SciSys-W Ltd.

12A, Chung Nam Centre
414, Kwun Tong Road
Kwun Tong
Hong Kong

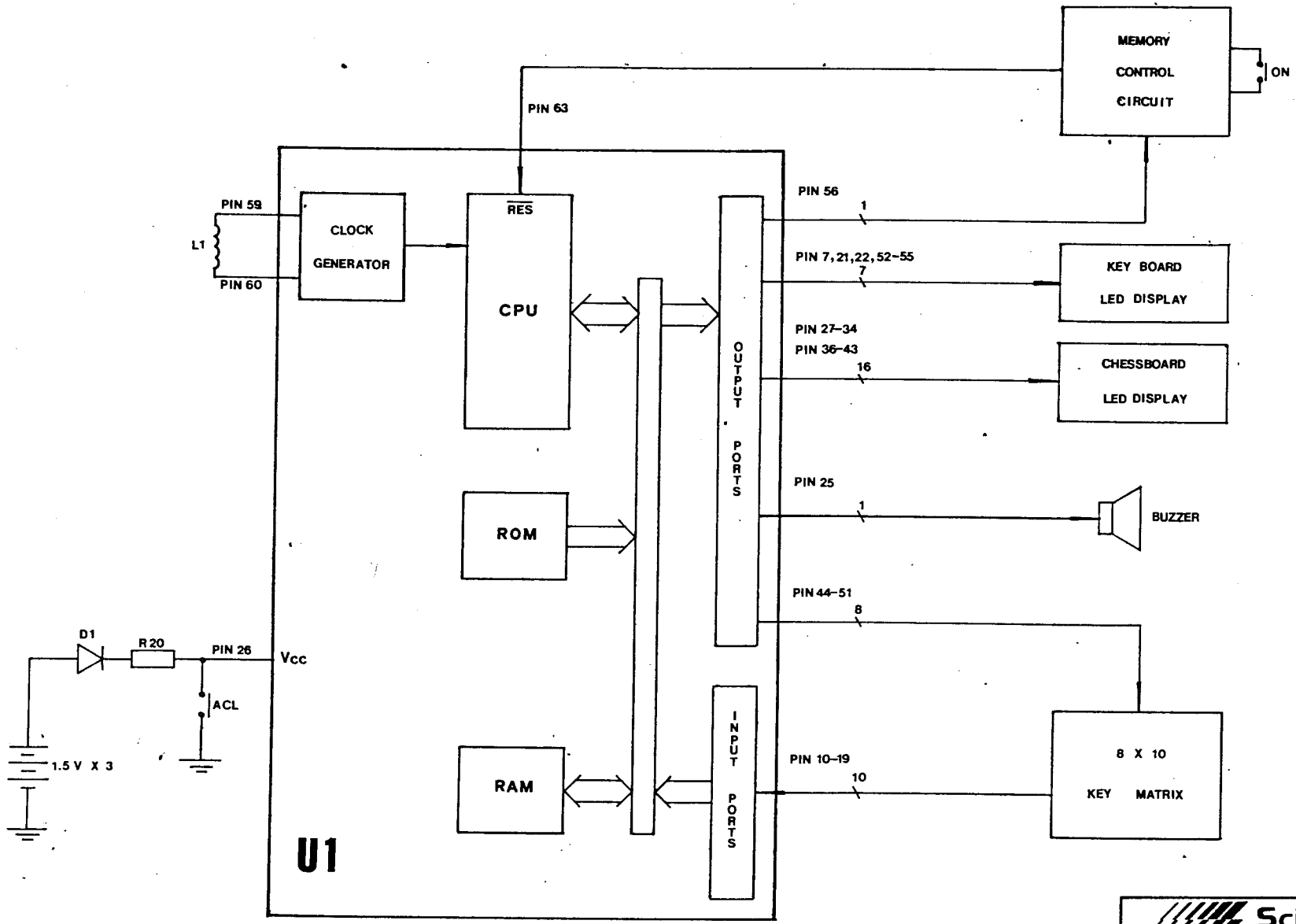
Telephone: 3-418211
Telex: 33169 SISYS HX
Cable: EINSTEIN

