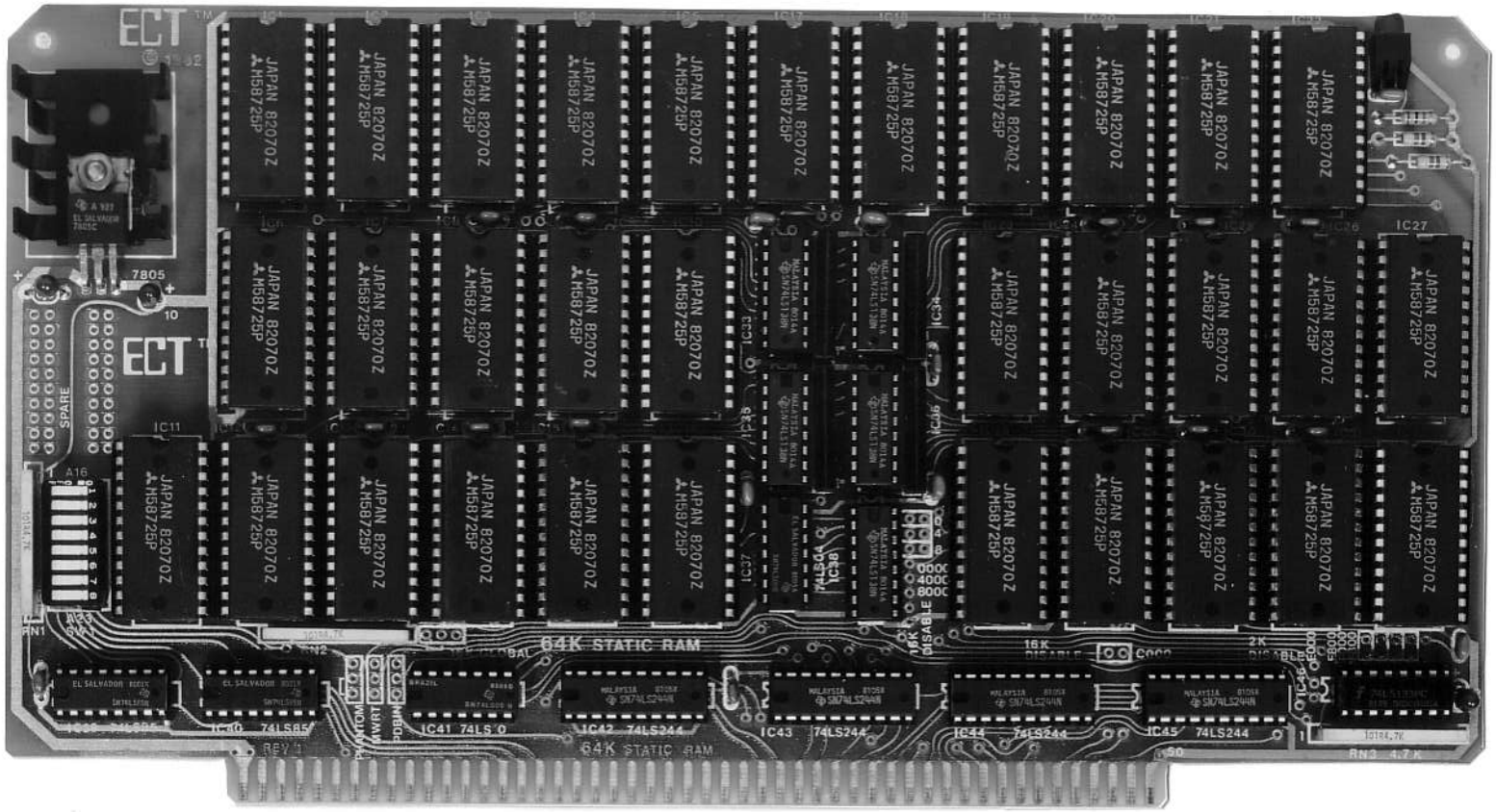
64K RAM



ECT™

ELECTRONIC CONTROL TECHNOLOGY, INC.

