
CARVIN

FX44 Series

Live Sound and Recording Mixers

OPERATION MANUAL

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Covers Models
FX1244 FX1244P FX1644 FX2444 FX3244

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About This Manual

The FX44 series mixers are specifically designed to address both the live sound mixing and recording needs of modern performers. The FX44 series consoles may be used with all audio equipment and speakers made by CARVIN and other major manufacturers. Like any mixing console, the performance you get from the FX44 mixer depends upon the system design and installation. Therefore this manual centers around explaining the features and various configurations of the FX44 consoles that will assure the easiest operation and best performance of your system. Additionally, this manual explains the special features and technical aspects of the FX44 series consoles. A glossary is included to help explain any terms you may not be familiar with. This manual covers all FX44 series consoles from 8 channels to 24 channels. All differences between the models are appropriately noted and explained.

Descriptions To the Section Contents

Section 1: FX44 Series Control Descriptions

We recommend that you read the entire Operator's Manual. However, if you are already familiar with professional consoles you may wish to skip to **Section 1** for the "FX44 Series Control Descriptions." This section contains all the basic information regarding controls and connections that you will need to get started quickly.

Section 2: For the New Owner

This section provides general information for the owner of the mixer.

Section 3: Detail Control Descriptions

"Getting To Know Your Mixer" goes into a detailed and easy to read description of the front panel features and rear panel connections on the FX44 series consoles. Each of the features explained are numbered and include a picture of the feature described. Also, each number assigned to the feature corresponds to the number assigned in the "FX44 Series Control Descriptions" (Section 1), for additional information.

Section 4: Special Features Of Your Console

"Special Features Of Your Console" describes important information on maintaining your console, how to use the various patch jacks on the console, and basic information that might be needed to achieve maximum performance from the console.

Section 5: Setting Up Your Sound System

"Setting Up Your Sound System" provides information on how to set up a complete sound system using the FX44 series console. Various cabling considerations, shielding concepts and other topics are discussed.

Section 6: Bi-Amping and Tri-Amping

"Bi-Amping and Tri-Amping" tells you how to set up multi-amplified sound systems and discusses the advantages of multi-amplification.

Section 7: Suggestions For Efficient Set-up And Quality Sound

"Suggestions For Efficient Set-up And Quality Sound" addresses the various procedures and needs in planning for a performance. It includes information on previewing the concert hall, repair and maintenance tool kits, powering up the sound system, and adjusting the sound system for maximum performance.

Section 8: Service Section

The "Service Section" includes technical specifications, wiring diagrams and harness diagrams. This section is designed to be a detailed overview of the technical aspects of the design and construction of the FX44 series consoles.

Section 9: Warranty

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Receiving Inspection

INSPECT YOUR CONSOLE AND THE SHIPPING CARTON FOR ANY DAMAGE which may have occurred during shipping. If any damage is found, notify the shipping company & CARVIN immediately and obtain a DAMAGE INSPECTION REPORT from the shipping company. Send a copy of the damage inspection report to CARVIN and return the console along with any accessories to CARVIN. This will allow CARVIN to process a damage claim with the shipping company and provide you with the quickest return of a new console. All merchandise must first be received by CARVIN before a new console can be shipped to you. This is both for your's and CARVIN's protection. If you file a "Damage claim" you will have to settle directly with the shipping company. Then, upon receiving the settlement, you may have to reorder any replacements.

SAVE THE CARTON & ALL PACKING MATERIALS. In the event you have to reship your mixer, always use the original carton and packing material. This will provide the best possible protection for your unit during shipment. Neither CARVIN nor the shipping company will be liable for any damage caused by improper packing. A replacement carton and foam inserts are available for \$20 plus \$10 shipping.

SAVE YOUR INVOICE. It will be required for warranty servicing of your unit. Always check your invoice against the items you have received. If you find some items missing it may be that they were shipped separately. Please allow several days for the rest of your order to arrive before inquiring. If you determine (after allowing an appropriate amount of time) you have not received all the items you ordered, please call CARVIN in order that we may file a tracer and take the proper steps to assure that you receive all the items in your order.

For the New Owner

Congratulations on your selection of CARVIN products: "The Professional's Choice." Your new FX44 series console demonstrates CARVIN's commitment to producing the highest quality & most sophisticated engineering in the audio industry today. Its wide acceptance and use by industry professionals illustrates the basis for CARVIN's recognition as "The Professional's Choice."

Professionalism can only be measured by people from the results they achieve through their efforts and knowledge. It is not something that automatically happens when buying a new or more sophisticated console. Rather, it's what you do with the equipment and how well you do it that ultimately makes the point. We are certain your new CARVIN console will deliver the performance necessary for you to achieve solid results, and ultimately enjoy a high degree of professional gain and enjoyment.

To compliment your new console and help you acquire that knowledge, we've included this manual. All of the information you need to be up and running is right here! You'll find using this manual easy and convenient. We've gone to great lengths to make it so. We've attempted to present the technical aspects of your new console accurately and in "plain English". But, if you have any questions that are not answered here, please call us at our toll free numbers. Our sales staff is well versed in the technical aspects of our products and are waiting to assist you with any questions you may have. We sincerely wish to ensure your complete satisfaction and enjoyment with your new console.

If you would like to comment on features or performance of your new console, please feel free to contact us. Criticism and comments from our customers has helped us improve and further develop our products and our business. We sincerely welcome any comments or ideas you may have.

Please, send in the warranty card. Although it is not absolutely necessary to ensure warranty protection, it will allow us to better know how you are using our equipment while keeping a ready reference for our files. Sending in the warranty card also helps us to mail out literature and information that may be of interest to you as a professional musician. Let us know where you are so we can keep in touch!

In this manual there are plenty of diagrams and descriptions to aid you in understanding your new console. So, with this manual in hand you hold the key to proper operation of your new console, and to achieve truly professional results.

May you enjoy many years of enjoyment, success, and fun with your new CARVIN console!

Carvin's national toll free number: 800-854-2235

Quick Start Up

GETTING STARTED QUICKLY

If you're like most new owners, you're probably in a hurry to plug your FX mixer in and use it. Here are some brief instructions to get you going quickly. With the mixer unplugged, turn the unit off and complete the following procedures:

1) CONNECTING AC POWER TO YOUR MIXER

- Check and change if necessary the rear AC Line Voltage Switch to the proper voltage. Change the fuse if necessary (listed on rear panel) if using 240V AC.
- Use only a grounded (3 prong) power outlet to prevent a shock hazard. This gives the quietest grounding for your mixer.

2a) CONNECTING SPEAKERS (Powered Models Only)

- Use the four 1/4" speaker jacks on the rear panel (two jacks each for the Right and Left channels which are controlled by the 2 Track "R & L" faders). Use only Heavy-Duty speaker cables (16 ga for 50', 14 ga for 100').

NOTE: Do not run your speakers through microphone wire or multi-conductor microphone junction boxes or "snakes" as sometimes referred to. This wire is normally a very light 20 gauge wire causing a substantial loss of power through the cable for less power to your speakers. All speaker wires must be non-shielded to prevent the power amplifier from oscillating at high frequencies.

2b) The "PROTECT" LED—Detects incorrect speaker impedance

- If the speaker impedance is lower than 4Ω (per channel) the "Protect" LED will display and engage the protect relay (this will happen only when playing very loud). This relay will disconnect the speakers from the power amp leaving the mixer on. To reset the "PROTECT" circuit, simply turn the mixer off and then on again. To prevent this from happening again, be sure your total speaker impedance to each power amp is not lower than 4Ω. This protect circuit also engages if the mixer becomes too hot to operate. However, this is a rare situation unless the fan is blocked.

3) CONNECTING INPUTS TO YOUR MIXER

- For low level balanced devices such as microphones, plug into the balanced "MIC" XLR input at the rear of the mixer. Use a 3 conductor shielded cable.
- For high output level devices such as Tape Recorders, CD's, Keyboards and Wireless mic receivers, plug into the "LINE" 1/4" input jacks on the rear panel. Use a 2 conductor shielded cable.

4) TURNING YOUR MIXER ON

- Adjust all faders and level controls of your mixer to the off position.
- Adjust all "EQ" tone controls—Hi, Hi Mid, Mid and Bass and the 9 Band Graphic EQ to their center position.
- Adjust all the Channel "PAN" Assign controls to their center position. • Turn the mixer on by the rear panel power switch and watch for the meter lamps to come on. Your mixer is now on and ready to operate.
- Be sure to "assign" the "L-R" switches on the channels (or the 1-2, 2-4 sub group switches). Now raise the "Channel" and "2 Track" Faders (Sub Group faders if assigned) and you should have signal coming out the mixer.

Things To Know

1a) "GAIN" INPUT LEVEL SETTINGS (Channel)

For the lowest "Channel" noise, set the MIC or LINE "Gain" controls (above the channel fader) up to the highest possible setting—just before the "Peak" LED flashes (it's OK if it flashes occasionally). If these levels are not set up to this point, your noise levels will be higher than normal.

1b) CHANNEL FADER LEVEL SETTINGS (Channel)

The large slider at the bottom of each channel is referred to as the "Fader". This control should always be set around the 2/3 position (-5 to 0) on the fader scale for high volume. If they are set lower, you will have more system noise because you are running the master 2-Track faders higher than you should.

1c) SUB GROUP AND 2 TRACK FADER LEVEL SETTINGS (Master Section)

For the lowest noise, these controls should be run lower than the channel faders (from -20 to 0). However, be careful that these controls are not set too low because distortion can result from any channel that is set too high.

NOTE: For the lowest noise performance for any mixing console, a good rule of the thumb is:

- a) Run the input "Gain—Mic or Line" to their maximum—just before the "Peak" LED flashes.*
- b) Run the "Channel" fader around the 2/3 position.*
- c) Run the "Sub Group and 2 Track Faders" around the 1/2 position or lower.*
- d) The numbers on the Faders controls are shown in dB levels with the "0" representing the normal "pass thru" gain—no attenuation or boost from that pre amp section.*

2) INTERNAL REVERB SYSTEM

For the best results when using the internal reverb system you should set the EFF6 send levels high and set the reverb return (MONO D) on the system master strip for the desired amount of reverb.

3) PowerTrack™ and "CLIP" LED's (Powered Models Only)

A switch at the rear panel allows the PowerTrack™ compressor to be switched on or off. The purpose of this feature is to delay the onset of power amp clipping (distortion—which is detected by the "Clip" LED's above the MONO level control). We recommend that you leave this feature on as it will give more useable power. NOTE: It is normal for the VU meters to peg to the far right before the power amp "Clip" lights come on. This does not constitute abuse of the meters.

About the FX44 Series Mixers

The FX44 series consoles represent the "State of the Art" in audio engineering advancements for professional sound mixing consoles available today. CARVIN consoles are used in virtually every aspect of professional sound reinforcement and have been praised by top artists and critics world wide. The basic concepts surrounding the design of the FX44 series consoles are centered on "real world" needs for a reliable and flexible console, required for today's demanding live performances.

Every detail of the FX44 series project received careful scrutiny. In-depth research including surveys of the professional sound community regarding the most important features, the most efficient metering, monitoring, and interface systems, new and innovative circuit designs, highly sophisticated production techniques led to the creation of a superior family of mixers. This high quality of engineering allows the FX44 series mixers to confidently address the requirements of a "total mixing system" for use in concert, broadcast, theater, and recording systems.

The FX44 series consoles were subjected to an extensive engineering program of rigorous laboratory and field testing. This testing has allowed CARVIN to fine tune the features and performance of the FX44 series consoles. The result is cleaner and quieter performance. Every aspect of this testing was scrutinized in great detail. The panel layout, color scheme, external dimensions and aesthetics were all carefully chosen in order to make the FX44 series consoles a "natural" for professional live mixing. The FX44 series consoles, although extremely sophisticated and complex in function, are sensibly organized and easily understood; mixing with the FX44 series consoles is a breeze!

The input channels of the FX44 series mixers utilize ultra-low noise differential mic pre-amps, separate mic and line gain controls, and ultra low noise op-amps. Careful attention to gain structure and circuit design provides absolutely quiet performance.

The residual output noise is below -90 dB! Each channel features (4) band equalization. The clarity and flexibility of this equalizer is exceptional! Each channel also has two monitor sends and four effect sends. (Internal DIP switches on each channel even allow the FX44 channels to be customized for any combination of monitor and effects sends.)

CARVIN has provided a built-in reverb system for the FX44 consoles. It incorporates a studio quality reverb system to provide a natural reverberation sound.

All FX44 series consoles feature two built-in graphic equalizers. They incorporate the same advanced circuitry and construction as found in CARVIN's highly praised EQ-2029 1/3 octave graphic equalizers!

After looking at the way typical power amplifiers reproduce music program material we recongized the fact that most audio power amplifiers cannot even approach their rated output power before audible clipping occurs on signal peaks. For example, a typical 100 watt amplifier cannot deliver more than 40 watts of average power before audible distortion occurs on the peaks of recorded music. This means that only about 40% of the available amplifier power can be used before an amp is driven into excessive distortion. For live music production this situation can be even worse (because of the extremely wide dynamic range of live sound). At CARVIN, we decided to look for a way to make better use of the power available in our powered mixing consoles. We found that by adding a very carefully programed dynamic range compressor (PowerTrack™) at the input of the power amp we could significantly increase the average output power of our amps before audible distortion occurs. The benefit to the user is a 3dB increase in volume before the power amp enters the range of audible distortion.

The power amps compressor effectively allows the amp to achieve volume levels that could only be reached by conventional amps rated at over twice the power! When you compare the power amp specifications of the FX44 series mixers to other products remember that the power ratings will not reflect the actual loudness that these mixers will achieve with real world program material. Also, because of the nature of CARVIN's exclusive "Power Track™" circuit it should be noted that amplifier power cannot be measured accurately without first switching off the compressor (rear panel switch). The Power Track circuit coupled with the high power MOSFET amplifiers provide an unbeatable combination of performance and reliability.

The FX44 series consoles are built using only the finest components. Electronically, all circuitry is designed for ultra low noise performance and extremely high reliability. An internal heavy duty power supply spares the expense and inconvenience of a separate outboard supply and is designed in such a way that system noise is not affected. Not only are the FX44 consoles quiet internally, but they also effectively reject external noise, such as common mode noise from microphones. Each channel of the FX44 features a separate printed circuit card for modularity and reliability. These channel cards are connected with highly reliable modular connectors and can be removed easily and quickly. Careful attention to signal routing and gain levels through the computer ribbon-type interconnect cables allow the FX44's to achieve extremely low crosstalk when compared to other consoles (Typically -65dB at 1k Hz.)

The CARVIN FX44 series mixers are an ultra-reliable state-of-the-art console. They are backed by CARVIN's commitment to excellence and experience in building thousands of professional mixers as well as speaker systems, power amplifiers, crossovers, equalizers, and numerous other professional sound system products. The FX44 series mixers were carefully engineered to be at the forefront of modern mechanical and electronic design. CARVIN is very proud of the FX44 series mixers and sincerely wishes you the enjoyment and the satisfaction that comes from knowing you own "the best": "The FX44 series mixer!"

Features of the FX44 Series Mixers

- Mic and Line Mixing at Each Channel (doubles the available inputs)
- Channel Assignment to Four Sub Groups or Two-Track
- Four Band Channel EQ
- Six Channel Sends (normally two monitor and four effects sends)
- Channel Sends Selectable Pre/Post Fader (via internal DIP switches)
- Four Effects Returns (3 stereo and 1 mono)
- Two Nine Band Graphic Equalizers
- Built-in Reverberation System
- PFL System for Solo Auditioning of Selected Channels or Groups
- Control Room Monitoring of 2-Track, Mon 1, or Effects Return A
- Headphone Monitoring of Control Room Selection
- Channel Peak warning Indicators with "Peak Stretching"
- Patch Points on all Channels
- Microphone Phantom Power (+48 VDC)
- Totally Modular Internal Construction
- Input Noise of -127 dBv
- 4dB or - 10dB Operating Level
- THD Less than .05%
- Outlet for 12V Mini-Lamp (Optional Accessory)
- 500 Watt MOSFET power amplifier (powered models)

Front Panel Controls on the Input Channels

Each channel of your console has 13 knobs, 4 switches and a linear fader. In this section we will describe the function of each input channel control and the ways to use it to produce the highest quality audio mix. You may wish to refer to the glossary at the end of the manual for any terms that you would like to have defined. By understanding the operation of each of the controls on your console, you will be better able to provide the most natural sounding mix of the various instruments or voices that are your program sources. Although simply understanding what each knob does will not ensure perfect mixes, it will provide the basis upon which you can expand your audio creativity. So, here we go.

1) Channel Equalizer

The Channel Equalizer ("EQ" to its friends) is a very precise set of tone controls. The **HI** or "Treble" control is at the top of the Channel Equalizer controls. The **HI MID** and **MID** controls are in the center. And, the **LOW** or bass control is at the bottom of this array. Use these knobs to modify the tone of the signal feeding this particular channel. It is most important is that you know that the flat (or neutral) setting for each EQ control is "0" or mid rotation. If you have any doubt about how to set them then always set the channel EQ controls flat (i.e. "0").

How a tone control works is basically similar to a volume control. The difference being that a tone control literally controls the volume of a specified frequency range. For instance, the **HI**, or treble control, when turned up will increase the volume of the high frequencies (at a 10kHz frequency center). Likewise, the **LOW**, or bass, control adjusts the volume at a 100Hz frequency center and therefore can be used to either emphasize or quiet the low range of an input signal. The **HI MID** (2kHz frequency center) and **MID** (500 Hz center) controls allow you to adjust the mid-range frequencies. Using the EQ control set, you can dial in the amount of boost or cut you desire. This is especially useful as the mid-range is usually the most critical "problem range". By using the **HI-MID** and **MID** EQ to selectively boost or cut various mid-range frequencies, you can effectively control this problem area. The EQ controls allow you to adjust the volume $\pm 12\text{dB}$ at their center frequencies. Experimentation is in order. It is worth noting that extreme adjustments of the tone controls should rarely have to be made. Usually these controls are used as a means of compensating for the imperfect response of various microphones in order to achieve the most natural sounding response of the sources you are mixing. If you find yourself making excessive adjustments with these controls you may want to try using either a different microphone or a different mic location. Making an instrument sound as natural as possible through the use of your Channel Equalizer is part of the overall art of professional mixing and recording.

