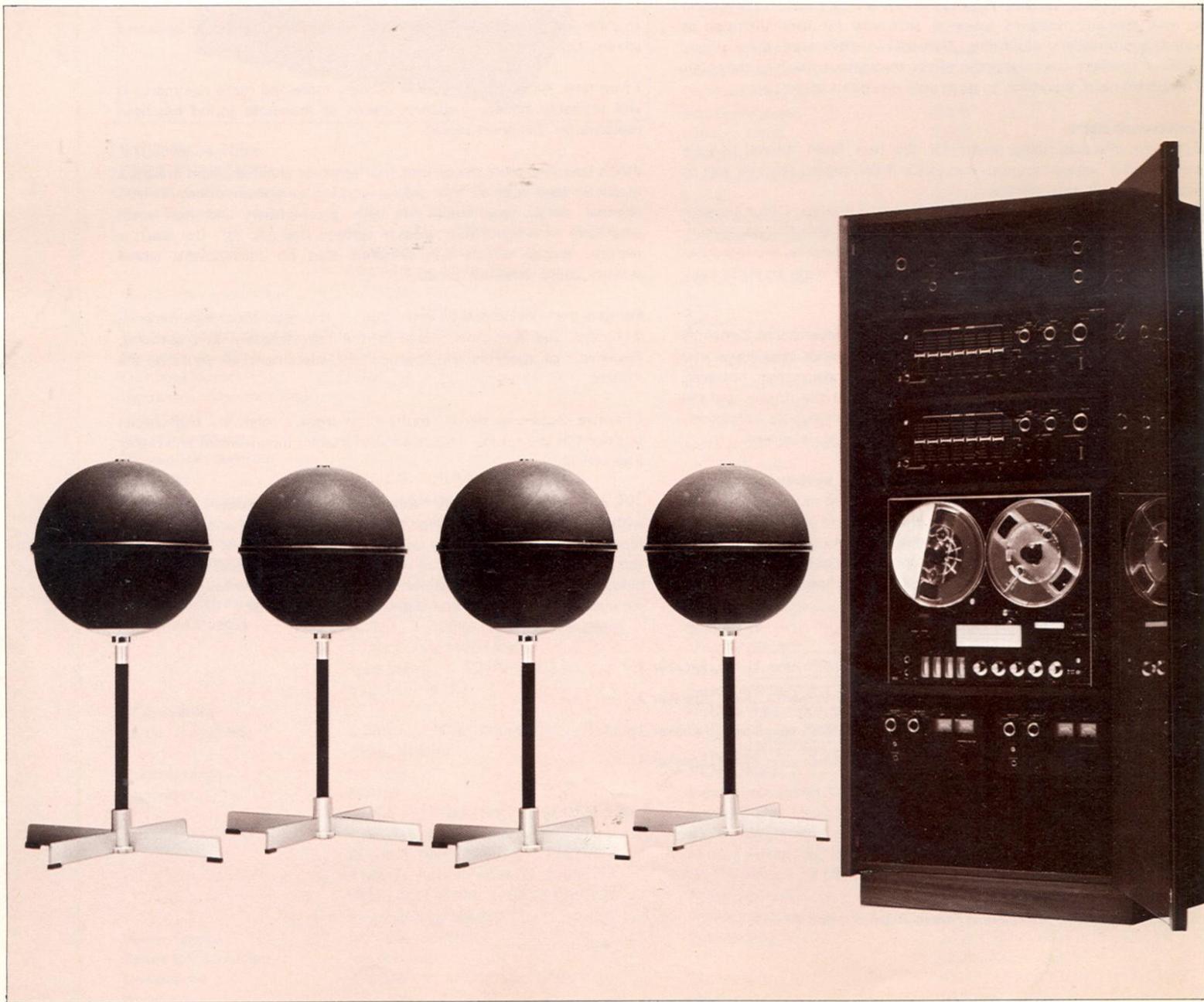


JVC
JVC AMERICA, INC.

