



RD-21S PhaseMaster Cart/Cassette Recording/Duplicating System (Stereo)



RPS-1 Stereo Record/Play Deck



PS-1 Stereo Playback Deck

RAMKO RESEARCH
11355-A Folsom Blvd / Rancho Cordova, California / 95670
(916) 635-3600

PhaseMaster™

A new concept in broadcast reproduction systems



RAMKO

The Ramko PhaseMaster Series is the new definition of performance, convenience and quality in broadcast sound reproduction.

Ramko PhaseMasters are not just another manufacturer's version of the cart machine, but are instead part of a complete system for recording, playing and duplicating your cartridges and cassettes.

They eliminate stereo phase shift error once and for all. They set new industry standards for low wow and flutter.

They deliver signal-to-noise, distortion and frequency response that are better than anything else in the industry.

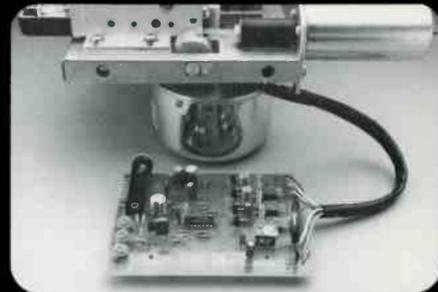
And they have all the operational and convenience features you've ever wanted in a cart system.

Read the details, then call (916) 635-3600 collect to arrange for a two week free trial (with prior credit approval).

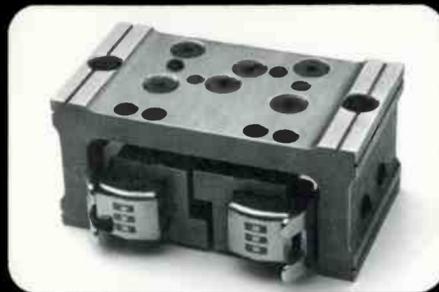
RAMKO



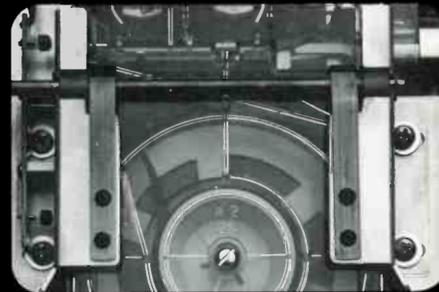
Simple and rugged, the PhaseMaster system sets new standards for low wow and flutter, and eliminates phase-shift error.



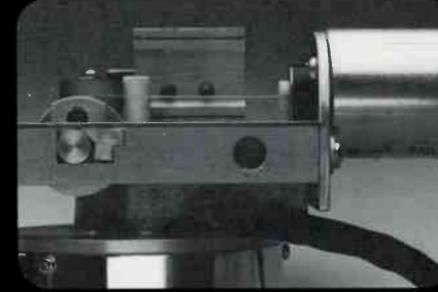
The crystal-controlled dc servo motor provides high timing accuracy, low heat generation and permits field speed changes.



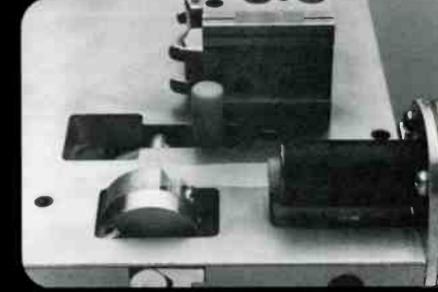
The machined head stack permits precise adjustments, is extremely stable, and is internally illuminated for easier inspection.



Carts are held by the edges to prevent distortion, with roller contact for easier insertion and withdrawal.



Pinch roller parallelism to the high-traction ceramic capstan is adjustable with the motor running.



The adjustable air-dampened solenoid is very smooth, very quiet.

PhaseMaster Series

"Real-time" phase shift error correction

The Ramko PhaseMasters solve the stereo phase shift problem in real-time, continuously compensating for errors as your tapes are played.

There are no time-consuming calibration procedures, and no complicated, expensive electro-mechanical devices for moving the heads around.

Instead, our unique solution is based upon an astoundingly simple fact:

Phase shift doesn't much matter in mono.

When you're recording stereo,

the PhaseMasters encode a mono L + R signal on the upper track, and a mono L - R signal on the lower track.

On playback, the left channel signals from both tracks are decoded and compared. Any phase shift between the two is compensated for by an electronic time delay. Once the initial comparison is made, the PhaseMaster locks onto the signals and tracks them continuously, varying the electronic time delay as necessary to correct the phase shift error in real-time.

Simple.

And it works—no more holes

in your sound, and no more side-to-side spectrum shift.

The ultimate system, mono and stereo

Whether you're into stereo or not, the PhaseMaster series provides a simple way for you to upgrade performance, decrease downtime and improve ease-of-use.