2) Monitor and Effects Buss Sends

The input channel's monitor and effects send controls are simply volume controls for setting up six "side mixes" which are independent of the main mix. They are used to set up mixes for stage monitors and various effects units. Each channel has two monitor send controls (**MON 1** & **MON 2**). These control the volume of that channel's signal in the **MON 1** & **MON 2** monitor mixes. The monitor level control on each channel adjusts the relative volume of that channel in the overall monitor mix. So, it is possible that you could set up a monitor mix that is entirely different from the main mix. For instance, you might have a vocal "out front", or louder, in the **MON 1** mix to allow a singer to concentrate on their vocals while feeding a relatively low level of that same vocal to the main mix. Since stage monitors are typically right next to the microphones, they are usually the mix most susceptible to feedback during a performance. Because of this we recommended that you use caution when adjusting monitor levels during a live performance. It takes a certain amount of "feel" to set up a good monitor mix without getting ringing or outright feedback. However, with experimentation and practice you will soon be able to get consistently good monitor mixes. The **MON 1** & **MON 2** signals are taken "pre fader" so that the channel fader has no effect on the signal level sent to the monitor mixes.

The **EFF 3** thru **EFF 6** controls send the channel signal to four more "side mixes" for use in feeding effects devices such as reverb or delay units. The "Effects Send" signals are taken "post fader". This means that when the channel fader is reduced, so is the effects signal. The **EFF 6** control also feeds the internal reverb system. Raising this control you will send the channel's signal to the internal reverb unit. However, the reverb effect will not be heard until the reverb return control (effects return **MONO**

D) is raised (see the System Master Strip). The internal reverb return is automatically defeated when an outboard device is plugged in the **EFF RTN D** jack.

The monitor sends are all "line level" signals and are designed to drive a power amplifier that will subsequently drive your monitor speakers. The effects sends can drive effects units directly. The six channel sends can be programmed (by way of DIP switches on each channel circuit board) to send out a signal that is either pre-fader or post fader. Additionally, the pre fader sends can be taken pre or post the channel EQ. Monitor mixes are normally pre fader, whereas effects mixes are post fader. This means that the monitor mixes are independent of the the channel fader setting while effects mixes will follow the channel fader setting. For example if you pull down the fader on the piano channel you will reduce the piano level in the main mix and the effects mixes but the piano level will be unchanged in the monitor mixes. The factory settings for the channel sends are as shown in the table below. For more information on customizing the channel DIP switch settings see section 9.

FX44 Mixer Factory Settings of Channel Send Options

Channel Send	Pre/Post Fader	Pre/Post EQ
MON 1 and MON 2	Pre	Post
EFF 3 and EFF 4	Post	Post
EFF 5 and EFF 6	Post	Post
PFL	Pre	Post

3) Channel Assign Switches

The assign switches determine which of the sub groups the channel signal will be assigned to and whether or not it goes directly to the two-track mix. Each channel can be assigned to any of the four individual sub groups, a pair of sub groups, all four sub groups, or directly to the two-track mix. The channel **PAN** control sets the relative volume at each sub group of the assigned sub group pair or pairs. Panning the channel all the way left will send the signal only to the left sub group of the pair; panning hard right will send signal only to the right sub group of the assigned pair(s). When the channel **L-R** (two track) assign switch is depressed the pan pot will pan the signal directly across the two-track stereo mix.

Example: You depress **ASSIGN 1-2**. By turning the **PAN** control fully left, all of the channel's signal will be sent to only SUB 1. Turning the **PAN** control fully right sends the signal to SUB 2 only. Setting the pan pot center sends the channel signal to both SUB 1 and SUB 2 equally.

** For the lowest noise levels it is important that you make sure that the assign switches are not depressed on any unused channels.*

4) PFL Switch

The channel **PFL** ("pre fader listen") switch allows you to solo audition each channel or sub group to the control room monitors (or phones) without affecting the main mix. The **PFL** switch lets you to hear only the channel (or channels) selected, even though you may be sending many signals through the mixer to the main mix. This is an extremely useful mixing feature that will help you to fine tune the EQ on individual sources, even during a performance. You can also combine solos. This means that you can depress one or more **PFL** switches in order to listen to combinations instruments to be sure their levels are good and that they are blending well. Also, the **PFL** signal level is controlled by the **MIC** and **LINE** gain controls just below it. This will allow you to adjust the level in the headphones of each input that you may have selected even if the channel fader is all the way down. Whenever you depress a **PFL** switch the associated green LED will come on to indicate that that channel is soloed. Also, whenever any channel or sub group is soloed, another master LED will light up on the System Master Strip to indicate that you are in a solo mode and that the normal control room feed has been interrupted by the solo system.

As shipped from the factory the **PFL** feeds are set pre fader (PFL). However if your application is mainly recording you may wish to set the PFL feeds to take the channel signal post fader. Pre fader soloing lets you audition channels even when the fader is all the way down but pre fader solos do not preserve the relative levels set at the channel fader. Post fader soloing preserves the relative levels set at the channel faders but gives you no signal when the channel fader is down. For live performances the pre fader solo lets you check levels and EQ for a source before you raise the channel fader. For details on changing the pre/post setting of the channel **PFL** switches see sec. 9.

5) PEAK Warning Light

Use the channel **PEAK** indicator to find the best setting for the **MIC** or **LINE GAIN** controls (see below). The **PEAK** warning light will flash whenever a signal exceeds a level of +15dBv anywhere within the channel. This light is used to warn the operator whenever signals levels are so high that there is risk of distortion. Whenever you see the **PEAK** LED flashing you should reduce the setting of the appropriate **MIC** or **LINE GAIN** control, whichever is being used, until the LED just stops flashing. It is just as important to be sure not to set the **GAIN** control too low. Setting the channel gain too low will prevent you from achieving the excellent signal-to-noise performance that the mixer is capable of delivering. Note that the **PEAK** indicator responds to overloading at the mic and line preamps, the channel EQ, and the channel fader amp. Use this indicator to set the **GAIN** controls on all of the channels as your first step whenever setting up a mix. Careful use of these controls will assure you of a distortion free mix with the lowest possible noise.

6) MIC and LINE GAIN Controls

The FX44 series mixers utilize a unique front end arrangement that allows you to use both the mic and line input of each channel simultaneously rather than making you choose between them with a mic/line switch. The input gain control settings are very important for establishing the best signal-to-noise ratio performance of the console. This simply means that optimum adjustment of these controls will offer the lowest possible "hiss" or background electronic noise.

The best way to use these controls is to start by rotating the gain control (corresponding to the input you are using) fully clockwise (while the source is active) and then backing off until the **PEAK** indicator just stops flashing. This provides the maximum usable gain for the input. If the signal is too strong from either your microphone or line input the red LED **PEAK** indicator will light. Rotate the **MIC** or **LINE** gain control (whichever you are using) counterclockwise until the **PEAK** light just goes out. Setting the input gain controls just below the peak threshold will set the input gain to deliver just the right level to the channel. Rotating the **GAIN** controls excessively counterclockwise beyond the point at which the **PEAK** light goes out will drop the signal too much and you may not have enough gain, or the noise floor (hiss) may become audible. Once this adjustment has been made you should not need to adjust this control again unless the signal changes at the source. You might want to experiment with this control a little bit to become familiar with its feel and operation.

7) Channel Fader

The Channel Fader controls the volume of each channel. It is accurately calibrated and adjusts the level of each channel as it is sent to the sub groups, two-track, and effects mixes. A "normal" setting for the channel faders would be between about -10 and +8 on the fader markings. This means that usually you will be operating your channel faders relatively high compared to your **2 TRACK** faders. Keeping the channel faders high will help assure the most quiet performance and best overall sound from your console.

Controls on the System Master Strip

The System Master strip is the vertical group of controls just right of the highest numbered channel strip. This is where you set monitor and effects levels and set effects return levels. Control room source selection, talkback, and two-track playback controls are here also.

1) 12V LAMP (Mini-Lamp connector)

The BNC connector labeled **12V LAMP** (located at the very top of the system master strip) is a receptacle for a standard 12 volt "Mini-Lamp". This light is used to provide illumination for the console when it is used in low light conditions. It operates on 12 volts and provides an excellent source of light where house lighting is kept low. The mini-light is offered by CARVIN and may be purchased for \$29.00 (specify Model G-12).

2) SEND Master Level Controls

Located just below the mini-lamp connector are six knobs labeled **MON 1**, **MON 2**, **EFF 3**, **EFF 4**, **EFF 5**, and **EFF 6**. These are the **SEND** master level controls. The **SEND** master level controls set the overall output signal level that is sent to the monitor amps and outboard effects. Commonly used effects are digital reverbs and digital delays, although there are a host of other effects devices that can also be used.

Buss signals from the channels are summed together and the overall level is set by the **SEND Master** level controls. From these controls the signal is routed to the corresponding rear panel **EFF SND** jacks.

Monitor amp input level controls should be set at maximum (or at least half maximum). The overall volume of the monitor speakers is then controlled from the monitor **SEND** master control(s) at the mixer. In general you may require two or even more separate monitor mixes to satisfy the needs of the performers. (For example: The singer usually wants to hear mainly vocals in his monitor mix but the drummer may want to hear more bass and less vocals in his monitor mix.)

Effects units may or may not have an input level control. If your unit has an input level control it should be set relatively high (at least half of the maximum setting) when used with the FX44 mixers. Then you can control the overall input level at the effects unit from the appropriate **SEND** master control. After you have connected the signal from the mixer to your effect unit, adjusted its levels, and dialed in its desired parameters, you will have to return the effects output signal back to the mixer. Do this by patching the output of the effects unit into one of the **EFF RTN** inputs at the mixer. (see section 5 and "Effects Returns" below)

3) METER Switches

These switches determine which signals will be shown by the meters on the meter panel. The meters normally show the signal level at the sub group outputs but can be switched to show the output levels of **MON 1** and **MON 2**, or the **2 TRACK** left and right outputs.

4) +48 VDC PHANTOM Power Switch

The **+48VDC PHANTOM** power switch (when depressed) will provide a 48 Volt D.C. voltage to pins 2 & 3 of the mic inputs of the console. This voltage is required to operate most "condenser" type microphones. Without "Phantom Power" you simply would not be able to use these types of microphones with your console unless you purchase an outboard power supply to provide this voltage. The red LED located just above the switch illuminates to indicate that phantom power is switched on.

If most of your microphones are dynamic types (not requiring Phantom power) and you are also using one or more condenser type mics, you will need to switch on the phantom power. This will not affect the operation of normal balanced dynamic microphones. If you are not using any microphones that require phantom power then we recommend that you leave it switched off.

Note: Before using the Phantom power switch with wireless microphones check to be sure your mic is tolerant of Phantom Power. It is best to consult with the microphone's manufacturer to be sure.

5) EFFECTS RETURNS Controls

All FX44 series mixers provide four effects return inputs. The first three returns are stereo while the fourth return is mono.

Each **EFFECTS RETURN** knob adjusts the level of that effects signal that is returned to the main mix. Use the **EFFECTS RETURN** controls to adjust the overall levels of your effects as they appear at your two-track or mono mix. The first return, **STEREO A**, is assignable to the two-track, sub groups 1 & 2, or to MON 1 & 2 by using the switches just below it. **STEREO B** and **STEREO C** returns feed the two-track mix directly; **MONO D** feeds the two-track mix by way of a pan pot. This allows you to pan a mono effects return anywhere in the stereo field. Example: use a digital delay set for about a 100 millisecond delay to produce a slapback echo effect on a vocal track. Pan the vocal to the center of the stereo mix and then pan the echo either far left or far right using the **MONO D** return.

The Internal Reverb system normally feeds the **MONO D** return. If you wish, you can override the internal reverb return and use the **MONO D** return for an outboard effect return simply by inserting a plug into the **EFF RTN D** jack at the rear panel. When using the built-in reverb system it is best to set the **EFF 6** send level at the channels and at the **EFF 6** send master fairly high (at least half way to three quarters up) while keeping the **MONO D** return control less than half way. This will result in the lowest noise. Reverb is a form of ambience which can give life to the mix in an otherwise dull sounding or dead room. Live reflective rooms will normally need less reverb or none at all. The **MONO D** return **PAN** control allows you to pan the reverb return anywhere across the two-track stereo field, from far left to far right. Experiment with your effects devices and the internal reverb system and you will no doubt find new ways to do things. Its a lot of fun mixing in delays, reverb, and other effects and can really spice up a mix. So, experiment and have fun!

6) Two-Track Play Back

The **2 TRK PB** control on the Master Effects Strip allows you to add a signal, directly from an external source into the 2 TRACK mix. This is done by depressing the **2 TRK OFF / L-R** switch and then raising the level control. The two-track playback feature is a way of providing an additional input without tying up valuable channels. This feature might be used to connect in a cassette or CD player to play back prerecorded music while the band goes on break in live sound applications. In a recording situation, the two-track playback control group is used for play back from the two-track tape machine.

7) Control Room Play Back Group

The **CTRL RM** source select switches allow you to choose the signal that you want to listen to in the control room (or through phones) while operating the console. The **LEVEL** control sets the sound level at both the control room outputs and at the phones jack. Individual channels or sub groups can be auditioned in the control room by depressing the **PFL** (solo) switch at that channel or group. Whenever a **PFL** switch is depressed the master **PFL** LED (located just above the control room **LEVEL** control) illuminates to indicate that the normally selected input to the control room has been temporarily replaced by the **PFL** signal. Any depressed **PFL** switches must be released before control room operation returns to normal. Remember: When the master **PFL** LED is lit you will be listening to only those channels and SUB's where the **PFL** switch is depressed. Note: We recommend that you use only professional type headphones with a rated impedance of 100 ohms or greater, 8 ohm headphones are not recommended because of the reduced signal level that can be delivered to them.

8) TALK BACK Switches & Level Control

This feature allows you to talk through either the monitors or main outputs of the console. For instance, if the operator wishes to talk to the performers on stage and he is operating the console from a distance, he can simply depress the **MON 1-2** switch and speak through the monitor systems by way of the built-in microphone located just below the talk back **LEVEL** control. Likewise, if the operator wishes to speak to the audience, he can simply depress the **2 TRACK** button and speak into the built-in microphone. The signal will be fed to the 2 TRACK mix and subsequently be heard in the main house mix. This feature is excellent for narration, or setting up systems where the console is situated a great distance from the stage.

The Four Sub Groups

1) Buss/Tape Switch

The **Buss/Tape** switch is a recording feature that allows playback of multi-track tape channels through the sub groups for quick playback checks of the track(s) just recorded. Depressing the **TAPE** switch routes the tape playback signal through the sub group's **2 TRK** level and **PAN** controls to the two-track mix. This allows quick checks of what went to tape without having to disturb the input channel settings in case a retake is needed.

2) MON 1 Buss Send

The **MON 1** level control allows you to send the sub group signal to the MON 1 monitor mix. This is a pre fader send.

3) Two-Track Level and PAN Controls

The **2 TRK** level control is used to send the sub group signal to the two-track mix. The **PAN** control allows you to pan the sub group signal across the stereo field of the two-track mix.

When the mixer is used for recording the **2 TRK** and **PAN** controls allow you to listen to tape tracks after recording them without having to go through the input channels. In a complex recording session the all the channels may be in use and a quick playback of a tape track could present a problem except for the **Buss/Tape** switch.

Note: The tape inputs to the FX44 mixers are internally connected to the line inputs of the first four channels. When doing four-track final mixdowns you would normally use the first four input channels to mix the four tape tracks. Any line input signals present at the first four channels will also be heard so you should take care to see that if there are line inputs connected to these channels that they are silent during mix down. Or you can simply disconnect the line inputs to the first four channels to make sure the mix is not contaminated by extraneous signals.

4) PFL Switch

The sub-group **PFL** ("pre fader listen") switch allows you to solo audition each sub group to the control room monitors (or phones) without affecting the main mix. The **PFL** switch lets you to hear only the sub-group (or channel) selected, even though you may be sending many signals through the mixer to the main mix. You can combine solos. This means that you can depress one or more **PFL** switches in order to listen to combinations instruments to be sure their levels are good and that they are blending well. Whenever you depress a **PFL** switch the associated green LED will come on to indicate that that sub-group is soloed. Also, whenever any channel or sub group is soloed, another master LED will light up on the System Master Strip to indicate that you are in a solo mode and that the normal control room feed has been interrupted by the solo system.

5) Sub Group Fader

The Sub-group Fader controls the volume of each sub-group. It is accurately calibrated and adjusts the level of each sub-group as it is sent to the sub outputs, tape outputs, and two-track mix.

The Main Outputs

1) The 2 TRACK Master Faders

This stereo fader pair sets the overall level at the two-track outputs of the mixer. The two-track outputs are available at the rear of the mixer on a pair of balanced XLR connectors as well as a pair of RCA phono jacks. The balanced outputs are recommended for long cable runs. For short cable runs (typical of recording situations) the RCA phono outputs are fine.

2) The MONO Master Level Control

The **MONO MASTER** control sets the level at the mono output of the mixer (one balanced XLR connector). The mono signal is the sum of the left and right outputs so the **2 TRACK** faders must be raised in order to have a mono output signal.

3) The GRAPHIC EQUALIZERS

Each FX44 mixer is provided with two nine band graphic equalizers. Each graphic EQ has a bypass switch and LED status indicator located below it. The LED is illuminated when the graphic EQ is switched into the signal path. The graphic EQ's are dedicated to the two-track outputs of the mixer.

Note on Powered Models:

The Graphic EQ's (as well as the power amplifiers) can be switched from the **2 TRACK** outputs to the **MONO** and **MON 1** outputs for convenient mono PA operation. The Stereo/Mono switch is located on the rear of the mixer above the speaker jacks. You should find the graphic EQ especially useful for controlling feedback in the monitor system. Note that the graphic EQ's follow the amp interrupt jacks so that any signal patched into the amp input will be processed through the corresponding graphic EQ.

