

SEPARATE COMPONENTS

THE EPITOME OF ONKYO ENGINEERING

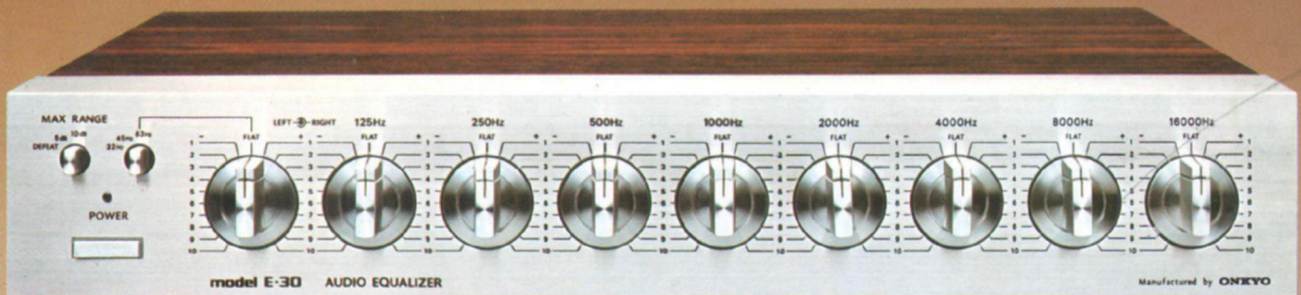
P-303



U-30



E-30



M-505



M-505

COMPLETE DC POWER AMPLIFIER

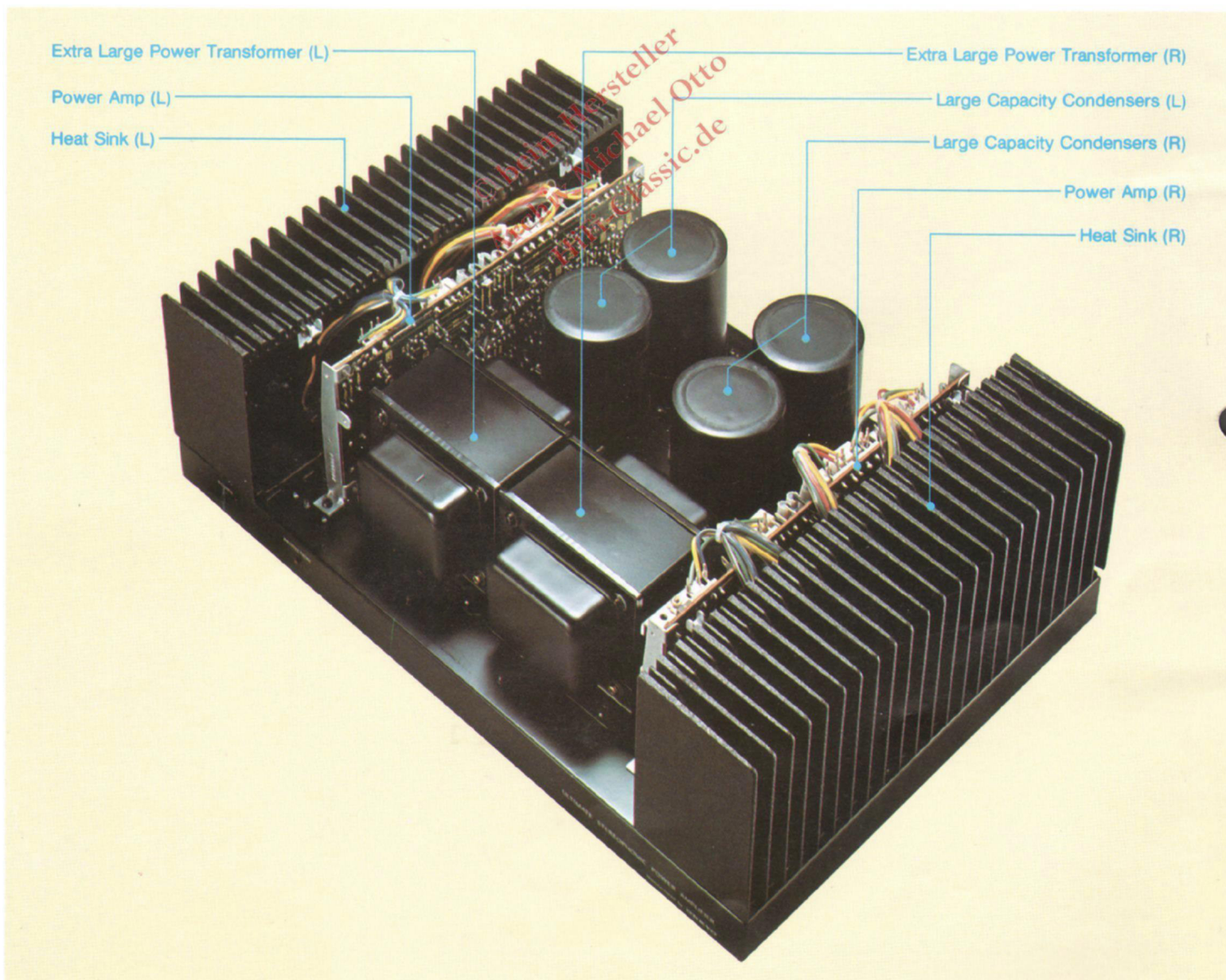


In designing the M-505, emphasis was placed on high fidelity waveform transmission and the elimination of all forms of distortion. Direct coupled circuit construction is a major factor in the design success realized in the M-505. Dual line construction has the merit of eliminating