A SIMPLE INTRODUCTION TO JVC'S 4-CHANNEL STEREO



From one channel to four channel sound reproduction!

Monaural sound

Before modern stereo, all home music reproducing equipment produced monaural sound. Even if you used ten speakers in ten separate enclosures, the result remained monaural sound because the original sound source — record or radio or tape — consisted of only one channel. At that time, JVC pioneered in the creation of high-fidelity reproduction units, units that effectively handled very wide range sound with virtually no distortion.

Stereophonic sound

When most people speak of "stereo" they refer to a modern 2-channel system. This means that the user's sound source consists of two separate channels, usually the left and right "sides" of the concert hall. Since we naturally hear stereophonically because of the positioning of our two ears, stereo marked a most important audio breakthrough.

Some of the most vital refinements in stereo resulted from JVC's original research. Until JVC presented its SEA (Sound Effect Amplifier) system, there had been neither a practical nor an accurate way to fully compensate for (1) the particular acoustical properties of various rooms, and (2) the variety of recording techniques, (3) characteristic of speaker, cartridge and so on.

Another advanced development in stereo was JVC's radial, omnidirectional speaker system. Four woofers and four tweeters are mounted in a specially designed spherical enclosure for total diffusion of sound, and unusually mounting. Beautiful in appearance, these unique globular speakers create a stereo effect throughout much of the room. There is no need, therefore, to sit in only one point in the room.

Quadrasonic stereo

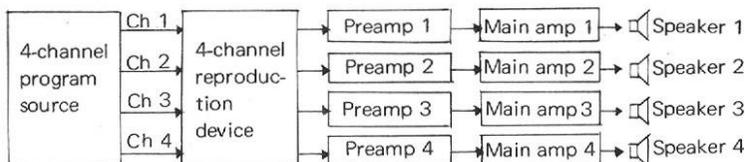
JVC now presents stereo sound for the first time! Stereo literally means "solid" and when you hear JVC's 4-channel sound, you will be listening to truly solid music!

Four channel stereo is exactly what its name implies — four separate channels of sound. Four channels in the original recording equipment, and hence in the listener's source. And four channels in the reproducing equipment, and hence four preamplifiers, four main amplifiers and four speaker systems.

If a jazz quartet, for example, is recorded on conventional 2-channel stereo, one channel will contain the piano and tenor saxophone; and the other channel, the drums and bass. In a 4-channel system, however, one channel handles the piano, one the sax, one the drums, and the fourth, the bass. Obviously quality, clarity, and especially "presence" will be significantly superior with 4-channel recording/playback.

For a 4-channel effect, a 4-channel playback system

For a 4-channel effect, a 4-channel playback system must be used. The recorded signal of each instrument is equalized and amplified through the one exclusive channel "assigned" to it. The results are so superior to present 2-channel stereo, that every critical audiophile, every serious music lover will soon find anything less than 4-channel stereo an unacceptable compromise.



Tape, FM broadcast or disc record
Tape deck, FM tuner or record player

Fig. 1. Principle of 4-channel Stereo Reproduction

The main differences between 4-channel stereo and conventional stereo

Stereo records — stereo tapes — stereo FM (multiplex). All these sound sources use conventional 2-channel stereo. Stereo records, for example, have one channel recorded on one side of the record groove, and the second channel on the other side (see Fig. 2).

Four track stereo tape is not 4-channel stereo. Four track stereo tape is 2-channel stereo, but 2-channel in two directions, hence 4 tracks. Thus side (or direction) A of a stereo tape feeds tracks 1 and 3 to the amplifier. Reverse the tape and side B feeds tracks 2 and 4 to the amplifier (see Fig. 2). Stereo cassettes use a similar system except that the tracks are sequential and not alternative. Eight-track cartridges also use only orthodox 2-channel stereo, but two sets of tracks are used for each direction (hence, a total of 8 tracks).

