

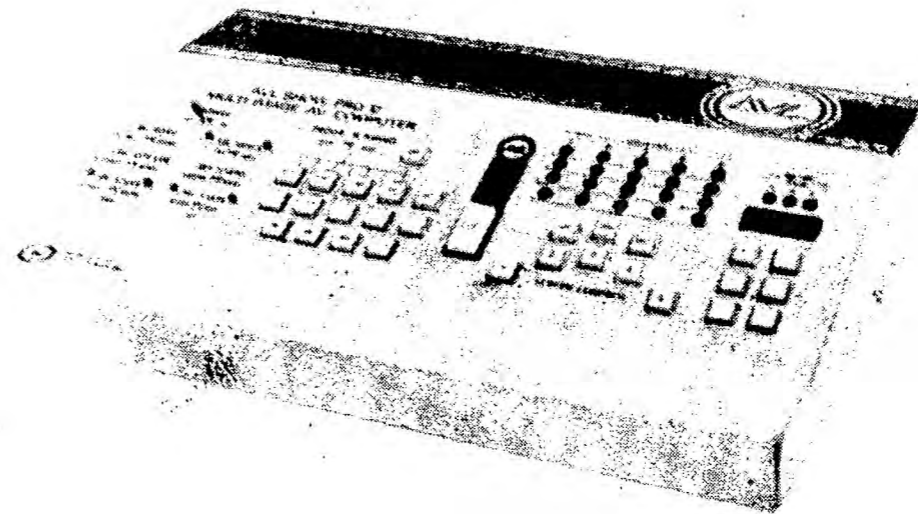
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# Show Pro Systems Multi-Image AV Computer Maintenance Manual

## Show Pro III



## Show Pro V



The professional team in multi-image programming systems

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## INTRODUCTION

THIS MANUAL IS INTENDED FOR BOTH FIELD AND SERVICE CENTER TROUBLESHOOTING THE AVL SHOW PRO FAMILY OF MULTI-IMAGE AV COMPUTERS.

FIELD REPAIR IS ALWAYS AN EMERGENCY PROCEDURE. HENCE, IT SHOULD BE DONE AS A LAST RESORT. IT IS NOT INTENDED AS A SUBSTITUTE FOR ADEQUATE BACKUP OR FOR FACTORY OR SERVICE CENTER REPAIRS.

SHOW PRO III AND V PROGRAMMERS ARE DESIGNED TO ALLOW REPLACEMENT OF ALL FUNCTIONAL SUBASSEMBLIES BY QUALIFIED PERSONNEL. USERS WHO INTEND TO MAKE EMERGENCY REPAIRS OR DIAGNOSE SYSTEM PROBLEMS ARE URGED TO READ THE MANUAL AT THEIR LEISURE (BEFORE A PROBLEM OCCURS) SO THAT THE SCOPE OF THEIR UNDERTAKING IS WELL IN MIND. USERS WITH QUALIFIED TECHNICAL PERSONNEL AND TEST EQUIPMENT MAY REQUEST SECTIONS 6 AND 7 OF THIS MANUAL.

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## 1.0 GENERAL TROUBLESHOOTING TECHNIQUES

### 1.1 BASIC TROUBLESHOOTING

ALL TROUBLESHOOTING CAN BE REDUCED TO FOUR FUNDAMENTAL STEPS.

1. DEFINITION OF THE PROBLEM - FOR INSTANCE, IS THERE REALLY A PROBLEM, OR UNDER THE OPERATING CIRCUMSTANCES, DOES THE EQUIPMENT OPERATE AS INTENDED. "INTENDED OPERATION" DOES NOT ALWAYS AGREE WITH WHAT WAS EXPECTED BY THE USER.
2. ISOLATION OF THE PROBLEM - IN A COMPLEX SYSTEM, IT IS HELPFUL TO ESTABLISH WHAT EQUIPMENT IS OPERATING CORRECTLY AND WHAT EQUIPMENT IS NOT. THIS IS USUALLY REFERRED TO AS ELIMINATING EXTRANEOUS VARIABLES.
3. LOCATION OF THE CAUSE - DETAILED INVESTIGATION USING TEST AND MEASUREMENT TECHNIQUES TO DIAGNOSE THE PROBABLE CAUSE.
4. REPAIR AND REPLACEMENT (ELIMINATION OF CAUSE) - ACTUAL FIXING OF THE PROBLEM BY SUBSTITUTING A KNOWN OPERATING ITEM FOR A DEFECTIVE ONE.

NOTE: IT IS IMPORTANT TO RETEST (REPEAT STEP 3) TO INSURE THE PROBLEM WAS CORRECTED AND NO NEW PROBLEMS WERE INTRODUCED.

### ▷ TROUBLESHOOTING HINTS

1. OPERATOR ERRORS ARE MORE COMMON THAN EQUIPMENT FAILURES.
2. MULTIPLE FAILURES ARE EXTREMELY RARE, NORMALLY THERE IS ONE CAUSE.
3. SYSTEM INTERCONNECTION PROBLEMS ARE MORE COMMON THAN ACTUAL COMPONENT FAILURES.
4. MECHANICAL PROBLEMS ARE MORE COMMON THAN ELECTRICAL.
5. POWER PROBLEMS ARE MORE COMMON THAN SIGNAL.
6. COMPONENTS OPERATED AT ELEVATED TEMPERATURES ARE MORE LIKELY TO FAIL.
7. MOST COMPONENT FAILURES ARE INTERFACE RELATED, *ie*, CAUSED BY AN OUTSIDE FACTOR.
8. HASTY REPAIRS, WITH INSUFFICIENT DIAGNOSIS, TEND TO COMPOUND PROBLEMS

1.2 USING THIS MANUAL - THE MANUAL IS ORGANIZED INTO THE FOUR STEPS LISTED IN SECTION 1.1

AS FOLLOWS:

1. DEFINITION  
(SYSTEM REVIEW)

SECTION 2 - PROVIDES AN OVERVIEW OF SYSTEM OPERATION TO AID IN ELIMINATING SYSTEM VARIABLES

2. ISOLATION  
(SYSTEM TROUBLE-SHOOTING)

SECTION 3 - PROVIDES DETAILS IN ISOLATING PROBLEMS

BETWEEN:

- PROJECTORS
- POWER PACKS
- TAPE DECKS
- PROGRAMMERS
- CABLING

3. LOCATION  
(PROGRAMMER TROUBLESHOOTING)

SECTION 4 - PROVIDES DETAILS ON OPENING, TESTING AND REPLACING BOARD LEVEL ASSEMBLIES IN PROGRAMMERS.

4. REPAIR

SECTION 4 - RESTRICTED TO REPLACING PROGRAMMER MODULES

### ▷ COMMON CAUSES OF PROBLEMS

- MOST COMMON
1. OPERATOR ERROR
  2. SLIDE PROJECTORS
  3. TAPE RECORDERS
  4. POWER PACKS
  5. PROGRAMMERS
- LEAST COMMON
6. AUXILIARY EQUIPMENT



GENERAL TROUBLESHOOTING  
TECHNIQUES

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1.0 GENERAL TROUBLESHOOTING (CONTD)  
1.3 TROUBLES - QUICK REFERENCE

IDENTIFY TROUBLE - THEN SEE ADDITIONAL INFORMATION PARAGRAPHS OR DIAGNOSTIC TABLES, PARAGRAPH 4.2 (SHEETS 24 THRU 27)

PROGRAMMER CONTROL PANEL PROBLEMS SEE SHEET 24 (4.2.1)				PROJECTOR PROBLEMS SEE SHEET 24 (4.2.2)				MAGNETIC TAPE PROBLEMS SEE SHEET 26 (4.2.3)				OTHER PROBLEMS SEE SHEET 27 (4.2.4)			
NO.	TROUBLE	ADDTL INFO		NO.	TROUBLE	ADDTL INFO		NO.	TROUBLE	ADDTL INFO		NO.	TROUBLE	ADDTL INFO	
		SP III	SP V			SP III	SP V			SP III	SP V			SP III	SP V
C1	ONE LAMP OUT WHEN PUSHED NEEDS LAMP CHANGE	4.2.1 4.9	4.2.1 4.9	P1	NO LAMP - ONE PROJECTOR ONLY	3.1	3.1	T1	NO MT-A (GREEN STATUS) WHEN RECORDING	3.8.1	3.8.1	X1	PROGRAMMER ALWAYS DROPS CUES - LOAD FROM TAPE	3.8.1 4.4	3.8.1 4.4
C2	ONE LAMP ALWAYS ON	4.2.1 4.5	4.2.1 4.5	P2	NO LAMP - ALL PROJECTORS ON ONE POWER PACK	3.1	3.1	T2	NO RECORD LEVEL DURING DUMP	3.8 4.9	3.8 T7	X2	PROGRAMMER SOMETIMES DROPS CUES - LOAD FROM TAPE	3.8.1 4.4	3.8.1 4.4
C3	NO PANEL LAMPS - APPARENT POWER LOSS	2.8.5	2.8.5 X15	P3	NO LAMP - ALL PROJECTORS ALL POWER PACKS	3.3	3.3	T3	NO RECORD	4.9	3.8 T2	X3	PROGRAMMER ALWAYS DROPS CUES - LOAD FROM MEMORY	4.2.4 4.4	4.2.4 4.4
C4	NO LAMPS, READY OR CUE, FAN RUNNING	2.8 4.4	2.8 X15	P4	NO ADVANCE - ONE PROJECTOR ONLY	3.1	3.1	T4	NO PLAY BACK	4.9	4.9 T7	X4	PROGRAMMER SOMETIMES DROPS CUES - LOAD FROM MEM	4.2.4 4.4	4.2.4 4.4
C5	WILL NOT ACCEPT CUES	4.0 4.4	4.0 4.4	P5	NO ADVANCE - ALL PROJ ON ONE POWER PACK	3.2	3.2	T5	CONTINUOUS MT-B (AMBER STATUS) - GOOD CUES	3.8.2	3.8.2	X5	CUES ALWAYS CHANGED - LOAD FROM TAPE	4.2.4 4.4	4.2.4 4.4
C6	RANDOM OP KEYS ON POWER-ON (NO INIT)	2.8-4	2.8-4	P6	NO ADVANCE - ALL PROJ ALL POWER PACKS	3.3	SEE P9	T6	MT-C (RED STATUS) ON - PLAY LOCKS UP - NO CUES ENTER	3.8.2	3.8.2	X6	CUES SOMETIMES CHANGED - LOAD FROM TAPE	4.2.4 4.4	4.2.4 4.4
C7	NO LAMPS OR INDICATORS ON PANEL	2.8-5 4.5-1	X16	P7	NO REVERSE - ONE PROJECTOR ONLY	3.1	3.1	T7	NO PLAYBACK LEVEL - MT-A (GREEN) NOT ON - GOOD CUES	3.8 4.9	4.9 T2	X7	AUXILIARY OR REVERSE CUES ADDED	4.2.4	3.8.2 4.2.4
C8	NO READY LAMPS	4.2.1 4.4	4.2.1 4.5	P8	NO REVERSE - ALL PROJ ON ONE POWER PACK	3.2	3.2	T8	MT-A (GREEN STATUS) FLASHES INTERMITTENTLY	3.8.2 4.9	3.8.2 4.9	X8	ANY CUES ADDED	4.2.4	3.8.2 4.2.4
C9	CUE COUNTER INCORRECT OR 000(0) OR BAD 1,2,3	4.0 4.5	4.5 4.6.2	P9	NO REVERSE - ALL PROJ ALL POWER PACKS	3.3	SEE P6	T9	TAPE PLAYS ON ONE UNIT BUT NOT ON ANOTHER	3.8.2	3.8.2	X9	PROGRAMMER BLOWS FUSE EVERY POWER-ON	4.3.1	4.3.2
C10	UNIT RUNS BY ITSELF - FLASHES CERTAIN LAMPS	4.2.1	4.2.1	P10	CENTER SCREEN - NO LAMP, ADVANCE OR REVERSE	-	4.2.2	T10	MT-A (GREEN STATUS) ON WITH NO CABLE CONNECTED	4.9	4.9	X10	RANDOM UPDATE OF MEM - CHANGE OF CUE(S)	2.8	2.8
C11	UNIT OSCILLATES FROM FWD TO REV OR TWO OTHER LAMPS	4.2.1	4.2.1	P11	OCCASIONAL (RANDOM) ADVANCE OR REVERSE	2.8 4.2.2	X13	T11	HUM (20/30 OR 50/60 HZ) ON SOUND OR CUE TRACK	3.8.2	3.8.2	X11	STATUS LAMPS NEVER CHANGE - OR ARE RANDOM	4.4	4.4
C12	ALL OP KEYS STAY ON WHEN PRESSED	4.2.1 4.5	4.2.1 4.5	P12	ONE PROJ ADVANCES OR REVERSES AT POWER-ON	4.8.1	4.8.2	T12	CROSSTALK - CUES AUDIBLE ON SOUND TRACK	3.8.2	3.8.2	X12	PROGRAMMER LOSES SAME CUE(S)	4.2.4 4.4	4.2.4 4.4
C13	START CHANGES TO ANOTHER CUE	4.2.1	4.2.1	P13	ALL PROJ ADVANCE OR REVERSE AT POWER-ON	4.2.2 C5	-	T13	TAPE RECORDER CONTROLS - SOURCE, TAPE, 1/4 & 1/2 TRACK	4.2.3	4.2.3	X13	PROGRAMMER RESETS AT RANDOM	2.8 4.4	2.8 4.4
C14	ANY CUE CHANGES TO ANOTHER CUE	4.2.1	4.2.1	P14	PROJ HOME INCORRECTLY WITH RESET OR HOME CUE	4.2.2 X13	-	T14	CUES DROPPED FROM KNOWN GOOD TAPE (TEST TAPE)	4.2.3 4.4	4.2.3 4.4	X14-X16	NO CLEAR, RESET, REVQ - REVQ ERASES MEMORY	SH 26	SH 26
C15	CUE LAMP STAYS ON WHEN PRESSED	4.2.1 4.4	4.2.1 4.4	P15	PROJ MOVE INCORRECTLY ON REVERSE CUE	X13	X13					X17	LAMPS FLASH, ADVANCE OR REVERSE AT POWER-DOWN	2.8-6	2.8-6
C16	CUE COUNTER - COUNTS UP CONTINUOUSLY	4.2.1	4.2.1	P16	LAMPS FLASH WHEN POWER IS TURNED ON	4.2.2 X17	4.2.2 X17					X18	PROJ DO NOT ADVANCE OR REVERSE WHEN TURNED ON	2.7	2.7
C17	UNIT HANGS UP IN PLAY, START OR HOME	4.2.1	4.2.1	P17	DISSOLVES FLICKER - ONE PROJECTOR	3.2 4.8.1	4.4 4.8.2					X19	LAMPS DIM, NO INIT, FAN RUNS SLOW	2.8-5 4.3.1	2.8-5 4.3.1
C18	MULTIPLE LAMPS ON OR FAIL TO WORK IN GROUPS	4.2.1 4.5	4.2.1 4.5	P18	DISSOLVES FLICKER - ALL PROJ, ONE POWER PACK	3.2 4.8.1	3.2 4.8.2					X20	FUSE BLOWS (PASS TRANSISTOR ISOLATION)	2.8-5 4.3.1	2.8-5 4.3.1
C19	MULTIPLE SWITCHES IN GROUPS WILL NOT WORK	4.2.1 4.5	4.2.1 4.5	P19	DISSOLVES FLICKER - ALL PROJ, ALL POWER PACKS	2.8-1 3.1-D	2.8-1 3.1-D					X21	RELAYS CAUSE ADV OR REV AT POWER-ON	4.2.4	4.2.4

## 1.0 GENERAL TROUBLE SHOOTING (CONTD)

### 1.4 REPLACEMENT GUIDE FOR FIELD REPAIRS

#### TABLE 1.4

PART NUMBER	DESCRIPTION	USED IN		TOOLS REQD	
		SP III	SP V	GRP A	GRP B
13 33 001	MAGNETIC TAPE BOARD	✓	✓	✓	
13 33 002	CONTROL CONSOLE BOARD	✓	✓	✓	
13 33 003	DISPLAY MODULE BOARD	✓		✓	
13 33 004	MEMORY BOARD	✓		✓	
13 33 005	SCREEN CONTROL BOARD	✓		✓	
13 33 006	CENTRAL PROCESSOR BOARD	✓	✓	✓	
13 33 007	POWER MODULE BOARD	✓		✓	
15 33 001	SCREEN CONTROL BOARD		✓	✓	
15 33 002	MEMORY BOARD		✓	✓	
15 33 003	DISPLAY MODULE BOARD		✓	✓	
15 33 014	POWER MODULE BOARD	✓*	✓	✓	
13 33 009	PASS TRANSISTOR ASSEMBLY	✓		✓	
15 33 011	PASS TRANSISTOR ASSEMBLY		✓	✓	
21-025	CAPACITOR, 21,000 $\mu$ f		✓	✓	
21-026	CAPACITOR, 36,000 $\mu$ f	✓	✓	✓	
60-002	TRANSFORMER, EG-495	✓	✓	✓	✓
60-004	TRANSFORMER, P-6378		✓	✓	✓
60-005	TRANSFORMER, 7549	✓		✓	✓
30-021	BRIDGE, MDA-980-1	✓	✓	✓	✓
30-023	BRIDGE, MDA-990-1		✓	✓	✓

## 1.5 RECOMMENDED TOOLS

ALL REPAIRS IN SECTIONS 1 THRU 4 OF THIS MANUAL CAN BE PERFORMED WITH GROUP "A" TOOLS. GROUP "B" TOOLS ARE REQUIRED FOR SERVICE CENTERS AND COMPONENT LEVEL TROUBLE SHOOTING AND REPAIR, EXCEPT FOR OLDER EQUIPMENT LISTED IN TABLE 1.4 THAT REQUIRE SOLDERING EQUIPMENT TO REPLACE TRANSFORMERS, BRIDGES, ETC

### GROUP A (BOARD REPLACEMENT)

1. SCREWDRIVER, 1/4" BLADE
2. NUTDRIVER
3. SMALL PLIERS
4. VOLT-OHM METER (MULTI-TESTER, P/N 50-004 OR EQUIV)
5. GROUNDED OUTLET TESTER
6. SILICONE HEAT TRANSFER COMPOUND
7. LAMP BUTTON PULLER (P/N 50-001)
8. LAMP PULLER (P/N 50-002)

### GROUP B (COMPONENT REPLACEMENT)

1. SOLDERING IRON (40 WATT MAXIMUM PREFERRED)
2. SOLDER SUCKER (P/N 50-003, SOLDERPULIT DS017 OR EQUIV)
3. SOLDER WICK
4. IC SOCKETS
5. 30 AWG INSULATED JUMPER WIRE
6. WIRE STRIPPER

### GROUP C (SERVICENTER)

1. DIGITAL VOLTMETER
2. OSCILLOSCOPE (WITH 5 MEGAHERTZ RESPONSE, MINIMUM)

## 1.6 TEST SET UTILIZATION

AVL HAS TEST SETS UNDER DEVELOPMENT TO AID FIELD TROUBLESHOOTING AND REPAIR. THESE WILL BE MADE AVAILABLE AS RELEASED FROM DEVELOPMENT.



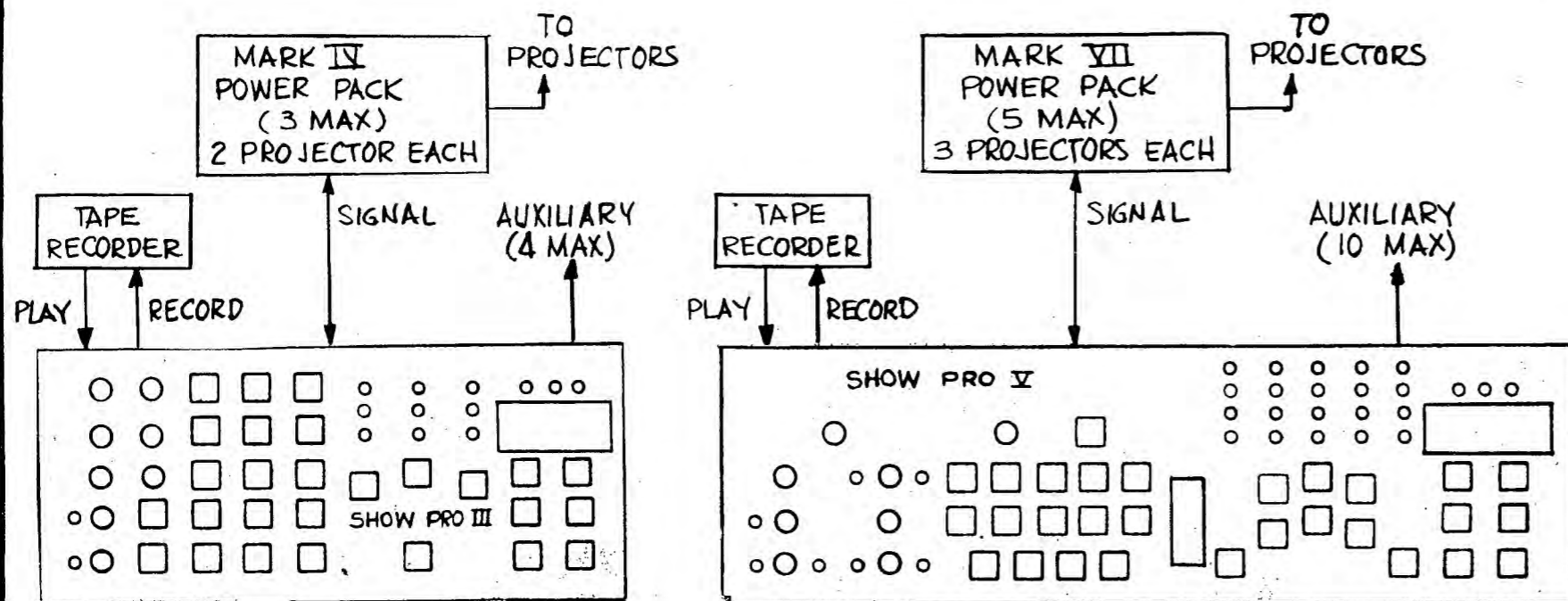
REPLACEMENT GUIDE / TOOLS

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## 2.0 SYSTEM ORIENTATION



### AC POWER REQUIREMENTS

		SP III		SP V	
		CURRENT	*FUSE	CURRENT	*FUSE
USA	115 VOLTS $\pm 10\%$ 60 HZ $\pm 5$ HZ	0.7A	1 AMP	1.2 A	2 AMP
OTHER	230 VOLTS $\pm 10\%$ 50 HZ $\pm 5$ HZ	0.4A	1 AMP	0.7A	2 AMP

\* UNITS EQUIPPED FOR BATTERY PACK MAY HAVE LARGER FUSES

**CAUTION:** PROGRAMMERS CONNECTED TO AN UNGROUNDED AC LINE, PARTICULARLY IN CARPETED LOCATIONS, MAY BE PERMANENTLY DAMAGED BY STATIC DISCHARGES

**NOTE:** A KNOWLEDGE OF CORRECT PROGRAMMING OPERATIONS IS REQUIRED TO UTILIZE THIS MANUAL. READ THE APPLICABLE MANUAL BEFORE PROCEEDING.

- SHOW PRO III OPERATOR'S MANUAL

- SHOW PRO V OPERATOR'S MANUAL

## 2.1 SYSTEM OPERATIONAL REQUIREMENTS

THE SP III AND SP V PROGRAMMERS ARE DESIGNED TO CONTROL SLIDE PROJECTORS. THE SIGNAL LEVELS ARE OPTIMIZED FOR THE KODAK EKTAGRAPHIC PROJECTOR (ALL MODELS), HOWEVER, THE EUROPEAN KODAK SAV PROJECTORS, TYPE A THRU G MAY BE USED WITH SUITABLE ADAPTER CABLES.

**NOTE:** CONSULT FACTORY IF THERE ARE ANY QUESTIONS IN UTILIZING OTHER MANUFACTURER'S PROJECTORS.

SYSTEM OPERATION REQUIRES THE FOLLOWING:

1. A SUITABLE AC POWER SOURCE (SEE TABLE)
2. A GROUNDED (THREE WIRE) AC POWER OUTLET.
3. PROJECTORS (2 FOR MARK IV, 3 FOR MARK VII) MUST BE CONNECTED TO THE SAME PHASE OF THE AC LINE AS THE ASSOCIATED POWER PACK.
4. THE PROGRAMMER AND POWER PACK/PROJECTOR GROUPS MAY BE ON DIFFERENT PHASES, IF GROUPINGS, AS DESCRIBED IN ITEM 3, ARE MAINTAINED.
5. ALL EXTERNAL EQUIPMENT, INCLUDING SLIDE PROJECTORS, POWER PACKS, TAPE RECORDERS, AND POWER BOXES MUST HAVE A THREE WIRE (GROUNDED) AC POWER LINE CORD.
6. THE TAPE INTERFACE ASSUMES A LINE LEVEL OUTPUT AND INPUT FROM TAPE DECK WITH A MINIMUM BANDWIDTH OF 10 KILOHERTZ. SEE PARAGRAPH 3.8 FOR ADDITIONAL MAGNETIC TAPE SPECIFICATIONS. LOW FREQUENCY RESPONSE TO 10 HERTZ IS DESIREABLE (SEE 3.8.2)



SYSTEM ORIENTATION

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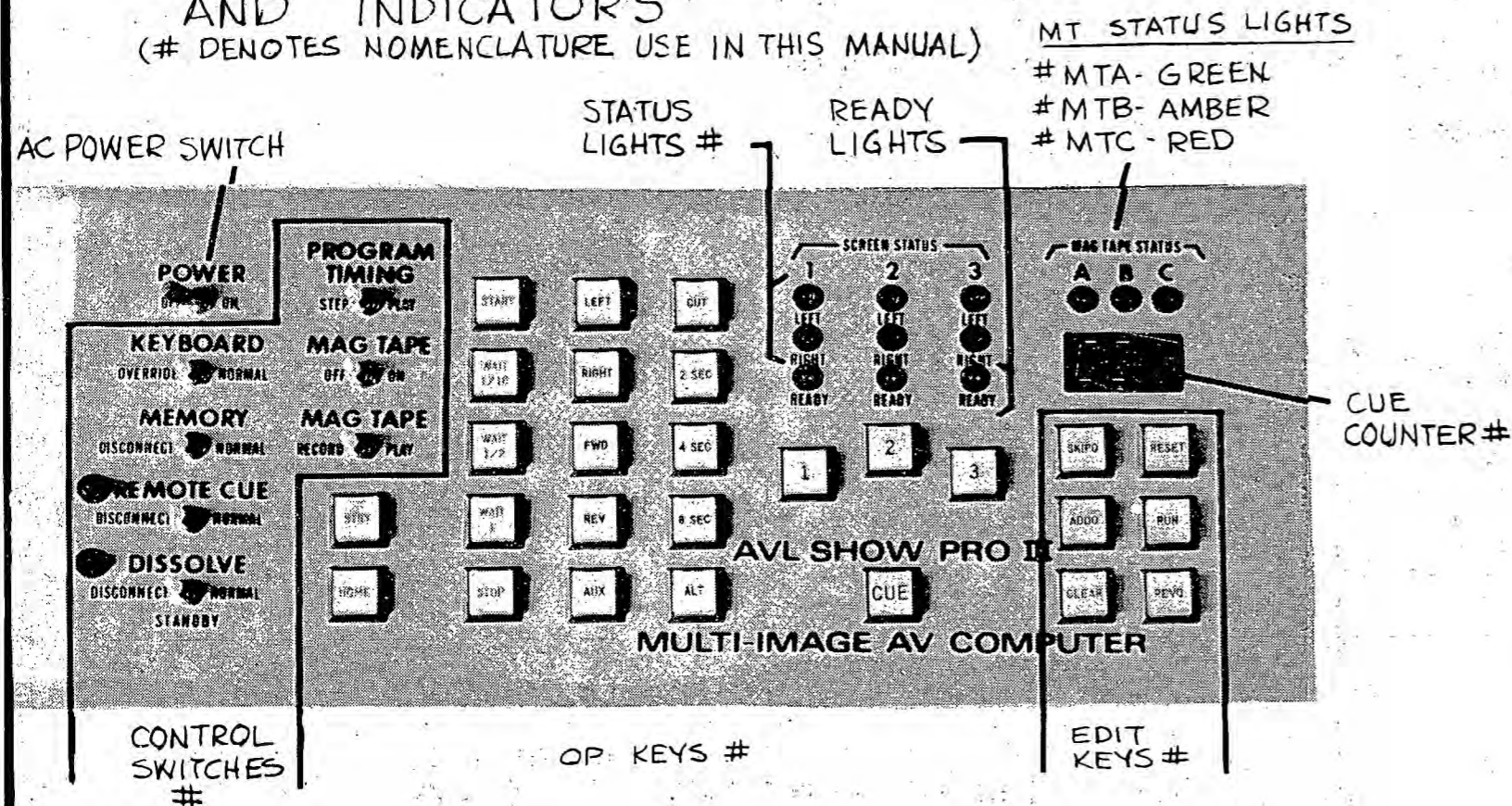
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## 2.0 SYSTEM ORIENTATION (CONTD)

## 2.3 SYSTEM CHECKOUT - SHOW PRO III

### CONTROL CONSOLE SWITCHES AND INDICATORS

(# DENOTES NOMENCLATURE USE IN THIS MANUAL)



#### MT STATUS LIGHTS

- # MTA - GREEN
- # MTB - AMBER
- # MTC - RED

- REVIEW THE OPERATION OF EACH SWITCH AND INDICATOR DESCRIBED IN SIII OPERATOR'S MANUAL, PAGES 3 THRU 7.

#### - CORRECT POWER-UP DISPLAY

1. TURN ON AC POWER SWITCH.
2. THE FOLLOWING LAMPS SHOULD FLASH MOMENTARILY:
  - OP KEYS
  - MT STATUS LIGHTS
  - SCREEN STATUS LIGHTS
3. ALL GREEN STATUS LIGHTS ON
4. CUE COUNTER AT "001"
5. ALL OTHER LAMPS OFF



THIS PROCESS IS CALLED INITIALIZATION (INIT #)

- "INIT" IS VERY IMPORTANT AND ESTABLISHES THE BASIS FOR TROUBLE SHOOTING THE PROGRAMMER. REFER TO PARAGRAPH 4.4, GENERAL BOARD LEVEL TROUBLESHOOTING.

- IF PROGRAMMER DOES NOT INITIALIZE, CONSULT SECTION 1.3 UNDER "CONTROL PANEL PROBLEMS".

#### OR

RANDOM INDICATION - IF UNIT DOES NOT INITIALIZE AND ON EACH POWER-ON A DIFFERENT PATTERN OF LAMPS AND INDICATORS OCCUR (INCLUDING CUE COUNTER) REFER TO PARAGRAPH 4.4

- FOR TROUBLE DIAGNOSIS, SWITCHES AND INDICATORS ARE GROUPED AS FOLLOWS:

- AC POWER SWITCH
- CONTROL SWITCHES
- EDIT KEYS

- THE MOST IMPORTANT GROUPS FOR TROUBLE SHOOTING ARE:

- READY LIGHTS
- OP KEYS
- MT STATUS LIGHTS
- CUE COUNTER
- SCREEN STATUS LIGHTS (LEFT & RIGHT)



SIII SYSTEM CHECKOUT

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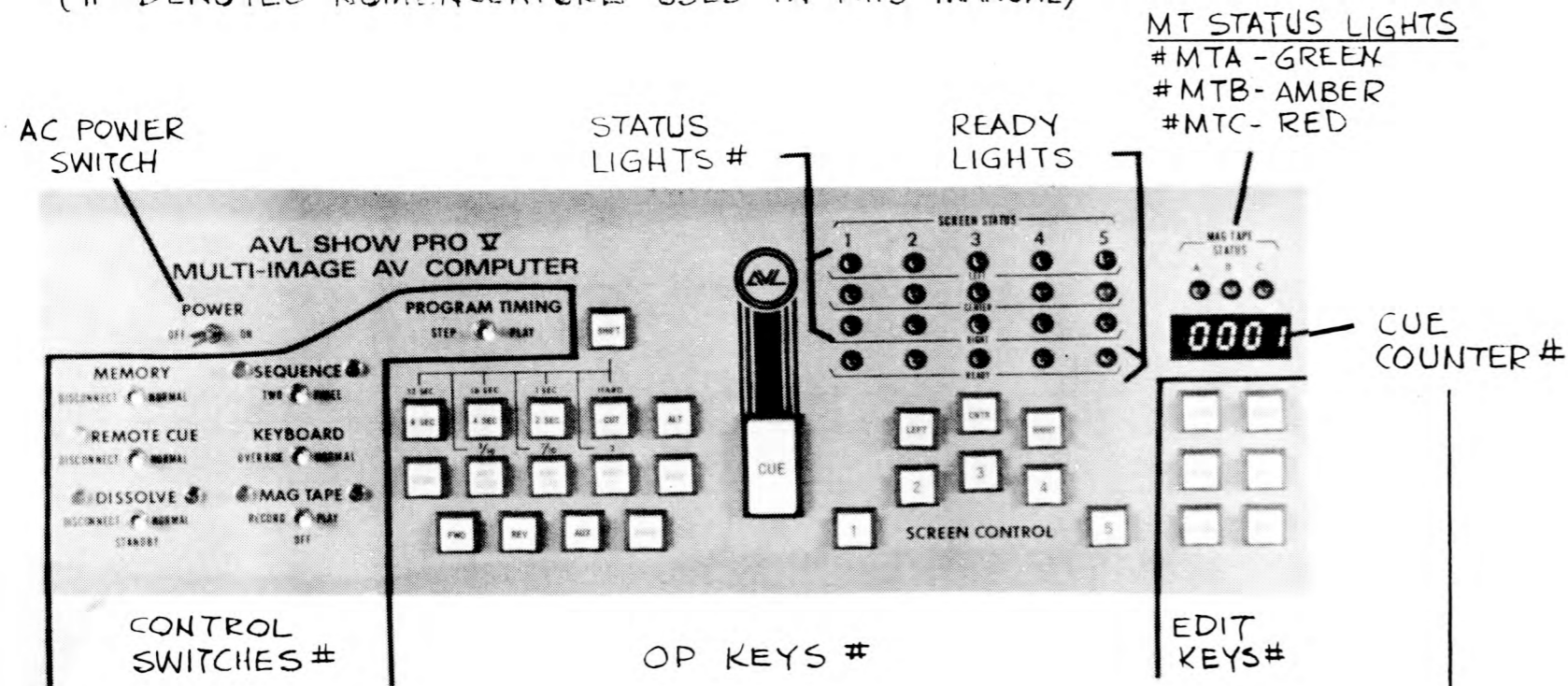


## 2.0 SYSTEM OPERATION (CONTD)

## 2.4 SYSTEM CHECKOUT - SHOW PRO V

### CONTROL CONSOLE SWITCHES AND INDICATORS

(# DENOTES NOMENCLATURE USED IN THIS MANUAL)



- FOR TROUBLE DIAGNOSIS, SWITCHES AND INDICATORS ARE GROUPED AS FOLLOWS:

- AC POWER SWITCH
- CONTROL SWITCHES
- EDIT KEYS

- THE MOST IMPORTANT GROUPS FOR TROUBLE SHOOTING ARE:

- READY LIGHTS
- OP KEYS
- MT STATUS LIGHTS
- CUE COUNTER
- SCREEN STATUS LIGHTS (LEFT, CENTER & RIGHT)

- REVIEW THE OPERATION OF EACH SWITCH AND INDICATOR DESCRIBED IN SPI OPERATOR'S MANUAL, PAGES 3 THRU 7

- CORRECT POWER-UP DISPLAY

1. TURN ON AC POWER SWITCH
2. THE FOLLOWING LAMPS SHOULD FLASH MOMENTARILY:
  - OP KEYS
  - MT STATUS LIGHTS
  - SCREEN STATUS LIGHTS
3. ALL GREEN STATUS LIGHTS ON
4. CUE COUNTER AT "0001".
5. ALL OTHER LAMPS OFF.

➔ THIS PROCESS IS CALLED INITIALIZATION (INIT #)

- "INIT" IS VERY IMPORTANT AND ESTABLISHES THE BASIS FOR TROUBLE SHOOTING THE PROGRAMMER. REFER TO PARAGRAPH 4.4 GENERAL BOARD LEVEL TROUBLESHOOTING

- IF PROGRAMMER DOES NOT INITIALIZE, CONSULT SECTION 1.3, UNDER "CONTROL CONSOLE PROBLEMS".

OR

RANDOM INDICATION - IF UNIT DOES NOT INITIALIZE AND ON EACH POWER-ON A DIFFERENT PATTERN OF LAMPS AND INDICATORS OCCUR (INCLUDING CUE COUNTER) REFER TO PARAGRAPH 4.4

{ NOTE - IF CUE COUNTER SHOWS "bad 1", "bad 2" OR "bad 3" REFER TO SHEET 33 FOR FURTHER SPI MEMORY DIAGNOSTICS.

	SPI SYSTEM CHECKOUT		
	B 10 83 001	SN 8	REV A

## 2.0. SYSTEM ORIENTATION (CONTD)

### 2.5 BASIC TROUBLE DIAGNOSIS

THE GREATEST ASSET TO RAPID TROUBLESHOOTING IS THE AVAILABILITY OF KNOWN GOOD SYSTEM COMPONENTS. BACKUP UNITS MAKE GOOD STANDARDS AND SHOULD BE MARKED WITH DATE CHECKED AND STATUS. FOR INSTANCE, THE FOLLOWING EQUIPMENT, KNOWN TO BE GOOD AND KEPT OUT OF OPERATION, COULD BE USED TO ISOLATE SYSTEM PROBLEMS:

- A POWER PACK, MARK IV OR MARK VII MAY BE USED INTER-CHANGABLY FOR TROUBLESHOOTING SP III AND SP V.
- AN EKTAGRAPHIC PROJECTOR WITH A GOOD TRAY AND SLIDES.
- A LOW-COST BATTERY OPERATED CASSETTE TAPE UNIT, WITH CABLES AND A TEST TAPE. A BATTERY OPERATED UNIT SIMPLIFIES CHECKING GROUND LOOPS AND HUM PROBLEMS.

NORMALLY, THE INITIAL STEP IS REDUCED TO DETERMINING WHETHER THE PROBLEM IS

- EXTERNAL TO THE PROGRAMMER OR
- INTERNAL TO THE PROGRAMMER

THE CHECKLIST FOR SYSTEM COMPONENTS INSURES THAT TIME IS NOT WASTED CHASING AN ILLUSIVE "PROGRAMMER" PROBLEM THAT IS, IN FACT, A DEFECTIVE PROJECTOR, POWER PACK, TAPE RECORDER, OR OTHER EXTERNAL EQUIPMENT.

**NOTE:** THE AVL "REMOTE CONTROL POWER BOX" MAKES AN EXCELLENT DIAGNOSTIC DEVICE FOR TROUBLESHOOTING AUXILIARIES AND PROJECTOR FORWARDS (REFER TO SECTION 3.6). A KNOWN GOOD AVL EXTENDER CABLE IS HELPFUL IN TROUBLESHOOTING IN FIXED LOCATIONS WHERE IT IS INCONVENIENT TO MOVE POWER PACKS AND PROJECTORS.

## CHECK LIST FOR SYSTEM COMPONENTS

### 1. PROJECTORS

- GOOD LAMP.
  - OPERATES MANUALLY IN REVERSE AND FORWARD RELIABLY.
  - CHECK TRAYS FOR WORN OR MISSING DETENT TEETH.
  - TRAY LOCATOR PLATE IN CORRECT POSITION.
- NOTE - BOTH TRAY DEFECTS CAN GIVE INDICATIONS OF A FAILURE WITH "HOME", "RESET" OR "REVQ".

### 2. POWER PACKS

- CHECKED OUT WITH PROGRAMMER AND PROJECTORS
- CABLES CHECKED PER ITEM 5 (BELOW)
- RED "ON" LAMP OPERATIONAL
- GROUND PIN ON AC LINE CORD INTACT

### 3. TAPES

- HIGH QUALITY TAPE, OR CHROMIUM DIOXIDE TAPE, IF APPLICABLE.
- NO SECOND GENERATION COPIES, PARTICULARLY FROM CASSETTES.
- WORN TAPES SHOULD BE REPLACED. SEE USE OF MT STATUS LIGHTS IN OPERATOR'S MANUAL

### 4. TAPE DECKS OR CASSETTE DRIVES

- CLEAN HEADS
- CORRECT TAPE TENSION
- CORRECT HEAD ALIGNMENT
- CORRECT RECORD LEVEL ON 2 AND 4 CHANNEL UNITS.

### 5. CABLES

- ALL CONNECTIONS SOLDERED OR CRIMPED. TWISTING AND TAPING WIRES ARE NOT ACCEPTABLE CONNECTIONS.
- NO SHARP BENDS OR FRAYED INSULATION.
- NO BENT OR MISSING CONTACTS.
- STRAIN RELIEFS ON ALL CONNECTOR CABLES.

6. AUXILIARY EQUIPMENT - AC INDUCTIVE LOADS SHOULD BE SWITCHED WITH POWER BOXES, AND NOT BY THE AUXILIARY CONTACTS. AUXILIARIES SHOULD BE OPERATED AT 24 VOLTS DC OR LESS.

THE LARGEST SINGLE SOURCE OF SYSTEM LEVEL MALFUNCTIONS ARE SIGNAL AND POWER RELATED CONNECTION PROBLEMS. THESE PROBLEMS ARE DESCRIBED IN SECTIONS 2.6 AND 2.8



BASIC TROUBLE DIAGNOSIS

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2.0 SYSTEM TROUBLESHOOTING (CONTD)2.6 SIGNAL RELATED PROBLEMS

THERE ARE THREE CLASSES OF EXTERNAL SIGNALS UTILIZED FOR SYSTEM OPERATION.

1. RELAY CLOSURES - FOR PROJECTOR ADVANCES, PROJECTOR REVERSES AND AUXILIARY CLOSURES.

ALL RELAY CLOSURES ARE MOMENTARY, FOR 1/4 SECOND (250 MILLISECOND) EXCEPT FOR AUX "O" ON SP III, WHICH IS A PROGRAMMABLE LATCHING CLOSURE. THE AVL "REMOTE CONTROL POWER BOX" IS AVAILABLE TO PROVIDE THE LATCHING FUNCTION ON ALL OTHER AUXILIARY OUTPUTS.

2. DISSOLVE FIRE PULSES

THESE 30VOLT DC PULSES ARE GENERATED BY THE PROGRAMMER SCREEN CONTROL BOARDS, ROUTED TO THE POWER PACKS WHERE THEY CONTROL TRIACS WHICH IN TURN CONTROLS THE PROJECTOR LAMPS. POWER FOR THESE PULSES IS FURNISHED FROM A 30VDC SUPPLY WHICH IS FED FROM THE 28VOLT AC POWER SUPPLIED BY THE POWER PACK.

THESE SIGNALS ARE THE MOST DIFFICULT TO TROUBLESHOOT AND ISOLATE DUE TO THE DISPERSED NATURE OF THE CIRCUITRY. SECTION 3.3 DETAILS THE CHARACTERISTICS OF THIS CIRCUIT.

3. LINE LEVEL MAGNETIC TAPE SIGNALS

REFER TO SECTION 3.8 FOR AN EXPLANATION OF THESE SIGNALS.

2.7 ENVIRONMENTAL PROBLEMS

THE FOLLOWING ENVIRONMENTAL CONDITIONS ARE OCCASIONALLY ENCOUNTERED, AND CAN CAUSE OTHERWISE INEXPLICABLE PROBLEMS.

POWER LINE NOISE - REFER TO SECTION 2.8

TEMPERATURE

OPERATING - PROGRAMMERS ARE DESIGNED TO OPERATE IN 32°F TO 140°F (0°C-60°C), AMBIENT TEMPERATURE BELOW 32°F (0°C) A SUITABLE WARMUP PERIOD MAY BE REQUIRED TO REMOVE INTERNAL CONDENSATION.

LOW - BELOW 50°F (10°C) THE LUBRICANT IN PROJECTORS BECOMES STICKY. PROJECTORS LEFT IN UNHEATED AREAS OVERNIGHT MAY APPEAR TO WORK INCORRECTLY (RESETS, HOME, REVQ) UNTIL THE MECHANISM WARMS UP.

VERY LOW - BELOW -4°F (-20°C) ELECTROLYTIC CAPACITORS AND CRYSTALS IN THE PROGRAMMERS CAN BE DAMAGED IF LEFT FOR EXTENDED PERIODS.

HUMIDITY - HEAVY INTERNAL CONDENSATION IN A PROGRAMMER WILL GIVE APPEARANCE TO PROBLEMS C4 THRU C14. PROGRAMMERS OPERATED OUTDOORS OR IN HIGH HUMIDITY AREAS SHOULD BE LEFT ON CONTINUOUSLY. HUMIDITY PROBLEMS WILL DISAPPEAR AFTER 15 TO 45 MINUTES OF WARM-UP WITH POWER ON.

	SIGNAL RELATED/ ENVIRONMENTAL		
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## 2.0 SYSTEM ORIENTATION (CONTD)

### 2.8 POWER RELATED PROBLEMS

LINE CHARACTERISTIC	SYMPTOM
1. <u>LOW LINE VOLTAGE</u> NOTE - U.S. EKTAGRAPHIC PROJECTORS DONOT OPERATE RELIABLY AT 100 VOLTS OR BELOW	- LAMPS FLICKER ON DISSOLVES ON ALL POWER PACKS - ADVANCE OR REVERSE MAY OCCASIONALLY FAIL
2. <u>BROWN-OUTS (LINE DIPS)</u> NOTE - THESE PROBLEMS CAN BE CORRECTED WITH THE BATTERY PACK OPTION	- RANDOM LOSS OF MEMORY - RANDOM CHANGE OF CUES - PROGRAMMER HANGS UP ON A CUE RANDOMLY - RANDOM PROGRAMMER RESETS (USUALLY ACCOMPANIED BY COMPLETE LOSS OF MEMORY) i.e. CLEAR+ RESET
3. <u>LINE NOISE (INCLUDING IMPRESSED                      SIGNALS AS USED FOR CLOCKS)</u>	- SAME SYMPTOMS AS FOR "BROWN-OUTS", MAY BE CORRECTED WITH POWER LINE FILTER OPTION
4. <u>LIGHTNING (OR SEVERE                      HIGH LINE VOLTAGE)</u>	- ALL PANEL LIGHTS ON, INDICATES A CATASTROPHIC FAILURE OF CPU BOARD - ALL PANEL LIGHTS OFF, INDICATES LOSS OF PASS TRANSISTOR DUE TO OVERHEATING OR CONTROL BOARD PROBLEM (SEE SHEET 31)

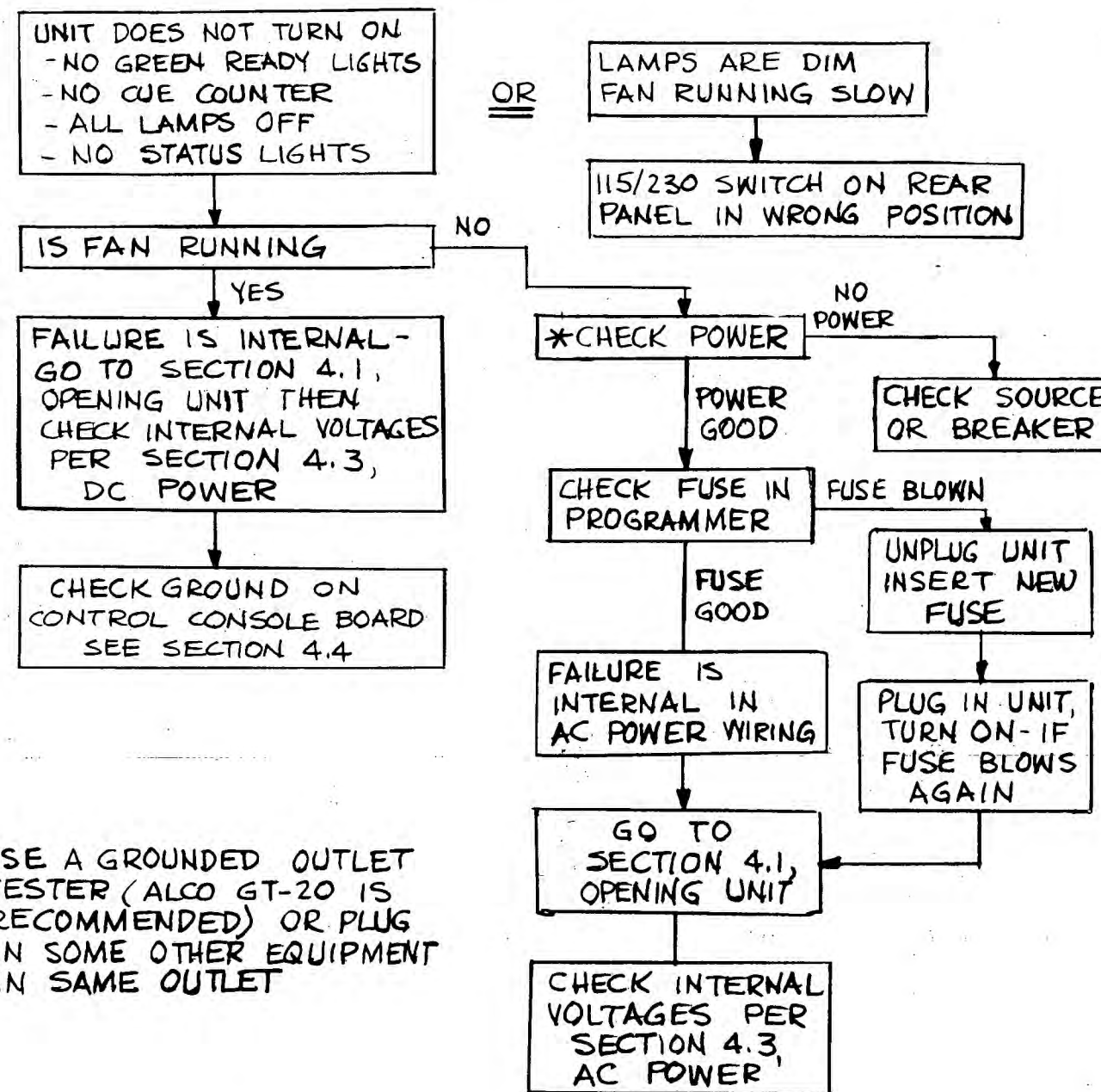
▷ NOTE - PASS TRANSISTOR FAILURE CAN OCCUR IN SPI  
 IF AIR FLOW VENTS ON BOTTOM OF UNIT ARE BLOCKED  
 FOR SUSTAINED PERIODS, OR IF FAN FAILS.

#### PROBLEM X17

LAMPS FLASH, ADVANCES AND REVERSES  
 AT POWER-DOWN

- THIS IS A SYSTEM CHARACTERISTIC AND  
 CAN BE PREVENTED BY TURNING OFF  
 POWER PACKS BEFORE TURNING OFF  
 PROGRAMMER POWER

### 5. APPARENT PROGRAMMER POWER LOSS



POWER RELATED PROBLEMS

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## 3.0 SYSTEM TROUBLESHOOTING

### 3.1 PROBLEM TROUBLESHOOTING - PROJECTOR (LAMPS, ADVANCES & REVERSES)

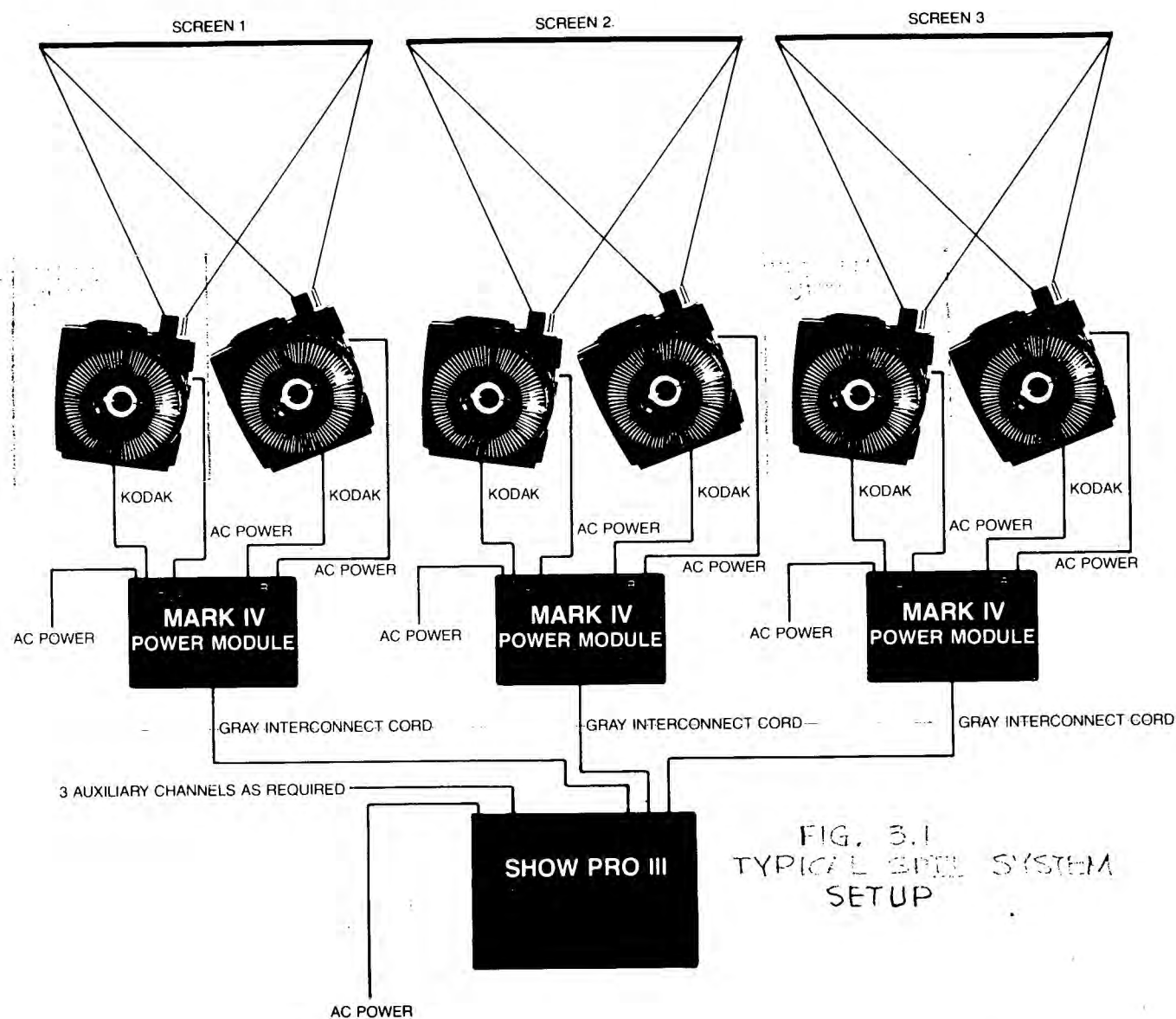


FIG. 3.1  
TYPICAL SPIII SYSTEM  
SETUP

#### GENERAL PROJECTOR ISOLATION PROCEDURE

- ESTABLISH A CONTROL UNIT
- SUBSTITUTE PROBLEM UNIT FOR CONTROL UNIT
- TEST PROBLEM UNIT
- IF PROBLEM PERSISTS, REPLACE DEFECTIVE UNIT

PROCEDURE IS APPLICABLE FOR:

- LAMP ACTION PROBLEMS
- FORWARD AND REVERSE PROBLEMS

SYSTEM HOOKUP PROCEDURES ARE DETAILED IN THE SPIII AND SPIV OPERATOR'S MANUALS. FIGURE 3.1 AND 3.2 ARE TYPICAL SETUPS FOR A SPIII AND A SPIV, RESPECTIVELY. THE FOLLOWING TESTS WILL ASSIST IN ISOLATING PROJECTOR PROBLEMS

#### A. SINGLE PROJECTOR PROBLEM

- ESTABLISH A CONTROL PROJECTOR. IT OPERATES SATISFACTORILY ON FORWARD, REVERSE AND LAMP ACTION (SCREEN 1 LEFT, FOR EXAMPLE)
- CHECK PROBLEM PROJECTOR PER SECTION 2.5. IF PROJECTOR WORKS MANUALLY CONTINUE TEST, IF NOT REPLACE UNIT. (CHANGE SLIDE TRAY IF NECESSARY)
- SUBSTITUTE PROBLEM PROJECTOR FOR CONTROL PROJECTOR
- IF PROBLEM IS CORRECTED THE FAULT IS IN THE POWER PACK, CABLES OR PROGRAMMER. REFER TO SECTION 3.2 FOR FURTHER ISOLATION OF PROBLEM
- IF PROBLEM STILL EXISTS IN CONTROL POSITION THE PROJECTOR IS DEFECTIVE AND MUST BE REPLACED.

▶ DO NOT ARBITRARILY SUBSTITUTE POWER PACKS. SEE SECTION 3.2

#### B. MULTIPLE PROJECTOR PROBLEMS (SAME POWER PACK - ALL PROJECTORS)

- FOLLOW STEP A PROCEDURE FOR ONE PROJECTOR
- IF PROBLEM IS CORRECTED TRY OTHER PROJECTORS. IF ALL ARE GOOD THE FAULT IS IN THE POWER PACK, CABLES OR PROGRAMMER REFER TO SECTION 3.2.
- IF PROBLEM PERSISTS, PROJECTORS ARE FAULTY - REPLACE,

#### C. MULTIPLE PROJECTOR PROBLEMS (DIFFERENT POWER PACKS)

- CHECK PROJECTORS PER STEPS A AND B
- IF PROJECTORS ARE GOOD, REFER TO SECTION 3.2

#### D. ALL PROJECTORS FLICKER OR ARE DIM

- THERE IS PROBABLY A LOW LINE VOLTAGE PROBLEM. TURN OFF ALL POWER PACKS EXCEPT FOR SCREEN 1.
- TURN OFF ALL OTHER PROJECTORS NOT PLUGGED INTO POWER PACKS.
- OBSERVE SCREEN 1. IF LAMP IS BRIGHTER OR FLICKER DISAPPEARS THERE IS A DEFINITE LOW LINE VOLTAGE PROBLEM.
- RECONNECT POWER PACKS (AND OTHER PROJECTORS, IF APPLICABLE) TO DIFFERENT OUTLETS OR SOURCES. BE SURE PROJECTOR AC CORDS ARE PLUGGED INTO POWER PACKS (REFER TO SECTION 2.1)

▶ ALTERNATE PROCEDURE - MEASURE AC LINE VOLTAGE WITH ONE SCREEN ON. READING SHOULD BE 105VAC MINIMUM. TURN ON OTHER SCREENS AND DISSOLVE UP ALL PROJECTORS. CHECK IF VOLTAGE DROPS BELOW 100VAC, PROJECTORS REQUIRE 95 TO 100VAC, THE PROGRAMMER WILL OPERATE RELIABLY TO 85VAC.



