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# *CARVIN*

## ***FET401***

**Monitor Power Amplifier**

**OPERATION MANUAL**

Manual No. 96-00401

Revision 2.0

Dec 1990

1155 Industrial Ave. Escondido, CA 92029  
(800)854-2235

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## For the New Owner

Congratulations on your selection of CARVIN products: "The Professional's Choice." Your new FET401 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 power amp. 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 FET401 will deliver the performance necessary for you to achieve solid results, and ultimately enjoy a high degree of professional achievement and enjoyment.

To compliment your new FET401 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 attempted to present the technical aspects of your new power amp accurately and in "plain English". But, if you have any questions that are not answered here, please call us on our toll free number. Our sales staff is well versed in the technical aspects of our products and is waiting to assist you with any questions you may have. We sincerely wish to ensure your complete satisfaction and enjoyment with your new power amp.

If you would like to comment on features or performance of your new power amp, please feel free to contact us. Comments from our customers have 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. 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 power amp. So, with this manual in hand you hold the key to proper operation of your new FET401, and to achieve truly professional results.

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

**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 in your FET401 and use it. Here are some brief instructions to get you going quickly. With the amp unplugged, turn the unit off and complete the following procedures:

### 1) CONNECTING AC POWER

- Check and change if necessary the rear AC Voltage Switch to the proper voltage. If a switch is not found, than pull out the Fuse Holder (built into the AC cord receptacle) and turn it over to the proper voltage as seen on the holder—this automatically switches the voltage and the fuse to the proper voltage and fuse value. On units with an AC Voltages Switch, change the fuse as necessary (fuse values are listed on the rear panel).
- Use only a grounded (3 prong) power outlet to prevent a shock hazard. This gives the quietest grounding for your amp.

### 2) CONNECTING SPEAKERS

- Use the two 1/4" speaker jacks on the rear panel or the Red and Black speaker binding post. Be sure all your speakers are properly wired in "Phase" with each other (positive and negative speaker terminals connected correctly to each other). The Red binding post is the positive connection while the Black binding post is negative. 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.*

### 3) CONNECTING INPUTS

- For high line level balanced output devices plug into the balanced "MIC" XLR input at the rear of the FET401. Use a 3 conductor shielded cable.
- For high level non-balanced inputs, plug into the "LINE" 1/4" input jacks on the rear panel. Use a 2 conductor shielded cable. **NOTE:** This will also accept a balanced 1/4" signal if you wire the balanced signal to a stereo phone plug.

### 4) TURNING ON THE FET401

- Adjust the level control to the off position.
- Adjust the 9 Band Graphic EQ's to their center position.
- Turn the amp on and slowly raise the level control to the desired setting.

### 5) THE LED "CLIP" INDICATOR

The "CLIP" LED indicates when the amp is starting to distort. Occasional flashing of this LED is all right. However, heavy flashing is not recommended especially because of damage that "square wave" power can do to speakers and horn drivers.

### 6) The "PROTECT" LED

- The "PROTECT" LED has three protect functions. It's important that these functions be understood should the LED come on and the amp go in a "Protect Mode".
  - a) The first protection mode is against shorted speaker outputs. If the speaker outputs should ever short while a signal is present at the output, the "Protect" relay will politely disengage the speakers from the output section of the power amp protecting the amp from any damage.
  - b) The second protection mode detects any excess load (current) that may be drawn from the speaker outputs. The FET401 is designed to give its full rated power into 2Ω

without the Protect Relay engaging. Even 1Ω loads can be used safely at less than full power. However, the Protect Relay will engage when the amp is driven to its full power and loaded less than its 2Ω rating.