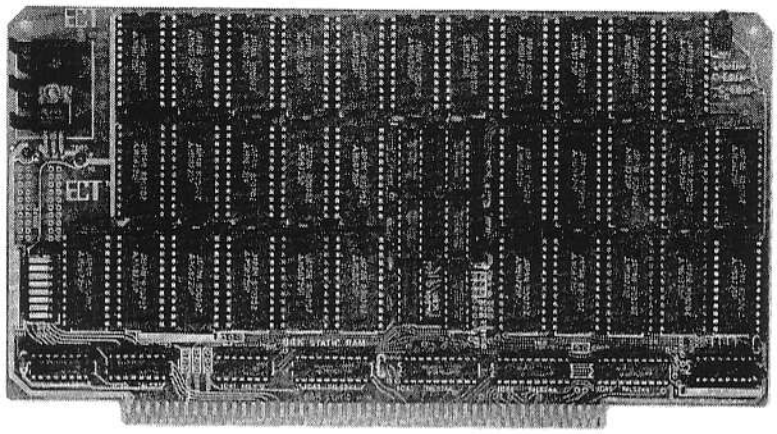
763 Ramsey Ave., Hillside, New Jersey 07205 (201) 686-8080

Building Blocks for Microcomputer Systems, Dedicated Controllers and Test Equipment.

64K RAM
64K x 8-Bit Fully Static Memory

- 64K x 8 Bits
- Fully Static
- Fully Buffered
- IEEE 696/S-100
- Extended Addressing

ELECTRONIC CONTROL TECHNOLOGY, Inc.'s 64K RAM is a low power fully static 64K x 8 bit S-100 bus memory board which utilizes a single supply 2K x 8 bit fully static memory IC with the same pinout as the 2716 EPROM, therefore ROM can be intermixed with the RAM. A DIP switch provides 24 bit extended addressing selection of the board on 64K boundaries; or the board can be used on just 16 bit address. For multi-user systems, 16K can remain global while 48K responds to extended addressing. Portions of the board can be disabled (for memory-mapped disk controllers or ROM) in 2K blocks above E000, in 16K blocks, in any 2K block with jumper wires, or in any block or single address by phantom. All signals to MOS devices are buffered by low power TTL to prevent damage by static electricity and to minimize capacitive loading on the bus. 8080, Z-80 or other CPU's can operate at 2 MHz or 4 MHz (DC to 10 MHz under certain conditions). Low profile IC sockets are provided for all IC's.



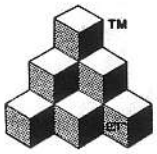
SPECIFICATIONS:

BUS: IEEE 696/S-100
MEMORY SIZE: 65,536 x 8 bits
MEMORY TYPE: 2,048 x 8 bit static RAM
6116, 2016, 8725 or equal (2716 EPROM's may be intermixed)
IC ACCESS TIME: 200 nS standard (other speeds optional — 150 nS)
ADDRESS BITS: 24 bits — switch selectable extended addressing
MULTI-USER: 16K can remain global
DISABLE: 16K blocks, 2K blocks above E000, or PHANTOM
BUS LOADING: 1 low power TTL load per line used
POWER (TYPICAL): 300 mA at +8V
SIZE: 5.3" x 10" x 1/16"
PC MATERIAL: FR4 double sided 2 oz. copper with plated through holes
EDGE CONTACTS: 50 per side on 0.125" spacing, gold over nickel plated
FINISH: Solder mask both sides with silk screened legend
SOCKETS: Low profile sockets for all IC's

Specifications subject to change without notice.

ECT™ ELECTRONIC CONTROL TECHNOLOGY, INC.
763 Ramsey Ave. • Hillside, N.J. 07205 • (201) 686-8080

ECT™
ELECTRONIC CONTROL TECHNOLOGY, INC.
763 Ramsey Ave., Hillside, New Jersey 07205 (201) 686-8080



Building Blocks for Microcomputer Systems, Dedicated Controllers and Test Equipment.