C O N T E N T S
****

Doc. No. : SH5-PG-021
Rev. : 0
Date : 4/10/85

EXPRESS 16K GENERAL PRODUCT SPECIFICATION

A.	Battery Requirement	:	1.5 volts (size AA or AM-3) x 3 pcs. Alkaline type recommended,
B.	Battery Life	:	100 hours typical using alkaline batteries
C.	Operating Voltage	:	3.5 - 6.5 volts
D.	Current Consumption	:	(a) 13mA typical (Normal mode at V.Batt = 4.5V with one LED on) 17mA max. (b) 10uA typical (Memory mode at V.Batt = 4.5V) 25uA max.
E.	Power Consumption	:	59mW typical 77mW
F.	System Clock Frequency	:	8MHz +/- 10% (V.Ba-t = 4.5V)



SH5 BLOCK DIAGRAM

SciSys-W Ltd.		
TITLE: SH5 BLOCK DIAGRAM		
DWG. NO. SH5-PE-025		REV. Ø
UNIT —	SCALE —	TOL. —
MATERIAL —		DATE 18/11/85
FINISH —		DRAWN
APPD. BY	ENG.	Q.A.

PROJECT : Express 16K (SH5)

Doc. No. : SH5-PS-024
Rev. : 0
Date : 13 November 1985

ADJUSTMENT PROCEDURE

OBJECT : To adjust system clock frequency

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

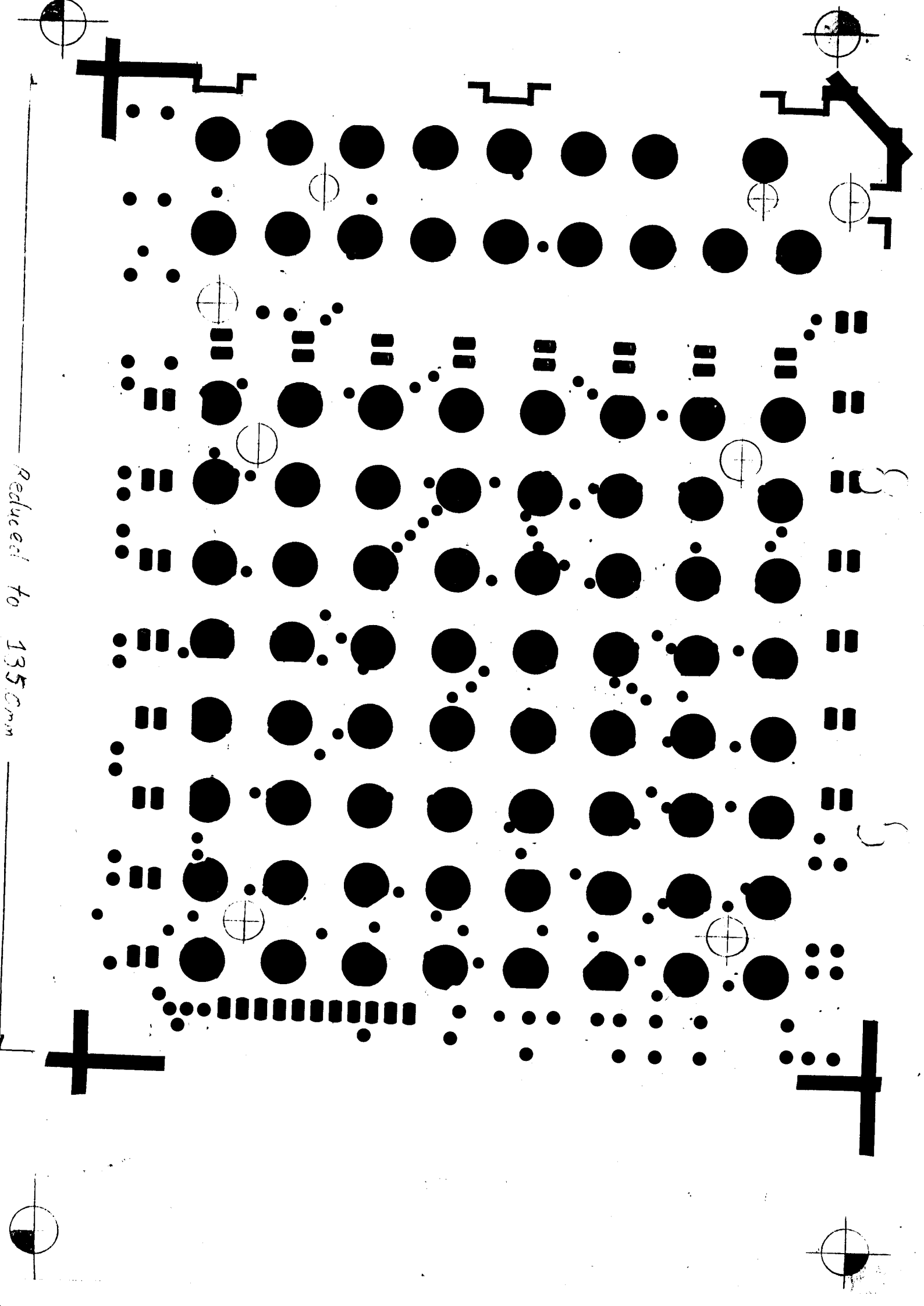
PROCEDURE :