FM multiplex (stereo) broadcasting is all also 2-channel stereo. Two signals are sent from the station as one unit; that unit is then decoded into two signals by the multiplex circuitry of the tuner.

In short, all present day stereo sound sources have used only 2-channel stereo. Up to now.

From now, 4-channel stereo will become more and more common. It will probably replace 2-channel stereo as monaural sound has been replaced by 2-channel stereo.

JVC's new 4-channel stereo uses four separate channels from a 4-track magnetic tape with all four tracks working in one direction. This 4-channel stereo tape feeds into four preamplifiers and four main amplifiers to activate four speaker systems (see Fig. 3). The result is realism, special effects and presence that no conventional stereo system could possibly produce!

Perhaps the most dramatic reflection of the total difference between 2-channel and 4-channel stereo is the new freedom in placement. Placement of speakers and, particularly, placement of yourself, the listener.

Effective 2-channel stereo results only from a relatively few special positions in the room. This is uncomfortable, inconvenient and rather impractical.

JVC not only presents truly "solid music" — true stereo — but music with freedom of movement for the listener. With 4-channel stereo, all four speaker enclosures may be placed in a row in front of the room. But there may also be placed with two sets in front and two sets behind. Or three in front and one behind. Wherever the four enclosures are placed, extremely natural stereo separation results!

Phonographic stylus

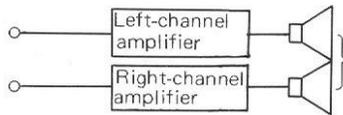
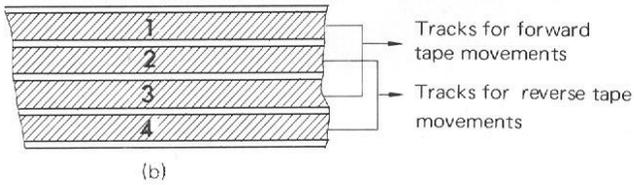
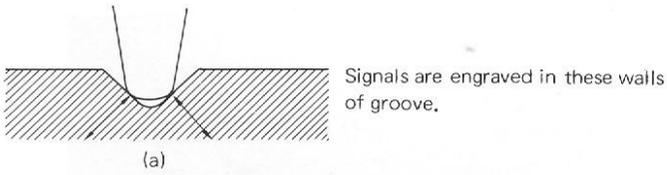


Fig. 2. Two-channel Stereo Systems.

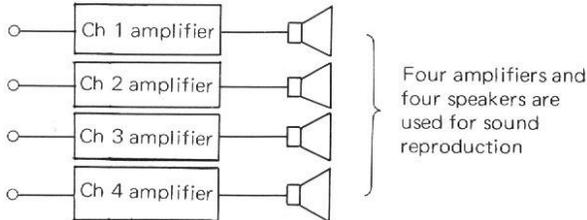
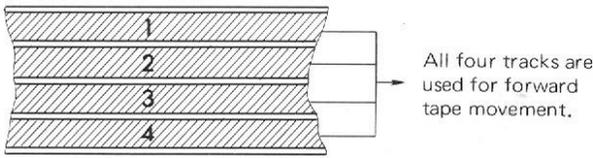
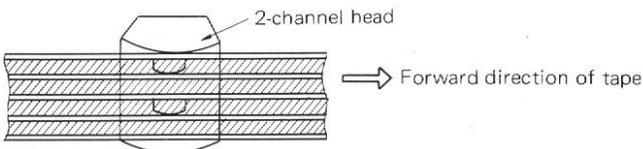


Fig. 3. 4-channel Stereo Tape and Reproduction.

Conventional Stereo System Head



4-channel Stereo System Head

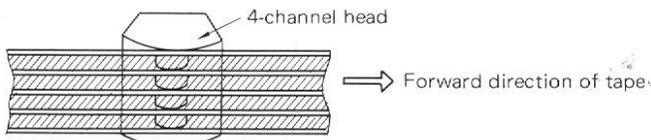


Fig. 4. Comparison of 4-channel stereo system head and conventional stereo system head.

