

marantz®



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A U D I O P H I L E

T H E M U S I C A L T E C H N O L O G Y



Marantz is a unique company. With roots that stretch back to the earliest days of the hi-fi industry and influences from all corners of the globe, Marantz is uniquely capable of bringing the highest possible musical performance to its products irrespective of price. The historic influences on the company's direction are important.

Marantz takes its name from American founder Saul Marantz. His products like the 7C pre-amplifier, the 8B power amplifier and the 10B tuner are regarded as classics today, sought after by discerning audiophile collectors. The standards set then are still as valid in today's world of digital signal handling.

In the early seventies a collaboration with a major Japanese producer was forged into a partnership which became Marantz Japan Inc adding an unsurpassed production expertise to the company portfolio. Throughout the eighties digital technology, especially Compact Disc, has been the spur to growth.

Our world-wide optical, electronic and mechanical design ability has proved indispensable. Marantz produced many of the first players heard and still used by music critics and hi-fi reviewers. Yet even as these first CD players were coming on to the market we were at work on a new generation of digital components to push

digital signal handling techniques further back up the reproducing chain. We can now offer the finest digital amplification components to match the excellence of our CD players. Thorough research and rigorous listening tests on real products form the backbone of our approach. Our attention to detail is

meticulous. Accurate specification and measured performance is not enough. The product we design and build must pass the most crucial test of musical authenticity - listening. We build for continued musical enjoyment. To this end the company has built up a wealth of data on the performance of passive

components and can now use custom-designed components to give unparalleled musical excellence. Non-magnetic, resonance-free construction is used in all components from CD players to loudspeakers to free our products from distortion and colouration. To achieve musical excellence in other words.

Since the founding of our company the goal has not changed our - long-term commitment is to musical enjoyment through technical excellence.

D I G I T A L A M P L I F I E R S



PM 95

DIGITAL AMPLIFIERS

Compact Disc was simply the first fruit of a full digital entertainment technology. CD Video and Digital Audio Tape (DAT) have now joined CD to provide alternative high quality sources. Bringing raw digital signals straight into the amplifier eliminates one unnecessary stage of amplification. A digital amplifier performs the digital to analogue conversion

immediately before power amplification. The highest possible sound quality can be therefore achieved and preserved. The digital circuits in our PM 95 are to the same exacting standards that set Marantz Compact Disc players apart from the rest. Selected TDA1541-AS1 four times oversampling 16-bit digital-to-analogue converters (DACs) are used to give improved linearity with low level signals giving an added refinement and purity to the sound. Resolution is further enhanced by the

newly developed 9th order General Impedance Converter (GIC) digital filter. Jitter elimination circuits, also featured in the Reference CD 12 CD player, are used to improve distortion across the entire bandwidth. High treble signals show a considerable reduction in distortion. Of true high power capability and audiophile performance, the PM 95 also offers unequalled convenience. A table-top remote control with programming display panel provides full control of input switching and volume from the listening position.

PM 95

The PM 95 uses low distortion, wide bandwidth MOS FETs in its power amplifier stages. Appropriately, for an amplifier handling signals with the fastest transient attack and widest dynamic range, the PM 95 is capable of delivering prodigious power — even into complex loudspeaker loads. To give the purest sound this amplifier can also be switched to deliver pure linear Class A amplification up to 20W output. The PM 95 accepts both optical and electronic digital inputs. Two optical inputs are provided for Compact Disc and Digital Audio Tape. The DAT circuit also has an optical output for digital tape monitoring. Two electronic digital inputs and outputs are also provided. Mechanical construction is important in cutting out unwanted vibrations. Materials have to be chosen to give electrical shielding and freedom from induced magnetic distortion. The chassis is die-cast in non-magnetic aluminium alloy; the top-plate is a rigid aluminium extrusion — even the feet are plaster filled. Borrowing know-how from CD player design, independent windings on the main toroidal power transformer are used for the digital and analogue circuitry to reduce noise. The Digital Direct switch bypasses the source selector and balance control to give the most direct audio path. Connecting the output straight from the digital-to-analogue converter stage to the power amplifier gives the finest possible sound. The PM 95 incorporates independent Linear Drive Power Supplies (LDPS) for power amp stage, analogue and digital circuitry. Marantz High Resolution

(HR) circuit philosophy is used throughout this outstanding amplifier.

RC 95

This intelligent table-top remote control comes preprogrammed for 10 components (and has a memory for 20). The wide bandwidth infra-red receiver allows the remote to learn and then store approximately 150 codes from any existing remote commanders.

PM 75

A digital amplifier based on the same quality digital oversampling circuits with jitter elimination used in the PM 95 amplifier and top Marantz CD players. Additionally, the amplifier features a phono input with moving coil option. The PM 75 can boast a Linear Cross-over design power amplifier section with 100W output. Tone controls are provided but the Expedient Tone Control circuit only alters the fundamental and harmonics at frequency extremes without altering the real music content. Custom components are used throughout, like the low-noise op-amps to give high-speed performance to the preamplifier section. Three independent power supplies are installed. A 600 Ohm line transformer is used in the volume control amplifier to isolate digital noise from the analogue circuits. The PM 75 has one optical and three electronic digital inputs, and one electronic digital output. Source Direct gives tone control bypass and direct connection of the input signal to the power amplifier through just the motorized four-gang two-stage volume control potentiometer.

PM 95

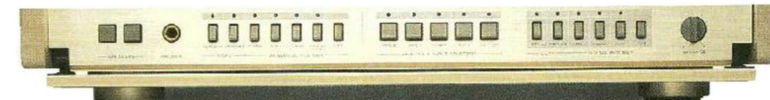
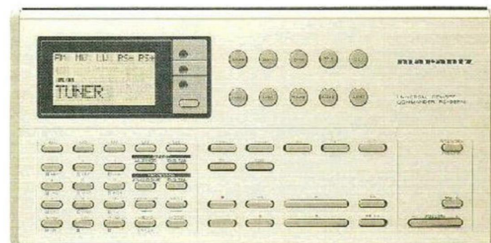
- 2x120W RMS into 8 Ohm from high-speed, low distortion MOS FETs switchable to pure 20W Class A
- Selected 4 times oversampling 16-bit DAC with jitter elimination circuits and 9th order GIC Filter
- 32, 44.1 and 48kHz sampling frequencies for CD, DAT and satellite
- Triple independent Linear Drive Power Supplies (LDPS)
- High resolution (HR) circuit
- Remote control with LCD function display
- Motorized 5-gang conductive plastics two-stage volume control
- Aluminium die-cast chassis and solid aluminium top-plate
- All connectors gold-plated, each input and output controlled by relay
- No tone controls
- Separate analogue and digital sound processor in/out and recording selectors
- All digital power supplies cut when using for analogue input
- Digital direct switch by-passing selector and balance control
- Plaster-filled isolating feet

RC 95

- Intelligent table-top remote with LCD display
- Pre-programmed for 10 components with a memory for 20
- Learning mode for use with other audio and video components

