sequence

Supervision: Digital trunks setup for CAS use robbed bit signaling (RBS) to convey supervisory states (on-hook, off-hook and wink status) and multi-frequency tones to convey digits. If the DS1 interface is set for SF (D3/D4) framing, then RBS includes A- and B-signaling bits and if set for ESF framing, then RBS includes A-, B-, C- and D-signaling bits.

CAS trunks used in interoffice applications require only the A-bit for operation and the other bits B-, C- and D-bits, as applicable to the type of framing used, follow the A-bit. CAS trunks used in some digital loop carrier applications, such as TR8 interfaces, and in PBX DOD/DID applications, use DTMF and require both A- and B-bits for signaling with SF framing. Where ESF is used, the C- and D-bits follow the A- and B-bits in most cases. GR303 integrated digital loop carrier interfaces always are set for ESF and may also use robbed bit signaling. Tables are provided later that define the signaling states used with common trunking schemes using SF and ESF framing and with GR303.[1]

PBX DOD trunks use Loop-Start or Ground-Start FXO and FXS signaling. PBX DID trunks usually use Loop-Reverse Battery signaling. It is common for DOD and DID trunks to be combined on the same DS1 interface (with some channels assigned as DOD trunks and other channels as DID trunks), but not all end office switching systems support combined DOD/DID.

Address Digits: Trunk addressing methods use multi-frequency schemes in which each digit is represented by two unique frequencies or tones. Interoffice trunks use MF-R1 (also known simply as MF) and PBX DOD/DID trunks usually use DTMF (Dual Tone Multi-Frequency). In some cases, PBX DID trunks may use MF.

MF is a 2-of-6 frequency scheme in which each digit is represented by two of six frequencies (700, 900, 1100, 1300, 1500, and 1700 Hz). In addition to the address numerals 0 – 9, MF includes control digits to indicate the beginning and end of a digit string (KP and ST, respectively) and operator control functions such as coin collect and return. For example, a 7-digit directory number would be transmitted as KP+NXX-XXXX+ST.

DTMF is a 2-of-8 scheme in which each digit is represented by two of eight frequencies (697, 770, 852, 941, 1209, 1336, 1477, and 1633 Hz). There are 16 possible combinations in a 2-of-8 scheme but only 12 are used in most applications (0 – 9, *, and #). The last four digits (A, B, C and D) were used in some military and old PBX applications but current switching systems do

[1] This document only lists GR303 RBS states and does not describe the protocol.

not support them. DTMF digit strings do not have start and stop digits as in MF. For example, a 7-digit number would be transmitted as NXX-XXXX. MF and DTMF use similar but not exactly the same transmission levels and timing intervals.

Signaling Sequences: Signaling sequences are protocols that specify the order of signaling state (supervision) changes and digit transmission. There are four basic signaling sequences used with CAS trunks depending on the application – Interoffice, FGC, FGD, and PBX.

GR303 interfaces use an embedded DS0 data link between the Integrated Digital Terminal (IDT) and the Remote Digital Terminal (RDT) called the Embedded Operations Channel (EOC) to transmit operations messages (for example, alarms). GR303 interfaces also use a separate DS0 data link to perform per-call timeslot assignments (Timeslot Management Channel – TMC) in conjunction with the RBS previously described (this is called *hybrid* signaling). This same channel can be used to transmit call processing (call setup and supervisory) messages via a common channel (Common Signaling Channel – CSC) in which case RBS is not required (this is called *inband* signaling). The EOC and TMC/CSC use the Link Access Protocol for the D-Channel (LAPD), and call processing messages are based on ITU-T Recommendation Q.931. Common channel signaling methods are beyond the scope of CAS trunking and are not discussed in this issue.

Table 1-1 summarizes the various application signaling sequences, addressing, signaling states and applicable signaling state tables. Table 1-2 shows the tone addressing schemes, and Tables 1-3 through 1-14 show on-hook and off-hook signaling states for the A-, B-, C- and D-bits as they are used with various application types. In Tables 1-3 and 1-7, “Office A” is the near-end location and “Office Z” is the far end. Additional information on signaling sequences is provided in Section 2.

