

DECEMBER, 1985
PART NO. — 314001-05

SX 64

PORTABLE COMPUTER

— SCHEMATICS —

 **commodore**

PART NO. — 314001-05

SX 64

PORTABLE COMPUTER

— SCHEMATICS —

Commodore Business Machines, Inc.

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INTRODUCTION

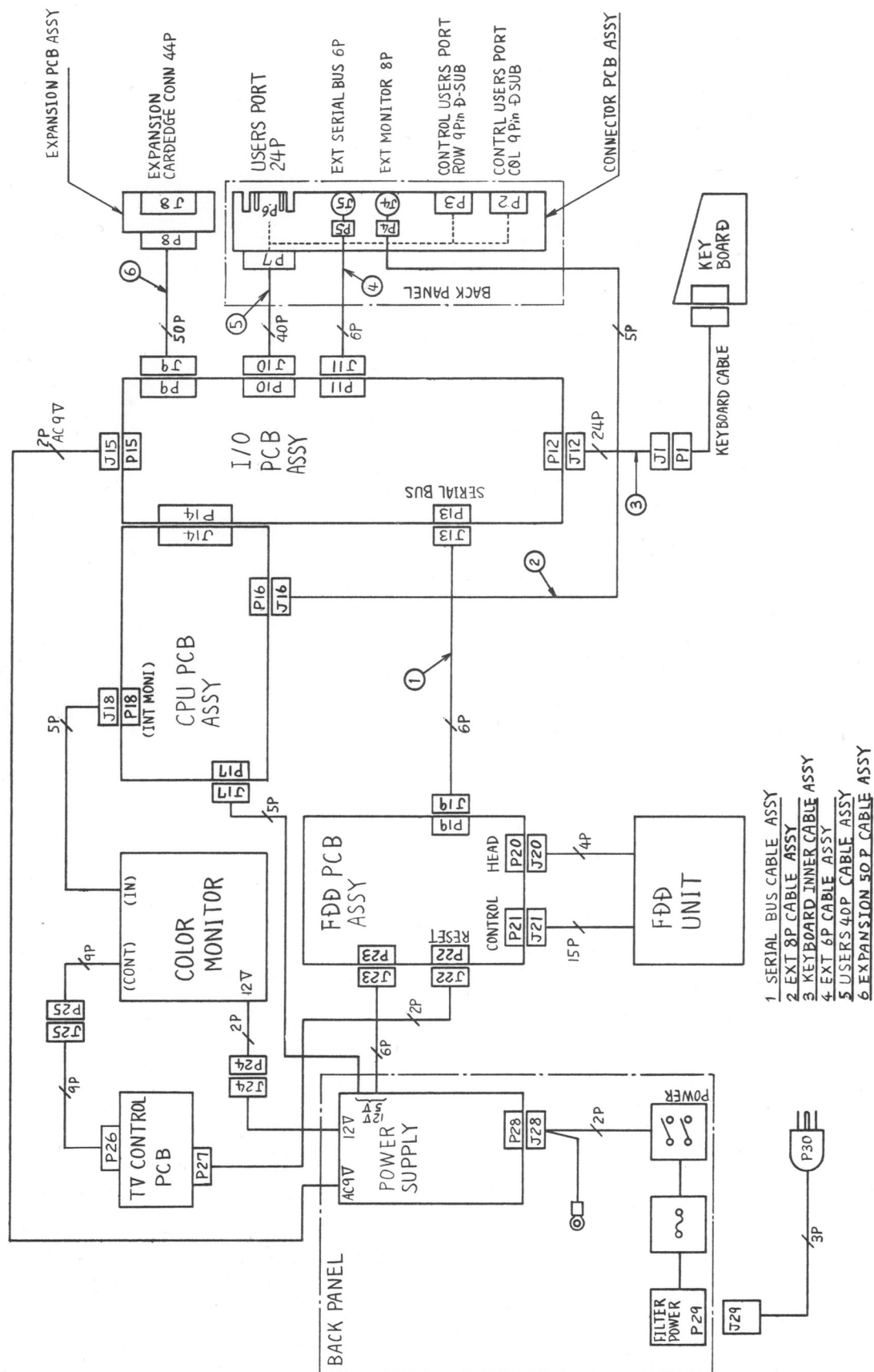
The SCHEMATICS and PARTS LISTS provided herein are intended for use by QUALIFIED SERVICE PERSONNEL. The troubleshooting, theory and diagnostics of the C64, 1702 and 1541 SERVICE MANUALS are **generally** applicable to the SX 64.

Parts availability from Commodore is limited. Some of the custom chips are used in many devices and are in stock. However, parts used in the monitor and power supply may be unique to the OEM manufacturer who supplied those assemblies. Only those parts indicated with a "C" are available from Commodore.

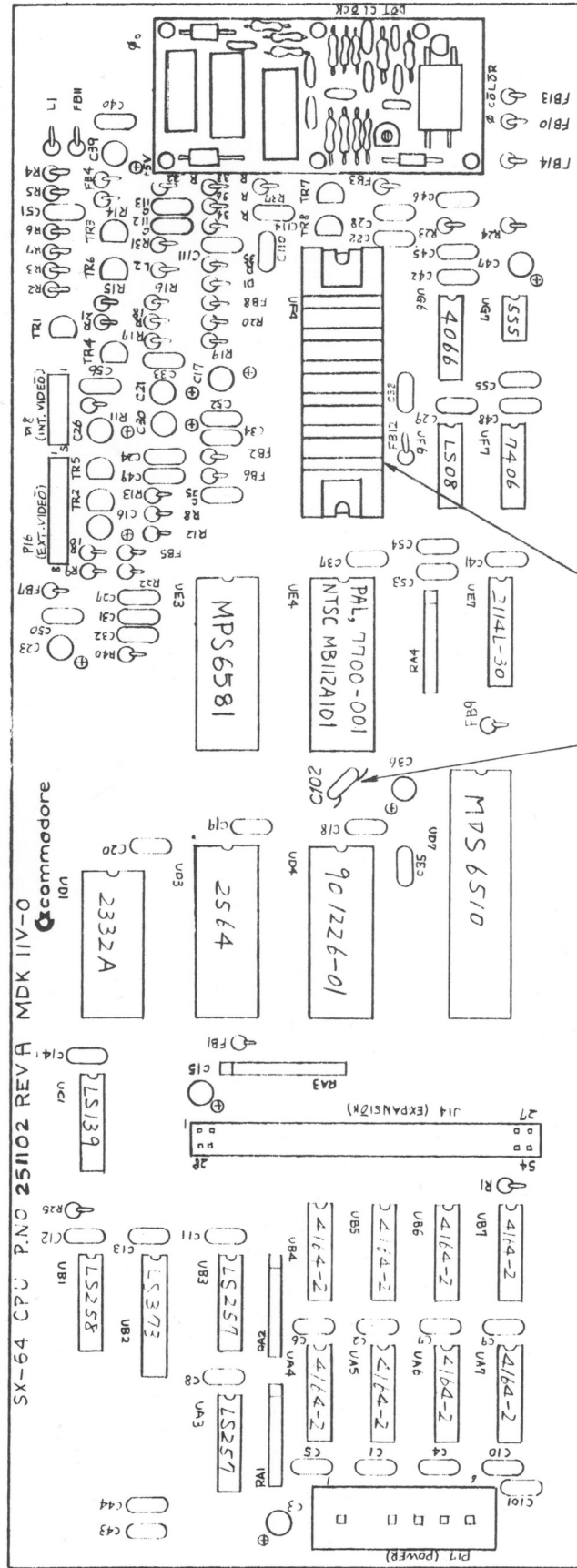
ASSEMBLY PARTS

C 250634-01	SX 64	KEYBOARD CABLE
C 251249-01	SX 64	USERS MANUAL
C 251250-01	SX 64	DEMO DISK
C 251555-01	SX 64	KEYBOARD
C 314095-01	SX 64	SINGLE KEY ASSY
C 325519-03	SX 64	ALPS DRIVE ASSY

BLOCK DIAGRAM

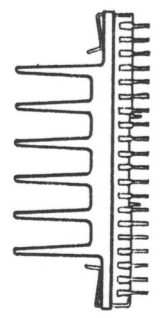
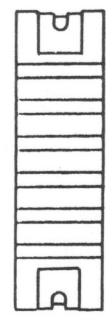
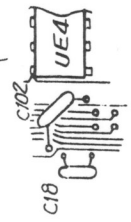