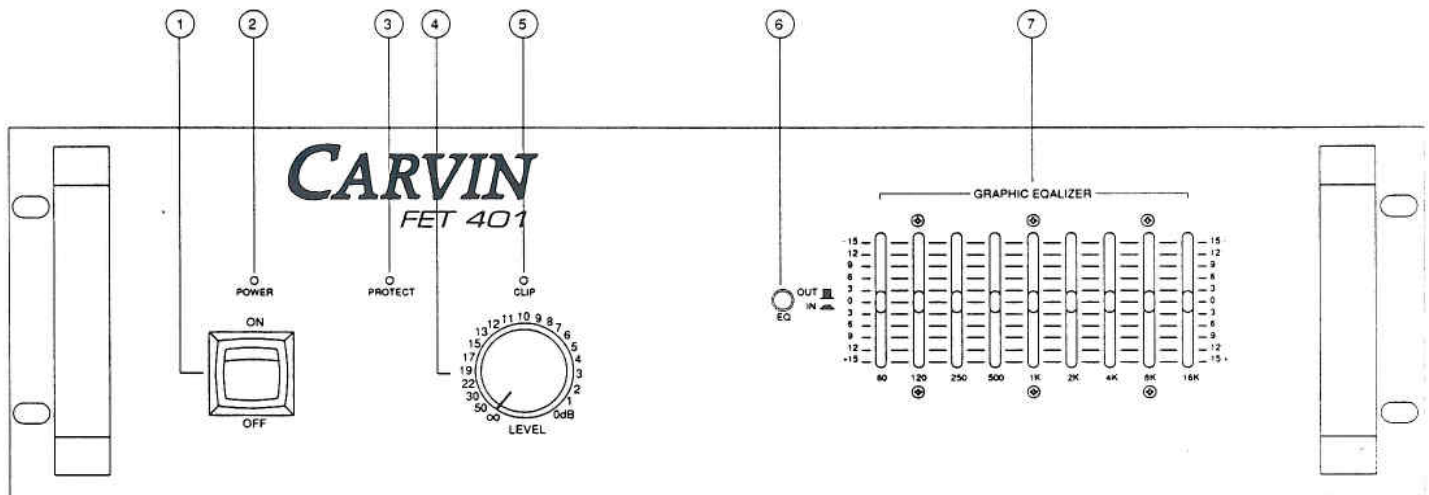
- c) The third protection mode is temperature related. The "Protect" LED will come on if the amp approaches its maximum operating temperature. This protect mode may be caused by blocked fan vents, excessively warm air going into the fan vents (if rack mount be sure the rack is properly vented with cool air), or the amp is driven hard below its rated speaker impedance.

### 7) RESETTING THE PROTECT LED

- a) If the FET401 does go into the protect mode because of an excessive load (current), simply turn the amp off—wait for 3 seconds—and than turn the amp on. The Protect LED will go off and the amp is ready to function.
- b) If the amp goes into the protect mode because of higher than normal operation temperature, turn the amp off—wait for to 3 seconds and if the Protect LED does not go off than you know that it's protecting from higher than normal operating temperatures. If this is the cause, leave the amp on and wait for the fan to cool the amp down. This generally takes about 3 to 5 minutes. At that time turn the amp off—wait for 3 seconds and turn it back on and the amp is ready to function. It's important to know that if your amp should ever go into a "Protect Mode" it does not harm your amp in any way. In fact, your amp was checked in the "Protect Mode" several times before its was shipped as part of Carvin's quality assurance program.

# FRONT PANEL FEATURES

FET401



## 1. POWER SWITCH

Push to turn the amplifier ON.

## 2. POWER LED

The Power LED Indicates when the FET401 is on.

## 3. PROTECT— LED

See "Quick Start Up"

## 4. LEVEL CONTROL

The Level Control should be turned up at least 1/3 for the FET401 to reach its full rated output. If not, your input source may start to distort (clip) by trying to drive the FET401 to its full output. If your signal is strong, it is not necessary to turn the FET401 full on.

## 5. CLIP LED

The CLIP LED will indicate when the power amp starts to distort. Occasional flashing is OK. If the LED is on continuously, turn the LEVEL control down. Amp distortion produces "square wave" power that is harmful to your speakers.

## 6. EQ IN/OUT SWITCH

If you require the Graphic Equalizer, push the EQ IN/OUT switch IN. Volume levels will be similar in either position providing the graphic sliders are in their center—neutral position.

## 7. GRAPHIC EQUALIZER

The 9 band Graphic Equalizer in the FET401 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 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 end treble.