Table 1-1 – Applications

Signaling Sequence	Addressing	Signaling States	Tables
Interoffice	MF-R1	Interoffice	1-3 and 1-7
Toll FGC or FGD	MF-R1	Interoffice	1-3 and 1-7
PBX DOD	DTMF	Loop-Start or Ground-Start	1-4, 1-5, 1-8, 1-9
PBX DID	DTMF	Loop-Reverse Battery	1-6 and 1-10
GR303	N/A	N/A	1-11 to 1-14

Table 1-2 – MF and DTMF Addressing Schemes

MF-R1		DTMF	
Frequency-Pair (Hz)	**Digit**	**Frequency-Pair (Hz)**	**Digit**
700-900	1	697-1209	1
700-1100	2	697-1336	2
900-1100	3	697-1477	3
700-1300	4	770-1209	4
900-1300	5	770-1336	5
1100-1300	6	770-1477	6
700-1500	7	852-1209	7
900-1500	8	852-1336	8
1100-1500	9	852-1477	9
1300-1500	0	941-1209	*
1100-1700	KP	941-1336	0
1500-1700	ST	941-1477	#
900-1700	STP	697-1633	A
1300-1700	ST2P	770-1633	B
700-1700	ST3P	852-1633	C
		941-1633	D
KP signal duration, minimum	55 ms	Cycle time, minimum	93 ms
All other signal duration, minimum	30 ms	Pulse duration, minimum	40 ms
Signal-off time, minimum	25 ms	Signal-off time, minimum	40 ms
Inter-digit interval, minimum	25 ms	Rise time, maximum	10 ms
Rise time, maximum	10 ms		

Table 1-3 – CAS Trunk RBS States – Interoffice (E&M): SF Framing

State	A	B
Office A → Office Z		
On-Hook	0	0
Off-Hook	1	1
Office A ← Office Z		
On-Hook	0	0
Off-Hook	1	1

Table 1-4 – CAS Trunk RBS States – FXO/FXS Loop-Start Signaling: SF Framing

State	A	B
Loop-Start Signaling (FXO)		
Network → Customer		
Loop Current Feed	0	1
Ringing (alternates with Loop Current Feed state)	0	0
Loop-Start Signaling (FXS)		
Network ← Customer		
Loop Open (On-Hook)	0	1
Loop Closed (Off-Hook)	1	1
Loop-Start Signaling with Reversal (FXO)		
Network → Customer		
Loop Current Feed	0	1
Reverse Loop Current Feed[2]	0	1/0
Reverse Loop Current Feed Open	1	1
Ringing (alternates with Loop Current Feed state)	0	0
Loop-Start Signaling with Reversal (FXS)		
Network ← Customer		
Loop Open (On-Hook)	0	1
Loop Closed (Off-Hook)	1	1

[2] B-bit alternates between 1 and 0 in successive superframes.

Table 1-5 – CAS Trunk RBS States – FXO/FXS Ground-Start Signaling: SF Framing

State	A	B
Ground-Start Signaling (FXO)		
Network → Customer		
Loop Current Feed (Tip ground)	0	1
Loop Current Feed Open (Tip open)	1	1
Ringing (alternates with Loop Current Feed state)	0	0
Ground-Start Signaling (FXS)		
Network ← Customer		
Loop Open (On-Hook)	0	1
Loop Closed (Off-Hook)	1	1
Service Request (Ring Ground)	0	0
Ground-Start Signaling with Reversal (FXO)		
Network → Customer		
Loop Current Feed (Tip ground)	0	1
Reverse Loop Current Feed (Ring ground) [3]	0	1/0
Loop Current Feed Open (Tip open)	1	1
Ringing (alternates with Loop Current Feed state)	0	0
Ground-Start Signaling with Reversal (FXS)		
Network ← Customer		
Loop Open (On-Hook)	0	1
Loop Closed (Off-Hook)	1	1
Service Request (Ring Ground)	0	0

Table 1-6 – CAS Trunk RBS States – Loop-Reverse Battery (LRB): SF Framing

State	A	B
Network → Customer		
Loop Open (On-Hook)	0	0
Loop Closed (Off-Hook)	1	1
Network ← Customer		
Loop Current Feed (On-Hook)	0	0
Reverse Loop Current Feed (Off-Hook)	1	1

[3] B-bit alternates between 1 and 0 in successive superframes.

