XAP TH1

Telephone Hybrid

Installation & Operation Manual

Gentner

Perfect Communication through Technology, Service, and Education.™

XAP TH1 Telephone Interface Installation and Operation Manual
Gentner Part No. 800-152-401
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Table of Contents

1 Introduction

Congratulations

Congratulations on purchasing the XAP TH1 telephone interface. The XAP TH1 uses the latest digital technology to maintain the highest possible audio quality. The XAP TH1 is designed to function as a stand-alone product or as an accessory to the XAP 800 (echo cancelling, audio processing, microphone mixing matrix) to add telephone lines into audioconferences.

The XAP TH1 is a single-line digital hybrid which uses digital-signal processing (DSP) to separate the transmit and receive audio, eliminating distortion, weak signals, and feedback. It continually filters low and high frequency noise to provide pure sound.

This manual explains how to install, set up and operate the XAP TH1 in a step-by-step format. It also supplies instructions on how to resolve technical problems, should any arise.

Technical Support

If you need any additional information on how to install, set up or operate your system, please contact us at one of the locations noted below. We welcome and encourage your comments so we can continue to improve our products and serve your needs.

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Product Registration

Please register your XAP TH1 online by visiting Gentner Technical Support at **www.gentner.com**. When your product is properly registered, Gentner Communications is better able to serve you should you require technical assistance. Registration information is also used to notify you of upgrades and new product information.

Unpacking

Ensure that the following items (See Figure 1, below) were received with your shipment:

XAP TH1

Push-on Blocks (2)
PART 673-016-003

8' Power Cord
PART 699-150-006

12' Telephone Cable
PART 830-000-012

XAP TH1 Manual
PART 800-152-401
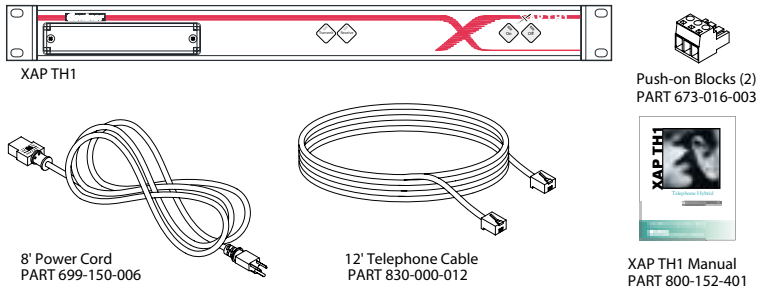
Figure 1. Equipment diagram

! **Gentner Communications is not responsible for product damage incurred during shipment. You must make claims directly with the carrier. Inspect your shipment carefully for obvious signs of damage. If the shipment appears to be damaged, retain the original boxes and packing material for inspection by the carrier. Contact your carrier immediately.**

Features

- Gentner's 100% digital signal processing (DSP) technology ensures crystal-clear audio with the deepest, most reliable hybrid null.

- Easy to install and operate

- Touch-tone dialing capability (40 character dial string)

- Simultaneous two-wire/four-wire operation within a XAP 800 system

- Continual adaptation to telephone line conditions

- Full-time telco echo cancellation with 31 millisecond tail time

- Conference up to 16 callers (with 16 XAP TH1s) within a XAP 800 system

- Selectable caller automatic gain control (AGC)

- Remote control via rear-panel connection

- Digital anti-alias filter to minimize hum and Central Office switching noise

- Compatible with any analog telephone system

- Program and operate with a connected PC or any other type of serial remote control device

Controls and Connections
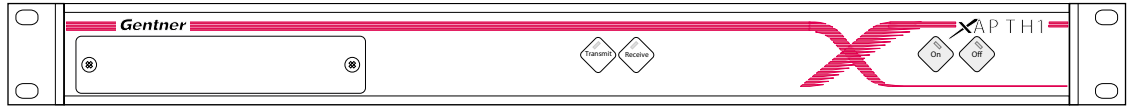
Figure 2. XAP TH1 front-panel controls

Front View

The XAP TH1 front-panel controls (see Figure 2, above) perform the following functions:

1. **Transmit LED** This bicolor LED indicates the audio levels being transmitted from the room to the telephone line.

2. **Receive LED** This bicolor LED indicates the audio level the room is receiving from the telephone line.

3. **On LED** This bicolor LED indicates the hybrid's ON state. The LED will illuminate green when the hybrid is in the ON state.

4. **Off LED** This bicolor LED indicates the hybrid's OFF state. The LED will illuminate red when the hybrid is in the OFF state.

5. **On** The ON button (momentary) connects the hybrid to the telephone line (dependent upon DIP switch settings) and automatically adapts the hybrid to the line. Pressing and holding the ON button for more than a half-second while the hybrid is active will readapt the hybrid.