The 9 band Graphic Equalizers in the FX44 mixers provides a wide degree of tonal flexibility. To properly use the Graphic EQ (equalizer), set all sliders to their center position. With the sliders at this position, there is no effect on the audio signal. When you raise the slider above the center position, you boost levels in a narrow frequency band. If you lower the slider below the center, you are subtracting levels. When using these sliders, think of them as volume controls that can add or subtract tones in narrow bands.

Frequency: The 63 Hz slider is used for deep sub bass level adjustments, the 125 Hz is for higher bass adjustments, the 250, 500 and 1K Hz is for mid and higher mid tone adjustments, the 2K and 4K Hz is for mid treble adjustments, and the 8K and 16K Hz sliders add to the very high treble notes.

Adjusting: It is recommended that all sliders are set in their center position before equalizing your tone. Typically low frequency feedback is in the 125 and 250 Hz range while high feedback is in the 2k and 4k Hz range. Occasionally you may have to turn one frequency (slider) off to -12dB to help stop feedback. But you should never turn the adjacent sliders off. Instead, set the adjacent sliders to -6dB to form a gentle negative curve. Likewise, if you need more deep bass, boost the 63 Hz by 10 dB and the 125Hz by 5 dB. Or, if you need more treble, boost the 8k by 6 dB and the 16k Hz by 4 dB. Note—there is not much signal at 16k so you may not hear any difference except for added noise. If you raise or lower all sliders at the same time, the EQ will act like a volume control because you are affecting all frequencies. Be careful with your adjustments, because you are affecting the overall sound.

If you are not familiar with the operation of a graphic EQ then one way to get familiar with the equalizer is to experiment with the sounds of the different bands. Run some prerecorded music through the mixer and, with the EQ's switched in, set each of the bands at "0". Pull the right **2 TRACK** fader all the way down so that you are listening to only the left channel. Then boost and cut each band of the left (top) EQ one at a time to become familiar with the way it affects the sound. Then experiment with the overall sound of all the bands of the equalizer until you learn to recognize the sound of each band.

The graphic EQ's are mainly used to "equalize" the response of the main speakers to provide the best sound for a given room. You are able to switch the graphics in or out of your main mix for an instantaneous evaluation of how they are affecting your main speakers by pressing the **IN/OUT** switch located just below the equalizers.

4) The VU Meters

The VU meters indicate the *relative* output signal levels at the four sub-group outputs. A pair of meter function switches on the system master strip allow the operator to switch the meters from subs 1&2 to MON1-2 to allow monitoring of the signal level at the MON1 and MON 2 outputs. Similarly, the sub 3&4 meters can be switched over to display the signal levels at the two-track outputs. It is fairly common in stereo PA setups to normally have meters 3 and 4 switched to monitor the two-track outputs.

It is important to realize that there is no single correct reading for the VU meters. Rather, the most important use of the meters is to display *relative* signal levels. You will often glance at the meters simply to determine if there is a signal present at an output. It is entirely possible to have very little or no meter movement but be producing a perfectly acceptable signal level. In church applications there are many occasions when the VU meters will be just barely moving, but a perfectly acceptable signal level is being reached. This is normal, and the VU meter is simply indicating that you are using very little of the available output level of the console.

On the other hand, a rock band may produce levels that would indicate from -10 to +3 VU. Although it is perfectly normal for high level audio signal peaks to indicate on the meter up into the "red" +3dB zone, you should be sure to keep the meter reading comfortably at or around "0" VU as a maximum value. On powered mixers you should always use the power amp clip indicators (located at the far right above the MONO MASTER control) as a guide to the maximum output level of the board. Because the maximum output level of the power amps is dependent on the speaker load the amps are driving it is normal for the meter level that corresponds to power amp clipping to vary according to the type and number of speakers you use.

For recording applications the meters and their calibration are more important than for sound reinforcement use. This is because you usually want to squeeze as much signal onto tape as possible without saturating (distorting) the tape. You normally want the meters on the mixer to be calibrated the same, and therefore to read the same, as the meters on the recorder simply to allow you to keep your eyes on the mixer and not have to watch the meters at the recorder all the time.

Tech Note on Meter Calibration:

The sensitivity of the VU meters can be adjusted to give a reading anywhere from a -30dB to a +10dB for a 0dBv output signal level. This allows the meters set your meters to any standard. The factory setting is +4dB at the balanced outputs for a "0" VU indication. (See section 4 for the adjustment procedure.)

REAR PANEL JACKS AND WHAT THEY DO

Although the back panel of any console can look rather complex and confusing to a novice, actually many of the "jacks" are redundant and quite simple to understand after a brief explanation. In the next few lines we hope to give you a good understanding of each of the functions of the jacks on the rear panel of your console. Please, don't be afraid to experiment a little with some of the examples. Our experience has shown that the best way to learn how to use each of the rear panel jacks is simple experimentation. If you follow the examples, you should have a lot of fun plugging things into your console.

In some sections there may be terms that you are unfamiliar with. Please refer to the glossary at the end of the manual if you are at all unfamiliar with any term.

Each of the inputs and outputs of the "FX-44" console are labeled according to the diagram in section 1-2. Simply follow the number to its corresponding jack and read up on the applications and use of that jack. Have fun!

CHANNEL JACKS

As you look at the rear panel you will notice, on the right, numbered boxes with 3 jacks in each box. The number of boxes will be 8, 12, 16, or 24, depending on the model you own. The number in the box corresponds to the number of the channel the jacks feed.

1) "LINE" Input Jack

This jack is a Line Input connection. It is designed to accept signals that are normally too strong for the "MIC" input just above it. Line level (or preamp) signals are typically from 200 millivolts to 2 volts. This input will accept signals from any line level source such as the line output of your tape deck, keyboard or instrument amplifiers. This jack accepts a "Guitar type" 1/4 inch phone plug; the type of plug found at the end of a guitar cord. Most tape decks use an RCA phono plug connector, and you may need to use an adapter to plug the outputs of your tape deck into this input, however, this is perfectly acceptable.

2) "MIC" XLR Mic Input

This is also an input, however, with far greater sensitivity. "LINE" input jacks like to see input voltages of typically 200 millivolts to 2 volts, whereas "MIC" inputs typically want to see 10 to 100 "Millivolts". We also like to call this type of input a "high gain" input. Because this input typically is used with microphones and is designed to greatly amplify very weak signals. There are (2) main differences between a mic and line input which is why this connector is so much different than the "LINE" connector.

A) This "XLR" (MIC) input is designed for low impedance signals. Low impedance simply means a lower resistance to the AC current sent from the microphone. Low impedance mic inputs offer very little resistance to this AC current which allows for much longer mic cords without loss of signal. This lack of line losses through long cable runs make low impedance mics the best possible choice for use with 'snakes' or mic cable extensions. Low impedance mics generally offer greater signal strengths which result in lower overall noise and higher performance from the mixer. Low impedance mics will offer the best overall response and output for the highest quality performance.

B) The input is "balanced". This term works closely in hand with the term 'Common Mode Rejection' for the mic input of your console. Since the signal from a microphone is so low in level, that as that signal is transmitted down its mic wire to the "MIC" input of your console, there is a good chance that other voltages "Hum" can be injected into the cable that could be heard later, when amplified by your console. What balancing does is eliminate much of this injected hum by comparing the balanced lines from the mic and removing any hum picked up by both lines. Canceling it at the input of the console. The act of this happening is called "Common Mode Rejection."

All microphone cables currently sold are "shielded." This means that the signal wire within the mic cord is surrounded by a tightly braided or solid "shield" or ground wire. This is done so that any

potential injected signals' "stray field", as from light sockets, etc., will be first be passed to ground prior to ever reaching the signal wire at the center of the cord. All mic level or "pre-amp" level cables should be shielded for the lowest possible noise. By this time you should be deducing that a "Balanced, Low Impedance" mic is the best to use with this input. And, with a properly shielded cord, it will provide the best overall gain, lowest noise and highest quality sound.

3) "DIR/PATCH", The Channel Direct Out and Patch

The channel patch jack allows you access to that channel for inserting different effects or signal processing equipment. Usually this jack is used with such signal processing equipment as compressors, limiters, delays, EQ's, etc. These devices can help with many problem situations requiring special attention. For instance, if you have a vocal input requiring a very precise equalization (tone shaping) you may wish to "patch in" a more elaborate equalizer than the standard tone controls found on the channels. This would allow you the ability to affect that particular channel without affecting adjacent channels. And, you achieve your objective of fine tuning that particular vocal. See the wiring diagrams for proper cable wiring of this patch point using a stereo phone plug connection. (Under "Special Features of Your Console" section). The jack should be configured: Tip to return and Ring to send (to the signal processor).

To use the "DIR/PATCH" for a direct channel output, insert the plug only halfway into the jack. Carvin offers the AP1 cable which is a 6" adapter which plugs into the DIR/PATCH giving a 1/4" jack for the "Send" and a 1/4" jack for the "Receive" portions of the Patch feature.

4) "MON", Mon 1 & Mon 2 Output Jacks

The "MON 1" and "MON 2" jacks are output jacks. These jacks are not "powered." This means that they must be connected to a power amplifier in order to properly drive monitor speakers. Because these jacks do not deliver a powered signal, they are said to be "pre-amp", meaning "Pre" amplifier (Sometimes called "Line Level"). So, these signals are usually returned to the stage to feed the monitor amplifier inputs, with the monitor amps subsequently driving the monitor speakers. Remember, with all pre-amp level signals it is best to use a good quality shielded cable.

5) "EFF SND", Effects Send Jacks

These jacks are used to drive outboard signal processors such as digital delays, reverb units, chorus effects, etc. The Effects Send, "EFF SND" 3 through 6, jacks are used as an output from your console to drive the input of the effect you desire to use. This is a "pre-amp" output and will drive the pre-amp or "line input" of the particular effect unit you wish to drive. Using the front panel Input Channel Controls, and Master Effects Strip of your unit you can vary the output of the Effects Send to drive your effect with as much, or as little signal as required for optimum performance.

6) "EFF RTN", Effects Return Jacks

The Effects Return jacks are an inputs to the console are is used in order to receive the outputs of your effects device. The Effects Return Jacks are designed to receive the affected signal and to have control over the overall amount of the effect you wish to hear in your mix. The maximum loading of this jack to any effect is 22k ohms. This prevents any overloading of your effect device. This Effects Return input also has a front panel control labeled "EFFECTS RETURNS", and will allow you to adjust the amount of effect you wish to hear in the mix. The Effects Returns are labeled "A" through "D". Effects "A" through "C" are stereo. Effect "A" is assignable to 3 places: 2 TRACK ("L-R") , Sub groups 1 and 2 ("SUB1-2"), or Monitors 1 and 2("MON 1-2"). Effects "B" and "C" feed the "2 TRACK" directly. The "L" and "R" allow the signal returned to be assigned to the Left or Right of the "2 TRACK", or other locations when return "A" is used. Finally, "EFF RTN D" is a Mono return and feeds the "2 TRACK" directly, but may be panned from Left to Right, using the Master Effects Strip. As stated before, if "EFF RTN D" has no plug inserted, then it will return from the built in internal reverb system.

"EFF SND"	Connects to the <u>Input</u> of your effect
"EFF RTN"	Connects to the <u>Output</u> of your effect

7a) "2 TRK" "OUT", 2 Track Left and Right Outputs

These two jacks are "pre-amp" outputs from the 2-Track Master controls. The labels in the box read, "2 TRK", "OUT", and the jacks are assigned "L" and "R". The same mix (Stereo Left & Right) appears at these outputs at a low (pre-amp) level, as appear at the speaker "LEFT" and "RIGHT" outputs. These pre-amp outputs may be used to drive a tape deck for stereo recordings of practice sessions or performances while simultaneously using the speaker outputs to drive your main speakers (On powered mixers). In general, the preferred choice is always to use the XLR type connectors ("LEFT OUT" and "RIGHT OUT") because of better signal levels and lower overall noise. However, if your equipment only has (single ended) inputs use these RCA Phono connectors as they will offer comparable quality and performance to the "LEFT OUT" and "RIGHT OUT" XLR jacks. These jacks can be used to drive additional power amplifiers should you require them.

Note: If you should require more speaker power than is available in your unit, you should use these jacks to connect to additional amplifiers (to subsequently drive additional speakers). Although, you may use the power amplifiers in your unit alone with any additional power amplifiers You CAN NOT take the OUTPUT of one amplifier to drive the INPUT of another to achieve more power. Doing this could cause damage to both amplifiers. You also CANNOT take the outputs of TWO separate amplifiers and use them to drive ONE (1) speaker. This also could result in damage to both amps!

7b) "2 TRK" "IN", 2 Track Left and Right Inputs

These two RCA Phono jacks are "pre-amp" inputs to the 2-Track Master controls. The labels in the box read, "2 TRK", "IN", and the jacks are assigned "L" and "R". These 2 jacks feed directly into the 2 TRACK mix. These would typically be used to feed a 'background' tape or effect directly in to the main mix.

8) "CTRL RM" Control Room, Left and Right Outputs

Use these two jacks to drive the amp powering the control room speakers (or stereo headphones). They deliver the output selected from the Master Effects Strip, on the front panel. The signal is selected by the "CTRL RM" switches and volume is controlled by the "LEVEL" knob.

9) "MONO OUT" XLR Output Connector

This is a "pre-amp" monaural output. It can drive tape decks or other amplifiers and it derives its signal from the summing of the "LEFT OUT" and "RIGHT OUT" XLR jacks. Therefore, any signal that appears at the Left and Right outputs will appear at the "MONO OUT" output only in 'Mono'. You can use the "LEFT" and "RIGHT" "2 TRK OUT" (pre-amp) output jacks to drive your tape deck for a stereo recording while using the "MONO OUT" output jack to drive your selected power amplifier to power your main speakers. Many churches and larger installations will find this jack extremely useful to send signals through telephone lines for remote broadcasts (using an appropriate phone coupler), or as a remote level feed to alternate rooms.

10) "LEFT OUT" and "RIGHT OUT" XLR Output Connector

These balanced XLR outputs are the preferred choice to use for preamp signals. They offer better signal levels and lower overall noise than the "2 TRK" "OUT" RCA phono jacks. These jacks behave similarly to the "2 TRK" "OUT" jacks described in 7a. The usual use of these jacks is to drive additional power amplifiers should you require them.

Note: If you should require more speaker power than is available in your unit, you should use these jacks to connect to additional amplifiers (to subsequently drive additional speakers). Although, you may use the power amplifiers in your unit alone with any additional power amplifiers You CAN NOT take the OUTPUT of one amplifier to drive the INPUT of another to achieve more power. Doing this could cause damage to both amplifiers. You also CANNOT take the outputs of TWO separate amplifiers and use them to drive ONE (1) speaker. This also could result in damage to both amps!

11) "STEREO—"MONO/MON1" SWITCH (Powered Models only)

This switch is used to select the type of signal sent to the speakers. The "STEREO" setting is used to send different signals to the left and right speakers, as for stage performances. "MONO/MON 1" is generally used for a Public Address (PA) system. The MONO output would feed the main speakers, and the MON 1 would feed the monitor to the lecturer (or additional speakers if needed).

12) "LEFT (MONO)" and "RIGHT (MON 1)" Power Amp Connections (Powered Models only)

These jacks are output jacks used to drive speakers. (See section #11, above for selected output.) There are 4 speaker outs, 2 Left and 2 Right. The MINIMUM speaker loading PER SIDE is 4Ω. That is to say 4Ω in one Left speaker jack and the other one unused, or 8Ω in each of the 2 Left speaker jacks. The same holds true for the Right side. Loading your console below 4Ω on either side may damage the amplifier circuitry. To determine the impedances you are using see Section #4-1 'Speaker Impedance'.

It is very important to note that on all speaker cords you should use ONLY NON-SHIELDED cables. This is the only place in your system that you will use this type of cable. Shielded cables such as guitar cords can cause high performance amplifiers such as the one in your console to oscillate from excessive cable capacitance. Oscillation is a form of electronic feedback and can ultimately damage your amplifier. See the diagram below to properly determine if your cables are shielded or not.

For speaker wire lengths up to 100', it is recommended that you use a 16 gauge or larger wire. For speaker runs up to 300', it is recommended that you use a 14 gauge or larger wire. This will provide the best proper delivery of power to your speakers. For speaker run lengths any longer than this we recommend that you call CARVIN for a proper recommendation.

CAUTION: You should always turn your unit off when connecting or disconnecting your speakers.

13) "POWER AMP INPUT", "L" and "R" Jacks (Powered Models Only)

These jacks are access inputs to the two power amplifiers you have in your unit. Normally the two power amplifiers in your unit are dedicated to driving the Stereo or Mono/MON 1 outputs from the 2 TRACK. This consumes the use of both power amplifiers. However, if you need only a "MONO" main speaker system, it will only require (1) amplifier to drive that system. So, by taking an external signal and plugging in either "POWER AMP INPUT", you can then use the console as a simple power amp. Additionally, using these inputs allow you to use the EQ, on the Master Section, assigned to the jack used (Left or Right), to adjust the signal. One or both "POWER AMP INPUT"s may be used. The end result is that you are able to (within your mixing console) internally power both your main speakers. These jacks make the power amplifiers in your unit extremely versatile. It allows you to use them for virtually any speaker power requirement you may have by simply plugging any "pre-amp" level signal into your internal power amplifiers ("POWER AMP IN" jacks) to subsequently power your main speakers ("LEFT" and "RIGHT"). In using these inputs you will interrupt the signal normally sent by the console to the speakers.

14) Power On/Off Switch

This is the main AC power switch for the mixer. It is normal to hear a slight thump on both turning on and turning off your console. This "Turn On Transient" will not harm your speakers. It is always a good idea to have the main volume faders off when turning on the console. This will eliminate any possibility of feedback or excessively loud noises when turning on your console.

15a) Power Cord Connector, With Fuse

A standard "European Style" power connector is provided. This allows you to detach your power cord when transporting your console. Be sure to check your A.C. power source to be sure it is a 110V to 120V, 50 to 60Hz A.C. source. If it is 240V, see #16 below. It is an excellent idea to get into a habit of placing your power cord in a place where it will always be transported with the console. This will save you from forgetting it or misplacing it and not being able to later power up your console. However, if you do misplace it you may always order another from CARVIN. They only cost \$5.00 plus \$2.00 shipping and we'll be ready to rush one to you should you need it.