Table 1-7 – CAS Trunk RBS States – Interoffice (E&M): ESF Framing

State	A	B	C	D
Office A → Office Z				
On-Hook	0	0	0	0
Off-Hook	1	1	1	1
Office A ← Office Z				
On-Hook	0	0	0	0
Off-Hook	1	1	1	1

Table 1-8 – CAS Trunk RBS States – FXO/FXS Loop-Start Signaling: ESF Framing

State	A	B	C	D
Loop-Start Signaling (FXO)				
Network → Customer				
Loop Current Feed	0	1	0	1
Ringing (alternates with Loop Current Feed state)	0	0	0	0
Loop-Start Signaling (FXS)				
Network ← Customer				
Loop Open (On-Hook)	0	1	0	1
Loop Closed (Off-Hook)	1	1	1	1
Loop-Start Signaling with Reversal (FXO)				
Network → Customer				
Loop Current Feed	0	1	0	1
Reverse Loop Current Feed	0	1	0	0
Reverse Loop Current Feed Open	1	1	1	1
Ringing (alternates with Loop Current Feed state)	0	0	0	0
Loop-Start Signaling with Reversal (FXS)				
Network ← Customer				
Loop Open (On-Hook)	0	1	0	1
Loop Closed (Off-Hook)	1	1	1	1

Table 1-9 – CAS Trunk RBS States – FXO/FXS Ground-Start Signaling: ESF Framing

State	A	B	C	D
Ground-Start Signaling (FXO)				
Network → Customer				
Loop Current Feed (Tip ground)	0	1	0	1
Loop Current Feed Open (Tip open)	1	1	1	1
Ringing (alternates with Loop Current Feed state)	0	0	0	0
Ground-Start Signaling (FXS)				
Network ← Customer				
Loop Open (On-Hook)	0	1	0	1
Loop Closed (Off-Hook)	1	1	1	1
Service Request (Ring Ground)	0	0	0	0
Ground-Start Signaling with Reversal (FXO)				
Network → Customer				
Loop Current Feed (Tip ground)	0	1	0	1
Reverse Loop Current Feed (Ring ground)	0	1	0	0
Loop Current Feed Open (Tip open)	1	1	1	1
Ringing (alternates with Loop Current Feed state)	0	0	0	0
Ground-Start Signaling with Reversal (FXS)				
Network ← Customer				
Loop Open (On-Hook)	0	1	0	1
Loop Closed (Off-Hook)	1	1	1	1
Service Request (Ring Ground)	0	0	0	0

Table 1-10 – CAS Trunk RBS States – Loop-Reverse Battery (LRB): ESF Framing

State	A	B	C	D
Network → Customer				
Loop Open (On-Hook)	0	1	0	1
Loop Closed (Off-Hook)	1	1	1	1
Network ← Customer				
Loop Current Feed (On-Hook)	0	1	0	1
Reverse Loop Current Feed (Off-Hook)	0	1	0	0

Table 1-11 – GR303 RBS States – Locally Switched – IDT → RDT

A	B	C	D	Loop Start	Ground Start	Loop-Reverse Battery	Coin		
							Coin First (CF)	Dialtone First (DTF)	Multiparty
0	0	0	0	-R Ringing	-R Ringing		-R Ringing	-R Ringing	-R Ringing
0	0	0	1						
0	0	1	0	DS0 AIS	DS0 AIS	DS0 AIS	DS0 AIS	DS0 AIS	DS0 AIS
0	0	1	1						
0	1	0	0	RLCF	RLCF		RLCF	RLCF	
0	1	0	1	LCF	LCF	LO	LCF	LCF	LCF
0	1	1	0						
0	1	1	1	DS0 Yellow	DS0 Yellow	DS0 Yellow	DS0 Yellow	DS0 Yellow	DS0 Yellow
1	0	0	0	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
1	0	0	1	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
1	0	1	0				+ Coin Check	+ Coin Check	+R Ringing
1	0	1	1				- Coin Check	- Coin Check	Tip Party Test
1	1	0	0				+ Coin Control	+ Coin Control	+T Ringing
1	1	0	1	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
1	1	1	0				- Coin Control	- Coin Control	-T Ringing
1	1	1	1	LCFO	LCFO	LC	LCFO	LCFO	LCFO

