TECH NOTE

CONVERGE TELEPHONE SPECIFICATIONS

Objective

This document is meant to assist installers when matching phone systems to the Converge Pro.

Usage

The Converge Pro with the telco hybrid, interfaces with 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 (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 and all connected devices must be FCC compliant.

The Converge Pro will also interface with 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 Converge Pro telco circuitry. Some side-effects may include low transmit levels, 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 the Converge Pro 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.

Table 1: Converge Telephone AC Characteristics

AC Characteristics				
Operating Limits			**Optimal Performance**	
	Min	Max	Min	Max
Loop Impedance	-	3000 ohms	200 ohms	900 ohms
Loop Loss	-	20dB	-	8dB
Receive Signal Level	-	+3.2 dBu	-10dBu to -20 dBu average speech level	
Transmit Signal Level	-	+3.2 dBu	-10dBu to -20 dBu average speech level	
THD+N	<0.3% re-max level 250 Hz to 3.3 kHz			
SNR	> 62 dB re-max level			
Frequency Response	-	-	250Hz to 3.3 kHz ±1dB	
Echo Delay	-	-	-	5ms

Table 2: Converge Telephone DC Characteristics

DC Characteristics				
Operating Limits			**Optimal Performance**	
	Min	Max		
Operating Loop Current	10 mA 12 ma (Japan, Australia)	120 mA (Europe = 60 mA)	20mA	100mA
On-hook current	5uA	-	-	-

Table 3: AC Termination vs. Country

AC Termination	
Country	AC Impedance
Argentina Brazil China Hong Kong India Japan Mexico Singapore South Korea Taiwan USA Malaysia	600 Ω
South Africa and Australia	220 Ω + (820 Ω || 120 nF) and 220 Ω + (820 Ω || 115 nF)
New Zealand	370 Ω + (620 Ω || 310 nF)
United Kingdom	320 Ω + (1050 Ω || 230 nF)

Table 4: Signaling

Signaling				
Ring	Min	Max		
Ring Voltage	16.5 Vrms	-		
Ring Frequency	10Hz	83 Hz	20 Hz US / 25 Hz Europe	
Ringer Cadence Detection	See Ring Detection (Table 5)			
Call Progress	**Note**: Call progress will not detect within 10 seconds after last digit dialed on outgoing call so as to remove the risk of a busy tone being incorrectly detected as call progress. **Note**: North American setting will detect either of 2 possible call progress signals. The additional detection is for POTS high frequency, fast cadence call progress tones from CO.			
Call Progress Tone Freq.	400 Hz	620 Hz	**Note**: 90% of signal must be inside this band to detect a positive high signal	
Call Progress ON-time	0.18 s (USA) 0.2 s all other countries	3.5 s		
Call Progress OFF-time	0.18 s	3.6 s		
Call Progress Cadence variation		3%		
Call Progress – North American setting also detects the CO high frequency, fast cadence on standard POTS (residential) lines.				

Signaling			
Alternate North American Call Progress Tone Freq(s)	1350 Hz	3500 Hz	**Note**: 90% of signal must be inside this band to detect a positive high signal.
Alternate North American Call Progress ON-time	0.18 s	0.4 s	
Alternate North American Call Progress OFF-time	0.18 s		
Loop Drop duration	200 ms		
Dialtone Detection	Tone(s) between 325 Hz and 480 Hz, with less than 12% energy outside this band.. Signal must be greater than -30 dB present for 0.5 seconds.		

Ring Detection

Ring detection is performed by detecting an active ring signal for a minimum specified ON-time, followed immediately by absence of ring signal for a specified OFF-time.

The times vary by country. All countries use the same ring voltage threshold and frequency range.

Ring Frequency: 10Hz to 83 Hz
Ring Voltage:16.5V min

Table 5: Ring Cadence Timing vs. Country

Ring Detection		
Country Setting	**On-Time (msec)**	**Off-Time (msec)**
Australia	150	256
New Zealand	384	256
Brazil	512	640
China	512	640
Japan	512	640
Singapore	384	256
S Africa	384	256
S Korea	512	640
Taiwan	512	640
UK/EU	384	640
India	384	640
Hong Kong	384	640
Malaysia	384	640
Argentina	384	640
United States	512	640

Custom Ring Detection

The ring cadence detection scheme on the Converge Pro utilizes voltage, frequency, and cadence to qualify an inbound ring. PBX's can be set with custom or distinctive rings that do not match the standard ring for the given country. The Converge Pro can be setup to detect these custom rings by setting a minimum on and off time for the ring detection. If custom ring cadences are used for the application, it is recommended that the on and off time settings on the Converge Pro be as close to the on and off setting used in the PBX. This will minimize ring false by the Converge Pro.

There are 3 commands that allow the custom ring detection. This setup is performed in the Telco Rx Channel Properties screen in Converge Console 2.0.30 or later. The commands are:

RINGMOD- Sets/Gets the ring cadence mode between standard or custom
RINGON- Sets/Gets the ring on-time for the cadence detection.
RINGOFF- Sets/Gets the ring off-time for the cadence detection.

Table 6: Physical Characteristics

Physical Characteristics	
Connector	**RJ11C**
Pin 1	Not Used
Pin 2	Not Used
Pin 3	Tip
Pin 4	Ring
Pin 5	Not Used
Pin 6	Not Used

Caller ID

Caller ID type I and II are supported for North America and the United Kingdom[1]

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1   Caller ID supported for ETSI standard. The other "standards" implemented in the UK are not supported.