15b) Power Cord Connector Fuse

The A.C. line fuse is a protective safety feature. If your console should have an electrical malfunction, this fuse will protect the console from further damage. You should never attempt to increase the value of this fuse from the value listed on the back of the chassis. To do so could cause damage to your console.

Fuse Replacement: The fuse is located inside the Power Cord Connector. With the power cord removed, you will notice a notch just inside the roof of the connector. Insert a straight edge screwdriver into this notch and gently pry it forward, using the bottom of the plug to push against. A 'top drawer' will slide forward. Remove this drawer. You will notice the drawer is made of a box in front and a clip containing a fuse behind it. Replace the fuse in the clip with a fuse of the appropriate value for your console(See below). Replacing the drawer in the connector will automatically connect the fuse. An extra fuse may be stored in the forward box.

Note: Be sure if you are ever in need of running your console from the A.C. power produced by a generator, that you use a properly "regulated" generator that will eliminate A.C. power surges. Such surges could damage your console and result in blown fuses.

FUSE VALUES FOR DIFFERENT MODELS

The fuse values for the different models are printed on the rear panel near the Power Connector. Different fuses are needed for 120V and 240V A.C. power supplies. Be sure to check the value of the fuse when you start using a different power source. If you are unfamiliar with international electrical values, it is best to ask the house manager which voltage is supplied.

Fuse Value Used:

<u>Model</u>	<u>120V Supply</u>	<u>Radio Shack #</u>	<u>240V Supply</u>
FX-844	1A Fast Blow	270-1250	0.5A
FX-1244	1A Fast Blow	270-1250	0.5A
FX-844P	5A Slow Blow	270-1175	2.5A
FX-1244P	5A Slow Blow	270-1175	2.5A
FX-1644	1A Fast Blow	270-1250	0.5A
FX-2444	1A Fast Blow	270-1250	0.5A

All fuses are 250V

16) "120V/240VAC" Switch

Be sure this switch is properly selected for the appropriate A.C. line voltage. The FX-44 series consoles will accommodate 120V or 240V A.C. line voltages at 50Hz or 60Hz. To determine if the switch is properly selected, look at the switch (on the switch is printed the voltage the switch is selected to). The voltage you read from the switch is the voltage the amplifier is set to accommodate.

17) Fan Cooling (Powered Models Only)

The powered FX-44 series console feature a quiet low speed cooling fan located in the rear control panel. This provides optimum cooling for the unit under any adverse loading conditions. Do not block the rear vent area.

Special Features of Your FX44 Mixer

1) Patching Capabilities

The "DIR/PATCH" jacks on each of the channels is a dual purpose jack requiring:

- 1) A "mono" plug (plug only to the first stop—about 3/4 of the way in for the DIRECT OUT.
- 2) A "stereo" plug (tip, ring, sleeve) for PATCHING into the channel. The "Ring" is used for the "Send" and the "Tip" connection is used for the "Return". The "Sleeve" is used for the "Ground".

2) Recording Capabilities

The main point we want to stress within the scope of this manual is that you may record directly from your mixer to your tape decks. If you are mixing a stereo performance, you will want to use the "2 TRK" "OUT" RCA Phono jack outputs (2) on the rear of the console and connect these to the "Line" inputs of your tape deck.

You may use either the balanced XLR type connect at the rear of your console or the RCA phono plug. The XLR connector provides a +10dBv signal, whereas the RCA phono plug connection produces a +4dBv signal. This simply means that the relative voltage output of the (+10dBv) balanced output is higher. If you are using recording equipment that is XLR compatible, it is advised to use the XLR type connectors, otherwise use the RCA phono plug outputs at the rear of your console.

3) VU Meter Calibration

The most often requested meter recalibration is for a -10dBv level. The easiest way to adjust, or re-calibrate your consoles VU meters is as follows:

3.a) Remove the bottom panel of your console to obtain access to the System Master circuit board (next to the last channel circuit board in your console). You will have to remove the bottom cover by removing the small sheet metal screws on the bottom panel as well as the (2) bottom screws in the left and right wood side panels.

3.b) Connect a good quality Volt Meter to the single ended 1/4 inch phone plug "SUB1 OUT" on the rear of your console. Set the Volt Meter to read A.C. voltage with the positive lead of the meter connected to the 'Tip' of the 1/4 inch connector and the negative lead to the ground or 'Ring' of the 1/4 inch connector.

3.c) Insert a good quality signal generator with a 1k Hz sine wave into one of the input channels ("LINE" jack on the rear panel) of the console.

3.d) Check that the "LINE GAIN" knob is adjusted to just under "PEAK" threshold. Bring up the channel volume (using the slider) of the channel with the generator plugged into it, and assign the channel to all the main outputs (SUB1 through SUB4) using the "ASSIGN" switches. Be sure your pan control is centered to feed the signal equally to all outputs.

3.e) Bring up the "SUB1" fader until your volt meter reads 0.245 Volts AC (-10dBv).

NOTE: Referenced to 0dBv = 0.775 Vrms.

3.f) On the System Master circuit board there are 4 small potentiometers for (VU) adjustment. These are located on the part of the board nearest the VU meters. Adjust the respective potentiometer for the sub group you are metering until your VU meters read "0" VU.

3.g) Connect the volt meter to the "SUB2 OUT", as you did in step #3.b. Adjust the "SUB2" fader so that the volt meter reads 0.245 Volts (A.C.). Repeat the potentiometer adjustment for the SUB2 VU meter. Now, continue until all 4 VU meters are adjusted. You have just calibrated the 1/4 inch single ended outputs to -10dB levels.

If you are calibrating your console to +4dBv, you will perform the same procedure explained above, except that your volt meter will be reading 1.23 Volts A.C. when you calibrate your meters to "0" VU.

Note on the zero stop:

Each VU meter has a small screw hole directly underneath it, on the face of the meter panel. This is a mechanical adjustment used to set the zero stop of the meter. By turning this screw you can set the far left "zero" for each of the VU meters. This adjustment is pre-set at the factory and should not normally require adjustment, however, after a lot of transporting and vibration the meters may eventually require a slight adjustment to "zero" them. It is an easy adjustment to make and can be done by simply using a small screwdriver to turn the adjustment screw until the meter rests at the far left small "0" (**not 0VU**), WITH THE MIXER TURNED OFF.

4) Speaker Impedance

On powered mixing consoles it is very important that you do not go below the unit's minimum impedance with your speaker system. What this means is that you cannot connect too many speakers in parallel to your powered mixing console. Speakers, as a rule, are connected in parallel. This means the '+' (Red) of the first speaker is connected to the '+' of the second speaker. Calculate the impedance for your speakers, on each channel (Left and Right) and be sure that it does not fall below the MINIMUM LOAD impedance that your mixing console is rated to handle. On all CARVIN powered mixers the MINIMUM RECOMMENDED impedance is 4 ohms (4Ω) per speaker jack. You may of course use higher impedances. In order to figure the impedance of your speaker system you should use the following formula:

FORMULA FOR PARALLEL IMPEDANCE

Find the rated impedance of each of your speakers. It should be written on the cabinet rear or bottom. It will typically be 8 ohms (8Ω), 4 ohms (4Ω), 3 ohms (3Ω), or 16 ohms (16Ω), but others do exist. Invert these numbers (i.e. make a fraction out of them).

Example: 8Ω would become $1/8$
 4Ω would become $1/4$

Add each of these fractions together and divide the denominator (bottom number) by the numerator (top number). The result will be your load impedance produced by your speaker system.

Example: You have two, 8Ω speakers connected in parallel, the impedance of them is calculated.

Add speaker impedances $1/8 + 1/8 = 2/8$

Divide denominator 8
 by numerator 2

This equals $8/2 = 4\Omega$ total load impedance

Example:

Speaker ratings: $8\Omega + 16\Omega + 16\Omega$
 So $1/8 + 1/16 + 1/16 = 4/16$
 Divide $16 / 4 = 4\Omega$ total load impedance

Usually whenever you are simply plugging one or more speakers into the back of your unit, you are running this type of parallel connection. And, the above calculation will give you an accurate indication of what impedance your speaker system (in ohms) is loading on to your amplifier.

Understanding that your console's amplifier does have limits regarding how many speakers you can hook up to it, and that the minimum limit is 4 ohms (4Ω) Left and 4Ω Right, is insurance that you are operating your mixer properly and that it will be reliable. This information should be all that

is required to properly determine the operating parameters of your mixer amp or any other amplifier. If you require additional speakers beyond the minimum load rating of your amplifier you will need additional amplifiers to drive them.

If you have any questions at all regarding how many speakers you can run off your mixer/amp or regular power amplifier, please do not hesitate to call CARVIN. We will be more than happy to assist you in determining if you are operating your system properly.

5) MAINTENANCE

There is very little maintenance required by your unit. The best possible maintenance is preventative. The major causes of breakdown occur from dirt and heat. Vacuuming the front panel of your console regularly will assure that harmful dust and dirt does not accumulate in any of the electronics. A slip cover (manufactured by CARVIN) is highly recommended and should be used whenever you are not operating the console. Always keep your cords in a clean and orderly manner. This assures you the most reliable connection and saves embarrassment from intermittences caused by poorly maintained equipment. Vacuum your speaker cabinets regularly, and keep them wiped off to eliminate any build up of dirt. It is also recommended that you purchase a vinyl slip cover to properly protect your cabinets. And, you should be sure to cover you cabinets whenever you are not using them.

Always keep your mixing console well ventilated when using it. Keep a minimum of 2 inches of free space behind the rear panel. This space will allow the hot air to escape, and not build up inside your console. Providing proper cooling will aid immensely in the reliability of your console.

SETTING UP YOUR SOUND SYSTEM

In this section you will be given a brief overview of what connections you will need to make in hooking up a sound system using your mixing console. You will shown some of the different set-ups possible, and given some basics on how to mix live sound. Finally we will offer you some suggestions for hooking up recording equipment and its proper operation. You should find this section both informative as well as enlightening, and we hope you will find this information a "head start" in operating your sound system properly. As always, experimentation is the key to success. Remember, after you have been given the basics and you understand all the controls, how you use them will ultimately expand your creativity as a sound system operator.

1) Input Connections From the Stage

For live sound reinforcement ("PA" Sound), the input signals to the mixer will come from the microphones and instruments on stage. Each microphone or instrument you wish to be amplified by the "PA" system must be connected to one of the mixing console inputs. It is preferred to have as many of the stage instruments as possible plugged into your mixing console. This allows you the best overall volume control of each of the instruments as they are amplified by the "PA" system and heard by the audience.

Many times the mixing console will be located a distance from the stage. This allows the performance to be monitored and mixed from the audience's perspective. Monitoring at a distance from the stage usually means employing a "Snake" cable (available from CARVIN). Each of the microphones and instruments are plugged into the snake box at the stage and the snake cable carries all these signals out to the mixer. There they are plugged into the console inputs. All snake cables are numbered, both on the snake box and the cable, so that you can keep track of which microphones are being plugged into which channels. It is a good idea at this point to label each of the console channels according to what instruments it will be controlling. This can be done with masking tape (Scotch brand #230 drafting tape) or another suitable "light" stick tape. The tape will give you a surface to write on, to properly label the channels. You will notice that all snake cables utilize 3-pin XLR type connectors. Therefore, all your instrument and microphone inputs will have to be this type. The (XLR) balanced low impedance format will ensure you the best possible performance and lowest possible noise when operating with long cable lengths, such as a snake. However, many times you may have a single ended output (1/4 inch phone plug type) from an instrument that you may need to plug into the snake or directly into the "LINE" input of your console. This can be accomplished by a high to low impedance adapter (available from Radio Shack or other electronics outlets). Due to the versatile capabilities of the Bi-polar differential input circuitry in the FX-44 series consoles, you may special wire a cable to have an XLR type connector at one end and a 1/4 inch phone plug at the other. Connect pin #3 of the XLR jack to the tip pin of the 1/4 inch phone plug. XLR pin #1 connects to the shield or ground of the 1/4 inch phone plug and XLR pin #2 is not utilized.

Before performing any of these types of special connections, we recommended that you first consult the manufacturer of the instrument or device you will be making this special connection to. Ask if the device will perform properly with the modifications you have in mind. If you are at all in doubt, we recommend using a high to low impedance adapter (as mentioned before) or a "Direct box."

Once you have connected all the input cables to your console, properly label the channels. Verify that all the connections are good and that all mics are connected properly. The next step is connecting your main amplifiers and speakers.

2) Connecting the Main Amps and Speakers

Any of the CARVIN FX-44 consoles can be used for Mono or Stereo sound reinforcement. The mixer model numbers describe the particular models features. The number represents the {number of channels} X {number of outputs} format. Therefore the FX1244 console for instance is a {12 channel} X {4 stereo output} format. This means that 12 input channels may be mixed to (4) outputs or "stereo", which subsequently may be summed together to feed a mono output. For the sake of simplicity we will show how to hook up a "stereo" system here.

3) Powered Mixers and Non-Powered Mixers

You will be using the "LEFT OUT" and "RIGHT OUT" XLR jacks as the main pre-amp outputs to drive your power amplifiers. These 2 balanced output jacks will provide the lowest noise levels for signal output. The same snake that was used to feed the signals from the stage to the mixer usually has provisions for sending output signals from the mixer to the stage. You may plug the (pre-amp level) LEFT OUT and RIGHT OUT outputs from your mixer into the snake cable. This will send the signal to the power amplifiers, usually left on stage. The power amplifiers will then drive your speakers. The "2 TRK OUT" RCA jacks may be used as auxiliary main pre-amp outputs. These RCA jacks are non-balanced outputs and generally used for taping.

Once the snake cable, or alternate means of cabling, carrying the signal has reached the stage, the connections are made to the power amplifiers. The power amp outputs can then be connected to the speakers, using a heavy gauge wire. A 16 gauge (AWG) or heavier non-shielded wire is recommended.

Note: Your speaker cables are the only ones that should not be shielded. All other cables in your system that carry 'Mic' and 'Pre-amp' level signals should be shielded. To have shielded cables connected to the power amp outputs of your amplifiers could result in damaging the amplifier circuits.

4) Powered Mixers

With powered mixers (i.e. mixers with built in power amplifiers) you cannot take the "LEFT (MONO)" and "RIGHT (MON1)" post amplifier outputs and feed them through the snake to power your speakers on stage. Doing this could result in damage to the power amp in the mixing console. Only 'Pre-amp' signals can be returned to the stage through the snake. Since you cannot send speaker level signals up the snake you will have to use separate speaker cables. These cables will carry the signal, from the powered console outputs, directly to the speakers. A 16 gauge(AWG) or heavier non-shielded wire is recommended. Keep in mind that the minimum loading for "LEFT (MONO)" and "RIGHT (MON1)" amp outputs is 4Ω per side. Even though there are two jacks per side.

Note: Your speaker cables are the only ones that should not be shielded. All other cables in your system that carry Mic and Pre-amp level signals should be shielded. To have shielded cables connected to the power amp outputs of your console or amplifiers could result in damaging the amplifier circuits.

6) Connecting the Monitor Amps and Speakers

In a typical setup for live sound the "FX" series MON1 and MON2 monitor (auxiliary) busses will be used to provide monitor mixes for the musicians on stage. The MON1 and MON2 output signals will be sent to the stage just like the main output signals. The signals are sent to the stage either by using a direct shielded wire from the rear of the mixer or by using the snake. The signal can now be plugged into the inputs of the monitor amplifiers that will be powering the monitor speakers.

Remember: ALL monitor sends are pre-amp level and are non powered. These signals are used to drive power amplifiers that subsequently drive your monitor speakers. You CANNOT drive loudspeakers directly from the "MON1" and "MON2" outputs.

The "MONO OUT" XLR jack would normally not be used for stereo performances. It would be used in a Mono set-up, where the signal sent to the loudspeakers is non-stereo or mono. The XLR "MONO OUT" delivers is the combination of the "LEFT OUT" and "RIGHT OUT" signals. Use this pre-amp out when you need only Mono signal, like during a lecture.

7) Connecting Outboard Effects

Although the reverberation system built into the "FX" series mixers will meet the effects requirements of most users, the mixers are also equipped with an auxiliary ("EFF SND") buss for mixing in other effects devices. Outboard effects are returned to the Master Effects Strip and 2 TRACK, where you can control both level and panning.

"EFF RTN D" is normally assigned to the console's internal reverb. Inserting a jack into "EFF RTN D" will defeat the reverb and send any signal to the 2 TRACK. This signal may be sent to either side of the 2 TRACK by using the "PAN" knob found on the Master Effects Strip.

"EFF RTN A" is assignable to the 2 TRACK ("L-R"), "SUB1-2" or "MON1-2" using the switches found under the "STEREO A" on the Master Effects Strip.

"EFF RTN B" and "EFF RTN C" both send to the 2 TRACK directly.

Outboard effects devices can be connected to the mixer by connecting the "EFF SEND" signal from the console rear to the 'Line' input of the effects device. The effects device output signal is returned back to one of the mixer's "EFF RTN" jacks. The interconnect cables will require 1/4 inch phone plugs, at one end, for connecting to the rear of the FX console, and plugs appropriate to the effects device at the other end.

Note: If you have need of more effects returns you may use the line input of an open or unused channel. An unused channel will offer the same capabilities as the EFF RTN jacks with the added option of equalization on the return effect signal and routing of the effects signal to the monitors. This is a common connection and if you are using more than 3 effects devices you may want to use a channel to return the effected signal.

Because the effects send and return levels of all "FX" series mixers are variable it is possible to use various effects units with operating ranges of -20dBv to +4dBv. This includes many guitar effects units ("Stomp Boxes"), providing they have acceptable audio quality. The effects unit usually found most useful will be a delay unit; either an analog delay, digital delay, or tape echo delay.

