PHILIPS

PHILIPS

Philips Advanced Hi-Fi Equipment and Motional Feedback Speakers.

"Before I go into detail about these speakers there's just one thing I should say about them: they're very good!"

DAVID MOUNCE, HI-FI SOUND. REVIEWING THE RH544. DECEMBER 1976.

PHILIPS PRESENT A SELF-CORRECTING SPEAKER

So you have decided to invest in a really good quality hi-fi system. It's a hard choice to make. There is so much good hi-fi equipment in the shops today. Every different make and model has its individual merits.

Philips have made this problem easier for you. In the following pages of this brochure you will see our finest hi-fi equipment.

Each unit carries the Philips stamp of ingenuity and refinement.

Each one has been patiently researched and rigorously tested to give you the best sound reproduction for your money.

You can buy each piece of equipment separately or combine them to build perfectly integrated sound systems.

At the heart of your Philips system, you'll have the cleverest, most faithful speakers you have ever heard.

They work on a brilliant new principle called Motional Feedback. An MFB speaker gives you amazingly lifelike sound without colouration from a very small enclosure. Too good to be true? Here's how it works.

THE PROBLEMS OF SPEAKER DESIGN

Imagine a set of organ pipes.

The low notes are produced from big, bulky pipes. The high notes from the smaller, slimmer ones.

The pipes that emit the low notes have to be large enough to handle the immense volume of air that is pumping through.

The theory is the same in speaker design.

Here also it is the low notes that can cause the trouble.

The speaker has to handle vast amounts of power so it can easily go wrong.

In a small speaker or drive unit, the small cone has to move a long way to translate so much power. (See Fig. 1.)

At the end of its travel the stiffness of the cone suspension distorts the notes. Just as when a car is heavily loaded you can feel every bump in the road. (See Fig. 2.) The only way out was to build cumbersome enclosures with large drive units.

Then, one day, Philips had a very bright idea.

WHY NOT BUILD A SPEAKER THAT CAN CORRECT ITSELF?

First we built a small speaker with a small cone.

And then we assumed it would go wrong.

Our next step was to devise a system that could *correct the notes before they left the cabinet.*

This is the simple key to Motional Feedback.

Instantaneous self correction.

The input signal from your disc, tape or radio is fed to the speaker through a pre-amplifier then a pre-amplifier to the drive unit.

Our ingenious plan was to mount a small sensing device at the apex of the drive unit, or woofer.,

This 'transducer' assumes that the acoustic output signal is wrong and *feeds it back* to an electronic 'comparator.'

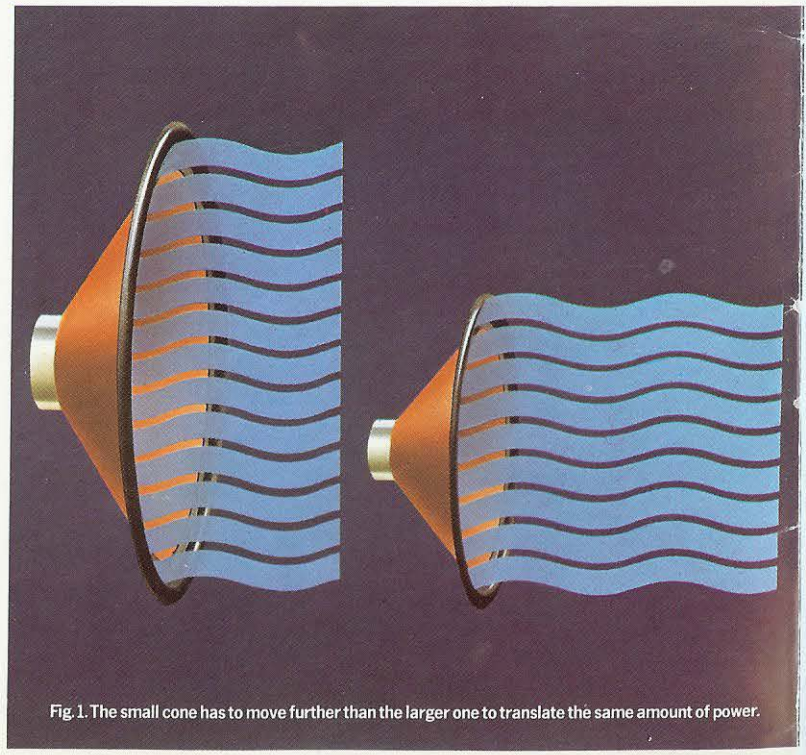


Fig. 1. The small cone has to move further than the larger one to translate the same amount of power.

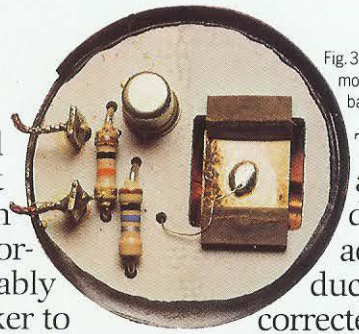


Fig. 3. The piezo-electric acceleration tranducer mounted at the apex of the woofer cone, feeds back the signal for instantaneous correction.

This signal is measured and compared to the original input signal. If there is any difference, an additive or subtractive signal corrects it. Right now, you are probably thinking that we allow the speaker to go wrong. We don't. The speaker corrects itself *instantaneously*. The answer is in the transducer. Or to give it its full name, the piezo-electric *acceleration* transducer. (See Fig. 3.)

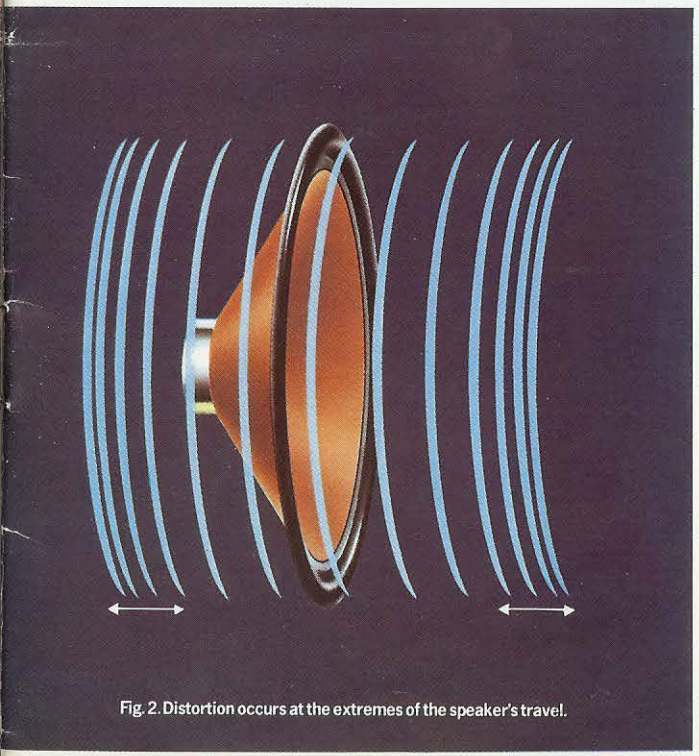


Fig. 2. Distortion occurs at the extremes of the speaker's travel.

