

PT68K-2

PERIPHERAL TECHNOLOGY

1480 Terrell Mill Rd., Suite 870

Marietta, Georgia 30067 USA

PT68K-2

USER'S MANUAL

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by

Peripheral Technology
1480 Terrell Mill Rd.
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Marietta, Ga. 30067

Revision 6/1/88

Table of Contents

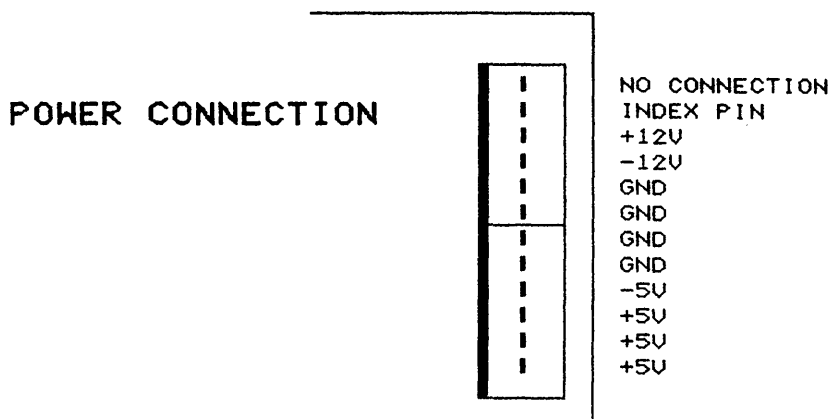
Power Connection	1
RS-232 Terminal	1
Monochrome monitor connection	2
Color monitor connection	2
Floppy disk connection	2
Speaker connection	3
LED connection	3
Reset switch	3
RS-232 cable construction	4
Printer connection	5
Winchester drives	6
Configuration options	7
Specifications	8
Parts list	9
Parts placement	11
Schematics	12

GETTING STARTED

These instructions assume that you have completed construction of the kit or have purchased an assembled board. Instructions for construction of the kit are contained in a separate manual.

POWER CONNECTION

Connect power to the PT68K-2 board. The power connector is J10.



MONITOR CONNECTION

These types of monitors may be connected to the PT68K-2:

- RS-232 terminal (Connector J22).
- IBM PC/XT compatible keyboard, monochrome adaptor card and monochrome monitor.
- IBM PC/XT compatible keyboard, color adaptor card and color monitor.

RS-232 TERMINAL CONNECTION

Connect a cable between J22 and the CRT. See the page 4, "RS-232 Interface" for more information. J22 is the MAIN terminal port. J11, J12 or J21 can be used for other terminals or serial printer ports. The use of J11, J12 and J21 is determined by the operating system. When using this type of terminal it is necessary to

press the <CR> key a few times when turning on the system. This allows the HUMBUG monitor to determine the baud rate of your terminal. The terminal should be configured for eight data bits, one stop bit, no parity and a baud rate between 300 and 19,200.

MONOCHROME MONITOR CONNECTION

1. Install an IBM compatible monochrome adaptor card in one of the IBM compatible I/O slots.
2. Plug a monochrome monitor into the monochrome display adaptor card.
3. Plug an IBM PC/XT/AT compatible keyboard into the keyboard connector port J9. The keyboard must be set to XT mode if it has an XT/AT switch position.
4. The HUMBUG monitor initializes the adaptor card on power up and displays a message. See the HUMBUG monitor manual for more information on monitor selection.

COLOR GRAPHICS (CGA) CONNECTION

1. Install a color graphics adaptor (CGA) card in one of the PC/XT I/O slots.
2. Plug a color monitor into the color graphics adaptor card.
3. Plug an PC/XT or AT compatible keyboard into the keyboard connector port J9. The keyboard must be set to XT mode if it has an XT/AT switch position.

The HUMBUG monitor initializes the adaptor card on power up and displays a message. See the HUMBUG monitor manual for information on monitor selection.

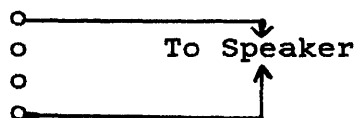
FLOPPY DISK CONNECTION

The PT68K2 computer will work with either 3-1/2" or 5-1/4" drives. Storage capacities are 360K for the 40 track drives and 720K for the 80 track drives. The PT68K2 will not work with the 1.2 MEG or 1.44 MEG drives that are sometimes used with IBM AT/clone computers. The drive cable used for the PT68K2 has all connections in parallel and does not twist part of the cable like IBM clone drive cables. Be certain not to use an IBM/clone drive cable.

1. Connect a cable between J13 and the floppy drive(s). Make sure that pin 1 on J13 connects to pin 1 on the floppy drive(s). (Pin 1 is near the power connector).
2. If you have two drives, there should be only one resistor terminator pack installed. The resistor terminator should be installed on the last drive in the system (the one at the far end of the cable). Some of the newer drives like the Toshiba drives (3-1/2 and 5-1/4 inch drives) do not contain any terminating resistors and this step will not apply if you have a newer drive(s).

SPEAKER CONNECTION

Plug the speaker into J18. The speaker wires should be on the outer terminals. Connection of the speaker is optional; however, no bell will be available when using the PC/XT keyboard and monitor unless the speaker is connected. The speaker also beeps on power up after successful completion of system tests.



MONITOR LED CONNECTION

On the baby AT cabinet there is a panel of three LED's with wires attached. The appropriate wire should be plugged in the appropriate pins on the PT68K2 system board.

- J15 - Power
- J16 - Disk access (WD1002A-HDO controller)
- J17 - Halt status

Connect the Turbo mode LED to J17. Note the HALT LED will light for a second when turning the computer on or when pressing the reset switch.

There are no polarization indicators on the LED plugs so it may be necessary to reverse the connector if the LED's do not light. Note: The LED's will not be damaged if the plug is installed incorrectly.

RESET SWITCH CONNECTION

Plug the connector from the reset switch to J23.

SYSTEM STARTUP

Refer to the HUMBUG manual for information on starting the system.