6. **Off** The OFF switch (momentary) disconnects the hybrid from the telephone line and mutes all audio.
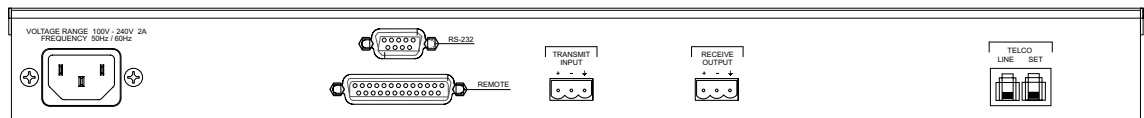
Figure 3. XAP TH1 back-panel connectors

Rear View

The XAP TH1 back-panel connectors (see Figure 3, above) perform the following functions:

1. **Power** The AC power cord input is a NEMA type connector allowing 100–240VAC, 50/60Hz.

2. **RS-232** This female DB9 serial port provides connection between the XAP TH1 and a PC or custom remote control.

3. **Remote** This DB25 connector provides control and status of the XAP TH1. See Appendix B for pinouts.

4. **Transmit Input** This Phoenix™ connection provides a non-gated electronically balanced line level input. The nominal input level is 0 dBu. This line input is mutable. The default setting is off (not muted).

5. **Receive Output** This Phoenix connection provides a balanced line level output. The nominal output level is 0 dBm. The outputs adjust for line imbalances and maintain a constant output level. This line output is mutable. The default setting is off (not muted).

6. **Line** This RJ-11 connector provides connection of a standard analog telephone line to the hybrid.

7. **Set** This RJ-11 connector allows connection to a standard telephone set. Tip and ring from the phone line are present at this connector when the hybrid is in its Off state. Tip and ring from the phone line are not present at this point when the hybrid is in its On state.

Touch-Tone Dialing

Through the RS-232 (and serial commands), the XAP TH1's touch-tone (DTMF) dialing capability can be accessed. This allows outbound calls to be initiated by the XAP TH1 without requiring an external dialer or telephone set. This feature continues to function after connection, enabling the user to issue tones for voice mail/pager interaction. See Serial Commands on page 15.

Before You Install

Power Requirements

The XAP TH1 automatically accommodates voltage requirements of 100–240VAC, 50/60Hz, 15W.

Telephone Line Requirements

The XAP TH1 model operates on a standard analog telephone line and connects to the telephone system with a standard RJ-11C modular jack. If you do not have an RJ-11C jack where you want to install your XAP TH1, call your telephone company for installation.

Equipment Placement

The XAP TH1 models are designed for installation into a standard 19-inch equipment rack. You can also purchase side panels for desktop placement.

2 Installation & Operation

Installation

The XAP TH1 is designed for easy installation and setup. All necessary interface connections are made through rear-panel connectors. This makes for easy installation.

The following block diagram (see Figure 4, below) shows the XAP TH1 when installation is complete in a XAP 800 system.

Typical Installation in XAP 800 System
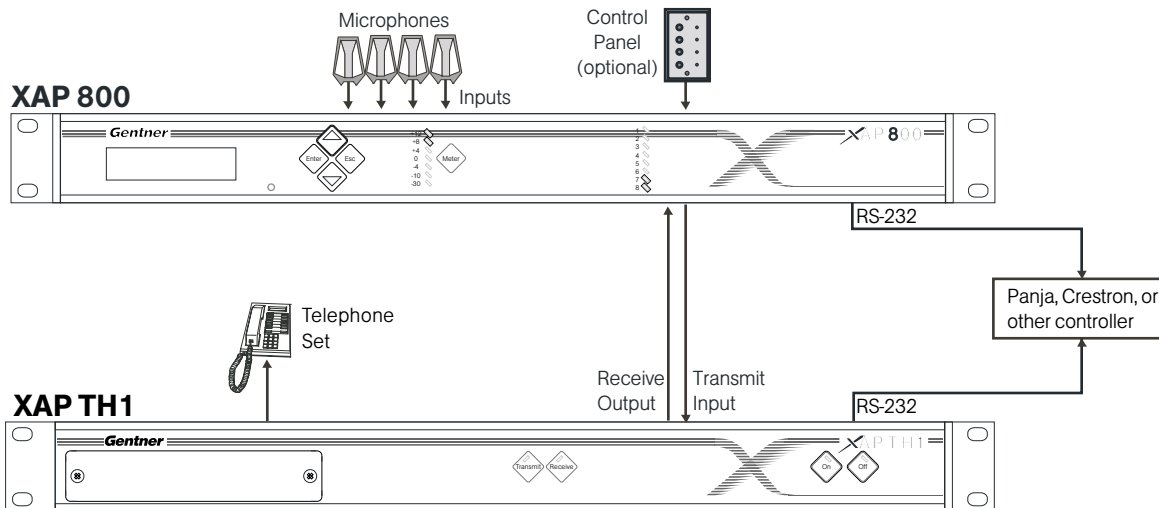
Figure 4. System diagram

