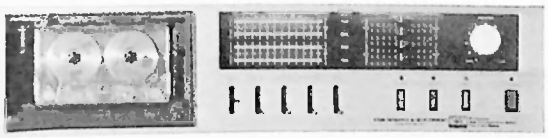
# 4 TRACK REAL TIME DUPLICATION SYSTEM

## Operating Manual

**FOUR TRACK MASTER CONTROL DECK**
RTDS-4TM



**FOUR TRACK SLAVE DECK**
RTDS-4TS

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# CONTENTS

# SAFETY HINTS

## INTERNAL ACCESS

High voltages are present at some internal locations. The cover should not be removed except by qualified technicians and then only with power disconnected or with appropriate caution when making service adjustments.

## ENTRY OF FOREIGN OBJECTS

If liquid is spilled on the unit or any foreign objects fall inside, unplug the power cord from the outlet immediately to avoid the possibility of electrical shock or damage to the unit. The unit should not be operated after such a mishap until examined by a competent service technician.

## HANDLING THE POWER-SUPPLY CORD

Power cords should be plugged into three-wire grounded outlets or into a UL approved, breaker protected power strip. Do not allow power cords to lie under heavy objects such as furniture or where they can be tripped over or run over by materials handling equipment.

When removing the power cord from an outlet, grasp the plug, not the cord, in order to avoid the possibility of breaking the cord. Never handle the power cord with wet hands or when standing on a wet surface. Always remove the cord from the outlet when moving equipment and it is a good idea to disconnect the power cord if the equipment is to be left unused for a long time.

## LOCATION

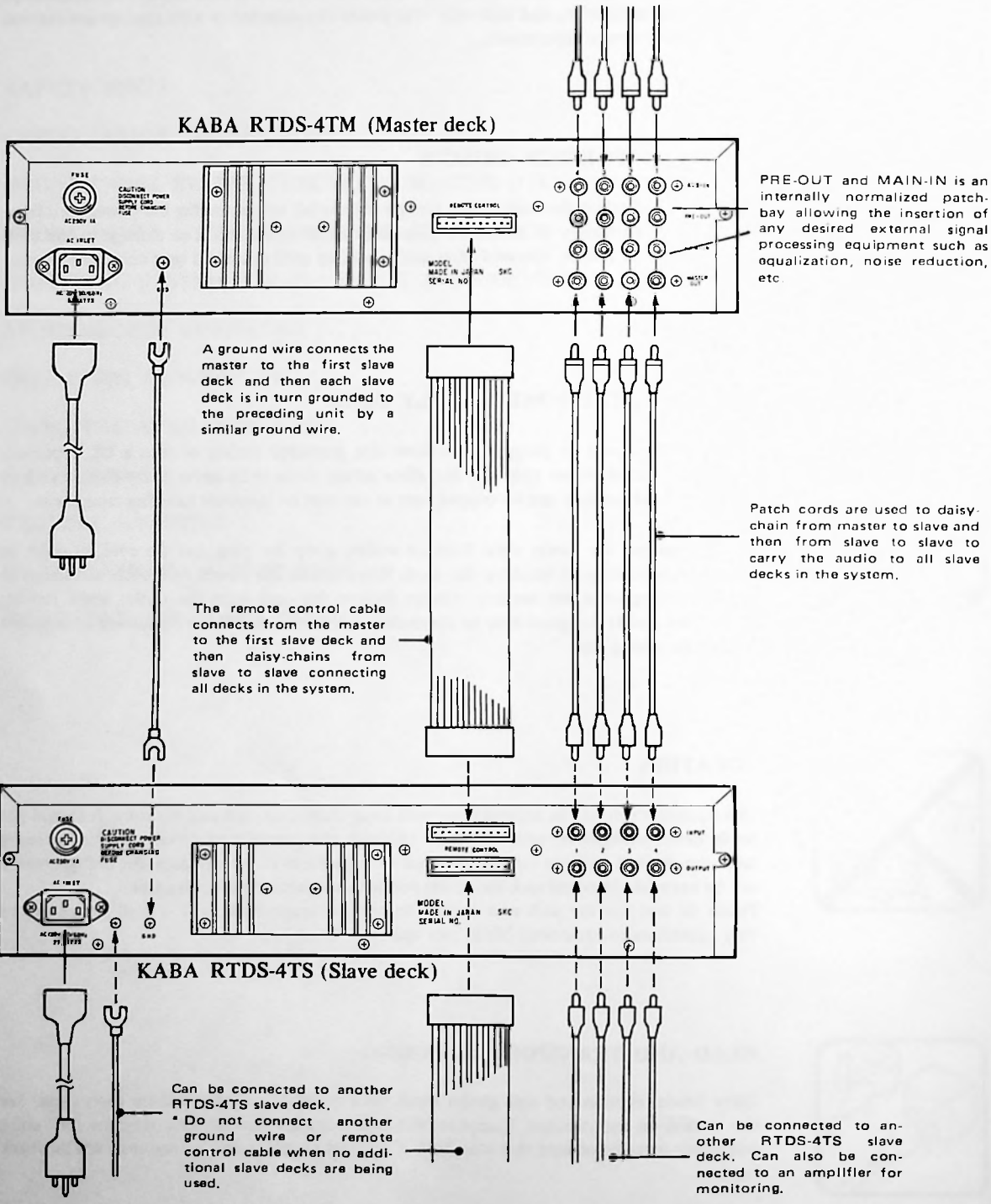
The equipment should be located in an area away from dust, dirt and moisture. It should not be in direct sunlight or near a heater. Although the power requirements are low, if many units are stacked without reasonable space in between in a confined area, the heat generated can be harmful. Standard rack mounting provides adequate ventilation space.
Please do not use the unit as a surface to hold beverage containers – such liquids can be very hazardous to equipment life if they spill.

