SONY

Dictation Products
Service Bulletin

Sony Service Company - Technical Services
A Division of Sony Corporation of America
Sony Drive, Park Ridge, New Jersey 07656

Model: CCP-200RF/D

No. 8

Subject: Troubleshooting Guide

Date: January 13, 1992

Symptom: —
(**)

Solution:

Introduction:

The CCP-200RF/D is a reformatter/duplicator which is based on the CCP-200 Cassette Duplicator. This unit, in its original form, is used for the reproduction of stereo cassette tapes at eight times normal speed on one or both sides simultaneously. The base machine is, therefore, a four-track, four-channel duplicator. This chassis is also utilized in the form of a monaural duplicator, running at 16 times normal speed (CCP-110).

This chassis provides all of the necessary features to produce a good, multi-purpose reformatter. The most important of these features are as follows:

A. Four-track, four-channel copying capability
B. Proven record of performance and reliability
C. Independent, servo controlled drive mechanisms
D. Compact, efficient design

The CCP-200RF/D Reformatter uses the above features in order to provide the customer with a unit that offers the following capabilities:

A. Direct duplication of original tapes, with the benefit of over-record protect.
B. Reformatting of tapes recorded at 1.2cm/s.
C. Reformatting of tapes recorded at 2.4cm/s.

Both reformatting modes are equipped with over-record protect, end of tape detection, and automatic rewind functions.

Theory of Operation - Reformatter Section:

The main control board for the reformatter is quite simple, consisting of timing circuits, head and motor switching, and a dual-channel amplifier. The IC-U2 is a dual timer used for rewind and stop functions. It interfaces to the duplicator's keyboard via open collector inverters, which connect directly to control lines K0 and K1 on the CPU.

There are two slide switches on the machines top plate, which were originally used to select Copy Modes (side A or A+B) and audio end ON/OFF. These switches have been reconfigured for use as Reformat/Duplicate and Speed Select. The lines from these switches appear on the schematic as ACTIVE and SPEED.

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The active line, when LOW (Reformat Mode), will enable the Timer (U2) and activate the Relay (K2), causing the copy side Capstan Motor to run at 16 times normal speed. This line will also activate K1 and K4. K1 will connect channels 1&4 and 2&3 together at the outputs of the playback amplifiers. This completes the four to two channel conversion requirement. K4 will short the upper half of the over-record protect head to ground. This prevents the over-record protect circuit from operating during the second pass of the reformat procedure. When the active line is HIGH (Duplicate Mode), U2 is disabled and the motor speed is decreased to eight times normal speed. Relays K1 and K4 are disabled, restoring the duplicator to a four-track, four-channel copier with full over-record protection.

Auto-Rewind Sequence:

During the Reformat Mode, it will be necessary to run the copy-side tape through the machine at least two times, turning the tape over each time. The process is as follows:

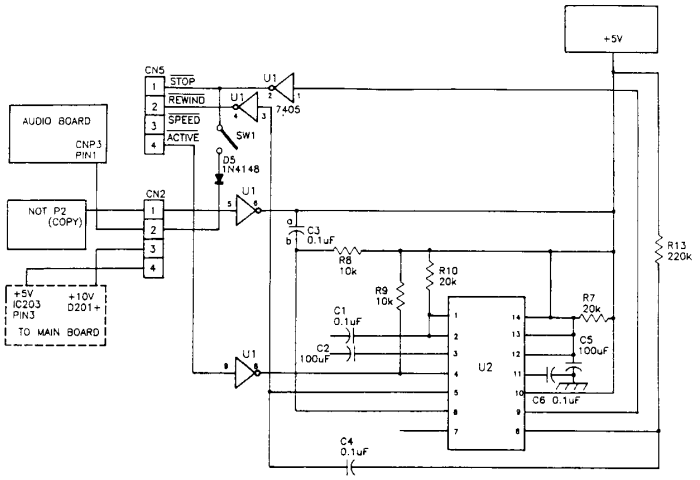
When the copy tape reaches the end, the signal from the copy-side CPU (COPY) will go HIGH. This signal produces a negative transient at pin 6 of U2. This will cause pin 5 of U2 to go HIGH for approximately two seconds, resulting in a rewind command being issued to the duplicator's CPU. At this point, a beeper will sound to inform the operator of the machine's status. The rewind command will ensure that the original-side tape is backed-up sufficiently to compensate for the end of tape detection software and to provide a slight overlap. The copy-side tape is also rewound slightly, providing for the use of tapes containing blank leader tape. Upon returning LOW, pin 5 will generate a transient at pin 8, this will result in pin 9 going HIGH for a short time, sending a stop command to the Duplicator Control System.

