

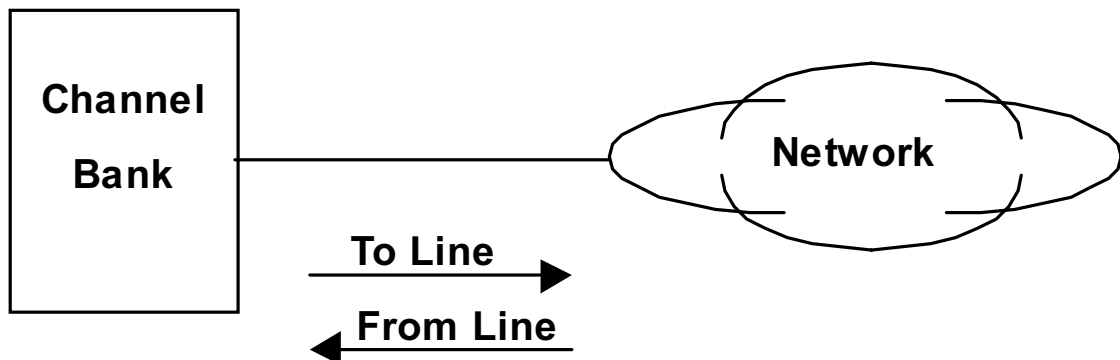
Signaling Bits Definitions on Voice Modules

Both T1 and E1 provides for CAS (channel associated signaling) bits, labeled A, B, C, and D. The meanings of those bits vary with application and with the convention used in each country. The following is a study of the known conventions.

References used:

- ANSI (American National Standards Institute) – This standard provides a comprehensive list of the standards used in the US, which is T1 based. Because E1 does not allow 0000 assignment for ABCD, some signaling assignments are not suited for E1.
- ITU (International Telecommunications Union) – This standard is silent on conventions, mainly because of the variety of standards used in each European country.
- SunSet T10, E10 Test Set – This test set provides a practical view of some popular conventions used throughout the world. However, it only covers the A and B bits.
- Manual for QFXS/QFXO plug-in module for Loop-V 4200.

In the tables below, the assignment for A, B, C, and D bits are listed.



To Line means the ABCD bits sent out over the T1 or E1 line by the plug-in card as dependent on the signaling conditions. From Line means how the plug-in card interprets the ABCD bits. The “*” means that this bit from the line is ignored by the card.

FXS/FXO

The Loop QFXS/QFXO plug-in module comply with ANSI for the A and B bits. For E1, because ABCD = 0000 is not allowed, the D bit for this case is changed to a 1. Since T and R leads for FXS and FXO are allowed to be interchanged, the meaning of normal and reversed battery can be interchanged. Thus while the Loop QFXS/QFXO is different from ANSI, this difference is not of consequence.

The option of “invert A” will allow Loop products to be compatible with most European PBXs.

FXS – Loop Start		ANSI	T10	Loop	Loop – Invert A
Foreign Exchange Subscriber					
ON-Hook	To Line	0101	01**	0101	1101
OFF-Hook	To Line	1111	11**	1101	0101
NO Ring	From Line	0101	*100	*1**	*1**
Ring	From Line	0000	*0**	00**	00**
Normal Batt	From Line	0101	-	***0	***0
Reverse Batt	From Line	0100	-	***1	***1

FXO – Loop Start		ANSI	T10	Loop	Loop-Invert A
Foreign Exchange Office					
ON-Hook	From Line	0101	01**	0***	1***
OFF-Hook	From Line	1111	11**	11**	01**
NO Ring, Norm Batt	To Line	0101	*100	0110	0110
Ring, Norm Batt	To Line	0000	*0**	0010	0010
Normal Batt, No Rg	To Line	0101	-	0110	0110
Reverse Batt, No Rg	To Line	0100	-	0111	0111

PLAR

For PLAR, only the A-bit is interpreted. The rest do not matter.

The option of “invert A” will allow Loop products to be compatible with most European standards.

PLAR		ANSI	T10	Loop	Loop – Invert A
Private Line Automatic Ringdown					
ON-Hook	To Line	0101	01**	0101	1101
OFF-Hook	To Line	1111	11**	1101	0101
NO Ring	From Line	0101	1***	0***	1***
Ring	From Line	0000	0***	1***	0***

Ground Start

Loop QFXS/QFXO do not support ground start.

FXS – Ground Start		ANSI	T10	Loop	Loop – Invert A
ON-Hook No RG	To Line	0101	01**	-	-
ON-Hook + RG	To Line	0000	00**	-	-
No TG	From Line	1111	1***	-	-
TG	From Line	0101	0***	-	-
Normal Batt	From Line	0101	-	-	-
Reverse Batt	From Line	0100	-	-	-

FXO – Ground Start		ANSI	T10	Loop	Loop – Invert A
ON-Hook No RG	From Line	0101	01**	-	-
ON-Hook + RG	From Line	0000	00**	-	-
No TG	To Line	1111	1***	-	-
TG	To Line	0101	0***	-	-
Normal Batt	To Line	0101	-	-	-
Reverse Batt	To Line	0100	-	-	-

E&M

For E&M, only the A-bit matters. Because E&M is world-wide standard, invert of A bit is not necessary

E&M		ANSI	T10	Loop	Loop – Invert A
ON-Hook	To Line	0000	00**	0001	-
OFF-Hook	To Line	1111	11**	1101	-
ON-Hook	From Line	0000	0***	0***	-
OFF-Hook	From Line	1111	1***	1***	-

DPT/DPO

Under certain conditions, the QFXS/QFXO card can also support DPT/DPO operations. This is because normal and reverse battery is supported. However, since only the D-bit is used to signal normal or reverse battery, while ANSI specifies all ABCD bits, there may be compatibility problems with other manufacturers' equipment. The DPT/DPO application is rare in the digital world.

DPO		ANSI	T10	Loop	Loop – Invert A
Dial Pulse Originating – Use FXS					
ON-Hook	To Line	0101	01**	0101	1101
OFF-Hook	To Line	1111	11**	1101	0101
Normal Batt	From Line	0000	0***	***0	***0
Reverse Batt	From Line	1111	1***	***1	***1

DPT		ANSI	T10	Loop	Loop – Invert A
Dial Pulse Terminating – Use FXO					
ON-Hook	From Line	0101	0***	0***	1***
OFF-Hook	From Line	1111	1***	1***	0***
Normal Batt	To Line	0000	01**	0110	1110
Reverse Batt	To Line	1111	11**	0111	1111