PROBLEM TROUBLESHOOTING -  
PROJECTOR

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SH 12  
REV A

## 3.0 SYSTEM TROUBLESHOOTING

### 3.2 PROBLEM ISOLATION - CABLES AND POWER PACKS

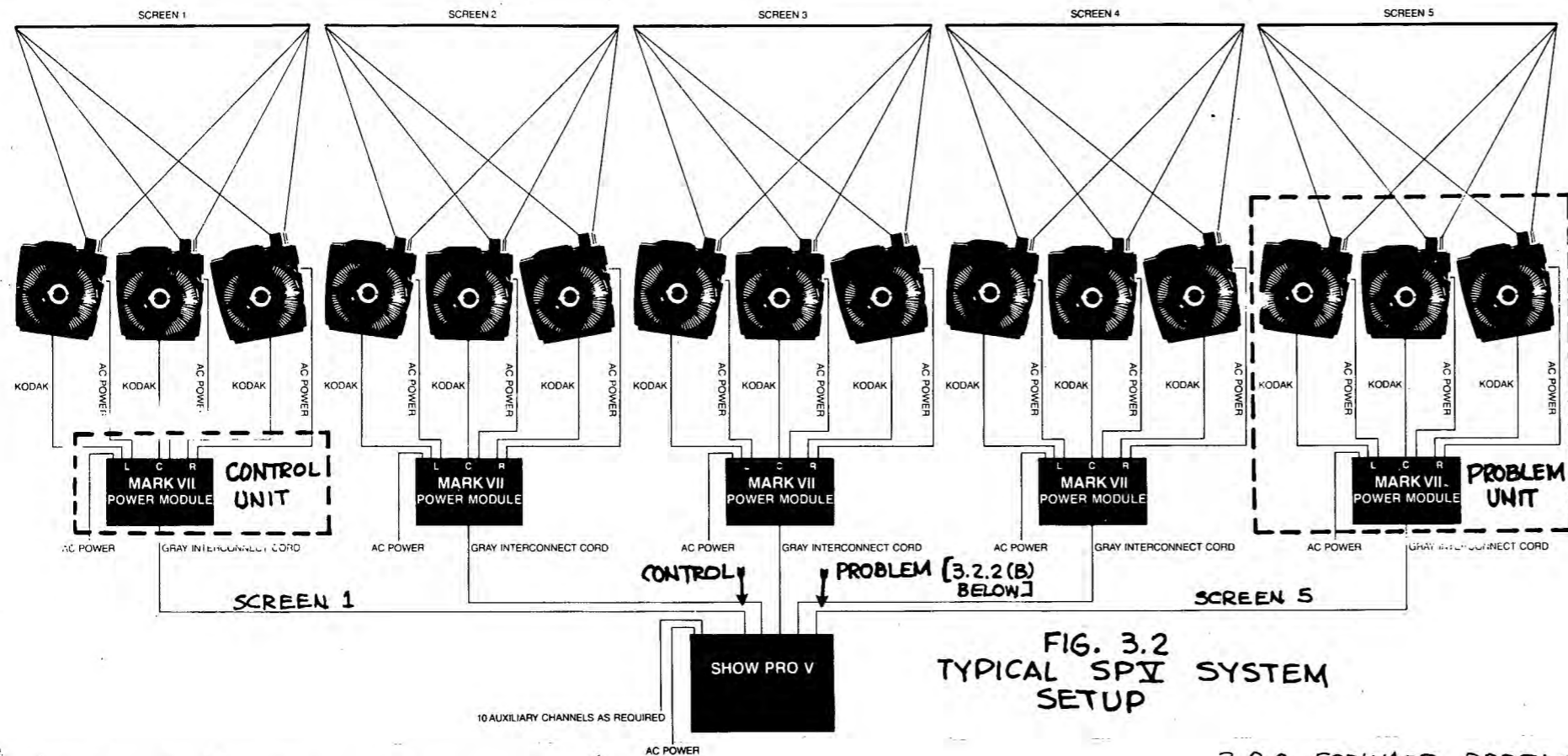


FIG. 3.2  
TYPICAL SPV SYSTEM  
SETUP

#### GENERAL POWER PACK ISOLATION PROCEDURE

- ESTABLISH A CONTROL UNIT
- SUBSTITUTE PER PROCEDURE ONLY
- TEST PROBLEM UNIT
- IF PROBLEM PERSISTS, REPLACE DEFECTIVE UNIT

#### 3.2.1 LAMP PROBLEM

**CAUTION:** DEFECTIVE LAMP CIRCUITS IN POWER PACKS AND PROGRAMMERS CAN AFFECT EACH OTHER, AND CAN CAUSE NEW PROBLEMS - FOLLOW PROCEDURES CAREFULLY

- SINGLE PROJECTOR - PROJECTOR IS GOOD PER SECTION 3.1 AND OTHER PROJECTORS ON POWER PACK ARE OPERATING.
- LAMP PROBLEMS: ALWAYS ON, ALWAYS OFF, DIM OR FLICKER
  - REPLACE WITH BACKUP UNIT OR EXCHANGE CONNECTOR WITH CONTROL UNIT ON BACK OF PROGRAMMER
  - IF PROBLEM PERSISTS, THE PROBLEM IS IN THE PROGRAMMER (SEE 4.4)
  - IF PROBLEM IS CORRECTED THE POWER PACK IS DEFECTIVE, REFER TO SECTION 3.4 FOR TROUBLESHOOTING PROCEDURE.

#### 3.2.1 LAMP PROBLEM (CONTD)

**B. MULTIPLE PROJECTORS - SAME POWER PACK, ALL PROJECTORS GOOD PER 3.1**

**CAUTION:** IT IS NOT POSSIBLE TO EXTERNALLY DETERMINE IF A FAILURE IS IN THE POWER PACK OR THE PROGRAMMER, UNLESS THE RED LAMP ON THE POWER PACK IS OUT (SEE ITEM D). THE PROGRAMMER OR POWER PACK MUST BE OPENED AND VOLTAGES MEASURED PER SECTION 3.7 BEFORE SUBSTITUTING POWER PACK.

**C. MULTIPLE PROJECTORS - DIFFERENT POWER PACKS, ALL PROJECTORS GOOD PER 3.1**

- USE PROCEDURE 3.2.1.A AND CHANGE ONE POWER PACK AT A TIME. IF PROBLEM PERSISTS, THE PROGRAMMER IS DEFECTIVE (REFER TO SECTION 4.1)

**D. POWER PACK RED LAMP OUT - WITH SWITCH ON**

- REPLACE BULB IF LAMP DOES NOT LIGHT
- REPLACE POWER PACK - IF TIME PERMITS, MAKE ADDITIONAL MEASUREMENTS PER SECTION 3.7
- IF PROBLEM PERSISTS OR NEW LAMP GOES OUT, THE DEFECTIVE POWER PACK MAY HAVE DAMAGED THE SCREEN CONTROL BOARD (SEE SECTION 3.7).
- REPLACE SCREEN CONTROL AND POWER PACK
- IF PROBLEM IS CORRECTED, POWER PACK IS DEFECTIVE (REFER TO SECTION 3.4)

#### 3.2.2 FORWARD PROBLEM

- IF AN EXTENDER CABLE IS USED, REMOVE FROM SYSTEM AND PLUG PROGRAMMED DIRECTLY TO POWER PACK. IF PROBLEM PERSISTS, THE EXTENDER CABLE IS GOOD.
- REMOVE CONTROL UNIT GREY CABLE FROM PROGRAMMER AND PLUG IN PROBLEM UNIT IN CONTROL CONNECTOR.
- IF PROBLEM PERSISTS, THE PROGRAMMER IS DEFECTIVE, THIS CAN BE CONFIRMED BY METER CHECKING THE OUTPUTS OF THE SCREEN CONTROL CONNECTOR PER SECTION 3.6. REPAIR PROCEDURE IS IN SECTION 4.0
- IF PROBLEM IS CORRECTED, THE POWER PACK IS DEFECTIVE, REPLACE WITH BACKUP UNIT. REPAIR USING TROUBLESHOOTING DATA IN SECTION 3.4

#### 3.2.3 REVERSE PROBLEM (FOLLOW PROCEDURE OUTLINED IN SECTION 3.2.2)



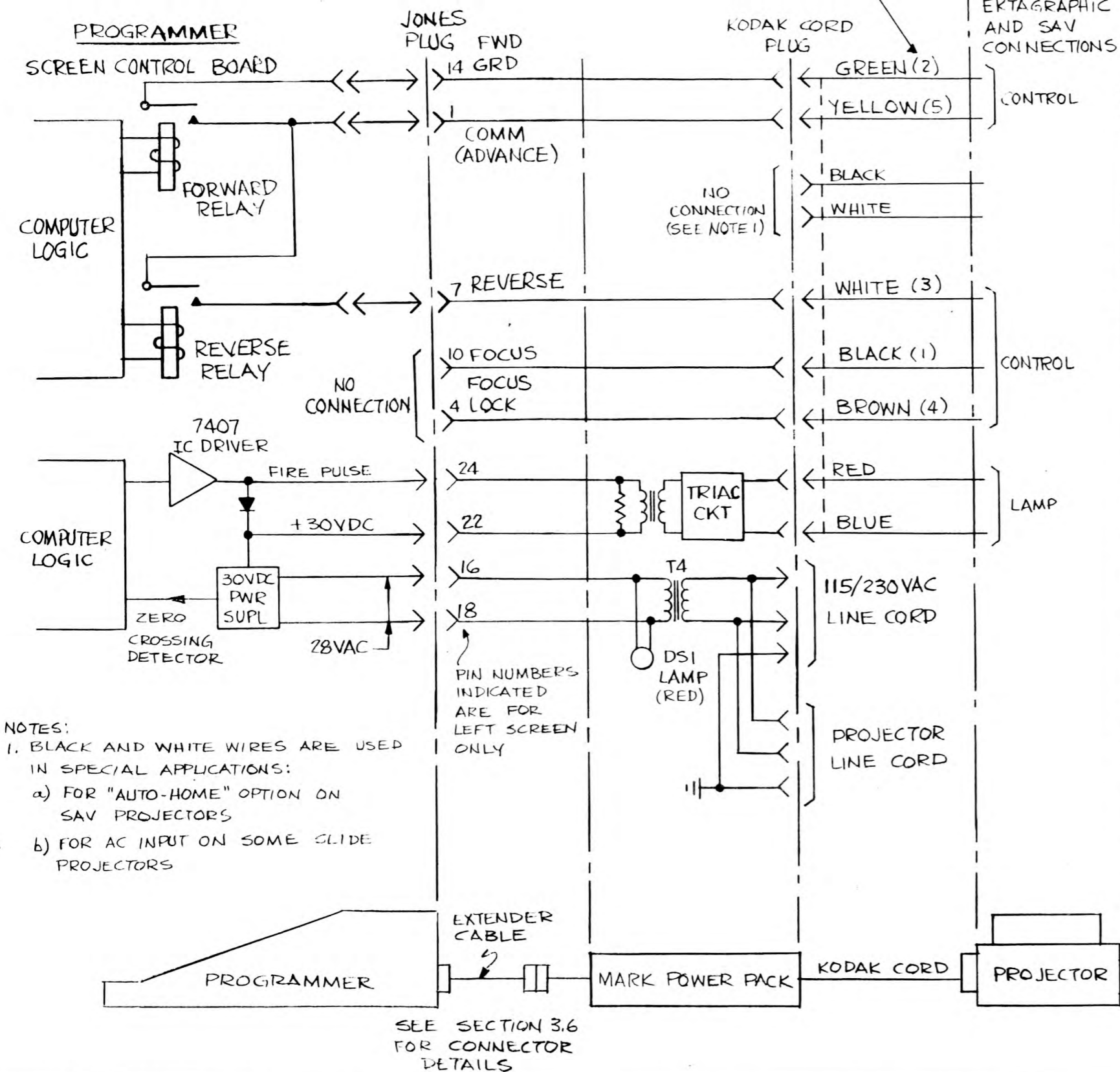
PROBLEM ISOLATION -  
CABLES AND POWER PACKS

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SN 13  
REV A

## 3.0 SYSTEM TROUBLESHOOTING (CONTD)

### 3.3 PROBLEM ISOLATION - PROGRAMMERS



- NOTES:
1. BLACK AND WHITE WIRES ARE USED IN SPECIAL APPLICATIONS:
    - a) FOR "AUTO-HOME" OPTION ON SAV PROJECTORS
    - b) FOR AC INPUT ON SOME SLIDE PROJECTORS

THE FIGURE TO THE LEFT ILLUSTRATES HOW THE FORWARD-REVERSE AND LAMP CIRCUITS ARE DISTRIBUTED THROUGH THE TYPICAL SYSTEMS DISCUSSED IN SECTIONS 3.1 AND 3.2.

THE FOLLOWING TABLE INDICATES SOME TYPICAL PROBLEMS RELATED TO THESE CIRCUITS.

CLASS	PROBLEM	SECT 1.3	POSSIBLE CAUSE	PROCEDURE
ALL PROJ ON SAME POWER PACK	NO ADVANCE	P5, P8	OPEN FORWARD GROUND (GRN) IN POWER PACK, PROJ, PROG OR CABLE	3.2.2, 3.4
	NO REVERSE			
	NO LAMPS	P2	- FAILURE OF 28VAC IN POWER PACK - FAILURE OF 30VDC IN PROG	3.2.1 (B), 4.
ALL PROJ ON SAME POWER PACK	FLICKER ALL LAMPS	P18	- FAILURE OF SCREEN CONTROL BD - FAILURE OF 28VAC/30VDC	3.2.1 (B), 4.8
ONE PROJ ON ANY POWER PACK	NO ADVANCE	P4	- POWER PACK - PROGRAMMER SCREEN CONTROL BOARD	3.2.2
	NO REVERSE	P7		3.2.2
	NO LAMP	P1		3.2.1 (A)
	FLICKER	P17		3.2.1
ONE PROJ ON ANY POWER PACK	CONTINUOUS ADV OR REV	P12	PROJECTOR, PROGRAMMER	4.2 *
MULT PROJ DIFF POWER PACKS	NO ADVANCE, REVERSE OR LAMP	P1, P4, P7, P17	ISOLATE WITH CONTROL PROJECTOR TECHNIQUE TO ESTABLISH IF PROGRAMMER IS FAULT	3.2.1, 3.2.2
ALL PROJ ALL POWER PACKS	NO ADVANCE OR REVERSE	P6, P9	+11V POWER SUPPLY IN PROGRAMMER	4.2, 4.3.1
	NO LAMP	P3	SCREEN CONTROL CLOCK (PROG) - SC BOARD, CPU BOARD	4.2, 4.5, 4.8

\* CHANGE PROJECTOR BEFORE OPENING PROGRAMMER



PROBLEM ISOLATION - PROGRAMMER

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SN 14

REV A

## 3.0 SYSTEM TROUBLE SHOOTING (CONTD)

### 3.4 TRACING DOWN POWER PACK PROBLEMS

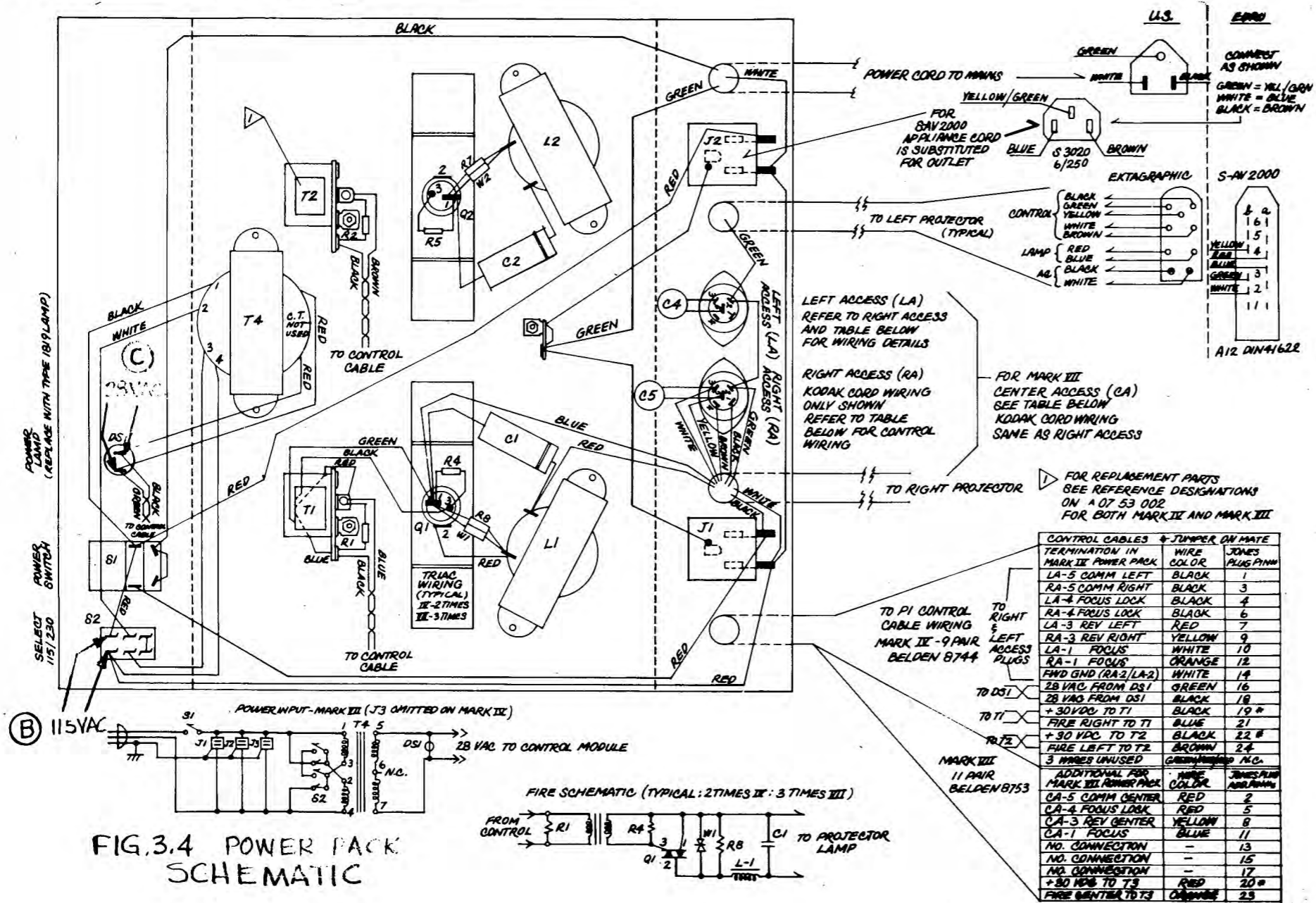
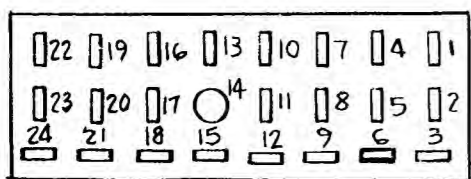
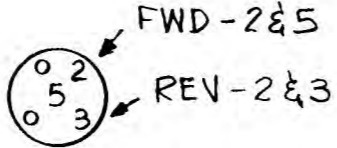


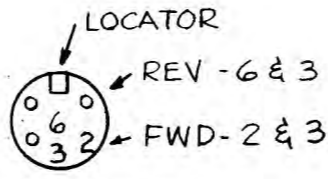
FIG. 3.4 POWER PACK SCHEMATIC



JONES (24 PIN) CONNECTOR (PIN END)



ACCESS PLUG (PIN END)



DIN (SAV) ACCESS PLUG (PIN END)

### 3.4 TRACING DOWN POWER PACK PROBLEMS (CONTD)

THIS PROCEDURE IS FOR POWER PACKS DETERMINED AS DEFECTIVE BY SUBSTITUTION.

THE MARK II AND III POWER PACKS DO NOT CONTAIN ANY ACTIVE COMPONENTS AFFECTING ADVANCES (FORWARD) OR REVERSES. HENCE, BROKEN WIRES OR LOOSE SOLDER CONNECTIONS, DUE TO SHOCK OR VIBRATION, ARE THE ONLY SOURCES OF FAULTS. WITH UNIT UNPLUGGED, PROCEED AS FOLLOWS:

#### 3.4.1 ADVANCE OR REVERSE

- OPEN UNIT AND CHECK WIRING PER FIGURE 3.4. OBSERVE THAT FORWARD AND REVERSE WIRING GOES DIRECTLY FROM CONTROL CABLE TO ACCESS PLUGS AND THENCE TO PROJECTOR CORDS.
- WITH METER SET ON R<sub>XI</sub> OHMS, CHECK ACCESS PLUG TO APPROPRIATE PIN ON PROJECTOR CORD. PIN 2 (GREEN) ON ACCESS PLUG CORRESPONDS TO PIN MARKED "GREEN" ON EKTAGRAPHIC PLUG. CONTINUITY IS INDICATED BY ZERO OHMS ON METER.
- IF CONTINUITY IS ESTABLISHED IN KODAK CORD, CHECK WITH METER BETWEEN JONES PLUG PIN (PER TABLE 3.4) AND ACCESS PLUG. IF "NO CONTINUITY" IS NOTED DEFECT IS PROBABLY IN CABLE. CONNECTOR HOOD CAN BE REMOVED AND SLID ON CABLE TO EXPOSE WIRE CONNECTIONS.
- IF ALL WIRES INDICATE CONTINUITY, THE CONTACTS ARE WORN OR WRONG DIAGNOSIS WAS MADE. RECHECK UNIT.

#### 3.4.2 LAMP PROBLEMS - DO NOT CONNECT PACK TO PROGRAMMER

- WITH COVER REMOVED, PLUG IN UNIT LINECORD. TURN ON POWER SWITCH, LAMP "DS1" SHOULD BE ON.
- WITH METER SET ON "120 ACV" CHECK FOR 115 VAC AT POINT "B". IF NOT PRESENT, CHECK WIRING.
- IF 115 VAC IS PRESENT, CHECK FOR 28 VAC AT POINT "C". IF PRESENT, CHECK FOR 28 VAC ON PINS 16 AND 18 OF JONES PLUG. IF PRESENT GO TO "E" BELOW.
- IF 28 VAC IS NOT PRESENT (DS1 IS OFF), TRANSFORMER T4 IS DEFECTIVE AND MUST BE REPLACED.
- IF 28 VAC IS PRESENT GO TO SECTION 3.5.

**NOTE:** TROUBLESHOOTING TRIAC FIRE CIRCUITS REQUIRES ADDITIONAL TEST EQUIPMENT (TESTS IN SECTION 3.5) IF EQUIPMENT IS NOT AVAILABLE RETURN UNIT TO FACTORY FOR REPAIR

	TRACING DOWN POWER PACK PROBLEMS		
	B 10 83 001	SN 15	REV A



3.0 SYSTEM TROUBLE SHOOTING (CONTD)

3.6 SCREEN CONTROL AND AUXILIARY CONNECTIONS

THIS PROCEDURE CAN VERIFY AUXILIARY AND PROJECTOR ADVANCES AND REVERSES AT THE PROGRAMMER, HENCE ELIMINATING THE PROGRAMMER AS THE CAUSE. AUXILIARIES MAY ALSO BE CHECKED WITH AN AVL REMOTE CONTROL POWER BOX.

NOTE  
RECORD AND PLAY JACKS ARE INTERCHANGED ON SOME UNITS

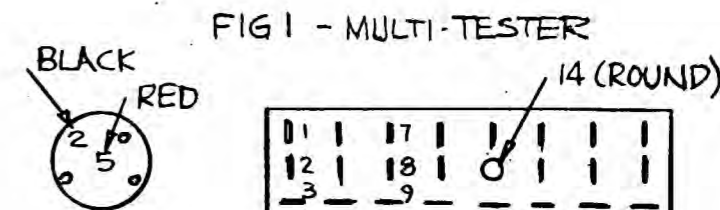
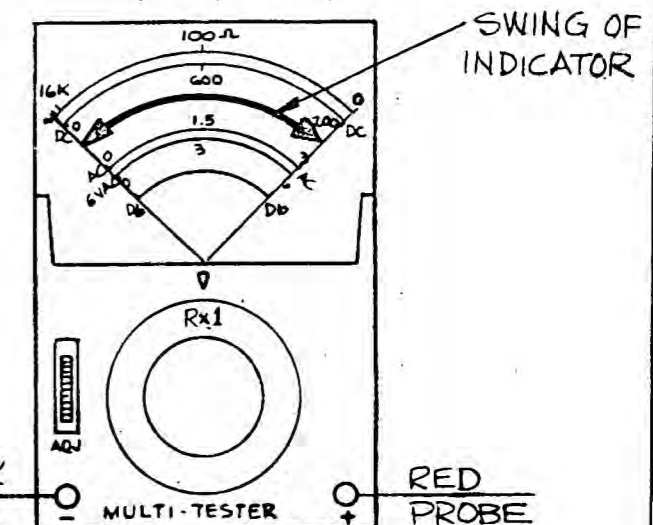
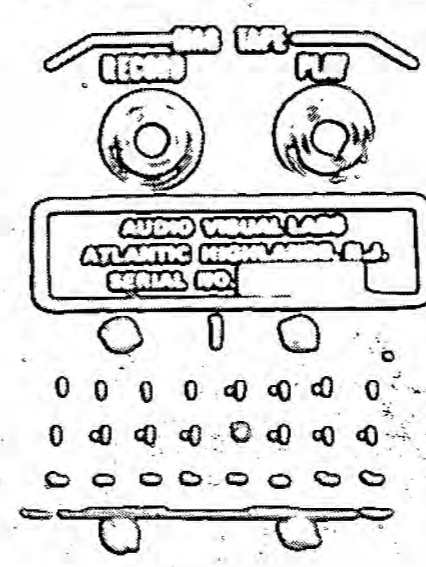
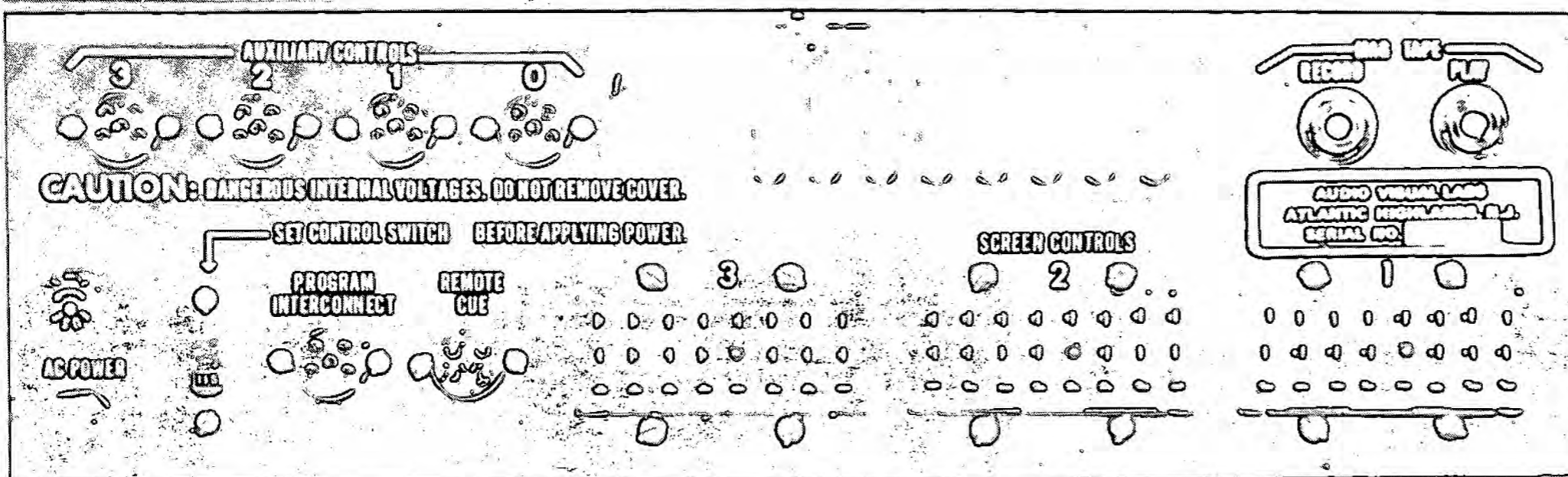
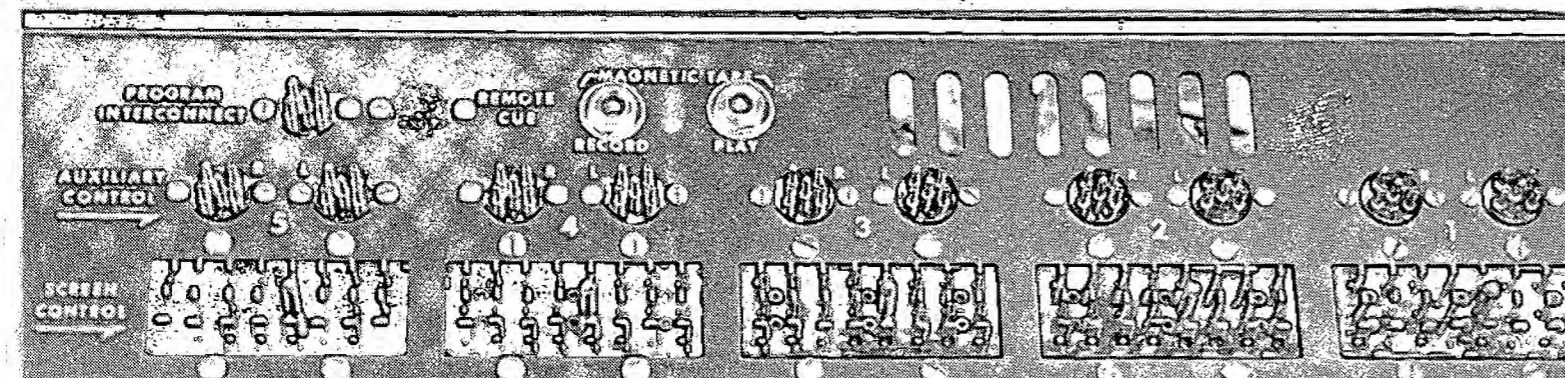


FIG. 2

FIG. 1 - MULTI-TESTER

FIG. 3 MALE CONN - PIN END

SHOW PRO III  
SHOW PRO V



TESTING PROCEDURE

- BOTH SP III AND SP V AUXILIARIES ARE TESTED BY PLACING THE BLACK PROBE ON PIN 2 AND THE RED PROBE ON PIN 5 (SEE FIG. 2). THE MULTI-METER DIAL SHOULD BE SET ON "Rx1" WITH PROBES AS INDICATED IN FIG. 1.
- WITH PROBES IN PLACE ACTIVATE EACH AUXILIARY AS FOLLOWS:  
 SP III AUX 0 - PRESS AUX & CUE ("ON" READING); AUX & CUE ("OFF" READING)  
 SP III AUX 1-3 - PRESS AUX, (1, 2 OR 3) & CUE (MOMENTARY READING - .25 SEC)  
 SP V AUX 1-5 LEFT } PRESS AUX, (1, 2, 3, 4 OR 5), (LEFT OR RIGHT) & CUE  
 SP V AUX 1-5 RIGHT } (MOMENTARY READING - .25 SEC)

3. JONES (24 PIN) CONNECTORS ARE TESTED BY PLACING THE BLACK AND RED PROBES ON PINS AS INDICATED BELOW FOR EACH SCREEN PLUG, ON BOTH SP III AND SP V. THE MULTI-TESTER DIAL SHOULD BE SET ON "Rx1".

FUNCTION	BLACK PROBE	RED PROBE	
		SP III	SP V
FORWARD	LEFT	PIN 14	PIN 14
	CENTER	-	PIN 14
	RIGHT	PIN 14	PIN 14
REVERSE	LEFT	PIN 7	PIN 7
	CENTER	-	PIN 8
	RIGHT	PIN 9	PIN 9

VALID CUE CODES FOR READINGS ARE - (FWD, REV), (LEFT OR RIGHT - SP III; LEFT, CENTER OR RIGHT - SP V), (1-3 OR 1-5) & CUE

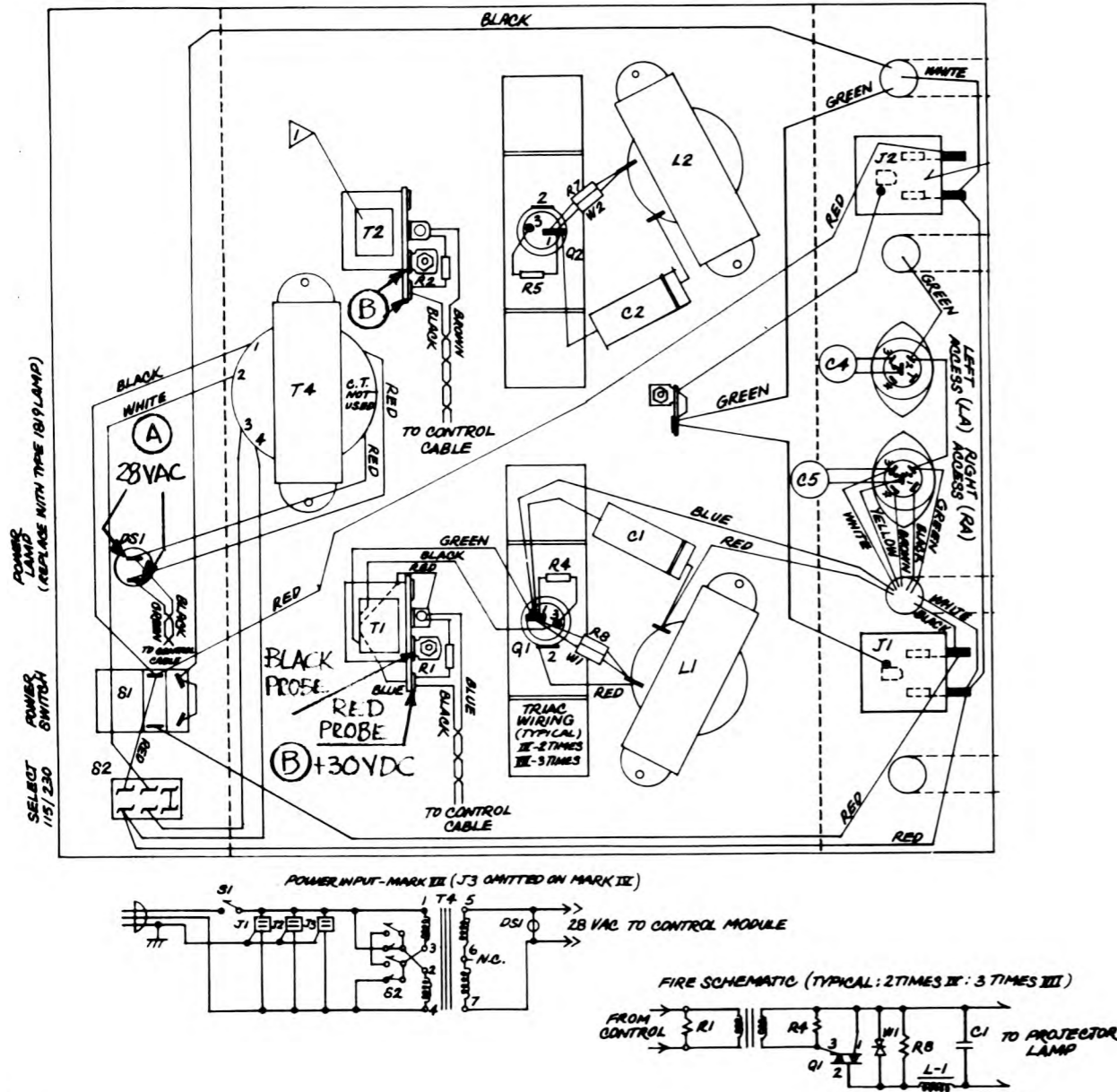
SCREEN CONTROLS AND AUXILIARY CONNECTIONS

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SN	REV
17	A

## 3.0 SYSTEM TROUBLESHOOTING (CONTD)

### 3.7 CHECKING SCREEN CONTROL OPERATION



AS DISCUSSED IN SECTION 3.3 "PROBLEM ISOLATION - PROGRAMMER" AND IN SECTION 3.2 "PROBLEM ISOLATION - CABLES AND POWER PACKS", A MULTIPLE PROJECTOR FAILURE, OF ALL PROJECTORS ON ONE POWER PACK, IS DIFFICULT TO ISOLATE. THE FOLLOWING ADDITIONAL TESTS AID IN THE ISOLATION OF THE PROBLEM WITHOUT THE POWER PACK CONNECTED TO THE PROGRAMMER.

IF IT IS CONVENIENT TO OPEN UP THE POWER PACK PROCEED AS FOLLOWS: (TURN OFF POWER, REMOVE COVER, TURN ON POWER)

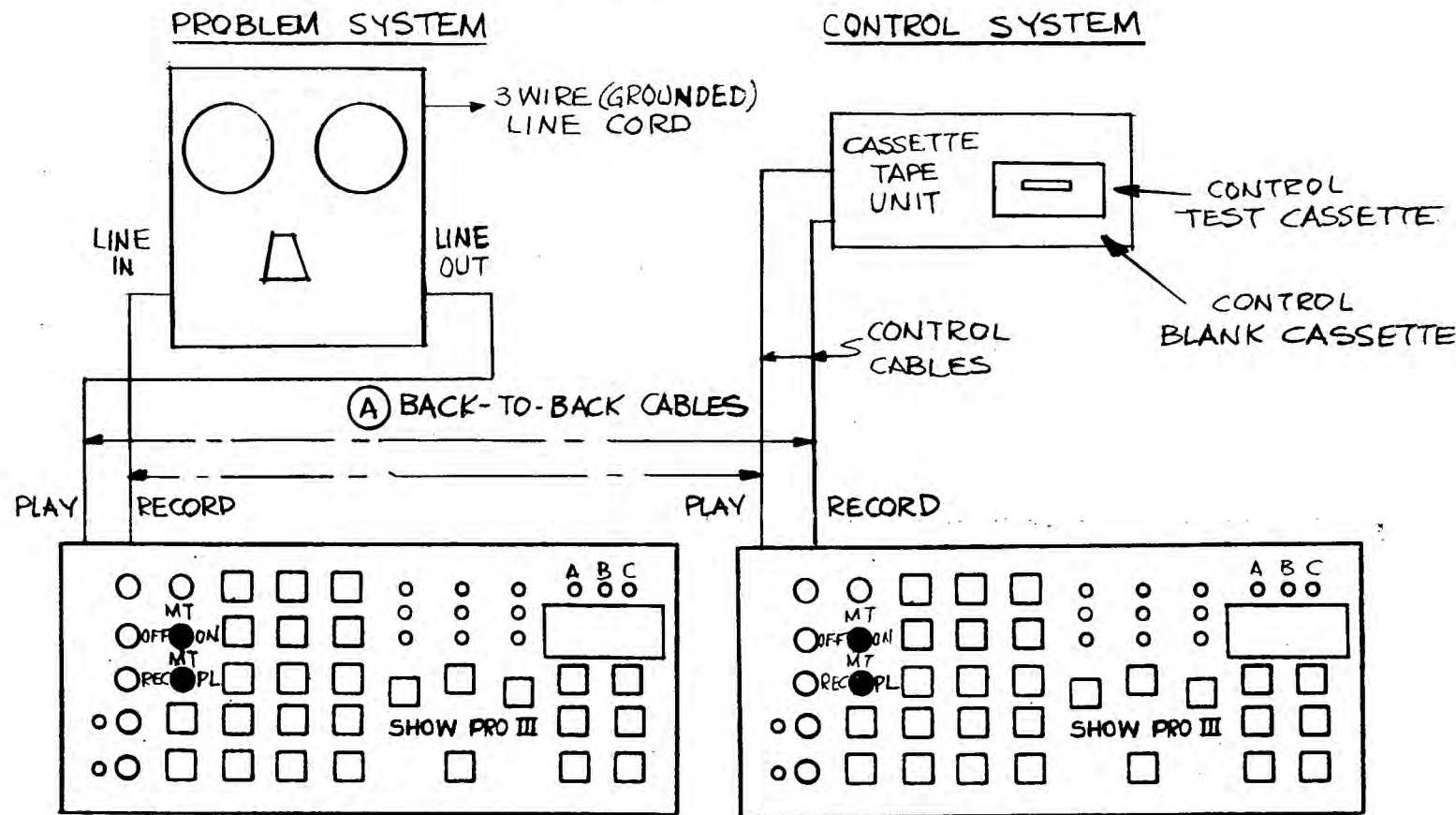
- A- WITH METER SET TO "120ACV" MEASURE POINT "A". THIS SHOULD READ 28VAC ± 3VOLTS. IF SO GO TO ITEM "B", IF READING IS LESS THAN 20VAC GO DIRECTLY TO ITEM "F".
- B- WITH METER SET TO "60DCV", CHECK TRANSFORMER T1 AS FOLLOWS:
  - BLACK PROBE ON MOUNTING HARDWARE OF TERMINAL STRIP
  - RED PROBE TO TERMINAL WITH BLUE AND BLACK WIRES
  - READING SHOULD MEASURE +30VDC ± 5 VOLTS
  - REPEAT PROCEDURE FOR TRANSFORMERS T2 AND T3 (IF APPLICABLE)
- C- IF ALL TRANSFORMERS MEASURE CORRECTLY, THE POWER PACK CAN BE CHANGED WITHOUT POSSIBLE DAMAGE TO THE PROGRAMMER. RECHECK BY UTILIZING CUTS AND DISSOLVES. REFER TO SECTIONS 3.4 AND 3.5 TO REPAIR POWER PACKS.
- D- IF TRANSFORMERS MEASURE NO VOLTAGE OR 12VDC OR LESS, THE POWER PACK IS PROBABLY GOOD AND THE SCREEN CONTROL BOARD IS BAD. THE POWER PACK MAY NOW BE CHECKED BY PLUGGING INTO ANOTHER SCREEN LOCATION.
- E- **NOTE:** DO NOT PLUG ANOTHER POWER PACK INTO PROGRAMMER UNTIL THE SCREEN CONTROL BOARD IS CHANGED (SECTIONS 4.1 AND 4.7)
- F- DISCONNECT SCREEN CONTROL (GREY) CABLE FROM PROGRAMMER. REMEASURE PER ITEM "A". IF LAMP DOES NOT LIGHT OR IF VOLTAGE REMAINS BELOW 20VAC, REPLACE POWER PACK. IF VOLTAGE MEASURES 25VAC OR GREATER GO TO SECTIONS 4.1 AND 4.7, SCREEN CONTROL

**CAUTION:** TRIACS HAVE EXPOSED 115VAC

	CHECKING SCREEN CONTROL OPERATION		
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## 3.0 SYSTEM TROUBLESHOOTING (CONTD)

### 3.8 CHECKING MAGNETIC TAPE OPERATION



#### GENERAL PROCEDURE

1. ESTABLISH THE CONTROL SYSTEM.
2. IF A CONTROL PROGRAMMER IS AVAILABLE, ESTABLISH A BACK-TO-BACK OPERATION AS SHOWN AT "A".
3. WITH CONTROL SYSTEM IN "RECORD" AND PROBLEM SYSTEM IN "PLAY" IF ALL CUES LOAD CORRECTLY THE PLAYBACK IS GOOD, IN PROGRAMMER.
4. WITH CONTROL SYSTEM IN "PLAY" AND PROBLEM SYSTEM IN "RECORD", RESET AND CUE, IF ALL CUES LOAD CORRECTLY THE RECORD IS GOOD.
5. IF A CONTROL PROGRAMMER IS NOT AVAILABLE USE TEST CASSETTE.
6. PLAY CONTROL TEST CASSETTE, IF CUES LOAD CORRECTLY, PLAY IS GOOD
7. RECORD ON CONTROL BLANK CASSETTE AND PLAY BACK, IF CUES ARE GOOD RECORD IS GOOD, IN PROGRAMMER.
8. IF ANY FAILURES OCCUR GO TO SECTION 4.9 OR 4.7.1 AND 4.7.2 SINCE PROBLEM IS IN PROGRAMMER.
9. IF NO FAILURES OCCUR, PROBLEM IS DEFINITELY IN TAPE UNIT, SUBSTITUTE NEW UNIT.

**NOTE:** A CONTROL PROGRAMMER MAY BE A SP<sup>III</sup>, SP<sup>V</sup>, PD2 OR PD3, AND MAY BE USED TO CHECK ANY OTHER, HOWEVER, THE MPIO IS NOT COMPATIBLE FOR THIS TEST.

BEFORE PROCEEDING, REVIEW AND BE FAMILIAR WITH MAGNETIC TAPE OPERATION IN THE OPERATOR'S MANUAL

SP<sup>III</sup> MANUAL - PAGE 26  
SP<sup>V</sup> MANUAL - PAGE 24

REVIEW CHECKLIST OF SECTION 2.5 "BASIC TROUBLE DIAGNOSIS"

#### 3.8.1 ISOLATING MAGNETIC TAPE PROBLEMS

PROBLEM	SYMPTOM	TYPICAL CAUSE	ISOLATION PROCEDURE	SECT. 1.3 TROUBLE
INTERMITTENT PLAY OR RECORD	GREEN LIGHT FLASHES IN PLAY OR RECORD OF HIGH SPEED DUMPS - CUES LOST	FRAYED OR BROKEN CABLES	USE SET OF CONTROL CABLES	T8, X1
CUES DROPPED OR CHANGED ON PLAYBACK	NO RED OR AMBER LIGHTS AND TAPE SEEMS TO READ IN PERFECTLY	RECORDED TOO LOW OR BACKLASH	USE CONTROL TAPE UNIT AND TEST TAPE	X1, X7 X2, T14
PROGRAMMER WILL NOT ACCEPT CUES	MT "C" RED LIGHT ON, NO CUES LOAD, GREEN LIGHT GOOD	RECORD LEVEL, HUM, CROSS TALK	REFER TO SECTION 3.8.2	T6
NO PLAY OR RECORD	CONNECTION PROBLEM, IF GENERAL PROCEDURE SHOWS PROGRAMMER PROBLEM ISOLATE PER PAR 4.4	CONNECTIONS MT BOARD MEM BOARD	SEE 4.2.3 & 4.2.4	T2, T3 T4, T7
TAPES PLAY ON SOME TAPE UNITS & NO OTHERS	TAPE UNIT VARIATIONS	HEAD ALIGN, WEAR, CONTACT OR DIRT	REFER TO SECT 3.8.2	CAN ADD TO ALL PROBLEMS
DUBBED TAPES OR COPIES WILL NOT PLAY	EXCESSIVE AMBER OR RED LITES	IMPROPER RECORDING	REFER TO SECT. 3.8.2	T5, T9
CUE DROPPED FROM TEST TAPE	SYSTEM CHECKED OUT PER GENERAL PROCEDURE (BACK TO BACK) BUT CUE IS DROPPED FROM TAPE	TAPE UNIT OR MEMORY BOARD	CHANGE TAPE UNIT, IF PROBLEM PERSISTS SEE 4.2.3	T14
CUES PLAY AND RECORD FROM CONTROL UNIT	SYSTEM WORKS BACK-TO-BACK BUT NOT WITH TAPE DECK	CABLES OR TAPE UNIT	CHANGE TAPE UNIT (SEE GENERAL PROCEDURE)	-
OCCASIONAL RED OR AMBER MT LITE	SEE TABLE 3.8.2(3)	INCORRECT RECORD LEVEL; POOR QUALITY TAPE; POORLY MAINTAINED RECORDER - SEE 3.8.2.		



CHECKING MAGNETIC TAPE OPERATION

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## 3.0 SYSTEM TROUBLE SHOOTING

### 3.8.2 SOLVING MAGNETIC TAPE SYSTEM PROBLEMS:

THE FOLLOWING ADDITIONAL SPECIFICATIONS ARE USEFUL GUIDELINES TO TAPE UNIT RECORDER/REPRODUCER REQUIREMENTS

TABLE 3.8.2(1)

LEVEL - UTILIZED THESE GUIDELINES FOR SETTING RECORD LEVEL. SEE INSERT TABLE 3.8.2(2) FOR TYPICAL LEVEL RELATED PROBLEMS	NORMAL* +3db TO YEILD Odb ON PLAYBACK  SET LEVEL TO ACTUAL DATA NOT TONE *	RUNNING MASTER +6db TO YIELD +3db FOR COPY	COPY Odb LINE LEVEL TO PROGRAMMER ABSOLUTE MINIMUM IS -3db ACROSS FULL BAND..WIDTH (SEE DRAWING BELOW)
--------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------	-----------------------------------------------	--------------------------------------------------------------------------------------------------------------

**CROSSTALK** - REDUCE GAIN ON AUDIO TRACKS TO MINIMUM WHEN RECORDING DIGITAL INFORMATION. THIS IS PARTICULARLY IMPORTANT FOR RECORDERS WITH POOR LOW FREQUENCY RESPONSE SINCE CROSSTALK IS MAXIMUM BELOW 100HZ. (SEE CURVE 6 BELOW) ADDITIONALLY SOUND TRACKS WITH PREDOMINANT LOW FREQUENCY (BASS BOOST) MUSIC CAN CAUSE EXCESSIVE CROSSTALK UNLESS SEPARATION IS CAREFULLY ADJUSTED.

**HUM** - THE SHOW PRO SYSTEM IS VERY TOLERANT OF HUM PROVIDING SUFFICIENT LOW FREQUENCY RESPONSE IS MAINTAINED (SEE CURVE 1 BELOW). ADDING GROUNDS TO UNGROUND RECORDERS AND USING ONLY PLAY OR RECORD CABLE CAN HELP THIS PROBLEM.

**BANDWIDTH** - NAB CURVE IS THE MINIMUM REQUIRED, SEE CURVE 10 BELOW. NO MORE THAN -8.8db DOWN AT 20HZ. COMPENSATE BY INCREASING RECORDED LEVEL TO +6db.

**DUBBING, COPYING AND MIXING:** - SEE CURVE 1 BELOW. TOTAL REDUCTION IN SIGNAL LEVEL AT FINAL UNIT TO PLAY SHOW TAPE SHOULD RESULT IN AT LEAST -3db TO SHOW PRO; PREFERRABLY Odb +1db.

### 3.8.2(2)

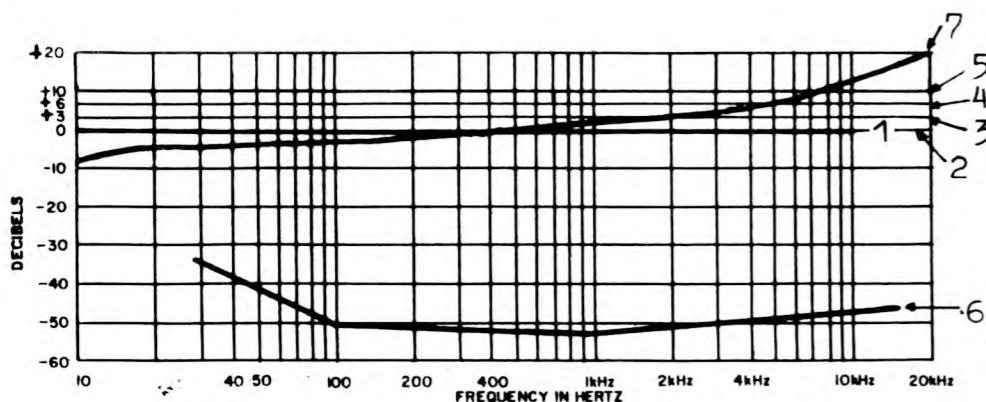
TO CHECK TAPE UNIT SEE PARAGRAPH 4.11.2

PROBLEMS CAUSING POOR TAPE OUTPUT LEVEL:

- 1 - TAPE BOUNCING ON PLAYBACK HEAD
- 2 - TAPE HAS GOOD CONTACT WITH PLAY HEAD BUT NOT RECORD HEAD
- 3 - SPLICES CAUSING BOUNCING
- 4 - SCRATCHES OR ABRASIONS OF TAPE
- 5 - DIRTY HEADS
- 6 - WORN HEADS
- 7 - POOR HEAD CONTACT (DROP OUTS)

NOTE: HIGH QUALITY TAPE PLAYED ON A GOOD TAPE UNIT WILL SHOW A VARIATION OF ABOUT +1db FROM REEL TO REEL (SEE PROBLEM 1 - TABLE 3.8.2(3))

- 1 SHOW PRO LINE LEVEL INPUT, IDEAL EQUALIZED CURVE,  $\pm 3db$  (10HZ TO 10KHZ)
- 2 RECORD LEVEL, IDEAL RECORDER, SET WITH TONE = Odb
- 3 RECORD LEVEL FOR RECORDERS WITH POOR (LOW/HIGH) FREQUENCY RESPONSE
- 4 RECORD LEVEL, IF RUNNING MASTER INTERMEDIATE IS UTILIZED
- 5 RECORD LEVEL (MAX + 10db)
- 6 TYPICAL CROSSTALK
- 7 NAB 1 7/8, 3 3/4 IPS



MAGNETIC TAPE FREQUENCY RESPONSE

\* THIS METHOD OF SETTING RECORD LEVEL IS ONLY NECESSARY IF PROBLEMS ARE ENCOUNTERED WITH A PARTICULAR RECORDER.

### 3.8.2(3)

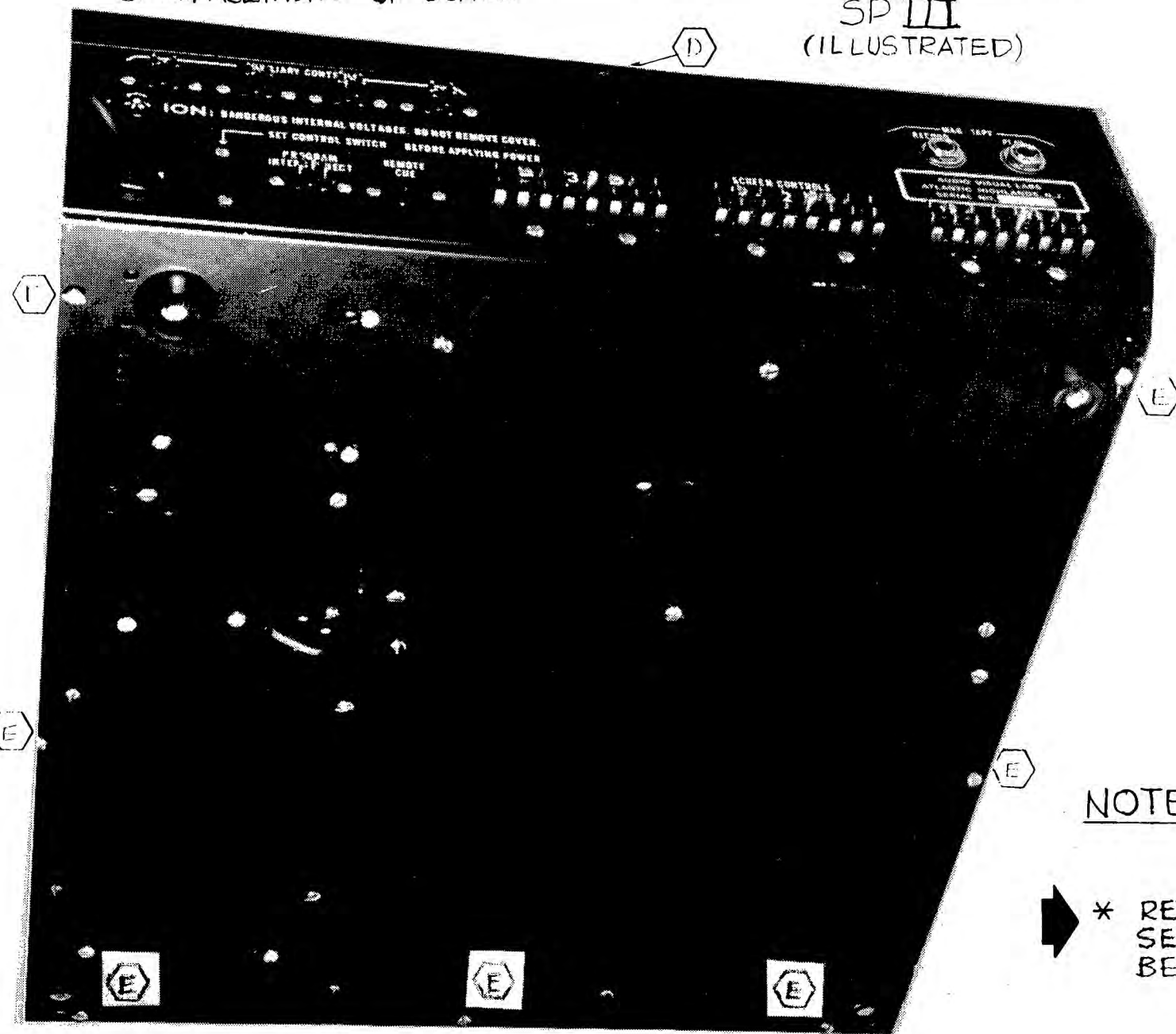
NO	TYPICAL TAPE RECORDING PROBLEMS	TYPICAL EFFECT ON SHOW PRO DIGITAL INFO	PROB. REF. SH 3
1	HEADS MISALIGNED (AZIMUTH ADJUSTMENT) FOR PREALIGNED HEADS SEE 6 & 7	TAPES PLAY WELL ON SOME UNITS & NOT OTHERS	T9
2	HEADS DIRTY	AMBER & RED LITES, MAY LOOSE OCCASIONAL CUE	T6 X2
3	PRINT THRU	CAN ADD A CUE IN UNRECORDED AREAS OF ONE TRACK. STORE TAPES CORRECTLY-PLAY THEM & IMMEDIATELY REWIND BEFORE USING	-
4	HARMONIC DISTORTION	NO PROBLEM IF TAPE UNIT IS WITHIN NAB SPECIFICATION OF 3% AT 400HZ	-
5	LOW FREQUENCY CUT-OFF	CAN CAUSE CONTINUOUS AMBER LITES, AND LOCK UP IF ACCOMPANIED BY TO LOW A RECORD LEVEL	T6
6	TAPE TENSION (BACKLASH) (SEE ALSO (BOUNCING) 7&14 BELOW)	UNIT MAY APPEAR TO COMPLETELY DROP A CUE (SEE 14 BELOW)	T9 X2
7	TAPE SKEW (WARRPED REELS, TAPE GUIDE)	SEE 1 AND 2 ABOVE AND T6 AND 14.	T9 X2
8	TAPE DROPOUT SCRATCHES, ETC.	NOISE PULSES WILL CAUSE AMBER OR RED LITES	-
9	HEAD VIBRATION DUE TO MOTION, REEL OR DRIVE MISALIGNMENT	SINCE THIS NOISE SOURCE IS USUALLY BELOW 800HZ OCCASSIONAL RED & AMBER LITES	-
10	FLUTTER-(TAPE RECORDER SPEED VARIATIONS	NO PROBLEM IF TAPE UNIT IS WITHIN NAB UNWEIGHIED VALUE OF 0.15 TO 0.2%	-
11	WORN HEADS	SEE 1 AND 2 ABOVE	-
12	POOR SIGNAL TO NOISE RATIO - (40db NAB SPECIAL PURPOSE SPECIFICATION)	OCCASIONAL AMBER LITES IF NOT WITHIN NAB SPECIFICATIONS	-
13	PLAYBACK SPEED 1 7/8, 3 3/4, 7.5 INCHES/SPEED	DUE TO INCREASED HIGH FREQUENCY RESPONSE, HIGH SPEEDS PERFORM BETTER ASSUMING EQUAL LOW FREQUENCY RESPONSE	SEE T9
14	CONTACT NOISE - PLAYBACK HEAD CONTACT PRESSURE	AMBER LITE, IF SIGNAL VARIATIONS EXCEED +10db (SEE 6 ABOVE) SPLICES MAY CAUSE TAPE TO MOMENTARILY POP OFF HEAD RESULTING IN DROPPED CUE	SEE 4.2.4

## 4.0 PROGRAMMER TROUBLESHOOTING \*

THE PROCEDURES OF THE PRECEDING SECTIONS 2 AND 3 SHOULD HAVE DEFINITELY ESTABLISHED IF A PROBLEM IS INTERNAL TO THE PROGRAMMER. THIS SECTION WILL ASSIST IN LOCATING THE PROBLEM TO THE BOARD LEVEL. THE GENERAL STEPS ARE:

- |                                                              |           |
|--------------------------------------------------------------|-----------|
| 1. OPENING THE PROGRAMMER                                    | PARAGRAPH |
| 2. ADDITIONAL DIAGNOSTICS RELATING PROBLEM TO POSSIBLE CAUSE | 4.1       |
| 3. ESTABLISHING AC AND DC POWER IS CORRECT                   | 4.2       |
| 4. BOARD LEVEL ISOLATION (DIAGNOSTICS)                       | 4.3       |
| 5. REPLACEMENT OF BOARD                                      | 4.4 - 4.9 |

SP III  
(ILLUSTRATED)



## 4.1 OPENING A PROGRAMMER

THE SAME PROCEDURE SHALL BE USE FOR THE SP III UNIT (ILLUSTRATED) AND THE SP V UNIT (NOT SHOWN) EXCEPT AS NOTED.

