Gentner

GENTNER BROADCAST SYSTEMS

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Firmware Version 1.0

Beta Site Testing—July 1992

EFT-3100

EFT-3100 Operations Manual

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Information in this manual is subject to change without notice.

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INTRODUCTION

Preface

This manual will provide all the information you need to properly use and maintain the EFT-3100. Read this manual thoroughly before attempting to use your EFT-3100.

This manual is accurate for EFT-3100 units equipped with Version 1.0 firmware. In order to ensure proper operation, EFT-3100 units which are to be used together must all be equipped with the same version of firmware. (An EFT-3100 is not compatible with an EFT-3000.)

Refer to this manual first if you have any questions or problems regarding the use of the EFT-3100. If you can't find an answer in the manual, please contact:

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Overview

The Gentner EFT-3100 is a three line Digital Extended Frequency Transceiver. Using three standard dial-up telephone lines, an EFT-3100 system is capable of providing an audio channel with a frequency response of 50 Hz to 7.5 kHz. With the EFT-3100, you can send very high quality audio over standard telephone lines anywhere in the world. EFT-3100 units are required at both the Transmit and Receive ends of the telephone lines.

The EFT-3100 utilizes highly sophisticated digital circuitry and digital signal processing techniques to automatically equalize each of the three telephone lines, adjust for differential line delays and match amplitude levels between lines. All processing of the audio signals is performed in the digital domain.

Setup of the three telephone lines is automatic and is initiated by the press of a single button on the front panel of the unit. The setup process takes approximately ten seconds.

The EFT-3100 can also be used as a two line Extended Frequency Transceiver, or as a single line Extended Frequency Transceiver. In the two-line mode, the unit will provide a frequency response of 50 Hz to 5 kHz. In the single-line mode, a frequency response of 50 Hz to 2.5 kHz will be provided.

No external telephone couplers are required. The EFT-3100 connects directly to the telephone lines, providing auto-answer/ auto-disconnect capability. A built-in Touch-Tone® pad and memory dialer eliminate the need for a separate telephone instrument. (The system can also be configured for pulse dialing, when required.)

The EFT-3100 can be operated at a remote site as a stand-alone device, greatly reducing equipment needs. It contains a two-input mixer and headset amplifier. Each input is switchable for microphone or line level, and phantom power for condenser microphones is internally selectable. A front panel VU meter with peak LED provides level indication. In addition, the EFT-3100 has an AGC limiter which can be activated by setting a front panel switch.

Features and Benefits

- Frequency response of 50 Hz to 7.5 kHz using three standard telephone lines.
- Built-in return channel provides half duplex communication for cueing personnel at the Transmit site when in two line extension mode.
- Built-in telephone couplers with auto-answer/auto-disconnect capability provide direct connection to the telephone lines.
- Advanced Digital Signal Processing (DSP) technology delivers the highest quality audio possible.
- Built-in Touch-Tone key pad and memory dialer eliminates the need for a separate telephone set.
- Ten second, one button setup automatically equalizes each telephone line's frequency response, compensates for differential line delay, and matches amplitude levels between lines.
- Digital noise reduction algorithm significantly reduces ambient line noise.
- Three-line, two-line, or single-line operation.
- Two built-in microphone/line level selectable inputs and a headset amplifier. Phantom power for condenser microphones is internally selectable.
- User friendly and automatic setup and operation. One person can initiate calls, set up, and operate the EFT-3100 system without assistance from the other site.

Applications

- ***Broadcast remotes.*** The system provides an easy method to deliver high quality audio using standard, inexpensive dial-up telephone lines.

- ***Backup for a broadcast STL.*** The EFT-3100 can be used as an emergency backup for your studio-to-transmitter link, providing a monaural channel of 50 Hz to 7.5 kHz.

- ***Teleconferencing.*** The EFT-3100 provides maximum intelligibility and audio quality. Use for return audio in video conferencing, or for high quality audio conferences.

- ***Recording studios.*** Use the EFT-3100 to lay down voice tracks with remote talent. Your sessions can be done in real time, without the expense of bringing the talent to the studio.

Controls and Components

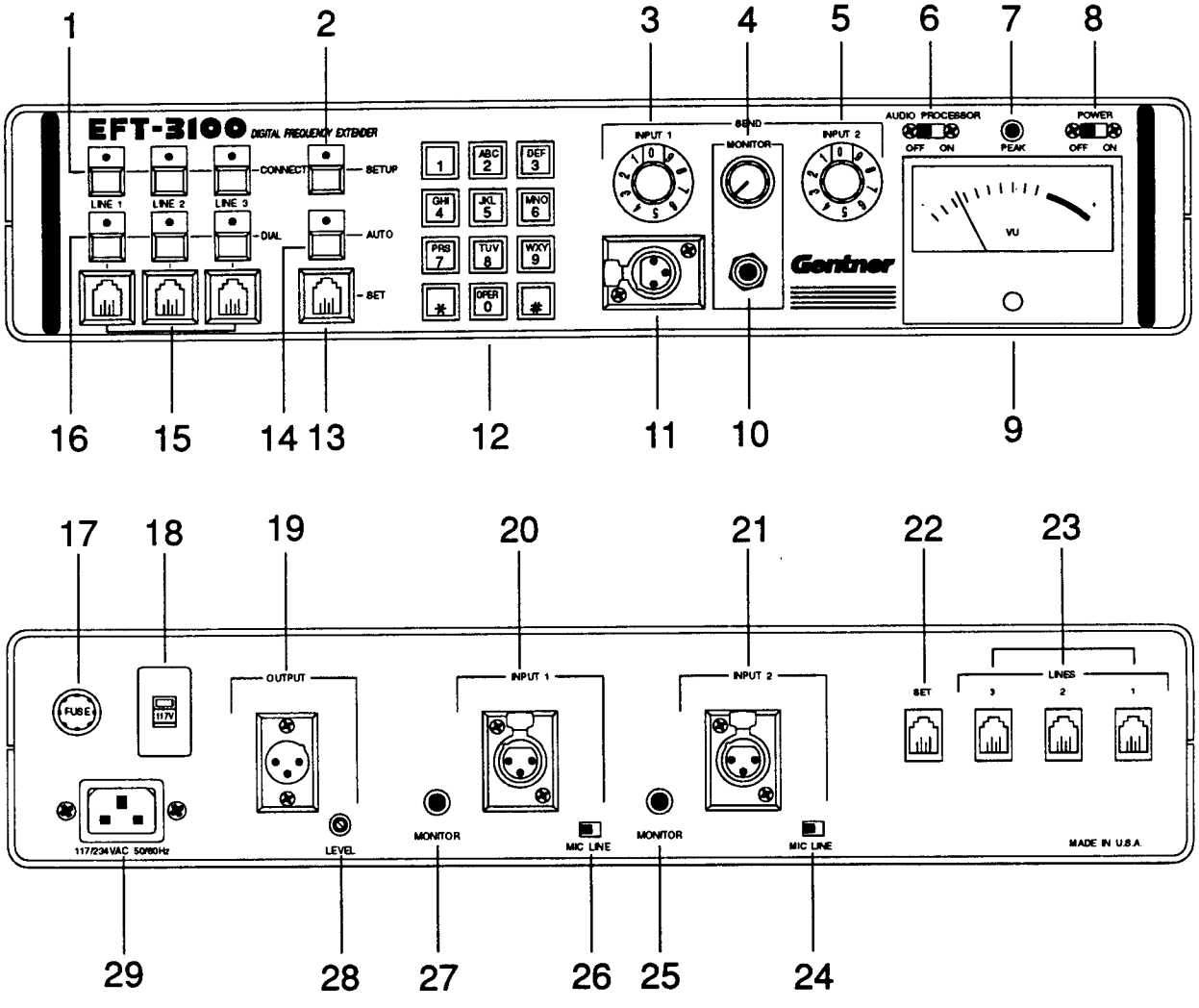

Figure 1-1
System Components

1. CONNECT Buttons

Use to connect to or "pick up" the telephone lines. The LEDs will glow when the telephone lines are connected. Toggles to off.

2. SETUP Button

Used for one-button connection and automatic setup. Or, once all of the telephone connections have been established manually between the two EFT-3100's, press the SETUP button to initiate the setup process. Toggles to off.

3. **INPUT 1 Mix Level**
   Level control for INPUT 1.

4. **MONITOR Level**
   Adjusts the listening level of the headsets plugged into the MONITOR jacks.

5. **INPUT 2 Mix Level**
   Level control for INPUT 2.

6. **AUDIO PROCESSOR Switch**
   When turned on, the SEND audio is limited to prevent distortion from excessive audio peaks.

7. **PEAK Indicator**
   Indicates peaks on INPUT 1 and 2 audio.

8. **POWER Switch**
   ON and OFF power switch.

9. **VU Meter**
   Indicates INPUT 1 and 2 level.

10. **MONITOR Jack**
    One of three jacks to plug a headset into.

11. **INPUT 1 Connector**
    One of two XLR connectors to feed mic level or line level audio to INPUT 1.

12. **Touch-Tone Pad**
    Use to dial telephone numbers and to change configuration settings. Also used to program telephone numbers for speed dialing.

13. **SET Jack**
    One of two jacks that you may connect a standard telephone set to.

14. **AUTO Button**
    Press for auto-answer/auto-disconnect and for speed dialing. Toggles to off.

