Buddy Remote Mixer

Section

About Comrex

Comrex has been building reliable, high quality broadcast equipment since 1961. Our products are used daily in every part of the world by networks, stations and program producers.

Every product we manufacture has been carefully designed to function flawlessly, under the harshest conditions, over many years of use. Each unit we ship has been individually and thoroughly tested. Most items are available off-the-shelf, either directly from Comrex or from our stocking dealers.

Comrex stands behind its products. We promise that if you call us for technical assistance, you will talk directly with someone who knows about the equipment and will do everything possible to help you.

Our toll free number in North America is 800-237-1776. The toll free number from the United Kingdom is 0-800-96-2093. Product Information, Engineering Notes and User Reports are available on the World Wide Web at http://www.comrex.com. Our internet E-Mail address is info@comrex.com.

Warranty and Disclaimer

All equipment manufactured by Comrex Corporation is warranted by Comrex against defects in material and workmanship for one year from the date of original purchase, as verified by the return of the Warranty Registration Card. During the warranty period, we will repair or, at our option, replace at no charge a product that proves to be defective, provided you obtain return authorization from Comrex and return the product, shipping prepaid, to Comrex Corporation, 65 Nonset Path, Acton, MA 01720 USA. For return authorization, contact Comrex at 800-237-1776 or 978-263-1800 or fax 978-635-0401.

This Warranty does not apply if the product has been damaged by accident or misuse or as the result of service or modification performed by anyone other than Comrex Corporation.

With the exception of the warranties set forth above, Comrex Corporation makes no other warranties, expressed or implied or statutory, including but not limited to warranties of merchantability and fitness for a particular purpose, which are hereby expressly disclaimed. In no event shall Comrex Corporation have any liability for indirect, consequential or punitive damages resulting from the use of this product.

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SECTION 1. BUDDY

The Comrex Buddy is a multifunction remote console designed to handle the complexities of ISDN remotes. It is also an ideal stand-alone console for sending program over standard dial lines. The Buddy is a complete remote studio, providing audio mixes for program feeds, communications, headphones and public address systems.

While digital audio codecs are revolutionizing the way broadcasters do remotes, multiple pieces of audio gear with complex cabling are often required in order to achieve the custom audio feeds at a remote site. Typical requirements include:

- Main program audio channel sent to station
- Headphone audio for program host and guests
- Intercom audio for producer or engineer
- Special mix for PA system
- Audio for emergency backup system

These individual mixes often contain one or more of the following sources:

- Main program audio
- Return codec channel
- Phone line intercom channel
- Producer or spotter mike

With all of these different mixes and with each mix requiring different levels, the remote site often resembles a wiring nest. The Buddy performs all these functions in one small rugged box.

The Buddy is a full featured 4 channel microphone/line mixer plus a headphone monitor control matrix. Included is a single line frequency extender (encoder), a telephone coupler with dial pad and a separate PA mixer.

Operation of the Buddy is very straightforward. The four channel mixer permits you to mix four microphones or two microphones and two line level sources (tape, CD, locker room feeds, referees calls from the field or even another Buddy). Plug in whatever source you have, put the level switches in the position that match their levels and you are ready to go. The mix is available on the rear panel through a 3-pin XLR connector marked PROGRAM OUTPUT. The following sections will go into more depth on each area of the Buddy and then we will show you some application examples.

Specifications

Connections

Program in:
(4) 3-pin XLR female
Headphone out:
(4) 1/4" phone jack
Aux-in:
3-pin XLR female
Spotter mic/line:
3-pin XLR female
PA feed out:
3-pin XLR male
Program out:
3-pin XLR male
Telephone line:
RJ-11C 6 pin modular jack

Levels

Microphone input, including Spotter:
-70 to -30 dBu balanced
Line input, including Aux-in and Spotter:
-4 to +8 dBu balanced
(Channels 3, 4 & Spotter switchable between mic & line)
PA feed out:
0 dBu balanced, nominal level
Program out:
externally switchable between 0 dBu and +4 dBu balanced

