

# TRM6.1

## Installation & Operation

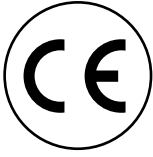


# Hafler®

# trans·ana▶

DESIGNED AND  
ASSEMBLED IN THE  
**USA**

## MONITORING SYSTEM



## Declaration of Conformity

Application of Council Directive: 73/23/EEC (low voltage directive)

Standard(s) to which Conformity is Declared: EN55103-1

EN55103-2

EN60065 (safety)

Manufacturer's Name: Hafler

Manufacturer's Address: 546 South Rockford Drive, Tempe, Arizona 85281, U.S.A.

Importer's Name: \_\_\_\_\_

Importer's Address: \_\_\_\_\_

Type of Equipment: 2-channel Audio Power Amplifier/Speaker

Model No.: TRM6.1

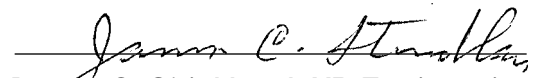
Serial Number: \_\_\_\_\_

Year of Manufacture:  1998  1999  2000  2001  2002

*I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s)*

Place: Hafler

Date: 12/01/98

  
James C. Strickland, VP Engineering

# PERFORMANCE SPECIFICATIONS

## TRM6.1

**Free Field Frequency Response** 55Hz–21kHz,  $\pm 2$ dB  
**Peak Acoustic Output**  $\geq 119$ dB (per pair w/music @ 1m)  
**Total Harmonic Distortion (THD)**  $< 0.5\%$ , 150Hz–21kHz (90dB @ 1m on axis)  
**High Frequency Driver** 1" (25mm) Vifa Soft Dome  
**Low Frequency Driver** 6.5" (165mm) Polypropylene Cone/  
 Inverted Nitrile Rubber Surround  
 Magnetically Shielded

**Cabinet** 0.26 ft<sup>3</sup> (7.3 liters) Vented

**Front Panel:** Power Switch  
 System LED (Power/Clip/Thermal)

**Rear Panel:** XLR Balanced Input  
 RCA Unbalanced Jack  
 Unbalanced/Balanced DIP Switch  
 Input Sensitivity DIP Switches  
 Bass Rolloff DIP Switches  
 Bass Shelving DIP Switches  
 Treble Shelving DIP Switches  
 IEC Standard Line Input / AC Line Fuse

**Dimensions** 8.875"W x 13.25"H x 11.50"D  
 (22.54cm x 33.65cm x 29.21cm)

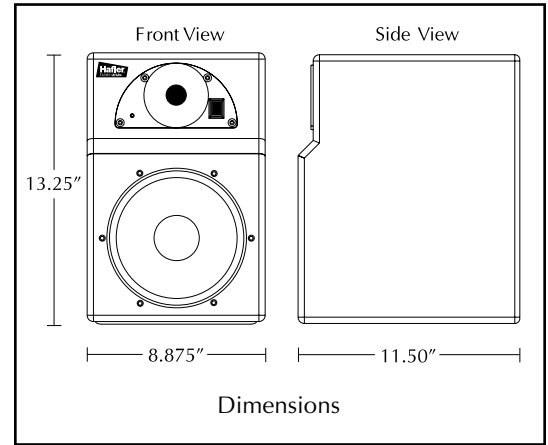
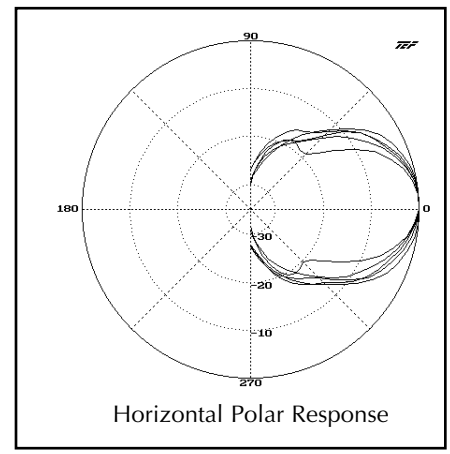
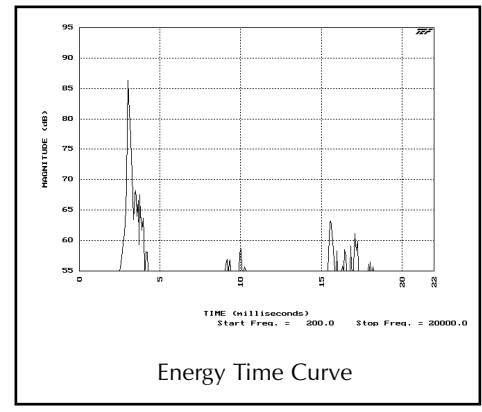
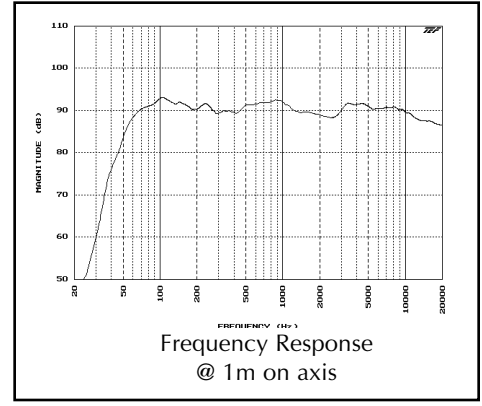
**Net Weight** 23 lbs. (10.43kg)

## AMPLIFIER SECTION

**Power Rating** FTC (20Hz–20kHz, 0.1% THD)  
 35 Watts RMS @ 6 ohms (high frequency)  
 50 Watts RMS @ 4 ohms (low frequency)  
**Signal-to-Noise**  $> 100$ dB  
**CMRR**  $> 70$ dB typical @ 1kHz  
**Input Impedance** 47k $\Omega$  per phase balanced, 47k $\Omega$  unbalanced  
**Input Sensitivity Range** 500mV to 3V (unbalanced)  
 275mV to 1.5V (per phase balanced)  
 (+4dB, +1dB, -2dB, -5dB, -8dB, -11dB)  
**Gain** +33dB max. to +18dB min.  
**Power Consumption** Idle Power: 11W / 150mA @ 115 VAC  
 (both channels driven) Idle Power: 11W / 75mA @ 230 VAC  
 Normal Operation: 55W / 600mA @ 120 VAC  
 Normal Operation: 54W / 310mA @ 230VAC  
 Full Power: 139W / 1.37A @ 120VAC  
 Full Power: 130W / 680mA @ 230VAC

## CROSSOVER SECTION

**Crossover Frequency** 3.2kHz  
**Crossover Slope** 24dB/octave Linkwitz-Riley  
**Subsonic Filter** Selectable 30Hz or 60Hz @ 12dB/octave  
**Bass Shelving** 30Hz to 200Hz,  $\pm 4$ dB  
 (+4dB, +2dB, 0dB, -2dB, -4dB)  
**Treble Shelving** 5kHz to 20kHz,  $\pm 4$ dB  
 (+4dB, +2dB, 0dB, -2dB, -4dB)



Specifications are subject to change without notice.

# NOTICE - IMPORTANT SAFETY INFORMATION



**WARNING: TO PREVENT FIRE OR SHOCK HAZARD  
DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.**

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

## 1. READ INSTRUCTIONS

All the safety and operating instructions of your Hafler equipment should be read before power is applied to the equipment.

## 2. RETAIN OWNER'S MANUAL

These safety and operating instructions should be retained for future reference.

## 3. HEED WARNINGS

All warnings on the equipment and in the operating instructions are important and should be followed.

## 4. FOLLOW INSTRUCTIONS

All operating and use instructions are important and should be followed.

## 5. HEAT

The equipment should be kept away from areas of high temperature, i.e., heater vents, radiators, stoves/ovens, fireplaces, etc.

## 6. VENTILATION

The equipment should be used in an area suitable for proper ventilation. Care should be taken not to impede airflow in and around the cabinet.

## 7. WATER AND MOISTURE

The equipment should not be used in or around water, such as a bathtub, sink, or swimming area. Also, the equipment should not be used in areas prone to flooding, such as a basement.

## 8. POWER SOURCES

The equipment should be connected only to a power source of the same voltage and frequency as that listed on the rear panel above the power cord entry point.

## 9. POWER CORD PROTECTION

Power cords should be arranged so they do not interfere with the movement of objects in the room: people, fan blades, utility carts, etc. Also, care should be taken that the cord is not pinched or cut, and placed so it is not in danger of being pinched or cut, as in under a rug, around a tight corner, etc.

## 10. POWER CORD GROUNDING

The power supply cord is of a three wire grounded type, designed to reduce the risk of electric shock sustained from a live cabinet. It is assumed to be of suitable length for most uses of the equipment. The use of extension cords and power strips is discouraged unless they are of suitable rating to deliver the required total current for safe operation of all connected equipment. Furthermore, extension cords or power strips must provide the same three wire

grounded connection. It is important that the blades of the equipment's plug be able to fully insert into the mating receptacle. **Never remove the round grounding pin on the plug in an attempt to mate to a two wire ungrounded receptacle:** use a grounding adaptor with the grounding tab or wire suitably connected to earth ground.

## 11. NON-USE PERIODS

During periods of extended non-use, the power cord should be unplugged from the power source.

## 12. CLEANING

The equipment should be cleaned only as detailed in the operating instructions.

## 13. OBJECT AND LIQUID ENTRY

Care should be taken so that objects and/or liquids, such as cleaning fluids or beverages, are not spilled into the enclosure of the equipment.

## 14. DAMAGE REQUIRING SERVICE

Hafler equipment should be serviced by qualified service personnel when:

- A. The power supply cord or plug has been damaged, or
- B. Objects have fallen onto, or liquid has been spilled into the equipment, or
- C. The equipment has been exposed to rain, or
- D. The equipment does not appear to operate normally or exhibits a marked change in performance, or
- E. The equipment has been dropped, or the enclosure has been damaged.

## 15. SERVICING

The user should not attempt to service the equipment beyond that which is described in the operating instructions. All other service should be referred to qualified service personnel.

## 16. CARTS AND STANDS

The equipment should be used with carts or stands only of sufficient strength and stability for the use intended. An equipment and cart combination should be moved with care. Quick stops and starts, excessive force, and uneven surfaces may cause the equipment and cart combination to topple.

# ADVERTENCIA – INFORMACION DE SEGURIDAD IMPORTANTE



El símbolo de flecha relámpago dentro de un triángulo equilátero, es para alertar al usuario de la presencia de “voltajes peligrosos” no aislados en el interior del aparato, los cuales pueden ser de suficiente magnitud para constituir un riesgo de choque eléctrico a las personas.

El símbolo de exclamación dentro de un triángulo equilátero, es para alertar al usuario de la presencia de instrucciones importantes de operación y mantenimiento (servicio) en la documentación que acompaña al equipo.

## 1. LEA LAS INSTRUCCIONES

Todas las instrucciones de seguridad y operación de su equipo Hafler, deben ser leídas antes de que el equipo sea conectado eléctricamente.

## 2. CONSERVE EL MANUAL DEL PROPIETARIO

Estas instrucciones de seguridad y operación, deben ser conservadas para futuras referencias.

## 3. CUADROS DE ADVERTENCIAS

Todas las advertencias en el equipo y en las instrucciones de operación, son importantes y deben ser seguidas.

## 4. SIGA LAS INSTRUCCIONES

Todas las instrucciones de uso y operación son importantes y deben ser seguidas.

## 5. CALOR

El equipo debe ser mantenido lejos de áreas de alta temperatura, como por ejemplo: ventilaciones de calentadores, radiadores, estufas/hornos, hogueras, etc.

## 6. VENTILACION

El equip debe ser usado en áreas con ventilación adecuada. Deben er tornadas las precauciones necesarias para no impedir el flujo de aire dentro y alrededor del aparato.

## 7. AGUA Y HUMEDAD

El equipo no debe ser usado en el agua ó alrededor de ésta, tales como en una bañera, tanque o áreas de nado. También, el equipo no debe ser usado en áreas propensas a inundaciones, tales como en un sótano.

## 8. FUENTES DE PODER

El equipo debe ser conectado a una fuente de poder del mismo voltaje y frecuencia que el indicado en el panel trasero sobre el punto de entrada del cable de corriente.

## 9. PROTECCION DEL CABLE DE CORRIENTE

Los cables de corriente deben ser dispuestos de forma tal que no interfieran con el movimiento de objetos en la sala: personas, aspas de ventilación, carretillas, etc. También, es necesario tener cuidado de que el cable no esté punzado o cortado, y debe estar ubicado de forma tal que esto no ocurra, como podría suceder debajo de una alfombra o al pasar el cable por una esquina aguda, etc.

## 10. ATERRAMIENTO DEL CABLE DE CORRIENTE

El cable de corriente es del tipo aterrado de tres hilos, diseñado para reducir el riesgo de una descarga eléctrica procedent de un chasis energizado. Se asume que su longitud es suficiente para la mayoría de usos del equipo. El uso de extensiones y multi-

enchufes no es recomendado, a menos que tengan el amperaje adecuado para poder suministrar la corriente requerida pra la operación segura de todo el equipo conectado. Aun más, las extensiones deben proveer de la misma conexión aterrada de tres hiles. Es importante que el enchufe se pueda introducir completamente en el receptáculo. Nunca remeva el pin de aterramiento en un intento por conectar el cable en un receptáculo de dos hilos no aterrado: use un adaptador de aterramiento que esté adecuadamente conectado a un punto de tierra.

## 11. PERIODOS SIN USO

Durante períodos prolongados sin uso del equipo, el cable de corriente debe ser desconectado de la fuente de electricidad.

## 12. LIMPIEZA

El equip debe ser limpiado solo en la forma que se detalla en las instrucciones de operación.

## 13. INTRODUCCIÓN DE OBJETOS Y LIQUIDO

Deben ser tornadas precauciones con el fin de que objetos y/ó líquidos, tales como fluidos de limpieza y gaseosas, no sean deramados dentro del chasis del aparato.

## 14. DAÑOS QUE REQUIEREN DE SERVICIO

Los equipos Hafler deben ser llevados a servicio por personal calificado cuando:

A. El cable de corriente ó el enchufe haya sido dañado, ó

B. Objetos ó líquido hayan sido introducidos ó derramado en el equipo, ó

C. El equipo haya sido expuesto a lluvia, ó

D. El equipo aparenta no operar normalmente ó exhibe un marcado cambio en su desempeño, ó

E. El equipo se ha caído, o el chasis ha sido golpeado.

## 15. SERVICIO

El usuario no deberá intentar darle servicio al equipo más allá de lo que está descrito en el instructivo de operación. Todo lo demás, deberá ser referido a servicio por personal calificado.

## 16. CARRETILLAS Y SOPORTES

El equipo podrá ser usado con carretillas y soportes que tengan la fortaleza y estabilidad suficiente para el uso previsto.

La combinación equipo/carretilla deberá ser movida con cuidado. Rápidas paradas y arranques, excesiva fuerza y superficies imparejas, pueden causar el volcamiento del conjunto de carretilla/equipo.

# ATTENTION: INFORMATIONS IMPORTANTES DE SÉCURITÉ



La lumière clignotante du symbole de la flèche à l'intérieur d'un triangle équilatéral, à pour objet d'alerter l'utilisateur de la présence "d'un voltage dangereux" non-isolé à l'intérieur du produit, qui pourrait être de magnitude suffisante au risque d'électrocution.

Le point d'exclamation, à l'intérieur d'un triangle équilatéral, à pour objet de prévenir l'utilisateur de l'importance des instructions de fonctionnement et de maintenance, jointes à l'appareil.

## 1. LIRE LES INSTRUCTIONS

Le mode d'emploi et les mesures de sécurité de votre équipement Hafler devraient être consultés avant sa mise en marche.

## 2. CONSERVER LE GUIDE DE L'UTILISATEUR

Le mode d'emploi et les mesures de sécurité devraient être conservés pour des références futures.

## 3. CONSIDÉRATIONS DE MISE EN GARDE

Le mode d'emploi et les mises en garde concernant cet équipement sont de grande importance et devraient être suivis.

## 4. SUIVRE LE MODE D'EMPLOI

Le mode d'emploi et les conseils d'utilisation sont importants et devraient être suivis.

## 5. CHALEUR

Le matériel devrait être préservé loin de toute source de chaleur: radiateurs, cuisinière/fours, cheminées,...etc.

## 6. VENTILATION

Le matériel devrait être utilisé dans un endroit à bonne ventilation. Il reste nécessaire de respecter la circulation de flux d'air à l'intérieur et autour du meuble.

## 7. EAU ET HUMIDITÉ

Le matériel ne devrait pas être utilisé près d'une source d'eau, telle qu'une baignoire, un évier, ou une aire de baignade. De plus, le matériel ne devrait pas être utilisé dans des lieux sujets aux inondations, tels que les sous-sols.

## 8. SOURCES D'ÉNERGIE

Le matériel devrait seulement être relié à une source d'énergie de même voltage et fréquence que celle indiquée sur le tableau arrière, au dessus de la fiche d'entrée de la prise de courant.

