


SERVICE MANUAL

PC 10-1/10-2

Preliminary

MARCH, 1987

PN-319914

 **commodore**
COMPUTERS

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Commodore Business Machines, Inc.

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CONTENTS

TITLE	PAGE
SPECIFICATIONS PC/10-1	1
SPECIFICATIONS PC/10-2	2
BLOCK DIAGRAM	3
BOARD LAYOUT	3
MAJOR PARTS LIST	4
PCB ASSEMBLY #380064	
PARTS LIST	5
BOARD LAYOUT	7
SCHEMATIC (sheet 1 of 8)	8
SCHEMATIC (sheet 2 of 8)	9
SCHEMATIC (sheet 3 of 8)	10
SCHEMATIC (sheet 4 of 8)	11
SCHEMATIC (sheet 5 of 8)	12
SCHEMATIC (sheet 6 of 8)	13
SCHEMATIC (sheet 7 of 8)	14
SCHEMATIC (sheet 8 of 8)	15
RAM EXPANDER	
PARTS LIST	16
BOARD LAYOUT	16
SCHEMATIC	16
MAJOR VENODRS LIST	17

SPECIFICATIONS

PC10-1	
MEMORY	
ROM	PHOENIX BIOS (16K)
RAM	512K WITH PARITY
RAM EXPANDABLE	
ON BOARD	YES
ON SLOTS	YES
CPU	
TYPE	8088
CLOCK SPEED	4.77 MHz
8087 MATH CO-PROCESSOR	SOCKET ON BOARD
NUMBER OF SLOTS	5 FULL LENGTH
OPERATING SYSTEM	MS-DOS 3.2
KEYBOARD	
NUMBER OF KEYS	85
TYPE	TYPEWRITER STYLE
NUMERIC KEYPAD	YES
FUNCTION KEYS	10
POWER SUPPLY	
OUTPUT RATING	112 WATTS
MAXIMUM CONFIGURATION SUPPORTED	TWO FLOPPY DRIVES + 40 MB HARD DRIVE + 5 EXPANSION CARDS
INPUT/OUTPUT PORTS	
RS-232C SERIAL	BUILT-IN
CENTRONICS PARALLEL	BUILT-IN
STORAGE	
FLOPPY DRIVE CONTROLLER	BUILT-IN SUPPORTS FOUR DRIVES
FLOPPY DRIVES	SINGLE HALF-HEIGHT
HARD DRIVE	OPTIONAL BRACKETS FOR HALF OR FULL HEIGHT
VIDEO	
ATI "GRAPHICS SOLUTION" ADAPTER	STANDARD
• MODES	
1) MONOCHROME ADAPTER	
2) COLOR/GRAPHICS ADAPTER	
3) HERCULES MONO GRAPHIC ADAPTER	
4) PLANTRONICS COLORPLUS ADAPTER	
5) EMULATION OF COLOR/GRAPHICS ADAPTER ON MONOCHROME MONITOR	
• TEXT MODES	
40 x 25	
80 x 25	
132 x 25	
132 x 44	
• GRAPHICS MODES	
320 x 200 (4 OR 16 COLORS)	
640 x 200 (2, 4, OR 16 COLORS)	
720 x 348 (HERCULES COMPATIBLE)	
• COMPATIBLE MONITORS	
IBM COMPATIBLE TTL MONOCHROME	
RGBI COLOR	
COMPOSITE COLOR OR MONOCHROME	
AUDIO	
POLYPHONIC TONES	YES