This device can predict electronically the rate of acceleration of the drive unit so it can anticipate the acoustic signal that will be produced. Therefore the signal can be corrected before it is transmitted.

How Motional Feedback gets rid of colouration

At Philips, we have unshakeable ideas on the quality of the sound that is produced from our equipment.

We believe the recording you play in your home should be as lifelike as possible.

That is why, wherever we can, we have flattened out the lumps and bumps in the frequency response of our speakers. We want you to enjoy uncoloured sound.

The Motional Feedback system helps us to achieve this ideal.

With conventional loudspeakers, a hump occurs at the lower end of the frequency response curve.

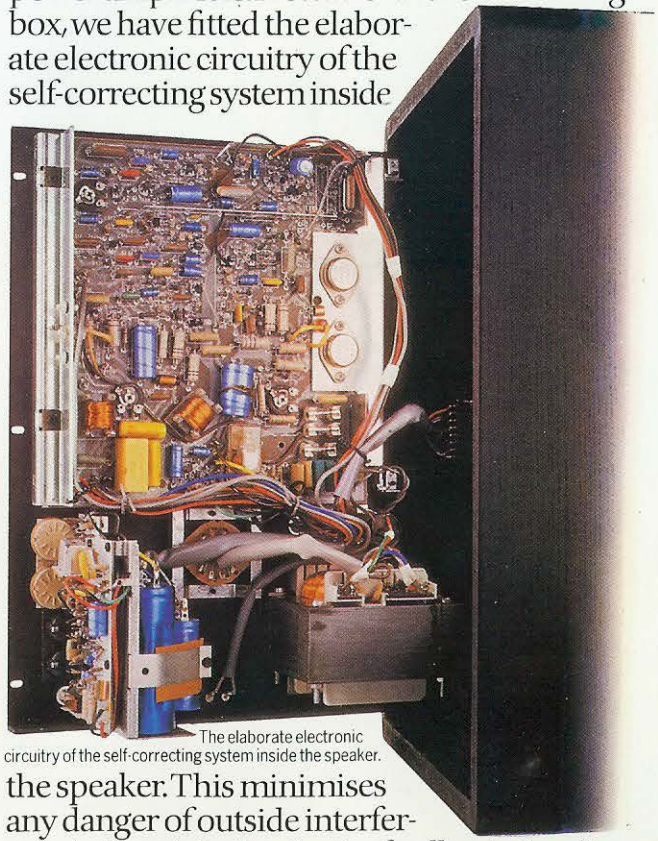
A colouration that is due to the resonance of the woofer.

This over-prominence of the bass notes is so common in English loudspeakers that our ears have become accustomed to hearing it. The self-correcting system in the MFB speakers allows for this hump and can correct it. You can hear the exact sound the recording engineer intended you to hear.

Or you can use the conventional tone controls to tailor this sound to suit your taste.

The speaker with the built-in amplifier

Every MFB speaker contains its own power amplifiers. Instead of a lot of air in a big box, we have fitted the elaborate electronic circuitry of the self-correcting system inside the speaker. This minimises any danger of outside interference being picked up by the feedback circuitry.



The elaborate electronic circuitry of the self-correcting system inside the speaker.

THE AMPLIFIER THAT SPECIALISES

Philips 60 watt MFB speakers contain two power amplifiers. One 20 watts, the other 40 watts.

When the input signal enters a speaker, a filter directs it to one or other of the amps.

Signals over 500Hz are handled by the conventional 20 watt amplifier. (Only a small amount of air movement is needed to transmit high notes, so there is little danger of distortion.)

Signals below that level are fed into the Motional Feedback system.

Now the 20 watt amp no longer has to worry about the low notes, it can concentrate on responding accurately to the high notes.

Its reaction to very sharp notes, its transient response, is better than ever.

GIVE YOUR SYSTEM A BOOST

On every MFB speaker there is a sensitivity control which allows you to connect a simple pre-amplifier or your existing high or low level power amplifier.

The built-in amplifier will then boost the power of your present power amplifier to 30, 60 or 100 watts per channel depending on the MFB speakers you are using.

It will also allow the very brave to string 100 watt MFB speakers together to produce a record breaking volume of up to 1500 watts per channel!

THE ROOM THE COMPUTER BUILT

When we test our speakers at Philips, we test them in two rooms.

First, in an anechoic chamber, we test the speaker for technical perfection.

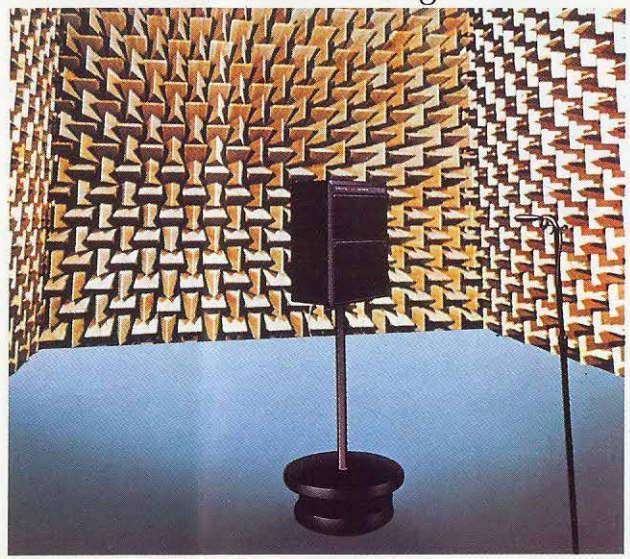
Then, in a typical listening room, we compare its responses.

It's a part of the philosophy we talked about earlier.

We design our equipment to produce uncoloured sound in a typical domestic environment, as well as in acoustically pure conditions.

That's why we constructed a Typical Listening Room.

We fed the dimensions of several hundred living rooms into our computer and allowed it to describe an 'average room.'



Philip's loudspeakers are tested in an anechoic chamber and in a typical listening room.

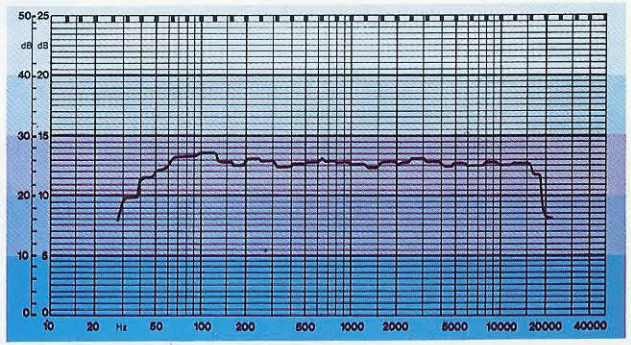
Then, at our headquarters in Eindhoven, we built a room which fairly represents the listening conditions of our customers.

The room has curtained windows, wall units, carpets, a three piece suite, a T.V. and pot plants. Once we had tested our speakers in this environment, we realised that the construction of the room was boosting the response of low frequencies by about 5db.