Output Clipping Level

+24 dBu

AF Response

+/-0.5 dBu, 50 Hz to 15 kHz

Distortion

Less than 0.1%, 50 Hz to 15 kHz

Power

120 VAC/60 Hz or
240 VAC / 50 Hz
(externally switchable)
Drain: 10 watts max

Size

11.25"W x 11.5"D x 4.5" H

Weight

8 lbs; 3.6 Kg

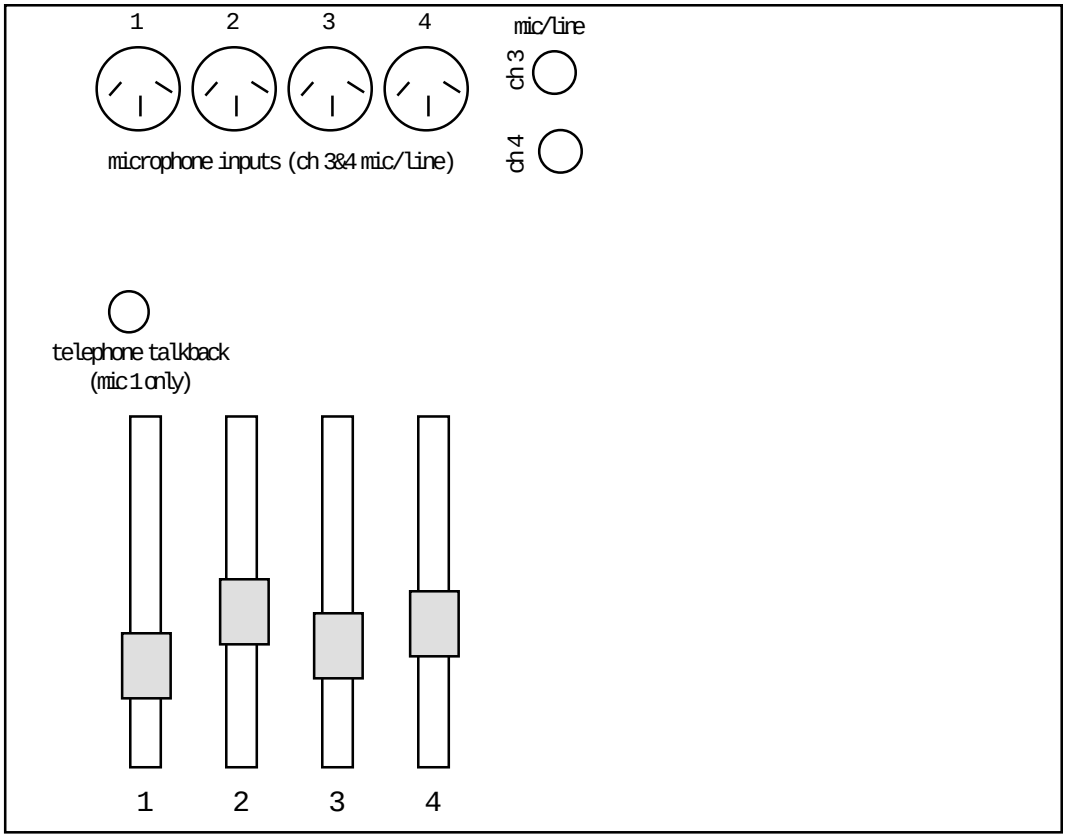
SECTION 2: MIXER

Connectors Four 3-pin XLR female Located on front panel, top left
Ch 1,2 - microphone only
Ch 3,4 - microphone/line

Operation The MICROPHONE connections are located on the top of the front panel. Each channel has a separate slide fader for controlling levels. The faders in the Buddy are manufactured by Penny & Giles and are the same as those used in the very best broadcast and recording consoles. The four channels are summed together and fed to the program output and to an LED volume unit indicator as well as the monitor matrix, the frequency extender (encoder) and the PA feed section.

There is no audio on a channel when the fader is in the bottom position.