- A- DISCONNECT ALL EXTERNAL EQUIPMENT PLUGGED INTO PROGRAMMER
- B- DISCONNECT PROGRAMMER AC LINE CORD.
- C- TURN UNIT UP-SIDE-DOWN ON A SOFT SURFACE TO PREVENT MARRING COVER.
- D- REMOVE 6-32 HEX NUT (SP V WILL HAVE 2 OR 3 NUTS)
- E- REMOVE SEVEN SCREWS (SP V WILL HAVE 8 SCREWS)
- F- HOLD BASE AND COVER TOGETHER
- G- TURN UNIT OVER (TO NORMAL OPERATING POSITION)
- H- LIFT COVER OFF BASE AND PLACE COVER TO LEFT OF BASE. DO NOT STRESS OR PULL ON COVER INTERCONNECTING WIRES AND CABLES. (SEE ILLUSTRATION NEXT PAGE)
- I- RECONNECT EXTERNAL EQUIPMENT. MINIMUM REQUIRED EXTERNAL EQUIPMENT FOR TESTING IS:

- |                      |                       |
|----------------------|-----------------------|
| SP III               | SP V                  |
| 1 MARK IV POWER PACK | 1 MARK VII POWER PACK |
| 2 PROJECTORS         | 3 PROJECTORS          |
| 1 TAPE RECORDER      | 1 TAPE RECORDER       |

- J- PLUG IN UNIT AC LINE CORD. UNIT CAN BE OPERATED WITH COVER OFF.

**NOTE** - PERFORM PRELIMINARY CHECKS, AS INDICATED ON FOLLOWING PAGE, BEFORE PROCEEDING

➔ \* READ AND BE FAMILIAR WITH SECTION 4.2 DIAGNOSTIC TABLES BEFORE OPENING PROGRAMMER



PROGRAMMER TROUBLESHOOTING

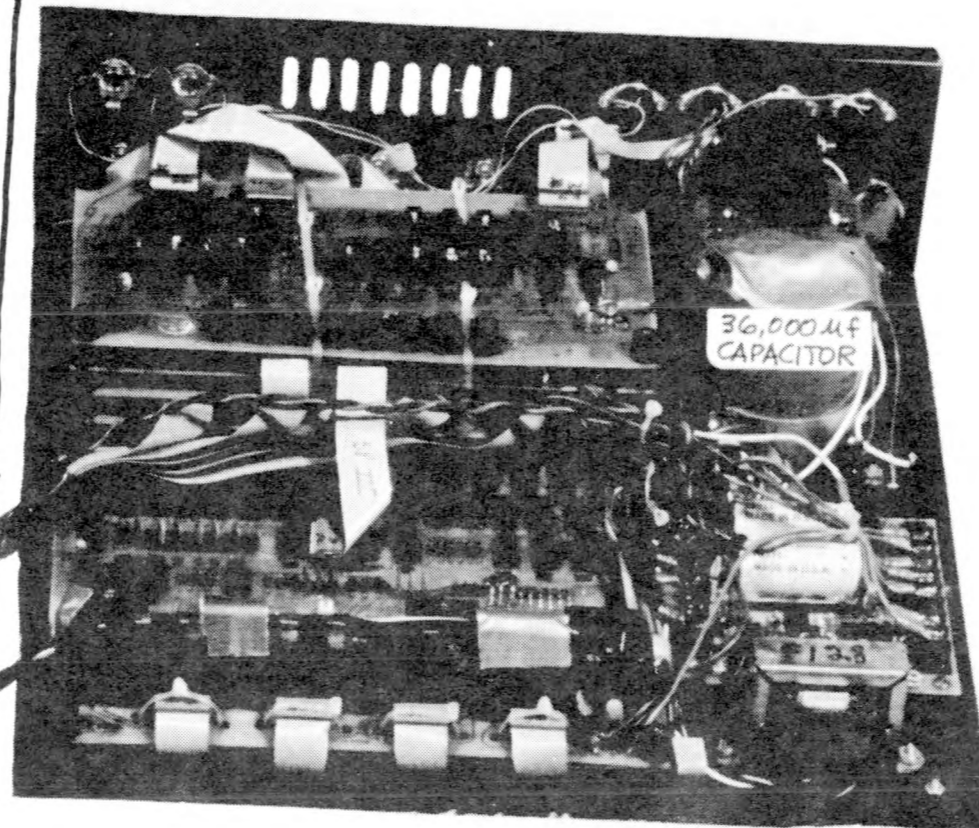
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4.0 PROGRAMMER TROUBLE SHOOTING (CONTD)

4.1 OPENING THE PROGRAMMER



THESE WIRES ARE RETAINED BY CLAMPS IN THE COVER. REMOVE WIRES FROM CLAMPS BEFORE PLACING COVER TO LEFT



4.1 OPENING THE PROGRAMMER (CONTD)

PRELIMINARY CHECKS

PERFORM THE FOLLOWING INSPECTIONS BEFORE RECONNECTING UNIT TO AC POWER:

- CHECK FOR INTERNAL DAMAGE ON BASE, SUCH AS:
  - BROKEN FUSEHOLDER
  - LOOSE TRANSFORMER
  - LOOSE BRIDGE
- INVERT COVER AND CHECK FOR:
  - BROKEN WIRES TO LAMPS OR SWITCHES
  - A2 CABLE TO DISPLAY MODULE
- CHECK ALL VISIBLE "RED DIP" CONNECTORS (FLAT RIBBON CABLE CONNECTORS)
- CHECK FOR BROKEN WIRES
- CHECK FOR LOOSE SCREWS OR BUMPERS. CHECK POWER MODULE FOR LOOSE TERMINALS.
- PERFORM VOLTAGE CHECKS PER PARAGRAPHS 4.3.1 OR 4.3.2

TEST POSITION - SPIII  
(SPII BASE SHOWN ON SHEET 22A)

TABLE 4.1 (SH 22A) SHOWS UTILIZATION OF INDIVIDUAL POWER SUPPLIES

ILLUSTRATIONS OF BOARDS

BOARD STACK	SPIII	SPIV
(TOP) MEMORY	SH 22	SH 22A
CPU	SH 32	SH 32
MAG TAPE	SH 35	SH 35
(BOTTOM) CONTROL CONSOLE	SH 31A	SH 31A
SCREEN CONTROL	SH 22	SH 22A

REFER TO "UNIT ASSEMBLY AND INSPECTION PROCEDURES" FOR DETAILED DATA

- SPIII - SEE SHEET 38
- SPIV - SEE SHEET 39

NOTE: BEFORE CHANGING A BOARD, CHECK POWER SUPPLIES (PARAGRAPH 4.3.1 AND 4.3.2), REVIEW BOARD LOCATION, ORIENTATION AND CONNECTIONS IN ILLUSTRATION, AS LISTED ABOVE.

CAUTION - WHEN DISASSEMBLING BOARD STACK, DISCONNECT AC POWER AND DO NOT REMOVE ANY BOARD POWER AND GROUND WIRES, EXCEPT FOR BOARD BEING REPLACED, SHORT OUT 36,000 μf (SPIII & SPIV) AND 21,000 μf (SPII ONLY) CAPACITORS PER PROCEDURE ON SHEET 22A



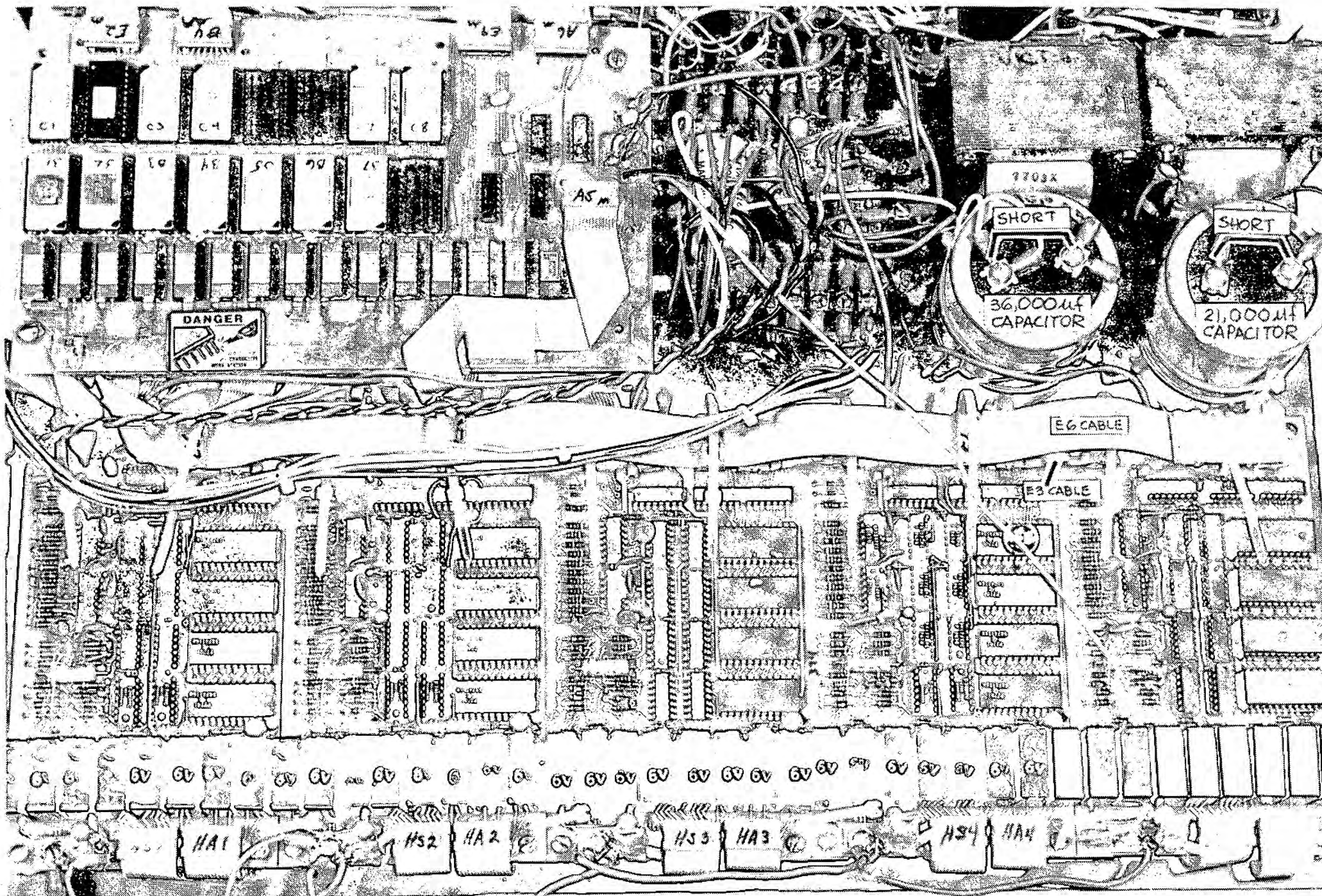
OPENING THE PROGRAMMER - SHOW PRO III

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4.0 PROGRAMMER TROUBLESHOOTING (CONTD)

4.1 OPENING THE PROGRAMMER (CONTD)

SPV




**WARNING:** BEFORE DISASSEMBLING BOARD STACK UNPLUG AC POWER CORD AND SHORT OUT (DISCHARGE) BOTH LARGE CAPACITORS WITH AN INSULATED HANDLE SCREWDRIER BY PLACING THE METAL BLADE ACROSS BOTH SCREW TERMINALS ON EACH CAPACITOR. REPEAT THIS PROCEDURE EACH TIME THE UNIT IS POWERED UP AND TURNED OFF.

TABLE 4.1  
POWER SUPPLY CONFIGURATION

POWER SUPPLY	UTILIZATION	REF SH
+5	ALL BOARDS, COVER AND DISPLAY MODULE	
GRD	ALL BOARDS, COVER AND DISPLAY MODULE	42,58
+11	SCREEN CONTROL RELAY SUPPLY ONLY	34,47,48 62.66
+12	+5V REF FOR POWER MODULE, 3850, 3853 CPU BOARD	32,50,51 52,61,68
-12	3341 MAG TAPE ONLY	35,51,56
+30VDC	SCREEN CONTROL ONLY - 28VAC SUPPLY COMES FROM POWER PACK	34,47,48 62.66

NOTE - WIRING TECHNIQUE FOR E3 CABLE IS SHOWN ON SPV SCREEN CONTROL SCHEMATIC, SHEET 66


 OPENING THE PROGRAMMER - SHOW PRO V  
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2

## 4.0 PROGRAMMER TROUBLESHOOTING (CONTD)

### 4.2.1 DIAGNOSTIC TABLE - CONTROL PANEL

PROGRAMMER CONTROL PANEL PROBLEMS				MOST PROBABLE CAUSE	OTHER POSSIBLE CAUSE	OTHER DETAIL	NOTES
NO.	TROUBLE	ADDTL INFO					
		SPIII	SPV				
C1	ONE LAMP OUT WHEN PUSHED NEEDS LAMP CHANGE	4.2.1 4.9	4.2.1 4.9	LAMP BURNED OUT- CHANGE PER SHEET 36	-	-	-
C2	ONE LAMP ALWAYS ON	4.5	4.5	SHORT IN CABLING OR CONTROL CONSOLE BOARD (SEE SH 31A)	FAILED CONTROL CONSOLE BOARD (LOGIC DRIVER)	-	-
C3	NO PANEL LAMPS- APPARENT POWER LOSS	2.8.5 4.5	SEE X15	INTERNAL CONNECTIONS ON CONTROL CONSOLE	+5 VOLT FAILURE (SEE C4)	-	-
C4	NO LAMPS, READY OR CUE, FAN RUNNING	2.8 4.4	-	EITHER +5 VOLTS OR CONTROL CONSOLE [SEE X9 (4.2.4)]	-	-	-
C5	WILL NOT ACCEPT CUES	4.4	4.4	CONTROL CONSOLE BOARD- ISOLATE PER SH. 31	CPU OR OTHER BOARD - IF NO INIT SEE CPU, SH 32	MEMORY - SEE SHEETS 31 AND 33	-
C6	RANDOM OP KEYS ON POWER-ON (NO INIT)	4.4	4.6	LOOSE CONNECTION - SEE CABLE NO. REFERENCE ON SH. 30	MEMORY BOARD FAILURE - SEE SH 31 AND 33	CPU BOARD FAILURE	IF CONNECTIONS ARE GOOD, CHANGE CPU THEN MEMORY, ONE AT A TIME
C7	NO LAMPS OR INDICATORS ON PANEL	2.8-5 4.5	4.5	CHECK +5 VOLT POWER (SEE 4.5.1)	CHECK CONTROL CONSOLE BOARD POWER (4.5)	-	-
C8	NO READY LAMPS	4.4 4.5	4.5	E8 CABLE UNPLUGGED	SPIII MEMORY - DBO	SPIII MEMORY - PROM C2/B2	-
C9	CUE COUNTER INCORRECT OR 000(0) OR BAD 1, 2, 3	4.4 4.5	4.5	E8 CABLE UNPLUGGED	-	SPIII MEMORY- PROM C8/B8	-
C10	UNIT RUNS BY ITSELF- FLASHES CERTAIN LAMPS	-	-	MEMORY BOARD PROM	-	-	-
C11	UNIT OSCILLATES FROM FWD TO REV OR TWO OTHER LAMPS	-	-	SPIII MEMORY - PROM C10/B10	-	-	-
C12	ALL OP KEYS STAY ON WHEN PRESSED	4.4 4.5	4.4 4.5	NO POWER TO CONTROL CONSOLE OR CPU BOARD FAILURE	"RANDOM INDICATION" SEE SH 32	MEMORY FAILURE (PROM)	-
C13	START CHANGES TO ANOTHER CUE	-	-	MEMORY BOARD (SPIII - RAM DBO)	-	-	IF "START" IS CHANGED TO ANOTHER CUE, PROBLEM IS USUALLY RAM
C14	ANY CUE CHANGES TO ANOTHER CUE	-	-	MEMORY BOARD	CPU BOARD	-	CHANGE MEMORY BOARD FIRST
C15	CUE LAMP STAYS ON WHEN PRESSED	4.4 4.5	4.4 4.5	CONNECTIONS - INTERNAL	MEMORY FAILURE (SPIII - RAM D7)	CPU FAILURE	CHANGE MEMORY BOARD FIRST
C16	CUE COUNTER- COUNTS UP CONTINUOUSLY	-	-	MEMORY BOARD (SPIII - PROM C3/B3)	-	-	-
C17	UNIT HANGS UP IN PLAY, START OR HOME	-	-	MEMORY BOARD (SPIII - PROM C11/B11)	-	-	-
C18	MULTIPLE LAMPS ON OR FAIL TO WORK IN GROUPS	4.5	4.5	CABLES OUT SEE SH 30 AND 31	IC FAILURE ON CC BOARD	-	-
C19	MULTIPLE SWITCHES IN GROUPS WILL NOT WORK	4.5	4.5	SEE SH 30 AND 31	IC FAILURE ON CC BOARD	-	-



4.0 PROGRAMMER TROUBLESHOOTING (CONTD)							
4.2.2 DIAGNOSTIC TABLE - PROJECTOR							
PROJECTOR PROBLEMS			ADDTL INFO SPIII   SPIV	MOST PROBABLE CAUSE	OTHER POSSIBLE CAUSE	OTHER DETAIL	NOTES
NO.	TROUBLE						
P1	NO LAMP - ONE PROJECTOR ONLY	3.1	3.1	LAMP BURNED OUT	TRIAC IN POWER PACK	FIRE CIRCUIT ON SCREEN CONTROL BOARD	-
P2	NO LAMP - ALL PROJECTORS ON ONE POWER PACK	3.1	3.1	POWER PACK (TRANSFORMER OR WIRING)	SCREEN CONTROL BOARD (+30VDC SUPPLY OR FIRE IC)	-	-
P3	NO LAMP - ALL PROJECTORS ALL POWER PACKS	3.3	3.3	E6 CABLE UNPLUGGED (5C CLOCK) OR CPU BOARD	SPIII - SCREEN CONTROL BOARD	CHANGE CPU BOARD FIRST	SPIV - IF ALL FAIL, FAULT IS IN CPU BOARD OR E3, E6 CABLE
P4	NO ADVANCE - ONE PROJECTOR ONLY	3.1	3.1	PROJECTOR	SCREEN CONTROL BOARD RELAY	-	-
P5	NO ADVANCE - ALL PROJ ON ONE POWER PACK	3.2	3.2	WIRING - POWER PACK CABLES	-	-	-
P6	NO ADVANCE - ALL PROJ ALL POWER PACKS	3.3	SEE P9	+11 VOLT SUPPLY IN PROGRAMMER	-	-	IF +11 SUPPLY THERE WILL BE NO FWD, REV OR AUX
P7	NO REVERSE - ONE PROJECTOR ONLY	3.1	3.1	PROJECTOR	SCREEN CONTROL BOARD RELAY	-	-
P8	NO REVERSE - ALL PROJ ON ONE POWER PACK	3.2	3.2	PROJECTOR	SCREEN CONTROL BOARD RELAY	-	-
P9	NO REVERSE - ALL PROJ ALL POWER PACKS	3.3	SEE P6	+11 VOLT SUPPLY IN PROGRAMMER	-	-	IF +11 SUPPLY THERE WILL BE NO FWD, REV OR AUX
P10	CENTER SCREEN - NO LAMP, ADVANCE OR REVERSE	-	4.2.2	MARK IV POWER PACKS BEING USED WITH SPIV	INCORRECT EXTENDER CABLES	-	-
P11	OCCASIONAL (RANDOM) ADVANCE OR REVERSE	2.8	X13	PROJECTOR	NOISE - INSTALL AC LINE FILTER	TRANSIENT VOLTAGES - OLDER UNITS (INSTALL SUPPRESSORS)	-
P12	ONE PROJ ADVANCES OR REVERSES AT POWER-ON	4.8.1	4.8.2	SCREEN CONTROL BOARDS	IC FAILURE	DEFECTIVE RELAY	SUBSTITUTE PROJECTOR BEFORE OPENING PROGRAMMER
P13	ALL PROJ ADVANCE OR REVERSE AT POWER-ON	SEE C5	-	CONNECTORS, INTERNAL TO PROGRAMMER (SEE 4.4)	"RANDOM INDICATION" CPU BOARD FAILURE	-	THIS MAY OCCUR WHENEVER PROGRAMMER DOES NOT INIT
P14	PROJ HOME INCORRECTLY WITH RESET OR HOME CUE	X13	-	PROJECTOR	NOISE	MEMORY BOARD RAM	CPU - 3850
P15	PROJ MOVE INCORRECTLY ON REVERSE CUE	X13	X13	PROJECTOR	MEMORY BOARD RAM	CPU - 3850	-
P16	LAMPS FLASH WHEN POWER IS TURNED ON	X17	X17	NORMAL - TURN ON POWER PACKS AFTER PROGRAMMER HAS INIT	-	-	USE BLANK FIRST SLIDE IF SYMPTOM PERSISTS
P17	DISSOLVES FLICKER - ONE PROJECTOR	3.2 4.8.1	4.4 4.8.2	LOW LINE VOLTAGE; OR DEFECTIVE TRIAC OR PULSE TRANSFORMER	DEFECTIVE SCREEN CONTROL BOARD FIRE CIRCUIT	-	LOW VOLTAGE FROM 30VAC TRANSFORMER IN POWER PACK CAN GIVE THESE SYMPTOMS - CHANGE POWER PACK FIRST
P18	DISSOLVES FLICKER - ALL PROJ, ONE POWER PACK	3.2 4.8.1	4.4 4.8.2	LOW LINE VOLTAGE; DEFECTIVE POWER PACK TRANSFORMER	DEFECTIVE SCREEN CONTROL BOARD	-	-
P19	DISSOLVES FLICKER - ALL PROJ, ALL POWER PACKS	2.8-1 3.1-D	2.8-1 3.1-D	LOW LINE VOLTAGE	DEFECTIVE SCREEN CONTROL CLOCK (SEE P3)	-	-

4.0 PROGRAMMER TROUBLESHOOTING (CONTD)  
4.2.3 DIAGNOSTIC TABLE - MAGNETIC TAPE

MAGNETIC TAPE PROBLEMS				MOST PROBABLE CAUSE	OTHER POSSIBLE CAUSE	OTHER DETAIL	NOTES
NO.	TROUBLE	ADDTL INFO					
		SPIII	SPV				
T1	NO MT-A (GREEN STATUS) WHEN RECORDING	3.8.1	3.8.1	PLAY CABLE NOT CONNECTED * - USE VU METER ON RECORDER	CHECK RECDR LEVEL AT RECORDER - VERIFY RECORDER PER 3.8.1	-	* PLAY CABLE MUST BE DISCONNECTED ON CERTAIN UNGROUNDED RECORDERS
T2	NO RECORD LEVEL DURING DUMP	3.8 4.9	SEE T7	EXTERNAL CONNECTION - SEE 3.8.1	VERIFY CONNECTIONS PER 4.9	MAG TAPE BOARD	-
T3	NO RECORD	SEE T2	SEE T2	CONNECTIONS	MAG TAPE BOARD	CPU BOARD, IF NOT MEMORY BOARD (PROM)	OCCASIONALLY BROKEN SWITCH WIRE ON CONTROL PANEL
T4	NO PLAY BACK	SEE T7	SEE T7	CONNECTIONS	MAG TAPE BOARD	CPU BOARD, IF NOT MEMORY BOARD (PROM)	OCCASIONALLY BROKEN SWITCH WIRE ON CONTROL PANEL
T5	CONTINUOUS MT-B (AMBER STATUS) - GOOD CUES	3.8.2	3.8.2	RECORDED LEVEL TOO LOW	RECORDER HAS POOR FREQUENCY RESPONSE	HEAD CONTACT NOISE OR RELATED TAPE UNIT - SEE 3.8.2	COPY MADE ON INCOMPATIBLE RECORDER - SEE 4.12.1
T6	MT-C (RED STATUS) ON - PLAY LOCKS UP - NO CUES ENTER	3.8.2	3.8.2	CROSSTALK FROM AUDIO TRACK	SECOND OR THIRD GENERATION COPY	RECORD LEVEL TOO LOW	LIMITED BANDWIDTH RECORDER
T7	NO PLAYBACK LEVEL - MT-A (GREEN) NOT ON - GOOD CUES	3.8 4.9	SEE T2	EXTERNAL CONNECTION - SEE 3.8.1	INTERNAL CONNECTION - VERIFY PER 4.9	MT-A LAMP WIRING SHOWN ON SH 35	-
T8	MT-A (GREEN STATUS) FLASHES INTERMITTENTLY	4.9	4.9	RECORDED LEVEL TOO LOW	RECORDER HAS VERY LIMITED BANDWIDTH*	-	* SWITCH IN NARROW BAND POSITION ON CERTAIN 3M-WOLLENSACK RECORDERS
T9	TAPE PLAYS ON ONE UNIT BUT NOT ON ANOTHER	3.8.2	3.8.2	TAPE UNIT PROBLEM - CHECK PER 4.12.2	INCOMPATIBLE RECORDERS	-	-
T10	MT-A (GREEN STATUS) ON WITH NO CABLE CONNECTED	4.9	4.9	NO GROUND ON PLAY JACK - (SEE SH 35)	-	-	STAR WASHERS NOT INSTALLED IN EARLIER UNITS
T11	HUM (20/30 OR 50/60 HZ) ON SOUND OR CUE TRACK	3.8.2	3.8.2	GROUND LOOP IN SYSTEM GROUND	NO AC GROUND ON TAPE DECK	SHORTEN RECORD/PLAY CABLES - CONNECT ONLY ONE AT A TIME	-
T12	CROSSTALK - CUES AUDIBLE ON SOUND TRACK	3.8.2	3.8.2	RECORD LEVEL INCORRECT - CROSSTALK IN MAG TAPE DECK	-	-	CUES OVER SOUND NOT RECOMMENDED - USE SEPARATE TRACKS
T13	TAPE RECORDER CONTROLS - SOURCE, TAPE, 1/4 & 1/2 TRACK	4.2.3	4.2.3	CHECK TAPE RECORDER OPERATOR'S MANUAL	-	-	-
T14	CUES DROPPED FROM KNOWN GOOD TAPE (TEST TAPE)	4.2.3 4.4	4.2.3 4.4	POSSIBLE MEMORY PROBLEM - CHANGE MEMORY BOARD	TAPE UNIT SHOULD BE CHECKED USING NAB TEST TAPE; OR PER 4.11.2	-	-

4.0 PROGRAMMER TROUBLESHOOTING (CONTD)  
4.2.4 DIAGNOSTIC TABLE - OTHER PROBLEMS

OTHER PROBLEMS				MOST PROBABLE CAUSE	OTHER POSSIBLE CAUSE	OTHER DETAIL	NOTES
NO.	TROUBLE	ADDTL INFO					
		SPIII	SPIV				
X1	PROGRAMMER ALWAYS DROPS CUES - LOAD FROM TAPE	3.8.1 4.4	3.8.1 4.4	MAG TAPE RECORDER	MEMORY BOARD	MAG TAPE BOARD ; 3341 - INFREQUENT PROBLEM	-
X2	PROGRAMMER SOMETIMES DROPS CUES - LOAD FROM TAPE	3.8.1 4.4	3.8.1 4.4	MAG TAPE RECORDER	MEMORY BOARD	CPU - 3850	-
X3	PROGRAMMER ALWAYS DROPS CUES - LOAD FROM MEMORY	4.4	4.4	MEMORY BOARD RAM	SPIII MEMORY - PROM C11/B11	CPU- 3850	-
X4	PROGRAMMER SOMETIMES DROPS CUES - LOAD FROM MEM	4.4	4.4	MEMORY BOARD RAM	CPU- 3850	-	-
X5	CUES ALWAYS CHANGED - LOAD FROM TAPE	4.4	4.4	MEMORY BOARD RAM	-	-	-
X6	CUES SOMETIMES CHANGED - LOAD FROM TAPE	4.4	4.4	MEMORY BOARD RAM	CPU- 3850	-	-
X7	AUXILIARY OR REVERSE CUES ADDED	4.4	4.4	DEFECTIVE MEMORY OR CPU BOARD WHEN TAPE WAS RECORDED	DEFECTIVE RECORD ON MAG TAPE BOARD	INCOMPATIBLE RECORDERS - SEE 4.12.2	HEAD CONTACTS - SEE 3.8.2
X8	ANY CUES ADDED	4.4	4.4	DEFECTIVE MEMORY OR CPU BOARD WHEN TAPE WAS RECORDED	DEFECTIVE RECORD ON MAG TAPE BOARD	INCOMPATIBLE RECORDERS - SEE 4.12.2	HEAD CONTACTS - SEE 3.8.2
X9	PROGRAMMER BLOWS FUSE EVERY POWER-ON	4.3.1	4.3.2	PASS TRANSISTOR SHORTED TO CHASSIS	+5, +12, +11 VOLT SUPPLIES SHORTED TO GROUND	+5, +12, +11 VOLT SUPPLIES SHORTED TOGETHER	-
X10	RANDOM UPDATE OF MEM - CHANGE OF CUE(S)	2.8	2.8	NOISE - SEE X13	MEMORY OR CPU BOARDS	-	TRANSIENT VOLTAGE SUPPRESSORS MAY BE NEEDED ON OLDER UNITS
X11	STATUS LAMPS NEVER CHANGE - OR ARE RANDOM	4.4	4.4	SPIII MEMORY - PROM C4/B4	-	-	-
X12	PROGRAMMER LOSES SAME CUE(S)	4.2.4 4.4	4.2.4 4.4	MEMORY BOARD - RAM	-	-	-
X13	PROGRAMMER RESETS AT RANDOM	2.8 4.4	2.8 4.4	NOISE - INSTALL AC POWER LINE FILTER	CPU - 3853	MEMORY BOARD - PROM	CPU - 3850 OR DATA GATES C1, C2, C3
X14 - X16	NO CLEAR, RESET, REVQ - REVQ ERASES MEMORY	4.4 4.5	4.4 4.5	MEMORY - X14, SPIII RAM DB6; X15, SPIII RAM DB5; X16, PROM	MEMORY BOARD - X14, SPIII PROM C7/B7 (DB7); X15, SPIII, RAM DB3	MEMORY BOARD - X15, B13 OR B14 (7404) IC	-
X17	LAMPS FLASH, ADVANCE OR REVERSE AT POWER-DOWN	2.8-6	2.8-6	NORMAL - SEE 2.8(6)	-	-	-
X18	PROJ DO NOT ADVANCE OR REVERSE WHEN TURNED ON	2.7	2.7	ENVIRONMENTAL PROBLEM - SEE 2.7	-	-	-
X19	LAMPS DIM, NO INIT, FAN RUNS SLOW	2.8-5	2.8-5	POWER SELECT SWITCH (115/230V) IN WRONG POSITION	-	-	-
X20	FUSE BLOWS (PASS TRANSISTOR ISOLATION)	2.8-5 4.3.1-6	2.8-5 4.3.1-6	INTERNAL SHORT - SEE REFERENCES	-	-	-
X21	RELAYS CAUSE ADV OR REV AT POWER-ON	-	-	INCORRECT INITIALIZATION, +11 VOLT RELAY CKT - CHANGE POWER MODULE	CPU BOARD FAILURE	-	--

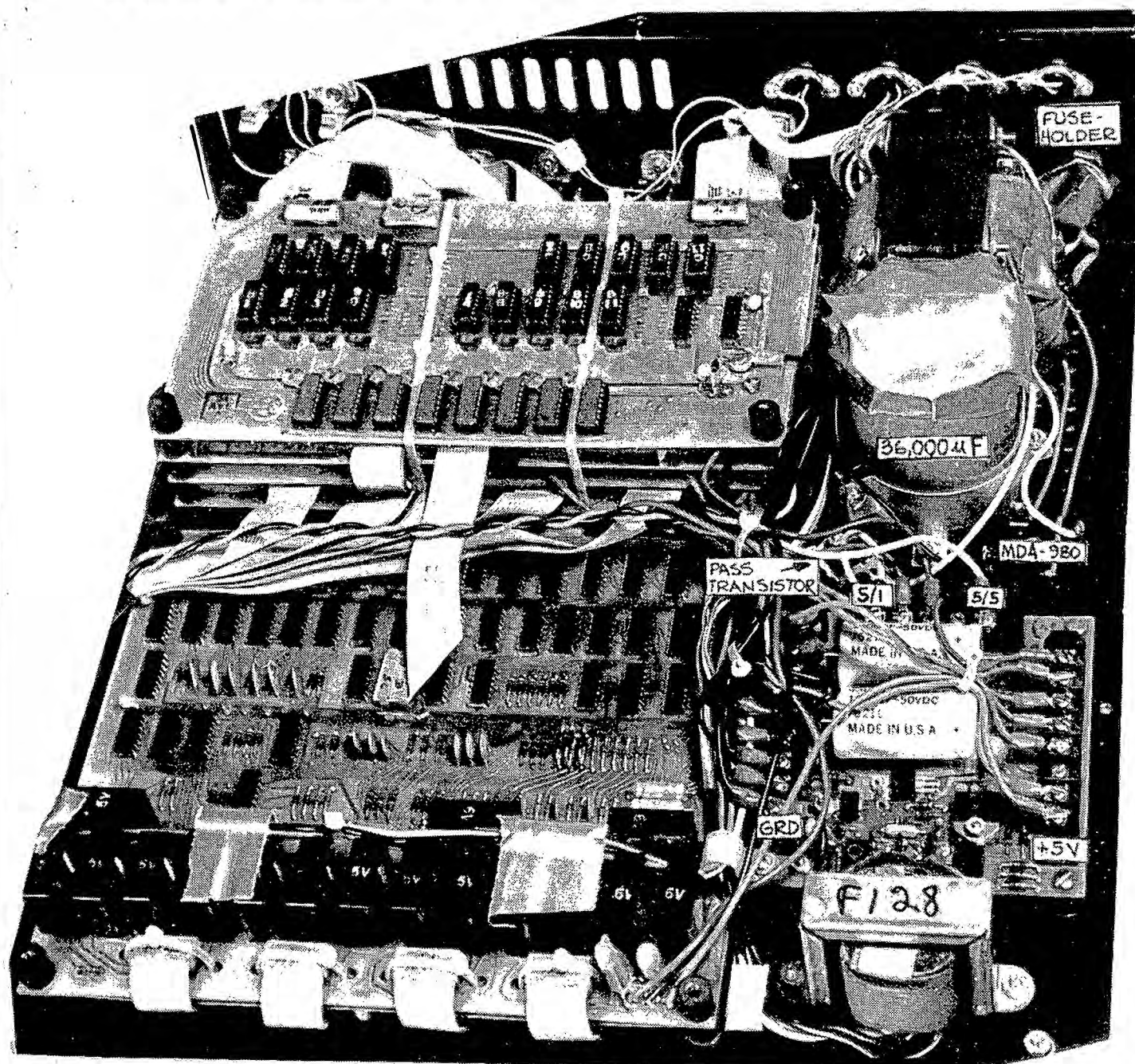
## 4.3 POWER SUPPLIES

### 4.3.1 POWER SUPPLIES - SP<sup>III</sup>

(ADDITIONAL WIRING DETAIL SHOWN ON SHEET 42)

### 4.3.2 POWER SUPPLIES - SP<sup>V</sup> (ILLUSTRATION ON SHEET 28)

(ADDITIONAL WIRING DETAIL SHOWN ON SHEET 58)



#### AC WIRE COLOR CODE

BLACK } 115/230VAC  
WHITE }  
GREEN - PROTECTIVE GROUND  
RED - SECONDARY AC WIRING

#### DC WIRE COLOR CODES

RED +5V      YELLOW -12V  
GREEN +11V    BLACK GROUND  
BLUE +12V  
NOTE: GREEN/MOLEX WIRING = REMOTE CUE

## POWER CHECKING PROCEDURE

NOTE: IF UNIT CONTINUOUSLY BLOWS FUSE SEE SH 28, PROB. X9

- 1- REMOVE INSULATING TAPE
- 2- MAKE MEASUREMENTS ON BRIDGE (SEE 6-B)

AC +8V TO +10V

DC +8V TO +11V (BLACK PROBE ON -)

(NOTE: IF AC IS CORRECT, GO TO "3", IF AC IS NOT CORRECT, GO TO "6")

3. MEASURE +28VAC ON POWER MODULE

3 POSITION STRIP. MEASURE THE DC OUTPUT OF BRIDGE: ON POWER MODULE (SP<sup>III</sup>); ON MDA-980 BRIDGE (SP<sup>V</sup>). SEE SHEET 28 FOR LOCATIONS.

AC +28V TO +32V

DC +14V TO +17V (RED PROBE

ON (+) C2 OF POWER MODULE (SP<sup>III</sup>);

ON (+) BRIDGE (SP<sup>V</sup>); BLACK PROBE

ON (-) C7 OF MODULE (SP<sup>III</sup>); ON

(-) BRIDGE (SP<sup>V</sup>)

4. DC MEASUREMENTS (POWER MODULE)

+5V - RED PROBE ON +5V TERMINAL STRIP, BLACK PROBE ON GROUND TERMINAL STRIP

+12V - RED PROBE ON TERMINAL 5/2 OR 5/4; BLACK PROBE ON GROUND

+11V - RED PROBE ON TERMINAL 5/3; BLACK PROBE ON GROUND

-12V - RED PROBE ON GROUND; BLACK PROBE ON TERMINAL 5/5

NOTE - SEE SHEET 29 FOR POWER MODULE TERMINAL NUMBERS

5. PASS TRANSISTOR - PROBE POINTS ARE:

COLLECTOR - (+) 36,000 uF CAP.

BASE - TERM 5/1 (PWR MODULE)

EMITTER - +5V TERM STRIP (POWER)

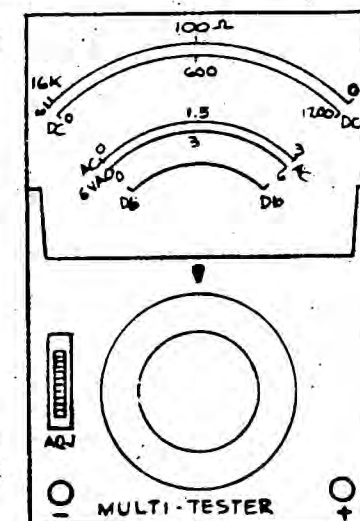
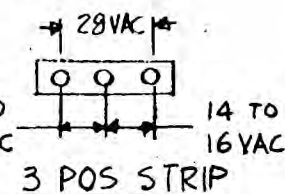
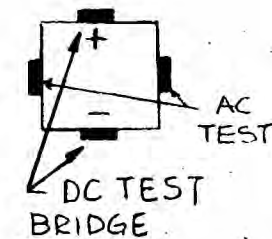
EMITTER-BASE VOLTAGE - 1.25/1.50V

6. NO AC POWER - EITHER THE BRIDGE OR THE TRANSFORMER ARE DEFECTIVE.

A) REMOVE WIRES FROM BRIDGE AND REPEAT STEP 2 MEASUREMENTS.

B) IF AC IS PRESENT, THE BRIDGE IS LOADING TRANSFORMER. REPLACE BRIDGE: SP<sup>III</sup>, MDA-980 (+5) & FOUR 1N400Z DIODES (D1-D4/ +12, -12, +11); SP<sup>V</sup>, MDA-980 (+5) & MDA-980 (+12, -12, +11)

C) IF NO AC IS PRESENT, CHECK ALL AC WIRING FROM POWER CORD TO FUSE, 115/230V SWITCH, MOLEX, POWER SWITCH AND TRANSFORMERS. IF WIRING IS GOOD, TRANSFORMERS ARE DEFECTIVE. CALL CUSTOMER SERVICE.



#### METER SETTINGS

AC - 30 ACV

DC - 15 DCV

+5 VOLTS DEPENDS ON +12 VOLTS - SEE SCHEMATIC SP<sup>III</sup> - SHEET 50 SP<sup>V</sup> - SHEET 68

IF +5V IS NOT PRESENT, CHECK +12V. IF +12V IS CORRECT CHANGE THE PASS TRANSISTOR (SEE SHEET 29). IF PROBLEM PERSISTS, CHANGE THE POWER MODULE.

NOTE - TAG ALL WIRES TO INSURE PROPER REASSEMBLY

FOR WIRING INFO - SEE REF DWGS

REFERENCE DRAWINGS	SH
SP <sup>III</sup> SPECS - POWER WIRING	42
SP <sup>V</sup> SPECS - POWER WIRING	58
SP <sup>III</sup> POWER MODULE SCHEM	50
SP <sup>V</sup> POWER MODULE SCHEM	68
BATTERY PACK SCHEMATIC	72

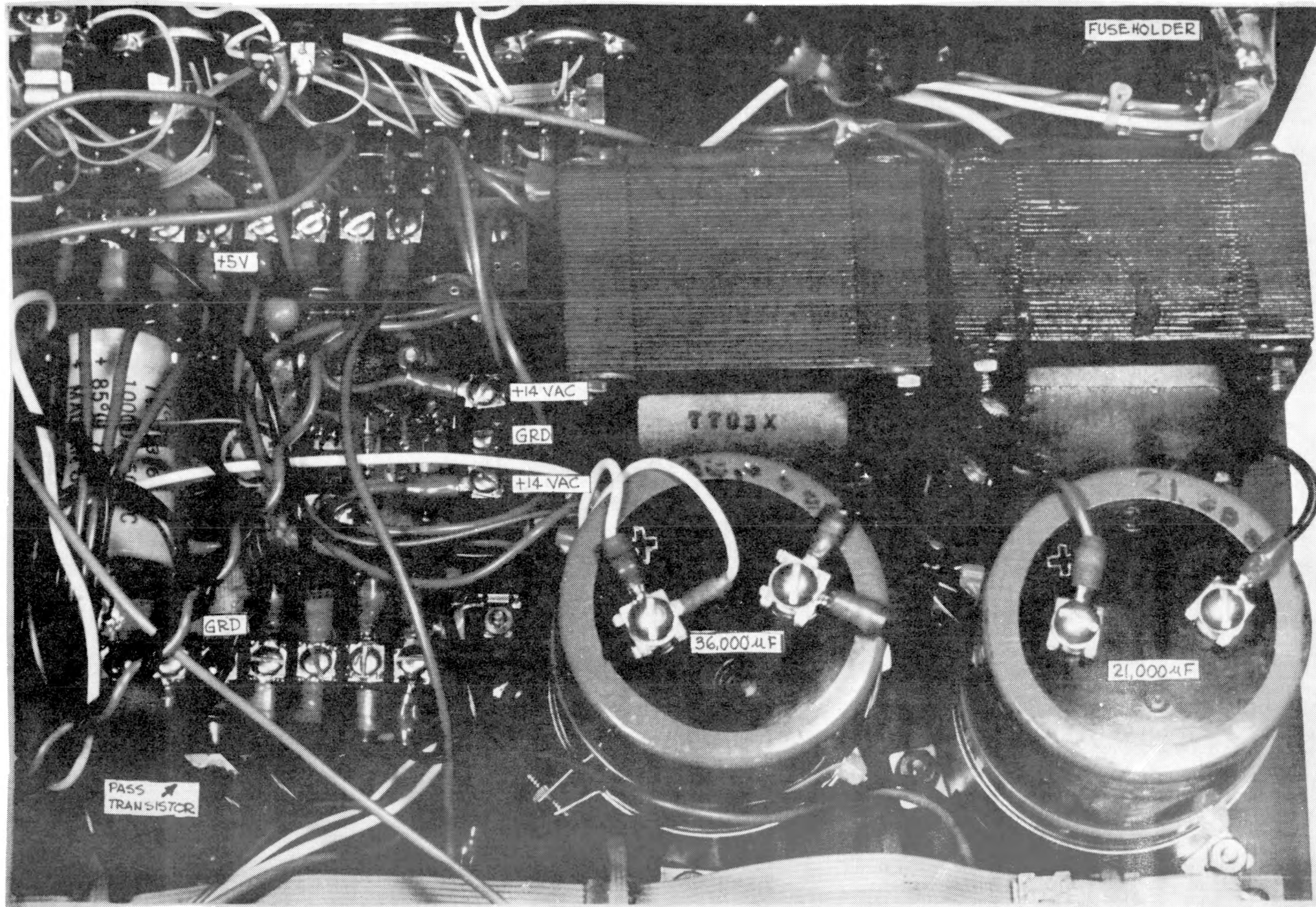


POWER SUPPLIES + SHOW PRO III

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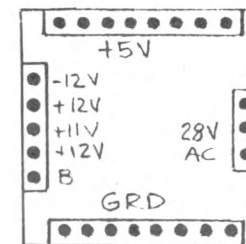
SH 27 REV A

## 4.3.2 POWER SUPPLIES - SPV



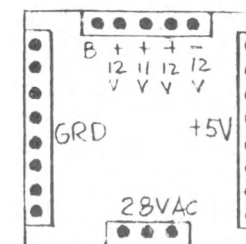
### POWER MODULE ORIENTATION

#### SPV



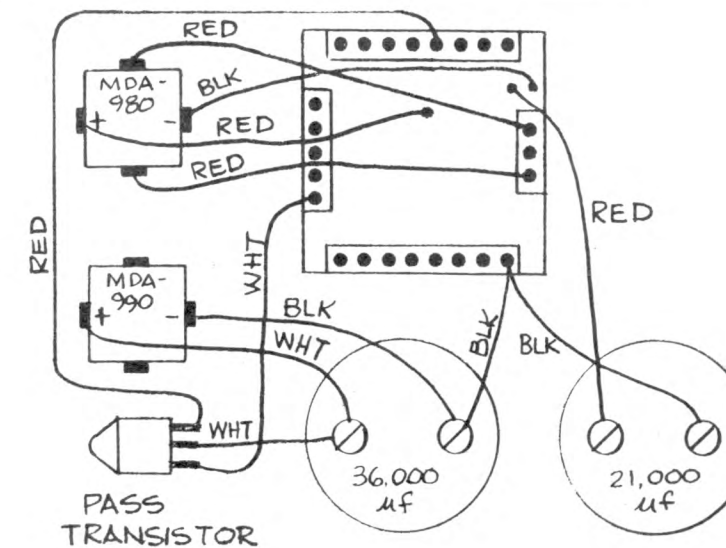
(FRONT OF UNIT)

#### SPIII



(FRONT OF UNIT)

### SPV POWER WIRING DETAIL



### X9 PROBLEM - UNIT CONTINUOUSLY BLOWS FUSES

1. CHECK TO SEE IF CASE OF PASS TRANSISTOR IS ISOLATED FROM BASE (SEE FIGURE ON SHEET 29)
2. WITH MULTI-METER SET AT RX1 OHMS, CHECK IF READING IS GREATER THAN 10-Ω:
  - a) +5V TO +12V
  - b) +5V TO +11V
  - c) +5V TO +30VDC (LOCATED ON SCREEN CONTROL) SEE SHEET 34 FOR LOCATION

- d) +5V TO -12V
- e) +12V TO -12V
- f) +11V TO -12V
3. CHECK ALL SUPPLIES (+5, +12, +11, -12, +30) TO GROUND.
4. IF ANY SUPPLY IS SHORTED (READING OF ZERO OHMS) TO ANY OTHER SUPPLY OR GROUND. SEE SHEET 37A FOR ISOLATION PROCEDURE.



POWER SUPPLIES -  
SHOW PRO V

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SH 28  
REV A

## 4.3. POWER SUPPLY (CONT'D)

### 4.3.2 CHANGING THE PASS TRANSISTOR

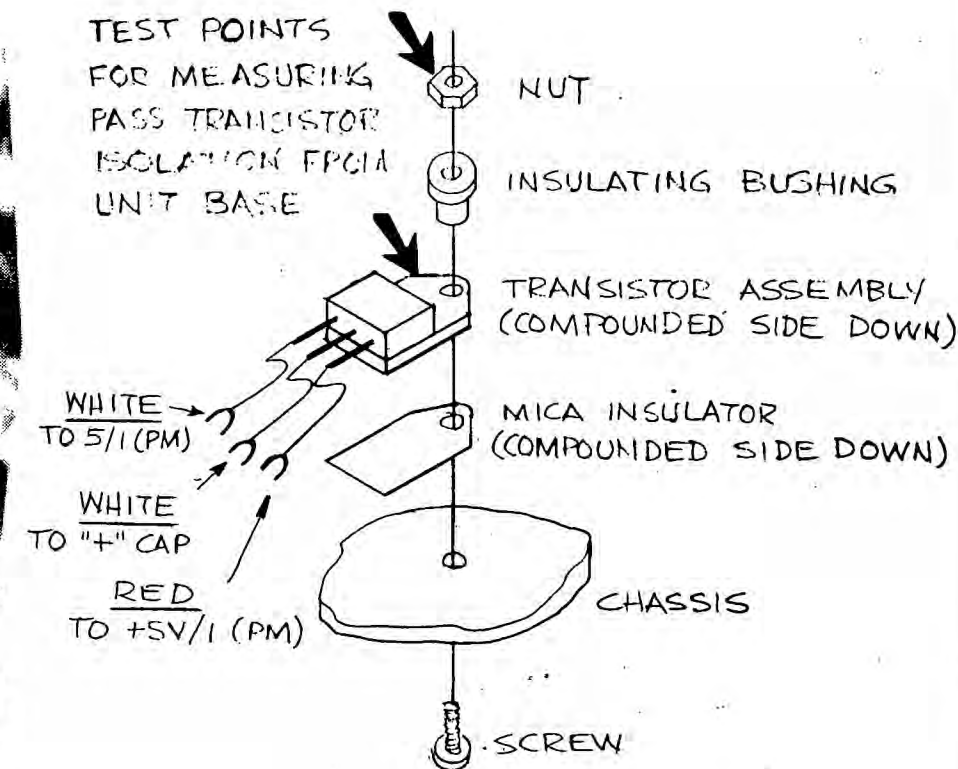
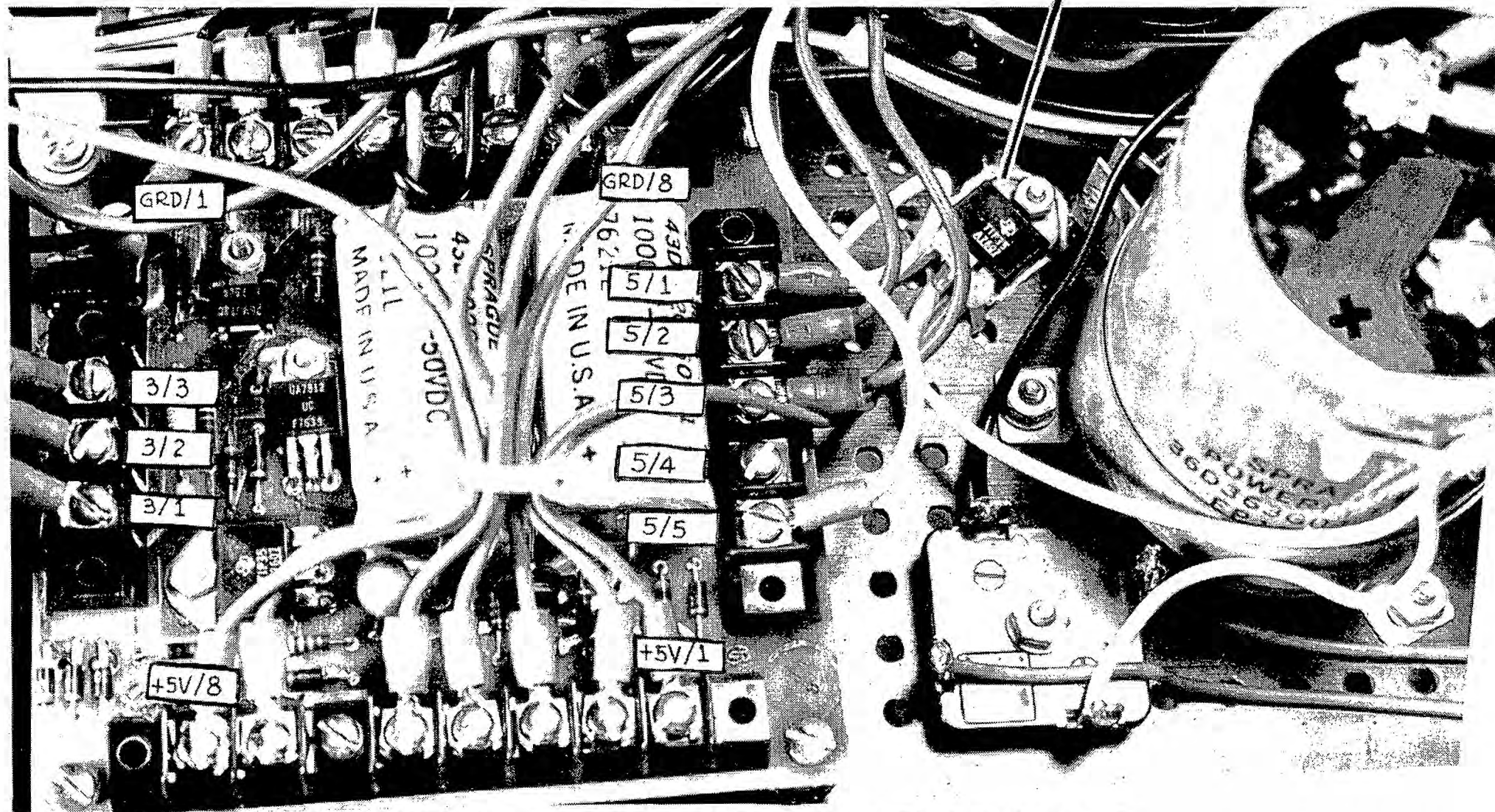


FIG. 4.3.1

#### NOTE

PASS TRANSISTOR ASSEMBLIES ARE AVAILABLE FOR FIELD REPLACEMENT

SPIII - PART NO. 13 33 015

SPVI - PART NO. 15 33 011

USE THE FOLLOWING PROCEDURE TO REPLACE A DEFECTIVE PASS TRANSISTOR:

1. CUT OFF STRAIN RELIEF TYRAP. REMOVE HARDWARE AND INSULATORS AND DISCARD. DISCONNECT LEADS.
2. INSTALL NEW TRANSISTOR IN THE FOLLOWING MANNER.
3. APPLY HEAT TRANSFER COMPOUND ON MICA INSULATOR AND TRANSISTOR METAL PLATE.
4. MOUNT TRANSISTOR AND ASSOCIATED PARTS PER FIGURE 4.3.1. BEFORE TIGHTENING HARDWARE WITH SCREWDRIVER AND NUTDRIVER VERIFY THAT THE INSULATOR IS POSITIONED CORRECTLY UNDER TRANSISTOR TO PREVENT SHORTING. TIGHTEN HARDWARE.
5. CONNECT LEFT (WHITE) LEAD TO TERMINAL 5/1 ON POWER MODULE. CONNECT CENTER (WHITE) LEAD TO "+" TERMINAL ON 36,000  $\mu$ f CAPACITOR. CONNECT RIGHT (RED) LEAD TO TERMINAL +5V/1 ON POWER MODULE.
6. VERIFY ISOLATION OF TRANSISTOR WITH MULTI-TESTER ON 5X1 SETTING. PLACE BLACK PROBE ON "-" TERMINAL OF CAPACITOR. RED PROBE ON TRANSISTOR METAL BASE. THE METER SHOULD SHOW NO READING. IF A READING IS SEEN, CORRECT THE SHORT AND RETEST.
7. INSTALL NEW STRAIN RELIEF TYRAP.
8. ON SPVI THE COMPONENTS ARE IN DIFFERENT LOCATIONS, BUT THE PROCEDURE AND CIRCUIT CONNECTIONS ARE THE SAME.