So we made a decision.

We changed the sensitivity of our bass amplifiers by 5db to neutralise this plateau.

It was a decision we believe in. And once you hear the new kind of sound from our speakers, we think you'll believe in it too.



Frequency characteristic of RH544: ⅓ octave plotted in typical listening room.

HOW MUCH?

We can't claim that the hi-fi equipment in this brochure is cheap. (But if you were looking for cut-price systems, you wouldn't have picked our brochure anyway.)

Once you study the impressive lists of specifications, you'll appreciate why.

One thing we can claim for every Philips hi-fi system is value-for-money.

You are paying for equipment that is out-of-the-ordinary in conception and design. (It has certainly stunned the audio press.)

Whether you decide to buy a complete system or one of the separate units, you are investing in equipment from a company that is one step ahead in hi-fi technology.


PHILIPS
ERIC CLAPTON

"In all tests the turntable and cartridge easily met their published specifications...The turntable unit looks smart and all operations are carried out smoothly. I can recommend it strongly." JOHN BORWICK, GRAMOPHONE. REVIEWING THE GA222. APRIL 1977.

The equipment shown on the previous page is one of the high performance systems you can build with our electronic record deck, front loading cassette deck, tuner pre-amp and 60 watt MFB speakers.

Each piece of equipment has a typically long list of refinements.

You will find them on later pages.

Meanwhile there are a few special features we can't wait to describe.

THE RECORD DECK HAS A SELF-CORRECTING SYSTEM TOO

The Philips GA222 electronic record deck is fitted with tacho control belt drive. (A system that has recently received very good publicity from the audio press.)

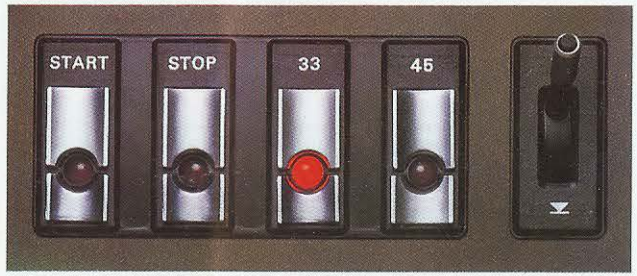
Tacho control works on a similar system to Motional Feedback.

The motor that drives the turntable is coupled to a generator by a solid shaft. As the motor turns, so does the generator. The signal it produces is fed to a comparator.

The comparator measures this signal against a fixed reference. (According to whether you are playing at 33 or 45 r.p.m.).

If there is any difference, it immediately makes the correction.

You have guaranteed speed stability.



The electronic record deck is fitted with featherlight touch controls.

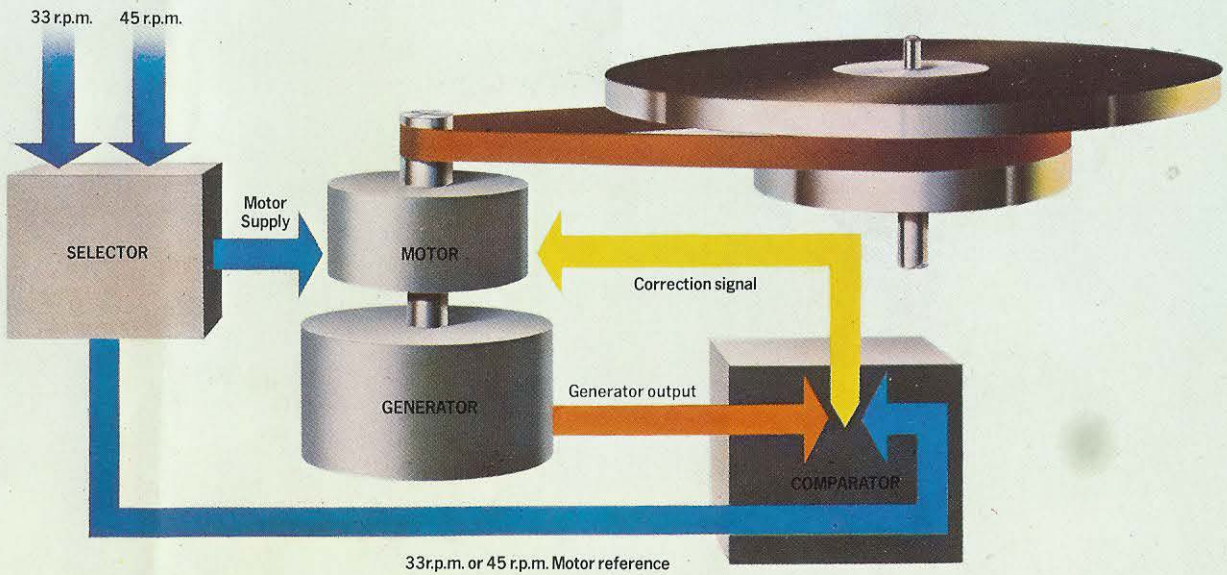
CONTROL AT YOUR FINGER TIPS

You'll find there's a special touch of luxury on all our advanced equipment.

On this electronic deck, featherlight touch controls, with LED indication, make sure you never jog your records.

The damped cueing device will also help to safeguard your precious records.

The principle of tacho control belt drive.



"This must surely be one of the most versatile tuners on the domestic market and I soon found that it was functionally excellent as well as visually impressive." JOHN BORWICK, GRAMOPHONE. REVIEWING THE AH762. APRIL 1977.

THE TUNER PRE-AMP DOES THE WORK FOR YOU

Our electronic engineers have made tuning in very easy indeed.

An 'Electronic Search Tuning' circuit automatically sweeps the FM waveband 'searching out' programmes for you.

You needn't twiddle knobs or remember wavelengths. You simply touch one of four controls and the circuit will sweep the waveband fast or slowly if you want a sample of each station.

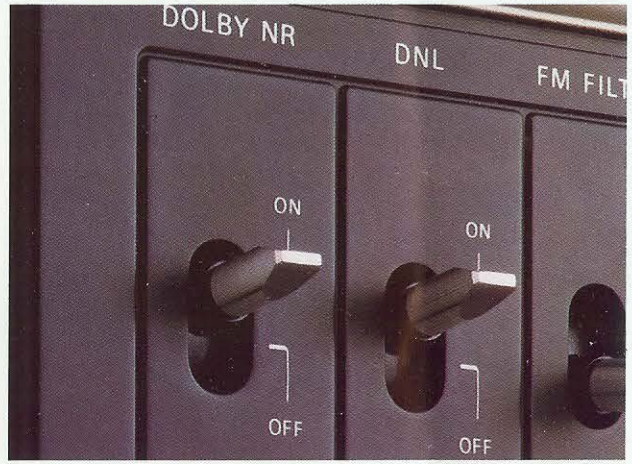
THE CASSETTE DECK HAS NO HISS OR CRACKLE

A lot of the exciting features on our new cassette deck are also fitted on the open reel deck. You can learn all about them on the next page.

On that impressive list of specifications, you will find DNL.

