

Date: **July, 1988**

Subject: **MANUAL CORRECTIONS—
 MAINTENANCE TOOLS LIST**

Model: **APR-5000**

Serial No: **SEE TEXT**

DESCRIPTION

Change or add the new part numbers in the APR-5000 Operation and Maintenance Manual, 1st Edition, Section 6.2.2 Tools as shown in Figure 1.

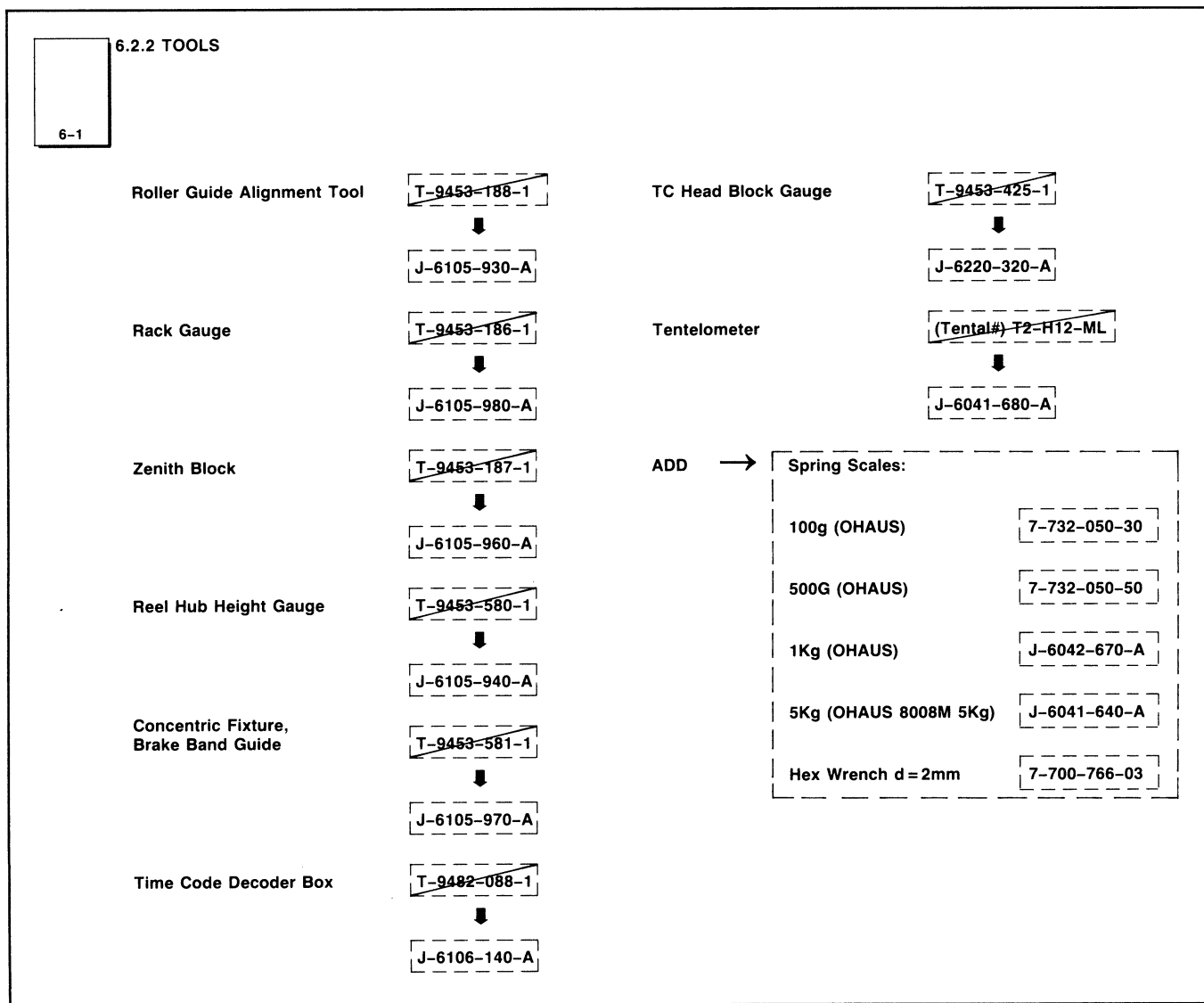


Figure 1

Date: **July, 1988**

Subject: **RMD BOARD TRANSISTOR
REPLACEMENT**

Model: **APR-5002/5003 AND PCM-3102/3202**

Serial No: 10,001 AND HIGHER

DESCRIPTION

Two types of transistors on the RMD Board are no longer available. Q3 and Q7 were formerly type 2SB854 (part number T-9413-424-1). Q5 and Q9 were formerly 2SD1130 (part number T-9413-423-1).

If Q3, Q5, Q7 or Q9 fails, follow the modification procedure described in this bulletin to install similar replacement transistors. The associated resistors must also be replaced.

PARTS REQUIRED

Part No.	Description	Qty.
8-729-300-24	2SA1170, (Q3/7)	2
8-729-300-18	2SC2774, (Q5/9)	2
1-247-688-11	Res, Carbon, 10 Ω , 5%, 1/4W, (R19/20/43/44)	4
1-249-401-11	Res, Carbon, 47 Ω , 5%, 1/6W, (R18/21/42/45)	4

MODIFICATION PROCEDURE

RMD Board

Component Side (See Figures 1 and 2.)

1. Replace Q3 and Q7 (2SB854) with 2SA1170 transistors.
2. Replace Q5 and Q9 (2SD1130) with 2SC2774 transistors.
3. Replace R19, R20, R43 and R44 (270Ω) with 10Ω resistors.
4. Replace R18, R21, R42 and R45 (1kΩ) with 47Ω resistors.

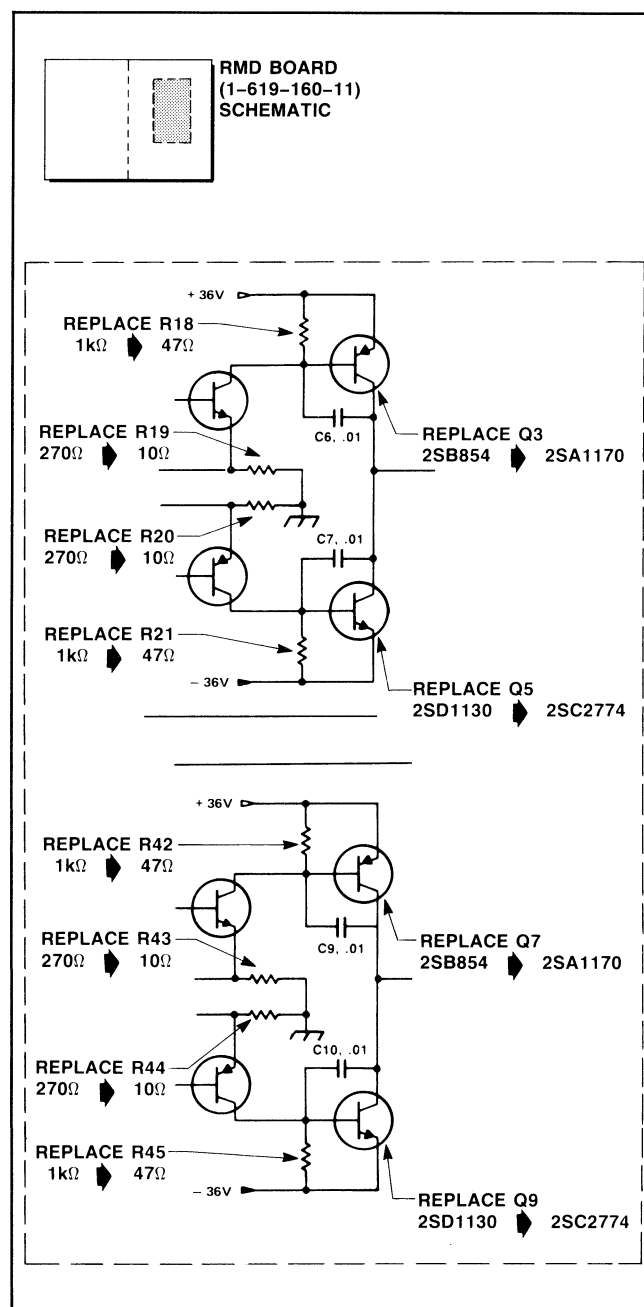


Figure 1

RMD BOARD
(1-619-160-11)
COMPONENT SIDE

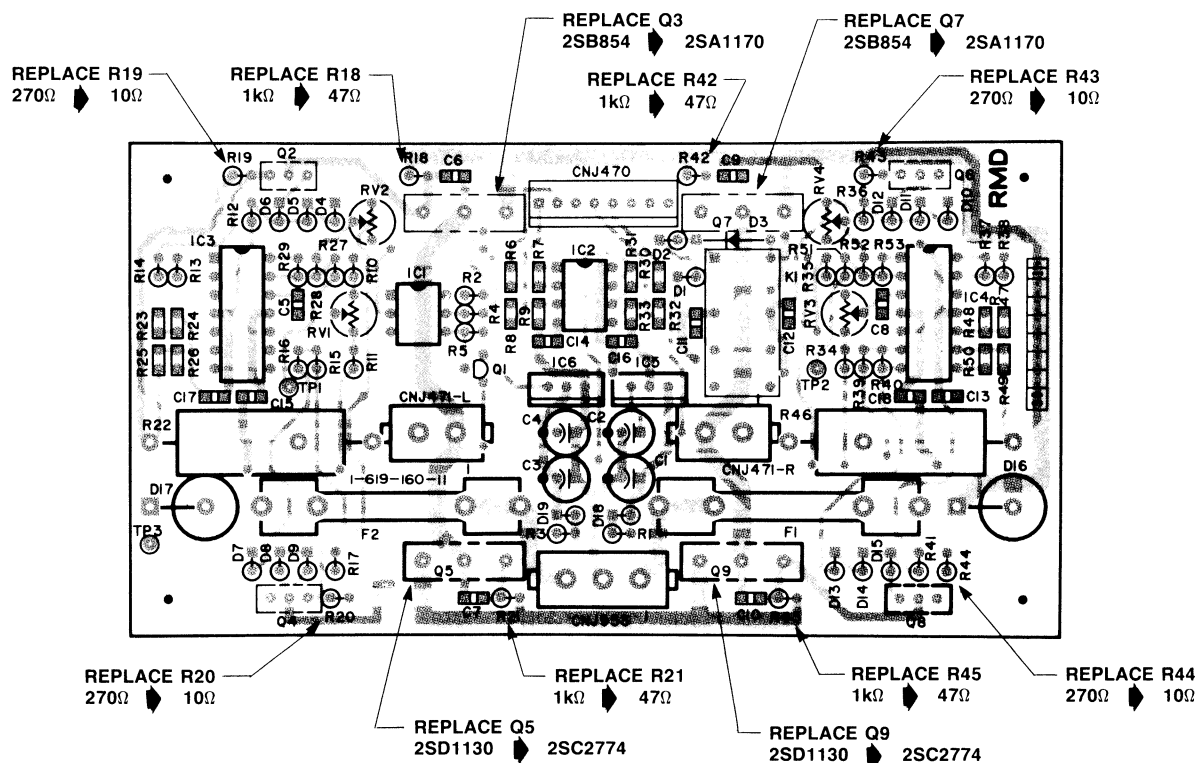


Figure 2

Date: **July, 1988**

Subject: **CPU FIRMWARE UPGRADE—VERSION
P4.01.01.2**

Model: **APR-5000 SERIES**

Serial No: **SEE TEXT**

DESCRIPTION

New CPU firmware is now available for APR-5000 Series tape recorders. The new firmware eliminates minor problems encountered in previous firmware. The improvements are described in this bulletin.