Individual mono and stereo playback and record/playback machines are available to work with your existing systems. Stereo units are available with and without our unique encoding/decoding electronics. The decoding electronics are also available for use with your present stereo playback units—contact the factory for details.

The Ramko PhaseMaster system is also available in a complete reproduction center which duplicates—as well as plays and records—your mono and stereo carts and cassettes.

The PhaseMaster Reproduction Center consists of four modules: an electronic control center; two A and B cart decks; and a cassette deck (or a third cart deck).

To record, you simply switch-select any of three inputs to record on any or all of the decks.

During playback, the PhaseMaster control center instantly

determines whether your tape is coded or uncoded, and automatically reproduces the correct outputs.

To duplicate, you simply load your recorded tape (cart or cassette, mono or stereo) and one or two blanks, switch-select the appropriate deck for an audio source, hit Play/Record and the control center automatically puts the signal where it's supposed to be.

Simple, because the PhaseMaster does most of the work.

PhaseMaster: the cart system, redefined

The Ramko PhaseMaster series has been designed and fabricated to provide you with cleaner sound and easier operation, day after day, month after month, year after year.

Electronically, performance is unmatched by any other system in existence.

Wow and flutter are typically 0.06%. Amplifier frequency response is within 0.25 dB of the NAB curve, and overall system response is 50 Hz-16 kHz ± 1.5 dB using our standard heads. Signal-to-noise ratio is 56 dB in stereo, 58 dB in mono. And an optional plug-in compander (available mid-1980) can improve this S/N by 15-20 dB.

Mechanically, the Phase-

Master series includes all the refinements you could have wished for.

A crystal-controlled brushless dc servo motor keeps timing accuracy within 0.05%. Power dissipation is only one-tenth that of a standard ac motor, and even this minimal amount of generated heat is kept away from your tapes by a ceramic capstan.

On PhaseMaster cart drives, speeds are field-selectable (3 $\frac{3}{4}$, 7 $\frac{1}{2}$, 15 ips) simply by changing jumpers. On our cassette drive, the speed is adjustable $\pm 5\%$ around 1 $\frac{7}{8}$ ips to compensate for speed errors introduced by other equipment. The cassette drive also features a built-in 25 Hz tone generator for compatibility with future automated cassette equipment.

To ensure proper tape travel and prevent tape skew, pinch roller parallelism is adjustable with the motor running. Motor position is adjustable to change the pressure of the pinch roller on the high-traction ceramic capstan without changing their parallelism.

The deck is a $\frac{5}{8}$ " thick casting for stability, with a stainless steel cover plate for wear resistance and EMI shielding. Carts are held in position by the edges to prevent distortion, using spring

loaded rollers, rather than friction springs, for easier, smoother insertion and withdrawal.

Heads are mounted in a machined stack that allows easy adjustment in three directions, yet is so stable and precise that heads can be interchanged between machines with no readjustments. And the heads are internally illuminated for easier inspection and cleaning.

The PhaseMasters also feature an exclusive optical cartridge insertion sensing system that eliminates the usual microswitch and prevents start-up "wow." As you begin to insert the cart, it breaks a light beam and brings the motor up to speed by the time the cart is fully inserted. When the cart is properly seated, a second optical sensor arms the start electronics for a smooth and wow-less start. The pinch roller is engaged by an adjustable air-dampened solenoid with a teflon-coated plunger for friction-free, quiet operation.

It all adds up to the finest cart/cassette system you can buy: the Ramko PhaseMaster.

Put the PhaseMaster to the test

The only way you're really going to know if the PhaseMaster Series is for you is to get your hands on a sample.

So we'd like to lend you one, free for two weeks (with prior credit approval). Just write us at the address on the back of this brochure.

Or, if you can't wait for the mail, contact our nearest representative or call (916) 635-3600 collect today.

Seeing is definitely believing.

Standard Features:

TAPE CARTRIDGE

- Automatic, "real-time" phase shift error correction.
- Automatic switching of record/playback, encoding/decoding.
- Simple duplication, cart-to-cart, cart-to-cassette, cassette-to-cart.
- Front-panel switch-selectable inputs and illuminated pushbutton controls.
- Integral testing for response, playback, cue tone, cue bias.
- Three cue tones with sharp, error-free digital sensing.
- Optical cart insertion latching and motor pre-start.
- Crystal-controlled brushless dc servo motor, ceramic capstan, air-dampened adjustable solenoid.
- Solid-state 4 $\frac{1}{2}$ -digit timer; left, right and phase analysis meters; and motor speed out-of-lock indicator.
- Precision head stack, with internal head illumination.
- All plug-in modules.