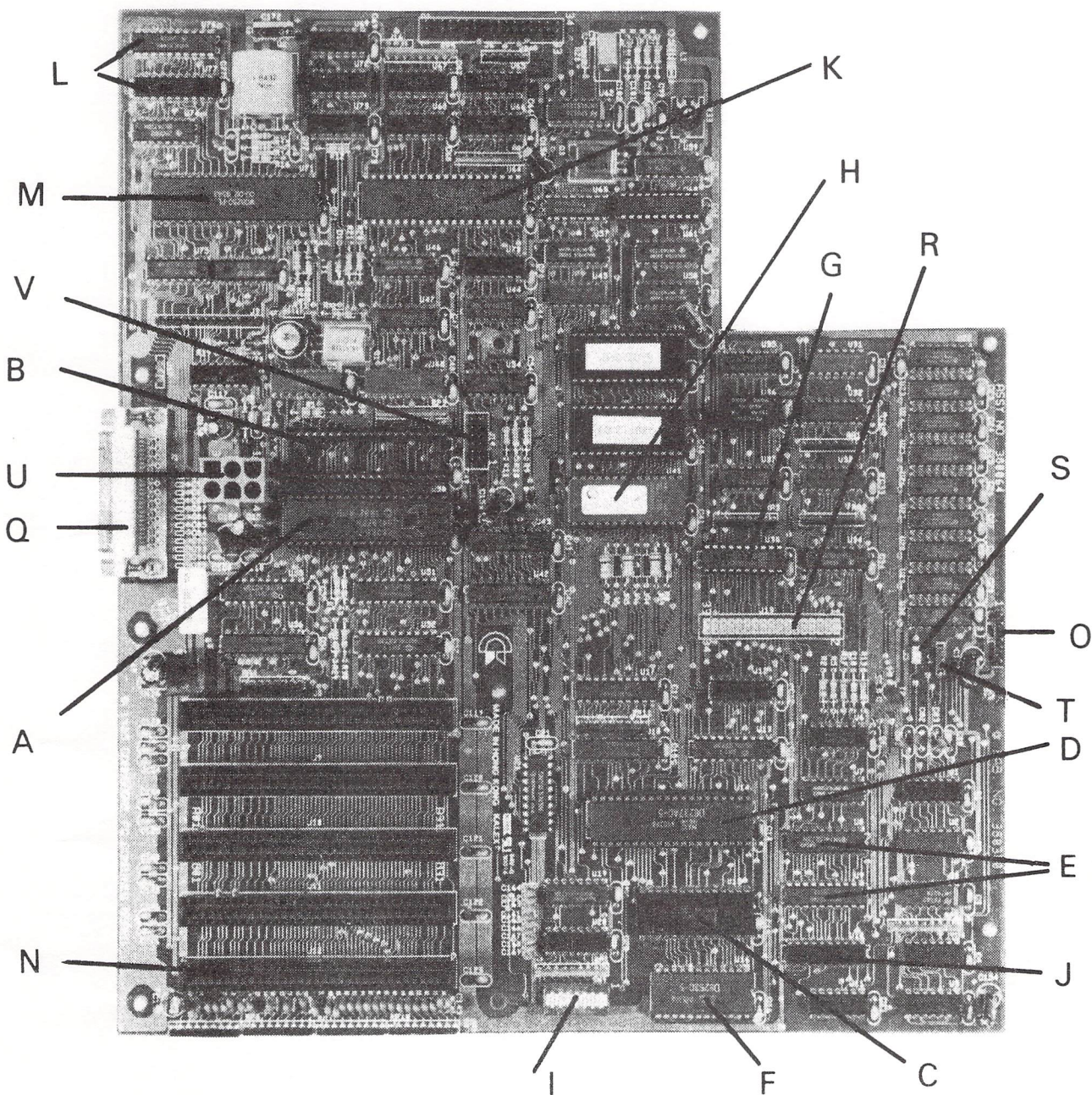
SPECIFICATIONS

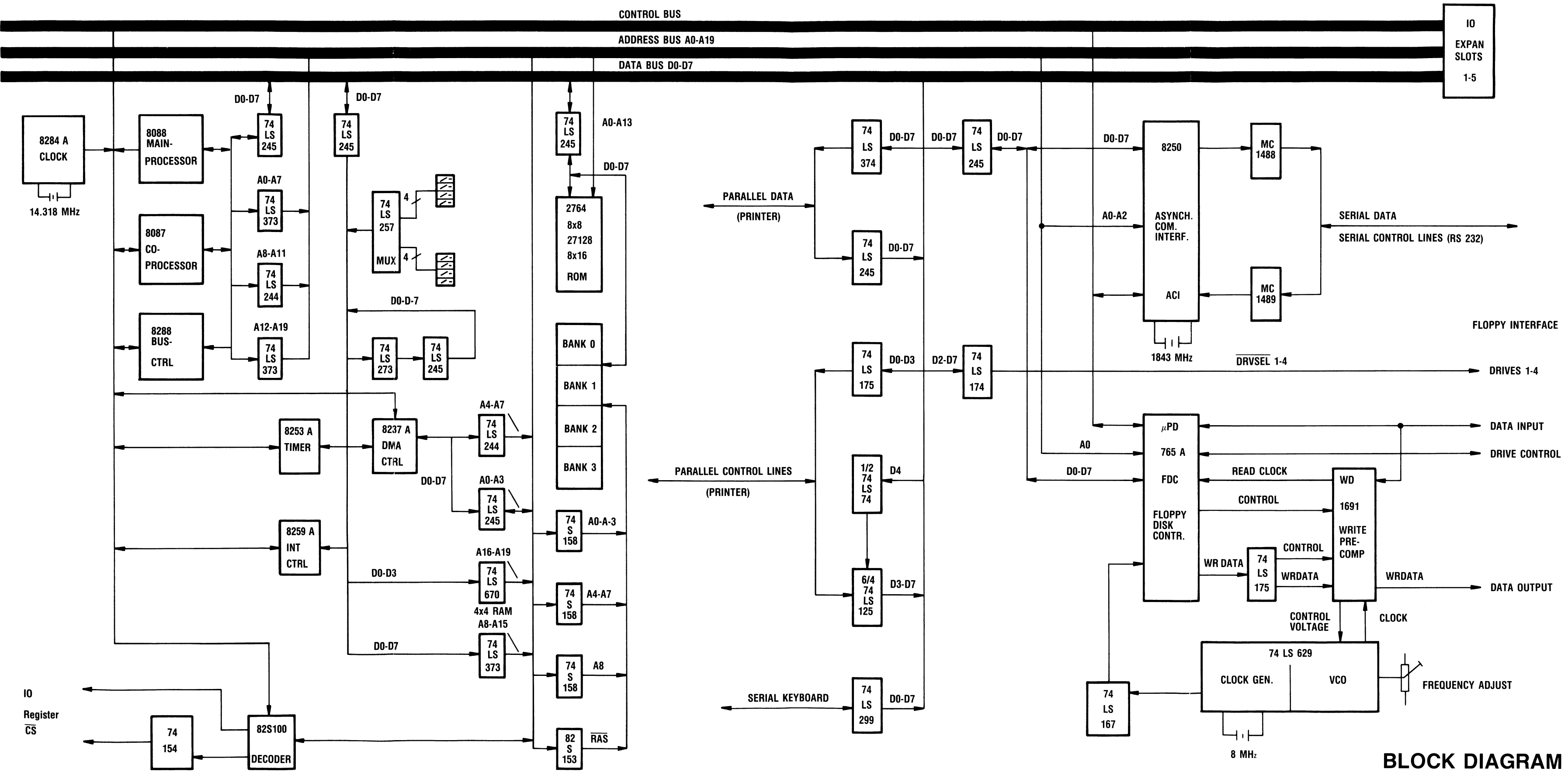
PC10-2	
MEMORY	
ROM	PHOENIX BIOS (16K)
RAM	620K WITH PARITY
RAM EXPANDABLE	
ON BOARD	N/A
ON SLOTS	N/A
CPU	
TYPE	8088
CLOCK SPEED	4.77 MHz
8087 MATH CO-PROCESSOR	SOCKET ON BOARD
NUMBER OF SLOTS	5 FULL LENGTH
OPERATING SYSTEM	MS-DOS 3.2
KEYBOARD	
NUMBER OF KEYS	85
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HARD DRIVE	OPTIONAL BRACKETS FOR HALF OR FULL HEIGHT
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ATI "GRAPHICS SOLUTION" ADAPTER	STANDARD
• MODES	
1) MONOCHROME ADAPTER	
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• COMPATIBLE MONITORS	
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RGBI COLOR	
COMPOSITE COLOR OR MONOCHROME	
AUDIO	
POLYPHONIC TONES	YES

BOARD LAYOUT

A = 8088 CPU
B = 8087 coprocessor
C = Interrupt controller
D = DMA controller
E = System registers
F = Timer
G = PAL address decoder
H = ROM/EPROM BIOS
I = DIP switch
J = Keyboard interface
K = Floppy controller

L = Parallel interface
M = Serial interface
N = I/O expansion slots
O = Internal keyboard connector
Q = Parallel printer connector
R = Internal serial connector
S = Loudspeaker connector
T = Floppy activity LED connector
U = Power connector
V = J14 Serial, Parallel, and Floppy configuration jumpers





BLOCK DIAGRAM

MAJOR PARTS LIST PC10-1/PC10-2

PC10-1 (SINGLE DRIVE, 512K)	312200-01
PC10-2 (DUAL DRIVE, 640K)	312200-03
MAIN ASSEMBLY	380073-01
TOP HOUSING	380101-01
BOTTOM HOUSING	380100-02
FRONT PANEL	380102-01
POWER CORD	903508-04
KEYBOARD ASSEMBLY	380008-02
PCB ASSEMBLY COMBINED MAIN BOARD	380064-01
PCB ASSEMBLY RAM EXP 384K	380065-01
PCB ASSEMBLY RAM EXP 256K	380065-02
PCB ASSEMBLY ATI (MONO/COLOR VIDEO)	380069-01
FLOPPY DISK DRIVE	380111-01
SPEAKER ASSEMBLY	8256099-03
POWER SUPPLY ASSEMBLY	380021-02
POWER SUPPLY ASSEMBLY SUB:	390138-01
POWER ON LED ASSEMBLY	380016-01
CABLE ASSEMBLY - KEYBOARD CONNECTOR	380017-01
CABLE ASSEMBLY - RS232	312208-01
CABLE ASSEMBLY - DRIVE	380012-02
DOS MANUAL	319905-01
BASIC MANUAL	319906-01

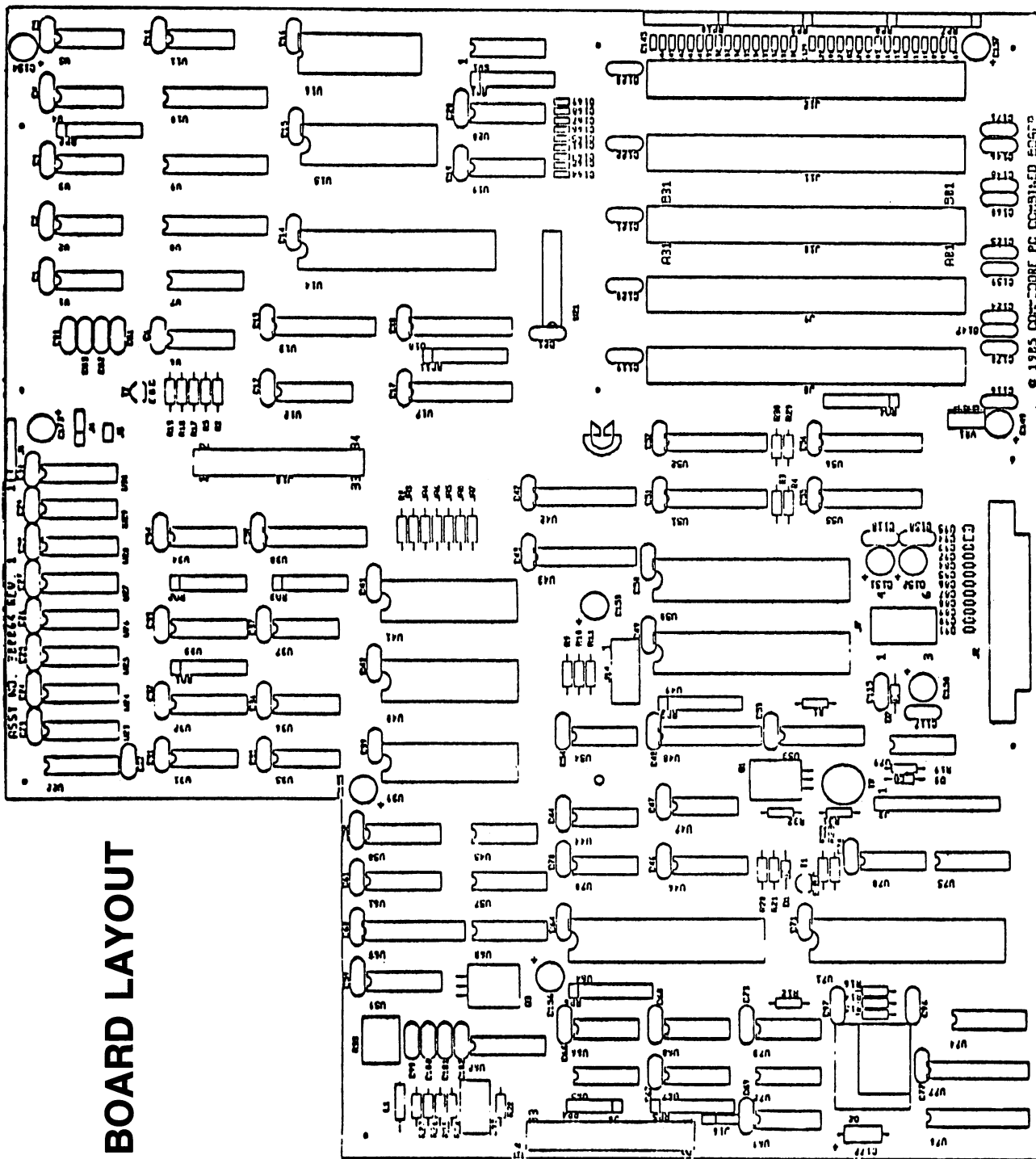
PARTS LIST PCB ASSY. #380064

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. Approved cross-references for TTL chips, Transistors, etc. are available in manual form through the Service Department, order #314000-01.