15. **Telephone Line Jacks**
    One of two sets of jacks for connecting telephone lines.

16. Dial Buttons
Press to activate the Touch-Tone pad to dial when manually dialing a telephone number. Toggles to off.

17. Fuse Holder
For 117V operation use a ½ amp Slow-Blo fuse. For 234V operation use a ¼ amp Slow-Blo fuse.

18. Line Voltage Select
Use to select either 117 VAC 50/60 Hz operation or 234 VAC 50/60 Hz operation.

19. OUTPUT Connector
This connector contains the balanced line level audio that is received from the other EFT-3100.

20. INPUT 1 Connector
One of two XLR connectors to feed balanced mic level or line level audio to INPUT 1.

21. INPUT 2 Connector
An XLR connector to feed balanced mic or line level audio to INPUT 2.

22. SET Jack
One of two jacks used to connect a standard telephone set.

23. Telephone Line Jacks
One of two sets of jacks used to connect the telephone lines.

24. Input 2 Mic/Line Switch
Use to select mic level or line level sensitivity for INPUT 2.

25. Monitor Jack
One of three jacks to plug a headset into.

26. Input 1 Mic/Line Switch
Use to select mic level or line level sensitivity for INPUT 1.

27. Monitor Jack
One of three jacks to plug a headset into.

28. Output Level
Use to adjust the level of the OUTPUT audio.

29. AC Power Input

Connect the supplied molded power cord between the AC Power Input and an AC power outlet.

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INSTALLATION

Unpacking Your EFT-3100

An EFT-3100 system requires two identical units (one unit at each end of the telephone lines) each containing the same operating firmware. If you only received one unit (either from a shipping or ordering error), contact your dealer or Gentner for assistance.

Carefully unpack your shipment and check for any damage. If you notice any damage to the unit, notify your shipping carrier immediately. Be sure to retain the original boxes and packing material for inspection by the carrier. Gentner is not responsible for shipping damage. You must make claims directly with the carrier.

Mounting Your EFT-3100

Rack Mount

If desired, you can mount the EFT-3100 in a standard 19" equipment rack using the rack ears included in the options bag that came with your unit.

To install the rack ears for the EFT-3100, use a Phillips screwdriver to remove the four chassis screws located on the side panels near the front edge of the unit. Install the two rack ears on the side of the EFT-3100 using the four $\frac{3}{32}$" X $\frac{1}{2}$" Phillips screws included with your unit.

The EFT-3100 does not require an internal cooling fan. As long as the unit receives adequate ventilation, it will operate normally.

Be careful not to block any of the ventilation holes in the unit's chassis. Always be sure that a free flow of air gets to the unit while it is operating.

Mounting in a Road Case

The EFT-3100 can also mounted in a road case, making it easy to transport while protecting it from the elements and other environmental hazards.

If you install your EFT-3100 in a road case, you should mount a cooling fan in the road case to insure the EFT-3100 receives adequate ventilation.

Setting Up the AC Power Input

Your EFT-3100 was shipped to you ready to use with a 117 VAC/60 Hz power source (unless otherwise marked.) A 1/2 A Slow-Blo fuse is installed. You can easily alter the AC power input to accept a 234 VAC/50 Hz power input.

To change the EFT-3100 to 234 VAC/50 Hz operation, set the red slide switch on the rear panel to the 234 V position. (See AC Power Select on the drawing below.) This slide switch is located next to the AC power cord receptacle for the unit.

Replace the fuse with the proper value. For 234 VAC operation, replace with a 1/4 A Slow-Blo fuse. The cord/plug set may also need to be changed to comply with local requirements.

NOTE: Always be sure that the EFT-3100 is configured for the correct power source prior to connecting it to power.

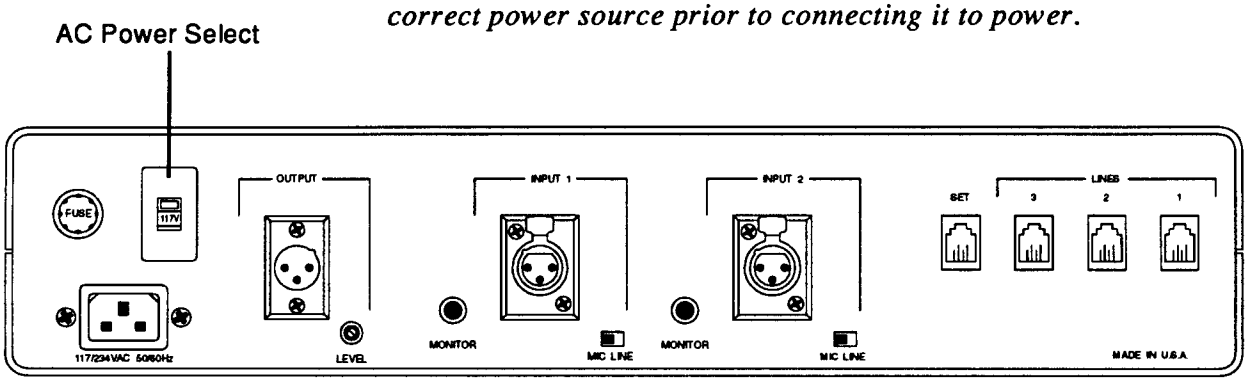


Figure 2-1
Configuring for Proper AC Power Input

Connecting Telephone Lines

The EFT-3100 is designed to work using up to three standard dial-up telephone lines. It may also work with other types of lines, such as dedicated loops, by changing the Gain Structure. (See page 2-5.)

The telephone lines may be connected to *either* the front panel jacks *or* the rear panel jacks; *never* both. Lines should be matched; line 1 to jack 1, 2 to 2 and 3 to 3 only.

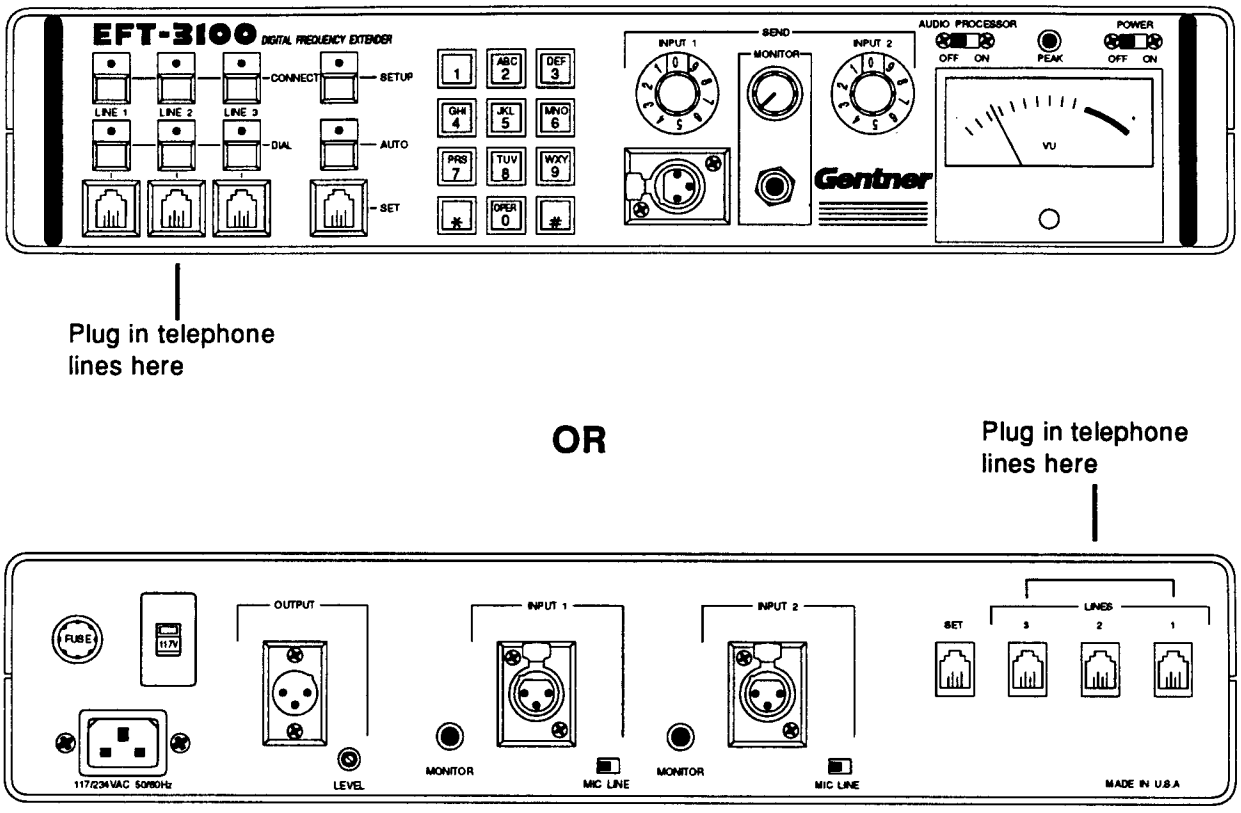


Figure 2-2
Connecting Telephone Lines

Telephone Line Gain Structure

Your EFT-3100 arrived from the factory configured for a 20 dB gain on each of the telephone lines. This setting provides the best signal to noise ratio. If you are using standard telephone lines direct from the telephone company, then the gain will not need to be adjusted.

