DH20/22

Digital Telephone Hybrids

Installation & Operation Manual

Gentner®

Perfect Communication through Technology, Service, and Education™

DH20/22 Installation and Operation Manual
Gentner Part No. 800-012-001
April 2000 (Rev. 2.0)

The connection ports on the SPH10 are to be used as follows:

Power	Connection to the provided power cord
Remote	Connection to external controlling and status device(s)
Monitor Out	Connection to external speaker 8 ohm
Send In	Connection to audio output devices
Caller Out	Connection to audio input devices
Aux Out	Connection to audio input devices
Telco Line	Connection to telephone line
Telco Set	Connection to telephone set

This equipment complies with the requirements of the EU guidelines:

CE

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.

Table of Contents

1 Introduction

Congratulations on your purchase of the DH20 or DH22 digital hybrid. With the variety of telephone systems in the world today, from cellular to digital to analog, it's increasingly difficult to have all callers sound the same on-air. To help bring uniformity and high quality sound to a broadcast talk show environment, we have created the DH20 and the DH22 digital telephone hybrids. These digital hybrids provide a telephone interface between a telephone line and audio equipment.

These hybrids use digital signal processing (DSP) technology to continually adapt to telephone-line conditions—providing consistent high-quality sound and send to caller separation. The DH20 is a single digital hybrid, allowing connection of a single telephone line for on-air use. The DH22 is a dual digital hybrid, allowing the connection of two telephone lines for on-air use. When connected in accordance to United States, Canada, the United Kingdom, and mainland Europe compliance standards, the digital hybrids are perfect for your telephone application.

This manual gives installation, set up, and operation instructions and helps you resolve technical problems, should any arise. For more information, please contact Gentner Communications. We welcome and encourage your comments so we can continue to improve our products and serve your needs.

What's In This Manual

The manual is divided into the following sections:

Overview summarizes the main capabilities of the DH20/22, along with the pre-installation site requirements.

Installation explains how to connect DH20/22 cables and how calibrate the different controls on the unit.

Operation describes how to use the front panel controls to connect and disconnect calls, switch calls to and from the hybrid, and use the remote control option.

Appendices include DH20/22 specifications, connector pinouts, and detailed warranty and compliance information.

Technical Support

Technical Support

For additional help on how to install, set up, operate or to obtain repair procedures and schematics for the DH20/22, please contact Gentner technical support.

Telephone: 1.800.283.5936 (USA) **or** 1.801.974.3760
Fax: 1.801.974.3638
E-mail: tech1@gentner.com
Web site: www.gentner.com

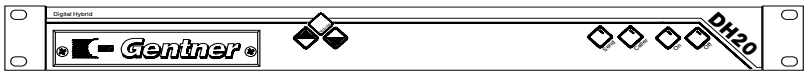
Sales and Customer Service

Telephone: 1.800.945.7730 (USA) **or** 1.801.975.7200
Fax: 1.800.933.5107 (USA) **or** 1.801.977.0087
E-mail: bcastinfo@gentner.com

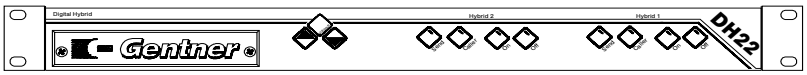
Gentner Communications Corporation
1825 Research Way, Salt Lake City, UT 84119

Unpacking

Ensure that the following items were received with your shipment:



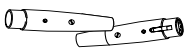
or



DH20
Part 910-012-101 (Domestic)
Part 910-012-103 (Pan European)
Part 910-012-104 (Australian)

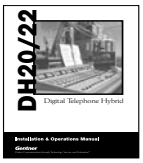
DH22
Part 910-012-001 (Domestic)
Part 910-012-003 (Pan European)
Part 910-012-004 (Australian)

AC Power Cord
Part 699-150-006



XLRs
1 male, 1 female
Parts 664-600-003
and 664-500-003

12-foot Modular
Telephone Cable
Part 830-000-012



DH20/22 Installation and
Operations Manual
Part 800-012-001

4 Rack Mount Cups
Part 684-400-001

4 Rack Mount Screws
Part 681-400-001

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.

Product Registration

Please register your DH20/22 online by visiting Gentner Technical Support on the World Wide Web at **www.gentner.com**. When your product is properly registered, Gentner Communications can better serve you should you require technical assistance or want to receive upgrades or new product information.

2 Overview

About the DH20/22

- Crystal clear, consistent audio quality
- Continual adaptation to telephone line conditions
- Selectable automatic mix-minus
- Selectable caller automatic gain control (AGC)
- 1W power amp with volume control on front-panel
- Selectable mic/line level input
- On/Off control via front panel and rear panel remote connection
- Analog receive filter for telephone line noise reduction
- Selectable caller control (ducking)
- Balanced inputs and outputs
- Auxiliary output for recording
- Simple installation and operation
- Adjustable send/caller audio level control
- Selectable single-ring auto-answer
- Selectable auto-disconnect

Product Description

DH20/22

The DH20 and DH22 provide superior analog telephone integration into broadcast applications. With a variety of selectable functions from the front panel DIP switches, these digital hybrids can be customized to meet your specific needs. By continually adapting to telephone line conditions and isolating send audio from caller audio, the DH20 and DH22 produce clean, consistent audio. Installation to consoles with no mix-minus capability is no problem. Both hybrids offer the built-in mix-minus feature.

DH22

The DH22 is a dual hybrid unit designed for conferencing two telephone lines. The DH22 has all the same features as the DH20, but can handle two callers at once. The two internal hybrids contain a common Send audio input and the two telephone lines are internally conferenced. This means two callers can be on-air at once. Both callers' audio can be output as a single input on your console or as two separate outputs to two console inputs.

Telephone Separation (Null)

Using Digital Signal Processing (DSP) technology and firmware developed by Gentner, the interface between a standard analog POTS line and your audio equipment will result in superior quality audio.

The primary function of the DH20 and DH22 hybrids are to maximize the null by maximizing the separation of send and caller audio. Both hybrids provide >55dB null between 250kHz to 3.5kHz.

Automatic Gain Control (AGC)

AGC normalizes the gain of caller audio, augmenting the level of "soft" callers, and attenuating the level of "loud" callers. This helps provide more uniform caller audio levels at the caller output of the hybrid.

The AGC threshold is -50dBm. The AGC works to achieve an equivalent average caller level of -30dBm from the telephone circuit.

Automatic Mix-Minus

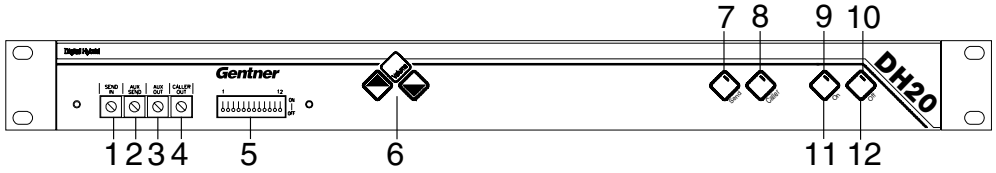
The DH20 and DH22 auto mix-minus creates a mix-minus for the hybrid when one is not available from the audio console. Caller/send isolation is equal to or greater than 50dB between 250Hz to 3.5kHz with 12dB maximum external loop gain. Send audio suppression up to 12dB maximum may be applied.

Caller Control

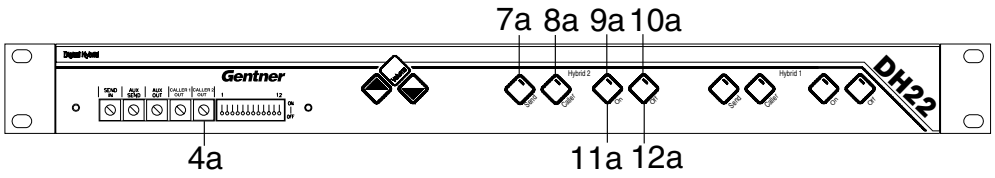
Caller control, also know as ducking, attenuates the caller input audio when send audio is present. The purpose of this attenuation is to allow the talent to dominate their conversation with the caller. The amount of caller control, attenuation, applied to the caller audio is selectable from 0 to 18dB in 6dB increments.

