Saitek

Saitek Ltd.
(SciSys-W Ltd.)
12/F Chung Nam Centre
414 Kwun Tong Road
Kowloon, Hong Kong
Tel: 3-418211
Telex: 33169 SISYS HX
Cable: EINSTEIN
Fax: 3-7979027

CONTENTS
****

Doc. No. : M6C-PG-009

Rev. : 1

Date : 29 September 1987

MAESTRO B - 4MHZ GENERAL PRODUCT SPECIFICATION

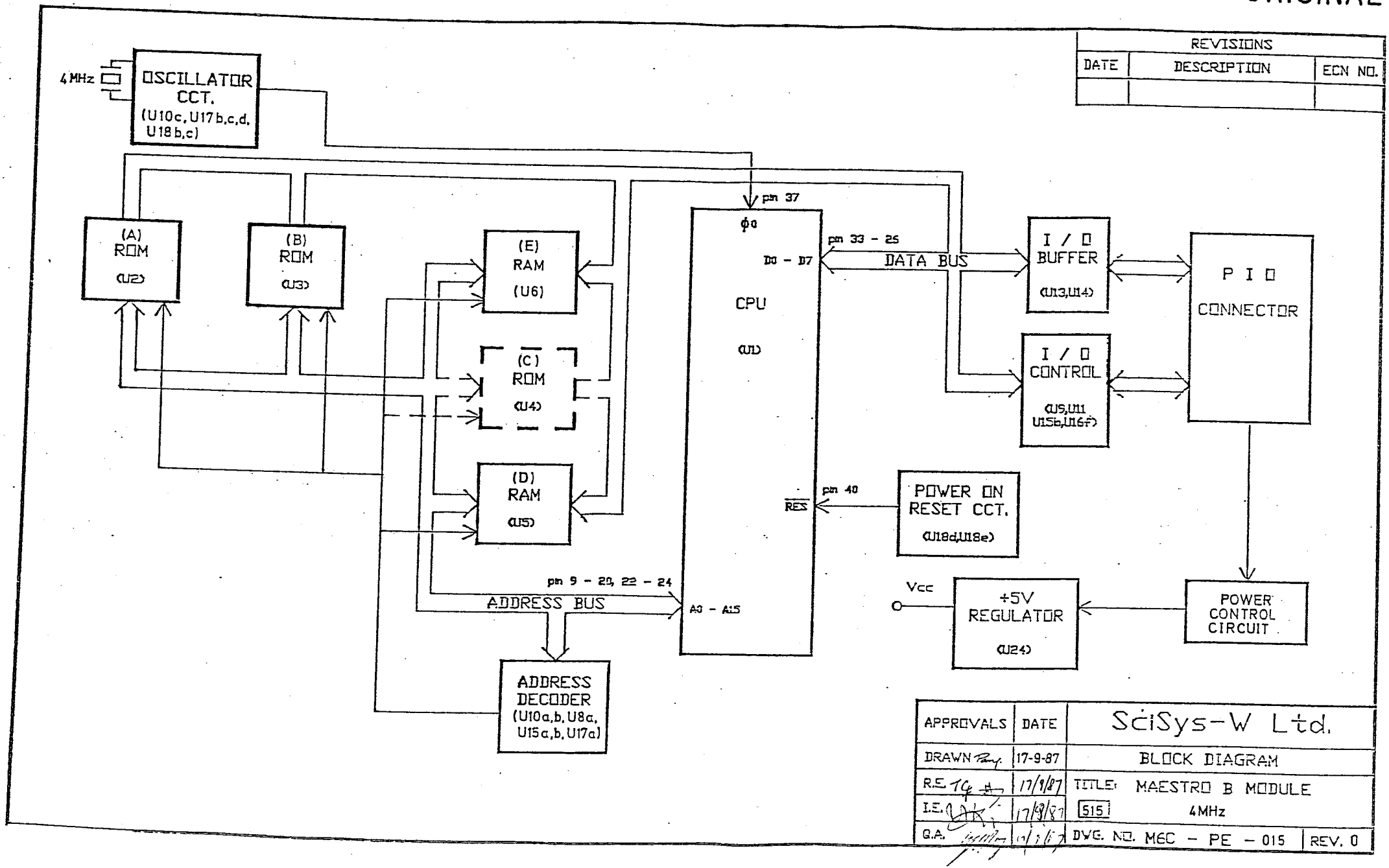
A. Current Consumption : a) Normal mode at V.Ad (SW6) = 9V
Measured at V+ of PIO Connector
68mA typical
100mA max.

b) Memory Mode at V.Ad (SW6) = 9V
Measured at V+ of PIO Connector
0.5uA typical
10uA max.

B. Power Consumption : 0.6W typical
0.9W max.

C. System Clock Frequency : 4 MHz +/- 1%

ORIGINAL



REVISIONS		
DATE	DESCRIPTION	ECN NO.

APPROVALS	DATE	SciSys-W Ltd.
DRAWN	17-9-87	BLOCK DIAGRAM
R.E.	17/9/87	TITLE: MAESTRO B MODULE
I.E.	17/9/87	515 4MHz
G.A.		DWG. NO. MEC - PE - 015 REV. 0