SX 64 CPU PCB LAYOUT



SEE DETAIL A

DETAIL



DETAIL A

PARTS LIST

SX 64 CPU

PCB ASSEMBLY #250408-01

PLEASE NOTE

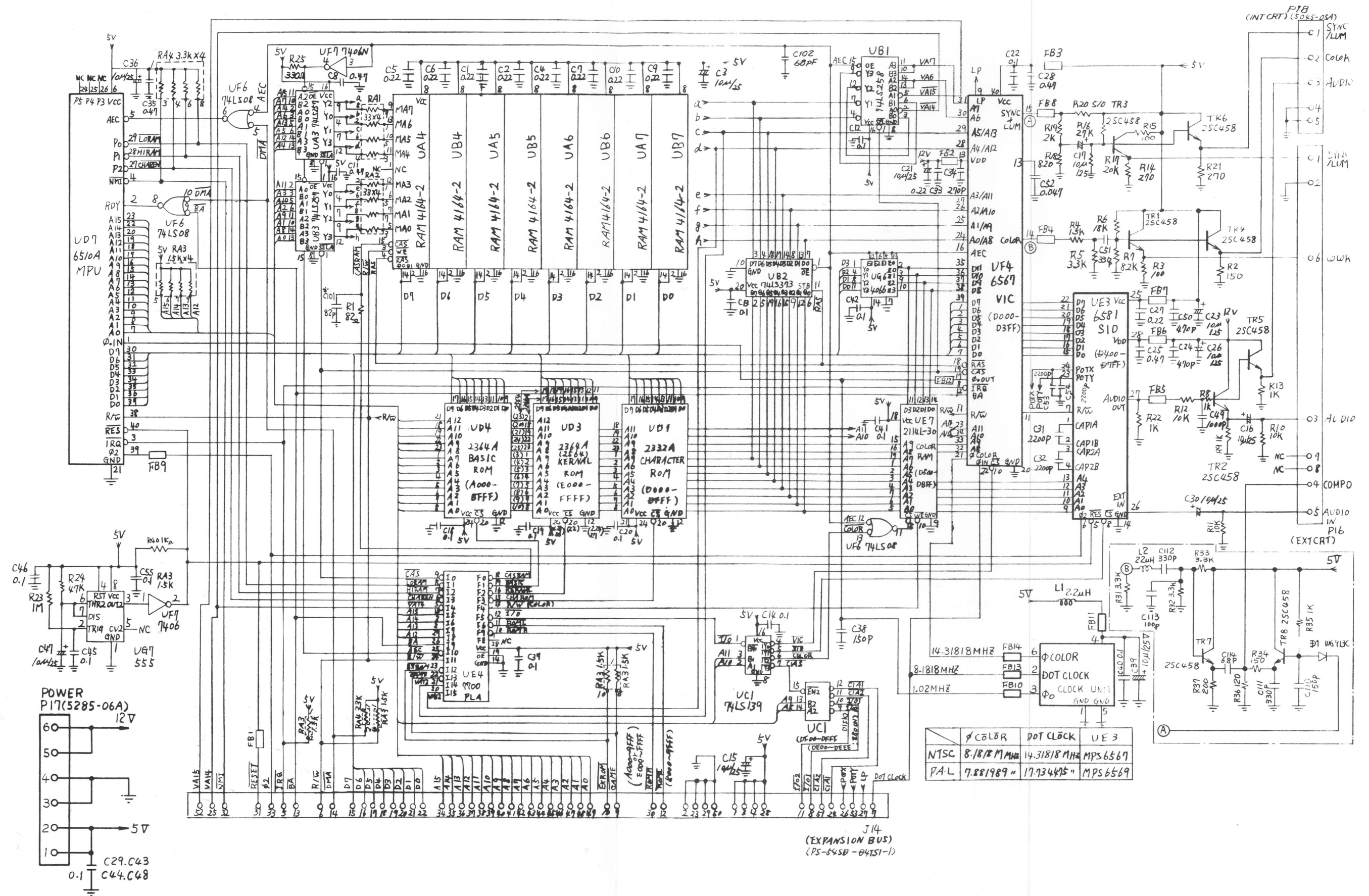
Commodore part numbers are provided for reference only and do not indicate the availability of parts from Commodore. Industry standard parts (Resistors, Capacitors, Connectors) should be secured locally.

INTEGRATED CIRCUITS			RESISTORS (Continued)			
UA3	74LS257	DO NOT USE TI OR NS	R21	270		
UA4-UA7	4164 DRAM 200NS		R22	1K		
UB1	74LS258		R23	1M		
UB2	74LS373		R24	47K		
UB3	74LS257	DO NOT USE TI OR NS	R25	330		
UB4-UB7	4164 DRAM 200NS		R31, 32,	3.3K		
UC1	74LS139		33			
UD1	2332 ROM CHAR	C 901225-01	R34	150		
UD3	2364 ROM Kernal	C 251104-04	R35	1K		
UD4	2364 ROM Basic	C 901226-01	R36	120		
UD7	6510 Microprocessor	C 906107-01	R37	200		
UE3	6581 SID	C 906112-01	RESISTOR PACKS			
UE4	7700-001 PLA	C 906114-01	RA1, 2	33	8Pin	
UE7	2114 RAM 300NS		RA3	3.3K	10Pin	
UF4	6567 VIC	C 906109-04	RA4	3.3K	8Pin	
UF6	7408		CAPACITORS			
UF7	7406		C1, 2	Ceramic	0.22μF,	25V
UG6	4066		C3	Elect	10μF,	25V
UG7	555 TIMER		C4-7	Ceramic	0.22μF,	25V
TRANSISTORS			C8	Ceramic	0.47μF,	50V
TR1-8	2SC 458		C9,10	Ceramic	0.22μF,	25V
DIODES			C11	Ceramic	0.47μF,	50V
D1	Diode, Signal WG 713C		C12-14	Ceramic	0.1μF,	25V
RESISTORS — All Values are in ohms-1/4 W 5% unless noted otherwise.			C15-17	Elect	10μF,	25V
R1	82		C18-20	Ceramic	0.1μF,	25V
R2	150		C21	Elect	10μF,	25V
R3	100		C22	Ceramic	0.1μF,	25V
R4	1.5K		C23	Elect	10μF,	25V
R5	3.3K		C24	Ceramic	470pF,	50V
R6	18K		C25	Ceramic	0.47μF,	50V
R7	8.2K		C26	Elect	10μF,	25V
R8	1K		C27	Ceramic	0.22μF,	25V
R9	1K		C28	Ceramic	0.47μF,	50V
R10, 11, 12	10K		C29	Ceramic	0.1μF,	25V
R13	1K		C30	Elect	10μF,	25V
R14	270		C31, 32	Ceramic	2200pF,	50V
R15	100		C33	Ceramic	0.22μF,	50V
R16	27K		C34	Ceramic	270pF,	50V
R17	20K		C35	Ceramic	0.47μF,	50V
R18	820		C36	Elect	10μF,	25V
R19	2K		C37	Ceramic	0.01μF,	25V
R20	510		C38	Ceramic	150pF,	50V
			C39	Elect	10μF,	25V
			C40-46	Ceramic	0.1μF,	25V
			C47	Elect	10μF,	25V
			C48	Ceramic	0.1μF,	25V

PARTS LIST PCB ASSEMBLY #250408-01 (Continued)**C - Indicates Commodore Stocked Part Number**

CAPACITORS (Continued)				MISCELLANEOUS	
C49	Ceramic	1000pF,	25V	FB1-14	Ferrite bead
C50	Ceramic	470pF,	50V		
C51	Ceramic	33pF,	50V	L1	Coil Inductor 2.2 μ H
C52	Ceramic	0.047 μ F,	25V	L2	Coil Inductor 22 μ H
C53, 54	Ceramic	1800pF,	50V		
C55	Ceramic	0.1 μ F,	25V	Y1	Clock Osc 14.31818 MHz 251105-01
C101	Ceramic	82pF			
C102	Ceramic	68pF			
C110	Ceramic	150pF,	50V		
C111, 12	Ceramic	330pF			
C113	Ceramic	100pF			
C114	Ceramic	68pF			

SX 64 CPU SCHEMATIC DIAGRAM



PARTS LIST

SX 64 DISK CONTROL PCB

PCB ASSEMBLY #250410-01

PLEASE NOTE:

Commodore part numbers are provided for reference only and do not indicate the availability of parts from Commodore. Industry standard parts (Resistors, Capacitors, Connectors) should be secured locally.