## HEAD AND TRANSPORT CLEANING

Dirty heads, capstan and tape guides mean poor quality tapes. Keep these parts clean. See the section on maintenance. Except for the degaussing instrument, keep magnets, steel chips and other metallic objects that may have a residual magnetic field away from the playback head.

# INSTALLATION CONNECTIONS

AUX-IN can connect to any external audio source such as another master unit, a four track reel-to-reel deck, two 1/4" half-track decks operating back-to-back, or a two-track input such as a record player, digital processor or an electronic instrument.




PRE-OUT and MAIN-IN is an internally normalized patch-bay allowing the insertion of any desired external signal processing equipment such as equalization, noise reduction, etc.

A ground wire connects the master to the first slave deck and then each slave deck is in turn grounded to the preceding unit by a similar ground wire.

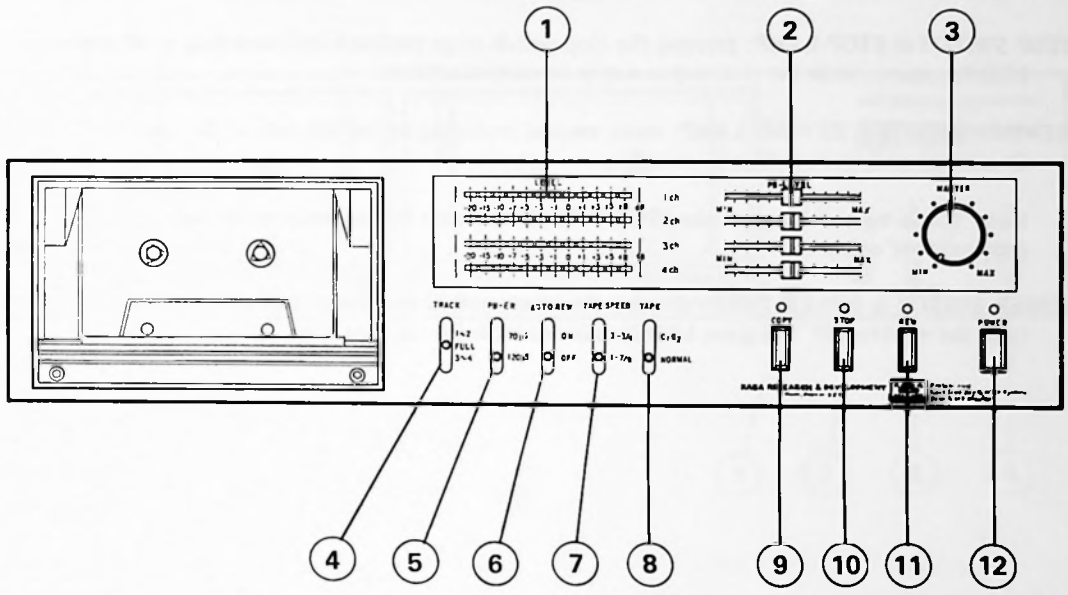
Patch cords are used to daisy-chain from master to slave and then from slave to slave to carry the audio to all slave decks in the system.