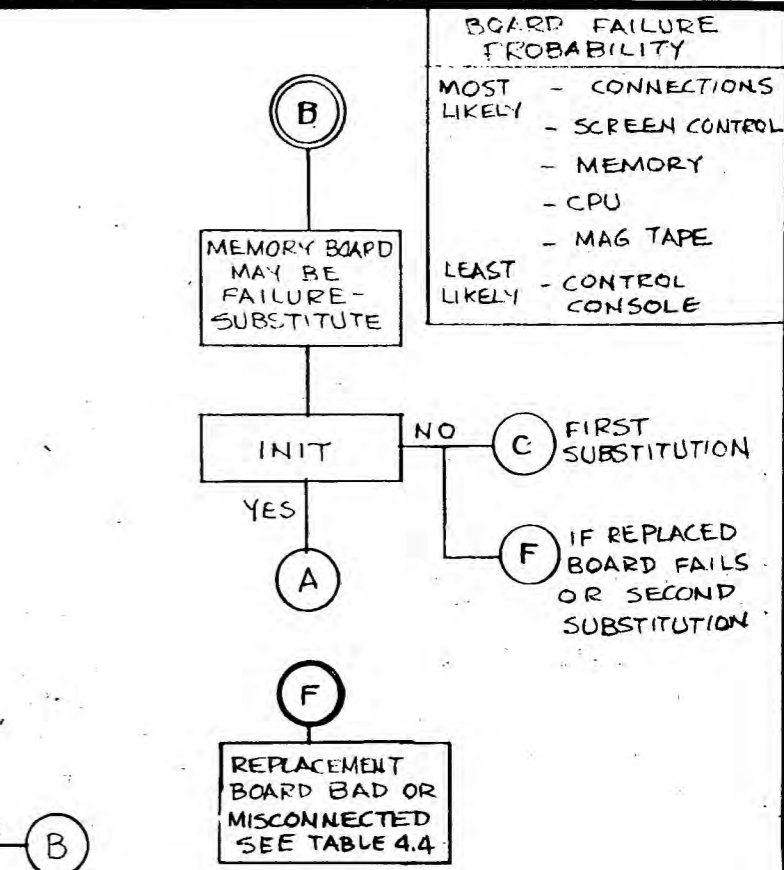
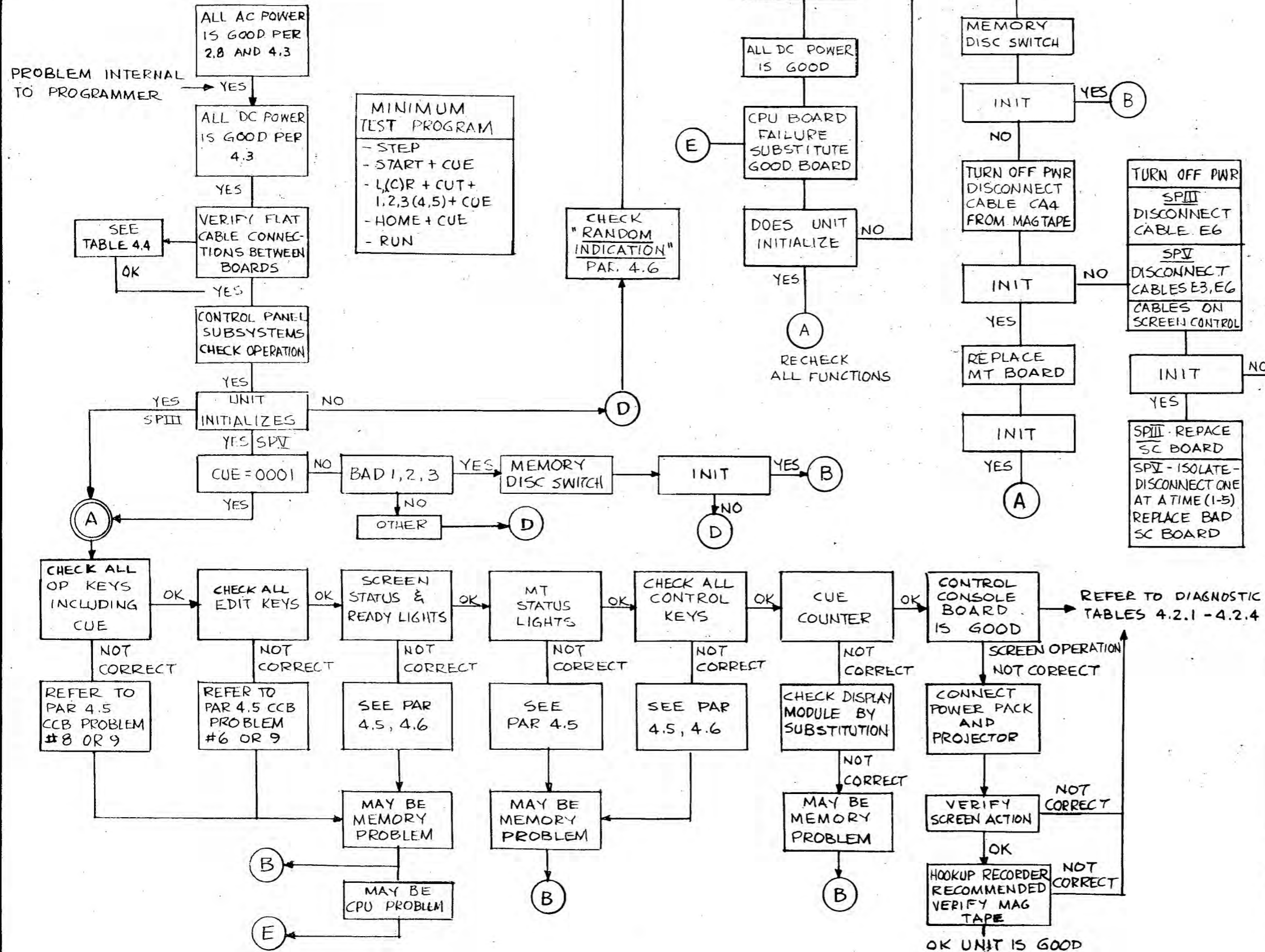
CHANGING THE PASS TRANSISTOR

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SN 29 REV A

## 4.0 PROGRAMMER TROUBLESHOOTING

### 4.4 GENERAL BOARD-LEVEL TROUBLESHOOTING



**BOARD FAILURE PROBABILITY**

<b>MOST LIKELY</b>	- CONNECTIONS
	- SCREEN CONTROL
	- MEMORY
	- CPU
	- MAG TAPE
<b>LEAST LIKELY</b>	- CONTROL CONSOLE

TABLE 4.4

BOARD	CABLE NO.	FUNCTION	PROBLEM FROM DIAGNOSTIC	FAIL NOTE
CC	A1	CCB TO PANEL	C4, C5, C6	
	A2	CCB TO DM	C7, C8	
	A3	CCB TO PANEL	C9, C12	
	A4	CCB TO PANEL	C15, C18	SH 31
	A5	CCB TO PANEL	C19	
	E5	CCB TO CPU		
MT	CA4	MT TO CPU	T3, T4	SH 35
	E8	CCB TO CPU		
CPU	A5	SPII MEM TO CPU	C6	SH 32
	A6	CPU TO REAR PANEL	T3, T4	SH 35
	E1	CPU TO MEM	C17	SH 32
	E2	SPII CPU TO SC	P3	SH 34
	E3	CPU TO MEM	C6, C12	SH 32
	E4	CPU TO MEM	P3, P13	SH 34
	E6	CPU TO MEM	C6	SH 32

**GENERAL BOARD-LEVEL TROUBLESHOOTING**

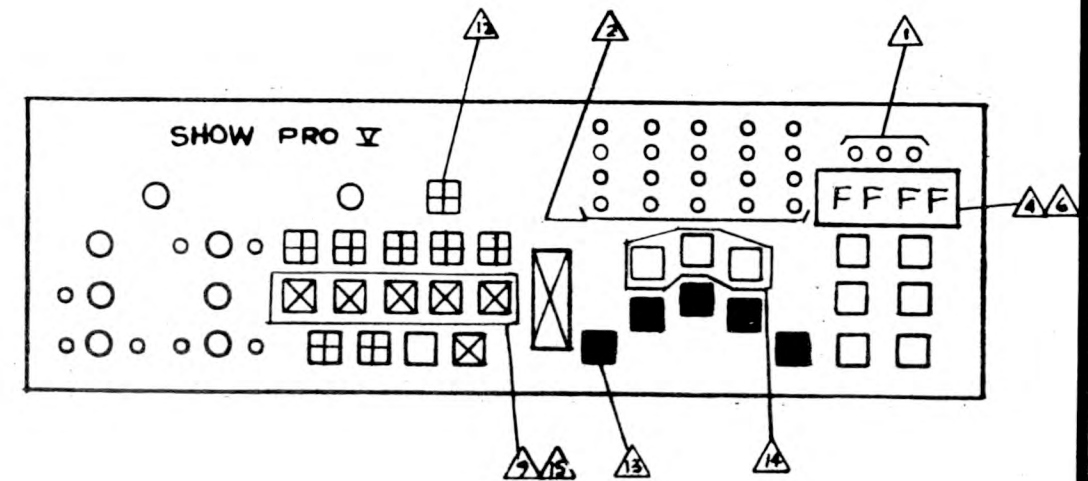
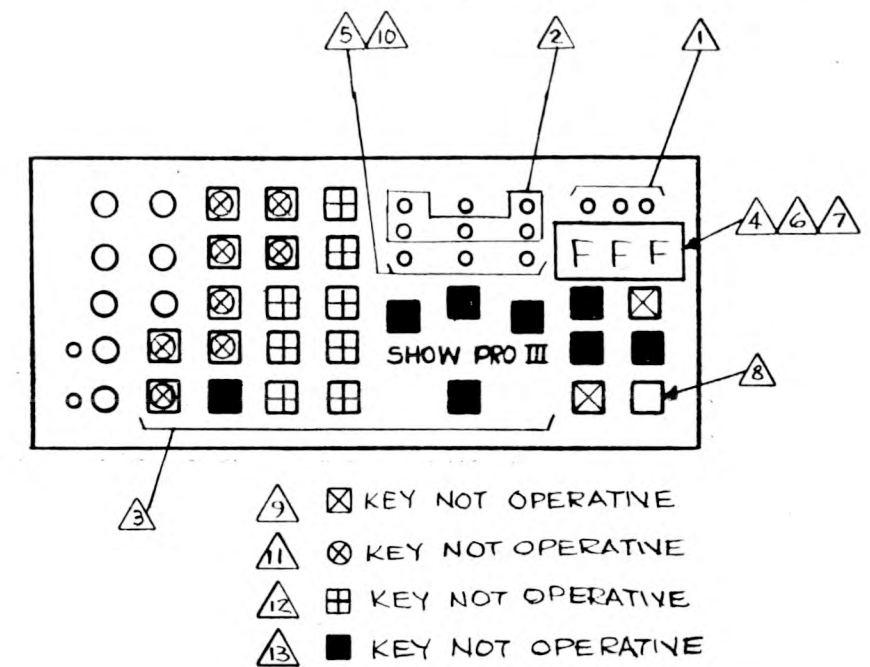
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## 4.5 CONTROL CONSOLE BOARD (CCB) TYPICAL PROBLEMS

NO	PROBLEM	SPIII INDICATION/SYMPTOM	SPV INDICATION/SYMPTOM
1	NO GROUND ON CONTROL CONSOLE BOARD	- NO LAMPS - FAN ON (SAME SYMPTOM AS +5V PASS TRANSISTOR FAILURE)	- LAMPS DIM IF PRESSED - ALL STATUS LITES WILL EVENTUALLY COME ON INCL READY - CUE COUNTER = FFFF $\triangle$ 4
2	NO POWER ON CCB	- NO INIT - $\triangle$ 1 MTA FLASHES, MTB OR MTC MAY LATCH ON - $\triangle$ 2 SOME STATUS LIGHTS - $\triangle$ 3 NO OP KEY SWITCHES WILL LIGHT - $\triangle$ 4 CUE COUNTER MAY READ "FFF"	- NO INIT - $\triangle$ 1 MTB MAY LATCH - $\triangle$ 2 SOME STATUS LITES - $\triangle$ 3 NO OP KEYS - $\triangle$ 4 CUE COUNTER = FFFF
3	E8-CABLE OUT	- UNIT APPEARS TO INITIALIZE - $\triangle$ 5 NO READY LIGHTS - $\triangle$ 6 CUE COUNTER READS "000"	- UNIT APPEARS TO INITIALIZE - $\triangle$ 5 NO READY LIGHTS - $\triangle$ 6 CUE COUNTER READS "0000" NO KEYS WILL LATCH
4	E5-CABLE OUT	RANDOM PATTERN - SEE PARAGRAPH 4.6	RANDOM - SEE PARAGRAPH 4.6
5	A1-CABLE OUT	- INIT - OK - CUES ENTER - STATUS LIGHT OK - READY NORMAL - $\triangle$ 7 = CUE COUNTER ALWAYS "001" - $\triangle$ 8 = NO REV Q	- INIT - OK - CUES ENTER - STATUS LIGHTS OK - READY NORMAL - $\triangle$ 7 CUE COUNTER ALWAYS "0001" - $\triangle$ 14 L-C-R OP KEYS WILL NOT OPERATE - $\triangle$ 8 NO REV Q
6	A2-CABLE OUT	- $\triangle$ 10 INIT WITH NO READY, NO STATUS - ALL CUES ENTER AND OPERATE - $\triangle$ 9 SWITCHES DO NOT OPERATE - $\triangle$ 4 CUE COUNTER MAY BE "FFF"	- NO INIT - RANDOM STATUS-READY-OK - ALL CUES ENTER AND OPERATE - $\triangle$ 15 WILL NOT ENTER IN "PLAY" (LATCH)
7	A3-CABLE OUT	- UNIT APPEARS NORMAL - $\triangle$ 11 $\otimes$ OP-KEYS DO NOT ENTER	- UNIT APPEARS NORMAL - OP KEYS DO NOT ENTER
8	A4-CABLE OUT	- INIT OK - $\triangle$ 12 $\boxplus$ OP-KEYS DO NOT ENTER - NO READY $\triangle$ 1	- INIT OK - OP KEYS DO NOT ENTER - READY OK
9	A5-CABLE OUT	- INIT OK - NO CUE BUTTON OPERATIONS - $\triangle$ 13 $\blacksquare$ KEYS DO NOT ENTER - ALSO $\triangle$ 9	- INIT OK - READY OK - $\triangle$ 13 KEYS DO NOT OPERATE
10	SINGLE LAMP ALWAYS ON	- LOGIC DRIVER FAILURE SEE SCHEMATIC SHEET 54 OR SHORT, SEE SHEET 31A	- LOGIC DRIVER FAILURE SEE SCHEMATIC SHEET 54 OR SHORT SEE SHEET 31A

$\triangle$  DENOTES SYMPTOM NUMBER- SEE FIGURES AT RIGHT



CONTROL CONSOLE

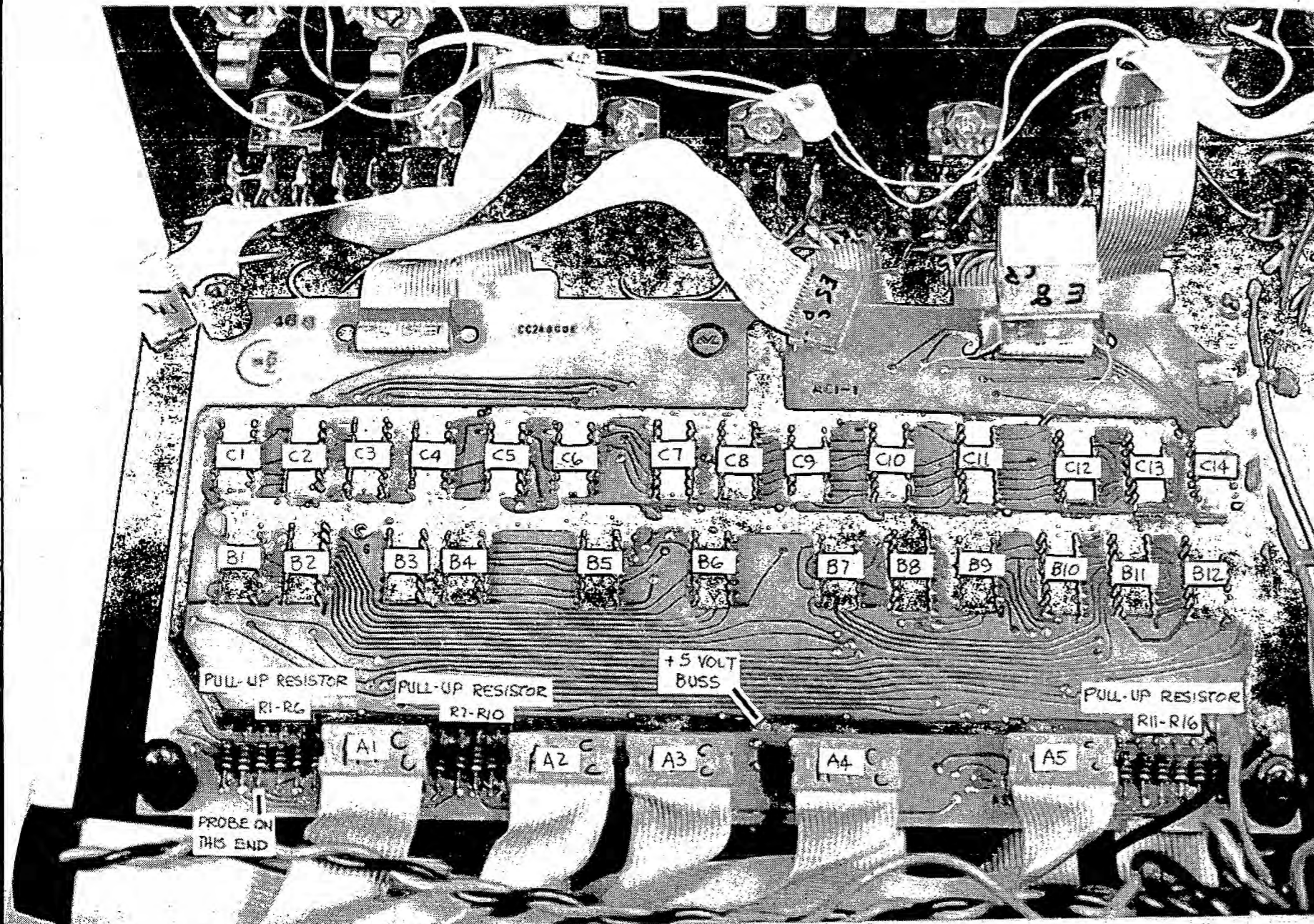
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SH 31

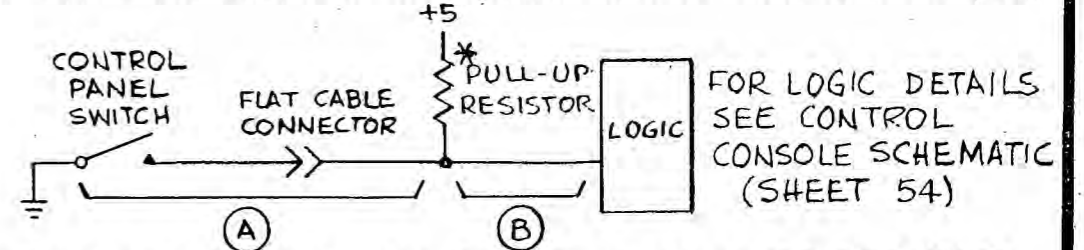
REV A



4.5 CONTROL CONSOLE BOARD (CONTD)



4.5,1 SWITCH CIRCUITS (COVER SWITCH WIRING - SEE SH 36 & 37)



\* PULL-UP RESISTOR IS INTERNAL TO LOGIC DEVICE ON CIRCUITS USING 7475 OR 74LS75 (TYPE 1) OR MAY BE COMBINED RESISTOR/LED (TYPE 3)

ALL INPUTS ARE "ACTIVE LOW", HENCE

FAILURE MODE

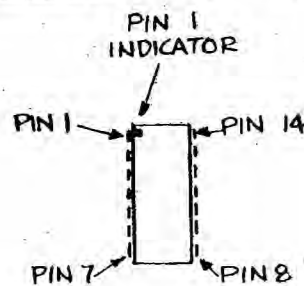
SYMPTOM

- |                                        |                                                               |
|----------------------------------------|---------------------------------------------------------------|
| 1. OPEN CIRCUIT IN (A)                 | FUNCTION NEVER ENABLED                                        |
| 2. SHORT TO GROUND IN (A)              | FUNCTION ALWAYS ENABLED                                       |
| 3. OPEN CIRCUIT IN (B)<br>(NO PULL-UP) | EITHER MODE 1, 2 OR<br>RANDOM CHANGES IN<br>MODES ON POWER UP |
| 4. SHORT TO GROUND IN (B)              | FUNCTION ALWAYS ENABLED                                       |

OPEN CIRCUITS RESULT IN "FUNCTION NEVER ENABLED". WIRING TO THE COVER SWITCHES CAN BE CHECKED BY REFERRING TO SHEETS 36 AND 37, FOR THE SWITCH LOCATION AND IT'S DESTINATION ON THE CONTROL CONSOLE BOARD. USE MULTI-METER SET AT RX1 OHMS, ZERO OHMS IS CORRECT READING. HIGH OHMIC READING INDICATES OPEN CIRCUIT.  
NOTE: CABLES A1 THRU A5 MUST BE PLUGGED IN FOR THIS TEST.

LEGEND FOR TABLES ON SHEETS 36 & 37

WIRE NO	A5 (CABLE NO)	
11	REVQ	SIGNAL (FUNCTION)
	R2D6 (R16)	PULL-UP RESISTOR
		DATA BIT CODE



TYPICAL PIN NUMBER FOR 14 PIN IC CHIP

INTERNAL (LOGIC) RESISTOR  
RAD7 (START) → C8-8 TO CABLE A3/9

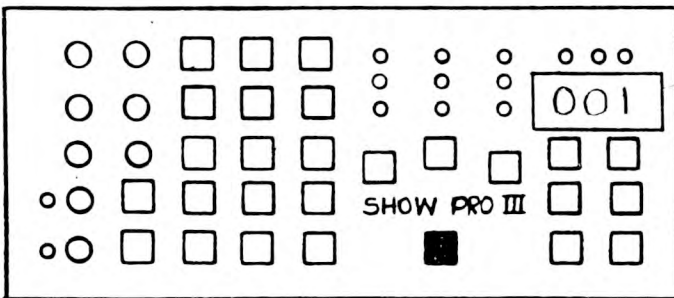
EXTERNAL RESISTOR  
CABLE A5/11 TO RES (R16) → B12-4 (REVQ) R2D6

	CONTROL CONSOLE		
	B 10 83 001	SN 31A	REV A

## 4.6 CENTRAL PROCESSOR BOARD (CPU) - THE FOLLOWING CONDITIONS CAN BE USE TO DIAGNOSE CPU FAILURE OR INTERNAL CONNECTION PROBLEMS, DUE TO COMPLEXITY OF CPU PROBLEMS, DETAILED CPU PROBLEM LOCATION IS IMPOSSIBLE WITHOUT SPECIAL TEST EQUIPMENT.

THIS BOARD IS COMMON TO SP<sup>III</sup> AND SP<sup>V</sup>

"RANDOM INDICATION" HAS FOLLOWING CHARACTERISTICS



WILL CHANGE TO "002" WITH CUE

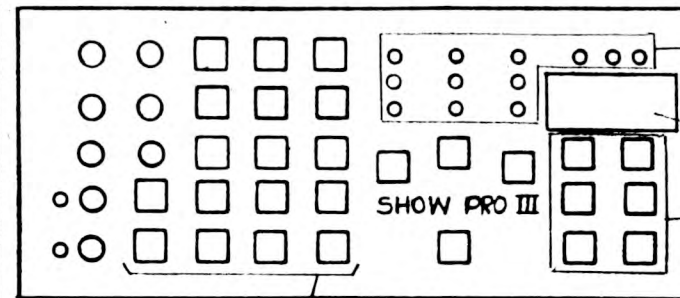
### E2 CABLE OUT (MEMORY)

#### SP<sup>III</sup>

- INIT APPEARS CORRECT
- START + CUE = 002
- CUE STAYS ON
- L+C+ CUE = CUE OUT

#### SP<sup>V</sup>

- INIT
- START + CUE = 0001
- CUE STAYS ON
- L+C+R+ CUE = KEY LAMPS STAY ON WHEN PRESSED



RANDOM PATTERN AT "POWER ON"

NO INIT

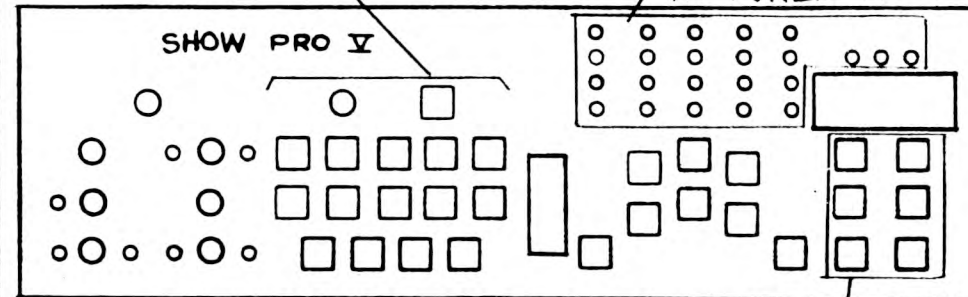
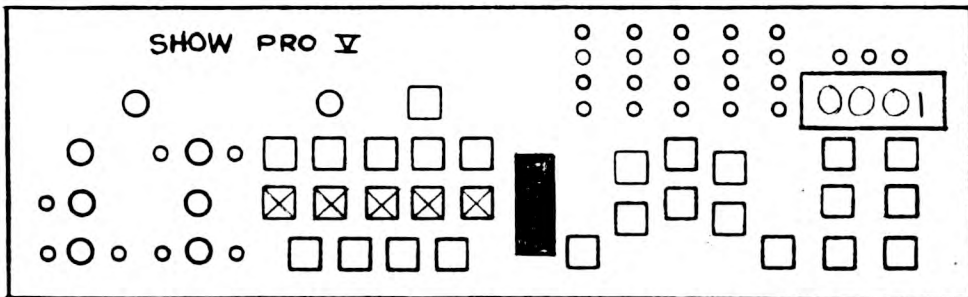
DO NOT ENTER

OP KEYS LATCH IF PRESSED

RANDOM PATTERN AT "POWER ON"

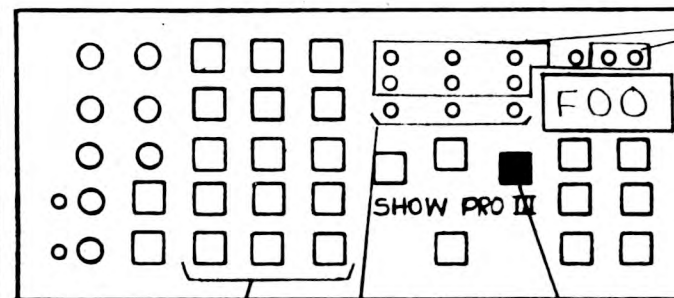
### RANDOM CONDITION CAUSES

- CPU, NO POWER
- MEMORY, NO POWER
- E5 CABLE OUT (SEE SHEET 31, CC)
- E4 OR E9 CABLE OUT
- A6 CABLE OUT (SP<sup>V</sup> ONLY)
- C1 DATA GATE
- C3 DATA GATE
- 3850 OR 3853 FAILURE
- CLOCK (CRYSTAL) FAILURE



DO NOT ENTER

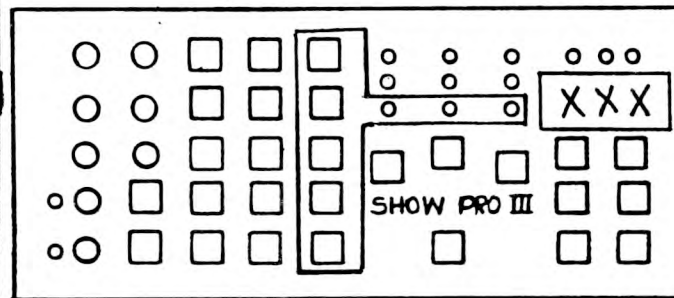
SEE SHEET 31



STARTS PATTERN  
DIGIT MAY CHANGE AT "POWER ON"  
NO STATUS OR ALL STATUS LAMPS

### NO POWER TO MEMORY

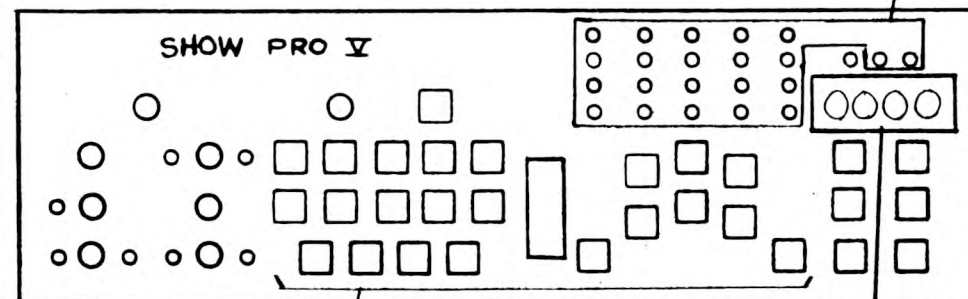
THIS IS A MEMORY PROBLEM WHICH CAN BE MISINTERPRETED AS A CPU PROBLEM



### DATA GATES C2 (SEE SHEET 32A)

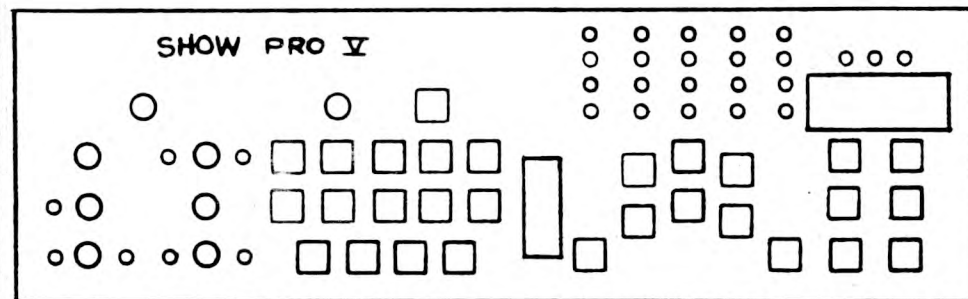
- POWER ON
- RANDOM INDICATION THEN CHANGES AFTER 1/10 SECOND

SP<sup>V</sup> - SEE "RANDOM INDICATION" ABOVE



OP KEYS ARE RANDOM

0000 OR FFFF (ALSO SEE 4.5, PROB 3)



CENTRAL PROCESSOR (CPU)

B 10 83 001

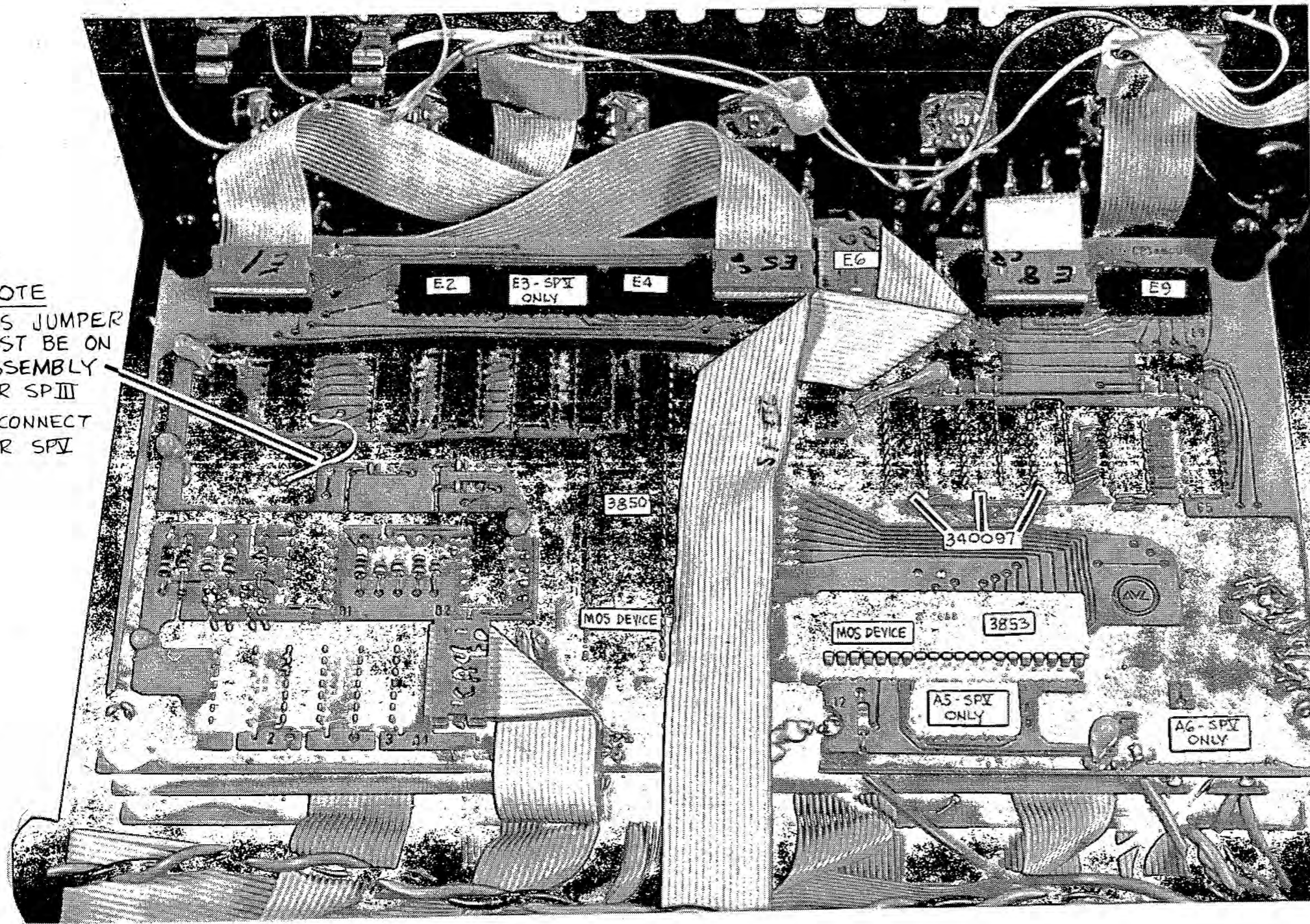
SH 32 REV A

4.6 CENTRAL PROCESSOR BOARD (CPU) - (CONTD)

THE FOLLOWING TABLE LISTS CPU BOARD PROBLEMS WHICH COULD CONTRIBUTE TO FAILURES DIAGNOSED IN OTHER FUNCTIONAL AREAS OR BOARDS.

NO.	TYPE OF PROBLEM	POSSIBLE CPU BOARD CAUSE
1	NO MAGNETIC TAPE RECORD	3850 I/O PORTS, RECORD CLOCKS
2	NO MAGNETIC TAPE PLAY	3850 I/O PORTS
3	NO LAMPS ON ANY SCREEN	SCREEN CONTROL CLOCK
4	FLICKER-ALL LAMPS ON ALL SCREENS	SCREEN CONTROL CLOCK
5	DEFECTIVE CUE STORAGE OR DROPPED CUES AT FIXED INCREMENTS (i.e. EVERY 16 <sup>TH</sup> CUE)	3853 MEMORY INTERFACE CHIP (ADDRESS BUS DRIVER)
6	RANDOM RESETS OR INTERMITTENT OPERATION	3853 MEMORY INTERFACE CHIP OR 3850 OR DATA GATES C1, C2, C3 (MISSING PULL-UP RESISTOR ON DATA BUS)
7	CUES CHANGED IN MEMORY	3850 OR DATA GATES
8	CUES DISPLAY ON CONSOLE OK BUT EXECUTE INCORRECTLY (MEMORY STORAGE OK)	3850 SCRATCH PAD MEMORY (THIS CAN ALSO BE PROM OR RAM MEMORY)
9	MEMORY CHIP SELECT FAILURE	ADDRESS DECODING LOGIC OR 3853

NOTE  
THIS JUMPER MUST BE ON ASSEMBLY FOR SP III  
DISCONNECT FOR SP IV



**WARNING** - THIS ASSEMBLY CONTAINS MOS-TYPE DEVICES.

1. SPARE BOARDS MUST BE WRAPPED IN ALUMINUM FOIL
2. KEEP POWER AND GROUND WIRES CONNECTED DURING TROUBLESHOOTING

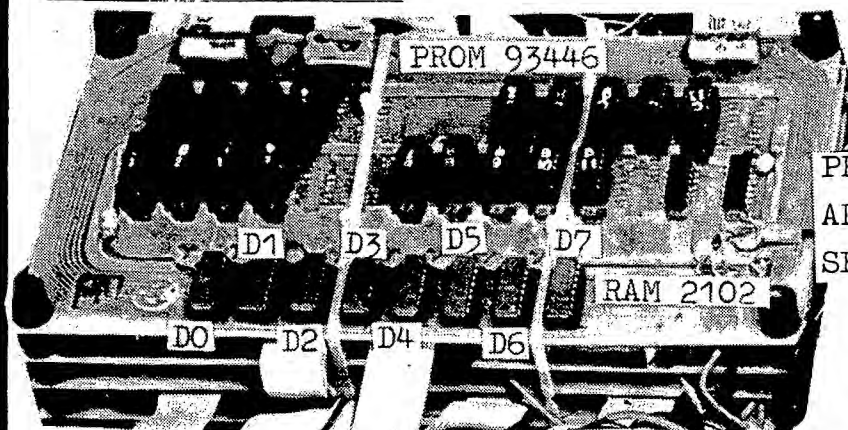


CENTRAL PROCESSOR (CPU)

B 10 83 001

SR 32A  
REV A

## 4.7.1 SP III MEMORY



PROM AND RAM CHIP LOCATIONS ARE SHOWN ON ASSEMBLY DWG SEE SHEET 43

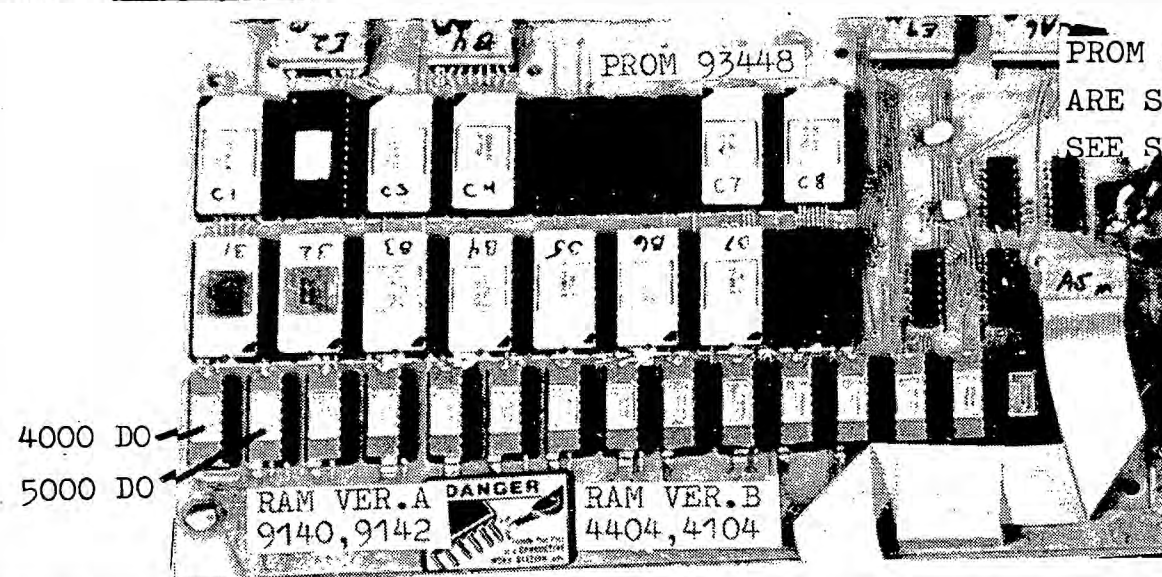
BOTH THE SPIII AND SPV MEMORY BOARDS HAVE 2 TYPES OF MEMORY CHIPS AND ARE FUNCTIONALLY IDENTICAL EXCEPT FOR STORAGE CAPACITY

- RAM MEMORY WHICH IS THE ACTUAL VARIABLE (READ-WRITE) STORAGE FOR CUES. ADDITIONALLY SOME RAM MEMORY IS UTILIZED FOR PROCESSOR REGISTERS (SEE CPU BOARD PROBLEM #8 SHEET 32A) IF RAM FAILS IN THE AREA OF THESE REGISTERS, CUES MAY APPEAR CORRECT ON THE CONTROL PANEL BUT EXECUTE INCORRECTLY.
- PROM MEMORY WHICH IS THE FIXED (READ-ONLY) STORAGE FOR THE PROGRAM WHICH DICTATES THE PARTICULAR SHOW PRO OPERATIONAL FEATURES.

RAM FAILURE MODES SPIII & SPV	SYMPTOM OR INDICATION	NOTES
CUE STORAGE	INTERNAL ADDRESS MATRIX	CUE CHANGED CUE STORED IN WRONG LOCATION OR DROPPED* IS EXTERNAL ADDRESS
	DATA BIT WRITE	CUE APPEARS CORRECT ON LOADING (WHEN IT IS PLAYED) BUT IS INCORRECT WHEN READ FROM MEMORY
	DATA BIT READ	CUE APPEARS AS "WRITE" ABOVE OR IS OCCASSIONALLY CHANGED TO ANOTHER CUE
	CHIP SELECT	EVERY STORAGE LOCATION WILL APPARENTLY HAVE A PROBLEM - IF PERMANENTLY SELECTED CAN CAUSE "RANDOM INDICATION" SEE 4.6
REGISTER STORAGE	CORRECTLY DISPLAYED CUES MAY EXECUTE INCORRECTLY	PROM FAILURE CAN CAUSE SIMILAR SYMPTOM

NOTE: WHEN A TROUBLE IS DIAGNOSED AS A POSSIBLE MEMORY PROBLEM A CALL TO AVL CUSTOMER SERVICE CAN MANY TIMES RESULT IN PIN-POINTING THE ACTUAL MEMORY CHIP INVOLVED. THE REPLACEMENT CHIP OR CHIPS THEN CAN BE DISPATCHED, RATHER THAN AN ENTIRE REPLACEMENT BOARD.

## 4.7.2 SPV MEMORY



PROM AND RAM CHIP LOCATIONS ARE SHOWN ON ASSEMBLY DWG SEE SHEET 61

PROM FAILURE MODES SPIII & SPV	SYMPTOM OR INDICATION	NOTES
INTERNAL ADDRESS	UNPREDICTABLE - HOWEVER TWO TYPICAL INDICATIONS ARE: 1 - UNIT HANGS UP AND FAILS TO EXECUTE A PARTICULAR CUE. 2 - A PARTICULAR FUNCTION ALWAYS EXECUTES INCORRECTLY i.e. UNIT MAY APPEAR TO BE RECORDING BUT NOTHING IS GOING ON TAPE.	SEE ALSO 3850 FAILURE CPU BOARD SHEET 32A
DATA READ - SINGLE BIT	SEE 2 ABOVE	UNIT MAY APPEAR TO OPERATE NORMALLY EXCEPT FOR ONE MINOR DISCREPANCY
DATA READ - WORD 8 BITS, OR 4 BITS IN CASE OF SPIII	ENTIRE GROUPS OF FUNCTIONS MAY NOT OPERATE, FOR INSTANCE MAY FAIL TO INITIALIZE	SPIII 93446 IS ORGANIZED AS 2 CHIPS OF 512 WORDS BY 4 BITS SPV 93448 IS ORGANIZED AS 1 CHIP OF 512 WORDS BY 8 BITS
CHIP SELECT	SAME AS DATA READ - WORD. ALSO SEE RAM CHIP SELECT	SEE ALSO CPU BOARD SHEET 32A

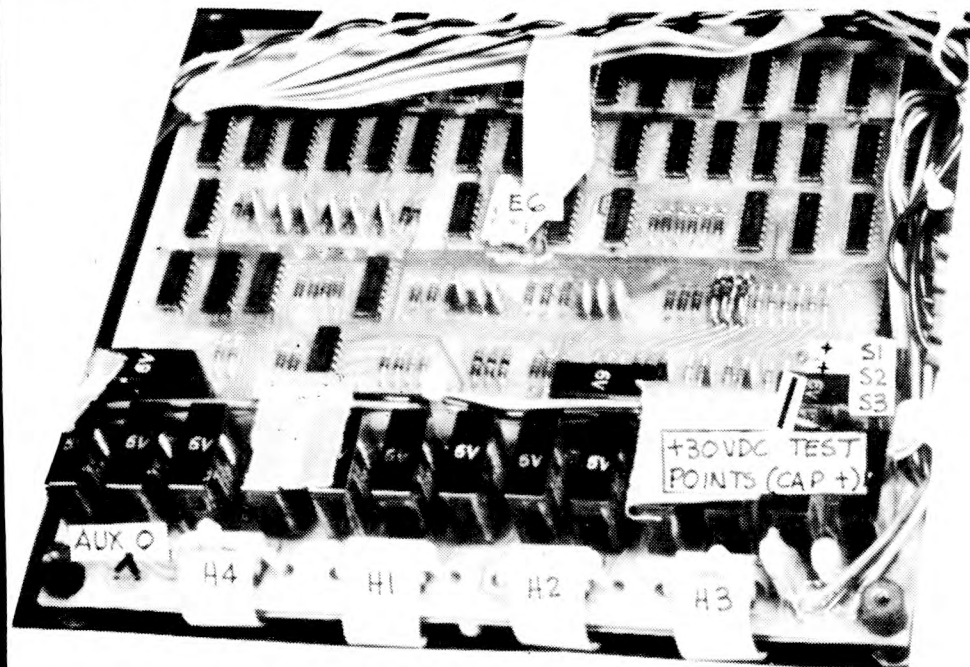


SPIII & SPV MEMORY

B 10 83 001

SN 33 REV A

## 4.8.1 SPIII SCREEN CONTROL



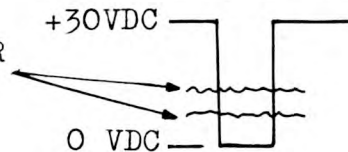
THE SHOW PRO III AND SHOW PRO V SCREEN CONTROL BOARDS ARE FUNCTIONALLY IDENTICAL ALTHOUGH PHYSICALLY PACKAGED AND PARTITIONED DIFFERENTLY.

- SPIII 3 SCREEN CONTROLS, 2 PROJECTOR/SCREEN ON ONE BOARD, PER CONTROL
- SPV 1 SCREEN CONTROL, 3 PROJECTORS/SCREEN ON ONE BOARD

EACH SCREEN CONTROL HAS ITS INDIVIDUAL +30V DC SUPPLY WHICH IS SUPPLIED FROM EITHER MARK IV OR MARK VII +28VAC SUPPLY VIA POWER PACK CABLES

TYPICAL SCREEN CONTROL PROBLEMS	SYMPTOM
BROKEN WIRE BETWEEN JONES PLUG AND H1, H2, H3 SHOW PROIII OR SCE SHOW PRO V	NO 30V DC POWER FROM KNOW GOOD POWER PACK A TEST POINT SHOW ABOVE
BROKEN WIRE BETWEEN JONES PLUG AND H1, H2, H3 SHOW PROIII OR SCE SHOW PRO V	RELAY PICKUPS UP-AUDIBLE CLICK CAN BE HEARD BUT NO ADVANCE OR REVERSE

TYPICAL FIRE PULSE

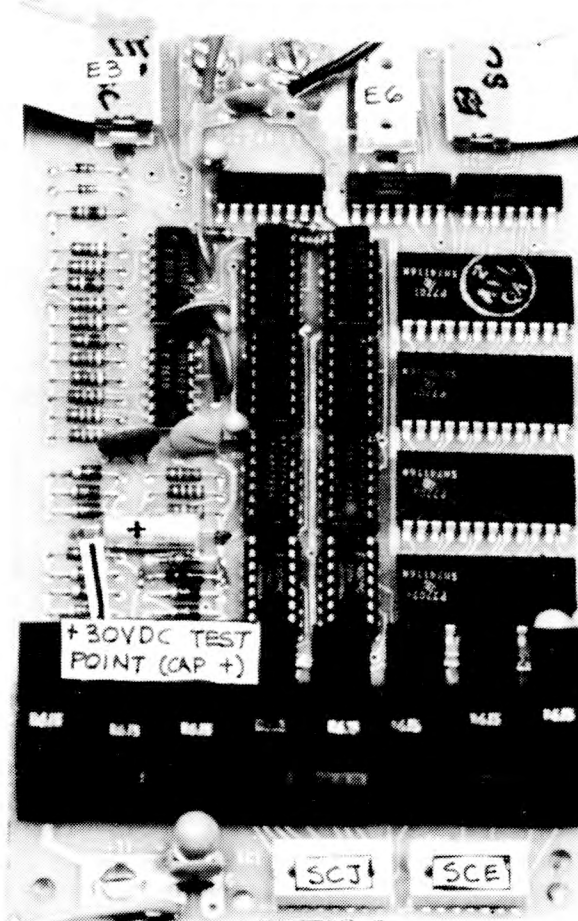


THIS WAVEFORM INDICATES FAILURE OF DRIVER WHICH CAN BE CAUSED BY 27V ZENER DIODE FAILURE OR LACK OF TRANSIENT SUPPRESSOR

**NOTE:**

ON OLDER SPIII UNITS, "AUX 0" MAY BE ADDED BY CONNECTING AN EBY CORD THE THE POINTS INDICATED ABOVE AND RUNNING THE CORD OUT OF THE UNIT THROUGH A FAN VENT HOLE.

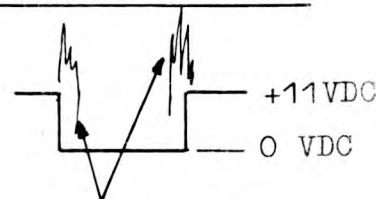
## 4.8.2 SPV SCREEN CONTROL



\* FIRE PULSE TEST POINTS

	SPIII			SPV
	S1	S2	S3	
LEFT	E12-12	E12-4	E12-6	P2
CTR	-	-	-	P4
RT	E12-10	E12-8	E12-2	P6

TYPICAL RELAY PULSE



SPIKES INDICATE FAILURE OF SUPPRESSION DIODE - REPAIR IMMEDIATELY, THIS CAN CAUSE DRIVER FAILURE

SCREEN CONTROL FAILURE MODES	SYMPTOM	NOTES
E3 CABLE OUT	NO SCREEN FUNCTIONS FOR SCREEN ON WHICH CONNECTOR IS OUT OR ANY HIGHER # SCREEN LAMPS MAY COME ON WITH POWER UP	SPIII E3 CABLE IS NOT USED
E3 CABLE OUT AT CPU BOARD	ALL LAMPS MAY COME ON - ALL RELAYS WILL CHATTER	SPV ONLY
E6 CABLE OUT AT SCREEN CONTROL BOARD - SPV	ALL PROJECTORS ON A GIVEN SCREEN REVERSE CONTINUOUSLY	SPV ONLY
E6 CABLE OUT AT SCREEN CONTROL BOARD - SPIII	ALL PROJECTORS REVERSE CONTINUOUSLY	SPIII ONLY
E6 CABLE OUT ON CPU BOARD	ALL PROJECTORS REVERSE CONTINUOUSLY	SPV ONLY

\* RELAY PULSE TEST POINTS

	SPIII			SPV
	S1	S2	S3	
LFWD	C2-10	D15-10	D1-2	N8
LREV	C2-8	D15-2	D1-4	N6
CFWD	-	-	-	P10
CREV	-	-	-	N10
RFWD	C2-4	D15-4	D1-10	N4
RREV	C2-6	D15-12	D1-12	P12
AUXL	-	-	-	N13
AUXR	-	-	-	N2
AUX0	D16-12			-
AUX1	D16-6			-
AUX2	D16-8			-
AUX3	D16-10			-

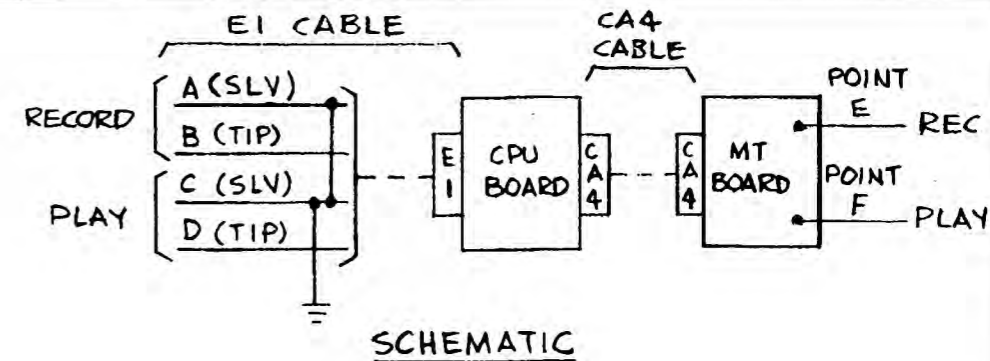
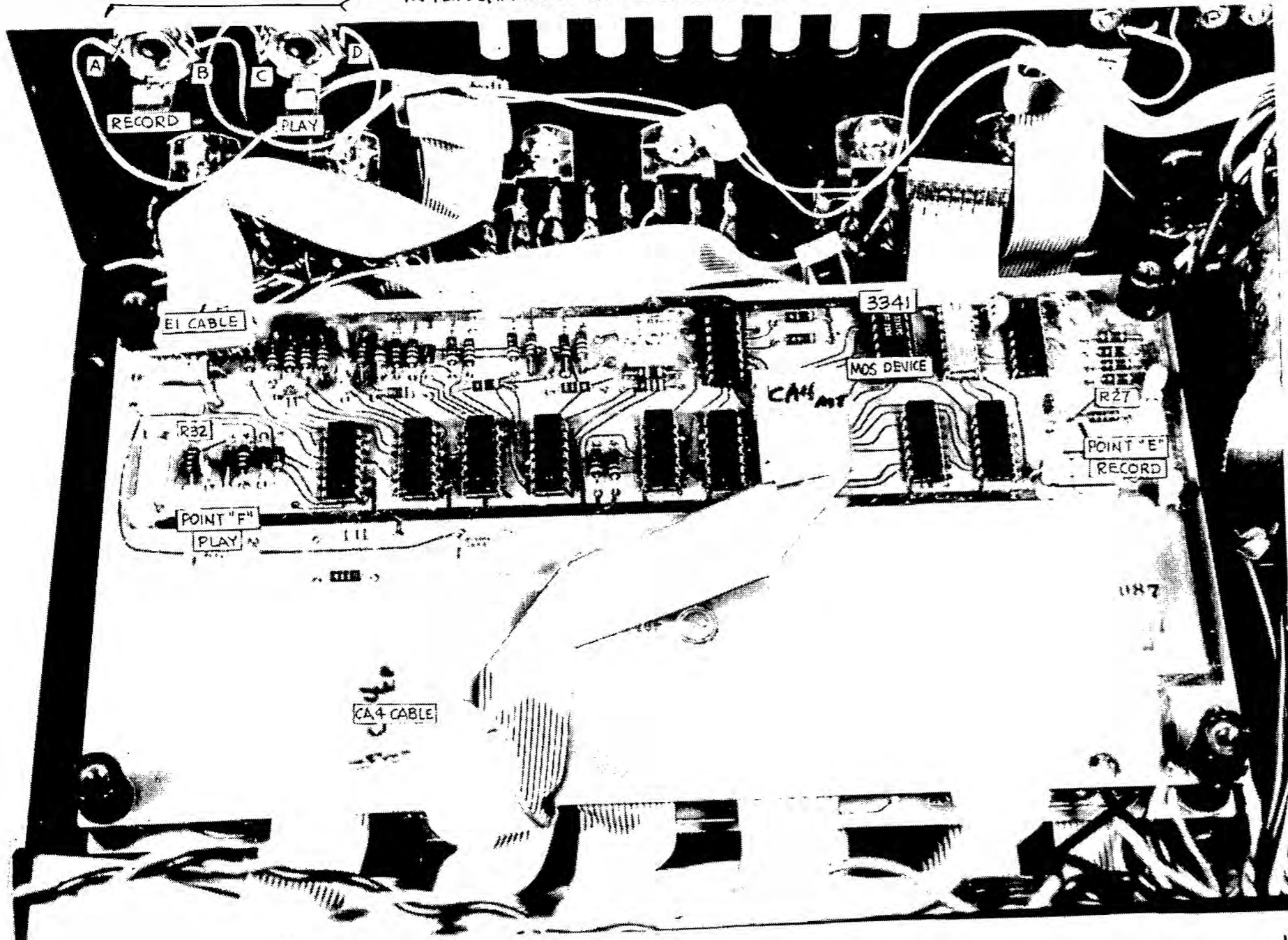
\* LOCATIONS SHOWN IN FIRE AND RELAY PULSE TABLES ARE (IC NO. - PIN NO.) IDENTIFICATION REFER TO SHEETS 43 (SPIII) AND 61 (SPV) FOR IC POSITIONS

	SCREEN CONTROL		
	B 10 83 001	SN 34	REV A

## 4.0 PROGRAMMER TROUBLESHOOTING (CONTD)

### 4.9 MAGNETIC TAPE

NOTE: JACK POSITIONS MAY BE INTERCHANGED ON SOME UNITS



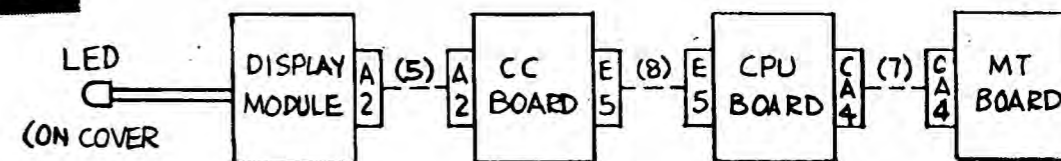
**CAUTION:** VERIFY UNIT POWER CORD IS UNPLUGGED BEFORE STARTING TO DISASSEMBLE BOARD STACK

-TO CHECK CONTINUITY FROM MAG TAPE BOARD TO REAR PANEL OF UNIT:

- a) PLUG CABLES EI AND CA4 INTO CPU BOARD
- b) WITH MULTI-METER SET AT R $\times$ 1 OHMS SCALE, CHECK RECORD BETWEEN POINTS "B" AND "E". SHOULD READ ZERO OHMS.
- c) CHECK PLAY BETWEEN POINTS "D" AND "F" SHOULD READ ZERO OHMS.
- d) IF READING IS HIGHER, THE EI CABLE OR THE CPU BOARD IS DEFECTIVE

**NOTE:** MT BOARD CAN BE REMOVED FROM BOARD STACK WITHOUT DISCONNECTING THE POWER WIRES.

### MT-A (GREEN STATUS) WIRING



**WARNING** - THIS ASSEMBLY CONTAINS MOS-TYPE DEVICES.

1. SPARE BOARDS MUST BE WRAPPED IN ALUMINUM FOIL,
2. KEEP POWER AND GROUND WIRES CONNECTED DURING TROUBLESHOOTING.

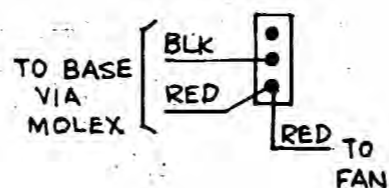
	MAGNETIC TAPE		
	B10 83 001	SN 35	REV A

## 4.0 PROGRAMMER TROUBLE SHOOTING (CONTD)

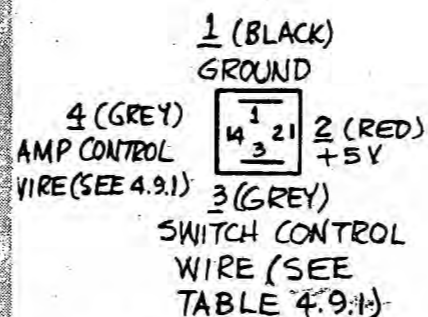
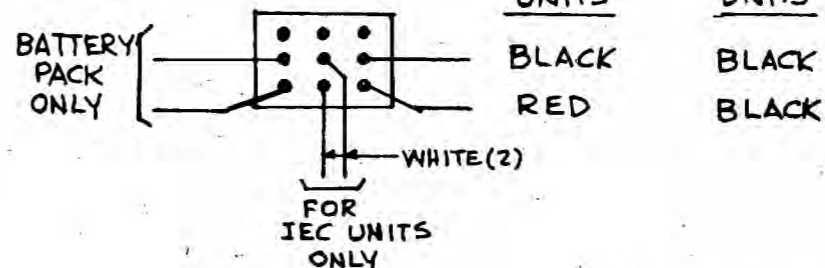
### 4.9.1 SHOW PRO III COVER

**CAUTION:** ON OLDER UNITS 115/230VAC IS EXPOSED WHEN POWER IS ON (AT FAN & POWER SWITCH)

#### OLDER UNITS

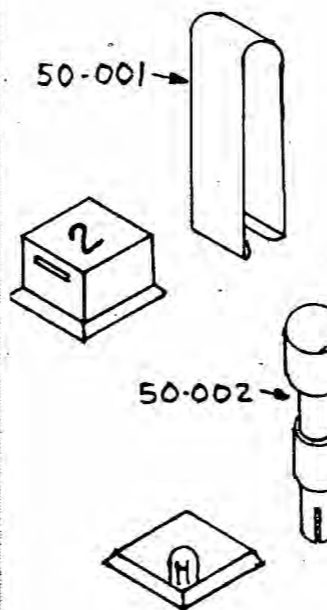


#### LATER UNITS EQUIPPED WITH KEYSWITCH



**TYPICAL LED**  
- FOR REPLACEMENT (REPAIRS), LONG LEAD IS WIRED TO +5 VOLTS (RED WIRE)

#### TYPICAL SWITCH WIRING



#### CHANGING A SWITCH LAMP

- REMOVE SWITCH CAP WITH A 50-001 PULLER BY GRABBING INDENTATIONS ON CAP AND PULLING UP

- REMOVE SWITCH LAMP WITH A 50-002 PULLER BY PLACING PULLER OVER LAMP AND SLIDING DOWN CLAMPING COLLAR. PULL STRAIGHT OUT, DO NOT TWIST OR BEND LAMP.