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Connecting the Unit

Refer to XAP TH1 back-panel connections (See Figure 5, below) for a description and placement of each of the connections you will be making. Each connector is numbered for easy identification. To install your XAP TH1, follow these step-by-step instructions:
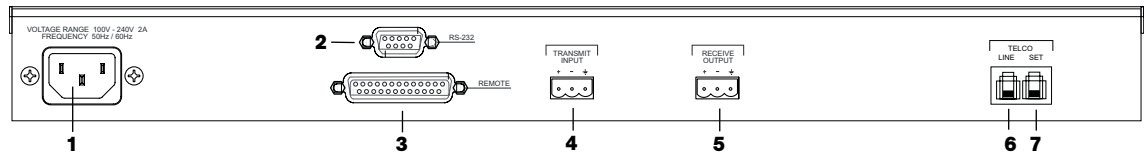
Figure 5. XAP TH1 back-panel connectors
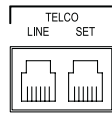
Figure 6. RJ-11C telephone-line connector
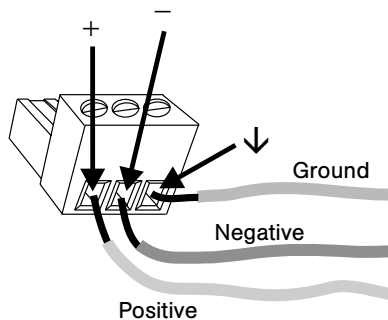
Figure 7. Phoenix push-on connector

1. Plug your telephone line from the wall jack into the RJ-11C Line jack [6].

2. Plug your telephone set into the RJ-11C Set jack [7].

3. If you are using a remote control device (Crestron, Panja AMX, etc.), connect via the RS-232 port [2]. You can also connect to a PC using this port.

4. If you are using a remote control for parallel control and hybrid status, plug it into the DB25 Remote connector [3].

5. Wire the XAP TH1 to the XAP 800 using the provided three-terminal Phoenix push-on connectors. These connectors are designed for easy wiring; simply insert the desired wire into the appropriate connector opening and tighten down the top screw.

   - **Transmit Input** Audio connected to the Transmit Input [4] will be sent down the telephone line.

   - **Receive Output** Audio from the Receive Output [5] (telephone participant audio) is passed to the XAP 800 for further routing and distribution. See Figure 4 on page 7.

The three terminals in the Phoenix connector correspond with the back-panel audio contacts (from left to right): +(positive), −(negative), and ↓(ground).

Connecting Power

The power input [1] will operate at any level between 100–240VAC, 50–60Hz, 15W (typical). Plug in the XAP TH1 to complete the hardware installation.

DIP Switch Settings

The XAP TH1 has a variety of operational features configurable through DIP switch settings, including noise burst/auto-adapt, receive AGC control, auto-answer, auto-disconnect, call progression/loop, and receive reduction. Default settings (as shipped from the factory) are denoted by an asterisk "*".
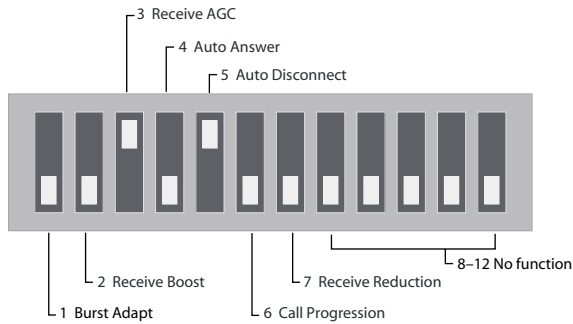
Figure 8. DIP Switch Settings

DIP Switch 1, Noise Burst/Auto-Adapt

In some applications, it may be desirable to adapt the hybrid with a white-noise burst, rather than allowing the hybrid to adapt automatically to line conditions. To enable this feature, DIP switch 1 behind the digital hybrid's front panel is used to enable/disable the noise burst (Table 1, below).

Table 1. Noise Burst Auto-Adapt DIP Switch Settings

| DIP Switch	Position	Description
1	ON (UP)	Burst adapt
1*	OFF (DOWN)	Auto-adapt

DIP Switch 2, 6dB Receive Boost

In some applications, it may be desirable to increase the receive audio by 6dB. To enable this feature, DIP switch 2 behind the digital hybrid's front panel is used to enable/disable the 6dB receive boost (Table 2, below).

Table 2. 6dB Receive Boost DIP Switch Settings

DIP Switch	Position	Description
2	ON (UP)	6dB Receive audio boost enabled
2*	OFF (DOWN)	6dB Receive audio boost disabled

DIP Switch 3, Receive Automatic Gain Control

DIP switch 3 behind the digital hybrid's front access panel enables/disables the AGC function in the firmware (Table 3, below).

Table 3. Receive AGC DIP Switch Settings

DIP Switch	Position	Description
3*	ON (UP)	Receive AGC enabled
3	OFF (DOWN)	Receive AGC disabled

To issue the AA (auto-answer) serial command to toggle auto-answer, DIP switch 4 must be OFF (DOWN).

DIP Switch 4, Auto-Answer

DIP switch 4 behind the XAP TH1's front access panel enables/disables auto-answer (Table 4, below).