64K STATIC RAM

Copyright 1982 ECT,Inc.

ELECTRONIC CONTROL TECHNOLOGY, Inc.'s 64K RAM is a low power fully static 64K x 8 bit S-100 bus memory board which utilizes a single supply 2K x 8 bit fully static memory IC with the same pinout as the 2716 EPROM, therefore ROM can be intermixed with the RAM. A DIP switch provides 24 bit extended addressing selection of the board on 64K boundaries; or the board can be used on just 16 bit address. For multi-user systems 16K can remain global while 48K responds to extended addressing. Portions of the board can be disabled (for memory-mapped disk controllers or ROM) in 2K blocks above E000, in 16K blocks, in any 2K block with jumper wires, or in any block or single address by phantom. All signals to MOS devices are buffered by low power TTL to prevent damage by static electricity and to minimize capacitive loading on the bus. 8080 , Z80 or other CPU's can operate at 2 MHz or 4 MHz (DC to 10 MHz under certain conditions). Low profile IC sockets are provided for all IC's.

ADDRESSING

The 64K STATIC RAM is configured as one 64K block of memory. Portions of memory may be disabled in a variety of methods - see the section on disable. Address lines A0 - A15 are fixed and define which memory IC on the board is being addressed. The board cannot be addressed to extend across 64K boundaries.

EXTENDED ADDRESSING

Address lines A16 - A23 are decoded to allow the user to configure a system with more memory than 64K. Switch 1 sets up the extended addresses. A16 is the switch closest to the heat sink while the rest of the addresses follow in sequence to A23 the switch closest to the fingers of the board. The switch being ON sets up a logic zero and OFF sets up a logic one. All switches ON set the board for the first 64K. Extended addresses can originate on the CPU board or be derived with a memory manager board. If your system does not have extended addresses read the section on 64K global.

64K GLOBAL

To use the 64K STATIC RAM in a system without extended addresses remove the extended address decoder IC's - IC39 & IC40 the 74LS85's. This will reduce power and eliminate problems caused by floating extended address lines.

16K GLOBAL

In multi-user systems the operating system occupies the upper most 16K of every 64K block. Each user has a dedicated block of 48K as defined by the extended addresses. (Note: to conform to the IEEE 696 "bank select" is done on the CPU board or memory manager board to produce the extended addresses.) Rather than having a separate 16K board for this purpose, one of the 64K STATIC RAM boards can be set up with the upper most 16K responding to all extended addresses (banks) while the first 48K responds only to the one extended address selected. To accomplish this cut the land on the solder side of the board between the two pads in the area labeled 16K global and put in a jumper between the other two pads as indicated on the screen of the 16K global area.

DISABLE

The 64K STATIC RAM is set up to easily disable any one or any combination of the four 16K blocks. Simply jumper the 2 pads associated with each of the appropriate 16K start addresses desired to disable. Note: the upper most 16K start address is C000. The upper most 8K can easily be disable in 2K blocks for ROM Monitors or disk controllers. Simply jumper the 2 pads associated with the appropriate start addresses (E000, E800, F000 & F800). A few examples of standard start addresses are: ECT's monitor on the R^2I/O board - F000 & F800 ; North Star's disk controller - E800 ; Thinker Toy's (Morrow's) disk controller - E000. Any 2K block can be disabled with jumper wires. One of each of the disable pair of pads is an input to the 74LS133. Any unused input to the 74LS133 may be jumpered to any one of the outputs of the 74LS138 chip select decoders to open a 2K window. Any buffered address line or inverted address line or gated combination of buffered address lines and/or inverted address lines can be used with an input of the 74LS133 to open a larger block or a multitude of windows. NOTE: memory IC's from disabled blocks should be removed from the board to conserve power - even though the board is disabled the memory IC's are still enabled.