Table 1-12 – GR303 RBS States – Locally Switched – RDT → IDT

A	B	C	D	Loop Start	Ground Start	Loop-Reverse Battery	Coin		
							Coin First (CF)	Dialtone First (DTF)	Multiparty
0	0	0	0		Ring Ground				
0	0	0	1						
0	0	1	0	DS0 AIS	DS0 AIS	DS0 AIS	DS0 AIS	DS0 AIS	DS0 AIS
0	0	1	1						
0	1	0	0			RLCF			
0	1	0	1	LO	LO	LO	LO	LO	LO
0	1	1	0						
0	1	1	1	DS0 Yellow	DS0 Yellow	DS0 Yellow	DS0 Yellow	DS0 Yellow	DS0 Yellow
1	0	0	0	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
1	0	0	1	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
1	0	1	0						
1	0	1	1						
1	1	0	0						
1	1	0	1	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
1	1	1	0				Coin Ground	Coin Ground	Tip Party Ground
1	1	1	1	LC	LC		LC	LC	LC

Table 1-13 – GR303 RBS States – Non-Locally Switched – DNE → RDT

				FXS at RDT		FXO at RDT		
A	**B**	**C**	**D**	**Loop Start**	**Ground Start**	**Loop Start**	**Ground Start**	**All Others**
0	0	0	0	-R Ringing	-R Ringing	LO	Ring Ground	Possible Use
0	0	0	1	-R Ringing	-R Ringing			
0	0	1	0	DS0 AIS	DS0 AIS	DS0 AIS	DS0 AIS	DS0 AIS
0	0	1	1					
0	1	0	0	RLCF	RLCF			
0	1	0	1	LCF	LCF	LO	LO	Possible Use
0	1	1	0					
0	1	1	1	DS0 Yellow	DS0 Yellow	DS0 Yellow	DS0 Yellow	DS0 Yellow
1	0	0	0					
1	0	0	1	Reserved	Reserved	Reserved	Reserved	Reserved
1	0	1	0					Possible Use
1	0	1	1					
1	1	0	0					
1	1	0	1					
1	1	1	0					
1	1	1	1	LCFO	LCFO	LC	LC	Possible Use

Table 1-14 – GR303 RBS States – Non-Locally Switched – RDT → DNE

				FXS at RDT		FXO at RDT		
A	**B**	**C**	**D**	**Loop Start**	**Ground Start**	**Loop Start**	**Ground Start**	**All Others**
0	0	0	0		Ring Ground	-R Ringing	-R Ringing	Possible Use
0	0	0	1					
0	0	1	0	DS0 AIS	DS0 AIS	DS0 AIS	DS0 AIS	DS0 AIS
0	0	1	1					
0	1	0	0					
0	1	0	1	LO	LO	LCF	LCF	Possible Use
0	1	1	0					
0	1	1	1	DS0 Yellow	DS0 Yellow	DS0 Yellow	DS0 Yellow	DS0 Yellow
1	0	0	0					
1	0	0	1	Reserved	Reserved	Reserved	Reserved	Reserved
1	0	1	0					Possible Use
1	0	1	1					
1	1	0	0					
1	1	0	1					
1	1	1	0					
1	1	1	1	LC	LC	LCFO	LCFO	Possible Use

Key:

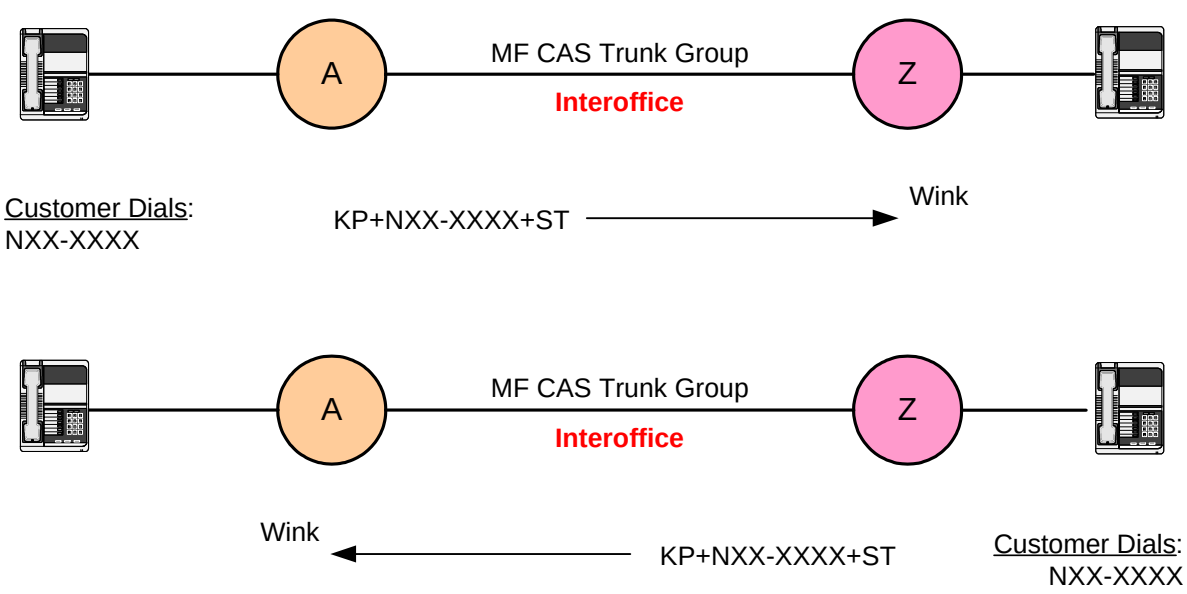
Undefined

LC	Loop closure
LO	Loop open
LCF	Loop current feed
RLCF	Reverse loop current feed
LCFO	Loop current feed open
DNE	Digital network element

2. Signaling Sequences

The signaling sequence depends on the application. The sequences for interoffice trunk applications are shown in Fig. 2-1. This sequence is simple wink start in both directions and includes the 4-, 7- or 10-digit called number (7 digits are shown).

Fig. 2-1 – Interoffice Trunk Signaling Sequences



The sequences for outgoing toll trunk applications are according to one of two basic protocols – Feature Group C and Feature Group D. Feature Group C (FGC) normally is used only on AT&T operator services trunks and on AT&T DAMA earth station trunks. Feature Group D (FGD) is used in equal access end offices on trunks to inter-exchange carriers (except the AT&T trunks as noted above).

FGC (also called FGC CAMA) consists of 2-stage outpulsing from end office to carrier and 1-stage outpulsing from carrier to end office. Both directions use wink start. In the end office to carrier direction, the first stage consists of the called number and is initiated by a wink start. The second stage is initiated by an off-hook from the carrier and consists of an ANI information digit followed by the calling number (Automatic Number Identification, or ANI).[4] KP and ST digits delineate each digit string (called number and calling number with ANI Info). In the outgoing direction, the digit string stop digit (ST) can take on several forms depending on the originating line – ST, STP, ST2P and ST3P (the last three are sometimes pronounced ST-Prime, ST-Double-Prime and ST-Triple-Prime and shown as ST', ST'' and ST''', respectively). On toll completing calls to the end office from the carrier, wink start is used to send the called number only (usually 7 digits but sometimes 4 digits). See Fig. 2-2.

FGD consists of 2-segment, 1-stage outpulsing on domestic calls and 3-segment, 2-stage outpulsing on international calls. On domestic toll calls from the end office to the carrier, the

[4] The 2nd stage off-hook may be replaced by a wink in certain carrier interconnections (but not in Alaska).

two segments consist of the calling number with ANI Info followed by called number. Wink start is used to initiate digit outpulsing and an acknowledgement wink is used at the end of the second segment.