INTEGRATED CIRCUITS			INTEGRATED CIRCUITS (continued)													
U1,4,5	—		U70	74LS125 Buffer	901521-20											
11,69,72	74LS74 D Type Flip F	901521-06	U71	8250 ACI	380205-01											
U2,45,73	74LS04 Inverter	901521-02	U74	74175 4 Bit D-FF	901522-43											
U3	7407 Buffer	901522-30	U75	74LS365 6 Bit Buffer	901521-48											
U6	74LS08 AND	901521-03	U77	74LS374 D Type FF	901521-43											
U7	74LS155	901521-79	U78	MC1489 Line Recvr	901524-07											
U8	74LS273 8 Bit D-FF	901521-42	U79	MC1488 Line Driver	901524-06											
U9,17	—		DIODES													
51,76	74LS244 8 Bit Buffer	901521-13	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">D2, D3</td> <td style="width: 30%;">1 N 4001 1A/50V</td> <td colspan="3" style="width: 45%;">900750-01</td> </tr> <tr> <td>D1</td> <td>1N 4148 50mA/50V</td> <td colspan="3">900850-01</td> </tr> </table>				D2, D3	1 N 4001 1A/50V	900750-01			D1	1N 4148 50mA/50V	900850-01		
D2, D3	1 N 4001 1A/50V	900750-01														
D1	1N 4148 50mA/50V	900850-01														
U10	74LS299 Shift Reg	901521-72	RESISTORS — All values are in ohms-1/4 W													
U12	74LS670 Register File	901521-82	5% unless noted otherwise.													
U13,52,	—		R1-4,16,		R28	8K2 ohm										
55	74LS373 D Latch	901521-29	18,29,30	33 ohm	R22	10K ohm										
U14	8237A-5 DMA Cntrl	380203-01	R24	68 ohm	R25	47K ohm										
U15	8259A Intrpt Cntr	901874-01	R13	220 ohm	R26	82K ohm										
U16	8253A-5 Timer	380202-01	R31	510 ohm	R14,15	1M ohm										
U18,21,	—		R32	820 ohm	R33	Trimmer										
42,56,43	74LS245 Buffer	901521-46	R17	1K2 ohm	0.1W 2K2 (Valvo, ECP 10 Type "S")											
U19	74LS367 6 Bit Buffer	901521-47	R8-12,19,	2K2 ohm												
U20	74LS257 MUX	901521-57	20,23,27	4K7 ohm												
U22-U30	Dram 256Kx1 150ns	380223-01	R5,21													
U31	74LS11 AND	901521-80	CAPACITORS													
U32,33	74HCT158 MUX	380227-04	C84-C95	Ceramic 2200 pF, 50V												
	Sub: 74S158 MUX	901525-31	C96	Ceramic 22 pF, 50V												
U34	74S280 Parity Gen	901525-29	C97	Ceramic 47 pF, 50V												
U35	74HCT32 OR	380227-01	C102	Ceramic 82 pF, 50V												
U36	Delay Line 50ns	324667-01	C81-83,	Ceramic 100 pF, 100V												
U37	74S00 NAND	901525-04	161-169													
U38	16L8 PAL	380257-01	C101	Ceramic 150 pF, 50V												
U39	7700 PLA Decode2	380212-08	C107-114,	Ceramic 1000 pF, 25V												
	Sub: FPLA 82S100	380212-08	126-145													
U40	7700 PLA Decode1	380212-07	C1-6,11-13,	Ceramic 0.1 μF, 50V												
	Sub: FPLA 82S100	380212-07	17-21,31,35,													
U41	BIOS EPROM 27128	380258-03	37,42-44,46,													
U44	74LS02 NOR	901521-21	47,51,52,54,													
U46,58,	—		58,61,66-70,													
61	74LS175 4 Bit D-FF	901521-34	73,77,78													
U47	74S74 D Type FlipFlop	901525-09	C14-16,22-													
U48	8288 Bus Cntrl	901876-01	30,32,33,34,													
U49	8087 Co-Processor	380201-01	36,38-41,													
U50	8088 CPU 5MHz	380200-01	48-50,53,56,													
U53	8284A Clk Gen	901875-01	59,60,64,71,													
U54	74ALS11 AND	380230-02	80,99,100,													
U57	74LS163 Counter	901521-33	115-125,146-													
U59	74LS629 VCO	901521-84	148,158-160,													
U60	1691 Data Separator	380207-01	170,171	Ceramic 0.22 μF, 50V												
U62	74LS123 Monoflop	901521-49														
U63	74LS174 6 Bit D-FF	901521-63														
U64	μPD765AC-2 FDC	380206-01														
U65	74LS14 Schmitt-Trig	901521-30														
U66-68	7438 NAND/OC	901522-09														

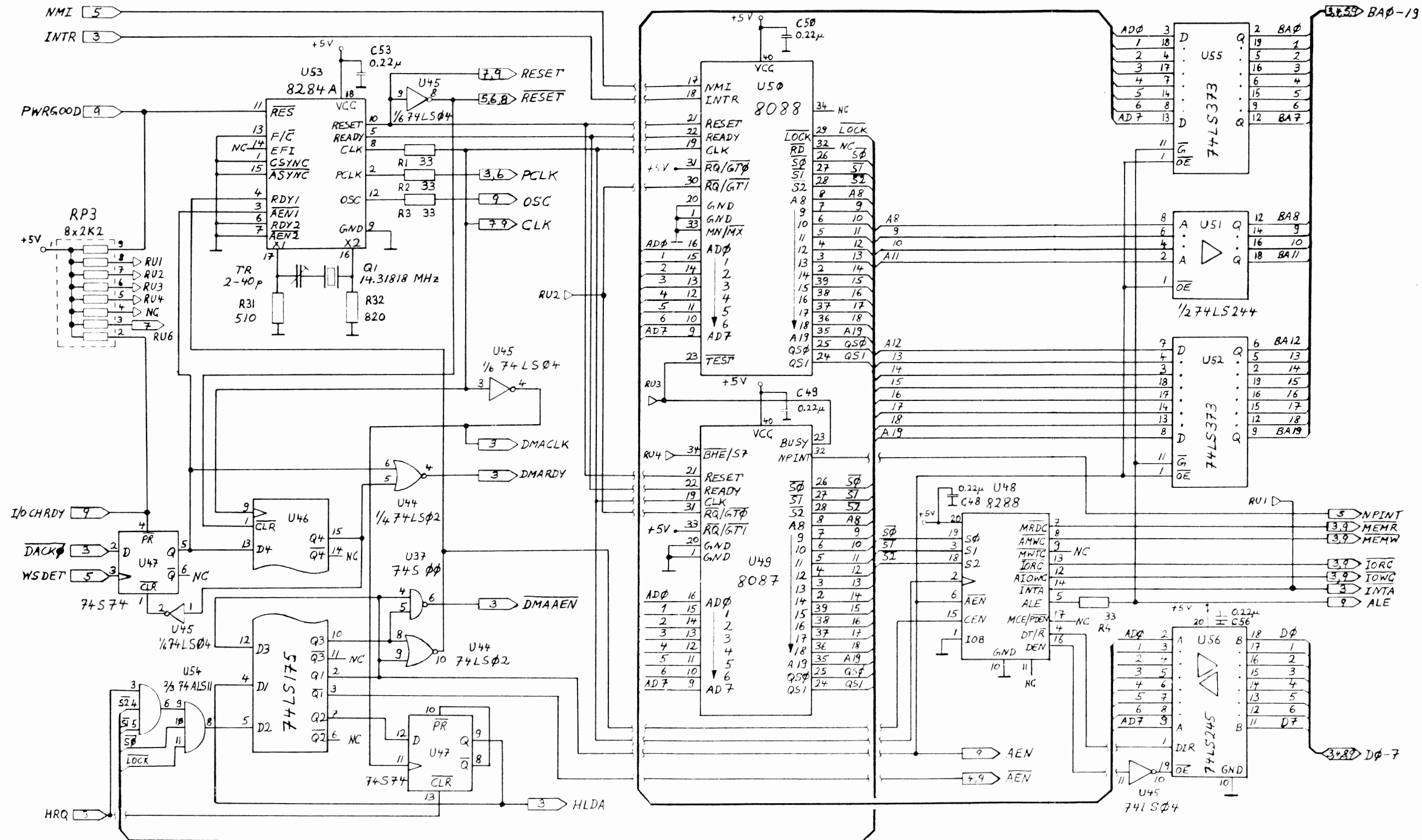
PARTS LIST (continued)