PHANTOM

The 64K STATIC RAM can be disabled for any byte or block by the Phantom line being controlled by other boards. A three pad jumper area is provided for Phantom. The center pad is one of the 74LS133 input disable leads. It is tied to a pad with a pull up resistor. To use the Phantom jumper the center pad to the other pad as marked on the board. The Phantom line needs only one pull-up resistor in the system. If there is no pull-up elsewhere in the system then leave the on board pull-up in; if there is, then cut the land between the two Phantom pads. NOTE: the input to the 74LS133 must have a pull-up to operate properly.

MEMORY WRITE (MWRT)

MWRT is a signal which is sometimes generated on a system front panel or on the CPU board. If your system is missing this signal just cut the land between the two pads marked MWRT and connect the center pad to the opposite pad and the board will use an internally generated MWRT signal. NOTE: if this jumper is in, the deposit switch on some front panels will not deposit into this board.

INDICATOR LIGHT

The LED is activated whenever the data output drivers of the board are activated - that is, the light goes ON whenever the the extended addresses coincide and the board is being read.

IC LOCATIONS

The memory IC's are numbered 1 - 32 in sequence of addressing. The first 32K is located on the left hand side of the board and the highest 32K is on the right hand side. Location 0000 is IC 1 which is in the upper left hand corner by the heat sink.

2716 EPROMS

2716 EPROM's may be used in the 64K STATIC RAM board. The programming Voltage pin #21 Vpp can interfere with the proper operation of the RAM's. 2716'S can be used on the board by bending pin 21 (Vpp) of each 2716 underneath the IC and soldering a wire directly on the 2716 from pin 21 to pin 24 (Vcc +5V). Use caution when soldering directly to the IC. Do not plug pin 21 into the socket with this jumper wire on it - IC 41 the 74LS00 will be destroyed. On Rev 2 boards there is a land on the solder side of the board by IC 5 that can be cut which will disconnect pin 21 of IC's 1 to 4 from the rest of the memory IC's. If these are cut free, a jumper wire can be soldered on the solder side of the board from pin 24 of IC 5 to the pad next to it. This will eliminate the need for jumper wires on IC's 1 to 4 - the first 8K of memory (ROM 2716's). Note: one or two 2716's may operate in the board without modification.

ELECTRONIC CONTROL TECHNOLOGY, Inc.

64K STATIC RAM

Parts List

Integrated Circuits

32	8725, 6116, 2016 Memory IC's	IC 1 - 32
5	74LS138	IC 33 - 36 & 37
1	74LS04	IC 37
2	74LS85	IC 39 - 40
1	74LS00	IC 41
4	74LS244	IC 42 - 45
1	74LS133	IC 46
1	7805	VR-1
1	LED	