The speed line, when LOW (2.4cm/s) will activate K3, causing the original-side Capstan Motor to run at eight times normal speed. When this line is HIGH (1.2cm/s), the original-side Capstan Motor will run at four times normal speed.

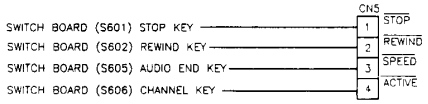
Motor Control:

In the original Duplicator, the Capstan Motor is of the B.S.L. type. This makes it possible to change the motor speed by simply changing the value of one component in the Control Circuit (R506). Part of the modification to the original machine is to remove R506 and route a pair of wires to the Reformatter Control Board. Here the various relays, that have been described above, allocate different resistive values to the servo control unit, according to speed and mode selected.

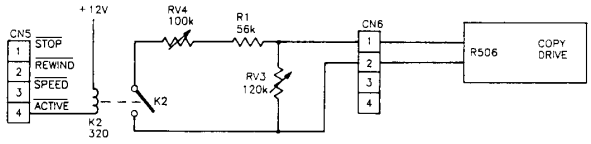
(See diagrams on pages 3 and 4)



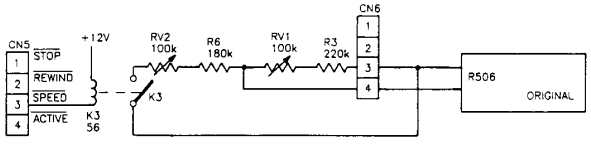
ACTIVE (REFORMAT) MODE SCHEMATIC



ORIGINAL SIDE DRIVE CONTROL



WHERE DOES THE CN5 CONNECTOR GO TO ?



COPY SIDE DRIVE CONTROL

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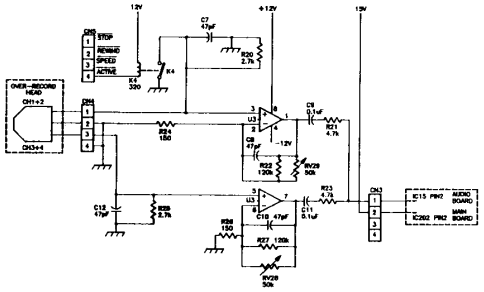
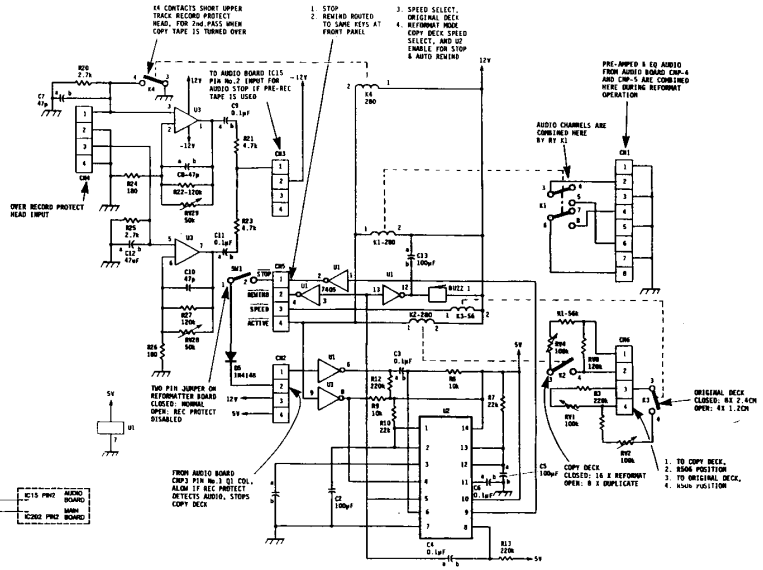


OVER-RECORD PROTECTION CIRCUIT



CCP-200RF/D

Test and Set-Up:

Should it be necessary to replace either a reformatter board or a capstan drive unit, the motor speed controls on the reformatter board will have to be reset.