The remote control cable connects from the master to the first slave deck and then daisy-chains from slave to slave connecting all decks in the system.

Can be connected to another RTDS-4TS slave deck.
* Do not connect another ground wire or remote control cable when no additional slave decks are being used.

Can be connected to another RTDS-4TS slave deck. Can also be connected to an amplifier for monitoring.

# FRONT PANEL SWITCH FUNCTIONS–MASTER DECK




(1) **FOUR-CHANNEL LED LEVEL INDICATOR**: displays output level of each track.

(2) **PLAYBACK GAIN CONTROL**: adjusts playback level up to +/—10dB. Moving sliders to the right increases output level. Center position provides standard level.

(3) **MASTER GAIN CONTROL**: adjusts output level of all tracks simultaneously at Master Out. Output level increases when control is turned clockwise. Maximum position provides standard level.

(4) **TRACK SWITCH**: selects the tracks on which audio signals are sent to the Slave Units (RTDS-4TS). When switch is on position 1-2, audio is sent only to tracks one and two. When switch is on FULL, audio is sent to all four tracks. When switch is on 3-4, audio is sent only to tracks 3 and 4.

(5) **PLAYBACK EQUALIZER SWITCH**: should be set according to the tape being played back.
70 $\mu$s: chrome (high bias) tape
120 $\mu$s: normal bias tape

(6) **AUTO REWIND SWITCH**: when switch is on, all transports will automatically rewind when the cassette in the master position reaches its end. This function is disabled in any slave transport that has a short or jammed cassette and does not operate when the system is recording from an external master.

(7) **TAPE SPEED SWITCH**: selects system operating speed – 1 7/8 ips (real-time) or 3 3/4 ips (double speed).

(8) **TAPE SWITCH**: selects the bias level in all slave units and should be set according to the type of tape being recorded.
$CrO_2$ : chrome (high-bias) tape
Normal: normal (standard-bias) tape

(9) **COPY SWITCH & COPY LAMP**: pressing the copy switch starts the master and all slave transports in the system, beginning the duplication cycle. The red LED illuminates while the master deck is in the playback mode.

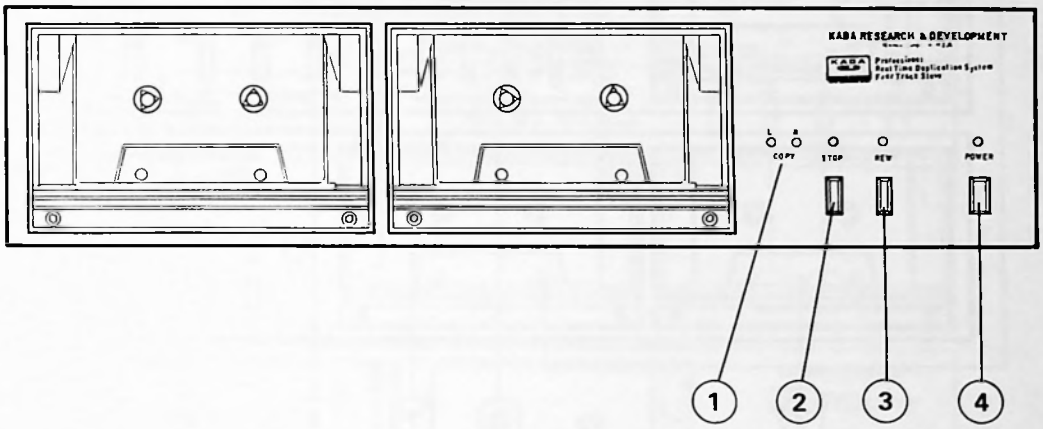
(10) **STOP SWITCH & STOP LAMP**: pressing the stop switch stops playback and recording in all positions. The green LED illuminates while the system is in a stop or ready condition.

(11) **REWIND SWITCH & REWIND LAMP**: starts manual rewinding to the left hub of the cassette. The orange LED illuminates while the machine is rewinding.

Note: Please be sure to press the STOP SWITCH and stop the machine before starting either the rewind or copy mode of operation.

(12) **POWER SWITCH & POWER LAMP**: pressing the power switch once turns the machine on; pressing a second time turns the machine off. The green LED illuminates while the machine is on.