Most conventional stereo cassette decks have *one* noise reduction system. Philips decks have *two*.

They have traditional Dolby* B Noise Reduction as well as our own Dynamic Noise Limiter. DNL was developed by Philips. It reduces the background hiss that spoils your enjoyment of quiet passages of music. (For instance, you will appreciate a slow piano solo much more on an MFB system with the DNL switched on.)



DNL reduces the background hiss that spoils your enjoyment of quiet passages of music.

Philips DNL breathes new life into the cassettes you recorded before other noise reduction systems were invented as it only operates on playback.

DON'T GO THROUGH STOP

One refinement you'll really appreciate on both our tape decks is 'solenoid control.'

This system allows you to bypass the stop button. You can move from one mode into another without pressing 'stop.'

With conventional mechanical systems, you always have to wait for the tape to stop before you can select another function. With 'solenoid control' you can switch, for example, directly from 'wind' to 'rewind' to 'start' without touching the 'stop' button. There is no risk of damaging the tape or the machine.

HOW WE DEVELOPED FSX

You won't have the bother and expense of frequently changing the heads on this cassette deck. They are made from a specially developed material, 'FSX,' that is very hard and very wear resistant.

The wear resistance of a material is closely connected with the binding forces between its atoms.

When a substance is 'worn,' particles are taken away from the surface that is exposed.

The stronger the particles are tied together, the more difficult it is to remove them. The binding force of atoms depends greatly on the distance between them.

Pure iron is magnetic, and therefore very suitable as a material for heads. However, its atoms are too big and the binding force too small. In other words, the material is too soft.

We solved this problem by adding smaller atoms to the pure iron that will settle like cement between the larger atoms.

The distance between each atom is now far shorter. Which is why FSX is so hard and wear resistant.

FSX also increases the magnetic power of iron by 2½ times. So it has excellent recording properties.

*Trademark of Dolby Laboratories Limited.

(For a full list of specifications see page 13 onwards.)

"Once again I am favourably impressed by the Philips design. The quality of recording was superlative, particularly at the highest speed, and the gimmicks will keep tape users happy for a very long time." JOHN BORWICK, GRAMOPHONE. REVIEWING THE N4506. APRIL 1977.

By changing one piece of equipment, you can change the whole system. We've swapped the cassette deck for our open reel deck.

But you can of course have both.

WHAT'S SO UNIQUE ABOUT OUR REEL-TO-REEL DECK?

When you use the Philips N4506 with MFB speakers it doesn't need an amplifier at all.

It has a built-in pre-amplifier that operates directly with the speakers. So this open reel deck can be used as the centrepiece of a complete hi-fi system.

You can plug a record deck, tuner or cassette deck into this ingenious machine.

The N4506 also has an exclusive post fading facility.

The open reel deck exclusive post fading facility.

This Philips invention allows a sequence of events which has never before been possible.

It permits gradual erasure of selected passages whilst the recorder is still in the playback mode. In practice, this means that any unwanted intrusion into, for example, a piece of recorded music can be faded out at exactly the right point and then faded back in again after the interruption has passed.

This effect is achieved by applying and removing *gradually* the high frequency oscillator signal to the erase head whilst the recorder is still in the playback mode. Creative editing has never been more straight forward.

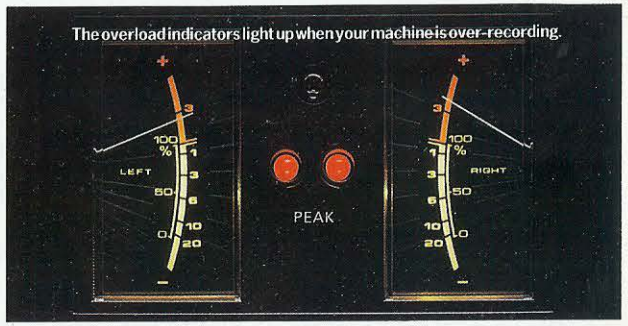
A FEW MORE EAR OPENERS

The N4506 has three long life heads. One for erase, one for playback and one for record.

This allows for a separate monitor function so you can hear exactly what you're laying down on the tape.

The three speed deck also has three motors. Two for wind and rewind, and an electronically controlled DC capstan motor for tape transport.

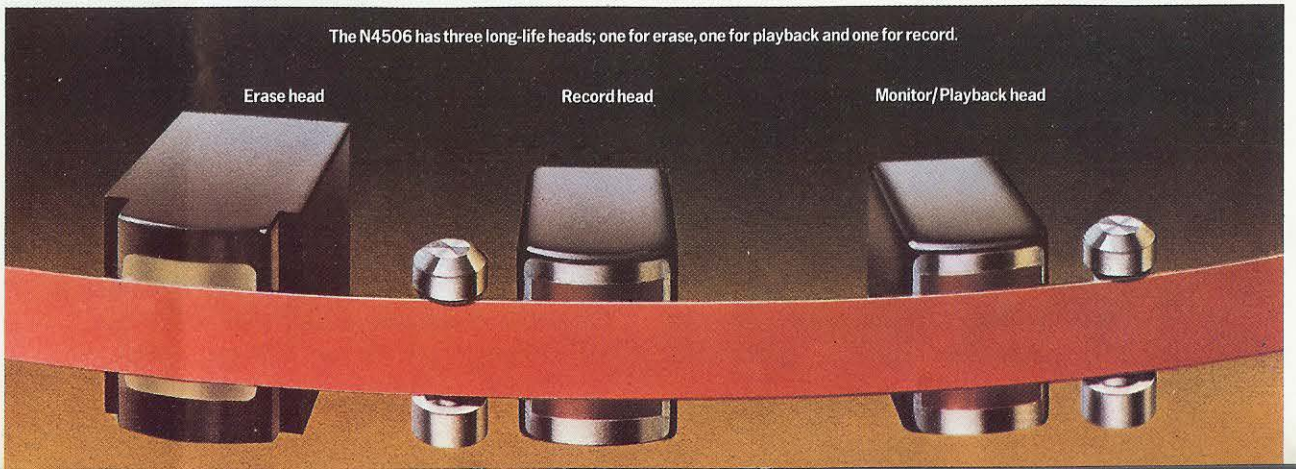
This eliminates the complicated mechanical systems and gives you greater reliability.



THE OVERLOAD INDICATOR

On the Philips cassette and open reel decks in this brochure, there are two meters that indicate the recording level. We have also fitted red light peak indicators that flash on when your machine is over recording, so you can see at a glance whether the signal is too strong.

(For a full list of specifications see page 13 onwards.)




PHILIPS
PHILIPS
PHILIPS
N 4506
magna-control

"Philips have years of experience in home audio equipment and so these questions of matching have been well looked after. A complete beginner could soon assemble the units guided by the excellent multi-language booklets provided."

JOHN BORWICK, GRAMOPHONE. REVIEWING THE N4506 OPEN REEL DECK, GA222 RECORD DECK, AH762 TUNER/PRE-AMPLIFIER, RH544 MFB SPEAKERS.