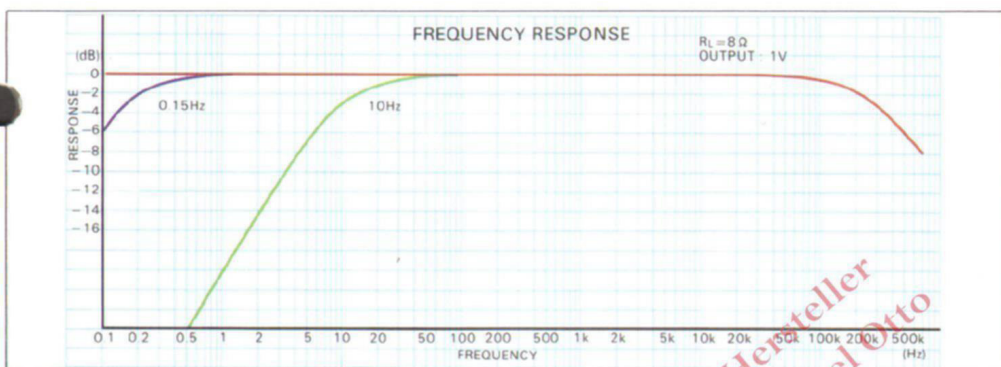
even the possibility of dynamic crosstalk distortion. Power supply improvements incorporated to maintain low impedance and clean regulated power include bus feeders and bus grounds, and extra large capacitors specially developed for audio use.

Completely DC Amp

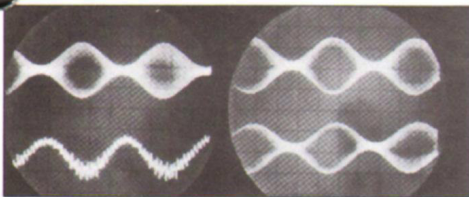
Direct coupled amplifiers which avoid the use of coupling capacitors between stages have been available for several years now. They offer very high fidelity waveform transmission, lowered phase shift, and the advantage of simplified



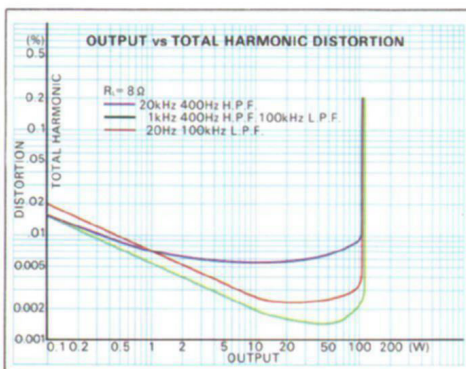
Spectacular Bass and Transient Response. Direct Coupled, Dual Line Construction Gives Power Without Distortion



design. In the M-505, phase shift is kept to within -5° throughout the audible frequency range. Onkyo further improves the DC amp by employing new low noise monolithic dual FETs in the first stage differential amp section. This gets over problems caused by speaker terminal DC drift. Since these FETs are made from a single pellet, they are perfectly matched for temperature response and stability. They also have superior humidity resistance, a benefit of ceramic base construction.

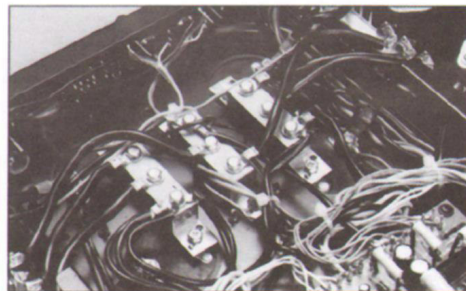


Oscilloscope photo (left) shows input signal (top) and resulting dynamic modulation of power supply voltage (bottom). Right: input signal (top) and resultant output waveform (bottom) affected by voltage instability.



Dynamic Transient Distortion

Dynamic transient distortion is prevented by dual line construction which is simply the complete separation of left and right channels from input to output. But other types of often ignored distortion are also virtually eliminated. Dynamic transient distortion (which doesn't show up under T.H.D. test conditions) occurs when a sudden signal causes a change in the supply voltage which in turn modulates or distorts the output signals. Impedance in the power supply is the underlying cause of this type of distortion which becomes particularly obvious with high volume, low frequency inputs.



The End of Dynamic Transient Distortion

To get rid of dynamic transient distortion, Onkyo uses heavy copper bus feeders and bus grounds with an ESR (equivalent series resistance) of nearly zero. Dynamic range, damping, and transient response are vastly improved.