Note: These are all effects that are normally mixed back in with the direct or dry signal. This 'Mix in' type of effect is different from an 'In line' effect, such as an equalizer, compressor or noise gate. 'In line' effects are usually patched into an output pre-amp signal path and will affect the whole signal. For 'In line' channel mixing, use the "DIR/PATCH" jack only. 'Mix in' effects combine a certain amount of the affected signal with the dry and unaffected signal. For example, you might normally add a little reverb to be mixed with the direct or dry signal from a vocal. To 'MIX in' at the channel insert a plug only half way into the "DIR/PATCH" jack and the return into the "LINE" jack. Use the "LINE" knob of the affected channel to adjust the desired mix. Only the 'Mix in' type effects are appropriate for use in the effects system of your mixer. All 'In line' effects are usually used between the main outputs of the mixer and the power amplifiers, or at the channel patch points ("DIR/PATCH" sends to the effects device and "LINE" returns).

Note: Many of the 'Mix in' type effects devices will feature a built in control that allows you to mix varying amounts of direct signal with affected or processed signal. When using the effects send and receive controls you should adjust your effects device to provide only the total affected signal. This will be returned and summed at the console (i.e. rotate the effects' device mix entirely to the "wet" or processed signal). Setting up this way will allow you the best control over the dry signal (sent from the channels directly to the outputs) being mixed with the affected or 'processed' signal summed to the outputs. Using only fully 'wet' and fully 'dry' signals at the channel SENDS will eliminate variations in volume when adjusting either the effects send or receive controls as heard in the main mix.

8) Monitoring at the Mixer

The FX series headphone output can be used to allow the sound mixer to solo individual channels, to set up the stage monitor mixes, and to audition either the two-track or mono main outputs. The output from the "CTRL RM" RCA jacks on the rear panel is the same as the phones jack. Whenever a "PFL" switch is selected, all the other signals, regardless of what has been selected by the Master Effects Strip, will no longer be heard. Only the sound of the signal source, where the "PFL" switch is selected, will be heard in the headphones. For instance, if a PFL switch is depressed at an input channel, the "CTRL RM" PFL LED illuminates to indicate that the solo signal has replaced the normally selected signal as the feed to the phones. When all channel solo switches are released the phones feed will automatically switch back to the signal selected at the "CTRL RM" group. Usually isolating or 'closed' type headphones are the best choice, because they help block out some of the sound from the main speakers. This allows you to better listen to what you have selected from your console oblivious to the surrounding ambient noise.

For phones monitoring of the the main outputs, turn the CTRL RM "LEVEL" knob all the way down, and plug a pair of stereo headphones into the jack at the front right of the mixer. Be sure your headphones are 100 ohms or greater for proper operation. Depress either the "L-R" switch located on the CNTRL RM part of the Master Effects Strip. None of the other switches should be depressed. Depressing the other switches will not harm anything, however, it will not allow you to concentrate on a single specific selection. Raise the CTRL RM "LEVEL" control for a comfortable volume in the headphones. You can now 'solo' different channels and hear the individual outputs in the headphones. For setting the Monitor mix, or adjusting the "EFF RTN A" mix depress the appropriate switch on the Master Effects Strip. Use the headphones feature for adjusting channel equalization, tracking down noisy inputs, etc.

9) Setting Up the Main Mix

In order to set the main mix, you need to first have the input channels adjusted properly. Important controls on the input channel are the "GAIN" controls. These controls determine the overall 'volume' of the signal sent to the "ASSIGN", from each individual channel. You should first set the input "GAIN" controls fully clockwise to its highest setting. If the highest setting on this control results in your "PEAK" LED flashing, rotate both controls fully counterclockwise. Rotate the "MIC" control fully clockwise, then counter clockwise, until the "PEAK" LED is off. Note the "MIC"'s position, then turn it fully counterclockwise. Now adjust the "LINE" control similarly, but after finding its proper setting DO NOT turn it back counterclockwise. Finally turn the "MIC" control clockwise to the position you previously recorded. As a rule the channel "PEAK" light should not be flashing if the channels are set up properly. Slight flashes from time to time are OK and indicate that you have probably set up your channels properly. The "PEAK" LED light flashes 6dB before actual output clipping (distortion) occurs so there is a safety margin. You do not have to worry about brief signal peaks escaping detection because a special peak circuit makes sure even the shortest over-level peaks will result in a strong flash by the "PEAK" LED. If the GAIN controls are set too low, then there may not be enough signal available at the channel fader when you are adjusting the SUBs' or main 2 TRACK mix. If the channel is too quiet after you have set up the main and monitor mixes, you will need to raise the channel GAIN controls to get more level. Be careful when you raise a channel GAIN control during a performance because you will be increasing the volume at the SUB's (if used), 2 TRACK mix and the MON1, MON2 mix, and you may risk feedback, especially at the monitors!

With the input channel GAIN controls set properly you are now ready to set up the Master Section mix. Start with a couple of channel faders at the nominal (0) setting and raise the "2 TRACK" faders to get the desired volume over the main speaker system. You should now hear combined audio from all the channels with raised faders. Proceed to adjust the channel faders to create the mix of input signals that you would like. Try to keep the channel faders working in the upper half of their range of travel. The faders of unused input channels should be left down so that they do not contribute noise to the mix. If you are listening to a stereo (2 TRACK) mix then you can use the Assign "PAN" controls to pan the individual channel signals anywhere between far left and far right. If you are mixing to a "mono" output, the pan controls will have no effect except for a slight volume loss at either far left or far right extremes. For mono mixing the channel pan controls are usually set at center (0). During Mono mixing you will probably want to use the "MONO MASTER"

volume control, located just above the 2 TRACK. This control adjusts the volume of the "MONO OUT" jack on the rear panel. (See #5 "Input Channel Controls" for SUB mixing using the Pan Control.)

10) Setting Up the Monitor Mixes

Each input channel of your console has knobs labeled "MON 1" and "MON 2". These knobs allow you to adjust the volume each channel sends to the desired monitor. They allow you to send two different monitor mixes at levels independent of your main mix. These two mixes (MON 1 and MON 2) are independent of each other and the main two track mix. The overall level of the MON 1 and MON 2 mixes is set by the two master "MON 1" and "MON 2" master knobs located on the Master Effects Strip in the SENDS section.

The monitor send signals, from each input channel, are 'post' the channel equalizer. This means the channel equalizer will affect both the monitor and main mix. Also, the monitor controls are 'post' the channel LINE point, which means that any effect you have patched into the channel will affect both the monitor mix and the main mix. Notice, the monitor controls are not affected by any of the faders. This means that the channel volume setting, controlled by the channel slider, will not affect the monitor volume. Your monitor volume levels are completely independent of your main mix.

The MON 1 and MON 2 mixes can be auditioned in the headphones by depressing the "MON1" and "MON 2" switch in the CNTRL RM group on the Master Effects strip. Remember that if a PFL switch is depressed, the PFL channels selected will always override the signal feeding the phones.

BI-AMPING & TRI-AMPING

1) DIFFERENCES BETWEEN CONVENTIONAL "PASSIVE" AND BI-AMPED / TRI-AMPED SOUND SYSTEMS

We have discussed how to set up a conventional sound system where a full range audio signal is sent to one amplifier. The amplified signal is then fed to a high level crossover within the speaker. This crossover will separate the 'lows' from the 'highs' and send the respective signals to the low and high frequency drivers. In 'Bi-Amping', the system utilizes a low level or 'active' crossover. The active crossover receives the output signal directly from the pre-amp outputs of your mixing console. Internally, the active crossover divides the signal into its high and low frequency signals. The low frequency signals are then fed to the amplifier that directly sends to only the low frequency drivers (woofers). The high frequency output of the active crossover similarly feeds the amplifier dedicated to the high frequency, which in turn feeds only the high frequency drivers (horns). Bi-amplification requires the use of two power amplifiers, one dedicated to high frequency drivers and another for the low frequency drivers. Bi-amplification will deliver a cleaner sound with minimal distortion and will drive the loudspeakers more efficiently. Bi-Amping will offer better control over the crossover points (The point where if a signal is higher it is sent to the high frequency, if lower then sent to the low frequency.) as well as the relative volume levels of the high and low frequency components.

Tri-Amping is the same as Bi-Amping except it adds in a midrange output, thus making a three-way system. In Tri-Amping, the output of the mixing console (full range audio signal) is fed to an active crossover that splits the audio signal into three frequency ranges: high, midrange, and low. The crossover outputs are fed to their respective amplifiers, subsequently driving the high, mid, and low frequency range drivers. Tri-Amping offers exceptional control over the relative levels of each element's volume while offering selectivity for each of the two crossover points. Tri-Amping is often used in high-quality high-level sound reinforcement applications.

2) BENEFITS OF BI-AMPING AND TRI-AMPING

Bi/Tri-Amping provides a great degree of efficiency that is typically lost by a conventional 'passive' crossover. Conventional crossovers use inductors, resistors, and capacitors in their design. These electronic devices can affect the output response of the power amplifier or waste much of its available output power. Since Bi-Amping or Tri-Amping bypasses in speaker crossovers a more efficient delivery of power from the amps to the speakers is achieved. This results in greater efficiency from the sound system.

The components of a passive crossover are used 'In line' with the outputs of the power amplifier and they affect the way in which the amplifier responds. This interaction can reduce the 'Damping' of the amplifier. Bi-Amping bypasses the passive crossover and offers a more direct output from the amplifier, effectively improving the damping performance of the system.

Bi-Amping & Tri-Amping also provides real power output 'Headroom' advantages. High frequencies tend to 'Ride' on top of the higher energy of amplified low frequencies. As an amplifier begins reaching its full output power capacity, the high frequencies may reach the maximum output capabilities, of the amplifier, before the low frequencies do. This effectively clips the high frequency material reducing its clarity. Since the human ear is very sensitive to high frequency distortion, this type of 'high frequency' clipping is very noticeable. By separating the high and low frequency signal prior to amplification, by the systems power amplifiers this, headroom problem is minimized. Bi-Amping allows for more low frequency headroom and far greater high frequency headroom (when compared to passive systems), and offers increased volume with less overall distortion.

3) WHEN TO UTILIZE A MULTI-AMP SYSTEM

Bi-Amped or Tri-Amped sound systems are best targeted towards high level sound reinforcement. The increased efficiency and headroom of these types of systems allow for higher volume levels, greater speaker protection, and less overall cost, compared to multiple speaker/amplifier systems. Because of the greater efficiency and protection of these types of systems, a Bi-Amped or Tri-Amped system will provide a higher degree of reliability for high volume sound reinforcement. Bi-Amping or Tri-Amping is the choice among professionals and sound companies where continuous high level sound reinforcement is required. It provides for an easier set-up and allows greater control over the response of the sound system.

If high level sound reinforcement is not needed the best choice would be a passive crossover network system. In small to medium sized rooms, clubs, or auditoriums you may not require the gain and output of a Bi-Amped or Tri-Amped sound system. Passive sound systems are overall less expensive and sound excellent for these types of applications. CARVIN manufactures many speakers that feature a passive crossover. This type of speaker is an excellent choice for main speaker systems or monitor systems, and each speaker may be optionally Bi-Amped, should you require extra output and headroom from your system down the line.

4) HOW TO USE AN ACTIVE CROSSOVER IN BI / TRI-AMPED SOUND

Understanding the optimum operating frequency ranges and power handling capacities of the loudspeaker drivers is essential to properly setting up the active crossover in a sound system. This information will allow the system operator to select the right crossover points in order to maximize the response of the system. For example, a high frequency driver may indicate its optimum response range is from 1500Hz to 20Khz. Its power handling capacity within that range may be 30 watts. The best choice for a crossover frequency would then be at 1500Hz. This setting would send all frequencies above 1500Hz to this driver. To choose a lower crossover frequency could cause excessive voice coil excursion and subsequent damage to the driver.

Note: For every octave a drivers frequency range is lowered its power handling capacity is divided by four. This means that dropping the crossover frequency to 750Hz (from 1500Hz) would allow the above driver only about 25 watts (rather than 100 watts) of power handling capacity.

Using a higher crossover point could allow for increased power handling capacity and less distortion. But realize that the frequencies under the crossover point may then be distorted if they are subsequently sent to a low frequency driver. So, if a higher crossover frequency was then desired (Say 2K or 2.5Khz) you would want to choose a woofer (or mid-range) speaker to compliment this crossover frequency. You should look for low and mid frequency drivers that maintain a good liner response up to, and down to, the desired crossover frequencies.

Good quality drivers are very important in achieving a 'Flat' or accurate responding system. Any quiet frequency ranges or inconsistencies in the response of drivers, within a sound system, will reduce the accuracy of the sound systems reproduction. Select drivers that have a smooth response throughout the range where they will be used. This will assure the best possible sound system from the driver response. Equally important is the active crossover's overall capabilities and performance.

The CARVIN XC-1000 crossover is an excellent representation of a quality crossover. It features a full range of 18dB/octave Butterworth filters that sum accurately. The XC-1000 offers sweepable parametric selection of crossover frequencies. Its high efficiency roll-off offers maximum protection to the high frequency drivers. As with any professional audio product, the XC-1000 has balanced inputs and outputs (and will accept high impedance sources). It will interface with any professional audio system, and addresses correct input and output impedances for maximum signal quality and performance. CARVIN highly recommends the use of this crossover with any of our professional Bi-Amp or Tri-Amp systems.

Some of the recommended settings for Bi-Amping and Tri-Amping CARVIN's speakers are as follows;

Speaker	Recommended Crossover Frequency
3018	300 Hz or lower
1210	2k Hz or lower with a upper cutoff @ 5k Hz for Tri-Amping
1331	150 Hz or lower
560	(Horn) 1.2k Hz for Bi-Amping and 5k Hz for Tri-Amping
993	1.2k Hz
973	1.2k Hz
962	1.2k Hz
852	1.2k Hz
802	1.2k Hz
792	1.2k Hz
752	1.2k Hz

SUGGESTIONS FOR EFFICIENT SET UP AND QUALITY SOUND

LIVE SOUND REINFORCEMENT

At this point we would like to make some general comments on setting up and operating a sound system. The most important point to emphasize is that a little planning before the day of the performance, can prevent serious problems the night of the performance, especially if you are new to sound reinforcement work.

PREVIEW THE CONCERT HALL

1) Power Requirements

Try to check out the concert hall before hand to determine where you can obtain power and how far you will have to run any extension cords. Check if there enough current capacity to power ALL the equipment you may need. This will ensure that you do not blow all the circuit breakers on the opening note. To check this, you need to know approximately what the total power line (AC) current requirement for your sound system will be. You can easily determine the total AC current requirement of the system (that is, the total number of 'Amperes' required from the AC line). To do this you need to add up the total current requirements of each piece of equipment (in amps) that you plan on using in your performance. Or, you can add the total 'watts' (power capability) of each piece of equipment in the system and divide by the number 120 (the AC line voltage). This will give you the total current needed (in amps) for your system. The current capability of the AC power circuits you use should exceed your total sound equipment's use by a healthy margin. As an example, let's say you have determined your total current requirement to be 15 amps. Then, add a good safety margin (25%). You should now make sure that the house circuits can supply at least 20 amps. In any event, make sure you power up the complete system well in advance of showtime. Now, if there are any problems you can correct them before, and not during, showtime.

One of the greatest problems of circuit overloading is flood or spot lights plugged into the same circuit you plan to use for the sound system. Try not to use the same circuit to power both the lighting and the sound system. Finally, don't forget to check that the circuit chosen can handle all your lighting requirements.

2) MAKE AN EQUIPMENT LIST

A good way to prepare for the show is to write out a list of ALL the equipment that you will be using. Later you can use this list as a check list when it comes time to load up before, and after, the performance. It will make sure that you do not forget or lose pieces of your gear. Your list should include everything from the mixer down to the last interconnect cable. If you start with a block sketch of the sound system showing the mixer, snake, main amps, main speakers, monitor amps, and monitor speakers you can then draw in each interconnect cable. On every cable drawn in label each end as to the type of connector it will need. This diagram will help you to quickly set up the system because you will not have to stop and think what connects to what. It's no fun scrambling to assemble interconnect cables when showtime is a few minutes away! A complete equipment list and system diagram can help prevent equipment loss and should allow quick and efficient sound system setup.

3) HAVE A GOOD TOOL KIT

Put together a good tool kit and add it to your equipment list. Make sure your tool kit includes a generous assortment of connector adapters. Stock enough spare connectors to repair each different type of interconnect cable you use in your system. Preventive maintenance is always the best way to assure the least amount of equipment related problems. Keep your cables clean and in good repair at all times. And, be sure to clean any dirt or dust off all your mixers, cables, and speakers. Such preventive maintenance will provide you with a much more reliable system. A good basic tool kit might carry the following items;

- 1) Spare cables and fuse's
- 2) Spare connectors or adapters
- 3) Pliers, wrenches, and wire cutters
- 4) Screwdrivers appropriate for any need
(Flathead and Phillips - Small & Large)
- 5) Soldering iron, solder, and solderwick

Of course, your tool kit can be as elaborate as you desire, according to your technical ability. It is also a good idea to carry a flashlight or accessory lamp for those occasions where the house lights go down and you are left in total darkness, groping for the faders!