Fig 1 Microphone Controls



SECTION 3: MONITOR MATRIX

Connectors Four 1/4" phone jacks Located on front panel, top left

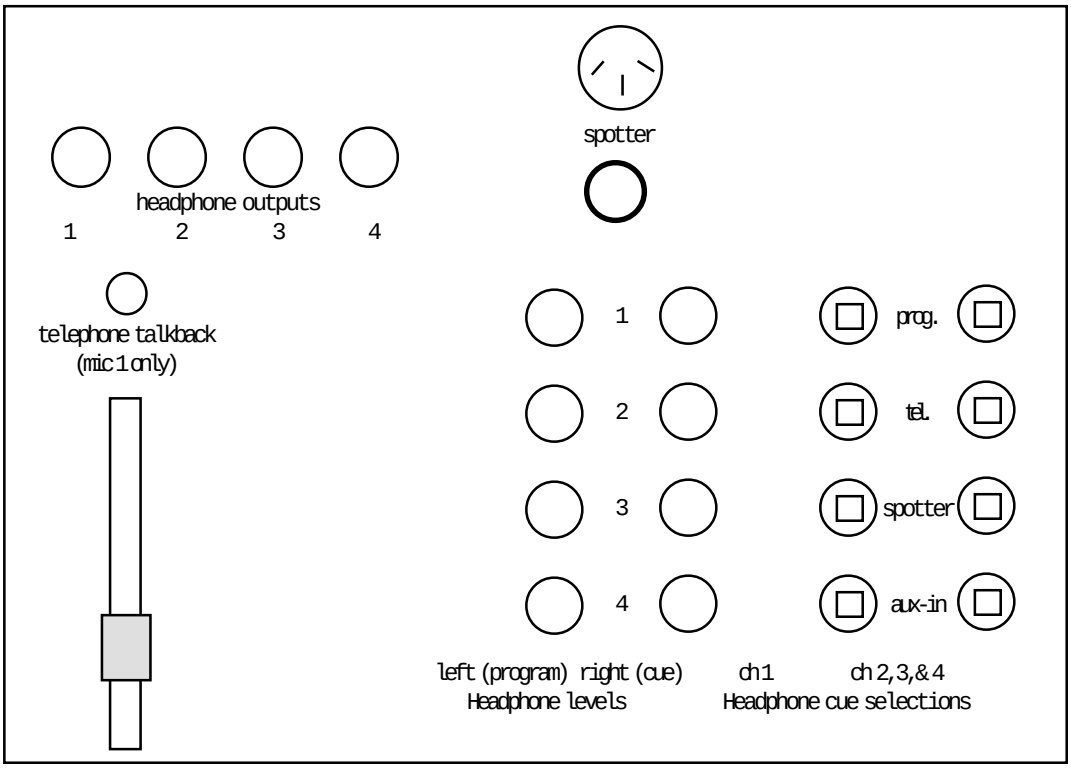
Operation The monitor section controls what each headphone receives. There are four rows of color coded knobs in two columns located to the right of center on the front panel. The color coding corresponds to the slide faders. Each headphone is color coordinated with its corresponding microphone channel. Channel 1 has red slide faders and red headphone level knobs. Channel 2 is yellow, 3 is green and 4 is blue.

The left side of the headphone hears program audio and the right side hears audio selected through the headphone cue selection push-buttons. The left headphone knob controls the level for the left side of the headphone. The right knob controls the audio level for the right side. The HEADPHONE CUE SELECTORS are push-button switches located to the right of the headphone level knobs. These switches are of the locking type which means that when they are pushed down, they latch in the down position. When they are down and engaged, the push-button window will be red. They control the audio sources fed into the headphones. The left column of push-buttons selects what channel 1 will hear in the right headphone. The right column of switches similarly controls channels 2,3,&4.

The cue selections are PROGRAM, TELEPHONE, SPOTTER AND AUX-IN.

NOTE: When SPOTTER is selected for channels 2,3,&4 AND the TELEPHONE TALKBACK is engaged on channel 1, any audio on channel 1 will be heard by channels 2,3,& 4. If there is audio on the SPOTTER input, the two audio sources will be mixed together. For more information, see Section 7.

Fig 2 Headphone Controls



SECTION 4: TELEPHONE

Connector RJ11-C modular plug Located on back panel

Operation

The telephone circuitry in the Buddy contains a dialer which may be place in the either the tone or pulse mode by means of the PULSE / TONE toggle switch located on top right of the front panel. The circuitry also contains an adjustable HYBRID and receive level control.