Unlike conventional 30 watt speakers, you can fit these compact MFB speakers onto your dining room shelf.

IT LOOKS AS GOOD AS IT SOUNDS

When our MFB sound system moves in, you needn't move out. This is amongst the most compact equipment you can buy.

The 60 watt speakers are only 15" high. The 30 watt speakers a mere 11" high.

Unlike conventional loudspeakers of the same power, you can tuck them away discreetly on any living room shelf.

No heavy drive equipment is required for MFB speakers, so the pre-amplifier is lighter to handle than normal control units.

The speaker enclosures are finished in black ash veneer with a black cloth screen.

The other units harmonise with this elegant look.

(For full list of the specifications see page 13 onwards.)

The comprehensive controls on the 100 watt MFB Speaker.

THE RH545 100 WATT MFB SPEAKER

If you're looking for really professional sound reproduction, Philips MFB 100 watt studio louspeaker is designed especially for the job.

1 15w Treble amplifier panel
2 50w Bass amplifier panel
3 Heat sinks
4 Input sensing circuit, power stabiliser and overload protection panel.
5 35w Mid-range amplifier panel

(For a full list of specifications see page 13 onwards.)

RH545 showing internal layout of the three amplifiers.

FRONT LOADING HI-FI CASSETTE DECK N2521

Dolby*B noise reduction system.
DNL–Dynamic Noise Limiter.
Auto or manual switching for ferro, ferrochrome or chrome cassette.
Hi–Fi "FSX" long life record/playback head.
Ferrite long life double gap erase head.
Solenoid controlled tape transport.
Manual post fading facility with lock.
Tape travel indicator.
Three digit tape counter with zero reset.
Individual left and right illuminated record level meters.
LED overload indicator.
Auto end of tape stop with function release.
Switchable FM pilot tone filter.
Variable line outputs.
Microphone and headphone sockets at front.
Head cleaning indicator.
Illuminated cassette compartment.
Tacho controlled DC motor.

*Trademark of Dolby Laboratories.

(For full specification, see page 22.)

TUNER/PRE-AMPLIFIER AH762

Double stereo facility.

Incorporates an electronic circuit which automatically sweeps the FM band 'searching out' programmes, thus dispensing with the usual 'knob twiddling' or the need for prior knowledge of station frequencies.

Aptly named 'electronic search tuning', the system is actuated by one of four touch controls providing either fast or slow sweeps up or down the band.

In addition, the slow control circuit stops for a few seconds on each station allowing the listener to briefly sample the programme content.

Releasing the touch control locks the tuner on to the station, otherwise the circuit automatically searches out the next station along the band.

5 FM pre-set controls.

(For full specification, see page 21.)

HI-FI ELECTRONIC AUTOMATIC RECORD PLAYER GA222

Automatic two speed player for 17 cm (7") and 30 cm (12") records with facility for manual play of 17 cm, 25 cm (10") and 30 cm discs.

Electronic touch controls for start/stop operations and speed selection, with indication by means of LEDs.

Photo electronic auto-stop switch and automatic pick-up arm return.

Slim-line, aluminium pick-up arm with headshell for standard ½" cartridge mounting. Supplied with GP401 Super M cartridge with diamond bi-radial stylus.

Direct-reading stylus force adjustment.

Side-thrust compensation, adjustable both for spherical and elliptical styli.

Separate fine speed controls for 33⅓ and 45 r.p.m. Belt drive turntable.

DC motor coupled to a frequency controlled tacho generator for electronic speed control.

Free floating sub-chassis for turntable and pick-up arm.

Very low wow, flutter and rumble figures.

Large smokey transparent dust cover with friction hinges.

Possibility for playing 30 cm (12") discs with cover closed.

(For full specification, see page 21.)

TUNER/PRE-AMPLIFIER RH743

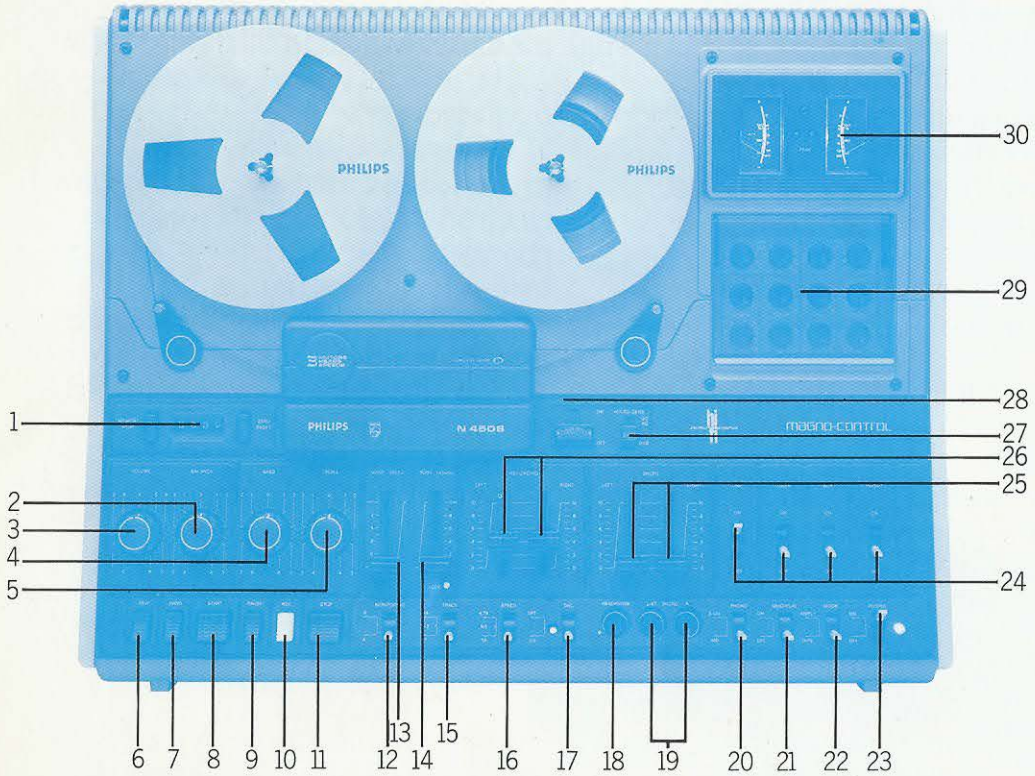
For use with MFB Loudspeakers.
Four wavebands.
5 FM Presets.
Individual controls for preset or manual tuning.
Switchable physiological compensation (contour).
Switchable AFC.
Tuning meter.
Signal strength meter.
Long, medium, short wave and FM/VHF coverage.
Automatic stereo decoder with indicator beacon.
Headphone socket on front panel with speaker muting switch.

(For full specification, see page 21.)

