

## Threshold

FET nine/e  
preamplifier

*OPERATING  
MANUAL*

## **IMPORTANT!**

to avoid fire and electrical hazards  
observe the following cautions

**DO NOT OPEN THE PREAMPLIFIER'S POWER  
SUPPLY - THERE ARE NO USER SERVICEABLE  
COMPONENTS INSIDE. REFER SERVICING  
TO QUALIFIED PERSONNEL ONLY.**

**TO PREVENT FIRE OR SHOCK HAZARD DO  
NOT EXPOSE THE PREAMPLIFIER OR ITS  
POWER SUPPLY TO RAIN OR MOISTURE.**

**DO NOT ALLOW LIQUIDS TO ENTER THE  
PREAMPLIFIER OR ITS POWER SUPPLY.**

**NEVER BYPASS THE POWER SUPPLY'S  
LINE FUSE OR REPLACE IT WITH ONE  
OF INCORRECT CHARACTERISTICS.**



this symbol is intended to  
alert you of the presence of  
uninsulated dangerous  
voltage within the unit's  
enclosure that may be of  
sufficient magnitude to  
constitute a risk of electric  
shock to persons.



this symbol is intended to  
alert you to the presence of  
important operating and  
maintenance instructions in  
the literature accompanying  
the unit

## **CONTENTS**

<b>introduction</b>	<b>5</b>
<b>quick instructions</b>	
installation	6
operation	6
cautions	6
<b>detailed operating information</b>	
location	7
installation	7
power requirements	8
balanced/unbalanced operation	9
input signal connection	9
setting the gain	9
setting the load	10
output signal connection	12
care	12
<b>design &amp; construction</b>	<b>13</b>
<b>warranty information</b>	
limited ninety-day warranty	14
extended limited warranty	14
warranty service procedure	14
reservations	15
update policy	15
<b>technical specifications</b>	<b>16</b>
<b>appendix illustrations</b>	
system interconnection diagram	a1
dimensional drawings	a2
gain stage	a3
power supply regulator	a4
primary circuit board	a5

# INTRODUCTION

Thank you for the confidence you have expressed in Threshold through purchase of your new Threshold FET nine/e preamplifier. This instrument is the culmination of Threshold's more than fifteen years experience in the design and manufacture of ultra-high performance audio electronics and is worthy of inclusion in the finest home music system.

The circuit designs embodied in your new Threshold preamplifier employ engineering concepts at the forefront of audio technology. They neither lose information or gain distortion and precisely maintain all elements of the most complex source material to achieve a spatially accurate soundstage of palpable ambience.

The topologies selected for inclusion in each particular Threshold preamplifier system component are the result of thorough technical analysis and extended listening using a variety of master and commercial music sources and reference equipment. Contributing virtually no sound of its own, your Threshold preamplifier component will accurately reproduce the exact character of its source component and program material.

The electronic parts which form the circuits of your Threshold component are selected from the products of the world's leading manufacturers. Its flawless level of construction and finish are the product of an assembly staff who take personal pride in their craftsmanship. Each Threshold preamplifier component is individually tested and adjusted to achieve precise conformance to the original reference prototype.

Threshold Corporation and all Authorized Threshold Dealers stand behind your Threshold component and are ready to provide comprehensive assistance if you have any questions or problems which are not resolved by the information in this manual.

# QUICK INSTRUCTIONS

The following instructions are designed to allow rapid installation and operation of your Threshold preamplifier. Nevertheless, in order to prevent any problems stemming from incorrect assumptions you should fully read this manual before extensively utilizing the equipment. This will insure that you realize maximum performance from your Threshold component.

**BE SURE TO READ THE OPERATING CAUTIONS OF STEP 3.**

If you experience any difficulty in applying these abbreviated instructions of these steps refer to the appropriate section in the body of this manual. In the event you encounter a persistent problem not covered here contact your Authorized Threshold Dealer, who will provide the necessary technical assistance.

## 1 installation

FIRST, make certain that all associated equipment is turned off. Set the level control of your preamplifier to MINIMUM (fully counter-clockwise). Be sure to allow for access to the rear chassis connectors during the installation procedure. For lowest noise do not employ a location where the preamplifier will be near equipment containing motors or power transformers - including the preamplifier's own power supply.

Power and signal connections are made at the chassis rear of your Threshold preamplifier. The signal attributes for each connector are identified on the chassis rear adjacent to the connector. Interconnect illustrations for your particular model are included in the TECHNICAL APPENDIX section of this manual.

Be sure the internal settings of the preamplifier are those which correctly accommodate the cartridge you wish to use.

## 2 operation

Insert the DC power cord of the preamplifier into the DC output receptacle of its power supply. Insert the AC power cord of the power supply onto the AC power connector on the rear chassis and connect its plug to an AC power mains of correct rating. This rating is indicated on the AC power connector assembly of the supply.

Once the DC and AC power connections are made the preamplifier is in operation. However, a few seconds are required for control circuitry to achieve stabilization. During this period no signal is allowed to appear at the preamplifier output.



## 3 cautions



Observe the following cautions to avoid electrical hazards and/or possible equipment damage.

1. The preamplifier power supply must be correctly set for the AC power supplied.
2. Disconnect the AC power cable from the AC mains before installing or removing it from the power supply connector. Do not leave the cord free of the supply while it is connected to an AC power mains.
3. Do not open the power supply, or allow liquid to enter the supply or preamplifier. Do not operate the preamplifier and its supply in rain or moisture.
4. Do not bypass the power supply fuse or replace it with one of different characteristics.
5. Never plug or unplug any signal or power connection to the preamplifier, or change an internal setting while the preamplifier or any of the associated equipment is operating.

# DETAILED OPERATING INFORMATION

## location/installation

### location

The FET nine/e preamplifier consists of two separate components: the audio circuitry chassis and the DC power supply chassis. This section addresses the strategic placement of these elements.

The most obvious consideration in their location is user accessibility and the lengths of the various interconnection cables in the system. Another important consideration is the magnetic field generated by several types of audio equipment and the proximity of other components which are sensitive to these fields. Power supply transformers and the motors used in rotational playback components are typical magnetic field sources.

Threshold preamplifiers are not unusually sensitive to external magnetic fields. However, to achieve -80 dB hum noise for a moving coil cartridge input the induced noise voltage must be less than 1/10,000,000 of a volt. It is therefore prudent to locate your Threshold preamplifier as far away as possible from magnetic field sources. Twenty inches is advisable. In no instance should a Threshold preamplifier be placed directly below or on top of a component having either a power transformer or a motor.

Remember, your preamplifier's DC power supply itself contains a power transformer - and a relatively large one. It was provided a separate chassis and a lengthy power cable to enable installation relationships assuring the lowest possible noise pickup for all susceptible components of the system.

### installation

Threshold e series FET preamplifiers have concealed mounting slots at each end of the faceplate which are configured to the EIA rack standard. These may be used to support the unit in either a horizontal or vertical position. The power supply of your preamplifier, however, must be placed on a horizontal surface and has no provisions for attachment to a standard rack securing rail.

To access the rack mounting slots dismount the machined dress covers at each end of the faceplate by removing the two gold plated bolts at each end with the 7/64" hex wrench supplied. Be careful not to damage the plastic light tube which extends from the rear of the right side dress cover. The slots provide a recessed area which will allow clearance for the 10/32 "low head" socket cap bolts supplied and will permit re-mounting the covers after installation.

The bolts holding the preamplifier to the rack should be tightened only enough to prevent it from moving. Excessive tightening against a misaligned rack may cause sufficient stress to result in a curvature of the faceplate. If you are installing multiple components in your rack, the heavier pieces of equipment should be the first installed and secured at the rack bottom.

Finally, your installation should accommodate your need to change signal connections or alter the internal settings of the unit should this become necessary in the future.