PM 75

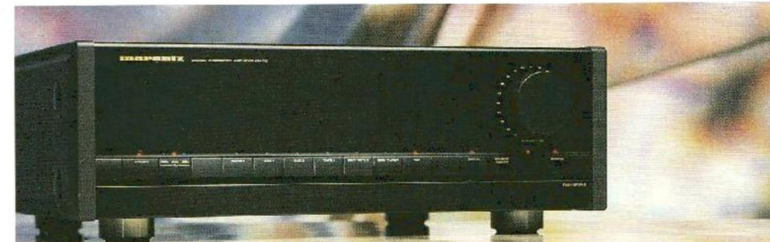
- 2x100W RMS into 8 Ohm
- Expedient Tone Control (ETC)
- Four times oversampling 16-bit DAC with jitter elimination circuits and phase linear 7th order GIC filter
- Linear Drive Power Supply for more than 80dB channel separation
- Three independent power supplies — preamplifier, power amplifier and digital
- Motorized four-gang two-stage volume control for improved S/N ratio
- Remote control
- Moving coil phono amp
- Three electronic digital inputs and one electronic digital output, one optical input
- Source direct with tone control bypass
- Recording selector for digital and analogue sources



INSIDE FLAP PM 95: CONTROLS



INSIDE FLAP PM 75: CONTROLS



PM 75

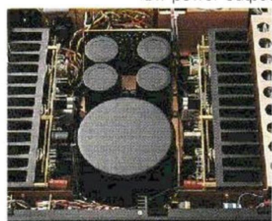
A U D I O P H I L E A M P L I F I E R S



PM 94

QUARTER A POWER

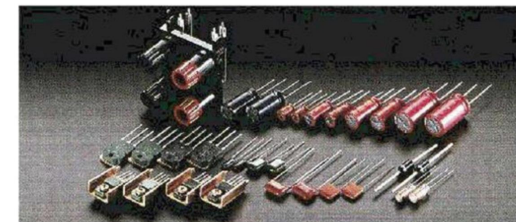
Class A amplification is a hi-fi ideal. This pure, linear, low distortion amplification has only one major drawback — inefficiency. This means low power output and high running temperatures. Marantz Quarter A amplification gives pure Class A up to one quarter the maximum amplifier output power. Above this point the amplifier runs in regular Class AB mode up to its maximum power output. The change over occurs smoothly and automatically in three stages, the amplifier accurately sensing the current and voltage drawn by the speakers. The Marantz Quarter A technique offers the unsurpassed clarity of Class A with the safety headroom of a powerful AB amplifier. MOS FETs power output transistors are used in these amplifiers. Quarter A and MOS FET amplification combine to give subtle detailing and stereo imagery with an ability to punch home the loudest peaks from modern digital recordings. Beauty to beast — on demand!



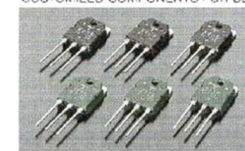
INSIDE PM 94

MOS FETs

Metal Oxide Semiconductor Field Effect Transistors (MOS FETs) are used in both the PM 94 and PM 84II amplifiers. MOS FETs operate in a more linear fashion than conventional bi-polar transistors. They give lower distortion with a wider, flatter frequency response. MOS FETs need lower current flow in the driver stages. This means our designers can produce a more stable amplifier with lower intermodulation distortion. Little negative feedback is necessary. This in turn gives these MOS FET amplifier designs an effortless wide-band power output. In other words the PM 94 and PM 84II offer a cleaner, more dynamic sound than most. The MOS FETs used in these Marantz amplifiers can switch 1 Ampere of current in just one ten millionth of a second! In musical terms that means a dynamic, exciting, punchy sound quality — even into complex loudspeaker loads or low impedances. The power supplies of each amplifier are designed for the effortless delivery of power to the output devices. Generously rated components are used here — witness the massive power capacitors in the PM 94 giving a total of 90,000pF capacitance. Non-magnetic construction with copper or copper shielded chassis components is employed throughout. This minimizes the distorting effects of electromagnetically induced currents in the chassis and connected mechanical components. The end result is cleaner, purer sound with the lowest levels of dynamic distortion. Marantz research and listening tests on electronic components has allowed the finest passive components to be chosen for each amplifier. Ceramic-damped capacitors and high-quality copper styrol



CUSTOMIZED COMPONENTS FOR BEST SOUND



MOS FETs

capacitors are used at key points throughout these designs. Providing the best of both worlds, the PM 94 and PM 84II combine true audiophile design with convenient and flexible input switching. CD/Phono Direct and Tone Defeat allow these amplifiers to be used in straight path mode for the highest possible audiophile sound quality. The PM 94 and PM 84II boast input switching for 10 inputs with full tape monitoring for three tape decks. Both amplifiers have an illuminated input selector and independent channel tone control. The PM 94 has doubled shielded transformers for its MC input which ensure the lowest noise and outstanding transient attack from moving coil cartridges preferred by audiophiles. This input conforms to the latest IEC RIAA recommendations giving a carefully rolled-off low end response avoiding the problems of muddled and distorted bass from warped or rippled records.

PM 94

- 2x150W RMS into 8 Ohms
- Quarter A amplification for pure Class A sound married to high-speed, low distortion MOS FETs for dynamic power
- CD/Phono Direct straight path and Tone Defeat to minimize colouration
- Custom components and non-magnetic construction for best sound
- Double-shielded moving coil phono input transformer

PM 84II

- 2x110W RMS into 8 Ohms from high-speed, low distortion MOS FETs
- Quarter A amplification for pure Class A sound
- CD/Phono Direct straight path and Tone Defeat to minimize colouration
- High specification FET phono section
- Custom components and plated non-magnetic chassis construction for low distortion sound
- Independent tape copy 1 to 2 and 2 to 1

PM 84II



PM 94
This is one of the very finest integrated amplifiers. It never lacks power or the willingness to propel the music, it is as muscular and as delicate as the finest audiophile equipment, yet is untussy.
Hi-Fi Answers — May 1989

A U D I O P H I L E A M P L I F I E R S



PM 64II

The PM 64II is a high-power integrated amplifier using unique Marantz Quarter A amplification with parallel push-pull high speed bipolar transistors. Quarter A gives low distortion, ultra-low colouration levels. Only on high peaks does the amplifier switch into Class AB amplification to give high power on instant demand. Custom components are used throughout this amplifier which conforms to the High Resolution circuit design and construction philosophy incorporating copper-plated components (even down to the transistor fixing plates and screws). This is done to eliminate electro-magnetically induced distortion. The PM 64II can accept inputs from up to eight source components including two tape decks and can drive two pairs of speakers through gold-plated relay controlled switching and high quality screw terminals. For enhanced sound quality the tone control and filter stages can be by-passed and the CD and Phono signal fed directly to the power amplifier stages through the precision volume control.

PM 45

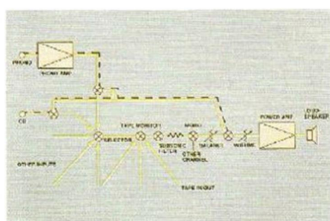
The PM 45 was designed to provide effortless power delivery and a musical performance far in advance of other amplifiers competing in its price range. The over-specified power supplies have recently been updated with even bigger power capacitors. This gives the PM 45 unrivalled dynamic power delivery into even 'difficult' loudspeakers and with the complex demands of modern Compact Disc signals. Though selling in a very competitive sector of the amplifier market, the PM 45 has been designed with all the care that goes to make even the most expensive Marantz audiophile amplifier an outright winner. Components are specially chosen as they make a tremendous difference in the final performance of the amplifier. All components are tested in the actual amplifier circuits for which they are chosen. The PM 45 has specially designed ceramic damped main power supply capacitors. This amplifier shares many of the features of the top-of-the-range models including the CD/Phono Direct switch. This dramatically improves sound quality on CD and Phono signals by directly linking the input signal through the high-quality volume control to the power amplifier stages by-passing tone controls, filters etc and thereby eliminating colouration. Monitor and dubbing for two tape decks is offered. The phono input has gold-plated sockets and can accept signals from both magnetic and moving coil cartridges.