Equipment Required:

1. Frequency Counter
2. Bulk Eraser
3. Stereo Cassette Player
4. 1KHz Test Tape (0dB)

Procedure:

1. Connect the Frequency Counter to test point #2 on the Duplicator's Audio Board.
2. Place the test tape in the original drive and set the speed control to 1.2cm/s.
3. Press the Copy key and observe the Frequency Counter.
4. Adjust RV1 on the Reformat Board until you get a reading of 4KHz (±1%).
5. Set the speed control switch to 2.4cm/s and adjust RV2 for a reading of 8KHz (±1%).
6. Place a blank tape in the original drive and place the test tape in the copy side drive.
7. Disable the recording circuits by connecting a crocodile test clip between test point #19 and test point #E19 on the Audio Board.
8. Disconnect the Jumper (SW1) on the Reformat Board.
9. Connect the Frequency Counter to test point #14 on the Duplicator's Audio Board.
10. Set the Reformat/Duplicate switch to Duplicate.
11. Set the Duplicator in Copy mode and adjust RV3 for a reading of 7.76KHz (±1%).
12. Set the Reformat/Duplicate switch to Reformat and adjust RV4 for a reading of 15.52KHz (±1%).
13. Reconnect the Jumper (SW1) and remove the test clip from points #19 and #E19.

When making the above adjustments to the copy-side of the Duplicator, it is important to note that all measurements at test point #14 should be at -25dB; this is to ensure that even low original recordings will be detected by the over-record circuits. Should adjustments be necessary, RV28 and RV29 are the components that should be adjusted.

If a new drive or drive control circuit is installed in the copy drive, you must ensure that the take-up torque is adjusted for 16 times speed, before the machine can be used as a Reformatter. Failure to do this will result in destroyed tapes.

If you do not have the necessary test equipment to perform this adjustment according to the manual, you can proceed by setting the Control (VR401) to maximum. Then place the unit in Reformat mode and observe the tape in the Copy position. Back off the setting of VR401 until you begin to see slack in the tape, between the pressure roller and the take-up reel. Increase the value of RV401 by a sufficient amount, to remove the slack.

TROUBLESHOOTING

The CCP-200RFD is a multi-function unit and can cause confusion in some circumstances. During the initial test period, we have become acquainted with the most frequent problems and their unusual causes. The following information should help in identifying and correcting these problems.

SYMPTOM #1 - TAPES STOP DURING COPY PROCESS:

This is the most common problem that we have encountered. First, check the following list to determine whether or not the machine has a manufacturing or adjustment defect.

1. **Head Bridge Assembly - (Copy Side):**

   The current production units have the over-record-protect head mounted on a fixed aluminum pillar on one side and a compressed spring on the other. All units that do not have heads mounted in this way, must have the head bridge assembly replaced. Please contact your Zone Tech Supervisor for replacement assembly.

2. **Copy Deck Stops:**

   Apart from the obvious problem of people putting recorded tapes in the copy drive, you may see the machine stopping on a tape that has been erased. This problem is due to the fact that some erasers leave electro-magnetic noise on the tape. This noise is not very noticeable at normal playback speed, but at 8 or 16 times speed it is amplified in both volume and frequency. This noise will become quite evident to the over-record-protect circuitry and can cause the machine to stop. Try a VIRGIN tape in the unit if you suspect this problem. Assuming that this tape works well, examine the type of equipment and the technique being used to erase tapes.

3. **Take Up Torque Adjustment:**

   One of the essential requirements of high speed duplication is the take up torque adjustment. If either the original or copy side adjustment is inadequate, the copy process will stop. This problem will be most apparent on the copy side drive, as this drive runs twice as fast as the original side drive. This control should be set to about 90% of maximum for proper operation.

4. **Tapes:**

   Use of very thin tape can cause the tape to stick to and wrap around the pressure roller mechanism. This problem will be compounded if the tape path and pressure roller mechanism is not kept clean.

SYMPTOM #2 - THE COPY TAPE IS SLOW:

1. This problem usually occurs when people are making copies of original tape in "Duplicate Mode". If the original was made to 1.2 cm/s, it can seem logical to set the machine to DUPLICATE and 1.2 cm/s. This will not work. The machine must always be set to 2.4 cm/s to make duplicates recorded at either 2.4 or 1.2 cm/s.

   The SPEED switch can only be set to 1.2 cm/s in the duplicate mode if you wish to convert a tape recorded at the older 2.4 cm/s format, to the new 1.2 cm/s format.

SYMPTOM #3 - COPY QUALITY IS POOR:

1. **Head Condition:**

   Any high speed duplicator can expect to experience head wear problems. During the reformat mode, the head wear will be accelerated due to the high speeds being used. The most apparent degradation in quality will usually be due to wear on the original side head.

2. **Over-Record-Protect Head Alignment:**

The primary purpose of the over-record-protect head is to detect audio on the copy tape, however, it also has another function. This function is to act as a guide for the tape being fed from the supply turntable. If the azimuth of O.R.P. head is incorrect, it will feed the tape past the record head at an improper angle, leading to drifting and phasing of the recorded signal.