Front-Panel Controls

The front-panel controls perform the following functions:



DH20 front-panel controls



DH22 front-panel controls

1. **Send In.** This trim pot adjusts the level of audio sent to the phone line via the Send In jack. At its midpoint (6 o'clock position), the trim pot is set for nominal send level (0dBm).

2. **Aux Send.** This trim pot adjusts the level of the auxiliary send audio coming from the remote connector input and going onto the telephone line to the caller. At its midpoint (6 o'clock position), the trim pot is set for nominal level (0dBm).

3. **Aux Out.** This trim pot adjusts the level of the audio at the Aux Out jack. At its midpoint (6 o'clock position), the trim pot is set for nominal level (0dBm).

4. **Caller Out.** This trim pot adjusts the caller audio level to the user's equipment. At its midpoint (6 o'clock position), the trim pot is set for nominal caller level (0dBm).

4a. The DH22 has a second Caller Out trim pot for hybrid 2.

5. **DIP Switches.** These DIP switches configure the hybrid's system. Individual switch functions are defined in Calibration (page 20).

6. **Volume.** These up/down buttons control the audio level of the monitor out speaker amplifier. Pressing once changes the level by 1dB. Pressing and holding a button sweeps the level up or down.

7. **Send LED.** This bi-color LED indicates the relative level of the send audio into the digital hybrid. Green indicates nominal level, amber indicates caution, red indicates clipping.

7a. The DH22 has a second Send LED for hybrid 2.

8. **Caller LED.** This bi-color LED indicates the relative level of the caller audio from the telephone line. Green represents nominal level, amber indicates caution, red indicates clipping.

8a. The DH22 has a second Caller LED for hybrid 2.

9. **On LED.** This LED indicates the DH20/22 has connected with the phone line. The LED illuminates green when the hybrid is on and flashes green when the phone line is ringing.

9a. The DH22 has a second On LED for hybrid 2.

10. **Off LED**. This LED indicates the hybrid is not connected to an active phone line. The LED illuminates red when the hybrid is off.

10a. The DH22 has a second Off LED for hybrid 2.

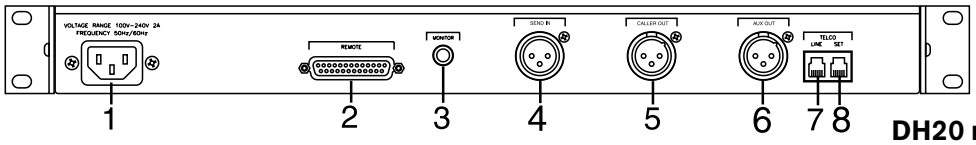
11. On. The On switch connects the hybrid to the telephone line.

11a. The DH22 has a second On switch for hybrid 2.

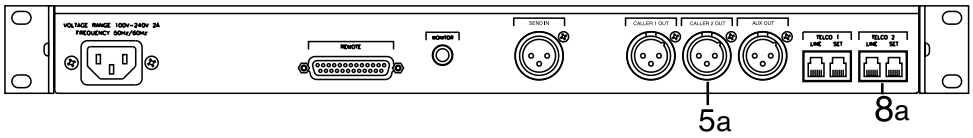
12. **Off.** The Off switch disconnects the hybrid from the telephone line and mutes all audio going to and from the telephone line.

12a. The DH22 has a second Off switch for hybrid 2.

Rear Panel Connectors



DH20 rear panel connectors



DH22 rear panel connectors

1. **Power.** The AC power cord input is a IEC type connector allowing use of premolded domestic US power cords as well as various other premolded international power cords.

2. **Remote.** This DB25 female connector provides remote control and status of the hybrid. Unbalanced send in, caller out ,and aux out audio are also available at the remote connector. See Appendix C: Connector Pinouts (page 29).

3. **Monitor Out.** This 1/4" jack is a speaker connection for monitoring the caller audio signal. The monitor output provides 1 watt into an 8 ohm speaker.

4. **Send In.** This balanced, female, 3-pin XLR input receives audio from the source (microphone or mixer) and sends it to the caller. Audio sent to the caller must be a mix-minus. See Mix-Minus (page 16).

5. **Caller Out.** This balanced, male, 3-pin XLR output contains the audio from the caller.

5a. The DH22 has a second Caller Out for hybrid 2.

6. **Aux Out.** This balanced, male, 3-pin XLR output contains a mix of caller and send audio or caller audio only. See DIP switches (page 20). This connector can feed a recording device to record both the caller and send audio.

7. **Line.** This RJ11 connector provides connection of the telephone line to the hybrid. A-Lead closure is provided.

8. **Set.** This RJ11 connector allows connection to a standard analog telephone set. The telephone line is present at this connector when the hybrid is off. The telephone line is not present at this connector when the hybrid is on. A-Lead closure is provided.

8a. The DH22 has a second line and set pair for hybrid 2.

If using a single microphone that needs phantom power to operate, you must supply this power to the microphone. The digital hybrid does not supply phantom power.

3 Installation

Before You Install

Power Requirements

The hybrids automatically adjust to accept voltage requirements of 100–240VAC, 50/60Hz.

Telephone Line Requirements

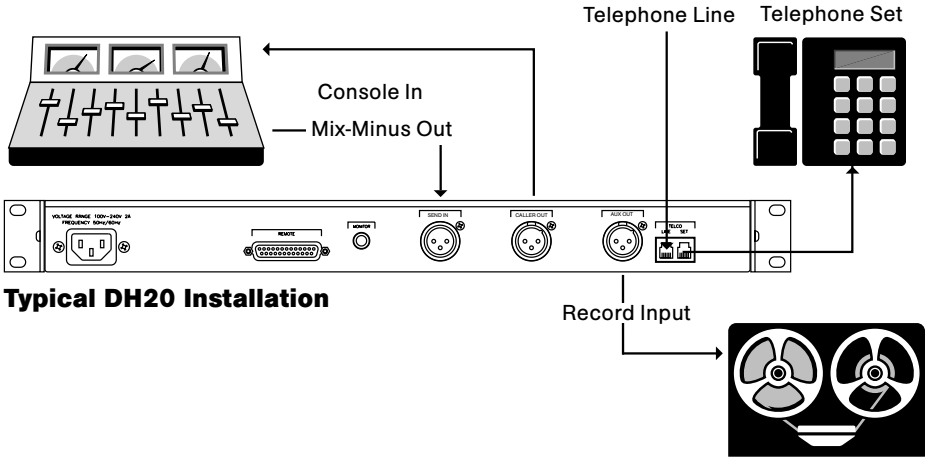
The DH20/22 operates on a standard POTS (plain old telephone service) analog telephone line or an analog extension from a PBX via a standard RJ11C modular jack.

Some telephone lines do not provide battery voltage (dry line, no DC offset voltage). If yours does not, the DH20/22 may be configured by qualified personnel for dry line operation. Please contact Gentner technical support for details.