RS-232 INTERFACE INFORMATION

Connectors J11, J12, J21, J22

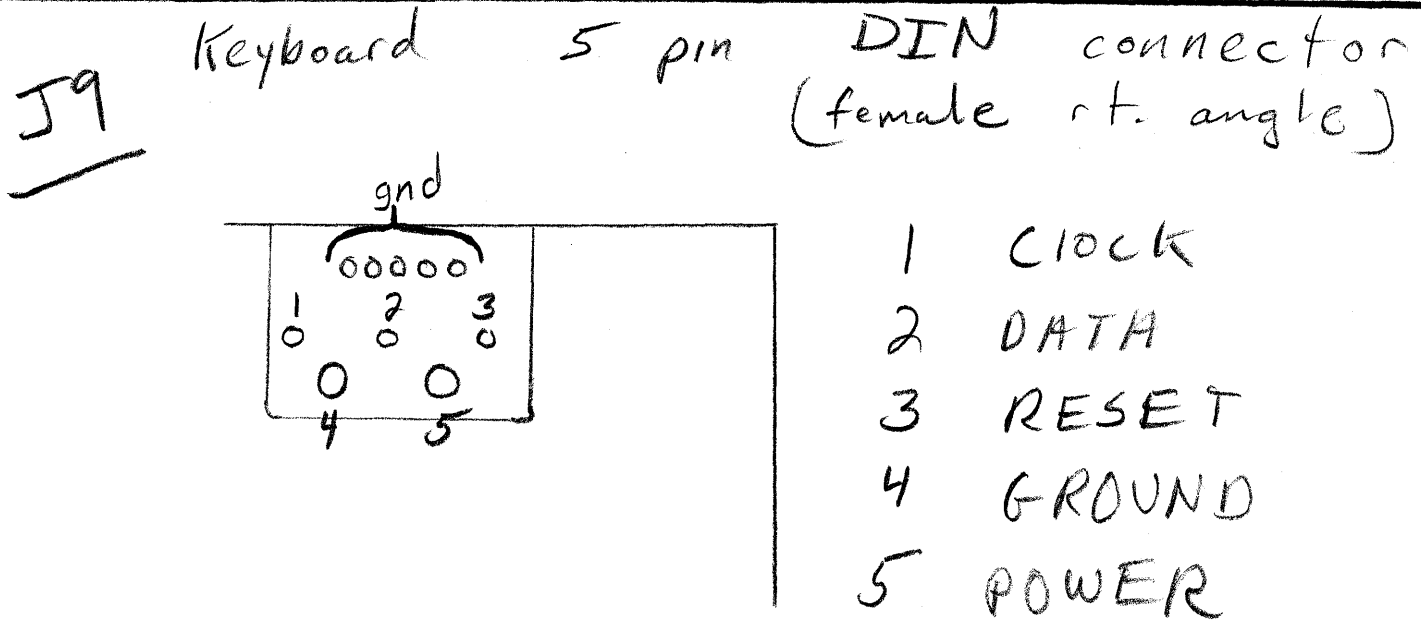
PIN DESCRIPTION

1	Request to Send (RTS)	1	o	o	6
2	Index	2	o	5	
3	Ground	3	o	o	4
4	Data Terminal Ready (DTR)				
5	Transmitted Data	(Viewed from component side)			
6	Received Data	(top)			

TYPICAL CRT TO COMPUTER CONNECTION

PIN	J11, J12, J21 OR J22	DB-25	PIN
6	o	o	2
5	o	o	3
3	o	o	7
4	o	o	20

Note: DTR must be connected for the RS-232 interface to work.
 RTS is not usually required unless interfacing to a modem.
 (DTR should be connected to +12V if no DTR is available from the terminal)

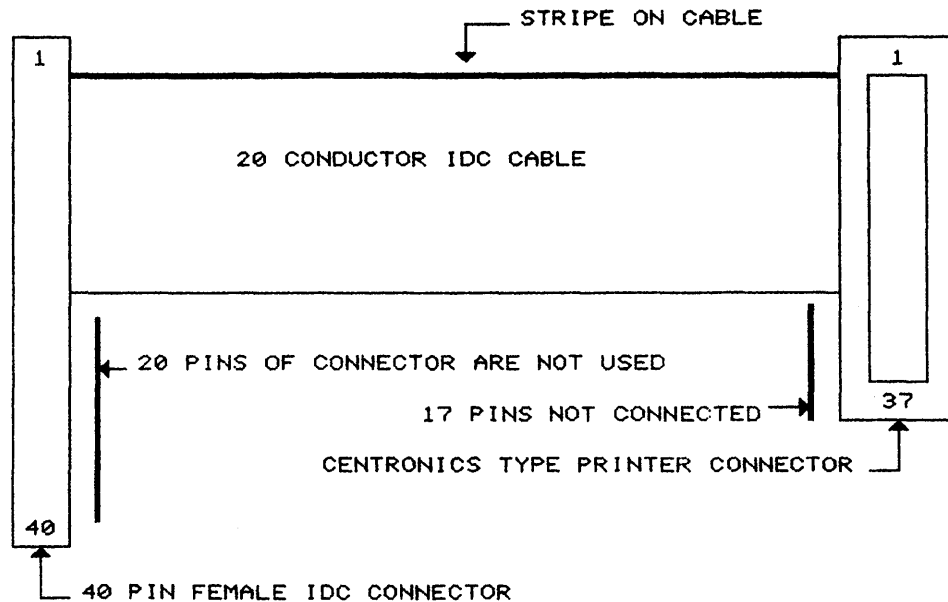


PRINTER INTERFACE

There are two ways to interface a printer to the PT68K2 computer. One option is to connect a printer to the PIA port (J8) on the PT68K2 computer. The other method is to connect a printer to the printer port of a monochrome or color card.

PIA Printer Port

The PIA port (J8) is arranged to allow IDC connectors to connect between J8 and the printer connector. To construct a cable use 20 conductor cable and follow the diagram below.



40 Pin IDC Connector

The cable should be positioned so that the striped end of the cable starts on pin one of the IDC connector. The last 20 pins are not used.