Resistors

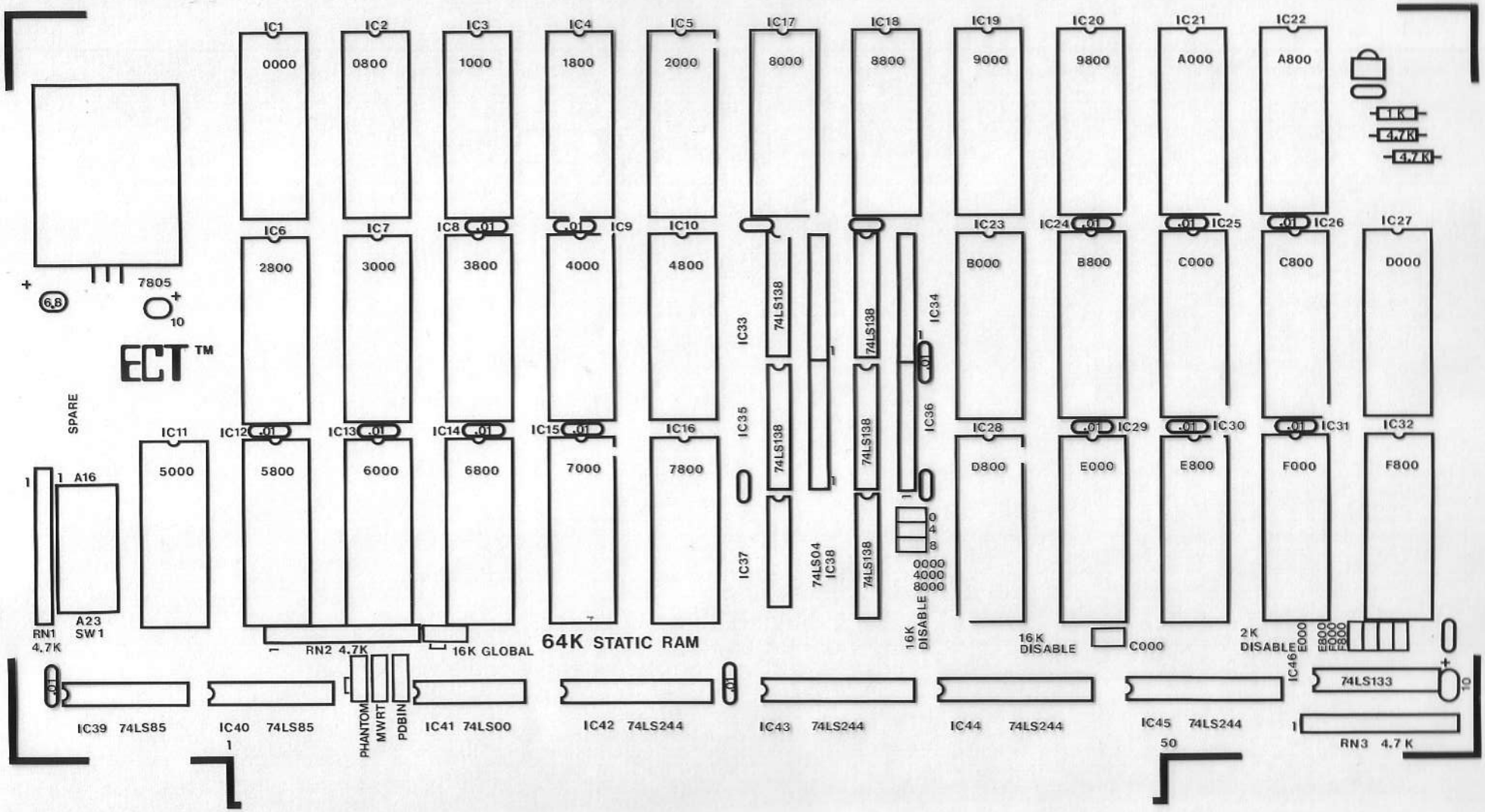
1	1K 1/4W	R 1
2	4.7K 1/4W	R 2 - 3
3	4.7K SIP Resistor Network	RN 1 - 3