Briefly, these are the main significant advantages of 4-channel stereo:

1. Totally new levels in clarity.
2. An exciting sense of presence that 2-channel stereo can never achieve. (This is because 4-channel stereo much more closely approximates the complexity of sound waves that reach the listener's ears in a concert hall.)
3. Stereo music can be fully enjoyed throughout most of the room.
4. There is never the problem of the "hole-in-the-center" or extremely artificial "stereo" effects.
5. When desired, special effects can be achieved easily and quite effectively.

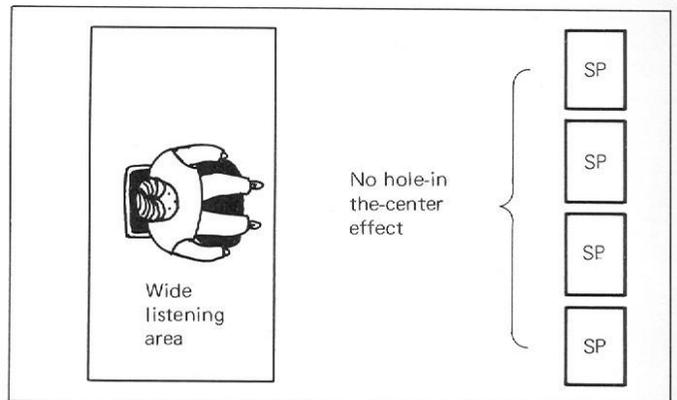
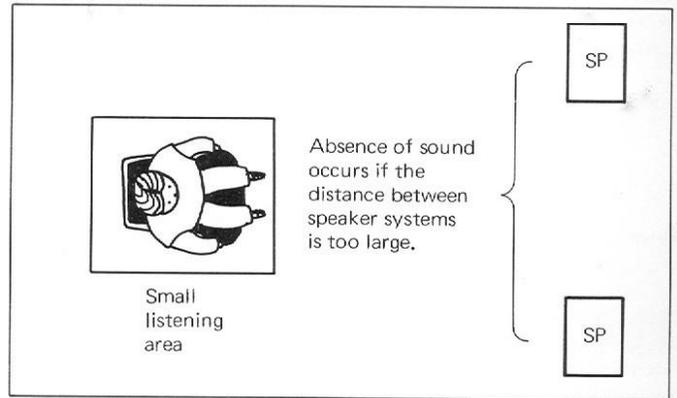


Fig. 5. Comparison of 2- and 4-channel Stereo Speaker Systems.

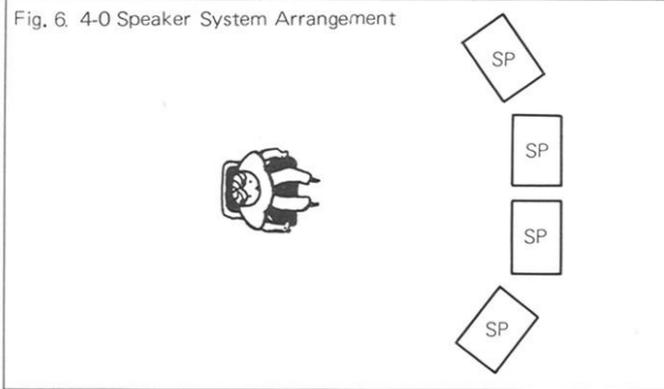
Three possible speaker arrangements

Three different arrangements demonstrate some of the capabilities of the new JVC system. In each case, the tape was specially programmed for a particular position.

1. 4-0 position (see Fig. 6)

All four speaker systems are placed in a row facing the listener. This creates a virtual speaker wall, and is usually used. A total field of natural stereo sound results with generally the highest degree of definition of individual instruments.