OPERATIONS

1) POWER UP SEQUENCE

There is really just one rule for good practice regarding the sequence in which to power up and down the system. The rule is:

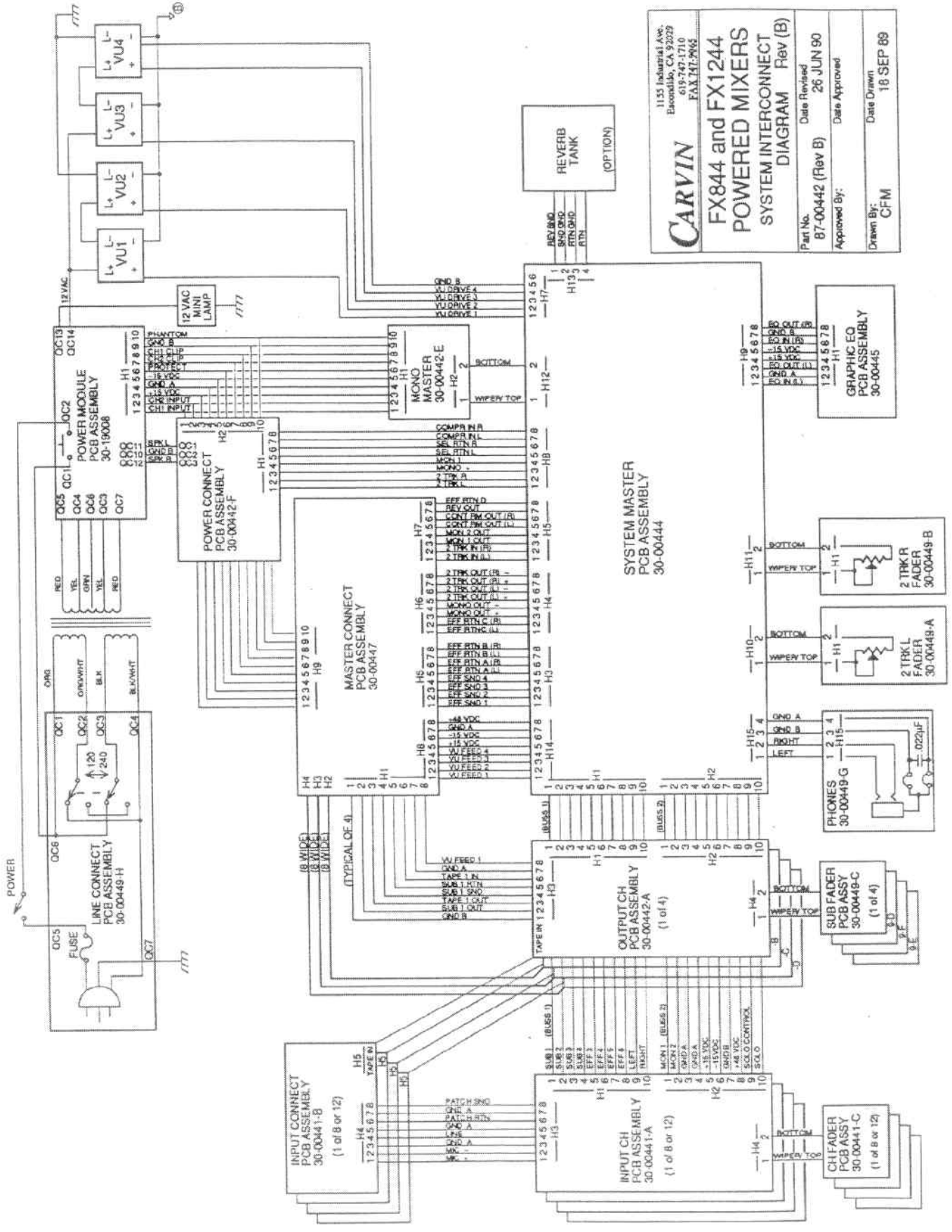
Turn the loudspeaker amplifiers on last and off first.

This will prevent any excessive transient signals from getting to your loudspeakers and possibly damaging the horn drivers.

Besides the concern over damaging the loudspeakers, it is not a good idea to expose your audience to obnoxious pops, squeals or thumps if you want them to come back again. Make sure your audience hears only clear sound from your sound system!

2) SOUND SYSTEM CHECK

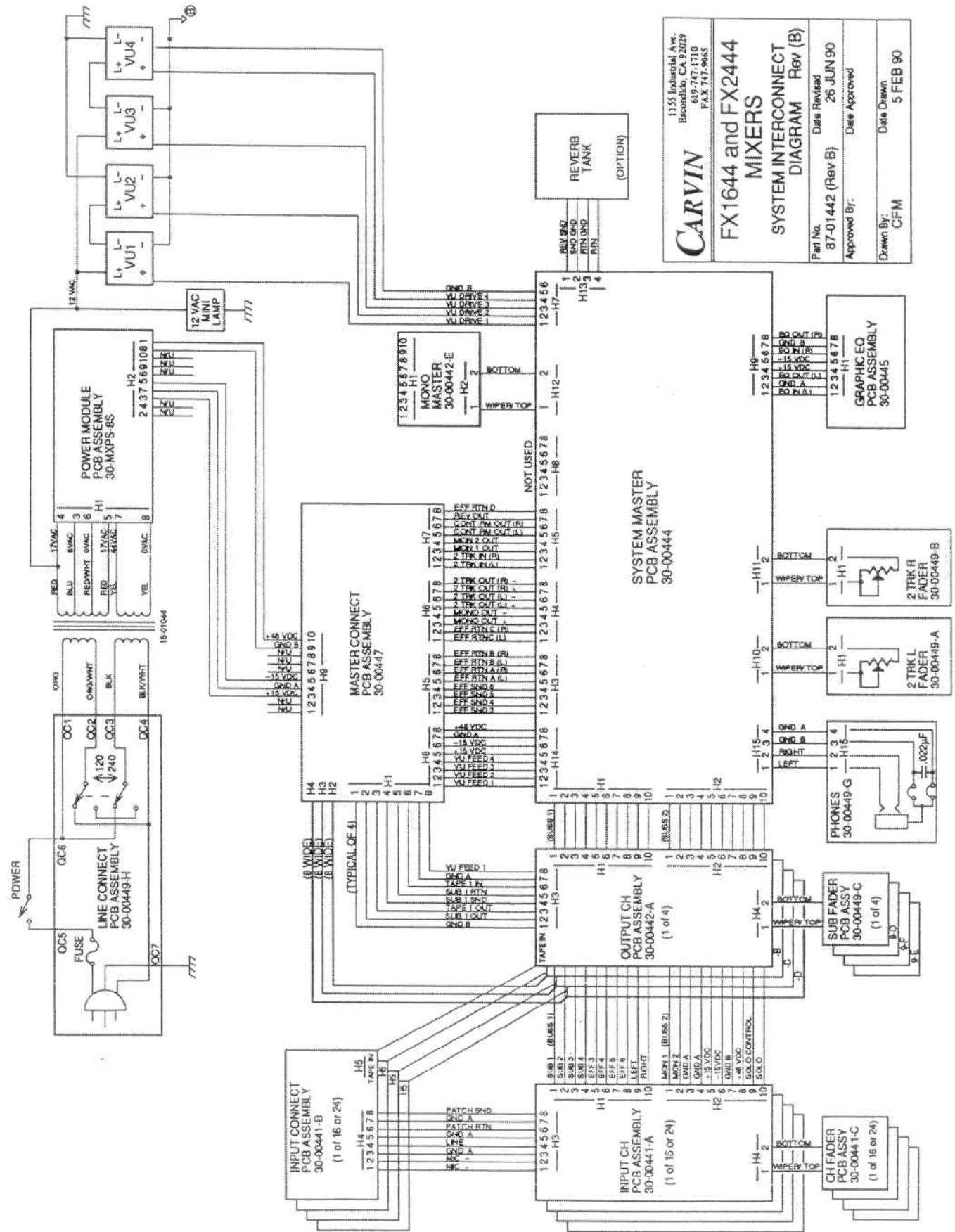
After the sound system is connected and powered up, you will want to check every microphone and instrument connection one line at a time. To check lines to your console, have an assistant speak into each microphone and send a signal through every instrument. You need to confirm that every microphone and line properly feeds its assigned channel on the mixer. Make sure that every channel used is properly identified on the writing strip. If your audience is seated at this time you can spare them from listening to this testing by switching off the main speaker amps, (or unplugging the speaker outputs on the mixers) and monitoring the sound check, using the PFL switches, over headphones. At the same time, you can verify the stage monitor system by raising the monitor sends at each channel and then carefully raising level on the monitor send knobs. Your assistant can verify the stage monitor sound as he checks each mic and instrument. Finally, check the main system sound by using one of the mics on the stage. This completes the basic system check out.



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 619-742-1710
 FAX 619-742-9665

**FX844 and FX1244
 POWERED MIXERS
 SYSTEM INTERCONNECT
 DIAGRAM Rev (B)**

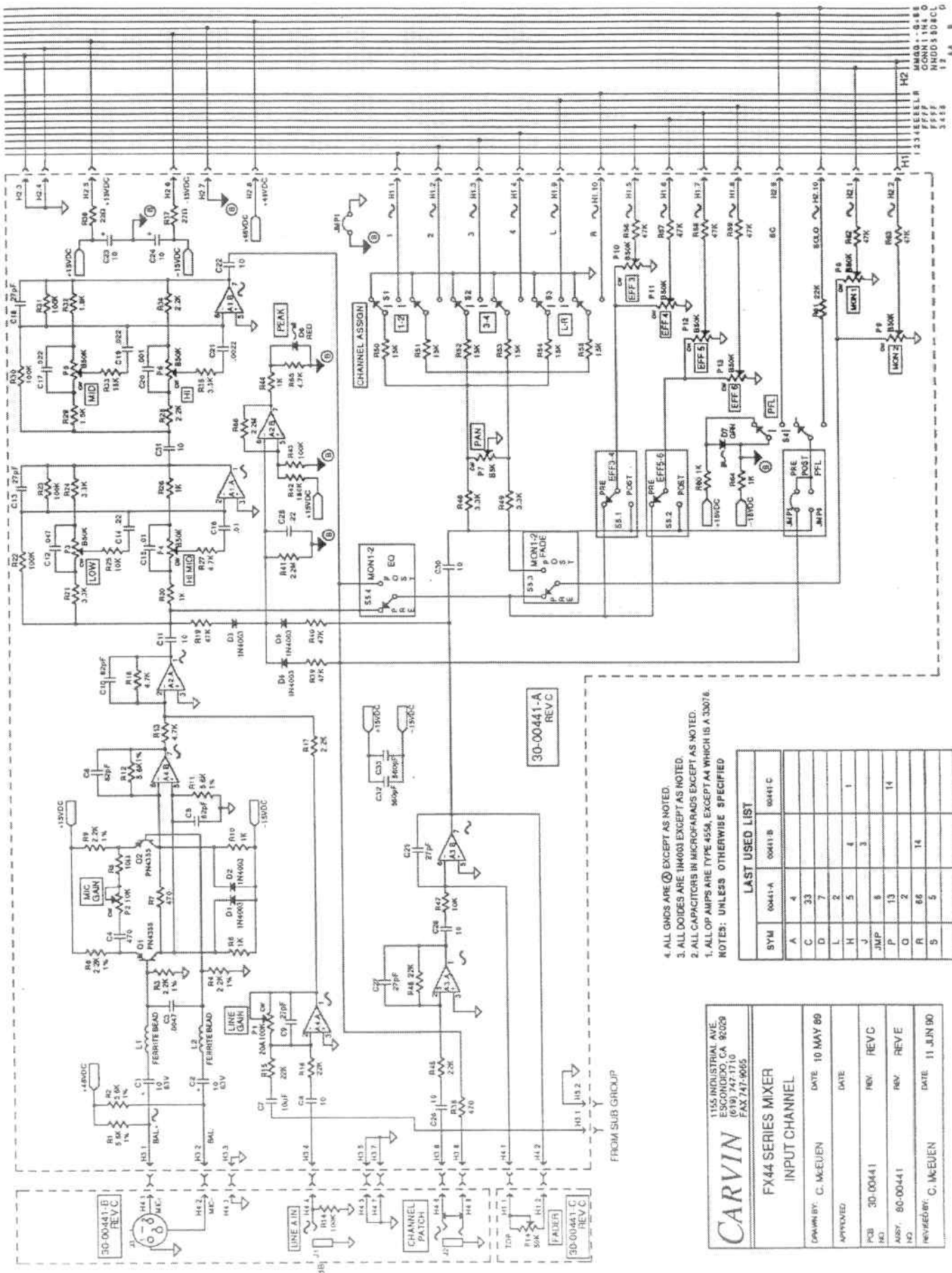
Part No. 87-00442 (Rev B)
 Date Revised 26 JUN 90
 Approved By: _____
 Date Approved: _____
 Drawn By: CFM
 Date Drawn 18 SEP 89



CARVIN
 1155 Industrial Ave.
 Brea, CA 92629
 619-747-1710
 FAX 714-965

FX1644 and FX2444 MIXERS
SYSTEM INTERCONNECT DIAGRAM Rev (B)

Part No. 87-01442 (Rev B)
 Date Revised 26 JUN 90
 Approved By: _____
 Date Approved: _____
 Drawn By: CFM
 Date Drawn 5 FEB 90



- 4. ALL GND'S ARE Ⓞ EXCEPT AS NOTED.
 - 3. ALL DIODES ARE 1N4001 EXCEPT AS NOTED.
 - 2. ALL CAPACITORS IN MICROFARADS EXCEPT AS NOTED.
 - 1. ALL OP AMPS ARE TYPE 4558, EXCEPT A4 WHICH IS A 33076.
- NOTES: UNLESS OTHERWISE SPECIFIED

LAST USED LIST			
SYM	00441-A	00441-B	00441-C
A	4		
C	33		
D	7		
L	2		
H	5	4	1
J	8	3	
P	13		14
Q	2		
R	66		14
S	5		

CARVIN

1155 INDUSTRIAL AVE
ESCONDIDO, CA 92029
(619) 742-7110
FAX 747-9065

**FX44 SERIES MIXER
INPUT CHANNEL**

DATE: 10 MAY 89

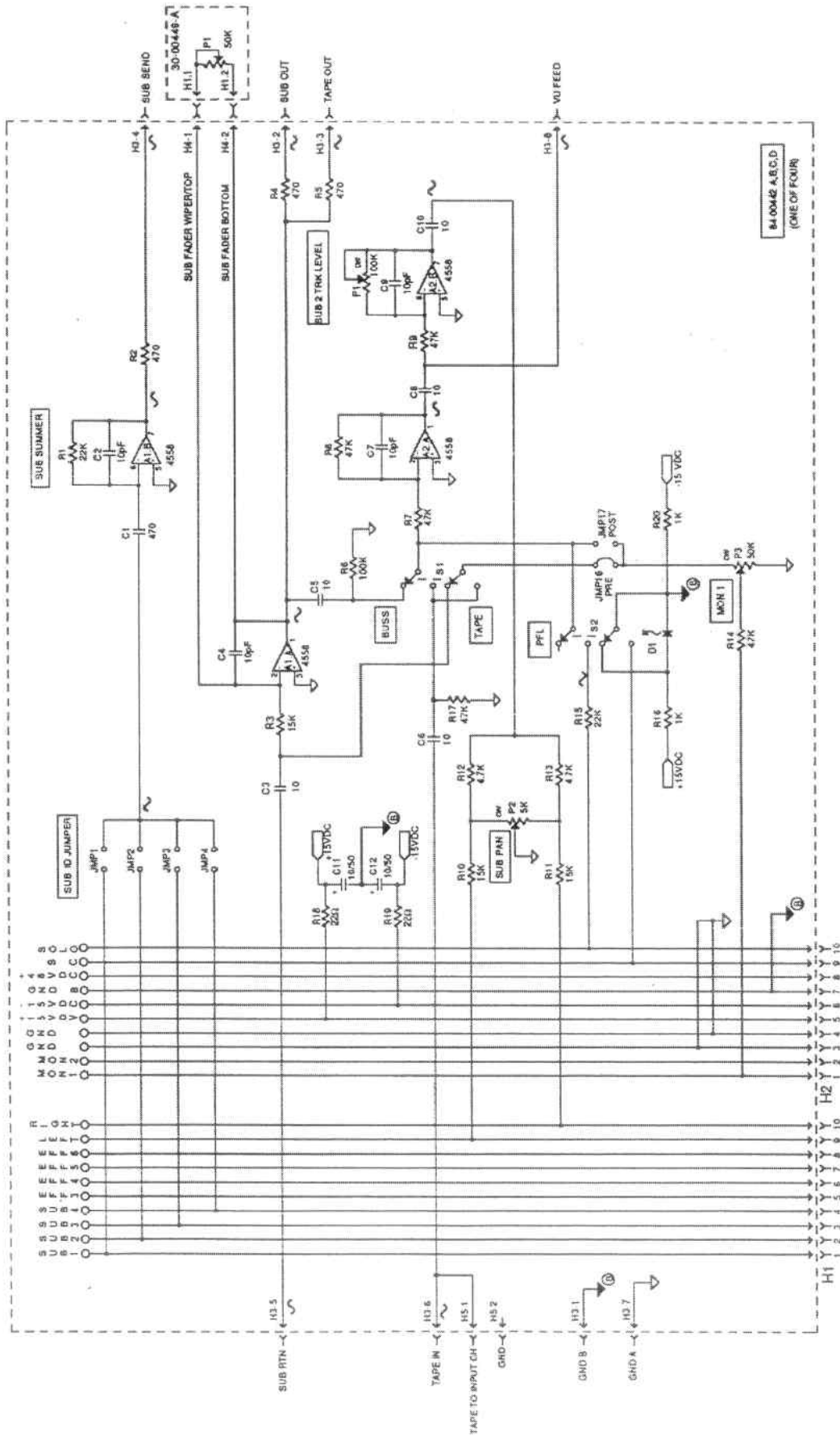
APPROVED: _____

REV: REV.C

REV: REV.E

DATE: 11 JUN 90

1.23 REE/ER
GND 1 1.2 B
FFFF
MNO55 SDCL
AA B
3.458



CARVIN
 114 INDUSTRIAL AVE.
 ESCANON, CA 95628
 PHN 714-737-1718
 FAX 714-737-1888

FX44 OUTPUT CHANNEL SCHEMATIC

DRAWN BY: T.R. BOYLL DATE: 18SEP88

APPROVED: DATE:

POB: 30-00442-A,B,C,D REV: C

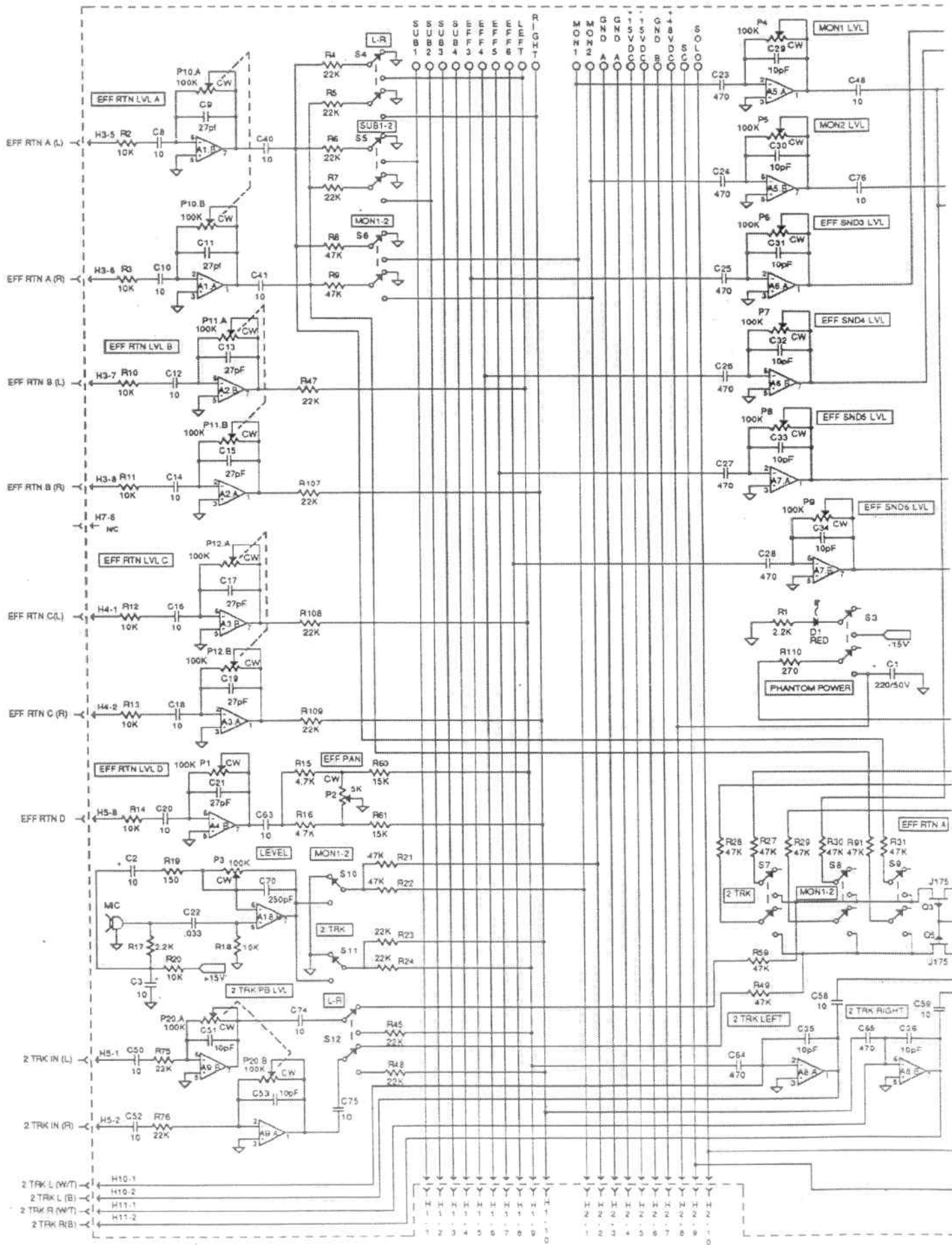
NO: 80-00442 REV: D

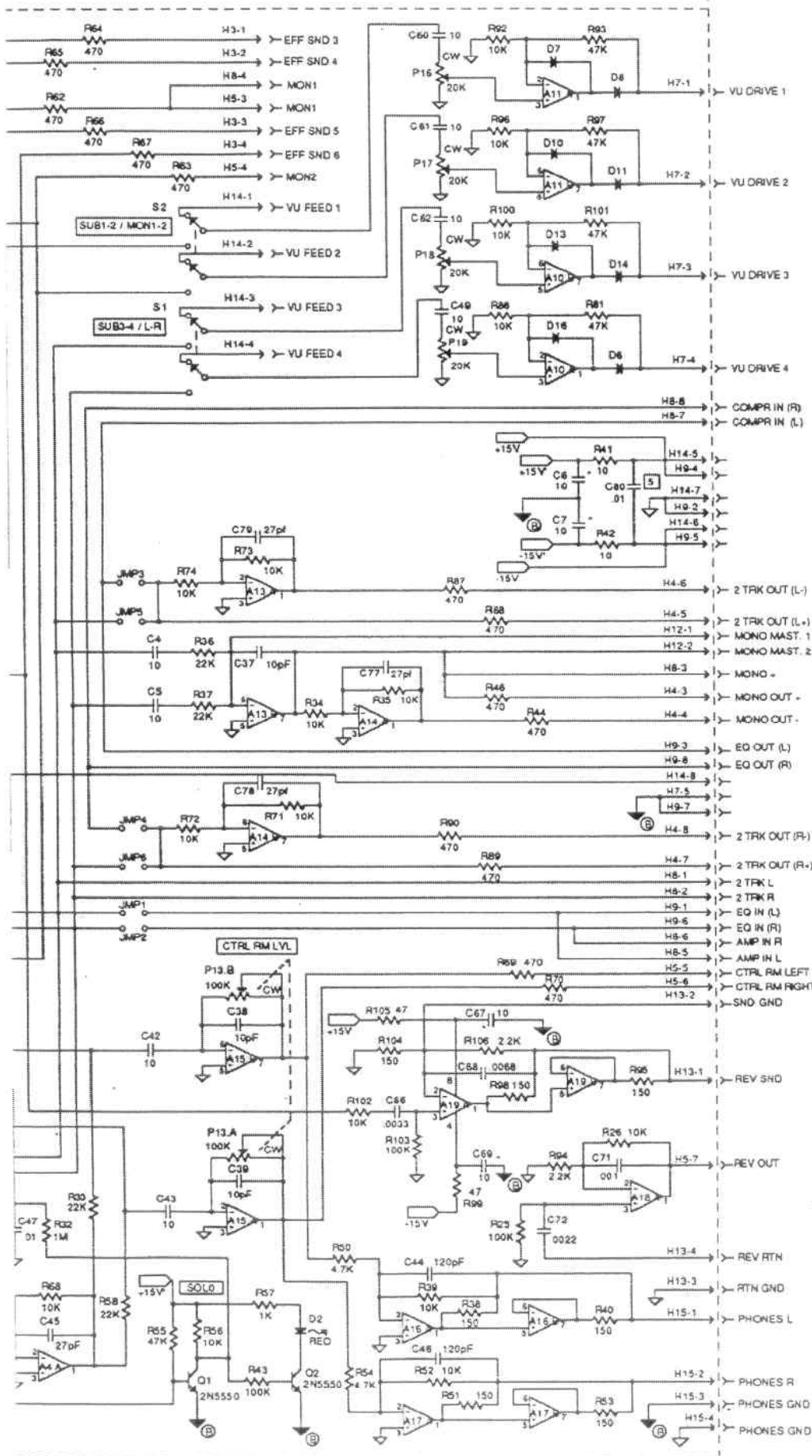
REVISED BY: C. MUELEN DATE: 24 MAY 90

LAST USED LIST

SYM	30-00442 A,B,C,D	00442 E	00442 F
A	2	1	1
C	12	2	8
D	1	5	2
M	5	2	2
J	0	0	6
JMP	17	0	3
OP	0	0	2
P	3	1	2
O	0	0	2
R	20	0	12
S	2	0	1

5. THE H1 HARNESS MUST BE SPLIT BETWEEN LINES 5 AND 6 ON ALL FOUR OUTPUT CHANNELS.
4. ALL GND'S ARE (A) EXCEPT AS NOTED.
3. ALL DIODES ARE 1N4003 EXCEPT AS NOTED.
2. ALL CAPACITORS IN MICROFARADS EXCEPT AS NOTED.
1. ALL OP-AMPS ARE TYPE 4558.





JMP	844	1644	2444
1			X
2			X
3			X
4			X
5	X		
6	X		

- 5. ADDED AS SECONDARY OPERATION.
- 4. ALL GNDS ARE (A) EXCEPT AS NOTED.
- 3. ALL DIODES ARE 1N4003 EXCEPT AS NOTED.
- 2. ALL CAPACITORS IN MICROFARADS EXCEPT AS NOTED.
- 1. ALL OP AMPS ARE TYPE 4558.

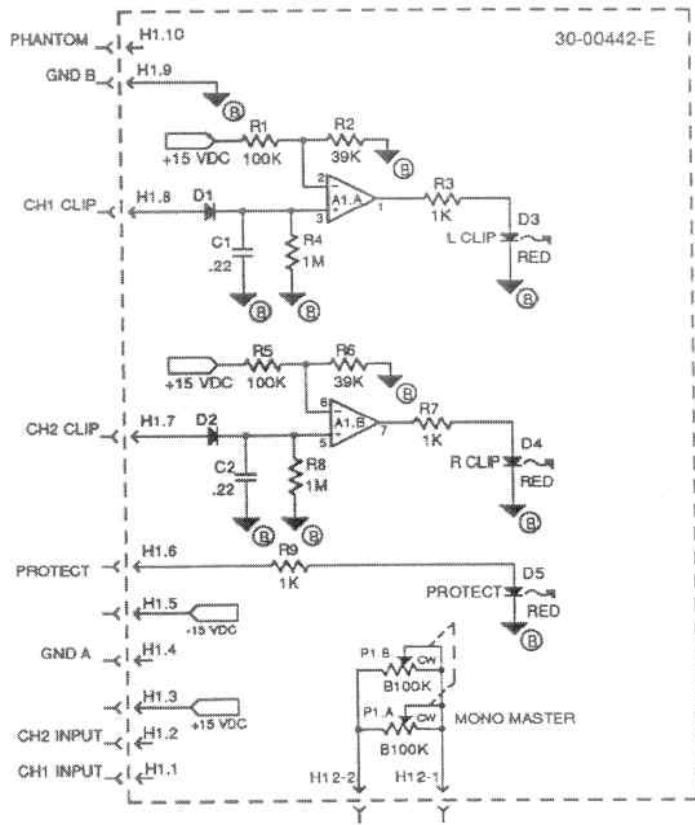
LAST USED LIST		
SYM	NOT USED	NOT USED
A	196	12
C	81	73, 54-57
D	16	3-5, 9, 12, 15
H	15	6, 8, 14
OP	2	
P	20B	14, 15
O	5	4
R	110	77, 80, 82-85
S	11	
JMP	6	

1155 INDUSTRIAL AVE.
ESCONDIDO, CA 92029
(818) 747-1710
FAX 747-8045

CARVIN

FX44 SYSTEM MASTER SCHEMATIC

DRAWN BY: T.R. BOYLL	DATE: 17 OCT 89
APPROVED:	DATE:
PCB NO: 30-00444	REV: B
ASSEMBY NO: 80-00444	REV: D
REVISED BY: C. McEJEN	DATE: 26 JUN 90



- 4. ALL GNDS ARE (A) EXCEPT AS NOTED.
- 3. ALL DIODES ARE 1N4003 EXCEPT AS NOTED.
- 2. ALL CAPACITORS IN MICROFARADS EXCEPT AS NOTED.
- 1. ALL OP AMPS ARE TYPE 4558.

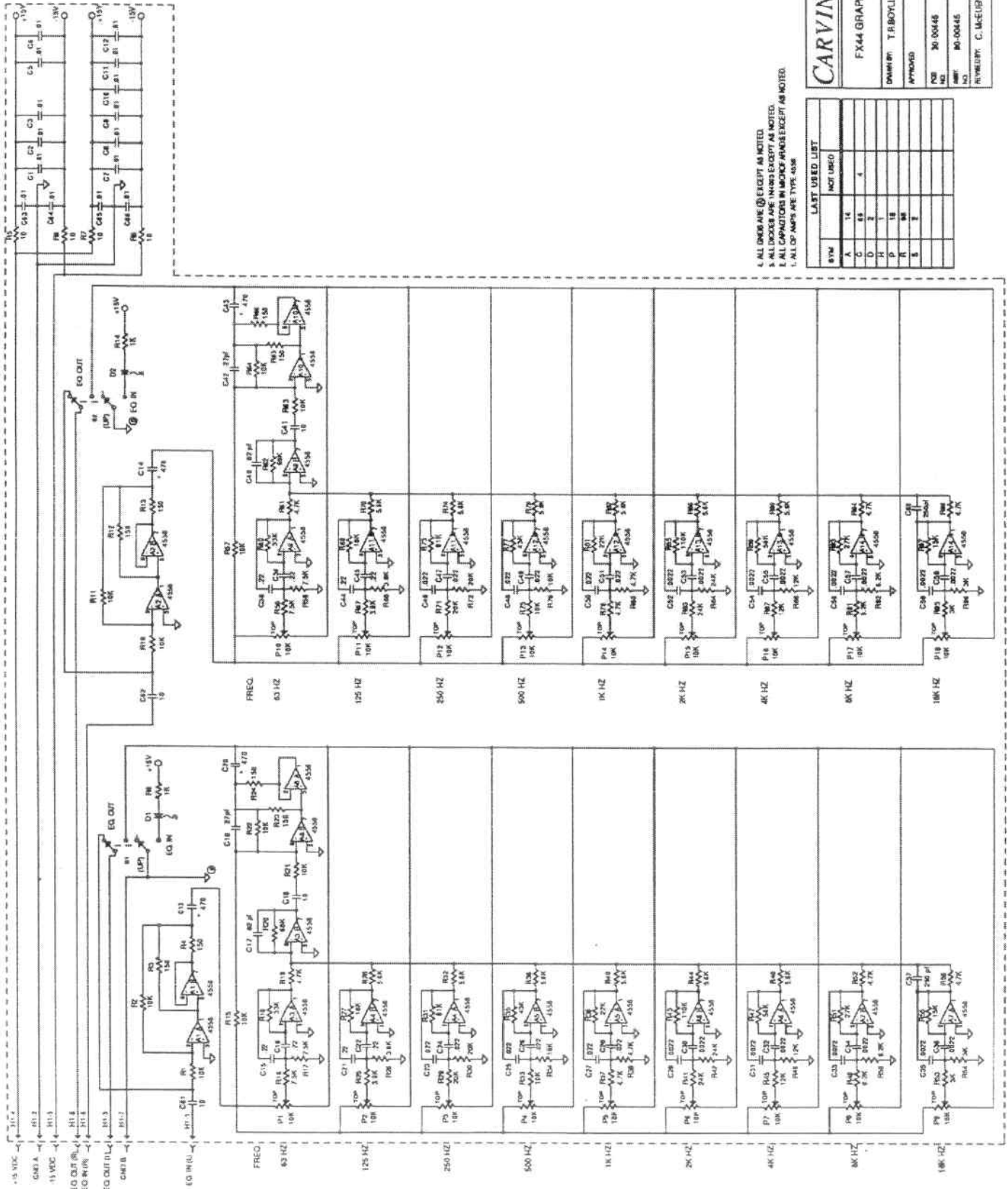
LAST USED LIST			
SYM	00442-E		
A	1		
C	2		
D	5		
H	12		
P	1		
R	9		

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FAX 747-9005

CARVIN

FX44 AMP STATUS BOARD

DRAWN BY: C. McEUN	DATE: 20 NOV 89
APPROVED:	DATE:
PCB NO: 30-00442-E	REV: C
ASSY. NO: 80-00412	REV: D
REVISED BY: C. McEUN	DATE: 29 JUN 90



- 1. ALL DIMENSIONS ARE IN INCHES EXCEPT AS NOTED.
- 2. ALL DIMENSIONS ARE IN MM EXCEPT AS NOTED.
- 3. ALL CAPACITORS IN MICRO FARADS EXCEPT AS NOTED.
- 4. ALL CAPACITORS ARE TYPE 5058.

CARVIN
 1158 INDEPENDENT AVE.
 ESCONTO, CA 92629
 (415) 737-7118

FX44 GRAPHIC EQUALIZER

DRAWN BY: T. B. BOYLL DATE: 08/01/88

APPROVED: DATE:

REV: 30-00148 REV: -

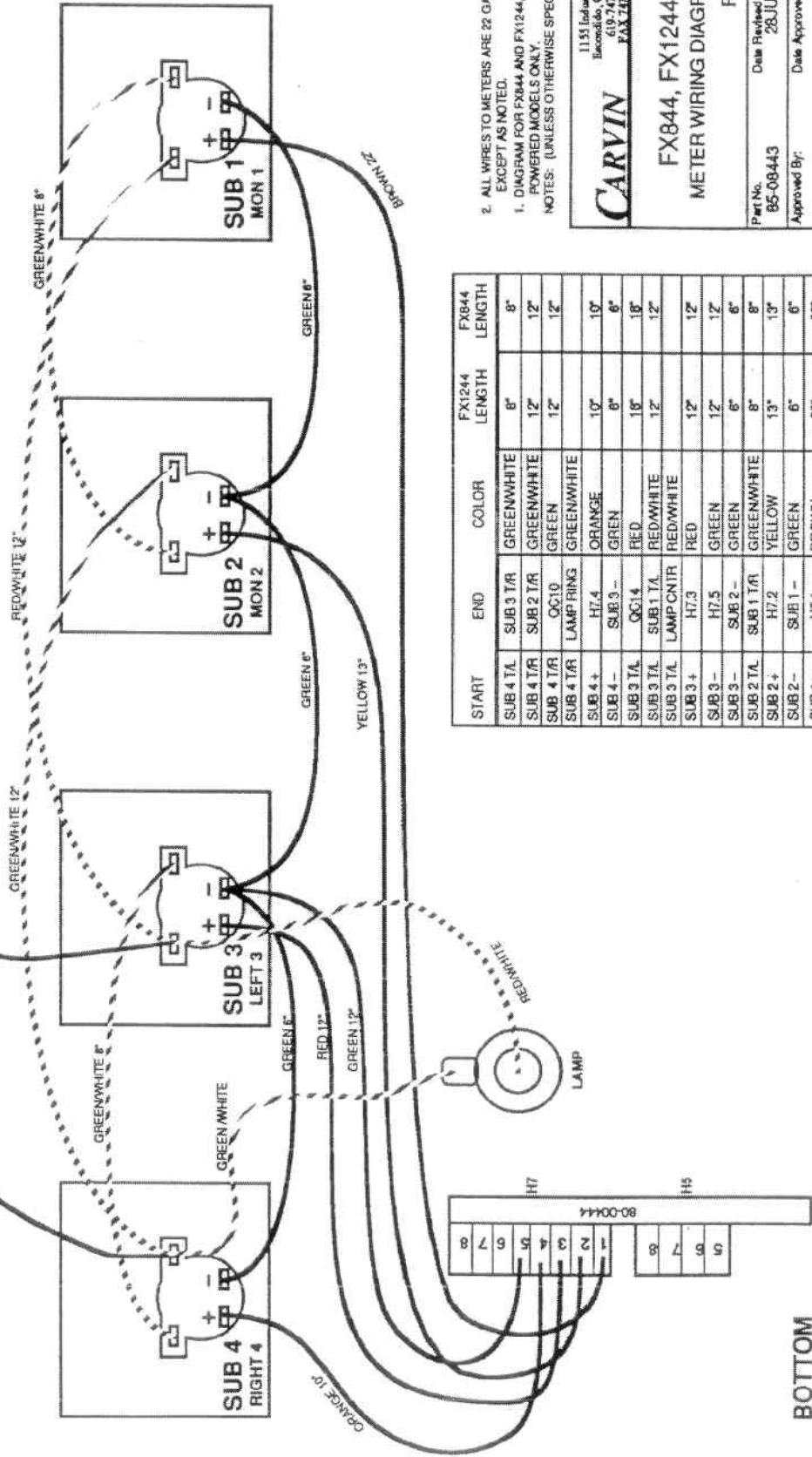
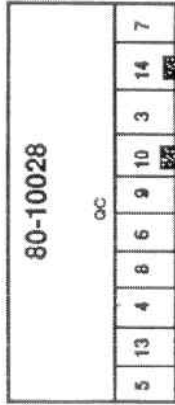
NO: 80-00845 REV: -