Using Non-Standard Lines

If you are using your EFT-3100 with non-standard telephone lines, such as cellular telephones or dedicated loops, the internal gain structure may need to be changed to avoid distortion caused by higher signal levels or to increase audio levels for lower signal levels.

If you dial out but cannot become connected to the number dialed, the jumper should be changed to the 10 dB setting for the non-standard line(s).

Changing the Gain Structure

☐ Terminate power to the unit.

☐ Remove the top cover by removing the four screws on the sides of the top cover and the two screws on the top of the top cover.

☐ Locate the jumpers labeled JP1 through JP9 on the bottom board, along the front edge near the Touch-Tone pad. The jumpers will be easily accessible without removing boards.

☐ Move the jumpers to the required positions as indicated below.

Gain	Line 1	Line 2	Line 3
0 dB	JP5	JP4	JP1
10 dB	JP7	JP6	JP2
20 dB	JP9*	JP8*	JP3*

* Factory Settings

☐ Replace the top cover and replace the six screws.

☐ Restore power to the unit.

Cellular Telephones

Many manufacturers of Cellular Telephones offer an interface for their products that simulates a telephone line. Many of these interfaces provide the proper Tip/Ring equivalency to be able to be used with the EFT-3100 without any modification. However, some interfaces do not provide a true telephone line simulation and will require that the EFT-3100 be modified to be able to use this type of line.

If you are using Cellular telephones with your EFT-3100, please contact Gentner Technical Support for assistance.

Connecting a Telephone Set

You may use a telephone set to initiate calls or answer calls when the EFT-3100 is not in use. However, the telephone set is not required for setup or operation of the EFT-3100. The EFT-3100 is capable of initiating and answering calls through the use of the Touch-Tone pad. Your headset can be used to listen to the tones, if desired. The MONITOR adjustment will be used to set the desired listening level. The EFT-3100 can be configured for pulse dialing, when required. Refer to "DIP Switch Settings" on page 2-12 for more information.

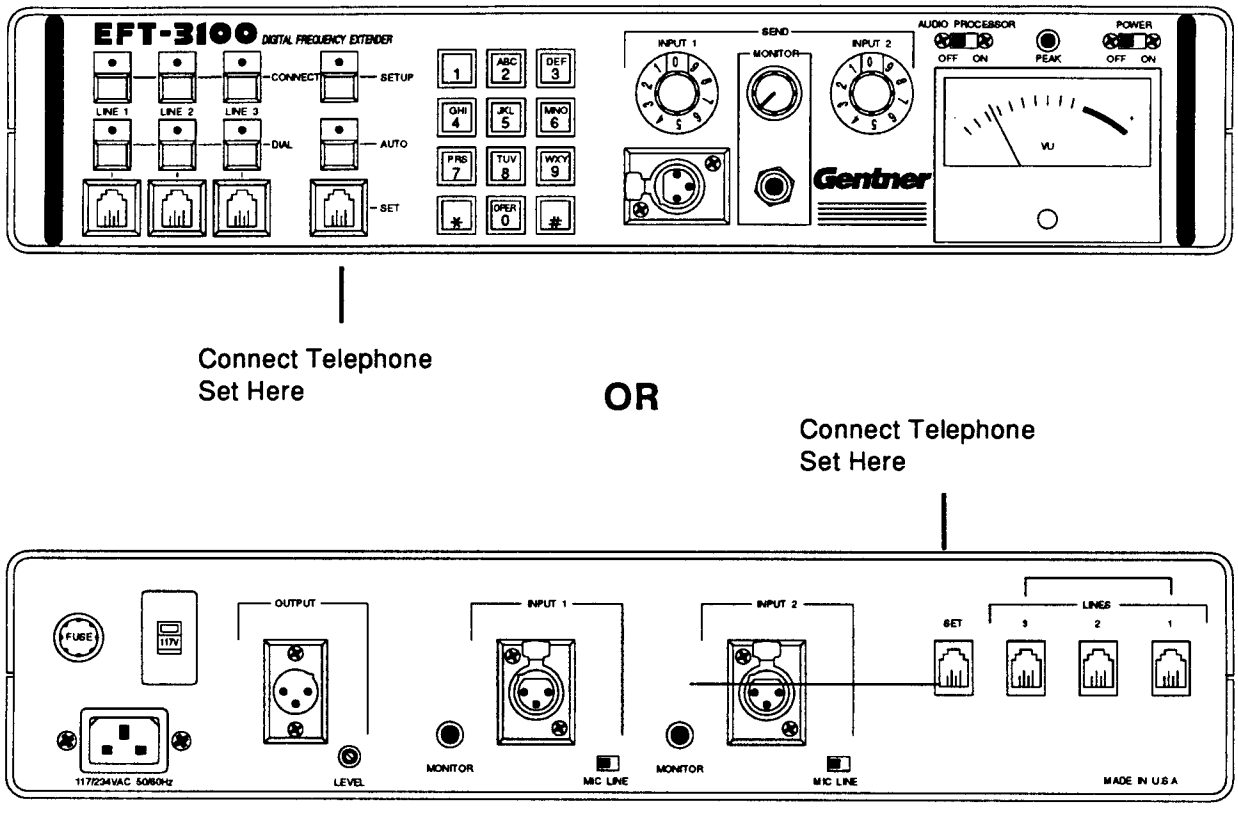


Figure 2-3
Connecting a Telephone Set

Connecting the Audio Sources to the Inputs

Connect the first audio source to *either* the front panel INPUT 1 connector or the rear panel INPUT 1 connector.

NOTE: Do not connect audio to both the front panel INPUT 1 and the rear panel INPUT 1 connectors simultaneously.

Connect the second audio source to the rear panel INPUT 2 connector.

Set the the Mic/Line switches for INPUT 1 and INPUT 2 for proper sensitivity.

Use the VU meter and the INPUT 1 and INPUT 2 level controls to adjust the level of the input. The needle on the VU meter should only occasionally go into the red area and the peak indicator should only flash occasionally.

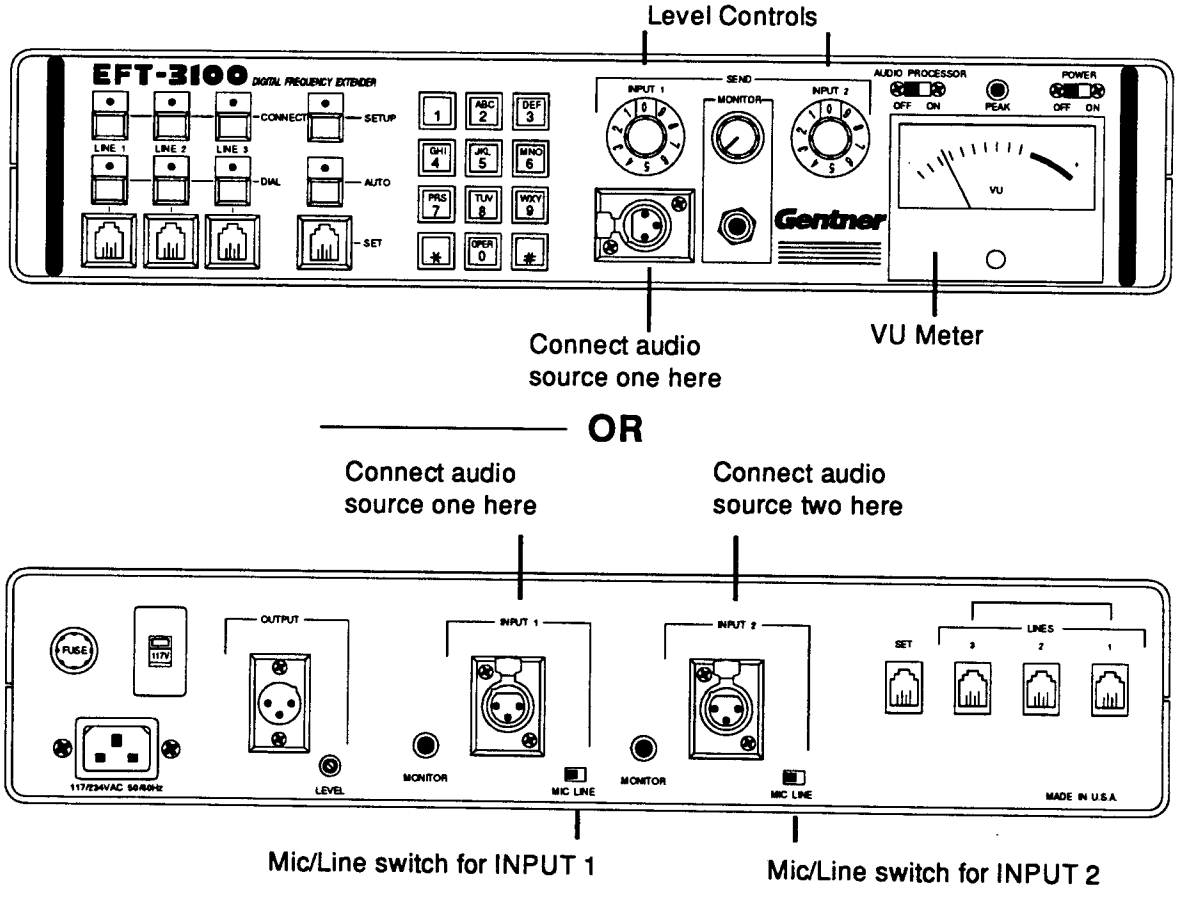


Figure 2-4
Connecting Audio Sources

Using Condenser Microphones

The EFT-3100 can be configured to provide +30 volts phantom power for condenser microphones. To enable this function, it is necessary to remove the top and middle circuit boards to access a jumper on the bottom circuit board.