**NOTE:** - TYPICAL SWITCH SCHEMATICS ARE SHOWN ON CONTROL CONSOLE SCHEMATIC, SHEET 54  
- FOR PANEL LAYOUT, SEE SH 41  
- FOR REMOTE REVERSE CUE, SEE SH 73

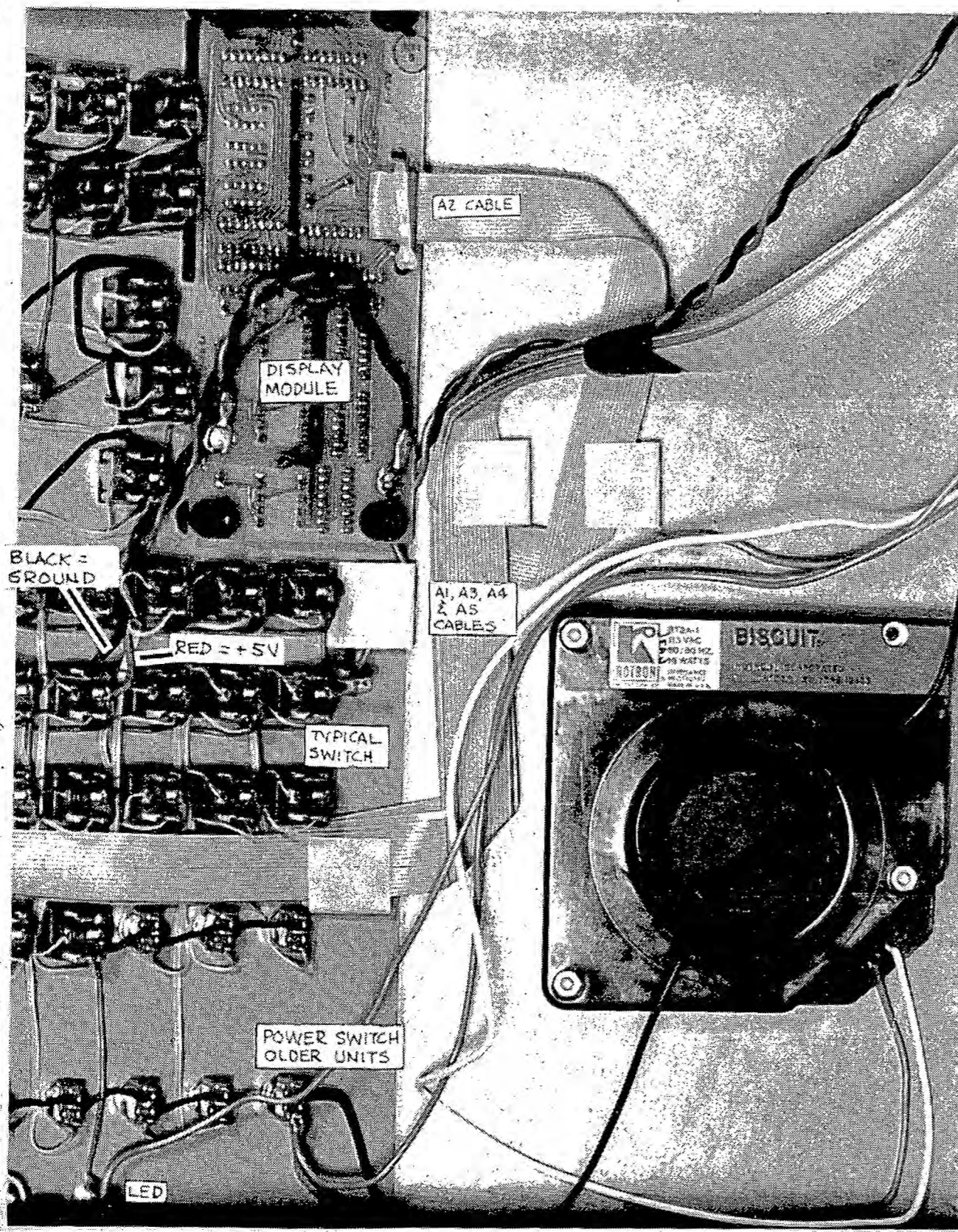


TABLE 4.9.1 (SEE SH 37 FOR LEGEND)

COVER CABLE WIRE ASSIGNMENTS				
WIRE NO.	A1	A3	A4	A5
16 RED	DISSOLVE R2D0 (R4)	HOME R4D0 (C7-1)	AUXILIARY ROD0 (C10-1)	STOP RID0 (B8-1)
1	REMOTE CUE R3D0 (R3)	HOME LR4D0 (B5-8)	AUXILIARY LROD0 (B6-2)	STOP LRID0 (B9-2)
15	MEMORY R2D1 (R2)	STANDBY R4D1 (C7-14)	REVERSE ROD1 (C10-14)	CUE RID1 (B8-14)
2	KEYBOARD R3D1 (R1)	STANDBY LR4D1 (B5-10)	REVERSE LROD1 (B6-2)	CUE LRID1 (B9-4)
14	MT PLAY R2D2 (R7)	WAIT 1 R4D2 (C7-11)	FORWARD ROD2 (C10-11)	1 RID2 (B8-11)
3	MT ON R3D2 (R8)	WAIT 1 LR4D2 (B5-12)	FORWARD LROD2 (B6-4)	1 LRID2 (B9-12)
13	PROG TIMING R2D3 (R6)	WAIT 1/2 R4D3 (C7-8)	ALTERNATE ROD3 (C10-8)	2 RID3 (B8-8)
4	* R3D3 -	WAIT 1/2 LR4D3 (B5-2)	ALTERNATE LROD3 (B6-6)	2 LRID3 (B9-10)
12	DISSOLVE R2D7 (R10)	WAIT 1/10 R4D4 (C8-1)	8 SECOND ROD4 (C11-1)	3 RID4 (B0-1)
5	* R3D7 -	WAIT 1/10 LR4D4 (B5-4)	8 SECOND LROD4 (B7-8)	3 LRID4 (B9-2)
11	* RID5 -	START R4D5 (C8-14)	4 SECOND ROD5 (C11-14)	CLEAR R2D6 (R16)
6	* LRID5 -	START LR4D5 (B5-4)	4 SECOND LROD5 (B7-10)	ADD CUE R3D6 (R15)
10	* RID6 -	RIGHT R4D6 (C8-11)	2 SECOND ROD6 (C11-11)	SKIP CUE R2D5 (R14)
7	* LRID6 -	RIGHT LR4D6 (B6-8)	2 SECOND LROD6 (B7-12)	REVERSE CUE R3D5 (R13)
9	* RID7 -	LEFT R4D7 (C8-8)	CUT ROD7 (C11-8)	RUN R2D4 (R12)
8	* LRID7 -	LEFT LR4D7 (B6-10)	CUT LROD7 (B7-6)	RESET R3D4 (R11)

\* DENOTES WIRE CUT OFF (FUNCTION NOT USED)



SHOW PRO III COVER

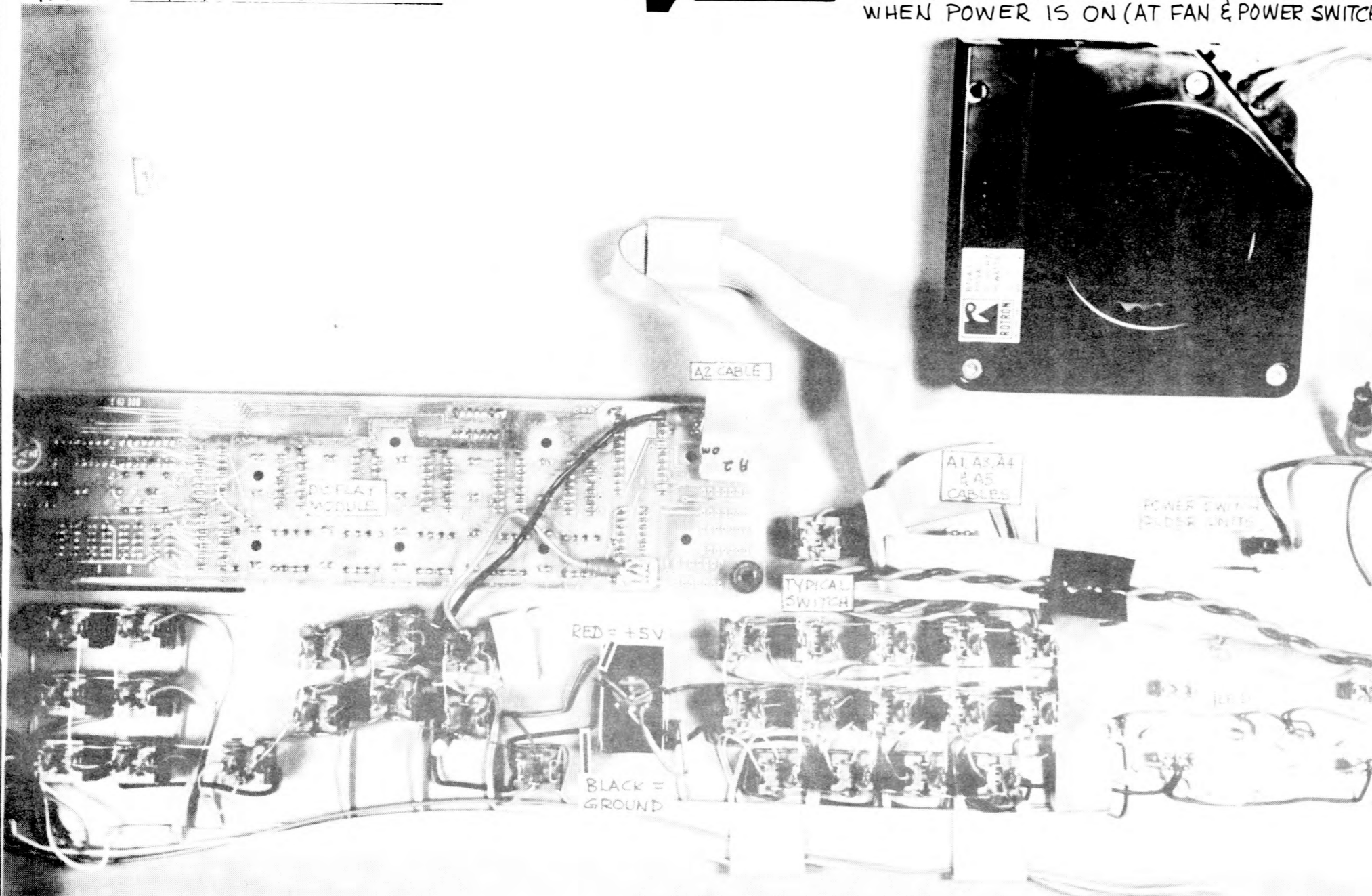
B 10 83 001

SH 36 REV A

## 4.0 PROGRAMMER TROUBLESHOOTING (CONTD)

### 4.9.2 SHOW PRO V COVER

**CAUTION:** ON OLDER UNITS 115/230 VAC IS EXPOSED WHEN POWER IS ON (AT FAN & POWER SWITCH)



### LEGEND FOR TABLE

WIRE NO.	A5 (CABLE NO.)	
11	REV Q	SIGNAL (FUNCTION)
	R2D6 (R16)	PULL-UP RESISTOR
		DATA BIT CODE

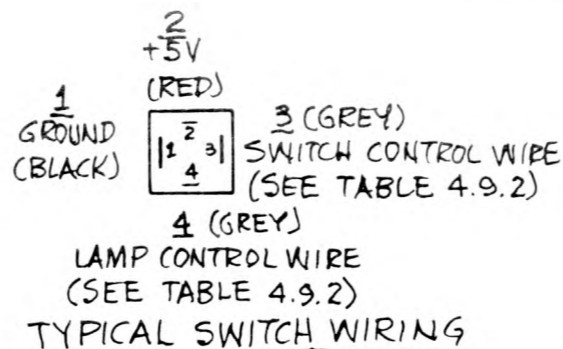
TABLE 4.9.2

COVER CABLE WIRE ASSIGNMENTS				
WIRE NO.	A1	A3	A4	A5
16 RED	DISSOLVE-NORM R2D0 (R4)	CUE R4D0 (C7-1)	CUT ROD0 (C10-1)	1 RID0 (B8-1)
1	MT RECORD R3D0 (R3)	CUE LR4D0 (B5-8)	CUT LROD0 (B6-2)	1 LRID0 (B9-2)
15	DISSOLVE-DISC R2D1 (R2)	HOME R4D1 (C7-14)	2 SECOND ROD1 (C10-14)	2 RID1 (B8-14)
2	MT PLAY R3D1 (R1)	HOME LR4D1 (B5-10)	2 SECOND LROD1 (B6-2)	2 LRID1 (B9-4)
14	MEMORY R2D2 (R7)	AUXILIARY R4D2 (C7-11)	4 SECOND ROD2 (C10-11)	3 RID2 (B8-11)
3	SEQUENCE 2/3 R3D2 (R8)	AUXILIARY LR4D2 (B5-12)	4 SECOND LROD2 (B6-4)	3 LRID2 (B9-12)
13	KEYBOARD R2D3 (R6)	WAIT 1 R4D3 (C7-8)	8 SECOND ROD3 (C10-8)	4 RID3 (B8-8)
4	* R3D3 -	WAIT 1 LR4D3 (B5-2)	8 SECOND LROD3 (B6-6)	4 LRID3 (B9-10)
12	REMOTE CUE R2D7 (R10)	WAIT 1/2 R4D4 (C8-1)	ALTERNATE ROD4 (C11-1)	5 RID4 (B10-1)
5	STEP/PLAY R3D7 (R9)	WAIT 1/2 LR4D4 (B5-4)	ALTERNATE LROD4 (B7-8)	5 LRID4 (B9-2)
11	RIGHT RID5 (B10-14)	WAIT 1/10 R4D5 (C8-14)	FORWARD ROD5 (C11-14)	REVERSE CUE R2D6 (R16)
6	RIGHT LRID5 (B9-4)	WAIT 1/10 LR4D5 (B5-6)	FORWARD LROD5 (B7-10)	RESET R3D6 (R15)
10	CENTER RID6 (B10-11)	STOP R4D6 (C8-11)	REVERSE ROD6 (C11-11)	RUN R2D5 (R14)
7	CENTER LRID6 (B9-6)	STOP LR4D6 (B6-8)	REVERSE LROD6 (B7-12)	SKIP CUE R3D5 (R13)
9	LEFT RID7 (B10-8)	START R4D7 (C8-8)	SHIFT ROD7 (C11-8)	CLEAR R2D4 (R12)
8	LEFT LRID7 (B9-8)	START LR4D7 (B6-10)	SHIFT LROD7 (B7-6)	ADD CUE R3D4 (R11)

\* DENOTES WIRE CUT OFF (FUNCTION NOT USED)

**NOTE** - REFER TO SHEET 36 FOR VARIATIONS ON POWER SWITCHES AND WIRING

- TYPICAL SWITCH SCHEMATICS ARE SHOWN ON CONTROL CONSOLE SCHEMATIC, SHEET 54
- FOR PANEL SCHEMATIC, SEE SH 59; FOR PANEL LAYOUT, SEE SH 60; FOR REMOTE REVERSE CUE OPTION, SEE SH 73



### TYPICAL LED

- FOR REPLACEMENT (REPAIRS), LONG LEAD IS WIRED TO +5 VOLTS (RED WIRE)



SHOW PRO V COVER

B 10 83 001

SH 37  
REV A



## 4.11 MISCELLANEOUS PROCEDURES:

### 4.11.1 ISOLATION OF SHORTED POWER SUPPLY:

#### IF +11VOLTS SHORTED TO GROUND OR TO ANY OTHER SUPPLY

- REMOVE GREEN WIRES FROM SCREEN CONTROL BOARDS, ONE AT A TIME, OBSERVING IF SHORT DISAPPEARS WHEN WIRE IS REMOVED. REPLACE BOARD IF SHORT IS DETECTED. IF NOT DETECTED, REPLACE POWER MODULE

#### IF -12VOLTS SHORTED TO GROUND OR ANY OTHER SUPPLY

- REMOVE YELLOW WIRE FROM MAGNETIC TAPE BOARD, IF SHORT DISAPPEARS CHANGE MT BOARD, IF SHORT PERSISTS CHANGE POWER MODULE.

**ALTERNATIVE:** IF SHORT DISAPPEARS WHEN YELLOW WIRE WAS REMOVED REINSTALL YELLOW WIRE, REMOVE 3341 (SEE SHEET 31A) IF SHORT DISAPPEARS REPLACE 3341

#### IF +12VOLTS SHORTED TO GROUND OR ANY OTHER SUPPLY

- REMOVE BLUE WIRE FROM CPU BOARD, IF SHORT DISAPPEARS CHANGE CPU BOARD, IF SHORT PERSISTS CHANGE POWER MODULE

**ALTERNATIVE:** IF SHORT DISAPPEARED WHEN BLUE WIRE WAS REMOVED, REINSTALL BLUE WIRE, REMOVE 3850 (SEE SHEET 32A), IF SHORT DISAPPEARS REPLACE 3850. IF SHORT PERSISTS, REMOVE 3853, IF SHORT PERSISTS, CHANGE CPU BOARD. IF SHORT DISAPPEARS CHANGE 3853

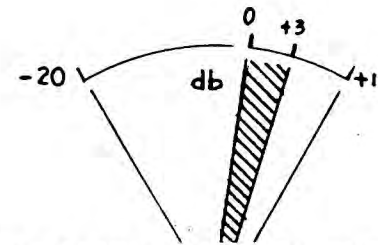
#### IF +30V DC SHORTED TO GROUND OR ANY OTHER SUPPLY

- DISCONNECT APPROPRIATE GROUND, +5 OR +11VOLT SUPPLY LEAD FROM SCREEN CONTROL BOARDS TAKING ONE BOARD AT A TIME. WHEN SHORT IS REMOVED REPLACE APPROPRIATE BOARD. IF SHORT IS NOT REMOVED REPLACE POWER MODULE.

## 4.12.1 TESTING TAPE UNIT

- REQUIRED:**
- 2 REELS OR CASSETTES OF HIGH QUALITY TAPE(NEW)
  - SHOW PRO III OR V

- 1 USING ONE REEL OF TAPE RELOAD HIGH SPEED DUMP ON MAGNETIC TAPE, OBSERVE VU METER



SET LEVEL BY DATA NOT TONE SO THAT MAXIMUM EXCURSION OF NEEDLE IS +3db

- 2 LEAVE LEVEL SET
  - REWIND AND RECORD (HIGH SPEED DUMP) ON TAPE A.
  - REWIND
- 3 LEAVE SAME LEVEL SET
  - RECORD SAME DUMP ON TAPE B
  - REWIND
- 4 PLAYBACK TAPE A OBSERVE VU METER
- 5 PLAYBACK TAPE B OBSERVE VU METER
- 6 AVERAGE READING OF TAPE A COMPARED TO TAPE B SHOULD BE:
  - 1 NAB RECORDERS/REPRODUCER +1db
  - 2 OTHER RECORDERS/REPRODUCER +3db
- 7 IF TAPES ARE OUT SIDE THESE LIMITS, TAPE RECORDER/REPRODUCER REQUIRES ADJUSTMENTS OR ARE UNSATISFACTORY.

**NOTE:** WHEN COPYING OR DUBBING TAPES, IT IS RECOMMENDED THAT THE MASTER TAPE AND RE-RECORDING BE DONE ON IDENTICAL TAPE UNITS TO AVOID ANY POSSIBLE MISMATCH PROBLEMS.



MISCELLANEOUS PROCEDURES

B 10 83 001

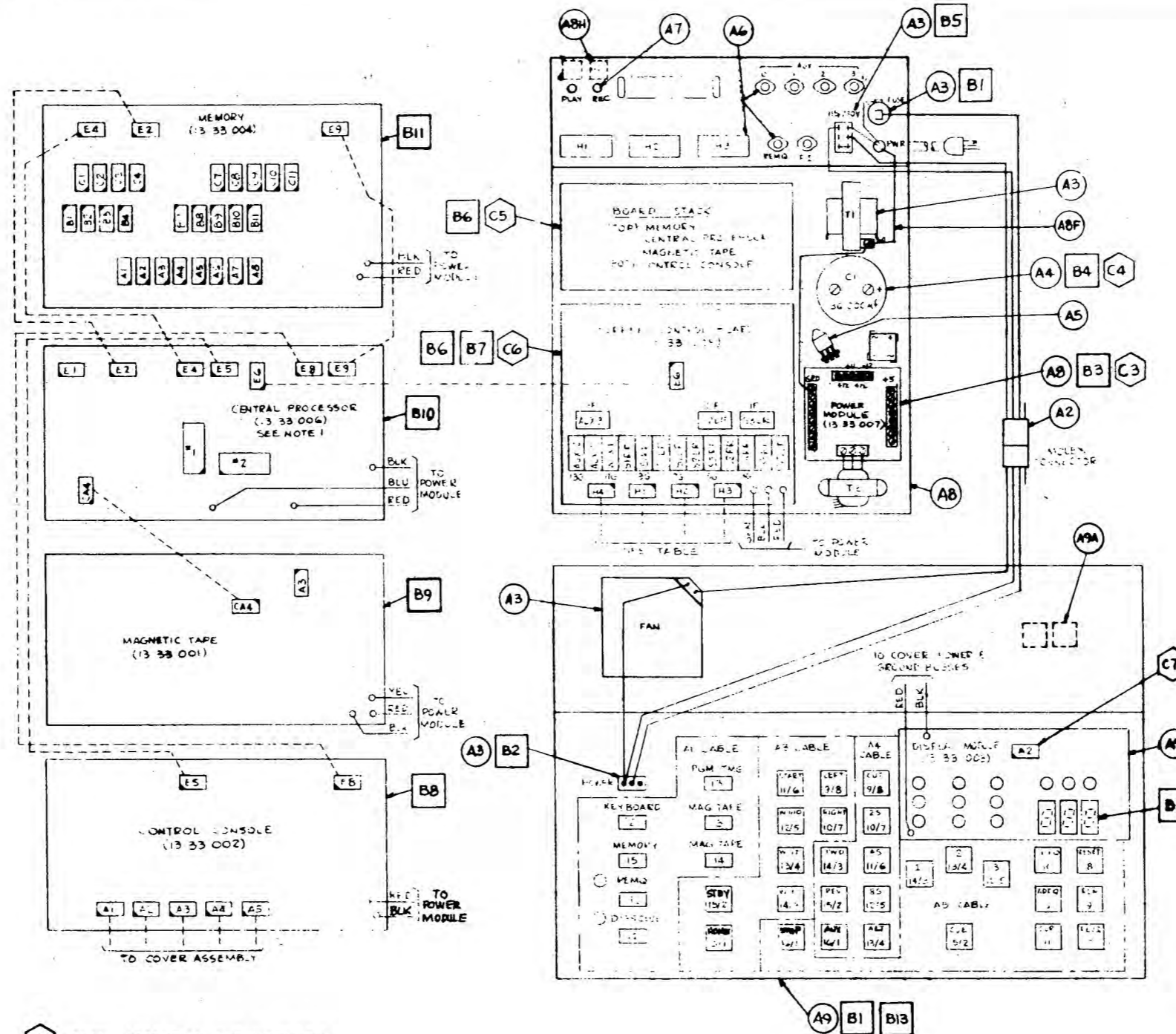
SN 37A REV A

# 4.12 INSPECTION DATA

## 4.12.1 SHOW PRO III INSPECTION PROCEDURES

### A GENERAL INSPECTION

- REMOVE DEBRIS FROM COVER AND BASE BY BLOWING OUT WITH COMPRESSED AIR, AND MANUALLY IF REQUIRED. CONFIRM BY VISUAL INSPECTION.
- CHECK COVER AND BASE MOLEX CONNECTORS. DO A PULL TEST ON LEADS.
- VERIFY SOLDER CONNECTIONS, SHRINK TUBING, AND INSULATING TUBING OR TAPE ON:
  - TRANSFORMERS
  - FUSEHOLDER
  - 115/230V SWITCH
  - POWER SWITCH
  - FAN
  - EMI FILTER (IF INSTALLED)
- CHECK BLUE CAPACITOR FOR:
  - VALUE
  - CORRECT CONNECTIONS
  - PULL TEST ON LEADS
  - VERIFY TYRAP AND DRESSING OF WIRES
  - LOCTITE ON CLAMP HARDWARE
- CHECK POWER (PASS) TRANSISTOR FOR:
  - POSITIONING OF INSULATOR AND INSULATING BUSHINGS
  - USE OF HEAT TRANSFER COMPOUND
  - INSULATED TERMINATIONS
  - TYRAP ON LEADS FOR STRAIN RELIEF
  - LOCTITE ON RETAINING NUT
- VISUAL INSPECTION OF EBY AND JONES PLUGS FOR:
  - SOLDER CONNECTIONS
  - PULL TEST ON EBY LEADS
  - SCORCHED OR MELTED INSULATION
  - OBVIOUS WIRING ERRORS
  - PROPERLY DRESSED CABLING AND MARKINGS
  - LOCTITE ON HARDWARE
- VISUAL INSPECTION OF MAG TAPE JACKS FOR:
  - INTERNAL TOOTH LOCKWASHER UNDER DECORATIVE WASHER
  - SOLDER CONNECTIONS
  - PULL TEST ON LEADS
  - SCORCHED OR MELTED INSULATION
- VERIFY THE FOLLOWING ON THE BASE:
  - FOUR (4) BUMPER FEET
  - LOCATIONS OF 12 FLAT CLAMPS AND ONE (1) CABLE CLAMP
  - ALL SCREWS TIGHT AND HAVE LOCTITE ON NUTS  
NOTE - IF ANY SCREWS MOVE DURING TIGHTENING THE LOCTITE BOND WILL BE BROKEN, AND ADDITIONAL LOCTITE (BLUE) MUST BE APPLIED ON THE EXPOSED THREADS AND NUT
  - SHOCKMOUNTS IN PLACE, WITH LOCTITE & GLYPTOL
  - POWER MODULE IN PLACE
  - CHASSIS GROUND - TWO SPADE LUGGED WIRES UNDER A TRANSFORMER MOUNTING NUT, THE POWER CORD GREEN WIRE AND A BLACK JUMPER TO THE POWER MODULE GROUND TERMINAL STRIP
  - NO PINCHED WIRES OR POSSIBLE SHORTS
  - INSPECTOR STAMP
- VERIFY THE FOLLOWING ON THE COVER:
  - INSPECTOR STAMP
  - DISPLAY MODULE IN PLACE WITH RED AND BLACK WIRES IN CORRECT SCREW TERMINALS
  - UNINSULATED LEAD ON LEADS CUT TO PREVENT SHORTS
  - NO PINCHED WIRES OR POSSIBLE SHORTS
  - OBVIOUS ERRORS IN BUTTON LOCATIONS



### C FINAL ASSEMBLY AND INSPECTION

- VERIFY ALL SCREWS ARE TIGHT. APPLY ADDITIONAL LOCTITE IF ANY HARDWARE MOVES DURING THIS PROCEDURE.
- CHECK TENSION ON ALL TYRAP.
- PULL TEST ON ALL ACCESSIBLE SPADE LUG WIRES.
- VERIFY INSULATION ON ALL AC POWER CONNECTIONS. INSTALL TAPE ON CAPACITOR TERMINAL SCREWS.
- INSTALL TWO TYRAP BANDS ON BOARD STACK.
- INSTALL CABLE CLAMPS ON (3SC) BOARD. ROUTE COVER WIRES THROUGH CLAMPS.
- VERIFY TYRAP ON DISPLAY MODULE CABLE CONNECTOR.
- BLOW OUT UNIT. SHAKE TEST WITH COVER AND BASE IN PLACE.
- INSTALL COVER SCREWS, NUTS AND LOCKWASHERS.
- PUT SERIAL NUMBER METALCAL IN PLACE
- UNIT IS READY FOR BURN-IN

### B ASSEMBLY OF SHOW PRO III

- VERIFY FUSE IN FUSEHOLDER (AGC-2, 2AMP); CONNECT MOLEX; CONNECT +5V (RED) AND GROUND (BLACK) WIRES FROM COVER TO POWER MODULE
- PLUG IN UNIT AND TURN ON POWER SWITCH
- CHECK POWER MODULE FOR:
  - +5V
  - +12V
  - +11V
  - 12V
- CHECK VOLTAGE AT TERMINALS ON BLUE CAPACITOR
- CHECK 115/230V SWITCH. SWITCH SELECTOR TO 230V AND TEST RETURN TO 115V POSITION.
- PLACE RF SHIELDS, COPPER SIDE DOWN, IN BOTH LOCATIONS.
- SCREEN CONTROL BOARD (3SC)
  - VERIFY INSPECTOR STAMP
  - CHECK H1, H2, H3 AND H4 CABLES FOR ROUND PINS, BENT PINS, MARKINGS
  - INSTALL H1 THRU H4 CABLES IN SOCKETS. CHECK FOR BENT PINS. INSTALL TYRAP.
  - CONNECT +5V (RED), +11V (GREEN) AND GROUND (BLACK) TO POWER MODULE.
  - INSTALL BOARD ASSEMBLY AND RF SHIELD WITH FOUR MALE/FEMALE SHOCKMOUNTS. APPLY CAUTION LABEL.
- CONTROL CONSOLE BOARD (CC)
  - VERIFY INSPECTOR STAMP
  - CHECK A1, A2, A3, A4 AND A5 CABLES FOR ROUND PINS, BENT PINS, MARKINGS
  - INSTALL A1 THRU A5 CABLES IN SOCKETS. CHECK FOR BENT PINS.
  - CONNECT +5V (RED) AND GROUND (BLACK) TO POWER MODULE
  - INSTALL BOARD ASSEMBLY AND RF SHIELD WITH FOUR MALE/FEMALE SHOCKMOUNTS. APPLY CAUTION LABEL.
- MAGNETIC TAPE BOARD (MG)
  - VERIFY INSPECTOR STAMP
  - CHECK C44 CABLE FOR ROUND PINS, BENT PINS, MARKINGS
  - CONNECT +5V (RED) AND GROUND (BLACK) TO POWER MODULE
  - INSTALL INSULATING FOAM BETWEEN (CC) AND (MG)
  - INSTALL BOARD ASSEMBLY WITH FOUR MALE/FEMALE SHOCKMOUNTS. APPLY CAUTION LABEL
- CENTRAL PROCESSOR BOARD (CP)
  - VERIFY INSPECTOR STAMP
  - VERIFY MODIFICATIONS ARE UP TO DATE
  - CONNECT +5V (RED), +12V (BLUE) AND GROUND (BLACK) TO POWER MODULE
  - INSTALL E5 AND E8 CABLES (CC), C44 CABLE (MG), AND E6 CABLE (3SC) IN SOCKETS. CHECK FOR BENT PINS.
  - INSTALL INSULATING FOAM BETWEEN (MG) AND (CP)
  - INSTALL BOARD ASSEMBLY WITH FOUR MALE/FEMALE SHOCKMOUNTS. APPLY CAUTION LABEL.
- MEMORY BOARD (3M)
  - VERIFY INSPECTOR STAMP
  - CHECK E2, E4 AND E9 CABLES FOR ROUND PINS, BENT PINS, MARKINGS
  - CHECK IC'S FOR LOCATION, BENT PINS, ORIENTATION
  - CONNECT +5V (RED) AND GROUND (BLACK) TO POWER MODULE. CONNECT BLACK JUMPER FROM (CP)
  - INSTALL E2, E4 AND E9 CABLES IN SOCKETS ON (CP). CHECK FOR BENT PINS.
  - INSTALL INSULATING FOAM BETWEEN (CP) AND (3M)
  - INSTALL BOARD ASSEMBLY WITH FOUR MALE/FEMALE SHOCKMOUNTS. APPLY CAUTION LABEL.
- TURN POWER ON. VERIFY CUE COUNTER READS "001".
- VERIFY LAMPS BY PRESSING EACH BUTTON
- UNIT IS READY FOR SYSTEM TEST. SEE A 13 83 004 FOR TESTING PROCEDURE.

SHOW PRO III UNIT ASSEMBLY AND INSPECTION PROCEDURES	
DATE	5/9/77
AUDIO VISUAL LABORATORIES, INC. ATLANTIC HIGHLANDS, NEW JERSEY 07718	
D 13 83 003	

# 4.12 INSPECTION DATA

## 4.12.2 SHOW PRO II INSPECTION PROCEDURES

### A GENERAL INSPECTION

1. REMOVE DEBRIS FROM COVER AND BASE BY BLOWING OUT WITH COMPRESSED AIR AND MANUALLY, IF REQUIRED. CONFIRM BY VISUAL INSPECTION.

2. CHECK COVER AND BASE MOLEX CONNECTORS. DO A PULL TEST ON LEADS.

3. VERIFY SOLDER CONNECTIONS. SHRINK TUBING AND INSULATING TUBING OR TAPE ON:

- A. TRANSFORMERS
- B. FUSEHOLDER
- C. 115/230V SWITCH
- D. POWER SWITCH
- E. FAN
- F. EMI FILTER (IF INSTALLED)

4. CHECK BOTH BLUE CAPACITORS FOR:

- A. VALUE
- B. CORRECT CONNECTIONS
- C. PULL TEST ON LEADS
- D. LOCTITE ON CLAMP HARDWARE

5. CHECK POWER (PASS) TRANSISTOR FOR:

- A. POSITIONING OF INSULATOR AND INSULATING BUSHINGS
- B. USE OF HEAT TRANSFER COMPOUND
- C. INSULATED TERMINATIONS
- D. TYRAP ON LEADS FOR STRAIN RELIEF
- E. LOCTITE ON RETAINING NUT

6. VISUAL INSPECTION OF EBY AND JONES PLUGS FOR:

- A. SOLDER CONNECTIONS
- B. PULL TEST ON EBY LEADS
- C. SCORCHED OR MELTED INSULATION
- D. OBVIOUS WIRING ERRORS
- E. PROPERLY DRESSED CABLING AND MARKING
- F. LOCTITE ON HARDWARE

7. VISUAL INSPECTION OF MAG TAPE JACKS FOR:

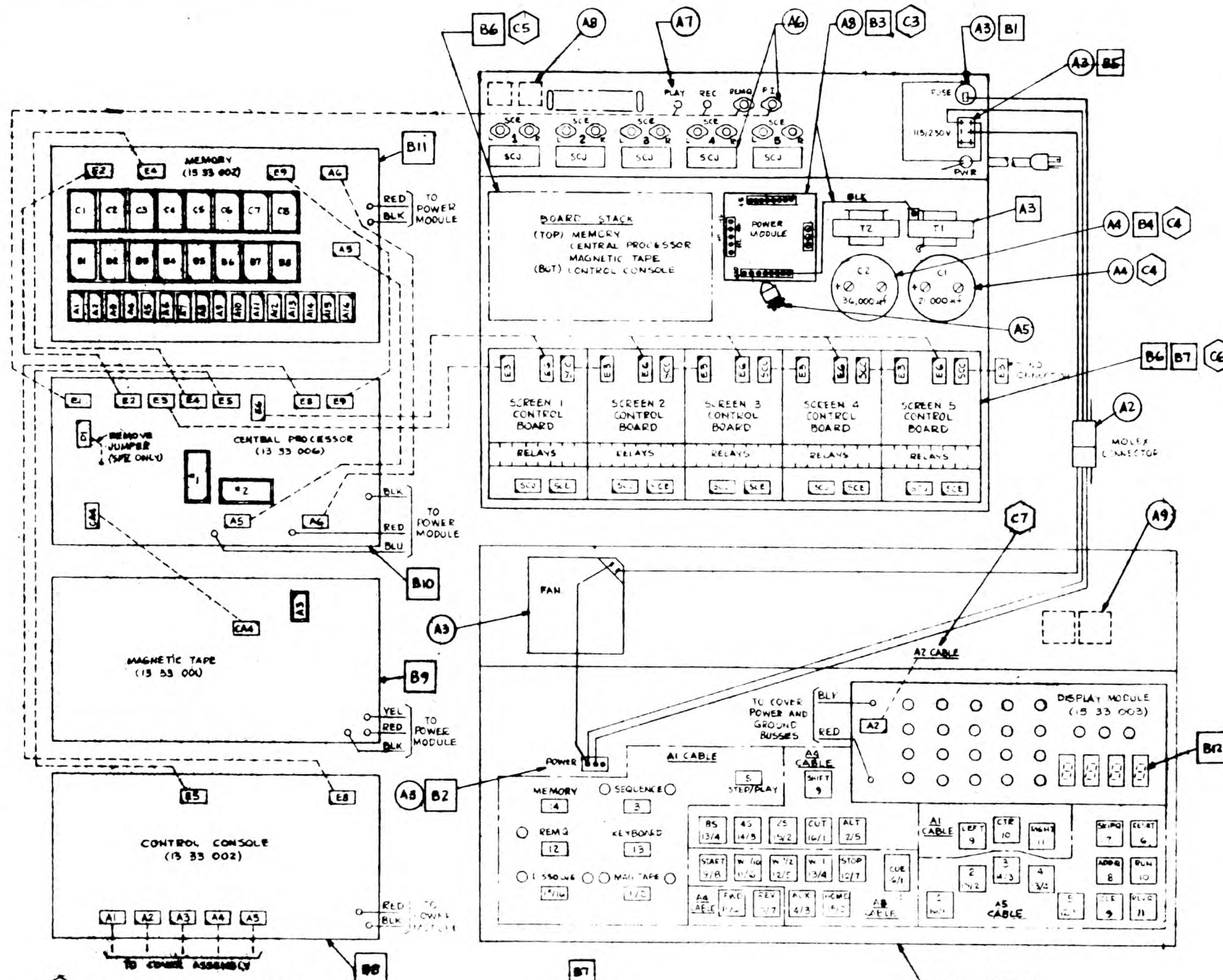
- A. INTERNAL TOOTH LOCKWASHER UNDER DECORATIVE WASHER.
- B. SOLDER CONNECTIONS
- C. PULL TEST ON LEADS
- D. SCORCHED OR MELTED INSULATION

8. VERIFY THE FOLLOWING ON THE BASE:

- A. INSPECTOR STAMP
- B. FOUR (A) BUMPER FEET
- C. LOCATIONS OF 14 FLAT CLAMPS
- D. ALL SCREWS TIGHT AND HAVE LOCTITE ON NUTS  
NOTE - IF ANY SCREWS MOVE DURING TIGHTENING THE LOCTITE BOND WILL BE BROKEN AND ADDITIONAL LOCTITE (BLUE) MUST BE APPLIED ON THE EXPOSED THREADS AND NUT
- E. SHOCKMOUNTS IN PLACE, WITH LOCTITE & GLYPTOL
- F. POWER MODULE IN PLACE
- G. CHASSIS GROUND - TWO SPADE LUGGED WIRES UNDER A TRANSFORMER MOUNTING NUT, THE POWER CORD GREEN WIRE AND A BLACK JUMPER TO THE POWER MODULE GROUND TERMINAL STRIP
- H. NO PINCHED WIRES OR POSSIBLE SHORTS

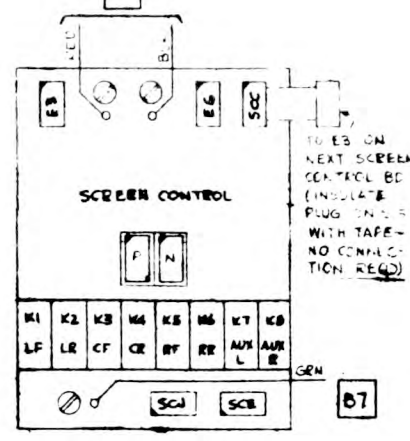
9. VERIFY THE FOLLOWING ON THE COVER:

- A. INSPECTOR STAMP
- B. DISPLAY MODULE IN PLACE, WITH RED AND BLACK WIRES IN CORRECT SCREEN TERMINALS
- C. UNINSULATED LEAD ON LED'S CUT TO PREVENT SHORTS
- D. NO PINCHED WIRES OR POSSIBLE SHORTS
- E. OBVIOUS ERRORS IN BUTTON LOCATIONS



### C FINAL ASSEMBLY AND INSPECTION

1. VERIFY ALL SCREWS ARE TIGHT. APPLY ADDITIONAL LOCTITE IF ANY HARDWARE MOVES DURING THIS PROCEDURE.
2. CHECK TENSION ON ALL TYRAPS
3. PULL TEST ON ALL ACCESSIBLE SPADE LUG WIRES
4. VERIFY INSULATION ON ALL AC POWER CONNECTIONS. INSTALL TAPE ON CAPACITOR TERMINAL SCREWS.
5. VERIFY CABLE CLAMPS ON (SC) BOARDS. ROUTE COVER WIRES THROUGH CLAMPS.
6. VERIFY TYRAP ON DISPLAY MODULE CONNECTOR
7. BLOW OUT UNIT. SHAKE TEST WITH COVER AND BASE IN PLACE
8. INSTALL COVER SCREWS, NUTS AND LOCKWASHERS.
9. PUT SERIAL NUMBER METALCAL IN PLACE.
10. UNIT IS READY FOR BURN-IN.



### B ASSEMBLY OF SHOW PRO II

1. VERIFY FUSE IN FUSEHOLDER (AGC-2, 2 AMP); CONNECT MOLEX; CONNECT +5V (RED) AND GROUND (BLK) WIRES FROM COVER TO POWER MODULE.
2. PLUG IN UNIT AND TURN ON POWER SWITCH.
3. CHECK POWER MODULE FOR: +5V; +12V; +11V; -12V.
4. CHECK VOLTAGE AT TERMINALS ON (C2) BLUE CAPACITOR.
5. CHECK 115/230V SWITCH. SWITCH SELECTOR TO 230V AND TEST. RETURN TO 115V POSITION.
6. PLACE RF SHIELDS, COPPER SIDE DOWN, IN BOTH LOCATIONS.
7. SCREEN CONTROL BOARD (SSC) - FIVE (5) REQUIRED

- A. VERIFY INSPECTOR STAMP
- B. VERIFY RESISTOR VALUES
- C. LOCATE FIVE BOARDS IN PLACE
- D. CHECK JONES, EBY AND CABLES ON BOARDS FOR ROUND PINS, BENT PINS, MARKINGS
- E. PLUG IN THE FOLLOWING CABLES ON EACH BOARD:
  - SHORT CABLE TO ADJACENT BOARD (SC1-SC4, SC5 IS LOOSE)
  - SCJ (JONES) AND SCE (EBY) CABLES AT RELAY END OF BOARD. CHECK FOR BENT PINS. INSTALL TYRAPS.
- F. CROSS CONNECT GREEN (+11V) POWER WIRES AS FOLLOWS:
  - SC1 WIRE TO SC2 TERMINAL
  - SC2 " " SC1 "
  - SC3 " " SC2 "
  - SC4 " " SC3 "
  - SC5 " " SC4 "
  - JUMPER (GREEN) FROM SC3 TERMINAL TO POWER MODULE (+11V)

- G. CROSS CONNECT RED (+5V) POWER WIRES AS FOLLOWS:
  - SC1 WIRE TO SC2 TERMINAL
  - SC2 " " SC3 "
  - SC3 " " SC2 "
  - SC4 " " SC5 "
  - SC5 " " SC4 "
  - JUMPER (RED) FROM SC3 TERMINAL TO POWER MODULE (+5V)
  - JUMPER (RED) FROM SC4 TERMINAL TO POWER MODULE (+5V)
- H. CROSS CONNECT BLACK (GROUND) WIRES AS FOLLOWS:
  - SC1 WIRE TO SC2 TERMINAL
  - SC2 " " SC3 "
  - SC3 " " SC2 "
  - SC4 " " SC5 "
  - SC5 " " SC4 "
  - JUMPER (BLK) FROM SC3 TERMINAL TO POWER MODULE GND
  - JUMPER (BLK) FROM SC4 TERMINAL TO POWER MODULE GND

8. CONTROL CONSOLE BOARD (CC)
  - A. VERIFY INSPECTOR STAMP
  - B. CHECK A1 THRU A6 CABLES FOR ROUND PINS, BENT PINS, MARKINGS
  - C. INSTALL A1 THRU A6 CABLES IN SOCKETS. CHECK FOR BENT PINS.
  - D. CONNECT +5V (RED) AND GROUND (BLK) TO POWER MODULE
  - E. INSTALL BOARD ASSEMBLY AND RF SHIELD WITH FOUR MALE/FEMALE SHOCKMOUNTS. APPLY CAUTION LABEL.

9. MAGNETIC TAPE BOARD (M6)
  - A. VERIFY INSPECTOR STAMP
  - B. CHECK CA CABLE FOR ROUND PINS, BENT PINS, MARKINGS
  - C. CONNECT +5V (RED) AND GROUND (BLK) TO POWER MODULE
  - D. INSTALL INSULATING FOAM BETWEEN (CC) AND (M6)
  - E. INSTALL BOARD ASSEMBLY WITH FOUR MALE/FEMALE SHOCKMOUNTS. APPLY CAUTION LABEL.

10. CENTRAL PROCESSOR BOARD (CP)
  - A. VERIFY INSPECTOR STAMP
  - B. VERIFY MODIFICATIONS ARE UP TO DATE
  - C. CONNECT +5V (RED), +12V (BLU) AND GROUND (BLK) TO POWER MODULE
  - D. INSTALL E5 AND E8 CABLES (CC), CA4 CABLE (M6)
  - E. INSTALL E6 CABLE IN (CP). INSTALL OTHER END IN E6 SOCKETS ON FIVE (5) SC BOARDS. CHECK ALL CABLES FOR BENT PINS.
  - F. INSTALL INSULATING FOAM BETWEEN (M6) AND (CP)
  - G. INSTALL BOARD ASSEMBLY WITH FOUR MALE/FEMALE SHOCKMOUNTS. APPLY CAUTION LABEL.

11. MEMORY BOARD (5M)
  - A. VERIFY INSPECTOR STAMP
  - B. OBTAIN A5, A6, E2, E4 AND E9 CABLES. CHECK FOR ROUND PINS, BENT PINS, MARKINGS. INSTALL ON (CP). CHECK FOR BENT PINS. INSTALL TYRAPS.
  - C. CHECK (5M) BOARD IC'S FOR LOCATION, BENT PINS, ORIENTATION.
  - D. CONNECT TWO +5V (RED) AND ONE GROUND (BLK) TO POWER MODULE
  - E. CONNECT ONE GROUND (BLK) FROM (CP) AND ONE GROUND (BLK) FROM (5M) TO SAME TERMINAL ON POWER MODULE.
  - F. INSTALL A5, A6, E2, E4 AND E9 CABLES. CHECK FOR BENT PINS. INSTALL TYRAPS.
  - G. INSTALL INSULATING FOAM BETWEEN (CP) AND (5M). CAUTION LABEL
  - H. INSTALL BOARD ASSEMBLY WITH FOUR MALE/FEMALE SHOCKMOUNTS. APPLY CAUTION LABEL.
12. TURN ON POWER. VERIFY CUE COUNTER READS "0001".
13. VERIFY LAMPS BY PRESSING EACH BUTTON.
14. UNIT IS READY FOR SYSTEM TEST. SEE A15 B3 002 FOR PROCEDURES.

SHOW PRO II UNIT ASSEMBLY AND INSPECTION PROCEDURES

DATE: 5/10/77

AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS, NEW JERSEY 07763

D 15 83 001

## SHOW PRO III

### UNIQUE BOARDS

DISPLAY MODULE  
ASSEMBLY- SH 43  
SCHEMATIC- SH 44

MEMORY  
ASSEMBLY- SH 43  
SCHEMATIC- SH 46

SCREEN CONTROL  
ASSEMBLY- SH 47  
SCHEMATIC- SH 48

POWER MODULE  
ASSEMBLY- SH 50  
SCHEMATIC- SH 50

### UNIT INFORMATION

COVER DETAIL- SH 41

SPECIFICATIONS- SH 42

## SHOW PRO III & V COMMON BOARDS

CENTRAL PROCESSOR  
ASSEMBLY- SH 51  
SCHEMATIC- SH 52

CONTROL CONSOLE  
ASSEMBLY- SH 51  
SCHEMATIC- SH 54

MAGNETIC TAPE  
ASSEMBLY- SH 56  
SCHEMATIC- SH 56

## SHOW PRO V

### UNIQUE BOARDS

DISPLAY MODULE  
ASSEMBLY- SH 61  
SCHEMATIC- SH 62

MEMORY  
ASSEMBLY- SH 61  
SCHEMATIC- SH 64

SCREEN CONTROL  
ASSEMBLY- SH 61  
SCHEMATIC- SH 66

POWER MODULE  
ASSEMBLY- SH 68  
SCHEMATIC- SH 68

### UNIT INFORMATION

COVER  
DETAIL - SH 60  
SCHEMATIC- SH 59

SPECIFICATIONS- SH 58

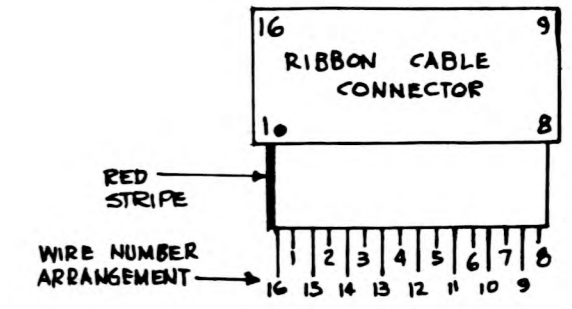


GUIDE TO DETAILED  
TECHNICAL DATA

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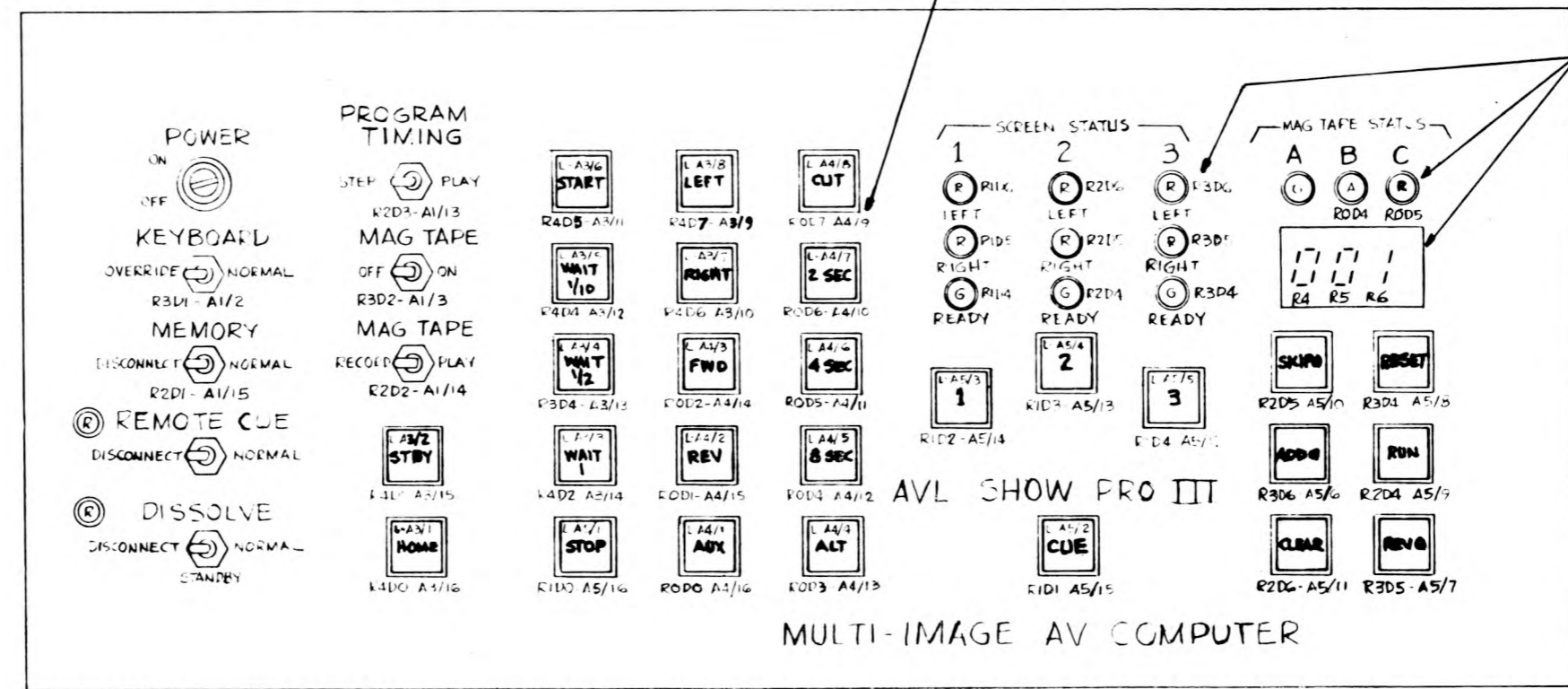
SH 40

REV A



FOR CONNECTOR ASSIGNMENT SEE CONTROL CONSOLE ASSEMBLY, SH 51  
CONNECTOR NUMBER → A4/9 ← PIN NUMBER

DISPLAY MODULE DECODING SEE SCHEMATIC, SH 44



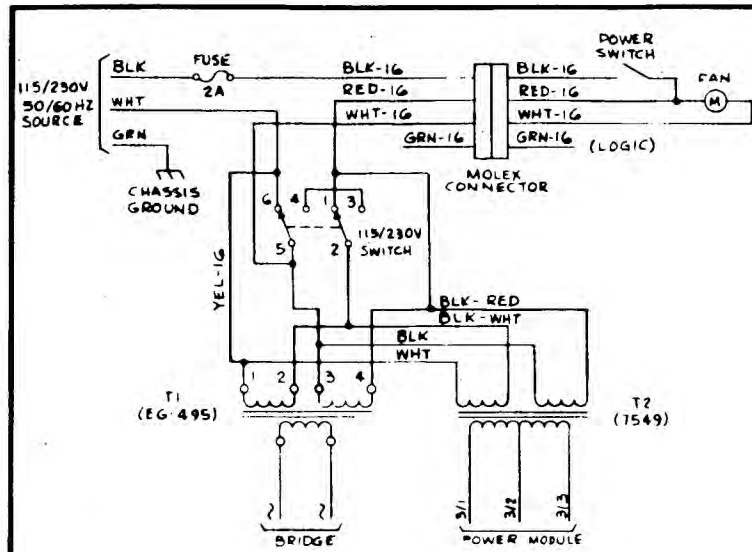
SPIII KEYBOARD - ADDRESS SPACE DECODING

		D7	D6	D5	D4	D3	D2	D1	D0
READ/ WRITE	R0	CUT	2 SEC	4 SEC	8 SEC	ALT	FWD	REV	AUX
READ/ WRITE	R1	(SPARE)	(SPARE)	(SPARE)	3	2	1	CUE	STOP
READ ONLY	R2	DISSOLVE NORMAL	CLEAR	SKIP Q	RUN	PLAY/STEP	MT PLAY	MEMORY DISC	DISSOLVE DISC
READ ONLY	R3	(SPARE)	ADD Q	REV Q	RESET	(SPARE)	MT ON	KEYBOARD DISC	REM Q
READ/ WRITE	R4	LEFT	RIGHT	START	WAIT 1/10	WAIT 1/2	WAIT 1	STBY	HOME

**SPIII COVER SWITCH PLACEMENT**

SCALE: FULL APPROVED BY: DATE: 8/24/87 DRAWN BY: REVISED:

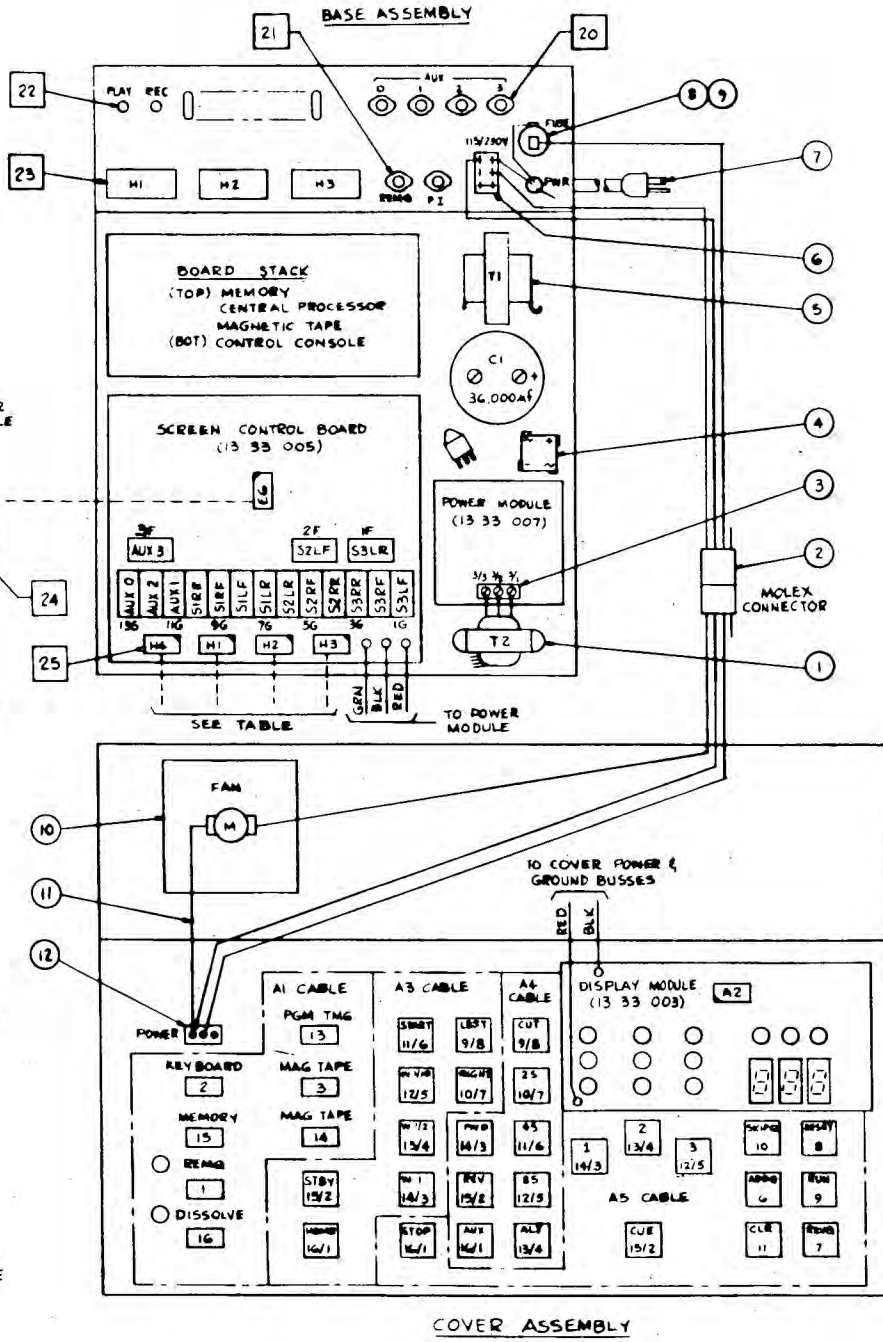
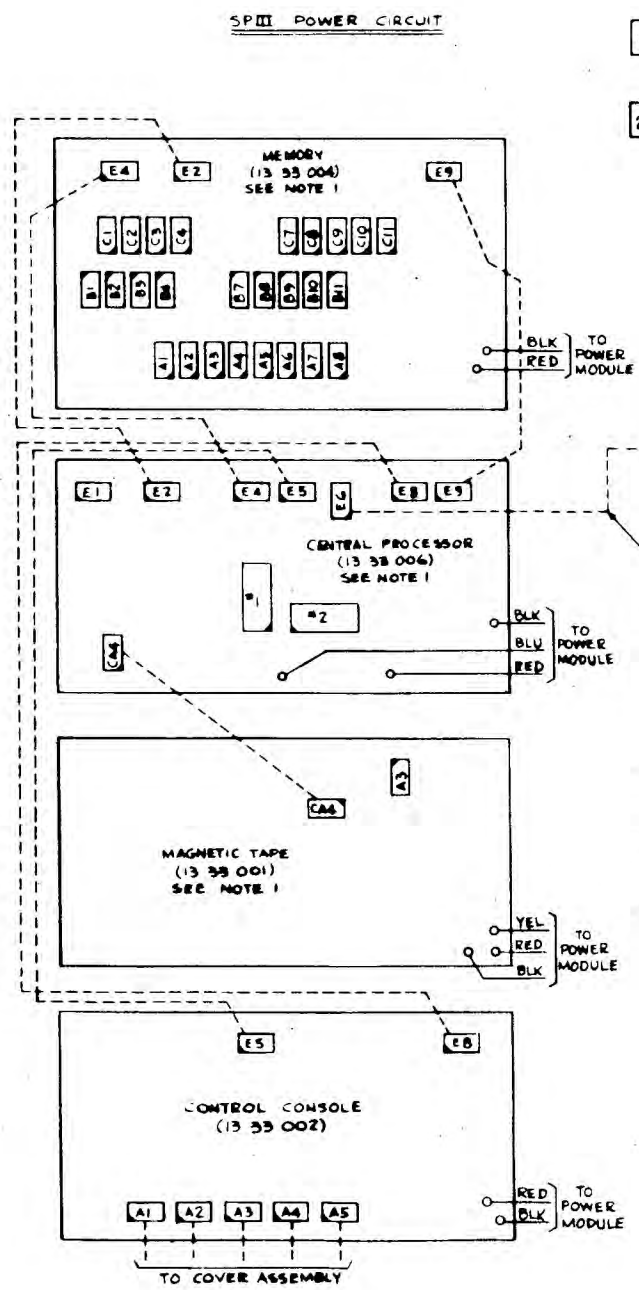
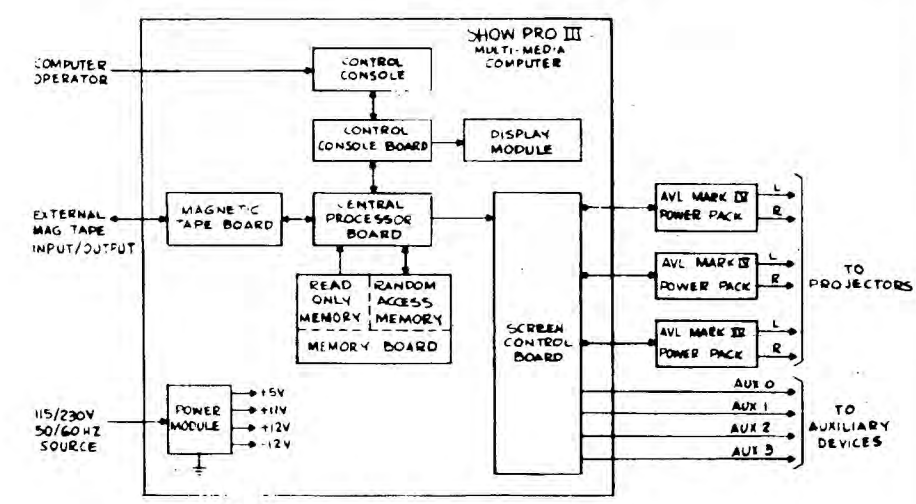
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c 13 95 004  
B 10 83 001 SH 41 REV A



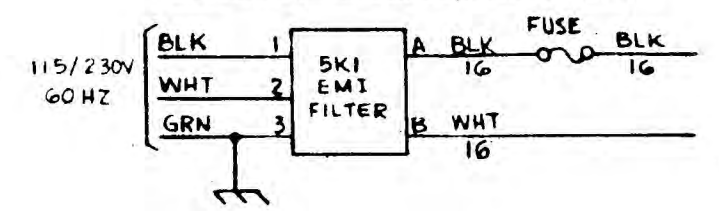
SCREEN CONTROL CONNECTIONS

HI, H2, H3 CABLES		H4 CABLE	
JONES PIN NO.	FUNCTION	CABLE PIN NO.	CONNECT TO
1	FORWARD LEFT	15	16
3	FORWARD RIGHT	10	1
7	REVERSE LEFT	2	15
9	REVERSE RIGHT	7	2
14	FORWARD GROUND	13	14
16	+28 VAC	16	3
18	-28 VAC	11	13
19, 22	+30 VDC	1	4
21	FIRE RIGHT	6	12
24	FIRE LEFT	12	5
2, 4, 5, 6, 8, 10, 11, 12, 13, 15, 17, 20, 23	NO CONNECTION	3, 4, 5, 8, 9, 14	AUX 0-2 AUX 0-5 AUX 1-2 AUX 1-5 AUX 2-2 AUX 2-5 AUX 3-2 AUX 3-5

- NOTES:
- CAUTION THIS ASSEMBLY CONTAINS MOS-TYPE DEVICES WHICH ARE SUBJECT TO ELECTROSTATIC (STATIC) CHARGES. INDIVIDUALS AND TOOLS SHOULD BE GROUNDED BEFORE COMING IN CONTACT WITH THE ASSEMBLY OR DEVICE. BOARD ASSEMBLIES MUST BE WRAPPED IN METALLIC FOIL FOR HANDLING AND/OR STORAGE.
  - ⚡ DENOTES PIN 1 OF A DEVICE OR CABLE PLUG.
  - ITEM NUMBERS 1 THRU 13, DESIGNATED WITH ○ ARE AC POWER COMPONENTS.
  - ITEM NUMBERS 20 THRU 26, DESIGNATED WITH □ ARE LOGIC LEVEL COMPONENTS.
  - APPROVED ALTERNATE MANUFACTURERS:



POWER FILTER MODIFICATION



ITEM NO.	PART NUMBER	MANUFACTURER	DESCRIPTION	NOTE
30				
29				
28				
27				
26	90-011		BULB, INCAN. (PUSH SWITCHES)	4
25	80-001	3M CO	CONNECTOR, RIBBON CABLE	4
24	83-030	ALPHA	CABLE, RIBBON, 16 COND	4,5
23	81-030	VERITRON	PLUG, MALE, 24 PINS	4
22	81-015	HM SMITH	JACK, AUDIO	4
21	81-021	EBY	JACK, FEMALE, 5 PINS	4
20	81-020	EBY	PLUG, MALE, 5 PINS	4
19				
18				
17				
16				
15				
14				
13		THOMAS & BETTS	TERMINAL LUG, SPADE, CRIMP	3
12	74-919	ALCO	SWITCH, KEY (SPDT)	3
11		ALPHA	WIRE, 16AWG, STRANDED	3
10	99-015	ROTRON	FAN	3
9	99-026	BUSSMAN	FUSE, 2 AMPERE	3
8	99-020		LITTLE FUSE	3
7	83-007	BELDEN	POWER CORD	3
6	72-008	SWITCHCRAFT	SLIDE SWITCH, DPDT	3
5	60-002	AVL	TRANSFORMER	3
4	30-021	MOTOROLA	BRIDGE, RECTIFIER	3
3	82-041	VERITRON	TERMINAL STRIP, BARRIER, 3 POS	3
2	81-005, 81-006	MOLEX	CONNECTOR, 4 POS	3
1	60-005	ENSIGN	TRANSFORMER	3

SHOW PRO III SPECIFICATIONS

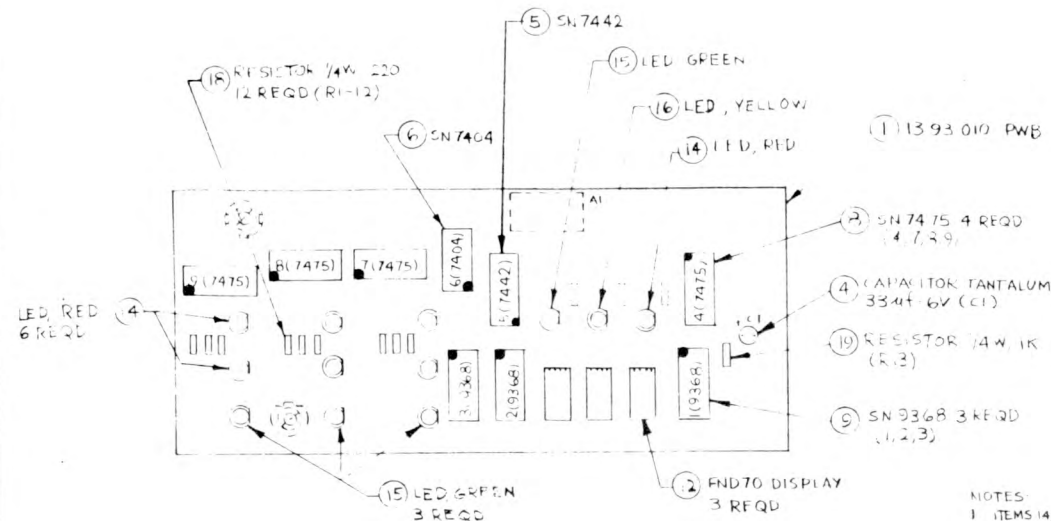
DATE: 1/25/77

AUDIO VISUAL LABORATORIES, INC  
ATLANTIC HIGHLANDS, NEW JERSEY 07716

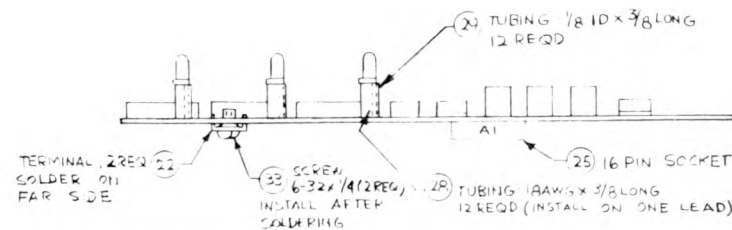
D13 99 001

REV A

B 10 83 001 42 A



NOTES  
 1. ITEMS 14, 15 AND 16 ARE POLARIZED - FLAT SIDE.  
 ITEM 12 HAS ONE END RIBBED.