PM 64II

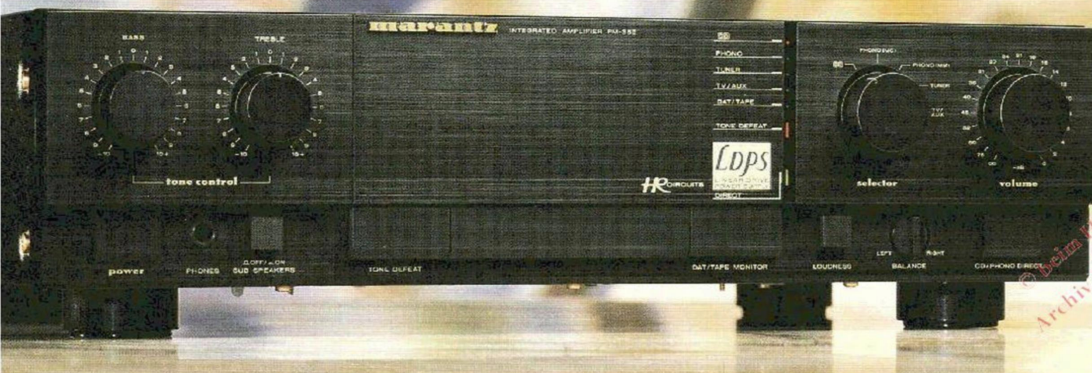
- 2x110W RMS into 8 Ohms
- Quarter A high-speed push-pull bipolar transistor output
- CD/Phono Direct straight path and Tone Defeat by-pass
- Copper-plated chassis for power supply to reduce distortion
- High specification FET phono section
- Twin tape monitors with tape copy

PM 45

- 2x55W RMS into 8 Ohms with low impedance load capability and high dynamic drive
- CD/Phono Direct and Tone Defeat for straightest path signal purity
- High specification, low noise FET phono input accepts magnetic and moving coil cartridges
- Custom components for low distortion sound
- Twin tape monitors with tape copy



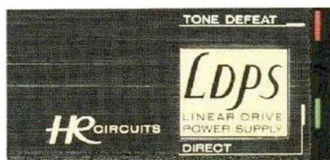
A U D I O P H I L E A M P L I F I E R S



PM 35II

HIGH-RESOLUTION CIRCUITRY

Marantz has conducted research into the sound of components and the effects of vibration on sonic performance for many years. This information has been fed back into the design of even our budget amplifiers the PM 35II and PM 25. We have called our approach to component choice and circuit design High Resolution circuitry. It starts with the printed circuit board layout. Perhaps unexpectedly, the board that carries power to the components through its copper tracks can influence sound performance. The ground potential of the left and right channels for instance is kept completely separate in our designs. Current flowing in the ground path of one channel could have unfavourable effects on the sound of the other channel. From input to output, therefore totally separate ground paths for the left and right channel are laid out.

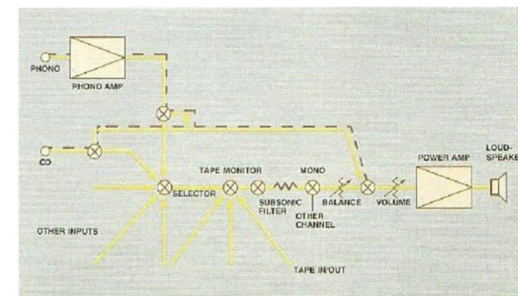


BALANCE

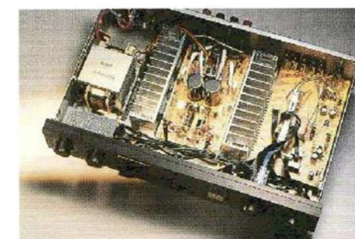
Further care is taken to design these high-performance budget amplifiers symmetrically. Each component has its own mirror image in the other channel. This improves separation, reduces noise and helps cancel out distortion. Competing budget amplifiers commonly use a single heat sink for their power transistors — the PM 35II is different. Independent heat sinks for left and right channels are used. The very high currents flowing in our power transistors can create vibrations. These can be carried through a shared heat sink into the output devices of the other channel. This is called 'microphony'. The power transistors act as tiny microphones picking up any unwanted vibration. The effect is heard as degraded stereo imaging and compression of dynamics.

CD/PHONO DIRECT

The CD/Phono Direct switch is featured on every audiophile amplifier from the PM 94 to the PM 35II; the PM 25 offers CD Direct switching. Operating this switch feeds the Phono and CD source signals directly to the high-accuracy volume control potentiometer which directly controls the level to the power amplifier. This simple audiophile arrangement (often described as a 'passive preamp') offers the finest possible sound. Routing the signal on a straight path connection to



CD-PHONO DIRECT SWITCH



INSIDE PM 35II

the power amplifier CD/Phono Direct cuts out unnecessary circuitry which can rob the sound of realism. Similarly our Tone Defeat circuit — a feature of all Marantz audiophile amplifiers — this by-passes tone controls and filter circuit to give the best possible sound. Hours of listening tests have helped us to improve our product to give audiophile performance at an affordable price. The popular newly revised PM 35II now offers an increased power output from 35 to 45W. The winning design philosophy of the PM 35II is carried over into the PM 25. This now 35W amplifier benefits from the major Marantz audiophile technologies.

PM 35II

- 2x45W RMS into 8 Ohm from triple-layer MESA Power transistors
- LDPS — Linear Drive Power Supply
- HR — High Resolution circuitry
- CD/Phono Direct and Tone Defeat for straightest path signal purity
- Independent left and right channels for improved clarity and imaging
- Low noise FET phono input accepts magnetic and moving coil cartridges

PM 25

- 2x35W RMS into 8 Ohm
- LDPS — Linear Drive Power Supply
- HR — High Resolution circuitry
- Independent left and right channels for improved clarity and imaging
- CD Direct and direct wired speaker terminals for pure sound
- Five inputs with gold-plated Phono and CD input sockets

PM 25



COMPACT DISC PLAYERS



CD 12

REFERENCE STANDARD COMPACT DISC

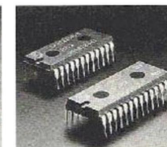
Marantz establishes a new sound quality bench-mark with the reference CD 12 — a three-part Compact Disc player. This player is built to the highest mechanical and electronic standards. The Compact Disc drive is electrically isolated from the separate digital-to-analogue converter (DAC). Acoustic feedback has been minimized by the use of a die-cast chassis and side panels, a ribbed aluminium top plate for strength and plaster filled die-cast feet with rubber isolators. Strong glass epoxy circuit boards are used further to reduce unwanted vibrations of active electronic components. Electrical shielding plays a vital role in the final signal quality — particularly of low level music information. To this end copper plating is used on the chassis and a special copper plated rear panel and circuit board shields are incorporated. The CD 12 is under the command of an intelligent remote control. This will handle up to 10 different products, each with up to 36 commands. This remote control will also 'learn' from other infra-red remotes. An LCD panel on the control itself shows all programming and functions.