# FRONT PANEL SWITCH FUNCTIONS–SLAVE DECK




(1) **COPY LAMP – L R**: Lamps indicate status of left and right slave transports. Lamp illuminates steady while a cassette is being copied in the respective position. Lamp flashes on and off when its transport stops before the master deck transport stops, thus indicating the presence of a short or jammed cassette.

NOTE: As long as any copy lamp is flashing, its associated transport cannot be operated by either the local or master STOP or REWIND switch. The defective cassette must be removed to reset the logic to allow further operation of the transport involved.

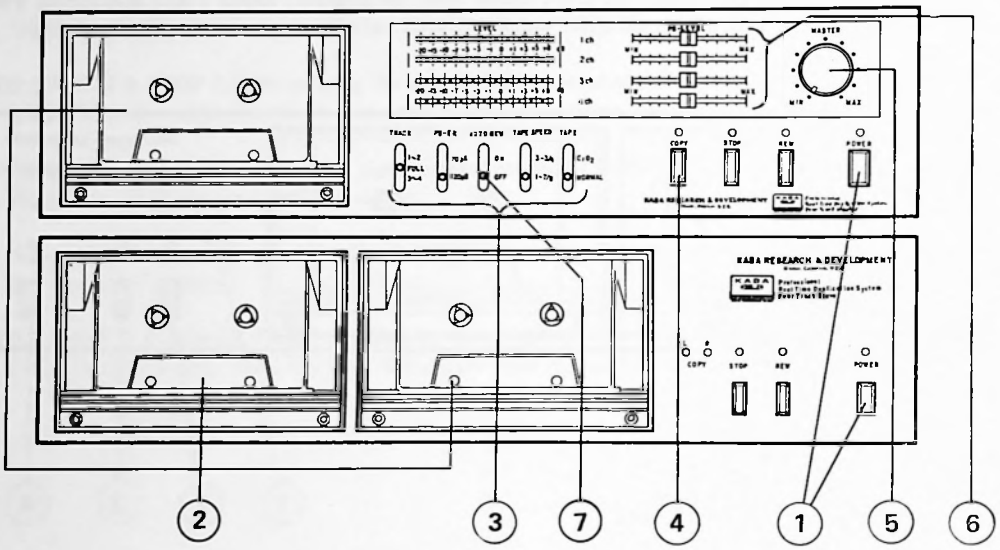
(2) **STOP SWITCH & STOP LAMP**: Pressing stop switch on slave deck stops both transports on only the one slave deck involved. The green LED illuminates while machine is in a stopped condition.

(3) **REWIND SWITCH & REWIND LAMP**: Pressing the rewind switch starts both transports on the slave deck involved rewinding tape to the left hub of the cassette. The orange LED illuminates while the machine is rewinding.

NOTE: Please be sure to press the stop switch on the deck involved to stop the machine before starting the rewind mode.

(4) **POWER SWITCH & POWER LAMP**: Pressing the power switch initially turns on the particular deck involved. Pressing the switch a second time turns the deck off. The green LED illuminates while the deck is on.

# ADJUSTING SYSTEM FOR PLAYBACK AND COPYING




(1) Turn on the master deck and all slave decks being used by pressing their power switches. Green power lights will indicate deck is on.

(2) Insert master cassette tape into the play transport and tapes to be copied into the slave transports.

(3) Set the selection switches:

TRACK: select the tracks to be copied; 1-2 for A side only, 3-4 for B side only or "FULL" for both sides (all four tracks).

P.B. EQ: set the equalization to the proper value for the type of tape being used in the master position.
70 $\mu$s: chrome tape
120 $\mu$s: standard bias or normal tape

AUTO REWIND: set to "ON" if auto rewind is desired when the master tape reaches its end and stops. If this switch is set to "OFF", no position will rewind until the rewind switch is pressed.

TAPE SPEED: set to 1 7/8 or 3 3/4 depending on whether real-time or double speed duplication is desired.

TAPE: set to "$CrO_2$" if copies are being made on chrome tape, to "NORMAL" if copies are being made on standard bias tape.

(4) Press COPY SWITCH to start playback or copy cycle.

