

RS-9900US

High Fidelity Stereo Cassette Deck with
Closed-Loop, Double-Capstan 3-Motor,
3-Head and Separate Amplifier Unit



Technics



output level dB

line in level

mic/aux level

left right

power

monitor mic att

tape source

0 dB 30 dB

FM 8kHz

osc

tape select

8kHz 400Hz

Dolby NR

mpx filter

in out

in out

in out

in out

normal ex

Technics
Stereo Record/Reproduce Amplifier 9900

variable

max

low

high

EO

R

L

play

rec

pre-set

headphones

level

in aux out

left mic right



timer

play off record

memory

play off rework

pitch control

stop fast

Technics
Tape Transport 9900
3 Motor/3 Head/Closed Loop

record

rewind

play

pause

0 0 0

effect

power

on off

STOP

RS-9900US

The Definitive Deck That Delineates the Limits of Cassette Technology.



The many amazing technological advances achieved in high fidelity cassette equipment over the last couple of years have been enthusiastically acclaimed by a great many audio fans all over the world. But, as remarkable as these advances may be, the really discerning tape deck connoisseur had yet to be fully satisfied with cassette decks, especially in terms of critical performances such as frequency response and dynamic range. It was in order to meet this ultimate challenge in cassette technology that Technics undertook the development of the RS-9900US—a tape deck that without any exaggeration must now be considered the pinnacle among the top quality “elite” of cassette decks. In fact, the RS-9900US now constitutes a very serious alternative to open-reel decks, not only because of price and convenience, but also because of its outstanding performances in all departments.

Why Two Separate Units?

In facing this challenge to redefine the limits of cassette technology, Technics decided that since the transport and amplifier sections basically served different purposes, and required specific design considerations in accordance with their different roles, the separation of the two sections was inevitable if they were to perform at the highest possible level, free of any mutual interferences such as stray magnetic fields, for example, which could affect other electronic circuits. Even in designing conventional cassette decks, it is necessary to shield certain circuits from various magnetic fields, and heat generated by the power transformer in order to avoid the generation of noise and loss of reliability. By separating the two units, the RS-9900US has not only eliminated these problems, but has permitted greater freedom in circuit design and innovation, resulting in the attainment of almost absolute limits in performance possibilities.

What Was Achieved by Separating The Two Units?

Highest Tape Transport Stability

- 1. Double-Capstan Closed-Loop 3-Motor Drive**
Unprecedented wow and flutter rating of 0.04% (WRMS)—far lower than human audibility.
- 2. Direct-Drive Capstan Motor**
Initially developed by Technics for turntables, direct-drive lends itself to tape transport for unerring accuracy and constant, uniform tape tension.
- 3. Two Coreless Rotor Type Reel Motors**
Extremely rapid start up times for take-up reel (fast forward) and supply reel (rewind) are executed by highly efficient Alnico magnet coreless type motors.

Wow & Flutter

0.04% (WRMS), ±0.10% (DIN)

Greater Operational Precision and Efficiency

- 1. Full IC Logic Control of All Transport Functions**
IC logic control permits direct switching from any transport mode into any other without causing the slightest hint of stress on the tape.
- 2. Peak Check Meters to DIN Professional Standards**
These high quality meters employ four high-stability operational IC's, which give them an almost ideal response time.
- 3. Tape Time Meter**
Features an electrical detector circuit, monitors supply reel motor speed and translates it into remaining tape time.
- 4. Pitch Control**
Playback speed can be varied by as much as ±5% allowing the user to modify tempo in either direction.

Unrivaled Electric Performance

- 1. Three-Head Configuration**

HPFT™ Record and Playback Heads

Designed independently for optimum performance. The true 3-head arrangement enables instant tape monitoring capability. **Instant Tape Monitoring Capability** Similar to professional open-reel equipment.



Frequency Response (CrO2)

25Hz-20kHz(±3dB), 20Hz-20kHz(DIN)

- 2. Mic Amplifier with Super Wide Dynamic Range**

Features a super wide dynamic range of 55 dB at -72 dB sensitivity.

- 3. Reproduce Amplifier Using Low-Noise PNP**

Transistors

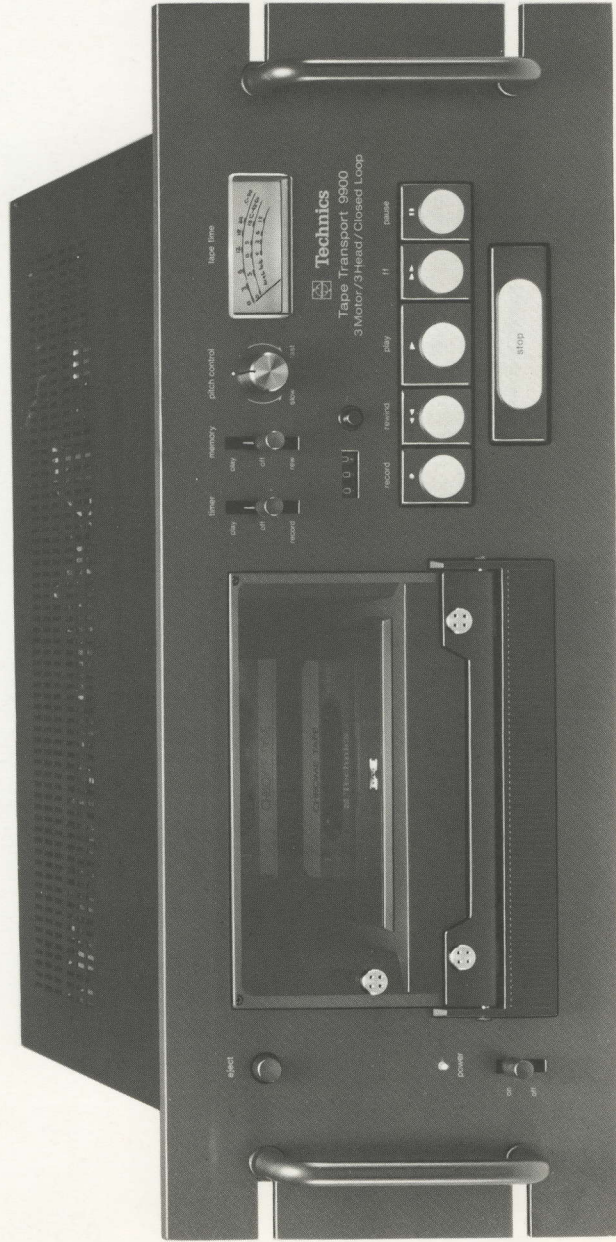
Using only the best available low-noise PNP transistors, an excellent signal-to-noise ratio of 67 dB overall (Dolby NR in) has been achieved. **Metal Film Resistors and Specially Selected Capacitors** Featured in the 3-stage direct-coupled playback amplifier to help produce the fantastic S/N ratio.

S/N Ratio 67dB(Dolby NR IN)

Perfect Matching of the Electromagnetic Characteristics of Any Cassette Tape

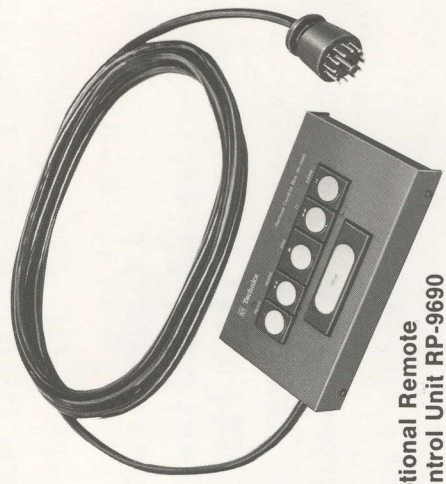
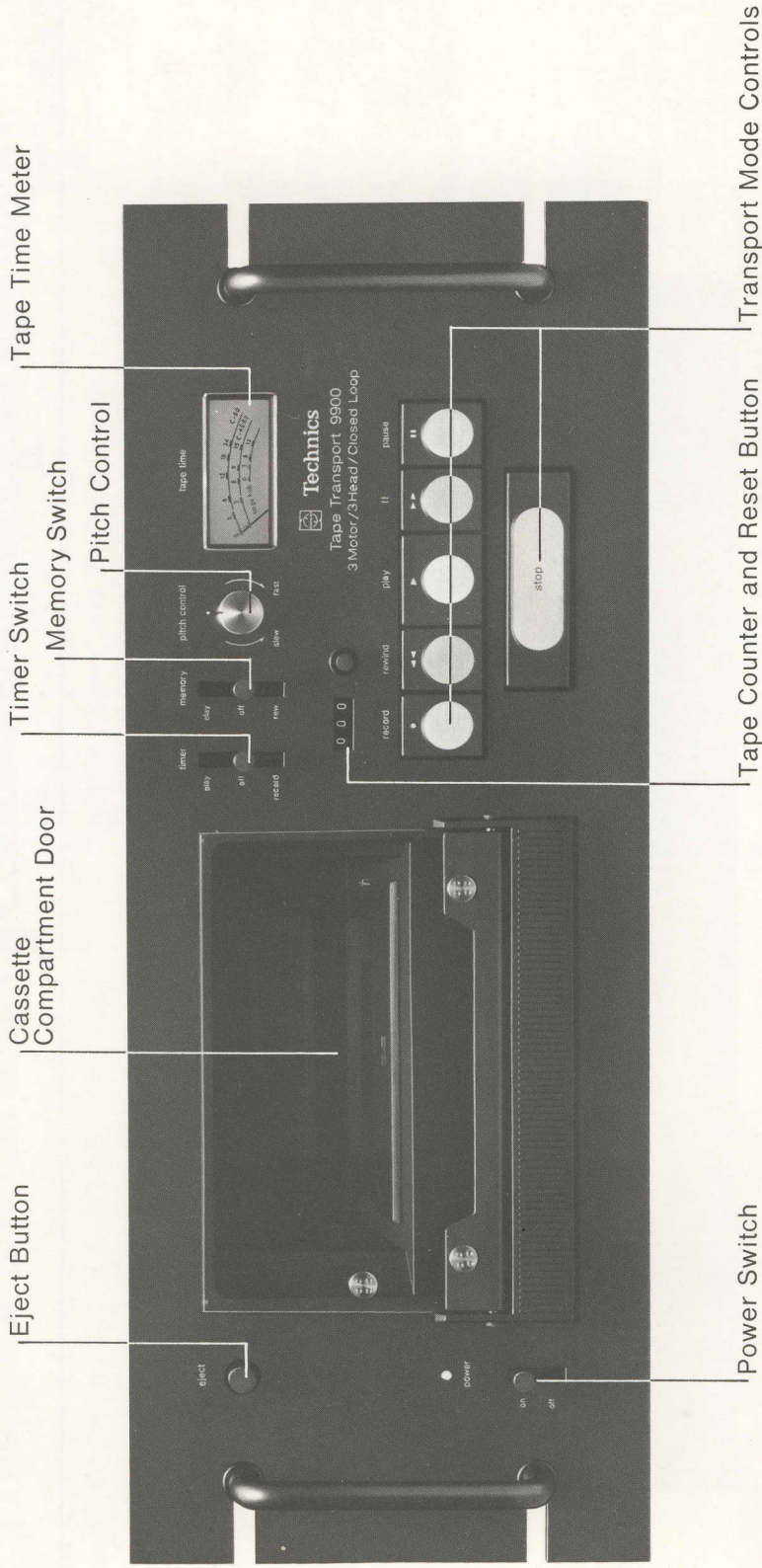
- 1. Dolby Playback Level Calibration**
Used for precision corrections of Dolby playback levels.
- 2. Dolby Recording Level Calibration**
Freedom in making Dolby recordings or where the tape sensitivity of the tapes vary.
- 3. Bias Calibration**
A wide scope of adjustments from -50~+100% of normal bias current is possible.
- 4. Equalization Calibration**
Each of the three tape selector positions may be adjusted by ±5 dB at 10 kHz.