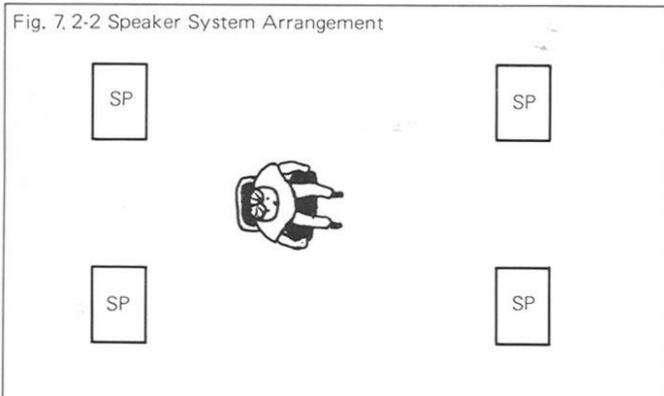
Fig. 6. 4-0 Speaker System Arrangement



2. 2-2 position (see Fig. 7)

Two systems face the listener, and two are behind him. Ideal for many installations, this position is particularly good for special sound effects. Echo and reverberational effects might come from the rear speakers, while 2-channel stereo comes from the front speakers. Various sound-on-sound recording techniques could now reach a level of sophistication that 2-channels never allowed.

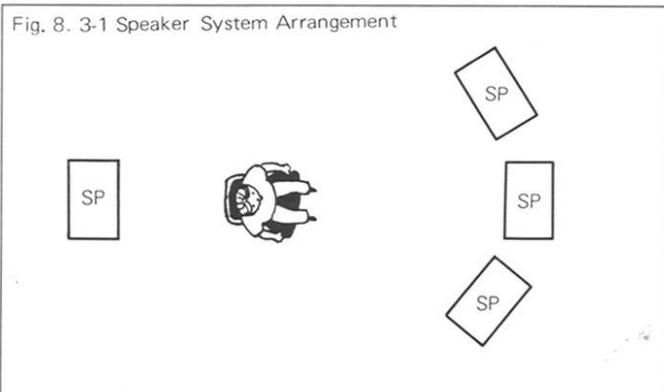
Fig. 7. 2-2 Speaker System Arrangement



3. 3-1 position (see Fig. 8)

Three systems face the listener and a fourth is behind him. This approximates the effect of certain seats in a concert hall. Unusual effects can also be heightened by this type of arrangement . . .

Fig. 8. 3-1 Speaker System Arrangement



Speaker System Arrangements for 4-channel Stereo Reproduction.

Special problems with 4-channel stereo.

About the only special problem will be correct phasing of speakers. Of course, correct phasing is essential even for 2-channel stereo, but it becomes even more critical and a bit more difficult with 4-channel stereo. This is particularly true for position no. 2 (two speakers in front, two in back).

Checking for correct phasing of speakers is no problem whatsoever to users of JVC components. Our preamplifiers have a pink noise generator built in. Pink noise is a sound whose energy is constant throughout the audible frequency range. And since its duration is controlled by the user, it is far superior to any music source for a wide variety of tests, especially speaker phasing.

Phase adjustment is simplicity itself just change the pink noise at normal phase to anti-phase (180° staggered to normal) in a split-second with the provided switch; no need to reconnect speaker cords.

For 4-channel use, connect the four speakers to the 1 and 2 amplifier outputs. Then check the phasing for each set of speakers separately with the pink noise generator; set amplifier speaker selector to 1 + 2 and make a final pink noise check.

SPECS AND DESCRIP OF INDIVIDUAL UNITS

All units are professional in performance and professional in appearance. Elegant black front panels are characteristic of each component for perfect matching when placed together.