CAPACITORS (Continued)			CONNECTORS		
C98	Polyester	0.68 μ F, 63V	J2	CNNT 25P Mini Din (Female, Amp 167131-1)	380307-02
C149-157, 173	Electro. Rad	47 μ F, 25V	J8-J12	CNNT 2x31P Edge (TI or TRW Equiv. .100 Center)	903446-02
C172	Electro. Axial	47 μ F, 16V	J7	CNNT 6P Female (Amp 350 827-01)	903349-01
TR	Var	2-40 pF			
MISCELLANEOUS			TRANSISTORS		
Q2	1.8432 Crystal	900555-02	T1, T2	NPN BC 337-16	324220-01
Q3	8.0000 Crystal	900556-01			
Q1	14.31818 Crystal	900558-01			
VR1	7905 Volt Reg -5V	901527-03			
L1	Coil 100 μ H 3 ohm	380329-01			
SW1	Dip Switch	903349-01			

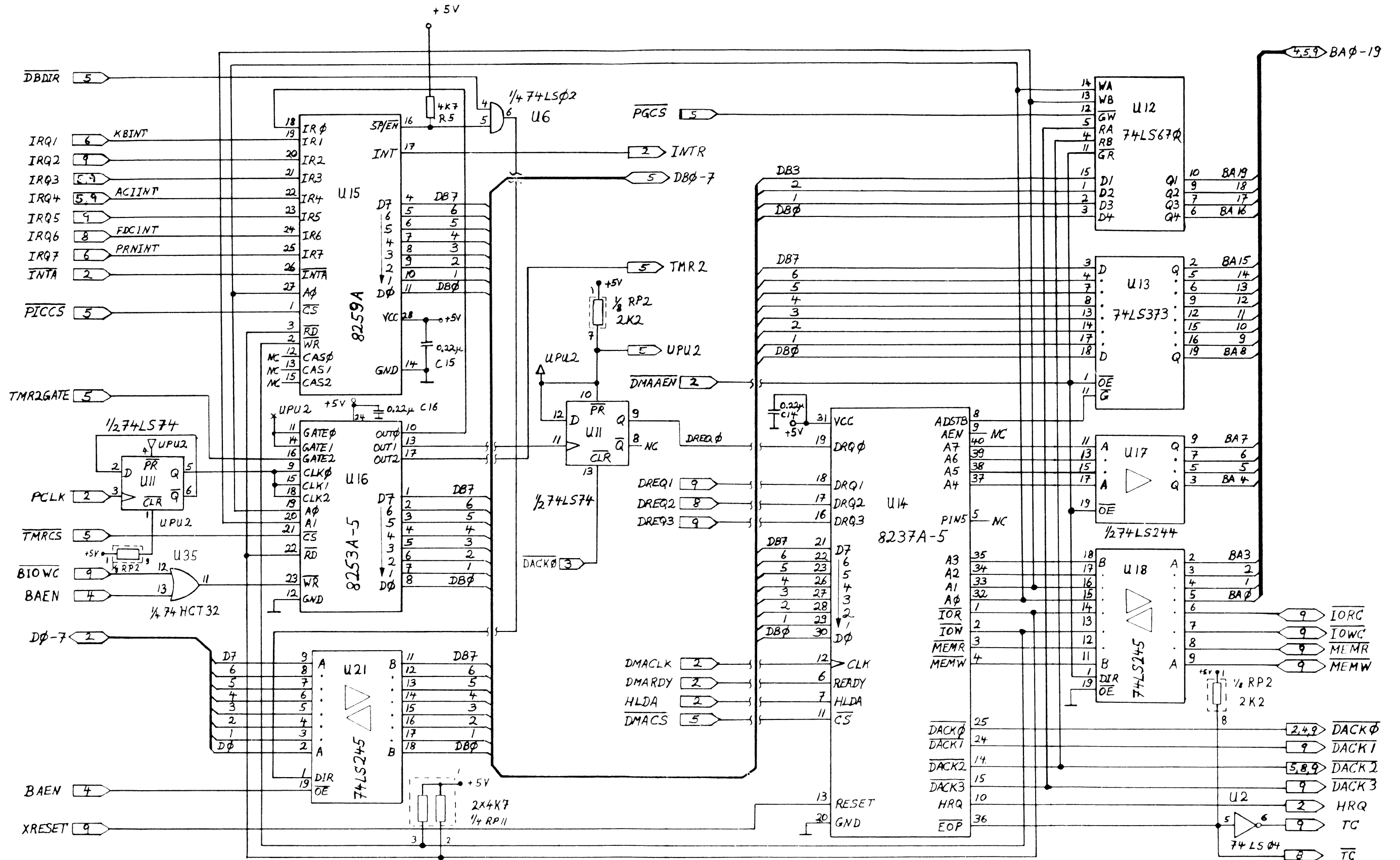


BOARD LAYOUT

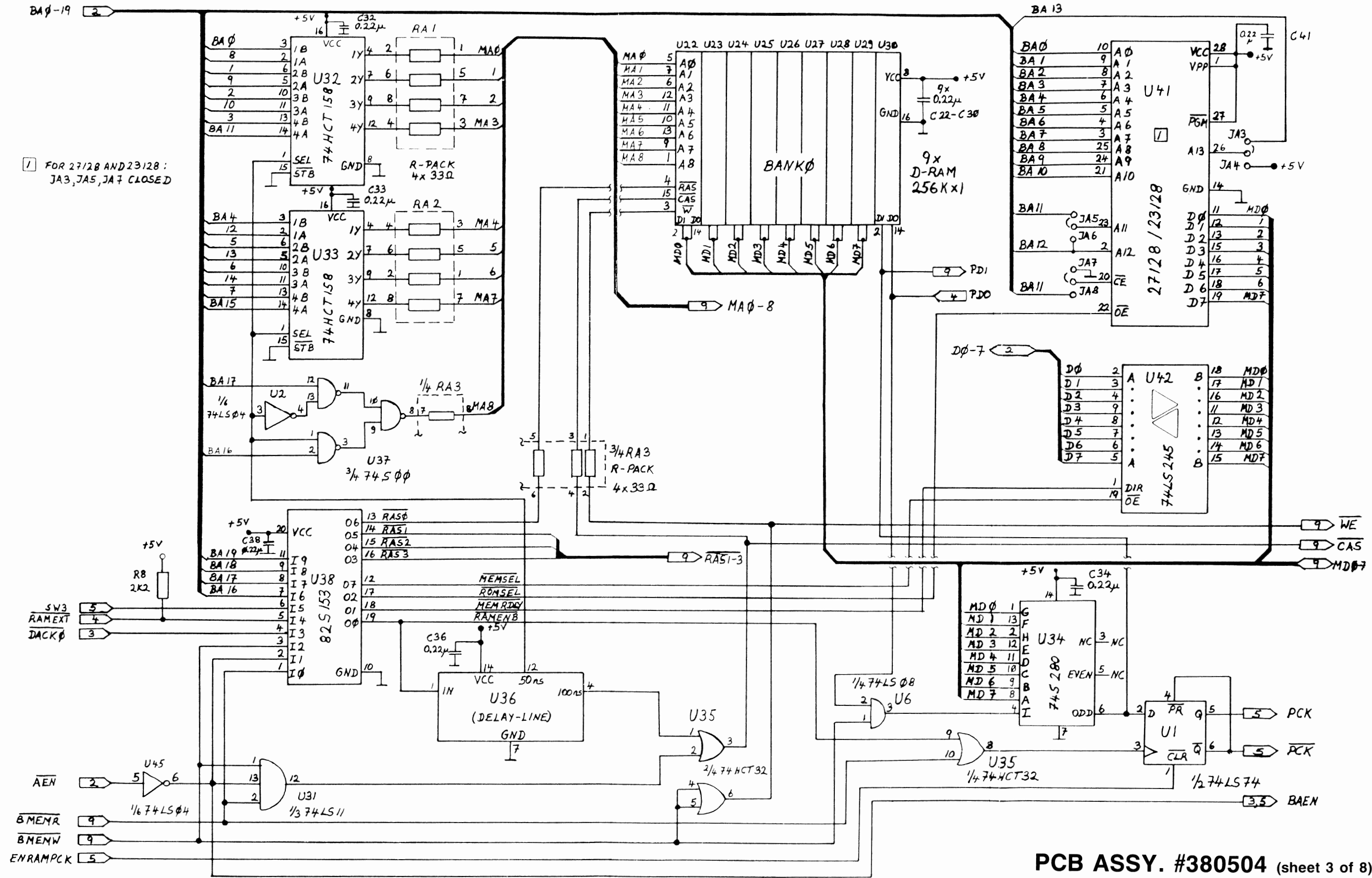
PCB ASSY. #380064

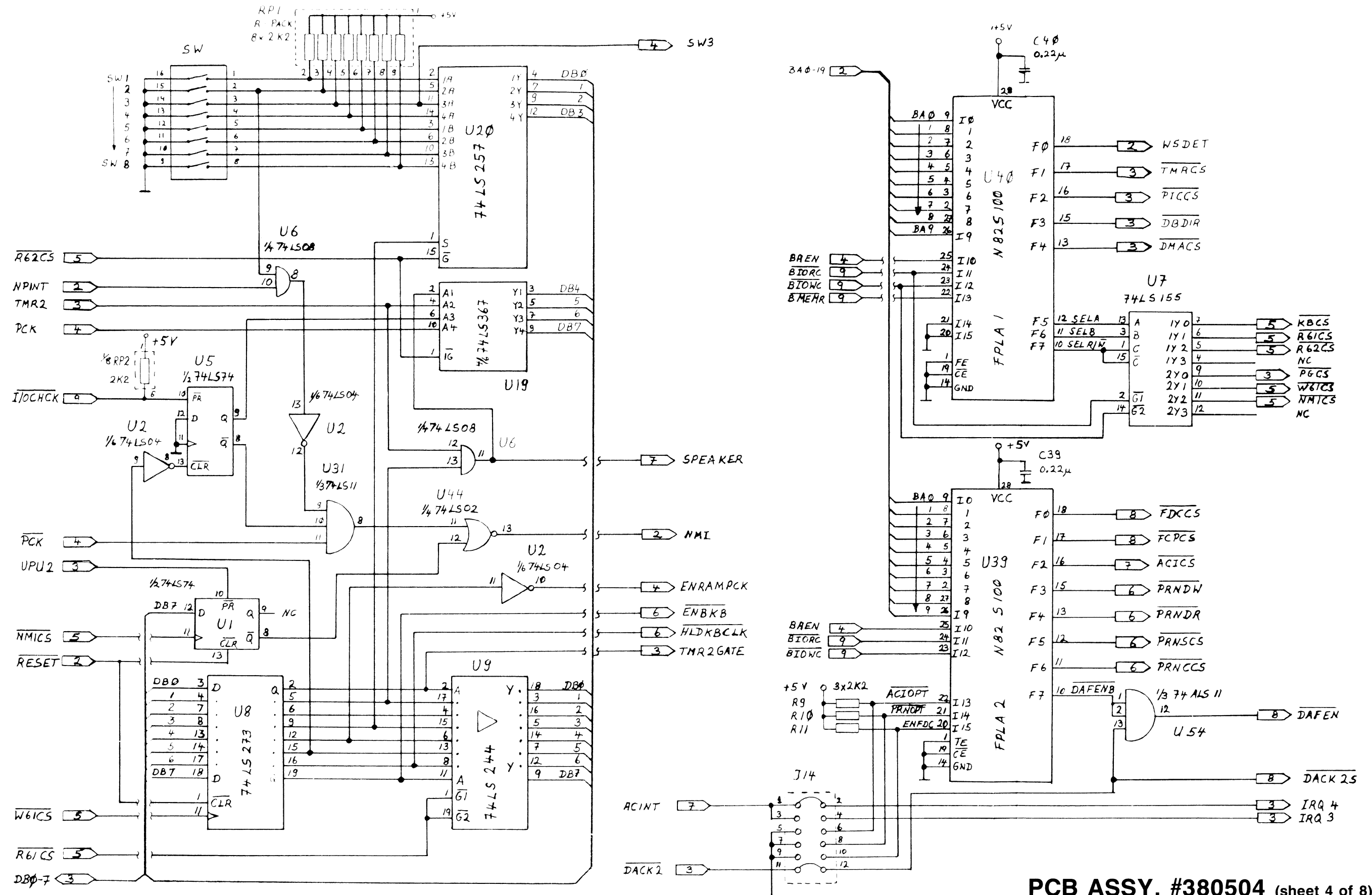


PCB ASSY. #380504 (sheet 1 of 8)

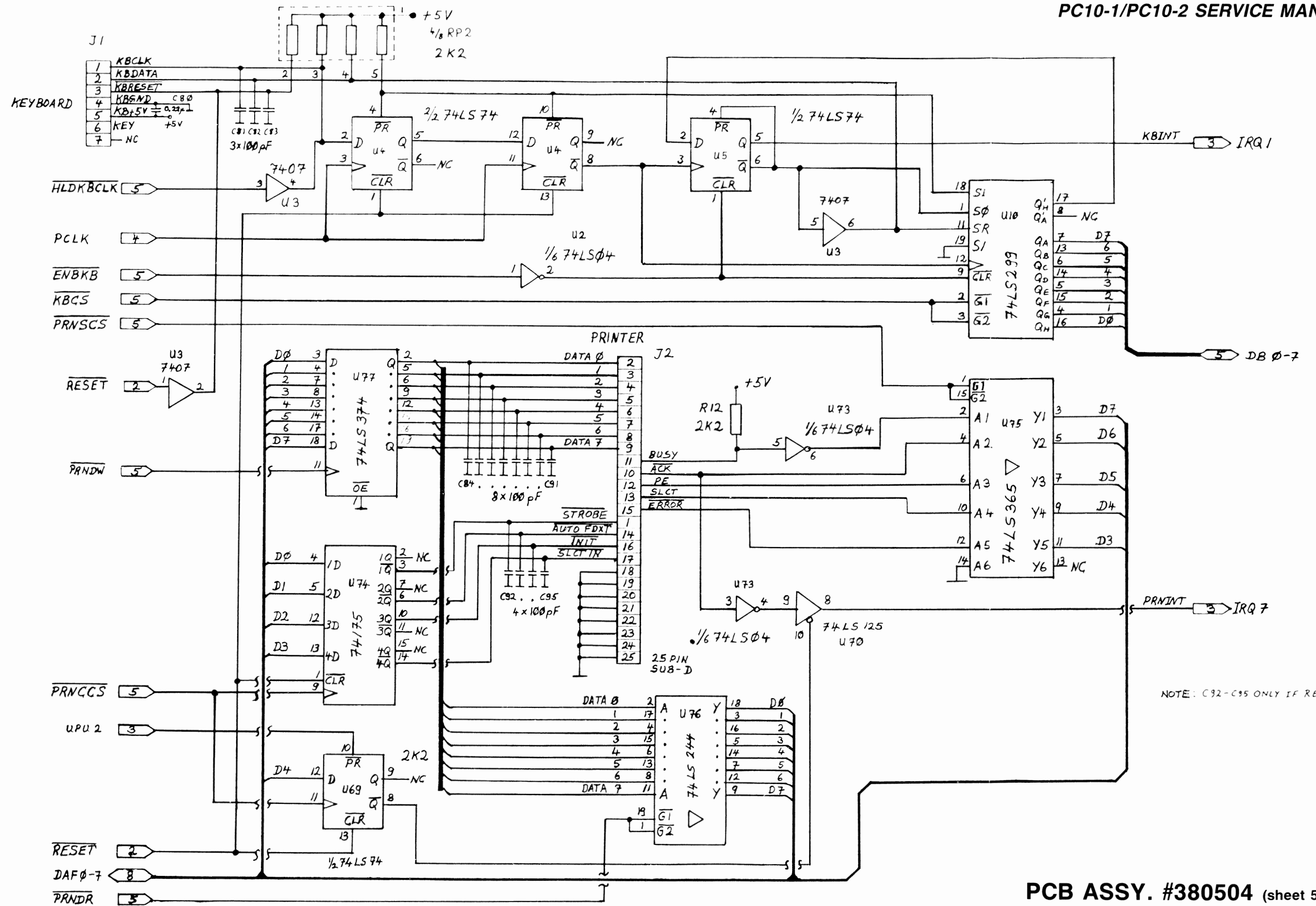


PCB ASSY. #380504 (sheet 2 of 8)