Install the new firmware in units with the following serial numbers:

APR-5001/5002/5002D/5002W 10,001-20,810

APR-5002H 10,001-20,738

APR-5003 10,001-21,142

Units with higher serial numbers have been factory modified.

FIRMWARE ORDERING INFORMATION

The new firmware is available from your Sony Professional Audio Products Dealer or the Sony National Parts Center in Kansas City at **(816) 891-7550**.

PARTS REQUIRED

Part No.	Description	Qty.
EAR5000-02	Version 4.01.01.2 Firmware Kit	
	Odd EPROM, P4.01.01.2, IC13	1
	Even EPROM, P4.01.01.2, IC14	1
	Memory Locations Label (T-9453-313-2)	1

APR-5000 SERIES UNITS (ALL MODELS)

Improvements in P4.01.01.2 Firmware

- Chase and Locate operations using EBU time code are improved. Slewing is reduced near target location.

- A Pre-Play condition is possible from a Locate operation, even if frozen external time code is supplied to the APR-5000 Series recorder.
- Minor inaccuracies have been eliminated in Locate operations when external time code is used.
- When using 1/2" tape, a momentary tape tension loss under unknown radius conditions has been eliminated. This problem previously occurred during a tape break when a small radius take up reel was on the machine.
- Sporadic Longitudinal Time Code correction errors are no longer injected into recorded time code. This problem previously occurred only when SMPTE Drop Frame time code was supplied externally at 7 1/2 and 15 ips running speed.

INSTALLATION PROCEDURE

1. Remove two screws from back of Top Rear Cover Assembly.
2. Remove Top Rear Cover Assembly. Note that GND screw under lower right end of cover may inhibit removal of cover assembly.
3. Remove upper two screws from Transport Control Panel. Lift panel to access CPU Board.
4. Replace IC13 (zone E2) with new IC13 EPROM. Replace IC14 (zone E5) with new IC14 EPROM.
5. Reassemble unit and replace screws.
6. Apply new Memory Location User Label (T-9453-313-2) over former label.
7. Store 0:00 or any valid number in Memory Location 50 to eliminate invalid data that may occur at this address when new firmware is installed.

Date: **July, 1988**

Subject: **IMPROVED ERASURE AT PUNCH-
IN/OUT POINTS**

Model: **APR-5002/5003**

Serial No: **20,001-20,014 (APR-5002)**
20,001-20,022 (APR-5003)

DESCRIPTION

The depth of erasure at punch-in and punch-out points can be improved on APR-5002/5003 recorders.

Perform Modification Procedure I to improve erasure of the audio tracks of APR-5002 recorders.

Perform Modification Procedure II to improve erasure of the audio and time code tracks of the APR-5003.

APR-5002 units with serial number 20,015 and higher, and APR-5003 units with serial number 20,023 and higher have been factory modified.

PARTS REQUIRED—MODIFICATION I

Part No.	Description	Qty.
1-214-573-00	Res, Metal, 4.7k Ω , 1%, 1/8W	4

MODIFICATION PROCEDURE I (APR-5002)

CNL Board

Component Side (See Figure 1.)

1. Remove Channel 1 CNL Board and remove shield from channel assembly.
2. Unfasten screws from Q2 and Q3 and remove heat sink bracket to access R134 and R137. Ensure that shoulder washers do not become separated from screws.
3. Replace R134 and R137 (15k Ω) with 4.7k Ω resistors.
4. Replace heat sink bracket on Q2 and Q3. Ensure that shoulder washer is reinstalled properly.

5. Reinstall shield on channel assembly and insert Channel 1 CNL Board in unit.
6. Repeat steps 1-4 on Channel 2 CNL Board.

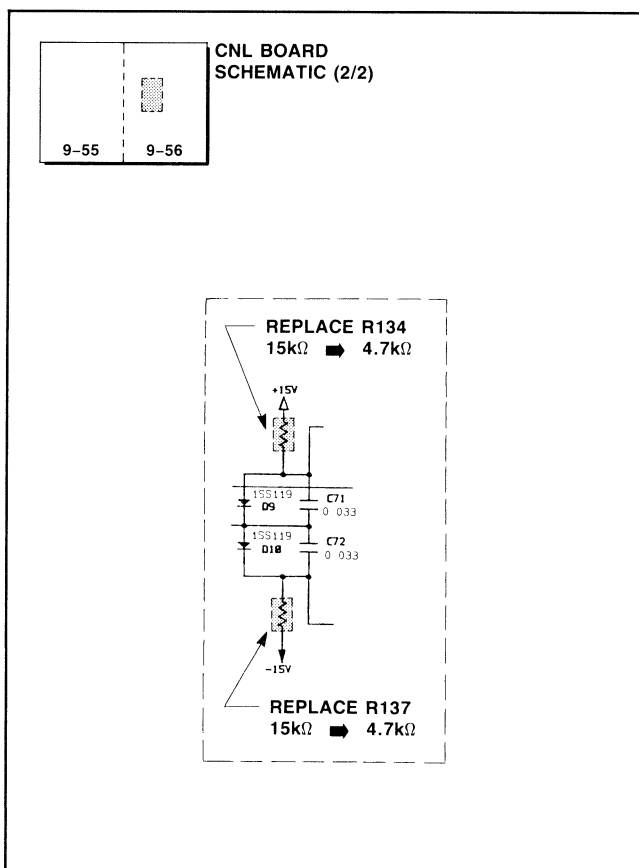


Figure 1

PARTS LIST—MODIFICATION II

Part No.	Description	Qty.
1-214-573-00	Res, Metal, 4.7k Ω , 1%, 1/8W	2
1-214-584-00	Res, Metal, 13k Ω , 1%, 1/8W	2

MODIFICATION PROCEDURE II (APR-5003)

TCC Board

Component Side (See Figure 2.)

1. Remove TCC Board from unit.
2. Remove shield from channel assembly.
3. Unfasten screws from Q2 (zone 2B) and Q3 (zone 3B), and remove heat sink bracket to access R134 and R137. Ensure that shoulder washers do not become separated from screws.
4. Replace R134 and R137 (15k Ω) in zone 2B with 4.7k Ω resistors.
5. Replace R113 and R117 (20k Ω) in zones 4A and 4B with 13k Ω resistors.
6. Replace heat sink bracket on Q2 and Q3. Ensure that shoulder washer is reinstalled properly.
7. Reinstall shield on channel assembly and insert Channel 1 TCC Board in unit.

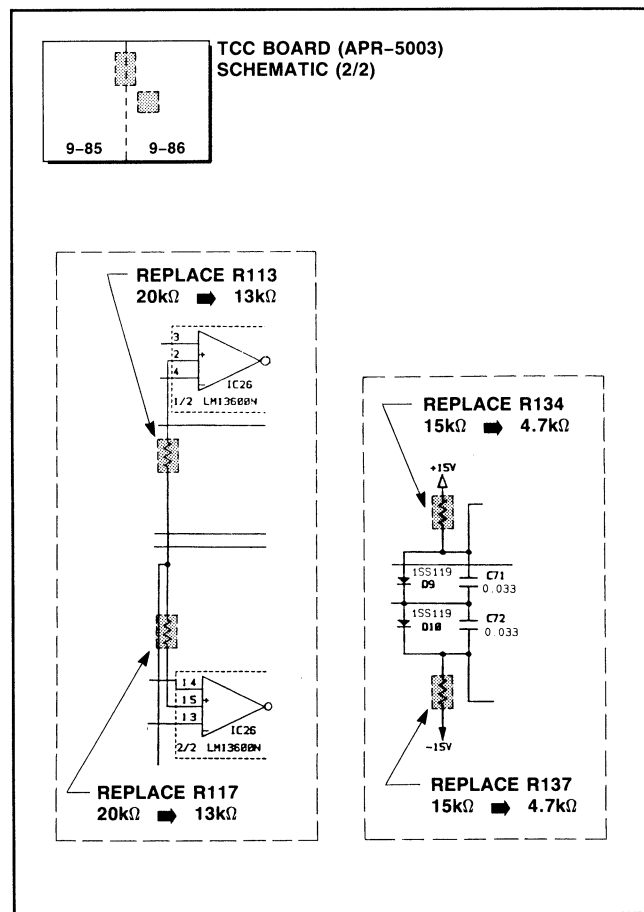


Figure 2

Date: **August, 1988**

Subject: **IMPROVED GROUNDING FOR HEAD
BLOCK ASSEMBLY**

Model: **APR-5002/5003**

Serial No: **10,001-20,014 (APR-5002)**
10,001-20,022 (APR-5003)

DESCRIPTION

To prevent excessive erase crosstalk, (more than 200mV) modify the Head Block assembly as described in the following procedure. This modification provides improved grounding.

APR-5002 units with serial number 20,015 and higher and APR-5003 units with serial number 20,023 and higher have been factory modified.

PARTS REQUIRED

Part No.	Description	Qty.
7-623-422-07	M3, Toothed Washer	1
7-682-647-09	Screw, + PS3X6	1
	Crimp Lug	1
	22AWG, 3" Length Insulated Wire	1

MODIFICATION PROCEDURE

1. Loosen three screws (M3x6) on front of Headstack, then remove Headstack.
2. Remove Pinch Roller Assembly.
3. Remove four screws (B4x6) from Top Front Cover, then remove cover.
4. Unfasten two mounting screws on Head Block Connector Assembly and lift assembly away from unit enough to allow for pin extraction.
5. Using pin extractor (AMP 91067-1), remove pin 77 from connector.
6. Desolder pin from wire. Save pin.
7. Strip insulation from both ends of 3 inch insulated wire in parts required list.
8. Solder crimp lug to one end of wire.
9. Solder other end of wire to pin 77 removed in step 6.

NOTE: Do not allow excessive amounts of solder to flow on to outside of pin. This will inhibit pin from being reinstalled.