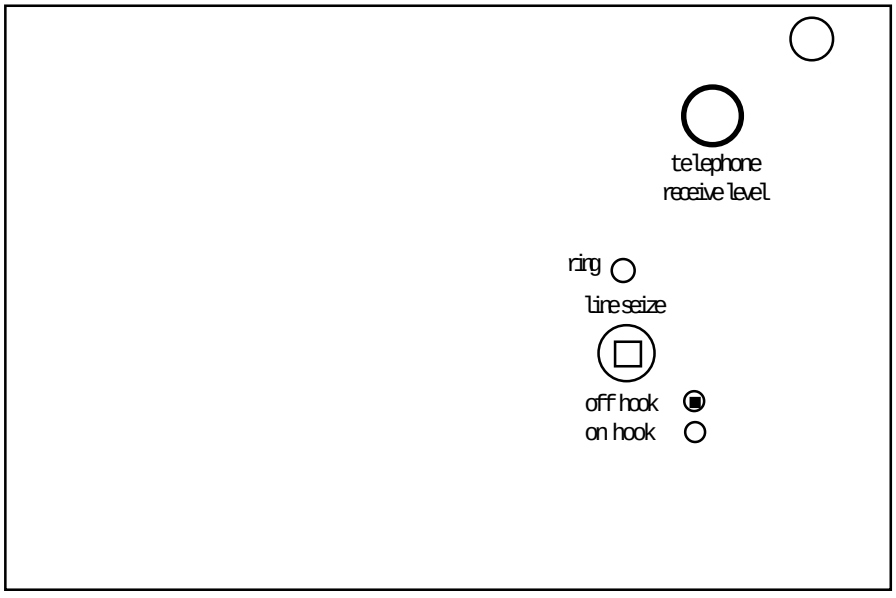
If the telephone line is dialed into the Buddy, a red LED marked ring will light up when the line is ringing. The LINE SEIZE push-button will enable the line to be picked up or released. The telephone is “off hook” when the red window is showing on the push-button. The phone is “on hook” when the window is black.

The level fed into the telephone line is quite a bit higher than the receive level. Also, the receive level on telephone lines will vary from call to call. The Buddy contains an automatically balancing hybrid which is designed to reduce the level of your local audio so that you can better hear the incoming audio. To control the incoming level of the telephone line in your headset, first adjust the “telephone receive level” knob as high as required without distorting the sound in your headphones. You can then adjust the right headphone knob as needed. The two controls should be able to handle the wide variety of levels found on telephone circuits.

Cellular Telephone

This will require an RJ11 (standard modular telephone jack) access to the cellular telephone. Many current model cellular telephones have this RJ11 access either built-in or available optionally for interfacing portable FAX machines or computer modems. The Buddy's RJ11 jack can be connected into this cellular RJ11 accessory port with a simple modular telephone cord.

Fig 3
Telephone controls
Upper right - front panel



SECTION 5: FREQUENCY EXTENDER

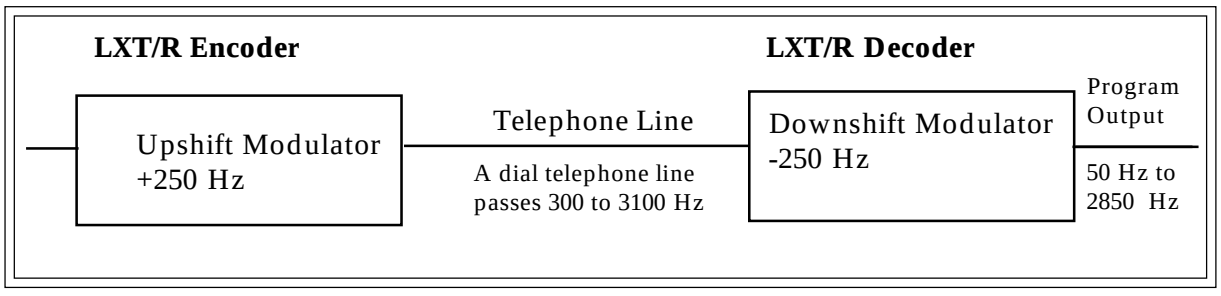
A one line frequency extender encoder is included in the Buddy. This frequency extender can be used to significantly improve the quality of program sent over a standard dial-up telephone line or cellular telephone (see Telephone, page 7.) A one line frequency extender decoder is required at the receiving end. The current model is an LXT/R, however the Buddy's frequency extender encoder is also compatible with all older one line frequency extender decoders.