## DETAILED OPERATING INFORMATION

### power requirements

**IMPORTANT CAUTIONS:** To avoid fire and electrical hazard do not remove the cover of the preamplifier DC power supply. Do not allow liquid to enter the preamplifier and/or power supply or operate them in rain or moisture. Always unplug the power cord from a live power source before installing or removing it from the supply connector. Do not leave the cord free of the supply while it is connected to a live AC source.

The e series DC power supply of your Threshold FET preamplifier is set for operation from the AC power furnished in the country of original end-user consumer sale unless supplied on special order. The power rating for which the unit is set is shown on the rear chassis of the supply by means of an indicator incorporated in the AC power connector assembly of the supply. Check this indicator to verify that it is set for the power supplied in your location.

Substantially impaired performance or severe damage may occur to both the preamplifier and supply if operation is attempted from an AC power source for which the supply has not been properly set.

If you intend to take your Threshold preamplifier out of the country where it was originally purchased, please contact Threshold/InConcert customer service for information regarding the conversion procedure for your preamplifier's power supply.

Insert the connector of your preamplifier's DC power cable into the DC output receptacle on the rear chassis of its power supply. Insert the separate AC power cord onto the AC power connector of the supply and connect its plug to an AC power mains of correct rating.

As soon as the preamplifier DC power supply is connected to the preamplifier and an AC power mains the preamplifier is in operation. However, a few seconds are required for control circuitry within the preamplifier to achieve stabilization. During this period no signal information is allowed to appear at the preamplifier outputs. When initially powering-up your preamplifier, or if your power is interrupted for more than an instant, be sure that the associated amplifier(s) are not turned on for at least a minute after power is again applied to the preamplifier.

Threshold FET nine/e preamplifiers are specifically intended to be left operating at all times and there is no "on-off" switch provided. Power consumption during periods your audio system is not in use is little more than that necessary to illuminate the preamplifier's LED "on" indicator. The life expectancy

of components is not adversely affected but, conversely, their temperature will remain constant, reducing stress and assuring peak operation at all times. However, if you plan to be away from home for more than a week it is advisable to unplug the components of your system from their AC power mains.

Your Threshold FET nine/e preamplifier and its DC power supply are attached to earth ground through the power cable of the supply when it is connected to a three-conductor power mains socket. This ground connection is a safety precaution which prevents the chassis from becoming electrically live in the event of a fault in the primary power circuits. The possibility of such an occurrence is extremely remote; nevertheless we recommend operating the preamplifier with this connection for maximum safety.

In rare instances noise may result from earth grounding when other audio components are also grounded through their power cables creating ground loops. This occurs because an electrical loop is formed by the multiple ground connection which picks up the magnetic field of the electrical environment. To eliminate these ground loops and their noise, it may be necessary to break the loop by disconnecting the multiple ground connections at some point(s). This can be accomplished by using "cheater" type AC adaptor plugs and leaving their external ground wire unconnected. Threshold experience has shown this ground disconnection is best done at components other than the amplifier(s). In this arrangement the disconnected components will still retain earth grounding via the shields of the signal cables between them.

If your home is not equipped with three-conductor wall outlets, three-to-two conductor adaptors, available at any supermarket or hardware store, will be required. Without them the AC mains plug of a Threshold component will not access a two conductor wall outlet. Make certain the adaptor's ground wire is connected to a true ground surface. In some older homes you may find that the electrical conduits themselves are not at earth ground potential and are unsuitable for use as a ground path.



## DETAILED OPERATING INFORMATION

### input signal connection

*analog disc (MC/MM cartridge) input*  
setting the gain

### input signal connection

If you have a questions regarding the suitability of any particular component for use with a Threshold preamplifier check with the manufacturer of the equipment or your Authorized Threshold Dealer.

**IMPORTANT:** Be certain all system components are turned off when connecting/disconnecting any signal cable.

Input signal connections are made to your FET nine/e preamplifier through the highest quality gold plated connectors. All connectors are located on the chassis rear and are clearly identified as to their application.

### *analog disc (MC/MM cartridge)*

These inputs are designed to directly accept the output of phonograph cartridges which exhibit a velocity response characteristic. Cartridges of this category are exemplified by high and low output moving coil, moving magnet, variable reluctance, moving flux, ribbon, and electret designs, all of which have an output of between 1 and 50 millivolts.

Different cartridges within this category require specific gain and input load characteristics. Consult the specification sheet for your cartridge to determine the appropriate gain and load settings. Make these settings as instructed in the following sections.

Centered between the left and right cartridge input connectors is a chassis ground binding post assembly. If your turntable has a separate grounding lead it should be attached at this point.

### setting the gain

As shipped from the factory your FET nine/e preamplifier is set to a gain characteristic suitable for the "high output" cartridges described below.

High output cartridges: Cartridges having a specified output greater than 3 millivolts are categorized as "high output" and should provide a sufficient listening level with your preamplifier's lower gain setting.

Low output cartridges: Cartridges having a specified output of less than 3 millivolts fall under the generic category of "low output" (whatever their generating principle) and require your preamplifier's higher gain setting.

If you find the low setting provides adequate gain with your cartridge this is the setting that should be used as it will have the lower distortion.

### TO CHANGE GAIN SETTINGS:

Should you find it necessary to re-set the gain of your preamplifier employ the following procedure:



**IMPORTANT! DO NOT OPEN YOUR PREAMPLIFIER WHILE IT'S POWER SUPPLY IS ATTACHED TO AN AC MAINS. DO NOT ALTER THE GAIN SETTING WHILE YOUR SYSTEM IS OPERATING.**

**AFTER DISCONNECTING** the preamplifier power supply from it's AC mains remove the top cover of the preamplifier with the hex wrench supplied in your owner's pack.

Locate the two miniature jumper assemblies which consist of a removable slider positioned over two of three pins extending upward from the base. These are positioned directly above and below the miniature switch assembly block at the left side of the left pair of small circuit boards when viewed from the front of the preamplifier.

### high output (MM) cartridge setting:

For low circuit gain - suitable for the high output cartridges described previously - position the slider of each assembly over the center pin and the outside pin of the assembly nearest the small circuit board to its side.

### low output (MC) cartridge setting:

For high circuit gain - suitable for the low output cartridges described previously - position the slider of each assembly over the center pin and the outside pin of the assembly nearest the side of the preamplifier chassis and the primary board mounting bracket.



**REPLACE AND SECURE THE PREAMPLIFIER COVER BEFORE RECONNECTING ITS POWER SUPPLY TO THE AC MAINS. DO NOT OPERATE YOUR PREAMPLIFIER WITH ITS COVER REMOVED.**

**IMPORTANT:** be sure the sliders of both the assemblies are equivalently positioned before closure or you will find it necessary to re-open the preamplifier and correct the settings.



## DETAILED OPERATING INFORMATION

### input signal connections (continued)

#### *analog disc (MC/MM cartridge) (continued)*

##### setting the load

As shipped from the factory your FET nine/e preamplifier is set for a cartridge load of 47,000 Ohms impedance and 50 picoFarads capacitance (all internal adjustment switches in the off position). These values are generally suitable for "moving magnet" cartridges - typical of the high output type previously described.

As a group moving coil (low output) cartridges are relatively insensitive to their capacitive load but each model cartridge will realize it's optimum performance into a specific load impedance.

Conversely, moving magnet (high output) cartridges as a group are designed to work into a load impedance of 47,000 Ohms but each model cartridge will realize its optimum performance with a specific input capacitance.

##### TO CHANGE LOAD SETTINGS:

If you find it necessary to re-set the load characteristics of your preamplifier employ the following procedure.

**IMPORTANT! DO NOT OPEN YOUR PREAMPLIFIER WHILE IT'S POWER SUPPLY IS ATTACHED TO AN AC MAINS. DO NOT ALTER LOAD SETTINGS WHILE YOUR SYSTEM IS OPERATING.**

**AFTER DISCONNECTING** the preamplifier power supply from it's AC mains remove the top cover of the preamplifier with the hex wrench supplied in your owner's pack.