Adjusting: It is recommended that all sliders be set in their center position before equalizing your tone. Typically low frequency feedback is in the 125 Hz and 250 Hz range while high feedback is in the 2k Hz 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 too. 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 effecting all frequencies. Take care not to over-adjust as this will drastically alter your over-all sound. Use the EQ in addition to proper microphone and speaker placement for the control of feedback.

**FET401 Specifications**

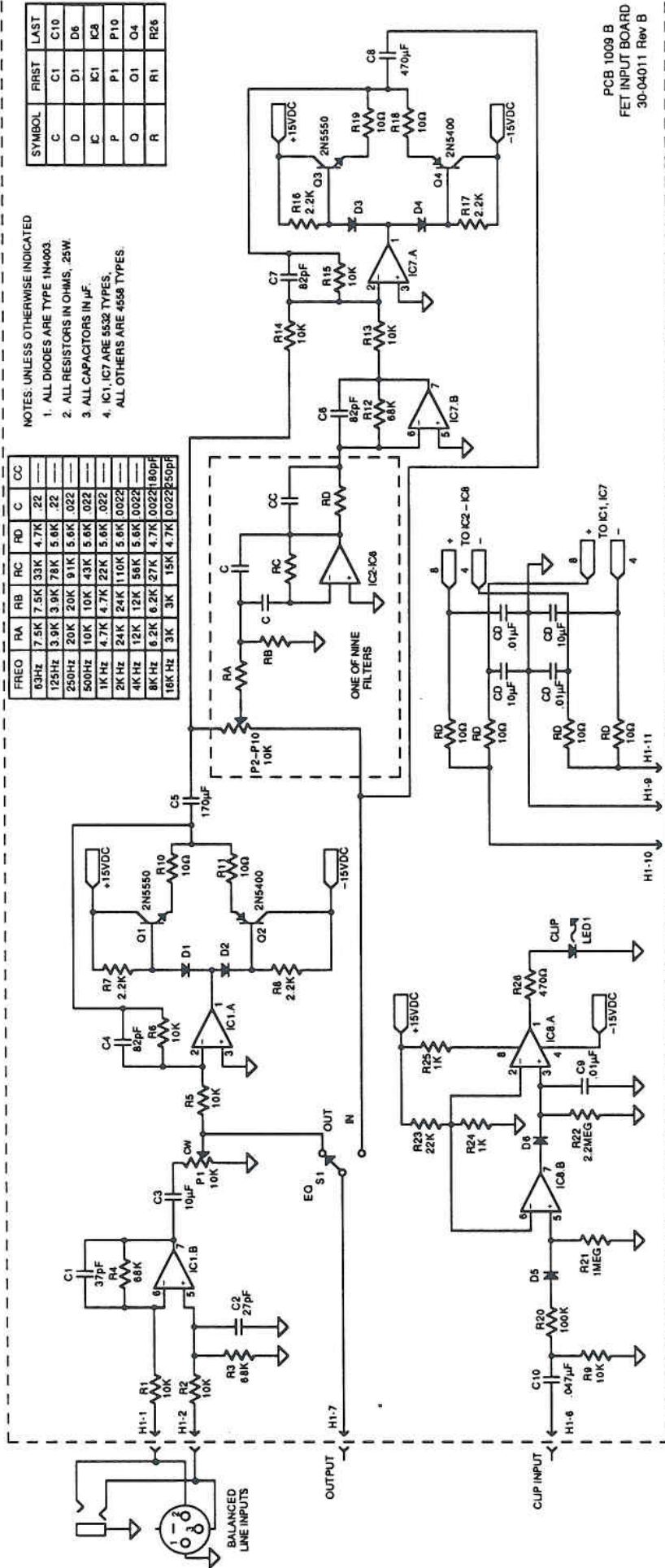
Power Output	8 $\Omega$ : 150w, 4 $\Omega$ 300w and 2 $\Omega$ 400w
Frequency Response	20 to 20k Hz $\pm$ 1.5 dB
THD	less than 0.1% 20 to 20k Hz at full power Typical: 0.01% THD
Input Impedance	10k Hz ohms
Input Connectors	Balanced XLR and balanced (stereo) 1/4" phone jack,
Maximum Input Level before clipping	
Balanced	+18 dB
Unbalanced	+12 dB
Graphic EQ Freq.	60, 120, 250, 500, 1k, 2k, 4k 8k and 16k Hz $\pm$ 15dB
Graphic IN/OUT switch	Yes
Speaker Outputs	Two 1/4" phone jacks, Two Binding Posts
Output Monitor	Power amp LED "Clip" indicator
Power Requirements	120/240 VAC 50-60 Hz
Fuse	120V: 5 Amp—slow-blow 5x20mm 240V: 2.5 Amp—slow-blow 5x20mm
Dimensions	19"W x 10"D x 5.25"H
Shipping Wt:	31 lbs