Newly Developed Capacitors for Audio Use

Big capacitors have been employed in

recent hi-fi amplifiers. But when it comes to musical reproduction, mere capacity is not enough. So Onkyo developed these capacitors specifically for use in audio equipment. Third harmonic distortion, a major cause of listener fatigue, is reduced to -150dB at 10kHz . ESR is below 0.01 ohms. The M-505 employs four of these $18,000\mu\text{F}$ capacitors in the power supply section to maintain regulated voltage and low impedance with even the most complex inputs.



Protection Circuits

Electronic detection circuits protect the amp and speakers from overloading and from output DC voltage. They also serve to put the amp in the standby mode when it is switched on. The red protection light on the front panel indicates that the protection circuits are in operation. Temperature controlled switches and fuses in the transformers protect the amp from overheating.

Low Filter Switch

When in the DC position there is no low frequency cut off. Switch to 0.15Hz when using a preamp having a direct current leak. In the 10Hz position the cut off has the effect of a subsonic filter eliminating rumble when playing record albums.

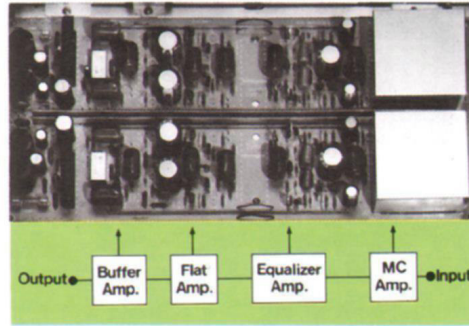


P-303

ULTIMATE STEREOPHONIC PREAMPLIFIER



Simple solutions are hard to find. But the P-303 will solve your preamp problems for good. Because a lot of thought went into the solutions incorporated in the P-303. And the result is a preamp that does precisely what it is supposed to do. The input signal is transmitted without distortion and RIAA phono equalization is provided with nearly perfect accuracy.



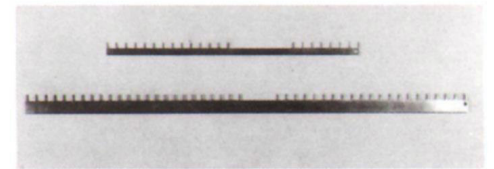
pedance down to nearly zero. The result is virtual elimination of dynamic transient distortion and an improvement in damping ability. For the maintenance of low impedance the power supply section is also important. A double stabilized circuit employing specially developed capacitors provides the well regulated temperature resistant performance necessary for high fidelity musical reproduction.

Dual Line Construction

As circuits become more complex and more condensed, the danger of left and right channel transient crosstalk distortion increases. The simple solution is to completely separate the two channels by means of dual line construction. The effect is the same as using two mono amplifiers and in a sense that's what Onkyo's P-303 really is.

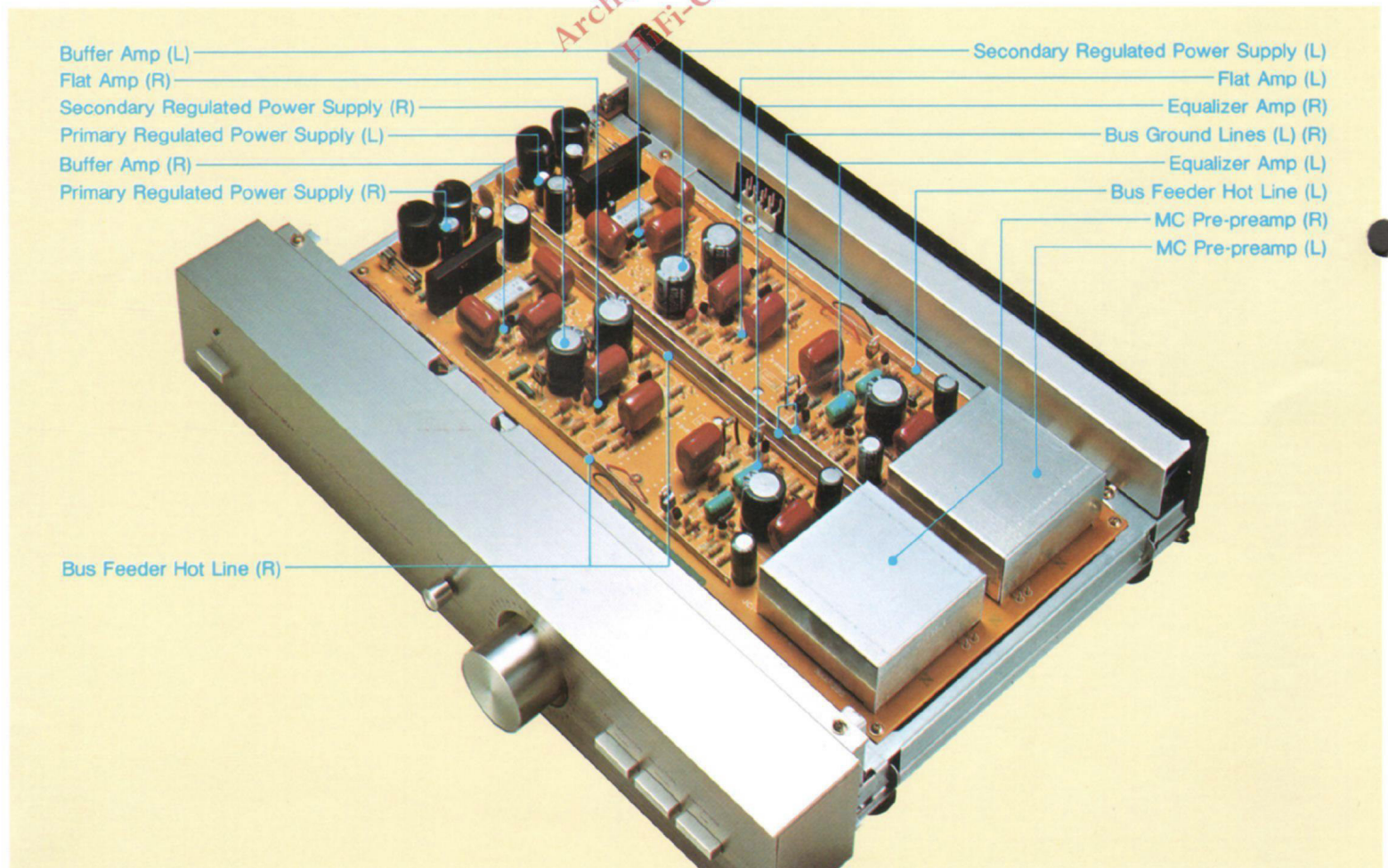
Low Impedance for Low Transient Distortion