## 9. PROTECTION DE LA PRISE DE COURANT

La prise de courant devrait être arrangée de façon à ne pas interférer avec le déplacement d'objets (chariots, pales de ventilateurs...etc.) ou de personnes à l'intérieur de la pièce. D'autre part, il faudrait faire très attention à ce que la prise ne soit pas percée ou coupée, ou disposée de façon à risquer de l'être, comme sous un tapis, autour d'un angle pointu...etc.

## 10. PRISE DE COURANT À TROIS FICHES

La prise de courant est composée de trois fiches, désignées à réduire le risque de décharge électrique de l'appareil.

Elle devrait être de longueur suffisante pour la plupart des utilisations de ce matériel. L'utilisation de rallonge et d'adaptateur est déconseillée à moins d'être en mesure de fournir la charge

électrique requise à un fonctionnement sans risque, de tout matériel relié.

## 11. PÉRIODES DE NON-UTILISATION

Durant les périodes de non-utilisation, la prise de courant ne devrait pas être branchée à une source d'énergie.

## 12. NETTOYAGE

Le matériel devrait être nettoyé en respectant les instructions indiquées.

## 13. PENÉTRATION DES LIQUIDES

Une attention particulière est exigée quant à la dispersion de liquides tels que les produits de nettoyage et boissons, de façon à éviter toute pénétration dans l'enceinte du matériel.

## 14. DÉGÂT NÉCESSITANT UNE RÉVISION

Le matériel Hafler devrait être révisé par des personnes qualifiées de service après-vente, lorsque:

- A. Les fiches ou la prise de courant ont été endommagés, ou:
- B. Des objets sont tombés sur le matériel, ou des liquides s'y sont dispersés, ou:
- C. Le matériel a été exposé à la pluie, ou:
- D. Le matériel ne semble pas fonctionner correctement, ou affiche un changement de performance, ou:
- E. Le matériel a été renversé à terre, ou l'enceinte a été endommagée.

## 15. RÉVISION

L'utilisateur ne devrait pas essayer de réviser le matériel en allant plus loin que ce qui a été décrit dans le mode d'emploi. Toute autre révision devrait être confiée à un personnel qualifié.

## 16. CHARRIOTS ET MEUBLES

Le matériel devrait être utilisé avec des chariots et meubles de qualité et stabilité suffisante à son utilisation préconçue.

L'ensemble du matériel et du charriot devrait être déplacé avec précaution. Des mises en marche et arrêts brusques, des collisions excessives ainsi que des surfaces inégales peuvent renverser l'ensemble du matériel et du charriot.

# ACHTUNG – WICHTIGE SICHERHEITS – INFORMATIONEN



Der Blitz mit dem Pfeil, in einem gleichschenkligen Dreieck, soll den Benutzer vor unisolierter "gefährlicher Spannung" innerhalb des Gerätes warnen.

Das Ausrufezeichen, in einem gleichschenkligen Dreieck, soll den Benutzer darauf aufmerksam machen, daß dem Gerät wichtige Operations - und Service - Informationen beigefügt sind.

## 1. INSTRUKTIONEN LESEN

Alle Sicherheits- und Operationshinweise Ihres Hafler Equipments sollten vor der Inbetriebnahme gelesen werden.

## 2. BETRIEBSANLEITUNG AUFBEWAHREN

Bewahren Sie die Bedienungsanleitung sorgfältig auf, damit Sie in dieser auch in Zukunft nachschlagen können.

## 3. WARNUNGEN BEACHTEN

Alle Warnungen des Gerätes und der Bedienungsanleitung sind extrem wichtig und müssen befolgt werden.

## 4. INSTRUKTIONEN BEACHTEN

Alle Operations- und Gebrauchshinweise sind extrem wichtig und müssen beachtet werden.

## 5. HITZE

Das Equipment sollte fern von Hitze ausstrahlenden Geräten aufgestellt werden, wie z.B. Heizungen, Öfen etc.

## 6. VENTILATION

Das Equipment sollte so aufgestellt werden, daß eine ausreichende Ventilation gewährt wird.

## 7. WASSER UND FEUCHTIGKEIT

Das Equipment sollte nicht im oder in der Nähe von Wasser benutzt werden, wie z.B. in Schwimmbädern, Saunen etc. Es sollte ebenfalls nicht in Überschwemmungsgefährdeten Gebieten aufgestellt werden, wie z.B. Kellerräumen.

## 8. STROMANSCHLUß

Das Equipment darf nur an eine Stromversorgung angeschlossen werden, die die gleichen Parameter aufweist, welche auf der Rückseite, über dem Anschlußterminal des Gerätes, aufgelistet sind.

## 9. SCHUTZ DER ZULEITUNG

Die Zuleitungen sollten so verlegt werden, daß diese nicht in den Bewegungsbereich anderer Möbelstücke oder Personen hereinragen. Achten Sie darauf, daß das Kabel nicht gequetscht oder durchschnitten wird, wie z.B. unter Schränken oder an scharfen Kanten etc.

## 10. MASSEANSCHLUß

Das dreiadrige Anschlusskabel ist mit einem Erdungsleiter ausgestattet, welcher die Risiken eines Elektroschocks verringert. Das Kabel hat eine Länge, welche für die meisten Anwendungen völlig ausreicht. Wenn Sie Verlängerungskabel benutzen, achten Sie darauf, daß dies die erforderlichen Ströme übertragen können. Benutzen Sie immer dreiadrige Verlängerungskable.

## 11. ZEITRÄUME IN DENEN DAS GERÄT NICHT GENUTZT WIRD

Wird das Gerät über einen längeren Zeitraum nicht genutzt (z.B. Urlaub), ziehen Sie bitte den Netzstecker aus der Steckdose.

## 12. REINIGEN

Reinigen Sie das Gerät nur, wie in der Bedienungsanleitung detailliert beschrieben.

## 13. EINDRINGEN VON FREMDKÖRPERN

Achten Sie darauf, daß weder Fremdkörper, noch Flüssigkeiten in das Gerät eindringen.

## 14. ERFORDERLICHER REPARATURSERVICE

Hafler Equipment sollte nur von qualifizierten Service-Technikern instand gesetzt werden, wenn:

A. Das Stromversorgungskabel beschädigt wurde

B. Eine Flüssigkeit in das Gerät eingedrungen ist

C. Das Gerät Regen ausgesetzt wurde

D. Das Gerät nicht mehr ordnungsgemäß funktioniert, ggf. nicht mehr die volle Leistung abgibt

E. Das Gerät runtergefallen ist oder das Gehäuse beschädigt wurde

## 15. SERVICE

Der Benutzer sollte nur den Service ausführen, der in der Bedienungsanleitung für den Benutzer freigegeben wird. Den weiterführenden Service sollte nur von qualifizierten Technikern durchgeführt werden.

## 16. AUFSTELLUNG

Das Equipment sollte so aufgestellt werden, daß der gewählte Untergrund die erforderliche Stabilität aufweist, so daß eine gefahrlose Benutzung gewährleistet wird.

Das Equipment und der Untergrund sollte mit äußerster Vorsicht bewegt werden. Bei schnellen Bewegungen oder starkem Abbremsen, kann es zum Umkippen des Equipments kommen.

# NOTARE – IMPORTANTI INFORMAZIONI SULLA SICUREZZA



Il simbolo del fulmine in un triangolo equilatero vuole avvertire della presenza di tensioni elevate non isolate e di valore sufficiente per costituire rischio di shock elettrico alle persone.

Il punto esclamativo contenuto in un triangolo equilatero vuole avvertire l'utente della presenza di parti di servizio e di manutenzione che sono dettagliate nel manuale di istruzioni.

## 1. LEGGETE LE ISTRUZIONI

Tutte le istruzioni riguardanti la sicurezza ed il funzionamento devono essere lette prima di applicare tensione all'apparato.

## 2. CONSERVATE IL MANUALE

Queste istruzioni riguardanti la sicurezza ed il funzionamento devono essere conservate come riferimento futuro.

## 3. AVVERTENZE

Tutte le avvertenze poste sull'apparato e sul libretto di istruzioni sono importanti e devono essere seguite.

## 4. SEGUIRE LE ISTRUZIONI

Tutte le istruzioni operative e di funzionamento devono essere seguite.

## 5. TEMPERATURA

L'apparato deve essere mantenuto lontano da tutte le zone ad alta temperatura, termosifoni, termoconvettori, stufe e forni, caminetti ed altro.

## 6. VENTILAZIONE

L'apparato deve essere posizionato in aree convenienti per una corretta ventilazione. Prestare attenzione che sia consentita circolazione d'aria attorno e dentro il cabinet.

## 7. ACQUA E POLVERE

L'apparato deve essere posizionato lontano da zone contenenti acqua, come vasche a bagno, acquari e piscine. Inoltre non deve essere impiegato in aree soggette ad allagamento, come le cantine.

## 8. REQUISITI DI ALIMENTAZIONE

L'apparato deve essere connesso solo ad un'alimentazione della stessa tensione e frequenza di quanto scritto sulla parte posteriore del telaio.

## 9. PROTEZIONE DEL CAVO DI ALIMENTAZIONE

Il cavo di alimentazione deve essere posizionato in modo di non interferire con il movimento di oggetti nella stanza: persone, ventilatori, carrelli, ecc...prestate attenzione anche che il cavo non sia tagliato o spellato e che non possa tagliarsi e spellarsi.

## 10. MESSA A TERRA

Il cavo di alimentazione è del tipo a tre fili con terra ed è progettato per ridurre il rischio di shock elettrici. Si presume che sia della lunghezza sufficiente per la maggior parte degli impieghi. L'impiego di prolunghie e adattatori è sconsigliato se questi non garantiscono la potenza sufficiente per il corretto funzionamento degli apparati connessi. È altresì importante che vengano sempre impiegate prolunghie con la configurazione a tre fili con terra.

## 11. PERIODI DI NON UTILIZZO

Durante lunghi periodi di non utilizzo, staccare il cavo di alimentazione.

## 12. PULIZIA

L'apparato deve essere pulito solo come indicato dalle istruzioni.

## 13. INGRESSO DI OGGETTI E LIQUIDI

Si deve prestar attenzione che oggetti e liquidi, come fluidi detergenti e bibite, non vengano versati all'interno dell'apparato.

## 14. RIPARAZIONI

Gli apparati Hafler devono essere riparati da personale qualificato quando:

- A. Il cavo di alimentazione o la spina sono danneggiati
- B. Oggetti sono caduti all'interno del telaio o quando del liquido è entrato
- C. Quando l'apparato è stato esposto a pioggia
- D. Quando l'apparato non sembra funzionare normalmente o quando esibisce un cambiamento di prestazioni o
- E. Quando è caduto o il telaio è stato danneggiato

## 15. ASSISTENZA

L'utente non deve tentare di prestare assistenza all'apparato, se non per quanto esposto nelle istruzioni. Tutti gli altri interventi devono essere effettuati da un tecnico specializzato.

## 16. CARRELLI E STAND

L'apparato deve essere impiegato su carrelli o stand solo se questi sono sufficientemente solidi e stabili per la funzione a cui si vuole dedicarli.

La combinazione di carrello ed apparato deve essere mossa con cautela. Fermate e partenze improvvise, forze eccessive e superfici irregolari, possono ribaltare la combinazione carrello e apparato.



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# INTRODUCTION

Thank you and congratulations on your purchase of the HAFLER TRM6.1 reference monitor, the world's finest brand in professional audio equipment.

The **TRM6.1** (Trans•ana Reference Monitor) is a bi-amplified, two-way near field monitor offering unmatched quality and performance in a truly professional grade product. The TRM6.1 is great for Professional Studios, Digital Work Stations, Broadcast Booths, and Home Project Studios.

Although we realize a professional such as yourself already knows a thing or two about pro audio, we urge you to read this manual to at least humor our technical writer. For ease of use, this manual is organized into three main sections: **Installation, Operation, and Service Reference.** "Installation" covers the set-up of your new HAFLER equipment in the system. "Operation" covers the controls and how to use them for optimum performance. "Service Reference" contains field service information useful for technicians and engineers.

## TECHNICAL DESIGN FEATURES

The TRM6.1 amplifiers utilize our trans•ana circuit topology employing MOSFETs in the output stage resulting in superior sound quality.

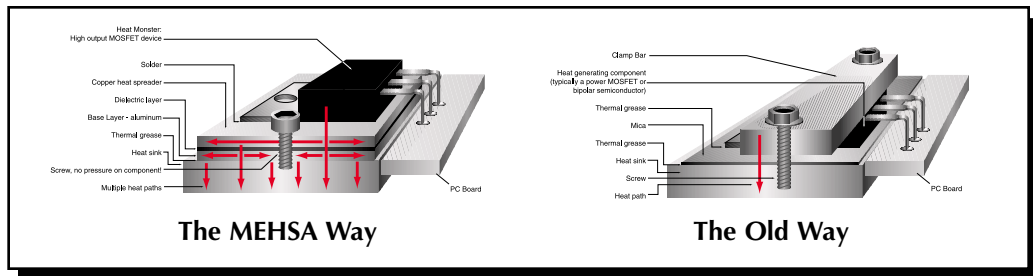
An active 4th order Linkwitz-Riley crossover sends frequencies above 3.2kHz to a 35-watt amplifier driving a proprietary wave guide tweeter, and frequencies below 3.2kHz to a 50-watt amplifier driving an 6" transducer. The high frequency channel features up to  $\pm 4$ dB of Treble shelving, while the low frequency channel features up to  $\pm 4$ dB of Bass shelving. In addition, the low frequency channel includes an active 2nd order subsonic filter selectable to limit harmful frequencies below 30Hz or 60Hz. Monitoring the status of both channels is done with an LED indicating Power On, Clipping and Thermal.

The high frequency transducer is a Ferrofluid cooled 1" (25mm) soft dome hemispherical tweeter utilizing a rigid but lightweight silk diaphragm. A Phase Lens and axis-symmetric exponential waveguide improve the transition of sound-waves from planar to spherical which result in excellent high frequency dispersion and coherent on-axis frequency response. The low frequency transducer is a proprietary 6.5" (165mm) steel basket woofer utilizing a 20 mil polypropylene cone with a 20 mil dust cap. The suspension consists of a nitrile rubber surround and an extended collar flat spider. The motor is constructed from a 1.25" diameter voice coil on an anodized aluminum former with an extended vented pole piece. The 33 oz. ferrite magnet is magnetically shielded to suppress stray leakage flux to only 4"...well within the confines of the monitor's walls, making it great for use near CRT monitors.

The cabinet is made from acoustically dead 19mm MDF, internally lined with damping material, and features a rear firing radiused Aerovent for reduced turbulence. The outside features a semi-gloss finish and includes a rubber pad on the underside to control vibration.

## MEHSA

(Maximum Efficiency HeatSink Application) MEHSA is a proprietary process that yields up to 5 times better heat transfer than traditional FET mounting techniques using the exact same components. A multi-layer insulated metal substrate operating with minimal thermal resistance spreads heat both downward and outward to quickly dissipate heat from each device across the heatsink. This process combined with our DSM technology and MOSFET devices allow us to squeeze more watts per cubic inch from every output device as well as provide consistent thermal stability.



**THE RESULT:** Better reliability through faster heat dissipation.

## Trans•ana

Trans•ana (TRANSconductance Active Nodal Amplifier) is a circuit that allows the audio signal to pass through the amplifier at low voltage. The signal is directly level-shifted to the fixed high voltage rails via a pair of driver transistors. Signal linearity is assured by an active node formed by the driver transistors at ultrasonic frequencies. This allows amplifier performance similar to Trans•nova which is highly stable and linear while utilizing the advantages of a non-floating power supply.

**THE RESULT:** An extended frequency band width accurately supplied to the output stages of the amplifier.

## MOSFET Devices

HAFLE is one of the few manufacturers in the sound community to utilize MOSFET devices in both the power supply and output stages. **MOSFET** (Metal Oxide Semiconductor Field Effect Transistor) devices offer several important inherent advantages over the 30-year-old technology of bi-polar design. These advantages include: thermal stability, fast switching speed, ultra low output impedance and wide bandwidth linearity. In addition, MOSFETs operate very similarly to vacuum tubes in that they are more linear than bipolar transistors. However, MOSFETs can deliver the midrange clarity without the limitations of transient response and high frequency phase shifting normally associated with tube operation.

**THE RESULT:** Thermal stability, fast switching speed, ultra low output impedance and wide bandwidth linearity.

## **Tweeter**

### **Wave Guide**

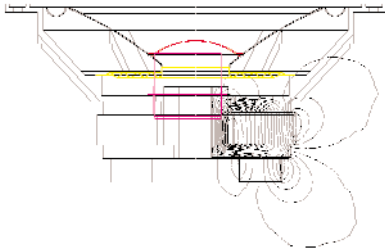
The wave guide is a proprietary axis-symmetrical form of horn mounted to the tweeter to increase efficiency. The wave guide improves the transition of sound waves (from planar to spherical) smoothly from the throat of the wave guide to the mouth. The unique shape and smooth surfaces improve the tweeter's off-axis frequency response as well as provide coherent on-axis response.