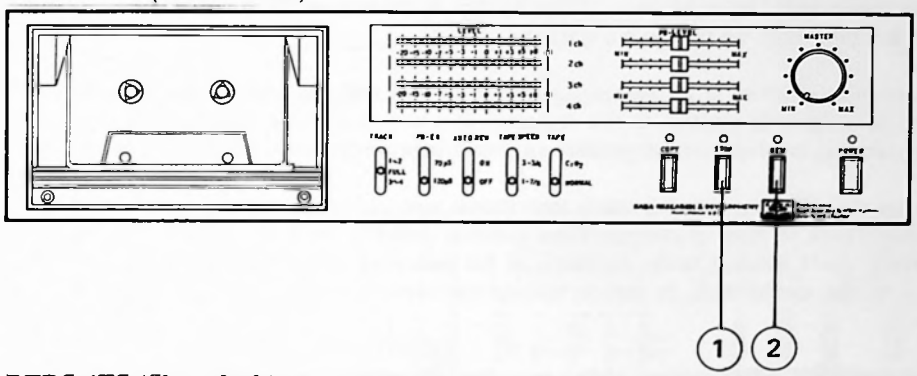
(5) Adjust the MASTER VOLUME to approximately 80% full clockwise. (Full clockwise is standard level) Watch level indicators while adjusting.

(6) Adjust the P.B. LEVEL for each channel to get the appropriate output on each one. Levels should normally be between −5 and +3. Sliders should ordinarily be near the center position. MASTER VOLUME can then bring all channels up or down as desired.

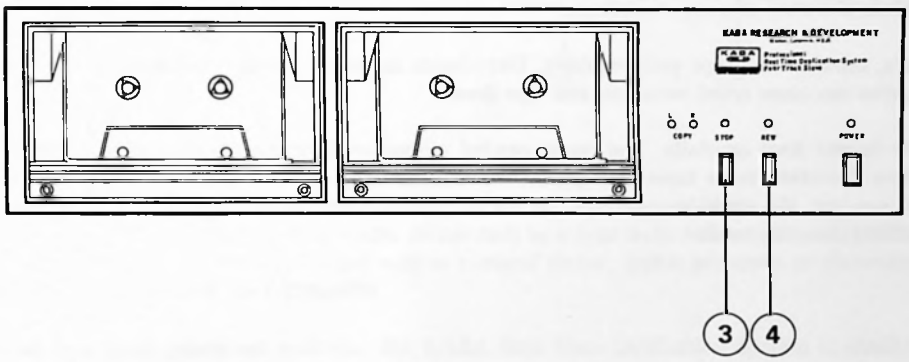
(7) Machines will shut off automatically when playback or copying is finished if AUTO REWIND is "OFF". If AUTO REWIND is "ON", machines will shut off after the rewind cycle is complete. Auto rewind does not function if an external master is being used. The AUTO REWIND function is disabled in any slave position that experiences a short or jammed cassette and the red LED copy light for that position will remain flashing until the problem cassette is removed.

# STOPPING AND REWINDING

RTDS-4TM (Master deck)




RTDS-4TS (Slave deck)




**STOPPING THE TAPE:**

(1) Pressing the master stop switch will stop either copying or rewinding on all decks.

(3) Pressing the stop switch on any slave deck stops either copying or rewinding on that deck only.

**REWINDING THE TAPE:**

(2) Pressing the master rewind switch will start rewinding on all decks.

(4) Pressing the rewind switch on any slave deck starts the rewind mode on that deck only. The rewind function will not operate on any transport on which the red trouble lamp is flashing.

NOTE: Copying starts only when COPY switch on the master deck is pressed.

# OPERATING SUGGESTIONS

1 Before inserting a cassette, make sure the tape is completely wound on the supply hub so that there is no loose tape inside the cassette. The major cause of tape damage in cassettes occurs as a result of not having the tape tightly wound on the hubs when the transport is started.

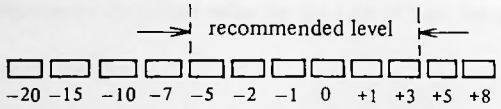
It is recommended practice in in-cassette duplication to start with the cassette wound backwards and rewind the cassette to the beginning position in the transport in which it is being recorded. This aligns the tape with the particular transport involved and will produce an overall improvement in the quality of recording.

2 Check to see that all select switches are in their proper positions before starting the record cycle. Incorrect switch settings may result in poor recordings. Press function switches firmly to avoid contact bounce or incomplete closure which could result in faulty operation of the associated relays. Since all functions of the slave decks are controlled by the master deck, be sure to operate the master deck function switches and controls in the proper sequence.