Phantom power is only supplied when the Mic/Line switch is in the Mic position.

The EFT-3100 is delivered from the factory with phantom power disabled.

Enabling Phantom Power

- ☐ Terminate power to the unit.
- ☐ Remove the top cover by removing the four screws on the side of the top cover and the two screws on the top of the top cover.
- ☐ Remove the top circuit board by removing the six hex nuts and the four connectors labeled J1, J2, J5, and J6. Place the board on a static-free surface.
- ☐ Remove the middle circuit board by removing the four stand-offs, the two hex nuts, and the four connectors labeled J5, J6, J15, and J16. Place the board on a static-free surface.
- ☐ To provide phantom power to INPUT 1 locate JP12 and JP13 near the input transformer. Move the jumper from JP12 to JP13.
- ☐ To provide phantom power to INPUT 2 locate JP10 and JP11 near the input transformer. Move the jumper from JP10 to JP11.
- ☐ Reinstall the middle board first, using the four stand-offs, two hex nuts, and the four connectors.
- ☐ Reinstall the top board using the six hex nuts and the four connectors.
- ☐ Replace the top cover and the six screws, then reapply power.

Connecting Headsets to the Monitor Jacks

The EFT-3100 will drive up to three headsets. (One is located on the front panel, the other two are located on the rear panel.) All three MONITOR outputs are individually buffered providing for short-circuit protection.

The listening level for all three headsets is adjusted with the MONITOR level control knob located on the front panel.

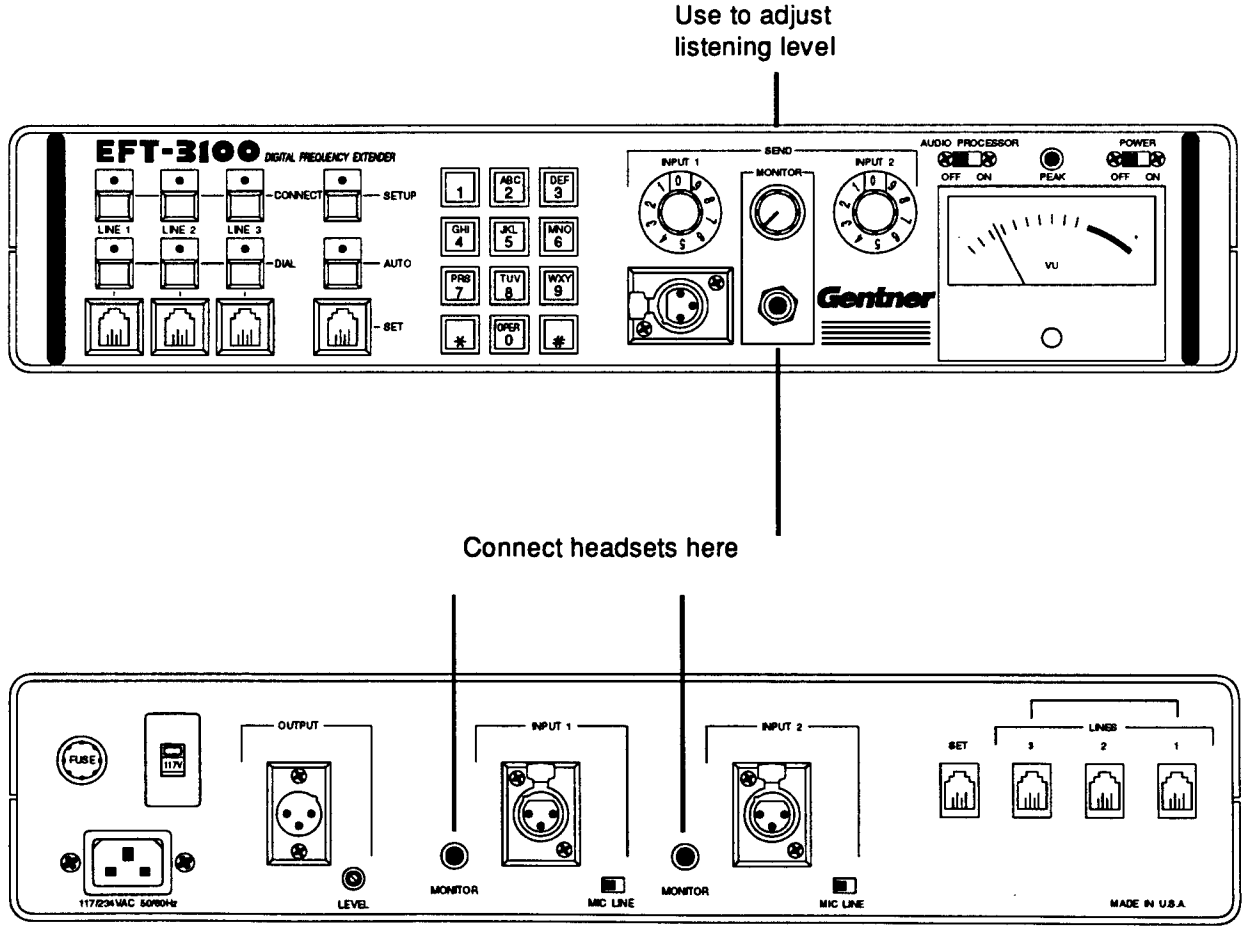


Figure 2-5
Connecting Headsets

Connecting the Output Audio

Connect the OUTPUT of the EFT-3100 to the input of your peripheral equipment, such as a console or audio amplifier.

With a small screwdriver, adjust the LEVEL control located on the back panel for proper output level for your peripheral equipment.

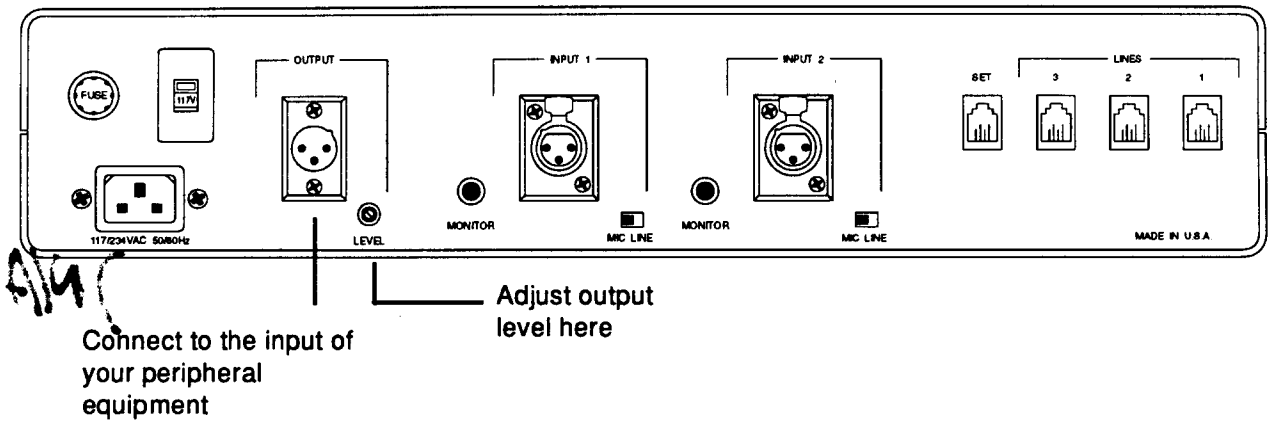


Figure 2-6
Connecting Output Audio

DIP Switch Settings

DIP switches are provided for changing various options, as detailed below. You will not need to remove the cover to access the DIP switches. They are located on the left side panel through the ventilation slots, numbered 1 through 8, from left to right. The factory default settings are indicated below with an asterisk.

DIP Switch Summary:

1	*ON OFF	Noise reduction ON Noise reduction OFF
2	ON *OFF	Pulse dialing Enabled DTMF Dialing Enabled
3	*ON OFF	Check for loop current Do not check for loop current
4	ON *OFF	Two-line extender; line 3 contains IFB (cue) Three-line extender
5	*ON OFF	Provide interband delay compensation Do not compensate for interband delay
6	*ON OFF	Provide intraband equalization Do not provide intraband equalization
7	OFF	Not Used
8	ON *OFF	Test Tone Enabled Normal operation

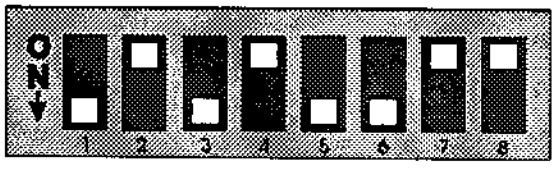


Figure 2-7
*Factory Default DIP Switch Settings

3

OPERATION

Introduction

This chapter details all necessary steps for normal setup and operation of your EFT-3100. When you arrive at the remote site, the EFT-3100 requires only a few quick steps to establish line connections, set up and configure the unit. Once the setup is complete, the Transmit unit will be able to communicate with the Receive unit with clear, high quality audio.