**THE RESULT:** Improves dispersion for a wider “sweet spot.”

## **Woofers**

### **Shielded Magnet**

A shielded magnet is used to reduce the radiation of high-strength magnetic fields from the woofer's motor assembly. Suppression is accomplished by attaching a “bucking” magnet to the motor assembly in order to keep stray leakage flux within the monitor cabinet. This type of shielding prevents color and image distortion when placing the woofer in close proximity to direct view (CRT) television receivers and computer monitors.



**THE RESULT:** Prevents distortion in TV and computer monitors.

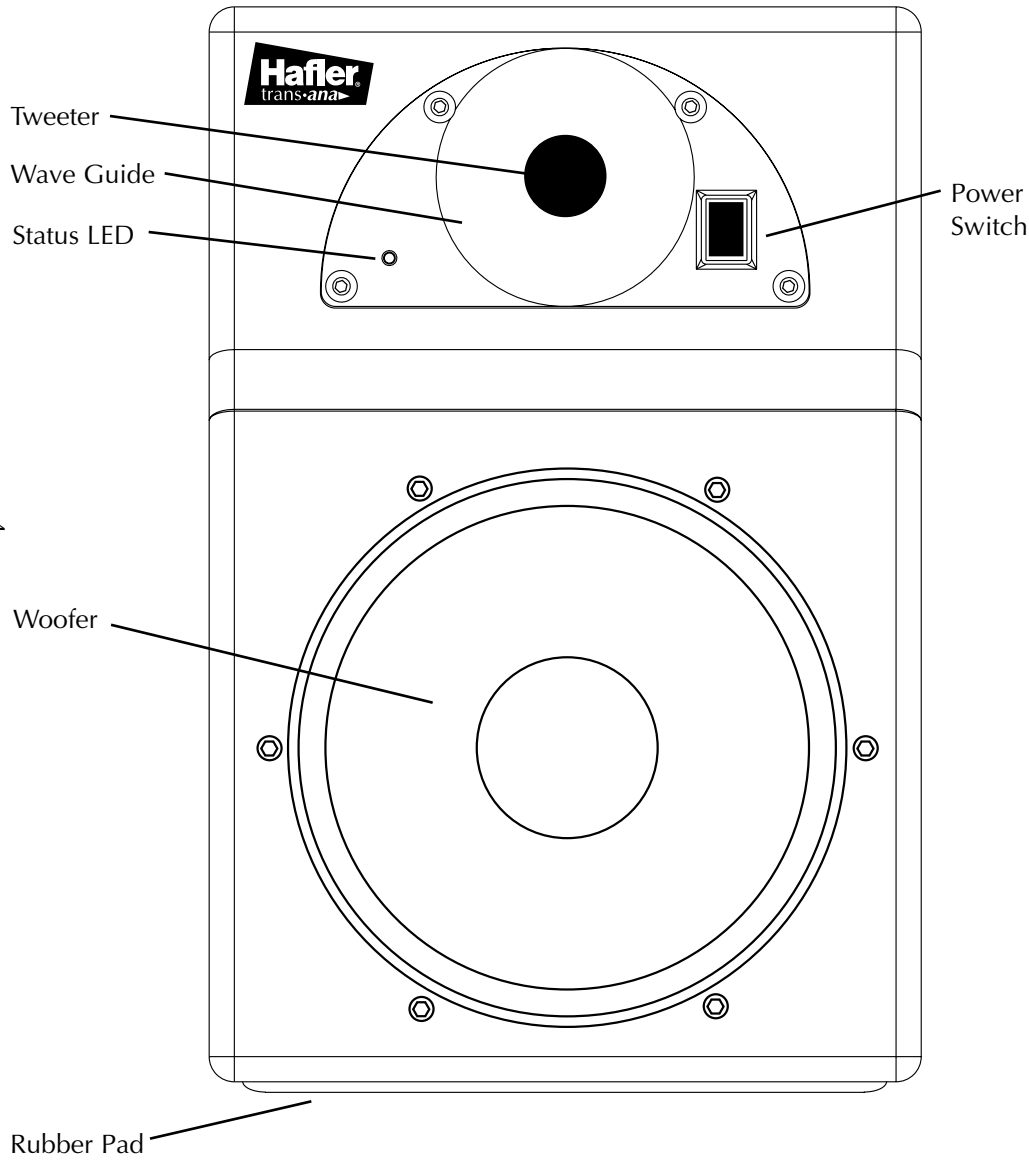
## **Cabinet**

### **Phase Coherent**

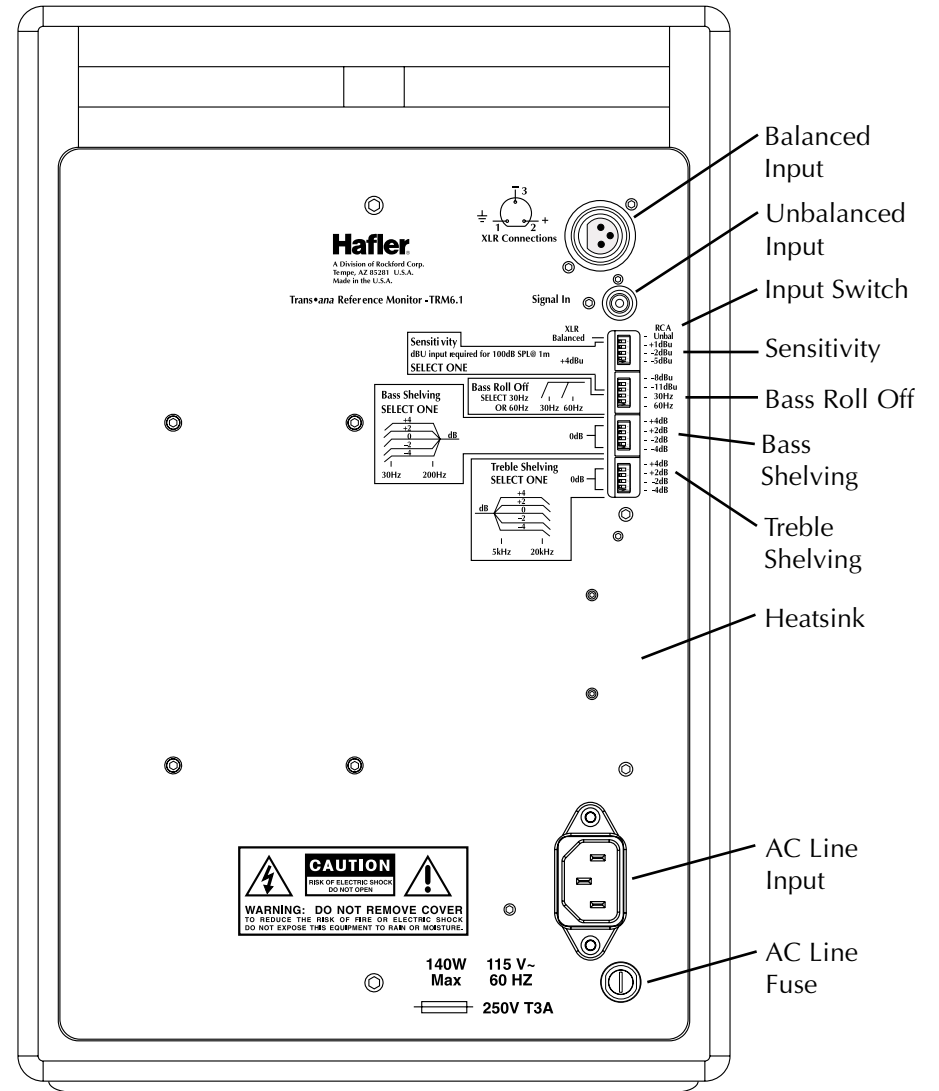
Each monitor is Phase Coherent in order to assure proper arrival times of all frequencies in the near field environment. This is accomplished by aligning both transducer's voice coils on a common ZDP (Zero Delay Plane) axis. The cabinet baffle positions the woofer forward and the waveguide displaces the tweeter back with an additional 39ms delay in the high frequency amplifier to precisely “tweak” the tweeter onto its ZDP axis. This allows the acoustic center, located midway between the high and low frequency transducers, to coherently deliver a flat frequency and phase response around the crossover point.

**THE RESULT:** Delivers a flat frequency and phase response.

# Front Panel View



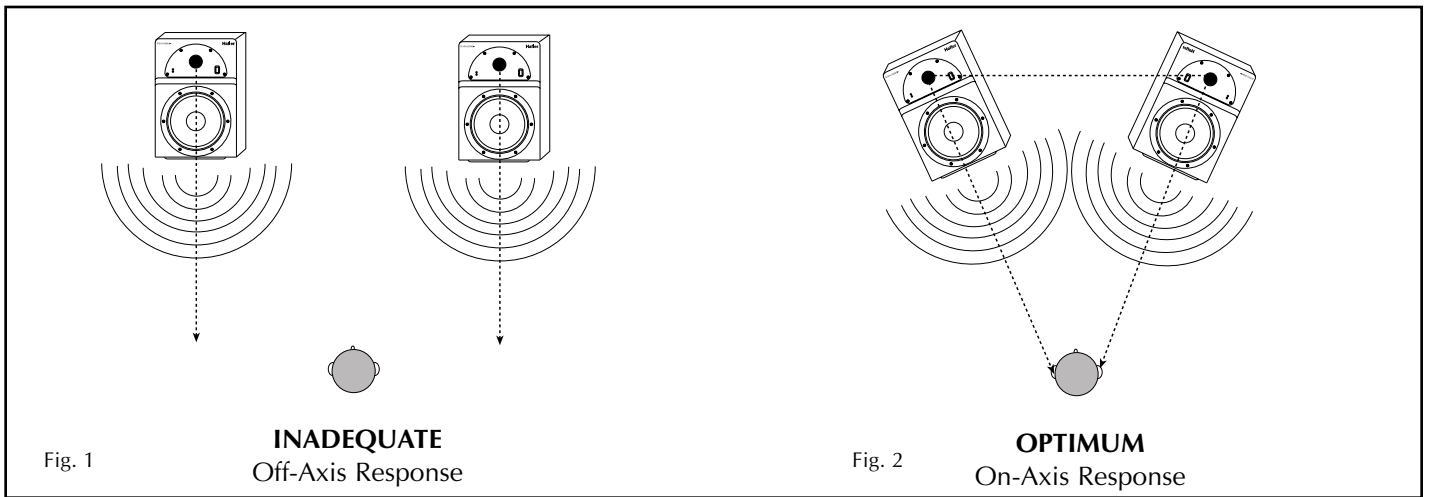
# Rear Panel View



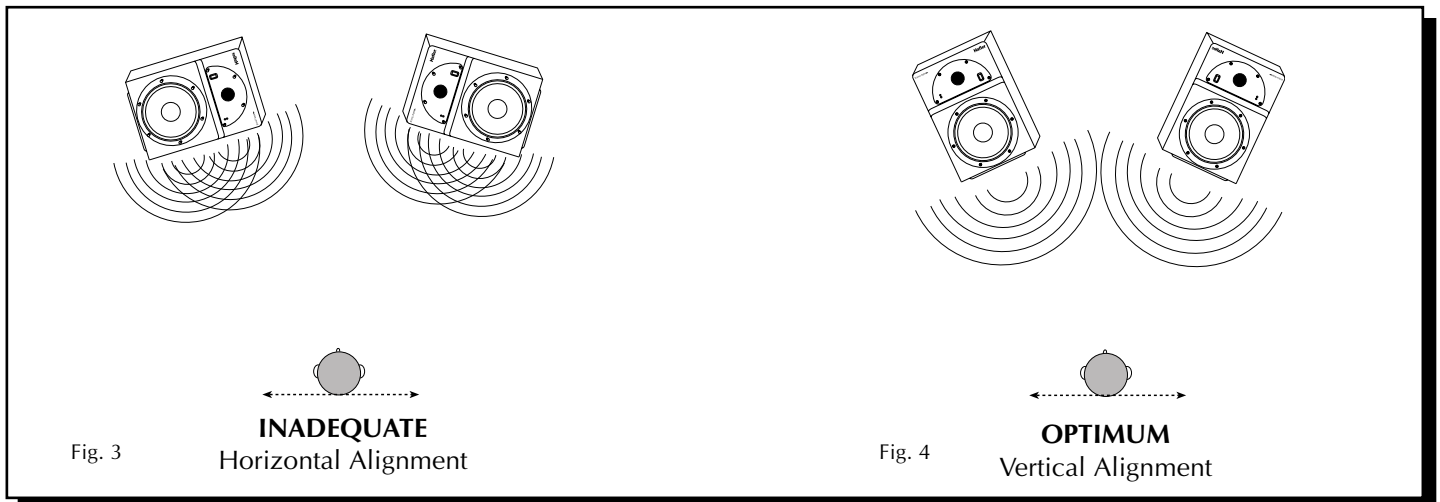
# INSTALLATION

## LOCATION

The location of your reference monitors in addition to the acoustics of the listening room will influence the system frequency response. In the near field environment, our ears are more sensitive to direct sound rather than the reverberation of sound. Below are some recommendations for the initial set-up which may help you optimize performance in complex acoustic environments. ***In any configuration, keep the rear of the monitor at least 5" (12.7cm) away from any wall or obstruction to reduce excessive boundary "loading" of the woofer vent and to optimize heat sink cooling.***



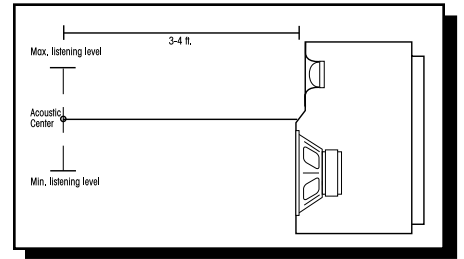
Aiming the monitors directly forward (Fig. 1) may cause response problems resulting in inadequate stereo imaging. Aiming the monitors toward you and spaced equally like a triangle (Fig. 2) provides the best imaging and produces the flattest frequency response.



If you frequently move your chair from *side to side* in front of your mixing console, positioning the tweeter and woofer in horizontal alignment (Fig. 3) can create complex lobing patterns. Minimizing this effect can be achieved by placing the tweeter and woofer in vertical alignment (Fig. 4). If it is essential to position the monitors horizontally, place them with the tweeters toward the inside.

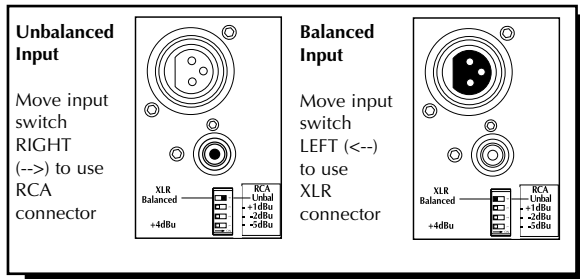
**DETERMINING ACOUSTIC CENTER**

Finding the "Acoustic Center" is accomplished by positioning the monitors so coherent arrival of the transducers occurs at ear level. The Acoustic Center is located 3 to 4 feet in front of the monitor, measuring perpendicularly from the center point of the cabinet (midway between the woofer and tweeter). Our tests have shown that a flat phase and frequency response occurs just above and below the Acoustic Center with the minimum and maximum height spanning between the tweeter dome and woofer dust cap.



**INPUT SWITCH**

The unbalanced input uses a conventional RCA phone jack. Move the input switch ON (→) to use this jack. The balanced input jack is an XLR plug. The XLR jack is connected according to the IEC and AES standard. Move the input switch OFF (←) to use this jack.



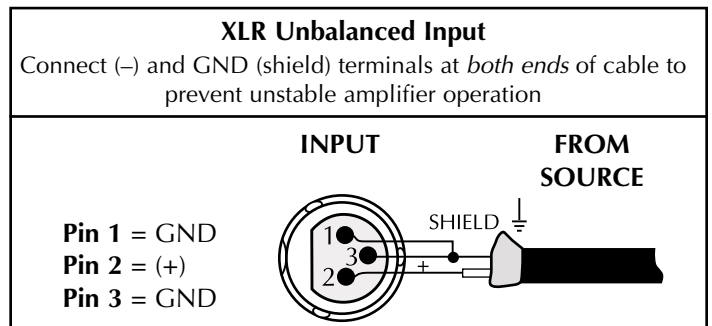
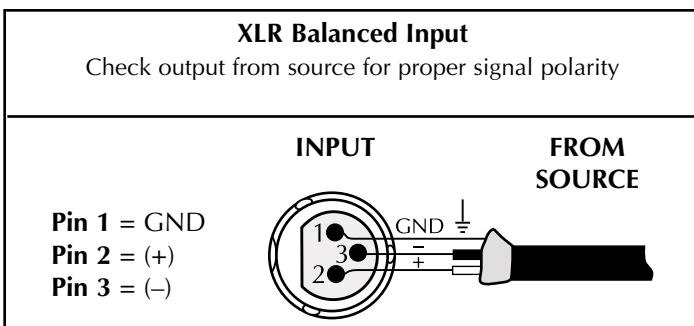
**MOUNTING**

The monitor may be mounted on a wall or ceiling, using suitable mounting hardware. The base of the monitor includes mounting inserts designed for use with "OmniMount Systems®" or equivalent mounting products<sup>1</sup>.