PROJECT : MAESTRO B - 4MHz

Doc.No. : M6C-PS-017

Rev. : 0

Date : 24 September 1987

ADJUSTMENT PROCEDURE

OBJECT : To adjust system clock frequency

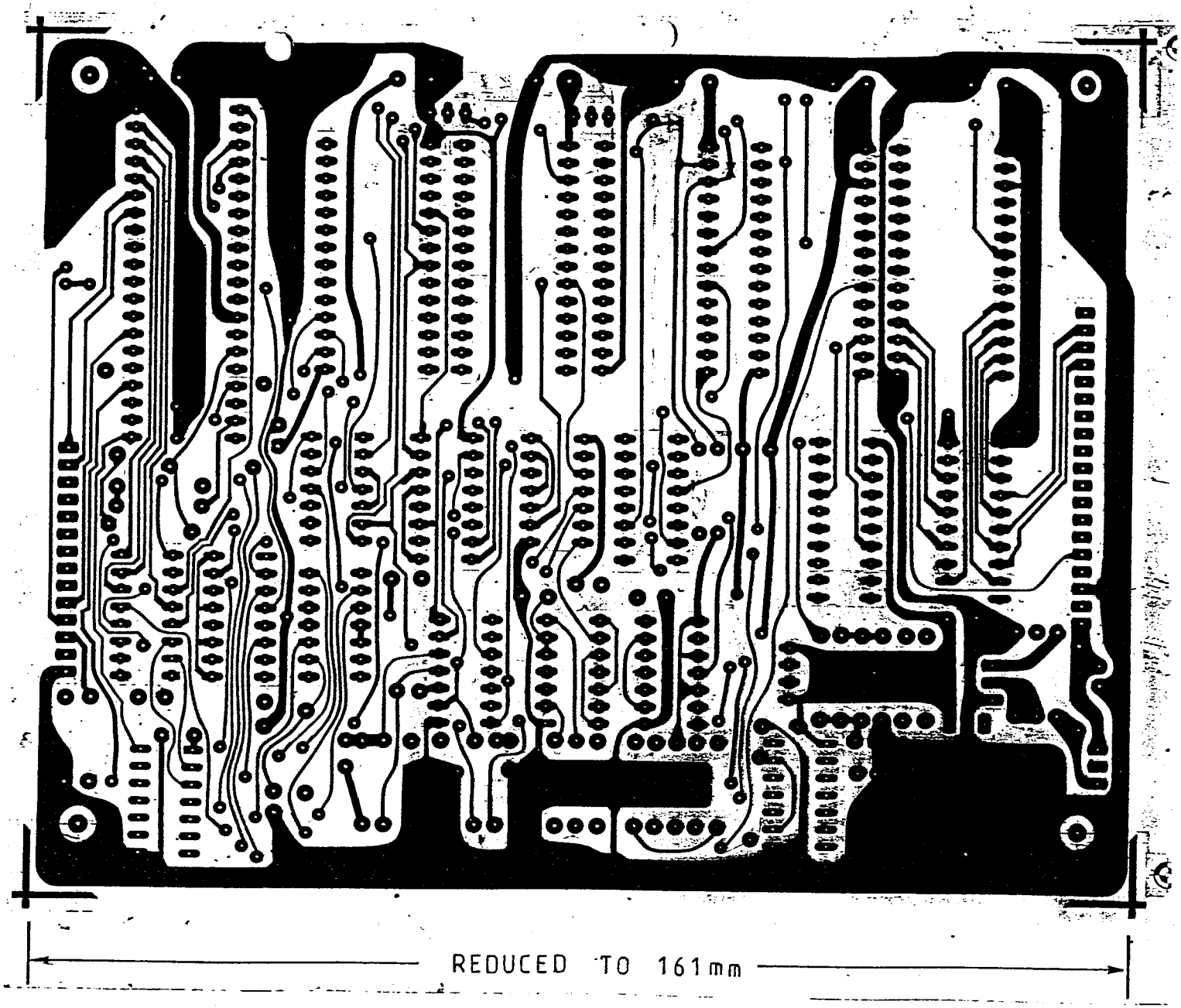
EQUIPMENT NEEDED : Frequency counter or Oscilloscope capable of frequency up to 10 MHz

PROCEDURE :