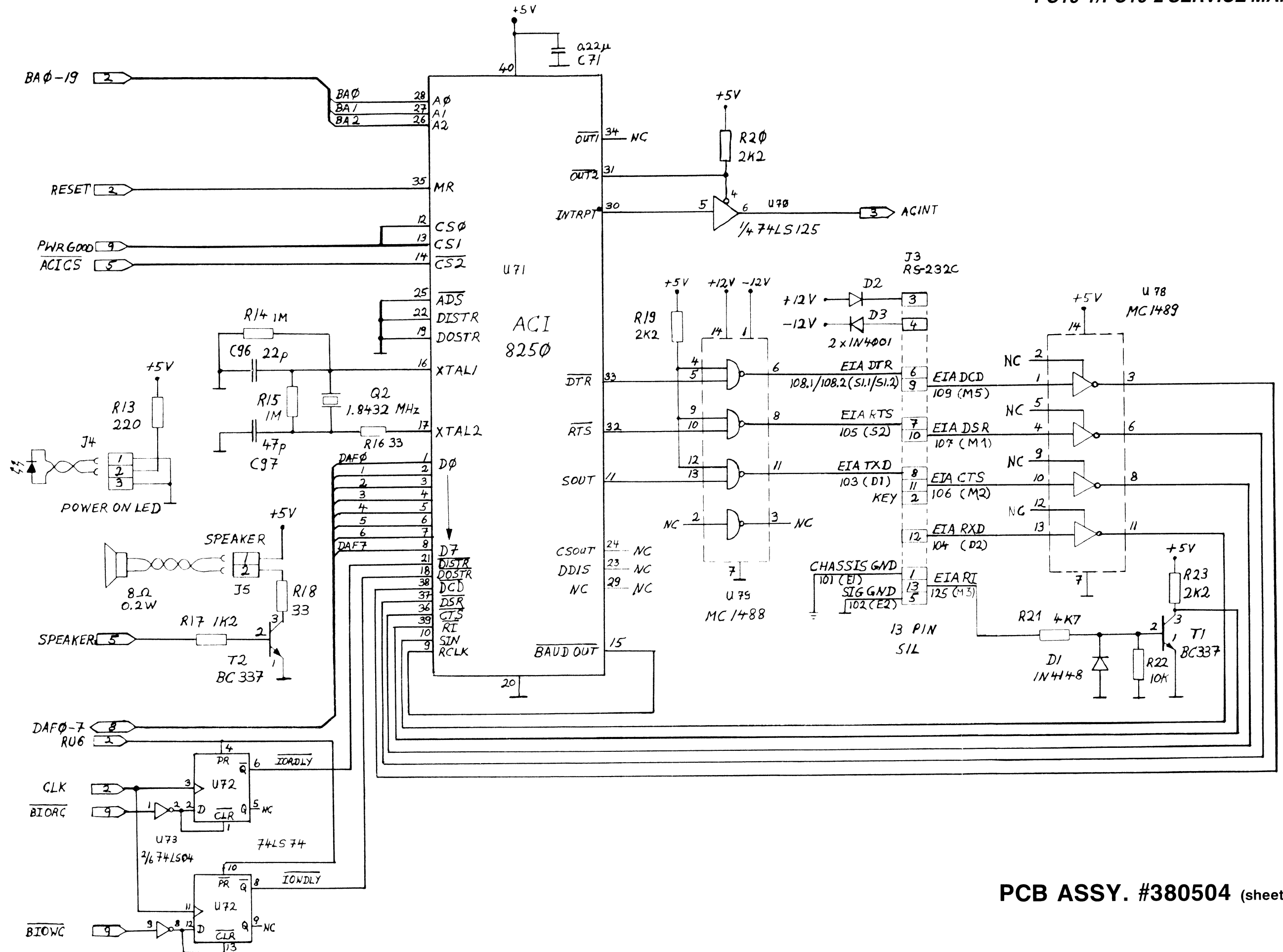


PCB ASSY. #380504 (sheet 4 of 8)

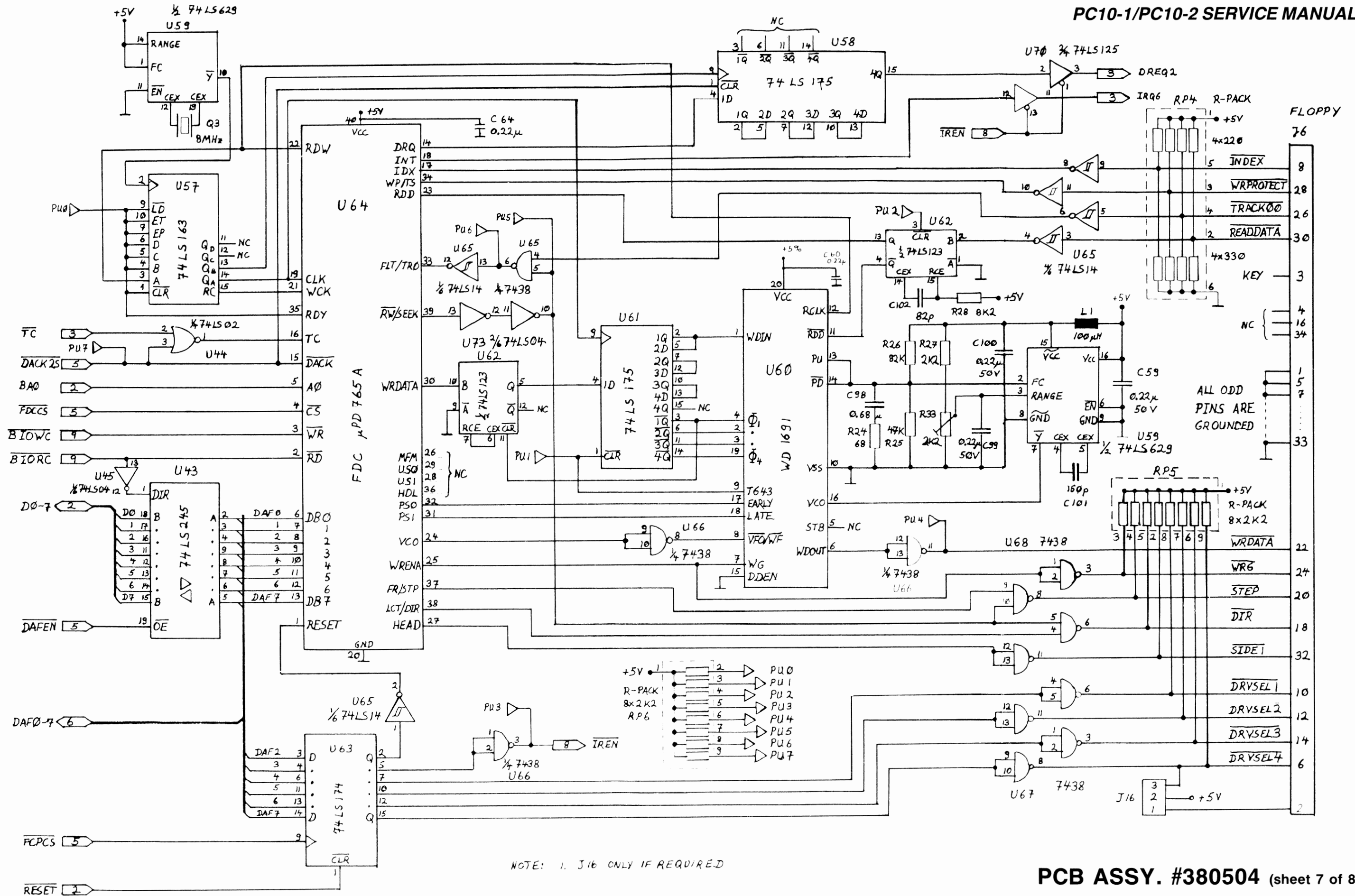


NOTE: C92-C95 ONLY IF REQUIRED

PCB ASSY. #380504 (sheet 5 of 8)