If you mount the monitors to a wall or ceiling, you must take special care to mount them securely to prevent them from falling and causing damage or injury. Make sure that the mounting hardware (fasteners and connectors) and the surface you are mounting to are each capable of securely holding the monitor in place even if it is struck or moved. Make sure the mounting hardware, fasteners, and connectors are rated for an object at least as heavy and bulky as the monitor.

**XLR WIRING CONFIGURATIONS**

Using the balanced XLR input is recommended for installations where long cable runs are used or when the potential for stray electromagnetic fields from other wires exists. There is a balanced and unbalanced method in which the XLR inputs can be used. The first method is an XLR Balanced Input using 3-conductor cable. The balanced signals carried on pins 2 and 3 are equal in amplitude and opposite in phase. Pin 1 is the ground and shield. In this configuration, noise common on both phases of signal are effectively "canceled" out. The second method is an XLR Unbalanced Input using 2-conductor cable with the signal carried in the center conductor and the ground carried on the shield. Many popular mixers use unbalanced outputs and can be used with the XLR balanced input. However, in this type of configuration we recommend using twisted pair cable or short cable length to prevent residual ground noise.



Use good judgement and common sense throughout all phases of the installation and use mounting techniques appropriate for the surface you select. Use the mounting hardware according to the manufacturer's recommendation and provide adequate reinforcement to the monitors if needed. Do not mount the monitor only to drywall—make sure the fasteners are secured to a stud, joist, or other structural support. If appropriate, use a secondary support for added safety—a properly installed safety cable provides an extra margin of safety and can be installed out of sight easily.



**OmniMount Part #  
100 ST-MP / 100 STX-MP**



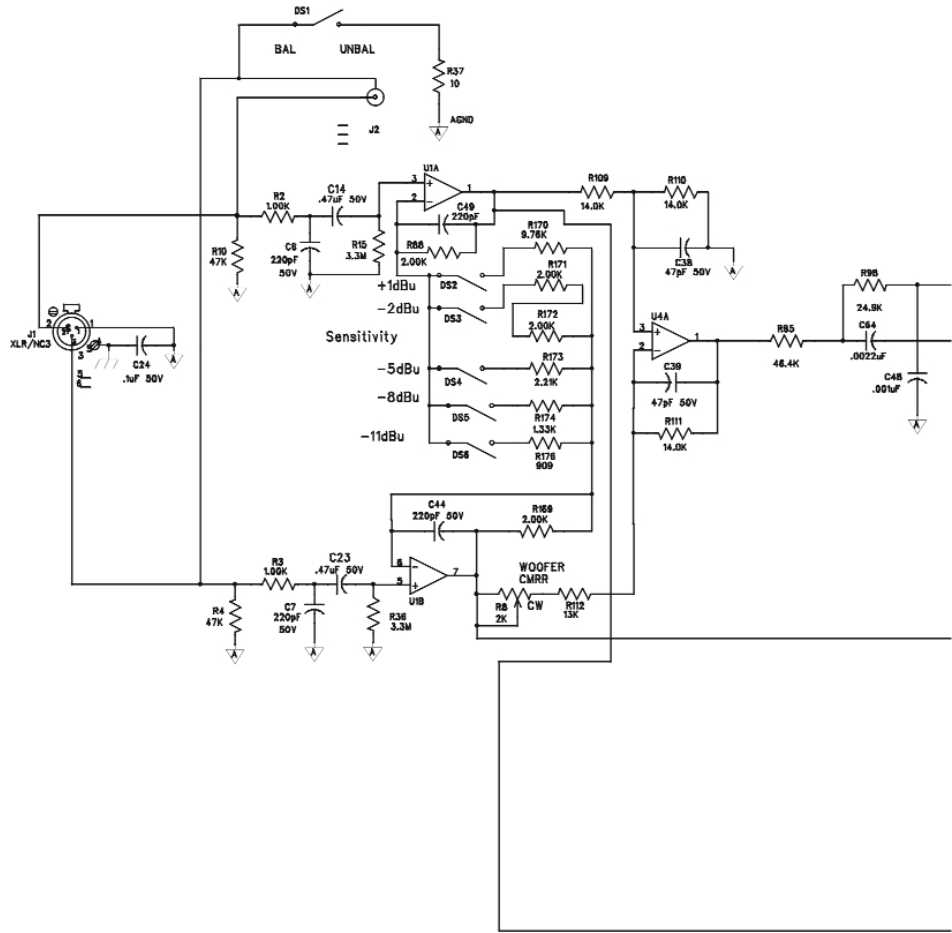
**OmniMount Part #  
100 WB / 100 WBX**

<sup>1</sup> "OmniMount Systems®" is a registered trademark of OmniMount Systems, 1501 West 17th Street, Tempe, Arizona 85281-6255, TEL (602) 829-8000 FAX (602) 756-9000. OmniMount Systems is not affiliated with Hafler or Rockford Corporation.

# SCHEMATIC DIAGRAM

NOTES: Unless specified otherwise

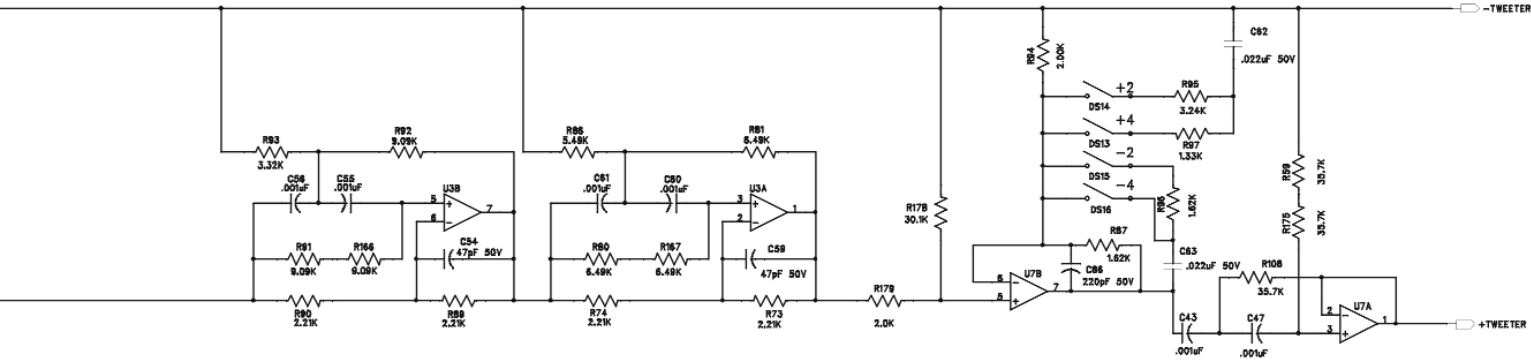
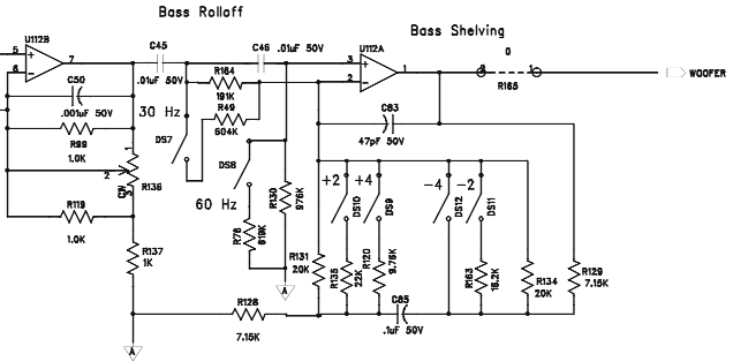
1. All resistors in ohms.
2. All capacitors in microfarads.
3. Channel 1 only shown.







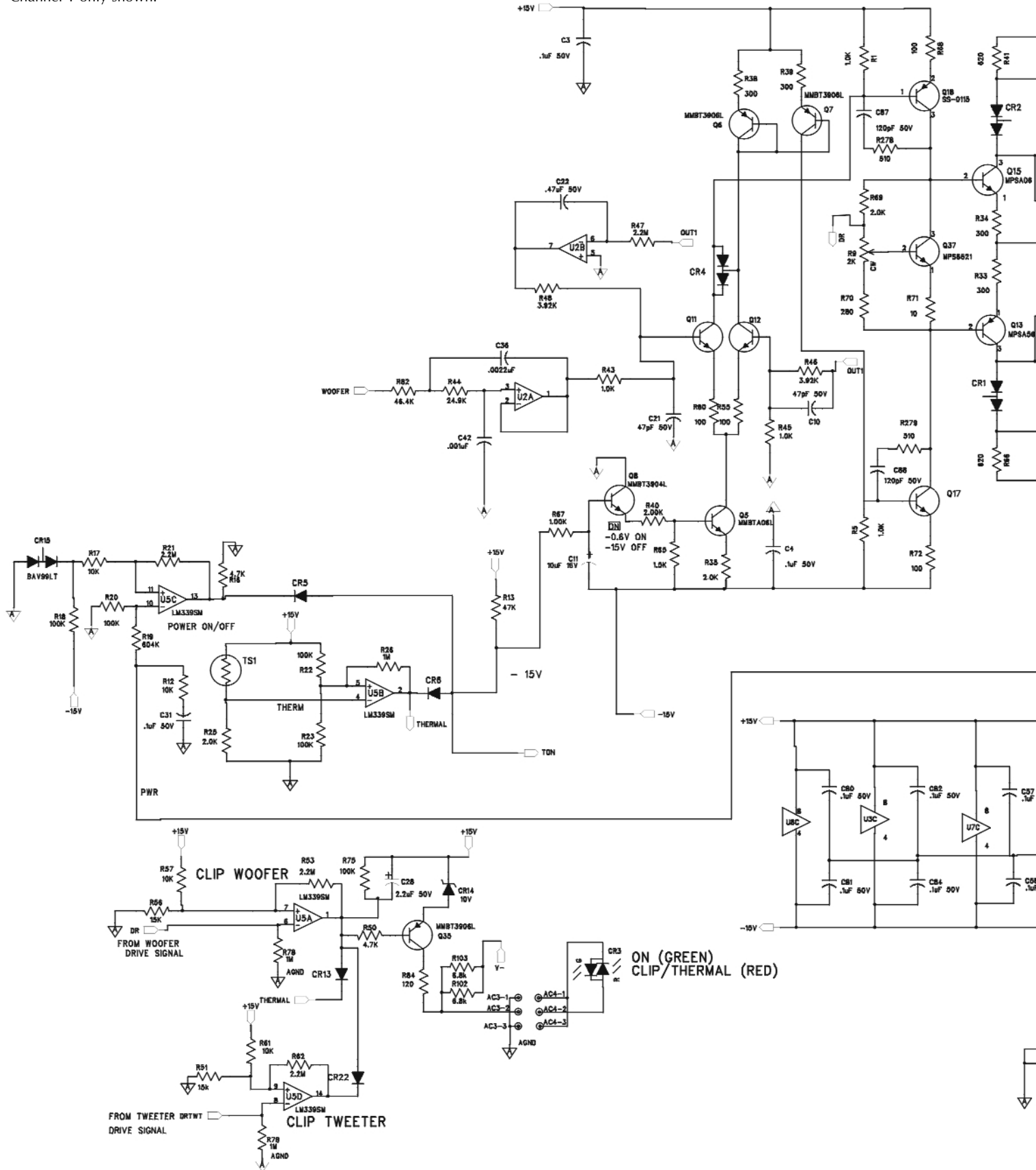
Qualified Service Personnel Only

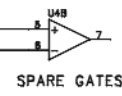
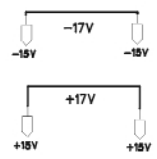
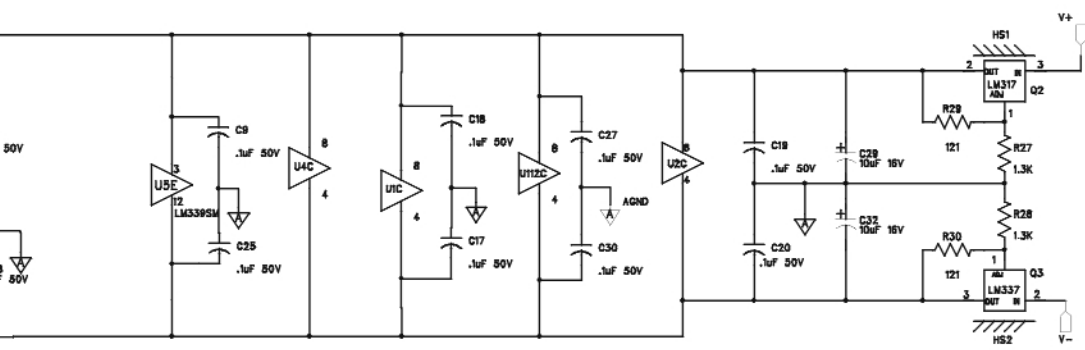
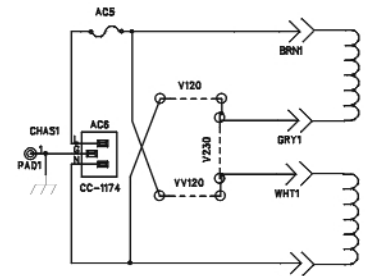
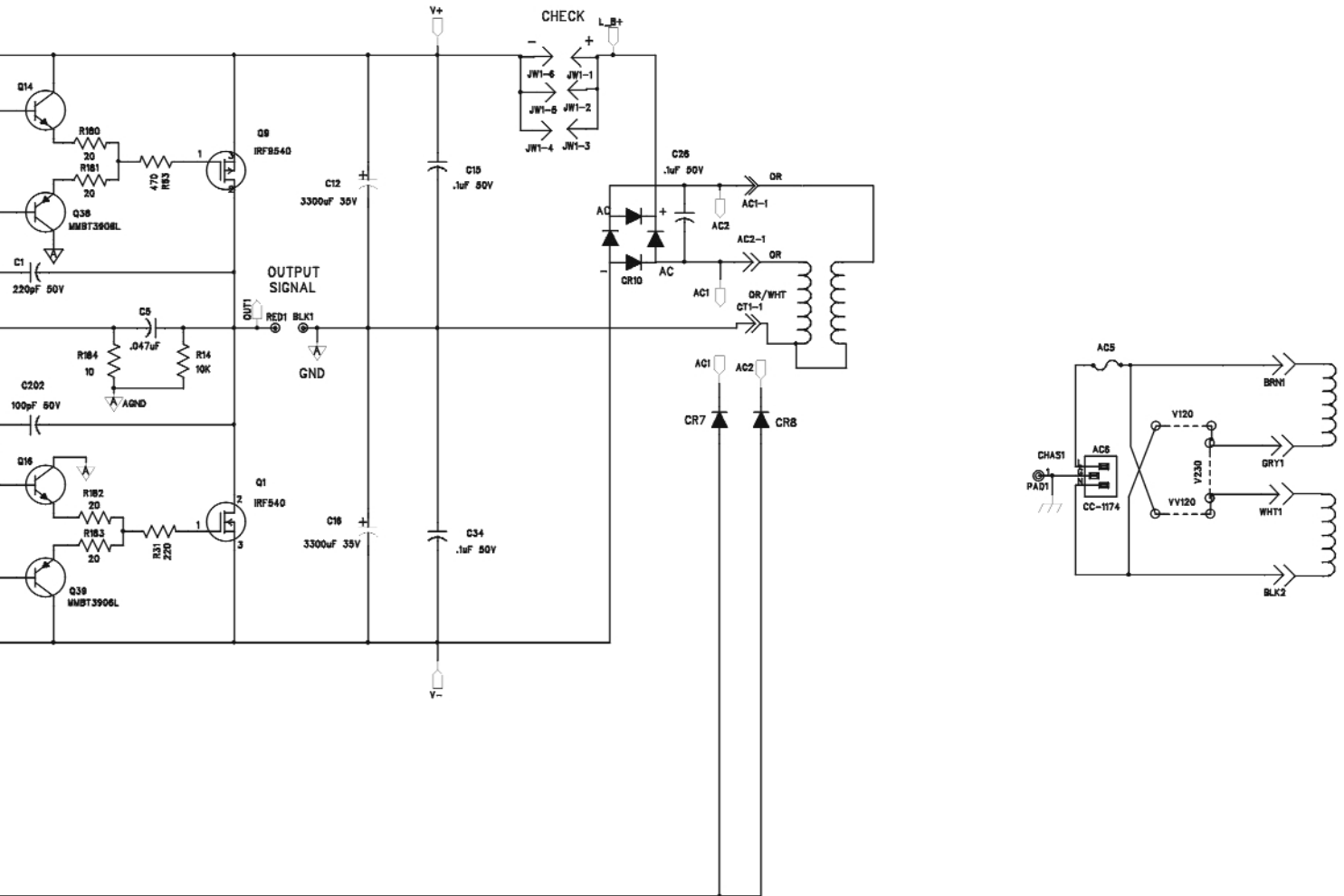