Operation To use the frequency extender, seize the telephone line by engaging the "on hook /off hook" push-button. When you hear the dial tone (make sure your headphone cue is selected to telephone) dial the receiving station. Once someone answers, you may talk to the other end. Make sure your microphone fader is up and the FREQUENCY EXTENDER push-button is in "bypass" position (the window will be dark.) When you are ready to send program, engage the frequency extender by pushing the button down so the red window shows. NOTE: When the frequency extender is engaged, the return audio on the telephone line is cut from the headphones. During program breaks, you can switch to "bypass" in order to communicate with the station through the headphones and microphones. (See page 10 for instructions on connecting a second telephone line into the Code Buddy for full time cueback.)
NOTE: When using the frequency extender, program audio will be heard in headsets when the cue selection is telephone.

How it Works Dial telephone lines sound "tinny" because they only pass 300 - 3100 Hz. However, the human voice carries most of its resonance and "natural" sound between 100 and 800 Hz. When you speak on the phone, you have no trouble understanding a conversation, but the sound is tinny, and listening to phone transmissions over a long period of time produces ear fatigue.

The telephone company selected the 300-3100 Hz range for economic reasons (a smaller bandwidth allows them to transmit more calls per line) and so the power lines sharing the same poles along the street do not infiltrate the phone line and induce a "hum" in telephone transmissions. One line systems encode program audio by shifting all frequencies up by 250 Hz, so that 50 Hz becomes 300 Hz allowing it to pass through the filters on the telephone line. At the decode end, all frequencies are downshifted 250 Hz, restoring 2-1/2 octaves of program energy at the low end (see figure 4).

Fig 4 One Line Frequency Extender



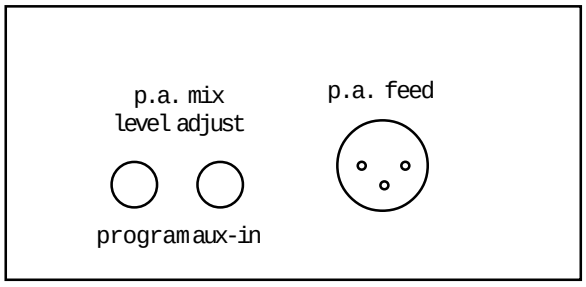
SECTION 6: PA SYSTEM FEED

Connector PA feed out 3-pin XLR male Located on rear panel

Operation If a remote broadcast or a remote talkshow is being conducted with an audience watching, some means of making it possible for them to hear may be desired. The PA feed section of the Buddy is a two input mixer with gain control for each input.

One input is the program being sent to the station or network and the other comes from the aux-in. Details on the AUX-IN connection are on page 8. Aux-in can be fed from the station, a local tape deck, or any other line input. If a digital codec is being used to send a remote talk show to the station and callers are being taken in at the station, the resulting mix-minus comes back over the return channel into the aux-in of the Buddy and the talk show host can hear the callers. Putting the host and callers out over the PA system is not a simple summing of the parts. The acoustics of the remote site will control how loud the host can be before feedback howl will occur. If simple summing is used the level of the callers might be too low. The separate controls for each will permit much better balance.

Fig 5
PA Feed
Rear Panel



SECTION 7: SPECIAL FEATURES

Channel 1

Channel 1 is ideally suited for use by a producer. It has separate cue selection capabilities and can be cut from the air to use the telephone.

Channel 1 has the capability to make cue selections independent of channels 2, 3 & 4. Channel 1 can be listening to the spotter, while the others listen to the program or channel 1 can listen to the telephone while the others listen to the aux-in.

When the TELEPHONE TALKBACK switch is pushed in, channel 1 microphone is taken from the program mix and placed on the telephone. The fader on channel 1 must be up. To listen to incoming telephone audio, the telephone cue must be selected for channel 1.