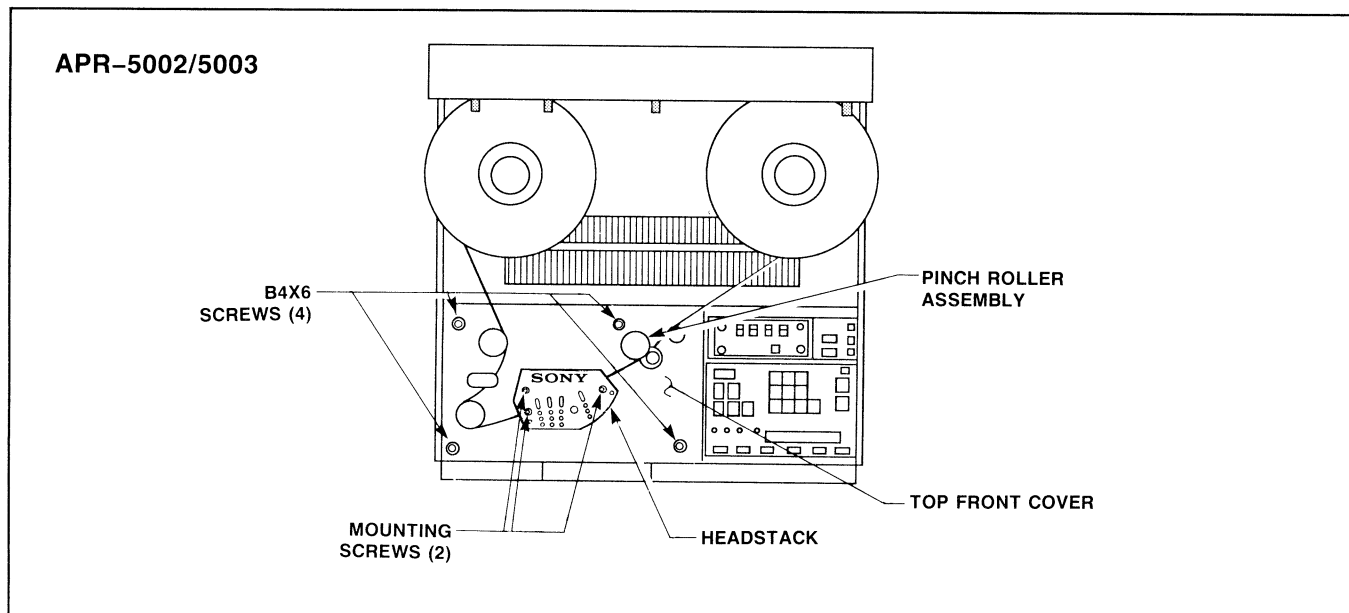
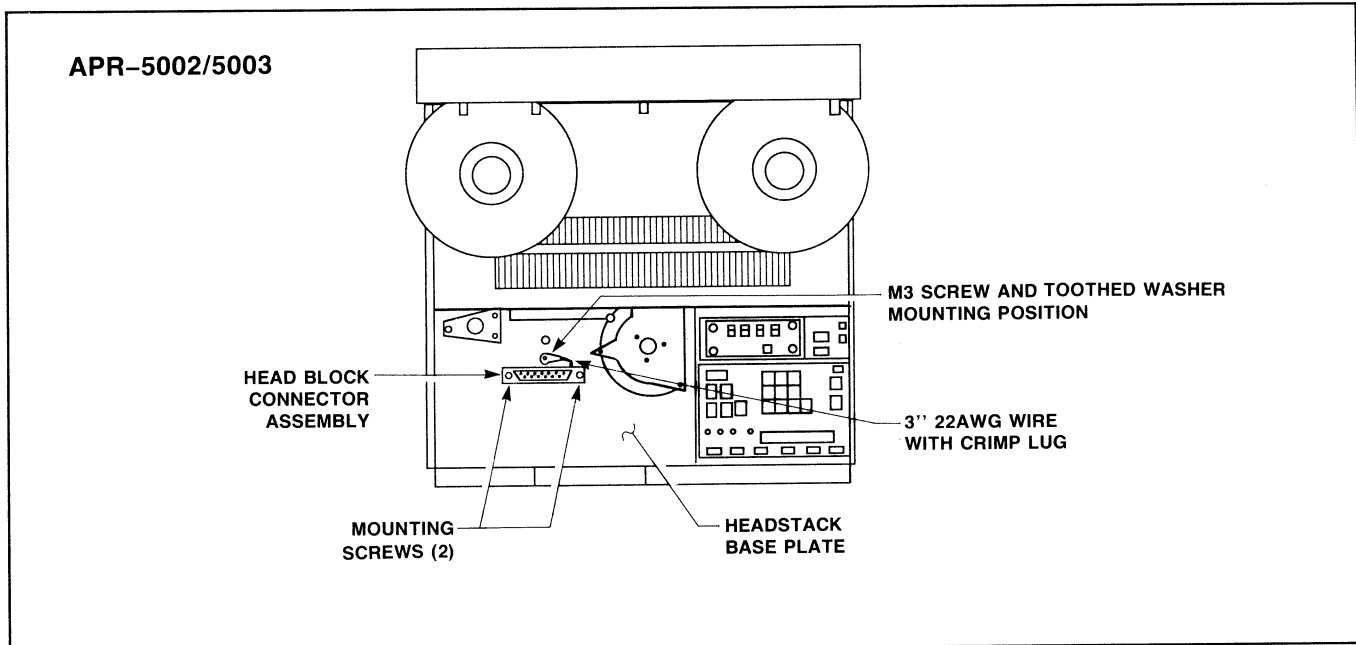


Figure 1

10. Reinstall newly wired pin 77 in connector, placing wire toward rear of machine.
11. Fasten crimp lug end of wire to Headstack Base Plate (behind connector) using M3 screw and toothed washer.
12. Reinstall Head Block Connector Assembly, Top Front Cover, Headstack and Pinch Roller Assembly.

**Figure 2**

Date: **September, 1988**

Subject: **IMPROVED CPU CRYSTAL FREQUENCY
 ACCURACY**

Model: **APR-5002/5002W/5003**

Serial No: **20,001 AND HIGHER**

DESCRIPTION

The CPU crystal in some APR-5000 Series recorders may run at 7.8670 MHz instead of 7.8720. As a result, the capstan runs 0.06% slow, but is only a problem in the most demanding applications. One problem application is when audio is processed separately from video.

To correct this problem, replace the crystal with part number **T-9412-725-1**. This modification is applicable to the following units:

- APR-5002 with serial numbers 20,001-20,837
- APR-5002W with serial numbers 20,001-20,842

- APR-5003 with serial numbers 20,001-20,200
- Units retrofitted with CPU PCB 1-619-161-xx (any suffix)
- Units with replacement crystals (part number 1-567-697-11)

Units with serial numbers 10,001-19,999 already contain the correct CPU crystal.

NOTE: Replace the CPU crystals in all APR-5000 Series units in your facility at the same time to avoid possible speed incompatibility.

OK

Sony Communications Products Company
A Division of Sony Corporation of America
Training and Publications
677 River Oaks Pkwy, San Jose, California 95134

Date: **September, 1988**

Subject: **REDUCED AUDIO ERASE BIAS
CROSSTALK INTO TC HEAD**

Model: **APR-5003**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

The audio erase signal may appear in the time code record/play circuit if the leads from each head are too close together in the Head Block Assembly. Audio erase crosstalk may partially erase previously recorded time code. Audio erase crosstalk may also erase time code as it is being recorded with the audio. Partially

erased time code may be garbled by the time code reader.

Should this occur, separate the audio erase leads from the time code record/play leads as much as possible. If the leads must cross, be sure they cross at right angles.

Date: **September, 1988**

Subject: **NEW CERAMIC TAPE LIFTERS**

Model: **APR-5000 SERIES**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

Metal replacement tape lifters have been discontinued. The new replacement tape lifters are ceramic and have a longer life. When replacing tape lifters, use the ceramic types described in this bulletin.

NOTE: If the unit will eventually be upgraded to a ¼ inch wide profile or ½ inch format, replace the complete lifter and shield assembly.

PARTS REQUIRED

Part No.	Description
X-3711-009-1	Plate A Assembly
X-3711-010-1	Plate B Assembly

Date: **October, 1988**

Subject: **ELIMINATION OF FALSE "ERASE ON" INDICATION**

Model: **APR-5000 SERIES**

Serial No: **20,001 AND HIGHER (SEE TEXT)**

DESCRIPTION

Some APR-5000 Series recorders may give a false "ERASE ON" LED indication. This problem occurs on the CNL Board if the heat sink standoff near edge connector pin 50 shorts to the IC23-1 trace.

If this problem occurs in a unit with one of the following serial numbers, modify the unit as described in this bulletin:

APR-5001/5002 20,001-20,800

APR-5002H 20,001-20,823

APR-5003 20,001-21,100

MODIFICATION PROCEDURE

CNL Board

Component Side (See Figure 1.)

1. Loosen standoff screw closest to edge connector pin 50.
2. Insert insulating tape between standoff and IC23-1 trace on component side.
3. Tighten standoff screw to 8.5 kg/cm.
4. Repeat for each CNL Board.

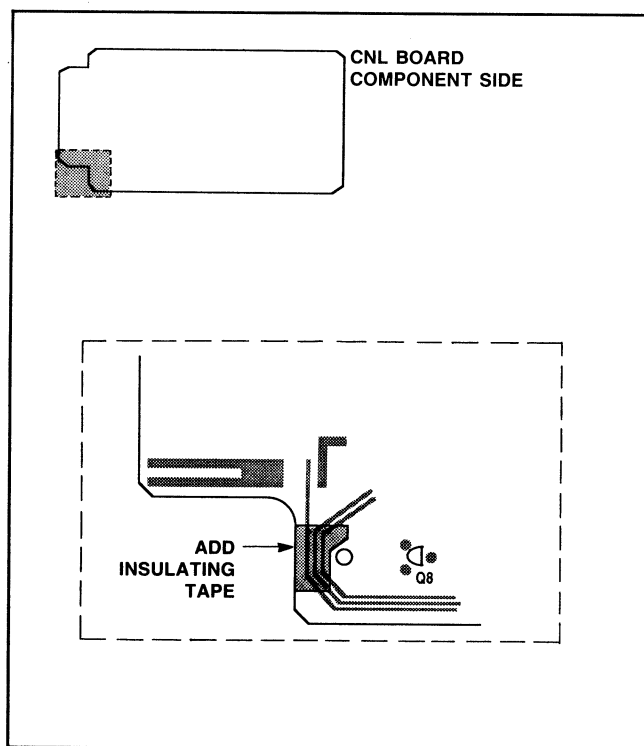


Figure 1

Date: **October, 1988**

Subject: **MANUAL CORRECTION—AMP CASE
 AND CHASSIS ASSEMBLY PARTS LIST**

Model: **APR-5000 SERIES**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

Correct the APR-5000 Operation and Maintenance Manual, 1st Edition through 1st Edition (Rev.5) as shown in this bulletin.