FREQ	RA	RB	RC	RD	C	CC
33Hz	7.5K	33K	4.7K	22	---	---
125Hz	3.9K	3.9K	78K	5.6K	22	---
250Hz	20K	20K	91K	5.6K	022	---
500Hz	10K	10K	43K	5.6K	022	---
1K Hz	4.7K	4.7K	22K	5.6K	022	---
2K Hz	24K	24K	110K	5.6K	0022	---
4K Hz	12K	12K	56K	5.6K	0022	---
8K Hz	6.2K	6.2K	27K	4.7K	0022	180pF
16K Hz	3K	3K	15K	4.7K	0022	250pF

NOTES, UNLESS OTHERWISE INDICATED

1. ALL DIODES ARE TYPE 1N4003.
2. ALL RESISTORS IN OHMS, .25W.
3. ALL CAPACITORS IN  $\mu$ F.
4. IC1, IC7 ARE 5532 TYPES.

ALL OTHERS ARE 4558 TYPES.



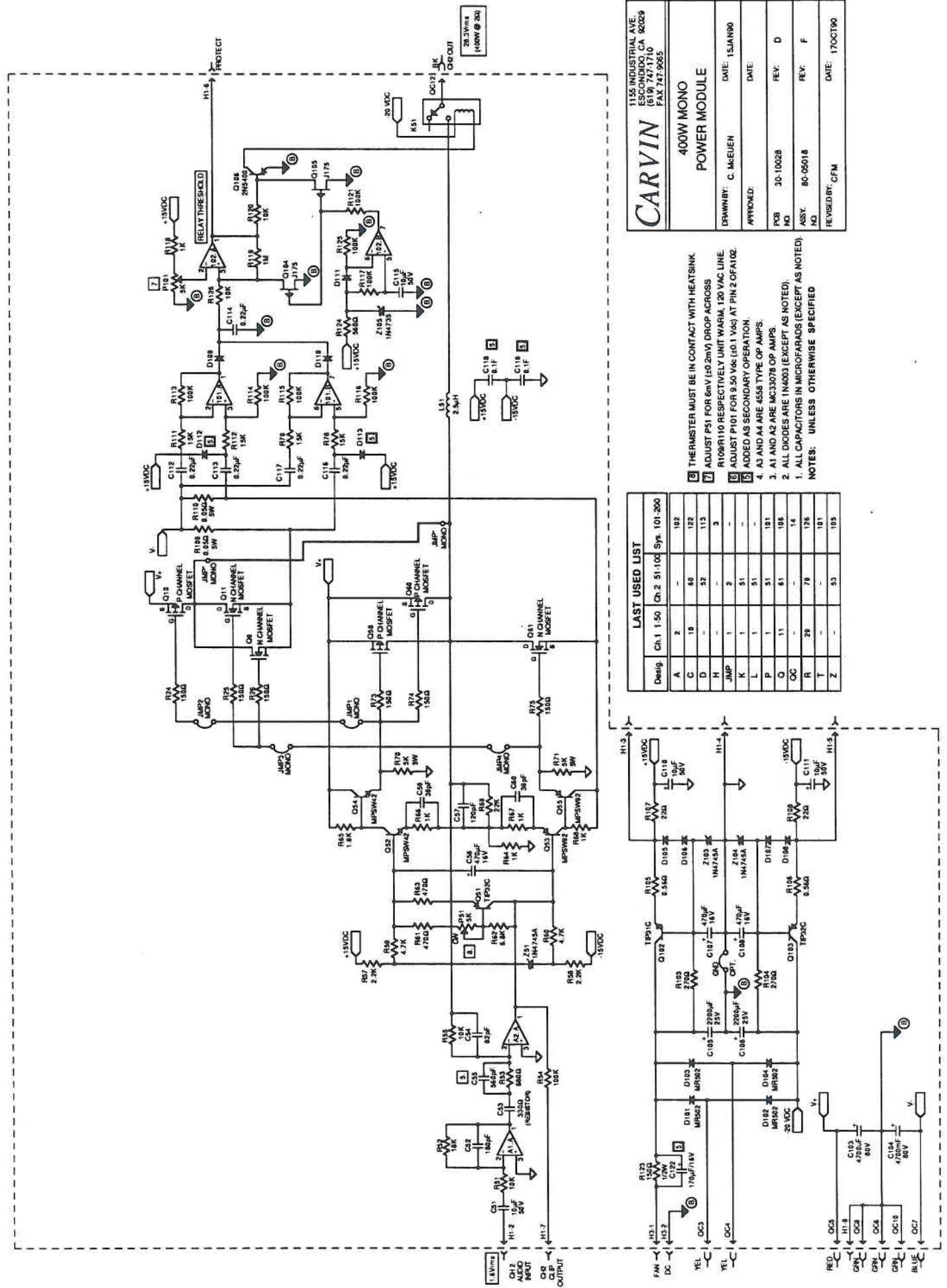
PCB 1009 B  
FET INPUT BOARD  
30-04011 Rev B