JITTER

The raw digital signal is fed from the CD 12 Compact Disc Drive to the separate digital-to-analogue converter box where it is converted and amplified. 'Jitter' is the word used to describe the unwanted constantly shifting time errors. These occur through even the slightest slack in the optical (Tos-link) connection. Equally, if a digital electrical connection is made using a phono-to-phono coaxial cable the capacitance of the cable itself can cause time shift errors. As the accurate recreation of the analogue music waveform depends on precise time base information fractional errors of this type will reduce the resolution of the signal. In other words reduce the musical detail. Jitter is eliminated by a phase-locked loop driven by high-accuracy clock beating many millions of times a second. A special optical cable is provided with the CD 12. Rather than glass fibre optics this new cable uses very low loss polished Mica. The optical core is clad in nylon fibre and covered with a strong PVC jacket ensuring the finest possible optical connection.



4 TOROIDAL POWER TRANSFORMERS



TDA 1451 A AS 1 SELECTED D/A CONVERTOR



GLASS EPOXY PCB WITH 70 MICRON COPPER



CDM 1 DIE-CAST MECHANISM



OPTICAL FIBRE CABLE

CONSTRUCTION

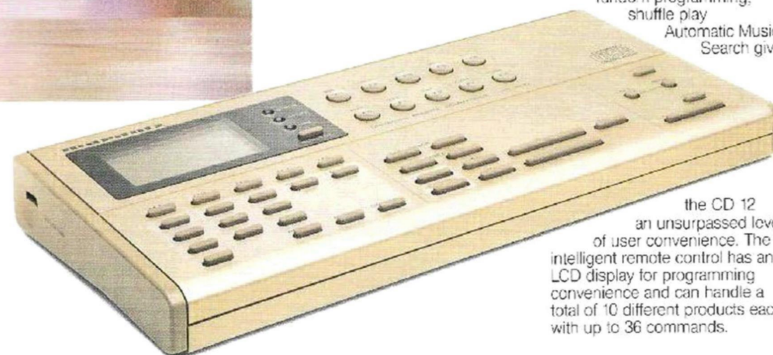
Not only are the transport and laser given a discrete power supply but four toroidal low-stray field power transformers are employed. One for the transport, one for the digital-to-analogue converter box, and one for analogue amplification. Independent circuit boards are used for the signal and servo circuitry. Each with its own copper-plated shield. The circuit boards are built to a new standard with double thickness copper tracks (70 rather than 35 micron). Newly developed electrolytic capacitors are used to further improve sound quality.

CONVENIENCE

Favourite Track Selection provides a permanent memory for up to 226 discs; six modes of repeat, random programming, shuffle play. Automatic Music Search give

CD 12

- Three piece construction — separate CD drive, digital-to-analogue converter and remote
- Fast access and accurate tracking with CDM1 aluminium die-cast laser mechanism
- 16-bit four times oversampling from selected TDA1451 A S1 DAC with jitter elimination circuitry for improved linearity at low levels
- Auto switching sampling frequency (32, 44.1 and 48kHz) for CD, DAT and satellite
- Vibration resisting construction with die-cast side panels, solid aluminium top cover and plaster-filled die-cast feet with rubber shock isolators
- Copper plated die-cast chassis and rear panel and circuit board shields for low noise performance
- Four toroidal low stray field power transformers and independent circuit boards for signal and servo circuitry
- Intelligent remote with LCD for use with other components
- Favourite Track Selection and Automatic Music Search
- Random programming
- Six modes of repeat (track, disc, programme, FTS, A-to-B and random)
- Balanced 600 Ohm output on D-to-A converter
- Optical and electronic couplings
- Guaranteed S/N ratio of 104dB and dynamic range of 96dB, channel separation 100dB and THD of 0.0015% at 1kHz



the CD 12 an unsurpassed level of user convenience. The intelligent remote control has an LCD display for programming convenience and can handle a total of 10 different products each with up to 36 commands.

C O M P A C T D I S C P L A Y E R S



CD 94 CDA 94

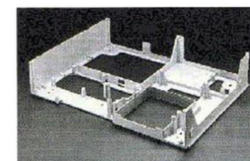
THE AUDIOPHILE COMBINATION

The CD 94 Compact Disc player has been designed to provide top-quality sound with superlative operating convenience, full infra-red remote control and Favourite Track Selection permanent memory. The CDA 94 digital-to-analogue converter box accepts digital signals from any suitably equipped CD player (and DAT or broadcast satellite signals). High accuracy digital conversion is matched by high-dynamic analogue signal handling in this unit. Together the CD 94 player and CDA 94 converter deliver exceptional musical fidelity.



CD 94 COMPACT DISC PLAYER

The proven audiophile performance of this player has been enhanced by the use of an improved 16-bit four times oversampling converter chip — the TDA1541A. The Marantz oversampling digital filter is characterized by very low distortion and a near absence of phase error — the resolution of low level musical detail is therefore assured. Accurate disc tracking is seen by Marantz as being of vital importance. The aluminium die-cast CDM1 mechanism provides a rigid platform for the readout laser. The whole transport sub-assembly is floated on massive rubber dampers inside a solid die-cast chassis to ensure isolation from mechanical vibration. Similarly, the top plate — of ribbed aluminium — and even the heatsink, are designed to improve mechanical isolation and reduce acoustic feedback. Non-magnetic construction is used throughout — die-cast alloy chassis, aluminium top plate, copper plated screws and back panel — to remove the distortion effects of eddy current coupling. Custom electronic components and care in the design of the power supplies guarantees the highest sound quality. The CD 94 has both optical and electronic digital outputs allowing ideal connection to the CDA 94 converter or PM 95 and PM 75 digital amplifiers.



DIE - CAST CHASSIS



OPTICAL FIBRE CABLE

CDA 94 DIGITAL-TO-ANALOGUE CONVERTOR

Using the same high quality converter chip and four times oversampling digital filter the CDA 94 digital-to-analogue converter offers further improved sound by optical coupling between the filter and converter and the use of high precision Bessel filters. The unit is designed around totally independent left and right audio output stages powered by massive and totally independent power supplies. Output is available as either a fixed unbalanced (phono), balanced (XLR connector) or variable (phono) signal. The variable output is controlled by a high-accuracy conductive plastics potentiometer allowing direct connection to a power amplifier. Absolute phase control is offered on this output.