STEREO OPEN REEL DECK PRE-AMPLIFIER N4506

3 heads allowing 'Before and After' monitoring.
3 speeds (1⅞, 3¾, 7½ ips).
Switchable DNL with indicator light.
Electronically controlled capstan motor.
Damped tape tension stabilizers.
Solenoid operated tape transport.
Four digit counter with zero reset button and zero stop.
Long life heads.
Large illuminated record level meters.
Post fading facility.
Variable winding speed.
Cueing facility.
Mixing possibilities.
Continuously variable input sensitivities.
Multiplay facility.
Automatic stop with button release.
LED overload indicators.
Integral MFB Pre-amplifier.

 (For full specifications, see page 21.)



1 Counter with zero-reset and zero stop
2 Balance control ┐
3 Volume control │ LOW LEVEL OUTPUT FOR M.E.B. LOUDSPEAKERS
4 Bass control │
5 Treble control ┘
6 Rewind
7 Fast forward
8 Start
9 Pause
10 Recording
11 Stop
12 A–B monitoring
13 Wind speed control
14 Post-fading control
15 Track selector
16 Speed selector
17 DNL switch with indicator
18 Headphone socket
19 Microphone sockets
20 MD/Crystal selector
21 Multiplay
22 Amplifier switch
23 Mains on/off switch
24 Input selection
25 Micro level left/right
26 Recording level left/right
27 Micro sensitivity switch
28 Cueing button
29 Level adjustment controls
30 Record level meters with LEDs

HI-FI ELECTRONIC MOTIONAL FEEDBACK 30 WATT LOUDSPEAKER ENCLOSURE RH541

Ingegral amplifier gives 30W C.S.W. output providing superb overall reproduction down to 35 Hz via the 7" MFB bass unit and up to 20,000 Hz with the conventional 1" dome treble driver.

A stereo input from a pre-amplifier, or power amplifier can be fed into the 5 pin DIN input socket at the rear of the enclosure. The signal can then be passed on to other MFB enclosures via a separate 5 pin DIN output socket.

An indicator on the front panel illuminates when the unit is operative, an automatic stand-by circuit switching off the supplies to the amplifier after a 2 minute pause in the input signal.

Wooden cabinet finished in rounded black ash with split removable front grills for easy access to drive units.

HI-FI ELECTRONIC MOTIONAL FEEDBACK 60 WATT LOUDSPEAKER ENCLOSURE RH544

Two integrated power amplifiers – a 40W amplifier for bass and 20W amplifier for mid range and treble – provide a total power of 60 watts C.S.W.

Application of Motional Feedback system in cabinet of small dimensions provides reproduction of high sound pressure level, virtually distortion free, from 30 Hz upwards.

Three way enclosure employing separate loudspeakers for bass, mid range and treble covers the full audio range.

Precise electronic cross-over filter system ensures extremely smooth reproduction and virtually flat frequency characteristic.

Continuously variable treble filter enables the enclosure to be adjusted to the acoustic characteristic of the room. Variable input sensitivity selection enable operation with almost all types of pre-amplifier or power amplifier.

Interconnection possibility of several loudspeaker enclosures for increased total power per channel.

Electronic on/off switching device, via a relay, switches the enclosure on and off automatically.

Attractive wooden cabinet with matching textile baffle cover.

HI-FI ELECTRONIC MOTIONAL FEEDBACK 100 WATT LOUDSPEAKER ENCLOSURE RH545

Studio loudspeaker enclosure equally suitable for use in domestic environments.

Three integral amplifiers with a total output of 100 watts continuous sine wave power generate sound pressures up to 108 dB at 1 metre.

12" woofer is driven by a 50 watt amplifier with motional feedback applied.

35 watt power amplifier drives the mid range speaker, while a 15 watt power amplifier drives the tweeter.

The overall transmission range is divided into three frequency bands (at 500 and 3000Hz) by high precision filters placed before the power amplifiers.

Three precision filters can be switched in as required to correct the acoustic radiation field which may be affected by the position in which the loudspeaker is situated.

An active low-frequency filter with an adjustment range of ±10dB and a passive high frequency filter, in which both the cut off frequencies (7 and 10 kHz) and the damping slope (max. 20 dB/octave) are adjustable; serve to match the loudspeaker to the acoustics of the room.

High pass filter with a cut off frequency of 35Hz protects against subsonic frequencies.

Each of the three loudspeaker units is protected against overload by means of electronic circuitry that blocks the channel in question as long as the overload situation continues.

A signal controlled electronic relay switches automatically from 'ready' to 'on' on receipt of an audio input signal if it is absent for more than 2 minutes.

Each enclosure is provided with pilot lights which indicate the modes of operation selected.

Symmetrical input socket for use in professional studios.

(For full specifications, see page 22.)

"I came to like the sound of these speakers more as time went on. The firm bass sound is very welcome in these days of over-tight bookshelf designs and transient response seemed excellent."

JOHN BORWICK, GRAMOPHONE, REVIEWING THE RH544.

GA 222

Turntable speeds 33⅓, 45 r.p.m.

Speed adjustment range 6%

Wow and flutter
Better than 0.08% (DIN), 0.055% (W.R.M.S.)

Rumble
Better than −41 dB (DIN A).
Better than −62 dB (DIN B).

Tracking error
Better than 0 9′/cm

Tone arm friction
Better than 20 mgf lateral and better than 5 mgf vertical

Stylus force
0.75 – 3 gf, adjustable

Side thrust compensation
Adjustable with ring, for spherical and elliptical/CD-4 styli.

Pick-up cartridge
GP 401 Super M

Pick-up lift
Hydraulically damped

Turntable
291mm (11⅜") diameter with stroboscopic rings

Motor
DC with frequency controlled motor/generator

Number of poles 72

GENERAL
Power requirements
240V AC only at 5W. 50 or 60 Hz without conversion. (Service solution for 110, 127 and 220V.)

Cabinet
Aluminium base, friction-hinged smoked grey transparent cover.

Dimensions
415 x 137 x 356mm (16⅜" x 5½" x 14")

Height with cover open 410mm (16⅛")

Weight 6.4 kg (14 lbs)

AH 762

AMPLIFIER SECTION
Outputs
2 x 5 pin 180°DIN sockets for 2 pairs of M.F.B. enclosures (switchable on front panel, system 1, system 2 or both)
IV per channel at ⩾ 1000 Ω (1 kHz)
headphones: 250 mV/8 Ω (5 pin 360°DIN socket) (will accept 8 – 600 ohm headphones)
tape: 2 mV/20 k ohm (coupled with tape input)

Distortion
harmonic ⩽0.1% @ rated output

Frequency response
20 – 25,000 Hz +1.5 – 3 dB

Signal/noise ratio
⩾ −55 dB w.r.t. rated output

Tone controls
bass ± 15 dB @ 50 Hz
treble ± 13 dB @ 10 kHz
presence ± 6 dB @ 2 kHz

Input sockets
(5 pin 180°DIN)
mag.p.u. 2 mV/47k Ω
tape recorder 200 mV/100k Ω
auxiliary 130 mV/150k Ω
mic. 1 mV/2k Ω

TUNER SECTION
Wave ranges
LW: 2000 – 857 metres (150 kHz – 350 kHz)
MW: 577 – 187 metres (520 kHz – 1605 kHz)
SW: 50,4 – 30,7 metres (5,95 – 9,78 MHz)
FM: 87,5 – 104 MHz (with automatic stereo decoder)