Later revisions will be corrected.

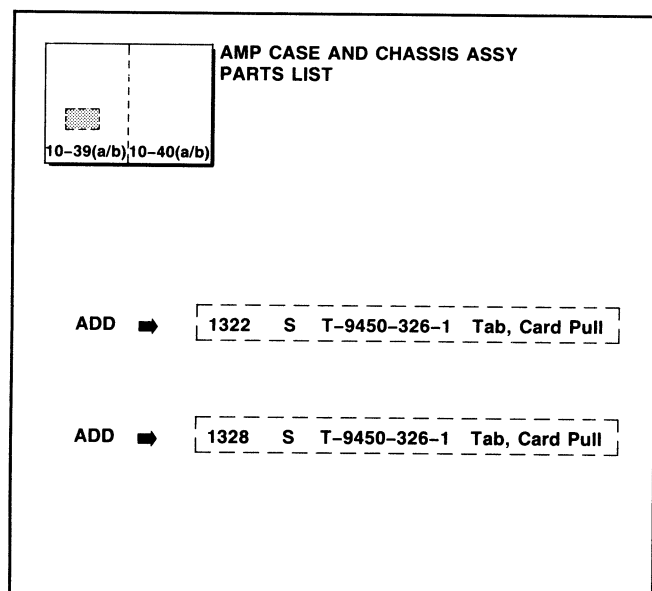


Figure 1

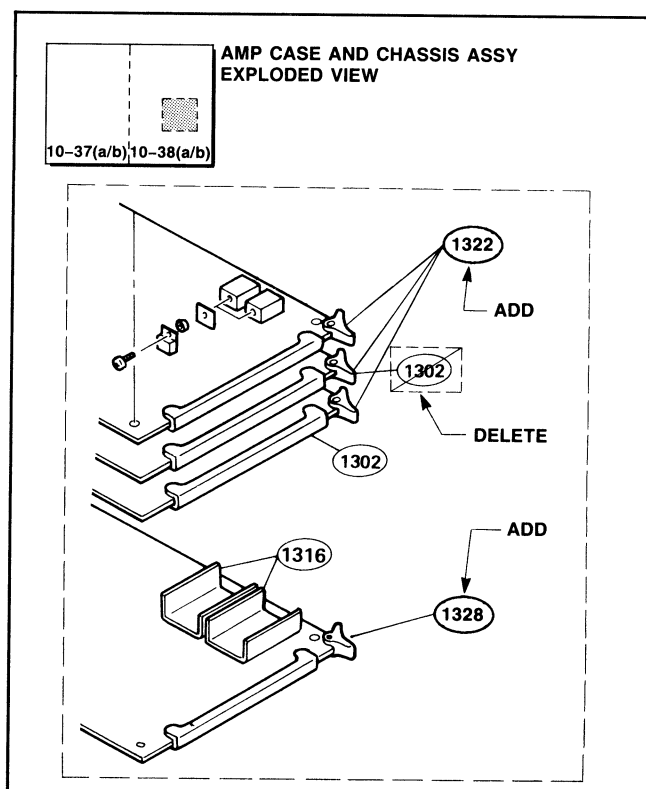


Figure 2

Date: **November, 1988**

Model: **APR-5002/5003**

Serial No: **10,001 AND HIGHER**

Subject: **INSTALLATION OF ½ INCH HEAD
BLOCK OPTION APR-HB-5002H**

DESCRIPTION

An installation kit is required when an APR-5002/5003 recorder is retrofitted with an APR-HB-5002H ½ Inch Head Block Option. Each installation kit contains all additional electrical and mechanical parts required when an APR-HB-5002H is installed on APR-5002/5003 recorders.

Caution: Unsatisfactory operation or component failure may result when an APR-HB-5002H is installed on a unit without an installation kit.

The serial number of the unit to be modified determines which installation kit is required.

Installation Kit 1 (**T-9482-479-1**) is for APR-5002/5003 units with serial numbers 10,001-10,250.

Installation Kit 2 (**T-9482-480-1**) is for APR-5002 units with serial numbers 20,001-20,700 and APR-5003 units with serial numbers 20,001-20,900.

Contact the dealer who sold the unit, or a regional Sony Professional Audio sales office to order the ½ Inch

Head Block Option. The appropriate Installation Kit (if required) is provided with the ½ Inch Head Block Option. Specify the model and serial number and appropriate upgrade kit part number when the order is placed.

Installation Kits 1 and 2 are also available separately from the Sony National Parts Center in Kansas City at **(816) 891-7550**.

APR-5002 units with serial numbers 20,701 and higher, and APR-5003 units with serial numbers 20,901 and higher do not need installation kits.

A ½ Inch Head Block can be moved from one unit to another only if each unit is equipped with a ½ inch installation kit.

A ½ inch splicing block is now available from the Sony National Parts Center as part number **T-9453-579-1**.

Date: **November, 1988**

Model: **APR-5000 SERIES**

Serial No: **10,001-20,700**

Subject: **ELIMINATION OF CPU WATCHDOG
TIMEOUT ERROR WITH P4.01.01.X
FIRMWARE**

DESCRIPTION

The CPU may randomly reset in units that contain Version P4.01.01.X firmware. Modify the unit as described in this bulletin to eliminate this problem.

Units with the following serial numbers have been factory modified:

APR-5002 20,603 and higher

APR-5002H 20,601 and higher

APR-5002W 20,701 and higher

APR-5003 20,701 and higher

PARTS REQUIRED

Part No.	Description	Qty.
T-9410-567-1	Cap, Ceramic, .1 μ F, 100V	1

MODIFICATION PROCEDURE

CPU Board (1-619-161-11)

Component Side

1. Trim each capacitor lead to approximately 3/16 inch.
2. Bend capacitor leads so capacitor will lie snugly on top of IC22 (zone 4C).
3. Solder capacitor between IC22-14 and IC22-15.

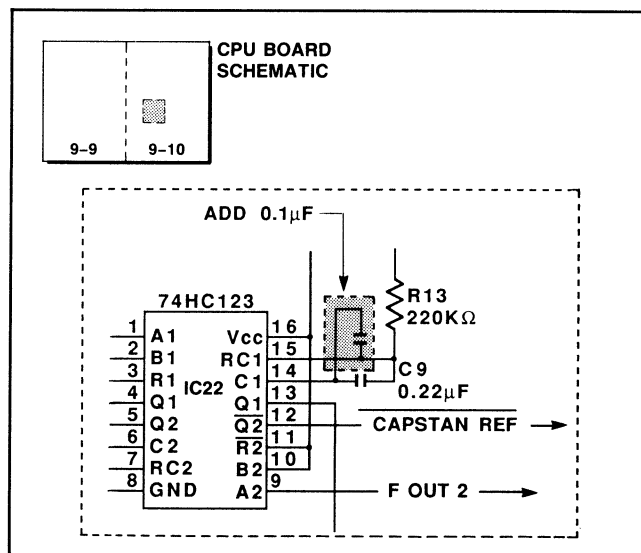


Figure 1

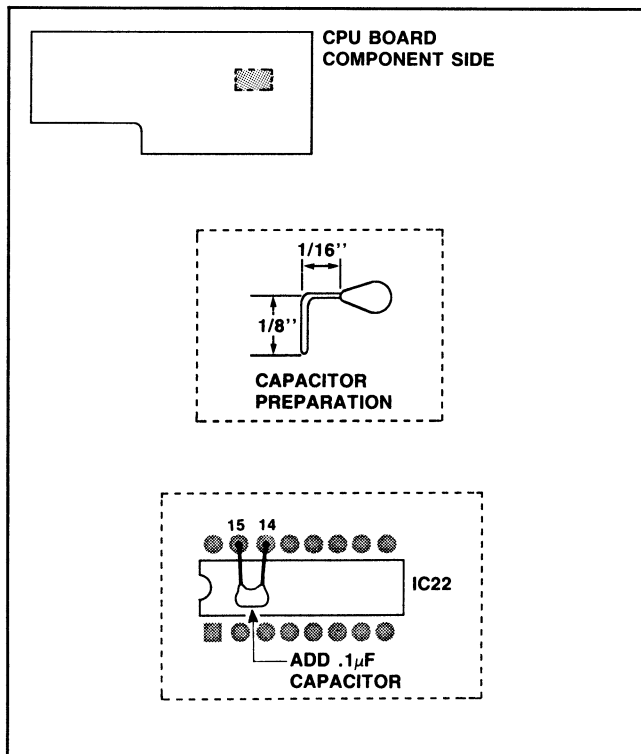


Figure 2

Date: **December, 1988**

Subject: **OPTIONAL MODIFICATION TO
ELIMINATE GLOBAL DIM FEATURE**

Model: **APR-5000 SERIES**

Serial No: **20,001 AND HIGHER**

DESCRIPTION

Modify the MST Board as described in the following procedure to disable the Global Dim feature.

This is an optional modification. No units are factory modified.

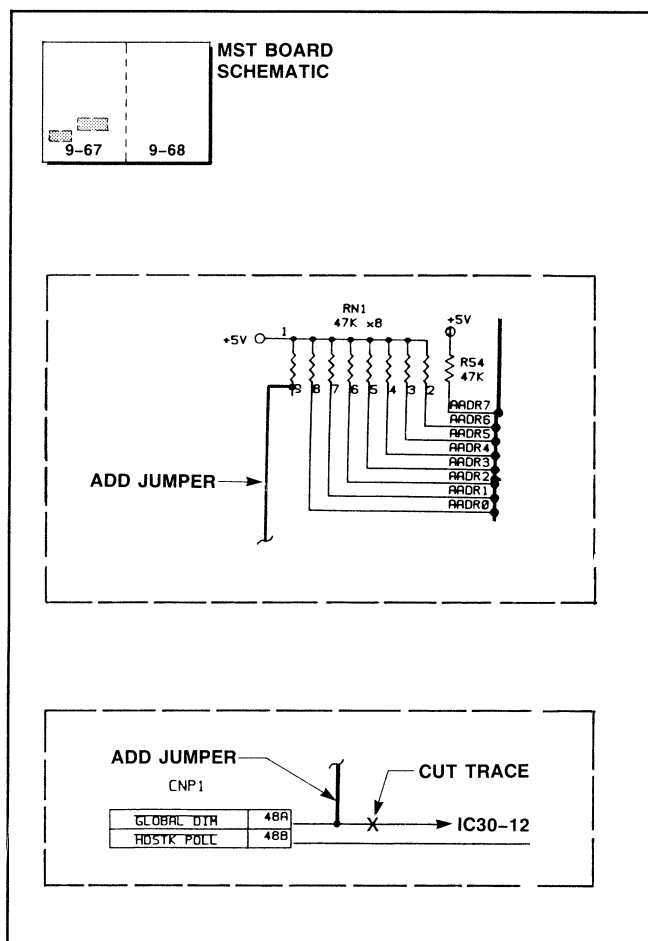


Figure 1

MODIFICATION PROCEDURE

MST Board

Solder Side (See Figures 1 and 2.)