Table 4. Auto-Answer DIP Switch Settings

DIP Switch	Position	Description
4	ON (UP)	Auto-answer enabled
4*	OFF (DOWN)	Auto-answer disabled (follows the serial command)

DIP Switch 5, Auto-Disconnect

DIP switch 5 behind the XAP TH1's front access panel enables/disables auto-disconnect (Table 5, below).

Table 5. Auto-Disconnect DIP Switch Settings

DIP Switch	Position	Description
5*	ON (UP)	Auto-disconnect enabled
5	OFF (DOWN)	Auto-disconnect disabled

In order for the settings on DIP Switch 6 to function, DIP Switch 5 must be ON (UP). Auto-disconnect must be enabled before either Call Progression or Loop Drop are applicable.

DIP Switch 6, Call Progression/Loop

DIP switch 6 selects either loop drop or call-progress mode. Call-progress mode will disconnect the line upon detection of a valid call-progress signal (Table 6, below). Call progress will detect reorder tone and busy signal for the U.S., Canada, United Kingdom, France, and Germany.

Table 6. Call Progression/Loop DIP Switch Settings

DIP Switch	Position	Description
6	ON (UP)	Call progression enabled
6*	OFF (DOWN)	Loop drop enabled

DIP Switch 7, Receive Reduction

In some applications, it may be necessary to duck the receive audio coming in through the telephone line when transmit audio is present. To serve this purpose, DIP switch 7 is designated to duck the receive audio by -6dB, if active (Table 7, below).

Table 7. Receive Reduction DIP Switch Settings

DIP Switch	Position	Description
7	ON (UP)	Receive reduction enabled
7*	OFF (DOWN)	Receive reduction disabled

Calibration

The following information will help you make adjustments to optimize your system performance. Verify all components and all connections. Ensure that proper power is supplied to the XAP TH1 and that the unit is OFF (the red OFF LED [4] will be lit; see Figure 9, below). If the green ON LED [3] is lit, press the OFF button [6].
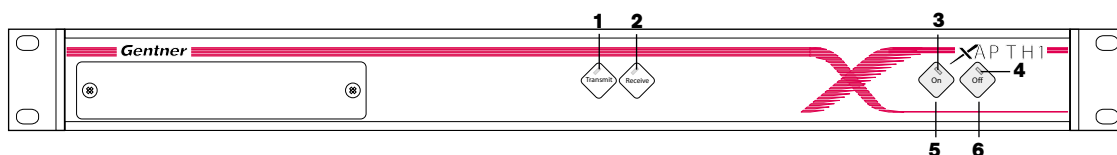
Figure 9. XAP TH1 front-panel controls

There are two calibration methods for the XAP TH1: noise burst and auto-adapt. Which procedure is used depends on whether you have DIP switch 1 ON (UP) for noise-burst adapt, or DIP switch 1 OFF (DOWN) for auto-adapt. Either will suffice to calibrate the XAP TH1. The difference is the application and/or personal preference. Some applications are not suited for a .75-second noise burst, and may require the gradual adaptation over time.

Some echo and ringing may be heard while the XAP TH1 is calibrating. Disregard it and continue with calibration until the end of the procedure. The echo and ringing will disappear.

Noise-Burst Adapt

If DIP switch 1 is ON (UP), have someone call the XAP TH1 from another location. Answer the line by pressing the ON button [5]. (If the auto-answer feature is active, the unit will answer the call after one complete ring.)

The caller will hear a short white noise burst (it will sound like static) and a short beep. This automatically adapts the XAP TH1 to the telephone line.

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Auto-Adapt

If DIP switch 1 is OFF (DOWN), call someone and continue to talk while the system adapts over time. Once complete, the XAP TH1 will be fully calibrated and ready for use.

Conclude your conversation and press the OFF button [6]. (If the auto-disconnect feature is active, and the distant location hangs up, the XAP TH1 will disconnect upon sensing loop drop or call-progress tones, depending on the position of DIP switch 6.)

XAP TH1 transmit and receive audio level adjustments are made via the XAP 800. Nominal transmit and receive level for the XAP TH1 is 0dB.

Transmit Level Adjustment

Someone in the local room should speak into the microphone at a normal distance, in a normal voice. The party at the distant location should not speak during the transmit adjustment. Adjust the XAP 800 output that is connected to the XAP TH1 TRANSMIT input to nominal 0 reaching peaks of +4dB to +8dB. The XAP TH1 TRANSMIT LED [1] should be solid green while the person is speaking and extinguish when the person stops. Refer to your XAP 800 manual for more information.

Receive Level Adjustment

Someone in the distant location should speak into the microphone at a normal distance, in a normal voice; the local room should maintain silence. Adjust the XAP 800 input that is connected to the XAP TH1 RECEIVE output to to nominal 0 reaching peaks of +4dB to +8dB. The XAP TH1 RECEIVE LED [2] should be solid green while the person is speaking and extinguish when the person stops.