Tape Transport Unit

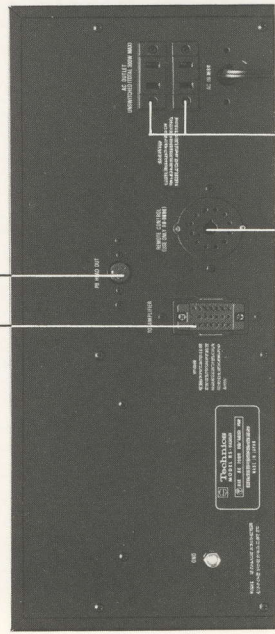


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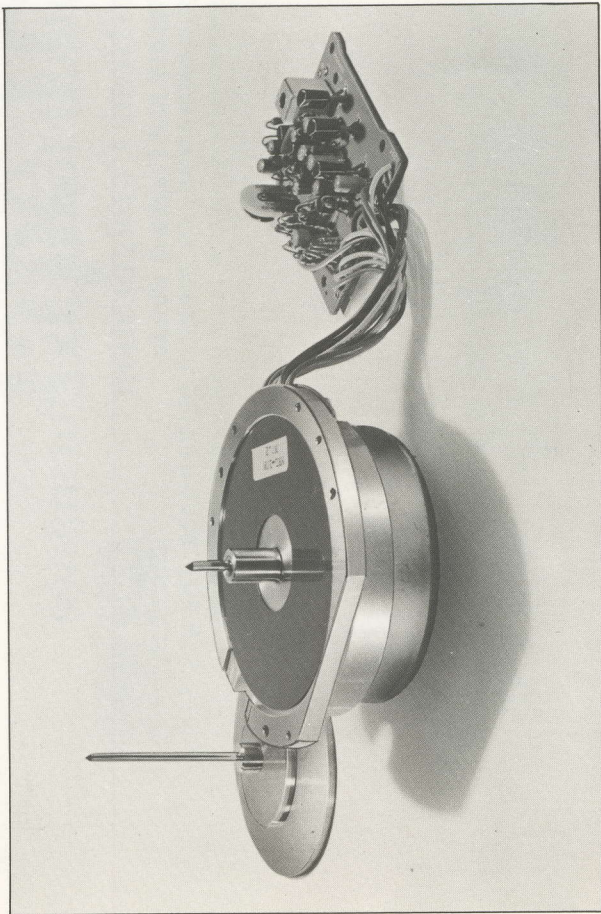
1. Guide to Functions



20-pin Connecting Jack
6-pin Connecting Jack
(for playback signals only)

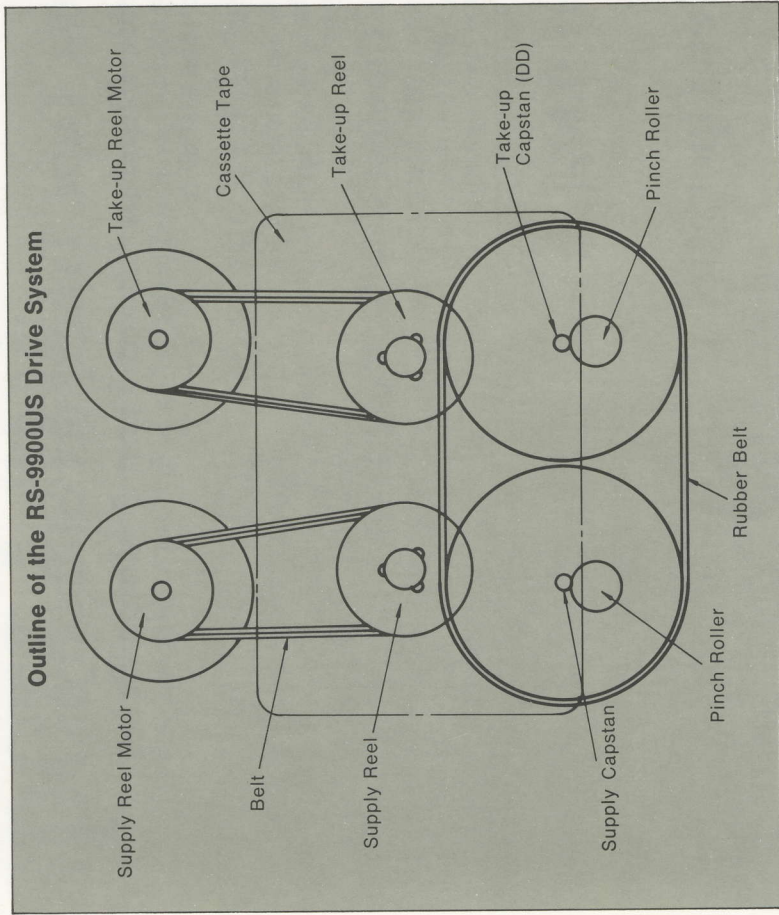


2. Closed-Loop 3-Motor Direct-Drive Transport System

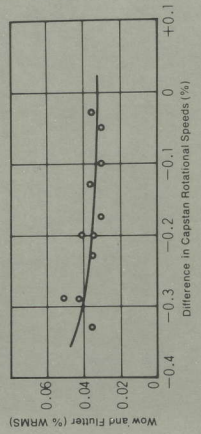


Double-Capstan Closed-Loop with Direct-Drive Motor for Outstanding Wow & Flutter of 0.04% (WRMS), $\pm 0.10\%$ (DIN)

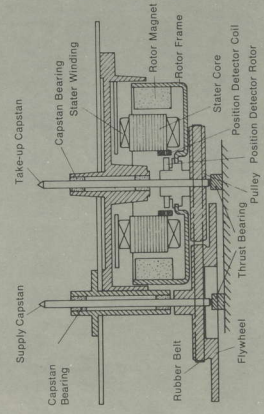
Adoption of the double-capstan closed-loop concept in the tape transport system has resulted in very significant reductions in wow and flutter, drift, and modulation noise. An 8-pole 24-slot direct-drive DC brushless motor drives the $\varnothing 3$ mm take-up capstan at the extremely low, but exact, speed of 5 rps. Vibration in the capstan has been reduced to less than $0.8\mu\text{m}$, and dynamic balance to less than $1\text{g}\cdot\text{cm}$, while rotor inertial moment is $5.34\text{g}\cdot\text{cm}\cdot\text{S}^2$, thus ensuring greater reliability and operational life. The supply capstan is also driven by this extremely stable motor, but via a very sturdy, elastic rubber belt. The very elasticity of this belt produces a slight, but very important difference in rotational speed between the two capstans. This difference has been designed to be no more than $0.1\text{--}0.2\%$, and means that a precise amount of back tension is always applied to the tape. So not only is the section of tape between the two capstans completely "isolated" from the rest of the drive system (which is one of the major reasons for the very low wow and flutter), but a perfectly constant tape-to-head contact has been obtained at relatively low tape tension. This means less wear and tear on tape and heads, decreased strain on tape base, and the accompanying reduction in modulation noise.



Wow & Flutter vs. Difference in Rotational Speed between Supply Reel and Take-up Reel Capstans

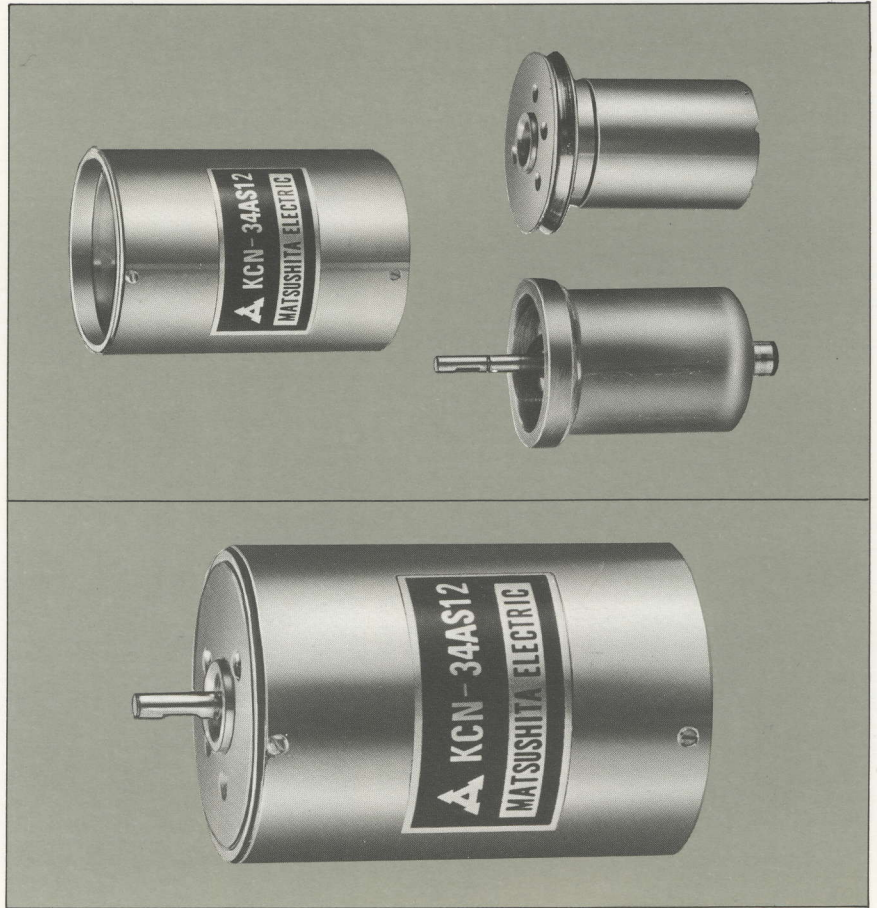


Cross-Sectional View of Double-Capstan Closed-Loop Mechanism with Direct-Drive Motor



Two Coreless Rotor Type Motors for Reel Drive

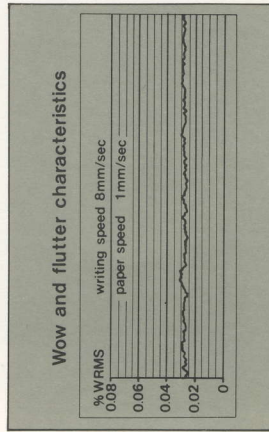
Both the supply and the take-up reels are driven by independent coreless rotor type micromotors (exclusive Technics design) which employ superior Alnico magnets, and employ a very sophisticated control system. This kind of motor is frequently used to drive the capstan in other decks, but in the RS-9900US, they are used to provide extremely smooth rotation and very fast start-up times. Their major advantages are low inertia, high torque, absence of cogging, excellent control capacity, high reliability and long operational life. The speed control facility means high, and constant fast forward/rewind speeds without subjecting the tape to any undue stress, and without the usual acceleration towards the end of the tape.