1. Cut trace between feed-thru hole to IC30-12 and feed-thru hole to edge connector pin 48A (zone 8F).
2. Solder jumper between edge connector pin 48A and RN2-9.
3. Attach label to MST Board to indicate board has been modified.

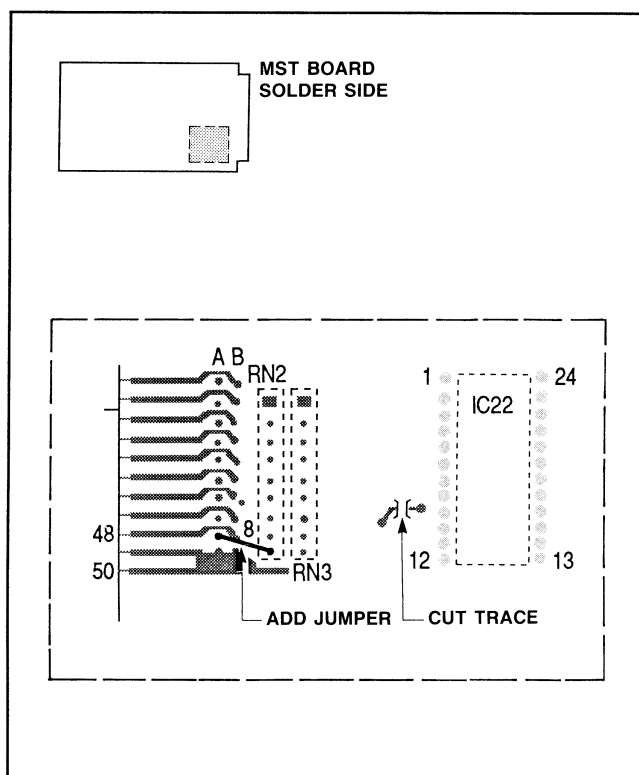


Figure 2

Date: **January, 1989**

Subject: **PROPER RECONNECTION OF PDB
BOARD CONNECTOR**

Model: **APR-5000 SERIES**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

Care must be used to properly reconnect plug CNP 910 to CNJ 910 on the PDB Board because the plug and jack are not keyed. The following symptoms are likely when CNP 910 is not properly connected to CNJ 910:

- All ALN panel LEDs will be on
- Meter bridge and keypad LEDs may be on
- The CPU power-on diagnostic routine will freeze at the software version number (i.e. "P.4.01.01.1").

Units with serial numbers 10,001-19,999 have no identifying marks on CNJ 910 or CNP 910. Mark corresponding points on CNJ 910 and CNP 910 before disconnection.

Units with serial numbers 20,001 and higher have white arrows on the underside of CNJ 910 and CNP 910 that must be aligned for proper reconnection.

Date: **March, 1989**

Subject: **MANUAL CORRECTION-PINCH ROLLER
 SPECIFICATION**

Model: **APR-5000**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

Correct the APR-5000 Maintenance Manual as shown in Figure 1.

6.5.11 PINCH ROLLER ADJUSTMENT
 PAGE 6-16

Step 8 Set the tension spring so that the pinch roller guide pressure is

~~1.9kg ± .2kg~~ (refer to Figure 6-21, Spring adjustments).



2.5kg +0.3/-0kg

Figure 1

Date: **March, 1989**Subject: **ERRATIC TAPE TENSION**Model: **APR-5000**Serial No: **10,001 AND HIGHER****DESCRIPTION**

The reel motor may spin when there is no tape in the EOT. With a tape in the EOT, tension may be erratic or the reels may creep. This symptom may even occur in the STOP mode. To correct this problem, perform the adjustments described in the following procedure.

ADJUSTMENT PROCEDURE

1. Turn machine OFF.
2. Remove 4x6 screws (2) from back of top rear cover.
3. Remove top rear cover to expose reel motor assemblies.
4. Unplug RTS Board reel motor from assembly to be adjusted.
5. Remove 3x6 PSW screws (2) holding RTS Board.
6. While holding RTS Board, carefully bend the hall effect sensor so that it is parallel with PC board and approximately $\frac{1}{32}$ inch from board surface. (Be careful not to break leads.)
7. Place RTS Board back in mounting position, and loosely install 3x6 PSW (2) screws.
8. While observing sensor from side, position sensor level with magnetic ring under turntable. Verify that clearance between front of sensor and magnetic ring is approximately $\frac{1}{32}$ inch.
9. Tighten 3x6 PSW (2) mounting screws to secure RTS Board in place.
10. Replace rear top cover and install 4x6 screws (2).

Date: **May, 1989**

Model: **APR-5002/5003**

Serial No: **20,001 AND HIGHER**

Subject: **REDUCTION OF MASTER ERASE
SIGNAL DISTORTION**

DESCRIPTION

The erase transient at the end of a recorded segment may be too large in APR-5002/5003 units that contain an MST Assembly with part number A-7850-376-B or A-7850-377-B. To correct this problem, perform the modifications described in the following procedure.

APR-5002/5003 units with serial numbers 20,001 through 20,701 that have not been modified to accept 1/2 inch headblocks have lower master bias and erase levels and will not have this problem.

PARTS REQUIRED

Part No.	Description	Qty.
1-162-672-11	Cap, Ceramic, 27pF, 50V OR	1
T-9411-279-1	Cap, Ceramic, 27pF, 100v	1

MODIFICATION AND ALIGNMENT PROCEDURE

MST BOARD (PN A-7850-376-B/377-B)

Solder Side (See Figures 1 and 2.)

1. Verify that master bias level is 15Vpp.
2. Perform record alignments for both channels.
3. Load a bulk erased tape into recorder.
4. Remove MST Board from unit.
5. Solder a 27pF capacitor in parallel with C66.
6. Replace MST Board into unit.
7. Remove CH1 CNL Board from unit.
8. Remove heat sink plate from board.
9. Replace CNL Board on card extender.

10. Power up unit.

11. Verify that the bias level at CN-30B of CNL Board is 15 Vpp. If necessary adjust RV1 on MST Board.
12. Connect oscilloscope CH-A input to CH-1 Line Out.
13. Connect oscilloscope CH-B input and EXT trigger input to IC23-8.
14. Set oscilloscope sweep to 5ms/div and Volts/div for 50mv/div. Select NORMAL and EXT trigger source.
15. Alternately select PLAY then RECORD modes at 1 second intervals.

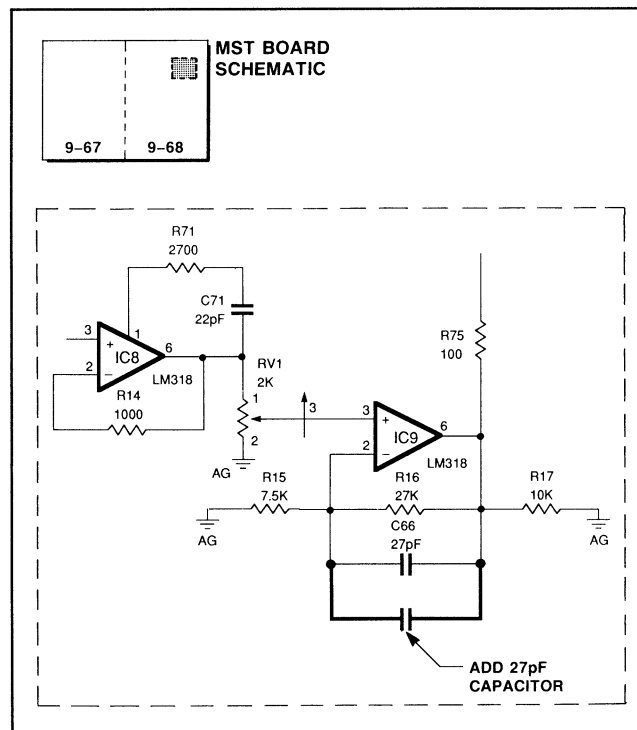
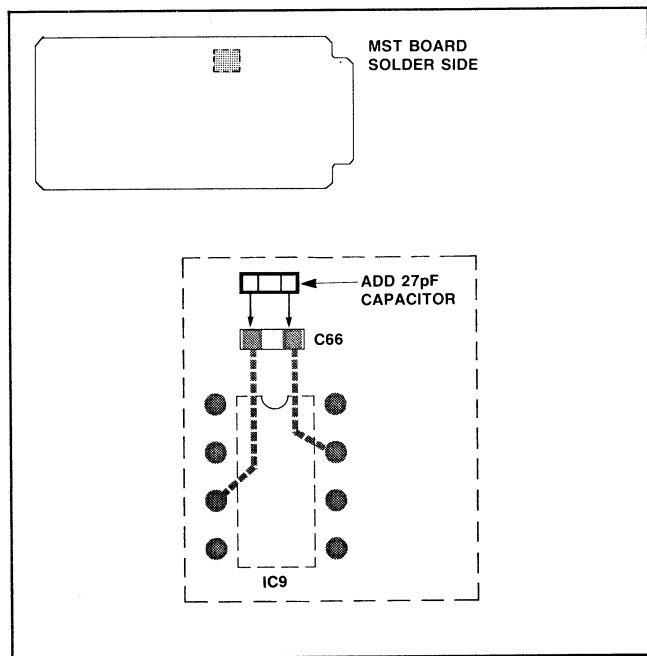
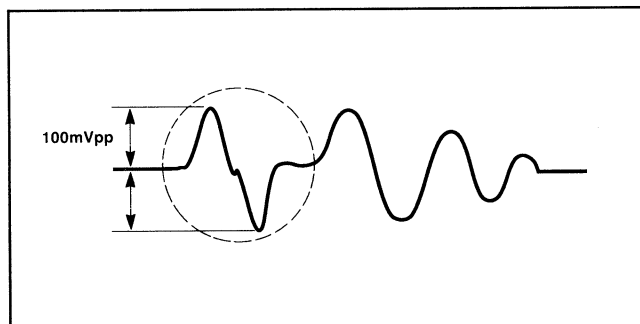


Figure 1

**Figure 2**

16. Adjust oscilloscope trigger level until *punch out* transient is easily detectable. See Figure 3.
17. Verify that transient is 100 mVpp or less. If specification is not met, contact your local Sony Regional Service Center.
18. Turn off power.
19. Replace heat sink on CNL Board and place board back into unit. Repeat steps 7 through 10 and 12 through 19 for CH-2 CNL Board.