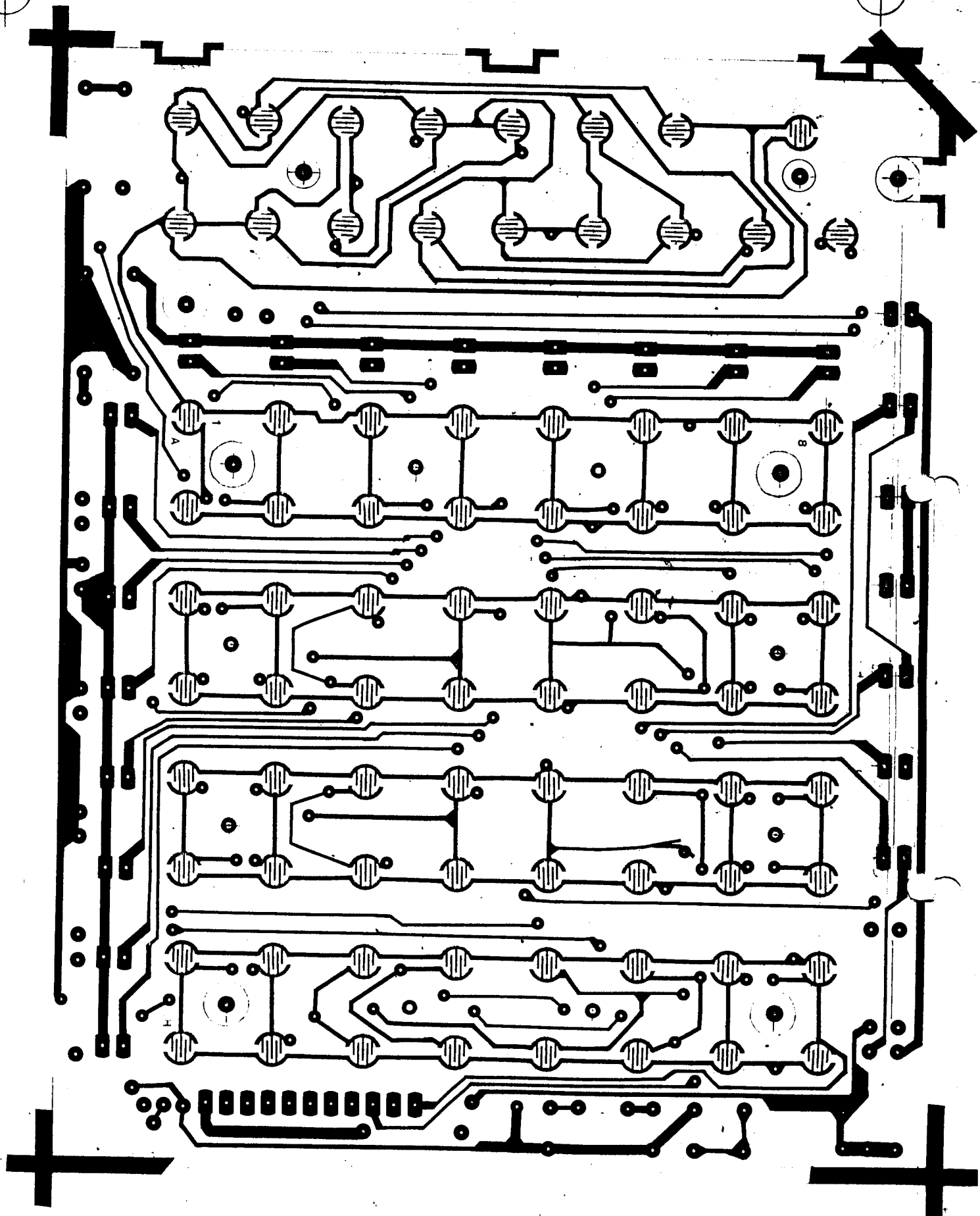
1. Disassemble unit by removing screws(4) on cabinet base.
2. Power on unit (V.Batt = 4.5V)
3. Place probe of counter/scope at pin 57 of U1. If frequency measured is out of specified range (2MHz ±10%), replace C4 and C5 until counter/scope reading is within specification.
4. Reassemble unit.