**CARVIN**

**FET 401  
INPUT/EQ**

1155 INDUSTRIAL AVE  
ESCONDIDO, CA 92029  
(619) 747-1710  
FAX 747-9065

DRAWN BY: C. McEJEN	DATE: 25JUN90
APPROVED:	DATE:
PCB 1009 B	REV. B
NO.	REV. B
ASSY. NO. 80-04011	REV. B
REVISED BY: CFM	DATE: 17OCT90



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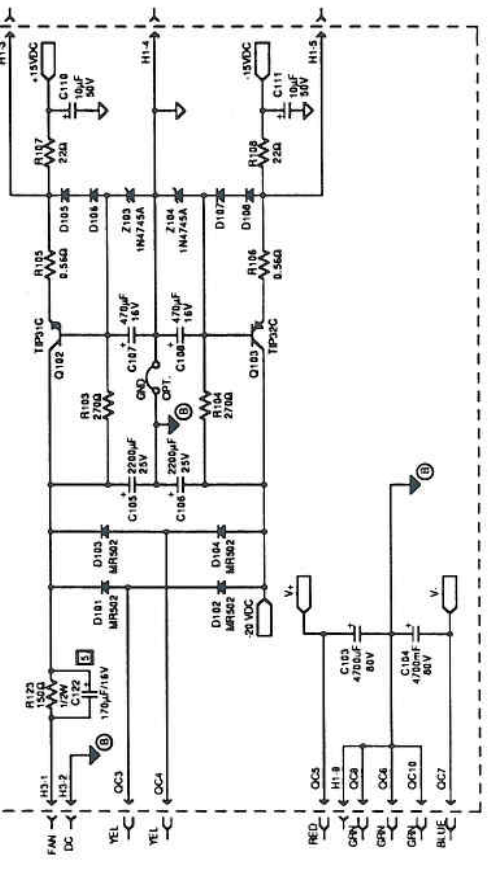
**400W MONO  
 POWER MODULE**

DRAWN BY: C. McEUIEN    DATE: 15JAN90  
 APPROVED:                    DATE:  
 PCB NO: 30-10028    REV: D  
 ASSY NO: 80-05018    REV: F  
 REVISED BY: CFM                    DATE: 17OCT90