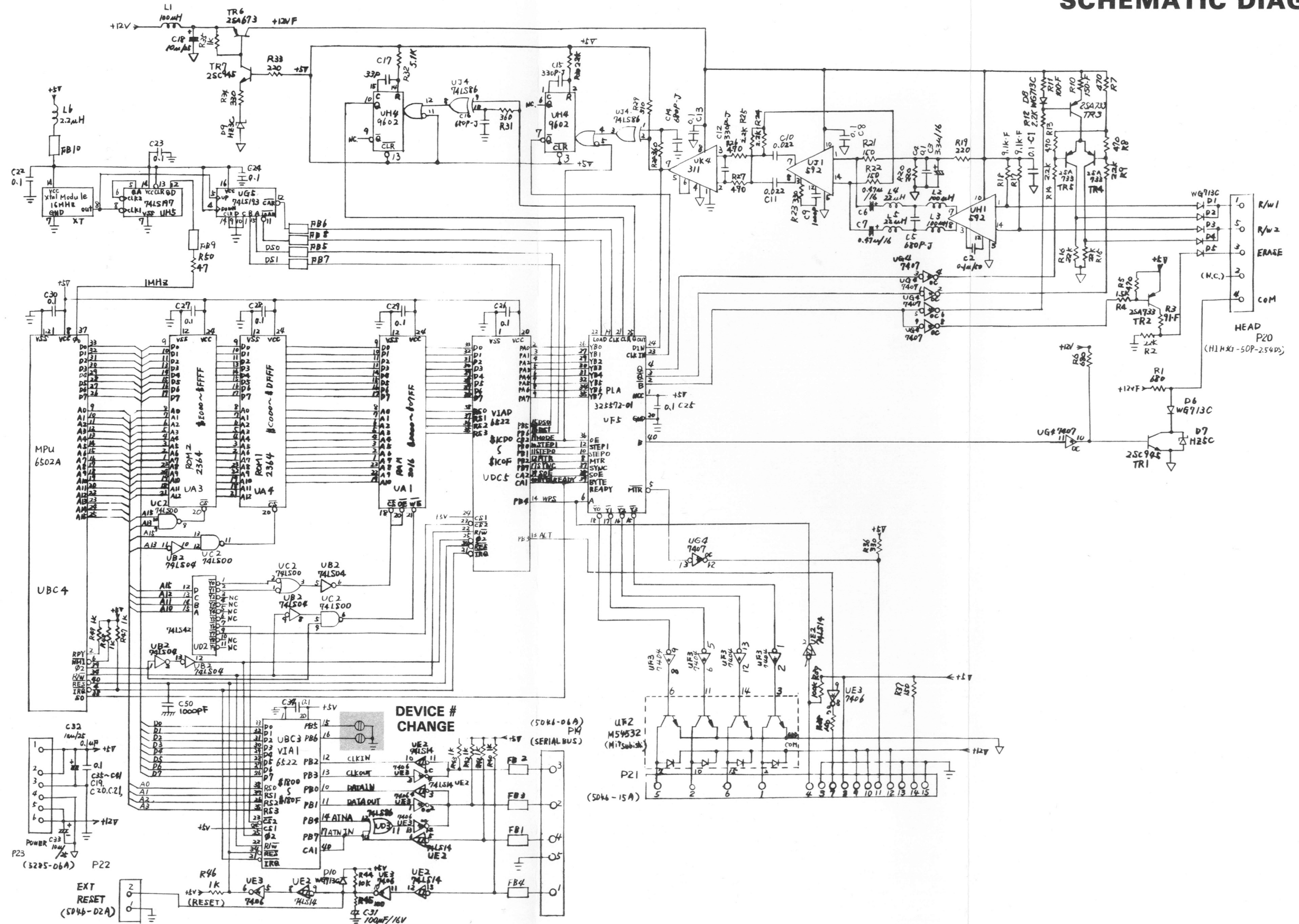
INTEGRATED CIRCUITS			RESISTORS (Continued)		
			— All are carbon 1/4 watt, 5% unless noted		
UA1	TMM2016P RAM		R7, 8	470	
UA3	ROM \$E000-\$FFFF	C 901229-05	R9	2.2K	
UA4	ROM \$C000-\$DFFF	C 325302-01	R10	150 1/4W, 1%	
UB2	74LS04		R11	100 1/4W, 1%	
UBC3	6522 VIA	C 901437-01	R12	2.2K	
UBC4	6502A CPU	C 901435-02	R13	470	
UC2	74LS00		R14	2.2K	
UD2	74LS42		R15, 16	22K	
UD3	74LS86		R17, 18	9.1K 1/4W, 1%	
UDC5	6522 VIA	C 901437-01	R19, 20	220	
UE2	74LS14		R21, 22	150	
UE3	7406		R23	330	
UF2	M54532P TRANS ARRAY	MITSUBISHI SUB:	R24, 25	2.2K	
	ULN2064 TRANS ARRAY		R26, 27	470	
UF3	7404		R28	360	
UF5	GATE ARRAY	C 325572-01	R29	510	
UG4	7407		R30	22K	
UG5	74LS193		R31	360	
UH1	592 VIDEO AMP		R32	5.1K	
UH4	9602 ONE SHOT		R33	220	
UH5	74LS197		R34	330	
UJ1	592 VIDEO AMP		R35	1K	
UJ4	74LS86		R36	330	
UK4	LM311 COMPARATOR		R37, 38	150	
TRANSISTORS			R39	100K	
TR1	2SC 945	SUB:2SC 1815	R40-43	1K	
TR2-5	2SA 733	SUB:2SA 1015	R44	10K	
TR6	2SA 673		R45	100	
TR7	2SC 945	SUB:2SC 1815	R46-49	1K	
DIODES			R50	47	
D1-6	Signal, 1N4148		CAPACITORS		
D7	Zener, 5.1V, 500mW, +/-5% HZ5C-2		C1, 2	Ceramic	.1μF, 25V
D8	Signal, 1N4148		C3	Electrolytic	3.3μF, 16V
D9	Zener, 3.3V, 500mW, +/-5% HZ3C-2		C4	Ceramic	.1μF, 25V
D10	Signal, 1N4148		C5	Ceramic	680pF, 50V
RESISTORS — All are carbon 1/4 watt, 5% unless noted			C6, 7	Tantalum	0.47μF, 16V
R1	680		C8	Ceramic	.1μF, 25V
R2	22K		C9	Ceramic	1000pF, 25V
R3	91 1/4W, 1%		C10, 11	Ceramic	.022μF, 25V
R4	1.5K		C12	Ceramic	330pF, 50V
R5	470		C13	Ceramic	.1μF, 25V
R6	680		C14	Ceramic	680pF, 50V
			C15	Ceramic	330pF, 50V
			C16	Ceramic	680pF, 50V
			C17	Ceramic	33pF, 50V
			C18	Electrolytic	10μF, 25V
			C19-21	Ceramic	.1μF, 25V

PARTS LIST SX 64 CPU PCB ASSEMBLY #250410-01 (Continued)