**Figure 3**

Date: **May, 1989**

Model: **APR-5000 SERIES**

Serial No: **10,001 AND HIGHER**

Subject: **OVERBIAS WITH HIGH-COERCIVITY
TAPE FORMULATIONS AND/OR 1/2" HEAD BLOCKS**

DESCRIPTION

When 1/2" head assemblies are installed in APR-5000 Series Tape Machines with serial numbers 10,001 and higher, the tape machines may not be able to achieve proper overbias with certain tape formulations and/or 1/2" head blocks. Modify these machines as described in the following procedure.

PARTS REQUIRED

Part No.	Description	Qty.
T-9412-178-1	D44C9 Transistor	2
T-9412-179-1	D45C9 Transistor	2

MODIFICATION PROCEDURE

1. Turn tape machine OFF.
2. Remove card holder from front of card cage.

3. Remove CNL #1.
4. Remove heat sink plate from top of CNL #1.
5. Locate Q4 and Q5.
6. If Q4 and Q5 are 2SC1133-C and 2SB857-C respectively, replace Q4 with a D44C9 (T-9412-178-1) and replace Q5 with a D45C9 (T-9412-179-1).
7. Reinstall heat sink plate to CNL #1.
8. Reinstall CNL #1 into card cage.
9. Repeat step 8 for CNL #2.
10. Reinstall card holder to front of card cage.

Date: **August, 1989**

Subject: **REEL HUB HEIGHT GAUGE PART
NUMBER**

Model: **APR-5000**

Serial No: **20,001 AND HIGHER**

DESCRIPTION

The part number for the Reel Hub Height Gauge is J-6015-940-A. Add this information to Section 6.2.4 of the APR-5000 Operation and Maintenance Manual, 1st Edition through 1st Edition (Rev. 5).

Date: August, 1989**Subject: DIAGNOSTIC ERROR CODES****Model: APR-5000****Serial No: 20,001 AND HIGHER****DESCRIPTION**

APR-5000 Series Recorder/Reproducers perform a self-diagnostic check at power-up. Each check is assigned a code number displayed in sequence on the locate time display. If a code remains on the display after power-up, the error must be cleared before proceeding. The diagnostic codes are as follows.

E001 EPROM version check sum verification. Replace EPROMs with correct version.

E002 Ram check. Invalid data in RAM, possible hardware failure. Repair or replace CPU Board.

E003 Memory read error. Information stored in memory locations 00-99 reverts to default values. All user program and memory information stored in these locations is lost. This message usually occurs after a software change and is cleared by switching the machine OFF, then ON. All user information must be restored in the appropriate memory location.

E004 Improper chase operation prior to power-down; occurs at next power-up. Perform a correct CHASE operation. If the message remains, readjustment of the V-F converter may be necessary. (Refer to Section 6.5.16 of the Operation and Maintenance Manual).

Date: **August, 1989**Subject: **RANDOM RESET**Model: **APR-5003V**Serial No: **10,001-10,611;**
10,613-10,617; 10,619**DESCRIPTION**

Some APR-5003V units reset randomly and occasionally lose alignment presets. To correct this problem, replace C9 on the CPU Board as described in the following procedure.

PARTS REQUIRED

Part No.	Description	Qty.
1-161-486-11	Cap, .1mF, Low Temp Coefficient	2

MODIFICATION PROCEDURE

1. Turn power OFF.
2. Remove rear and front overlays from machine.
3. Remove Function Block.
4. Disconnect all ribbon and power cables from CPU Board.

5. Remove five Phillips head screws that secure CPU Board.
6. Remove CPU Board.
7. Replace C9 with two .1mF capacitors in parallel.
8. Reinstall CPU Board.
9. Replace five Phillips head screws that secure CPU Board.
10. Reconnect all ribbon and power cables to CPU Board.
11. Close front control panel door.
12. Reinstall two B4x30 Phillips on left and right side panels.
13. Turn power ON.

AnalogDate: **November, 1990**Subject: **HOURL METER—EXCESSIVE TIME
INDICATION**Model: **APR-5003V**Serial No: **11,301-11,330****DESCRIPTION**

The hour meter of some units may indicate excessive time not relative to real time operation. If this occurs, inspect R57 on the CSL board to confirm that its value is 270k Ω . If not, replace R57 with a 270k Ω resistor.

PARTS REQUIRED

Part No.	Description	Qty.
1-247-889-00	Res, 270k Ω , Carbon, 1/6W, 5%	1

Analog

Date: **January, 1991**

Subject: **REEL TABLE HEIGHT ALIGNMENT**

Model: **APR-5001/5002/5003V**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

The reel hub height gauge is now available for adjustment of the reel table height. The part number is J-6105-940-A. Add this information to the APR-5001/5002/5003V Operation and Maintenance Manual,

1st Edition and 1st Edition (Rev. 1 and 2), as shown in Figure 1.

Section 6.5.4.2 Reel Table Height Adjustment is shown in Figure 2.

APR-5001/5002/5003V OPERATION AND MAINTENANCE MANUAL
 PAGE 6-2-1

ADD

Illustration No.	Description	J No.
J9	Reel Hub Height Gauge	J-6105-940-A

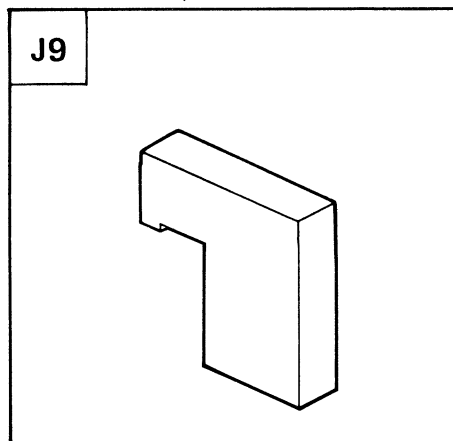


Figure 1

APR-5001/5002/5003V OPERATION AND MAINTENANCE MANUAL
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ADD SECTION:

6.5.4.2 Reel Table Height Adjustment

1. Remove upper rear cosmetic panel.
2. Place the Reel Hub Height Gauge on the Reel Motor Mounting Plate (as shown in Figure 6-8-2).

NOTE: The specification of reel table height states that the distance between the reel hub assembly and the gauge shall be 0. In other words, no gap should be present between the reel hub assembly and the gauge.

3. If the specification is not met, loosen the set screw with a 2mm hex wrench and adjust height accordingly (refer to Figure 6-8-2).

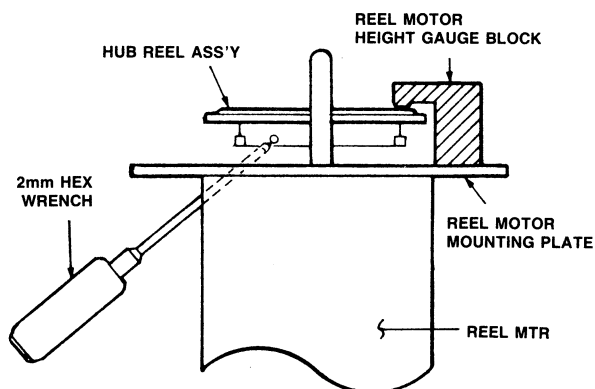


Figure 6-8-2.

Figure 2

Date: **July, 1989**

Subject: **FIRMWARE UPGRADE—P4.02.01.5
 (CPU) / P1.01.01.3 (LNT)**

Model: **APR-5003V**

Serial No: **10,001-10,520**

DESCRIPTION

Firmware version P4.02.01.5 (CPU) / P1.01.01.3 (LNT) for the APR-5003V is now available. The three EPROMs to be replaced are IC13 and IC14 on the CPU Board and IC13 on the LNT Board.

NOTE: The new firmware is not compatible for use with the APR-5003 or other APR-5000 series machines.

The new version firmware is factory installed in APR-5003V units with serial numbers 10,521 and higher.

IMPROVEMENTS AND FEATURES

- Pressing the PLAY switch after CHASE is initiated from "Resolve on Play" will no longer cause the machine to enter a non-performing resolve mode.
- If Establish and Maintain triggered operations are requested in manner where the source is changed, the second request of the triggered operation will fail. For example:
 - 1) From Establish LTC to Maintain with video, tone, or VITC
 - 2) From Establish VITC to Maintain with LTC.

- Operation of offset capture relative to an unlocked moving master or to frozen (and repeating) master time code is corrected.
- Loading a non-zero value for the manual acceleration allowance (memory location 50) will override any internal acceleration allowance defaults. When a zero value is loaded, the internal default acceleration allowance will be active but will not be displayed.
- An infrequent inability to park to a frozen master time code is corrected.

PARTS REQUIRED

Part No.	Description	Qty.
EAR-5003V-01	P4.02.01.5 / P1.01.01.3 Firmware Kit	1

Date: July, 1989

Subject: **HIGH FLUTTER WHEN USING "EXT SRC" INPUT**

Model: **APR-5001/5002/5003**

Serial No: **20,201 AND HIGHER (APR-5001)**
20,201 AND HIGHER (APR-5002)
20,401 AND HIGHER (APR-5003)

DESCRIPTION

High flutter may occur when using the EXT SRC input. Flutter is caused by a slow rising edge on the output of IC7 on the CNX Board. To correct this problem, modify the CNX Board as described in the following procedure.

NOTE: This modification is only necessary when using an external capstan source input.

PARTS REQUIRED

Part No.	Description	Qty.
T-9413-636-1	IC, HCPL 2531	1
1-249-425-11	Resistor, 4.7kΩ, 1/6W, 5%	2

MODIFICATION PROCEDURE

CNX Board

1. To access the CNX Board, first remove five pop-in fasteners on rear panel (A).
2. Remove hex screws (6) located on rear panel (B).

3. Open lower rear panel by removing screws (2) located in upper left- and right-hand corners (C). (See Figure 1.)
4. Remove CNX board by first removing screws (2) holding board in place (A). (See Figure 2.)
5. Push connectors out through cutouts so CNX Board can clear lip of outer panel when being lifted out.
6. If CNX board is numbered T-9412-316-1, it will have a 5-pin resistor network (RN1) instead of discrete resistors at R80 and R81. If so, remove IC7 (HCPL-2730) and replace with HCPL-2531 (T-9413-636-1). No resistor changes are needed.
7. If CNX board is numbered T-9412-316-2 through T-9412-316-4, or 1-619-162-11, proceed with steps a and b.
 - a. Remove IC7 (HCPL-2730) and replace with HCPL-2531 (T9413-636-1).
 - b. Remove R80 and R81 (470Ω) and replace with 4.7kΩ resistors.
8. Reinstall CNX Board by repeating steps 1 and 2 in reverse order.