On international calls, the sequence is more complicated. The first segment consists of a tandem routing code, or 1NX digits (either 138 or 158 depending on whether the call requires operator assistance), followed by the 4-digit carrier identification code and up to 3 digits to indicate the country code. After the first segment, the carrier returns another wink to initiate the next two segments, which are similar to domestic calls. The last segment is completed by an acknowledgement wink from the carrier. Incoming toll (toll completing to the end office) always uses wink start and usually are configured for 7 digits. FGD toll trunk signaling sequences are shown in Fig. 2-3.

MF CAS trunks use a wink after seizure to indicate that a digit receiver is connected and ready to collect digits and also to acknowledge digit reception in FGD. A wink is a short off-hook transition (from on-hook to off-hook and back to on-hook) of the signaling bits. Wink duration is at least 140 ms and averages around 240 ms, but longer winks may be observed. A few applications use Immediate-Dial in which digits are outpulsed almost immediately after seizure (a short delay of 50-70 ms is imposed between seizure and outpulsing).

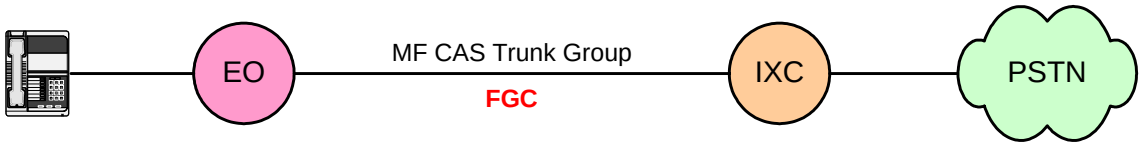
Outgoing toll trunk signaling sequences include ANI digits. A 1-digit ANI Information digit (sometimes indicated as “ANI I”) is used with FGC and a 2-digit ANI Information digit (“ANI II”) is used with FGD. FlexANI is a term commonly used to indicate ANI II in FGD trunk groups. The functions of these digits are shown in Table 2-1.

PBX signaling sequences are similar to interoffice trunk applications except that digit string start and stop digits (KP and ST) are not used with DTMF tones. Fig. 2-4 shows typical sequences. The number of DOD digits will depend on the digits dialed by the PBX station user and how the PBX is setup to handle those digits (a 7 digit local number is shown). DOD trunks are 2-way but only carry digits in the PBX to end office direction.

DID trunks are 1-way only (from the end office to PBX). The DID digits also will depend on particular setups but typically are the last 3 or 4 dialed digits and correspond to the PBX station number in most applications. Not all PBXs can be equipped for DID.

Fig. 2-2 – Feature Group C Toll Trunk Signaling Sequences

Originating Signaling Sequence - Customer-to-IXC Call - FGC



Customer Dials: 1+NPA-NXX-XXXX	KP+NPA-NXX-XXXX-ST( ) →	Wink
	KP+I-7D ANI-ST →	Off-Hook
Customer Dials: 0+NPA-NXX-XXXX	KP+NPA-NXX-XXXX-ST( ) →	Wink
	KP+I-7D ANI-ST →	Off-Hook
Customer Dials: 0-	KP+ST( ) →	Wink
	KP+I-7D ANI-ST →	Off-Hook
Customer Dials: 011+CC-NN	KP+1+CC-NN-ST( ) →	Wink
	KP+I-7D ANI-ST →	Off-Hook
Customer Dials: 01+CC-NN	KP+1+CC-NN-ST( ) →	Wink
	KP+I-7D ANI-ST →	Off-Hook
Customer Dials: 411	KP+907-555-1212-ST( ) →	Wink
	KP+I-7D ANI-ST →	Off-Hook
Customer Dials (Alternate): 411	KP+411-ST( ) →	Wink
	KP+I-7D ANI-ST →	Off-Hook