MTR-10M SPECIFICATIONS

Type	: 4-track 4-channel playback/4-track 2-channel record/playback compatible tape deck
Motor	: Hysteresis synchronous
Tone control:	: Bass, Treble
Volume control	: 1 ch./2 ch., 3 ch./4 ch. inter-linked (control of individual channel possible)
VU meters	: 1 for each channel (4 in total)
Channel switching	: Equipped with a 2-channel/4-channel changeover switch
Bias system	: AC bias
Erase system	: AC erase
Tape speeds	: 19 cm/sec. (7-1/2 ips), 9.5 cm/sec. (3-3/4 ips)
Stereo recording time (two-way)	: 1-1/2 hours (with L.P.T. at 19cm/sec.) 3 hours (with L.P.T. at 9.5cm/sec.) (Double the above figures for monophonic recording)
Fast forward time	: Within 3-1/2 minutes for 7" reel of tape
Rewind time	: Within 2-1/2 minutes for 7" reel of tape
Wow and flutter	: Less than 0.15% (at 19cm/sec. R.M.S.) Less than 0.25% (at 9.5cm/sec. R.M.S.)
Frequency response	: 30 to 20,000Hz (at 19cm/sec.), 30 to 13,000Hz (at 9.5cm/sec.)

S/N ratio:	: Better than 52dB (from peak level)
Crosstalk:	: Better than 50dB
Distortion factor	: Less than 0.8% for rated recording and playback
Record/playback equalization	: NAB standard
Input jacks	: Two microphone jacks (0.5mV, 10K)
Record/play connector (DIN)	: Maximum sensitivity 15mV, signal source impedance 80K Ω Rated output 0.5V (0 to 1V variable), output impedance approx. 3.3K Ω
Output jacks:	: Two auxiliary output jacks (0 to 1V variable), output Impedance approx. 3.3K Ω)
Power source:	: AC 120V 50/60 Hz
Power consumption	: 40W (50Hz), 38W (60Hz)
Transistors	: 32
Diodes	: 6
Dimensions	: 18cm H x 38cm W x 32cm D (placed horizontally) 7" H x 15" W x 12-5/8" D
Weight:	: 9.8Kg, 21.5 lbs.



5107/MCA-105E SPECIFICATIONS

Main Amplifier Section

Total Dynamic Power	: 120W (60W + 60W) 4 Ω IHF 100W (50W + 50W) 8 Ω IHF
Continuous power	: 72W (36W + 36W) 4 Ω IHF 64W (32W + 32W) 8 Ω IHF
Matching impedance	: 4 – 16 Ω
TDH at rated power	: Less than 0.5% at 1 KHz
IM distortion at rated power:	: Less than 0.7%
Power bandwidth	: 20Hz – 50KHz –2dB
Damping factor	: 50 at 8 Ω
Input sensitivity for rated output	: 0.6V
Input impedance	: 50K Ω

Preamplifier Section

Equalizer	: Phono 1, 2 RIAA
Frequency response	: 25Hz – 400KHz \pm 0.5 dB
Rated output	: 2.5V, THD less than 0.1%
Output impedance	: 4K Ω

Signal to Noise Ratio

Phono 1, 2	: 76dB
AUX	: 87 dB

Input Sensitivity for Rated Output

Phono 1, 2	: 1mV (47K Ω)
AUX 1, 2	: 30mV (100K Ω) adjustable
Tuner	: 30mV (100K Ω)
Tape play 1, 2	: 30mV (100K Ω)
MIC	: 1mV (47K Ω)

SEA Section

Center frequency	: 40/60Hz, 150Hz, 400Hz, 1KHz, 2.4KHz, 6KHz, 15KHz
Control range	: \pm 10 dB

Controls

Muting	: Muting
MODE (STEREO REV., STEREO, LEFT + RIGHT, LEFT, RIGHT)	: MODE (STEREO REV., STEREO, LEFT + RIGHT, LEFT, RIGHT)
SELECT (MIC, PHONO 1, PHONO 2, TUNER, AUX 1, AUX 2), TAPE MONITOR (TAPE 1, OFF, TAPE 2)	: SELECT (MIC, PHONO 1, PHONO 2, TUNER, AUX 1, AUX 2), TAPE MONITOR (TAPE 1, OFF, TAPE 2)
Pink noise generator	: Pink noise generator

Power Source

AC 120V 50/60 Hz	: AC 120V 50/60 Hz
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Power Consumption