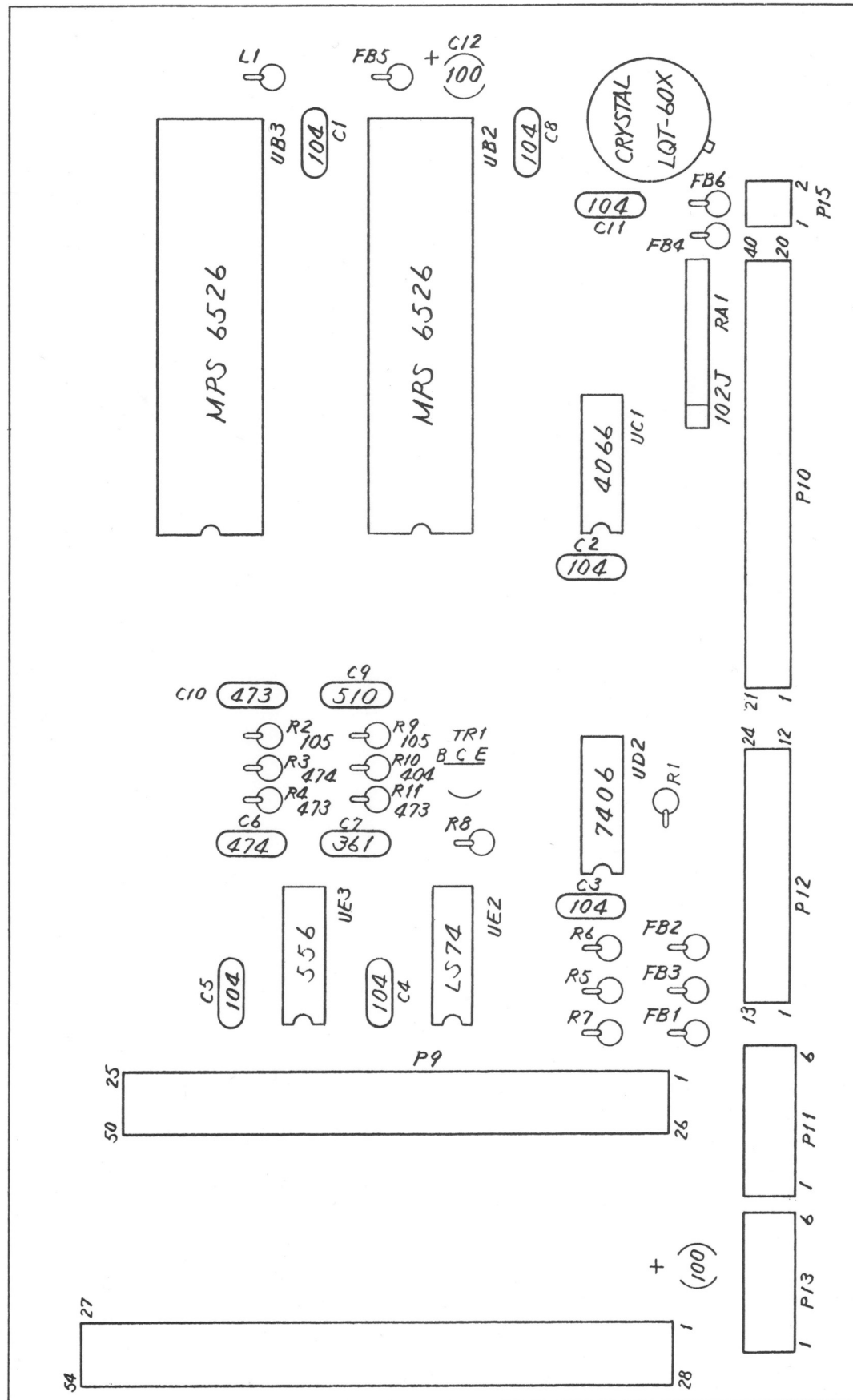
C - Indicates Commodore Stocked Part Number

CAPACITORS (Continued)				MISCELLANEOUS — PCB ASSY #1540048	
C22-30	Ceramic	.1 μ F,	25V	FB1-10	Ferrite Bead
C31	Electrolytic	100 μ F,	16V	L1-3	Coil Inductor 100 μ H
C32, 33	Electrolytic	10 μ F,	25V	L4, 5	Coil Inductor 22 μ H
C34-41	Ceramic	.1 μ F,	25V	L6	Coil Inductor 2.2 μ H
C50	Ceramic	1000pF,	25V	Y1	Crystal Module 16 MHz 50ppm (NDK, Tyocom) 325566-01 Sub: Crystal Module 16 MHz 100ppm (NDK, Tyocom, Kyocera) 325566-02

SX 64 FDD SCHEMATIC DIAGRAM



SX 64 I/O PCB LAYOUT



PARTS LIST

SX 64 I/O

PCB ASSEMBLY #250409-01

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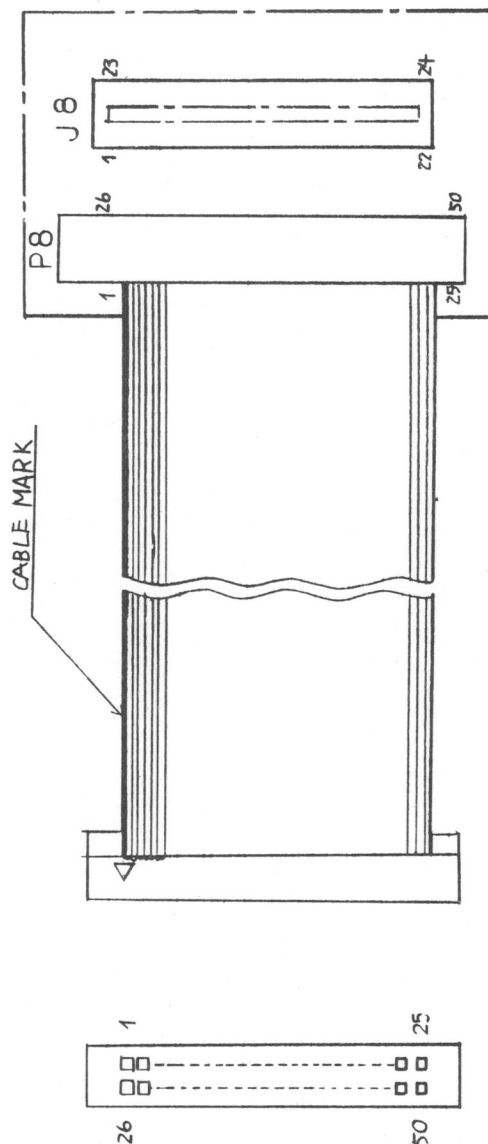
INTEGRATED CIRCUITS		RESISTOR PACK	
UC1	4066	RA1	1K 8Pin
UB2, 3	6526 CIA	CAPACITORS	
UD2	7406		
UE2	74LS74A	C1-5	Ceramic 0.1 μ F, 25V
UE3	556	C6	Ceramic 0.47 μ F, 50V
TRANSISTORS		C7	Ceramic 330pF, 50V
TR1	2SC 945	C8-11	Ceramic 0.1 μ F, 25V
RESISTORS — All Values are in ohms-1/4 W 5% unless noted otherwise.		C12, 13	Elect 10 μ F, 25V
R1	220	MISCELLANEOUS	
R3	3.3K	FB1-6	Ferrite Bead
R4	47K	L1	Coil Inductor 2.2 μ H
R5, 6, 7	1K	UA1	Crystal Module 60Hz
R8	100K		
R10	3.3K		
R11	47K		