Locate the miniature switch block assembly mounted on the carrier board at the left side of the preamplifier when viewed from the front. The switches of the assembly are used to set the impedance and capacitance characteristics for both input channels. Each switch actuator contains a rounded depression which allows it to be moved with a small implement such as the tip of a ball point pen.

The switches of each block are numbered 1 through 8 with switch 1 located nearest the front of the preamplifier. The "on" position is toward the same side of the assembly for every switch, and this "on" position is identified.

##### selecting impedance and capacitance:

Switches 1 through 4 effect the left channel.

Switches 5 through 8 effect the right channel.

**THE SETTINGS FOR BOTH CHANNELS SHOULD BE IDENTICAL.**

Select the appropriate impedance and capacitive values for both channels of the cartridge in use by moving the required switches to the "on" position (to the left when the switches are viewed from the front of the preamplifier) in accordance with the "on" values specified in the table below. The switch positions below are as seen from the front of the preamplifier.

	8	=	200 pF
	7	=	100 pF
	6	=	100 $\Omega$
right channel	5	=	47.5 $\Omega$
<hr/>			
left channel	4	=	47.5 $\Omega$
	3	=	100 $\Omega$
	2	=	100 pF
	1	=	200 pF

all switches off: 47,000 Ohms, 50 picoFarads/ch.

all capacitance (pF) switches on: 250 pF/ch.

all impedance ( $\Omega$ ) switches on: 32.2  $\Omega$  /ch.

It is not necessary to have an exact match to the cartridge load specifications in order to realize top performance. Simply select the closest available value to that recommended in the cartridge instruction sheet.



**REPLACE AND SECURE THE PREAMPLIFIER COVER BEFORE RECONNECTING ITS POWER SUPPLY TO THE AC MAINS. DO NOT OPERATE YOUR PREAMPLIFIER WITH IT'S COVER REMOVED.**

**IMPORTANT:** Be sure the switches of both the left and right channels are equivalently set before closure or you will find it necessary to re-open the preamplifier and correct the settings.

Remember, in all cases the capacitive load actually realized for a given switch position will be that specified above plus the capacitance inherent in the signal cables connecting the turntable to the amplifier. This capacitance is generally in the range of 100 pF. The exact value may be found in the specification sheet for the turntable or interconnects you are using.

In large measure the final impedance and capacitive values you select may ultimately be the result of personal preference.

## DETAILED OPERATING INFORMATION

### input signal connections (continued)

#### output signal connection

#### *compact disc, am/fm tuner, television audio*

Inputs on your Threshold preamplifier bearing any of the above designations are designed to receive "flat" high level audio signals from their associated component. The titles to these input pairs are essentially self explanatory as to the type of program source equipment which should be connected to them. Their titles correspond to the designations applied to the INPUT SELECTOR control on the preamplifier's front panel.

Each of these inputs has an identical input load characteristic of a nominal 20 kOhms.

#### *recorder*

Your Threshold preamplifier provides for the connection of an associated recorder and allows instant selection between monitoring the source material or the recorded signal. These capabilities are fully explained in the FRONT PANEL CONTROLS section of this manual.

The output from the recorder - the signal you want to hear - should be connected to the MONITORING INPUT connector pair of the recorder group.

The input to the recorder - the signal you want to record - should be connected to the RECORDING OUTPUT connector pair of the recorder group.

Most reel-to-reel recorders will allow simultaneous recording and monitoring of the just recorded signal. Recorders having this capability will allow instant comparison through your preamplifier's front panel MONITORING SIGNAL control of the original source signal and the just recorded signal. Fewer cassette recorders allow this as do virtually no PCM video format recorders. Check the owner's manual for your recorder to determine the exact nature of the signal appearing at the recorder's output connectors during the recording process.

The signal information appearing at any RECORDING OUTPUT connector pair is unaffected by the MONITOR, BALANCE, or LISTENING LEVEL controls on the preamplifier's front panel.

#### output signal connection

The Threshold FET nine/e preamplifier provides an unbalanced output signal at line level through the RCA connectors on its rear panel designated: PREAMPLIFIER OUTPUT.

The unbalanced output signal is sourced at an impedance of 100 Ohms. This value allows the use of quality cable in fairly extended lengths for connection to the following component without the introduction of detrimental signal effects.

If you have any questions regarding the suitability of any particular make or model component with which you wish to use the FET nine/e contact the manufacturer of the component or your Authorized Threshold Dealer.

# DETAILED OPERATING INFORMATION

## front panel controls (continued)

### *input selector*

This control determines which input signal will be fed to the preamplifier circuits from those presented to the rear chassis input connectors (exclusive of the RECORDER group). The control knob designations correspond with those identifying the input connectors on the preamplifier's rear panel.

### *listening source*

This control selects only the signal that is routed to the preamplifier's rear chassis PREAMPLIFIER OUTPUT connectors for playback through the associated amplifier and loudspeakers. Choice is made between the signal from the SELECTOR control or that of the recorder's monitoring signal. The signal selected by the LISTENING SOURCE control will be affected by the preamplifier's SIGNAL MODE, CHANNEL LEVELS, and LISTENING LEVEL controls.

The purpose of this control is to permit instant comparison between a "master" signal source and the signal as it has just been recorded by one or more associated recorders.

NOTE: If the source component for the recording signal has a high output impedance, switching from listening to the source to monitoring the recorded signal will subtly influence the recording level. If this is the case the preamplifier's control should not be switched during quality critical recordings. It is not unknown for the source/monitor control of recorders to exhibit this characteristic as well.

### *signal mode*

This control is for use in effecting the reproduction characteristics of program material selected by the LISTENING SOURCE control for appearance at the preamplifier outputs.

#### STEREO position

In this position the left and right channel signal paths of your preamplifier are completely independent and fully isolated left and right channel information will appear at the respective output connectors of the preamplifier.

#### SUMMED MONO position

In this position left and right channel information is added together (L+R) to produce a monophonic sum of the signal selected by the LISTENING SOURCE control. This modified signal will simultaneously appear at both the left and right channel output connectors of the preamplifier.

NOTE: It is not the purpose of this control to enable summed mono recording. If you wish to use a stereo input for mono recording it is recommended to sum the signal via Y adaptors, then split the summed mono signal with a second Y adaptor for presentation to the stereo channel inputs of the preamplifier.

In the summed mono position no stereo characteristics will be experienced in the reproduced sound. This position is useful when playing older, monophonic analog disc recordings as the additive matrix will cancel out the vertically generated component of a stereo cartridge's response. With the vertical component cancelled only the true lateral groove information of a monophonic record is reproduced. This prevents a stereo cartridge from generating distortion products of a "difference" nature, such as those caused by groove-pinch for example, while reproducing a monophonically cut recording.

Because of azimuth tolerances between the tracks of different tape recorder's record and reproduce head stacks and/or tape skew characteristics two channel tape recordings played in the SUMMED MONO position may produce a slight, though unusual, audible distortion.

NOTE: If the signal source component has a very low output impedance, low output current capability, and the material has significant signal difference between the two channels, using the mono switch may induce distortion as a result of one source channel "talking" to the other. If this is a problem, either do not use the mono mode or arrange for some resistance in the source output.

## DETAILED OPERATING INFORMATION

### front panel controls (continued)

#### ATTENUATE 20 dB position

This position reduces the loudness level of the signal appearing at the preamplifier's output connectors by 20 dB from that of normal preamplifier operation. This option is useful when loudness must be temporarily reduced and then precisely restored to its original gain level.

Remember, this control is not intended for use while recording. In order to avoid any possibility of signal interaction the SIGNAL MODE control should be left in the stereo position during quality critical recording.

#### *channel levels*

This control affects the relative signal levels heard between the left and right channels of your preamplifier. The electrical center of the control is indicated by the word "balanced" on the faceplate and by a detente at the center of the control's rotation. In this position the gain levels of both the left and right channels are equivalent.

Rotating the control clockwise from the detente will bias the sound toward the right loudspeaker, counterclockwise toward the left.