37 Pin Printer Connector

The cable should be positioned on the connector with the striped end of cable starting on pin 1 of the printer connector.

MONO/COLOR Printer Port

If using the printer port of the monochrome or color adaptor card you will need an IBM compatible printer cable. These cables are available from Peripheral Technology as well as other IBM clone computer dealers. The adaptor card uses a male DB-25 connector with a Centronics 37 pin male connector on the printer end.

WINCHESTER INTERFACE

There are two choices for a hard disk controller. One is the use of a WD1002A-HDO controller. The other choice is to use an IBM compatible PC/XT controller (WDXT-GEN Western digital). The PT68K-2 will not accept other types of controller cards. The PC/XT type of controller is recommended over the WD1002A-HDO since the PC/XT type is less expensive and is more readily available.

WDXT-GEN Controller

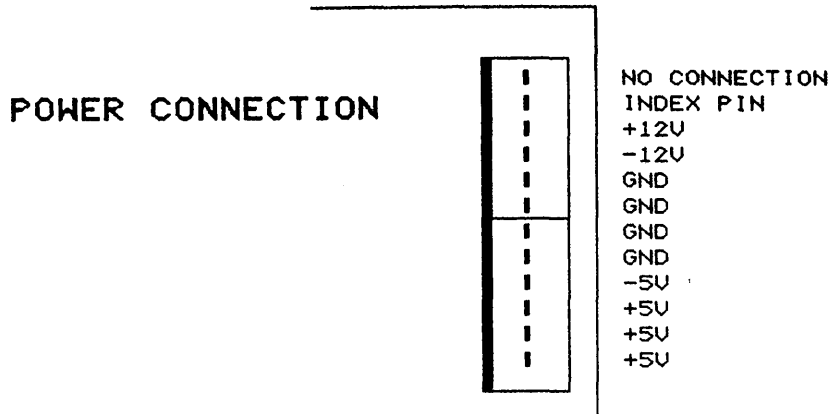
1. Plug the controller into one of the PC/XT expansion slots.
2. Connect the 20 and 34 conductor ribbon cables between the controller card and the winchester drive. Use J2 for the first winchester and J3 for the second winchester drive. Be certain to observe pin 1 polarization of the cable between the drive and the controller card. IF THE CABLES ARE PLUGGED IN BACKWARDS THE DRIVE OR CONTROLLER COULD BE DAMAGED.
3. Connect power to the hard disk drive. Any of the cables from the power supply may be used.
4. You are now ready to format the drive. Consult the 'HDFORMAT' command in the SK*DOS manual for information on formatting the drive. Use a step rate code of '5' for drives that have a buffered step.

WD1002A-HDO controller

1. The winchester interface port is designed to work with a Western Digital WD1002A-HDO controller card. You may substitute a WD1002-05 if desired but the software does not support the floppy controller on the WD1002-05 board.
2. Connect a 40 conductor cable between the Winchester expansion interface connector and the Western Digital WD1002A-HDO board (J7 on the PT68K-2 and J5 on the WD1002A-HDO).
3. The winchester drive should be configured to respond as the second drive (Drive '1' if you start with '0') and its data cable should connect to J2 on the WD1002A-HDO.
4. Connect cables between the winchester drive and the WD1002A-HDO controller. See the Western Digital data sheet for more information.
5. You are now ready to format the drive. Refer to the 'HDFORMAT' command in the SK*DOS manual and proceed with formatting your winchester drive.

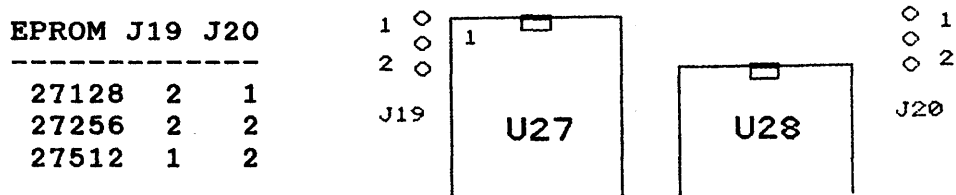
CONFIGURATION OPTIONS

- J1 - J6 PC/XT I/O expansion slots
- J7 - Winchester interface connector for Western Digital WD1002A-HDO controller
- J8 - PIA connector
- J9 - PC/XT keyboard connector
- J10 - Power connector



- J11 - RS-232 Port
- J12 - RS-232 Port
- J13 - Floppy disk connector
- J14 - Test connector (should be shorted)
- J15 - LED - Power indicator
- J16 - LED - access of WD1002A-HDO controller
- J17 - LED - 68000 'HALT' status
- J18 - Speaker connector
- J19 - Eprom select
- J20 - Eprom select

EPROM SELECTION



- J21 - RS-232 Port
- J22 - RS-232 Port
- J23 - Reset connector (Shorted = reset)
- J24 - Processor speed (1=8.0 MHZ, 2=10 or 12 MHZ)
- J25 - System configuration
 - Position 1 - DRAM enabled
 - Position 2 - DRAM disabled, EPROM is mapped to address 0

Note: J14, J15 and J16 will drive LED's directly. It is not necessary to install a series dropping resistor.

PT68K-2 SPECIFICATIONS

MC68000 Processor, 8.0 MHZ Clock, No wait state DRAM
8 or 10 MHZ uses 150ns RAM, 12MHZ uses 120ns RAM

000000-0FFFFFFF RAM (1024K)
FF0000-FF0FEF RAM (4K) BATTERY BACKED UP RAM
FF0FF1-FF0FFF CLOCK REGISTERS (MK48T02)
F80000-F9FFFF EPROM (128K)
FA0001-FBFFFF IBM SLOT I/O PORTS (ODD BYTES)
C00001-DFFFFFFF IBM SLOT MEM READ/WRITE (ODD BYTES)
FE0001-FE003F MC68681 DUART
FE0041-FE007F MC68681 DUART
FE0081-FE00BF MC68230 PIA
FE00C1-FE00FF FLOPPY DRIVE SELECT
FE0101-FE013F WD1772 FLOPPY DISK CONTROLLER
FE0141-FE017F WD1002 WINCHESTER CONTROLLER
FE0181-FE01BF SPARE
FE01C1-FE01FF IBM KEYBOARD

^{oc1}
FE01C1-Drive Select Register BIT 1 BIT 0

0	0	- Drive select 0
0	1	- Drive select 1
1	0	- Drive select 2
1	1	- Drive select 3

Bit 5 - 0=Single density
 1=Double density
Bit 6 - 0=Side 0
 1=Side 1

Note: The first 8 locations of EPROM are mapped to address 0 after a reset. After four "AS" strobes RAM is restored to the first eight locations.