A producer on Channel 1 can also be heard in the headphones of channels 2,3,& 4 without his audio appearing on the program output. To do this, the channel 1 TALKBACK push-button must be engaged and the fader up. Channels 2,3,& 4 must select SPOTTER as a cue selection. For this mode, channel 1 audio (the producer) is summed with spotter audio

Spotter

The Spotter input is through an XLR female connector and is switch selectable between microphone and line input levels. The SPOTTER audio appears only as a cue selection heard in the right headphone. Spotter input can be from a person on the field at a sports event identifying players, or from any information source that you do not want to go out over the air. There is a separate level control for spotter input.

Aux-in

Aux-in is through an XLR female connector. This input is line level and can be heard in the headphones or through the PA system. Aux-in can be a tape, CD, another Buddy, program return from the audio codec (if an ISDN line is being used) or any other line input. The level control is located on the top right of the front panel.

If you plan to use the Frequency Extender and telephone line built into the Buddy for program transmission, you may want to interface a second phone line for full time cueback from the station. To do this, you will need an external telephone coupler (Comrex Model TCB-1 Manual Telephone Coupler or Comrex Model TCB-2 Auto-Answer Telephone Coupler) to connect the second telephone line into the Buddy. This coupler can be connected into either the SPOTTER or AUX-IN connections. By making the appropriate cue selection (either SPOTTER or AUX-IN), you will be able to hear the cueback line in your left ear. Note: Receive levels of phone lines can vary significantly. If the receive level is very low, we recommend using the SPOTTER connections set to MIC level. Level adjustments can be made with the volume controls on the spotter or aux-in positions and with the volume controls for the left headphones.

SECTION 8: TECHNICAL FACTS

Levels The program output level may be set to either 0 dBu or +4 dBu by means of a toggle switch on the rear panel.

Power The power can be set to eight 115 volts AC or 230 volts AC through a switch on the rear panel of the Buddy.

Pin-outs

Reference Description	Connector Type	Pin # or Term	Pin Names	Connector Names
J7	3 Conductor 1/4" Phone Jack	Tip Ring Sleeve	Cue 1 - Right Pgm 1 - Left Gnd	Headphone 1 Output
J9	3 Conductor 1/4" Phone Jack	Tip Ring Sleeve	Cue 2 - Right Pgm 2 - Left Gnd	Headphone 2 Output
J8	3 Conductor 1/4" Phone Jack	Tip Ring Sleeve	Cue 3 - Right Pgm 3 - Left Gnd	Headphone 3 Output
J10	3 Conductor 1/4" Phone Jack	Tip Ring Sleeve	Cue 4 - Right Pgm 4 - Left Gnd	Headphone 4 Output
J4	Female XLR	1 2 3	Gnd In + In -	Microphone 1 Input
J5	Female XLR	1 2 3	Gnd In + In -	Microphone 2 Input
J1	Female XLR	1 2 3	Gnd In + In -	Microphone / Line 3 Input
J2	Female XLR	1 2 3	Gnd In + In -	Microphone / Line 4 Input

Reference Description	Connector Type	Pin # or Term	Pin Names	Connector Names
J3	Female XLR	1 2 3	Gnd In + In -	Spotter Input
J6	Female XLR	1 2 3	Gnd In + In -	Aux-In Input
J13	RJ-11	Pin 3 Pin 4	Ring Tip	Telephone Line
J2	Male XLR	Pin 1 Pin 2 Pin 3	Gnd Out + Out -	PA Feed Output
J3	Male XLR	Pin 1 Pin 2 Pin 3	Gnd Out + Out -	Program Output

The Buddy audio inputs and outputs are designed to accept and to drive electrically balanced input and output signals. Sometimes, it is unavoidable to use unbalanced audio signals, like those found on consumer audio equipment. In the case of an unbalanced signal being fed into the Buddy via the XLR connectors, always connect the “audio high” signal to pin 2, and connect the audio ground to pins 1 and 3. Likewise, when feeding unbalanced equipment inputs from the Buddy, connect pin 2 to the “audio high” input pin, and connect pins 1 and 3 to the audio ground input.