Installation

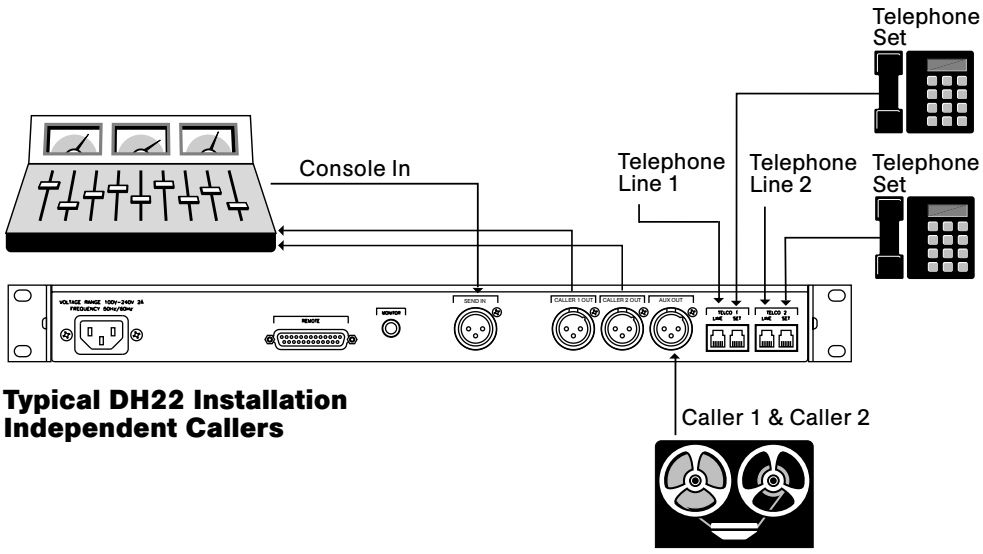
The hybrids are designed for easy installation and set up. All necessary interface connections are made through rear panel connectors. Refer to Rear Panel Connectors (page 11) for a description and placement of each of the connections you will be making.

The diagram below illustrates typical hybrid connections for the DH20. To install your hybrid, make the following connections:

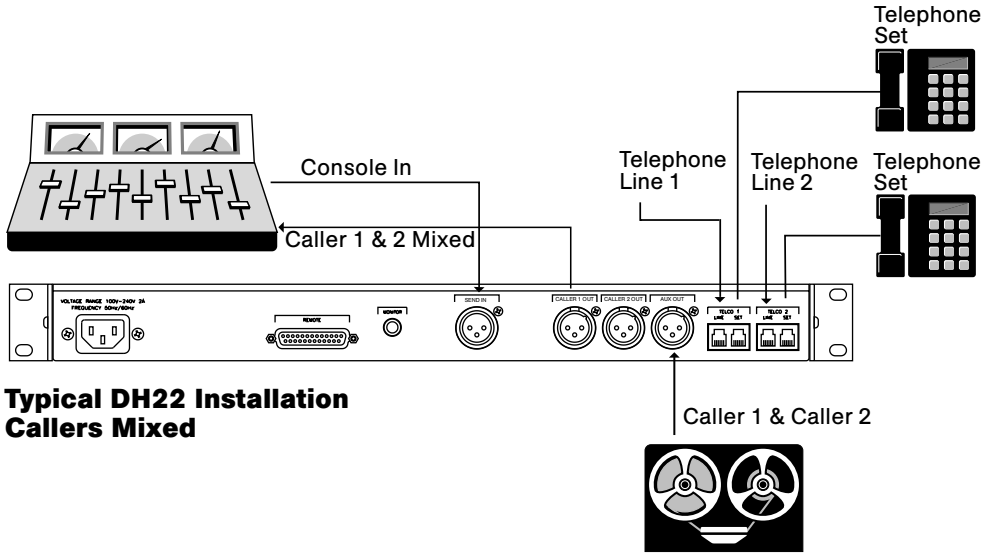


Typical DH20 Installation

The diagrams below illustrate typical hybrid connections for the DH22.



Typical DH22 Installation
Independent Callers

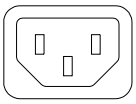


Typical DH22 Installation
Callers Mixed

To install your hybrid, make the following connections.

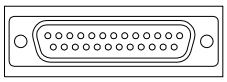
Power Connection

The hybrid will operate at any power level between 100–240VAC, 50–60Hz.



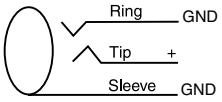
Remote Control

If using a remote control for parallel control and hybrid status, use the DB25 Remote connector. For pinouts, see Appendix C: Connector Pinouts (page 29).



Monitor Out

This 1/4" TRS jack provides a 1W amplified caller signal into an 8 Ohm speaker.

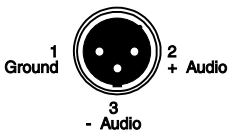


Send In

Connect the Send In female XLR jack to an output from your studio console. When the hybrid is on, the audio connected to this input will be fed onto the phone line. Audio sent to the telephone line must be a mix-minus. See Mix-Minus (page 16).

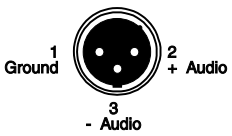
Caller 1 and 2 Out

Connect the Caller Out male XLR jack(s) to an input(s) on your audio console. When the hybrid is on, this output will contain the audio coming from the caller(s). The DH22 Caller Out audio may be configured for a mix of caller audio on Caller 1 Out or independent caller audio on Caller 1 Out and Caller 2 Out. See DIP switches (page 20).



Aux Out

Connect this male XLR jack to your recording device. The Aux Out can be configured to contain a mix of send audio and caller audio or caller audio only. See DIP Switches (page 20).

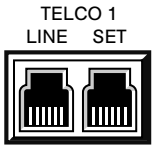


Telco 1 Line

Plug your analog telephone line into the RJ11C line jack.

Telco 1 Set

Plug your telephone set into the RJ11C set jack.

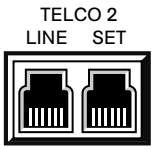


Telco 2 Line (For DH22)

Plug your second analog telephone line into the RJ11C line jack.

Telco 2 Set (For DH22)

Plug your second telephone set into the RJ11C set jack.

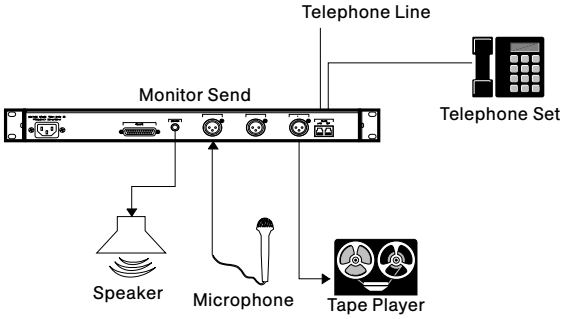


Mix-Minus

Mix-minus is a mix of all audio being sent to the Send In jack of the hybrid, minus the caller audio. Without a mix-minus feed from the console, the caller audio sent to the console will be retransmitted to the caller. This can cause hollow sounding audio and can even result in feedback. The following diagrams illustrate some of the ways to create/configure an external mix-minus feed for the DH20/22 hybrid. If these diagrams do not apply or are not desirable, then simply activate the DH20/22's internal mix-minus feature. See DIP switches (page 20).

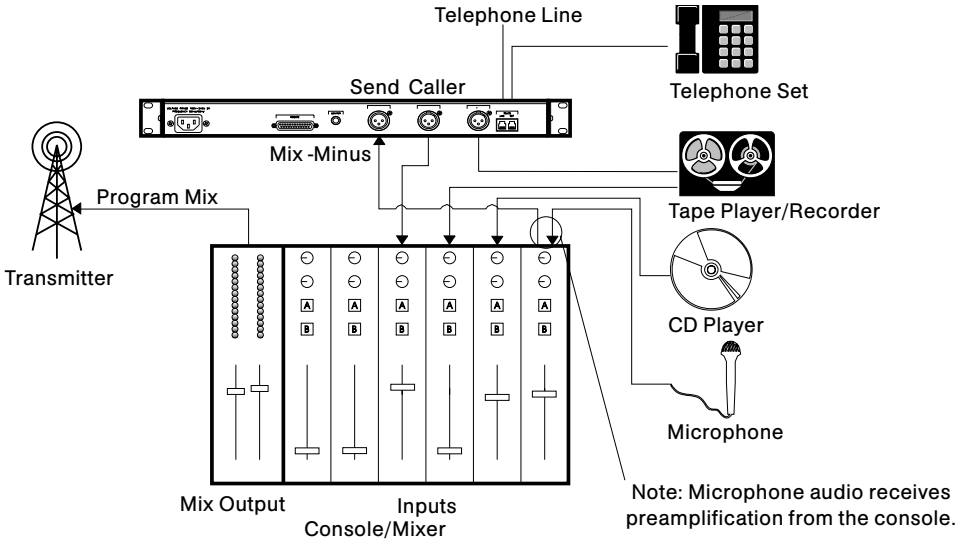
Using the Mic Preamp of the Hybrid

If only microphone audio is being sent to the caller, the internal microphone preamplifier of the hybrid may be used. When doing this, change the Send In jack from a line level input to a mic level input by placing DIP switch #4 to the on (up) position. In this configuration, make sure the microphone is not picking up the caller's audio as it is presented in the room by the speaker.