ST( ) Depends on Originating Line Type

1+ Non-Coin	ST2P
1+ Coin	ST
0+/0- Non-Coin	ST3P
0+/0- Coin	STP

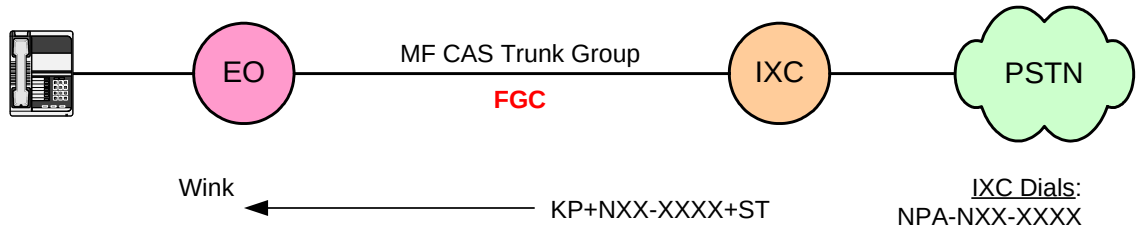
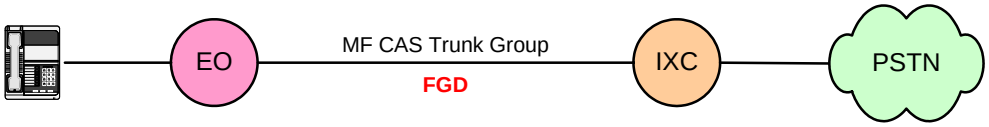


Fig. 2-3 – Feature Group D Toll Trunk Signaling Sequences

Originating Signaling Sequence - Customer-to-IXC Call - FGD



Customer Dials:
1+NPA-NXX-XXXX
KP+II-10D ANI+ST → Wink
KP+NPA-NXX-XXXX+ST →
Acknowledgment Wink

Customer Dials:
0+NPA-NXX-XXXX
KP+II-10D ANI+ST → Wink
KP+0+NPA-NXX-XXXX+ST →
Acknowledgment Wink

Customer Dials:
0-
KP+II-10D ANI+ST → Wink
KP+0+ST →
Acknowledgment Wink

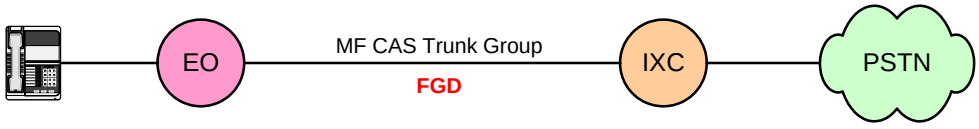
Customer Dials:
011+CC-NN
KP+1(NX)+XXXX-CCC+ST → Wink (1st Stage)
Wink (2nd Stage)
KP+II-10D ANI+ST →
KP+CC-NN+ST →
Acknowledgment Wink

Customer Dials:
01+CC-NN
KP+1(NX)+XXXX-CCC+ST → Wink (1st Stage)
Wink (2nd Stage)
KP+II-10D ANI+ST →
KP+CC-NN+ST →
Acknowledgment Wink