145W max.	: 145W max.
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Dimensions

H5-1/8", W 17-5/8", D 15-3/8"	: H5-1/8", W 17-5/8", D 15-3/8"
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Weight

25.3 lbs.	: 25.3 lbs.
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5108/MCT-105E SPECIFICATIONS FM-AM STEREO TUNER

FM Section

IF Rejection	: 100 dB
Tuning Range	: 88 – 108 MHz
Front-End	: 4 Gangs
IF Stage	: 5 Stages
Usable Sensitivity	: 1.5 μ V
Image Rejection	: 100dB (83MHz)
Spurious Rejection	: 100dB
AM Suppression	: 80dB
Capture Ratio	: 1.5dB
Selectivity	: –70dB (\pm 400 KHz)
Frequency Response	: 20 – 15KHz \pm 1dB
T.H.D.	: 0.3% (100% mod. MONO)
Signal to Noise Ratio	: 65 dB
Antenna terminal	: 75 Ω Unbalanced 300 Ω Balanced

FM MPX Section

Type	: Switching System
Separation	: More than 35dB at 400Hz More than 20dB at 10KHz
SCA Rejection	: 40dB
Carrier Leak (19KHz 38KHz)	: –60dB
Stereo Automatic	: Operating Level : 8 μ V
Output (400Hz 100% mod.)	: VARIABLE : 1.5V(1K Ω) with Level Control FIXED : 0.1V (1K Ω) Fixed FM MONO : 0.1V (50K Ω)
Residual Noise	: Less than 0.1V (at Level Control min.)

AM Section

Tuning Range	: 535 – 1605 KHz
Usable Sensitivity	: 20 μ V
Selectivity	: –27dB (at 1000KHz \pm 10KHz)
Image Rejection	: 80dB (at 1000KHz)
T.H.D.	: 1% (30% mod. 1000 μ V input)
Antenna terminal	: EXT. ANT.
Output (1KHz 30% mod.)	: 0.5V (1K Ω) with Level Control
Signal to Noise Ratio	: 50dB (1000 μ V input) (1000KHz, 30% mod.)

FEATURES

Signal input meter, Center Tuning Meter	
Stereo Rader, Headphone Jack (8 Ω)	
Stereo Separation Control, FM Noise Cut Filter	
Muting Adjust, AC Socket	
34 Transistors, 31 Diodes	: 1 FET, 5 IC's 2 X'tal Filters
Power Source	: AC 120V 50/60 Hz
Power Consumption	: 13W
Fuse Rating	: 1.2A (100 – 120V) 0.5A (200 – 240V)
Dimensions	: H5-1/2", W16-13/16", D11-13/16"
Weight	: 18.3 lbs.