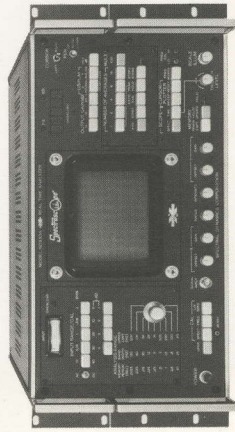
Outstanding Mechanical Performance

The adoption of the direct-drive motor in the double-capstan closed-loop system, and of independent coreless type reel motors, coupled with extreme precision engineering, are responsible for unparalleled tape transport stability in the RS-9900US. This has naturally resulted in very big improvements in tape tension stability, modulation noise, drift, wow and flutter, operational life, and reliability. Some of these improvements have been amply demonstrated by the accompanying graphs of test results.

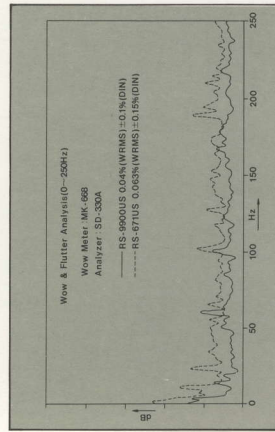
Wow & Flutter Characteristics



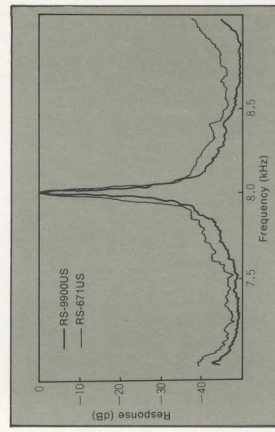
Real-Time Analyzer



Wow & Flutter Analysis 0—250 Hz



Modulation Noise

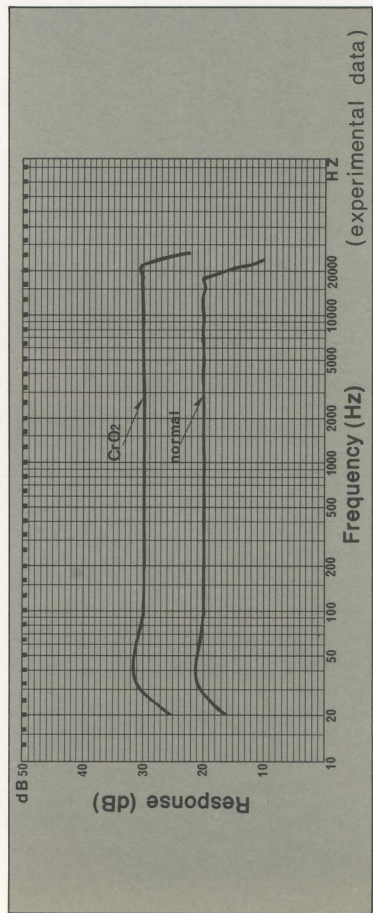


3. Three-Head Configuration

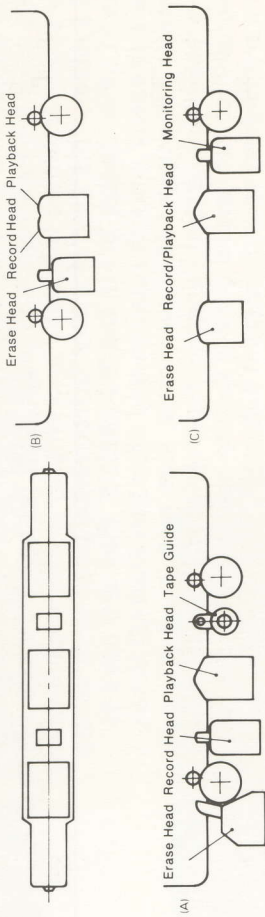


One of the major factors behind the outstandingly high performance in the RS-9900US, has been the adoption of the 3-head configuration which, because of the restrictions imposed by the structure of the compact cassette tape, is certainly no easy feat in cassette decks. Three-heads mean that both the record and playback heads can be designed independently to suit their specific roles rather than compromising between their respective requirements. That is, by narrowing the gap in the playback head to as little as $0.8\mu\text{m}$, considerable extension of the frequency response curve, especially in the high frequency region, can be obtained. And a somewhat larger gap ($5\mu\text{m}$) in the record head means greater reduction in distortion. Besides the improvement in performance, 3-heads also provide direct tape monitoring and thus instant tape/source comparison.

Overall Frequency Response



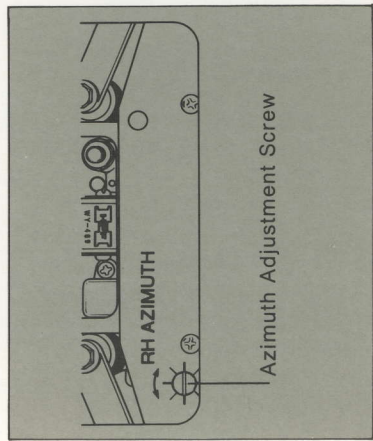
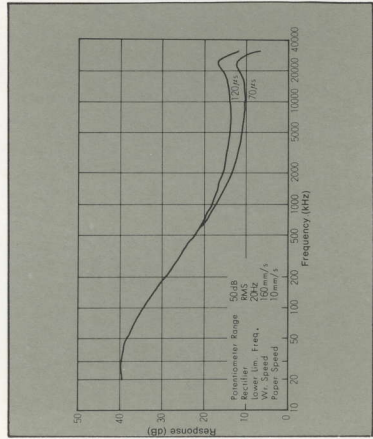
Three-Head Systems



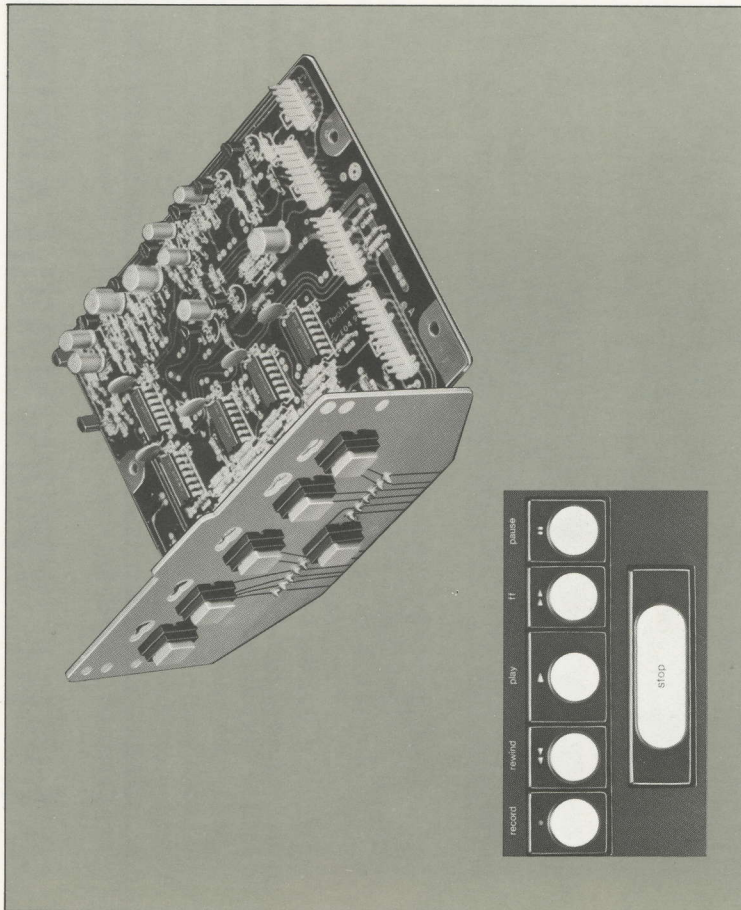
Although there are three main 3-head systems available, Technics chose to employ system (A) because it is the only true 3-head system, permitting each head to be designed independently for near-perfect performance. It also permits user-adjustable azimuth optimization. See page 21, 4), "Equalization Calibration," for instructions in azimuth adjustment.

Both record and playback heads employ the now-famous extremely hard high quality HPF material which features a super-hard ultra-smooth finish, and next to no loss in the frequency response right up to 20 kHz. The equalization curve describes an almost ideal contour, thus further improving S/N ratio, while the excellent alignment nature of the HPF head greatly reduces phase deviation between channels. The record head and erase head have both been designed to fit into narrow openings, and thus feature long narrow core sections which incorporate special means to prevent saturation of the magnetic circuits.