CD 94

- Compact Disc player with selected 16-bit four times oversampling twin DAC with digital filtering
- Fully floating die-cast laser mechanism
- Non-magnetic, vibration free construction
- Four separate power supplies with high power transformer and totally independent audio supply circuitry
- Custom components
- Twin motor disc loading system for accurate tracking, fast loading and access
- Optical and electronic digital outputs
- Favourite Track Selection, Automatic Music Search and six repeat modes
- Infra-red remote control

CDA 94

- Digital-to-analogue converter with automatic switching sampling frequency — 32, 44.1 and 48kHz
- Selected 16-bit four times oversampling twin DACs with digital filtering gives 96dB dynamic range with fast transient attack and superb phase linearity
- Precision analogue filtering
- Optical and electronic digital inputs with source selection
- Independent left and right audio output amplifiers
- Three totally independent power supplies each with its own transformer
- Absolute phase control
- Custom components
- Balanced, variable and fixed outputs
- Digital monitor input/output
- Headphone socket with level control



INSIDE FLAP CD-94: CONTROLS



INSIDE FLAP CDA-94: CONTROLS

CD 94/CDA 94
Winner of the Diapason d'or 1987

CD 94
"In summing up, let me emphasize just how impressed I am with the CD 94. It really is one of the finest CD players I've heard so far."
New HiFi Sound February 1988

© Heim Hersteller
Archiv Michael Otto

C O M P A C T D I S C P L A Y E R S



CD 85

The CD 85 establishes a new standard of construction and features in its price class. Every care has been taken to minimize colouration and distortion from vibration and electro-magnetic coupling. The CD 85 uses a full die-cast chassis with a floating transport. A non-magnetic, stiff aluminium top plate and copper shielded rear panel are used. The CD 85 incorporates the Marantz High Resolution circuit philosophy. Double thickness copper tracks are used on the circuit boards. Custom components, like ceramic damped capacitors and discrete high-speed voltage regulators, are used in the analogue circuit. Four independent power supplies are provided. The output stage DC

amplifier is designed with perfect left/right symmetry. Gold-plated phono output sockets have been used. All this attention to design detail ensures a sound that is both sweet and powerful with excellent stereo imagery and detail resolution. A fully featured remote control player, the CD 85 has a permanent memory for up to 226 disc programmes (Favourite Track Selection).

- Twin 16-bit DAC with four times oversampling and digital filtering
- High Resolution (HR) circuitry with DC amplification
- Fully floating die-cast single beam laser mechanism for accurate tracking and fast access
- Die-cast chassis with copper-plated rear panel and aluminium top-plate cuts out vibration and

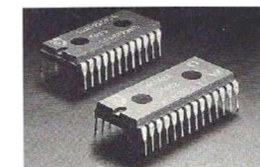


- magnetic coupling
- Symmetrical output stage using single chip op amp
- Four independent power supplies and custom components
- Digital output on/off switch
- Favourite Track Selection with six mode repeat plus Automatic Music Search and Shuffle play
- Optical output
- Gold-plated digital and analogue output
- Full function infra-red remote control



CD 75II

The CD 75II Special Edition CD player is a much improved version of the award winning CD 65/75 model modified with custom components in the UK to the highest sonic standard. Full remote control and Favourite Track Selection bring an added convenience to outstanding sound quality of a standard against which other CD players are judged. High-linearity A-version converter chips are used with four times oversampling and digital filtering. These low distortion converters ensure a crisply 'focused' stereo performance and full treble detail without harshness or digital 'glare'. Triple independent power supplies ensure that no digital noise reaches the analogue output



D/A CONVERTOR TDA 1541 AS 1

stages while retaining tight bass control. The servos that ensure accurate tracking of the disc are fed from a separate power supply so as not to disrupt treble delicacy or detail. Direct access is given to 99-tracks with a 20-step memory which can programme by track, index point or time. The CD 75II

has the convenience of both fixed and variable level outputs (phono).

- Twin 16-bit DAC with four times oversampling and digital filtering
- Three separate power supplies for mechanical, digital and analogue audio stages
- Fully floating die-cast laser mechanism
- Modified in the UK with custom components for highest quality sound
- Favourite Track Selection
- Full remote control
- Optical and electronic digital output
- Headphone output with level control



CD 65II

The CD 65II Special Edition is modified in much the same way as the CD 75II giving the same high quality sound in a top value for money package. Whereas the CD 75II has both optical and electronic digital outputs, the CD

65II has only an electronic output. Though both players are equipped with remote control this only extends to basic play and search functions on the CD 65II. The CD 75II additionally offers remote programming and volume control.

- Twin 16-bit DAC with four times oversampling and digital filtering
- Three separate power supplies for mechanical, digital and analogue audio stages
- Fully floating die-cast laser mechanism
- Modified in the UK with custom components
- Remote control
- Electronics digital output
- Headphone output with level control



CDM 1 II DIECAST MECHANISM

C A S S E T T E C K S, T U N E R S

SD 55

This top-quality 3-head deck gives off-tape monitoring during recording. Twin high-torque motors ensure even tape transport and fast spooling. A heavy flywheel and precision capstan give low wow and flutter. Good

head to tape contact is necessary for powerful bass and clean highs. A special back-tensioner operates on the supply spool to keep the tape firm across the head. Two noise reduction systems (Dolby B and C) are provided, ensuring compatibility with existing tapes. Additionally, Dolby HX Pro brings

life-like dynamics to home recordings. Transport and functions are under micro-processor control. This gives unrivalled ease of use over such intricate functions as Block Memory Repeat, Programmed Search playback, Time Recording and Intro Search. The large

undistorted display gives peak metering and function display.

- Three tape heads give monitoring during record
- Twin motor logic control with heavy flywheel and precision ground capstan for low wow and flutter
- Dolby B and C noise reduction and Dolby HX Pro
- Automatic tape selection
- Fine bias adjustment gets the best out of any tape
- Quick Music Search
- Automatic Music Search
- MPX filter optimizes off-air recording
- Back tensioner for even tape transport



SD 45II

The SD 45II is built to an unparalleled standard. While other cassette decks at this price will use a standard off-the-shelf chip the SD 45II uses a discrete component playback amplifier.

This gives the deck a capability of exceptional high-fidelity playback. Design techniques and components from the PM amplifier range have been used throughout. Component choice

has been heavily influenced by listening tests. Selected audiophile quality components are used at critical points in the circuits. High grade ceramic-damped are used around the Dolby noise reduction circuit. High

speed op amp and top specification tape heads complete an impressive picture. Automatic tape selection makes tape equalisation easy, while fast acting meters and Variable Bias help get the best dynamic headroom out of every tape.

- High performance tape transport
- Selected audiophile components
- Dolby B and C noise reduction
- Super hard metal alloy tape heads
- Variable tape bias
- Clear display with four-digit tape counter and fast acting peak hold fluorescent meters
- MPX filter



SD 35

A good tape transport is essential for a hi-fi cassette deck. The SD 35 incorporates a logic controlled transport with independent capstan drive and

tape take-up motors. This gives the SD 35 excellent tape to head contact and low wow and flutter for stable clear sound. Dolby B and C noise reduction systems

are fitted to make the best of pre-recorded tapes and home recordings. Fluorescent peak meters guarantee accurate level setting for the best use of tape

headroom. Correct tape recording bias and playback equalisation is automatically ensured while variable bias is provided to get the last final performance edge from normal and Type II tapes. Custom components are used throughout. Particular attention being given to critical signal path components like the power supply and phase compensation capacitors.