3 Do not change select switch settings while a recording is in process. Doing so will not harm the equipment but will likely result in distorted or noisy recordings.

4 Clean heads, capstans and tape path regularly. Dirty heads cause loss of high frequencies and excessive noise. Dirt on the capstan can cause speed variations and tape skew.

5 Adjust the output level carefully. The recommended output level for most tapes will be between −5 and +3 as shown below. However, some tapes with greater "head room" may allow output levels as great as +8. If the output level is set too low, the signal-to-noise ratio on the duplicated tapes may be unsatisfactory. If the output level is too high, distortion may result.

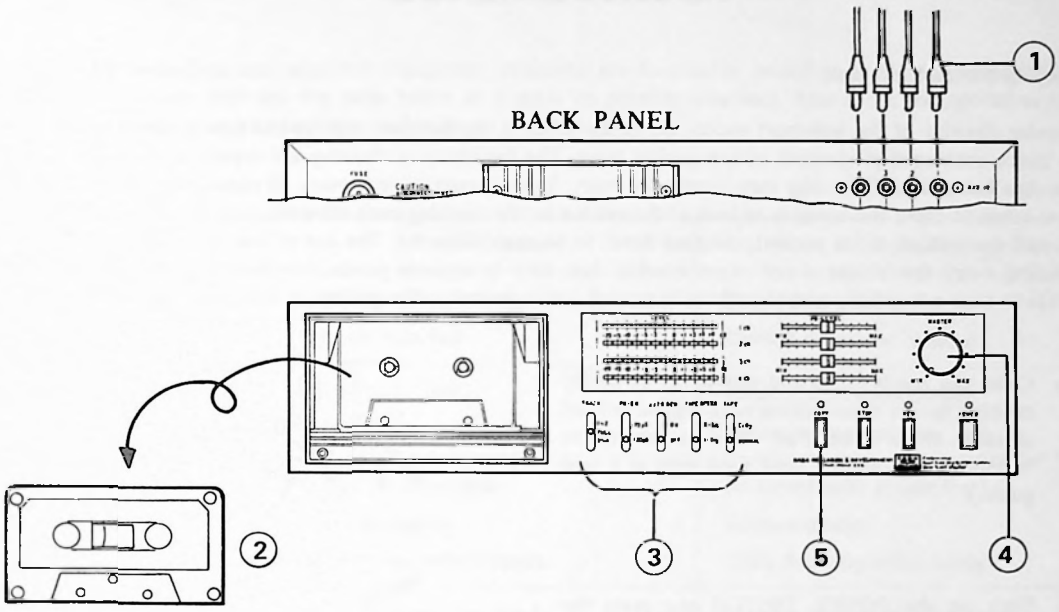



LEVEL INDICATOR

6 Each slave deck is equipped with two trouble indicator LEDs – one for each transport. Please refer to the discussion in paragraph 1 on page 7, "COPY LAMP – L R", for details regarding the trouble lamp function.

7 Keep your cassette tapes in their cases after recording with the tape rewound on the left hub so dust and dirt will not enter the housing and adhere to the tape and the tape within the cassette will not become loose.

# USING THE AUXILIARY INPUT




(1) Connect the wires from another deck or audio device such as a four track reel-to-reel, two 1/4" half-track decks operated back-to-back, or a two-track input such as a record player, digital processor or electronic instrument to AUX-IN on the back panel of the RTDS-4TM.

Because all four track inputs are available, the KABA Real Time Duplication System is ideally suited for the production of all types of audio-visual synch-sound programs and will insure the finest stereo audio possible for such productions.

(2) Make sure there is no cassette in the master play transport. AUX-IN is automatically disconnected when a cassette is inserted in the play transport.

(3) Set the selection switches.

TRACK: select the tracks to be copied by the RTDS-4TS decks. If the signal is coming from a two channel device such as a digital processor, a musical instrument or a stereo deck, TRACK should be set to 1-2.

TAPE SPEED: set at 1 7/8 for all real-time inputs from external audio devices. If 3 3/4 speed is used, the external device must also play at double speed. If a reel-to-reel master is being played at double speed, additional equalization, if needed, may be accomplished by using the PRE-OUT and MAIN-IN patch terminals on the rear of the RTDS-4TM.