# SCHEMATIC DIAGRAM

NOTES: Unless specified otherwise

1. All resistors in ohms.
2. All capacitors in microfarads.
3. Channel 1 only shown.





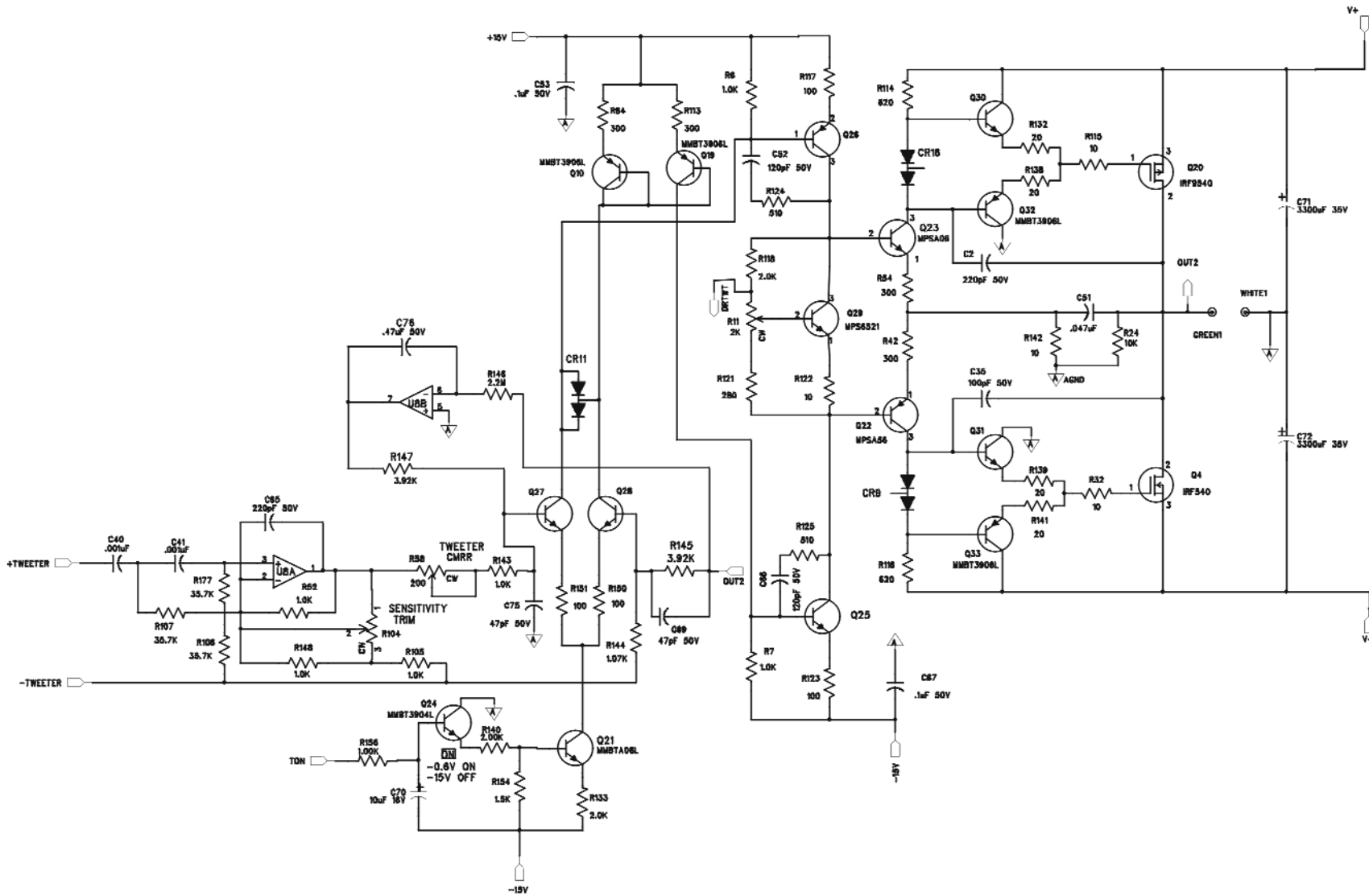
NOTES: Unless specified otherwise

1. All resistors in ohms.
2. All capacitors in microfarads.
3. Channel 1 only shown.



Qualified Service Personnel Only

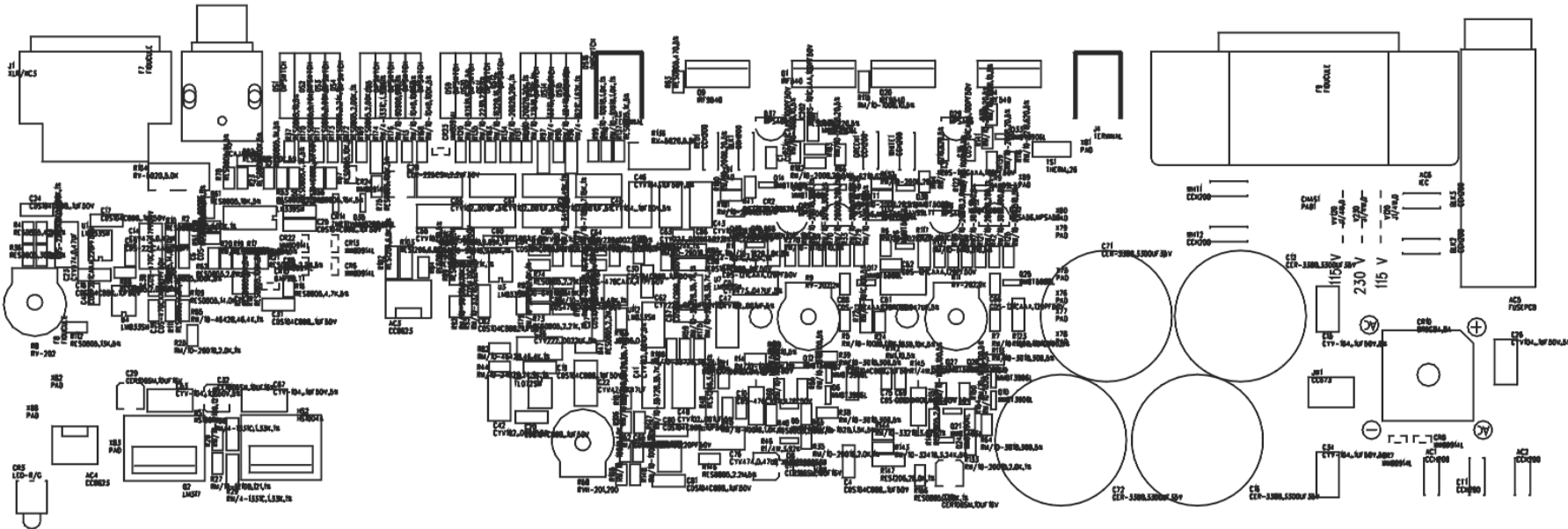
# SCHEMATIC Diagram





Qualified Service Personnel Only

# PC BOARD LAYOUT



ROCKFORD/HAFLE PC-2328-B

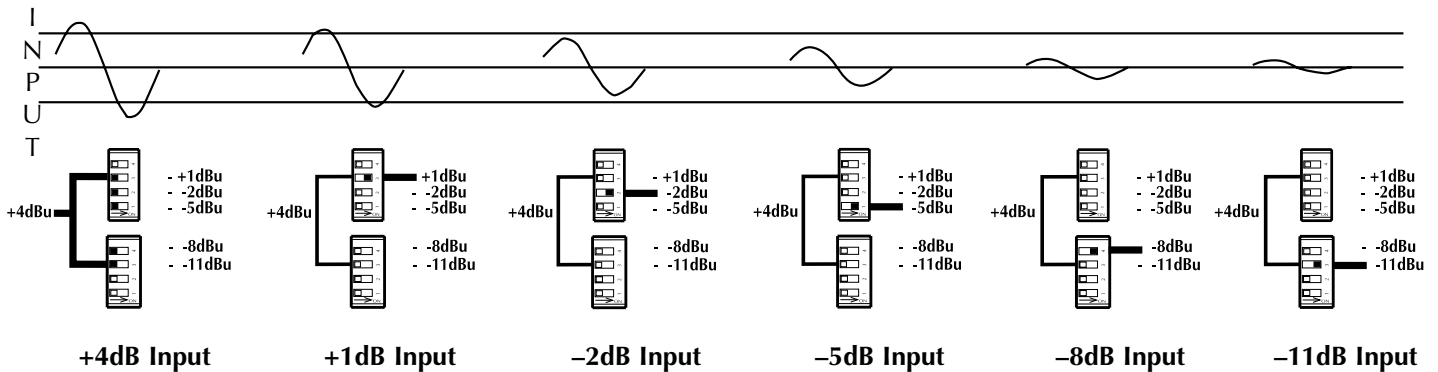
SILKSCREEN COMPONENT SIDE

# OPERATION

**NOTE:** When using the **INPUT SENSITIVITY**, select only one switch configuration at a time. Engaging multiple switch configurations (i.e., moving two or more switches ON) may cause undesirable operation and is **NOT RECOMMENDED**.

## INPUT SENSITIVITY

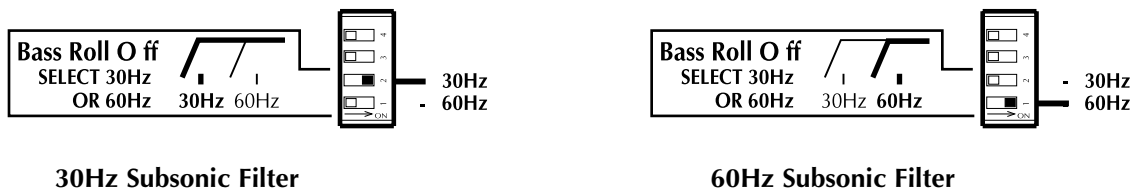
The Input Sensitivity adjustment is used to match the monitor with signal levels from a variety of mixing consoles. The Input Sensitivity uses DIP switches to match input levels over a 15dB range and are marked +1dB, -2dB, -5dB, -8dB, and -11dB. These numbers indicate the input in dBu required to produce an output of 100dB SPL @ 1 meter. When all switches are in the OFF (left) position, the monitor is matched to +4dB input level. In the +4dB switch setting, the monitor is less sensitive to the input signal. In the -11dB switch setting, the monitor is more sensitive to the input signal.



**NOTE:** When using the **Bass Roll Off**, select only the 30Hz or 60Hz filter. Engaging both switch configurations at one time (both switches ON) may cause undesirable operation and is **NOT RECOMMENDED**.

## BASS ROLL OFF

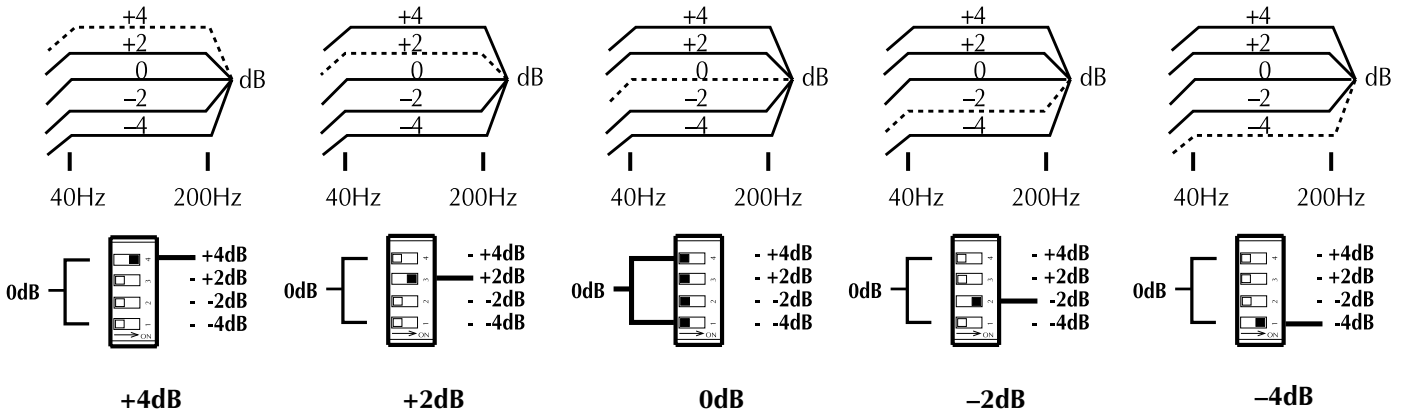
The Bass Roll Off is a subsonic filter used to limit harmful frequencies sent to the low frequency transducer to prevent overexcursion. The filter is selectable to electronically limit frequencies below 30Hz or 60 Hz at a 12 dB/octave roll off. When both switches are in the OFF (left) position, the amplifier has an electrical -3dB down point of 28Hz. For optimum operation select only one switch configuration at a time.



**NOTE: When using the BASS SHELVING & TREBLE SHELVING, select only one switch configuration at a time. Engaging multiple switch configurations (i.e., moving two or more switches ON) may cause undesirable operation and is NOT RECOMMENDED.**

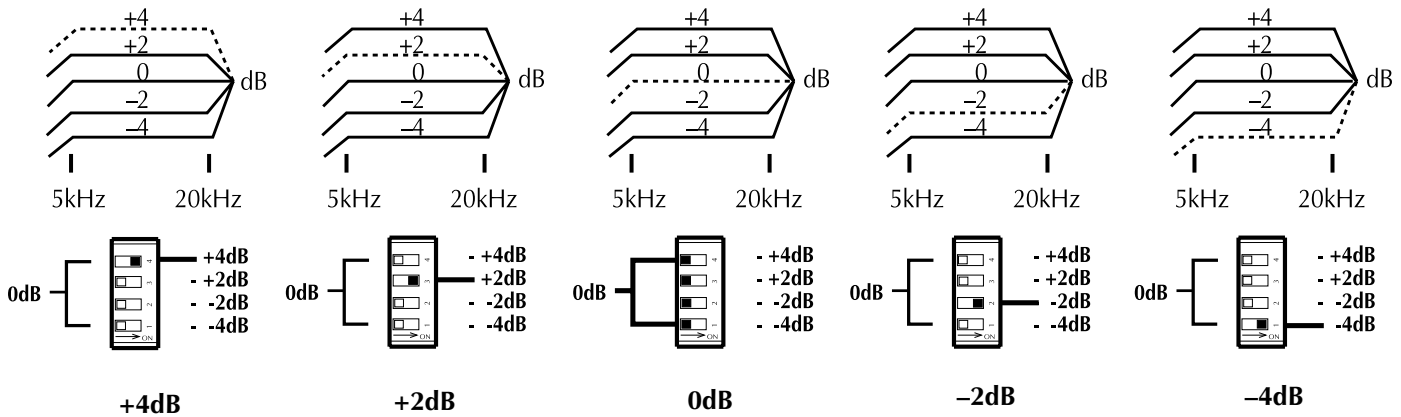
**BASS SHELVING**

Bass Shelving is used to match the low frequency response of the monitor to the acoustic environment. Bass Shelving uses DIP switches to control frequencies from 40Hz to 200Hz over an 8dB range and are marked +4dB, +2dB, -2dB, and -4dB. When all switches are in the OFF (left) position, the bass level is at 0dB.



**TREBLE SHELVING**

Treble Shelving uses DIP switches to control frequencies from 5kHz to 20kHz over an 8dB range and are marked +4dB, +2dB, -2dB, and -4dB. When all switches are in the OFF (left) position, the treble level is at 0dB.



**AC LINE**

The TRM6.1 operates from a 115 VAC/60Hz power line. The TRM6.1CE operates from a 230 VAC 50/60Hz power line. Connection is made by a 16 gauge, IEC Type 320, grounded line cord. For safety considerations only a properly grounded (earthed) receptacle should be used. If a grounded circuit is not available, do not break off the ground pin; use the proper adapter plug for a two wire receptacle with the grounding plug suitably connected to earth ground.



**IMPORTANT: The power line fuse is mounted on the rear panel. If this fuse blows, replace it only with the same type and rating as indicated in the parts list.**

## POWER SWITCH

The POWER switch is located on the front panel. The LED will illuminate GREEN, indicating the respective amplifiers are on. It is possible to leave the power switch in the ON position and switch the monitor remotely through a power distribution block or switched outlet. When doing so, make sure the switch is rated for the current required by the monitor.