Setup and operation of the EFT-3100:

- ☐ Installation should be complete, as detailed in Chapter 2, Installation.
- ☐ Preparation at Receive site:Telephone lines should be pre-connected. Power should be applied to the unit and switch set to ON. The unit should be set as a Receiver. (Page 3-4, Transmit Mode or Receive Mode, will describe this procedure.) The unit must be set with AUTO on.
- ☐ Connect AC power to the EFT-3100 at the Transmit site. The POWER switch, located on the front panel, must be placed in the ON position.
- ☐ Set the EFT-3100 as a Transmitter or Receiver. (See page 3-4, Transmit Mode or Receive Mode, for information on this procedure.)

- ☐ Make the telephone connections between the two EFT-3100's. (Refer to page 3-6, Dialing Telephone Numbers.)
- ☐ Press SETUP to initiate the setup process. (See page 3-11.)
- ☐ Adjust audio level controls if necessary. (See page 3-16.)
- ☐ Both EFT-3100's are now operational.

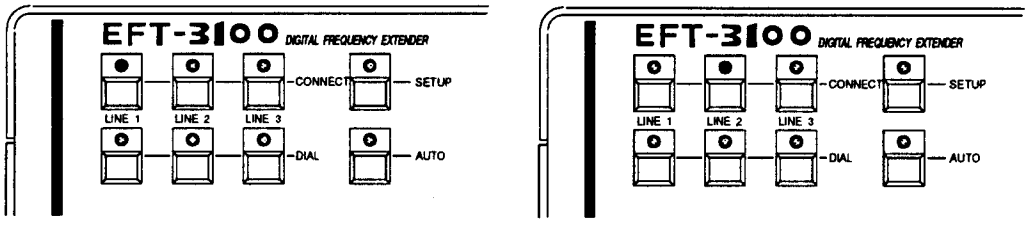
Power-Up Diagnostics

The EFT-3100 performs an automatic diagnostic check when the unit is turned on. This check takes less than two seconds. When complete, the unit's LED lights should all be off. The unit will then be ready for connection and setup.

Should an internal error be detected, the Connect, Dial, Setup and/or Auto lights will be lit at the conclusion of the diagnostic check. This will indicate some type of internal fatal error. Call Gentner's Technical Support for assistance.

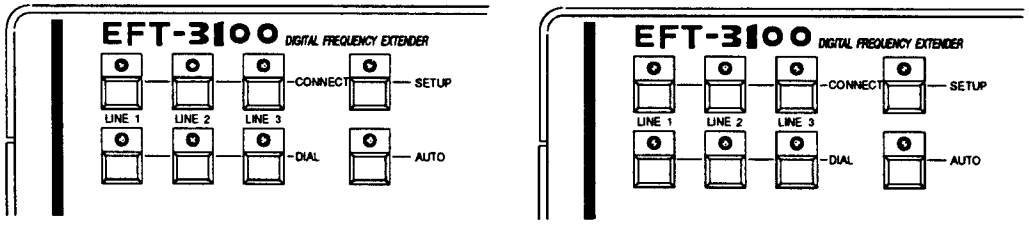
Below is a diagram of the light sequence and what type of error the unit is experiencing. When discussing the problem with Technical Support, be prepared to tell them what light sequence is displayed.

LEGEND: ● = OFF ◍ = ON



Bad ROM Checksum

Bad RAM



Bad Configuration Register

All lights flashing erratically: System Failure

Figure 3-1
Error Message Light Sequences

Mode Configuration

Auto Answer/Auto Disconnect

The EFT-3100 can be configured to automatically answer and disconnect calls by pressing the AUTO button so that the LED lights.

Auto answer makes it possible for the Transmit site to make all of the telephone connections without any assistance at the studio. Auto Disconnect causes the EFT-3100 to disconnect the line if the call is terminated at the other end.

Transmit Mode or Receive Mode

Both the Receive (studio) EFT-3100 and the Transmit (remote) EFT-3100 are identical, and are capable of operating as either a Transmit or Receive unit.

When the unit is in the AUTO mode the AUTO LED indicates whether it is acting as a Transmitter or Receiver. If the unit is configured as a Transmitter, the AUTO LED remains lit continuously. If the unit is configured as a Receiver, the AUTO LED flashes rapidly.

To toggle the EFT-3100 between the Transmit and the Receive modes:

☐ SETUP LED must be off. (If it is on, press and hold the SETUP button until the LED turns off.)

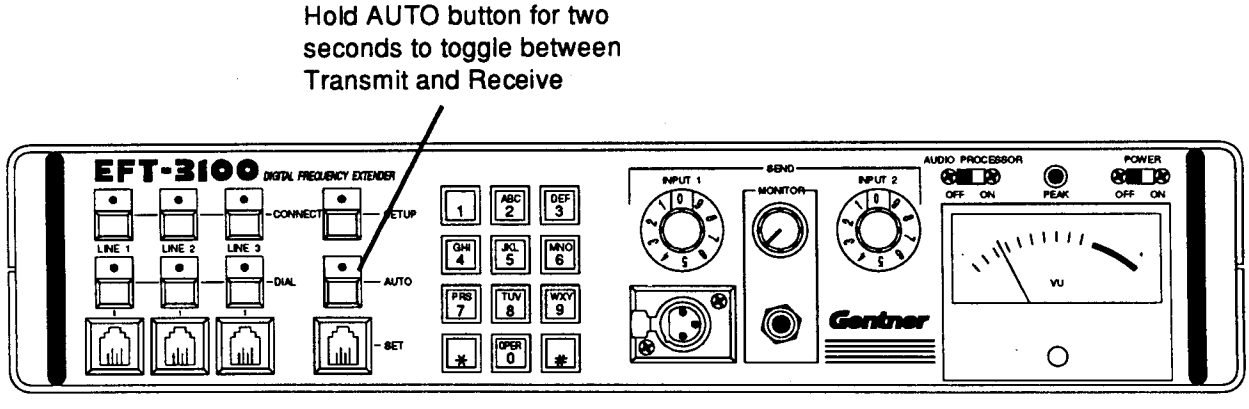


Figure 3-2
Transmit/Receive Mode

- ☐ Press and hold AUTO button two seconds. AUTO LED will glow steadily if the unit is in the Transmit mode, or will flash rapidly if it is in the Receive mode.

- ☐ To toggle your unit between Transmit and Receive mode, press and hold the AUTO button for two seconds.

- ☐ If you are at the remote site and configuring your remote unit to be the Transmit unit, the studio unit will automatically be configured as the Receive unit.

Dialing Telephone Numbers

Making the telephone connections between the two EFT-3100's can be initiated from either the Transmit or the Receive unit.

Remember, when dialing the telephone numbers, Line 1 of the Transmit unit must be connected to Line 1 of the Receive unit, and Line 2 must be connected to Line 2, and Line 3 to Line 3.

NOTE: Line connections on each unit must be made to either the front panel or the back panel. The line connections will not operate properly if they are mixed with both front and back connections. The connections will work properly, however, if one unit's line connections are on the back and the other unit's connections are on the front.

There are four dial techniques available for use: Manual, Speed Dial, One Button Dial (Automatic Setup), and Dialing using the Telephone Set. The One Button Dial (Automatic Setup) is the fastest, most efficient method for establishing connection to all three lines. However, some circumstances may require using another method. Read through this section to familiarize yourself with each to determine the technique best suited to your application.

Manual Dialing

To manually dial a telephone number using the built-in keypad:

- ☐ If you want to listen to the tones as you dial, connect a headset to the MONITOR jack and adjust the MONITOR control for proper listening level.
- ☐ Verify AUTO LED is off. (Toggle to off if necessary.)
- ☐ Starting with Line 1, press the DIAL button then the CONNECT button. You will hear the dial tone in your headset. If you are using an external telephone set, *do not* press CONNECT.
- ☐ Using the built-in keypad, dial the telephone number for Line 1 of the receiving EFT-3100. You will hear the Touch-Tones in the headset. If you are using an external telephone set, press CONNECT *after* dialing.

☐ As soon as you hear the line ringing, repeat this process on Line 2, then on Line 3.

☐ When all lines are established, proceed to SETUP (page 3-11).

NOTE: Manual dialing is frequently used when only a single line needs to be connected. If voice only is to be transmitted, a good line quality can be obtained using a single line. If a broad band transmission is required, such as music, lines two and three should be added. Lines two and three handle the higher frequency transmissions, offering higher quality audio.

Speed Dialing

Speed dialing allows you to dial a telephone number using a one-digit memory location. This method is used efficiently when connecting a single or double line.

To program the speed dial numbers, refer to "Programming Speed Dial Numbers" on page 3-8.

To dial a telephone number using speed dialing:

☐ Put the EFT-3100 in AUTO mode by pressing the AUTO button. The AUTO LED should be on.

☐ Starting with Line 1, press the DIAL button. The CONNECT LED will light.

☐ On the keypad, press the # button, followed by one of the memory locations, 1 through 9.

☐ As soon as the line begins ringing you may repeat this process for Line 2 then Line 3.

☐ When all lines are established, proceed to SETUP (page 3-11).

One Button Connect and Automatic Setup

This feature will automatically connect and set up your unit to the companion EFT-3100 one easy step, when all three lines are to be connected.