Calibration is now complete.

Operating Your XAP TH1

Easy-to-access front-panel controls make operation of the XAP TH1 simple. Figure 10 (below) shows each front panel LED and button by number.
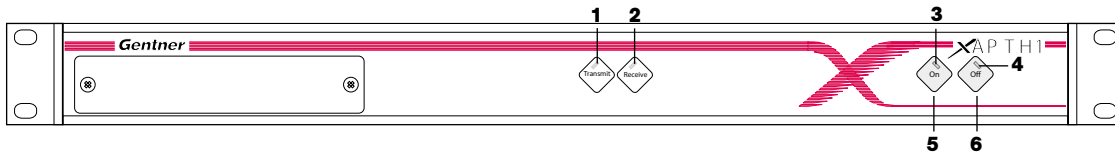
Figure 10. XAP TH1 front-panel controls

Answering a Call

An incoming call will ring on the telephone set connected to the XAP TH1 and flash the ON LED. You can answer the call in one of two ways:

- Press the ON button [5] on either the front panel or from your remote control. This will route the call through the XAP TH1 to the XAP 800. The green ON LED [3] will light. The red OFF LED [4] will extinguish. Upon connection, the XAP TH1 automatically (if DIP switch is set to Off) adjusts to the line conditions.

- Answer the call by picking up the telephone handset and talking to your party over the telephone.

If auto-answer is enabled (DIP switch 4), the XAP TH1 will answer after the first complete ring.

Making a Call

Call the party normally, using your handset. After the other party has answered, route the call through the XAP TH1 by pressing the ON button [5]. The ON LED [3] will light and the XAP TH1 will take control of the call, disabling the telephone set. You may now safely hang up the handset without disconnecting your call. When the conversation is complete, press the OFF button [6] to disconnect the call.

If using RS-232 touch tone, it is not necessary to hit the ON button [5]. When using the DIAL serial port command, the XAP TH1 automatically engages the hybrid. See Serial Commands, page 15.

Disconnecting a Call

If the call is routed through the XAP TH1 (the ON LED [3] will glow), press the OFF button [6] (OFF LED [4] will glow, ON LED [3] will extinguish).

If your call is through the handset only (the red OFF LED [4] will be lit), hang up when the conversation is complete.

If auto-disconnect is enabled (DIP switch 5), the XAP TH1 will disconnect upon sensing loop drop or call-progress tones (depending on the position of DIP switch 6).

Remote Connector (DB25) Option

A customer-supplied remote control or contact-closure switch can be used to perform three functions: mute on/off, system on, and system off. For pinouts, see Connector Pinouts, page 23.

Custom Controller (RS-232) Option

The XAP products are designed to function with custom serial control systems such as Crestron and Panja (AMX). The controller is connected to the XAP TH1 RS-232 port. Via the custom controller, the XAP TH1 can be turned on or off; transmit and receive audio can be muted; DTMF tones can be generated (See Serial Commands, Page 15); telephone hybrid can be renulled; input and output can be metered; and ERL and ERLE can be read.

When Not in Use

The XAP TH1 is inactive when the red OFF LED [4] is lit.

Appendix A

Serial Commands

The XAP TH1 accepts serial commands via the RS-232 serial port. The RS-232 serial port default protocol is 9,600, 8 bits, 1 stop bit, no parity. The commands in this section pertain only to the XAP TH1.

Command Structure

The structure of serial commands is as follows:

The command, then any additional options in the order that they appear in the command descriptions on the following pages.

Example: A command to enable auto-answer on the XAP TH1 would have the command line: AA 1. In this command line, AA=command, 1=on state). If a command calls for a "null" value, leave a blank in the command line (e.g. "AA" would return the current state of auto-answer on the TH1).

Commands can use uppercase or lowercase letters. Return values always use uppercase letters. In order for a command to be recognized by the serial port, the command must be terminated by a carriage return.

XAP TH1 Serial Commands

Command	Function	Command	Function
AA	Auto-answer	RING	Ring acknowledgement
DIAL	Dial touch-tones	RINGEN	Changes or reports the state of ring indication
HOOK	Send hook-flash to the line	TE	Control/report the connect state of the unit
HOOKD	Set hook-flash duration	TERL	Return telephone ERL
LVL	Return transmit/receive level	TERLE	Return telephone ERLE
MUTE	Control/report mute status*	VER	Return current version of software
NULL	Renulls XAP TH1 to telephone line		

* applied to a specific channel

Conventions

The following typographic conventions are used to set off parameters and explain their function in command strings.

Convention	Example	Description
< >	<X>	Mandatory parameters
[ ]	[X]	Optional parameters
−	1−8	Range between the values
,	4,7,9	List of available values
bold	**AA**	Command

This serial command only functions if DIP switch 4 is OFF (DOWN).

AA

This command activates and deactivates the auto-answer feature.

☞   **AA** <X>

Explanation: <X> is the action (i.e. auto-answer enable, auto-answer disable, current state).