- ⚠ **Standard practice is to turn the amplifier on last and off first when switching components to prevent sending damaging transients to the speakers.**
- ⚠ **Es costumbre encender el amplificador de último y apagarlo de primero cuando se estan encendiendo/apagando otros equipos, para así evitar el envío de transientes dañinas a los parlantes.**
- ⚠ **Il est de pratique courante de commencer par tourner l'amplificateur sur "off" et de terminer par "on," lorsqu'il s'agit de prévenir l'envoi de passages nuisible aux haut-parleurs.**
- ⚠ **Der Verstärker sollte als letztes Gerät eingeschaltet und als erstes Gerät wieder ausgeschaltet werden, um eine Beschädigung der Lautsprecher durch Spannungsspitzen zu vermeiden.**
- ⚠ **L'uso comune consiglia l'accensione dell'amplificatore per ultimo e lo spegnimento per primo quando si accendono i vari componenti, per evitare l'invio di transitori danneggianti agli altoparlanti.**

## STATUS LED

Amplifier operation is monitored internally and has a status LED. This indicator can be used for system troubleshooting in case of aberrant behavior.

**LED** – Monitors the status of the amplifiers.

COLOR	STATUS
GREEN	Power on*
FLASHING RED	Clipping
RED	Thermal

\*Indicates the amplifier is on regardless of input signal

## RUBBER PAD

A large rubber pad is supplied to eliminate annoying buzzes and rattles when placing the monitors on mixing consoles or similar mounting surfaces. Attach the pad to the underside of the monitor in the following manner:

- Thoroughly clean area where pad will be positioned (i.e., with isopropyl alcohol)
- Remove paper liner from rubber pad (avoid touching adhesive with fingers)
- Position pad in desired location
- Press pad firmly to insure good contact

## BREAK-IN and WARM-UP

We recommend initially breaking in the woofer for approximately 8 hours with musical information to establish the monitor's natural bass response. To achieve the best sonic performance and image stability from the internal amplifiers, we recommend letting them warm up for 1 hour before beginning any critical listening.

## CLEANING and MAINTENANCE

There is no requirement for regular maintenance on the electronic components of the monitor. If the cabinet or woofer becomes soiled, it can be cleaned using a damp, soft cloth. If the monitor is located in a particularly dusty environment, cleaning the inside with compressed air or vacuuming every 18 to 24 months is sufficient.



# PARTS LIST

DESIGNATOR VALUE  
ALL RESISTORS IN OHMS

DESIGNATOR	VALUE	PART #			
R1	RES 1.0K OHM 1/10W 1%	RM/10-1001B	R174	RES 1.33K OHM 1/4W 1%	RM/4-1331C
R10	RES 47K OHM 1/10W 5%	RM/10-473B	R175	35.7K OHM 1/10 WATT 1%	RM/10-3572B
R102	RES 6.8K OHM 1/4W 5%	RM/4-682C	R176	RES 909 OHM 1/10W 1%	RM/10-9090B
R103	RES 6.8K OHM 1/4W 5%	RM/4-682C	R177	35.7K OHM 1/10 WATT 1%	RM/10-3572B
R104	POT 5K 10% PIHER	RV-502Q	R178	30.1K RES 1% 0805	RM/10-3012B
R105	RES 1.0K OHM 1/10W 1%	RM/10-1001B	R179	RES 2.0K OHM 1/10W 1%	RM/10-2001B
R106	35.7K OHM 1/10 WATT 1%	RM/10-3572B	R18	RES 100K OHM 1/10W 5%	RM/10-104B
R107	35.7K OHM 1/10 WATT 1%	RM/10-3572B	R180	RES 20 OHM 1/10W 5%	RM/10-200B
R108	35.7K OHM 1/10 WATT 1%	RM/10-3572B	R181	RES 20 OHM 1/10W 5%	RM/10-200B
R109	RES 14K OHM 1/10W 1%	RM/10-1402B	R182	RES 20 OHM 1/10W 5%	RM/10-200B
R11	POT 2K TRIM	RV-202	R183	RES 20 OHM 1/10W 5%	RM/10-200B
R110	RES 14K OHM 1/10W 1%	RM/10-1402B	R184	RES 10 OHM 1W	RM1-100-012
R111	RES 14K OHM 1/10W 1%	RM/10-1402B	R19	RES 604K OHM 1/10W 1%	RM/10-6043B
R112	RES 13K OHM 1/10W 5%	RM/10-133B	R2	RES 1.0K OHM 1/10W 1%	RM/10-1001B
R113	RES 300 OHM 1/10W 5%	RM/10-301B	R20	RES 100K OHM 1/10W 5%	RM/10-104B
R114	RES 620 OHM 1/10W 5%	RM/10-621B	R21	RES 2.2M OHM 1/10W 5%	RM/10-225B
R115	RES 10 OHM 1/10W 5%	RM/10-100B	R22	RES 100K OHM 1/10W 5%	RM/10-104B
R116	RES 620 OHM 1/10W 5%	RM/10-621B	R23	RES 100K OHM 1/10W 5%	RM/10-104B
R117	RES 100 OHM 1/4W 5%	RM/4-101C	R24	RES 10K OHM 1/10W 5%	RM/10-103B
R118	RES 2.0K OHM 1/10W 1%	RM/10-2001B	R25	RES 2.0K OHM 1/10W 1%	RM/10-2001B
R119	RES 1.0K OHM 1/10W 1%	RM/10-1001B	R26	RES 1M OHM 1/10W 5%	RM/10-105B
R12	RES 10K OHM 1/10W 5%	RM/10-103B	R27	RES 1.3K OHM 1/10W 5%	RM/10-132B
R120	RES 9.76K OHM 1/10W 1%	RM/10-9761B	R278	RES 510 OHM 1/10W 5%	RM/10-511B
R121	RES 280 OHM 1/10W 1%	RM/10-2800B	R279	RES 510 OHM 1/10W 5%	RM/10-511B
R122	RES 10 OHM 1/10W 5%	RM/10-100B	R28	RES 1.3K OHM 1/10W 5%	RM/10-132B
R123	RES 100 OHM 1/4W 5%	RM/4-101C	R29	RES 121 OHM 1/4W 1%	RM/4-1210C
R124	RES 510 OHM 1/10W 5%	RM/10-511B	R3	RES 1.0K OHM 1/10W 1%	RM/10-1001B
R125	RES 510 OHM 1/10W 5%	RM/10-511B	R30	RES 121 OHM 1/4W 1%	RM/4-1210C
R128	RES 7.15K OHM 1/10W 1%	RM/10-7151B	R31	RES 220 OHM 1/10W 5%	RM/10-221B
R129	RES 7.15K OHM 1/10W 1%	RM/10-7151B	R32	RES 10 OHM 1/10W 5%	RM/10-100B
R13	RES 47K OHM 1/10W 5%	RM/10-473B	R33	RES 300 OHM 1/10W 5%	RM/10-301B
R130	RES 976K OHM 1/10W 1%	RM/10-9763B	R34	RES 300 OHM 1/10W 5%	RM/10-301B
R131	RES 20.0K OHM 1/10W 1%	RM/10-2002B	R35	RES 2.0K OHM 1/10W 1%	RM/10-2001B
R132	RES 20 OHM 1/10W 5%	RM/10-200B	R36	RES 3.3M OHM 1/10W 5%	RM/10-335B
R133	RES 2.0K OHM 1/10W 1%	RM/10-2001B	R37	RES 10 OHM 1/10W 5%	RM/10-100B
R134	RES 20.0K OHM 1/10W 1%	RM/10-2002B	R38	RES 300 OHM 1/10W 5%	RM/10-301B
R135	RES 22K OHM 1/10W 5%	RM/10-223B	R39	RES 300 OHM 1/10W 5%	RM/10-301B
R136	POT 5K 10%	RV-502Q	R4	RES 47K OHM 1/10W 5%	RM/10-473B
R137	RES 1.0K OHM 1/10W 1%	RM/10-1001B	R40	RES 2.0K OHM 1/10W 1%	RM/10-2001B
R138	RES 20 OHM 1/10W 5%	RM/10-200B	R41	RES 620 OHM 1/10W 5%	RM/10-621B
R139	RES 20 OHM 1/10W 5%	RM/10-200B	R42	RES 300 OHM 1/10W 5%	RM/10-301B
R14	RES 10K OHM 1/10W 5%	RM/10-103B	R43	RES 1.0K OHM 1/10W 1%	RM/10-1001B
R140	RES 2.0K OHM 1/10W 1%	RM/10-2001B	R44	24.9K OHM RES. 1/10 W 1%	RM/10-2492B
R141	RES 20 OHM 1/10W 5%	RM/10-200B	R45	RES 1.0K OHM 1/10W 1%	RM/10-1001B
R142	RES 10 OHM 1W	RM1-100-012	R46	RES 3.92K OHM 1/4W 1%	RMP/4-3921-03
R143	RES 1.0K OHM 1/10W 1%	RM/10-1001B	R47	RES 2.2M OHM 1/10W 5%	RM/10-225B
R144	RES 1.07K OHM 1/10W 1%	RM/10-1071B	R48	RES 3.92K OHM 1/4W 1%	RM/4-3921C
R145	RES 3.92K OHM 1/4W 1%	RMP/4-3921-03	R49	RES 604K OHM 1/10W 1%	RM/10-6043B
R146	RES 2.2M OHM 1/10W 5%	RM/10-225B	R5	RES 1.0K OHM 1/10W 1%	RM/10-1001B
R147	RES 3.92K OHM 1/4W 1%	RM/4-3921C	R50	RES 4.7K OHM 1/10W 5%	RM/10-472B
R148	RES 1.0K OHM 1/10W 1%	RM/10-1001B	R51	RES 15K OHM 1/10W 5%	RM/10-153B
R15	RES 3.3M OHM 1/10W 5%	RM/10-335B	R52	RES 1.0K OHM 1/10W 1%	RM/10-1001B
R150	RES 100 OHM 1/10W 5%	RM/10-101B	R53	RES 2.2M OHM 1/10W 5%	RM/10-225B
R151	RES 100 OHM 1/10W 5%	RM/10-101B	R54	RES 300 OHM 1/10W 5%	RM/10-301B
R154	RES 1.5K OHM 1/10W 5%	RM/10-152B	R55	RES 100 OHM 1/10W 5%	RM/10-101B
R156	RES 1.0K OHM 1/10W 1%	RM/10-1001B	R56	RES 15K OHM 1/10W 5%	RM/10-153B
R16	RES 4.7K OHM 1/10W 5%	RM/10-472B	R57	RES 10K OHM 1/10W 5%	RM/10-103B
R163	RES 16.2K 1/10 1%	RM/10-1622B	R58	200 TRIM POT	RVH-201
R164	RES 191K OHM 1/10W 1%	RM/10-1913B	R59	35.7K OHM 1/10 WATT 1%	RM/10-3572B
R165	RES 0 OHM 1/10W	RM/10-000B	R6	RES 1.0K OHM 1/10W 1%	RM/10-1001B
R166	RES 9.09KOHM 1/10W 1%	RM/10-9091B	R60	RES 100 OHM 1/10W 5%	RM/10-101B
R167	RES 6.49K OHM 1/10W 1%	RM/10-6491B	R61	RES 10K OHM 1/10W 5%	RM/10-103B
R169	RES 2.0K OHM 1/10W 1%	RM/10-2001B	R62	RES 2.2M OHM 1/10W 5%	RM/10-225B
R17	RES 10K OHM 1/10W 5%	RM/10-103B	R63	RES 470 OHM 1/10W 5%	RM/10-471B
R170	RES 9.76K OHM 1/10W 1%	RM/10-9761B	R64	RES 300 OHM 1/10W 5%	RM/10-301B
R171	RES 2.0K OHM 1/10W 1%	RM/10-2001B	R65	RES 1.5K OHM 1/10W 5%	RM/10-152B
R172	RES 2.0K OHM 1/10W 1%	RM/10-2001B	R66	RES 620 OHM 1/10W 5%	RM/10-621B
R173	RES 2.21K OHM 1/10W 1%	RM/10-2211B	R67	RES 1.0K OHM 1/10W 1%	RM/10-1001B
			R68	RES 100 OHM 1/4W 5%	RM/4-101C
			R69	RES 2.0K OHM 1/10W 1%	RM/10-2001B
			R7	RES 1.0K OHM 1/10W 1%	RM/10-1001B

R70	RES 280 OHM 1/10W 1%	RM/10-2800B	C50	CAP .001UF	CDS-102CBAA
R71	RES 10 OHM 1/10W 5%	RM/10-100B	C51	.047UF 50V	CYV-473-033
R72	RES 100 OHM 1/4W 5%	RM/4-101C	C52	CAP 120PF	CDS-121CAAA
R73	RES 2.21K OHM 1/10W 1%	RM/10-2211B	C53	CAP .1UF 50V	CYV-104-033
R74	RES 2.21K OHM 1/10W 1%	RM/10-2211B	C54	CAP 47PF 50V 5%	CDS-470CAAA
R75	RES 100K OHM 1/10W 5%	RM/10-104B	C55	CAP .001UF 50V	CYV-102-033
R76	619K OHM 1/10W 1%	RM/10-6193B	C56	CAP .001UF 50V	CYV-102-033
R78	RES 1M OHM 1/10W 5%	RM/10-105B	C57	CAP .1UF 50V 10%	CDS-104CBBB
R79	RES 1M OHM 1/10W 5%	RM/10-105B	C58	CAP .1UF 50V 10%	CDS-104CBBB
R8	POT 2K TRIM	RV-202	C59	CAP 47PF 50V 5%	CDS-470CAAA
R80	RES 6.49K OHM 1/10W 1%	RM/10-6491B	C6	CAP 220PF 50V 5%	CDS-221CAAA
R81	RES 6.49K OHM 1/10W 1%	RM/10-6491B	C60	CAP .001UF 50V	CYV-102-033
R82	46.4K OHM RES. 1/10 W 1%	RM/10-4642B	C61	CAP .001UF 50V	CYV-102-033
R84	RES 120 OHM 1/10W 5%	RM/10-121B	C62	CAP-022UF 50V	CYV-223-033
R85	46.4K OHM RES. 1/10 W 1%	RM/10-4642B	C63	CAP-022UF 50V	CYV-223-033
R86	RES 5.49K OHM 1/10W 1%	RM/10-5491B	C64	CAP .0022UF 50V	CYV-222-033
R87	RES 1.62K OHM 1/4W 1%	RM/4-1621C	C65	CAP 220PF 50V 5%	CDS-221CAAA
R88	RES 2.0K OHM 1/10W 1%	RM/10-2001B	C66	CAP 120PF 50V 5%	CDS-121CAAA
R89	RES 2.21K OHM 1/10W 1%	RM/10-2211B	C67	CAP .1UF 50V	CYV-104-033
R9	POT 2K TRIM	RV-202	C69	CAP 47PF 50V 5%	CDS-470CAAA
R90	RES 2.21K OHM 1/10W 1%	RM/10-2211B	C7	CAP 220PF 50V 5%	CDS-221CAAA
R91	RES 9.09KOHM 1/10W 1%	RM/10-9091B	C70	CAP 10UF 16V	CER-106SM
R92	RES 9.09KOHM 1/10W 1%	RM/10-9091B	C71	CAP 3300UF 35V	CERS-338B
R93	RES 3.32K OHM 1/10W 1%	RM/10-3321B	C72	CAP 3300UF 35V	CERS-338B
R94	RES 2.0K OHM 1/10W 1%	RM/10-2001B	C75	CAP 47PF 50V 5%	CDS-470CAAA
R95	RES 3.24K OHM 1/10W 1%	RM/10-3241B	C76	CAP .47UF 50V	CYV-474-033
R96	RES 1.62K OHM 1/4W 1%	RM/4-1621C	C80	CAP .1UF 50V 10%	CDS-104CBBB
R97	RES 1.33K OHM 1/4W 1%	RM/4-1331C	C81	CAP .1UF 50V 10%	CDS-104CBBB
R98	24.9K OHM RES. 1/10 W 1%	RM/10-2492B	C82	CAP .1UF 50V 10%	CDS-104CBBB
R99	RES 1.0K OHM 1/10W 1%	RM/10-1001B	C83	CAP 47PF 50V 5%	CDS-470CAAA
			C84	CAP .1UF 50V 10%	CDS-104CBBB
C1	CAP 220PF 50V 5%	CDS-221CAAA	C85	CAP .1UF 50V	CYV-104-033
C10	CAP 47PF 50V 5%	CDS-470CAAA	C86	CAP 220PF 50V 5%	CDS-221CAAA
C11	CAP 10UF 16V	CER-106SM	C87	CAP 120PF 50V 5%	CDS-121CAAA
C12	CAP 3300UF 35V	CERS-338B	C88	CAP 120PF 50V 5%	CDS-121CAAA
C14	CAP .47UF 50V	CYV-474-033	C9	CAP .1UF 50V 10%	CDS-104CBBB
C15	CAP .1UF 50V	CYV-104-033			
C16	CAP 3300UF 35V	CERS-338B	CR1	DIO DUAL BAV99L	SS-260SM
C17	CAP .1UF 50V 10%	CDS-104CBBB	CR10	BRIDGE RECTIFIER	SS-0799-068
C18	CAP .1UF 50V 10%	CDS-104CBBB	CR11	DIO DUAL BAV99L	SS-260SM
C19	CAP .1UF 50V 10%	CDS-104CBBB	CR13	DIO MMBD914L	SS-803SM
C2	CAP 220PF 50V 5%	CDS-221CAAA	CR14	DIO ZENER MMBZ5240BL	SS-1052
C20	CAP .1UF 50V 10%	CDS-104CBBB	CR15	DIO DUAL BAV99L	SS-260SM
C202	CAP 100PF 50V 5%	CDS-101CAAA	CR16	DIO DUAL BAV99L	SS-260SM
C21	CAP 47PF 50V 5%	CDS-470CAAA	CR2	DIO DUAL BAV99L	SS-260SM
C22	CAP .47UF 50V	CYV-474-033	CR22	DIO MMBD914L	SS-803SM
C23	CAP .47UF 50V	CYV-474-033	CR3	RD/GRN BICOLOR LED	SS-2423
C24	CAP .1UF 50V 10%	CDS-104CBBB	CR4	DIO DUAL BAV99L	SS-260SM
C25	CAP .1UF 50V 10%	CDS-104CBBB	CR5	DIO MMBD914L	SS-803SM
C26	CAP .1UF 50V	CYV-104-033	CR6	DIO MMBD914L	SS-803SM
C27	CAP .1UF 50V 10%	CDS-104CBBB	CR7	DIO MMBD914L	SS-803SM
C28	CAP 2.2UF 50V	CER-225CSM	CR8	DIO MMBD914L	SS-803SM
C29	CAP 10UF 16V	CER-106SM	CR9	DIO DUAL BAV99L	SS-260SM
C3	CAP .1UF 50V 10%	CDS-104CBBB			
C30	CAP .1UF 50V 10%	CDS-104CBBB	Q10	XSTR MMBT3906LT1 PNP	SS-0791
C31	CAP .1UF 50V 10%	CDS-104CBBB	Q11	XSTR MMBT5088L NPN	SS-0114
C32	CAP 10UF 16V	CER-106SM	Q12	XSTR MMBT5088L NPN	SS-0114
C34	CAP .1UF 50V	CYV-104-033	Q13	XSTR MPS-A56	SS-101A-45
C35	CAP 100PF 50V 5%	CDS-101CAAA	Q14	XSTR MMBT5088L NPN	SS-0114
C36	CAP .0022UF 50V	CYV-222-033	Q15	XSTR NPN MPSA06	SS-102A-45
C38	CAP 47PF 50V 5%	CDS-470CAAA	Q16	XSTR MMBT5088L NPN	SS-0114
C39	CAP 47PF 50V 5%	CDS-470CAAA	Q17	XSTR MMBT5088L NPN	SS-0114
C4	CAP .1UF 50V 10%	CDS-104CBBB	Q18	XSTR MMBT5087L PNP	SS-0115
C40	CAP .001UF 50V	CYV-102-033	Q19	XSTR MMBT3906LT1 PNP	SS-0791
C41	CAP .001UF 50V	CYV-102-033	Q2	Regulator LM317	SS-1375
C42	CAP .001UF 50V	CYV-102-033	Q21	XSTR MMBTA06L	SS-102SM
C43	CAP .001UF 50V	CYV-102-033	Q22	XSTR MPS-A56R	SS-101A-45
C44	CAP 220PF 50V 5%	CDS-221CAAA	Q23	XSTR NPN MPSA06	SS-102A-45
C45	CAP .01UF 50V	CYV-103-033	Q24	XSTR MMBT3904LT1 NPN	SS-0792
C46	CAP .01UF 50V	CYV-103-033	Q25	XSTR MMBT5088L NPN	SS-0114
C47	CAP .001UF 50V	CYV-102-033	Q26	XSTR MMBT5087L PNP	SS-0115
C48	CAP .001UF 50V	CYV-102-033	Q27	XSTR MMBT5088L NPN	SS-0114
C49	CAP 220PF 50V 5%	CDS-221CAAA	Q28	XSTR MMBT5088L NPN	SS-0114
C5	.047UF 50V	CYV-473-033	Q29	XSTR MPS6521	SS-209