1(NX) Depends on Call Type

Int'l 0+/0-	158
Int'l 1+	138

Terminating Signaling Sequence - IXC-to-Customer Call - FGD



Wink ← KP+NXX-XXXX+ST

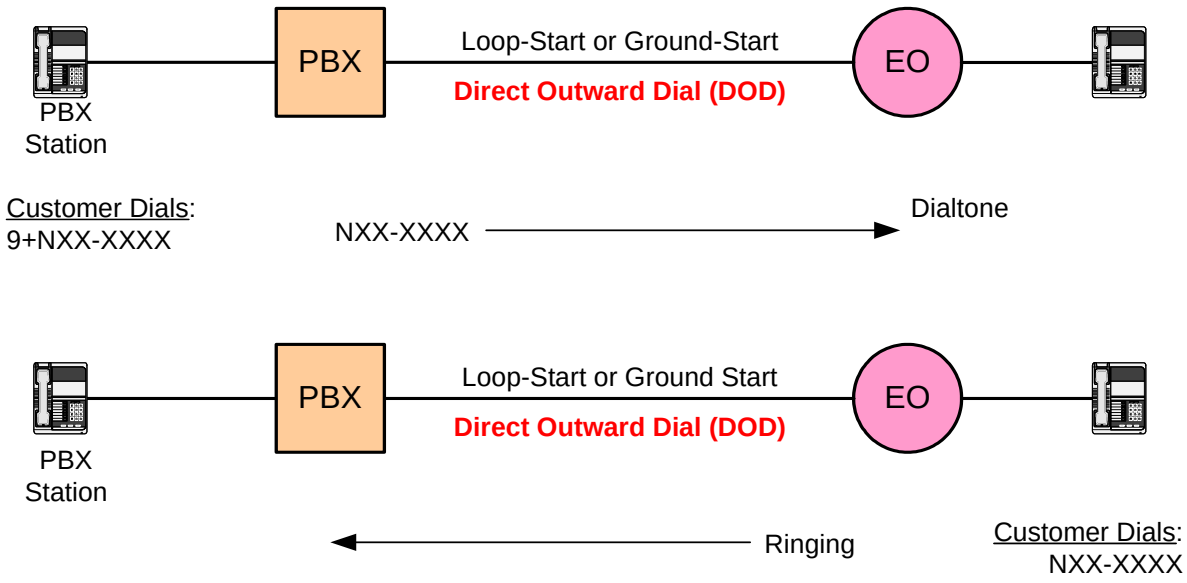
IXC Dials:
NPA-NXX-XXXX

Table 2-1 – ANI Info Digits (most common shown in BOLD)

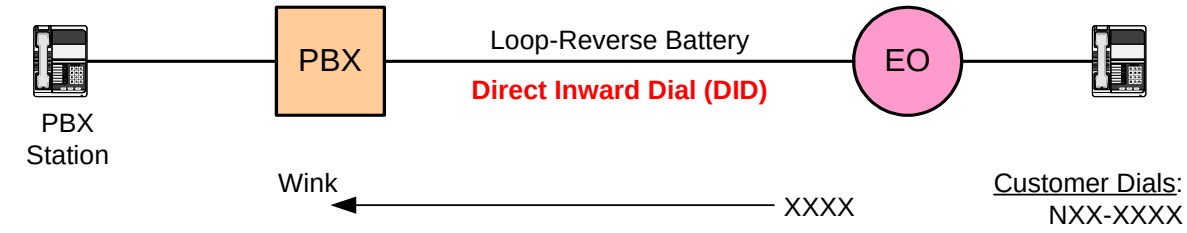
Digit	Function	Remarks
FGC – 1-Digit ANI Info		
0	**POTS**	
1	Operator Identified	
2	ANI Failure	
3-5	Unassigned	
6	**Hotel/Motel**	
7	**Special Operator Handling Required**	
8-9	Unassigned	
FGD – 2-Digit ANI Info		
00	**POTS**	
01	Operator Identified	
02	ANI Failure	
03-05	Unassigned	
06	**Hotel/Motel**	
07	**Special Operator Handling Required**	
08-19	Unassigned	
20	Automatic Identified Outward Dialing	AIOD
21-22	Unassigned	
23	Coin/Non-Coin Status In Question	
24	800 Service Call	800 number converted to POTS number
25-26	Unassigned	
27	**Public Paystation**	
28	Unassigned	
29	Prison/Inmate Service	
30-32	Intercept	
33	Unassigned	
34	Operator Handled Call	
35	Unassigned	
36	Customer Specific	
37-39	Unassigned	
40-49	Carrier Assigned	
50-51	Unassigned	
52	OUTWATS	
53-59	Unassigned	
60	Telecommunications Relay Service (TRS)	
61	Cellular/Wireless Carrier Type 1	
62	Cellular/Wireless Carrier Type 2	
63	Cellular/Wireless Carrier Roaming	
64-65	Unassigned	
66	TRS from Hotel/Motel	
67	TRS from Restricted Line	
68-69	Unassigned	
70	**Private Paystation**	
71-92	Unassigned	
93	Virtual Private Network	
94-99	Unassigned	

Fig. 2-4 – PBX DOD and DID Signaling Sequences

Signaling Sequence - PBX Station-Customer Call - DOD



Signaling Sequence - Customer-PBX Station Call - DID



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2.2 (Correct 1+FGC Coin, April 20, 2005)