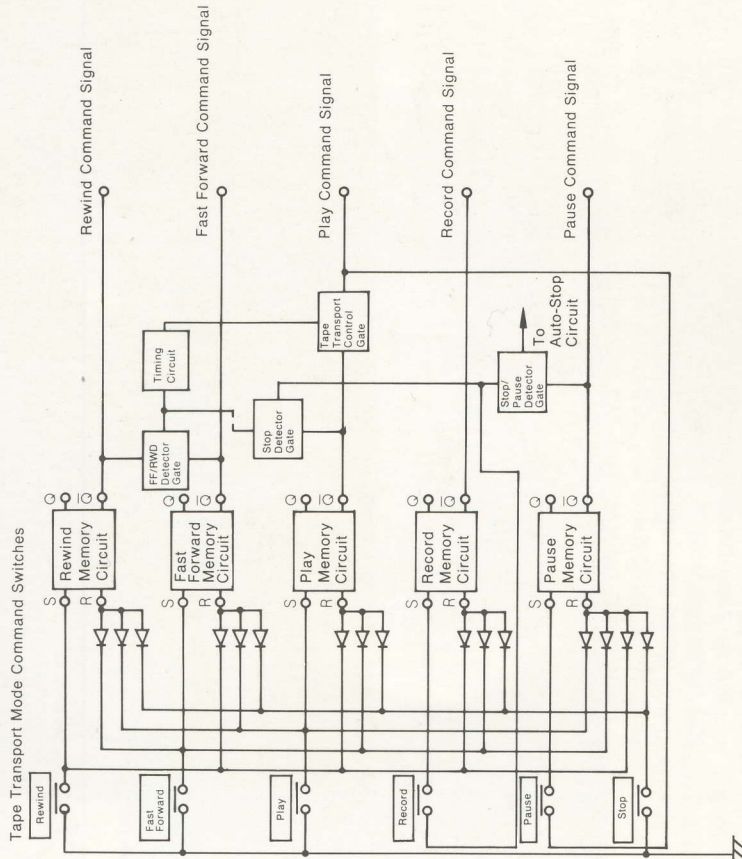
Playback Amplifier Equalization Characteristics



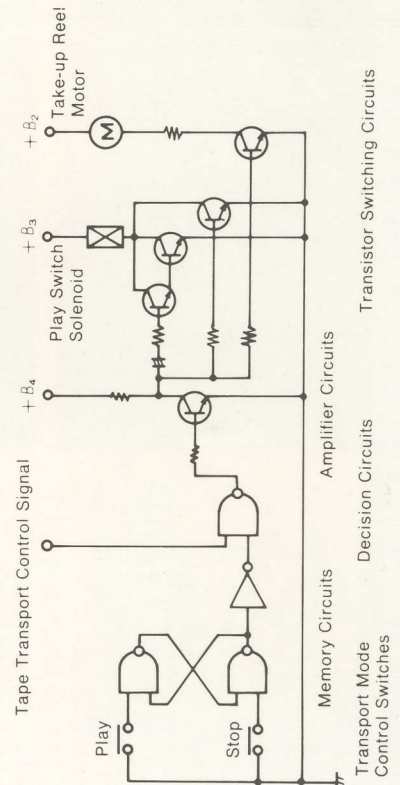
4. IC Logic Control plus Switching Transistors



Block Diagram of Control Circuits



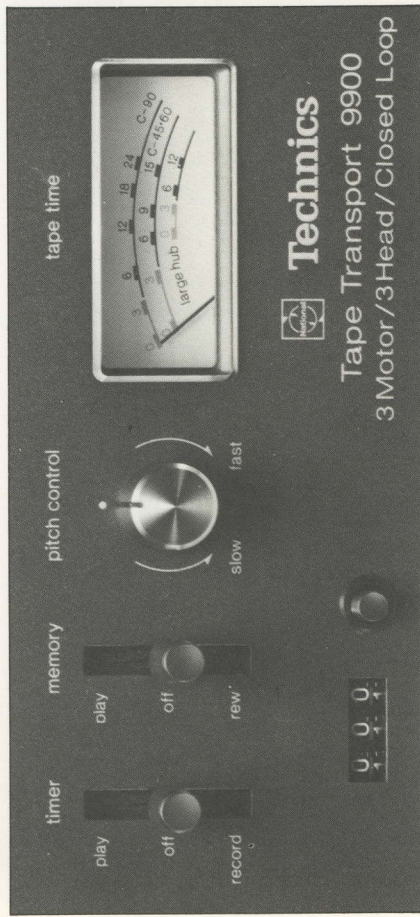
Motor Control Circuits and Solenoid Operated by IC Logic and Switching Transistors



A large scale incorporation of switching transistors and IC's has replaced almost all mechanical contacts, thus improving stability and reliability of the control system. In order to be able to switch from any transport mode to any other, exclusive type NAND gate flip-flop memory circuits have been employed since these prevent "jamming" in case of accidental simultaneous operation of different control keys.

When switching direct from say, fast forward to play mode, tape transport is halted temporarily automatically before proceeding to the new transport mode. Full IC logic also facilitates easy timer controlled, or remote controlled, recording and playback, memory rewind and memory play. And if the power has been switched off (whereby none of the logic circuits, including the eject button circuit can be operated) the cassette may still be ejected by means of a specially installed manual eject button. Furthermore, all tape transport keys feature indicator lamps for at-a-glance check, and very pleasant-to-operate 0.8 mm stroke operation.

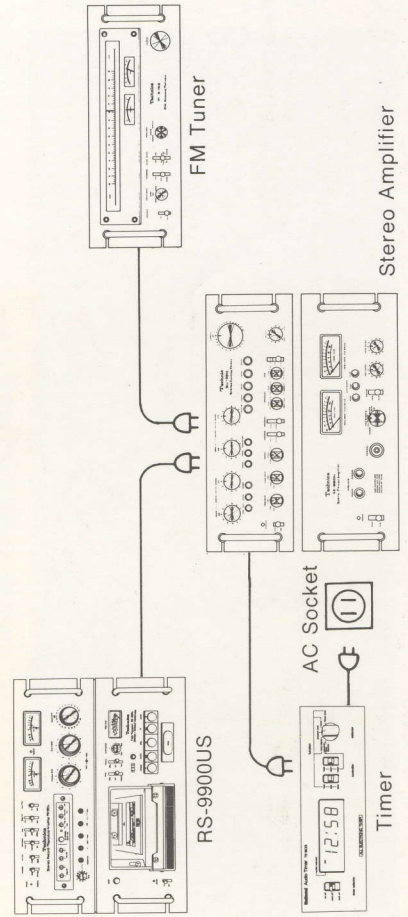
5. Extra Features



Technics
Tape Transport 9900
3 Motor/3 Head/Closed Loop

1) Unattended Recording and Playback

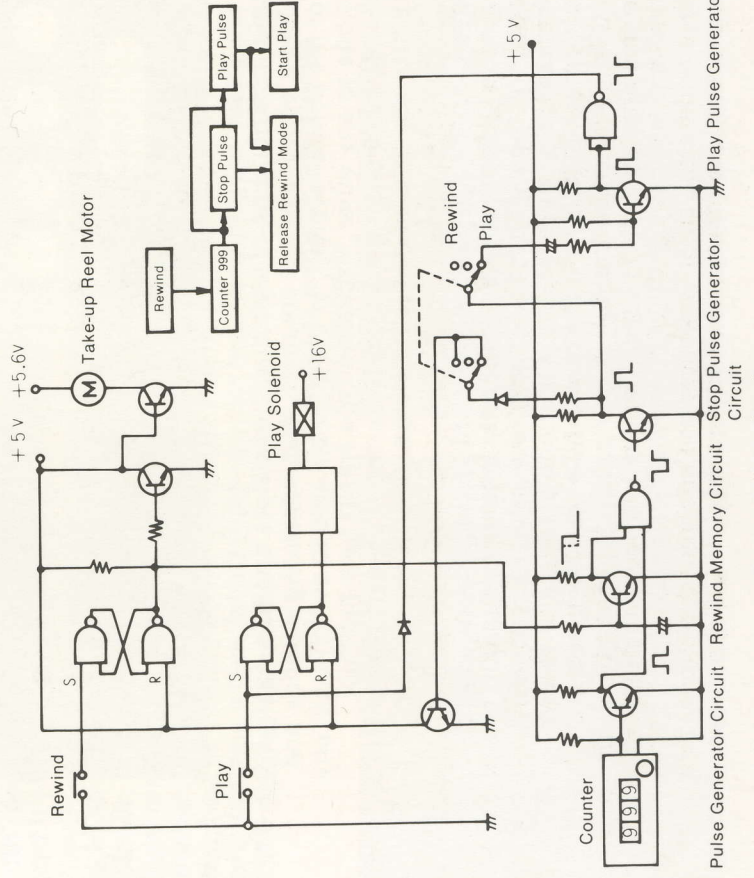
The RS-9900US goes a step further in the unattended recording/playback feature in that the tape transport keys (record, play, and pause) do NOT have to be pre-set. Once the timer has been connected properly, and the desired program source adjusted (for unattended recording), the only other operation required is the setting of the special timer switch on the front panel of the transport unit. Simply set to "record", or "play", as desired.



2) Memory Play/Rewind

The memory play/rewind system featured in the RS-9900US employs a pulse generator circuit, rewind memory circuit, and a play pulse generator circuit, which control the tape transport circuits once the memory switch has been set to either "play" or "rewind". At the beginning of any desired section of the tape, simply press the tape counter reset button (to 000). At the end of the recording, or playback, press the rewind key, whereupon the tape will rewind and automatically stop at 999 (slightly preceding the selected point), and, if the memory switch has been set to "play", will automatically commence to play from that point. This is extremely convenient when wishing to listen to a just recorded passage immediately, or when listening to a particular section several times over.

Memory Rewind and Playback Circuitry



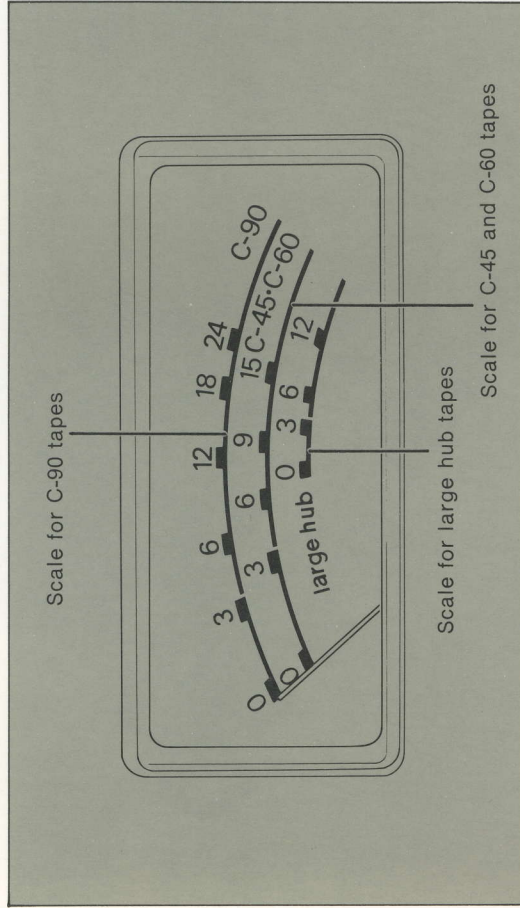
Pulse Generator Circuit
Rewind Memory Circuit
Stop Pulse Generator Circuit
Play Pulse Generator Circuit
Rewind Decision Circuit

3) Pitch Control

Due to the adoption of the direct-drive motor, tape speed in playback can actually be speeded up, or slowed down, if the user wishes to modify tempo of a musical piece. Variation of up to $\pm 5\%$, corresponding to almost half a tone of musical pitch in either direction, can be employed.