BY: C. MACE/USA DATE: 10 NOV 89

LAST USED LIST

SYM	NOT USED
A	14
C	89
D	2
H	18
J	18
K	1
L	1
M	1
N	1
O	1
P	1
Q	1
R	1
S	1
T	1
U	1
V	1
W	1
X	1
Y	1
Z	1

TOP



BOTTOM

START	END	COLOR	FX1244 LENGTH	FX844 LENGTH
SUB 4 TAL	SUB 3 T/R	GREEN/WHITE	8"	8"
SUB 4 T/R	SUB 2 T/R	GREEN/WHITE	12"	12"
SUB 4 T/R	OC10	GREEN	12"	12"
SUB 4 T/R	LAMP RING	GREEN/WHITE		
SUB 4 +	H7.4	ORANGE	10"	10"
SUB 4 -	SUB 3 -	GREEN	6"	6"
SUB 3 TAL	OC14	RED	18"	18"
SUB 3 TAL	SUB 1 TAL	RED/WHITE	12"	12"
SUB 3 TAL	LAMP C/N/R	RED/WHITE		
SUB 3 +	H7.3	RED	12"	12"
SUB 3 -	H7.5	GREEN	12"	12"
SUB 2 -	SUB 2 -	GREEN	6"	6"
SUB 2 TAL	SUB 1 T/R	GREEN/WHITE	8"	8"
SUB 2 +	H7.2	YELLOW	13"	13"
SUB 2 -	SUB 1 -	GREEN	6"	6"
SUB 1 +	H7.1	BROWN	22"	22"

2. ALL WIRES TO METERS ARE 22 GA EXCEPT AS NOTED.
 1. DIAGRAM FOR FX844 AND FX1244, POWERED MODELS ONLY.
 NOTES: (UNLESS OTHERWISE SPECIFIED)

CARVIN
 1155 Industrial Ave.,
 Escondido, CA 92029
 619-747-1710
 FAX 619-995

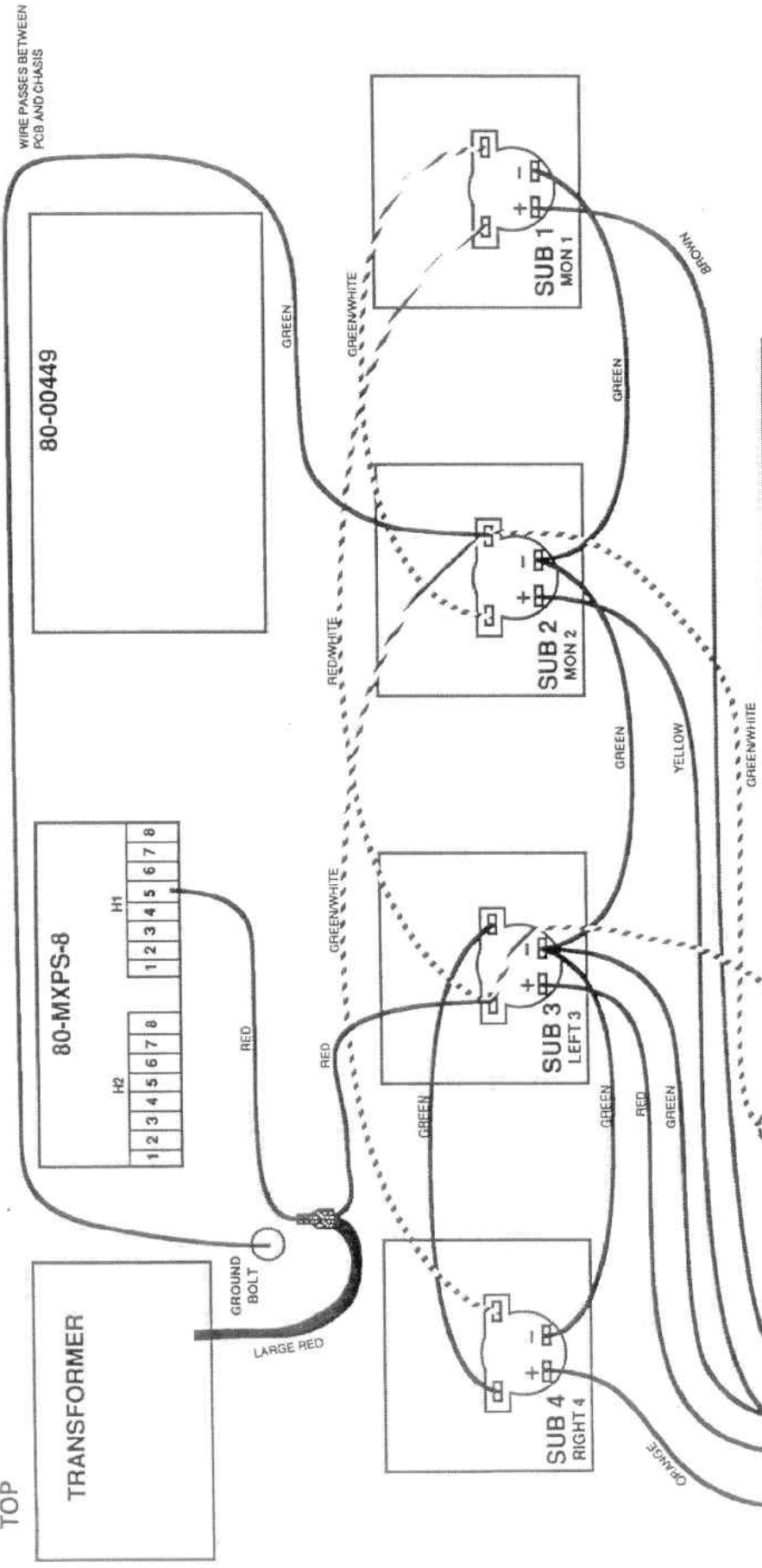
FX844, FX1244
 METER WIRING DIAGRAM
 Rev (-)

Part No: 85-08443
 Date Revised: 28 JUN 90

Approved By:
 Date Approved:

Drawn By: CFM
 Date Drawn: 26 JUN 90

TOP



WIRE PASSES BETWEEN PCB AND CHASSIS

80-00449

80-MXPS-8

H2: 1 2 3 4 5 6 7 8

H1: 1 2 3 4 5 6 7 8

TRANSFORMER

GROUND BOLT

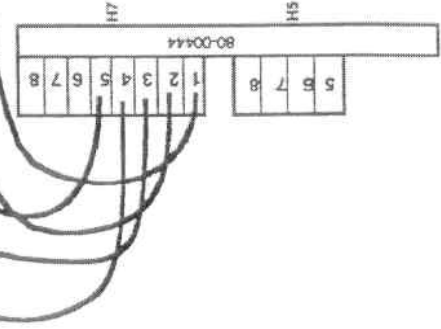
LARGE RED

SUB 4
RIGHT 4

SUB 3
LEFT 3

SUB 2
MON 2

SUB 1
MON 1



START	END	COLOR	FX2444 LENGTH	FX1644 LENGTH
SUB 4 T/R	SUB 3 T/R	GREEN	8"	
SUB 4 T/R	SUB 2 T/R	GREEN/WHITE	12"	
SUB 4 +	H7 4	ORANGE	13"	
SUB 4 -	SUB 3 -	GREEN	6"	
SUB 3 T/L	XENON & H1,5	RED	21"	
SUB 3 T/L	SUB 1 T/L	RED/WHITE	12"	
SUB 3 T/L	LAMP CNTR	WHITERED	12"	8"
SUB 3 +	H7 3	RED	15"	
SUB 3 -	H7 5	GREEN	18"	
SUB 3 -	SUB 2 -	GREEN	6"	
SUB 2 T/R	GND BOLT	GREEN	17"	12"
SUB 2 T/L	SUB 1 T/R	GREEN/WHITE	8"	
SUB 2 T/R	LAMP RING	GREEN/WHITE	17"	12"
SUB 2 +	H7 2	YELLOW	18"	
SUB 2 -	SUB 1 -	GREEN	6"	
SUB 1 +	H7 1	BROWN	24"	

2. ALL WIRES TO METERS ARE 22 GA. EXCEPT AS NOTED.
 1. DIAGRAM FOR FX1644 AND FX2444.
 NON-POWERED MODELS ONLY.
 NOTES: (UNLESS OTHERWISE SPECIFIED)

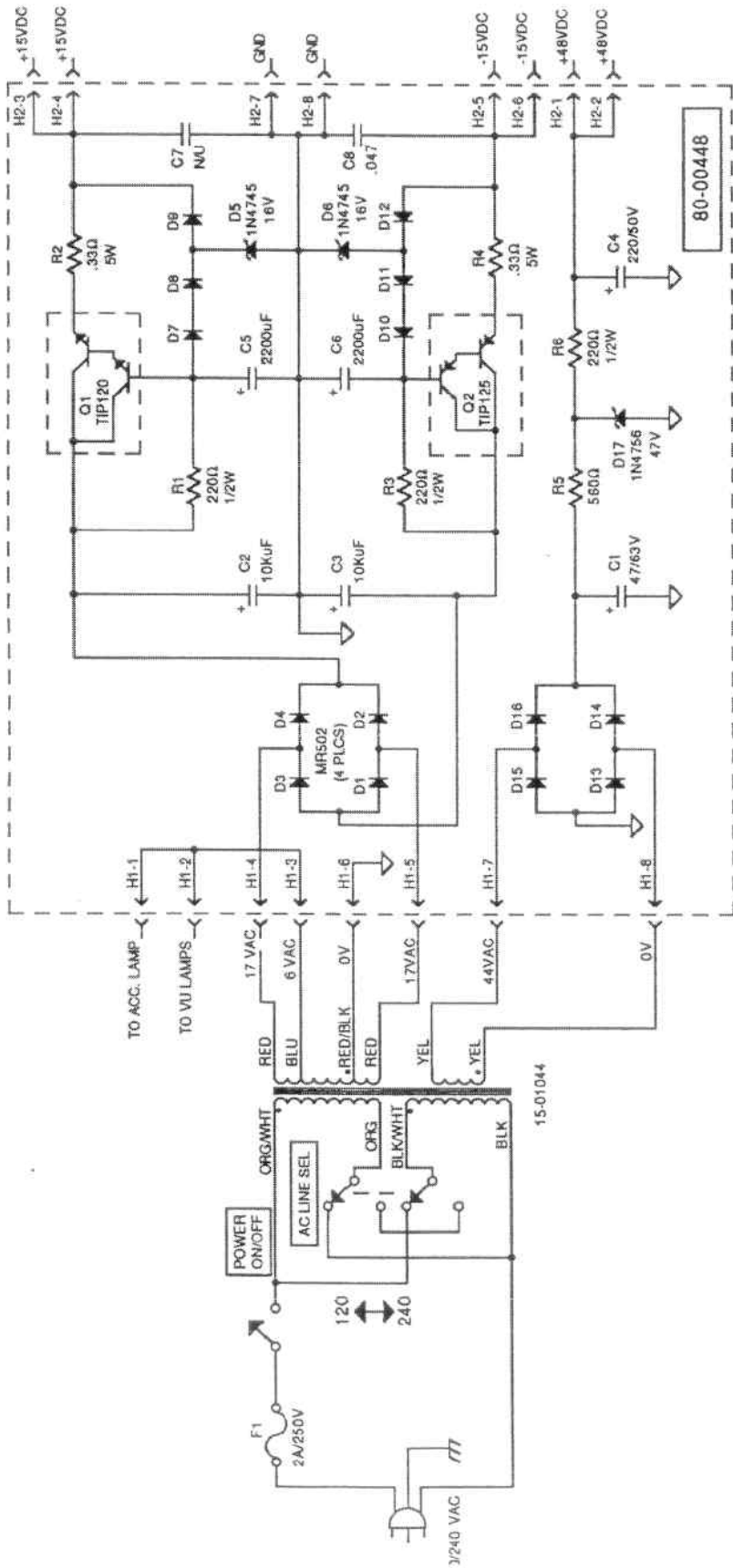
CARVIN
 1155 Industrial Ave.
 Escondido, CA 92029
 619-747-1110
 FAX 747-2965

FX1644, FX2444
 METER WIRING DIAGRAM
 Rev (A)

Part No. 85-16443 (Rev A)
 Date Revised 14MAR90
 Approved By: _____
 Date Approved _____

Drawn By: CFM
 Date Drawn 12MAR90

BOTTOM



CARVIN	
1155 INDUSTRIAL AVE. ESCONDIDO, CA 92029 (818) 747-1710 FAX 747-9065	
DC POWER SUPPLY MODULE	
DRAWN BY: C. McEUEEN	DATE: 7 MAR 90
APPROVED:	DATE:
PCB NO: 30-MXPS-BA	REV: A
ASSY. NO: 80-00448	REV: B
REVISED BY: CFM	DATE: 26 JUN 90

LAST USED LIST	
SYM	
C	8
D	17
H	2
Q	2
R	6

2. ALL CAPACITORS IN MICROFARADS EXCEPT AS NOTED.
 1. ALL DIODES ARE 1N4003 EXCEPT AS NOTED.
 NOTES: UNLESS OTHERWISE SPECIFIED.

FX44 TECHNICAL SPECIFICATIONS

Frequency Response

Mic or line inputs to
two-track output: 20 Hz-20k Hz±1dB

Total Harmonic Distortion

Mic in to two-track out
40 dB gain
+10dBv output, 20-20kHz: less than .1%
typical 1kHz THD: less than .03%
Line in to two-track out
10 dB gain
+10dBv output, 20-20kHz: less than .1%
typical 1kHz THD: less than .03%

Equivalent Input Noise

unweighted, 150 ohm source: -128 dBv

Output Noise

(unweighted/20kHz B/W) -90 dBv
(two-track, mono, or
monitor outs)
All faders minimum: -92 dBv
Master faders nominal -88 dBv

Maximum Gain

Mic in to two-track out: 70 dB
Line in two-track out: 32 dB
Effects return to two-track out: 26 dB

Crosstalk

Adjacent channels: -60 dB at 1kHz

Common Mode Rejection

-75 dB at 1 kHz

Peak Warning Level: 6 dB below clipping
(+14 dBv)

Phantom Power: +48 VDC applied to pins
2 and 3 of mic input XLR's

Channel Equalizer Type: 4 band active

Hi band: ±12 dB @ 10 kHz
Hi Mid band: ±12 dB 2 kHz
Mid band: ±12 dB @ 500 Hz
Low band: ±12 dB @ 100 Hz

Graphic Equalizers (2) In/Out bi-pass switch

Type: 9 band at octave intervals
Max boost/cut: ±12 dB
Center frequencies: 63, 125, 250, 500, 1k, 2k, 4k, 8k,
16k

Metering

High quality dynamic VU meters
are factory calibrated for +4 dBv
at the unbalanced outputs. Meters
may be recalibrated for -10 dBv or
+8 dBv at 0 VU

Mic Input Connector: 3-pin XLR type
Input impedance: 3k ohms (balanced)
Source impedance: nominal "low impedance"

(50 ohms to 1k ohms)
Nominal input range: -70 to -10 dBv (.3mV to 300mV)
Maximum input level: +10 dBv (3.3V)

Line Input Connector: One 1/4" phone jack
Input impedance: 22k ohms
Nominal input range: -20 dBv to +10 dBv (100mV to 3V)
Maximum input level: +30 dBv (30V)

Channel Output

Send/ Recieve Connector: One 1/4" stereo phone jack
Direct Out: Via channel send
Output: -10 dBv

Sub Outputs 1 thru 4

Sub Output connectors: Four 1/4" phone jacks
Maximum output level: +20 dBv
Tape Out connectors: Four RCA jacks
0 VU Nominal output level: +4 dBv unbalanced

Tape Returns 1 thru 4

Connectors: Four RCA jacks

Two-Track Outputs

R & L Balanced connectors: Two 3-pin XLR's
Unbalanced connectors: Two RCA jacks
0 VU Nominal output level: +4dBv unbalanced

Mono Output

Balanced output connector: 3-pin XLR
0 VU Nominal output level: +4dBv unbalanced
Maximum output level: +26 dBv balanced

Monitor 1 & 2, and Effects 1 thru 4 Sends

Connectors: Six 1/4" phone jacks
Maximum output level: +20 dBv (10k ohm load)

Headphone Output 1/4" stereo phone jack
100 ohms or higher (stereo)

Power Amplifier ("P" Powered Models)

500 W @ 4 ohms (250 watts/ch)
340 W @ 8 ohms (170 watts/ch)

Total harmonic distortion: .1% (20 Hz to 20k Hz)
Frequency response: 20 Hz to 20k Hz (±2dB)
Minimum load impedance: 4 ohms per channel

Power Supply: Fully regulated & protected

Mini-Lamp: 12 Volts (option: G-12V Mini Light)

Power Requirements: 120/240 VAC 50-60 Hz

Weight: FX844P 61 lbs, FX1244P 64 lbs
FX1644 70 lbs, FX2444 76

Warranty: 1 year