- Board can use 27128, 27256, or 27512 EPROM (EPROM 450 ns).
- Each I/O decode is 64 bytes. This results in some of the I/O devices being multiple mapped within their I/O decode block.
- Floppy drives up to four DS/DD 40 or 80 track. Drives may be 3.5 or 5-1/4 size. Does not support 1.2 MEG or 1.44 MEG drives.
- Winchester interface (J8) requires WD1002A-HDO controller card.
- The clock (MK48T02) has a lithium battery mounted in the chip. The expected life of the battery is approximately 5 years. The battery will supply 31,000 hours of operation.
- The PC/XT expansion I/O option will allow the use of an IBM PC/XT keyboard, monochrome monitor and hard-disk interface card (WDXT-GEN).

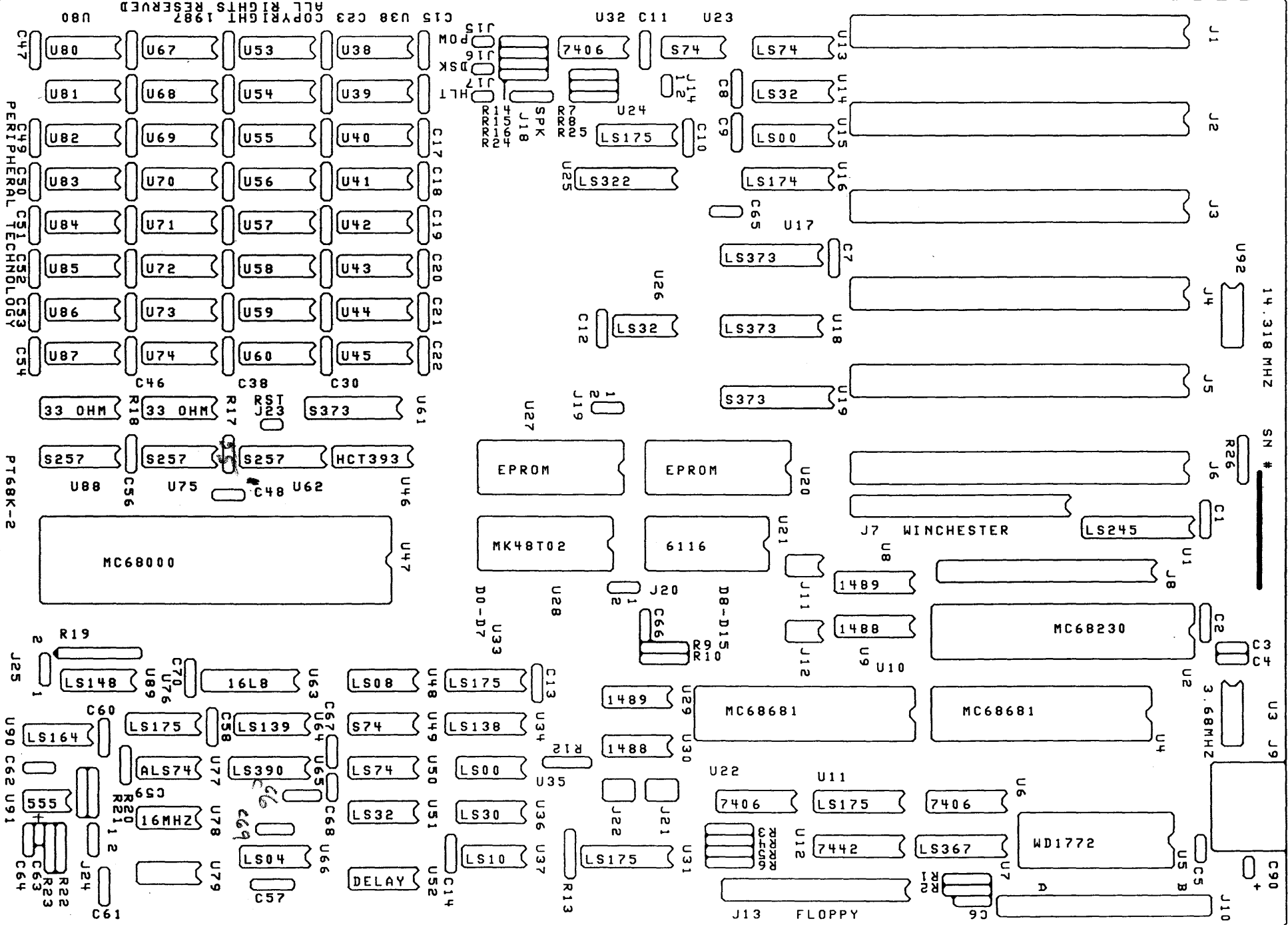
Parts List PT68K-2

1	U1	74LS245
1	U2	MC68230P8
1	U3	3.686400 MHZ OSCILLATOR
2	U4,U10	MC68681P
1	U5	WD1772
6 3	U6,U22,U32	7406
1	U7	74LS367
2	U8,U29	1489
2	U9,U30	1488
6 5	U11,U24,U31 U33,U76	74LS175
1	U12	7442
2	U13,U50	74LS74
3	U14,U26,U51	74LS32
2	U15,U35	74LS00
1	U16	74LS174
3	U17,U18	74LS373
2	U19,U61	74S373
2	U20,U27	27128, 27256 OR 27512 EPROM (450NS)
.1	U21	6116 2K X 8 SRAM (400NS OR FASTER)
2	U23,U49	74S74
1	U25	74LS322
61	U28	6116 (2Kx8 SRAM) OR MK48T02 (Clock and 2Kx8 SRAM)
1	U34	74LS138
61	U36	74LS30
1	U37	74LS10
32	U38-U45 U53-U60 U67-U74 U80-U87	256K DRAM 150NS (120NS for 12 MHZ processor)
1	U46	74HCTLS393
1	U47	MC68000P8, MC68000P10 or MC68000P12
1	U48	74LS08
1	U77	74ALS74
1	U52	DATA DELAY DEVICES DDU66-150 150 NS DELAY GATE