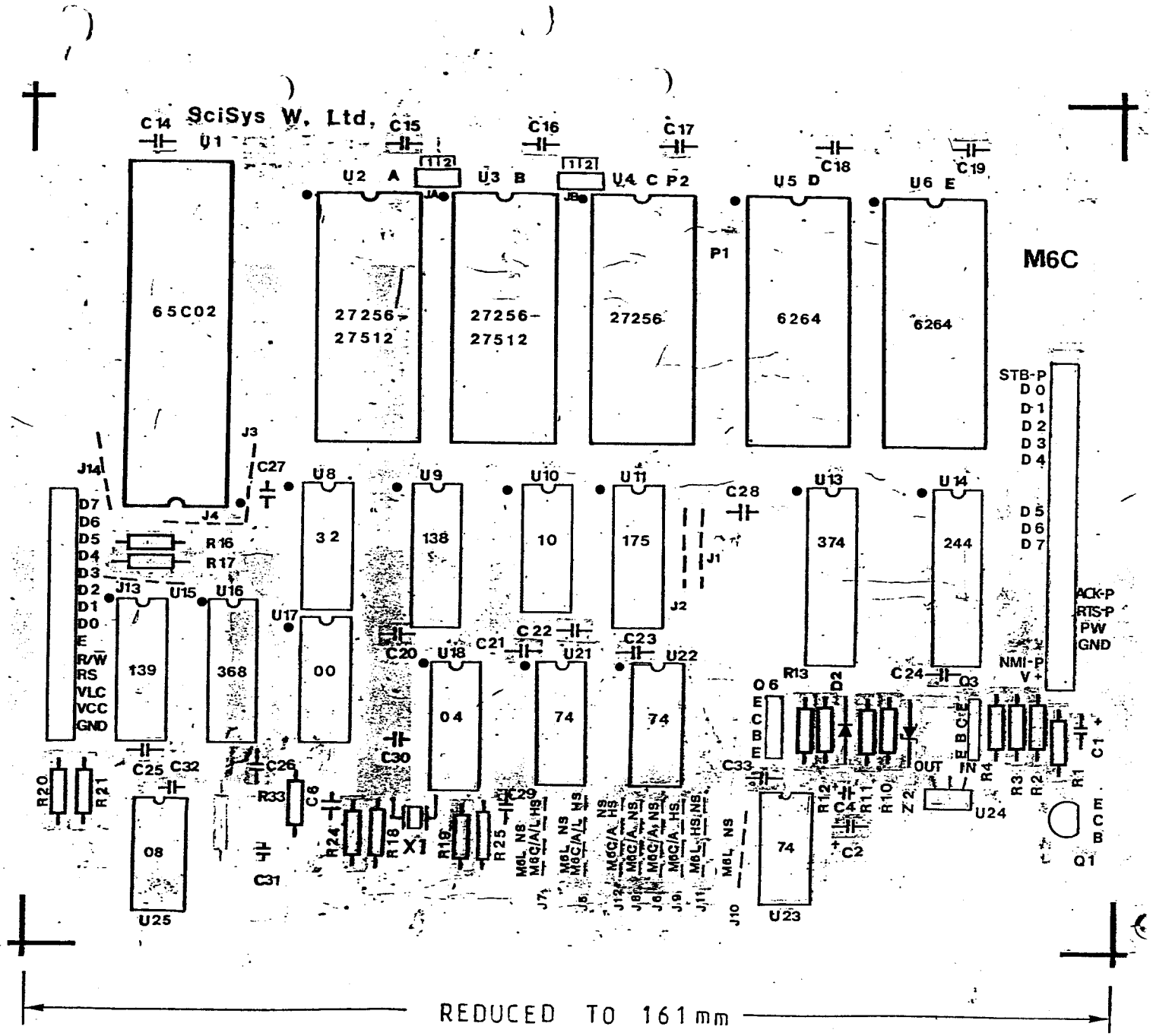
1. Disassemble unit by removing screws(6) on bottom cover.
2. Power on unit
3. Place probe of counter/scope at pin 39 of U1. If frequency measured is out of specified range (3.96 - 4.04 MHz), replace C6 until counter/scope reading is within specification.
4. Reassemble unit.