If you experience any difficulty in realizing a stable stereo image check the loudspeaker wiring to make certain one channel has not been inadvertently connected out-of-phase. The owner's manual for your amplifier and loudspeakers will detail the correct configuration to assure proper phasing.

#### *listening level*

The LISTENING LEVEL control of your preamplifier is a sealed 32 detente position attenuator of the highest quality. Precision resistance elements are used to produce the signal attenuation realized for each channel. To assure maximum channel isolation the control assembly consists of two independent controls mounted on a common shaft and it simultaneously alters the left and right channel signal levels which appear at the preamplifier's output connectors. It is production tested for 1 dB absolute tracking accuracy.

At full counterclockwise rotation no signal appears at the preamplifier's output connectors. As the control is rotated clockwise output is increased in approximately 3 dB steps at the upper and lower ends of the control range, and approximately 1.5 dB for each step through the center of its range.

The rotation of this control has no effect on signals appearing at the RECORDING OUTPUT connectors of the preamplifier.

## DETAILED OPERATING INFORMATION

### care

#### care

All signal connectors of your preamplifier are gold plated and their surfaces will exhibit no oxidation. Airborne contaminants, however may make occasional cleaning necessary. Threshold recommends use of a cotton swab for this purpose saturated with 99% isopropyl alcohol. So-called "rubbing" alcohol should not be used as it often contains undesirable additives such as lanolin or perfumes.

All rotating switch contacts are gold plated and the switch bodies are sealed to eliminate the possibility of entry by dust or other pollutants.

At the factory detail cleaning of metal surfaces is done using a quality spray window cleaner with kim-wipes, a lint free wiping "paper". White vinegar or a dilute ammonia solution may also be used. However, because the formulas for household cleaners vary and/or change without notice, Threshold can assume no responsibility for the results obtained with any particular product.

Do not use abrasive cleaners, polishes, or "dusting" sprays on your preamplifier's surfaces. Remember, the aluminum alloy of which the faceplate is made is an intrinsically soft metal. It will not withstand the careless use of tools during the course of installing the preamplifier in a rack or cabinet.



## DESIGN AND CONSTRUCTION

The correlation between simplicity of gain path and sonic purity is regarded as axiomatic at Threshold and research efforts have always been directed toward achieving wide bandwidth and high linearity with as few components in the signal path as possible. Any complexity is reserved for support circuits that bias or power the gain devices and is held exclusive from the audio signal path.

Your Threshold FET nine/e preamplifier embodies advanced audio design applied to preserving the sonic integrity of the highest quality music sources. The circuits are not implementations of op-amps, nor are they evaluated solely as a function of bench testing. Threshold gain stages must pass stringent objective and subjective requirements.

A schematic diagram of the preamplifier's gain stage as well as the power supply regulators and primary circuit board interconnections can be found in the technical appendix section of this manual.

The power supply regulators consist of capacitor bypassed zener voltage references driving bipolar differential circuitry followed by bipolar voltage gain and bipolar power voltage followers. The circuits are completely complementary with respect to plus and minus supplies. Each of these circuits is individually trimmed for an output of 18 volts to 1% tolerance.

The supply input and output is bypassed on the regulator board and bypassed again on the primary board. Connections to the primary board are made on redundantly connected gold sockets.

The gain stage module utilizes dual differential pairs of ultra low noise N-channel J-FETs in parallel to achieve higher transconductance and lower noise than is possible with single devices. They are biased by a unique active current source which is adjusted to provide maximum balance for the differential circuit and thus absolutely minimal DC offset. The signal from the input stage is further amplified by a select P-channel MOSFET which is cascoded for maximal linearity and bandwidth. The output of the MOSFET is passed to complementary followers which comprise the output of the circuit.

Those circuits which accommodate the direct input from a phonograph cartridge have had considerable care and attention devoted to RIAA de-emphasis accuracy. To maintain the integrity of the phase and amplitude information contained in an analog disc

recording the preamplifier must effect a precise inversion of the RIAA recording characteristic inscribed on the disc. The RIAA de-emphasis circuits of the FET nine/e preamplifier are comprised of both feedback and passive approaches and were modeled to levels of 0.01 dB accuracy. Precision tolerance and selected components deliver typical flatness within 0.1 dB.

Absolute gain and frequency response is guaranteed to within 0.25 dB of RIAA specifications.

The neutrality of these high performance circuits is preserved through extensive shielding and power supply isolation. Each channel has twin separate discrete class A voltage regulators, input and output bypassed by the highest quality film capacitors, and sourced by a toroidal transformer and 30,000 microFarads of computer grade capacitance. The tight regulation of this design in conjunction with the high power supply rejection of the gain circuits insures absolutely minimal noise, modulation, and crosstalk effects.

Components were selected from manufacturers recognized as suppliers of the finest parts available. The few capacitors associated with the signal path in functions such as RIAA equalization are advanced technology film types specifically selected for their absolute transparency in audio applications. Resistors are RL02 or RN55 metal film devices. Circuit boards are military-grade glass-epoxy featuring gold over nickel over copper with gold plated-through holes. Every lead or pin junction to the board is virtually a soldered gold plated socket.

The components comprising your preamplifier were tested and adjusted for performance by both human and automated testers and carefully inspected for flawless appearance both before and after the assembly process. The incoming semiconductors are tested for breakdown, gain, noise and linearity on arrival. The gain modules are fully characterized, and the finished product undergoes thorough testing before and after a "burn-in" period. Every Threshold component is built to the high standards of craftsmanship and finish for which Threshold has received world-wide recognition.

Your Threshold preamplifier embodies the personal vision of Threshold's founders, Nelson Pass and Rene Besne, and represents the most original electronic concepts clothed in sculptured elegance. Starting with the first Threshold product, the 800A amplifier introduced in 1975, our goal has been to produce audio classics of timeless value.

## **WARRANTY INFORMATION**

**limited ninety day warranty**

**extended limited warranty**

**warranty service procedure**

Every effort has been made to insure that your Threshold component represents the highest level of performance, reliability and finish. Upon delivery to you (date of purchase) it is automatically covered by the following warranty:

### **limited ninety-day warranty**

Any failure of the Threshold component covered by this warranty to operate according to specifications applicable at the time of manufacture as a result of a manufacturing defect will be corrected by Threshold without charge for parts, labor, and surface transport to and from the factory facility for a period of ninety (90) days from date of purchase or not more than five (5) months from date of manufacture.

This ninety-day limited warranty is extended to the original purchaser only. It is contingent upon purchase of the Threshold component at retail by the original end-user consumer from an Authorized Threshold Dealer in the United States and applies only to Threshold components purchased for United States use at 120 volts.

The following situations are specifically excluded from warranty coverage:

1. Any Threshold component under performance testing by any facility or personnel not authorized by Threshold Corporation.
2. Any Threshold component not operated in accordance with the instructions contained in its operating manual.

3. Any Threshold component which has, in the sole opinion of Threshold, been subject to accident, abuse, tampering, unauthorized modification, neglect, or has had its serial number removed or defaced.

4. Any consequential damage of any nature.

This limited warranty gives you specific legal rights. You may also have other rights and some of the exclusions may not be applicable in your state.

Freight charges will be billed for a component returned under this ninety-day limited warranty and found by the factory to be operating in accordance with its applicable specifications.

### **extended limited warranty**

An extended limited warranty is available for Threshold components at no charge. The terms of this extended limited warranty are fully described on the Extended Limited Warranty Registration Card which is packed with each Threshold component sold for United States use. To obtain extended limited warranty coverage you must fully complete the Extended Limited Warranty Registration Card and return it to InConcert/Threshold within 15 days of purchasing your Threshold component.

### **warranty service procedure**

In the unlikely event your Threshold component should require service under warranty take it, with proof of purchase date and with its carton and packing material, to any Authorized Threshold Dealer. The Authorized Dealer will handle the details required for factory repair.

Direct shipments to the factory will not be accepted without a factory issued return authorization number which must clearly appear on the address label of the shipping carton.