X=0	Parameter disables auto-answer
X=1	Parameter enables auto-answer
X=2	Parameter to toggle the state from one state to the other (regardless of current state)
X= Null	Parameter to report back the current state

DIAL

DTMF tones can be generated through the XAP TH1. This capability remains active after a call is placed, so tones can be issued for use with voice mail and pagers.

If the XAP TH1 is not connected when this command is issued, the unit will connect to the line first, then dial the tone(s).

⌂   **DIAL** <STRING>

Explanation: <STRING> is any valid combination of touch tone characters. A comma indicates a two-second pause. STRING has a maximum length of 40 characters. Valid characters are: 0 through 9, #, * and ,

Return Values: DIAL returns the dialed string of numbers. The string is returned after the command has been completed (i.e. dialed all the touch tones).

Example: The following command dials the number (801) 975-7200. A 9 and a pause is generated to get an outside line on a PBX.

The number to be dialed: DIAL 9,8019757200

The following is returned out the serial port: DIAL 9,8019757200

HOOK

This command sends a momentary interruption in line seizure (hook flash) to the telephone line. This command is write only.

⌂   **HOOK**

Return Values: If hook flash succeeded, the following is returned out the serial port: HOOK

Example:
The following command request hook flash: HOOK

The following is returned out the serial port: HOOK

HOOKD

This command changes or reports the hook-flash duration of the unit.

⌨   **HOOKD** <X>

Explanation: <X> is the action (i.e. hook-flash duration, current state)

X=0	Parameter to set hook-flash duration to 50 ms
X=1	Parameter to set hook-flash duration to 90 ms
X=2	Parameter to set hook-flash duration to 100 ms
X=3	Parameter to set hook-flash duration to 110 ms
X=4	Parameter to set hook-flash duration to 250 ms
X=5	Parameter to set hook-flash duration to 300 ms
X=6	Parameter to set hook-flash duration to 400 ms
X=7	Parameter to set hook-flash duration to 500 ms
X=8	Parameter to set hook-flash duration to 600 ms
X=9	Parameter to set hook-flash duration to 700 ms
X=Null	Parameter to report back the current state.

Return Values: The command will return the hook-flash duration of the unit in the same format as the command. HOOKD <X>

Example: The following command requests hook-flash duration:
HOOKD

The following is returned out the serial port: HOOKD 4

LVL

This command reports back the transmit or receive level for a unit.

⌨   **LVL** <CH>

Explanation: <CH> is which parameter to be measured.

CH= RXIN	Parameter for level from the telephone line
CH=RXOUT	Parameter for level from the XAP TH1
CH=TXIN	Parameter for level into the XAP TH1
CH=TXOUT	Parameter for level to the telephone line

Return Values: LVL will return the output level of the line channel in the same format as the command.

Example: If is current level for RXIN channel is -20dBu, the following is returned out the serial port:

LVL RXIN -20

MUTE

This command controls or reports the mute status of a channel.

⌨   **MUTE** <CH> <X>

Explanation:

<CH> is the channel(s) to be muted/unmuted.

CH=T	Parameter to apply to the transmit channel
CH=R	Parameter to apply to the receive channel
CH=*	Parameter to apply to both channels

<X> is the action (i.e. mute, unmute, report the mute state).

X=0	Set mute to off
X=1	Set mute to on (mute the selected channel)
X=2	Parameter to toggle the state from one state to the other (regardless of current state)
X=NULL	Report the current state of mute for the selected channel

Return Values: MUTE returns the mute status in the same format as the command.

Example: If current state of mute for channel T is muted, the following is returned out the serial port: MUTE T 1

If current state of mute for channel T is unmuted, the following is returned out the serial port: MUTE T 0

NULL

This command sends a short noise burst down the telephone line and forces the XAP TH1 to adapt to the telephone line. This command is write only.

⌨   **NULL**

Return Values: If the renull succeeded, the following is returned out the serial port: NULL

RING

When the XAP TH1 receives a valid ring from the telephone line, the XAP TH1 will respond.

⌨   **RING**

RINGEN

This command changes or reports back the state of the ring indication.

🖃   **RINGEN** <X>

Explanation: <X> is the action (i.e. which ring indication, current state)

X=0	Parameter to set the state to OFF
X=1	Parameter to set the state to ON
X=2	Parameter to toggle the state from one state to the other (regardless of current state)
X= Null	Parameter to report back the current state.

Return Values: The command will return the updated condition of the ring indication in the same format as the command.

TE

Controls and reports the connection status of the unit.

🖃   **TE** <X>

Explanation: <X> is the action (e.g. connect, disconnect, current state)

X=0	Parameter to set the unit to disconnect from the line
X=1	Parameter to set the unit to connect to the line
X=2	Parameter to toggle the state from one state to the other (regardless of current state)
X= Null	Parameter to report back the current state.