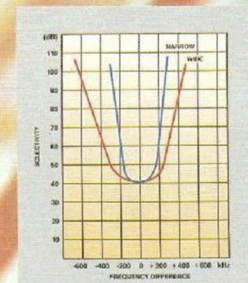
- Logic control twin motor tape transport
- Dolby B and C noise reduction
- Separate balance and level controls
- Variable tape bias
- Super hard metal alloy tape heads and MPX filter



ST 54L

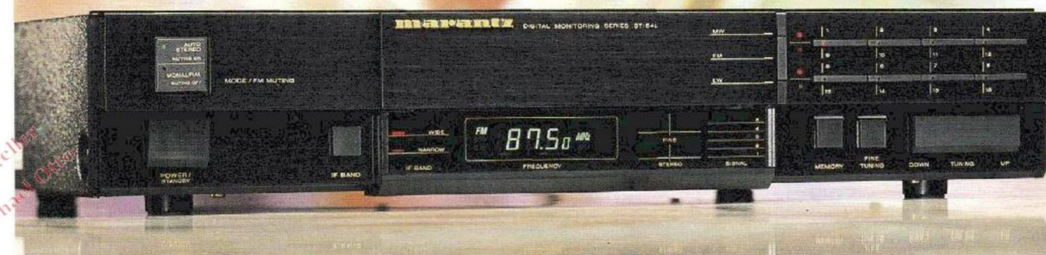
Wide dynamic range and low distortion are the keys to getting the best from modern FM Stereo radio. The state of the art three-band ST 54 tuner uses the precision of digital quartz synthesizer tuning with a low noise, high sensitivity MOS FET front end. Switchable IF bandwidth lets the tuner pick up one station broadcast close in frequency to another without interference, in

areas where stations are spaced further apart the Wide mode gives optimum stereo separation. Fine tuning permits tuning slightly off-station to achieve the lowest distortion in difficult reception conditions or on cable systems. The ST 54 can memorize 16 FM and 8 AM stations — memory backup protects the preset tuning for about a month in case of power supply interruption.



NARROW-WIDE SWITCH FUNCTION

- Quartz synthesizer tuning for precise, drift-free tuning over three wavebands — ST 54: FM, MW, ST 54L: FM, MW, LW
- High-sensitivity dual gate MOS FET design with selectable IF bandwidth
- 16 FM and 8 AM station presets and last station memory and memory backup for at least one month
- Ratio detector audio conversion for best possible sound



ST 35L

This attractive three-band tuner features many of the circuit refinements found in much more expensive units. The ST 35 uses the same quartz locked tuning and a low distortion high sensitivity MOS FET front end to guarantee wide

dynamics and low noise. Custom components are used throughout. The ST 35 uses the same ceramic filters as in the top of the range ST 54 model. These give precise phase linearity for a cleaner sound with sharper

stereo. Memory storage allows for 16 FM and 8 AM preset stations with memory back up for a month in the case of power failure. The Last Station feature automatically brings up the last station tuned when the tuner is powered up.

- Three-band digital tuner ST 35: FM, MW, ST 35L: FM, MW, LW
- Quartz synthesizer precision
- High sensitivity MOS FET front end design
- Selected components
- Linear phase IF filters
- Memory presets for 16 FM and 8 AM stations



L O U D S P E A K E R S



LD 60 DMS LD 50 DMS LD 20 DMS

LOUDSPEAKERS

Compact Disc has made the job harder for loudspeakers. The wide dynamic range, superb stereo imaging and finest detail captured from CD make added demands on loudspeakers. Flatter frequency response and lower distortion with high output level potential are the goals for a loudspeaker to reproduce the best digital recordings.

The Marantz Digital Monitoring Series presents technically advanced speakers built to a high specification and finish. New materials have been used. Irrespective of size Marantz speakers are capable of high sound pressure levels and an outstanding bass performance.

The mid/bass cones in the LD series loudspeakers are moulded from a rigid, lightweight, yet well self-damped, material — polypropylene stiffened with glass fibre. This ensures a high-speed driver with neutral, uncoloured sound and a crisp precise attack. These fast drivers are tuned to the cabinet volume by Dynamic Bass Reflex Alignment. The critical tuning of driver and cabinet air mass results in outstanding bass performance for the size of cabinet coupled with excellent bass note separation. The Bi-ground crossover design used in

these speakers separates the ground paths of the bass and treble drivers. This ensures that heavy currents in the bass ground return do not modulate the treble signal. The speakers can of course be wired conventionally as well.



REAR PANEL OF LD 50 DMS

LD 60 DMS

A new three-way design based on the well-received LD 50 DMS. The 25-mm soft dome tweeter has been joined by a 19-mm super tweeter. This, and the larger cabinet volume, enables the LD 60 DMS to reach out further to the frequency extremes with clean, dynamic undistorted sound.

LD 50 DMS

The stiffened polypropylene cone in the mid/bass driver of this speaker has been given a new surround. Of a more pliable material this not only gives a faster bass performance but terminates travelling waves in the cone resulting in a smoother, more detailed midband.

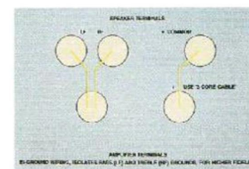
A larger magnet delivers a faster, tighter bass punch.

The improved rigidity cabinet retains the double thickness front baffle design but this is now produced in Medite. This material revision and stout internal bracing delivers fast bass and outstanding stereo imagery. The baffle design allows the grilles to be used without affecting the stereo performance of this speaker.

Higher quality crossover components of high-current type have been included in the Bi-ground crossover. The over-specified design allows high sound pressure levels to be produced without crossover saturation effects leading to compression and veiling of detail.

LD 20 DMS

The LD 20 DMS is a compact stand-mounted design that can be used with amplifiers in the 30-100W (RMS) output range. This speaker can produce surprisingly high levels of deep bass.



BI-GROUND WIRING

The small cabinet gives this loudspeaker an edge, stable stereo images in width and depth.

The LD DMS range of speakers is built in Britain using specially designed custom drive units and advanced cabinets. Cabinets are rigidly braced and have Medite baffles throughout.

Extensive listening tests have been conducted to produce speakers that are neutral performers but with excellent stereo imagery, clean and open midrange and powerful, tuneful bass.

BI-GROUND WIRING

Bi-wired speakers are no longer only to be found among the ranks of expensive audiophile loudspeakers. A loudspeaker with a bi-wired crossover can achieve higher fidelity as the high current associated with the bass signals are kept apart from the delicate high frequency signals in the crossover network.

Usually two fully independent networks are provided with two sets of terminals and two sets of cable required.

Marantz research has shown that dramatic improvements in sound quality can be achieved by separating just the ground paths for the treble and bass sections of the crossover. This allows the user the option of three-core cable (Marantz ML 55S is a triple core high purity oxygen-free copper cable suitable for bi-wiring the LD range).

LD 60 DMS

- High power handling and above average sensitivity for truly dynamic performance
- Exceptional bass extension from Dynamic Bass Reflex Alignment
- Low colouration super-tweeter/tweeter combination with high stereo imaging capability
- Bi-ground crossover with high current capability components for smoother integration and improved dynamics

LD 50 DMS

- Above average sensitivity and high power handling ensures outstanding dynamic performance
- Dynamic Bass Reflex alignment for clean, fast bass with phenomenal extension
- Low colouration stiffened polypropylene mid/bass driver and Mylar dome tweeter
- New improved rigidity cabinet with double thickness Medite front baffle and internal bracing for fast bass and outstanding stereo imagery
- Bi-ground crossover with high current capability components for smoother integration and improved dynamics

LD 20 DMS

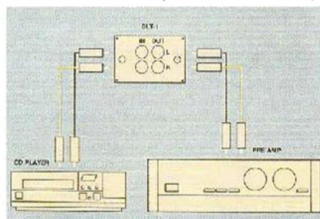
- High power handling capability
- Dynamic Bass Reflex alignment for tight, deep bass
- Low colouration driver combination
- New improved rigidity cabinet with Medite front baffle and internal bracing
- Bi-ground crossover to further reduce colouration



PH 95 DLT 1

MUSIC LINK

A hi-fi system is only as good as its weakest link. Marantz has identified a need for quality accessories to further improve the performance of its products in the home. Poor quality interconnects and loudspeaker cable can make even the most expensive hi-fi equipment sound decidedly mediocre. The Music Link range of leads and loudspeaker cable has been designed to give both quality hook-up and value for money.