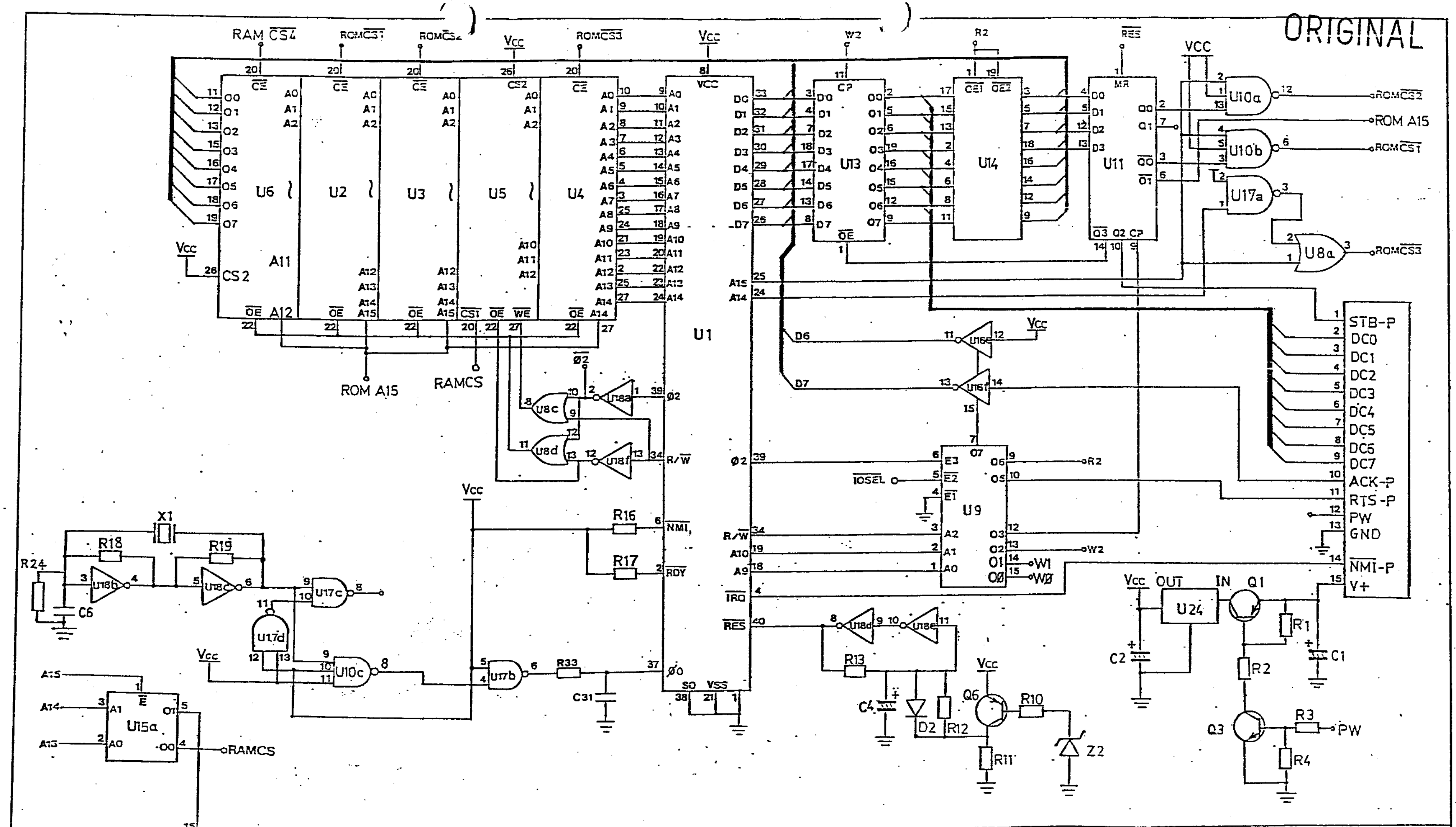
MAESTRO B MODULE (4MHz) TROUBLE-SHOOTING CHART

SYMPTOMS	POSSIBLE CAUSES
Unit will not turn-on	1) Check Vcc for 4.75-5.25V. If Vcc is not within this range: i) Check for U24 pin 1 input for higher than 7V, if not, defective adapter circuit. ii) Check for V+ pin 15 of edge connector for higher than 7.5V, if not, defective adapter. iii)Check PW pin 12 of edge connector for higher than 4V, if not, check R3,R4. iv) Check for broken connection(s) between edge socket connector and logic PCB. 2) Check clock circuit - check clock frequency at U1 pin 39 for 4MHz +/- 1% square wave, if not, i) check U18,U17,U10, R33, C31. ii) defective U1, crystal X1. 3) Check reset circuit - check U1 pin 40 for the changes of logic 'low' to logic 'high' state when power is switched from OFF to ON. if not, i) check C4 at power up. ii) check Q6, R10,R11, Z2. iii)defective U18, C4, R12, D2. 4) Check for defective IC. 5) Check for broken traces. 6) Check for bad contacts between IC and IC socket.
MODULE TESTER test	
1) LED 1 to 8 on tester not scanning	
a) LED 1 not light up	- ROM failure: defective U2 or broken traces.
b) LED 2 not light up	- ROM failure: defective U3 or broken traces.
c) LED 3 not light up	- ROM failure: defective U4 or broken traces.
d) LED 4 not light up	- RAM failure: defective U5 or broken traces.
e) LED 5 not light up	- ROM failure: defective U2 or broken traces.
f) LED 6 not light up	- ROM failure: defective U3 or broken traces.
g) LED 7 not light up	- ROM failure: defective U4 or broken traces.
h) LED 8 not light up	- RAM failure: defective U6 or broken traces.
2) All 8 LEDs not light up	- Check for broken connections between edge socket connector and logic PCB. - Check connections between U11 pin 10 and U16 pin 4. - Defective U9,U11,U13,U16.
3) Only one of 8 LEDs lights up	- Check connection to the corresponding lighted LED. - Defective U13,U14.
4) NMI pin test LED lights up	- Edge socket pin 14 shorted to pin 15.
5) RTS-P test LED not toggle	- Check U1 pin 6 short to ground. - Check for broken connection between U9 pin 10 to the logic PCB. - Defective U9.


REDUCED TO 161mm

SOLDER SIDE
REV.1
M6C-PE-002
REDUCED TO 161mm


SciSys W. Ltd.
M6C
65C02
27256
27512
6264
74
139
368
00
08
04
138
10
175
32
244
374
X1
Z2
Q1
P1
P2
J1
J2
J3
J4
J13
J14
U1
U2
U3
U4
U5
U6
U8
U9
U10
U11
U13
U14
U15
U16
U17
U18
U21
U22
U23
U24
U25
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
C26
C27
C28
C30
C31
C32
C33
R16
R17
R20
R21
R33
D7
D6
D5
D4
D3
D2
D1
D0
E
R/W
RS
VLC
VCC
GND
STB-P
D 0
D 1
D 2
D 3
D 4
D 5
D 6
D 7
ACK-P
RTS-P
PW
GND
NMI-P
V+
OUT
IN
REDUCED TO 161 mm



REVISION		
DATE	DESCRIPTION	ECN NO

SciSys-W Ltd.

TITLE: MAESTRO B MODULE (4MHz) SCHEMATIC DRAWING

DWG. NO. M6C-PE-013 | REV. Ø

UNIT N/A | SCALE N/A | TOL. N/A

MATERIAL N/A | DATE 15-9-87

FINISH N/A | DRAWN

APPD. BY

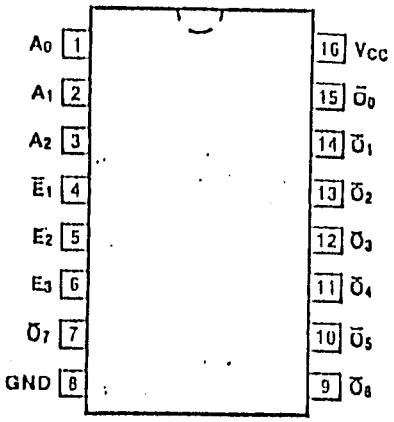
M6C-4-FINAL (MAESTRO B) PARTLIST — REV. 1
CREATED 14 MAY 87 — UPDATED 29 SEP 87
SCHEMATIC DWG : M6C-PE-013 — REV. 0
LOGIC PCB NO. : M6C-PE-002 — REV. 1
EDGE CONNECTOR PCB NO. : M6L-PE-019 — REV. 2