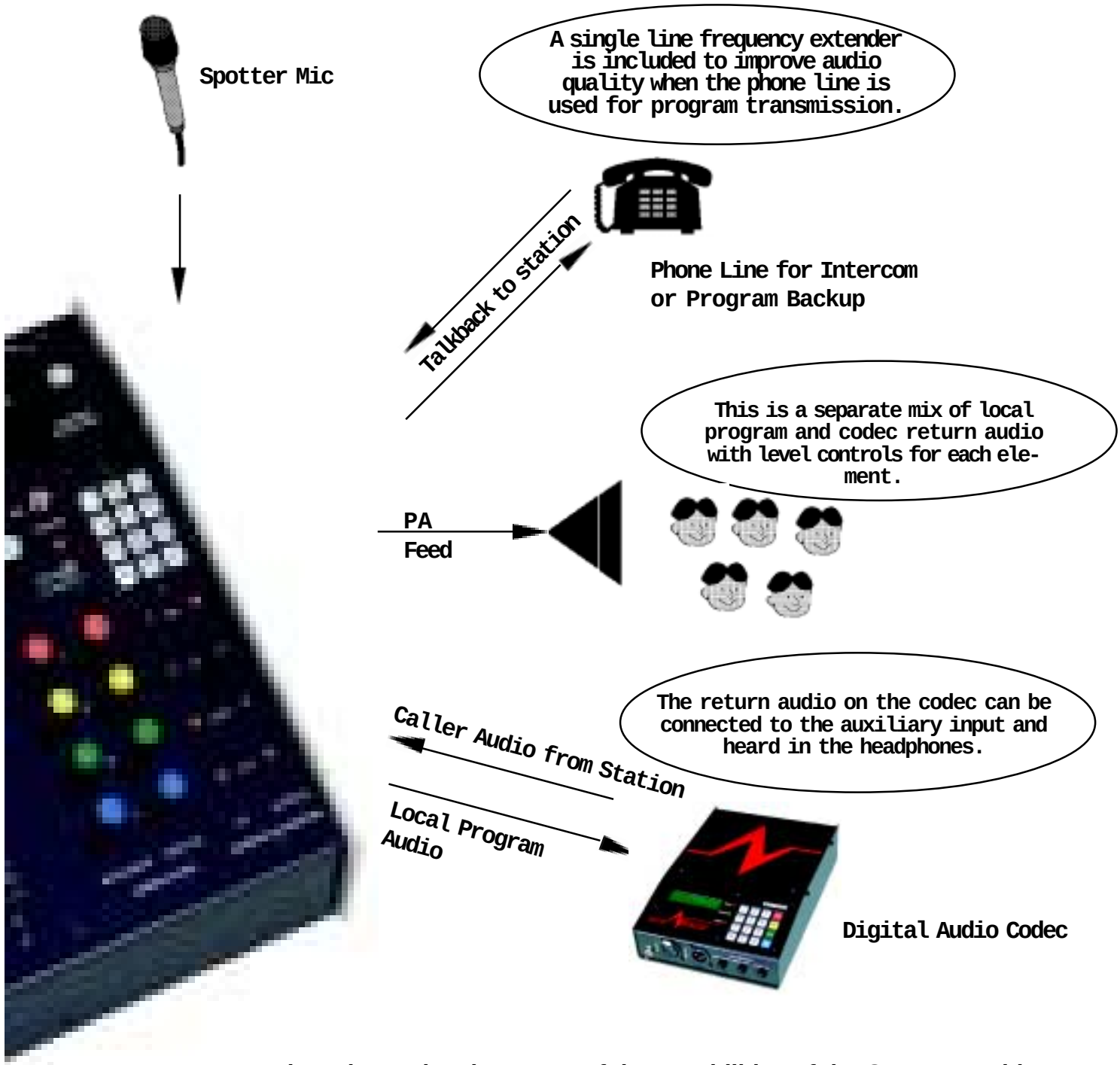
SECTION 9: MAINTENANCE

The Comrex Buddy is manufactured very carefully and with the highest quality parts. It has been designed with the rough life of remotes in mind and should give you many years of trouble free service. We at Comrex stand behind this products as we do with all our products.