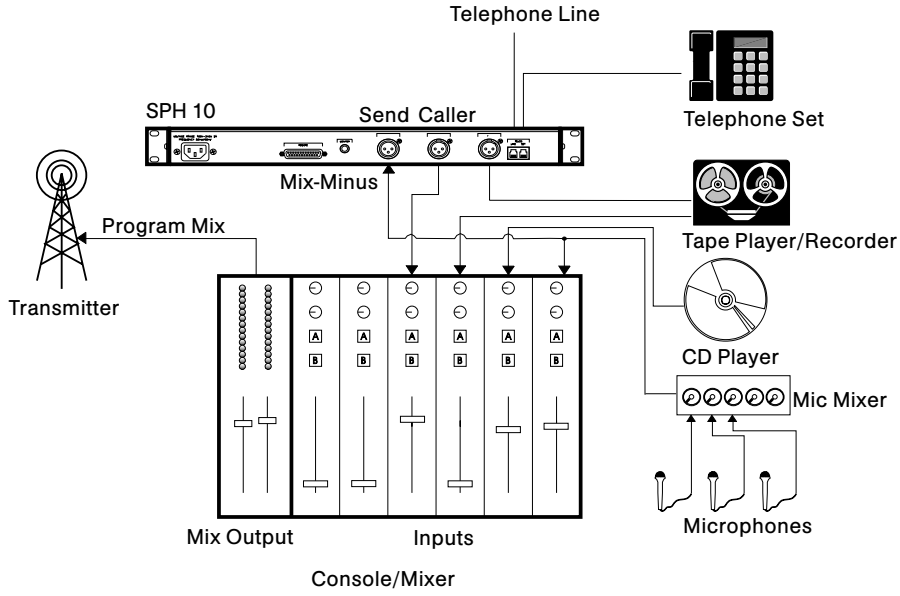
Using the Direct Mic Output of the Console

If only microphone audio is being sent to the caller, then it is possible to use the console's direct microphone output. Use the console direct microphone output to provide line level microphone audio to the Send In jack of the DH20/22.



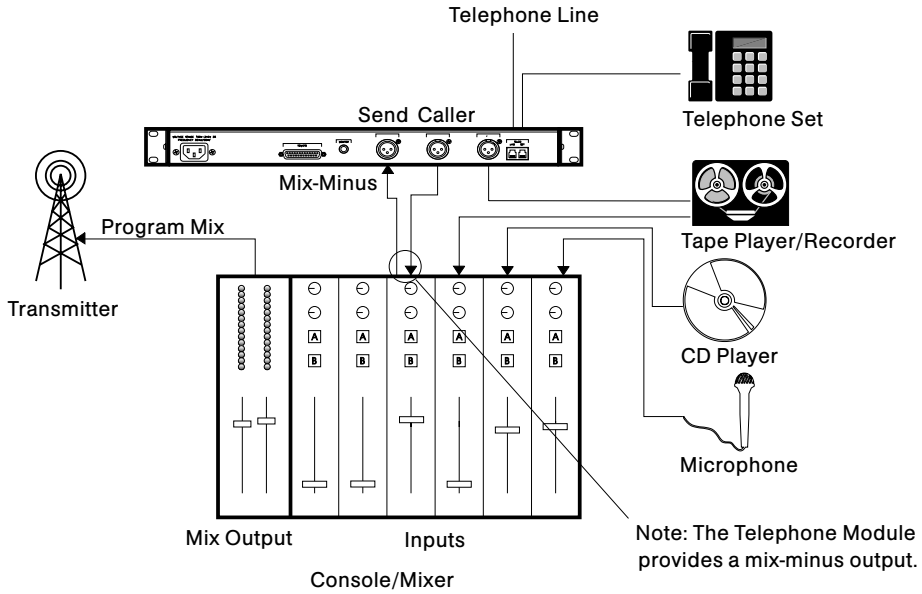
Using a Discrete Microphone Mixer

If only microphone audio is being sent to the caller, a separate microphone mixer may be used. The mic mixer will provide the mix-minus feed for the hybrid, because its output contains no caller audio.



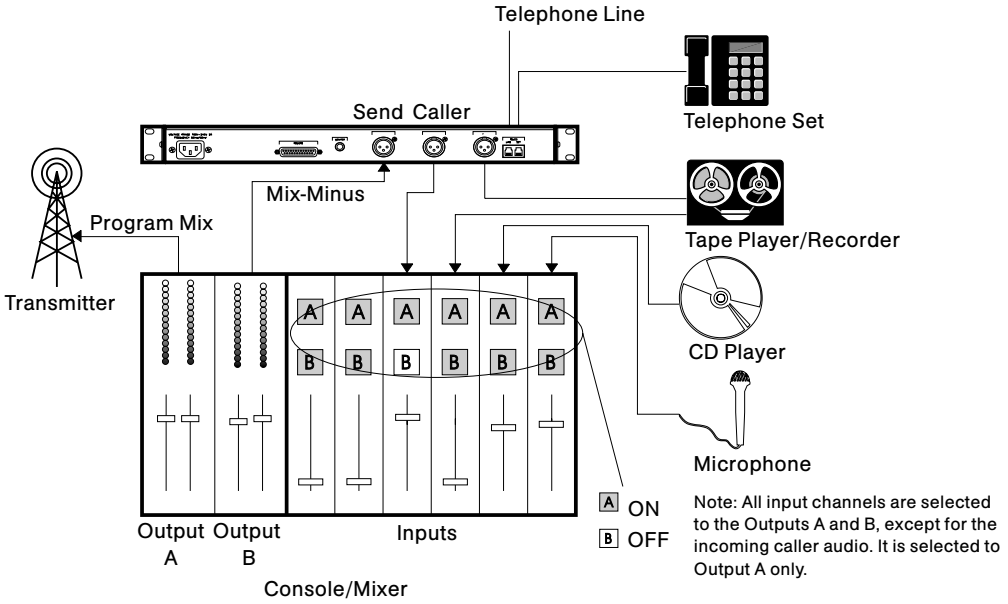
Using an Internal Mix Bus (Telephone Module)

Many console manufacturers provide optional telephone hybrid modules for their consoles. These modules are designed to receive audio from a hybrid and transmit audio to the hybrid. A telephone module will create a mix-minus for the hybrid at its output.



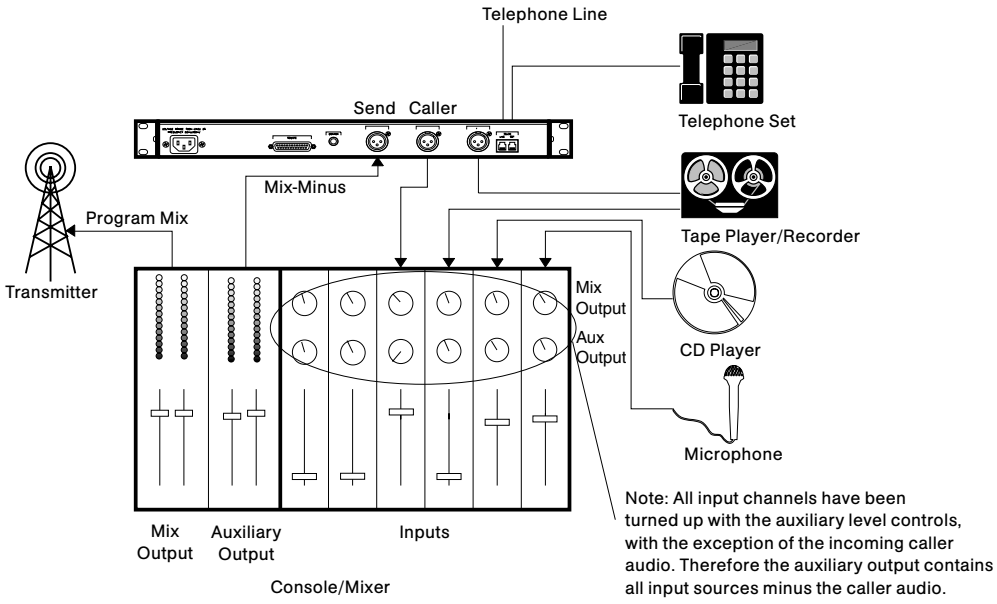
Using a Separate Mix Output Bus from the Console

If the console has an extra mix output, then use this extra output to provide a mix-minus feed for the hybrid. Simply route all audio, minus the caller audio, to the extra output bus of the console (Output B).