The design of many amplifiers includes the assumption that the power supply has no impedance. Although this is not the case, the dynamic transient distortion arising from such impedance is not measured in ordinary tests of amplifier performance. The use of bus feeders and bus ground lines in the P-303 brings im-



High S/N Ratio Equalizer Amp

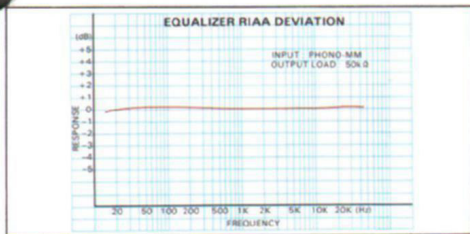
Advanced circuit design and strictly



Some Simple Breakthroughs Give Sophisticated Performance.

Includes Pre-Preamp for MC Cartridges

selected components deliver a very high phono S/N ratio of 83dB. RIAA equalization is improved with polypropylene film capacitors chosen for their frequency response and transient response characteristics. Deviation from the RIAA curve is kept to within $\pm 0.2\text{dB}$ (20 ~ 20kHz), a degree of fidelity that's hard to beat.



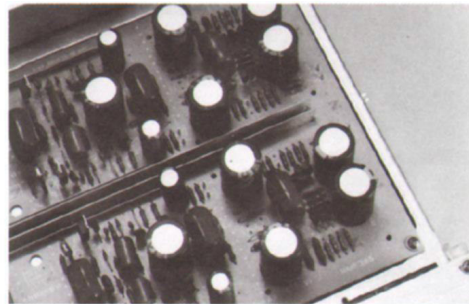
Precision Attenuator Volume Control

A front and back interlocking four ganged attenuator volume control is employed to bring S/N ratio way up when the volume level is reduced. Gang error and step error are reduced for low distortion and accurate control capability. The front panel is decibel graduated to make precision volume settings easy.

High Performance MC Pre-Preamp

A low impedance input pre-preamp for MC phono cartridges is provided so you can choose the type of cartridge you prefer. S/N ratio, always a problem with MC pre-preamps has been raised to the impressive figure of 70dB thanks to

super-low-noise transistors and ingenious circuit design.