Return Values: If the current connect state is ON, the following is returned out the serial port: TE 1

If the current connect state is OFF, the following is returned out the serial port: TE 0

Example:
The following connects the unit to the telephone line: TE 1

The following is returned out the serial port: TE 1

The following reports the connection state of the unit: TE

The following is returned out the serial port: TE 1

TERL

This command reports back the telephone echo return loss (ERL) for the XAP TH1 in dB. This is a read-only parameter.

⌘   **TERL**

Return Values: If the current TERL level for the telephone canceller is 10 dB, the following is returned out the serial port:

    TERL 10

TERLE

This command reports back the telephone echo return loss enhancement (ERLE) for the XAP TH1 in dB. This is a read-only parameter.

⌘   **TERLE**

Return Values: If the current TERLE level for the telephone canceller is 20dB, the following is returned out the serial port:

    TERLE 20

VER

This command returns current version of software. This version is unique to a released version of software. This command is read only.

⌘   **VER**

Return Values: VER returns the version of software (a major version number followed by a period and a minor version number).

Example: The following command requests the version number: VER
The following is returned out the serial port: VER 1.0

B Appendix B

Pinouts

Remote Connector Pinout

Pin	Description	Pin	Description
1	Remote ON *	14	ON indication **
2	Remote OFF *	15	OFF indication **
3	N/C	16	N/C
4	N/C	17	N/C
5	Switch/Indicator Common	18	Switch/Indicator Common
6	Transmit Presence Indicator **	19	N/C
7	Receive Presence Indicator **	20	N/C
8	N/C	21	Switch/Indicator Common
9	Unbalanced Transmit Audio Input (0dBu nominal)	22	Audio Common
10	Unbalanced Receive Audio Output (0dBu nominal)	23	Audio Common
11	N/C	24	Audio Common
12	N/C	25	Switch/Indicator Common
13	Audio Common		

* Remote control provided via contact closure to Switch/Indicator Common

** Remote indicators provided via open collector outputs to Indicator Common (<15V, <39mA)

RS-232 Com Port

Pin	Description	Pin	Description
1	Not used	6	Not used
2	TXD	7	Not used
3	RXD	8	Not used
4	Not used	9	Not used
5	Ground		

Set Connector Pinout

Pin	Description	Pin	Description
1	To pin 6 of SET RJ-11C	4	Tip
2	To pin 5 of SET	5	To pin 2 of LINE
3	Ring	6	To pin 1 of LINE RJ-11C

Line Connector Pinout

Pin	Description	Pin	Description
1	To pin 6 of LINE RJ-11C	4	Ring
2	To pin 5 of LINE	5	To pin 2 of SET
3	Tip	6	To pin 1 of SET RJ-11C

Appendix C

Specifications

DIMENSIONS
17"/43.2cmW x 1.75"/4.5cmH x
8"/25.4cmD

WEIGHT
7 lb/3.18 kg (dry)
12 lb/5.4 kg (shipping)

REAR PANEL CONNECTORS
POWER: IEC Type
Auto-adjusting power module from
100−240 VAC, 50/60Hz, 15W (typical)
REMOTE: DB25 female connector.
Remote Transmit Input:
0dBu nominal, unbalanced 10kOhm
impedance
Remote Receive:
0dBu nominal, unbalanced, 50 Ohm
impedance
Control Inputs:
Remotely activate functions with a
momentary switch closure to ground
Status Outputs:
Remotely check the status outputs.
Status outputs are open collector out
puts rated at 30VDC and 40mA maxi-
mum.

RS-232: DB9 female
9600, 8 bits, 1 stop bit, no parity
TRANSMIT INPUT:
Push-on terminal block with slotted set-
screw connectors contacts provided at
terminal block at +20dBm maximum input,
0dBu nominal level, balanced bridging
>20kOhm impedance
RECEIVE OUTPUT:
Push-on terminal block with slotted set-
screw connectors contacts provided at
terminal block at +20dBm maximum input,
0dBu nominal level, <50 Ohm impedance
TELCO LINE: RJ-11 connector
POTS (plain old telephone service)
telephone line or analog extension from a
PBX. A-Lead Supervision provided
TELCO SET: RJ-11 connector
A-Lead Supervision provided

FRONT PANEL CONNECTORS
CONTROLS:
On Button
Off Button
STATUS LEDS:
Transmit Audio Presence
Receive Audio Presence

TELEPHONE TRANSMIT

Nominal send input of 0dBu referenced to -15dBu onto the telephone line.
FREQUENCY RESPONSE:
  ±1dB from 250Hz to 3.3kHz (AGC disabled)
SIGNAL-TO-NOISE RATIO:
  >56dB reference to 0dBu at -15dBm on the telephone line
RECEIVE AUDIO DISTORTION
  <.3%

TELEPHONE RECEIVE

Nominal phone line level of -15dBu referenced to caller output of 0dBu
FREQUENCY RESPONSE:
  ±1dB from 250Hz to 3.3kHz (AGC disabled)
SIGNAL-TO-NOISE RATIO:
  >56dB reference to 0dBu at -15dBm on the telephone line

RECEIVE AUDIO DISTORTION
  <.3%

ECHO CANCELLATION

NULL: 55dB nominal
TAIL TIME: 31ms

OPERATING TEMPERATURE

32–100˚ F / 0–38˚ C

HUMIDITY

0–80 percent

All specifications are subject to change without notice.