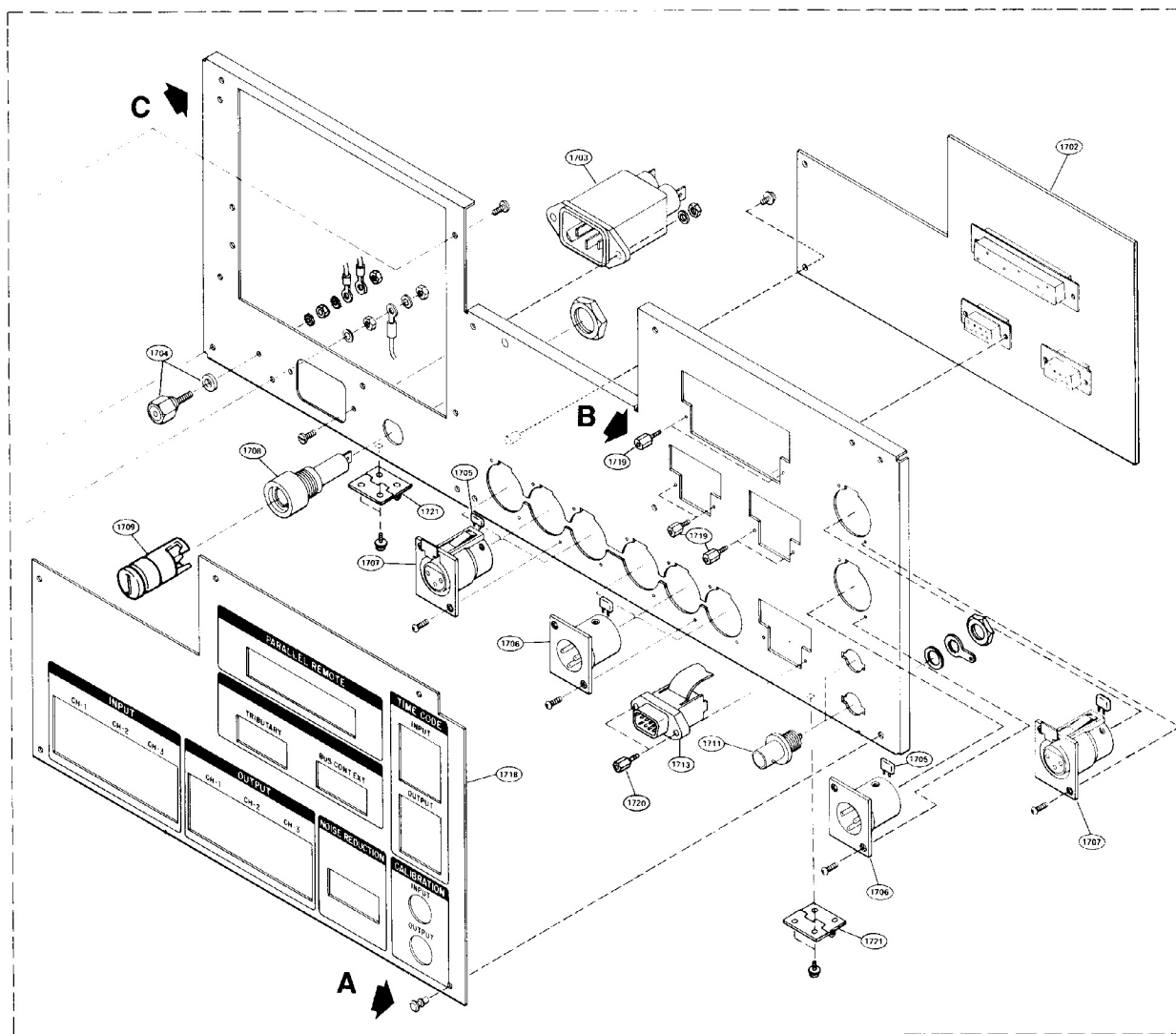
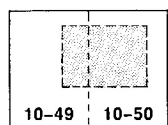


Figure 1

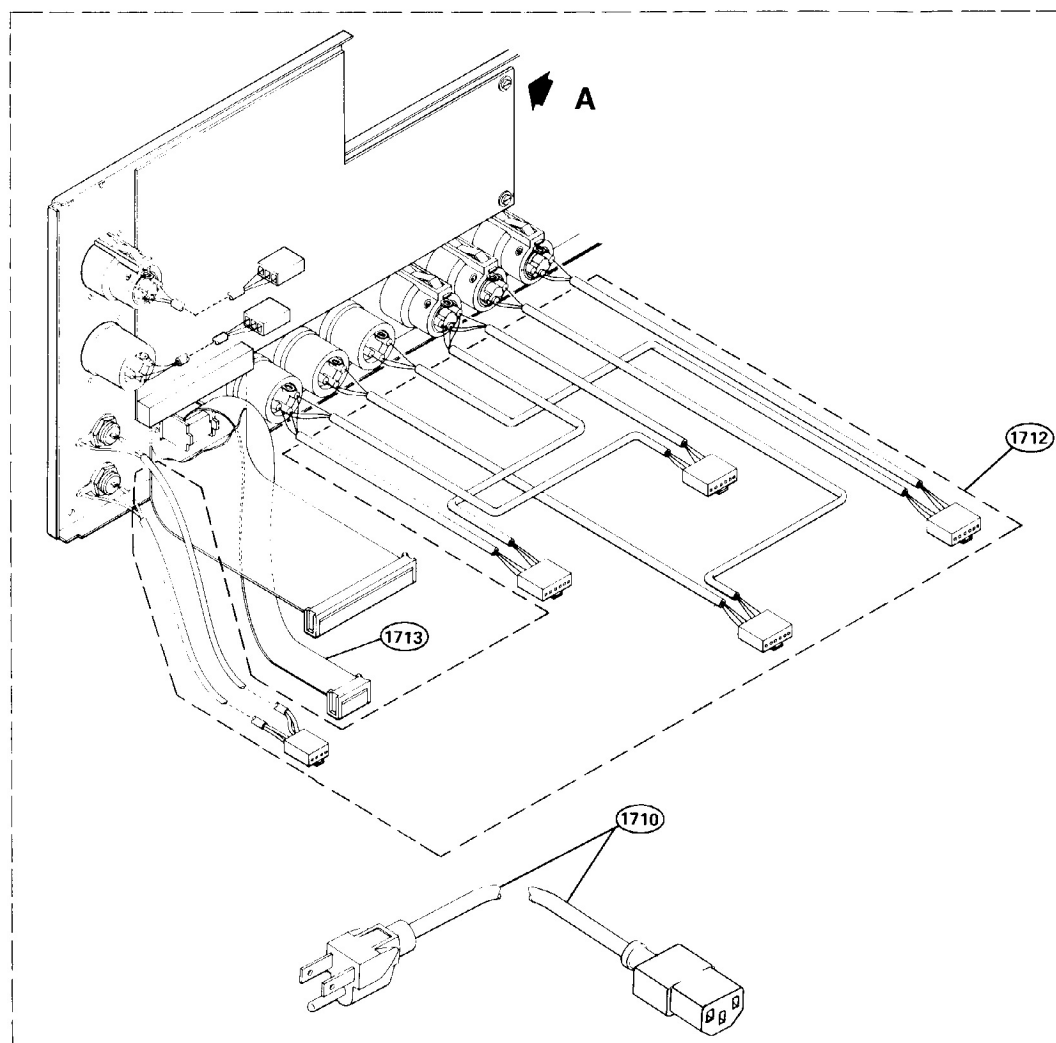
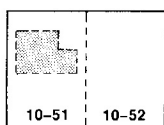


Figure 2

Date: **August, 1989**Subject: **TRANSISTOR CHANGE**Model: **APR-24/5003V**Serial No: **10,001-10,401 (APR-24)**
10,001-10,801 (APR-5003V)**DESCRIPTION**

The SP-7000-0127-01 transistor used in the following locations in APR-24 and APR-5003V units has been replaced with a type 2N4401 in later production units.

CNL Board: Q1 and Q8

TCC Board: Q8

MRA Board: Q4

The new part is compatible for use in all earlier units. However, the protective plastic tubing used on the former part is no longer required.

The part number has changed as follows.

FORMER			NEW	
SP-7000-0127-01		→	2N4401	
T-9410-286-1			T-9414-392-1	

Date: **August, 1989**

Subject: **PAL USED IN CURRENT APR MODELS**

Model: **APR-24/5003V**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

A PAL type IC is used at IC11 on the CPU Board in APR-24 and APR-5003V units.

These units must have PAL version 14-200-1 (part number T-9414-201-1).

Date: **August, 1989**

Model: **APR-24/5003V**

Serial No: **10,001-10,105 (APR-24)**
10,001-10,500 (APR-5003V)

Subject: **EXCESSIVE PUNCH-IN/PUNCH-OUT NOISE**

DESCRIPTION

Some units may exhibit excessive punch-in/punch-out noise. To correct this problem, modify the MST Board and all CNL Boards as described in the following procedure.

Units with the following serial numbers are factory modified.

APR-24: 10,106 and higher

APR-5003V: 10,501 and higher

APR-24 PARTS REQUIRED

Part No.	Description	Qty.
1-231-409-11	Res, Pack, SIP, 5.6k, 9-pin	6
1-214-575-11	Res, 5.6k, 1/8W, 1%	6
1-162-747-21	Cap, 56pF	6

APR-5003V PARTS REQUIRED

Part No.	Description	Qty.
1-231-409-11	Res, Pack, SIP, 5.6k, 9-pin	2
1-214-575-11	Res, 5.6k, 1/8W, 1%	2
1-162-747-21	Cap, 56pF	2

MODIFICATION PROCEDURE

- Turn unit power OFF.
- Remove Master Board (MST or MST1) from card cage. (For instructions, refer to applicable Operation and Maintenance Manual.)
- Replace RN4 with 5.6k SIP resistor pack.
- Replace R57 with 5.6k resistor.
- Replace C66 with 56pF capacitor.
- Reinsert MST Board into card cage.
- Remove a CNL Board from card cage.
- Remove heat sink plate from CNL Board.
- Install CNL Board on extender card and insert into CNL Board slot.
- Turn power ON.
- Load bulk-erased tape onto unit.
- Connect line out of Channel 1 to oscilloscope.
- Attach oscilloscope probe to EXT trigger input of oscilloscope.
- Attach oscilloscope probe to IC23-8 of CNL Board.
- Adjust oscilloscope timing to 5mS/div.
- Adjust Channel 1 sensitivity to 50mV/div.
- Select NORMAL and EXT for trigger source.
- Press RECORD READY for channel under test.
- Alternate pressing PLAY, then RECORD, continuously at one-second intervals.
- Adjust oscilloscope trigger until Punch-in/Punch-out transient is easily detectable.
- Adjust RV4 on CNL CW or CCW for minimum transient level (just visible peak-to-peak).
- Ensure maximum level peak-to-peak does not exceed 100mV.
- Remove oscilloscope probe from IC23-8 of CNL Board.
- Turn power off.
- Remove CNL Board and extender card from CNL slot.
- Remove CNL Board from extender card.
- Reinstall CNL heat sink plate.
- Reinsert CNL Board into card cage.
- Repeat steps 7 through 28 for each CNL Board.