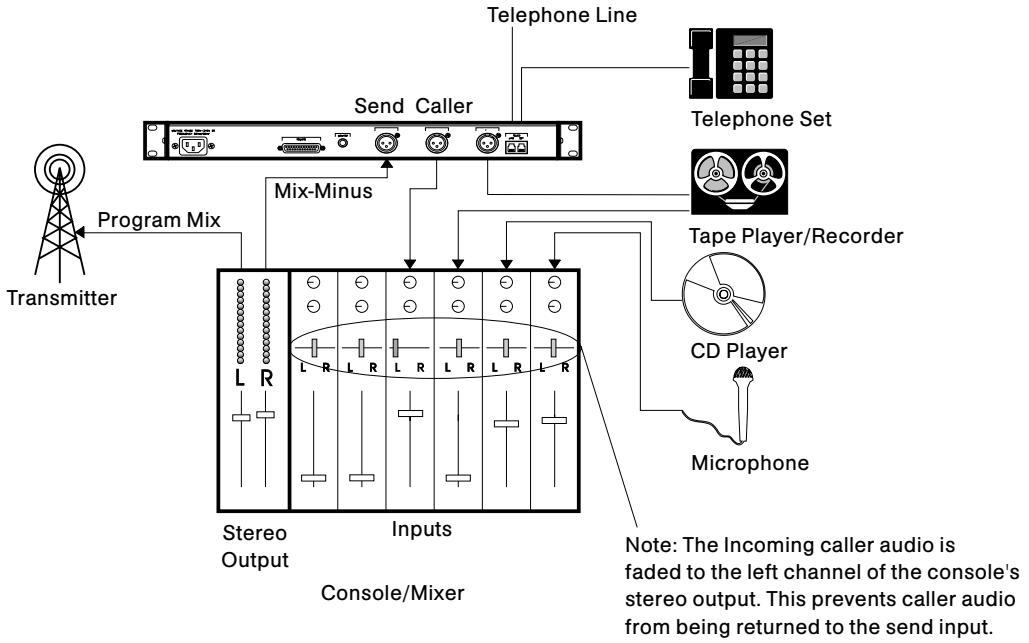
Using a Separate Auxiliary Output Bus from the Console

If the console has an auxiliary output, usually called Aux Out or Aux Send, then use this auxiliary output to provide a mix-minus feed for the hybrid. Simply route all audio, minus the caller audio, to the auxiliary output bus of the console.



Using the Stereo Outputs of the Console

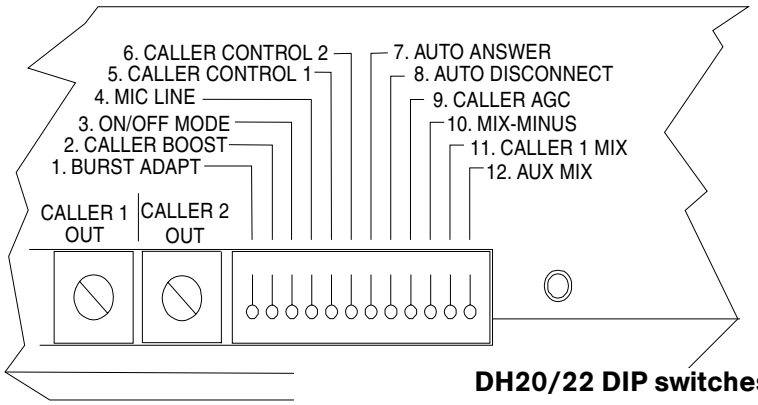
By using the stereo outputs of the console, it is possible to create a mix-minus for the hybrid. By panning the caller audio to the left channel only, the caller audio is prevented from reaching the right channel output of the console. Therefore, the right channel output is a mix-minus, a mix of all audio minus the caller audio.



Calibration

DIP Switches

DIP switches are “off” in the down position and “on” in the up position.



DH20/22 DIP switches

Burst Adapt

DIP switch 1 enables/disables the burst adapt feature. In the off position (down) the hybrid is in auto adapt mode and the hybrid will send a very short courtesy tone to the caller upon connection to the telephone line. In the on position (up) the hybrid will send a noise burst to the telephone line and aggressively adapt before returning to auto adapt mode. Each press of the On button will generate a new noise burst.

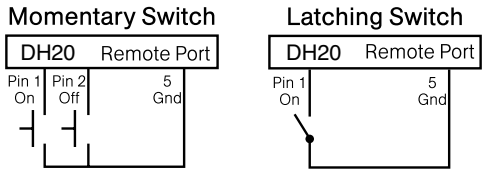
In either mode the hybrid continually monitors and adapts to the changing telephone line conditions in order to digitally cancel the telephone line echo and provide the best send-to-caller separation possible.

Caller Boost

DIP switch 2 enables/disables the caller boost feature. In the off postion (down) the caller boost feature is disabled. In the on position (up) the hybrid adds 6dB of level boost to the caller's audio at the Caller Out jack.

Remote On/Off Control

DIP switch 3 allows the hybrid to work with two types of switches for external control: momentary and latching. In the off position (down) the On/Off control inputs respond to momentary closures to ground. This turns the hybrid on when it receives a momentary closure on the On control input and off when it receives a closure on the Off control input. In the on position (up) the Off control input is disabled and the On control input responds to a latching closure to ground. This will cause the hybrid to turn on when the latching switch is closed to ground and the hybrid will remain on until the closure to ground is opened. This DIP switch setting also affects the operation of the front panel On/Off buttons. See Appendix B (page 29) for remote control connector pinouts.



Momentary and Latching switches

Mic/Line Select

DIP switch 4 sets the gain of the Send In jack. In the off position (down) the input is a line level (0dB) input. In the on position (up) the input is a mic level providing +55dB of input gain.

Caller Control (Ducking)

DIP switches 5 and 6 enable/disable the caller control feature. In the on position (up) the hybrid will provide caller control, which is the suppression of caller audio when send audio is present. In the off position (down) caller control is disabled. DIP switch 5, when active, adds 6dB of caller control and DIP switch 6, when active, adds 12dB of caller control. If both are active, then the sum of the two DIP switches is used and 18dB of caller control is provided.

Auto Answer

DIP switch 7 enables/disables the auto answer feature. In the off position (down) the hybrid will not automatically answer the telephone line. In the on position (up) the hybrid will automatically answer the telephone line after the first ring.

Auto Disconnect

DIP switch 8 enables/disables the auto disconnect feature. In the off position (down) the hybrid will not automatically disconnect the telephone line. In the on position (up) the hybrid will automatically disconnect the telephone line after the caller hangs up.

The telephone line must provide loop drop, loop reversal, or call progress signals in order for the auto disconnect feature to function. Most telephone systems will provide loop drop shortly after the calling party hangs up. Some PBX systems, but not all, will provide either loop drop or call progress tones such as reorder tones or busy signals. The hybrid will detect most of these signals and then auto disconnect from the telephone line.