	ITEM DESCRIPTION	QTY.	REFERENCE
	*** MCU ***		
1	I.C. 65C02	1	U1
1	I.C.: 6264	2	U5,U6
1	27C256 (150ns)	2	U2,U3
	*** LOGIC BOARD ASSEMBLY ***		
	LOGIC PCB (D-SIDED, 160x125mm)	1	
	CONNECTOR PCB (D-SIDED, 62x10mm)	1	
1	I.C.: 74HCT 00	1	U17
1	74HCT 04	1	U18
1	74HCT 08	1	U25
1	74HCT 10	1	U10
1	74HCT 32	1	U8
1	74HCT 138	1	U9
1	74HCT 139	1	U15
1	74HCT 175	1	U11
1	74HCT 244	1	U14
1	74HCT 368	1	U16
1	74HCT 374	1	U13
1	REGULATOR 78M05	1	U24
1	CRYSTAL (4MHz)	1	X1
1	TRANSISTOR NPN 9014	1	Q3
1	TRANSISTOR PNP 9012	1	Q6
1	TRANSISTOR BD438	1	Q1
	DIODE 1N4148	1	D2
	ZENER: 5V1	1	Z2
	CAPACITORS:		
	12pF CER.	1	C6
	50pF CER.	1	C31
	0.1uF CER.	13	C14-C26
	4.7uF ELECT.,16V	1	C2
	100uF ELECT.,16V	1	C1
	10uF TANT.	1	C4
	RESISTORS (1/4W 5% CARBON-FILM):		
	100	1	R33
	240	1	R2
	680	1	R24
	1K	3	R10,R18,R19
	2K7	1	R1
	3K3	1	R16
	5K6	1	R11
	10K	3	R3,R12,R17
	56K	1	R4
	100K	1	R13

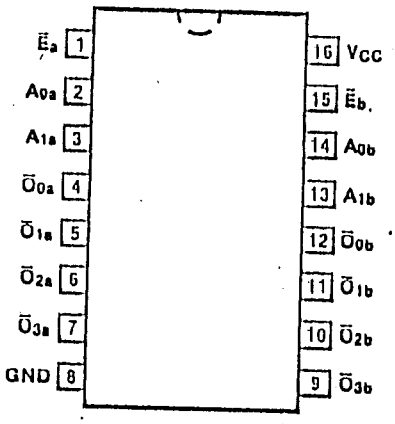
	*** ELECTRO-MECHANICAL ACCESSORIES ***		
	IC SOCKET (28 PINS)	3	U2-U4
1	EDGE CONNECTOR (15 PINS)	1	
	CONNECTOR ARRAY (19 CKT L=35mm)	1	
	SCREWS (SELF-TAP, CROSS RECESS, PAN HEAD, TYPE BT):		
	M3x8 (FOR CABINET)	6	
	M/C SCREW M3x6x0.5, CROSS RECESS, PAN HEAD (FOR HEAT SINK)	1	
	NUT M3x0.5 (FOR HEAT SINK)	1	
	HEAT SINK (PS2 TYPE)	1	
1	JUMPER SELECTOR SET	2	
	BARE JUMPER WIRE L=12.5mm	5	J3,J6,J8,J12,J13
1	RATING PLATE	1	
	SPEAKER NETTING FELT	1	
	SPACER STRIP (63.5x13.0mm)	1	
	FOAM SPACER A (72x22x17.0mm)	1	
	FOAM SPACER B (35x16x17.0mm)	1	
	*** OVERLAY ***		
1	OVERLAY - M6C (WHITE, LEXAN)	1	
	*** PLASTIC ***		
1	PLASTIC SET:	1	
	TOP CABINET	1	
	BOTTOM CABINET	1	
	BATTERY DOOR	1	
	*** PACKAGING ***		
	SERIAL NO. LABEL	1	
1	INSTRUCTION MANUAL	1	
1	GIFTBOX	1	
	BUBBLE BAG (500x175mm)	2	
	SHIPPING CARTON	1/20	
1	IMPORTANT LABEL	1	
	POLYFOAM SHEET (105x50x10mm)	1	