## WARRANTY INFORMATION

warranty service procedure (continued)

reservations

update policy

### warranty service procedure (continued)

For your convenience the InConcert marketing division of Threshold Corporation maintains an 800 number to facilitate warranty service inquiries. To obtain warranty information, including a return authorization number if one is required, call Threshold/InConcert customer service at:  
1 (800) 888 8055.

Threshold products whose original consumer sale was made outside the United States will be covered by those warranty terms extended by the importing distributor which may differ in some respects from those given above. Warranty service, if required, is the responsibility of the importing distributor.

If a Threshold product is removed from the country in which the original consumer purchase was made, Threshold distributors and/or dealers in any subsequent country are not obligated by the terms of this warranty. Any repairs made under the terms of this warranty will be at the discretion of the distributor or dealer.

### reservations

Because Threshold is constantly researching new technologies and materials the option is reserved to incorporate design refinements or modifications into ongoing production without notice or obligation. For this reason a particular Threshold product may have slight differentiation from its illustration or electrical description but it will always equal or exceed the standards set by the original design and/or factory reference unit.

### update policy

If practical, such design modifications may be incorporated in whole or in part in prior units whose original consumer sale was in the United States for 120 volt use at a modest charge. This service is available with the provision that these units have been registered with Threshold via their extended warranty registration card within 15 days of purchase.

Threshold offers an update service for select models. Contact Threshold/InConcert customer service for specifics. Your Authorized Threshold Dealer will be able to advise you of any factory available modifications should they become available to a particular product model.

Update service for models whose original sale was made outside the United States is at the discretion of the importing distributor and any specific modification may not be suitable for these units. Importing distributors will advise the Authorized Threshold Dealers in their distribution area if any modifications are applicable for their particular market area.

# TECHNICAL SPECIFICATIONS

## Threshold

FET nine/e  
preamplifier

### *description*

dual channel, non-inverting field-effect transistor audio preamplifier providing gain and equalization required for velocity characteristic "magnetic" cartridges of moving coil, moving magnet, or other design. It allows selectable gain of +40 dB or +60 dB at 1 kHz and loading of 50 pF, 100 pF, 200 pF, or 250 pF and 32.2 Ohms, 47.5 Ohms, 100 Ohms, or 47,000 Ohms. It allows full control of the selected signal prior to power amplification or in record monitoring. Four input sources are available in addition to the record and monitor signals of an associated recorder. Front panel controls consist of: INPUT SELECTOR, LISTENING SOURCE, SIGNAL MODE, CHANNEL LEVELS, and LISTENING LEVEL. An unbalanced characteristic flat output signal at line level is provided.

## cartridge gain section

### *input impedance*

selection of: 32.2 Ohms, 47.5 Ohms, 100 Ohms, or 47 kOhms in parallel with 50 pF, 100 pF, 200 pF, or 250 pF allows appropriate termination for both moving magnet and moving coil cartridges.

### *gain*

moving magnet: 76.45 = +37.7 dB @ 1 kHz.  
moving coil: 841 = 58.5 dB @ 1 kHz.  
25 Ohm source, 47 kOhm input load. 10 kOhm and 1 nanoFarad output load.

### *RIAA*

de-emphasis accuracy within  $\pm 0.25$  dB.

### *distortion*

moving magnet: 0.005% @ 5 Volts RMS preamplifier output.  
moving coil: 0.05% @ 5 Volts RMS preamplifier output.  
20 Hz through 20 kHz. 10 kOhm and 1 nanoFarad output load.

### *noise*

moving magnet: -80 dBA referenced to 5 mV input.  
moving coil: -66 dBA referenced to 1 mV input.

### *crosstalk*

-88 dB 20 Hz through 20 kHz.  
25 Ohm source, 47 kOhm input load. 10 kOhm and 1 nanoFarad output load.

TECHNICAL SPECIFICATIONS (continued)

high level section

<i>input impedance</i>	unbalanced: 20 kOhms.
<i>output impedance</i>	unbalanced: 100 Ohms. tape out from unbalanced input: 100 Ohms + source impedance.
<i>gain</i>	10.68 = +20.57 dB. 10 k $\Omega$ , 1 nanoFarad load. LISTENING LEVEL control full clockwise, 25 Ohm source.  1 = 0 dB. 10 k $\Omega$ , 1 nanoFarad load. through RECORDER OUTPUT connectors. LISTENING LEVEL control full clockwise, 50 Ohm source.
<i>frequency response</i>	DC to -0.2 dB @ 100 kHz. 10 k $\Omega$ , 1 nanoFarad load. input through PREAMPLIFIER OUTPUT connectors. LISTENING LEVEL control full clockwise, 25 Ohm source.
<i>distortion</i>	0.007%, 20 Hz through 20 kHz. @ 10 k $\Omega$ , 1 nanoFarad load and 8 Volts RMS out.  0.010%, 20 Hz through 20 kHz. @ 300 Ohm load and 4 Volts RMS out.
<i>noise</i>	20 $\mu$ Volt = -0.94 dBV, -112 dB referenced to maximum output. random noise 20 Hz through 20 kHz.  3 $\mu$ Volt = -110 dBV, -128 dB referenced to maximum output.
<i>crosstalk</i>	-84 dB @ 1 kHz. -80 dB @ 20 kHz. LISTENING LEVEL control full clockwise, 25 $\Omega$ source.  -94 dB @ 1 kHz. -66 dB @ 20 kHz. LISTENING LEVEL control @ unity gain, 25 $\Omega$ source.

Because Threshold is constantly researching new technologies and materials the option is reserved to incorporate design refinements or modifications into ongoing production without notice or obligation.

# APPENDIX ILLUSTRATIONS FET 9e TECHNICAL DRAWINGS CONTENTS

## **a1 System Interconnection Diagram**

Rear Panel

(R4350050B-NC)

## **a2 Dimensional Drawing**

FET 9e

(R4350050C-NC)

## **a3 Gain Stage**

Gain  
Layout, Gain PCA

(S5541098-A1)  
(R5541098-A)

## **a4 Power Supply Regulator**

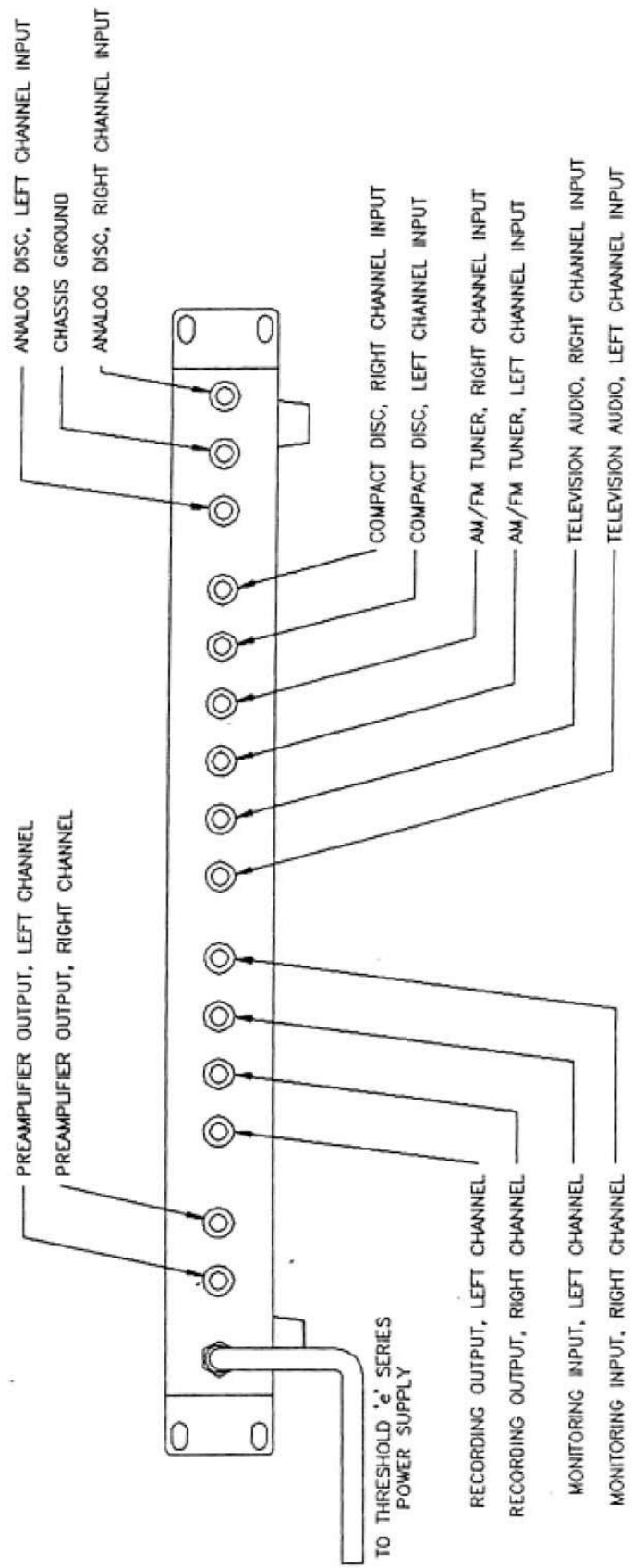
Power Supply  
Layout, Regulated Power Supply