Q3	Regulator LM337	SS-1376
Q30	XSTR MMBT5088L NPN	SS-0114
Q31	XSTR MMBT5088L NPN	SS-0114
Q32	XSTR MMBT3906LT1 PNP	SS-0791
Q33	XSTR MMBT3906LT1 PNP	SS-0791
Q35	XSTR MMBT3906LT1 PNP	SS-0791
Q37	XSTR MPS6521	SS-209
Q38	XSTR MMBT3906LT1 PNP	SS-0791
Q39	XSTR MMBT3906LT1 PNP	SS-0791
Q5	XSTR MMBTA06L	SS-102SM
Q6	XSTR MMBT3906LT1 PNP	SS-0791
Q7	XSTR MMBT3906LT1 PNP	SS-0791
Q8	XSTR MMBT3904LT1 NPN	SS-0792
U1	OPAMP TL072CD	SS-143SM
U112	OPAMP TL072CD	SS-143SM
U2	OPAMP TL072CD	SS-143SM
U3	OPAMP TL072CD	SS-143SM
U4	OPAMP TL072CD	SS-143SM
U5	COMPTR QUAD LM339	SS-730SM
U7	OPAMP TL072CD	SS-143SM
U8	OPAMP TL072CD	SS-143SM
DS1	SW SIDE ACT DIP 4 POS	SW-1649
DS12	SW SIDE ACT DIP 4 POS	SW-1649
DS4	SW SIDE ACT DIP 4 POS	SW-1649
DS8	SW SIDE ACT DIP 4 POS	SW-1649

J1	CONN XLR NEUTRIK NC3FAH-2-0	CC-2339	
J2	RCA JACK, SINGLE WHITE, GOLD	CCH-232	⚠
JW1	SH 2X3 JUMPER	CC-648	⚠
JW1	HDR 6 PIN DUAL ROW	CC-673	

V120	RES 0 OHM 1/4W (JUMPER WIRE)	RMP/4-0000-03
VV120	RES 0 OHM 1/4W (JUMPER WIRE)	RMP/4-0000-03

	6.5" Woofer	FG26387WP	⚠
	1" Tweeter	SPK10424	⚠
	TRM6 MEHSA Bar	WP-2439	⚠
			⚠
AC6	CONN IEC POWER INLET	CC-1174	⚠
CHASS1	HARNESS P1000 CHASSIS GND	FA-1401-A	⚠
	FUSE 3A 3AG SLO BLO	FS-003SB	⚠
	FUSE HOLDER CAP 3AG	FS-1175	⚠
	FUSE HOLDER BODY PC MOUNT	FS-1176	⚠
TS1	THERMISTOR 10K EPOXY	SS-0426-066	
	Power Switch	SHW9840	
	IEC Linecord	WIR9856	
	Transformer	TT-2326-E	⚠

**MODEL: TRM6.1CE (230 VAC 50/60 Hz)**

RES 0 OHM 1/4W (JUMPER WIRE)	RMP/4-0000-03
FUSEHOLDER CAP 5X20mm	FS-1269-A
5X20mm 0.8A SLO-BLO FUSE	FS-1484-A
European Linecord <HAR>	WIR10138

⚠ Components marked with this symbol are safety critical and should only be replaced with identical components.

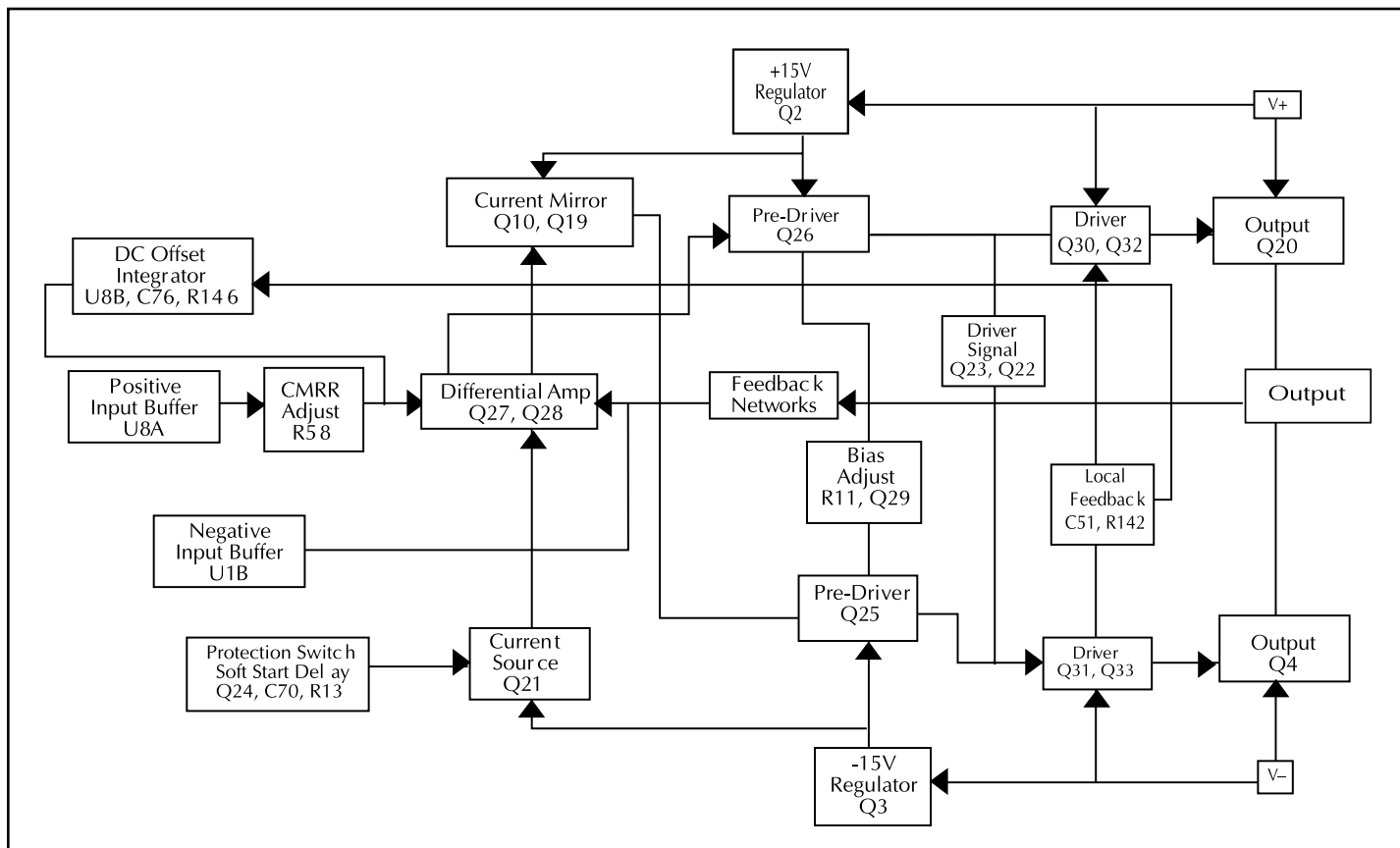
⚠ Los componentes marcados con el simbolo son ⚠ imprescindibles para la proteccion del equipo, por lo cual que solo sean reemplazados por los mismos componentes.

⚠ Les composants marqués du symbole ⚠ sont indispensables à la sécurité et ne peuvent être remplacés qu'avec des composants identiques.

⚠ Bauteile, die mit einem ⚠ gekennzeichnet sind, sind sehr wichtig und dürfen nur mit den original Ersatzteilen ausgetauscht werden.

⚠ I componenti contrassegnati da ⚠ sono critici per la sicurezza e devono essere rimpiazzati solo con ricambi di valore identico.

# TRM6.1 FUNCTIONAL BLOCK DIAGRAM



# SERVICE REFERENCE

## CIRCUIT OPERATION



**Qualified Service Personnel Only**

### *trans•ana Implementation*

The transistor Q24 is configured to operate as a switch that controls the constant current source Q21 of the differential amplifier Q27 and Q28. Switch Q24 is under the control of the thermal and turn-on circuits, and provides a Soft Start turn-on ramp according to the charging time of C70 through R13 and R156.

U8B is configured as a DC servo-integrator to null the output offset voltage. Class AB bias current is established by Q29, and adjusted by R11.

The positive and negative input signals are conveyed to the pre-driver transistors Q25 and Q26 by the differential amplifier Q27 and Q28, and by current mirror Q10 and Q19. Drivers Q22 and Q23 make the transition from the low-voltage front-end circuit to the high-voltage output stage. Buffer transistors Q30 and Q32 enhance the front-end drive current, and drive the positive output MOSFET Q20. The same is true for buffer transistors Q31 and Q33 and negative output MOSFET Q4.

## CALIBRATION



**WARNING: Only a competent technician should attempt the following procedure.**

### ***Bias:***

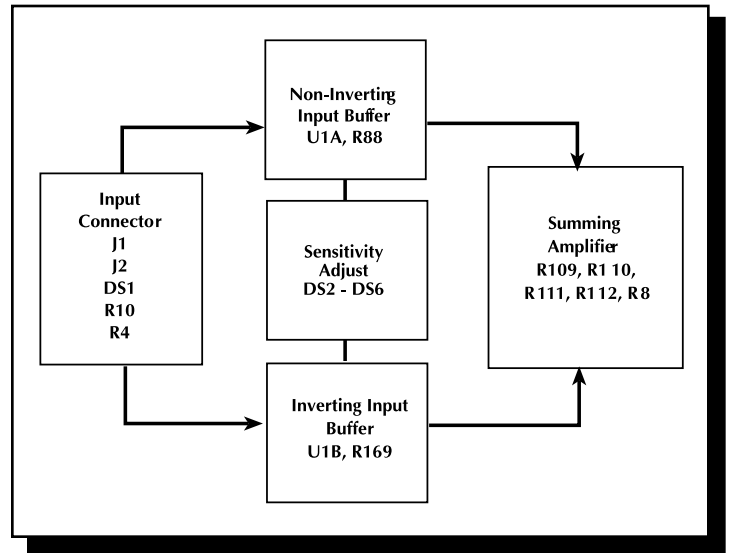
The bias control establishes the quiescent Class AB output current of the amplifier. The bias should not need readjustment from the factory setting; however, if the amplifier is repaired and the output devices have been changed, calibrating the bias is necessary. **Disconnect the power to the amplifier before removing the heatsink assembly from the speaker cabinet.** To adjust the bias, remove the jumper JW1 and connect an ammeter across the exposed pins. Adjust trimpots **R11 and R9 fully counter-clockwise before reapplying power to the unit.** After the Soft Start turn-on has settled, note the ammeter reading. Adjust R11 until an additional 50mA is created. Then adjust R9 until another 50mA is added to the ammeter reading. Replace jumper JW1.

### Input Circuit

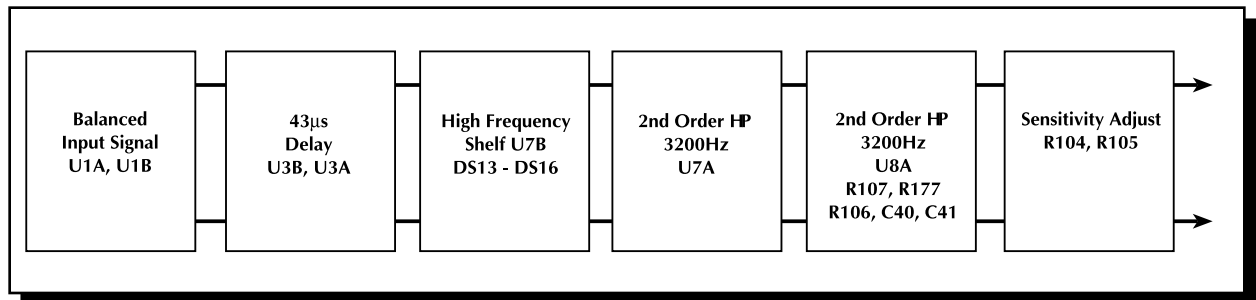
The input signal is connected to the amplifier through the balanced XLR connector J1, or the unbalanced RCA connector J2. Balanced/unbalanced switch DS1 will ground the inverting input buffer, allowing operation with an unbalanced signal on either connector. Input buffers U1A and U1B provide a stable input impedance, dominated by R10 and R4. The input circuit gain is set by switches DS2-DS6. Each switch inserts a different divider resistor for the feedback resistors R88 and R169, resulting in up to 15dB of additional input gain when DS6 is closed. Trimpot R8 adjusts the common-mode-rejection of the woofer channel.

The non-inverting input signal from U1A pin 1, and the inverting input signal from U1B pin 7, are summed together to form an unbalanced signal at U4A pin 1.

