

**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  <b>NOTE:</b> 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
<p><b>COMMENTS:</b> Eliminate preset error (PE).                      1. Remove R15.                      2. Install 1M<math>\Omega</math> 1/6W 5% resistor between pins 7 and 15 of IC25.</p>					

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
<p><b>COMMENTS:</b> Includes the first time code recovery circuit.</p>					
3.	08/25/85	APR-5002 APR-5003	10,101 10,105	T-9412-327-3	T-9481-802-3 T-9481-274-1
<p><b>COMMENTS:</b> A. Correct artwork: jumper pins 3 and 11 of IC26.                      B. Time code spec change: change R33 and R34 to 150kΩ.                      C. Eliminate preset error.                      1. Remove R56.                      2. Add 1kΩ 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 .047μF/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 7.5kΩ.</p>					
	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
<p><b>COMMENTS:</b> A. Eliminate random resets caused by thermal instability in watchdog circuit.                      1. Install National or RCA 74HC123 in IC22.                      2. Add .1μF 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).</p> <p><b>NOTE:</b> 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)</p>					
5.	09/09/88 05/30/89	APR-5003V	10,001	1-619-161-12	A-7850-736-A
<p><b>COMMENTS:</b> Reduce incidence of random resets: replace C9 with one .22μF (or two .1μF) low temperature coefficient capacitors.</p>					

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
<p><b>COMMENTS:</b> Dolby optocoupler improvement.                      1. Change IC44 from TIL126 to TIL119.                      2. Change R156 from 3.3kΩ to 330Ω.                      3. Change R109/R111 from 3kΩ to 2.7kΩ.</p>					
2.	03/28/85	APR-5002	10,021	T-9412-187-2	T-9480-934-2
<p><b>COMMENTS:</b> 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 4.7kΩ to 2kΩ.</p>					

## 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
<b>COMMENTS:</b> A. Improve calibration output accuracy. 1. Change R54 from 18.7k $\Omega$ 1% to 21k $\Omega$ 1%. 2. Confirm R53 is 10k $\Omega$ 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
<b>COMMENTS:</b> A. Delete unnecessary components: C106/C107. B. TCC input gain change: change R48 to 15k $\Omega$ 1%. C. Erase drive gain change: change R136 to 240 $\Omega$ 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
<b>COMMENTS:</b> 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 $\Omega$ 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
<b>COMMENTS:</b> A. Interim 1/2" compatibility. 1. Replace R75 (60.4k $\Omega$ ) with 36k $\Omega$ . 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
<b>COMMENTS:</b> A. Erase distortion reduction. 1. Replace R134 and R137 (15k $\Omega$ ) with 4.7k $\Omega$ . 2. Replace R113 and R117 (20k $\Omega$ ) with 13k $\Omega$ . 3. Replace C71 and C72 (.33 $\mu$ F) with .033 $\mu$ F.					
8.	11/24/86	APR-5002 APR-5003		1-619-158-12	A-7850-374-A A-7850-379-A
<b>COMMENTS:</b> 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
<b>COMMENTS:</b> A. Erase/Bias gain reduction: replace R115 and R119 (10k $\Omega$ 1%) with 15k $\Omega$ 1%.					
10.	01/29/88	APR-5002 APR-5003		1-619-158-14	A-7850-374-C A-7850-379-C
<b>COMMENTS:</b> 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	
<b>COMMENTS:</b> A. Memory for APR-5003V and APR-24 expanded.					