(S5541096)  
(R5541096-NC)

## **a5 Primary Circuit Board**

FET 9e  
Layout, FET 9e

(S4541500)  
(R4541500-NC)

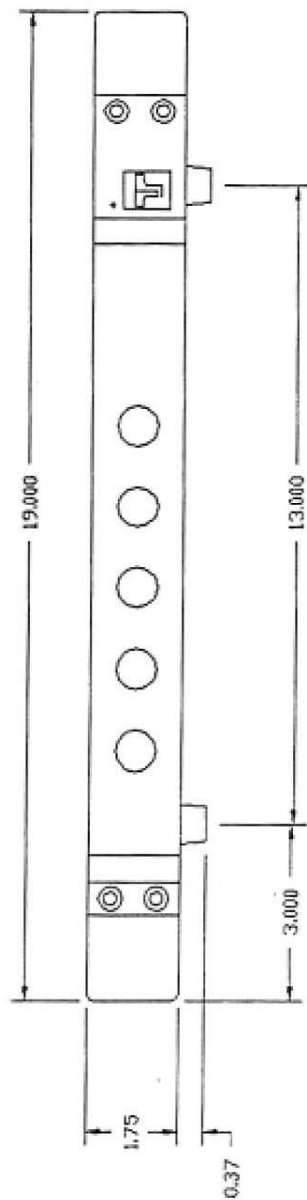
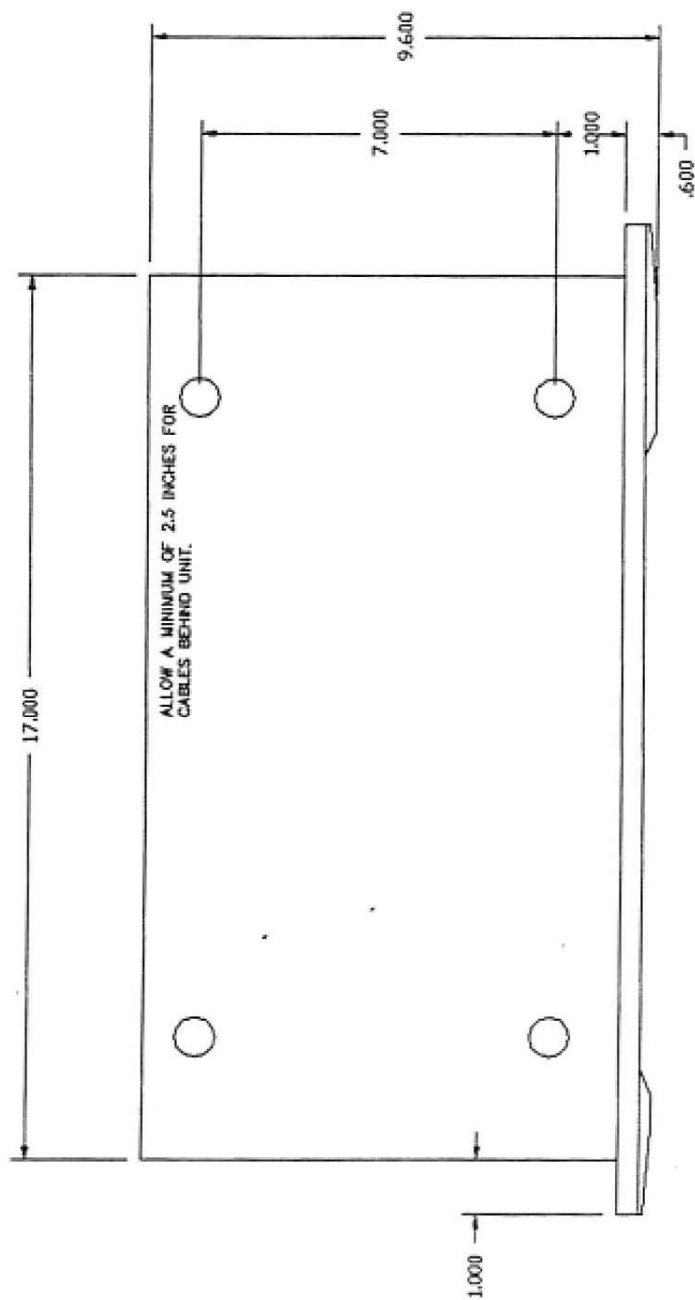


# REAR VIEW OF FET 9e PREAMPLIFIER

NOTE:  
LEFT CHANNEL = A CH.  
RIGHT CHANNEL = B CH.

REV	DESCRIPTION	DATE	APP
THRESHOLD CORP			
DATE: 08-06-90	APP BY	DRAWN BY	
SCALE N/A	PAGE 1 OF 1	REV	NC
REAR PANEL, FET 9e			
PART NO	CAD FILE	DRAWING NO	
N/A	435\0050BHC	R4350050B-HC	