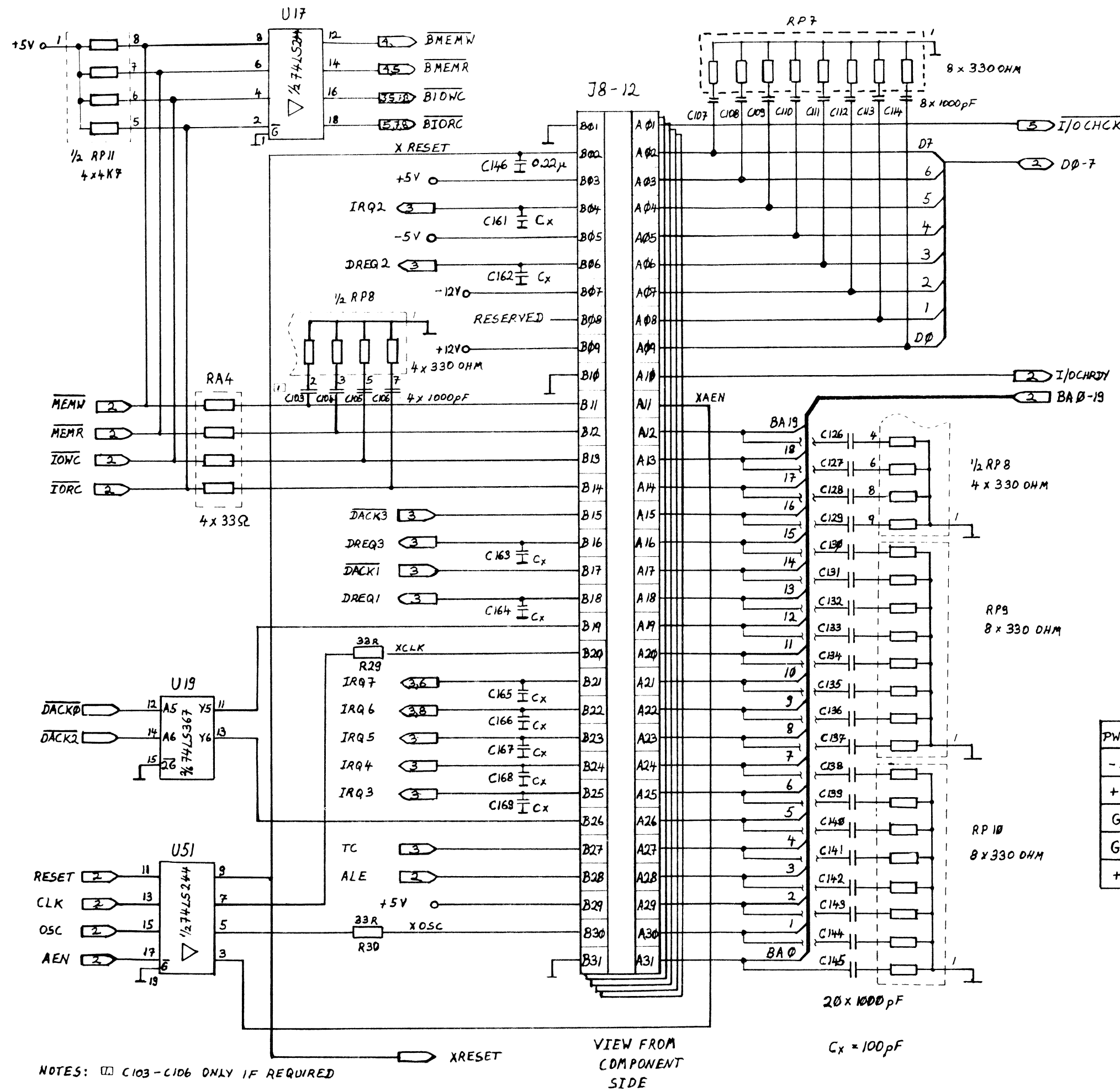


PCB ASSY. #380504 (sheet 6 of 8)

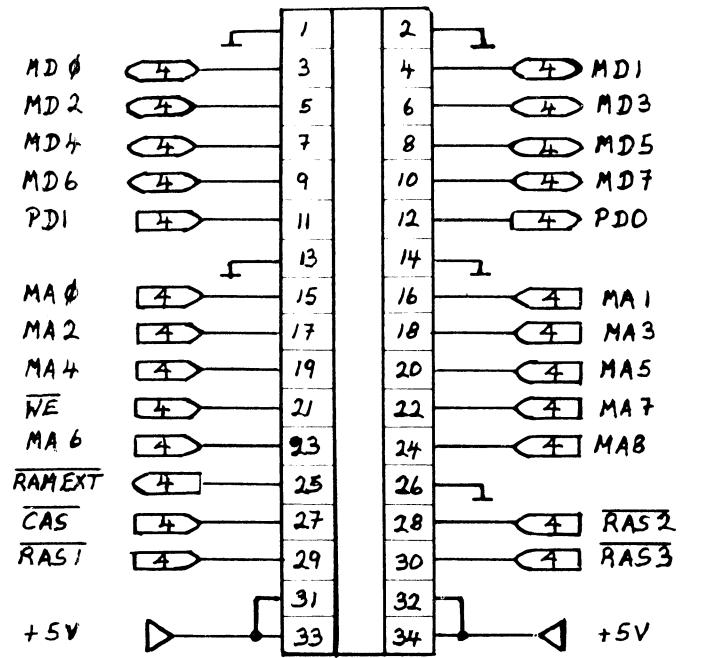


NOTE: 1. J16 ONLY IF REQUIRED

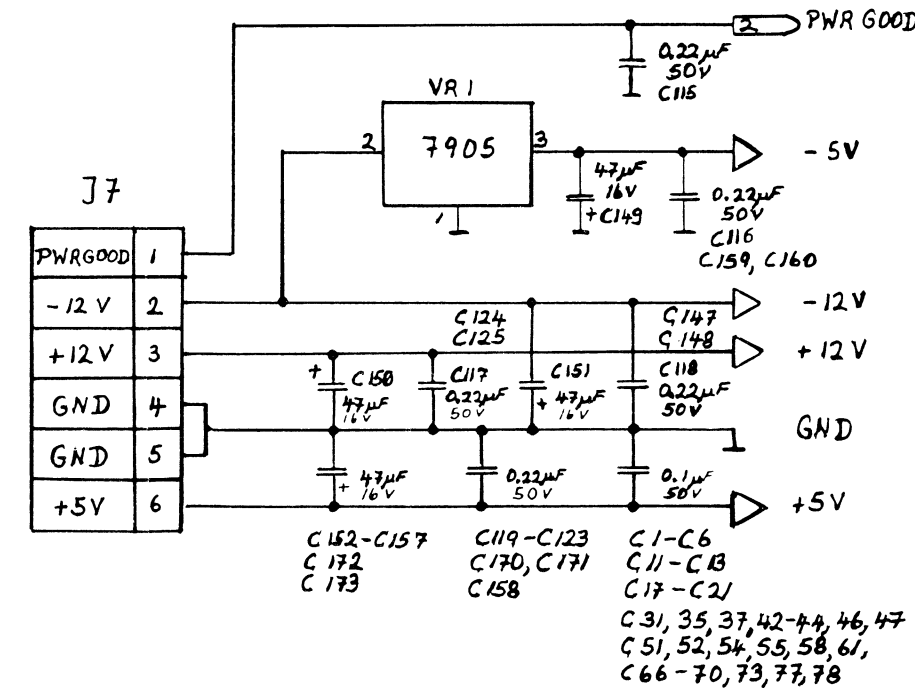
PCB ASSY. #380504 (sheet 7 of 8)



J13
RAM-EXPANSION-CONNECTOR



I/O-POWER-CONNECTOR /-5V SUPPLY



PCB ASSY. #380504 (sheet 8 of 8)