Warranty

Gentner Communications Corporation (Manufacturer) warrants that this product is free of defects in both materials and workmanship. Should any part of this equipment be defective, the Manufacturer agrees, at its option, to:

A. Repair or replace any defective part free of charge (except transportation charges) for a period of one year from the date of the original purchase, provided the owner returns the equipment to the Manufacturer at the address set forth below. No charge will be made for parts or labor during this period;

B. Furnish replacement for any defective parts in the equipment for a period of one year from the date of original purchase. Replacement parts shall be furnished without charge, except labor and transportation.

This Warranty excludes assembled products not manufactured by the Manufacturer whether or not they are incorporated in a Manufacturer product or sold under a Manufacturer part or model number.

THIS WARRANTY IS VOID IF:

A. The equipment has been damaged by negligence, accident, act of God, or mishandling, or has not been operated in accordance with the procedures described in the operating and technical instructions; or,

B. The equipment has been altered or repaired by other than the Manufacturer or an authorized service representative of the Manufacturer; or,

C. Adaptations or accessories other than those manufactured or provided by the Manufacturer have been made or attached to the equipment which, in the determination of the Manufacturer, shall have affected the performance, safety or reliability of the equipment; or,

D. The equipment's original serial number has been modified or removed.

NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE, APPLIES TO THE EQUIPMENT, nor is any person or company authorized to assume any warranty for the Manufacturer or any other liability in connection with the sale of the Manufacturer's products.

Manufacturer does not assume any responsibility for consequential

damages, expenses, or loss of revenue or property, inconvenience, or interruption in operation experienced by the customer due to a malfunction in the purchased equipment. No warranty service performed on any product shall extend the applicable warranty period.

In case of unsatisfactory operation, the purchaser shall promptly notify the Manufacturer at the address set forth below in writing, giving full particulars as to the defects or unsatisfactory operation. Upon receipt of such notice, the Manufacturer will give instructions respecting the shipment of the equipment, or such other matters as it elects to honor this warranty as above provided. This warranty does not cover damage to the equipment during shipping and the Manufacturer assumes no responsibility for such damage. All shipping costs shall be paid by the customer.

This warranty extends only to the original purchaser and is not assignable or transferable.

Gentner Communications Corporation, 1825 Research Way, Salt Lake City, Utah 84119

Compliance

FCC Part 15 Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

Changes or modifications not expressly approved by Gentner Communications Corporation could void the user's authority to operate the equipment.

FCC Part 68 Compliance
FCC Registration Number: FBIUSA-43110-BR-T
Ringer Equivalence Number (REN): 0.6B

A label containing, among other information, the FCC registration number and Ringer Equivalence Number (REN) for this equipment is prominently posted on the top plate, near the rear of the equipment. If requested, this information must be provided to your telephone company.USOC Jacks: This device uses RJ-11C and RJ21X terminal jacks.

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of the RENs should not exceed five (5). To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the telephone company to obtain the maximum RENs for the calling area.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. If advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice for you to make the necessary modifications in order to maintain uninterrupted service.

If you experience problems with this equipment, contact Gentner Communications Corporation, 1825 Research Way, Salt Lake City, Utah 84119, or by phone at (801) 975-7200 for repair and warranty information. If the trouble is causing harm to the telephone network, the telephone company may request you remove the equipment from the network until the problem is resolved.

No user serviceable parts are contained in this product. If damage or malfunction occurs, contact Gentner Communications for instructions on its repair or return.

This equipment cannot be used on telephone company provided coin service. Connection to Party Line Service is subject to state tariffs.

IC Compliance
Ringer Equivalence Number (REN): 0.6B
IC Certification Number: 1970 11504 A

NOTICE: The Industry of Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by Gentner Communications. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Safety Information
CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electrical inspection authority, or electrician, as appropriate.

European Compliance
This equipment has been approved in accordance with Council Decision 98/482/EC for pan-European single terminal connection to the public switched telephone network (PSTN). However, due to differences between the individual PSTNs provided in different countries, the approval does not, of itself, give an unconditionally assurance of successful operation on every PSTN network termination point. In the event of problems, you should contact your equipment supplier in the first instance.

Gentner Communications Corporation of 1825 Research way, Salt Lake City, Utah 84119, U.S.A. declares that this equipment is designed to be compatible with the following networks: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and United Kingdom.

CE **This equipment complies with the requirements of the EU guidelines:**

89/336/EEC	"Electromagnetic Compatibility"
73/23/EEC	"Electrical operating material for use within specific voltage limits"
1999/5/EC	"Radio Equipment and Telecommunications Equipment"

Conformity of the equipment with the above guidelines is attested by the CE mark.