3	U62,U75,U88	74S257
61	U63	PAL16L8B2NC
1	U64	74LS139
1	U65	74LS390
1	U66	74LS04
1	U78	16 MHZ OSCILLATOR
1	U79	OPTIONAL (20,24 OR 32 MHZ OSCILLATOR)
61	U89	74LS148
1	U90	74LS164
1	U91	555
1	U92	14.318180 MHZ OSCILLATOR
6	J1-J6	62 PIN CARD EDGE CONNECTOR
2	J7,J8	40 PIN DUAL HEADER STRIP
1	J9	5 PIN PC DIN CONNECTOR
2	J10	POWER CONNECTOR

Parts List PT68K2

4	J11,J12,J21 J22	6 PIN DUAL HEADER STRIP	
1	J13	34 PIN DUAL HEADER STRIP	
1	J18	4 PIN SINGLE HEADER STRIP	
4	J19,J20,J24 J25	3 PIN SINGLE HEADER STRIP	
4	J15,J16, J17,J23	2 PIN SINGLE HEADER STRIP	
6	R1-R6	150 OHM 1/4W RESISTOR	
1	R7	4.7K OHM 1/4W RESISTOR	
5	R8-R10,R12 R13	10K OHM 1/4W RESISTOR	
3	R14,R15,R16	330 OHM 1/4W RESISTOR	
2	R17-R18	33 OHM 16 PIN DIP RESISTOR	
1	R19	10K 8 PIN SIP RESISTOR	
4	R20,R21,R26 R24	2200 OHM 1/4W RESISTOR	
2	R22,R23	1 MEG 1/4W RESISTOR	
1	R25	33 OHM 1/4W RESISTOR	
3	C3,C4,C5	47PF DISC CAP	
1	C63	1.0 uF 16V TANT CAP	
64	C1,C2,C64 C6-C62,C65	0.1 uF DISC CAP	
1	C90	10 uF 16V TANT CAP	
1	C68	33 PF DISC CAP	
1		8 PIN IC SOCKET	
22		14 PIN IC SOCKET	
47		16 PIN IC SOCKET	
1		16 PIN IC SOCKET WITH DE-COUPLING CAPACITOR	U62
7		20 PIN IC SOCKET	
2		24 PIN IC SOCKET	
3		28 PIN IC SOCKET	
2		40 PIN IC SOCKET	
1		48 PIN IC SOCKET	
1		64 PIN IS SOCKET	
1		PT68K-2 BOARD	

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14.318 MHZ

SN #

U3 J9

3.68MHZ

C90

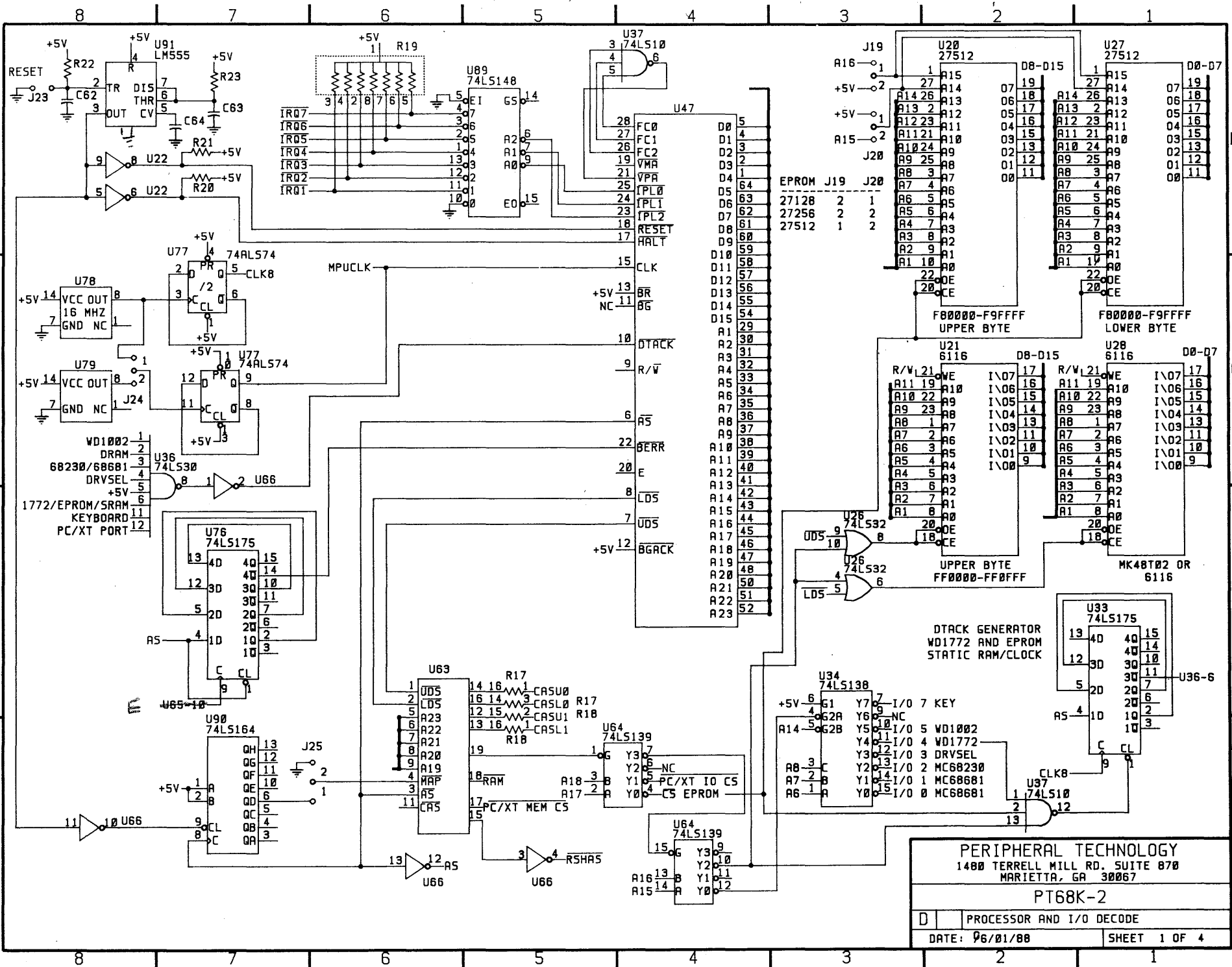
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J13 FLOPPY