SX 64 I/O

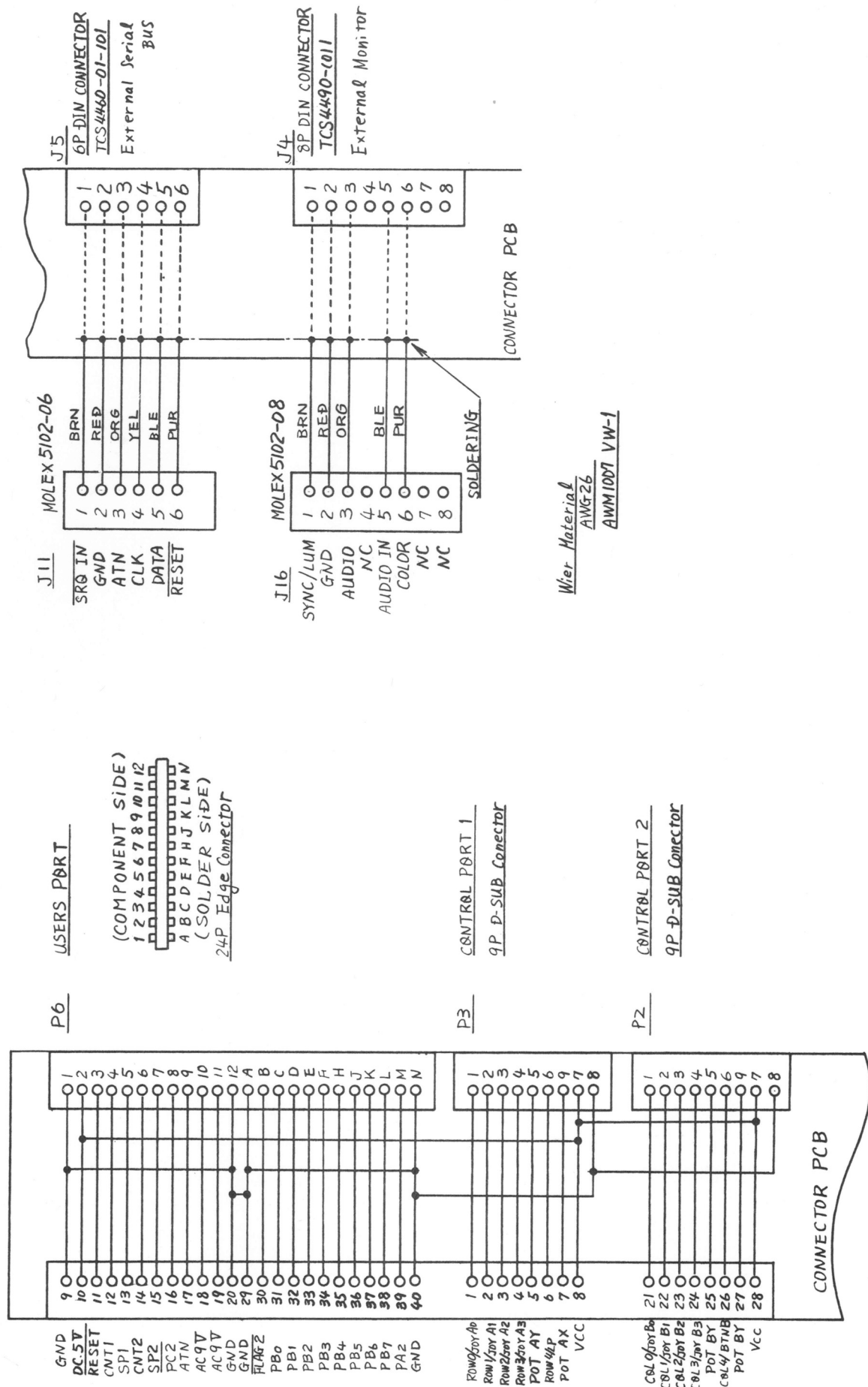


SX 64 EXPANSION PCB LAYOUT

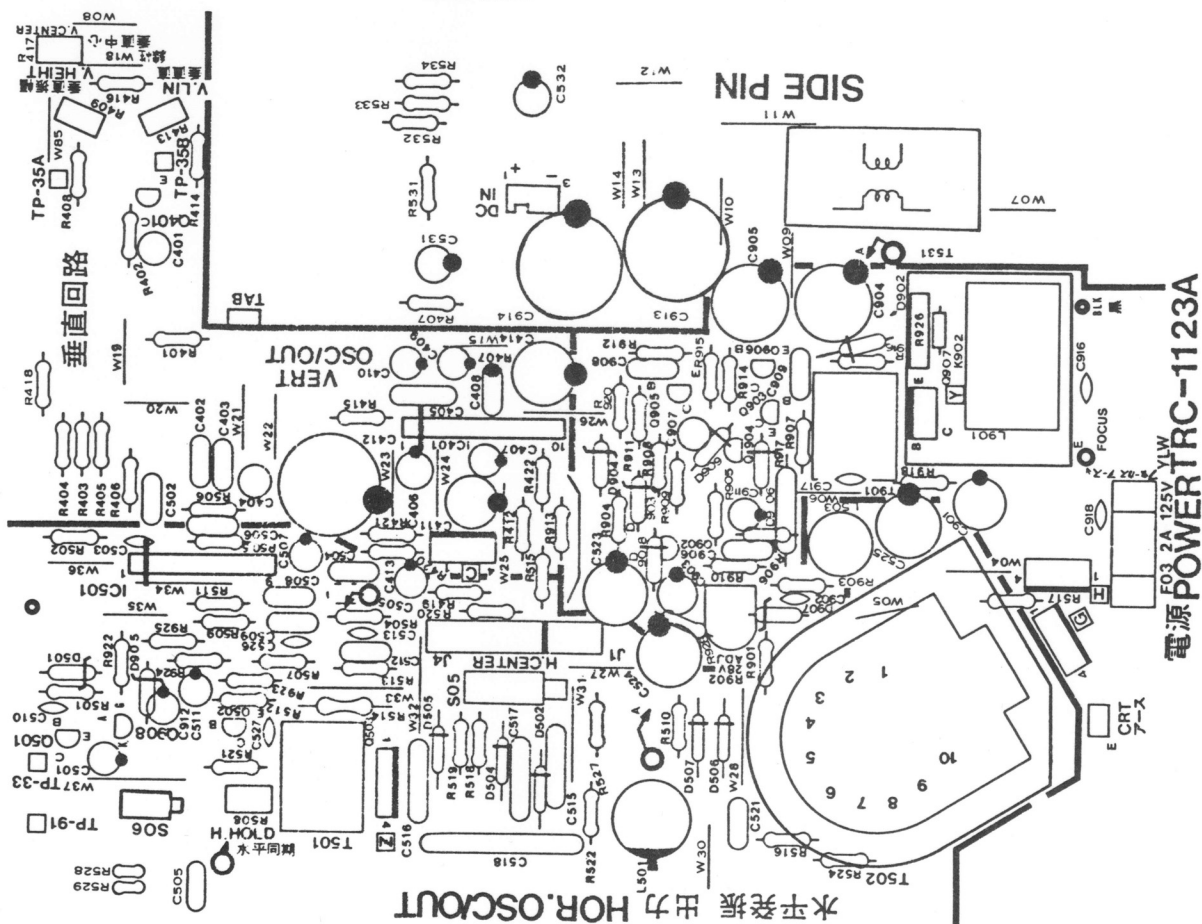
EXPANSION	P8	J8	EXPANSION	P8	J8
GND	9	1	GND	34	23
+5 V	3	2	ROMH	28	24
+5 V	30	3	RESET	33	25
LRQ	8	4	NMI	32	26
R/W	27	5	SØ2	26	27
DOT CLOCK	1	6	A15	10	28
I/O1	29	7	A14	35	29
GAME	6	8	A13	11	30
EXROM	31	9	A12	36	31
I/O2	5	10	A11	12	32
ROML	4	11	A10	37	33
BA	2	12	A9	13	34
DMA	7	13	A8	38	35
D7	19	14	A7	14	36
D6	44	15	A6	39	37
D5	20	16	A5	15	38
D4	45	17	A4	40	39
D3	21	18	A3	16	40
D2	46	19	A2	41	41
D1	22	20	A1	17	42
D0	47	21	A0	42	43
GND	18	22	GND	43	44
OPEN	23	—	OPEN	48	—
"	24	—	"	49	—
"	25	—	"	50	—



SX 64 EXPANSION SCHEMATIC DIAGRAM



SX 64 MONITOR PCB LAYOUT



SX 64 MONITOR ASSEMBLY PARTS LIST

PLEASE NOTE:

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CHASSIS PARTS

V01	*CRT,	150BMB22-AF
	*CRT Socket,	C39158-D
DY1	*Def. Yoke,	C29131-VA (See note below)
T502	*F.B. Transf.	CJ39587-00A
Q907	Transistor,	2SD1118
Q503	Transistor,	2SC2335
R523	*Focus Pack,	CJ49510-257
C001	*Ceramic Cap,	1000pF, 3KV, +100%, -0%

NOTE:

IF DEFLECTION YOKE CJ26235-00A IS USED,
THE FOLLOWING PARTS VALUES CHANGE:

DEF and POWER REG PCB 1124 A-1		
CAPACITORS		
C515, 517	*Polypropylene,	5600pF, 630V, $\pm 5\%$
C519, 520	*Elect,	4.7 μ F, 160V, +30%, -10%

VIDEO and AUDIO PCB 1124 A-2		
CAPACITORS		
C201	Elect,	1000 μ F, 25V, $\pm 20\%$
C206	Bi-Polar Elect,	4.7 μ F, 50V, $\pm 20\%$
C522	Mylar,	.1 μ F, 50V, $\pm 20\%$

* SAFETY COMPONENTS — Use EXACT replacement ONLY.

DEF and POWER REG PCB 1123 A-1	
INTEGRATED CIRCUITS	
IC401 IC501	Vert., μ PC1031H2 Hor., AN5750
TRANSISTORS	
Q401 Q501 Q502 Q902 Q903,4,5 Q906 Q907	2SA1015 (Y, GR) 2SC1685 2SA817A (O,Y) 2SA1015 (Y, GR) 2SC1685 2SA817A (O,Y) 2SD1118
DIODES	
D501 D502 D504,5, 6,7 D902 D903 D904 D905 D906 D907 D908, 9	Zener RD6.8E (B2) V19E V09E U19B *Zener RD6.8E (B2) Zener Hz12 (B) *Zener RD6.8E (B2) 1S2473H *Zener RD13E (B1) 1S2473H
RESISTORS	
R901 R910 R917 R923 R924 R925 R926	* Carbon, 8.2K, 1/4W, \pm 5% * Carbon, 9.1K, 1/4W, \pm 5% Oxide Mtl Film, 1.5K, 1W, \pm 5% * Carbon, 27K, 1/4W, \pm 5% * Carbon, 10K, 1/4W, \pm 5% * Carbon, 68K, 1/4W, \pm 5% Mtl Film, 0.22, 2W, \pm 10%
VARIABLE RESISTORS	
R409 R413 R417 R508 R909	V. Hght, 22K V. Lin, 2.2K V. Center, 1K Hor. Hold, 2.2K *B1 Adj., 2K