This control, incidentally, utilizes the one and only relay in the whole tape deck—all other switching is performed by IC logic.

4) Tape Time Meter



The uncertainty about just when the tape is going to run out, can at times prove to be very annoying, especially when the program source cannot be recorded a second time etc. The ingeniously designed tape time meter, which shows how many minutes are left in C-45, C-60, C-90 and large hub tapes, goes a long way to alleviate this problem, giving the user sufficient warning near the end of the tape.

Electrically, a detector circuit monitors the speed of the supply reel motor, translating the information into remaining tape time.

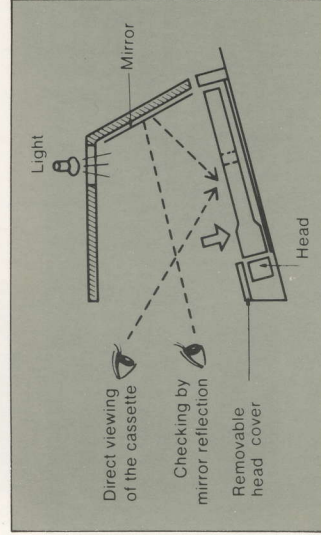
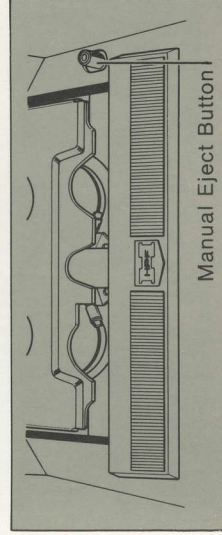
5) Pneumatically Damped Cassette Compartment Door



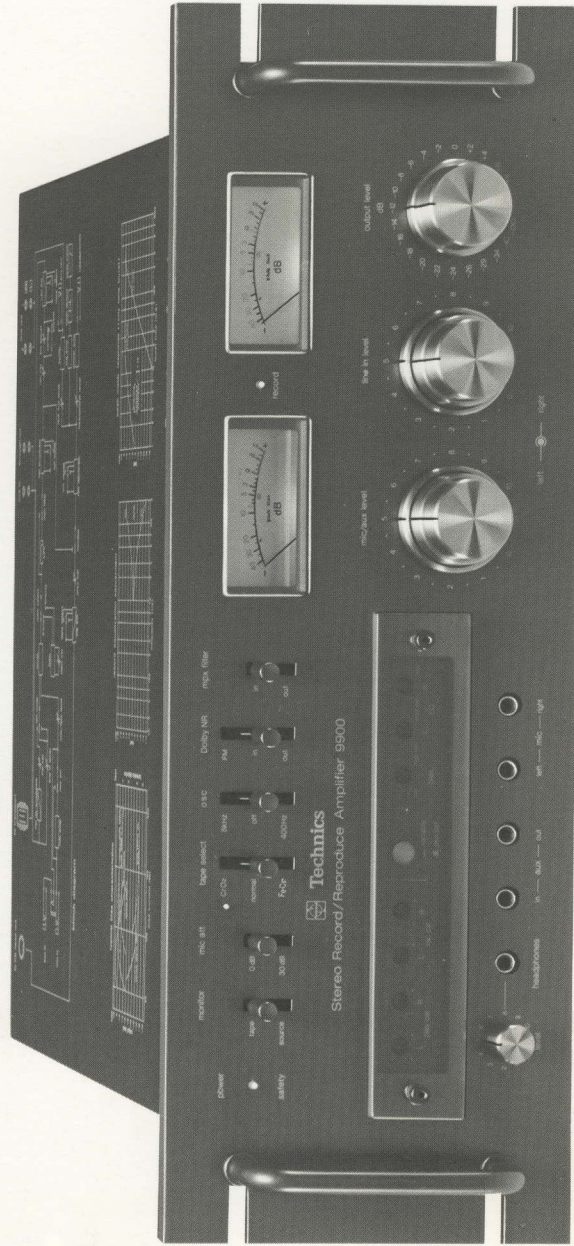
This sturdy glass door opens gently and quietly due to the pneumatically damped opening mechanism. This avoidance of unnecessary vibrations further exemplifies Technics' insistence on top quality performance in all systems.

The cassette compartment also features a manual eject button to be used in case of electrical failure or to remove cassette when unit is turned off.

Viewing of the cassette in operation is made possible by internal compartment illumination and a mirror. A removable head cover provides easy access to the heads for demagnetizing or cleaning.

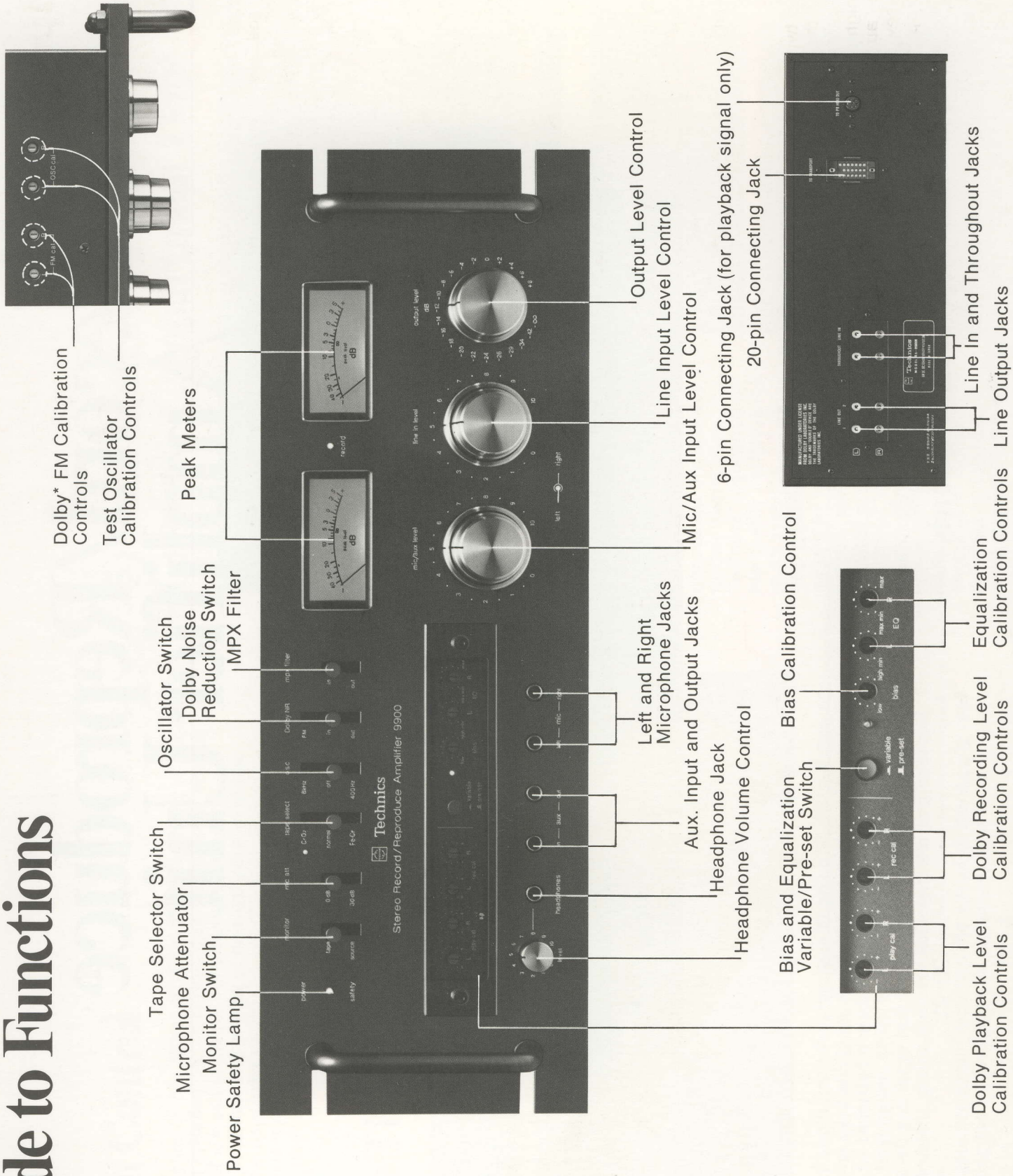


Record/Reproduce Amplifier Unit



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1. Guide to Functions



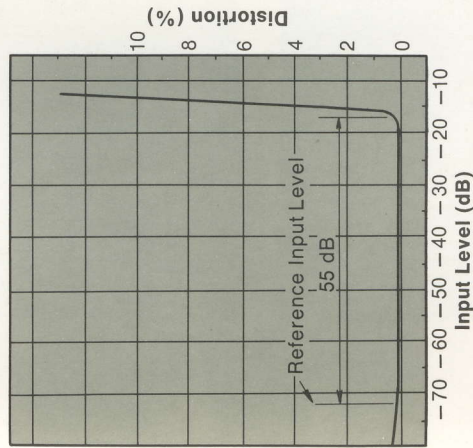
*Dolby and "Double D" device are the trademarks of the Dolby Laboratories Inc.