☐ All power and line connections must be complete to the unit, and all three numbers must be stored in memory locations 1, 2, and 3, respectively.

- ☐ Verify CONNECT, DIAL, and SETUP LEDs are off. Toggle to off, if necessary.
- ☐ AUTO LED should be ON.
- ☐ Momentarily press the SETUP button.
- ☐ The EFT-3100 will automatically connect all three lines and dial the numbers stored in memory locations 1, 2, and 3. The EFT-3100 configures as a Transmit unit. Upon successful completion, the three CONNECT LEDs will be lit and the SETUP LED will glow steadily.
- ☐ If the unit is unable to complete the setup, the SETUP LED will flash and audio will become unmuted in a default setup mode.
- ☐ To abort the setup after it has been initiated, press and hold the * key until setup quits.

Dialing using the Telephone Set

The unit includes a SET jack that allows a normal telephone set to be connected to the unit. This telephone set can be used to dial the telephone numbers during the setup procedure.

- ☐ Connect the telephone set to *either* the front or rear panel SET jack.
- ☐ Press the DIAL button for Line 1.
- ☐ Lift the handset of the telephone and dial the number for the corresponding line at the other EFT-3100.
- ☐ When you hear the line ringing in the handset, press the CONNECT button on the EFT-3100.
- ☐ You may now repeat this process for lines two and three.

Programming Speed Dial Numbers

There are nine memory locations (buttons 1 through 9) where you can store commonly used telephone numbers. If you want to hear the Touch-Tones as you are programming, press a DIAL button first and listen with a headset.

To program a speed dial number:

- ☐ Make sure the AUTO LED is not lit. If it is, press the AUTO button to toggle off.
- ☐ Press # twice on the keypad.
- ☐ Choose a memory location by pressing one of the numbers, 1 through 9.
- ☐ Dial the telephone number as you normally would, include a 1 (or a 0 in some cases) and the area code if you will be dialing long distance. Up to 24 digits may be stored in one memory location.
- ☐ If you need a one-second pause in your dialing sequence, press the * button. (For example, you may need to place a pause between the outside line access code and the telephone number: 9*8743653.)
- ☐ Press # once to store the telephone number.
- ☐ Repeat this process to store additional numbers.

You will want to make a note of the numbers stored at each memory location, for reference during speed dialing operations.

- ☐ The battery backup RAM retains the speed dial numbers for several years under normal operating conditions.

Clearing a Speed Dial Number Location

- ☐ Make sure the AUTO LED is not lit. If it is, press the AUTO button to toggle off.
- ☐ Press # twice on the keypad.
- ☐ Press the keypad number location you want to clear from memory.
- ☐ Press # once to complete. The number location is now clear.

Clearing All Speed Dial Numbers

- ☐ Turn power switch to OFF.
- ☐ Simultaneously press and hold the * and # keys.
- ☐ While holding the * and # keys, turn power switch to ON.
- ☐ Continue to hold the * and # keys until a beep is heard. All numbers in the memory will be cleared.

Answering Telephone Calls

Calls ringing into the EFT-3100 are indicated by the CONNECT LED flashing. If the EFT-3100 is in AUTO mode (AUTO LED light will be ON), it will automatically answer the call after one or two rings. If you wish to manually connect the call, press the flashing CONNECT button. See Auto Connect and Disconnect on page 3-4.

Initiating the Setup Procedure

Once the proper telephone connections have been established for all required telephone lines, (one, two or three) the unit must be configured for operation. This step is not necessary when using the One Button Dial and Automatic Setup technique described on page 3-7.

The setup process is automatic, and takes only a few seconds to complete. The SETUP button on either the Transmit or Receive unit must be pressed to start this process:

☐ Press the SETUP button. The AUTO button will light. This causes the EFT-3100 units to configure the telephone lines and begin sending and receiving frequency extended audio.

If both EFT-3100's happen to be configured for the same mode, (both are a Transmitter or both are a Receiver), the unit that initiates the SETUP process forces the other unit into the opposite mode.

During the setup process, the SETUP LED flashes rapidly and the OUTPUT audio is muted. When the setup process is complete, the SETUP LED stops flashing and remains lit continuously.

NOTE: Any time the SETUP button is illuminated, the EFT-3100 freezes all lines in use. It is not possible to manually disconnect lines, to add lines or to toggle in or out of AUTO mode when the SETUP LED is lit.

If the EFT-3100 cannot successfully set up the telephone lines, the SETUP button LED will remain flashing and audio will be unmuted using default setup configurations. It may be necessary to redial the telephone lines and repeat the setup procedure.

Both units may be dropped out of SETUP simultaneously from either location by pushing and holding the SETUP button until the LED extinguishes. When one unit is dropped out of SETUP, the other unit will drop out automatically (provided SEND audio is not present at that unit).

Using the Built-In Audio Processor

The EFT-3100 has a built-in audio processor (limiter) which will help prevent distortion due to over-driven telephone lines and digital signal processing circuitry.

The audio processor acts on both input channels of the EFT-3100. The limiting helps prevent distortion from excessive audio peaks.

Before activating the audio processor, be sure that you are not over-driving either EFT-3100 input. Verify that the Mic/Line selector switches on the rear panel are properly set.

NOTE: The EFT-3100 processor cannot correct distortion caused by over-driven inputs.

To activate the audio processor, complete the following in sequence:

- ☐ Move the small slide switch above the VU meter (marked AUDIO PROCESSOR) to the OFF position.
- ☐ Adjust audio level for occasional peaks on the PEAK LED indicator. (See Figure 1-1, reference number 6 and 7.)
- ☐ Move the AUDIO PROCESSOR slide switch to the ON position.

While in this mode, the function of the PEAK LED indicator changes to show the threshold of limiting.

Adjusting Relative Band Levels

After the SETUP process is complete, you can change the relative level of each of the three frequency bands on the Receive unit. This allows you to adjust the frequency response of the audio received from the other EFT-3100.

NOTE: Relative level adjustment is not available at the Transmit unit and each time the SETUP link is broken, the adjustment information is lost.

The frequency bands for the EFT-3100 are as follows:

LOW BAND — 50 Hz to 2.5 kHz

MID BAND — 2.5 kHz to 5 kHz

HIGH BAND — 5 kHz to 7.5 kHz

To adjust the relative levels on the bands, press and hold the appropriate button (as shown on Figure 3-3 below), on the keypad until the required level is reached. Remember, only one button may be pressed at a time.

The level may be increased incrementally up to +6 dB and decreased incrementally down to infinity. Spanning the whole adjustment range takes about eight seconds.

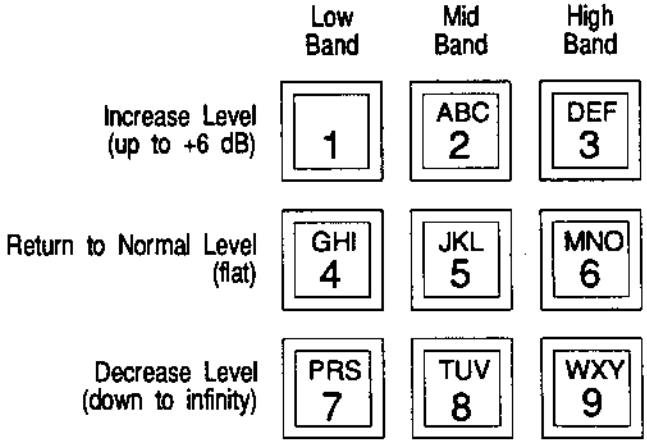


Figure 3-3
Making Band Equalization Changes

Sending Cues with the EFT-3100

The EFT-3100 system can be configured to send audio cues from the studio (Receive unit) to the remote site (Transmit unit). This one-way communication, or half-duplex, permits total separation of the cue signal from the program audio. This feature is available when using the system in the two-line mode. It is not available in a single-line frequency mode.

Two-Line Mode

When the system is set up as a two-line frequency extender, the Transmit unit can be configured to receive cue signals from the studio unit by a simple DIP switch setting change. Refer to the DIP Switch Summary on page 2-12 then proceed as follows:

- ☐ To send audio cues from the Receive unit to the Transmit unit, connect the desired cue source to one of the input channels on the Receive unit.
- ☐ Change DIP switch 4 to ON. This changes the system to a two-line extender, and will use line 3 for cue sending.
- ☐ Establish telephone connections on all three lines.
- ☐ Initiate SETUP.

When in the two-line mode, the EFT-3100 will use Line 3 for the transmission of cue tones. Line 3 will keep the cue signals separate from program audio and will be heard as a side tone in the headset. Cue signal volume can be adjusted by using the method described on page 3-~~16~~ 15 Adjusting IFB (Monitor) and Side Tone Levels.

Adjusting IFB (Monitor) and Side Tone Levels

When the EFT-3100 is powered-on, no side tone will be heard. The headset level can be adjusted with the Monitor control knob. Side tone can be added using the keypad, as detailed below. When the side tone is increased, the IFB level is incrementally decreased; and when side tone is decreased, the IFB level is incrementally increased, thereby creating a balance between the two settings. As long as the system power remains on, the levels remain as adjusted, even if SETUP is reinitiated. The system defaults to the "no-side tone" setting when power is terminated then restored.