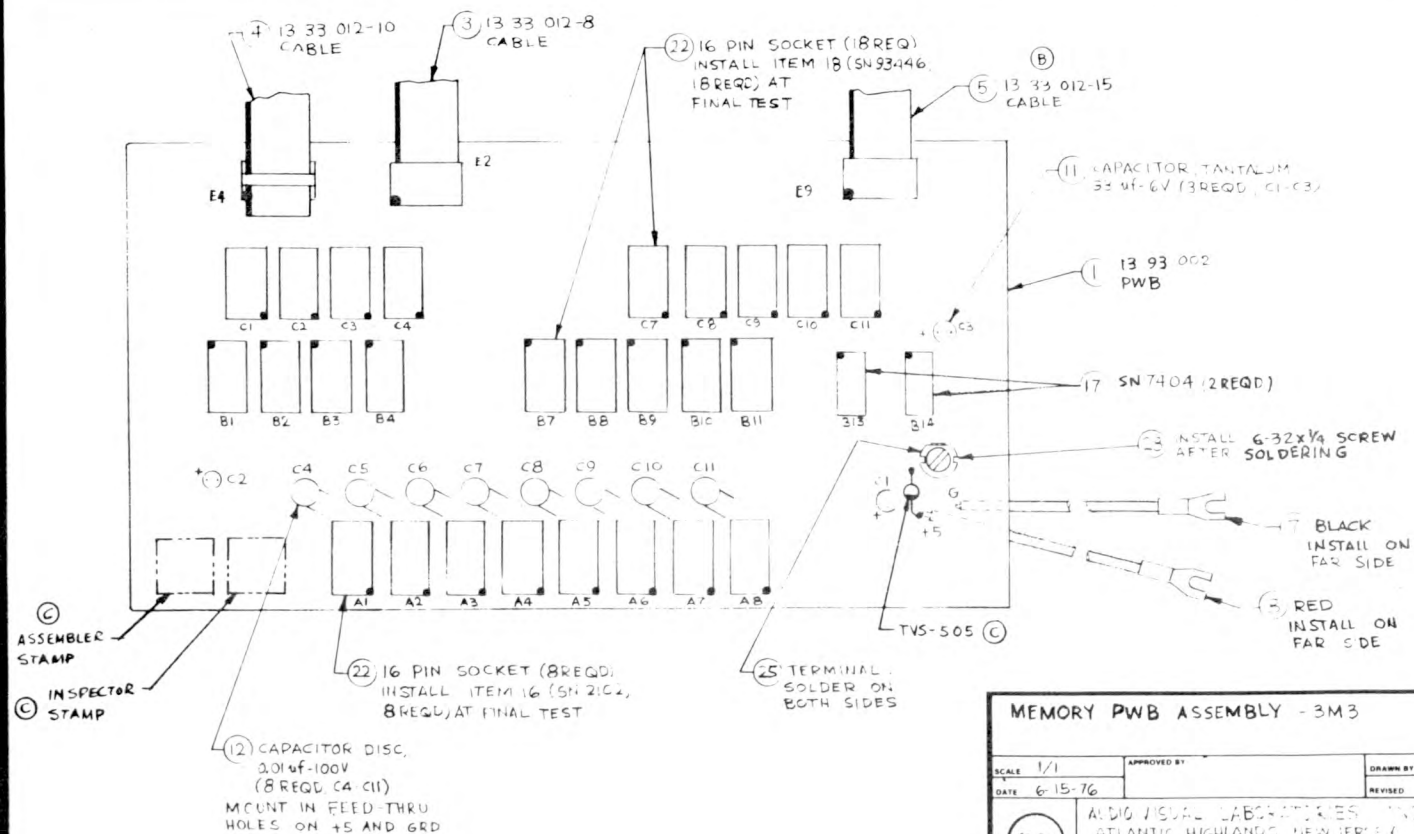


DISPLAY MODULE PWB ASSEMBLY - 3DM2

SCALE 1/1 APPROVED BY \_\_\_\_\_ DRAWN BY \_\_\_\_\_  
 DATE 6-15-76 REVISED \_\_\_\_\_

AVL AUDIO VISUAL LABORATORIES, INC.  
 ATLANTIC HIGHLANDS, NEW JERSEY 07716

B 13 33 003 SH 1 OF 1 REV A



MEMORY PWB ASSEMBLY - 3M3

SCALE 1/1 APPROVED BY \_\_\_\_\_ DRAWN BY \_\_\_\_\_  
 DATE 6-15-76 REVISED \_\_\_\_\_

AVL AUDIO VISUAL LABORATORIES, INC.  
 ATLANTIC HIGHLANDS, NEW JERSEY 07716

B 13 33 004 SH 1 OF 1 REV C

## PROM MEMORY CONFIGURATION

PROM LOCATION	STANDARD PROMS 3-5-76	SAV CONVERT PROMS 9-2-77	
C1	STD	*	
C2	STD	*	
C3	STD	"NC3"	
C4	STD	*	
(SPARE)			
(SPARE)			
C7	STD	"NC7"	
C8	STD	*	
C9	STD	*	
C10	STD	*	
C11	STD	*	
(SPARE)			
B1	STD	*	
B2	STD	*	
B3	STD	*	
B4	STD	*	
(SPARE)			
(SPARE)			
B7	STD	*	
B8	STD	*	
B9	STD	*	
B10	STD	*	
B11	STD	*	
(SPARE)			
MARKINGS	NONE	AS SHOWN	

\* DENOTES "PROM NOT MODIFIED"

AVL S.P.I.I. UNIQUE BOARD ASSEMBLIES  
 DISPLAY MODULE & MEMORY

B 10 83 001 SH 43 REV A

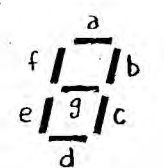
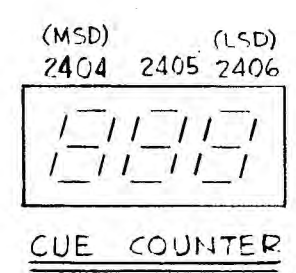
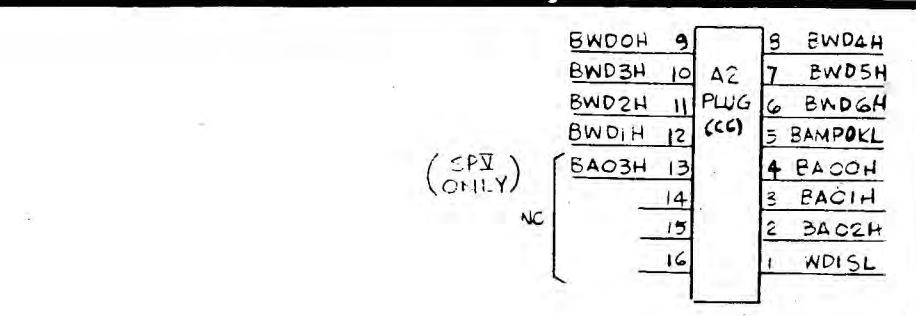
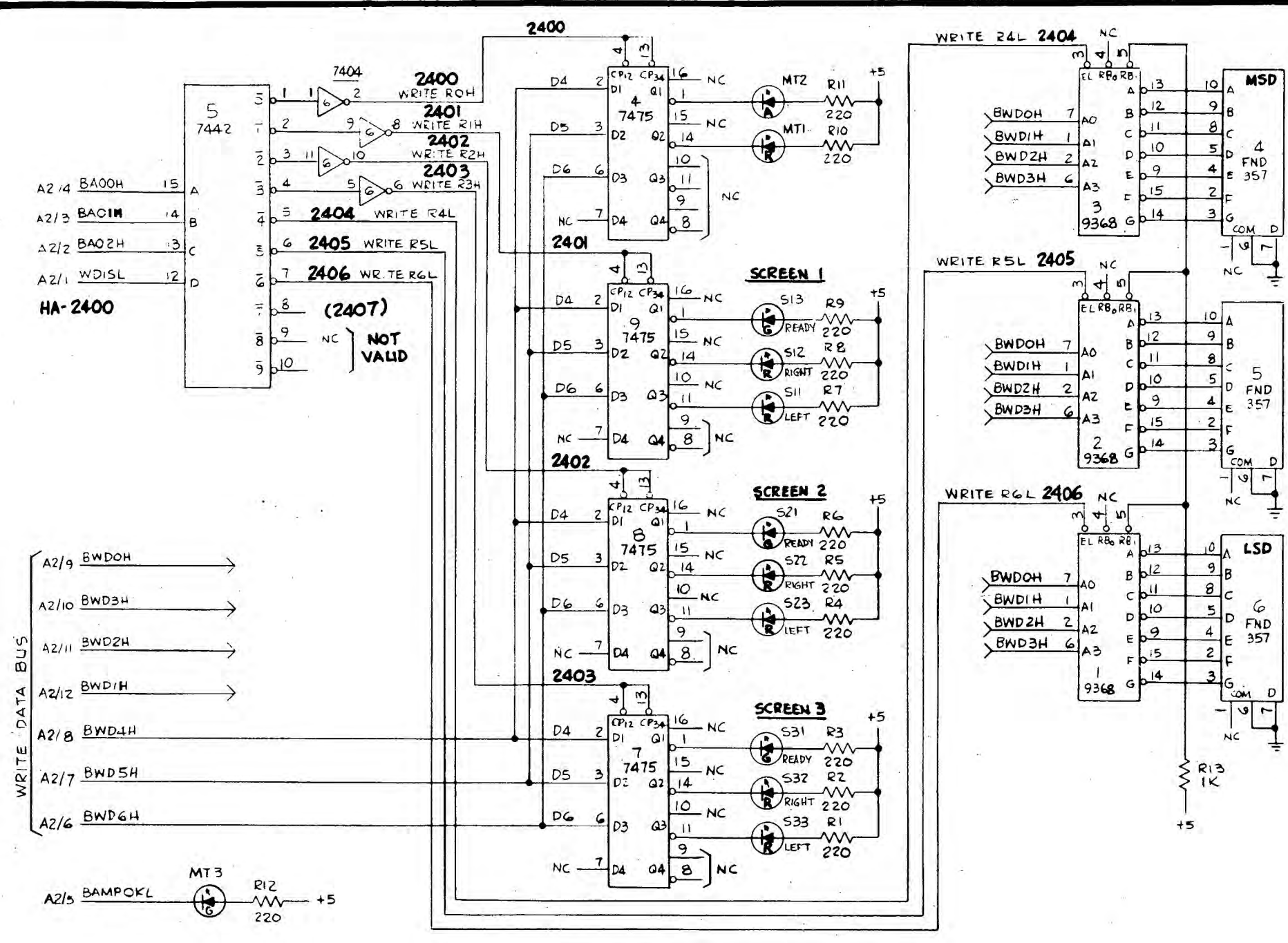


TABLE B

BINARY STATE	INPUTS					OUTPUTS							DISPLAY
	EL	A3	A2	A1	A0	a	b	c	d	e	f	g	
-	H	X	X	X	X	STABLE							STABLE
0	L	L	L	L	L	H	H	H	H	H	L	L	
1	L	L	L	L	H	L	H	H	L	L	L	L	
2	L	L	L	H	L	H	H	L	H	H	L	H	
3	L	L	L	H	H	H	H	H	L	L	H	H	
4	L	L	H	L	L	L	H	H	L	L	H	H	
5	L	L	H	L	H	H	L	H	H	L	H	H	
6	L	L	H	H	L	H	L	H	H	H	H	H	
7	L	L	H	H	H	H	H	L	L	L	L	L	
8	L	H	L	L	L	H	H	H	H	H	H	H	
9	L	H	L	L	H	H	H	L	L	H	H	H	
10	L	H	L	H	L	H	H	L	H	H	H	H	
11	L	H	L	H	H	L	L	H	H	H	H	H	
12	L	H	H	L	L	L	L	H	H	H	L	L	
13	L	H	H	L	H	L	L	H	H	H	L	L	
14	L	H	H	H	L	L	L	L	H	H	H	H	
15	L	H	H	H	H	L	L	L	L	H	H	H	

TABLE A

HEX ADDRESS	WRITE DATA ASSIGNMENT							
	D7	D6	D5	D4	D3	D2	D1	D0
2400	-	-	MT1	MT2	-	-	-	-
2401	-	S1/L	S1/R	S1/RDY	-	-	-	-
2402	-	S2/L	S2/R	S2/RDY	-	-	-	-
2403	-	S3/L	S3/R	S3/RDY	-	-	-	-
2404	-	-	-	-	-	-	-	-
2405	-	-	-	-	SEE TABLE B			
2406	-	-	-	-	-	-	-	-
2407	-	-	-	-	-	-	-	-

IC	+5	GRD
7404	14	7
7442	16	8
7475	5	12
9368	16	8

SPARES  
NONE

DISPLAY MODULE SCHEMATIC - 3DMZ

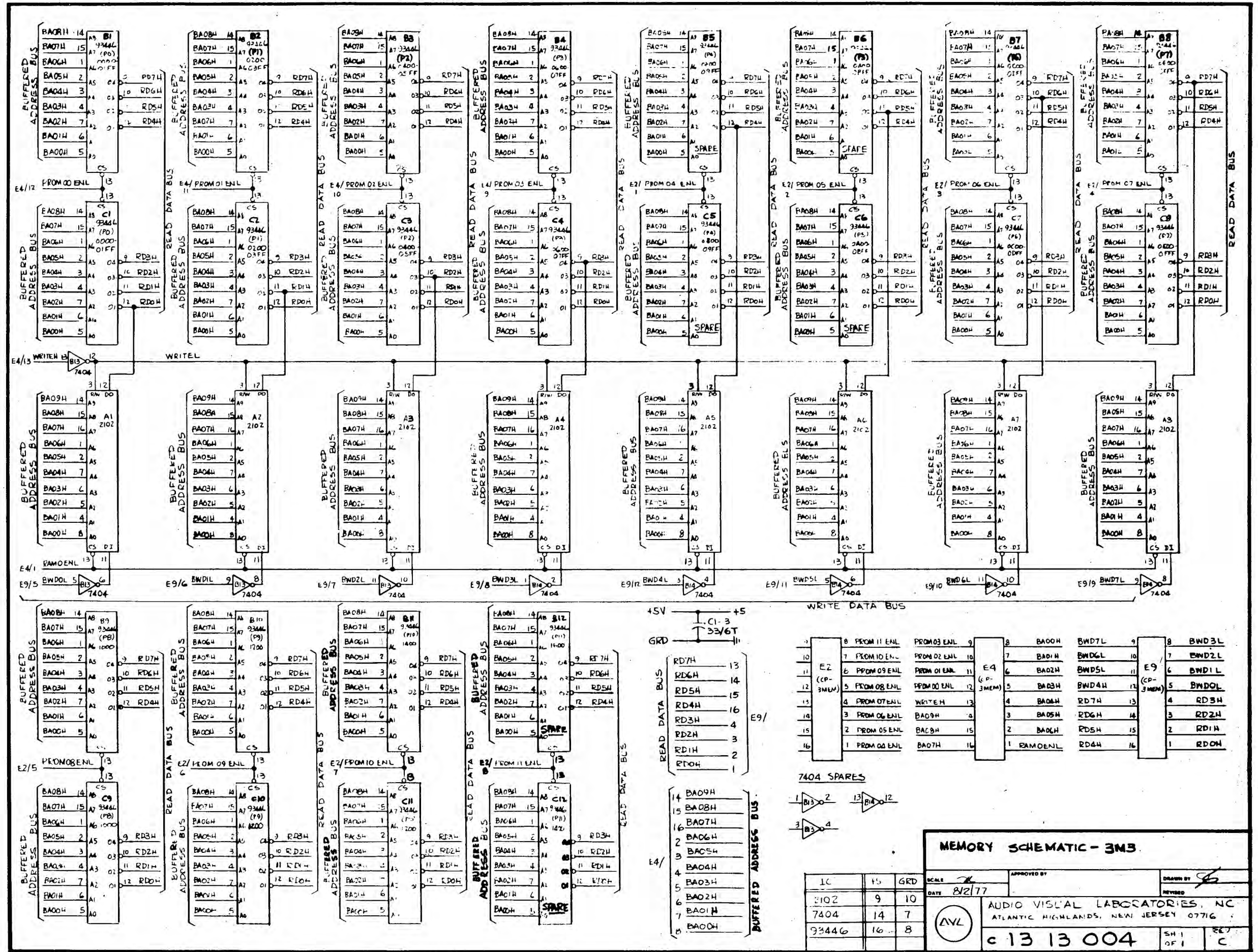
SCALE:  APPROVED BY: \_\_\_\_\_ DRAWN BY: \_\_\_\_\_  
DATE: \_\_\_\_\_ REVISED: \_\_\_\_\_

AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS, NEW JERSEY 07716

**AVL** C 13 13 003 SH 1 OF 1 REV B

**B 10 83 001** SN 44 REV A





**MEMORY SCHEMATIC - 3MS**

SCALE: 1/8" = 1"

APPROVED BY: [Signature]

DATE: 8/21/77

DRAWN BY: [Signature]

REVISED:

AUDIO VISUAL LABORATORIES, NC  
ATLANTIC HIGHLANDS, NEW JERSEY 07716

c 13 13 004

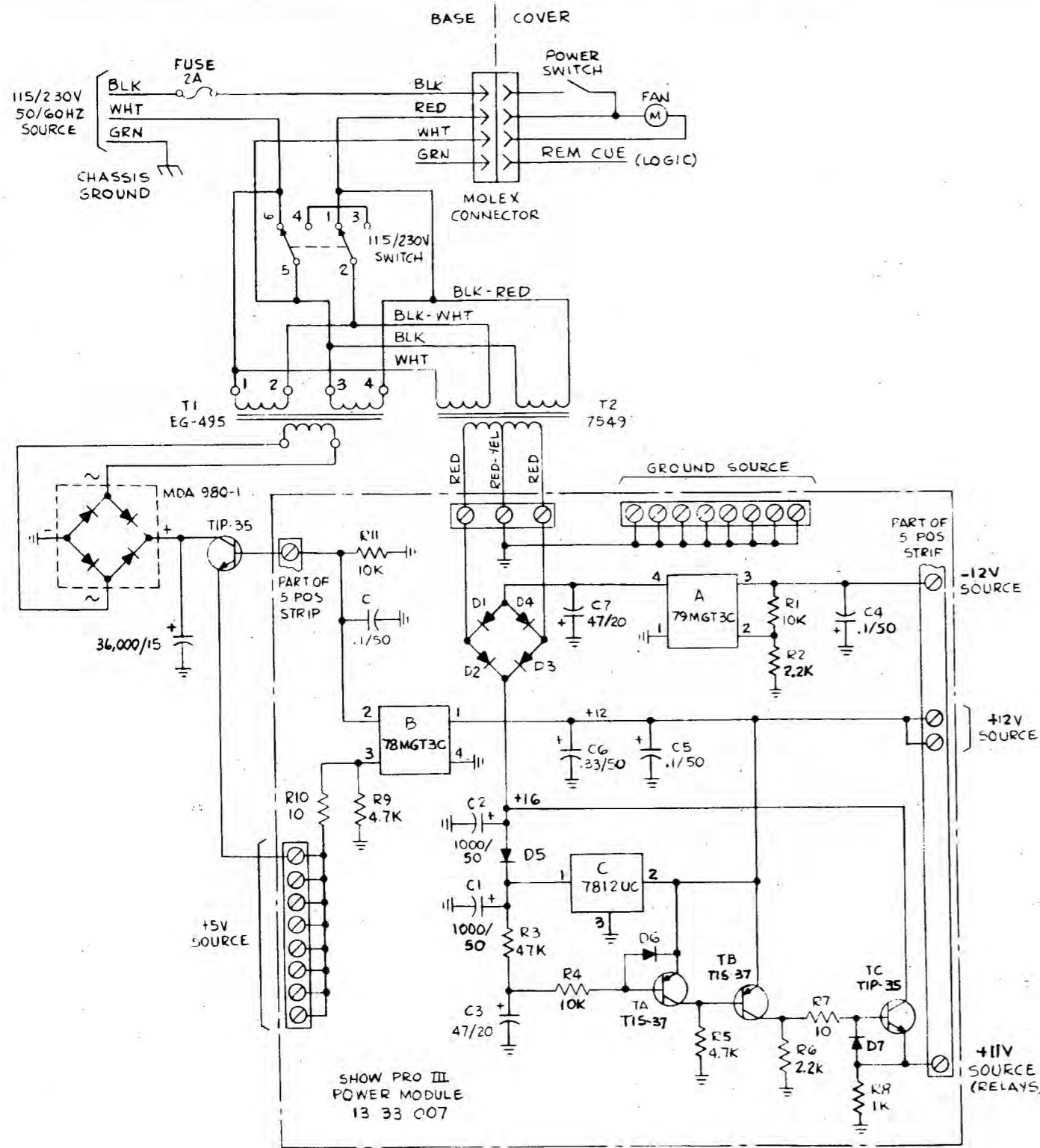
SH 1 OF 1

REV C

**B 10 83 001 46 A**



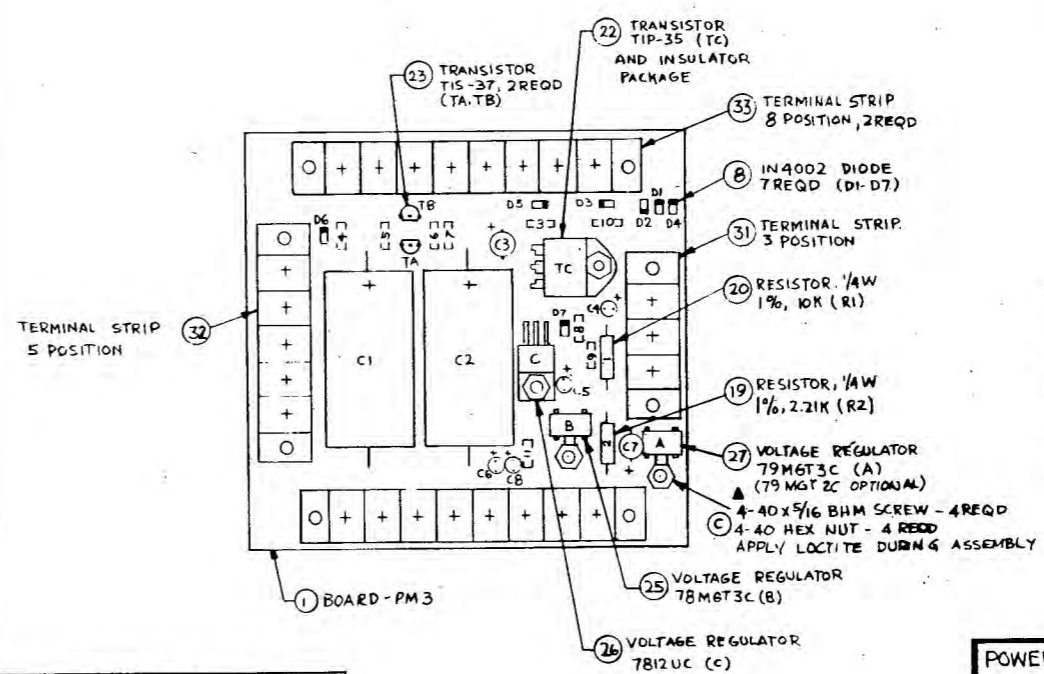




SHOW PRO III  
POWER MODULE  
13 33 007

RESISTOR CARBON 1/4W, 5%					
SYM	RES	SYM	RES	SYM	RES
R3	47K	R7	10A	R11	10K
R4	10K	R8	1K		
R5	4.7K	R9	4.7K		
R6	2.2K	R10	10A		

NOTES:  
① A DENOTES LOCTITE (BLUE)  
ON SCREW THREADS



CAPACITORS		
ELEC-50V	MYLAR-20V	TANT-50V
C1 1000uf	C3 47uf	C4 0.1uf
C2 1000uf	C7 47uf	C5 0.1uf
		C6 0.33uf
		C8 0.1uf

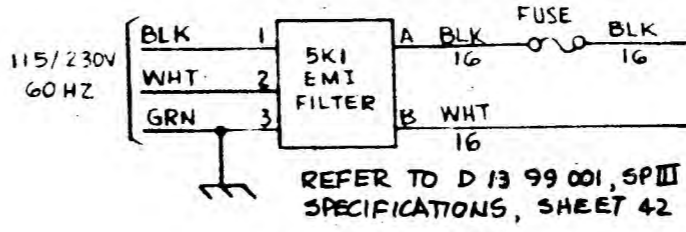
POWER MODULE PWB ASSEMBLY - 3PM3  
SP III

SCALE: 1/1  
DATE: 6-23-76  
APPROVED BY: [Signature]  
DRAWN BY: [Signature]

AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS, NEW JERSEY 07716

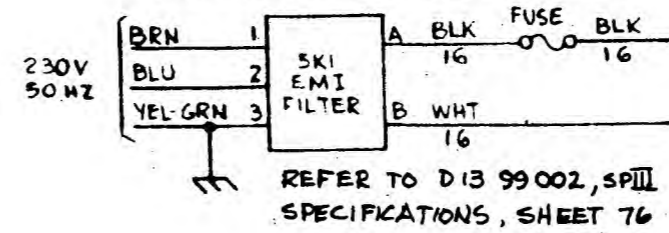
B 13 33 007 SH 1 OF 1 REV C

### DOMESTIC UNIT POWER FILTER MODIFICATION



REFER TO D 13 99 001, SP III  
SPECIFICATIONS, SHEET 42

### IEC UNIT POWER FILTER MODIFICATION



REFER TO D 13 99 002, SP III  
SPECIFICATIONS, SHEET 76

NOTE:  
REFER TO SHEET 72 FOR POWER MODULE  
MODIFICATION REQUIRED FOR BATTERY  
PACK OPTION.

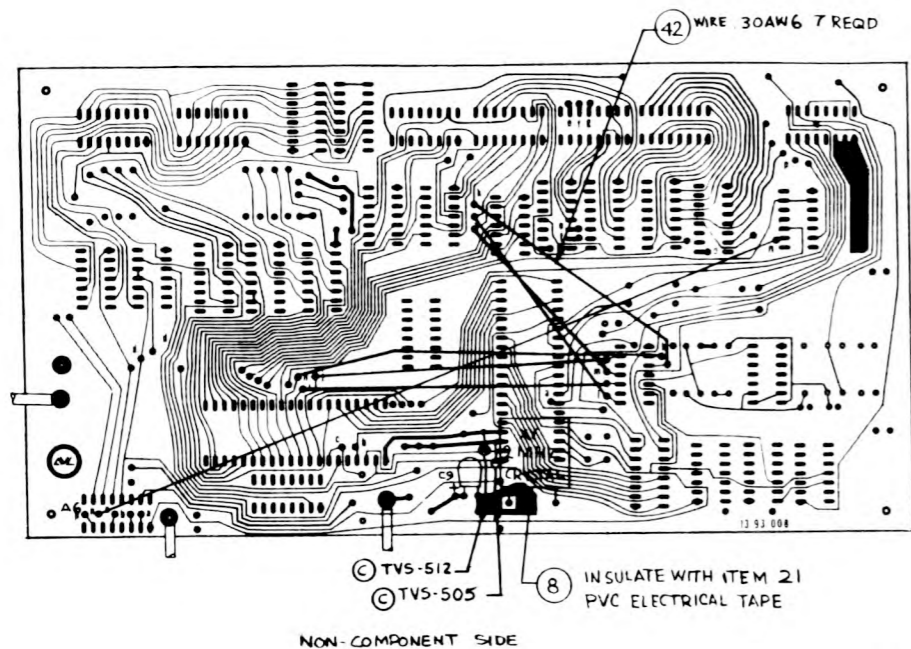
SHOW PRO III POWER MODULE AND  
UNIT AC POWER SCHEMATIC

SCALE: 1/1  
DATE: 2/1/77  
APPROVED BY: [Signature]  
DRAWN BY: [Signature]

AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS NEW JERSEY 07716

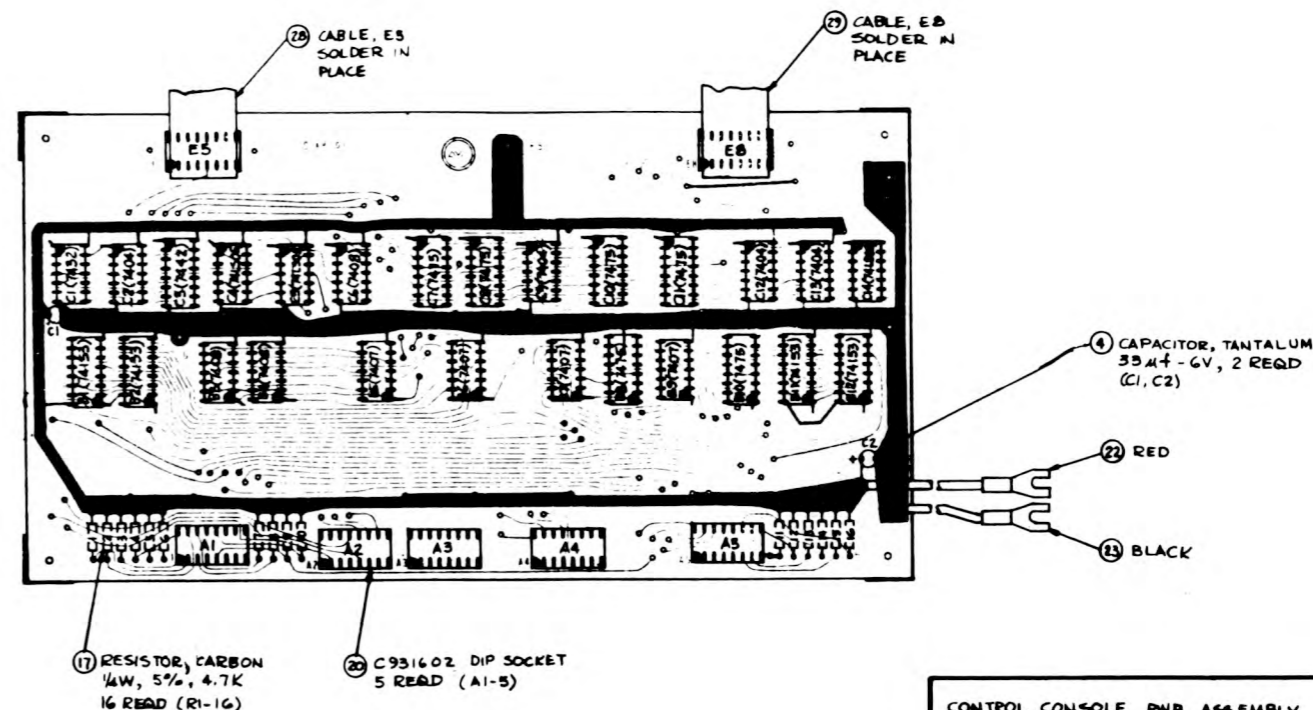
c 13 13 007 SH 1 OF 1 REV D

B 10 83 001 SH 50 REV A



**CENTRAL PROCESSOR PWB ASSEMBLY-CP3 (BOTTOM)**

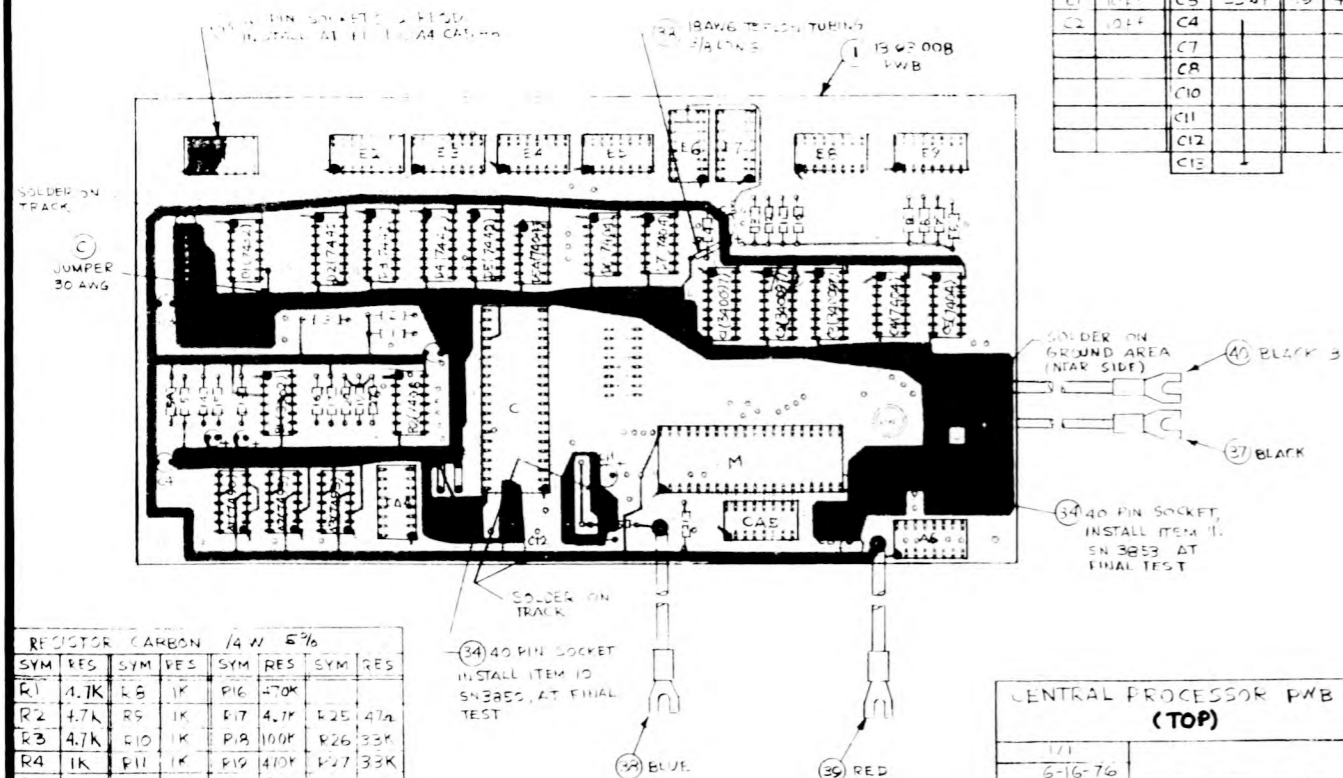
1/1	WED
6/16/76	
AUDIO VISUAL LABORATORIES, INC. ATLANTIC HIGHLANDS, NEW JERSEY 07716	
B 13 33 006	SH 2 OF 2 REV D



**CONTROL CONSOLE PWB ASSEMBLY**

		SP3/5	
DATE: FULL			
REV: 2/10/77			
AUDIO VISUAL LABORATORIES, INC. ATLANTIC HIGHLANDS, NEW JERSEY 07716			
B 13 33 002	SH 1 OF 1	REV	A

CAPACITORS			
DISC-1KV	TANT-6V	TANT-20V	TANT-50V
C1 10UF	C3 22UF	C9 47UF	C5 1UF
C2 10UF	C4		C6 1UF
	C7		
	C8		
	C10		
	C11		
	C12		
	C13		



RESISTOR CARBON 1/4 W 5%					
SYM	RES	SYM	RES	SYM	RES
R1	4.7K	R8	1K	R16	470K
R2	4.7K	R9	1K	R17	4.7K
R3	4.7K	R10	1K	R18	100K
R4	1K	R11	1K	R19	470K
R5	47K	R12	1K	R20	4.7K
R5A	47K	R13	1K	R21	1K
R6	1K	R14	47K		
R7	1K	R15	47K		

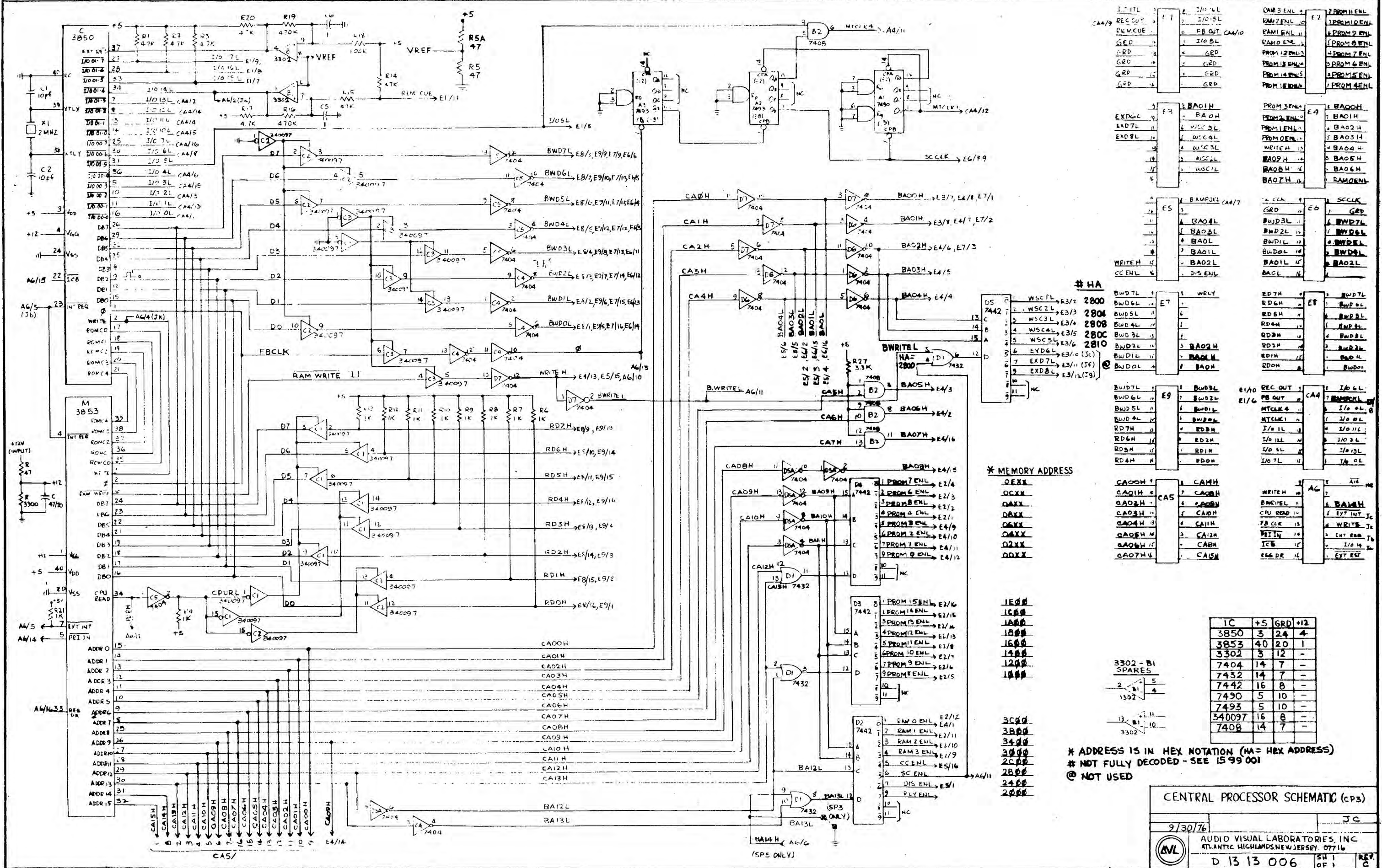
**CENTRAL PROCESSOR PWB ASSEMBLY-CP3 (TOP)**

1/1	WED
6-16-76	
AUDIO VISUAL LABORATORIES, INC. ATLANTIC HIGHLANDS, NEW JERSEY 07716	
B 13 33 006	SH 1 OF 2 REV D



SP III & SP V COMMON USE BOARD ASSEMBLIES

B 10 83 001	SH 51	REV A
-------------	-------	-------



REC OUT	1	I/O 6L	RAM 3 ENL	2	PROM 1 ENL
DEM CUE	2	I/O 6L	RAM 2 ENL	3	PROM 2 ENL
GRD	3	I/O 6L	RAM 0 ENL	4	PROM 0 ENL
GRD	4	I/O 6L	PROM 12 ENL	5	PROM 7 ENL
GRD	5	I/O 6L	PROM 13 ENL	6	PROM 8 ENL
GRD	6	I/O 6L	PROM 14 ENL	7	PROM 9 ENL
GRD	7	I/O 6L	PROM 15 ENL	8	PROM 4 ENL

BA00H	1	BA00H	1	BA00H
BA01H	2	BA01H	2	BA01H
BA02H	3	BA02H	3	BA02H
BA03H	4	BA03H	4	BA03H
BA04H	5	BA04H	5	BA04H
BA05H	6	BA05H	6	BA05H
BA06H	7	BA06H	7	BA06H
BA07H	8	BA07H	8	BA07H

BA08L	1	BA08L	1	BA08L
BA09L	2	BA09L	2	BA09L
BA10L	3	BA10L	3	BA10L
BA11L	4	BA11L	4	BA11L
BA12L	5	BA12L	5	BA12L
BA13L	6	BA13L	6	BA13L

BA14L	1	BA14L	1	BA14L
BA15L	2	BA15L	2	BA15L
BA16L	3	BA16L	3	BA16L
BA17L	4	BA17L	4	BA17L
BA18L	5	BA18L	5	BA18L
BA19L	6	BA19L	6	BA19L

BA20L	1	BA20L	1	BA20L
BA21L	2	BA21L	2	BA21L
BA22L	3	BA22L	3	BA22L
BA23L	4	BA23L	4	BA23L
BA24L	5	BA24L	5	BA24L
BA25L	6	BA25L	6	BA25L

BA26L	1	BA26L	1	BA26L
BA27L	2	BA27L	2	BA27L
BA28L	3	BA28L	3	BA28L
BA29L	4	BA29L	4	BA29L
BA30L	5	BA30L	5	BA30L
BA31L	6	BA31L	6	BA31L

BA32L	1	BA32L	1	BA32L
BA33L	2	BA33L	2	BA33L
BA34L	3	BA34L	3	BA34L
BA35L	4	BA35L	4	BA35L
BA36L	5	BA36L	5	BA36L
BA37L	6	BA37L	6	BA37L

BA38L	1	BA38L	1	BA38L
BA39L	2	BA39L	2	BA39L
BA40L	3	BA40L	3	BA40L
BA41L	4	BA41L	4	BA41L
BA42L	5	BA42L	5	BA42L
BA43L	6	BA43L	6	BA43L

BA44L	1	BA44L	1	BA44L
BA45L	2	BA45L	2	BA45L
BA46L	3	BA46L	3	BA46L
BA47L	4	BA47L	4	BA47L
BA48L	5	BA48L	5	BA48L
BA49L	6	BA49L	6	BA49L

BA50L	1	BA50L	1	BA50L
BA51L	2	BA51L	2	BA51L
BA52L	3	BA52L	3	BA52L
BA53L	4	BA53L	4	BA53L
BA54L	5	BA54L	5	BA54L
BA55L	6	BA55L	6	BA55L

# HA

W5C1L	E3/2	2800
W5C2L	E3/3	2804
W5C3L	E3/4	2808
W5C4L	E3/5	280C
W5C5L	E3/6	2810
EYD6L	E3/10 (J6)	
EXD7L	E3/11 (J6)	
EXD8L	E3/12 (J6)	

\* MEMORY ADDRESS

DEXX	
OCXX	
OAXX	
OBXX	
OCXX	
OQXX	
ORXX	

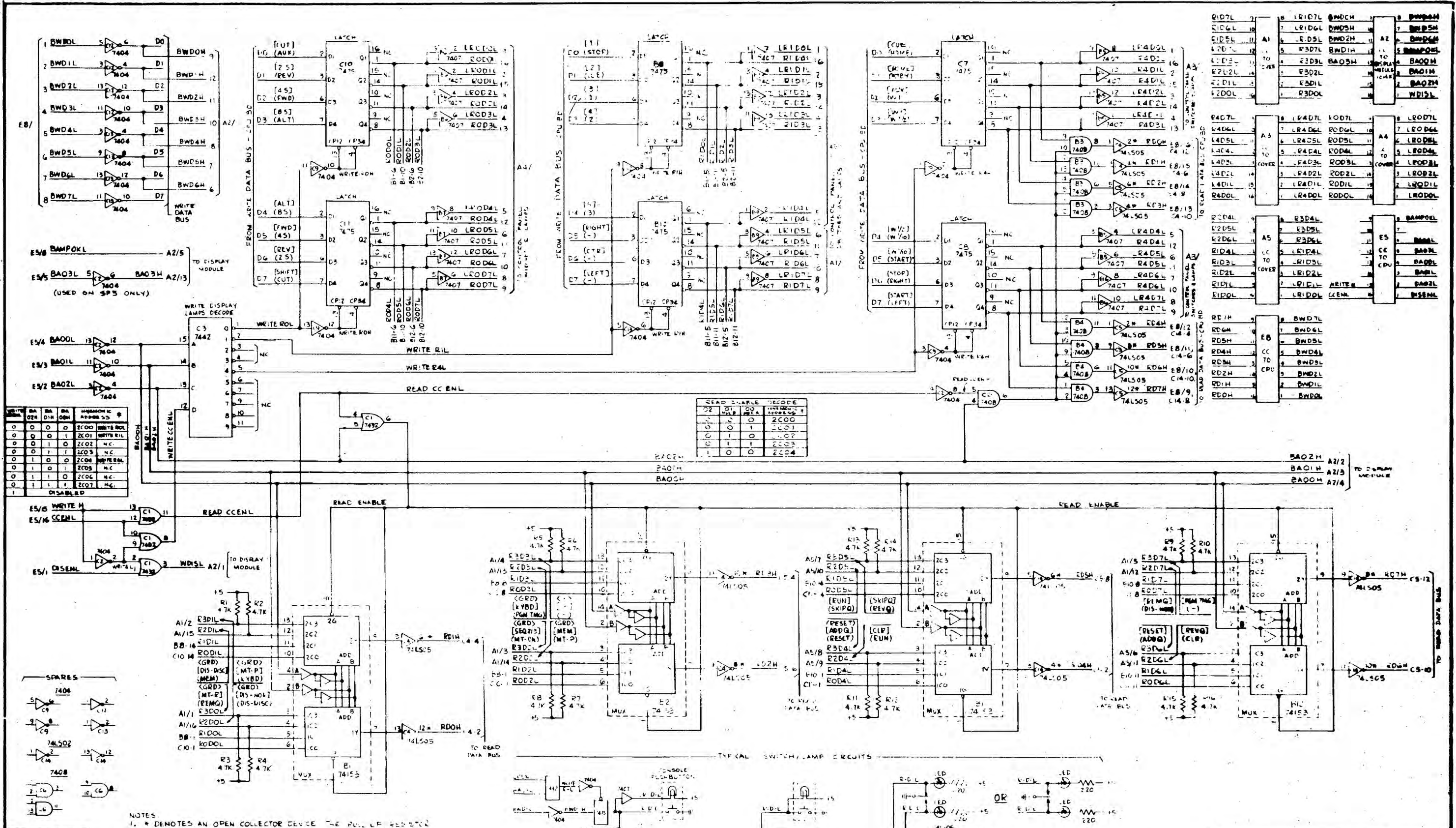
1E00
1E08
1E10
1E18
1E20
1E28
1E30
1E38
1E40
1E48
1E50

3C00
3C08
3C10
3C18
3C20
3C28
3C30
3C38
3C40
3C48
3C50

\* ADDRESS IS IN HEX NOTATION (HA= HEX ADDRESS)  
 # NOT FULLY DECODED - SEE 15 99 001  
 @ NOT USED

CENTRAL PROCESSOR SCHEMATIC (CPS)			
9/30/76	J.C.		
AUDIO VISUAL LABORATORIES, INC.			
ATLANTIC HIGHLANDS, NEW JERSEY 07716			
D 13 13 006	SH 1	REV C	

B 10 83 001 52 A

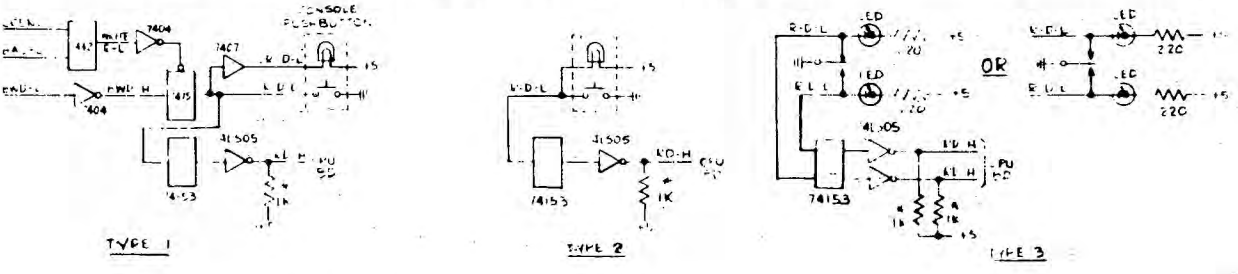


WRITE DATA BUS	BA	DB	DA	DB	DA	MEMORIC ADDRESS	FUNCTION
0	0	0	0	0	0	2C00	WRITE ROL
0	0	0	0	1	0	2C01	WRITE RIL
0	0	0	1	0	0	2C02	N.C.
0	0	1	0	0	0	2C03	N.C.
0	1	0	0	0	0	2C04	WRITE RAL
0	1	0	1	0	0	2C05	N.C.
0	1	1	0	0	0	2C06	N.C.
0	1	1	1	0	0	2C07	N.C.
1	1	1	1	1	1		DISABLED

READ ENABLE DECODE				
00	00	00	00	2C00
00	00	01	00	2C01
00	01	00	00	2C02
00	01	01	00	2C03
00	10	00	00	2C04
00	10	01	00	2C05
00	11	00	00	2C06
00	11	01	00	2C07

- NOTES
- \* DENOTES AN OPEN COLLECTOR DEVICE THE PULL UP RESISTOR IS LOCATED ON THE CPU BOARD.
  - A2/1 DENOTES CONNECTION TO OFF-BOARD CABLE CONNECTOR. A2=1 DENOTES CONNECTION TO ON-BOARD CIRCUITRY.
  - ( ) DENOTES SP3 SWITCH FUNCTION. ( ) DENOTES SP5 SWITCH FUNCTION. ( ) DENOTES EM3 SWITCH FUNCTION OR CONNECTION.
  - ↑ DENOTES ADDRESS IS IN HEXIDECIMAL NOTATION.