If you do have any problem with the Buddy, please call us **first**. We can listen to your feed and often diagnose problems and offer suggestions that will correct the problem. In our experience, the most common problem experienced with audio equipment are with cables. We suggest that you consider purchasing "ready-made" cables.

Another very strong suggestion is that you do not permit any modification of the Buddy. Comrex policy requires that any equipment returned to us for repair must be "de-modified" before it can be examined. This raises the cost of the repair and, in many cases, is the cause of the problem. If you feel that a special feature must be added, please talk with us first to insure it is done correctly.

SECTION 10: APPLICATION EXAMPLES



Remote broadcast showing some of the capabilities of the Comrex Buddy.

In this setup, a post-game talk show is being sent on ISDN. There is a host and two guests at the remote site, along with a producer. The Buddy is connected to a Digital Audio Codec (in this instance the Comrex Nexus) for 15 kHz mono program feed and return audio. Callers are fed down the return ISDN channel from the station into the mixer's auxiliary input and are heard in both the headphones and the PA output. A producer is using channel one in the intercom mode which cuts that channel from air and allows him to communicate with the station over the phone line in the mixer. The producer is also being heard by the host and his guests. The PA feed is a mix of local program and the caller audio from the station.

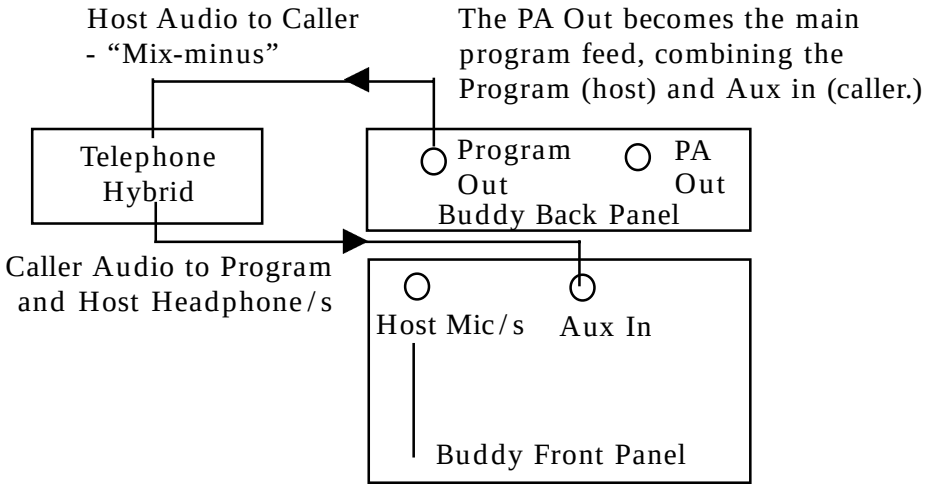
SECTION 11: SPECIAL HOOKUPS

Connecting a Hybrid to the Buddy

We have been asked by some Buddy users if there is a way to incorporate telephone interviews through the Buddy. We explain that the Buddy's telephone interface is meant for communications or for program delivery and not to interface caller audio with host audio for interviews. Combining the host's audio with a caller's voice requires a telephone hybrid and also requires that a mix-minus feed be available to send back to the caller.

The diagram below shows how to connect an external telephone hybrid to the Buddy to create the necessary mix-minus. In this application, the PA output becomes the main program feed, combining the host and caller audio and the Program Output is used to provide the mix-minus back to the caller.

Note: If you are using the Buddy to feed an ISDN or SW56 codec, you can connect the codec return audio into SPOTTER (rather than the AUX-IN) to bring the return audio into the headsets.



Connecting a Second Phone Line into the Buddy.

If you are using the telephone interface built into the Buddy for frequency extended program transmission, you may wish to have a second "cueback" line for fulltime communications with the studio. This can be done by connecting a second phone line into an external telephone coupler (i.e. Comrex Model TCB-1) and feeding this coupler into the SPOTTER position, which can be selected into the headsets. Depending on the receive level of the telephone line (they can vary anywhere between -40 and -15 dBm), you may select either mic or line level and then adjust the SPOTTER and headphone volume controls to a comfortable level.

SECTION 12: SCHEMATICS