- ☐ Verify SETUP LED is ON. (Press the SETUP button to toggle to on, if required.)
- ☐ Each momentary press of the * button to increases the side tone incrementally.
- ☐ Each momentary press of the # button decreases the side tone incrementally.
- ☐ Momentarily press the 0 (zero) button to make the IFB (monitor) and side tone levels equal.

Normally, monitoring the audio through the headset is all that is required. When a line delay is evident, particularly a delay from a satellite telephone connection, the side tone adjustment will reduce the delay distraction for the talent.

Breaking the Connection

This procedure can be accomplished from either the Transmit or Receive unit.

To manually disconnect a telephone line:

☐ Press the SETUP button until the LED goes off.

☐ Press CONNECT button on the line to be dropped until the LED light goes off.

NOTE: If the other EFT-3100 is operating in the AUTO mode, it will automatically disconnect the corresponding line on sensing the loss or reversal of loop current. If the unit is not in the AUTO mode, it will NOT disconnect.

WARNING! Breaking a single line during operation could have undesirable effects. For example, dropping the middle line would cause the 2.5 to 5.0 kHz frequency components to drop out of the output from the EFT-3100 Receive unit.

In general, you should not break line connections until after you are finished using the EFT-3100.

Ending Transmission from the Remote Site

When the remote broadcast is concluded, the units must *always* be disconnected properly using the procedure outlined below.

CAUTION: If the unit is powered off without disconnecting the lines, billing will continue. Telephone connections are held through power glitches and will also be held during power down, until disconnected properly.

Disconnect the Transmit unit as follows:

- ☐ Press the SETUP button until the LED goes off.
- ☐ Press CONNECT button on Line 1 until the light goes off.
- ☐ Repeat for Lines 2 and 3.
- ☐ Disconnect phone jack lines.
- ☐ Disconnect headsets and MIC/LINE connections.
- ☐ Turn power switch to OFF.
- ☐ Unplug power source.

After Electrical Power Interruptions

The Gentner EFT-3100 uses magnetic latching relays to connect each telephone line. They retain their latest instruction regardless of power outages because of the built-in battery backup. After an outage, you are back on the air without having to redial and initiate SETUP.

Similarly, EFT-3100 units retain their configuration status through power interruptions; that is, a Receiver will still be configured as a Receiver, etc.

After a power outage, the units will be back on and immediately usable, however the audio will be the default setup. During the next break, SETUP should be reinitiated. (Refer to Page 3-11 for SETUP information.)

NOTE: The default mode is frequency extended and corrected in a manner that is typical of the average telephone line conditions. In many instances, the sound quality remains very good.

What To Do If You Lose a Telephone Line

Reallocate Line Assignments

If a telephone line goes dead while you are using the EFT-3100, the corresponding CONNECT button LED indicator will go OFF.

☐ Press and hold the SETUP button until the LED turns off.

Dropping either unit out of SETUP will cause the matching unit to drop out of SETUP.

☐ To reallocate line assignments, you may need to terminate existing connections. If so, press the CONNECT buttons on active lines that need to be repositioned.

☐ Next, reallocate line assignments in order of priority. For instance, if you lose Line 1 (top priority), you may have to manually reposition an alternate line to the RJ-11C jack. If only two lines are usable, Line 3 would be lowest priority.

☐ Redial the corresponding line numbers at the matching unit using either manual or speed dial procedures (as described on pages 3-6 to 3-9).

☐ Momentarily press the SETUP button. The EFT-3100 unit will adapt to operate with excellent quality, however at reduced band width, since only two lines will be in use.

When the setup process is complete, the SETUP LED will be ON.

Adding a Line

If you are only using one or two telephone lines, another line can be added quickly and easily. Make sure the line connection has been made. (See Connecting Telephone Lines, page 2-4.)

☐ Press the SETUP button and hold until the SETUP LED turns off.

☐ Press the DIAL button for the line position to be added and manually (or speed) dial the number.

☐ Press the SETUP button momentarily to configure the unit. The setup process takes only a few seconds to complete. The SETUP LED will light when the process is complete.

Using the EFT-3100 as a Two Line Frequency Extender

You can use the EFT-3100 unit as a two line frequency extender. In the two line mode, the unit will provide a frequency response of 50 Hz to 5 kHz. (See also Adjusting Relative Band Levels on page 3-13.)

Line 1 - 50 Hz to 2.5 kHz
Line 2 - 2.5 kHz to 5 kHz

The EFT-3100 can be configured to receive audio cues from the studio, separate from the program audio. See Sending Cues with the EFT-3100 on page 3-14 for information on setup and use.

☐ To use the EFT-3100 unit in the two line mode, simply establish telephone connections between Line 1 on both units, and Line 2 on both units.

☐ Press SETUP button at either unit.

NOTE: The EFT-3100 is not compatible with any other telephone frequency extension unit even when it used in the two line mode. You must use EFT-3100 units configured with the same firmware version on both ends of your telephone connections.

If you are only using two telephone lines and wish to add another line while you are using the EFT-3100 unit, you must press and hold the SETUP button for four seconds. The SETUP button LED indicator will go OFF.

Adding a Line

If you are using two telephone lines, another line can be added quickly and easily. Make sure the line connection has been made. (See Connecting Telephone Lines, page 2-4.)

☐ Press the SETUP button and hold down for four seconds. The SETUP LED indicator will go OFF.

☐ Press the DIAL button for the line position to be added and manually (or speed) dial the number.

☐ Press the SETUP button momentarily to configure the unit. The setup process takes only a few seconds to complete. The SETUP LED will light when the process is complete.

Using the EFT-3100 as a Single Line Frequency Extender

You can use the EFT-3100 unit as a single line frequency extender. In the single line mode, the unit will provide a frequency response of 50 Hz to 2.5 kHz. Cue is not available while in a single line mode.

- ☐ To use the EFT-3100 unit in the single line mode, simply establish a telephone connection for line #1 between the EFT-3100 Transmit and Receive units.
- ☐ Next, press SETUP button at either unit.

NOTE: The EFT-3100 is not compatible with any other telephone frequency extension unit even when it used in the single line mode. You must use EFT-3100 units configured with the same firmware version on both ends of your telephone connections.

Adding a Line

If you are using one telephone line, you may add another line while you are using the EFT-3100 unit. Make sure the line connection has been made. (See Connecting Telephone Lines, page 2-4.)

- ☐ Press the SETUP button and hold down until the light goes off.
- ☐ Press the DIAL button then the CONNECT button for the line position to be added.
- ☐ Manually (or speed) dial the number.
- ☐ Press the SETUP button momentarily to configure the unit. The setup process takes only a few seconds to complete. The SETUP LED will light when the process is complete.

4

MAINTENANCE AND TROUBLESHOOTING

EFT-3100 Maintenance

Your EFT-3100 system is a highly reliable device. It has been thoroughly tested at the factory before being shipped to you. Using normal handling precautions and under normal operating conditions, the system will not require any routine service or maintenance.

To protect your EFT-3100 system from damage, do not operate it in an excessively hot or cold environment. Do not drop the system or any of its components.

If you leave your EFT-3100 permanently connected to telephone lines, it is strongly recommended that you provide external surge protection for each of the three telephone lines plus the AC power input. Gentner can provide highly reliable surge protection devices for both the telephone lines and the AC power input. Call the Gentner sales office for more information at (801) 975-7200.

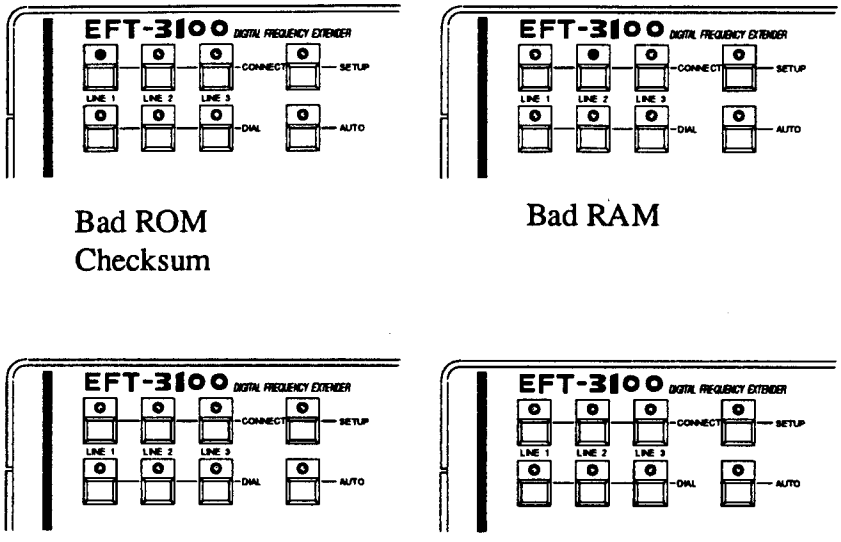
The EFT-3100 does not contain any user serviceable parts. Should your unit not operate satisfactorily, call Gentner and ask for Technical Support.

WARNING! The EFT-3100 contains CMOS integrated circuits. All service to the unit must be performed in a static-free environment.

Resetting the CPU

The EFT-3100 is a microprocessor based device. If the unit starts behaving erratically, turn the unit off for a few seconds and then turn back on. Power-Up Diagnostics, detailed on page 3-3, is performed automatically by the system upon applying power. The graphic display of warning lights and their error type is being repeated here.