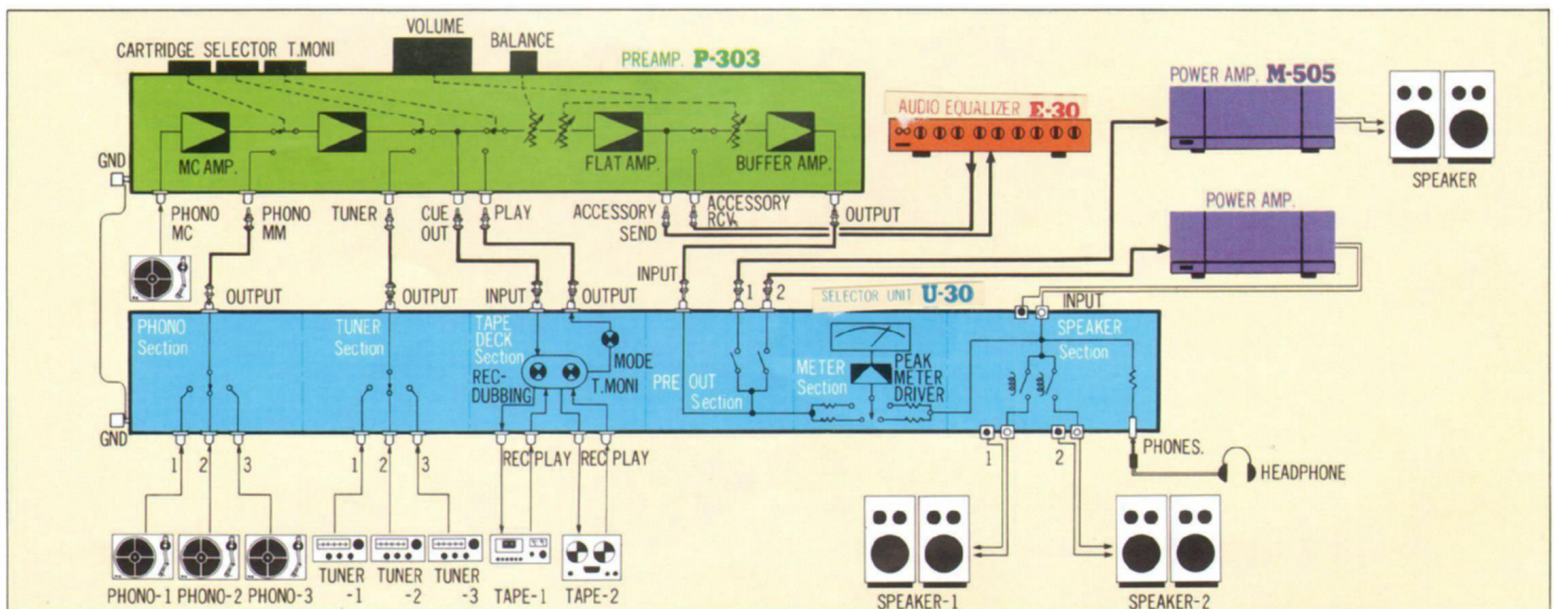
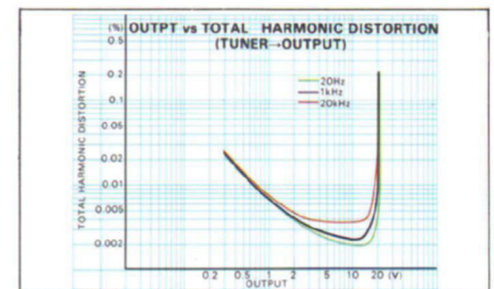
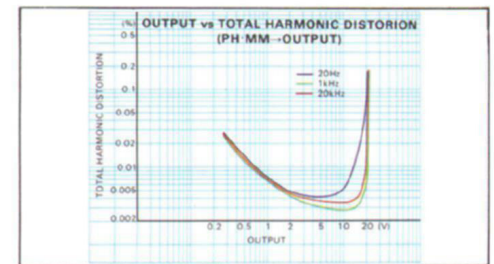
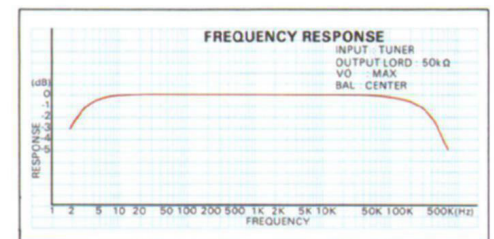
Reed Relay Transient Killer Circuit

A newly developed type of reed relay transient killer circuit is used to eliminate annoying click noise which occurs when the preamp is turned on and off.

The Ultimate System

It's not easy to convince people that Onkyo has developed the ultimate total system for sound reproduction. Hearing is, after all, believing. So hook everything up and hear the striking difference that Onkyo's ultimately simple solutions make. You may notice that the P-303 Preamp has no tone controls. That's because tone should be controlled properly with an Audio Equalizer like the E-30. And if you need level meters, speaker switches and input and recording selectors, see what the U-30 System Unit has to offer. The total effect

of the total system may take some getting used to. But if the ultimate in high fidelity is what you are after, listen to Onkyo's system. It may be the ultimate solution.



E-30

Octave Band Stereo Equalizer



Conventional tone controls in amplifiers, no matter how well designed, permit the frequency response curves to be shaped only within certain and usually quite narrow limits, usually only at the high and low ends of the spectrum. For complete and highly flexible frequency response control, professionals have long been using graphic equalizers; these divide the audible sound spectrum into numerous slices or "bands", often spaced an octave apart, and permit each band to be individually boosted or attenuated.

The Onkyo E-30 is a very advanced octave band equalizer designed to be used in combination with the P-303 preamp or in other top grade audio systems. A great deal of painstaking care went into the design of its circuits to preclude any possibility of a negative effect on signal quality. The E-30 will let you tailor the system's frequency response in virtually any imaginable way without causing the slightest change in other factors determining signal quality.