2. Amplifier

1) Recording Amplifier

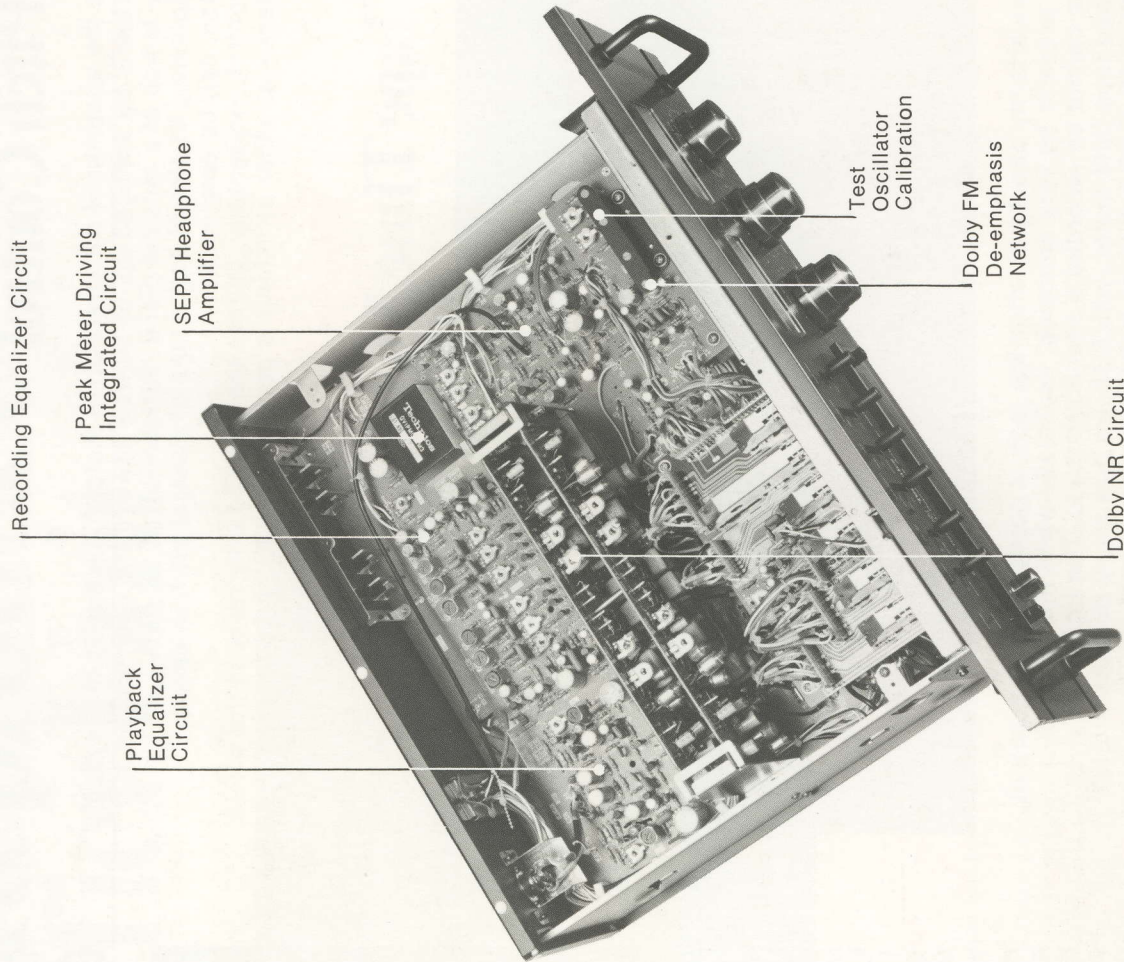
Microphone Amplifier

By means of this 2-stage direct-coupled amplifier circuit, which employs low-noise PNP transistors and low-noise metal film resistors, noise has been reduced to very low levels, and a dynamic range of 55 dB (at -72 dB sensitivity) has been attained. The gain of this stage has been set at 30 dB, but this can in effect, be bypassed by switching in -30 dB attenuation (microphone attenuator on front panel), whereby the incoming signal passes directly on to the next stage, resulting in additional improvement in noise figure and dynamic range.



Line In Circuits

Signals from the two line-in terminals (LINE IN on the rear panel, and "aux in" on the front panel) are passed directly on to the level setting circuit without passing through the amplifier, thus attaining very high dynamic range and very low noise level. Note that since "aux in" and "mic" employ the same level setting circuit, they cannot be used together. If both jacks have been connected, microphone input will be given priority.



Mixing Circuit

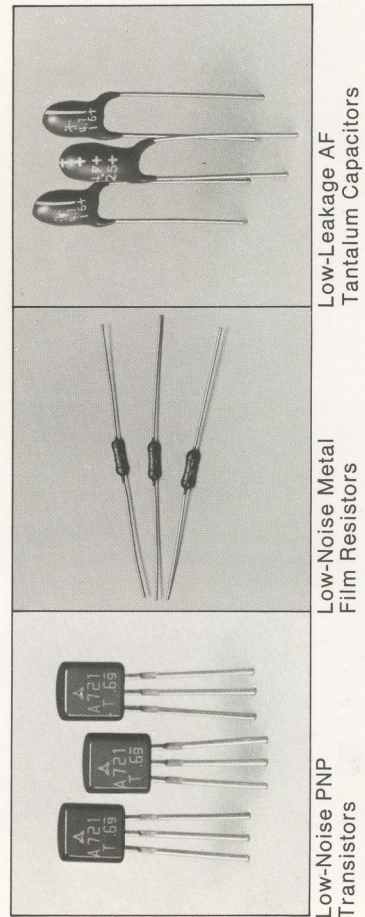
The RS-9900US features two types of mixing—mic mixing with line input, and aux. input mixing with line input. In either case, both signals are controlled independently by the “mic/aux level” and “line in level” controls. The mixing amplifier employs transistors and an FET in an “operand” type amplifier circuit which eliminates mixing loss and interference between the two signals.

Equalizer Amplifier

The recording equalizer amplifier is also a 2-stage direct-coupled circuit designed with sufficient negative feedback, resulting in reduced noise and stable record peaking characteristics. Bass equalization is 3180 μ sec.

2) Reproduce Amplifier

Strict selection of circuit elements, such as the low-noise metal film resistors and the minimal leakage tantalum coupling capacitors, plus low-noise PNP transistors, has greatly assisted in attaining the incredibly low S/N ratio of 132 dB (as referenced against input signal).



3) SEPP Headphone Amplifier

Conventional tape decks connect the headphone output to a rec/PB amplifier, resulting in distortion problems and loss in frequency response. Even stereo amplifiers insert a resistor in between the headphone and speaker outputs, thus causing reduction in damping factor, and consequent loss of sound quality.

The RS-9900US employs a separate ITL, OTL, SEPP amplifier just for the headphones, giving an optimum damping factor of 10, very lucid high fidelity monitoring, and ample power to drive even high impedance type headphones.

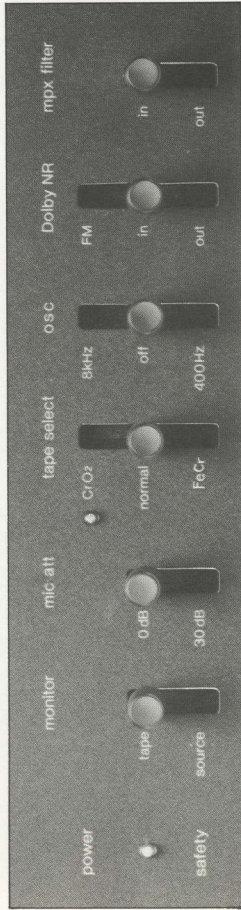
4) Four Independent Dolby NR Circuits

Two separate Dolby encoding circuits on the recording side, and two separate decoding circuits in playback, give the RS-9900US greater scope for optimum performance in regular Dolby recording (and playback), and in the recording of pre-encoded FM broadcasts. The RS-9900US is also equipped with a de-emphasis network to compensate for the over-de-emphasis in regular tuners. Dolby FM signals will thus be recorded in proper encoded form, with normal decoded signals being monitored.

5) Muting Circuit

The unpleasant “click” noise, and the possible damage to speakers, caused when the power supply is turned ON and OFF, is completely muted by the electronic muting circuit. Most other switching circuits employ noiseless switching transistors, also in order to avoid the unpleasant “click” noise in the speakers. The power switch muting circuit remains activated for about 6 secs (until all circuits are stabilized).

3. Selectors



1) Tape/Source Monitor Selector

Because of the true 3-head system adopted in the RS-9900US, programs which are being recorded (including Dolby FM broadcasts) can be monitored simultaneously. Comparison with the original source is achieved by simply throwing the monitor selector to "source".

2) Mic Attenuator

When the mic attenuator is switched to the 30 dB position, the microphone amplifier is bypassed, resulting in 30 dB less gain, but a better S/N ratio and dynamic range. This switch is recommended for use with high output microphones which produce high sound pressure levels.

3) CrO₂/Normal/FeCr Tape Selector

The tape selector switch, in conjunction with the calibration controls, permit 100% optimization of bias and equalization for the various types of tapes now on the market.

4) Test Oscillator (400Hz/8kHz)

This built-in test oscillator circuit provides both a 400 Hz and an 8 kHz signal for use in the calibration level settings and the

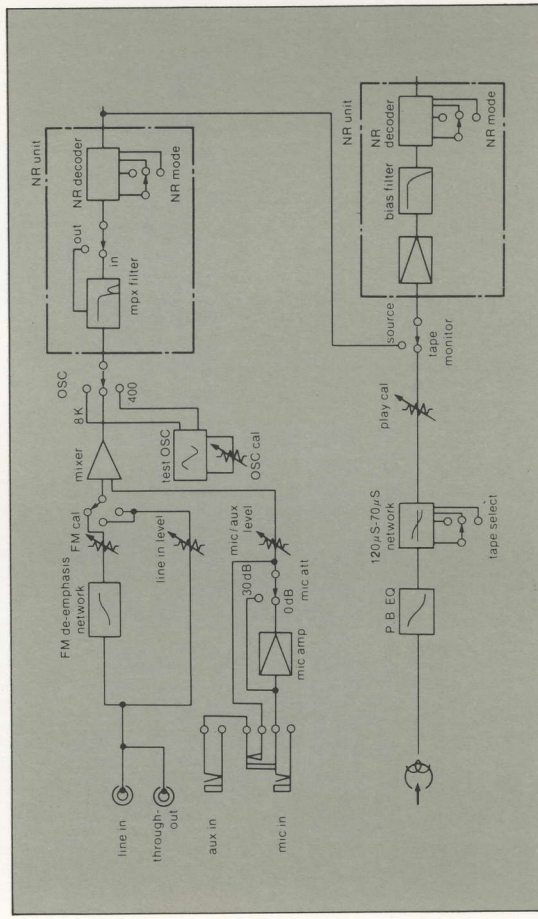
azimuth adjustment. The oscillator output of 400 Hz is set at the factory to correspond to the 00 marks (-5 dB points) on the level meters, and the 8 kHz to the -25 dB points, but the oscillator can be realigned if necessary by the calibration controls on the top panel.

5) Dolby NR Selector

The Dolby in position is used when recording ordinary program sources such as disc records, while the Dolby FM position is used when recording FM broadcasts which have already been encoded into Dolby signals. Dolby out is required for playback of non-Dolby tapes.