TOL:  
.XX =  $\pm .03$   
.XXX =  $\pm .010$   
ANGLE =  $\pm 1/2^\circ$

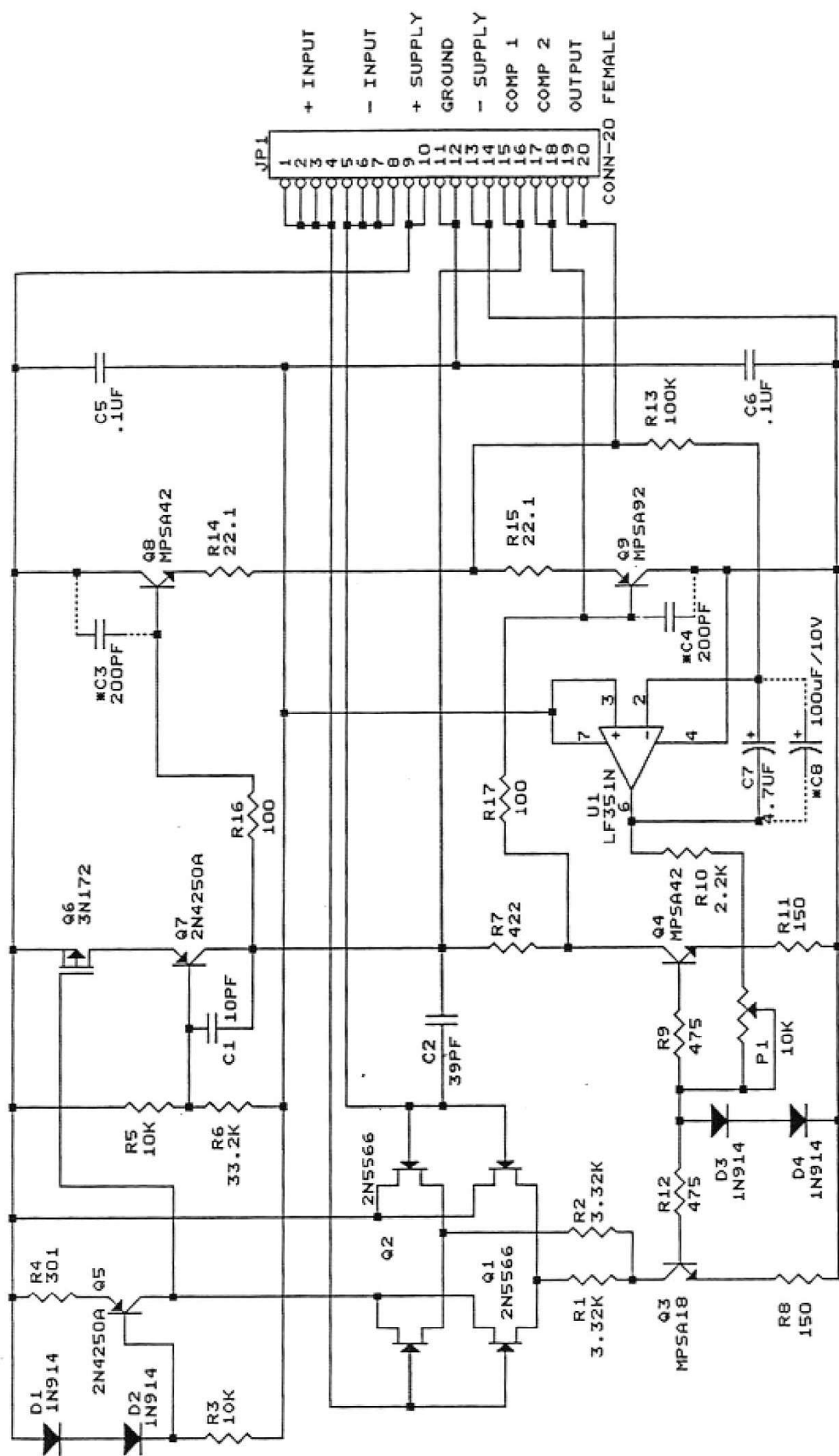


DIMENSIONS ARE IN INCHES

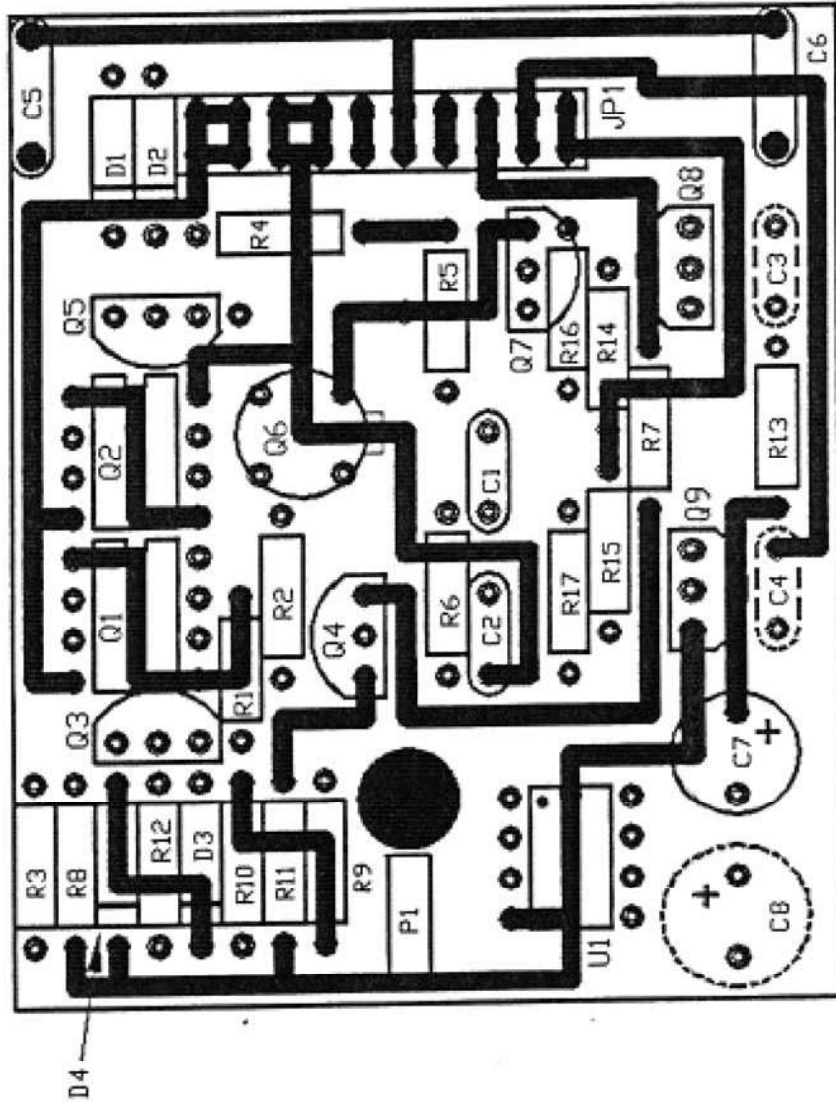
REV	DESCRIPTION	DATE	APP
THRESHOLD CORP			
DATE: 08-07-80	APP BY	DRAWN BY	
SCALE: N/A	PAGE: 1 OF 1	REV	NC
DIMENSIONAL DIAGRAM, FET 9e			
PART NO: N/A	CAD FILE: 435\00500CIG	DRAWING NO: R43500500C-NC	



TOL:  
 .XX=  $\pm .03$   
 .XXX=  $\pm .010$   
 ANGLE=  $\pm 1/2^\circ$







NOTES:

1. THIS DRAWING ILLUSTRATES P/N 554-1098 & P/N 554-1099.
2. C3, C4 & C8 ARE ON THE 554-1099 PCA ONLY.
3. ALL RESISTORS ARE 1/4 WATT.
4. Q8 & Q9 RECEIVE CLIP-ON HEAT DISSIPATORS P/N 044-0268

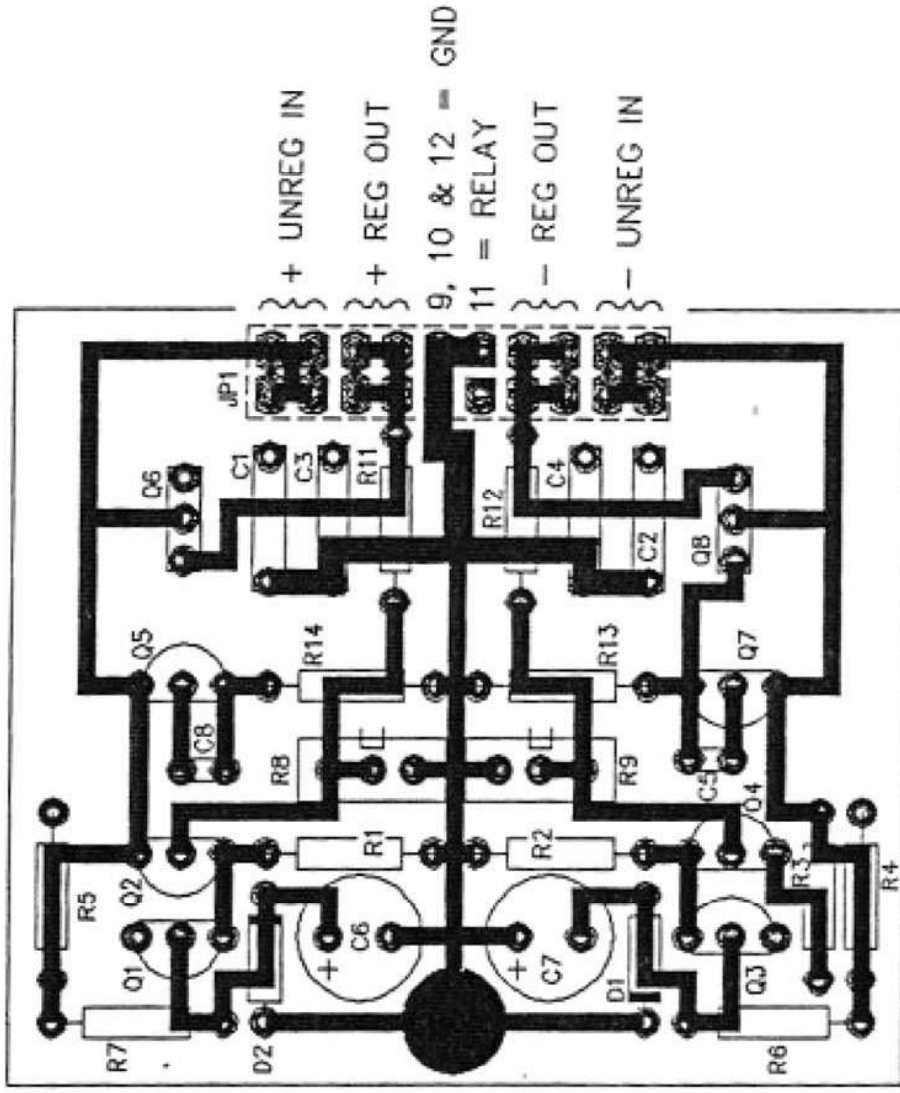
ECO 50102	08-15-90
RELEASE #R30915	12-29-88
REV	DESCRIPTION
<b>THRESHOLD CORP</b>	
DATE: 08-15-90	APP BY
SCALE N/A	PAGE 1 OF 1
LAYOUT, GAIN PCA	
PART NO	CAD FILE
N/A	954\1098A
DRAWING NO	
R5541098-1099-A	