==========

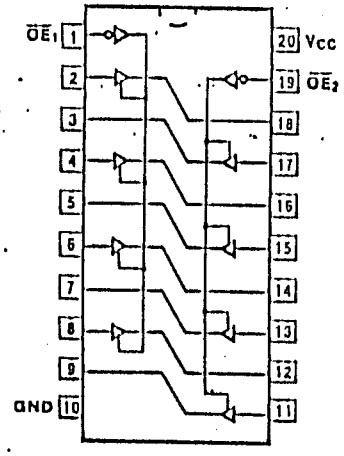
■ PIN ARRANGEMENT



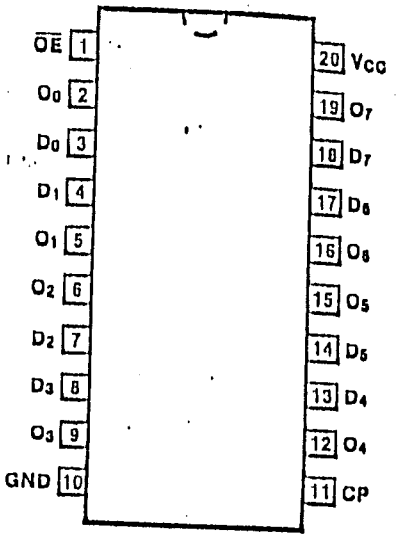
74HCT138



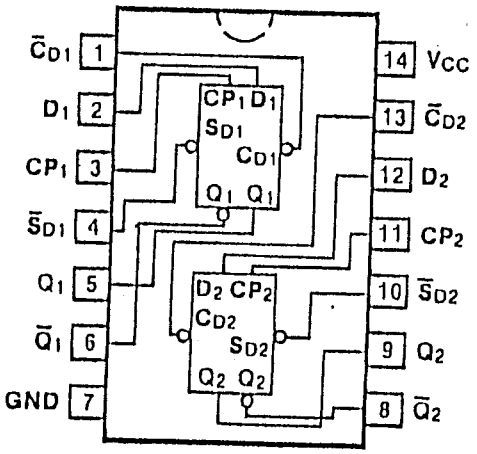
74HCT139



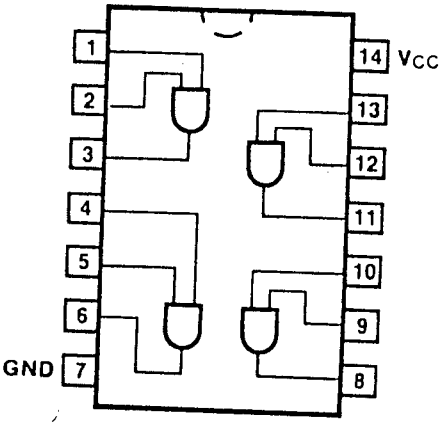
74HCT244



74HCT374

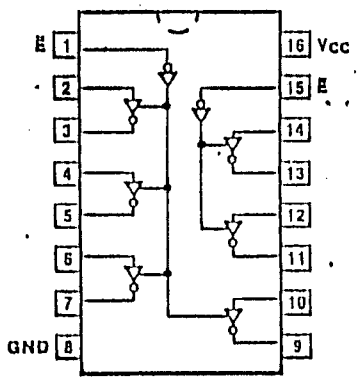


74HCT74

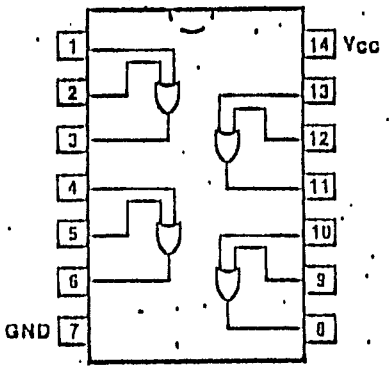


74HCT08

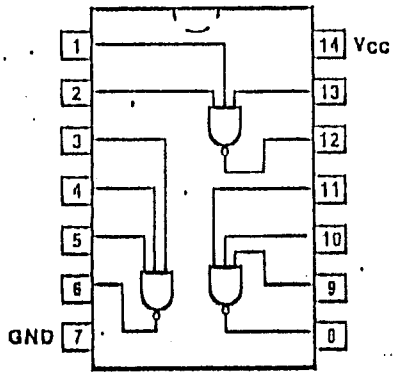
■ PIN ARRANGEMENT



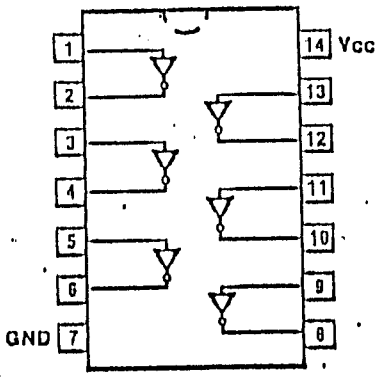
74HCT368



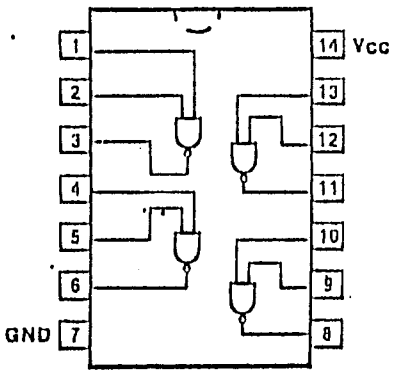
74HCT32



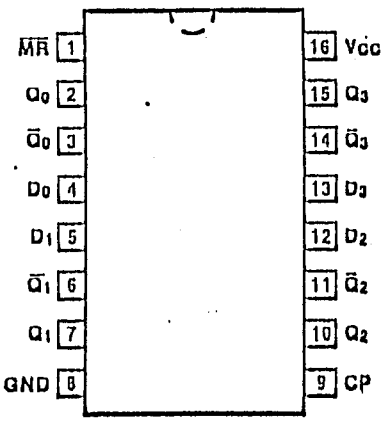
74HCT10



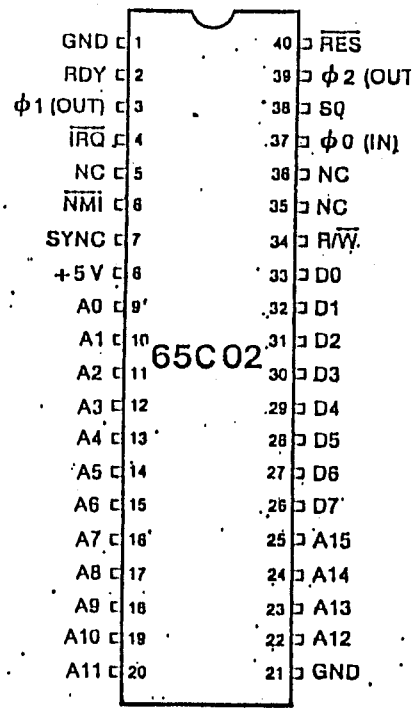
74HCT04

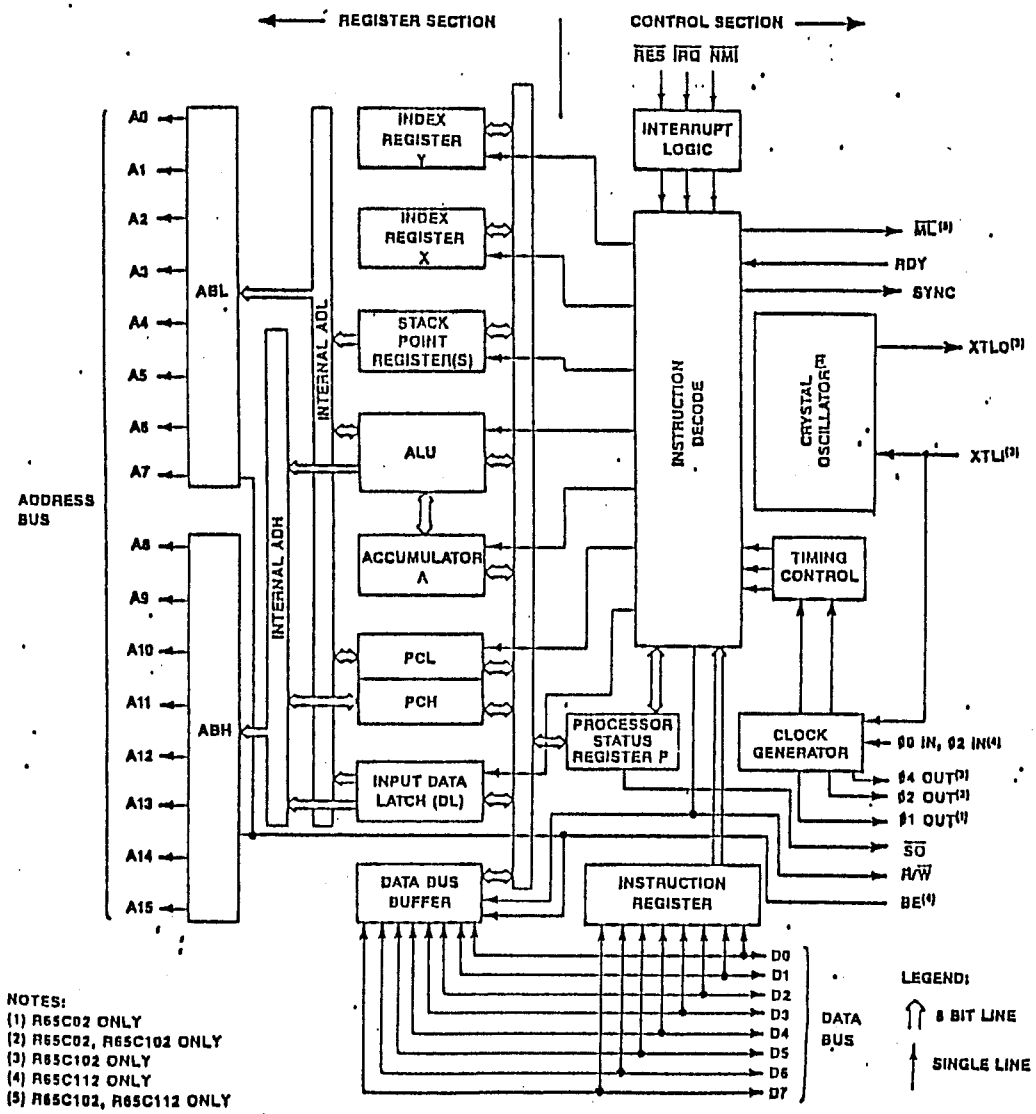


74HCT00

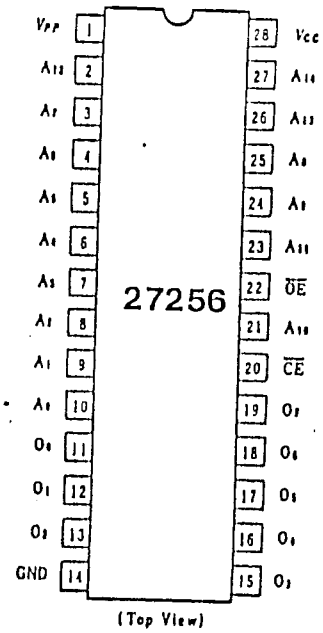


74HCT175

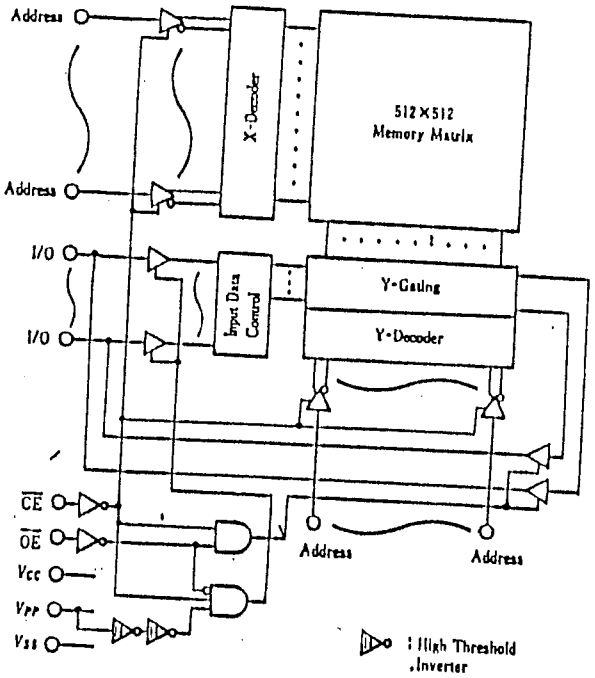


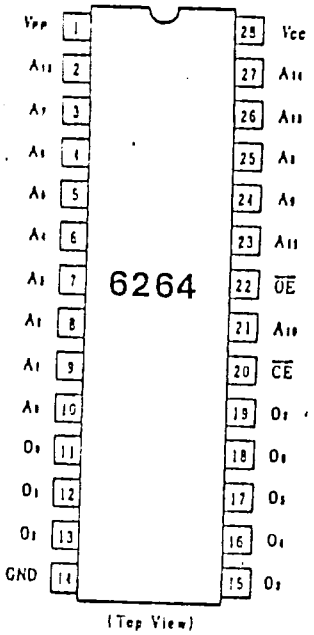


NOTES:
(1) R65C02 ONLY
(2) R65C02, R65C102 ONLY
(3) R65C102 ONLY
(4) R65C112 ONLY
(5) R65C102, R65C112 ONLY

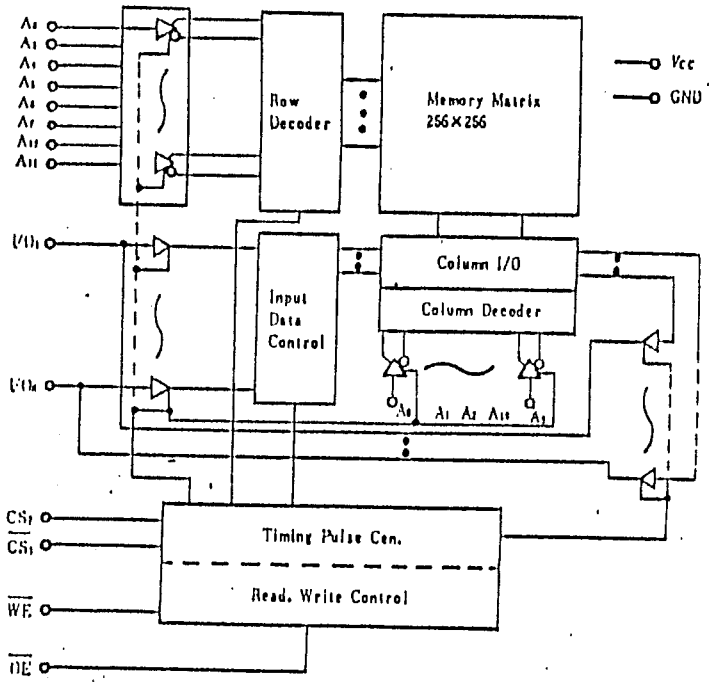


■ BLOCK DIAGRAM





■ BLOCK DIAGRAM



FUNCTIONAL TEST PROCEDURE FOR MAESTRO B MODULE

8.1 Functional test with SW6

	PURPOSE	PROCEDURE	OBSERVATION
1.	Preset SW6	- Power up SW6 (by pressing ACL) - Press LEVEL - Press STOP	- "Module" LED is OFF. - Red solid "A1" LEDs come on. - All LEDs come off.