LEGEND: ● = OFF ◍ = ON



Bad ROM Checksum

Bad RAM

Bad Configuration Register

All lights flashing erratically: System Failure

Figure 4-1
Error Message Warning Light Display

If a system failure is indicated by the light display, turn the unit off at the power switch. Wait a few seconds and turn back on. If it still shows an error, try resetting the CPU. If failure is again indicated, call Gentner Technical Support for further information.

NOTE: Resetting the CPU will ERASE the telephone numbers stored in the memory. These numbers will need to be reprogrammed, following the steps under Dialing Telephone Numbers, page 3-6, before an auto-dial or auto-reconnect procedure can be initiated.

When resetting the CPU, proceed as follows:

- ☐ Turn off power to the unit by moving the POWER slide switch to the OFF position.
- ☐ Press and hold the * and # buttons simultaneously on the built-in Touch-Tone pad.
- ☐ While holding these buttons down, turn the POWER switch back on. Continue to hold the * and # buttons for four seconds before releasing.

If you are experiencing total system failure (all lights flashing erratically), do not reset the CPU. Turn the unit off and call Gentner Technical Support.

The CPU does not reset on a simple power-down or power outage.

Troubleshooting

This section is intended as a guide to solving common problems which may occur when operating the EFT-3100. Gentner suggests you try the solution(s) listed below since most common problems are easily resolved.

If you need further assistance, call Gentner Technical Support at (801) 975-7200.

❖ **Speed Dialing does not work.**

✓ AUTO mode is not active. Press the AUTO button.

OR

✓ Numbers have not been programmed into Memory Dial locations. Refer to "Programming Speed Dial Numbers," on page 3-8, for instructions on how to program numbers.

❖ **Can't manually dial telephone lines.**

✓ AUTO button is still active. Press the AUTO button to toggle to off, then, manually dial the number.

❖ **I'm in an area that doesn't have Touch-Tone service.**

✓ You must dial the telephone numbers using pulse dialing. One way to do this is to configure your EFT-3100 for pulse dialing as explained in "DIP Switch Settings" on page 2-11 (Figure 2-7). A second way is to use a telephone set that provides pulse dialing. See page 2-7 for information on connecting a telephone set.

❖ **The Receive EFT-3100 won't answer the telephone lines.**

✓ The AUTO mode is not activated in the Receive unit. Call someone and have them push the AUTO button, or manually answer the lines.

❖ **Talent can't hear themselves in headsets.**

✓ Side Tone level is not high enough. Press the * button on the EFT-3100's Touch Tone pad until the level increases.

❖ **Audio going into the console from the Receive unit is too low.**

✓ Audio output level needs to be increased. Use a small screwdriver to adjust the output trimmer pot located on the rear panel. See Figure 1-1, item number 19.

❖ **Receive audio is distorted.**

✓ Input audio level at the Transmit site is too high. Tell talent to reduce send level. If send level is ok, check output level of Receive unit to make sure it is not too high.

NOTE: if you are using the EFT-3100 with non-standard telephone lines (such as dedicated loops), the internal gain structure of the unit may be set too high. See page 2-5 of this manual to reset the gain structure.

5

WARRANTY AND FIRMWARE LICENSE

EFT-3100 Firmware License

The EFT-3100 is a microprocessor based system. All firmware for the unit was developed by Gentner Communications Corporation.

By purchasing the EFT-3100, you accept the terms of the Gentner Firmware License Agreement stated below. This License Agreement becomes effective as of the date of purchase of the EFT-3100.

GENTNER FIRMWARE LICENSE AGREEMENT

Gentner Communications Corporation, (hereinafter referred to as Gentner), is the sole owner of the EFT-3100 firmware. The EFT-3100 firmware is defined as all software stored in the memory device supplied with this license. Gentner grants to the purchaser and/or the end-user of the Gentner EFT-3100 unit a non-exclusive license to use the firmware under the following terms and conditions.

This firmware is:

✓ For use on only the EFT-3100 which has been purchased and properly registered by serial number with Gentner.

- ✓ Not to be copied or duplicated in any way, and not to be transferred or delivered to any other person or entity without the written consent of Gentner.

- ✓ Protected by all applicable copyright and patent laws. Any copyrights and patents assigned to Gentner for the EFT-3100 remain the sole property of Gentner.

This license does not assign or transfer ownership of the firmware. Included in this license is all information contained in the instruction manuals, schematic diagrams, and related materials.

This license shall remain in effect for the life of your EFT-3100. You may terminate the license by returning the EFT-3100 to Gentner in its original container. This license is automatically terminated if you violate any of the terms and conditions of this license. Upon such termination, the EFT-3100 must be returned to Gentner.

This license agreement is granted solely to the original purchaser of the EFT-3100. If the EFT-3100, and thus the firmware and this license, is to be passed to another person or entity in any way, the original purchaser must advise Gentner in writing of this transfer. The new holder of the EFT-3100 must acknowledge in writing acceptance of the terms and conditions of this license. The license shall be deemed terminated if such written acceptance is not presented to Gentner.

Warranty Agreement

The Gentner Warranty Agreement on the following page is effective as of the date of receipt by the purchaser of the EFT-3100. This warranty shall not be effective unless Gentner is notified in writing by the purchaser of the receipt of the unit and the unit's serial number.

You have been supplied with a Gentner Warranty Registration Card. Use this card to notify Gentner of your purchase of the EFT-3100 and the serial number of your unit.

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, 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 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 Manufacturer or an authorized service representative of Manufacturer; or,

C. Adaptations or accessories other than those manufactured or provided by Manufacturer have been made or attached to the equipment which, in the determination of 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 Manufacturer or any other liability in connection with the sale of 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 Manufacturer at the address set forth below in writing, giving full particulars as to the defects or unsatisfactory operation, upon receipt of such notice, 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 Manufacturer assumes no responsibility for such damage. All shipping costs shall be paid by customer.

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

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

Special Notices

The information contained in this manual is subject to change without notice. Gentner Communications Corporation makes no warranty of any kind with regard to this material including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Gentner Communications Corporation shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

EFT Product Line Updates

Gentner Communications may offer new options and firmware updates for the EFT product line. As a registered owner of an EFT product, you will automatically be notified of updates when they become available.

You must return a completed Warranty Card in order to notified of updates to the EFT product line. (If the card is lost, you may notify us by letter. Your letter must include the following information:

- EFT-3100 serial number
- Your name
- Name of your organization
- Your address
- Date of purchase
- Dealer Name
- Mail your Warranty Registration Card or letter to:

Gentner Broadcast Systems
1825 West Research Way
Salt Lake City, Utah 84119

6

SPECIFICATIONS

Physical Specifications

The EFT-3100 is enclosed in a rugged metal case, which may be mounted in a standard 19" equipment rack with the optional rack ears provided with the unit. The actual physical dimensions of the main system are:

Height:	3.5"/ 8.9 cm
Width:	17.0"/43.2 cm
Depth:	10.0"/25.4 cm
Weight (dry):	10 lbs/4.53 kg
Shipping weight:	13 lbs/5.9 kg

The EFT-3100 uses XLR, 1/4" phone, and modular telephone jacks for all connections. Note that some connections are duplicated on the front and rear panel for your convenience.

Electrical Specifications

Power Requirements:	117/234 VAC; 60/50 Hz; 15 watts.
Telephone Interface:	Three internal hybrid couplers; 600 ohm nominal impedance; Transient voltage protection with intentional path to ground from Tip and Ring at +/- 230 volts; Ringing voltage detection 25 volts RMS, 15 to 90 Hz; Automatic answer (if enabled) after one complete ring; Automatic disconnect on interruption of loop current or reversal of loop current.
Microphone Level Inputs:	150 ohm nominal input impedance. Transformer balanced input. Two microphone level inputs provided.
Line Level Inputs:	>50 K ohm nominal bridging input impedance. Transformer balanced input. Two line level inputs provided.
Audio Output:	600 ohm nominal output impedance. Actively balanced output. Output level user-adjustable from -15 to +10 dBm.
Indicators:	Input level indication by standard VU meter on front panel. Peak input level indicated by LED on front panel.
Connectors:	Telephone line and set connectors are female modular RJ-11C. Inputs 1 and 2 are female XLR. Output connectors are male XLR. Headphone outputs are 1/4" phone jacks.
Switches:	Power, audio processor switches are two-position slide. All other switches are momentary push-buttons with integral LED indicators.

Processing:	All digital signal processing is performed by proprietary architecture using a combination of digital signal processors.
Temperature Range:	Gentner recommends the operation of the EFT-3100 in an environment of between +5 and +35 degrees Celsius.

Pin-outs for the EFT-3100 Connectors

XLR Connectors:	Pin 1 = Ground Pin 2 = Audio Low Pin 3 = Audio High
1/4" Phone Jacks:	Tip = Audio Sleeve = Ground
RJ-11C LINE Jacks:	Pin 1 = not connected Pin 2 = A-Lead Closure Pin 3 = Tip Pin 4 = Ring Pin 5 = A-Lead Closure Pin 6 = not connected
RJ-11C SET Jacks:	Pin 1 = not connected Pin 2 = not connected Pin 3 = Ring Pin 4 = Tip Pin 5 = not connected Pin 6 = not connected