Aerials
Internal ferroceptor for MW and LW, wire aerial for local mono FM and SW reception.
IEC sockets for FM dipole aerial and AM aerial/earth

Sensitivity
AM: 90μ V EMF for 26 dB S/N ratio
FM: 2μV terminal voltage across 300 ohms for 26 dB S/N
ratio and 40 kHz deviation

Selectivity
AM: 100 times for 9 kHz off resonance
FM: 300 times for 300 kHz off resonance

GENERAL

Power requirements
110, 127, 220 or 240V AC only, 50 or 60 Hz, 16 watts

Dimensions
630 x 122 x 344mm
(24¾" x 4¾" x 13½")

Weight
7.4 kg (16.5 lbs)

RH 743

Outputs
Line: 1 V per channel @ 1,000 Hz (5 pin 180° DIN socket)
impedance > 1000 Ω
Headphones: 250 mV/8 Ω (5 pin 360° DIN socket)
(will accept 8 – 600 ohm headphones)
Tape: 2 mV/20 k ohm (coupled with Tape input)

Inputs (5 pin 180°DIN)
Tape 200 mV/50 k ohm
M.D.P.U. 2 mV/50 k ohm

Distortion (for 2 x 1 V output)
Harmonic < 0.1%
Intermodulation ⩽0.3% (250 – 8,000 Hz; 4:1)

Frequency response
20 Hz – 25 kHz +1.5 – 3 dB

Signal/Noise Ratio
⩾ −55 dB (w.r.t. 2 x 1 V output)

Crosstalk
⩾ −40 dB @ 1,000 Hz
⩾ −30 dB from 250 – 10,000 Hz

Tone controls
Bass (50 Hz) +14 dB
Treble (10 kHz) +13 dB

Contour (Max)
+7 dB @ 50 Hz, +5dB @ 10 kHz

Sockets
5 pin 180°DIN for Tape in/out
5 pin 180°DIN for M.D. Pick-up
5 pin 180°DIN for Output to M.F.B's (stereo)
5 pin 360°DIN for Headphones
IEC 2 pin for FM dipole
IEC 2 pin for AM aerial/ earth

Controls
Push buttons for: On/Off, Contour, Pick-Up, Tape, LW, MW, SW, FM

5 separate FM Presets, FM Manual, AFC
Speaker Muting
Sliders for: Volume, Balance, Bass, Treble
Rotary controls for: Tuning, 5 separate tuners for FM push-button Presets.

TUNER SECTION
Wavebands
LW: 2000 – 875 metres (150 kHz – 350 kHz)
MW: 577 – 187 metres (520 kHz – 1605 kHz)
SW: 50,4 – 30,7 metres (5,95 MHz – 9,78 MHz)
FM: 87,5 – 104 MHz

Aerials
Ferroceptor for MW and LW, wire aerial for local, mono FM and SW
IEC input sockets for FM dipole and AM aerial/earth

Sensitivity
AM: 90μ V e.m.f. for 26 dB S/N ratio
FM: 2μ V terminal voltage for 26 dB S/N ratio at 40 kHz deviation across 300 ohms

Selectivity
AM: 100 x for 9 kHz off resonance
FM: 300 x for 200 kHz off resonance

F.M. Performance
Distortion ⩽1% @ 75 kHz deviation
Pilot suppression −35 dB @ 19 and 38 kHz
Crosstalk −40 dB @ 1,000 Hz

GENERAL
Power Requirements
110, 127, 220V or 240V 50 or 60 Hz AC only @ 12 W

Dimensions
w x h x d 605mm x 300mm x 122mm
(23¾" x 11⅞" x 4¾")

Weight 5 kg (11 lb.)

N4506

TAPE SECTION
Tape speeds
19, 9.5, 4.76 cm/sec (7½, 3¾, 1⅞ in/sec)

Tracks 4

Maximum reel diameter 18 cm (7")

Frequency response

for 19 cm/sec:	
DIN 45 500	35 – 25,000 Hz
NAB	35 – 26,000 Hz
for 9.5 cm/sec:	
DIN 45 500	35 – 19,000 Hz
NAB	35 – 20,000 Hz
for 4.76 cm/sec:	
DIN 45 500	35 – 11,000 Hz
NAB	35 – 11,500 Hz

Signal to noise ratio (without DNL using Philips high output tape)

	DIN 45 500 and NAB
for 19 cm/sec:	⩾60 dB
for 9.5 cm/sec:	⩾60 dB
for 4.76 cm/sec:	⩾58 dB

Improvement in S/N ratio with DNL:
⩾10 dB between 4,000 & 14,000 Hz

Wow and flutter

	DIN 45 500	NAB
at 19 cm/sec:	⩽ 0.1%	⩽ 0.05%
at 9.5 cm/sec:	⩽ 0.15%	⩽ 0.07%
at 4.76 cm/sec:	⩽ 0.3%	⩽ 0.2%

Rewind time
180 sec for 18 cm (7") LP tape (540 m)

Tape heads
one long life erase head
one long life recording head
one long life playback head

Motors
one electrically controlled DC capstan motor
two DC winding motors

CONNECTIONS 5 pin 180°DIN sockets for:

Tape IN/OUT
input 2mV into 20k ohm (Pins 1 and 4)
100mV into 1M ohm (Pins 3 and 5),
output 1V into 10k ohm (Pins 3 and 5)

Monitor output
1V into 10k ohm (Pins 3 and 5)

Mic. input left or stereo
0.15mV into 2k ohms (Pins 1 and 4)

Mic. input right
0.15mV into 2k ohm (Pin 1)

Tuner
2mV into 2k ohm or 100mV into 1M ohm

Phono
3mV into 50k ohm (magnetic)

Aux
2mV into 2k ohm or 100mV into 1 ohm

M.F.B. output
IV

Note: All the above are continuously variable from zero to the maximum stated

Headphone output (5 pin 360°DIN)
3V into 600 ohm, 75mV into 8 ohm

Remote control (5 pin 240°DIN)
for N6718 remote start/stop function

GENERAL
Dimensions
557 x 437 x 210mm (22" x 17¼" x 8¼")

Weight
14 kg (31 lbs)

Mains supply
110, 127, 220, 240V 50/60 Hz AC only.
35W

Accessories supplied
EL3768/14 stereo connection cable.
Reel of LP18 high output tape. 'Metal look' empty reel. Transparent dust cover.
Removable feet for horizontal operation.
Head cleaning buds.

N 2521

Tape system
Philips Compact Cassette

Track configuration
2 x 2 (stereo) acc. to IEC standards

Tape speed
4.76 cm/sec (1⅞ i.p.s.)