J13 FLOPPY

J13 FLOPPY

J13 FLOPPY

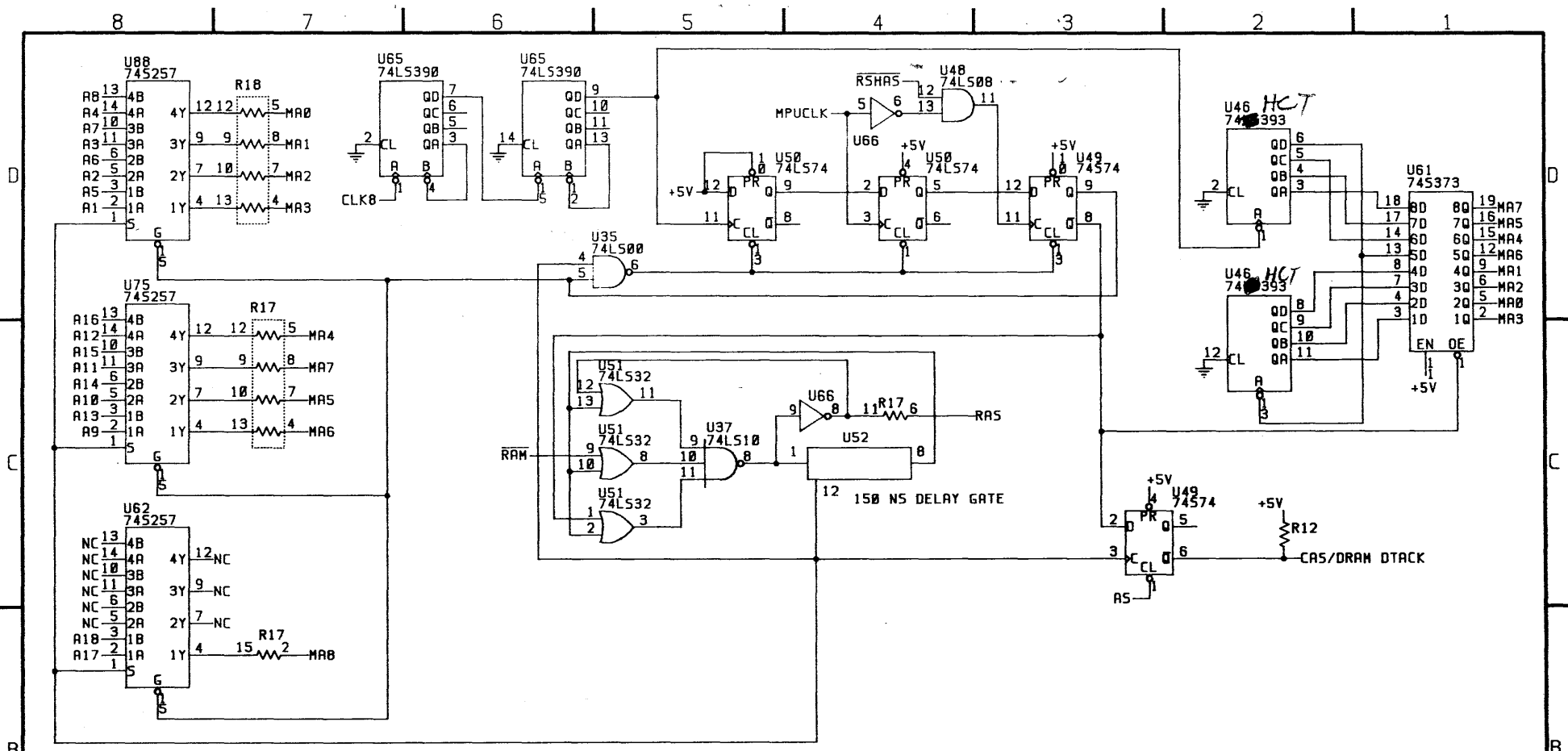


PAGE 12

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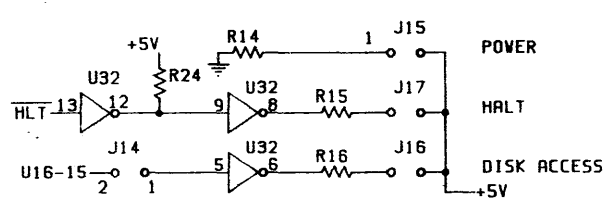
PT68K-2

D	PROCESSOR AND I/O DECODE
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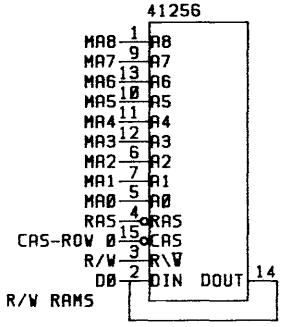
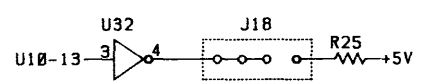