2.	Check M6C connection	- Install M6C into SW6 - Press GO	
3.	Check M6C Level E1	- press LEVEL, COLOR, COLOR, COLOR COLOR	- Red solid "E1" LEDs come on.
4.	Check book	- Move E2, E4 - Move E4, E2	- SW6 should response immediately with a book move. - You should hear the New Game sound.
5.	Check CHECKMATE	- Press ANALYSIS - Move F2,F4,E7,E5,G2,G4 - Press PLAY - Move D8,H4	- "Check, end" LEDs come on.
6.	Remove M6C	- Press STOP - Remove M6C - Press GO - Press LEVEL	- All LEDs come off. - Red solid "A1" LEDs come on.
7.	Reinstall M6C	- Press STOP - Reinstall M6C onto SW6 - Wait for 10 seconds - Press GO - Press LEVEL	- All LEDs come off. - Red solid "E1" LEDs come on.
8.	Finish	- Press STOP - Remove M6C	- All LEDs come off.

8.2 QC test mode on M6C

Objective: To check expansion socket U4.
Will check data/address/CE/OE/V+/GND lines.

Procedure: 1) Plug in test EPROM in U4(27C256 with program L6C526 + L6C526)

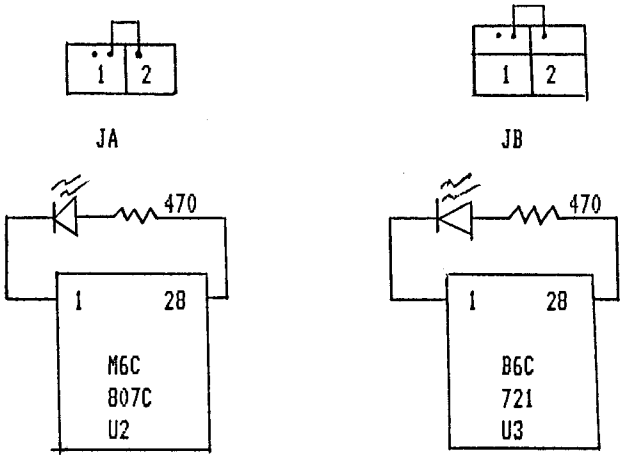
2) Connect an electronic device (No. M6A-PE-011) to M6C to enable QC test mode.
The M6C program will execute the internal RAM/ROM and PIO check.

3) Switch on the tester via a +8V DC 300mA adapter.