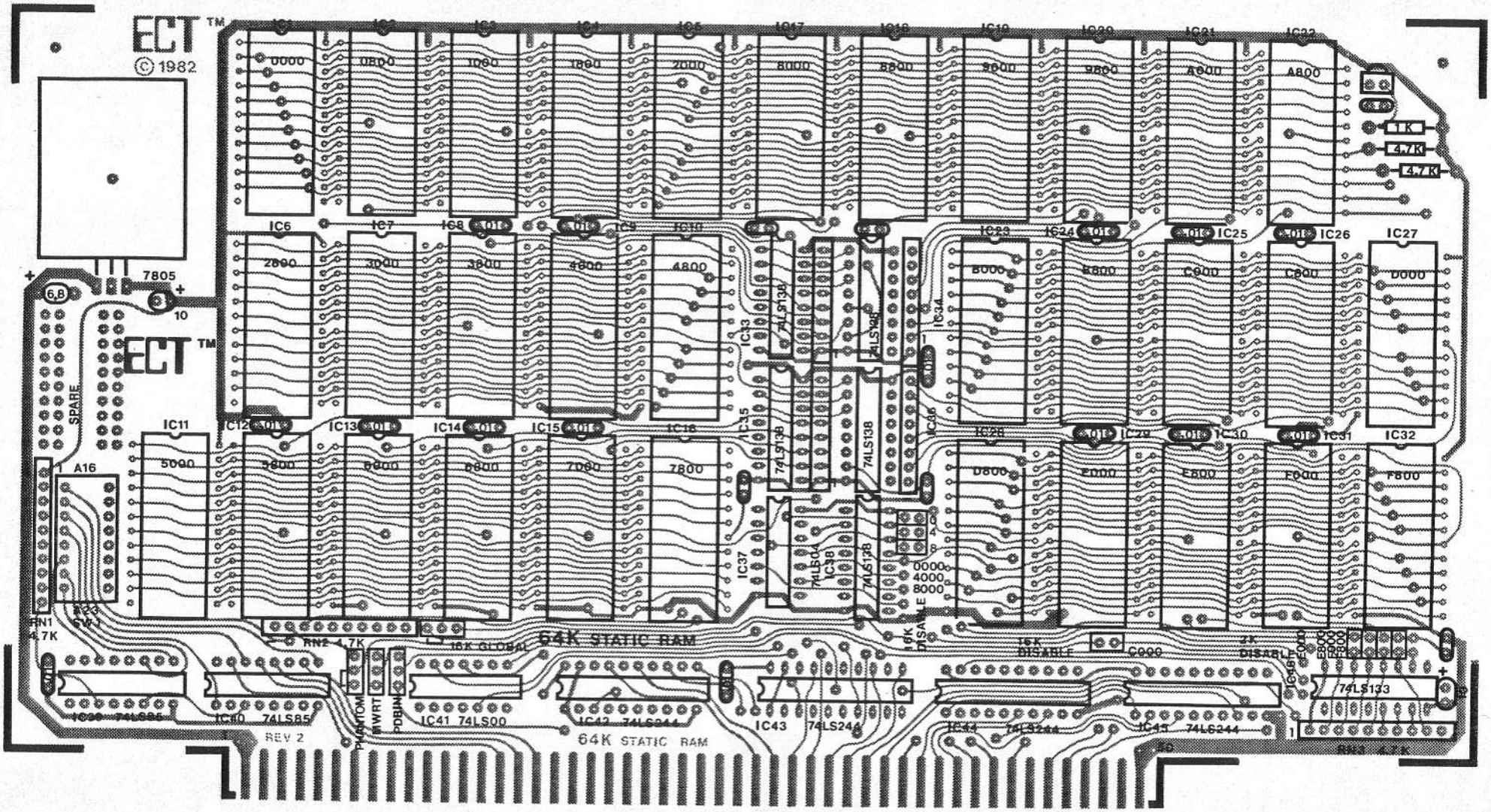
Capacitors

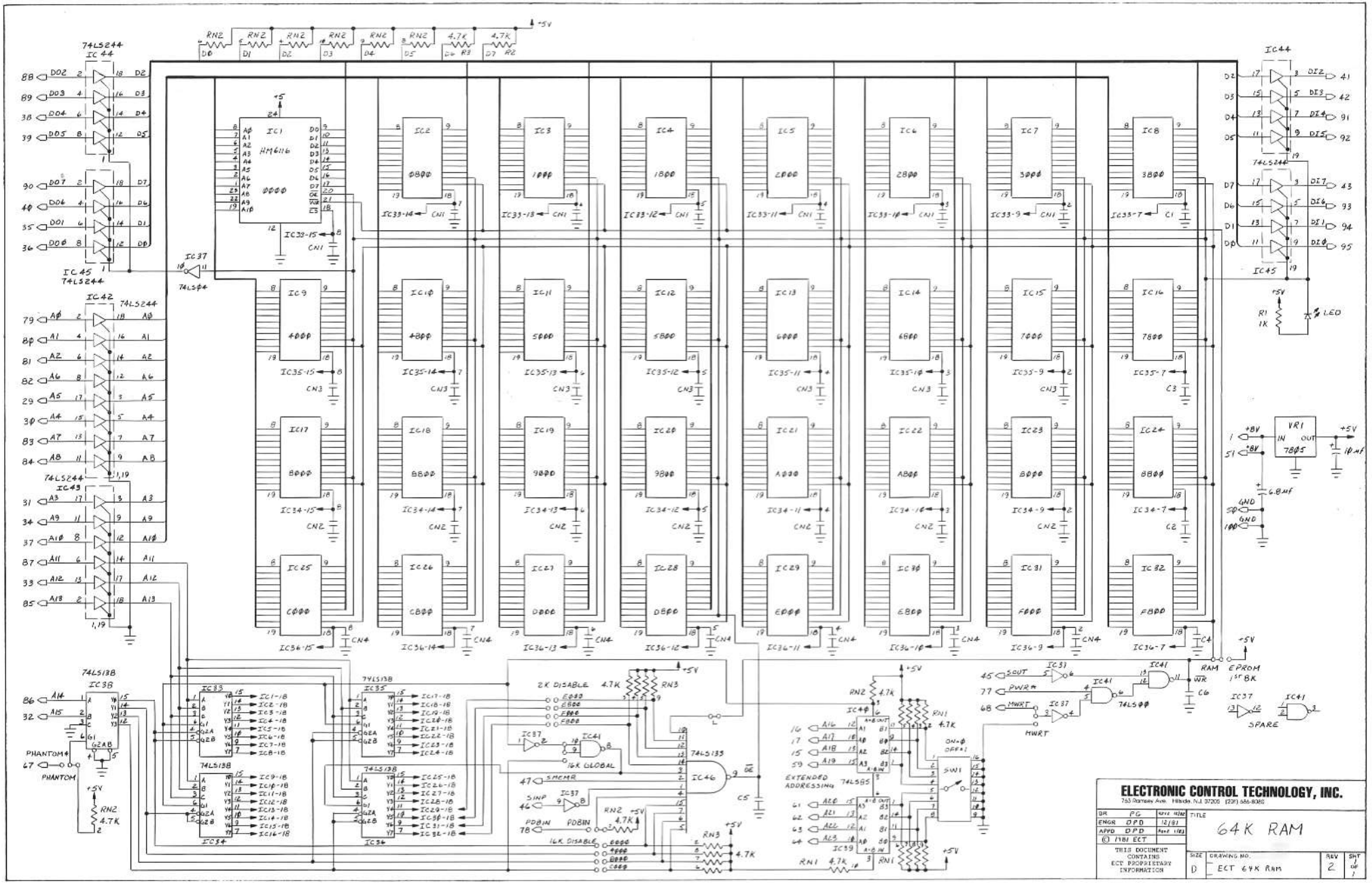
3	10 MF 16 V	C 1 - 3
15	.01 MF	C 4 - 18
6	470 pF	C 19 - 24
4	470 pF SIP Networks	CN 1 - 4

MISCELLANEOUS

1	Heat Sink
1	8 bit DIP switch
32	24 pin IC sockets
2	14 pin IC sockets
8	16 pin IC sockets
4	20 pin IC sockets
1	64K STATIC RAM PC board
1	manual