TAPE: set according to whether chrome or standard bias tape is being used in the copy positions (RTDS-4TS decks).

(4) Adjust the MASTER GAIN so that peak levels do not exceed +3 (unless copy tape has greater than normal head room). If the left-right stereo balance needs adjusting, it can be accomplished with the individual track slider gain controls.

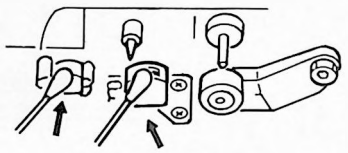
(5) Press COPY SWITCH to start all the RTDS-4TS decks copying. Note that since the external audio source does not control system start up, it is necessary to cue up the external audio source to start just after the system COPY SWITCH has been pressed and enough time has elapsed to allow the cassette leader to pass the record heads.

# MAINTENANCE

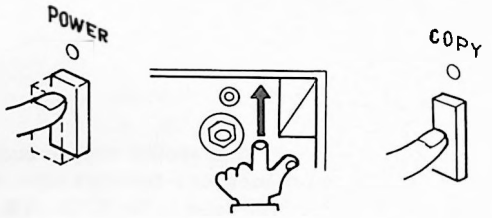
1 Keeping the transport clean

Regular cleaning of the transport region, particularly heads, pinch-roller, capstan and tape guides is recommended to insure continued production of top-quality tapes. The frequency of cleaning will depend a lot on the quality of the tape being used. This may vary from once every 3 or 4 passes to once every 50 passes. A good indicator as to how often to clean the heads is to look at the residue on the cleaning swab after cleaning the head. If there is even a small amount of oxide present, cleaning needs to be more frequent. The use of low quality tapes that require cleaning every few passes is not recommended. Not only is valuable production time lost but such tapes cause heads to wear out quickly and contribute to a much lower general audio quality on the finished product.

a) Clean the heads (erase and play-back) by gently rubbing with a clean cotton swab dipped in head cleaning fluid. (The erase head in the master transport is a dummy head used only as a tape guide.)



b) Turn on the POWER SWITCH and press the COPY SWITCH while pushing up the cassette detect switch which is located in the upper right hand corner of the transport. This action keeps the capstan and pinch-roller running.




c) Clean the capstan and pinch-roller while they rotate. Use a light pressure of the swab so as not to stop the rotation of the pinch roller. Avoid getting the cotton swab too far back on the capstan so as not to catch cotton fibers in the bearing.

d) Do not insert a tape until all cleaning fluid has evaporated.

2 Panel maintenance

a) Do not use chemicals or furniture polish on the panels. These products may discolor or disfigure the surface.

b) If a stain does not wipe off easily, dip a soft cloth into a dilute neutral detergent solution, wring it out and gently clean off the stain. Then use a clean, soft dry cloth to wipe off all the moisture.

3 Head demagnetization

Recorder heads may become magnetized by normal ON and OFF surges through the recorder electronics during use, by extremely loud passages on the tape or through use of magnetized tools or testing with an ohmmeter. Permanently magnetized heads can cause partial erasure of a valuable master, particularly of the higher frequencies.

The user should obtain a good quality head demagnetizer and use it regularly in the manner prescribed by the manufacturer.

# TROUBLE SHOOTING

Unsatisfactory recordings and apparent equipment problems are frequently caused by incorrect operation. If you experience a problem, first use the table below as a guide to possible solutions. Also check the operation of other peripheral equipment that may be being used with the system.

| Symptom | Possible cause | Remedy |
|---|---|---|
| Tape not moving | Disconnected power cord<br>Tape on right hub | Re-connect cord<br>Rewind or reverse cassette |
| No recording | Master tape blank<br>Incorrect connections | Replace with good master<br>Reconnect equipment |
| Distorted sound and noise | Record level too high<br>Worn out master<br>Dirty or magnetized heads | Re-record with proper level<br>Replace master<br>Clean & demagnetize heads |
| Loss of high frequencies | Dirty or magnetized heads<br>Position of select switches incorrect | Clean & demagnetize heads<br>Position select switches properly for tape in use |

If these simple remedies do not solve the problem, refer to the service manual or call toll free 800-231-TAPE for further assistance. (from CA, 415-883-5041)

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ask for 4-TRACK REALTIME SERVICE DEPARTMENT