CONNECTION SCHEME DLT 1

PH 95

This Phono RIAA equalizer can be used to add the highest quality phono input for conventional turntables to the PH 95 digital amplifier. Two neatly styled cases — matching the DLT 1 transformer — contain the equalizer circuitry

and separate power supply. The phono equalizer conforms to the Marantz High Resolution (HR) circuitry philosophy and incorporates components chosen for sound quality. Gold-plated phono sockets are used. The magnetic cartridge input uses an FET RIAA equalisation stage for best possible signal-to-noise ratio. The Moving Coil input uses a high quality low-noise transformer. The IEC recommended subsonic roll-off is incorporated to give much reduced intermodulation distortion.

DLT 1 DIGITAL LINE TRANSFORMER FOR COMPACT DISC ENHANCEMENT

The performance of many existing Compact Disc players can easily be improved. With many of the CD players on the market their digital noise is present on the internal bus line. This in turn is connected to the ground side of the output socket. The problem arises when such a CD player is connected to an amplifier where the ground potential of input stage is lower than that of the CD player. The digital noise is then carried into the amplifier and heard as distortion. The DLT 1 Digital Line Transformer isolates the ground of any digital music source. Because a transformer is used to connect the CD player and amplifier there is no direct electrical connection so unwanted digital noise can no longer travel through the ground path. Cutting out digital noise in this way cleans up both middle and high frequency. This gives better definition and improved stereo imagery as well as taking away 'digital harshness'. The DLT 1 is saturation free at all signal levels.



Music Link

The Music Link range comprises a top-quality triple insulated 1-metre phono-to-phono interconnect, a double insulated audiophile 1-metre phono-to-phono lead and unterminated triple core loudspeaker cable.

ML 95L

This top-quality interconnecting lead has twin cores of high purity oxygen-free copper individually wrapped in a hard polythene insulator and then jacketed in a second hard polythene layer. Two shields are used. A soft copper wire net offers shielding from radiated electromagnetic signals. This is wrapped in strong polythene tape under a second shield of soft permalloy wire screening the cable from induced magnetic effects. A drain wire of tinned soft copper completes the extensive shielding of the signal cores. This cable is available in 1-metre lengths terminated in 24 carat gold-plated phono plugs.

ML 55L

This audiophile interconnect comprises a high purity oxygen free copper core with a mesh screen of the same material. Both core and screen are held firmly in place with hard polythene insulators under a PVC jacket to further reduce microphony effects. The 24 carat gold-plated phono plugs on this 1-metre lead are spot welded to reduce the number of metal-to-metal contacts found in soldered plugs.

ML 55S

Available in 10-metre lengths ML 55S is a triple core loudspeaker cable. High purity oxygen free copper is used with individual PVC coverings and an overall flat PVC jacket with polarity marking. This length can be halved and used as a pair of 5-metre cables. Thermal shrinking tubes are provided to terminate the cable neatly.

ML 95L

- High purity oxygen free copper interconnect in 1-metre length
- Triple insulated construction with double shields — copper mesh against radiated noise and permalloy shield against induced magnetic effects
- 24 carat spot-welded gold-plated plugs

ML 55L

- High purity oxygen free copper interconnect in 1-metre length
- Double insulated construction
- 24 carat spot-welded gold-plated plugs

ML 55S

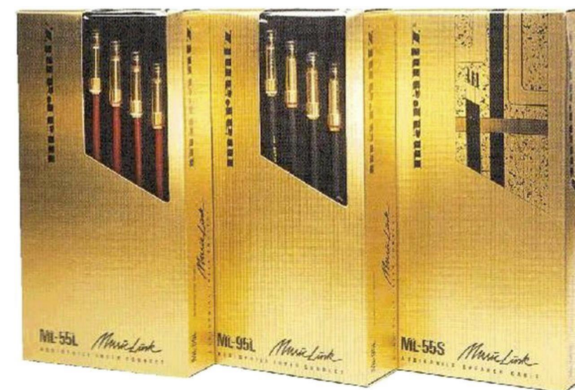
- High purity oxygen free copper triple core loudspeaker cable single 10-metre length
- Thermal shrinking sleeves for neat termination of shorter lengths

DLT 1

- Isolating Digital Line Transformer to cut out digital noise

PH 95

- RIAA phono equalizer with highest quality FET MM and MC transformer for low noise
- High Resolution circuits and separate power supply
- Strict IEC RIAA subsonic roll-off for lower IM distortion and cleaner bass



AUDIOPHILE COMPACT DISC PLAYERS

TECHNICAL SPECIFICATIONS	UNITS	CD 12	CD 94	CDA 94	CD 85	CD 75 II	CD 65 II
Frequency range (0,1 dB limits)	Hz-kHz	2-20 (fixed and variable) 20-20(balanced)	2-20	2-20 (fixed and variable) 20-20(balanced)	2-20	2-20	2-20
Dynamic range	dB	> 96	> 96	> 96	> 96	> 96	> 96
Signal to noise ratio	dB	> 104	> 104	> 104	> 102	> 102	> 102
Channel separation	dB	> 100	> 100	> 100	> 100	> 100	> 100
Total harmonic distortion (including noise)	%	< 0,0015	< 0,0015	< 0,0015	0,0015	0,0015	0,0015
IM distortion (at maximum output)	dB	> -90	> -90	> -90	> -90	> -90	> -90
Phase linearity	%	± 0,2	± 0,2	± 0,2	± 0,2	± 0,2	± 0,2
Wow and Flutter		quartz precision	quartz precision	—	quartz precision	quartz precision	quartz precision
D/A converter		2x16 bit	2x16 bit	2x16 bit	2x16 bit	2x16 bit	2x16 bit
Audio output level (at msb)	V/rms	2Fixed 4 Var	2	2Fixed 4 Var	2	2	2
Headphone output		yes	variable	variable	variable	variable	—
Digital output (0,5 V into 75 Ohm load)		1 x gold plated phono + opt	1 x gold plated phono + opt	1 phono + opt	1 phono + opt	1 phono + opt	1 phono
Four-times oversampling		yes	yes	yes	yes	yes	yes
Dimensions (WxHxD)	mm	455x206x345	462x104x368	462x104x368	462x104x363	420x90x300	420x90x300
Net weight	kg	28	10,3	9	8,5	4	4
Power supply							
N-version	V AC	220	220	220	220	220	220
T-version	V AC	240	240	240	240	240	240