IC	GRD	+5
74LS05	7	18
7404	7	14
7408	7	14
7432	7	14
7442	8	16
7475	12	5
74153	8	16



CONTROL CONSOLE PWB SCHEMATIC

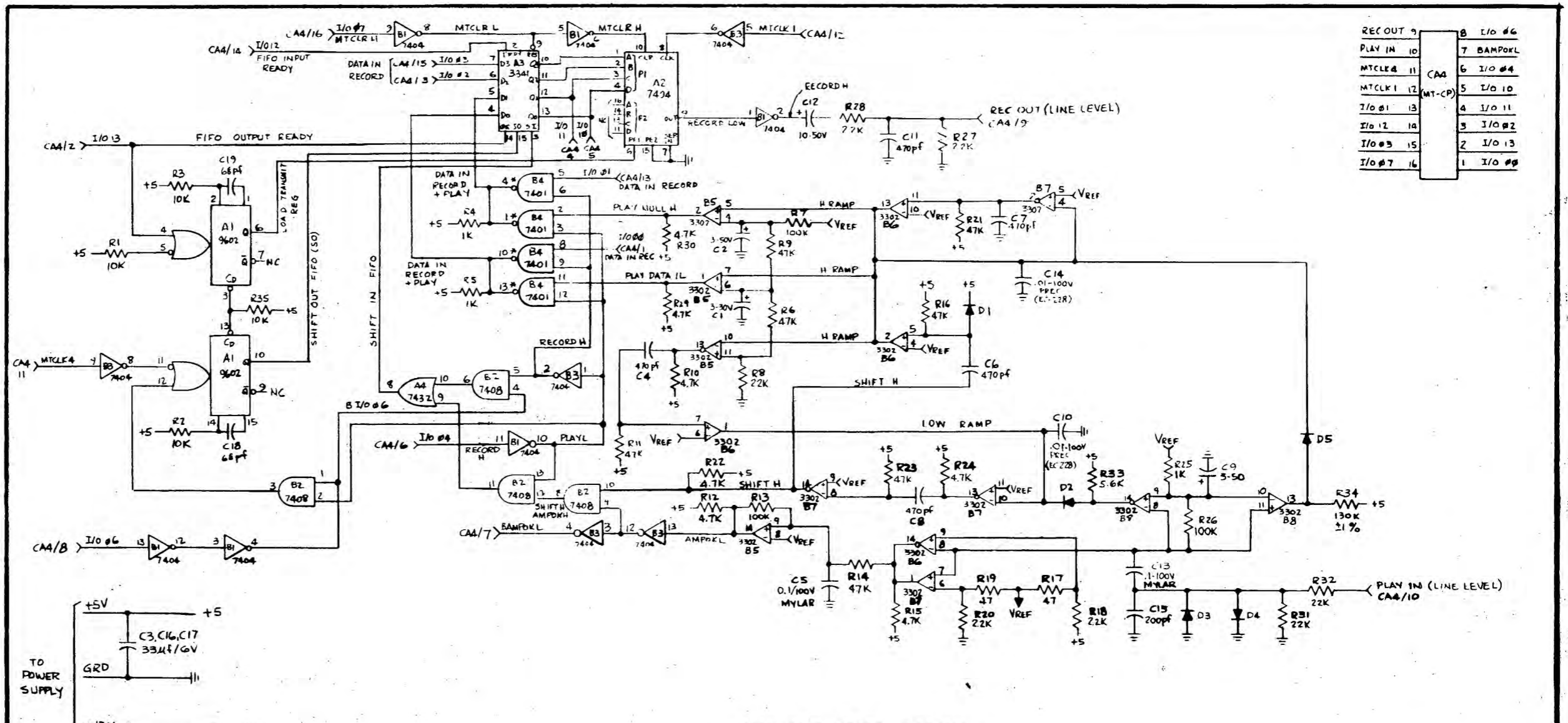
2/11/77

AVL AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS, NEW JERSEY 07716

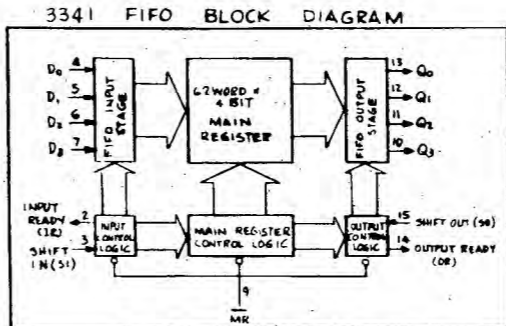
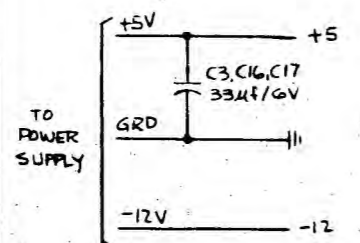
D 13 13 002

REV B

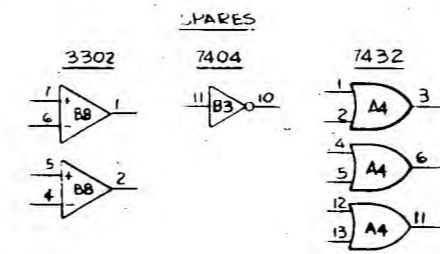
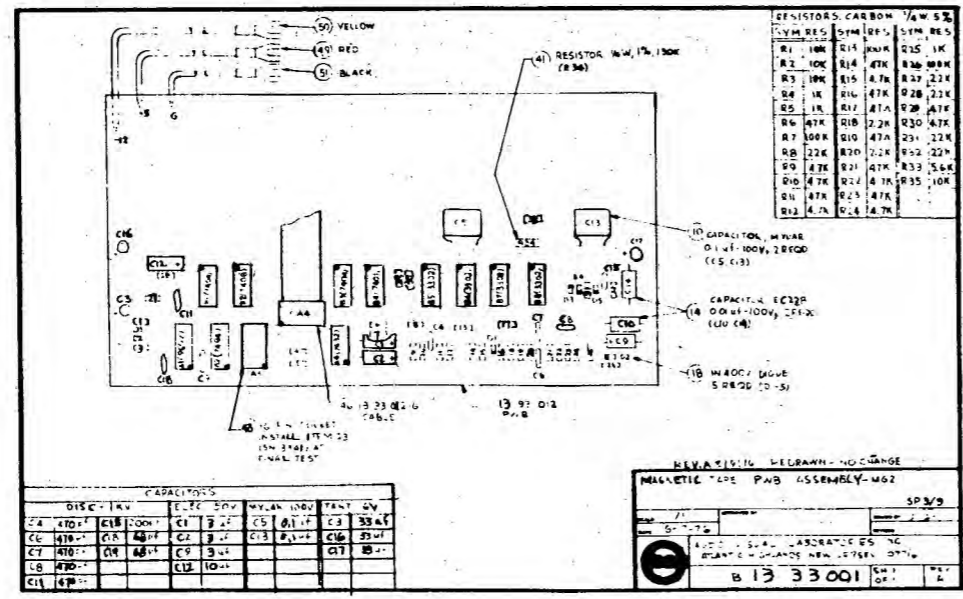
B1083001 54 A



REC OUT 9	8	I/O #6
PLAY IN 10	7	BAMPK1
MTCLR 11	6	I/O #4
MTCLR I 12	5	I/O 10
I/O 1 13	4	I/O 11
I/O 2 14	3	I/O #2
I/O 3 15	2	I/O 13
I/O 7 16	1	I/O #8



NOTES:  
1. \* DENOTES OPEN COLLECTOR



IC	GRD	+5	-12
3302	12	3	
3341	8	16	1
7401	7	14	
7404	7	14	
7408	7	14	
7432	7	14	
7494	12	5	
9602	8	16	

MAGNETIC TAPE BOARD SCHEMATIC  
SP3 & SP5

DATE: 5/31/77

AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS, NEW JERSEY 07716

AVL

C 13 13 001

B 10 83 001

SH 56

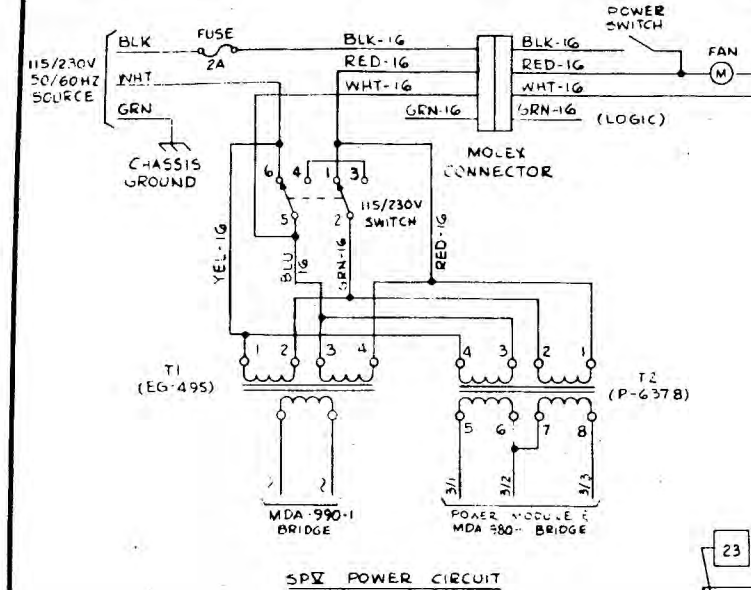
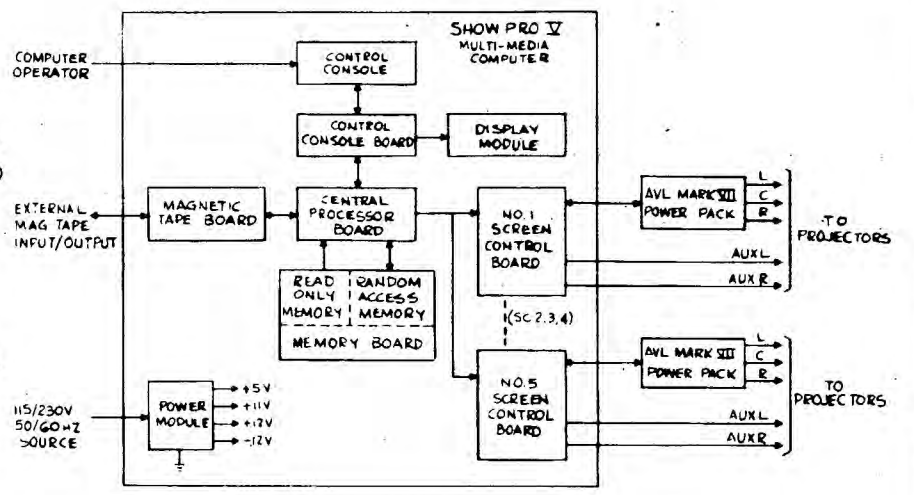
REV B



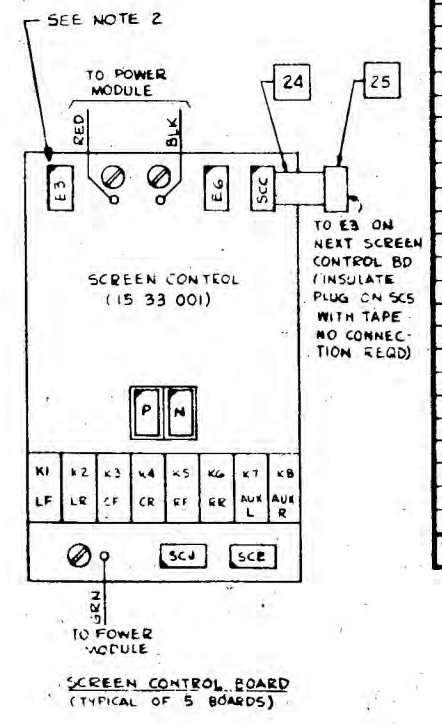
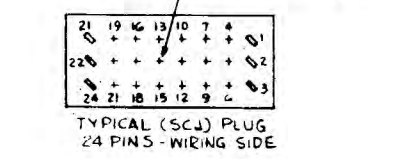
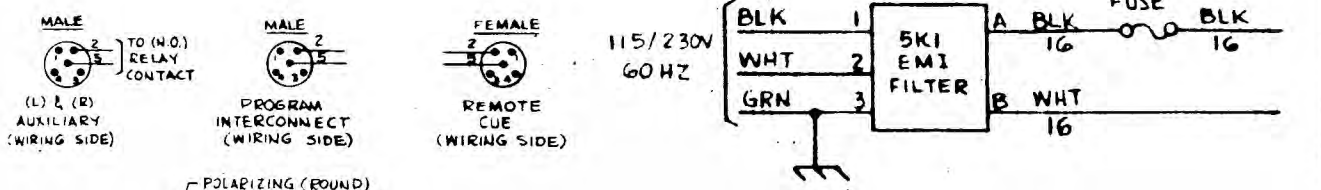
SCREEN CONTROL CONNECTIONS (NOTE 6)

SCJ CABLE		SCE CABLE		CONNECT TO
JONES PIN NO.	FUNCTION	CABLE PIN NO.	CABLE PIN NO.	
1	FORWARD LEFT	2	16	NO CONNECTION
2	FORWARD CENTER	16	1	
3	FORWARD RIGHT	7	15	
7	REVERSE LEFT	3	2	
8	REVERSE CENTER	12	14	
9	REVERSE RIGHT	8	3	
14	FORWARD GROUND	1	13	
16	+28VAC	9	4	
18	-28VAC	10	12	
19,20,22	+30VDC	11	5	
21	FIRE RIGHT	13	11	
23	FIRE CENTER	14	6	
24	FIRE LEFT	15	10	
4,5,6,10,11,12,13,15,17	NO CONNECTION	4,5,6	9	
			8	AUX R-5

- NOTES:
- CAUTION - THIS ASSEMBLY CONTAINS MOS-TYPE DEVICES WHICH ARE SUBJECT TO ELECTROSTATIC (STATIC) CHARGES. INDIVIDUALS AND TOOLS SHOULD BE GROUNDED BEFORE COMING IN CONTACT WITH THE ASSEMBLY OR DEVICE. BOARD ASSEMBLIES MUST BE WRAPPED IN METALLIC FOIL FOR HANDLING AND/OR STORAGE.
  - ⚡ DENOTES PIN 1 OF A DEVICE OR CABLE FLUG
  - ITEM NUMBERS 1 THRU 14, DESIGNATED WITH ○ ARE AC POWER COMPONENTS.
  - ITEM NUMBERS 20 THRU 27, DESIGNATED WITH □ ARE LOGIC LEVEL COMPONENTS.
  - APPROVED ALTERNATE MANUFACTURERS:
  - THE (SCJ) CABLE CONNECTS A SCREEN CONTROL BOARD WITH THE CORRESPONDING 24 PIN OUTPUT CONNECTOR. THE (SCE) CABLE CONNECTS A SCREEN CONTROL BOARD TO THE CORRESPONDING (L) AND (R) AUXILIARY OUTPUT CONNECTORS.
  - THESE SPECIFICATIONS ARE FOR DOMESTIC UNITS. REFER TO D15 99 003 FOR IEC MODEL SPECIFICATIONS



POWER FILTER MODIFICATION

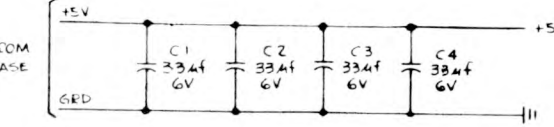
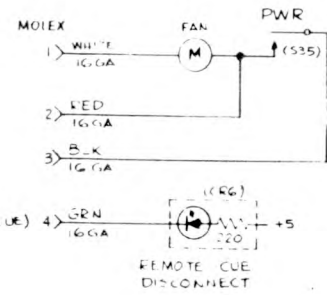
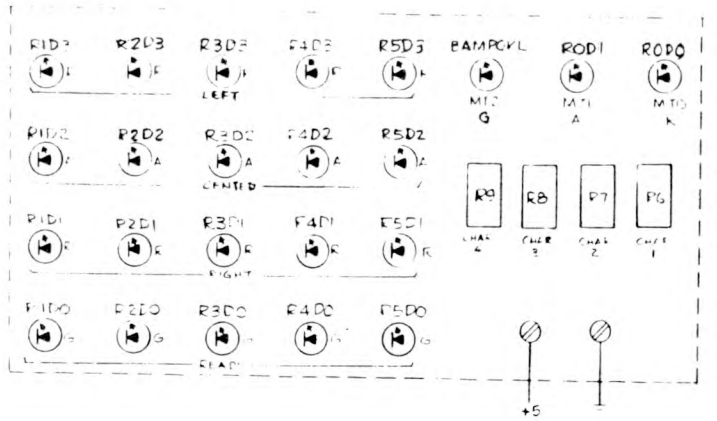
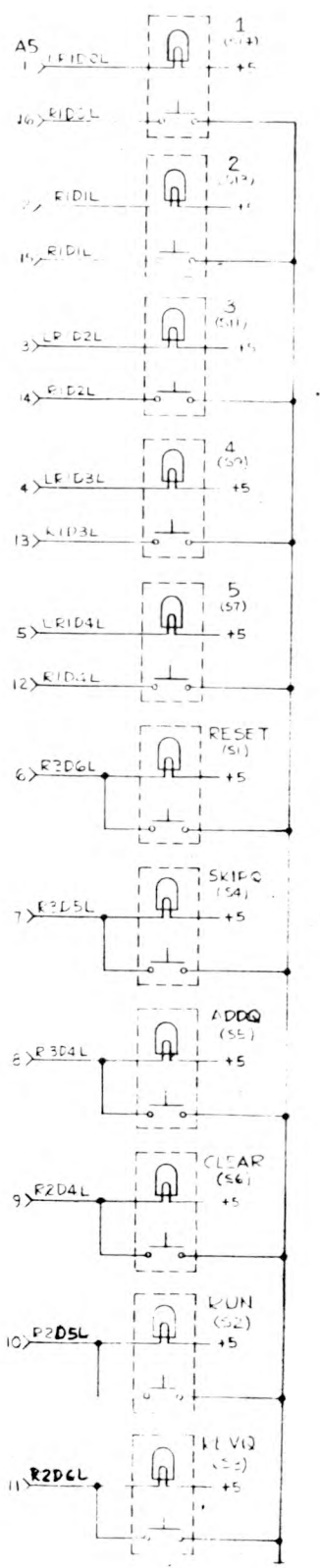
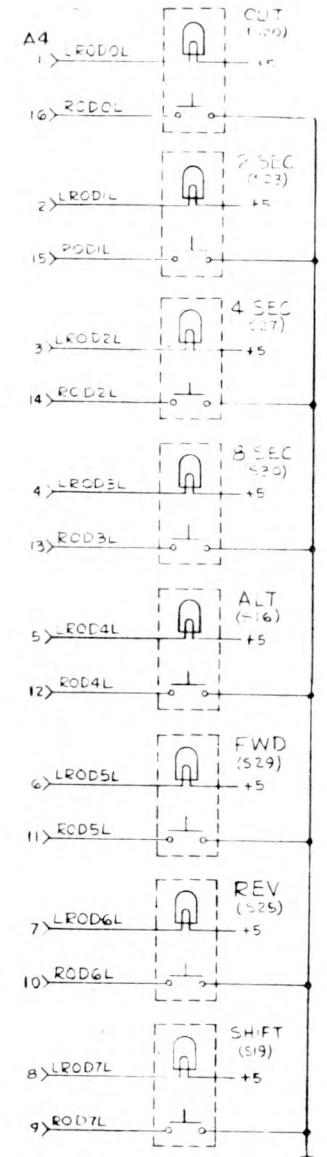
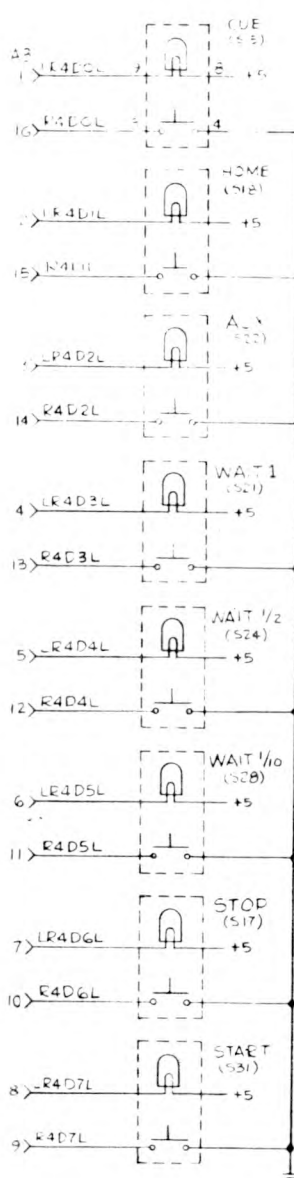
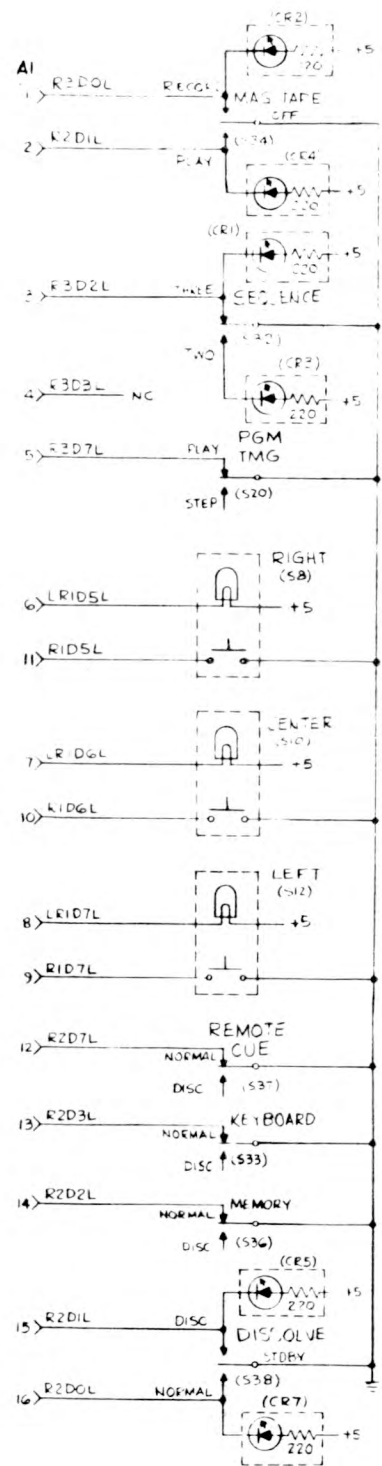


ITEM NO.	PART NUMBER	MANUFACTURER	DESCRIPTION	NOTE
29				
28				
27	90-011	CHICAGO MIN LAMP	BULB, INCAN. (PUSH SWITCHES)	4
26	90-010	CHICAGO MIN LAMP	BULB, INCAN. (CUE SWITCH)	4
25	80-001	3M CO.	CONNECTOR, RIBBON CABLE	4
24	85-030	ALPHA	CABLE RIBBON, 16 COND	4,5
23	81-020	EBY	PLUG, MALE, 5 PINS	4
22	81-015	H.H. SMITH	JACK, AUDIO	4
21	81-021	EBY	JACK, FEMALE, 5 PINS	4
20	81-030	VERNI TRON	PLUG, MALE, 24 PINS	4
19				
18				
17				
16				
15				
14	30-021	MOTOROLA	BRIDGE, RECTIFIER	5
13		THOMAS & BETTS	TERMINAL LUG, SPADE, CRIMP	5
12		ALPHA	WIRE, 16 AWG, STRANDED	5
11	74-015	ALCO	SWITCH, KEY (3PDT)	5
10	99-015	KOTRON	FAN	5
9	82-041	VERNI TRON	TERMINAL STRIP, BARRIER, 8 POS	5
8	99-026	BUSSMAN	FUSE, 2 AMPERE	5
7	99-020	LITLIFUSE	FUSE HOLDER	5
6	72-008	SWITCHCRAFT	SLIDE SWITCH, DPDT	5
5	83-007	BELDEN	POWER CORD	5
4	60-004	STANCOR	TRANSFORMER	5
3	60-002	ELEC WINDINGS	TRANSFORMER	5
2	30-023	MOTOROLA	BRIDGE, RECTIFIER	5
1	81-005, 81-006	MOLEX	CONNECTOR, 4 POS	5

SHOW PRO V SPECIFICATIONS DOMESTIC UNIT (NOTE 7)

DATE	1/21/77	REV	8
AUDIO VISUAL LABORATORIES, INC.			
ATLANTIC HIGHLANDS, NEW JERSEY 07716			
D 15 99 002			
REV	58	REV	A

B 10 83 001 58 A



F1D7L	9	8	L R1D7L
F1D6L	10	7	L R1D6L
F1D5L	11	6	L R1D5L
R2D7L	12	5	F R2D7L
R2D3L	13	4	F R2D3L
R2D2L	14	3	F R2D2L
R2D1L	15	2	F R2D1L
R2ECL	16	1	F R2D0L

BWD3H	9	8	B W D3H
BWD2H	10	7	B W D2H
BWD1H	11	6	B W D1H
BAC3H	12	5	B A C3H
BAC2H	13	4	B A C2H
BAC1H	14	3	B A C1H
NC	15	2	B A O2H
NC	16	1	W D15L

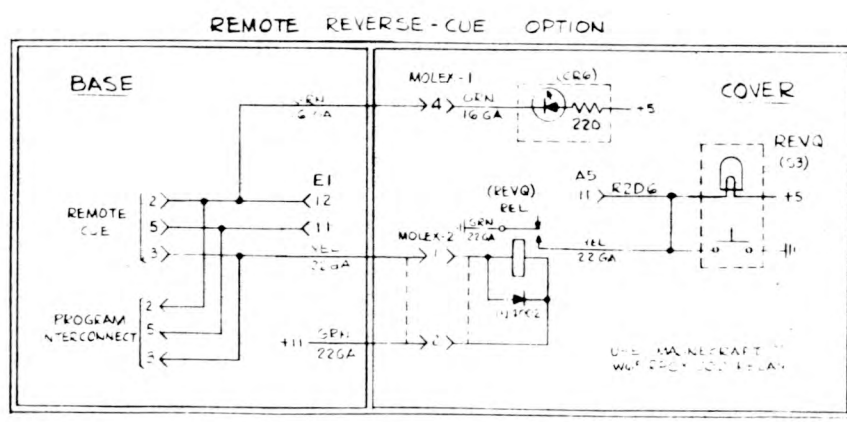
R4D7L	9	8	L R4D7L
R4D6L	10	7	L R4D6L
R4D5L	11	6	L R4D5L
R4D4L	12	5	L R4D4L
R4D3L	13	4	L R4D3L
R4D2L	14	3	L R4D2L
R4D1L	15	2	L R4D1L
R4D0L	16	1	L R4D0L

R0D7L	9	8	R0D7L
R0D6L	10	7	R0D6L
R0D5L	11	6	R0D5L
R0D4L	12	5	R0D4L
R0D3L	13	4	R0D3L
R0D2L	14	3	R0D2L
R0D1L	15	2	R0D1L
R0D0L	16	1	R0D0L

R2D4L	9	8	R3D4L
R2D5L	10	7	R3D6L
R2D6L	11	6	R3D6L
R1D4L	12	5	L R1D4L
R1D3L	13	4	L R1D3L
R1D2L	14	3	L R1D2L
R1D1L	15	2	L R1D1L
R1D0L	16	1	L R1D0L

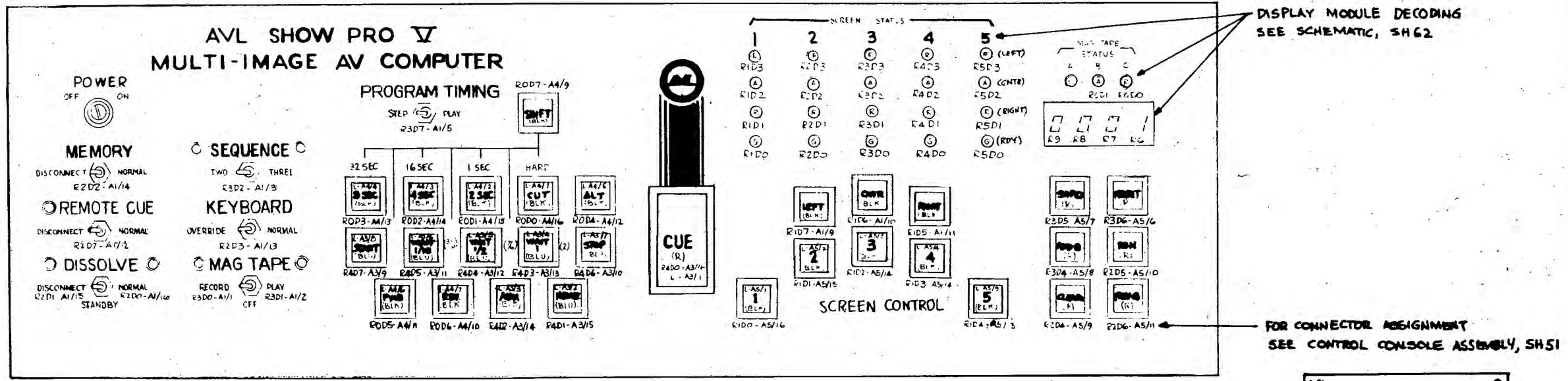


NOTES  
 LEDs (CR1-7) NEED AN EXTERNAL 220Ω 1/4W RESISTOR IF THE LED ASSEMBLIES ARE SUPPLIED WITHOUT INTERNAL RESISTORS.  
 2 CAPACITORS SHALL BE TANTALUM.

**SPI COVER SCHEMATIC**

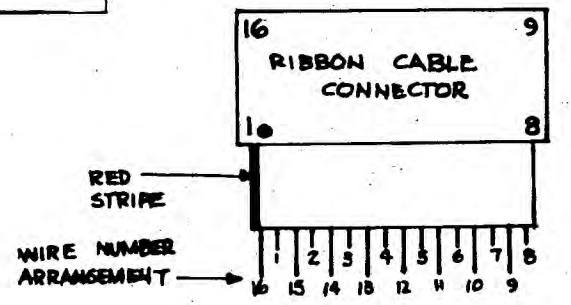
DATE: 5/21/76  
 APPROVED BY: [Signature]  
 DRAWN BY: G  
 AVI  
 AUDIO VISUAL LABORATORIES, INC.  
 ATLANTIC HIGHLANDS, NEW JERSEY 07716  
 D 15 13 006

B 10 83 001 SM 59 A



SPI KEYBOARD - ADDRESS SPACE DECODING

		D7	D6	D5	D4	D3	D2	D1	D0
READ/WRITE	R0	SHIFT	REV	FWD	ALT	8 SEC	4 SEC	2 SEC	CUT
READ/WRITE	R1	LEFT	CNTR	RIGHT	5	4	3	2	1
READ ONLY	R2	REMOTE CUE	REVQ	RUN	CLEAR	KEYBOARD NORMAL	MEMORY DISC	DISSOLVE DISC	DISSOLVE NORMAL
READ ONLY	R3	PLAY/STEP	RESET	SKIPQ	ADDQ	(SPARE)	SEQ 2/3	MT PLAY	MT RECORD
READ/WRITE	R4	START	STOP	WAIT 1/10	WAIT 1/2	WAIT 1	AUX	HOME	CUE



CONNECTOR NUMBER → A5/11 ← PIN NUMBER

**COVER, SWITCH PLACEMENT**

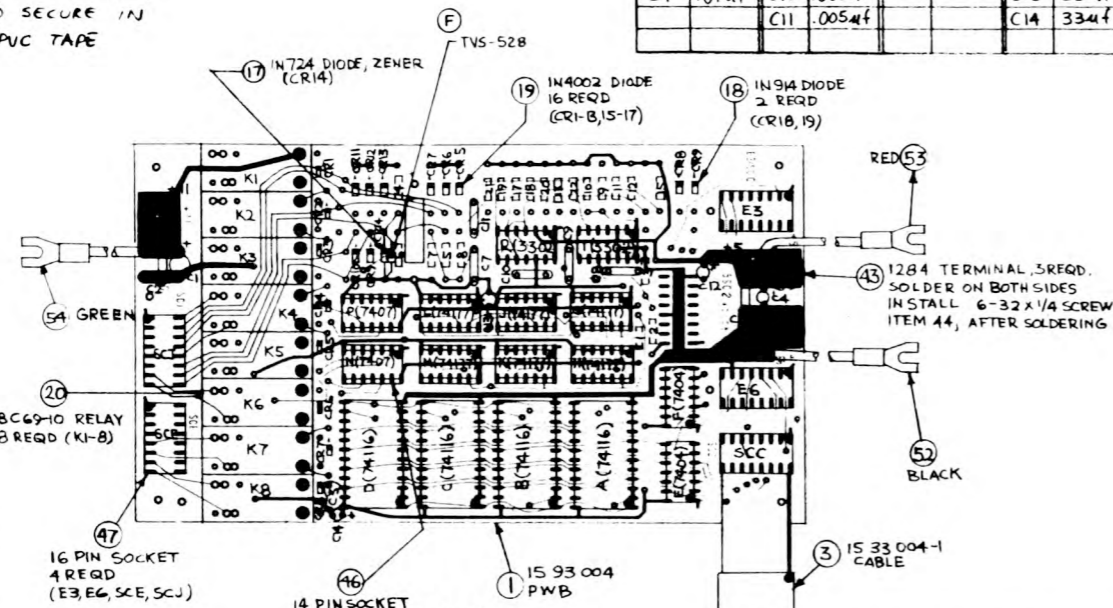
**SPI**

SCALE: P P 7L  
DATE: P P 7L  
APPROVED BY: \_\_\_\_\_  
DATE: P P 7L  
AVI  
FEDERAL BUREAU OF INVESTIGATION, NC  
ATLANTA, GA 30303  
P 15 95 003  
REV: B

B 10 83 001 60 A

NOTES:  
1. JUMPERS "a" AND "b" SHALL BE WIRED ON THE NON-COMPONENT SIDE WITH 30AWG WIRE. DRESS WIRES AWAY FROM TYRAP HOLE AND SECURE IN PLACE WITH BLACK PVC TAPE

CAPACITORS					
DISC-100V	DISC-1KV	ELEC-50V	TANT-6V	TANT-20V	
C2 .01uf	C8 .002uf	C6 10uf	C4 33uf	C1 47uf	
C5 .01uf	C9 .005uf		C12 33uf	C3 47uf	
C7 .01uf	C10 .005uf		C13 33uf		
	C11 .005uf		C14 33uf		

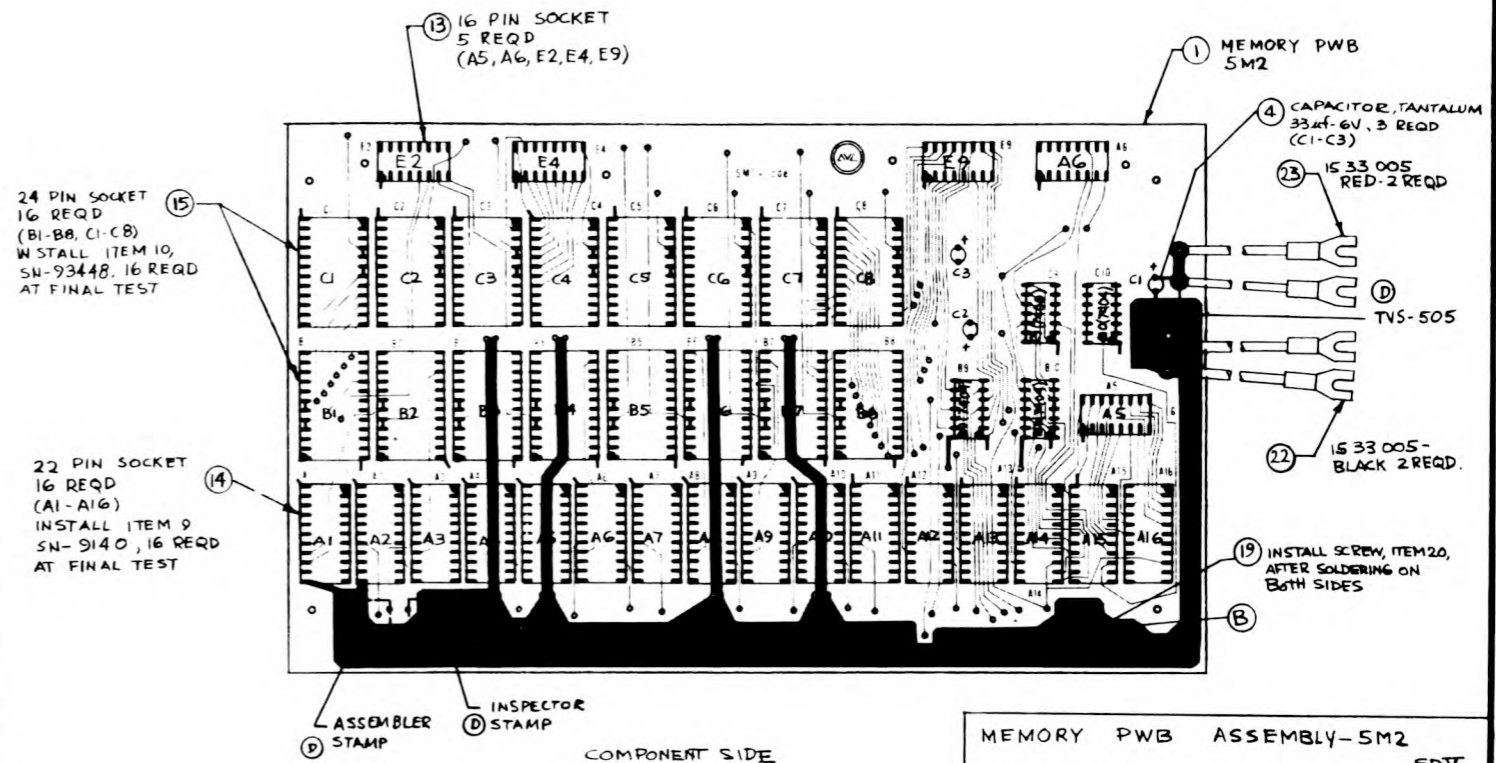


RESISTOR, CARBON, 1/4 W, 5%			
SYM	RES	SYM	RES
R1	4.7K	R13	10K
R2	1K		
R3	1K	R15	10K
R4	1K		
R5	4.7K	R17	4.7K
R6	4.7K	R18	4.7K
R7	12K	R19	4.7K
R8	22K	R20	4.7K
R9	100K	R21	4.7K
R10	4.7K	R22	4.7K
R11	4.7K		
R12	4.7K		

COMPONENT SIDE

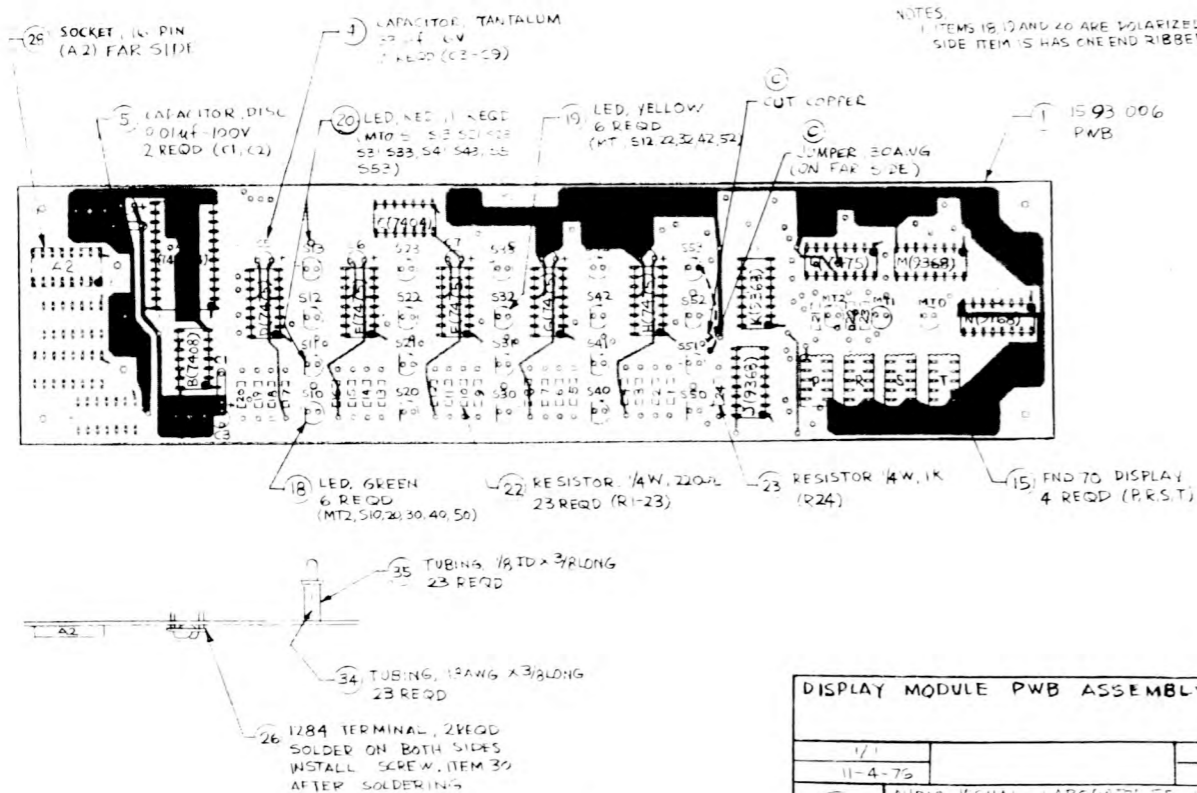
SCREEN CONTROL PWB ASSEMBLY

5SC2 SPX  
1/1 W8D  
11-3-76  
AVL AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS NEW JERSEY 07716  
B 15 33 001 CH 1 OF 1 REV F



MEMORY PWB ASSEMBLY-5M2

SPX  
1/1 W8D  
8-6-76  
AVL AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS NEW JERSEY 07716  
B 15 33 002 SH 1 OF 1 REV D



NOTES:  
1. ITEMS 18, 19 AND 20 ARE POLARIZED WITH FLAT SIDE. ITEM 15 HAS ONE END RIBBED.

COMPONENT SIDE

DISPLAY MODULE PWB ASSEMBLY-5DM2

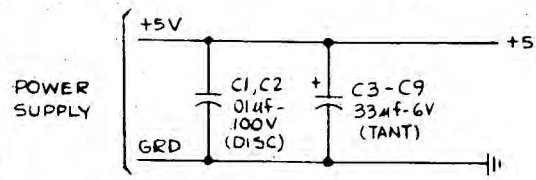
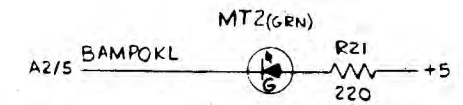
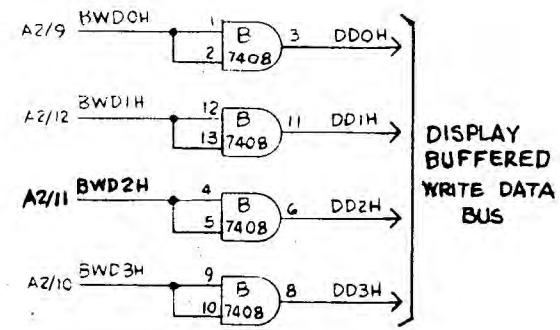
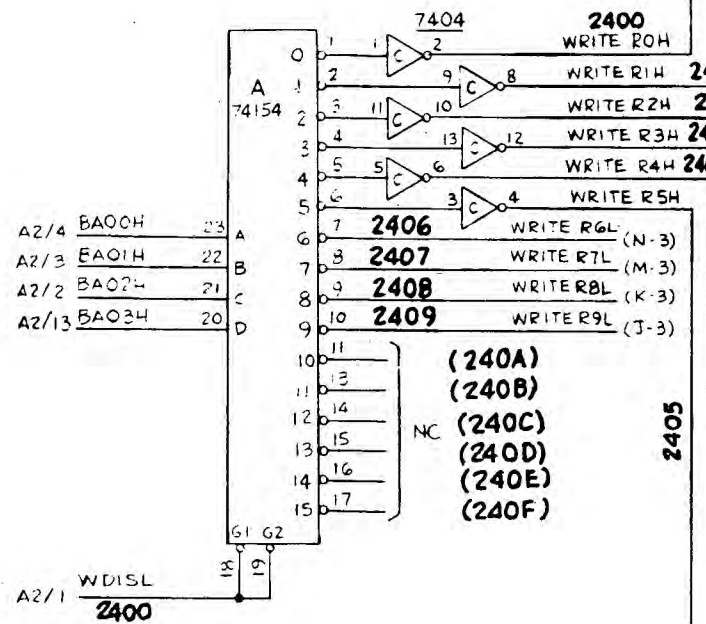
SPX  
1/1 W8D  
11-4-76  
AVL AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS NEW JERSEY 07716  
B 15 33 003 SH 1 OF 1 REV C

PROM LOCATION	STANDARD PROMS 9-15-76	UNIVERSAL PROMS 12-13-76	VERSION B PROMS 6-22-77	SAV CONVERT PROMS 9-15-77
C1	STD	UNIV	"VER B"	*
C2	STD	*	*	*
C3	STD	*	*	*
C4	STD	*	*	*
(SPARE)				
(SPARE)				
C7	STD	UNIV	*	"NC7"
C8	STD	UNIV	"VER B"	*
B1	STD	*	*	*
B2	STD	*	*	*
B3	STD	UNIV	*	*
B4	STD	UNIV	"VER B"	"NB4"
B5	STD	*	*	*
B6	STD	*	"VER B"	*
B7	STD	*	*	*
(SPARE)				
MARKINGS	NONE	NONE	AS SHOWN	AS SHOWN

\* DENOTES "PROM NOT MODIFIED"

PROM MEMORY CONFIGURATION

AVL SPX BOARD ASSEMBLIES - SCREEN CONTROL, MEMORY & DISPLAY MODULE  
B 10 83 001 SH 61 REV A



IC	+5	GRD
7404	14	7
7408	14	7
7475	5	12
9368	16	8
74154	24	12

SPARES - NONE

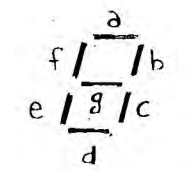
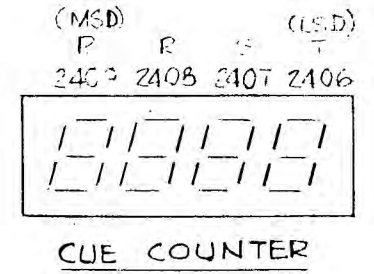
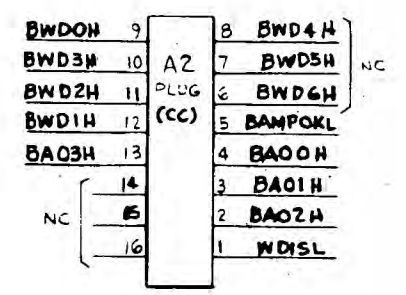
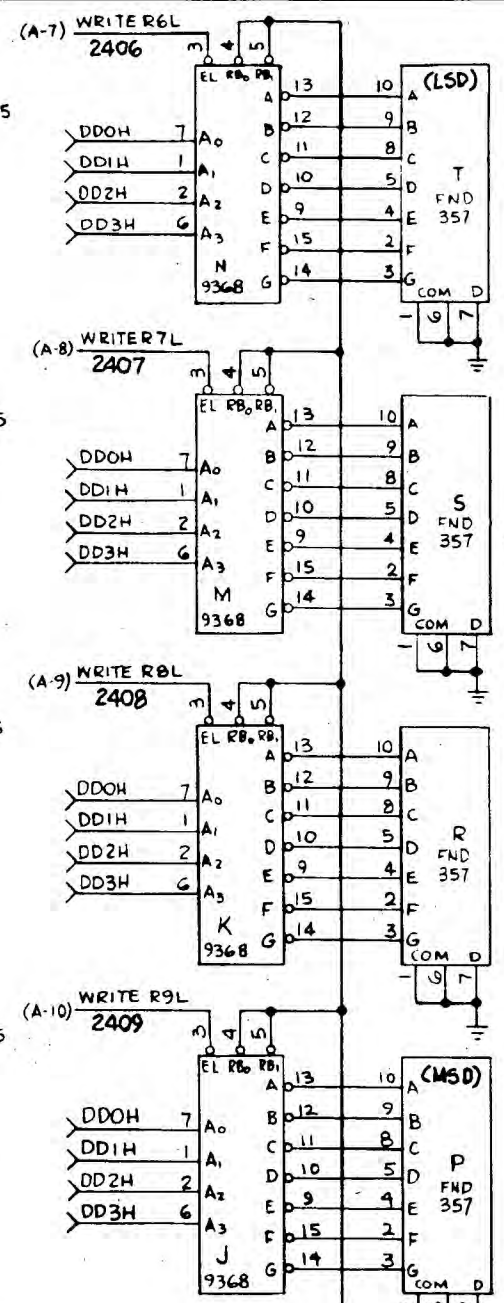
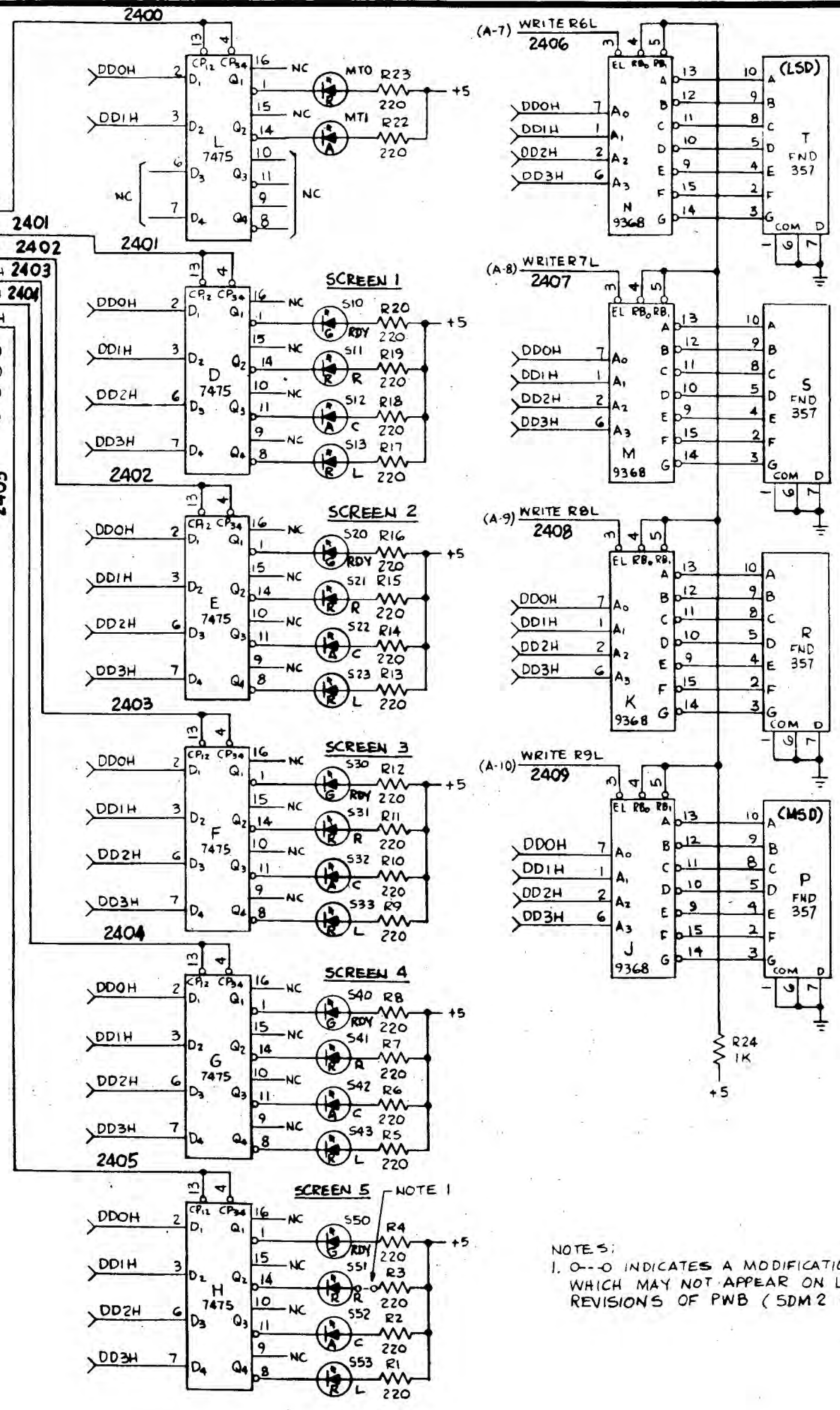


TABLE A

HEX ADDRESS	WRITE DATA ASSIGNMENT							
	D7	D6	D5	D4	D3	D2	D1	D0
2400	-	-	-	-	-	-	-	MTI MTO
2401	-	-	-	-	S1/L	S1/C	S1/R	S1/RDY
2402	-	-	-	-	S2/L	S2/C	S2/R	S2/RDY
2403	-	-	-	-	S3/L	S3/C	S3/R	S3/RDY
2404	-	-	-	-	S4/L	S4/C	S4/R	S4/RDY
2405	-	-	-	-	S5/L	S5/C	S5/R	S5/RDY
2406	-	-	-	-	DIGIT SELECTION DECODING			
2407	-	-	-	-	SEE TABLE B, SHEET 44			
2408	-	-	-	-	(C 13 13 003)			
2409	-	-	-	-	-	-	-	-
240A	-	-	-	-	-	-	-	-
240B	-	-	-	-	-	-	-	-
240C	-	-	-	-	-	-	-	-
240D	-	-	-	-	-	-	-	-
240E	-	-	-	-	-	-	-	-
240F	-	-	-	-	-	-	-	-

NOTES:  
1. 0--0 INDICATES A MODIFICATION JUMPER WHICH MAY NOT APPEAR ON LATER COPPER REVISIONS OF PWB (SDM2 REV).