# SPECIFICATIONS–MASTER DECK

## 1. TAPE DECK SECTION

| | | |
|---|---|---|
| System | | Compact cassette 4 channel |
| Head | | "Sendust" play back head |
| Motor | | Brushless DC direct drive ball bearing |
| Rewind time | | Approx. 70 seconds (C-60) |
| Wow & flutter | | 0.05% (WRMS) |
| Frequency response | | 20Hz–20,000Hz +/– 3dB |
| S/N ratio | | 57dB or better |
| Harmonic distortion | | 1% or less (0dB) |
| Tape speed | | 1-7/8 or 3-3/4 ips +/– 0.5% |
| Crosstalk | | Better than 50dB |
| Channel separation | | Better than 40dB |
| Output | (MASTER OUT) | 1V 30ohm, female RCA |
| | (PRE OUT) | 1V 600ohm, female RCA |
| Input | (AUX IN) | 1V 20,000ohm, female RCA |
| | (MAIN IN) | 1V 20,000ohm, female RCA |

## 2. SUBFUNCTIONS

P.B. equalization (120/70 μs)
Auto rewind (ON/OFF)
Tape selector (NORMAL/$CrO_2$)
Track selector (1-2/FULL/3/4)
Speed selector (1-7/8 & 3-3/4)
P.B. level control (individual track & ganged)
LED level indicator (–20 to +8dB)

## 3. MISCELLANEOUS

| | |
|---|---|
| Power requirements | AC 120V, 60Hz |
| Power consumption | 27 watts |
| Dimensions (W x H x D) | 16-17/32 x 4-5/8 x 12-13/32 inches |
| Weight (net) | 13.2 lbs |
| Temperature range | 0–45 deg C (32–138 deg F) |
| Humidity range | 0–95% (no condensation) |
| Circuits | Plug-in replaceable |
| Transport | Modular replaceable sub-assembly |

## 4. FURNISHED PARTS

| | |
|---|---|
| Power cord | (1) |
| Operation manual | (1) |
| Warranty card | (1) |

## 5. NOTES

1) Reference signal for distortion, crosstalk and channel separation measurements: 1KHz
2) Wow & flutter: JIS, 3KHz with acoustic compensation (weighted)
3) S/N ratio: measured at the 3rd harmonic 3% distortion level (weighted)
4) Reference output level: 0dB LED level indicator = 160nwb/m

# SPECIFICATIONS–SLAVE DECK

## 1. TAPE DECK SECTION

| | |
|---|---|
| System | Compact cassette 4 channel |
| Heads | "Sendust" record head (2)<br>"Ferrite" erasing head (2) |
| Motors | Brushless DC direct drive ball bearing |
| Rewind time | Approx. 70 seconds (C-60) |
| Wow & flutter | 0.05% (WRMS) |
| Frequency response | 20Hz–20,000Hz +/– 3dB |
| S/N ratio | 55dB or better |
| Harmonic distortion | 1% or less (0dB) |
| Tape speed | 1-7/8 or 3-3/4 ips +/– 0.5% |
| Crosstalk | Better than 50dB |
| Channel separation | Better than 40dB |
| Input | 1V 50Kohm, female RCA |
| Output | Pass inputs |

## 2. SUBFUNCTIONS

Auto stop
Tape trouble indication system

## 3. MISCELLANEOUS

| | |
|---|---|
| Power requirements | AC 120V, 60Hz |
| Power consumption | 45 watts |
| Dimensions (W x H x D) | 16-17/32 x 4-5/8 x 12-13/32 inches |
| Weight (net) | 16.5 lbs |
| Temperature range | 0–45 deg C (32–138 deg F) |
| Humidity range | 0–95% (no condensation) |
| Circuits | Plug-in replaceable |
| Transport | Modular replaceable sub-assembly |

## 4. FURNISHED PARTS

| | |
|---|---|
| Power cord | (1) |
| Patch cords, 12" two-conductor RCA-RCA | (2) |
| Control cable, 9" 10-conductor, female Molex | (1) |
| Ground connector, 9", spade terminations | (1) |
| Operation manual | (1) |
| Warranty card | (1) |

## 5. NOTES

1) Reference signal for distortion, crosstalk and channel separation measurements: 1KHz
2) Wow & flutter: JIS, 3KHz with acoustic compensation (weighted)
3) S/N ratio: measured at the 3rd harmonic 3% distortion level (weighted)
4) Reference output level: 0dB LED level indicator = 160nwb/m