Frequency response for chromium tape
25–14,000 Hz (acc. to DIN 45 500)

Frequency response for ferro tape
40–12,000 Hz (acc. to DIN 45 511)

S/N ratio (without noise reduction) for chromium tape
⩾56 dB (acc. to DIN 45 500)

S/N ratio (without noise reduction) for ferro tape
⩾53 dB (acc. to DIN 45 511)

Improvement in S/N ratio with DNL
⩾10 dB from 4 kHz–14 kHz

Improvement in S/N ratio with Dolby NR*
⩾8 dB acc to DIN 45 405

Wow and flutter
⩽0.15%

Fast wind/rewind time
85 seconds for C60 cassette

Channel separation (at 1,000 Hz)
20 dB (acc. to DIN 45 500)

FM pilot tone suppression
⩾30 dB (switchable)

Equalization
70 + 3180 μ S for chromium tape
120 + 3180 μ S for ferrochrome and ferro tapes

Bias and erase frequency
100 kHz+5%

Distortion at line output
⩽3% (T.H.D.)

Heads
Hi-Fi "FSX" long life record/playback head; ferrite long life double gap erase head

Motor
Tacho-controlled DC motor

SOCKETS: On front panel
microphone right (5 pin 180°DIN)
microphone left and stereo (5 pin 180°DIN)

Sensitivity
0.25 mV/2k ohms

Headphones
5 pin 360°DIN

Output
10 mW + 1 dB at 600 ohms

SOCKETS: On rear panel

Monitor 5 pin 180°DIN IV/10 k ohms

Line in/out
5 pin 180°DIN

Line input
0.25 mV/2k or 100 mV/1M ohms

Line output
1 V/10k ohms
Note: line and monitor outputs are adjustable with two individual left and right controls on rear panel

GENERAL
Power requirements
110, 127, 220, or 240V AC 50 or 60 Hz at approximately 16 W

Dimensions
360 x 308 x 155mm (14¼ x 12⅛ x 6⅛")

Weight
5.5 kg (12 lbs)

*Trademark of Dolby Laboratories Inc.

RH 545

Volume
70 litres (2.5 cu ft) (50 litres acoustic)

Total power of amplifiers
100W continuous sine wave power

Frequency response
20–20,000 Hz (DIN)

Loudspeakers
AD12100/MFB4, 12" woofer
AD0210/Sq4, 2" dome squawker
AD0162/T8, 1" dome tweeter

Cross over frequencies
500 and 3000 Hz

Connections
Socket for mains input
five pole DIN sockets for signal in and out (asymmetrical)
Input socket for studio plug (symmetrical)

Input sensitivity
Continuously variable 1-23V
symmetrical 10k ohm at 1V
asymmetrical 100k ohm at 1V

Automatic on/off switch
Rise time ⩽1 sec: at input signal ⩾1.5mV; fall off time >2 min

Low note filters
–5 dB at 200 Hz
–5 dB at 60 Hz
–3 dB from 55 to 160 Hz

Bass control
From +10 dB to –10 dB at 60 Hz
Turnover frequency 350 Hz

Treble filter
Continuously variable, 0-20 dB per octave
Turnover frequencies at 7 kHz or 100 kHz

Amplifier for woofer

Output power
50W continuous sine wave power

Harmonic distortion (at 100 Hz)
D ⩽ 1% at 50W
D ⩽ 0.1% at 40W

Power bandwidth
5-5000 Hz

Amplifier for squawker

Output power
35W continuous sine wave power

Harmonic distortion (at 1000 Hz)
D ⩽ 1% at 35W
D ⩽ 0.1% at 25W

Power bandwidth
40-30,000 Hz

Amplifier for tweeter

Output power
15W continuous sine wave power

Harmonic distortion (at 5kHz)
D ⩽ 1% at 15W
D ⩽ 0.1% at 10W

Power bandwidth
40-50,000 Hz

GENERAL
Power supply
240V AC 50/60 Hz

Power consumption
Max. 200W

Cabinet
Wood, ash veneered

Dimensions
w x h x d 437 x 657 x 362 mm
(17¼" x 26¼" x 14¼")

Weight (each)
31 kg (68 lbs)

RH 544

Volume 15 litres (9 litres acoustic)

Total power of amplifiers
60W continuous sine wave power

Frequency response 30–20,000 Hz (DIN)

Loudspeakers
AD8067/MFB4, 8" woofer
AD0210/Sq8, 2" dome squawker
AD0160/T8, 1" dome tweeter

Treble filter
Continuously variable, 0–18 dB per octave, –3 dB at 7,000 Hz

Cross-over frequencies
Electronic cross-over at 500 Hz, passive cross-over at 3,000 Hz

Connections
Socket for mains input. DIN sockets (5-pole, 180°) for signal in and out

Input sensitivity
Continuously variable 1–23 V at 100 Kohm

Electronic on/off Switch
Rise time <1 sec. at input signal ⩾2 mV; fall-off time >2 min.

Amplifier for woofer

Output power
40W. Continuous Sine Wave Power

Harmonic distortion
D ⩽ 1% at 40 W
D ⩽ 0.1% at 30W

Power bandwidth 10–3,000 Hz

Frequency range
5–2,000 Hz (+0.5–3 dB)

Amplifier for squawker and tweeter

Output power
20W. Continuous Sine Wave Power

Harmonic distortion
D ⩽ 1% at 20W D ⩽ 0.1% at 15W

Power bandwidth 100–50,000 Hz

Frequency range
500–60,000 Hz (+0.5–3 dB)

GENERAL
Power supply
110, 127, 220 and 240 V. AC, 50/60 Hz

Power consumption
Max. 150W

Cabinet
Wood, ash veneered

Dimensions
287 x 387 x 228mm
(11⅜" x 15¼" x 9") Plus 50mm (2") for Plug

Weight 12.3 kg (27 lbs)

RH 541

AMPLIFIER SECTION
Power Output
30W R.M.S. ± 1 dB
40W Music Power

Distortion (Harmonic)
D ⩽ 1% @ 30W
D ⩽ 0.1% @ 20W

Cross Over Frequency 1400 Hz

Input Sensitivity
(3 Position Switch)
1 V/10 k ohm (for pre-amplifier)
7.5 V/100 ohm (for power amp ⩽ 14W/4 ohm)
19 V/100 ohm (for power amp >14W/4 ohm)

Electronic On/Off Switch
Rise time ⩽ 1 sec with input signal ⩾1.5 mV; fall off time ⩾2 minutes

ENCLOSURE
Volume
8 litres (.28 cu. ft.) (4.5 litres acoustic)

Frequency Response
35–20,000 Hz (DIN)

Drive Units
AD7066/W4 MFB, 7" for bass notes
AD0161/T8, 1" dome for treble notes

CONTROLS AND CONNECTIONS
On/Off switch
Left/Right switch
3 position input sensitivity switch
5 pin DIN input socket
5 pin DIN output socket
Captive mains lead
Mains voltage adjuster

GENERAL
Power Requirements
110, 127, 220, 240 AC 50 or 60 Hz
65W max.

Dimensions
229 x 294 x 184 mm (9" x 11¾" x 7¼")

Weight
6.8 kg (15 lbs)

Philips Electrical Limited
420/430 London Road, Croydon CR9 3QR

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