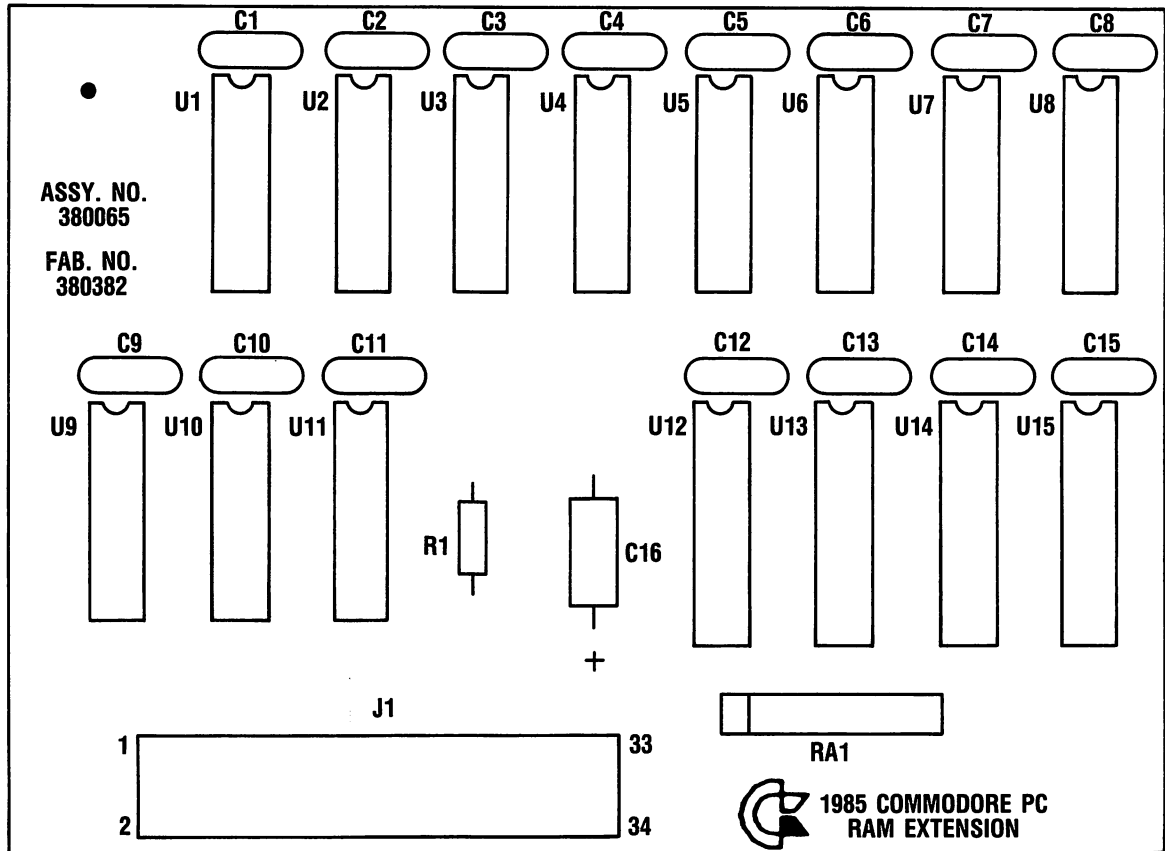
NOTES: □ C103-C106 ONLY IF REQUIRED

PARTS LIST RAM EXPANDER

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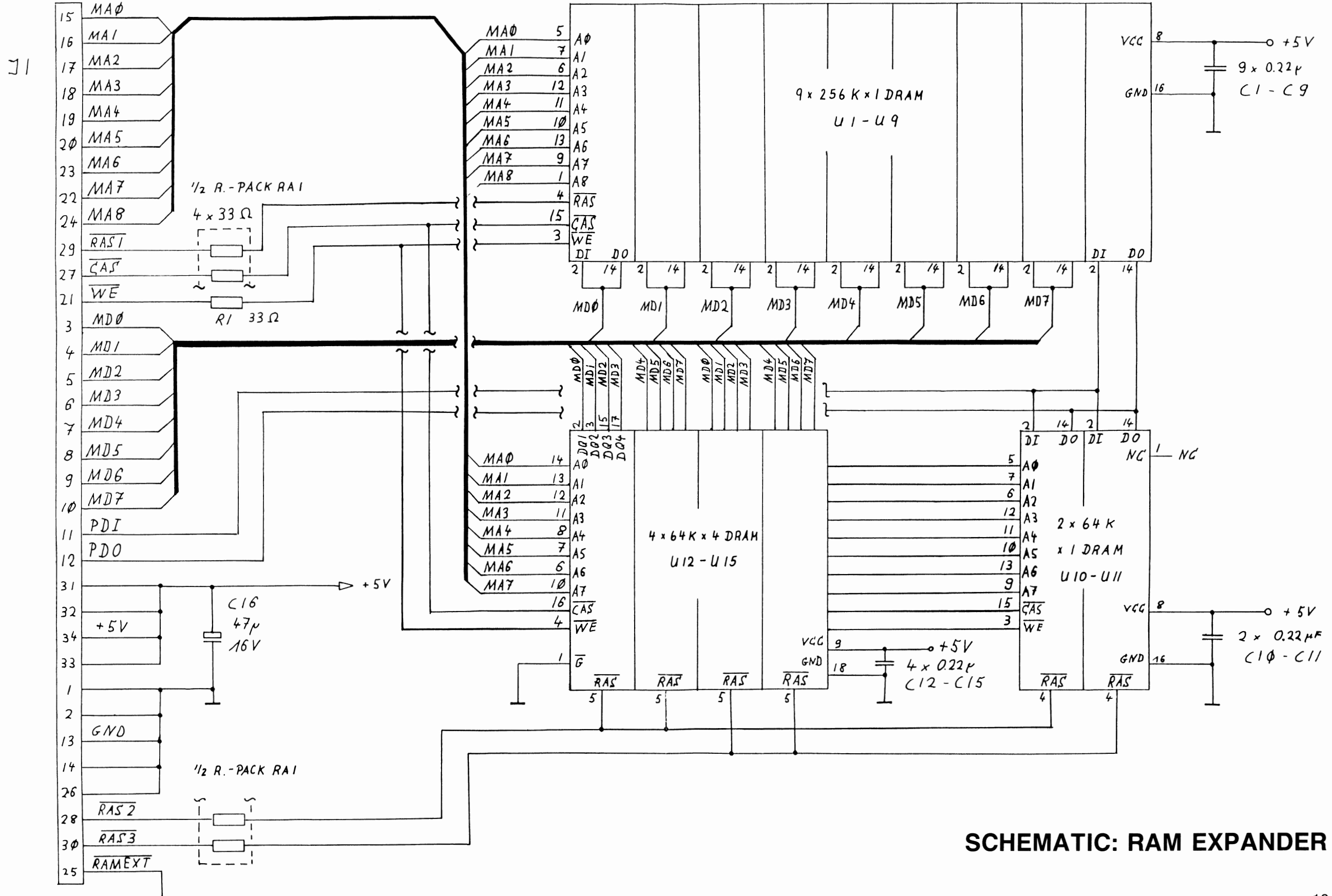
INTEGRATED CIRCUITS			RESISTORS	
U1-9	4256 256Kx1 Dram	380223-01	R1	33 ohm 1/4W
U12-15	4464 64Kx4 Dram	380256-01	RA1	4x33 ohm SIP
U10,11	4164 64Kx1 Dram	904150-02		
CAPACITORS			CONNECTORS	
C16	Electrol Axial 47 μ F 16V		J1	CNNT 34P Female 380311-01 (Amp 1-166 592-7)
C1-15	Ceramic 0.22 μ F 50V			

BOARD LAYOUT



RAM EXPANSION CONNECTOR

34 Pin



SCHEMATIC: RAM EXPANDER

APPROVED VENDORS LIST
PCB ASSY. COMBINED MAIN BOARD

PART NUMBER	DESCRIPTION	VENDOR NAME	VENDOR PART NO.
380200-01	IC LSI MPU 8088 5MHZ	AMD INTEL NEC	AM8088 8088 4PD8088
380202-01	IC LSI PRGM INTVAL TIMER 8253	SIEMENS AMD INTEL NEC NEC	SAB8088 P8253-5 P8253-5 VPD8253C-2 VPD8253C-5
380203-01	IC LSI DMA-CNTRL D8237AC-5	NEC	D 8237 AC-5
380205-01	IC LSI ACI 8250	NSC	INS8250AN
380206-01	IC LSI FDC UPD765	WESTERN DIGI NEC	WD8250PL VPD 765AC-2
380223-01	IC MEM DRAM 256KX1BIT 150NS	FUJITSU HITACHI MATSUSHITA NEC OKI SAMSUNG SHARP TI TOSHIBA	MB81256-15 HM50256P-15 MN41256-15 D41256C-15 MSM41256-15 KM41256-15 LH21256-15 TMS4256-15NL TMM41256P-15
324667-01	IC DIGITAL DELAY LINE	BEL DATATRONIC NYTRONICS PCA ELECT PULSE ENG	0447-0250-02 DL6310 DDL-250F EP8205 21214
380207-01	IC LSI DATA SEPARATOR 1691	WESTERN DIGI	WD1691
901524-06	IC LIN LINE DRIVER MC1488	FAIRCHILD MOTOROLA SIGNETICS	UA1488PC MC1488 MC1488
901524-07	IC LIN LINE DRIVER MC1489	MOTOROLA NSC SIGNETICS	MC1489 MC1489 MC1489

PCB ASSY. RAM EXPANSION CARD

PART NUMBER	DESCRIPTION	VENDOR NAME	VENDOR PART NO.
380223-01	IC MEM DRAM 256KX1BIT 150NS	FUJITSU HITACHI MATSUSHITA NEC OKI SAMSUNG SHARP TI TOSHIBA	MBB1256-15 HM50256P-15 MN41256-15 D41256C-15 MSM41256-15 KM41256-15 LH21256-15 TMS4256-15NL TMM41256P-15
380256-01	IC MEM DRAM 64KX4BIT	TI TI	TMS 4464 JL-15 TMS 4464 NL-15
901505-02	IC MEM DRAM 64KX1BIT 150NS	FUJITSU HITACHI MICRON NEC OKI SHARP TOSHIBA	MB8264-15P-G HM4864-2 MT4264-2 UPD4164C-15 MSM3764-15RS LH2164-15 TMM4164P-3



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