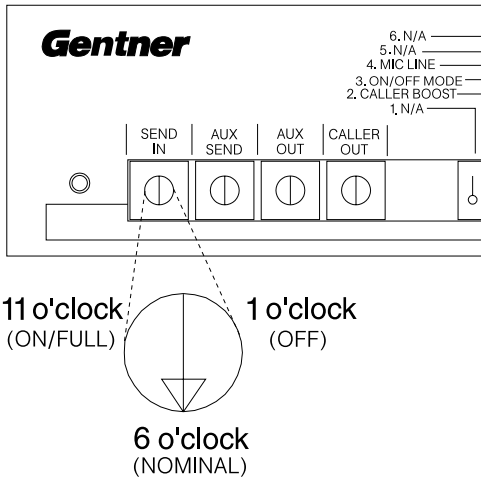
Automatic Gain Control (AGC)

DIP switch 9 enables/disables the AGC feature. In the off position (down) the AGC feature is disabled. In the on position (up) the AGC feature is enabled. When enabled, the AGC feature normalizes the gain of the caller audio, augmenting the level of "soft" callers, and attenuating the level of "loud" callers. This helps provide more uniform caller audio levels at the caller output of the hybrid. The AGC threshold is -50dBm and the AGC works to achieve an equivalent average caller level of -30dBm from the telephone circuit.

Automatic Mix-Minus

DIP switch 10 enables/disables the automatic mix-minus feature. In the off position (down) the automatic mix-minus feature is disabled. In the on position (up) the automatic mix-minus feature is enabled. When automatic mix-minus is enabled, it is not necessary for you to create a mix-minus output with your console/mixer. You can simply feed program audio to the send input of the hybrid and the hybrid will automatically remove the caller audio from the program mix and prevent it from returning to the caller as echo, which prevents possible feedback.

When Caller 1 Mix is enabled, the Caller 2 XLR is not active.



DH20/22 trim pots

With comfortable listening levels, the Send LED should illuminate solid green with an occasional flash of amber on audio peaks. If the Send LED illuminates red, the audio levels are clipping and should be decreased via the send level adjustments.

Caller 1 Mix (DH22 Only)

DIP switch 11 enables/disables the Caller 1 Mix feature. In the off (down) position the Caller 1 Mix feature is disabled and telephone lines one and two will appear at the Caller 1 Out and Caller 2 Out XLR connectors respectively. This allows each caller to be routed to a separate input channel of a console or mixer. In the on (up) position the Caller Mix feature is enabled and telephone lines one and two will be internally mixed by the hybrid and appear at the Caller 1 Output. This allows two callers to be routed to a single input channel of a console or mixer.

Aux Mix

DIP switch 12 enables/disables the aux mix feature. In the off (down) position, the Aux Out and Remote Aux Out will contain caller audio only. In the on (up) position the Aux Out and Remote Aux Out audio will contain a mix of send and caller audio.

Trim Pots

The front panel trim pots provide level adjustments of the Send In, Aux Send, Aux Out, and Caller Out audio connectors. Separate audio level controls let you optimize the audio level(s) of the DH20/22 to match the audio levels required by the interfaced audio equipment.

In order to optimize the audio levels, have someone call the hybrid from another location. Answer the line by pressing the On button and continue through the level adjustments. Be aware that some suppression and/or echo may be heard while calibrating the audio levels. Disregard it and continue until the end of the procedure. When the hybrid is properly calibrated there will be no echo or suppression.

Send In Adjustment

This pot adjusts the Send In audio. Adjust this pot along with your console audio control until callers verify that the audio level they are receiving is at a comfortable listening level.

Aux Send Adjustment

This pot adjusts the level of the auxiliary send audio at the remote connector input. Adjust this pot along with your console audio control until callers verify that the audio level they are receiving is at a comfortable listening level.

Aux Out Adjustment

This pot adjusts the level of send and caller audio at the Aux Out jack. Adjust this pot along with your console audio control to set the proper level for your recording device or other external devices.

Caller 1 Out Adjustment

This pot adjusts the Caller 1 Out audio. Adjust this pot along with your console audio control to set the caller's voice/audio to a comfortable listening level.

Caller 2 Out Adjustment

This pot adjusts the Caller 2 Out audio. Adjust this pot along with your console audio control to set the caller's voice/audio to a comfortable listening level.

Training the Telephone Echo Canceller

Upon connection to the telephone line, the digital hybrid will automatically begin its telephone echo cancellation process. This will optimize the send to caller separation. If the send to caller separation is not sufficient, you may force the hybrid to "train" itself to the telephone line by pressing and holding the On button for one second. After one second, the hybrid will emit a burst of white noise. The noise burst allows the hybrid to aggressively adapt to the echo returning from the telephone network and allows the hybrid to maximize its send-to-caller separation. This noise burst can be generated at any time by pressing and holding the On button for one second. To force a noise burst on every connection to the telephone line, activate the Burst Adapt DIP switch 1. See DIP switches on page 20.

Training the Mix-Minus

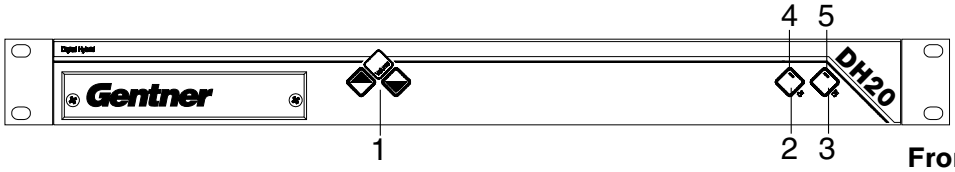
Upon connection to the telephone line, the digital hybrid will automatically begin its mix-minus echo cancellation processes. To verify/fine tune the calibration of the mix-minus, watch the Send LED as the caller speaks. If the Send LED is not lighting or only flashing green on the caller's audio peaks, then the calibration is already complete. If the Send LED is lighting solid green on caller audio, decrease the loop gain via the Send Input pot or the console level control and train the telephone echo canceller. As the caller continues to speak, you should notice that the Send LED will begin to illuminate less and less until it no longer illuminates green on caller audio. This process may need to be repeated if the desired results are not achieved or if the caller is complaining of excessive echo.

The Caller trim pot has no effect on the Caller LED. The Caller LED indicates actual level from the telephone line only. If the Caller LED flashes green only ocassionally with caller audio, the level from the telephone line is too low and you should activate the Caller Boost DIP switch. See DIP swiches on page 20.

4 Operation

Front Panel

Easy-to-access front panel controls make operation of the DH20/22 simple.



Front panel controls

Using the Hybrid

Press the On button (2) to connect the hybrid to the telephone line. Press the Off button (3) to disconnect the hybrid from the telephone line.

The On and Off buttons do not turn on/off the power to the DH20/22. They connect and disconnect it from the phone line. On=on line. Off=off line.

Using the Telephone Set

Lift the handset to connect the telephone to the telephone line. Hang up the handset to disconnect the telephone from the telephone line.

Switching a Call from the Set to the Hybrid

Press the hybrid's On button (2). The active call will switch from the phone to the hybrid.

DH22 users:
Ensure that you press the On or Off button that corresponds with the hybrid you wish to connect or disconnect.

Switching a Call from the Hybrid to the Set

Make sure the telephone handset is off hook. Then press the hybrid's Off button (3). The active call will switch from the hybrid to the phone.

Disconnecting a Call

To disconnect the telephone line, the hybrid must be off and the telephone handset must be hung up. If either the hybrid is on or the handset is off hook, then the phone line is still active.

DH22 users:
When both hybrids are active in the On position, telephone callers will be conferenced internally by the DH22.

Placing a Call

Lift the handset and listen for the dial tone. Dial the party you wish to call. Talk to the caller with the telephone set or press the hybrid's On button (2) to talk through the hybrid. When finished, press the Off button (3) and/or hang up the handset.

Adjusting the Monitor Output Level

To adjust the level at the monitor output, use the volume buttons (1). With each press, the ▲ volume button increases the monitor output level by 1dB. The ▼ volume button decreases the monitor output level by 1dB. Pressing and holding the ▲ or ▼ button will sweep the level up or down respectively.