RESULT: DATA LINE LEDs 1-8: Scanning one by one in cycle (2-3 sec. per cycle)
Cycle LEDs A & B: Change one state after data line LEDs having completed one scanning cycle.
NMI LED V+, GND: Normally off, lights up if the pin is shorted to either V+ or ground.
After scanning DATA LINE LEDs, LED 1,2, 4,5,6, 8 should light up simultaneously for 1 second if there is no test EPROM in U4 (Burn-in use).
LED 1,2,3,4,5,6,7,8 should light up simultaneously for 1 second if there is a test EPROM in U4.

8.3 Check U2, U3 pin 1 Bank switching (for future 27C512 expansion)

Procedure: 1. Connect jumper selector JA, JB to "position 2".
2. Replace test EPROMs at socket U2, U3 as follows:



3. Switch on the tester via a + 8V DC 300mA adapter

Result: DATA LINE LEDs 1-8: Scanning one by one in cycle (2-3 sec. per cycle)
Cycle LEDs A & B: Change one state after data line LEDs having completed one scanning cycle.
NMI LED V+, GND: Normally off, lights up if the pin is shorted to either V+ or ground.
After scanning DATA LINE LEDs, LED 1,2,4,8 should light up simultaneously for 1 second.

Note: DATA LINE LED & PROGRAM relationship

Position	U2	U3	U4	U5	U6
LED	1	2	3	4	8
	5	6	7		
Function	Program	Book	Expansion	RAM1	RAM2