 **Qualified Service Personnel Only**

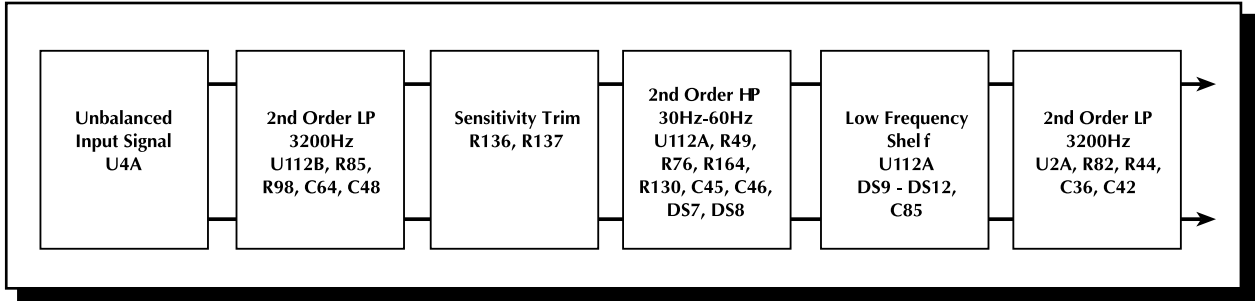


### Tweeter Crossover



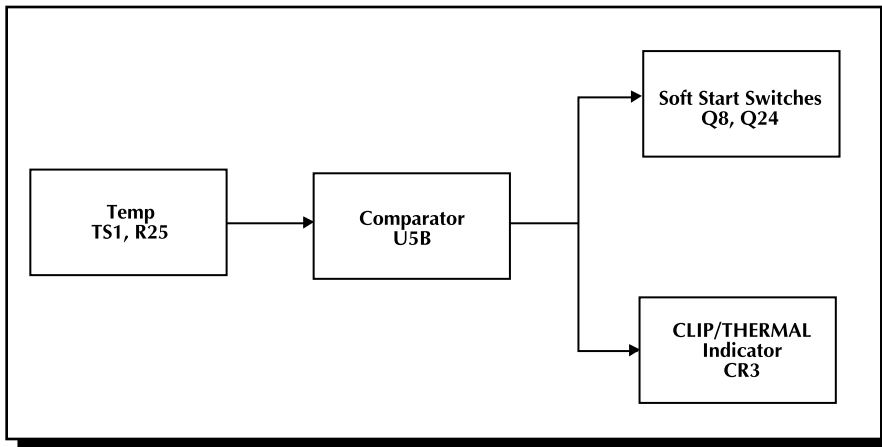
The balanced input signal at U1A pin 1 and U1B pin 7 connects to a 2-stage 39µs delay, using U3A and U3B. This is followed by the high-frequency shelf circuit at U7B. Switches DS13-DS16 add various reactive components to the feedback network of U7B, resulting in +4dB, +2dB, -2dB, or -4dB of gain shelving above 5kHz. The next stage at U7A is a 3.2kHz 2nd order high-pass filter. The last stage consists of another 3.2kHz 2nd order high-pass filter, bringing the overall tweeter crossover response to a 4th order 24dB/octave slope. The final components before the tweeter amplifier (R104 and R105) can provide up to 2dB of additional gain to the tweeter channel.

**Woofer Crossover**



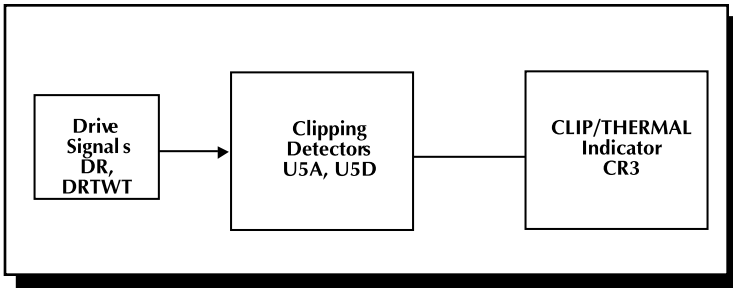
The input signal at U4A pin 1 connects to the 3200Hz 2nd order low-pass filter at U112B. Approximately 2dB of additional gain can be added to this stage by adjusting R136 against the divider resistor, R137. The next stage is a 30Hz–60Hz switchable sub-sonic high-pass filter. This is followed by an adjustable low-frequency shelving filter which defaults at +6dB gain, according to the feedback resistors R129 and R134, and dividers R131 and R128. DS9–DS12 will switch in various reactive feedback networks to accomplish +4dB, +2dB, -2dB, or -4dB of gain shelving below 200Hz. The last stage is another 3200Hz 2nd order low-pass filter at U2A, which cascades with the previous filter at U112B to produce an overall 4th order slope of 24dB/octave for the woofer amplifier.

**Thermal Protection**



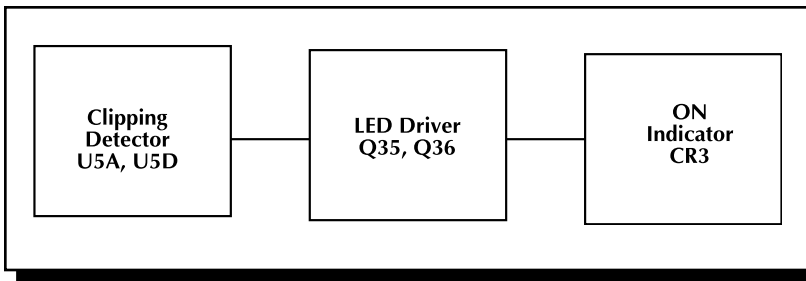
The thermal protection is activated, and shuts down audio operation, when the amplifier heatsink reaches an excessively high temperature. The voltage divider R22 and R23 establishes the reference voltage on pin 5 of U5B. The control voltage on pin 4 is established by the voltage divider TS1 and R25. TS1 is a NTC (Negative Temperature Coefficient) thermistor mounted on the heatsink. As TS1 warms and the resistance falls, the voltage on pin 4 rises. When the voltage on pin 4 exceeds the voltage on pin 5, the output on pin 2 goes low, shutting down the Soft Start switches Q8 and Q24, and lighting the CLIP/THERMAL indicator red.

**Clipping Indicator**



The CLIP indicators are driven by the comparator U5A and U5D. The voltage divider R56, R57, and R51, R61 establishes the reference voltage for the Clipping detector at pin 7 of U5A and pin 9 of U5D. Excessive drive signal at pin 6 or pin 8 will trigger its comparator low and light the CLIP/THERMAL indicator red.

**On Indicator**

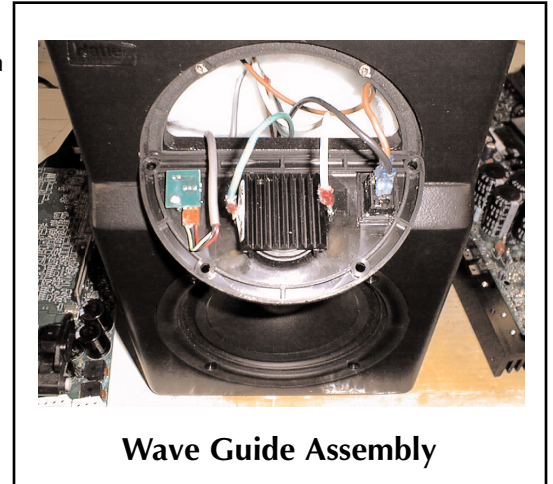


The bicolor LED, CR3, will remain green unless a THERMAL or CLIP condition is detected. The outputs of comparators U5A and U5D will be high, and Q35 will be off, allowing current to flow through the green LED of CR3 from ground to -17V.

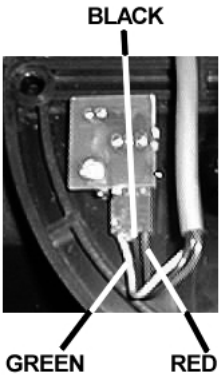
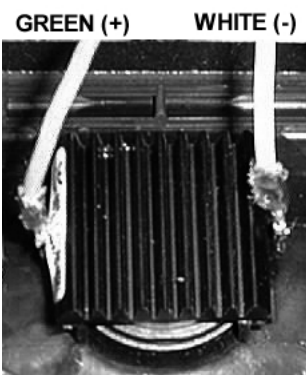
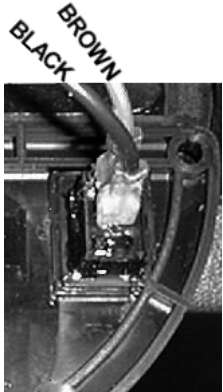


**TWEETER REPLACEMENT**

1. Remove (4) screws from wave guide using a 3/32" Allen Wrench
2. Remove wave guide assembly from enclosure
3. Disconnect the LED harness (**FIG. 1**)
4. Disconnect the (2) speaker wires from the tweeter (**FIG. 2**)
5. Disconnect the (2) power switch wires (**FIG. 3**)
6. Unclip the tweeter from wave guide (4 catch fingers)
7. Position the replacement tweeter into wave guide
8. Snap the tweeter into wave guide
9. Follow steps 1-5 in reverse order to install wave guide assembly



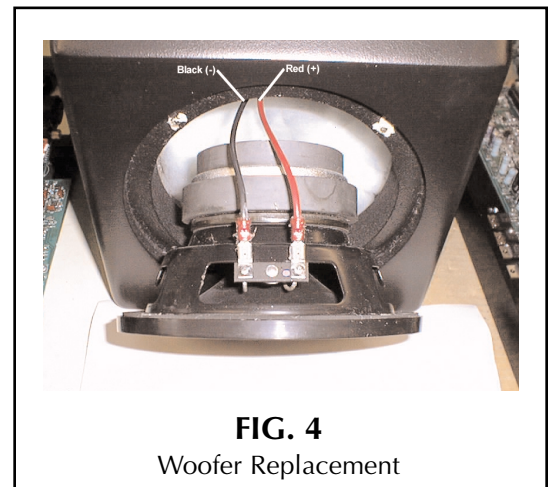
**! CAUTION: Reconnect wires as indicated in each diagram!**

 <p><b>FIG. 1</b> LED Harness</p>	 <p><b>FIG. 2</b> Tweeter Replacement #SPK10424</p>	 <p><b>FIG. 3</b> Power Switch</p>
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**WOOFER REPLACEMENT**

1. Remove (4) screws from woofer using a 3/32" Allen Wrench
2. Remove woofer from enclosure
3. Disconnect (2) speaker wires (**FIG. 4**)
4. Follow steps 1-3 in reverse order to install new woofer

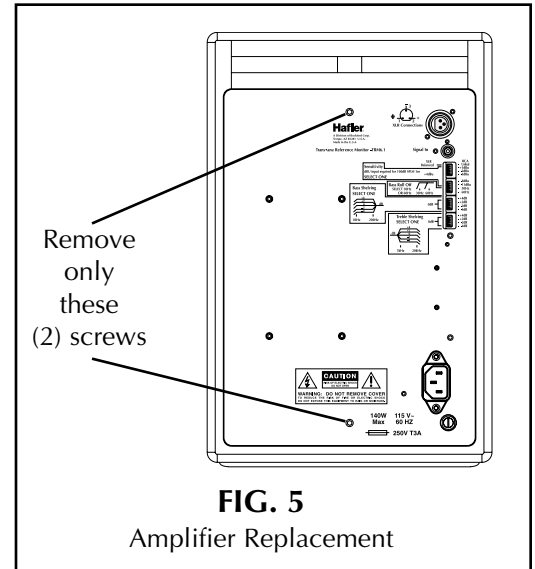
**! CAUTION: Reconnect wires as indicated in each diagram!**



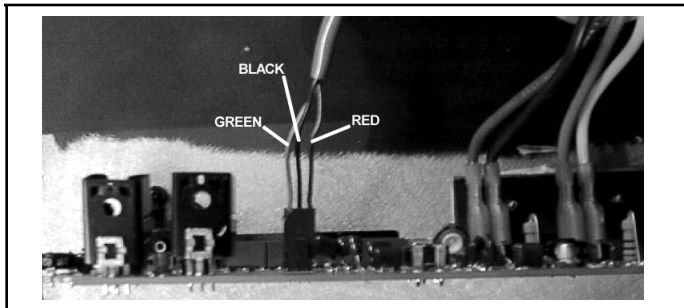
**AMPLIFIER REPLACEMENT**

1. Remove (2) screws from back using a 3/32" Allen Wrench (FIG. 5)
2. Disconnect PCB mounted LED harness (FIG. 6)
3. Disconnect PCB mounted tweeter speaker wires (FIG. 7)
4. Disconnect PCB mounted woofer speaker wires (FIG. 7)
5. Disconnect PCB mounted transformer primary wires (FIG. 8)
6. Disconnect PCB mounted transformer secondary wires (FIG. 8)
7. Disconnect PCB mounted power switch wires (FIG. 8)

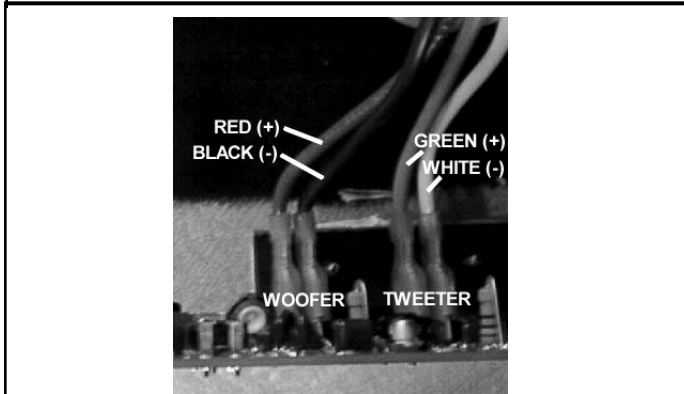
**! CAUTION: Reconnect wires as indicated in diagram!**



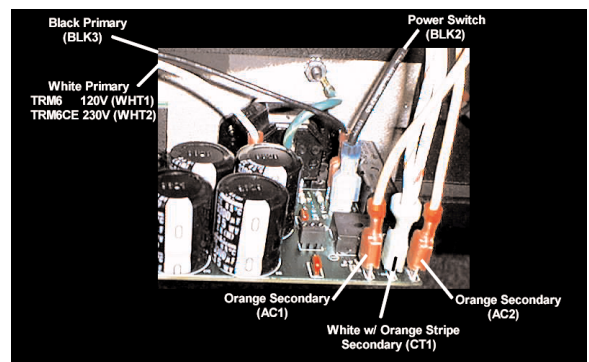
**FIG. 5**  
Amplifier Replacement



**FIG. 6**  
PCB Mounted LED Harness



**FIG. 7**  
PCB Mounted Speaker Wires

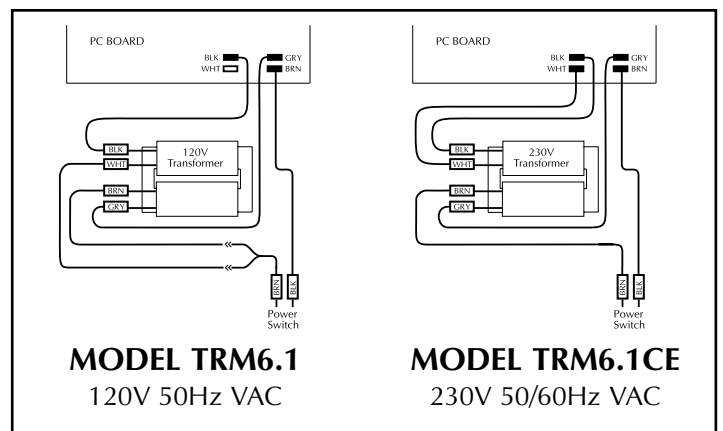


**FIG. 8**  
Transformer / Power Switch Wires

**TRANSFORMER REPLACEMENT**

The TRM6.1 is available both 120V and 230V versions. If it is necessary to perform service on the amplifier, be sure to check connections to the transformer before re-applying power and/or re-assembling the unit.

**! CAUTION: Reconnect wires as indicated in diagram!**



# SERVICE POLICY AND LIMITED WARRANTY

Rockford Corporation (Hafler Division) offers a limited warranty on Hafler products on the following terms:

- **Length of Warranty**

- 1 year on Reference Monitors

- **What is Covered**

- This warranty applies only to products sold to the original owner and is non-transferable. This warranty only applies to units sold in the continental United States. You are required to have a copy of the receipt stating the customer's name, dealer name, product purchased and date of purchase.

- **Products found to be defective during the warranty period** will be repaired or replaced (with product deemed to be equivalent) at Hafler's discretion.

- **What is NOT Covered**

- 1. Damage caused by accident, abuse, improper operations, water, theft
  - 2. Service performed by anyone other than Hafler or an Authorized Hafler service center
  - 3. Any product purchased outside the United States (please contact your local dealer)
  - 4. Shipping charges to get the unit to Hafler
  - 5. Any product which has had the serial number defaced, altered, or removed

- **Limit on Implied Warranties**

- Any implied warranties including warranties of fitness for use and merchantability are limited in duration to the period of the express warranty set forth above. Some states do not allow limitations on the length of an implied warranty, so this limitation may not apply. No person is authorized to assume for Hafler any other liability in connection with the sale of the product.

- **How to obtain service or technical support**

- Please call 1-800-669-9899 for Rockford/Hafler support. You must obtain an RA # (return authorization number) to return any products to Hafler. You are responsible for shipment of product to Hafler.

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This product is designed, developed and assembled in the USA by a dedicated group of American workers. The majority of the components used in the construction of this product are produced by American companies. However, due to the global nature of their manufacturing facilities and the electronics parts industry in general, some parts may be manufactured in other countries.