Date: **December, 1989**

Subject: **SERIAL UPGRADE KIT**

Model: **APR-5003**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

An APR-5003 serial upgrade kit is now available. Presently, this upgrade supports only BVE-900/9000 editors. This kit provides the following features.

1. Serial control of an APR-5003 and expanded synchronization control using Longitudinal Time Code (LTC) only. (Since no video reference is utilized, an external LTC, correctly framed with house video, is required for correct operation with SONY editor products.)

2. Encompasses all features and facilities of the APR-5003 with stipulations provided in Table 1.

PARTS REQUIRED

Part No.	Description	Qty.
T-9985-276-1	APR-5003 Serial Upgrade Kit	1

Table 1

Function/Mode	Features
VIDEO INPUT	NOT PROVIDED.
SYNCHRONOUS OPERATIONS	To Video or VITC (Vertical Interval Time Code), Tone, or TTL: NOT PROVIDED.
• Resolve	1) To Video or VITC, Tone, or TTL references: NOT PROVIDED. 2) To LTC reference: RETAINED.
• Time Code Generation	External reference restricted to LTC only.
• CHASE Operation	External Lock reference restricted to LTC only.
• Triggered Edit Synchronization	(Includes Preview, Edit, and Review operations.) 1) Establish Lock reference restricted to LTC only. 2) Maintain Lock reference restricted to LTC data-dependent and data-independent operations only.

Analog

Date: **March, 1990**

Subject: **BASE SUPPORT PIN DIFFERENCES**


Model: **APR-5000/5003V**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

The base support pin used to mount the APR-5000 on the SU-14 stand will differ, depending on the serial number of the machine being mounted.

All APR-5003V units require part number 3-711-203-01.

APR-5000 Serial Number	Part Number Base, Support Pin
10,001-10,999	T-9452-282-1
20,001-Higher	3-711-203-01 

Analog

Date: **May, 1990**

Subject: **POWERING UP WITHOUT PROMS—LOSS
OF PRESET DATA**

Model: **APR-24/5000**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

Powering up an APR-24 or APR-5000 unit without PROMs in IC13 and IC14 on the CPU Board will result in loss of all preset data contained in the battery backed up RAM.

Do not leave IC13 or IC14 vacant at any time.

Sony Corporation of America
Technical Publications
677 River Oaks Pkwy, San Jose, California 95134

Analog

Date: **May, 1990**

Subject: **MEMORY LOCATION LABELS**

Model: **APR-5003V**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

Memory location labels are no longer installed on APR-5003V units. All memory location information required to operate the APR-5003V is now contained in the APR-5003V Pocket Guide (Sony part number T-9483-118-1).

Analog

Date: **May, 1990**

Subject: **REMOTE CONTROL CABLES AVAILABLE**

Model: **APR-24/5000**

Serial No: **10,001 AND HIGHER**

DESCRIPTION

Remote control cables for the APR-24 and the APR-5000 are now available as service parts. The part numbers are as follows.

APR-24: 1-574-212-11

APR-5000: T-9481-814-1

Analog

Date: **December, 1990**

Subject: **CPU AND CNL BOARD HISTORY**

Model: **APR-5000 SERIES**

Serial No: **ALL**
DESCRIPTION

Several revisions of printed circuit board artwork and software issues have evolved through ongoing improvements to the APR-5000 Series Recorder/Reproducer. The following is a compilation of changes pertaining to the CPU and CNL boards.

CPU SOFTWARE HISTORY

DATE	SERVICE PART NO.	VERSION	COMMENTS
02/15/85	NOT RELEASED	P2.01.01.0 P2.01.02.0 P2.01.03.0 P2.01.04.1 P2.01.04.2 P2.01.04.3	Initial release 03/15/85 Correct tensions 06/01/85 Improve LOCATE accuracy
01/15/86	NOT RELEASED	P2.01.04.4 P3.01.01.0 P3.01.01.1	Time code chip set Initial TC specific P3.01.01.0 corrections (see Technical Bulletin 88-008)
09/14/87	NOT RELEASED	P4.01.01.1	Initial "Universal" software for both APR-5002 and APR-5003 NOTE: On some APR-5002s, IC24 must be removed for this software to operate.
06/01/88	EAR5000-01	P4.01.01.2	Corrections for P4.01.01.1
04/18/89	EAR5000-02	P4.01.01.5	Corrections for P4.02.01.4
01/19/90	NOT RELEASED EAR5003V-01	P4.01.01.4 P4.02.01.5	Initial APR-5003V release APR-5003V upgrade

CPU HISTORY

ITEM	DATE	MODEL	SERIAL NO.	PCB NO.	ASSY NO.
1.	06/01/84	APR-5000	10,000	T-9412-327-1	T-9481-802-1 T-9481-037-1
COMMENTS: Eliminate preset error (PE). 1. Remove R15. 2. Install 1MΩ 1/6W 5% resistor between pins 7 and 15 of IC25.					

CPU HISTORY (Cont'd.)

ITEM	DATE	MODEL	SERIAL NO.	PCB NO.	ASSY NO.
2.	01/15/85	APR-5000 APR-5002 APR-5003	10,001 10,051 10,001	T-9412-327-2	T-9481-802-2
COMMENTS: Includes the first time code recovery circuit.					
3.	08/25/85	APR-5002 APR-5003	10,101 10,105	T-9412-327-3	T-9481-802-3 T-9481-274-1
COMMENTS: A. Correct artwork: jumper pins 3 and 11 of IC26. B. Time code spec change: change R33 and R34 to 150k Ω . C. Eliminate preset error. 1. Remove R56. 2. Add 1k Ω 1/6W 5% resistor from S1/D1 junction to the anode of 1N914 diode. Solder the cathode to IC1-13 of CPU. 3. Replace C4 with a .047 μ F/50V electrolytic cap with the positive side to the S1/D1 junction. D. PCB standoff change due to battery size reduction. E. CPU startup at low temperature: change R4 to 7.5k Ω .					
	04/08/86				
4.	07/11/86	APR-5002 APR-5003	20,001	1-619-161-11	A-7850-378-A A-7850-379-A
COMMENTS: A. Eliminate random resets caused by thermal instability in watchdog circuit. 1. Install National or RCA 74HC123 in IC22. 2. Add .1 μ F ceramic capacitor between pins 14 and 15 of IC22. B. Parallel resonant crystal (1-567-697-11) running .06% slow; replace with series resonant crystal (T-9412-725-1). NOTE: Series resonant crystals are factory installed in the following units: 10,001-19,999 (APR-5002/5003) 20,838 (APR-5002) 20,201 (APR-5003)					
5.	09/09/88 05/30/89	APR-5003V	10,001	1-619-161-12	A-7850-736-A
COMMENTS: Reduce incidence of random resets: replace C9 with one .22 μ F (or two .1 μ F) low temperature coefficient capacitors.					

CNL HISTORY

ITEM	DATE	MODEL	SERIAL NO.	PCB NO.	ASSY NO.
1.	02/15/85	APR-5002	10,001	T-9412-187-1	T-9480-934-1
COMMENTS: Dolby optocoupler improvement. 1. Change IC44 from TIL126 to TIL119. 2. Change R156 from 3.3k Ω to 330 Ω . 3. Change R109/R111 from 3k Ω to 2.7k Ω .					
2.	03/28/85	APR-5002	10,021	T-9412-187-2	T-9480-934-2
COMMENTS: A. Improve bias/erase control: add 1N914 diode in parallel with R45 and R46. B. Cue relay drive improvement. 1. Change Q1 from 2N3904 to 8-729-904-18. 2. Change R38 from 4.7k Ω to 2k Ω .					

CNL HISTORY (Cont'd.)

ITEM	DATE	MODEL	SERIAL NO.	PCB NO.	ASSY NO.
3.	08/07/85	APR-5002	10,059	T-9412-187-3	T-9480-934-3
COMMENTS: A. Improve calibration output accuracy. 1. Change R54 from 18.7k Ω 1% to 21k Ω 1%. 2. Confirm R53 is 10k Ω 1% (if not, replace it). B. Bias temperature stability: replace IC26 with "FIX" assembly (T-9482-089-1).					
4.	12/03/85	APR-5003	10,015		T-9481-949-1
COMMENTS: A. Delete unnecessary components: C106/C107. B. TCC input gain change: change R48 to 15k Ω 1%. C. Erase drive gain change: change R136 to 240 Ω 1/8W 1%. D. Improve thermal stability and reduce front end oscillation: change C163 and C164 to 22pF.					
5.	04/25/86	APR-5002 APR-5003		T-9412-187-5	T-9480-934-5 T-9481-949-2
COMMENTS: A. Eliminate Bias/Erase indication on power-up. 1. Replace IC29 and IC30 with "FIX A" (T-9482-362-1). 2. Replace R87 with a 10k Ω 1/8W 1%. B. Eliminate noise on tape at power-up/down: replace IC18 with "FIX E" (T-9482-363-1).					
6.	09/23/86	APR-5002 APR-5003			T-9480-934-6 T-9481-949-3
COMMENTS: A. Interim 1/2" compatibility. 1. Replace R75 (60.4k Ω) with 36k Ω . 2. Replace C40 (12pF) with 22pF. 3. Replace IC18 FET gate (15V) with 18V.					
7.	10/13/86	APR-5002 APR-5003	20015 20023	1-619-158-11	A-7850-373-A A-7850-378-A
COMMENTS: A. Erase distortion reduction. 1. Replace R134 and R137 (15k Ω) with 4.7k Ω . 2. Replace R113 and R117 (20k Ω) with 13k Ω . 3. Replace C71 and C72 (.33 μ F) with .033 μ F.					
8.	11/24/86	APR-5002 APR-5003		1-619-158-12	A-7850-374-A A-7850-379-A
COMMENTS: A. Correct PCB artwork error: reverse positioning of symbol for Q6.					
9.	01/21/87	APR-5002 APR-5003		1-619-158-12	A-7850-374-B A-7850-379-B
COMMENTS: A. Erase/Bias gain reduction: replace R115 and R119 (10k Ω 1%) with 15k Ω 1%.					
10.	01/29/88	APR-5002 APR-5003		1-619-158-14	A-7850-374-C A-7850-379-C
COMMENTS: A. Q6 silkscreen error corrected. B. JU4 and JU5 added for FEX compatibility. C. Add insulation tape between PCB and standoff to prevent possible short circuit.					
11.	06/22/88	APR-5003V	10,001	1-619-158-15	
COMMENTS: A. Memory for APR-5003V and APR-24 expanded.					