Remote Control Option

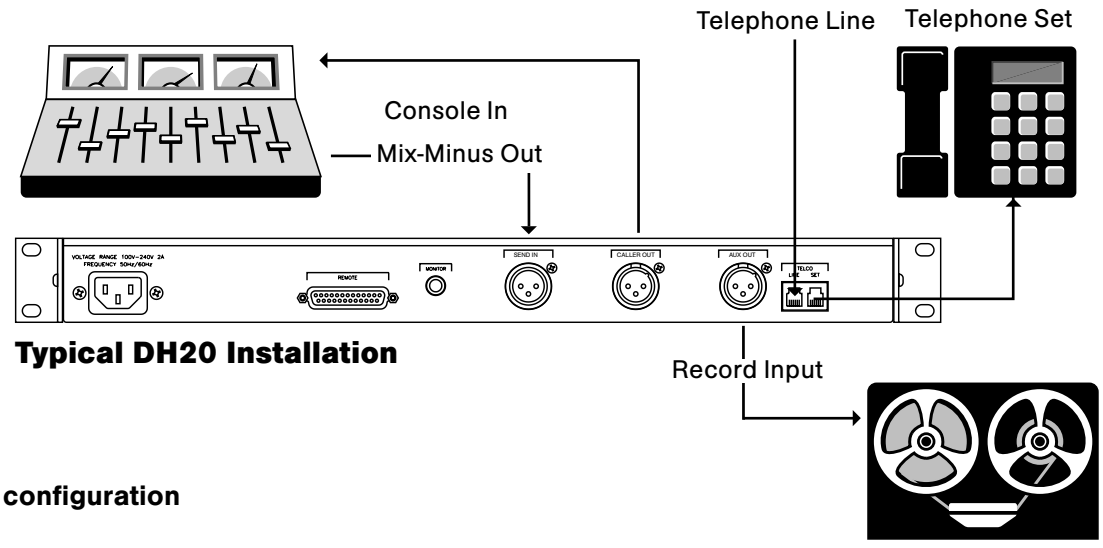
The remote control connector can be used to perform three functions: Monitor Mute On/Off, Hybrid On, and Hybrid Off.

If using a remote control device, internal DIP switch 3 will select the type of button switch function you need (momentary or latching). See Calibration (page 20).

DIP switch 3 does not change the operation of the monitor mute input. The monitor output will be muted for as long as the monitor mute input pin is tied to ground.

Recording Option

While on a connected call, a mix of both send and caller(s) audio, or caller(s) audio only, will be routed to the Aux connector. Connect your recording device to this connector. Activate the record function of the external recording device to capture the audio.



Typical DH20 Installation

Typical recording configuration

Appendices

Appendix A: Specifications

DIMENSIONS

17.125"/43.5cm W x 1.75"/4.44cm H x 10.125"/25.7cm D

WEIGHT

6.4lbs/2.9kg (dry)
11.3/5.13kg (shipping)

OPERATING TEMPERATURE

32-100°F / 0-38°C

HUMIDITY

0-80%

FRONT PANEL CONTROLS

CONTROLS:
- Hybrid One On Button
- Hybrid One Off Button
- Hybrid Two On Button (DH22)
- Hybrid Two Off Button (DH22)
- Volume Up and Volume Down Buttons

STATUS LEDS:
- On Status
- Off Status
- Hybrid One Send Audio Presence
- Hybrid One Caller Audio Presence
- Hybrid Two Send Audio Presence (DH22)
- Hybrid Two Caller Audio Presence (DH22)

ADJUSTMENTS:
- Send Input Level
- Caller One Output Level
- Caller Two Output Level
- Auxiliary Input Level
- Auxiliary Output Level
- Burst Adapt Selection
- Mic/Line Selection
- Caller Boost Selection
- Momentary/Latching Control
- Auto Answer/Disconnect Selection
- Caller Control Selection (0, 6, 12, or 18dB)
- AGC Selection
- Auto Mix-Minus Selection
- Caller One Mix Selection (DH22)
- Aux Mix Selection

REAR PANEL CONNECTORS

POWER: IEC Type
- Auto Adjusting, 100-240VAC, 2A, 50/60Hz, 30W

REMOTE: DB25 female
- Remote Send input:
  - 0dBu nominal, adjustable, unbalanced, 20kOhm impedance
- Remote Caller and Aux outputs:
  - 0dBu nominal, adjustable, unbalanced, 50 Ohm impedance

Control inputs:
Remotely activate any of the following functions with a switch closure to ground: Hybrid 1 ON, Hybrid 1 OFF, Hybrid 2 ON, Hybrid 2 OFF, and Monitor Mute.
Status Outputs:
Remotely check the status and audio presence of the hybrids using the hybrid 1 and 2 ON, OFF, Send, and Caller Presence status outputs. Status outputs are open collector outputs rated at 30VDC and 40mA maximum.

MONITOR OUTPUT: 1/4" stereo jack
Tip = + phase, Ring = ground, Sleeve = ground, 1W output into an 8 Ohm load

SEND INPUT: XLR female
Mic/Line selectable, -55/0dBu nominal, adjustable, balanced bridging, 20kOhm impedance

CALLER 1 AND 2 OUTPUTS: XLR male
0dBu nominal, adjustable, balanced, 50 Ohm impedance

AUX OUTPUT: XLR male
0dBu nominal, adjustable, balanced, 50 Ohm impedance

TELCO 1 AND 2 LINES: RJ11 connector
POTS (plain old telephone service) telephone line or analog extension from a PBX or dry line (no DC offset voltage). A-Lead Supervision provided

TELCO 1 AND 2 SETS: RJ11 connector
A-Lead Supervision provided

TELEPHONE TRANSMIT

Nominal send input of 0dBu referenced to −15dBu onto the telephone line.

FREQUENCY RESPONSE:
+/- 1dB from 250Hz to 3.5kHz

SIGNAL TO NOISE:
>56dB

DISTORTION:
<0.2%

TELEPHONE RECEIVE

Nominal phone line level of −15dBu referenced to caller output of 0dBu.

FREQUENCY RESPONSE:
+/- 1dB from 250Hz to 3.5kHz

SIGNAL TO NOISE:
>56dB

DISTORTION:
<0.2%

NULL

SEND-TO-CALLER SEPARATION:
55dB nominal

TAIL TIME:
32 milliseconds

MIX-MINUS

CALLER-TO-SEND SEPARATION:
50dB nominal

TAIL TIME:
32 milliseconds

All specifications are subject to change without notice.

Appendix B: Connector Pinouts

Remote Connector Pinout

Pin	Description
1	Remote Hybrid 1 On *
2	Remote Hybrid 1 Off *
3	Remote Hybrid 2 On *#
4	Remote Hybrid 2 Off *#
5	Switch/Indicator Common
6	Hybrid 2 Send Presence Indication **#
7	Hybrid 2 Caller Presence Indication **#
8	N/C
9	Unbalanced Send Audio Input (0dBu nominal)
10	Unbalanced Caller Audio Output (0dBu nominal)
11	Unbalanced Aux Audio Output (0dBu nominal)
12	Monitor Mute Control*
13	Audio Common
14	Hybrid 1 On Indication **
15	Hybrid 1 Off Indication **
16	Hybrid 2 On Indication **#
17	Hybrid 2 Off Indication **#
18	Switch/Indicator Common
19	Hybrid 1 Send Presence Indicator **
20	Hybrid 1 Caller Presence Indicator **
21	Switch/Indicator Common
22	Audio Common
23	Audio Common
24	Audio Common
25	Switch/Indicator Common

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

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

DH22 only.