NOTE: D0 - BANK 0 SHOWN, OTHERS SIMILAR

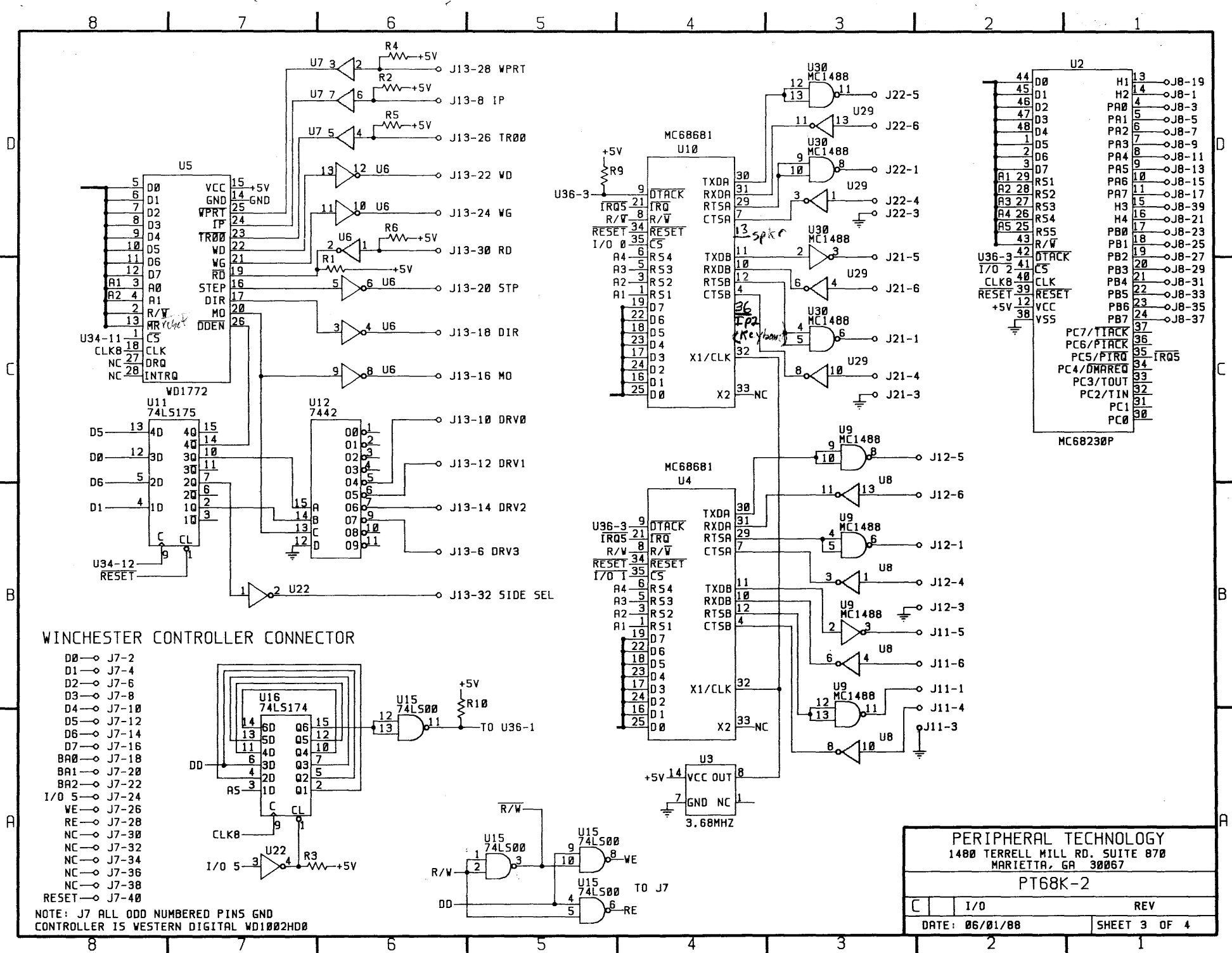
LED INDICATORS.



SPEAKER



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MARIETTA, GA 30067	
PT68K-2	
REFRESH LOGIC	REV
DATE: 06/01/88	SHEET 2 OF 4



U2

44	D0	H1	13	J8-19
45	D1	H2	14	J8-1
46	D2	PA0	4	J8-3
47	D3	PA1	5	J8-5
48	D4	PA2	6	J8-7
1	D5	PA3	7	J8-9
2	D6	PA4	8	J8-11
3	D7	PA5	9	J8-13
A1 29	RS1	PA6	10	J8-15
A2 28	RS2	PA7	11	J8-17
A3 27	RS3	H3	15	J8-39
A4 26	RS4	H4	16	J8-21
A5 25	RS5	PB0	17	J8-23
43	R/W	PB1	18	J8-25
U36-3 42	DTACK	PB2	19	J8-27
I/O 2 41	CS	PB3	20	J8-29
CLKB 40	CLK	PB4	21	J8-31
RESET 39	RESET	PB5	22	J8-33
VCC 12	VCC	PB6	23	J8-35
VSS 38	VSS	PB7	24	J8-37
	PC7/TIACK		37	
	PC6/PIACK		36	
	PC5/PIRQ		35	IRQ5
	PC4/DMAREQ		34	
	PC3/TOUT		33	
	PC2/TIN		32	
	PC1		31	
	PC0		30	

MC68230P

WINCHESTER CONTROLLER CONNECTOR

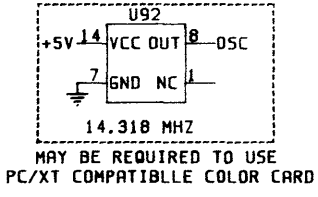
- D0 -> J7-2
- D1 -> J7-4
- D2 -> J7-6
- D3 -> J7-8
- D4 -> J7-10
- D5 -> J7-12
- D6 -> J7-14
- D7 -> J7-16
- BA0 -> J7-18
- BA1 -> J7-20
- BA2 -> J7-22
- I/O 5 -> J7-24
- VE -> J7-26
- RE -> J7-28
- NC -> J7-30
- NC -> J7-32
- NC -> J7-34
- NC -> J7-36
- NC -> J7-38
- RESET -> J7-40