IC1 0000
IC2 0800
IC3 1000
IC4 1800
IC5 2000
IC17 8000
IC18 8800
IC19 9000
IC20 9800
IC21 A000
IC22 A800
1K
4.7K
4.7K
7805
6.8
10
ECT™
IC6 2800
IC7 3000
IC8 .01
IC9
IC10 4800
IC33
74LS138
IC23 B000
IC24 .01
IC25 C000
IC26 C800
IC27 D000
SPARE
IC11 5000
IC12 .01
IC13 .01
IC14 .01
IC15 .01
IC16 7800
IC35
74LS138
74LS138
IC34
IC36
IC28 D800
IC29 .01
IC30 .01
IC31 .01
IC32 F800
A16
A23
SW1
RN1
4.7K
5800
6000
6800
7000
IC37
74LS04
IC38
0
4
8
0000
4000
8000
16K
DISABLE
E000
F000
16K
DISABLE
C000
2K
DISABLE
E000
E800
F000
IC46
RN2 4.7K
16K GLOBAL
64K STATIC RAM
.01
IC39 74LS85
IC40 74LS85
PHANTOM
MWRT
PDBIN
IC41 74LS00
IC42 74LS244
IC43 74LS244
IC44 74LS244
IC45 74LS244
74LS133
10
RN3 4.7 K


ECT™
© 1982
ECT™
7805
SPARE
A16
RN1 4.7K
RN2 4.7K
RN3 4.7K
64K STATIC RAM
16K GLOBAL
16K DISABLE
2K DISABLE
PHANTOM
MWRT
PDBIN
REV 2
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC21
IC22
IC23
IC24
IC25
IC26
IC27
IC28
IC29
IC30
IC31
IC32
IC33
IC34
IC35
IC36
IC37
IC38
IC40 74LS85
IC41 74LS00
IC42 74LS244
IC43 74LS244
IC44 74LS244
IC45 74LS244
74LS133
74LS138
74LS04
0000
0800
1000
1800
2000
2800
3000
3800
4000
4800
5000
5800
6000
6800
7000
7800
8000
8800
9000
9800
A000
A800
B000
B800
C000
C800
D000
D800
E000
E800
F000
F800
1K
4.7K
4.7K


ELECTRONIC CONTROL TECHNOLOGY, INC.
753 Ramsey Ave. Hillside, N.J. 07205 (201) 686-8080
DR PG
ENGR DPD 12/81
APPD DPD
© 1981 ECT
THIS DOCUMENT CONTAINS ECT PROPRIETARY INFORMATION
TITLE
64K RAM
SIZE D
DRAWING NO. ECT 64K RAM
REV 2
SHT 1 OF 1
HM6116
74LS244
74LS138
74LS133
74LS85
74LS04
74LS00
VR1 7805
EPROM 1ST BK
RAM
SPARE
EXTENDED ADDRESSING
2K DISABLE
16K GLOBAL
16K DISABLE
PHANTOM
LED

WARRANTY

ELECTRONIC CONTROL TECHNOLOGY, hereinafter referred to as ECT, in an effort to assure its customers that it is providing them with quality products, components and workmanship, hereby warrants its products as follows:

All products both in kit form and assembled units sold by ECT are manufactured from components purchased through factory distribution and any part which fails because of defects in workmanship or material will be replaced at no charge for a period of three (3) months following the date of purchase. The defective part must be returned postpaid to ECT within the warranty period.

Any fully assembled kit, which fails to perform satisfactorily, may be returned to ECT within the warranty period, and if in the judgement of ECT it has been assembled with care and has not been subjected to electrical or mechanical abuse, it will be restored to proper operating condition and returned, regardless of the cause of malfunction, with a minimal charge to cover shipping and handling.

Any unit purchased as a kit and returned to ECT and which in the judgement of ECT is not covered by this warranty will be repaired and returned at a cost commensurate with the work required. In no case will this charge exceed twenty dollars ($20.00) without prior notification to and approval by the owner.

Any product purchased as an assembled unit is guaranteed against defects in materials and workmanship and is further guaranteed for a period of three (3) months to meet the specifications in effect at the time of manufacture. All warranted factory assembled units returned to ECT postpaid will be repaired and returned without charge.

This warranty is made in lieu of all other warranties expressed or implied and is limited in any case to repair or replacement of the ECT product involved.