DISPLAY MODULE SCHEMATIC - 5DM

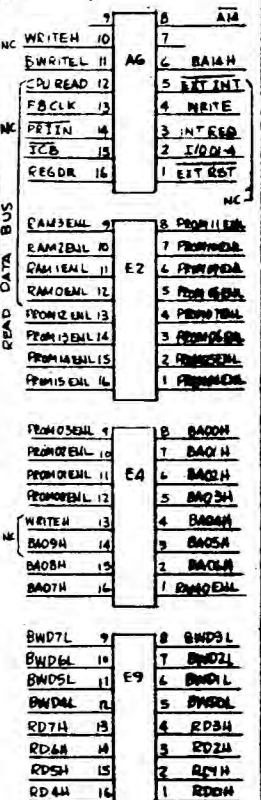
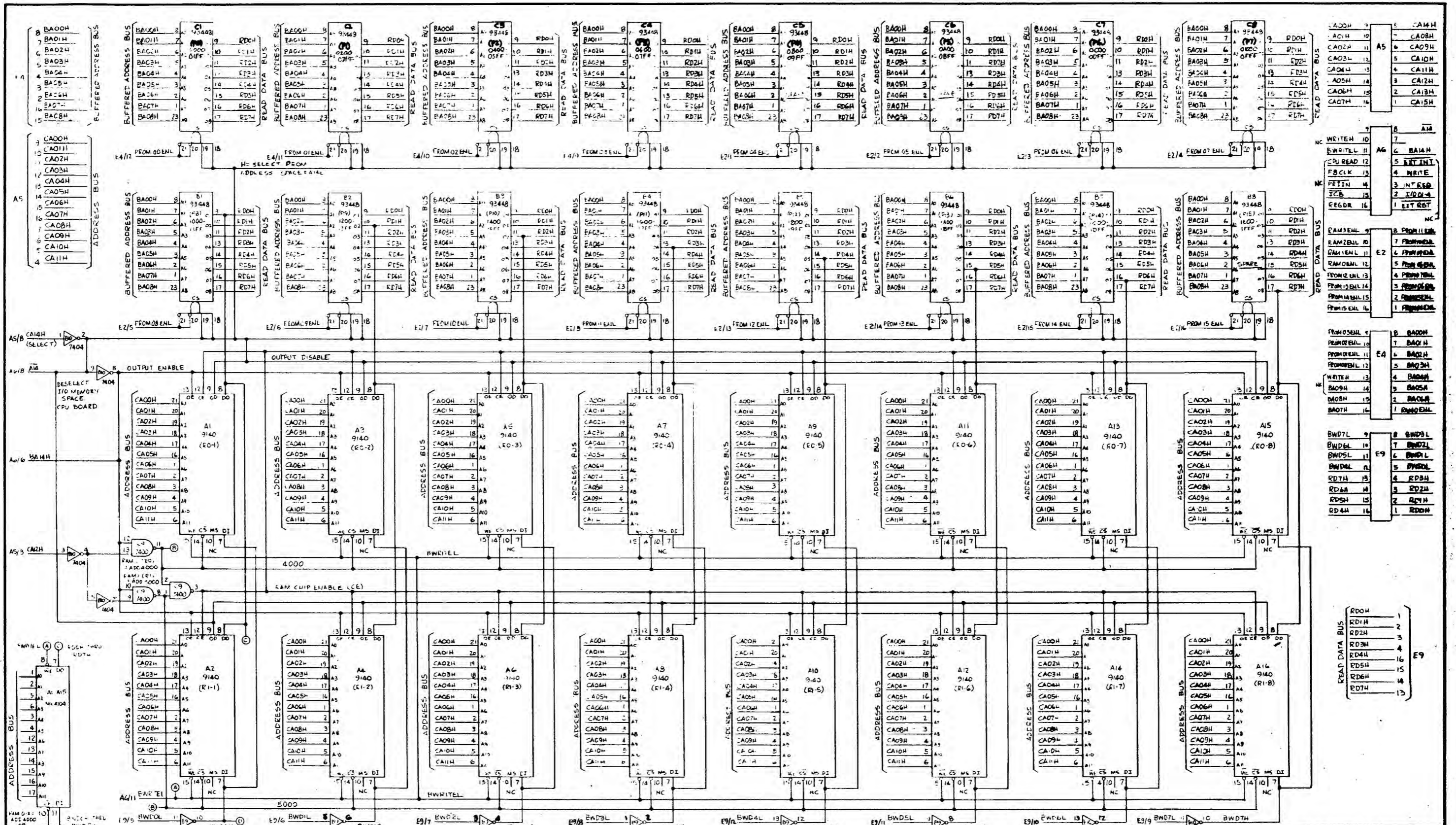
SCALE:  $\frac{1}{8}$  APPROVED BY: *[Signature]* DRAWN BY: *[Signature]*

DATE: 1/25/77

AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS, NEW JERSEY 07716

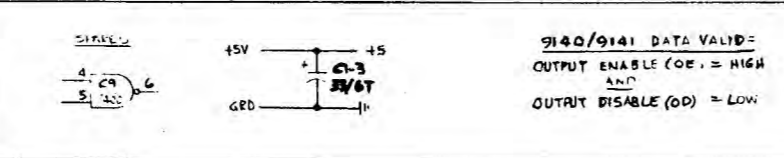
AVL C15 13 003 SH 1 REV B

B 10 83 001 SH 62 REV A



OPTIONAL  
RAM CHIP USED  
ON SM3 MEMORY  
BOARDS ONLY  
(CIRCUIT CONNECTIONS  
INDICATED BY ○)

IC	15	GRD
100	14	7
7404	14	7
9140/41	22	11
9344B	24	12
SM3 ONLY	4104	12



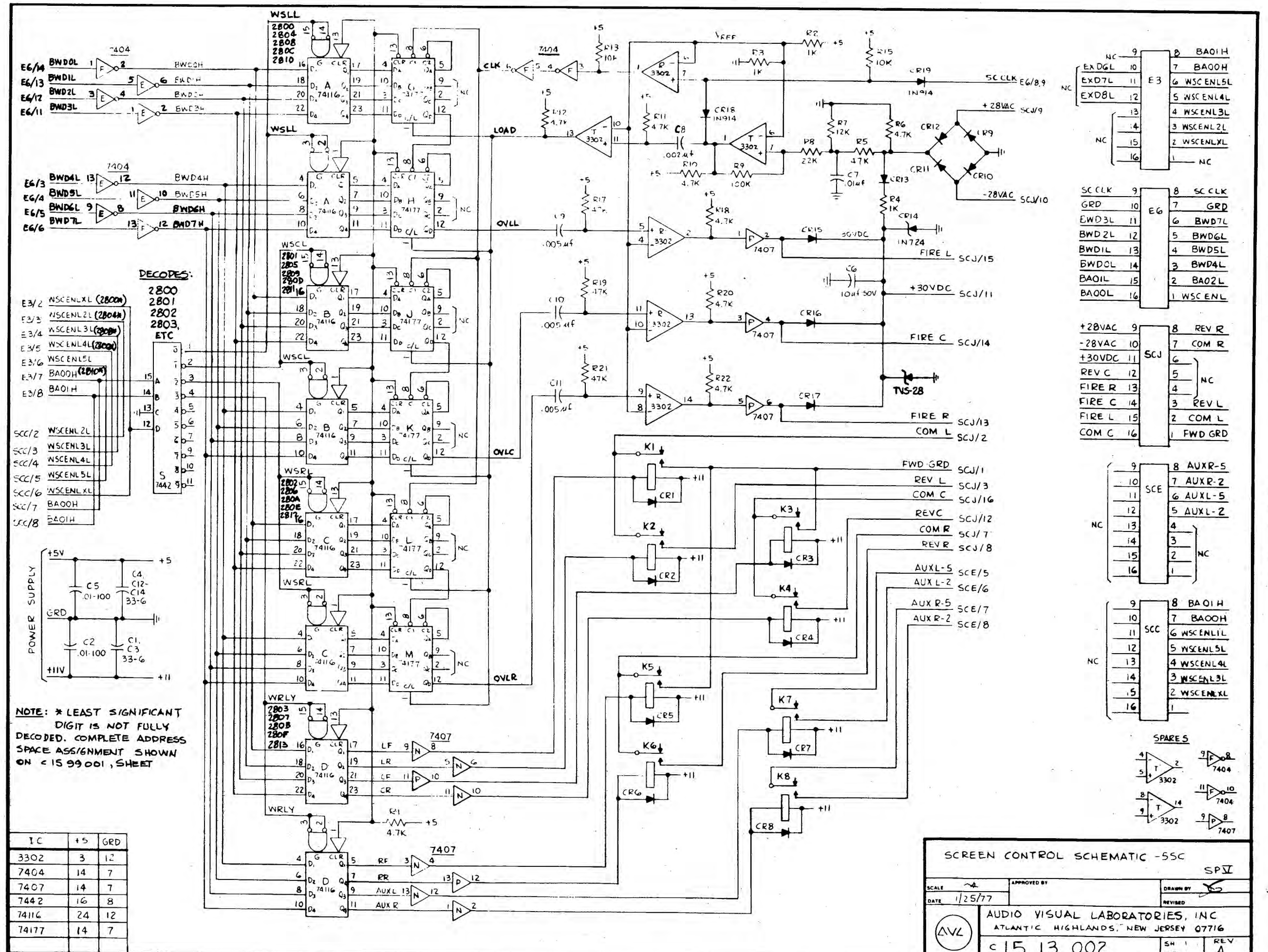
**MEMORY SCHEMATIC - SM2 & SM3**

AVL AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS, NEW JERSEY 07716

REV. 10/76

AVL

B 10 83 001 64 A



**DECODES:**

E3/2	WSCENLXL (2800)	2800
E3/3	WSCENL2L (2804)	2801
E3/4	WSCENL3L (2808)	2802
E3/5	WSCENL4L (280C)	2803, 2805, 2809, 2816
E3/6	WSCENL5L	ETC
E3/7	BA00H (2810)	
E3/8	BA01H	
SCC/2	WSCENL2L	
SCC/3	WSCENL3L	
SCC/4	WSCENL4L	
SCC/5	WSCENL5L	
SCC/6	WSCENLXL	
SCC/7	BA00H	
SCC/8	BA01H	

NOTE: \* LEAST SIGNIFICANT DIGIT IS NOT FULLY DECODED. COMPLETE ADDRESS SPACE ASSIGNMENT SHOWN ON C15 99 001, SHEET

IC	+5	GRD
3302	3	12
7404	14	7
7407	14	7
7442	16	8
74116	24	12
74177	14	7

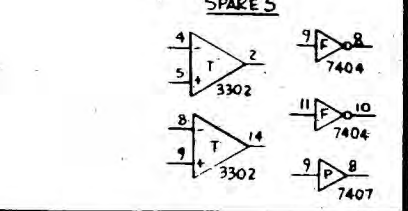
NC	9	8	BA01H	
EXD7L	10	7	BA00H	
EXD7L	11	E3	6	WSCENL5L
EXD8L	12	5	WSCENL4L	
	13	4	WSCENL3L	
	14	3	WSCENL2L	
	15	2	WSCENLXL	
	16		1	NC

SC CLK	9	8	SC CLK	
GRD	10	7	GRD	
EWD3L	11	E6	6	BWD7L
BWD2L	12	5	BWD6L	
BWD1L	13	4	BWD5L	
BWD0L	14	3	BWD4L	
BA01L	15	2	BA02L	
BA00L	16	1	WSCENL	

+28VAC	9	8	REV R
-28VAC	10	7	COM R
+30VDC	11	6	
REV C	12	5	NC
FIRE R	13	4	NC
FIRE C	14	3	REV L
FIRE L	15	2	COM L
COM C	16	1	FWD GRD

	9	8	AUXR-5	
	10	7	AUXR-2	
	11	SCE	6	AUXL-5
	12	5	AUXL-2	
	13	4		
	14	3		
	15	2	NC	
	16	1		

	9	8	BA01H	
	10	7	BA00H	
	11	SCC	6	WSCENL1L
	12	5	WSCENL5L	
	13	4	WSCENL4L	
	14	3	WSCENL3L	
	15	2	WSCENLXL	
	16	1		



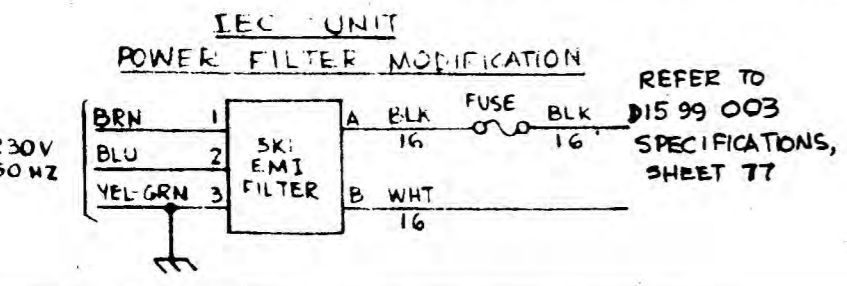
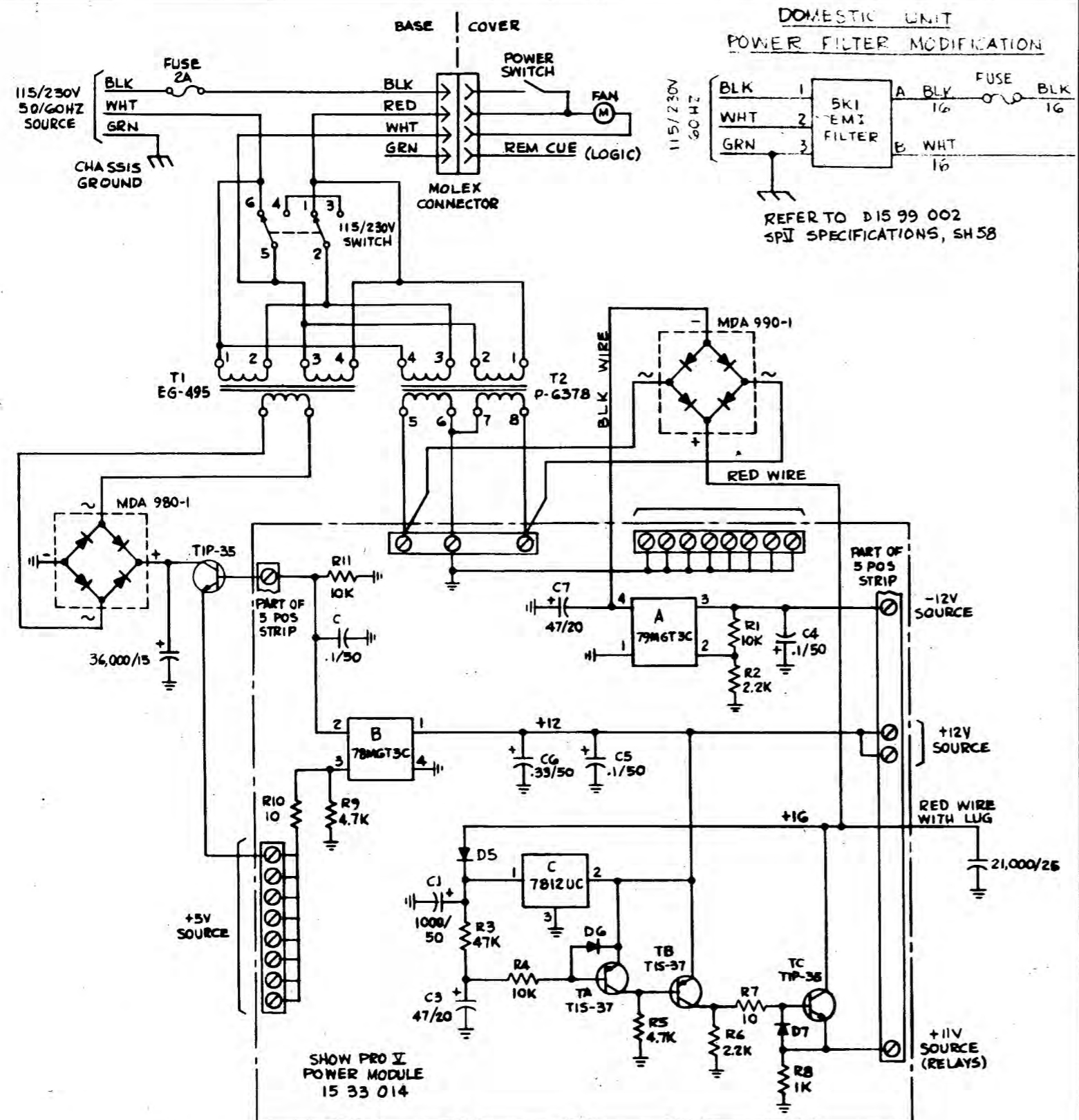
**SCREEN CONTROL SCHEMATIC -SSC**

SCALE:  $\sim$  APPROVED BY: SPJ  
 DATE: 1/25/77 DRAWN BY: [Signature]  
 REVISED: [Signature]

AUDIO VISUAL LABORATORIES, INC.  
 ATLANTIC HIGHLANDS, NEW JERSEY 07716

C15 13 002 SH 1 OF 1 REV A

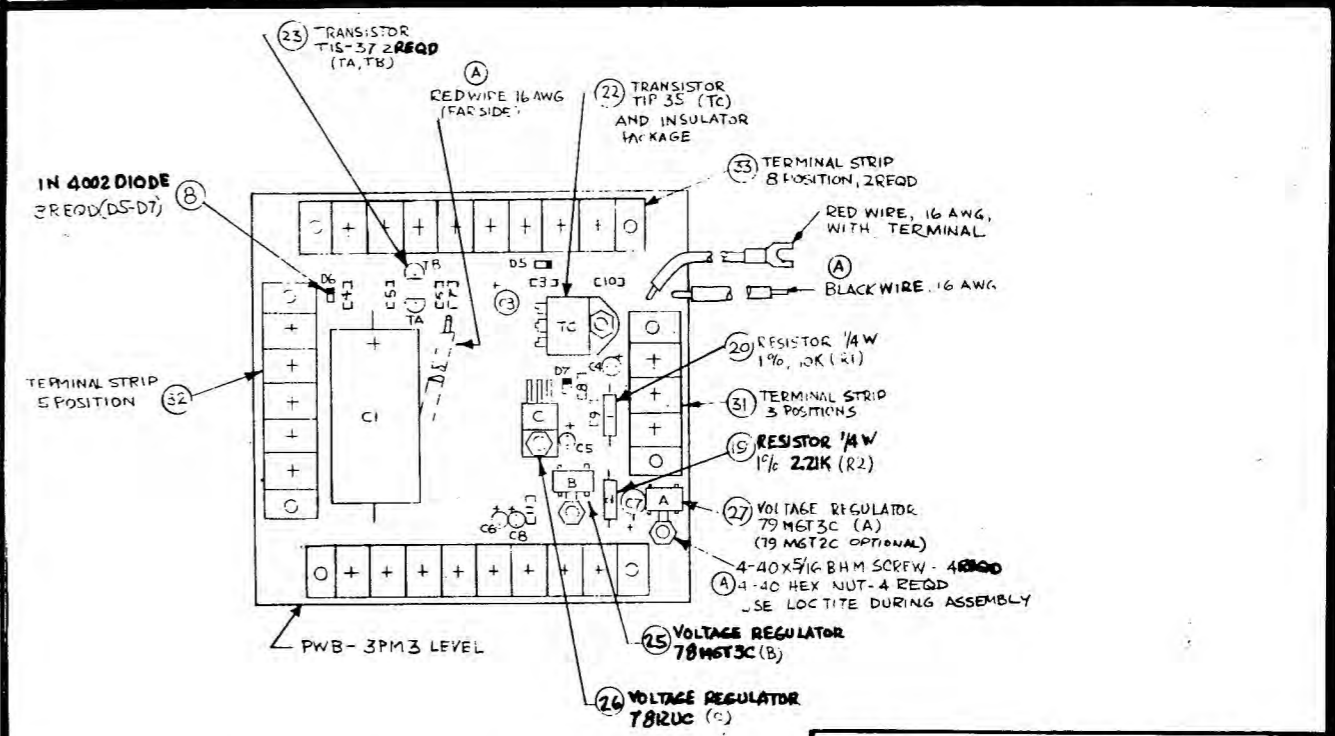
**B 10 83 001** 34 66 A



SHOW PRO II POWER MODULE AND UNIT AC POWER SCHEMATIC

SCALE: 1/1	APPROVED BY:	DRAWN BY: <i>[Signature]</i>
DATE: 2/1/77	REVIEWED:	
AUDIO VISUAL LABORATORIES, INC ATLANTIC HIGHLANDS, NEW JERSEY 07716		
AVL	SHI OF 1	REV B

c 15 13 007



CAPACITORS

ELEC-50V	MYLAR-20V	WANT-50V
C1 1000uf	C3 47uf	C4 0.1uf
	C7 47uf	C5 0.1uf
		C6 0.33uf
		C8 0.1uf

RESISTOR CARBON 1/4W, 5%

SYM	RES	SYM	RES	SYM	RES
R3	47K	R7	10K	R11	10K
R4	10K	R8	1K		
R5	4.7K	R9	4.7K		
R6	2.2K	R10	10.4		

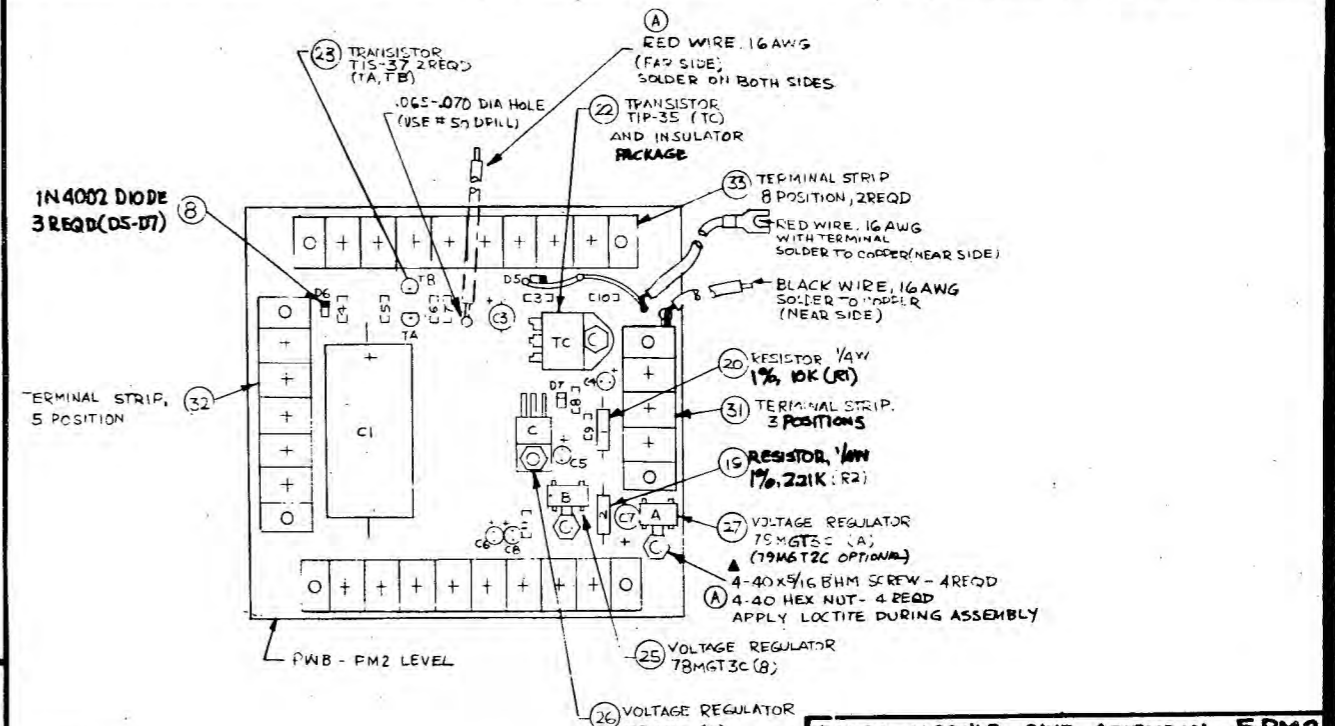
POWER MODULE PWB ASSEMBLY - 5PM3  
SPX

SCALE: 1/1  
DATE: 6-23-76  
APPROVED BY: *[Signature]*  
DRAWN BY: *[Signature]*

AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS, NEW JERSEY 07716

B 15 33 014

SHI OF 1 REV A



NOTE:  
REFER TO SHEET 72 FOR POWER MODULE MODIFICATION REQUIRED FOR BATTERY PACK OPTION.

POWER MODULE PWB ASSEMBLY - 5PM2  
(MODIFIED 3PM2)  
SPX

SCALE: 1/1  
DATE: 6-23-76  
APPROVED BY: *[Signature]*  
DRAWN BY: *[Signature]*

AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS, NEW JERSEY 07716

B 15 33 010

SHI OF 1 REV A

B 10 83 001  
SHI OF 1 REV A



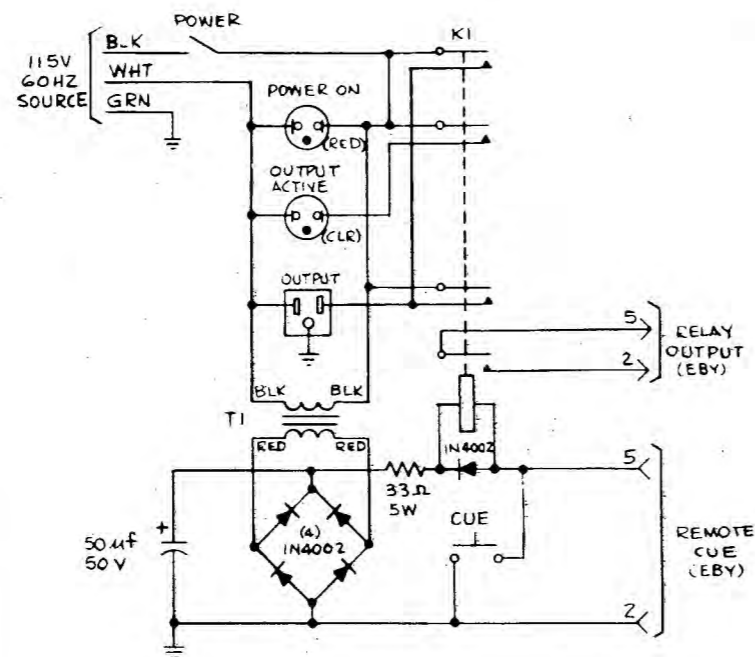


FIG. 1  
SCHEMATIC  
(DOMESTIC UNIT)

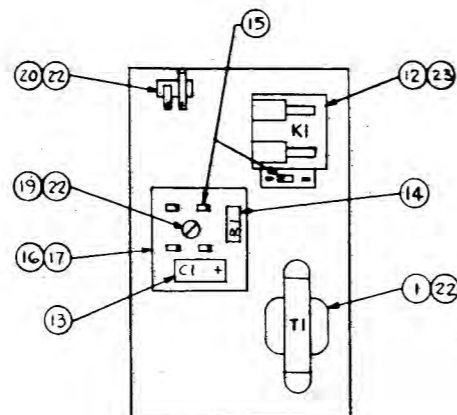
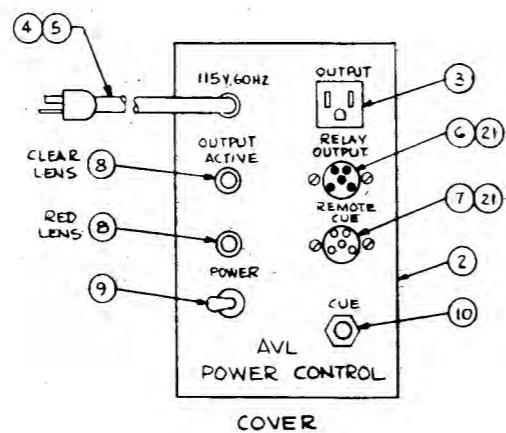


FIG. 3  
ASSEMBLED UNIT

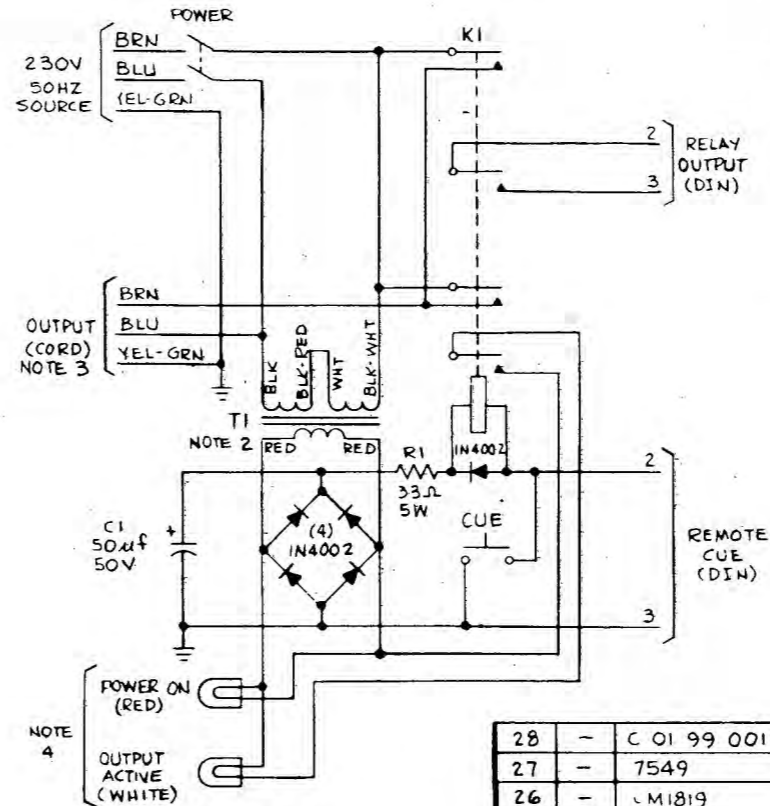


FIG. 2  
SCHEMATIC  
(IEC UNIT)

- NOTES:
1. THIS COMPONENT IS NOT IN COMPLIANCE WITH IEC REQUIREMENTS AND IS NOT SUPPLIED.
  2. TRANSFORMER IS NOT IN COMPLIANCE WITH IEC REQUIREMENTS. AN ENSIGN 7549 TRANSFORMER IS SUPPLIED. WIRE PER FIG. 2 SCHEMATIC.
  3. AC OUTLET IS SUPPLIED BUT IS NOT IN COMPLIANCE WITH IEC REQUIREMENTS. A SR-5P-4 GROMMET IS SUPPLIED SO AN IEC APPLIANCE CORD MAY BE USED TO PROVIDE AN AC OUTPUT. (SEE ITEM 24)
  4. NEON LAMPS ARE NOT IN COMPLIANCE WITH IEC REQUIREMENTS. TWO 30V INCANDESCENT LAMPS AND HOLDERS ARE SUPPLIED (ITEMS 25 & 26). WIRE PER FIG. 2 SCHEMATIC.

ITEM NO.	QTY	PART NUMBER	MANUFACTURER	DESCRIPTION	IEC KIT QTY	NOTE
28	-	C 01 99 001	AVL	SPECIFICATIONS DRAWING	1	
27	-	7549	ENSIGN	TRANSFORMER	1	2
26	-	M1819	CHICAGO LAMP	BULB, INCANDESCENT, 30V	2	4
25	-	E2-410	CALECTRO	LAMP HOLDER ASSEMBLY	2	4
24	-	SR-5P-4	HEYCO	GROMMET, SMALL	1	3
23	✓			8-32 HARDWARE	✓	
22	✓			6-32 HARDWARE	✓	
21	✓			4-40 HARDWARE	✓	
20	1			TERMINAL STRIP, 2 POS	1	
19	1			SHOCKMOUNT	1	
18	4			BUMPER (FOOT)	4	
17	10		VECTOR	FLEA CLIPS	10	
16	1		AVL	VECTOR BOARD, 1 3/4 x 2 1/4	1	
15	5	IN4002		DIODE	5	
14	1			RESISTOR, CARBON, 5W, 33Ω	1	
13	1			CAPACITOR, ELEC, 50µf-50V	1	
12	1	845L-4C-24D	GUARDIAN	RELAY, ON-OFF, 4PDT	1	
11	1	606-633	CALECTRO	TRANSFORMER (P-117V, 5-25.2V)	-	2
10	1	101-HU	SWITCHCRAFT	SWITCH, PB(N.O.) RED	1	
9	1	82607	AH & H	SWITCH, TOGGLE, DPST	1	
8	2	E2-420	CALECTRO	NEON LAMP ASSEMBLY	-	4
7	1	119-5F	EBY	JACK, FEMALE, 5 PIN	-	1
6	1	119-5M	EBY	PLUG, MALE, 5 PIN	-	1
5	1	SR-6P3-4	HEYCO	GROMMET, LARGE	1	
4	1	17419	BELDEN	POWER CORD	-	1
3	1	1280-103	H.H. SMITH	AC OUTLET	1	3
2	1		AVL	COVER	1	
1	1	428	PREMIER	BOX, 5W x 7L x 3H	1	

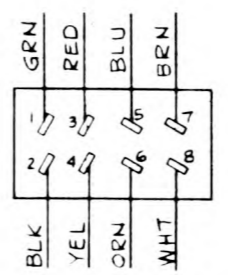
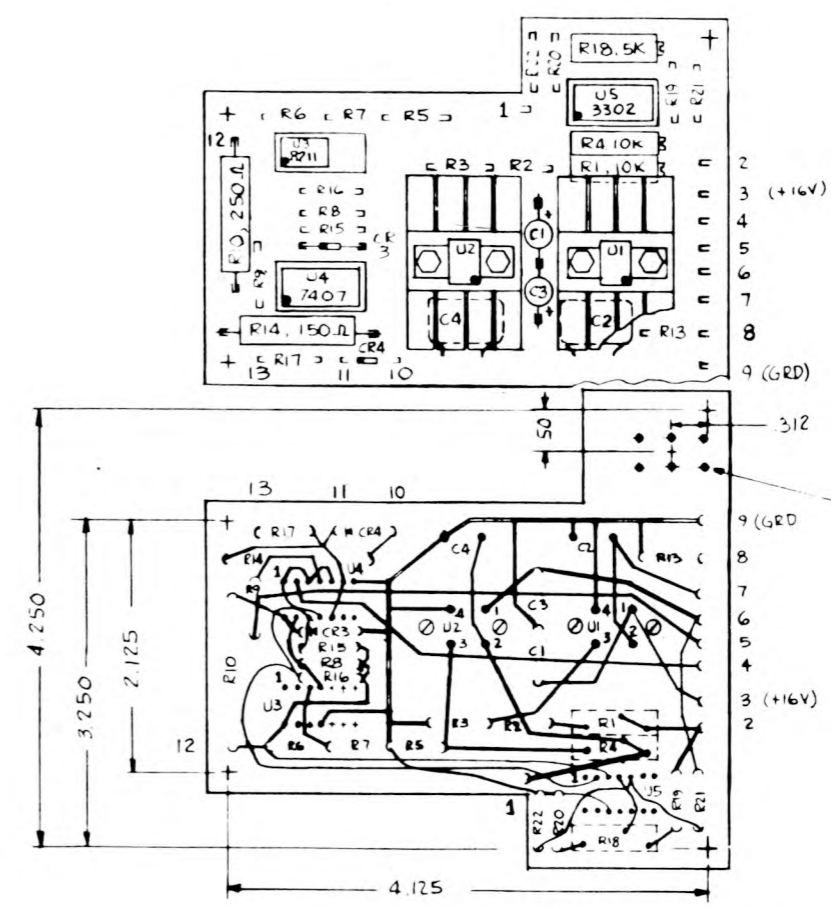
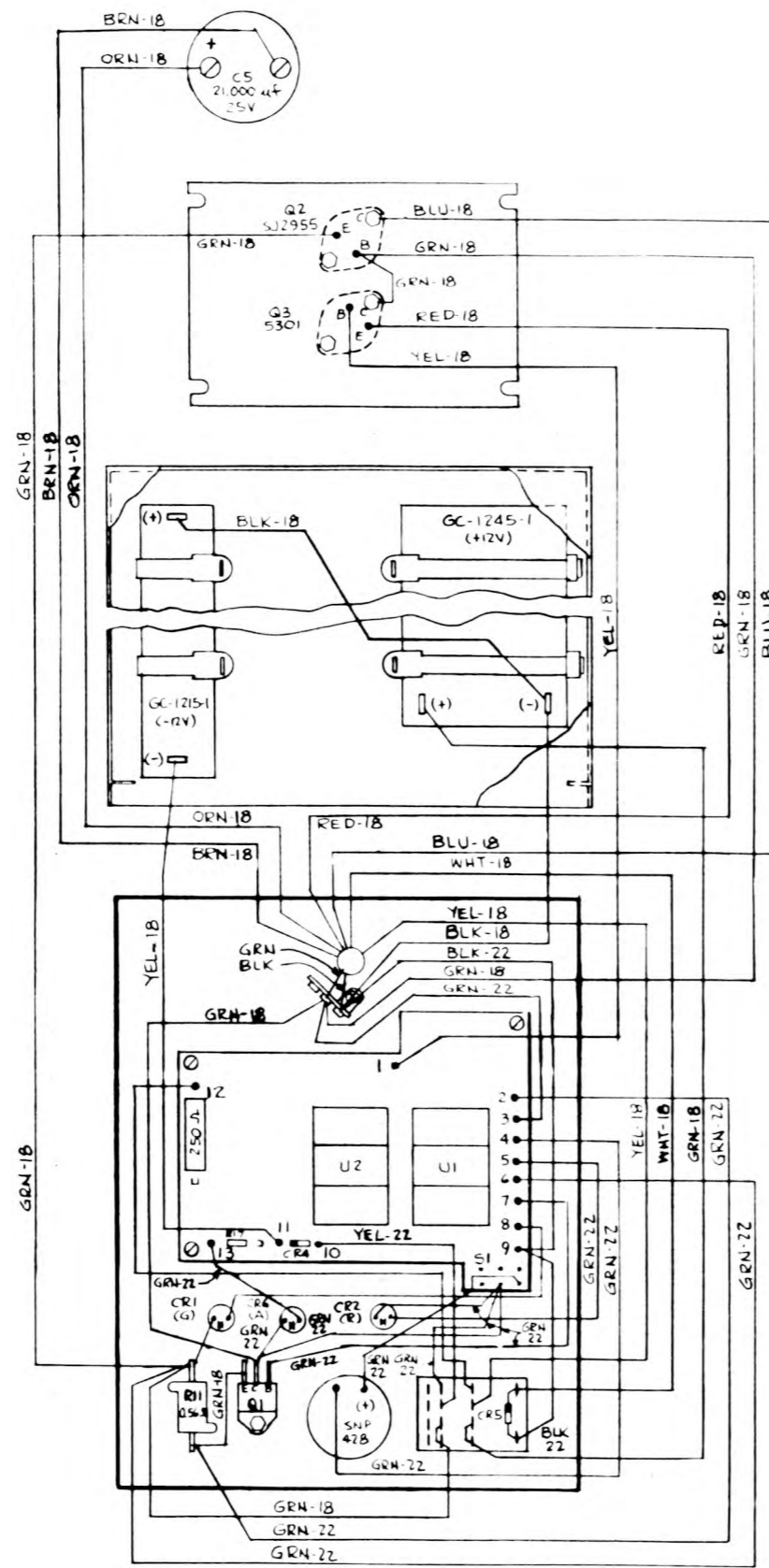
POWER BOX SPECIFICATIONS  
(DOMESTIC AND IEC)

SCALE: NONE APPROVED BY: \_\_\_\_\_ DRAWN BY: \_\_\_\_\_  
 DATE: 3/11/77 REVISION: \_\_\_\_\_

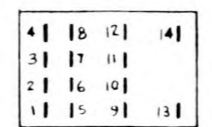
AVL AUDIO VISUAL LABORATORIES, INC  
 ATLANTIC HIGHLANDS, NEW JERSEY 07716

C 01 99 001 SH 1 OF 1 REV 2

B 10 83 001 SH 70 REV A



CABLE CONNECTOR  
(WIRING SIDE)



RELAY CONTACTS

- C1 1.0/50V TANT
- C2 0.1/100V MYLAR
- C3 10/50V TANT
- C4 0.1/100V MYLAR
- C5 21,000/25V ELEC
- U1 4A 78MGT 2C
- U2 4A 78MGT 2C
- U3 ICL8211CPA (IN SOCKET)
- U4 SN7407 (IN SOCKET)
- U5 SN3302 (IN SOCKET)
- CR1 GRN LED ASSEMBLY
- CR2 RED LED ASSEMBLY
- CR3 IN 750
- CR4 IN 400Z
- CR5 IN 400Z
- CR6 AMB LED ASSEMBLY
- R1 10K POT
- R2 4.7K 1/4W
- R3 4.7K 1/4W
- R4 10K POT
- R5 4.7K 1/4W
- R6 15K 1/4W
- R7 1.5K 1/4W
- R8 10K 1/4W
- R9 470Ω, 1/4W
- R10 250Ω, 5W (4602)
- R11 0.5Ω 25W (RH-25)
- R13 470Ω 1/4W
- R14 150Ω 5W (4596)
- R15 10K, 1/4W
- R16 10K 1/4W
- R17 470Ω 1/4W
- R18 5K POT
- R19 10K 1%
- R20 10K 1%
- R21 10K 1%
- R22 10K 1%

PRECISION RESISTOR

**BATTERY PACK ASSEMBLY AND WIRING DIAGRAM**

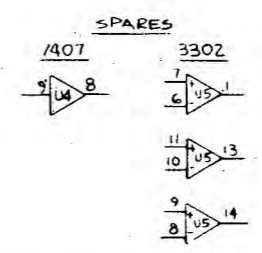
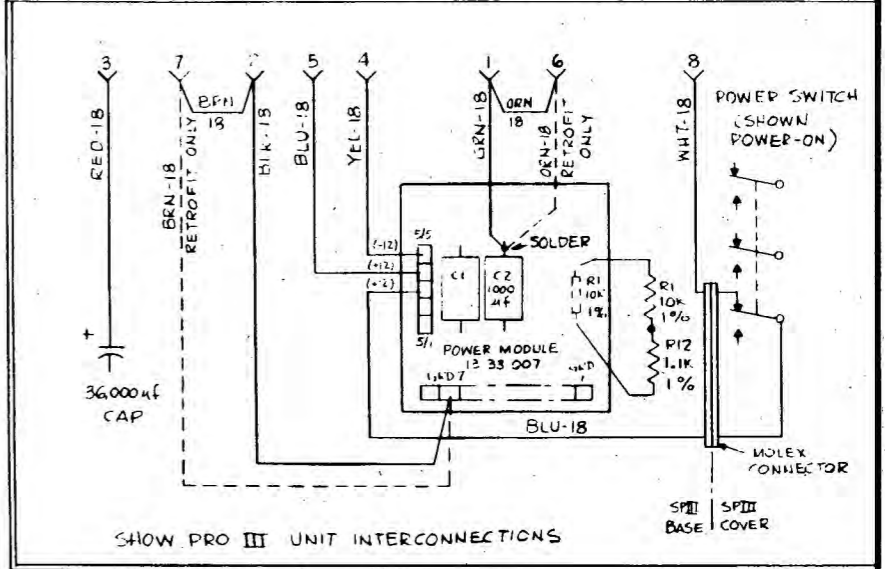
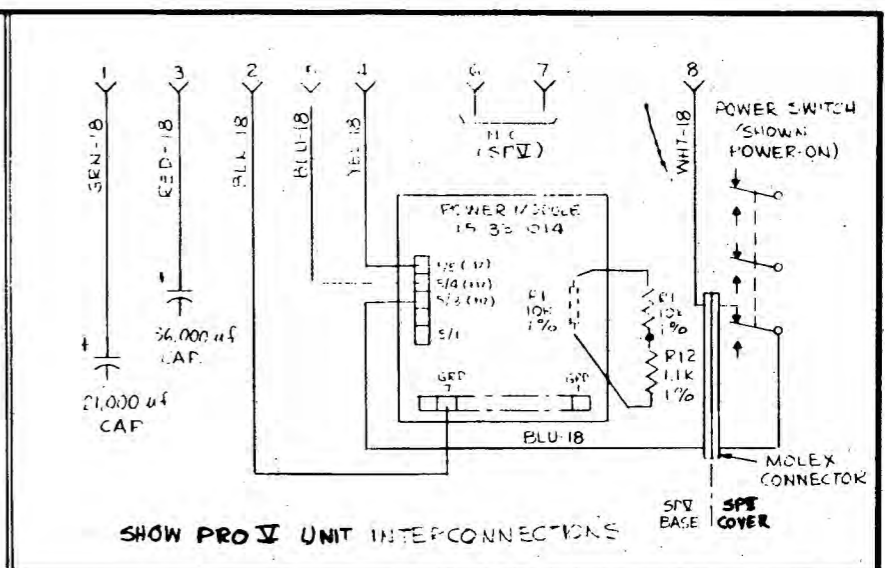
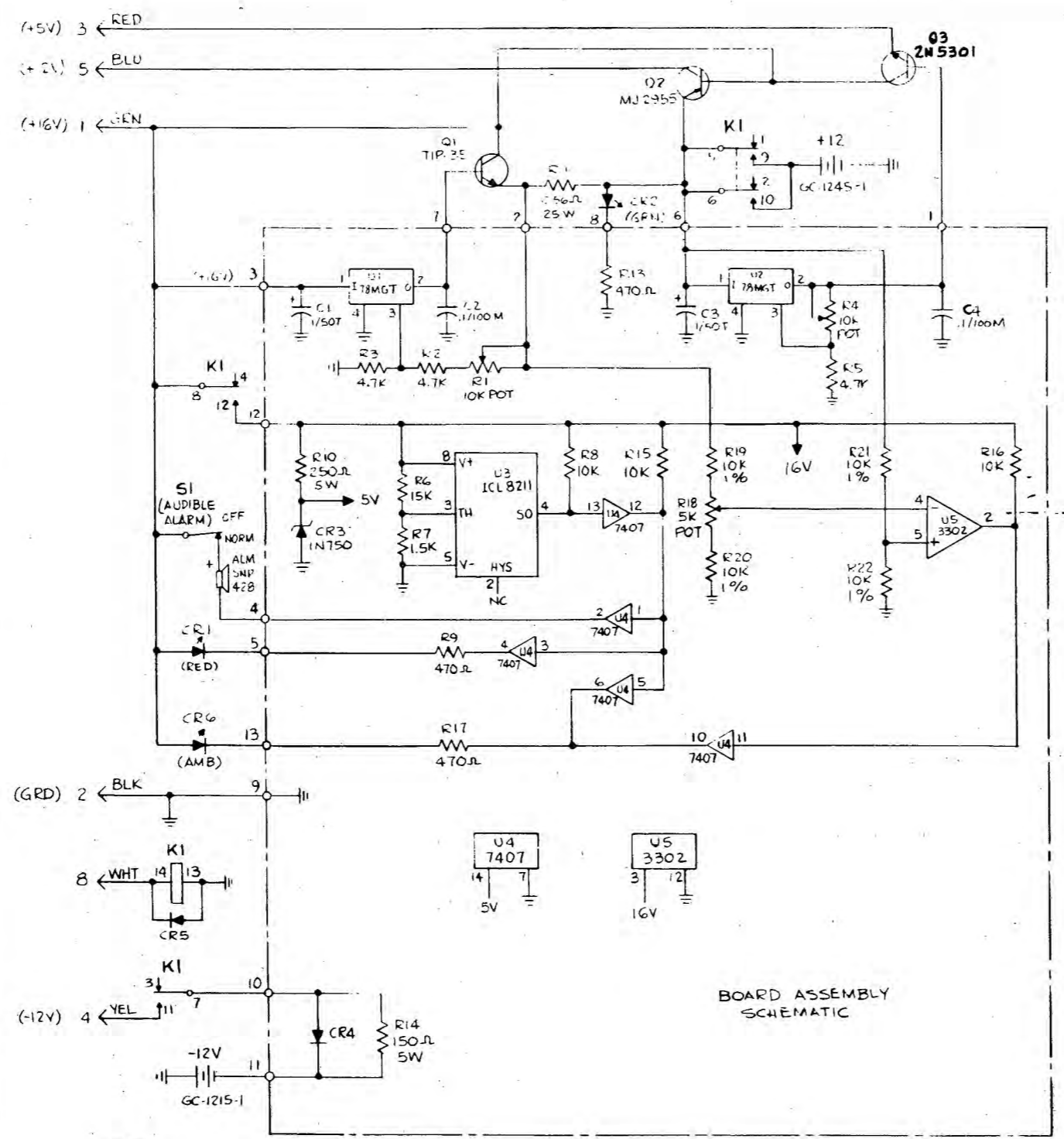
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DATE: 6/17/77      REVISED:

AUDIO VISUAL LABORATORIES, INC.  
ATLANTIC HIGHLANDS, NEW JERSEY 07716

AVL	C 01 33 001	GN 1 OF 2	REV B
B 10 83 001	SH 71	REV A	

REV B 7/24/77 BOARD MODIFIED  
REV A 7/20/77 CKT MODIFIED

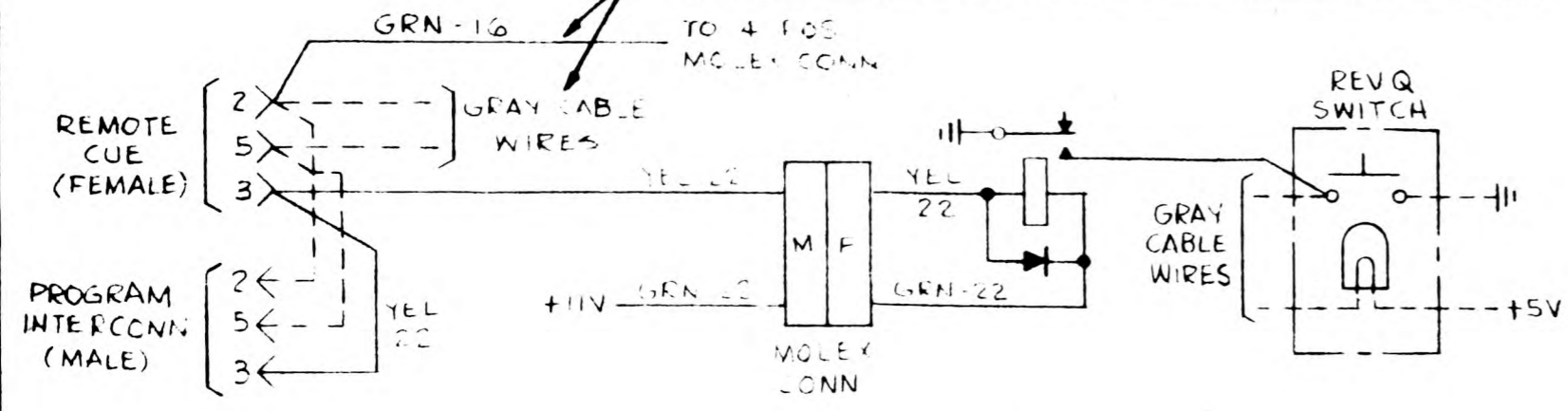


REV H 9/25/77 ADDED SPIII  
REV G 7/21/77 REDRAWN

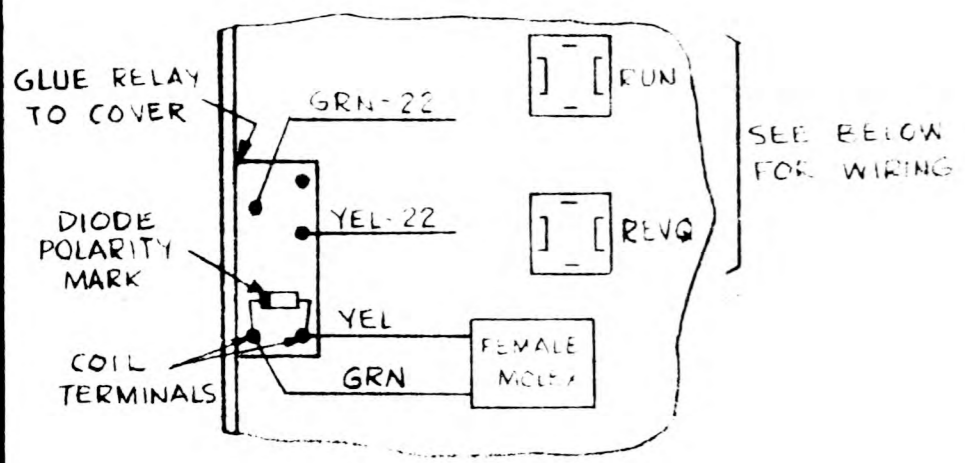
BATTERY PACK SCHEMATIC AND SYSTEM INTERCONNECTIONS

SCALE	APPROVED BY	DRAWN BY
DATE 7/21/77		REVISED
AVL AUDIO VISUAL LABORATORIES, INC ATLANTIC HIGHLANDS, NEW JERSEY 07717		
C 01 13 007		
SH 1	REV H	
OF 1		
B 10 83 001		SH REV
		72 A

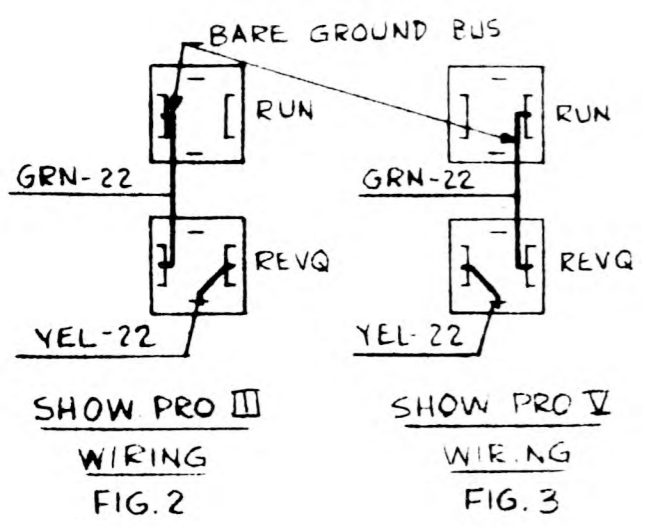
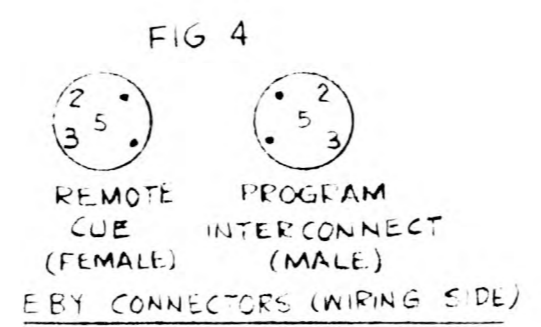
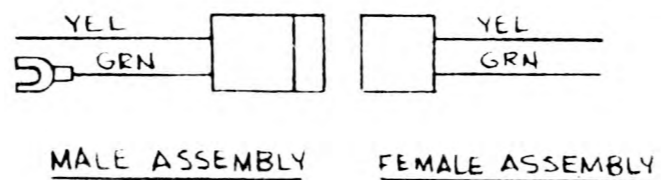
\* DENOTES SCHEMATIC AFTER MODIFICATION PER NOTE 5



REMOTE REVERSE CUE SCHEMATIC



INSIDE VIEW OF COVER  
FIG. 1



SHOW PRO II  
WIRING  
FIG. 2

SHOW PRO V  
WIRING  
FIG. 3

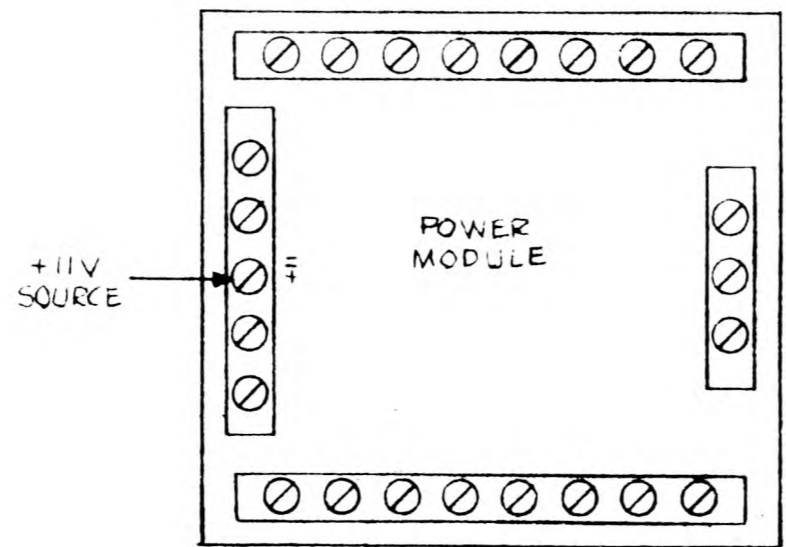


FIG. 5  
REV A 3/11/77 MOD FIG. 1, NOTE 5

INSTALLATION INSTRUCTIONS

COVER

1. ADHERE RELAY TO INSIDE WALL OF COVER NEAR "REVQ" SWITCH (SEE FIG. 1) SCRAPE OFF A SECTION PAINT TO INSURE PROPER ADHESION.
2. ATTACH DIODE AND WIRES FROM FEMALE MOLEX ASSEMBLY TO RELAY COIL TERMINALS. CHECK POLARITY OF DIODE WITH FIG. 1. SOLDER IN PLACE.
3. USING LOOSE PIECES OF WIRE PROVIDED, CONNECT RELAY CONTACTS PER FIG. 1. ATTACH A YELLOW WIRE BETWEEN RELAY AND "REVQ" SWITCH ATTACH A GREEN WIRE BETWEEN RELAY AND BARE WIRE GROUND BUS CONNECTING "REVQ" AND "RUN" SWITCHES. SEE FIG. 2 OR FIG. 3 FOR LOCATION OF TERMINATIONS. SOLDER IN PLACE.

BASE

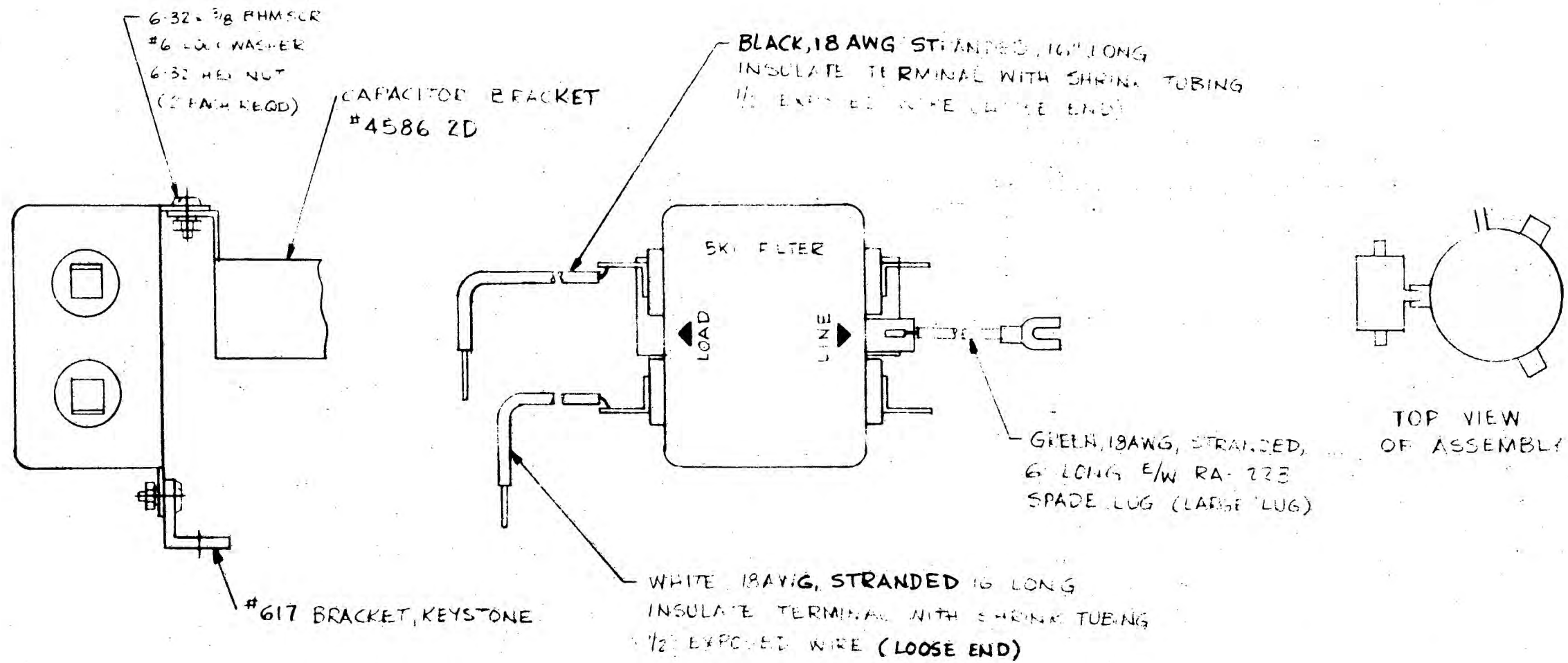
4. USING LOOSE PIECES OF WIRE PROVIDED, ADD A YELLOW WIRE BETWEEN PIN 3 OF "PROGRAM INTERCONNECT" (MALE PLUG) AND PIN 3 OF "REMOTE CUE" (FEMALE JACK). ATTACH YELLOW WIRE FROM MALE MOLEX ASSEMBLY TO PIN 3 OF "REMOTE CUE". SOLDER IN PLACE. (SEE FIG. 4 FOR PINS).
- \* 5. CAREFULLY EXCHANGE GREEN AND GREY WIRES ON PIN 5 WITH GREY WIRE ON PIN 2 (REMOTE CUE ONLY). SOLDER IN PLACE.
6. ATTACH GREEN WIRE EQUIPPED WITH SPADE LUG ON MALE MOLEX ASSEMBLY TO +11V SOURCE ON POWER MODULE (SEE FIG. 5). TIGHTEN SCREW. NOTE - ON SHOW PRO II +11V MAY BE OBTAINED FROM SCREEN CONTROL BOARD NO. 1 (GREEN WIRE).
7. DRESS WIRES OF MOLEX ASSEMBLIES THROUGH WIRE RETAINER CLIPS, FOLLOWING ROUTE OF EXISTING 4-WIRE MOLEX ASSEMBLIES.

PARTS LIST

- 1 RELAY, WG5RPCX, SPDT, 11V
- 1 MALE MOLEX ASSEMBLY (2 POSITION)
- 1 FEMALE MOLEX ASSEMBLY (2 POSITION)
- 1 DIODE, IN4002
- 1 GREEN WIRE, 22 AWG, SOLID, 24"
- 1 YELLOW WIRE, 22 AWG, SOLID, 24"
- 1 EPOXY GLUE KIT 2 PART, FAST SETTING

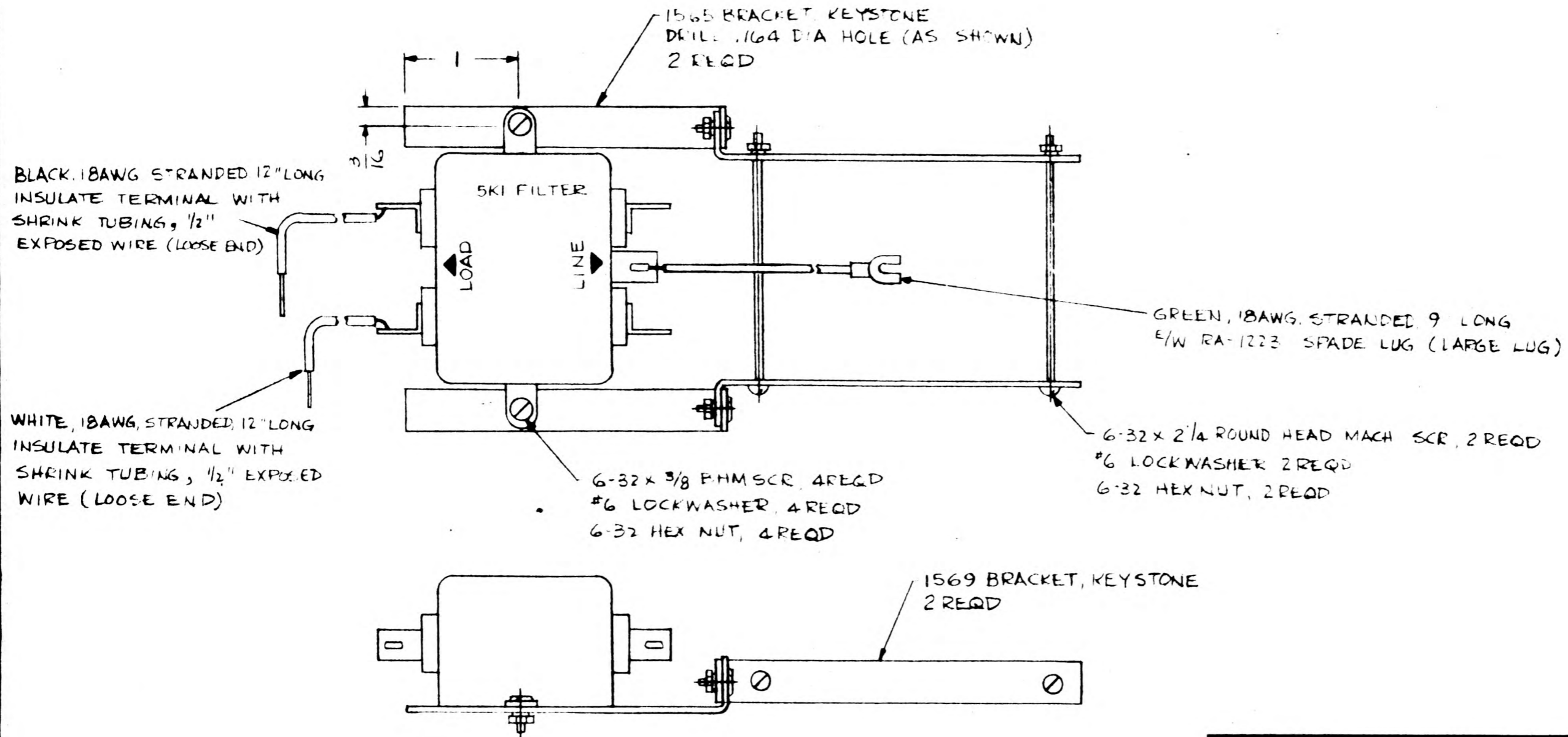
REMOTE REVERSE CUE KIT INSTALLATION INFORMATION			
SCALE NONE	APPROVED BY	DRAWN BY	
DATE 1/28/77		REVISED	
AVL	AUDIO VISUAL LABORATORIES, INC ATLANTIC HIGHLANDS, NEW JERSEY 07716		
	B 13 53 004	SH 1 OF 1	REV A

B 10 83 001	SH 73	REV A
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NOTE - FOR FIELD INSTALLATION INSTRUCTIONS  
REFER TO AVL 13 53 005, AVAILABLE FROM  
CUSTOMER SERVICE.

SHOW PRO 3 POWER FILTER MODIFICATION KIT SKI FILTER ASSEMBLY			
SCALE $\times$	APPROVED BY	DRAWN BY $\times$	
DATE 4/26 77		REVISED	
AVL	AUDIO VISUAL LABORATORIES, INC ATLANTIC HIGHLANDS, NEW JERSEY 07716		
	B 13 33 017	SH 1 OF 1	REV $\times$
B10 83 001			SH 74 REV A



NOTE - FOR FIELD INSTALLATION INSTRUCTIONS  
REFER TO AVL 15 53 003, AVAILABLE  
FROM CUSTOMER SERVICE.

SHOW PRO 5 POWER FILTER MODIFICATION KIT 5KI FILTER ASSEMBLY			
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DATE 4/20/77		REVISED	
AVL	AUDIO VISUAL LABORATORIES, INC ATLANTIC HIGHLANDS, NEW JERSEY 07716		
	B 15 33 015	SH 1 OF 1	REV <i>[Signature]</i>

B 10 83 001 75 A



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