CAPACITORS			
C401, 404 C408 C409, 410 C412 C413 C509 C515,16, 17 C518 C520 C523, 24 C525 C901 C904, 905 C907 C913, 914	Bi-Polar Elect, Tantalium, Tantalium, Elect, Elect, Polypropylene, *Polypropylene, Mtl Mylar, *Polypropylene, *Elect, Elect, *Elect, *Elect, Bi-Polar Elect, *Elect,	1 μ F, 1 μ F, 22 μ F, 1000 μ F, 0.22 μ F, 5600pF, 4700pF, 1.5 μ F, 0.047 μ F, 470 μ F, 4.7 μ F, 100 μ F, 470 μ F, 10 μ F, 2200 μ F,	50V, \pm 20% 25V, \pm 10% 10V, \pm 10% 25V, \pm 20% 50V, \pm 20% 50V, \pm 5% 630V, \pm 5% 100V, \pm 5% 200V, \pm 10% 16V, +30%, -10% 160V, +30%, -10% 35V, +30%, -10% 35V, +30%, -10% 25V, \pm 20% 16V, +30%, -10%
TRANSFORMERS			
T901 T501 T502 T531	Pwr Drive, Hor Drive, *F.B., *Side Pin,	A76567-MA A76568-MA CJ39587-00A C39084-A	
MISCELLANEOUS			
F03	*Fuse, 2A, 125V		
VIDEO and AUDIO PCB ASSY 1123 A-2			
INTEGRATED CIRCUITS			
IC201 IC601	Audio, HA11401 Video, AN5250		
TRANSISTORS			
Q201 Q601	2SA562TM (Y) 2SD1133		
DIODES			
D601 D503	Zener, RD10E (B3) 1S2076A		

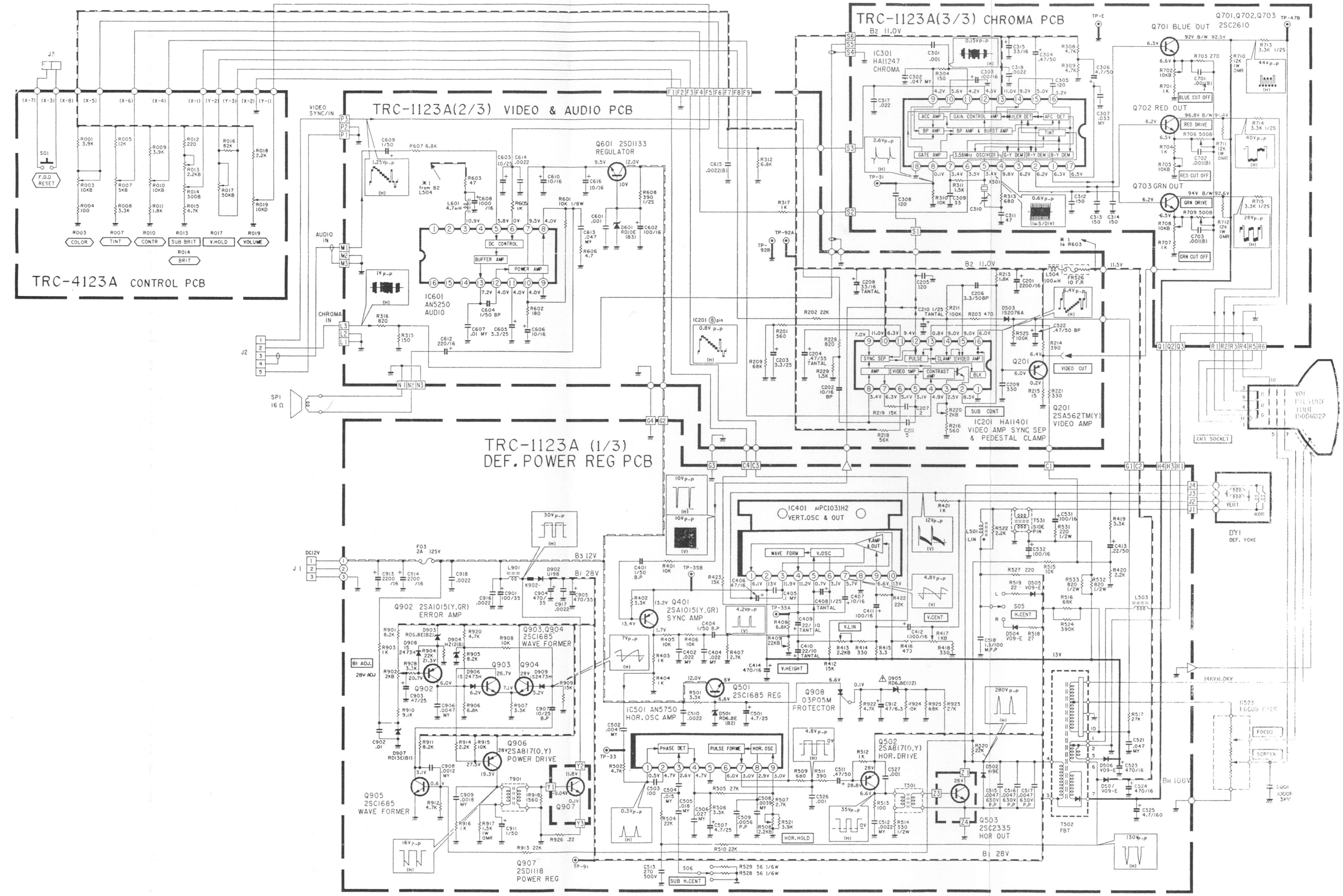
* SAFETY COMPONENTS — Use EXACT replacement ONLY.

VIDEO and AUDIO PCB ASSY 1123 A-2 (Continued)			
VARIABLE RESISTOR			
R220	Sub Cont, 2K		
CAPACITORS			
C201	Elect,	2200μF,	16V, +30%, -10%
C202	Bi-Polar Elect,	10μF,	16V, ±20%
C203	Elect,	3.3μF,	25V, +30%, -10%
C204	Tantalium,	0.47μF,	35V, ±20%
C206	Bi-Polar Elect,	3.3μF,	50V, ±20%
C208	Tantalium,	33μF,	16V, ±10%
C210	Tantalium,	1μF,	25V, ±20%
C604	Bi-Polar Elect,	1μF,	50V, ±20%
C608	Elect,	1000μF,	25V, ±20%
C522	Bi-Polar Elect,	0.47μF,	50V, ±20%
MISCELLANEOUS			
FR526	*Fusible Resistor, 10, 1/4W, ±5%		
L504	Peaking Coil	100μH	
L601	Peaking Coil	4.7μH	