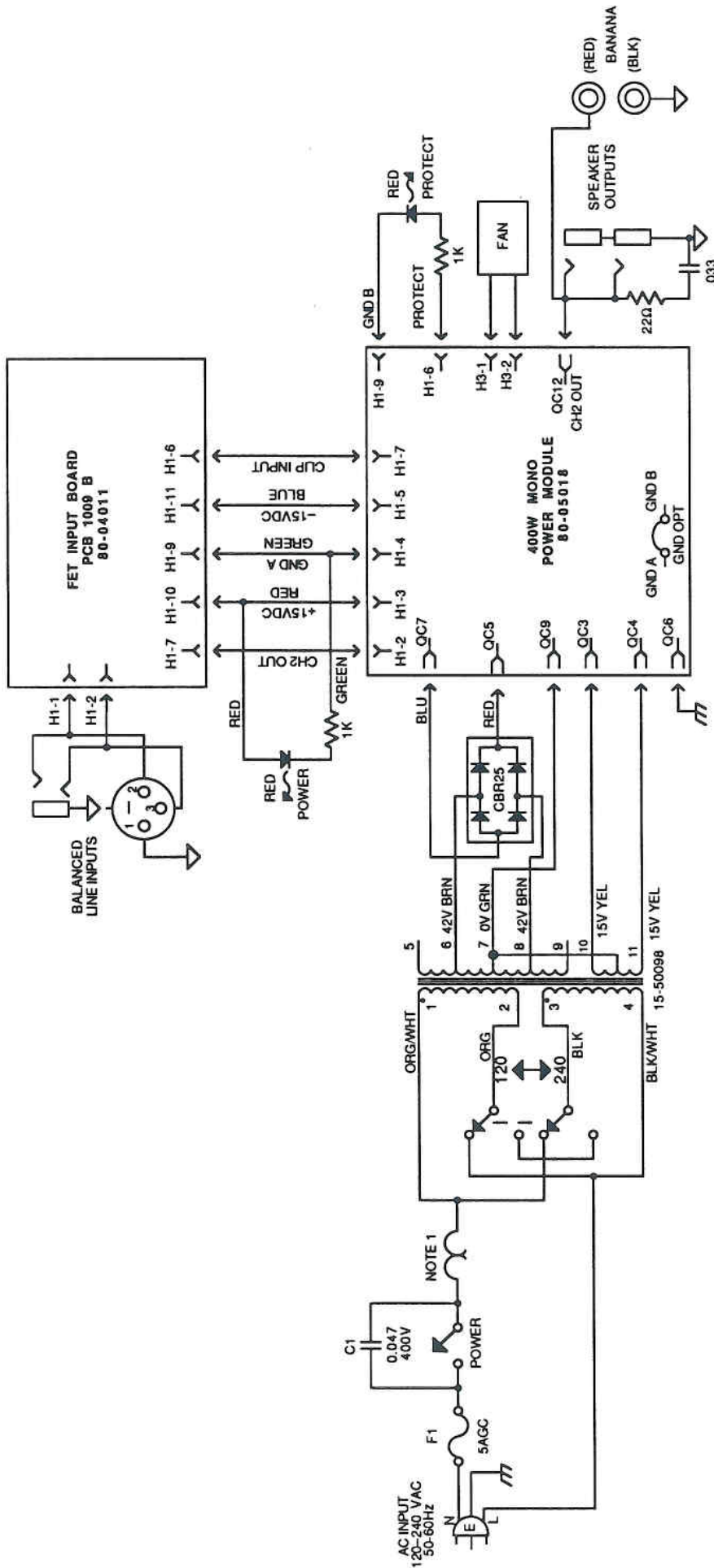
- 1. THERMISTOR MUST BE IN CONTACT WITH HEATSINK
- 2. ADJUST P51 FOR 6mV (±0.2mV) DROP ACROSS R108/R110 RESPECTIVELY UNIT WARM, 120 VAC LINE.
- 3. ADJUST P101 FOR 9.50 Vdc (±0.1 Vdc) AT PIN 2 OF A102.
- 4. A3 AND A4 ARE 4558 TYPE OP AMPS.
- 5. ALL CAPACITORS IN MICROFARADS (EXCEPT AS NOTED).
- 6. ALL DIODES ARE 1N4003 (EXCEPT AS NOTED).
- 7. NOTES: UNLESS OTHERWISE SPECIFIED

**LAST USED LIST**

Design	Ch 1	1-50	Ch 2	51-100	Sys.	101-200
A	2	-	-	-	-	102
C	10	60	122	-	-	102
D	-	32	113	-	-	102
H	-	-	-	2	-	3
JMP	1	-	-	-	-	-
K	1	51	-	-	-	-
L	1	51	-	-	-	-
P	1	51	-	-	-	101
OC	11	81	-	-	-	108
OC	-	-	-	-	-	14
R	28	78	126	-	-	101
T	-	-	-	-	-	101
Z	-	-	-	53	-	105