TOL:  
 .XX=  $\pm .03$   
 .XXX=  $\pm .010$   
 ANGLE=  $\pm 1/2$



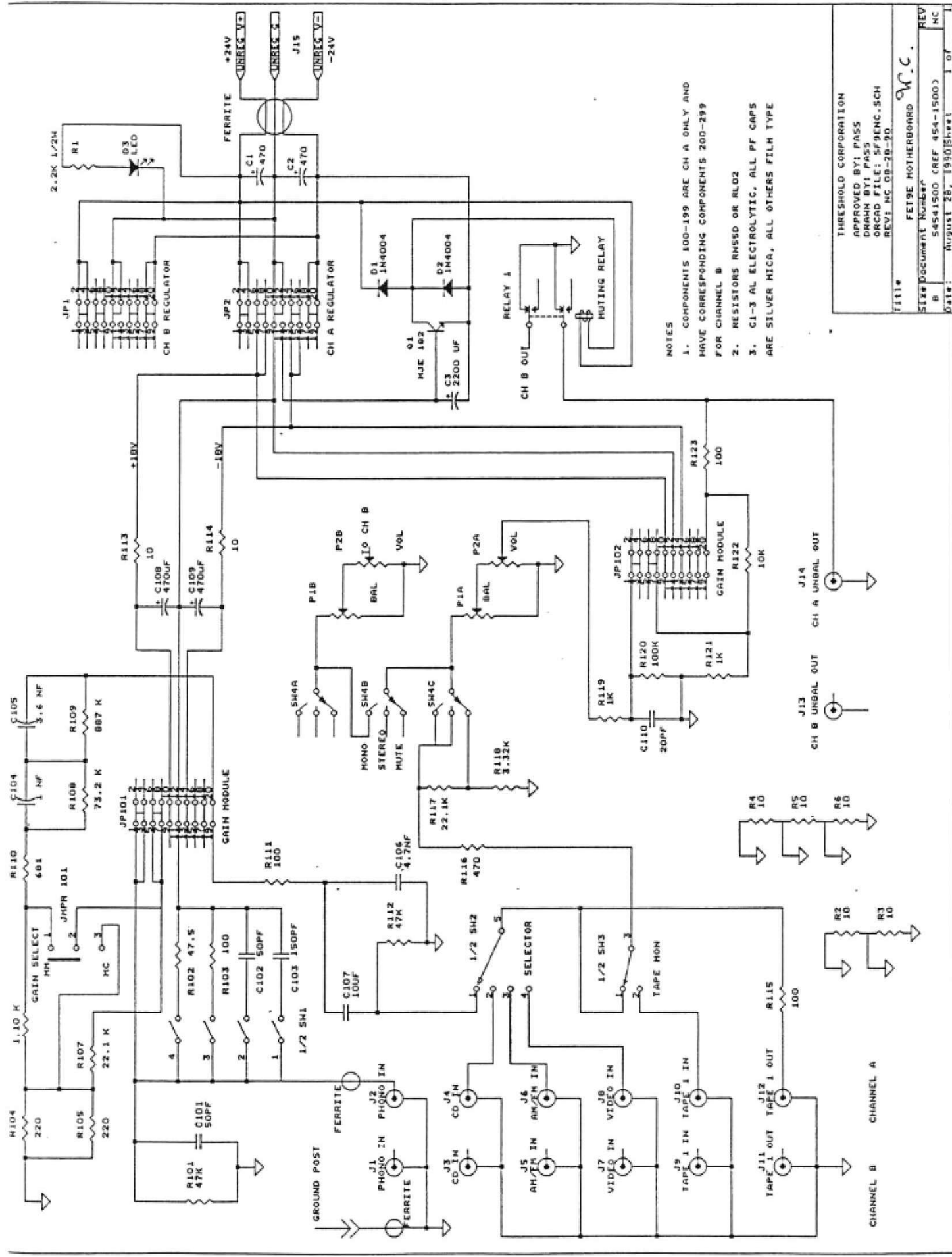




REV	DESCRIPTION	DATE	APP
THRESHOLD CORP			
DATE: 08-07-90	APP BY	DRAWN BY	
SCALE N/A	PAGE 1 OF 1	REV	NC
LAYOUT, REGULATED POWER SUPPLY			
PART NO	CAD FILE	DRAWING NO	
N/A	954\1036NC	R5541036HC	



TOL:  
 .XX =  $\pm .03$   
 .XXX =  $\pm .010$   
 ANGLE =  $\pm 1/2^\circ$



- NOTES
1. COMPONENTS 100-199 ARE CH A ONLY AND HAVE CORRESPONDING COMPONENTS 200-299 FOR CHANNEL B
  2. RESISTORS RM550 OR RLO2
  3. C1-3 AL ELECTROLYTIC, ALL PF CAPS ARE SILVER MICA, ALL OTHERS FILM TYPE

THRESHOLD CORPORATION	
APPROVED BY: PASS	
DRAWN BY: PASS	
ORCAD FILE: SF9ENC.SCH	
REV: NC 08-28-90	
File#	FE19E MOTHERBOARD
Size	Document Number
B	54541500 (REF 454-1500)
NC	REV
0111	August 28, 1990 Sheet 1 of 1

# WARRANTY NOTICE AND IDENTIFICATION RECORDS

## Limited Ninety-Day United States Warranty

Threshold e series components which are purchased from an Authorized Threshold Dealer in the United States and delivered for United States use at 120 volts are covered by a Limited Ninety Day Warranty to the original end-user consumer. This Limited Warranty becomes effective automatically upon purchase of the unit.

The specific terms of this Limited Ninety Day Warranty are fully described in the warranty information section of this manual and on the Extended Limited Warranty Registration Card which is included with all Threshold components sold for use in the United States.

If this Threshold component was purchased in the United States for use in the United States and an Extended Limited Warranty Registration Card was not included with it there is no assurance of its being a new, factory calibrated unit. Should this be the case please contact InConcert/Threshold customer service at 1 (800) 888 8055.

## Identification Records

For future reference in the identification of your Threshold component please enter the serial number and other pertinent information regarding its purchase below:

---

model

---

serial number

---

date purchased

---

dealer

---

address

---

# **Threshold Corporation**

7325 roseville road

sacramento california 95842

printed in U.S.A.  
057 1923 rev-n1