NOTE: J7 ALL ODD NUMBERED PINS GND
 CONTROLLER IS WESTERN DIGITAL WD1002HD0

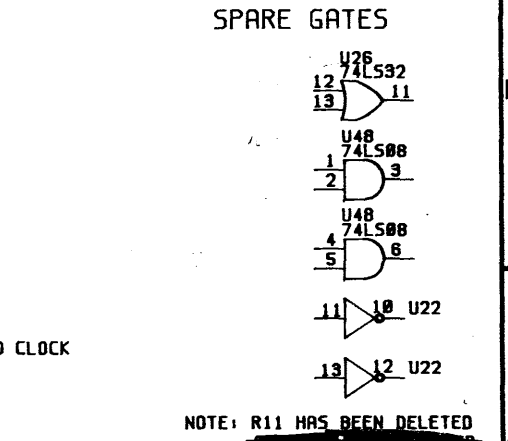
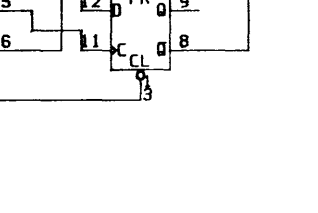
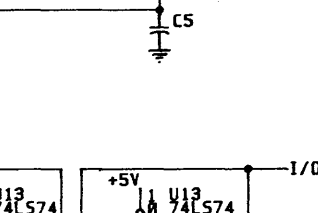
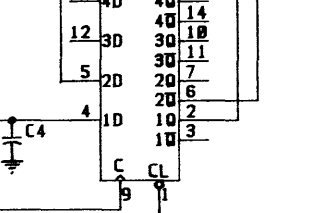
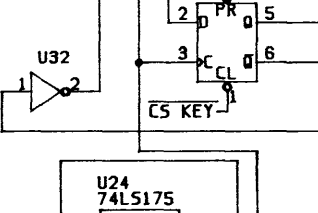
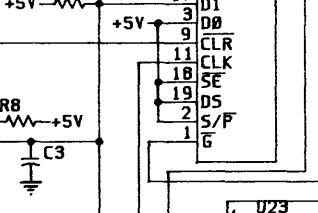
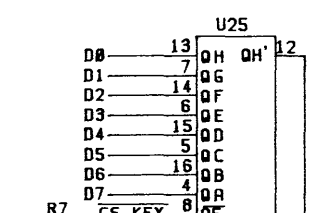
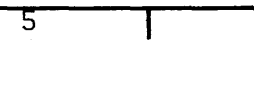
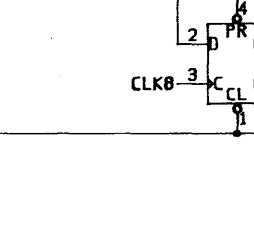
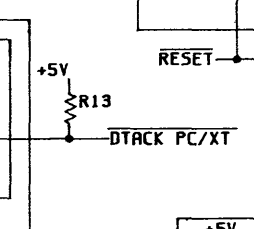
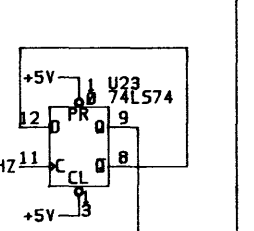
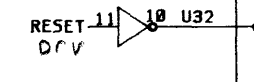
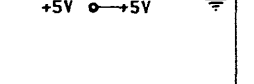
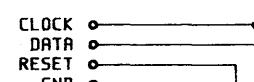
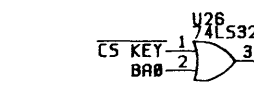
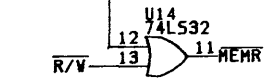
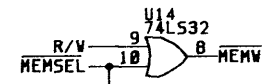
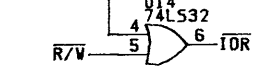
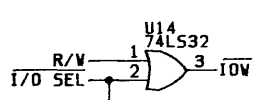
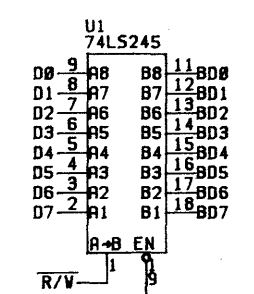
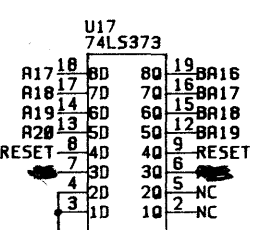
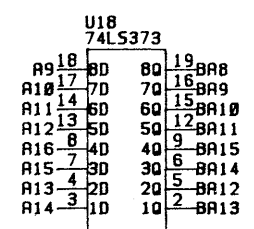
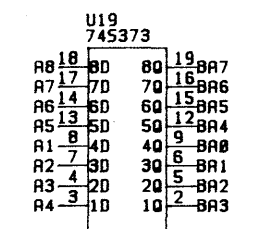
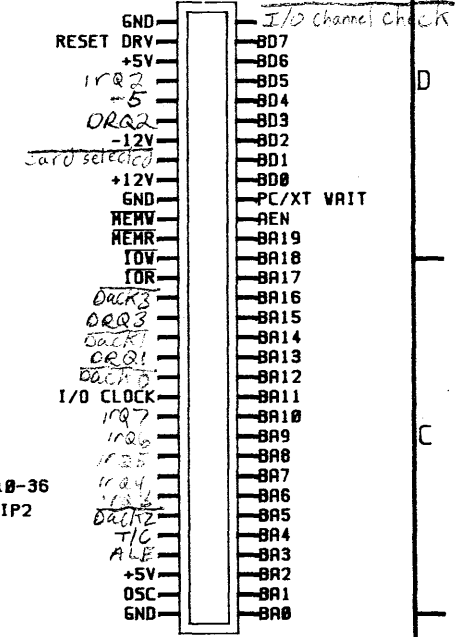
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C	I/O	REV
DATE: 06/01/88		SHEET 3 OF 4

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OPTIONAL



J1-J6 PC/XT CONNECTOR
COMPONENT SIDE VIEW
REAR PANEL



NOTE: R11 HAS BEEN DELETED

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