<b>CARVIN</b>		1155 INDUSTRIAL AVE. ESCONDIDO, CA 92029 (619) 747-1710 FAX 747-9065	
		<b>FET 401 INTERCONNECT</b> Rev A	
DRAWN BY:	C. MCEUEN	DATE:	17 OCT 90
APPROVED:		DATE:	
PCB NO.		REV:	
ASSY. NO.	85-00401	REV:	A
REVISED BY:		DATE:	

1. THERMAL SWITCH MOUNTED ON HEATSINK.  
NORMALLY CLOSED, OPEN AT 185° F.  
NOTES: UNLESS OTHERWISE INDICATED

## Warranty and Service Information

You may use our specialized service department to repair your amp. Call us Toll-Free 800-854-2235 for your Service number so we will anticipate your shipment. Put the Service Number on the carton and be sure to include a full description of every problem when returning your unit. Pack the amp in its original carton using all its packing material and return it by UPS pre-paid. Units with physical damage, missing parts, or damage from improper service are not serviceable.

### • CALL BEFORE RETURNING

If in doubt about a malfunction, please call our service department (toll-free) and we will help you determine if your unit is defective to avoid costly shipping.

### • REPAIRS UNDER WARRANTY(1Year)

1. There is no charge for service under warranty. However, shipping is to be paid both ways by the customer.
2. Include a copy of the original invoice to verify your warranty along with a full description of the problem(s).
3. Allow approximately 10 days for servicing.
4. Include a check for return shipping charges (see the CARVIN catalog for current shipping rates).
5. Speaker Systems: If you require a loudspeaker repair, you should remove the defective component (speaker) to save shipping charges.
6. To avoid damage, ship only in the original carton.

### • REPAIRS OUT OF WARRANTY

1. After your warranty has expired, call us for the current flat rate charge which includes parts labor and testing to bring your unit up to factory specifications.
2. The return shipping charge will be listed in the current CARVIN catalog.
3. You may include your check (after you have called for your service & shipping quote) to avoid COD charges.
4. Allow approximately 10 days for repair and testing, plus shipping time.
5. To avoid damage, ship only in the original carton (save your carton).

### • SERVICING IN YOUR AREA

You may select your own service center or have your own qualified technician work on the unit at your own expense. This will not void the warranty unless damage was done because of improper servicing. Under the ONE YEAR WARRANTY, Carvin will ship parts pre-paid to you or your technician providing that the defective part(s) are first returned for our inspection. If you do not have a qualified service person, we ask that you do not involve yourself in servicing the unit.

### LIMITED WARRANTY

Your Carvin Professional Series Product is guaranteed against failure for ONE YEAR. Carvin will service the unit and supply all parts at no charge to the customer providing the unit is under warranty.

**CARVIN WILL NOT PAY FOR PARTS OR SERVICING OTHER THAN OUR OWN.**

This warranty is extended to the original purchaser only and is not transferable. THIS WARRANTY DOES NOT INCLUDE FAILURES CAUSED BY INCORRECT USE, INADEQUATE CARE OF THE UNIT, OR NATURAL DISASTERS. A COPY OF THE ORIGINAL INVOICE IS REQUIRED TO VERIFY YOUR WARRANTY.

Carvin takes no responsibility for any horn driver or speaker damaged by this unit. This warranty is in lieu of all other warranties, expressed or implied. No representative or person is authorized to represent or assume for Carvin any liability in connection with the sale or servicing of Carvin products. No liability is assumed for damage due to accident, abuse, lack of reasonable care, loss of parts, or failure to follow Carvin's directions. CARVIN SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

*In the interest of creating new products and improving existing ones, Carvin is continually researching the latest state of the art audio design methods, and modern packaging and production techniques. Thus, Carvin reserves the right to make changes in its products and specifications without notice or obligation.*

**Toll Free 800-854-2235**

**CARVIN**

1155 Industrial Ave.

Escondido, CA 92029

(619) 747-1710 M-F 8 to 4:30

