

Using the XAP TH2/XAP 400 on a PBX line

The XAP TH2 and XAP 400 products interface to the public switched telephone network to provide audio for a hands free conferencing environment. They are designed to work with analog telephone lines using loop signaling provided from a public switched network provider. This is also referred to as a POTS (Plain Old Telephone Service) line. All parameters (levels, impedance, etc.) of this type of phone line are defined and regulated by the FCC. Any devices, such as the XAP TH2/XAP 400, that connect to this type of line must be FCC compliant.

It is also possible to interface the XAP TH2 and XAP 400 to an analog extension provided by a Private Branch Exchange or PBX. The PBX must also be FCC compliant but only where it interfaces with the public network. The internal line parameters of the PBX are proprietary. This can result in a wide variety of levels and impedances, which may result in less than optimal performance of the XAP TH2 and XAP 400's telco circuitry. Some side effects may include low transmit level, distorted receive audio and in extreme cases, intermittent side-tone or ringing (usually at the beginning of every call).

This document outlines the parameters of the analog line that are required for correct operation of a XAP product. The information below outlines both the limits that the device will operate and a range where optimal performance is achieved. Parameters that are outside of the optimal performance range may or may not yield satisfactory operational results depending upon the environment and how the device is used. These parameters are for US/Canada setting.

AC Characteristics	Operating limits		Optimal performance	
	Min	Max	Min	Max
Loop Impedance	-	3000 ohms	200	900 ohms
Loop Loss	-	20dB	-	8dB
Receive signal level ¹	-	-1 dBu	-10dbu to -20dbu average speech level	
Longitudinal balance ²	-	-	50dB	-
Crosstalk ²	-	-	50dB	-
Distortion ²	-	-	50dB	-
Noise ²	-	35 dBrnC	-	15dBrnC
Frequency Response	-	-	200 – 3.4kHz +/- 3dB	
Echo Delay ³	-	-	-	5mS
DC Characteristics	Operating limits		Optimal performance	
	Min	Max	Min	Max
DC Voltage ⁴	15V-24V	120V	NA	NA
Polarity	Independent	Independent	NA	NA
On Hook current	7 uA	-	-	-
Off hook current (Loop Current)	15 mA	120 mA	20 mA	100 mA
Signaling	Operating limits		Optimal performance	
	Min	Max	Min	Max
Loop Drop duration ⁵	250 mS	-	-	-
Ring Voltage ⁶	33 Vrms	130 Vrms	-	-
Ring frequency ⁶	17Hz	68Hz	-	-
Dialtone detection limits ⁷	330Hz and 440 Hz +/- 10Hz		-	-
Hook Flash detection at CO ⁸	50mS	2 sec	-	-

Physical Characteristics	
Connector	RJ11C
Pin 1	Not used
Pin 2	A-Lead
Pin 3	Tip
Pin 4	Ring
Pin 5	A-Lead
Pin 6	Not used

Notes

1. Transmit is not specified -- FCC Limits the Transmit level to -9 dBm averaged over 3 seconds
2. Specification applies across in-band frequencies
3. Assumes 6dB attenuation of echo- Additional delay can be tolerated if attenuation is greater.
4. Minimum voltage is dependant on loop resistance. Specification assumes minimum loop length- Minimum voltage requirement will increase to meet minimum loop current requirement on longer loop lengths
5. Requirement for auto-disconnect only
6. Requirement for auto-answer only
7. Dial tone detection limit are for dial tone attenuation on XAP THx (Applies to US only)