Functions and Applications

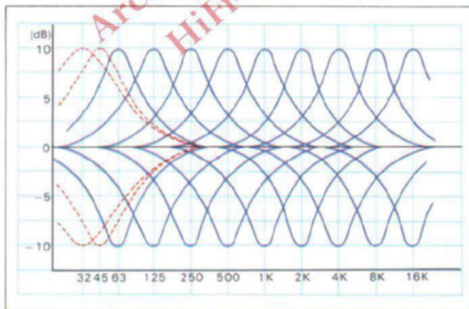
Frequency response can be attenuated or boosted, by as much as 10dB, at any or all of nine frequency points ("center frequencies") spaced at one-octave intervals. Boost or attenuation can be performed separately for the two stereo channels. The lowest center frequency can be shifted to either of three points: 63Hz, 45Hz or 32Hz, to cope with a variety of ultra-low range problems such as tonearm resonances, standing waves, etc.

A very unique feature of the E-30 is the switchable maximum range—where only relatively small response changes are desired, the total boost/attenuation range can be switched to 5dB (against the above-mentioned 10dB), permitting very precise fine adjustments.

In the "defeat" position of this switch, the entire equalizer circuitry is bypassed, and the signal emerges unaltered. This

permits instant comparisons between original and equalized response patterns.

The advanced hi-fi enthusiast or professional audio engineer will have a great variety of uses for the E-30, from denoising of program material to response tailoring as compensation for listening room or other components' characteristics. The shallow mid-to-high range dip exhibited by many magnetic phono cartridges can be easily compensated for, imperfect sonic balances in older recordings can be greatly improved, special effects can be created on your tape recordings—standing wave problems can be eliminated, speaker coloration can be ameliorated—there is virtually no end to the tasks that the E-30 can perform in the hands of the knowledgeable user.



Circuit Construction

In their pursuit of ultimate sonic purity, Onkyo engineers have gone to great lengths to assure that the E-30 will equalize frequency response in any way

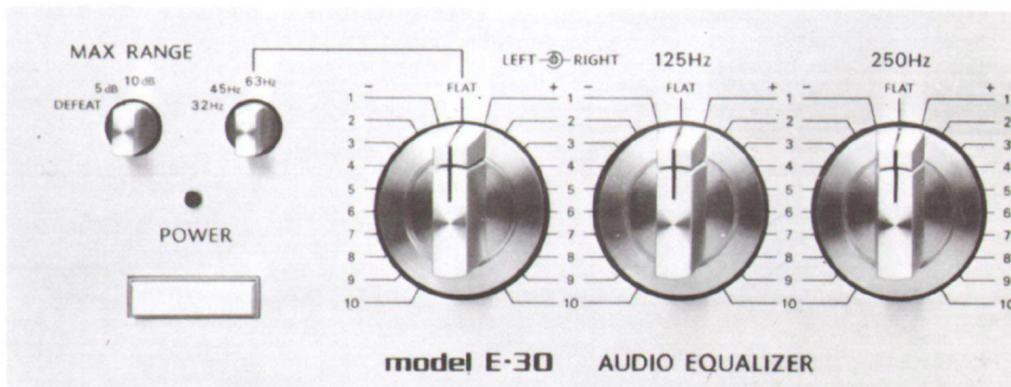
desired, without causing the least change or deterioration in signal quality. To prevent any inter-channel crosstalk from occurring, the left and right channel circuits are totally separate, from power supply through output, and arranged on separate circuit boards. Direct, separate power supplies with four bus feeder holes for near-zero impedance assure the highest operational stability under dynamic signal conditions.

All amplification stages, from the input buffer through the control stages and the output buffer, are class A type balanced push-pull circuits equipped with selected NPN and PNP transistors. Excellent linearity and a super-wide dynamic range (up to 15V max. output) testify to the superior circuit quality.

In the time constant circuits (i.e. the equalizer filters), the needed inductances are provided by semiconductors rather than coils, as the latter would be prone to magnetic distortions and hum. This explains the superior signal-to-noise ratio and contributes to the wide dynamic range.

The relentless pursuit of quality led to a bit of (apparent) luxury—input and output jacks are gold plated for optimum contact and corrosion resistance.

A subsonic filter, switchable to 15Hz or 30Hz turnover frequency and with a slope steepness of 6dB/oct. provides a further means of ultra-low signal clean-up.



U-30

Peak Meter & Selector Unit



Designed to serve as a level metering and component selector unit in an elaborate Onkyo (or other) component audio system, the U-30 combines two functions into one easy to use unit: a peak meter for measuring line level voltages and power amp wattage outputs, and a selector for switching several turntables, tuners, tape decks, power amplifiers and speakers in and out of the system.

Applications as a Peak Meter

The meter section of the U-30 will provide very valuable information regarding signal and power levels in an audio system. Being true peak meters, its two large and easy to read meters indicate peak levels with an extremely short attack time of only 100 microseconds.

As a line voltage meter, the U-30 measures peak levels in pre-amplifier, tuner, tape deck or similar outputs. Meter ranges for this application are 1V or 10V for a 0dB reading, with a -40dB to +5dB scale.