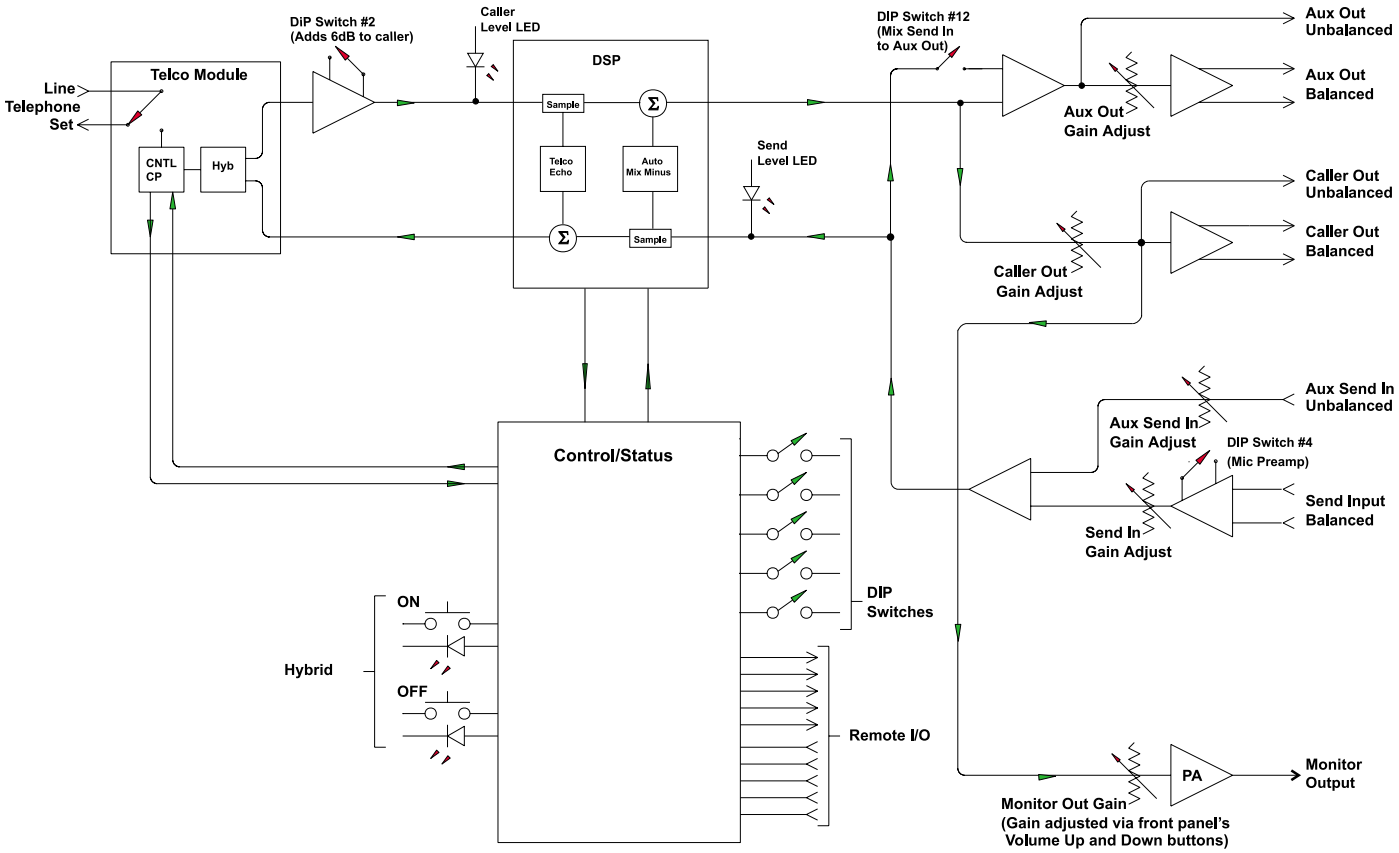
Line Connector Pinout

Pin	Description
1	To pin 6 of SET RJ11C
2	To pin 5 of LINE
3	Tip
4	Ring
5	To pin 2 of SET
6	To pin 1 of SET RJ11C

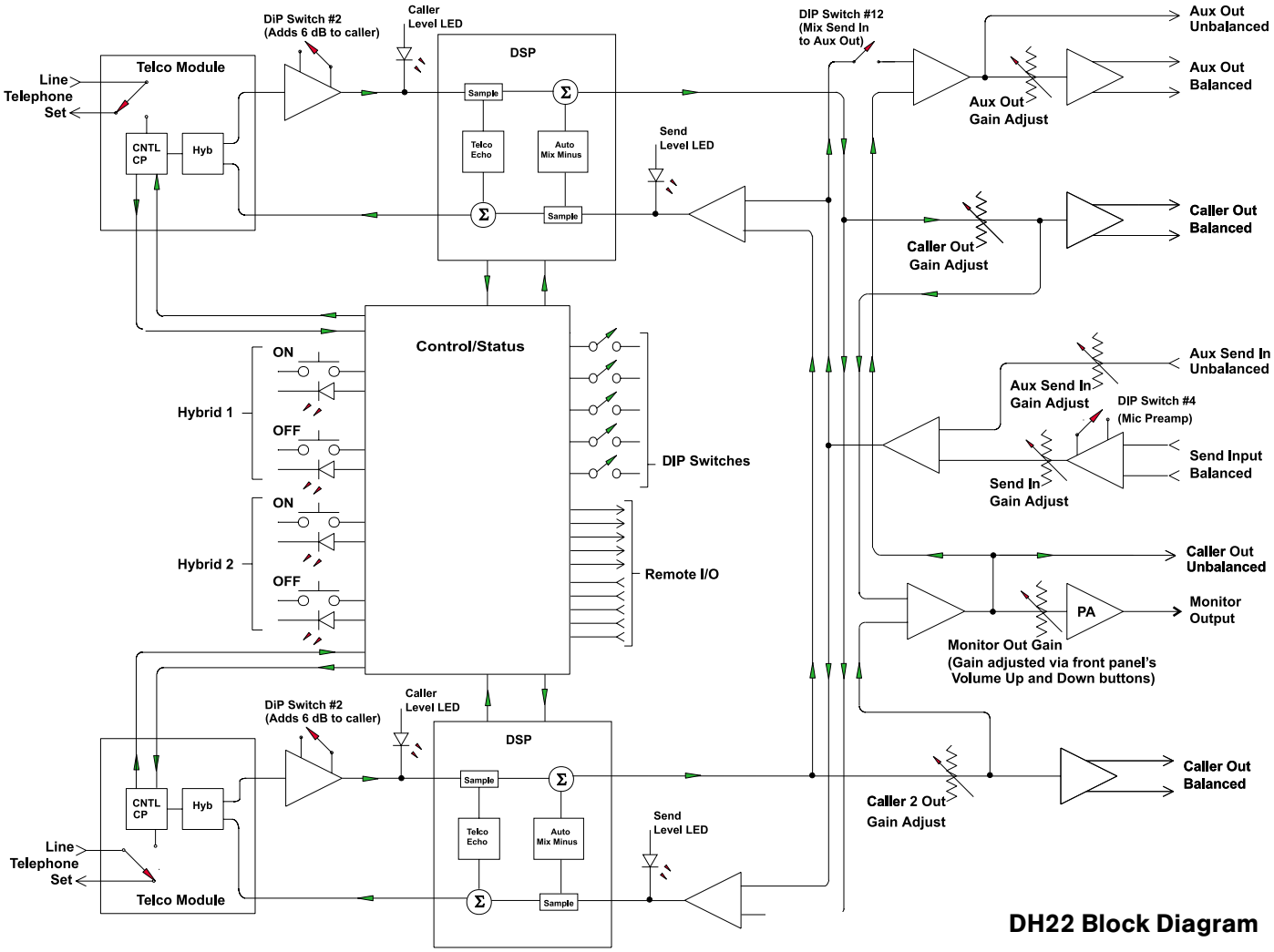
Set Connector Pinout

Pin	Description
1	To pin 6 of LINE RJ11C
2	To pin 5 of SET
3	Ring
4	Tip
5	To pin 2 of LINE
6	To pin 1 of LINE RJ11C

Appendix C: Block Diagrams



DH20 Block Diagram



DH22 Block Diagram

Appendix D: Warranty & Compliance

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 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 of labor during this period; or,

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 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

FCC Part 15 Compliance

This equipment has been tested and found to comply with the limits for a Class B 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-31573-BR-N

Ringer Equivalence Number (REN): 1.1B

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 RJ11C 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 telephone 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

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.

Ringer Equivalence Number (REN): 1.1
IC Certification Number: 1970 8175 A

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.