AUDIOPHILE CASSETTE DECKS

TECHNICAL SPECIFICATIONS	UNITS	SD 35	SD 55	SD 45 II			
Mechanism		logic	logic	logic			
Motors and type		2 DC	3 DC	2 DC			
Numbers of heads		2	3	2			
Auto reverse		—	—	—			
Auto tape selection		yes	yes	yes			
High speed dubbing		—	—	—			
Frequency response (without Dolby)							
Normal tape	Hz-kHz	20-17	20-19	20-18			
Chrome tape	Hz-kHz	20-18	20-20	20-19			
Metal tape	Hz-kHz	20-19	20-21	20-20			
Signal to noise ratio (Chrome tape 1 kHz)							
With Dolby B/C	dB	65/74	70/80	68/75			
Without Dolby	db	57	65	59			
Wow and Flutter DIN weighted	%	0.09	0.05	0.09			
Wow and Flutter RMS weighted	%	0.06	0.03	0.06			
Outputs							
Line level/impedance	mV/kOhm	500/3,3	300/5	500/3,3			
Headphone level/impedance	mV/Ohm	50/100	40/8	50/100			
Dimensions (WxHxD)	mm	420x100x260	452x100x265	420x100x260			
Net weight	kg	4.5	9.6	4.4			
Power supply							
N- and T-versions	V AC	220/240	220/240	220/240			
E-version	V AC	110 ~ 240	110 ~ 240	110 ~ 240			

AUDIOPHILE TUNERS

TECHNICAL SPECIFICATIONS	UNITS		ST 54	ST 35			
FM Stage 87,5-108 MHz							
Sensitivity							
DIN mono (s/n 26 dB 75 Ohm)	µV		0,7	0,9			
DIN stereo (s/n 46 dB 75 Ohm)	µV		20	25			
Selectivity adjacent channel 98 MHz (*Wide IF ** Narrow IF)	dB		40*/75**	65			
Tuner output (1kHz 75 kHz Dev.)	mV		940	940			
Signal to noise ratio							
S/N DIN weighted mono	dB		85	76			
S/N DIN weighted stereo	dB		76	70			
Total harmonic distortion mono	%		0,05*/0,15**	0,1			
Total harmonic distortion stereo	%		0,08*/0,3**	0,2			
Accuracy of frequency response							
Across 30 Hz-15 kHz bandwidth	dB		+0,5/-1,5	+0,5/-2			
Stereo separation	dB		55*/50**	45			
MW Stage (531-1602 kHz)							
Sensitivity 1 MHz ± 9 kHz	µV		350	400			
Selectivity (s/n 20 dB 30% mod 1 MHz)	dB		40	30			
Signal to noise ratio at 1 MHz	dB		54	50			
LW Stage (153-281 kHz)							
Sensitivity (s/n 20 dB 30% mod. 250 kHz)	µV		800	800			
Signal to noise ratio at 250 kHz	dB		50	45			
Dimensions (WxHxD)	mm		416x73x295	420x60x260			
Net weight	kg		3,4	2,8			
N- and T-versions	V AC		220/240	220/240			
E-version	V AC		110 ~ 240	110 ~ 240			

AUDIOPHILE AMPLIFIERS

TECHNICAL SPECIFICATIONS	UNITS	PM 94	PM 84 II	PM 64 II	PM 45	PM 35 II	PM 25
Power output							
RMS 8 Ohms	W	150	110	110	55	45	35
DIN 8 Ohms	W	160	140	115	50	55	45
DIN 4 Ohms	W	240	190	170	63	70	55
IHF dynamic power 8 Ohms	W	200	180	146	59	70	50
IHF dynamic power 4 Ohms	W	330	300	225	86	95	70
THD at 8 Ohms rated RMS output	%	0,01	0,015	0,02	0,02	0,025	0,03
Intermodulation distortion	%	0,01	0,015	0,02	0,02	0,025	0,03
Damping factor		100	100	100	100	100	80
Magnetic cartridge input							
Accuracy of frequency response to IEC RIAA	dB	± 0,25	± 0,25	± 0,5	± 0,5	± 0,5	± 0,5
Signal to noise ratio	dB	92	90	86	86	86	86
Input sensitivity, impedance, capacitance	mV/kOhm/pF	2,5/47/100	2,5/47/200	2,5/47/200	2,5/47/200	2,5/47/200	2,5/47/200
Moving coil cartridge input							
Input sensitivity impedance	µV/Ohm	125/3 300/40	250/100 40/3	250/100	250/100	250/100	—
CD/Aux/TV/Video inputs							
Input sensitivity impedance	mV/kOhm	150/33	150/30	150/20	150/20	150/20	150/45
Signal to noise ratio	dB	92	90	86	96	96	92
Frequency response	Hz-kHz	10-100 ± 1 dB	10-70 + 1 dB	10-70 + 1 dB	15-70 + 1 dB	15-70 ± 1 dB	15-60 ± 1 dB
Tone characteristic (100 Hz and 10 kHz)	dB	10 ± 2	10 ± 2	10 ± 2	10 ± 2	± 6	± 8
Channel separation	dB at 1 kHz	> 80	> 80	> 80	> 80	> 80	> 80
Dimensions (WxHxD)	mm	452x164x410	416x146x410	416x146x334	416x118 x334	420x100x260	420x100x260
Net weight	kg	25	18	12,5	8,6	6,7	5,6
Power supply							
N- and T-versions	V AC	220/240	220/240	220/240	220/240	220/240	220/240
E-versions	V AC	110 ~ 240	110 ~ 240	110 ~ 240	110 ~ 240	110 ~ 240	110 ~ 240

DIGITAL AMPLIFIERS

TECHNICAL SPECIFICATIONS	UNITS	PM 95	PM 75				
Power output							
RMS 8 Ohms	W	120	100				
DIN 8 Ohms	W	150	110				
DIN 4 Ohms	W	220	130				
IHF dynamic power 8 Ohms	W	160	125				
IHF dynamic power 4 Ohms	W	280	160				
Sampling frequency		32/44,1/48	32/44,1/48				
THD at 8 Ohms RMS rated output	%	0,02	0,02				
Intermodulation distortion	%	0,02	0,02				
Damping factor		100	100				
Magnetic cartridge input							
Accuracy of frequency response to IEC RIAA	dB	—	± 0,5				
Signal to noise ratio	dB	—	86				
Input sensitivity, impedance, capacitance	mV/kOhm/pF	—	2,5/47/200				
Moving coil cartridge input							
Input sensitivity impedance	µV/Ohms	—	250/100				
CD/Aux/TV/Video input							
Input sensitivity impedance	mV/kOhm	150/30	150/20				
Signal to noise ratio	dB	99	96				
Frequency response	Hz-kHz	10-100 ± 1 dB	10-70 ± 1 dB				
Tone characteristic (100 Hz and 10 kHz)	dB	—	± 8				
Channel separation	dB at 1 kHz	> 90	> 80				
Digital input		2 phono + 2 opt	3 phono + 1 opt				
Digital output 0,5 V into 75 ohm load		2 phono + 1 opt	1 opt				
Dimensions (WxHxD)	mm	452x156x410	452x132x331				
Net weight	kg	28	18				
Power supply							
N- and T-versions	V AC	220/240	220/240				
E-version	V AC	110 ~ 240	110 ~ 240				

LOUDSPEAKERS

TECHNICAL SPECIFICATIONS	UNITS	LD 60 DMS	LD 50 DMS	LD 20 DMS			
System		3-way	2-way	2-way			
Power	W	100	100	60			
Sensitivity (1kHz/1W/1m)	dB	86	88	88			
Frequency response	Hz-kHz	35-30	35-30	40-30			
Impedance	Ohm	8	8	8			
Transducers: woofer	mm	200	200	160			
midrange	mm	25	—	—			
tweeter	mm	19	19	19			
Dimensions (WxHxD)	mm	270x420x270	270x420x270	230x378x241			

marantz®

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Concept, design and production by Two's Company, Eindhoven, The Netherlands
Printed in the Netherlands 3122 330 40031

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