As a watt meter, peak power levels up to about 300 watts can be measured, with the 0dB point corresponding to either 100W or 10W. This means that accurate readings can be taken at all possible listening levels. This function will be very useful in determining and comparing the efficiencies of different speaker systems, finding the needed output power ratings for given speaker/room combinations, determining amp clipping levels, and various other advanced uses.

Meter Features

In its circuit construction, the meter sec-

tion employs advanced operation amplifiers in its logarithmic compressors. Meter response ("attack time") is extremely fast at 100 microseconds (for a 0dB reading), while decay time has been consciously slowed to 1 sec to permit convenient readings of peak levels to be taken.

Frequency response is highly linear, staying within ± 1 dB from 20Hz to 20kHz. With a total scale range of 45dB, and 1V/10V/10W/100W range switching, any imaginable audio level can be accurately measured.

Two sets of inputs are provided for line levels and power amp outputs, respectively. These can remain connected at all times, switching being effected from the front panel.

Applications as a Selector

The latest generation of technically advanced preamplifiers such as the Onkyo P-303 have been consciously designed with only the bare minimum of control functions, input and output connections. In an elaborate audio installation including, for example, several tape decks, tuners, power amps and speaker systems, connectors provided on the preamp will not be enough so that additional jacks must be made available with a selector such as the U-30. With

its wiring designed and built in such a way that it will cause no appreciable degradation in audio quality, the U-30 can accommodate up to

- 3 turntables
- 3 tuners or auxiliary signal sources
- 2 tape decks, with dubbing possibility in either direction
- 2 power amplifiers (fed from one pre-amp)
- 2 pairs of speakers (driven from one power amp).

It also features a mode switch with stereo normal, stereo reverse, and mono positions. In mono, either the L channel, R channel or a mixed L+R channel signal can be obtained. Careful, painstaking design and construction of all circuits and signal path sections helps avoid any negative effect on signal quality—direct line power supply and completely independent circuit boards for the left and right channels are just two examples. To avoid undesirable increases in wiring capacitance and switching resistance, switches have been located as closely to the jacks as possible, and silver plated switch contacts are employed in the speaker relay. All jacks are gold plated for minimum resistance and highest corrosion resistance.



OPTION

Low Capacitance Patch Cord with Gold Plated Pin Plugs

The pursuit of the highest possible quality in audio systems must not stop at the components such as amplifiers, but should include such seemingly minor details as the patch cords that interconnect the units.

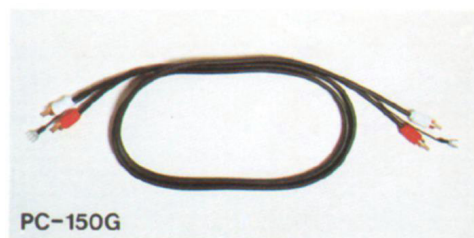
Conventional shielded patch cords possess capacitance, i.e. they act as capacitors, thereby causing a noticeable loss in high frequency signals. Also, corrosion of pin plugs can cause hum, noise and contact problems.

Enter the Onkyo Low Capacitance Cord, Model PC-150G.

This is a stereo patch cord; with a capacitance of only 33 pF per meter and using a special copper alloy as the conductor material, it causes no measurable high range losses. A third conductor is provided, terminated in split lugs for easy and firm ground-to-ground connection. The cord is highly pliant and hard to break or kink.

The pin plugs are gold plated to assure optimum contact with practically zero electrical resistance and extremely long service life.

This cord is highly recommended for audio system connections in Onkyo or other top grade installations. Length 150 cm.



PC-150G

SPECIFICATIONS

M-505 POWER AMPLIFIER

Power output	
Dynamic	600 watts total (4 Ω) 320 watts total (8 Ω)
Continuous	
Both channels driven	
1 kHz, 0.05% THD	165 W + 165 W (4 Ω) 110 W + 110 W (8 Ω)
20-20,000 Hz, 0.05% THD	140 W + 140 W (4 Ω) 105 W + 105 W (8 Ω)
Total harmonic distortion	0.05% at rated power 0.02% at 1 watt output 0.01% at rated power
IM distortion	22.5 dB at 1 kHz
Gain	+0, -1.5 dB at DC-150 kHz
Frequency response	1.5 V
Input sensitivity	100 kΩ
Input impedance	4-16 Ω
Load impedance	100 (8 Ω, 1 kHz)
Damping factor	0.15 Hz/10 Hz 6 dB/Oct.
Filter	110 dB (IHF A NETWORK)
Signal to noise ratio	POWER CUT OFF FREQUENCY SELECTOR (DC, 0.15 Hz, 10 Hz-rear panel)
Controls	LEVEL ADJUSTER (L, R-rear panel)
Outputs	SPEAKERS
Inputs	INPUT P.
Semiconductors	2 FETs, 45 transistors, 31 diodes
Power supply rating	AC 120 V 60 Hz or 220 V 50 Hz
Dimensions (W x H x D)	450 (17 ³ / ₄ ") x 165 (6 ¹ / ₂ ") x 322 (12-11/16") mm
Weight	17 kg (37.4 lbs.)