MCP-105E SPECIFICATION

Solid State Pre-Amplifier with Built-in S.E.A. System

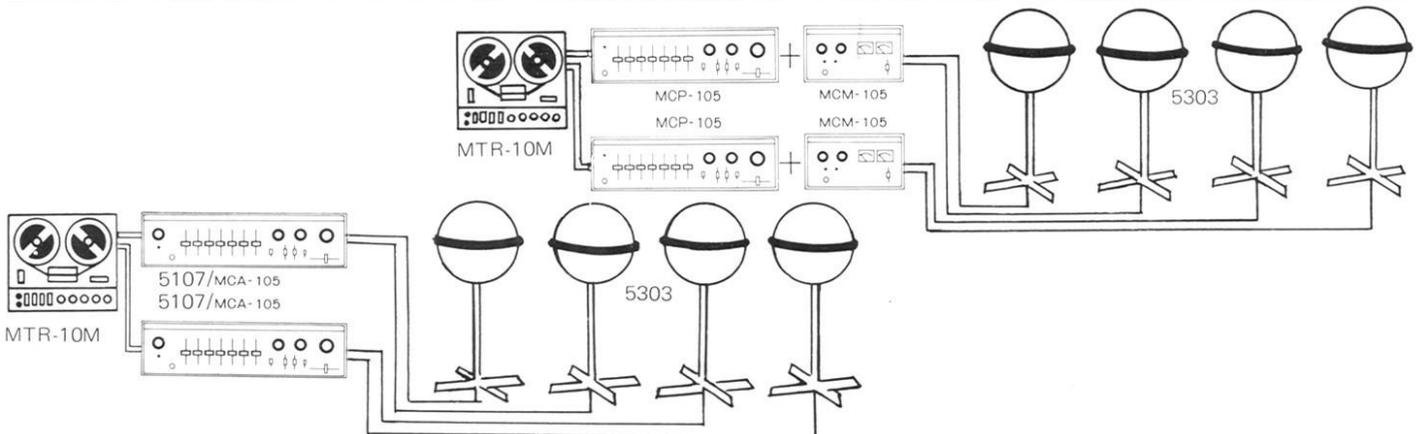
Input Jack	: PHONO 1, PHONO 2, MIC. L, R, TUNER L, R, AUX 1, AUX 2, TAPE PLAY 1, TAPE PLAY 2.
Output Jack	: PRE OUT 1, PRE OUT 2, REC. OUT 1, REC. OUT 2
DIN Jack	: TAPE PLAY 1
Output Impedance	: PRE OUT 0.5K Ω at 1V output. REC. OUT 12K Ω at 300mV. DIN 80K Ω at 30mV.
Frequency Response	: MIC, AUX, 18Hz - 100 KHz \pm 0.5dB PHONO RIAA \pm 0.5 dB
THD	: Less than 0.03% at 1V, 1KHz
IM Distortion	: Less than 0.1% at 1V, 1KHz
Signal to Noise Ratio	: PHONO 80dB, MIC 85dB, AUX 100dB
Input Sensitivity	: PHONO 1.2mV, 50K Ω , MIC 1.2mV, 300K Ω TAPE PLAY 120mV, 80K Ω . DIN 120mV, 80K Ω AUX 120mV, 80K Ω
Maximum Phono Input	: 120mV.
S.E.A. Center Frequency	: 40/60Hz, 150Hz, 400Hz, 1KHz, 2.4KHz, 6KHz, 15KHz
S.E.A. Control Range	: \pm 10dB.
S.E.A. Defeat Switch	: Yes.
Pink Noise Generator:	: Yes.
Subsonic Filter	: 18Hz(-30dB), -18dB/oct.
Power Source	: AC 120V 50/60 Hz
Power Consumption	: 4.5W.
Dimensions	: 5-3/8" (H), 16-15/16"(W), 11-3/8"(D)
Weight	: 18.7 lbs.



MCM-105E SPECIFICATIONS

Solid State Integrated Main Amplifier

Total Dynamic Power	: 140W (70W + 70W) IHF 8 Ω 100W (50W + 50W) IHF 4 Ω
Continuous Power	: 100W (50W + 50W) IHF 4, 8 Ω
THD at Rated Output	: 0.07% at 1KHz.
IM at Rated Power	: 0.2% (60Hz: 7KHz = 4 : 1)
Power Bandwidth	: 20 - 30,000Hz \pm 0.5dB
Frequency Response	: 18Hz - 45KHz \pm 0.5dB
Subsonic Filter	: 18Hz, 45KHz - 12dB/oct.
Signal to Noise Ratio	: 110dB
Input Impedance	: 120K Ω
Input Sensitivity	: 0.8V
Damping Factor	: 0.5, 5, 50 Selectable at 8 Ω
Speaker Selector	: 1, 2, 1 + 2
VU Meter Sensitivity	: 0, 10, 20, 30 dB
Protector Circuit	: Automatic Recovering Electronical Protector
Power Source	: AC 120V 50/60 Hz
Power Consumption	: 190W, 50, 60Hz
Dimensions	: 5-3/8"(H), 8-1/2"(W), 12-5/8"(D)
Weight	: 16.5 lbs.



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