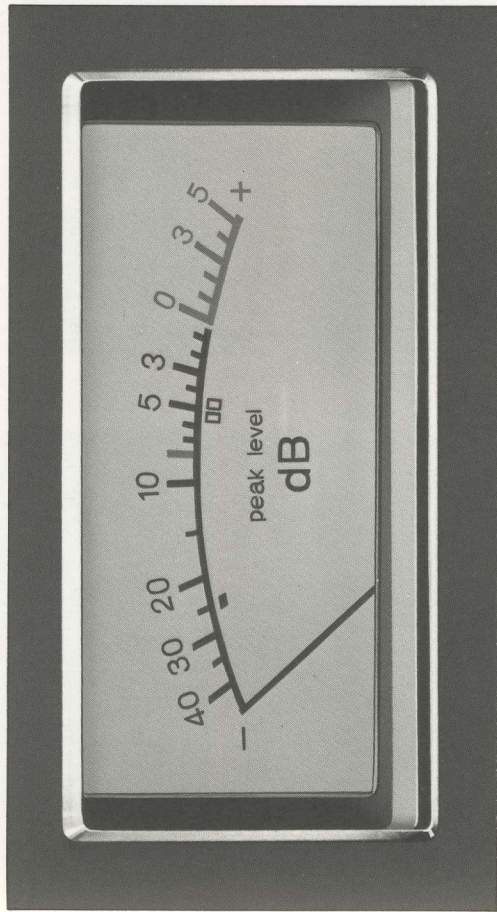
6) MPX Filter

This is a low-pass filter which removes the 19 kHz and 38 kHz carrier leaks when recording FM stereo programs. Although such leaks are inaudible to the human ear, they can cause beat interference when using the Dolby system.



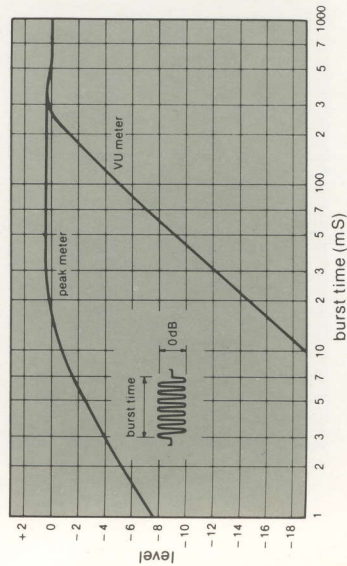
4. Precision Controls

1) Peak Meters



Employing four high-stability operational IC's, these high quality peak level meters (not peak "check" meters) conform to DIN standards (10 msec/0 dB ± 1.5 dB; 3 msec/0 dB -4 dB). The response time is almost ideal while linearity, and reliability of the meters themselves, are also well above standard. The red mark (-8 dB) on the scale corresponds to 0 VU. This consequently enables very accurate reading of peak transient levels, and optimum adjustment of recording levels, for all kinds of program sources.

Peak Meter Response (1 kHz tone burst)

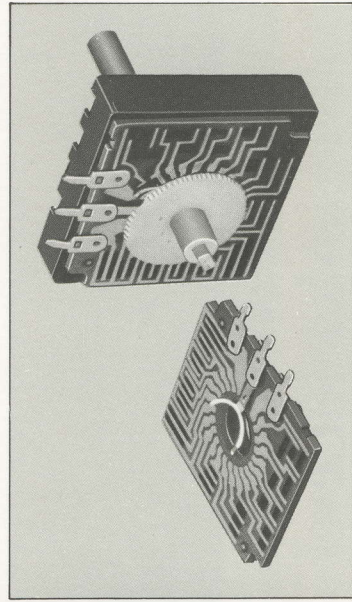
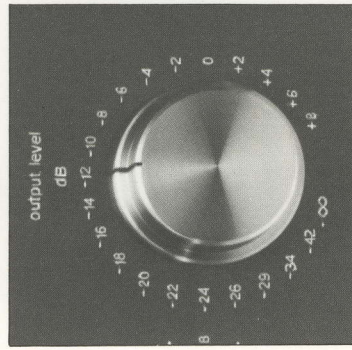


Peak Meter Performance Ratings

Response Time	10 ms ± 1 dB ± 1.5 dB
Indication Response	90 ms less than -2 dB
Delay Time	300 ms

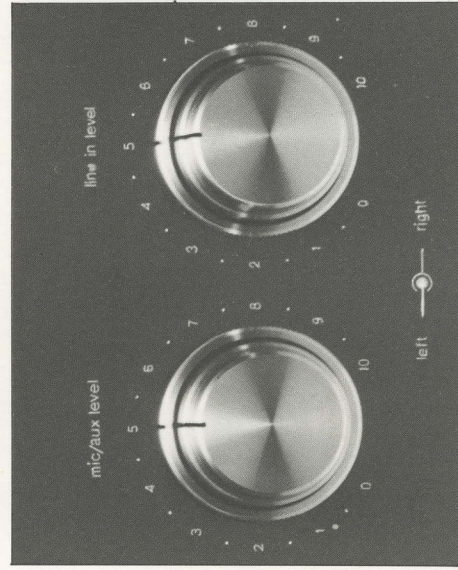
2) Attenuator-Type Output Level Control

This 2-ganged attenuator type potentiometer is variable in 2 dB steps from a 0 dB point (0.42V) up to $+8$ dB, and down to $-\infty$. Also features a click-stop knob for instant reproduction of output level settings.

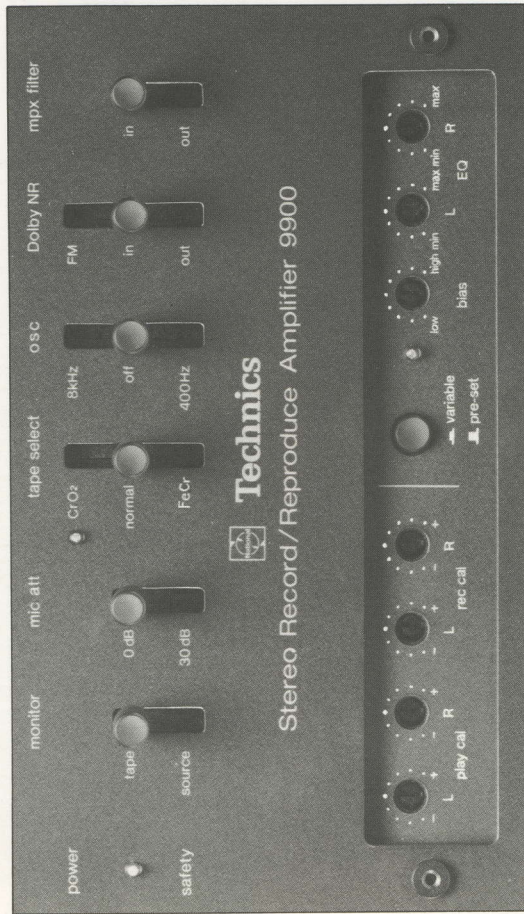


3) Pre-Set Markers

Both mic/aux level and line-in level control knobs feature pre-set memory markers. These markers can be used very effectively in fade-ins and fade-outs.



5. Calibration Controls

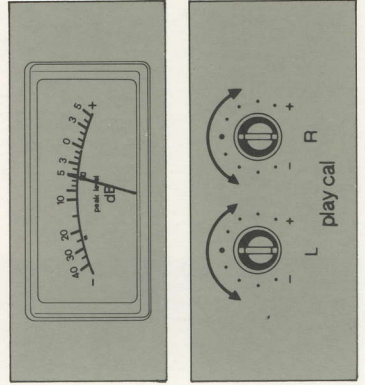


1) Dolby Playback Level Calibration

Although the Dolby playback level has already been adjusted at the factory, low (5°C - 10°C) or high (30°C - 35°C) temperatures may cause a slight loss of alignment. In such cases, a locally obtainable Dolby level tape (200nWb/m recording level tape) should be used for this calibration. Simply insert the tape and press the play key. The meter needles should deflect across to the Dolby \square mark. If they do not, adjust the "play cal" controls to get correct deflection. Note that monitor switch should be at "tape". And in order to protect the speakers, the output level control should be turned down.

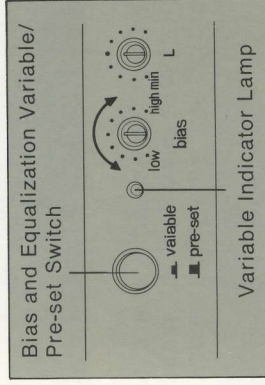
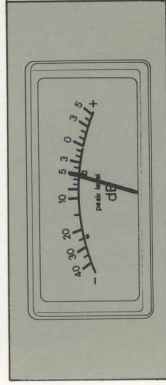
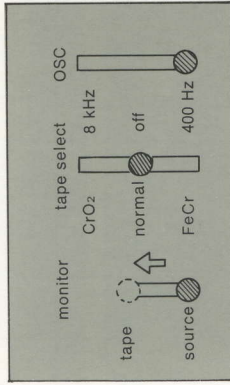


Dolby Level Tape (200nWb/m Recording Level Tape) available at audio stores.

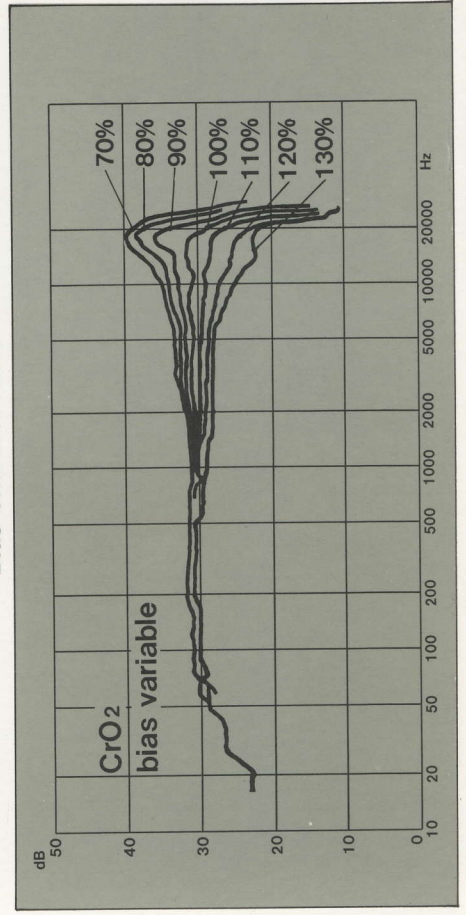


2) Bias Calibration

Bias current can be adjusted by up to -50% and +100% of the normal level, but if reduced too far, distortion will increase, and erasure will be incomplete. First push the bias and equalizer variable/pre-set button into "variable" position, whereupon the variable indicator lamp will light up. Next insert the cassette to be recorded, and set the oscillator switch to "400 Hz". Also switch the tape selector to the appropriate tape type. Then set the monitor to the "source" position, and check that the meter deflects across to the \square mark. Now press the record and play keys, thus putting the deck into the record mode. When the monitor switch is then set to "tape", the 400 Hz signal being recorded on the tape, will be indicated on the meter. Adjust the bias calibration control so that the meter deflection reaches a maximum.