P-303 PREAMPLIFIER

Input sensitivity and Impedance	PHONO MC: 100 μV/10 Ω PHONO MM: 2.5 mV/30, 50, 100 kΩ (Switchable) TUNER: 150 mV/50 kΩ TAPE PLAY: 150 mV/50 kΩ ACCESSORY RCV: 1.5 V/82 kΩ TAPE REC: 150 mV/12 kΩ ACCESSORY SEND: 1.5 V/100 Ω OUTPUT: 1.5 V/600 Ω Max. 15 V
Rated output and impedance	±0.2 dB, 20-20,000 Hz +0, -1.5 dB, 3.5 Hz-200 kHz
RIAA deviation	PHONO MM: 330 mV RMS at 1 kHz, 0.05% THD. 1600 mV RMS at 10 kHz, 0.05% THD.
Frequency response (TUNER)	PHONO MC: 13 mV RMS at 1 kHz, 0.05% THD. 63 mV RMS at 10 kHz, 0.05% THD.
Phono overload	0.006% at PHONO MM, 3 V output 0.03% at PHONO MC, 3 V output 0.01% (70 Hz: 7 kHz=4:1)
Total harmonic distortion	PHONO MC: 70 dB (IHF A NETWORK) PHONO MM: 83 dB (IHF A NETWORK) TUNER: 100 dB (IHF A NETWORK)
Intermodulation distortion	1.5 V
Signal to noise ratio	POWER VOLUME BALANCE TAPE MONITOR SELECTOR (PHONO, TUNER) CARTRIDGE (MM, MC) IMPEDANCE SELECTOR (30 kΩ, 50 kΩ, 100 kΩ) rear panel ACCESSORY TERMINAL SWITCH rear panel
Rated output voltage	PHONO MC PHONO MM TUNER TAPE PLAY ACCESSORY RCV
Controls	
Inputs	

Outputs

TAPE REC OUT, CUE OUT
OUTPUT
ACCESSORY SEND
AC OUTLET SWITCHED x 3
UNSWITCHED x 1
52 transistors, 29 diodes
AC 120 V 60 Hz or 220 V 50 Hz
450 (17³/₄") x 83 (3-5/16") x 370 (14-9/16") mm
7.5 kg (16.5 lbs.)

E-30 EQUALIZER

Input sensitivity	1.5 volts/100 kohms
Output voltage	Rated: 1.5 volts/600 ohms Max: 15 volts/600 ohms
Total harmonic distortion	0.01%
IM distortion	0.01%
Signal to noise ratio	100 dB (IHF A NETWORK)
Center frequency	32 Hz/45 Hz/63 Hz switchable 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz
Level adjustable range	±10 dB (1 dB/step) or ±5 dB (0.5 dB/step)
Gain	0 dB (Flat)
Low cut filter	OFF, 15 Hz, 30 Hz
Controls	POWER BAND LEVEL CONTROLLER x 9 (L/R independently) LOWEST BAND SELECTOR MAX. RANGE SWITCH LOW CUT FILTER SWITCH (rear panel)
Semiconductors	68 transistors, 21 diodes
Power supply rating	AC 120 V, 60 Hz or AC 200 V, 50 Hz
Dimensions (W x H x D)	450 (17-3/4") x 83 (3-5/16") x 360 (14-3/16") mm
Weight	6.5 kg (14.3 lbs.)

U-30 SELECTOR UNIT

Peak meter section	1 V, 10 V for PRE OUT 10 W, 100 W for SPEAKERS 8 ohms
Sensitivity	-40 dB—+5 dB +5—-10 dB: ±1 dB -10—-30 dB: ±3 dB -30—-40 dB: ±5 dB
Indicating range	20 Hz—20 kHz: ±1 dB
Accuracy	100 μsec.
Frequency range	1 sec.
Response time	100 kohms
Recovery time	SELECTOR PHONO (1, 2, 3) TUNER (1, 2, 3)
Input impedance	TAPE MONITOR (1, SOURCE, 2) REC MODE (2-1, 1-2, OFF, REC) PRE OUT (OFF, 1, 2, 1 & 2) MODE (NORM, REV, R+L, L, R) PEAK METER SWITCH (100 W, 10 W, OFF, 1 V, 10 V)
Controls	SPEAKERS (OFF, 1, 2, 1 & 2) PHONO (1, 2, 3) TUNER (1, 2, 3) TAPE PLAY (1, 2) TAPE IN PRE OUT IN SPEAKER IN PHONO OUT TUNER OUT TAPE REC (1, 2) TAPE OUT PRE OUT (1, 2) SPEAKER (1, 2) PHONES
Inputs	4 ICs, 9 transistors, 25 diodes AC 120 V, 60 Hz or AC 220 V, 50 Hz 450 (17-3/4") x 83 (3-5/16") x 360 (14-3/16") mm 6 kg (13.2 lbs.)
Outputs	
Semiconductors	
Power supply rating	
Dimensions (W x H x D)	
Weight	

Specifications and design are subject to change without notice.

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