CASSETTE

- A/B monitoring.
- Logging in/out capability.
- Jumper selectable played indicator or lockout.
- Jumper selectable speed select (3 $\frac{3}{4}$, 7 $\frac{1}{2}$, 15 ips).
- Three switch selectable external inputs.
- Front panel switch—selectable inputs and illuminated pushbuttons.
- 25 Hz tone generator for possible future automation use.
- Speed variable $\pm 5\%$ around 1 $\frac{7}{8}$ ips.
- Brushless DC servo controlled motor.
- All electronic fast forward, rewind, stop & play front panel controls.
- Record and play.
- All plug-in modules.
- Quick disconnect rear panel connectors.
- Three switch selectable external inputs.

SPECIFICATIONS:

Tape Cartridge	7 $\frac{1}{2}$ ips standard, field selectable to 3 $\frac{3}{4}$ and 15 ips.
Tape Speed	0.095% max. DIN weighted (0.04% to 0.07% typical).
Wow and Flutter	0.05% or better.
Timing accuracy	Amplifier: ± 0.25 dB NAB curve.
Frequency Response	System: 50 Hz-16 kHz ± 1.5 dB standard heads, ± 1 dB with premium heads.
Stereo Separation	50 dB.
Signal-to-Noise Ratio Playback	56 dB stereo, 58 dB mono standard (71 dB and 73 dB with optional compander).
Audio Output Level	± 25 dBm.
Audio Output Impedance	Dual outputs: 150 ohms, strappable to 600 ohms.
Amplifier Distortion	0.3% maximum.
Input Impedance	20,000 ohms (600 ohms selectable)
Power	117/234 volts AC, 50/60 Hz.
Cassette	
Tape Speed	1 $\frac{7}{8}$ ips—3 $\frac{3}{4}$ & 7 $\frac{1}{2}$ ips also available.
Variable Speed Adjustment	$\pm 5\%$ around 1 $\frac{7}{8}$ ips.
Wow and Flutter	$\pm .095\%$ or less weighted (DIN 45-507).
Fast Wind Time	60 seconds.
Response	50 Hz—13 KHz ± 3 dB.
Signal-to-Noise Ratio	-50 dB.
Harmonic Distortion	0.5%.
Audio Output Level	± 25 dBm.
Input Impedance	20,000 ohms (600 ohms selectable).

Models and Accessories

RD-21S	PhaseMaster Cart/Cassette Recording/Duplicating System (stereo). Includes 2—RS-1 A/B cart decks, CD-1 cassette deck, CC-1 record/duplicate control center, and 19" W x 10 $\frac{3}{4}$ " H x 15 $\frac{3}{4}$ " D rack mount frame.
RD-30S	PhaseMaster Cart Recording/Duplicating System (stereo). Includes 3—RS-1 A/B cart decks, CC-1 record/duplicate control center, and 19" W x 10 $\frac{3}{4}$ " H x 15 $\frac{3}{4}$ " D rack mount frame.
PM-1	PhaseMaster Mono Playback Cart Deck, 8 $\frac{5}{8}$ " W x 5 $\frac{1}{4}$ " H x 14 $\frac{3}{4}$ " D.
PS-1	PhaseMaster Stereo Playback Cart Deck, 8 $\frac{5}{8}$ " W x 5 $\frac{1}{4}$ " H x 14 $\frac{3}{4}$ " D.
RS-1	PhaseMaster Stereo Record/Play Cart Deck. For use with CC-1 Recording/Duplicate Control Center, 8 $\frac{5}{8}$ " W x 5 $\frac{1}{4}$ " H x 14 $\frac{3}{4}$ " D.
RPS-1	PhaseMaster Stereo Record/Play Machine. Completely self-contained. 8 $\frac{5}{8}$ " W x 5 $\frac{1}{4}$ " H x 14 $\frac{3}{4}$ " D.
RPM-1	PhaseMaster Mono Record/Play Machine. Completely self-contained. 8 $\frac{5}{8}$ " W x 5 $\frac{1}{4}$ " H x 14 $\frac{3}{4}$ " D.
CD-1	PhaseMaster Stereo Record/Play Cassette Deck. For use with CC-1 Recording/Duplicate Control Center, 8 $\frac{5}{8}$ " W x 5 $\frac{1}{4}$ " H x 14 $\frac{3}{4}$ " D.
CC-1	PhaseMaster Stereo Record/Duplicate Control Center. Will control 2—RS-1 cart decks and 1—CD-1 cassette deck or 3—RS-1 cart decks. 8 $\frac{5}{8}$ " W x 5 $\frac{1}{4}$ " H x 14 $\frac{3}{4}$ " D.
---	Premium heads for PhaseMaster Cart Deck.
---	Stereo Matrix decoding unit for use with other than PhaseMaster playback decks.
---	Companding noise reduction system—Plug-in record unit.
---	Companding noise reduction system—Plug-in playback unit.
---	Remote Start/Stop controls.
---	Table top cabinet for Recording/Duplicate system or individual units.