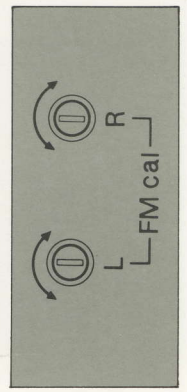
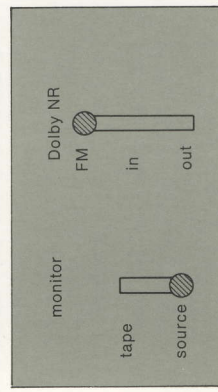
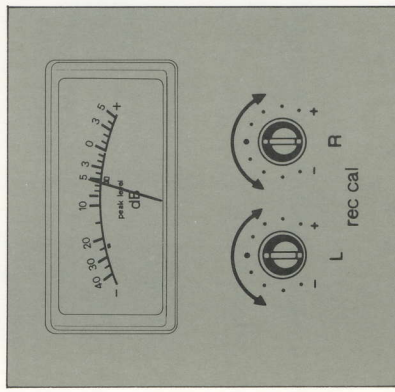
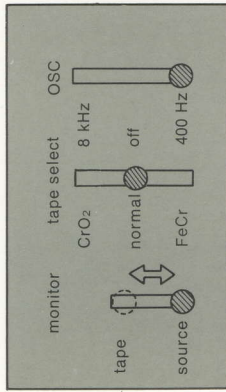
Bias Characteristics



3) Dolby Recording Level Calibration

This calibration is recommended in order to obtain optimum Dolby recording conditions for the wide variety of different tapes now available.

After inserting the cassette tape (and turning the output level control down), set the oscillator switch to "400 Hz". Then switch the tape selector to the appropriate position (depending on type of tape being used), and set the monitor switch to "source". Check that the meter needles deflect across to the Dolby $\square\square$ mark. Next press the record key, and then the play key, thus commencing record mode. Now switch monitor to "tape", and check for any movement away from the Dolby $\square\square$ mark. If there is any difference in the needle indication, readjust by means of the "rec cal" controls. Finally switch the monitor back to "source" and check for any further change in position of the needles.



FM Dolby Calibration

When FM Dolby broadcasts become available, the broadcasting station will transmit a 400 Hz calibration signal just prior to the actual Dolby FM program. To perform calibration, place the Dolby NR switch in the "FM" position, and the monitor switch to "source"; then adjust the "FM cal" screws so that the meter needles point to the $\square\square$ marks for the 400 Hz Dolby input tone.

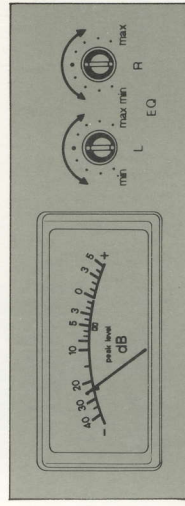
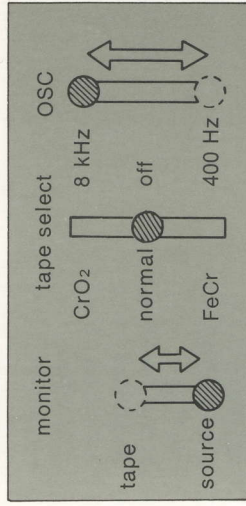
4) Equalization Calibration

This calibration should be performed after first completing the bias, and recording level calibrations.

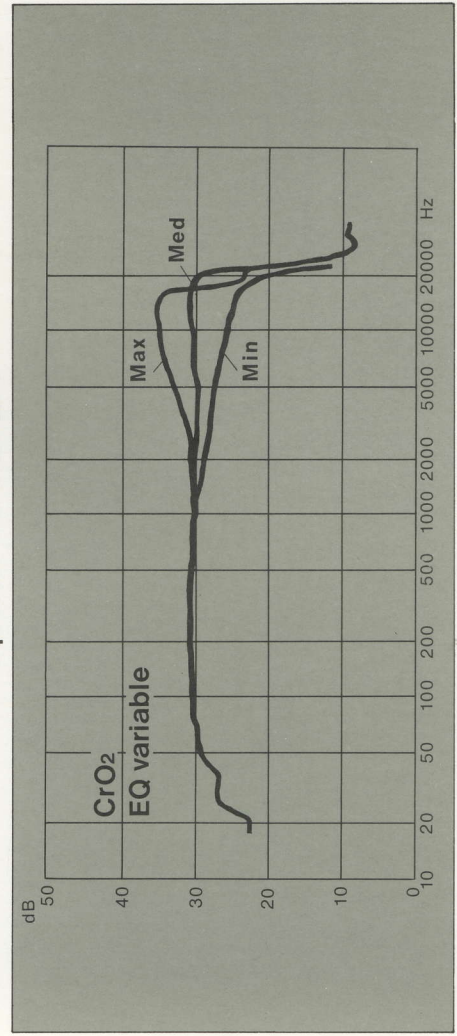
Like the bias calibration, the oscillator switch is set to 400 Hz, and the monitor to "source", in order to check that the meter reads correctly to the $\square\square$ mark. The deck is again put in the recording mode, but this time the oscillator is switched over to 8 kHz, whereby the meter needle should deflect across to the -25 dB position. Return the monitor switch back to "tape", and check for optimum azimuth (where meter needle gives maximum deflection when adjusting the azimuth adjustment screw located inside the cassette compartment).

Now adjust both the equalization calibration controls (left and right) so that the 8 kHz signal reading on the meter is exactly -25 dB. Next check that there is no meter deflection away from the -25 dB position when the monitor switch is switched back

and forth between "tape" and "source" positions. Then finally check that there is likewise no deflection away from the $\square\square$ mark when the monitor switch is again switched back and forth between "tape" and "source" when the oscillator is set to 400 Hz.



Equalizer Characteristics



Specifications

Track System: 4-track, 2-channel stereo recording and playback
Recording System: AC bias (90 kHz), AC erase
Tape Speed: 4.8 cm/s. (1 7/8 ips)
Wow and Flutter: 0.04% (WRMS), $\pm 0.10\%$ (DIN)
Frequency Response: CrO2 tape; 25—20,000 Hz (± 3 dB)
 (—25 dB from 0.42V output)
 Normal tape; 25—18,000 Hz (± 3 dB)
 20—18,000 Hz (DIN)
Signal-to-Noise Ratio: Dolby NR in; 67 dB (above 5 kHz)
 (signal level)
 = maximum recording level at 3% THD)
Harmonic Distortion: 1.4% (CrO2/Normal tape 160nWb/m 333 Hz)
Inputs: Mic; sensitivity 0.25mV/applicable microphone impedance 200 Ω —20 k Ω
 Line; sensitivity 60mV/input impedance 150k Ω
 Aux; sensitivity 60mV/input impedance 150k Ω
 Line; output level 0.42V/load impedance 47k Ω over
 47k Ω over
 Through out; output level 0.42V/load impedance 47k Ω over
 47k Ω over
 Aux; output level 0.42V/load impedance 47k Ω over
 Headphones; output level 0—900mV//impedance 8 Ω —125 Ω
Rec/PB Connection: 5p DIN type; input level 1mV//impedance 10k Ω
 output level 0.42V//impedance 3.3k Ω
Fast Forward and Rewind Time: Approx. 70 second with C-60 cassette tape

Pitch Control:
Calibration Controls:

Tape speed variable range $\pm 5\%$ at playback
 Play cal; playback level variable range ± 3 dB
 at 333 Hz
 Rec cal; recording level variable range ± 5 dB
 at 1,000 Hz
 Bias cal; bias current variable range
 —50~ +100% (100% = standard tape)
 EQ cal; recording equalizer variable range

Motors:

3-motor closed-loop double-capstan system
 1-DD DC brushless capstan motor
 2-DC coreless motor for reel table drive
 3-head system
 2-HPF heads for rec/playback
 1-double gap ferrite head for erasure
 AC; 110/125/220/240V, 50/60 Hz
 48W

Head:

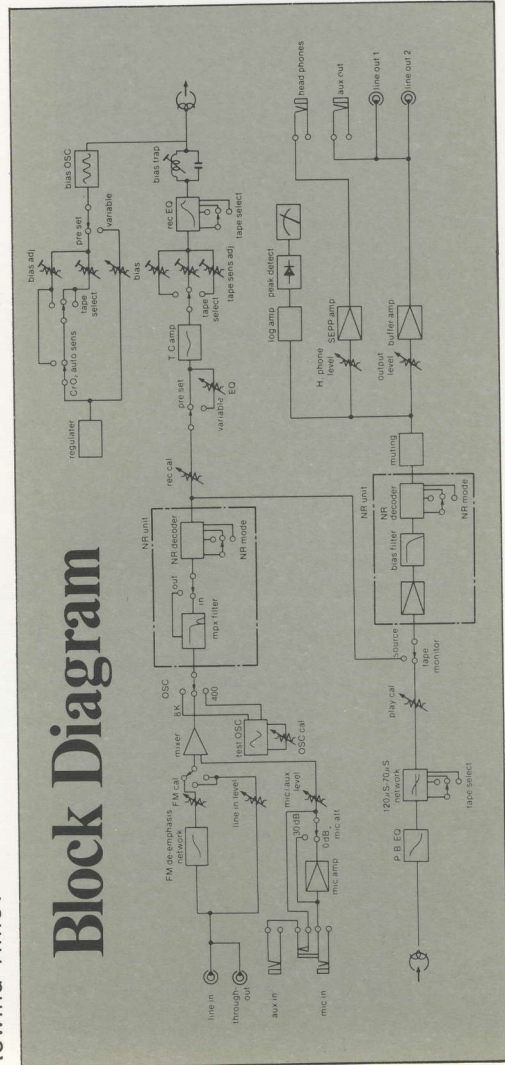
Transport unit; 48.3cmx19.3cmx37.5cm
 (19"x7 7/8"x14 3/4")
 Amplifier unit; 48.3cmx17.3cmx37.5cm
 (19"x6 7/8"x14 3/4")
 Transport unit; 15.0 kg (33 lbs.)
 Amplifier unit; 9.0 kg (19 7/8 lbs.)

Power Requirements:
Power Consumption:

Weight:

Specifications are subject to change without notice.

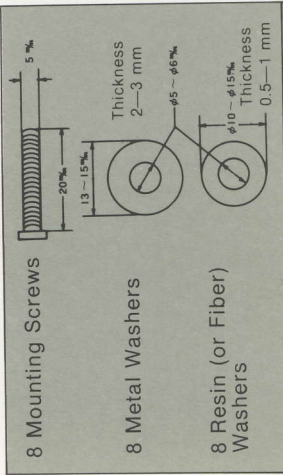
Block Diagram



Rack Mounting

The RS-9900US may be mounted in either the B.T.S. standard rack, or the U.S.A. standard rack.

Fittings Required for Rack Mounting



 **Technics**
Matsushita Electric