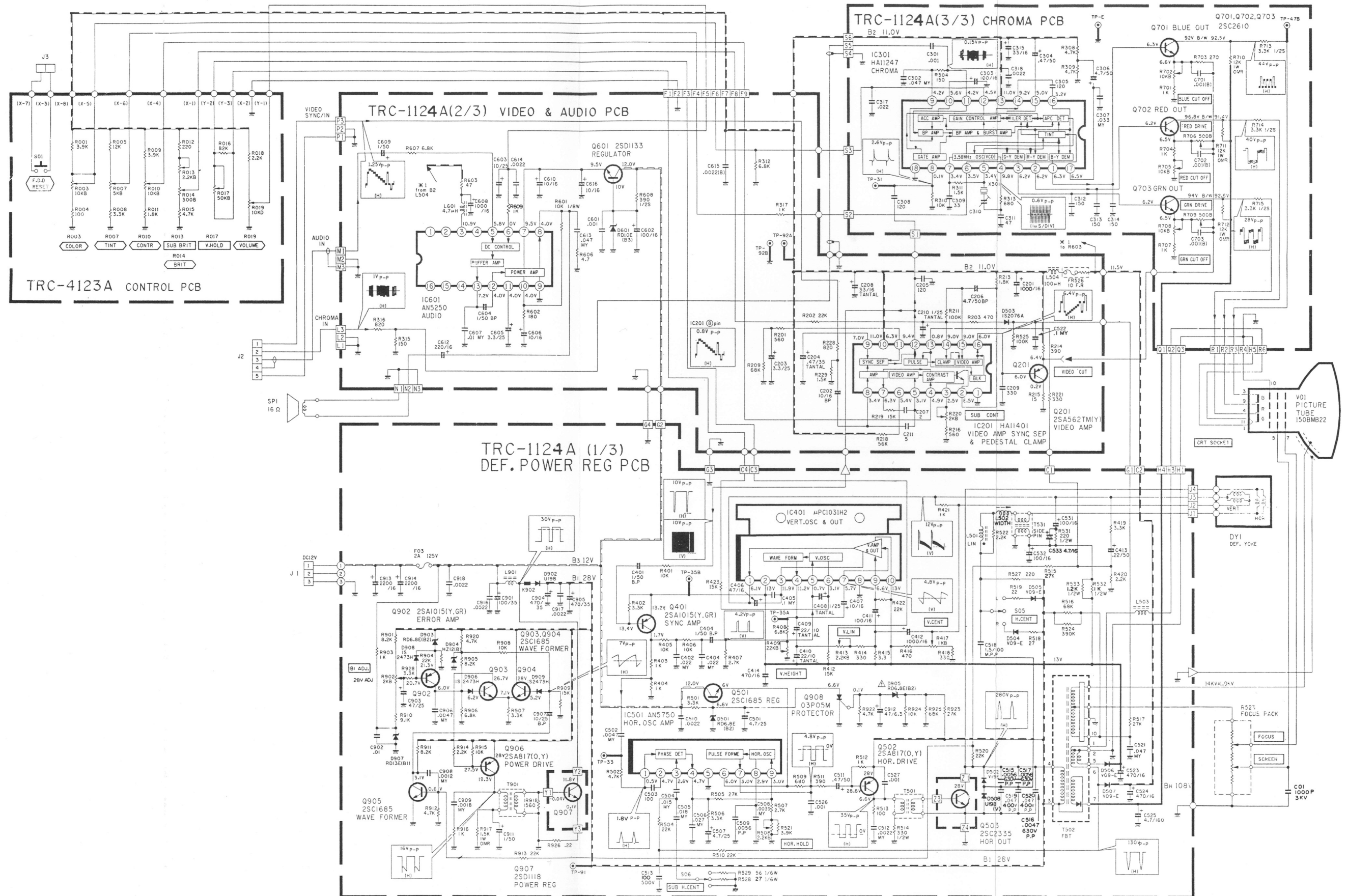
CHROMA PCB ASSY 1123 A-3			
INTEGRATED CIRCUITS			
IC301	HA11247		
TRANSISTORS			
Q701,2,3	2SC2610		
RESISTORS			
R710,11, 12	Oxide Mtl Film, 12K, 1W, ±5%		
VARIABLE RESISTORS			
R702	B. Cut-Off, 10K		
R705	R. Cut-Off, 10K		
R706	R. Drive, 500		
R708	G. Cut-Off, 10K		
R709	G. Drive, 500		
CAPACITORS			
C303	Elect,	100μF,	16V, ±20%
C304	Elect,	0.47μF,	50V, ±20%
C306	Elect,	4.7μF,	50V, ±20%
C310	Trimmer		
C315	Elect,	33μF,	16V, ±20%
MISCELLANEOUS			
X301	Crystal A75746		

*SAFETY COMPONENTS — Use EXACT replacement ONLY.

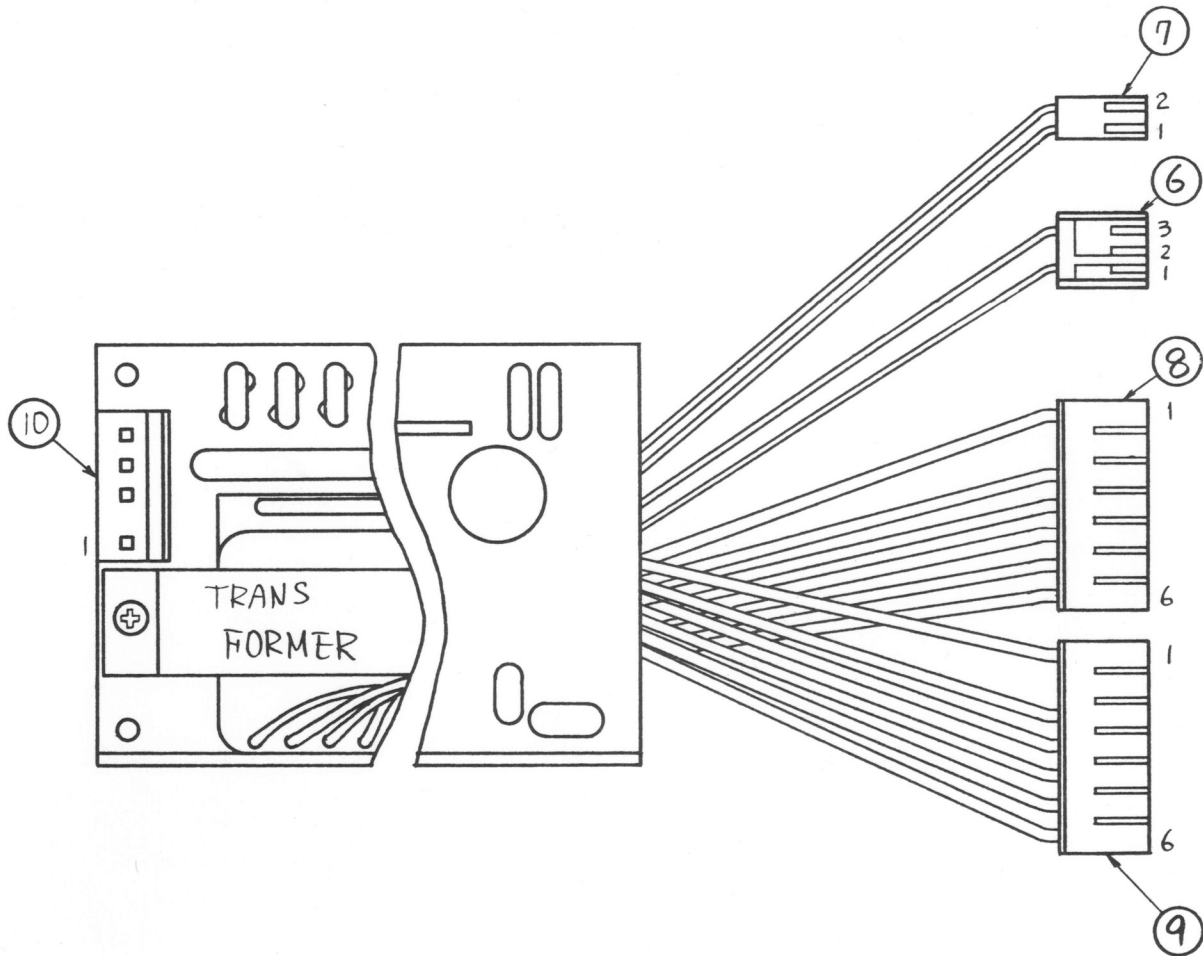
SX 64 MONITOR SCHEMATIC -01



SX 64 MONITOR SCHEMATIC -01A



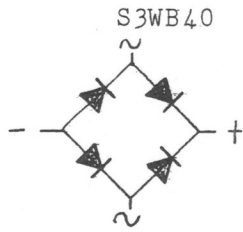
POWER SUPPLY #250623 WIRING DIAGRAM



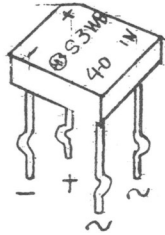
PART NO	VENDOR NO	VENDOR'S NAME	POLE	PIN NO	NAME OF SIGNAL	COLOR	WIRE	NOTE
6	Ei 171822-3	AMP	3	1	12V	BRN	UL1007 AWG24	
				2	NC			
				3	GND	BLK		
7	5102-02	MOLEX	2	1	AC9V	BLU	UL1007 AWG24	
				2	AC9V	BLU		
8	5227-06	MOLEX	6	1	5V	ORG	UL1007 AWG18	
				2	5V	ORG		
				3	GND	BLK		
				4	GND	BLK		
				5	12V	RED		
				6	12V	RED		
9	5227-06	MOLEX	6	1	5V	ORG	UL1007 AWG18	
				2	5V	ORG		
				3	GND	BLK		
				4	GND	BLK		
				5	12V	RED		
				6	12V	RED		
10	5285-04A	MOLEX	4	1	AC IN			
				2	AC IN			
				3	NC			
				4	F,G			

PARTS INFORMATION

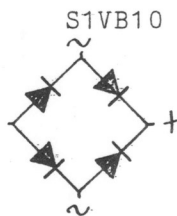
1, REC1



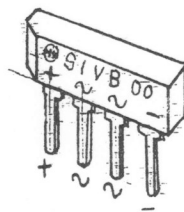
RECTIFIER STACKS DIODES



2, REC2



RECTIFIER STACKS DIODES



3, D1

ERB24-06C

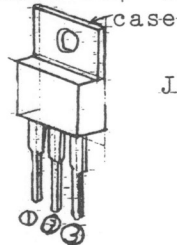
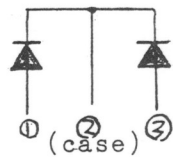


FAST RECOVERY DIODES



4, D6,7

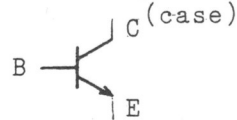
ESAC85-009 , ESAC82-004 SCHOTTKY BARRIER DIODES



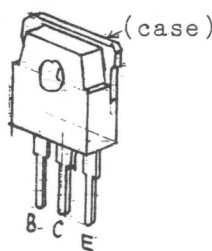
JEDEC :TO-220AB

5, Q1

2SC2625

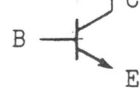


POWER TRANSISTOR

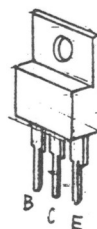


6, Q3

2SC2334 (case)

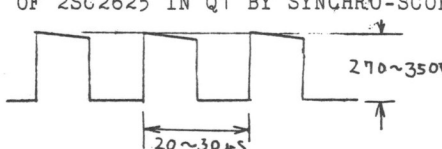
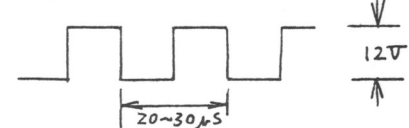


POWER TRANSISTOR
C (case)

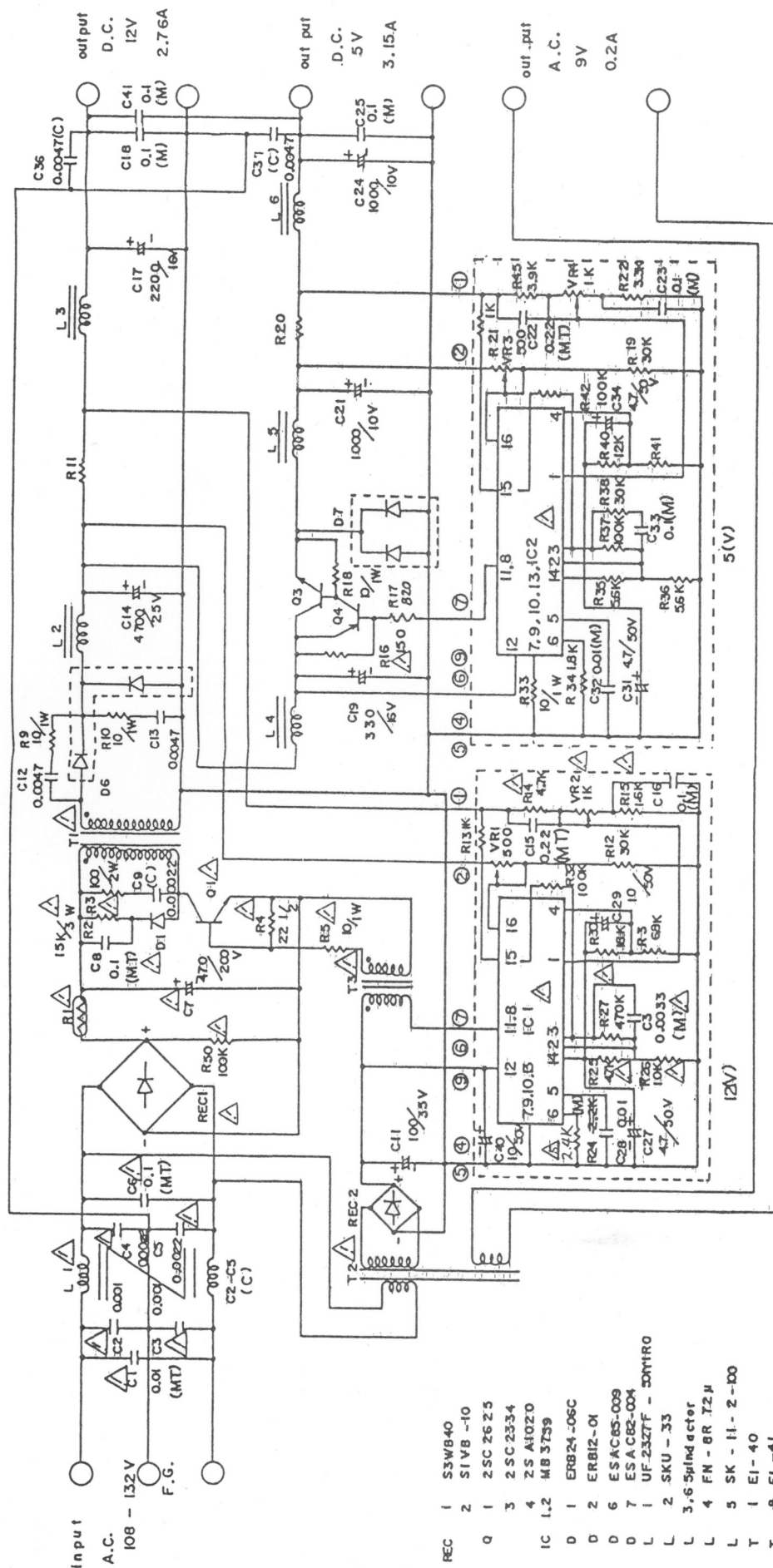


JEDEC :TO-220AB

TROUBLESHOOTING GUIDE

TRUBLE	CHECK POINT	CAUSES AND TEST	SOLUTION
NO OUTPUT	SOME SCRAP INSIDS	SHORT CIRCUIT BIY SCRAP <u>YES</u>	CLEANING
	OK		
NO AC 9V OUTPUT	SUPPLEMENTARY CIRCUIT	T2 TRANSFORMER SHORT OR OPEN <u>YES</u> T2 PRIMARY LEAD WHITE TO WHITE 160~200Ω SECONDARY LEAD RED TO RED 9~12Ω SECONDARY LEAD BLUE TO BLUE 3.2~3.7Ω	CHANGE T2
	OK		
IN CASE OF REC1 SHORT FUSE IS CUT	CHECK BRIDGH DIODE	REC2 S1VB-10 DIODE RECTIFIED VOLTAGE DC 12~15V REC1 S3WB40 SHORT OR OPEN <u>YES</u>	CHANGE REC1
	OK		
IN CASE OF Q1 SHORT FUSE IS CUT	CHECK SWITCHING TRANSISTOR	Q1 2SC2625 SHORT OR OPEN <u>YES</u>	CHANGE Q1
	OK		
	CHECK HIGH-SPEED RECTIFY DIODE	D6 ESAC85-009 SHORT OR OPEN <u>YES</u>	CHANGE D6
	OK		
12V CONTROL CIRCUIT		CHECK BETWEEN COLLECTOR AND EMITTER OF 2SC2625 IN Q1 BY SYNCHRO-SCOPE	NO CHANGE A BOARD OF 12V CONTROL
			
		YES	
		12V OUTPUT ADJUSTMENT SHIFT <u>YES</u>	RE-ALIGNMENT
5V output ONLY NO OUTPUT	CHECK SWITCHING TRANSISTOR	Q3 2SC2334 SHORT OR OPEN <u>YES</u>	CHANGE Q3
	OK		
	CHECK DRIVE TRANSISTOR	Q4 2SA1020-0orY SHORT OR OPEN <u>YES</u>	CHANGE Q4
	OK		
	CHECK HIGH-SPEED RECTIFY DIODE	D7 ESAC82-004 SHORT OR OPEN <u>YES</u>	CHANGE D7
	OK		
5V CONTROL CIRCUIT		CHEC BETWEEN EMITTER OF 2SC2334 AND GRUND IN Q4 BY SYNCHRO-SOOPE	NO CHANGE A BOARD OF 5V CONTROL
			
		YES	
		5V OUTPUT ADJUSTMENT SHIFT <u>YES</u>	RE-ALIGNMENT

POWER SUPPLY #250623 SCHEMATIC DIAGRAM



CAPACITOR

(M) POLYESTER FILM CAPACITOR

(MET) METALLIZED POLYESTER FILM CAPACITOR

(C) CERAMIC CAPACITOR

NOTE

ALL CAPACITANCE ARE IN MICROFARADS
ALL RESISTANCE VALUES ARE IN OHMS
UNLESS OTHERWISE SPECIFIED IN THE DIAGRAM.

CRITICAL COMPONENT