EXPRESS 16K TROUBLE-SHOOTING CHART

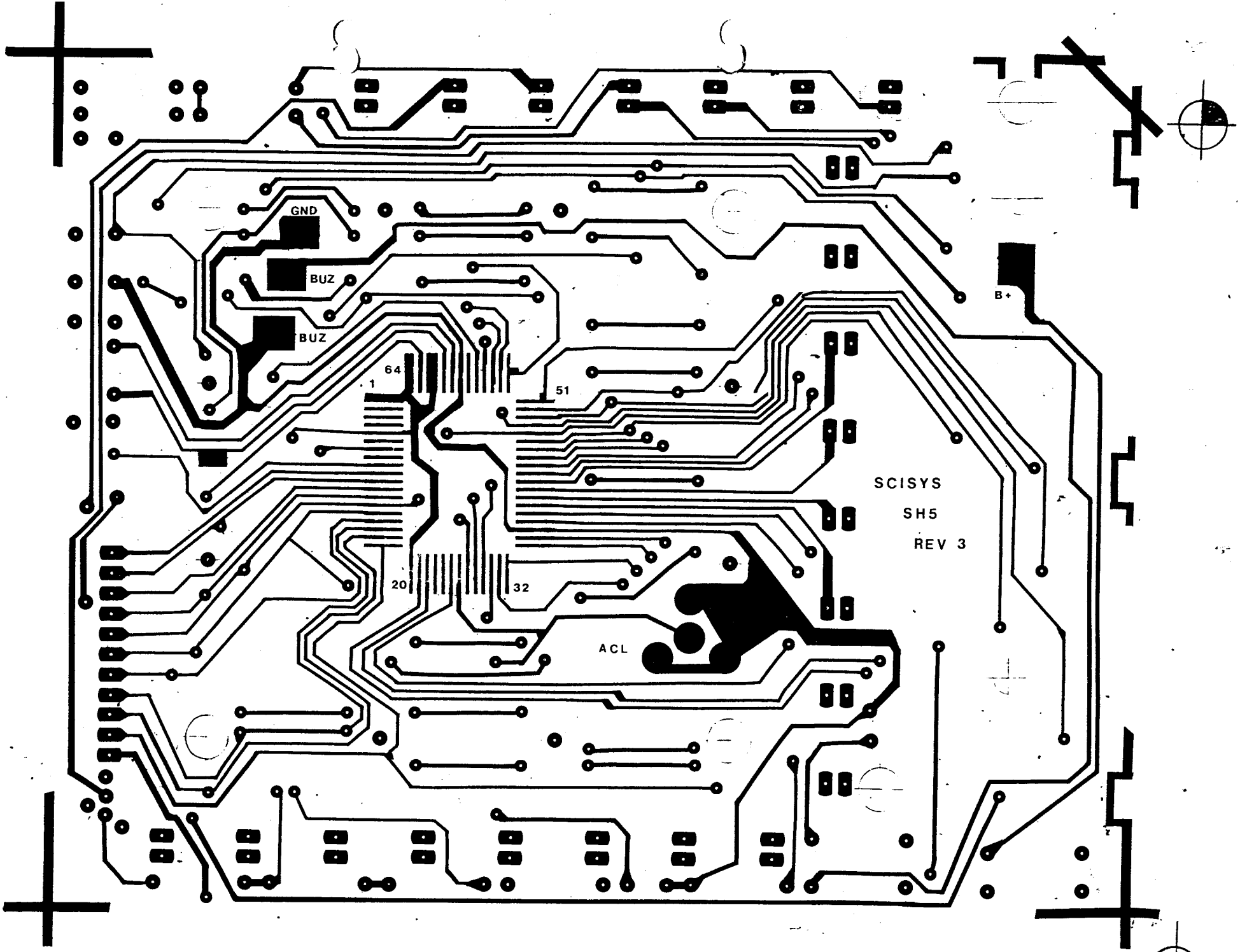
SYMPTOMS	POSSIBLE CAUSES
Unit will not turn ON	1) Dead or weak batteries 2) Broken connection(s) in battery wiring 3) Defective power supply - Check D1,R20,C2
LED(s) light up randomly and abnormally when batteries are installed (cannot reset by ACL)	1) Check action at U1 pin 63 (changes from logic 'LOW' to logic 'HIGH' when 'ON' is pressed when escape from MEMORY mode.) 2) Defective L1 (no clock) - Look for 2MHz at U1 pin 57 3) Defective U1
LED(s) missing	1) Look for broken traces or short circuits on PCBs 2) Broken connections between PCBs 3) Defective corresponding LED(s) 4) Defective U1
LED position '1' to LED position '8' all missing	1) Check R14
LED position 'A' to LED position 'H' all missing	1) Check R15
LED(s) turn on when they should not	1) Short circuits on PCBs 2) Defective U1
No response or improper response to command keys or chessboard	1) Broken or short traces on PCB. 2) Check logic 'HIGH' at U1 pin 10 to U1 pin 19 when no key is pressed 3) Poor contact between conductive rubber and PCB or sensor and PCB 4) Defective conductive rubber or sensor 5) Defective U1
No sound	1) Broken wiring from beeper to PCB 2) Defective beeper 3) Defective D2, D3 4) Defective U1 (check U1 pin 25) Check for pulse output when 'Sound ON'

SYMPTOMS		POSSIBLE CAUSES
No memory function		
a) Cannot enter 'MEMORY' mode	1)	Poor contact between conductive rubber and PCB
	2)	Broken or short circuits on PCB
	3)	Defective U1
b) Cannot escape from 'MEMORY' mode when press 'ON'	1)	Look for 0.6V at Q1 -base - if not, check R16,R17,Q1
	2)	Look for logic 'HIGH' at U1 pin 63 and change to logic 'LOW' when press 'ON' - if not, check R18,C3,Q1
	3)	Defective U1
Excessive current drain Current > 25mA when 'ON' Current > 100uA in 'MEMORY	1)	Components wirings or PCB trace short-circuited
	2)	Contaminations and/or foreign particles on PCB
	3)	Capacitor leakage
	.	- Check C1,C2,C3
	4)	Defective U1
Generates illegal moves when escapes from "MEMORY'	1)	Battery exhausted
	2)	Defective U1

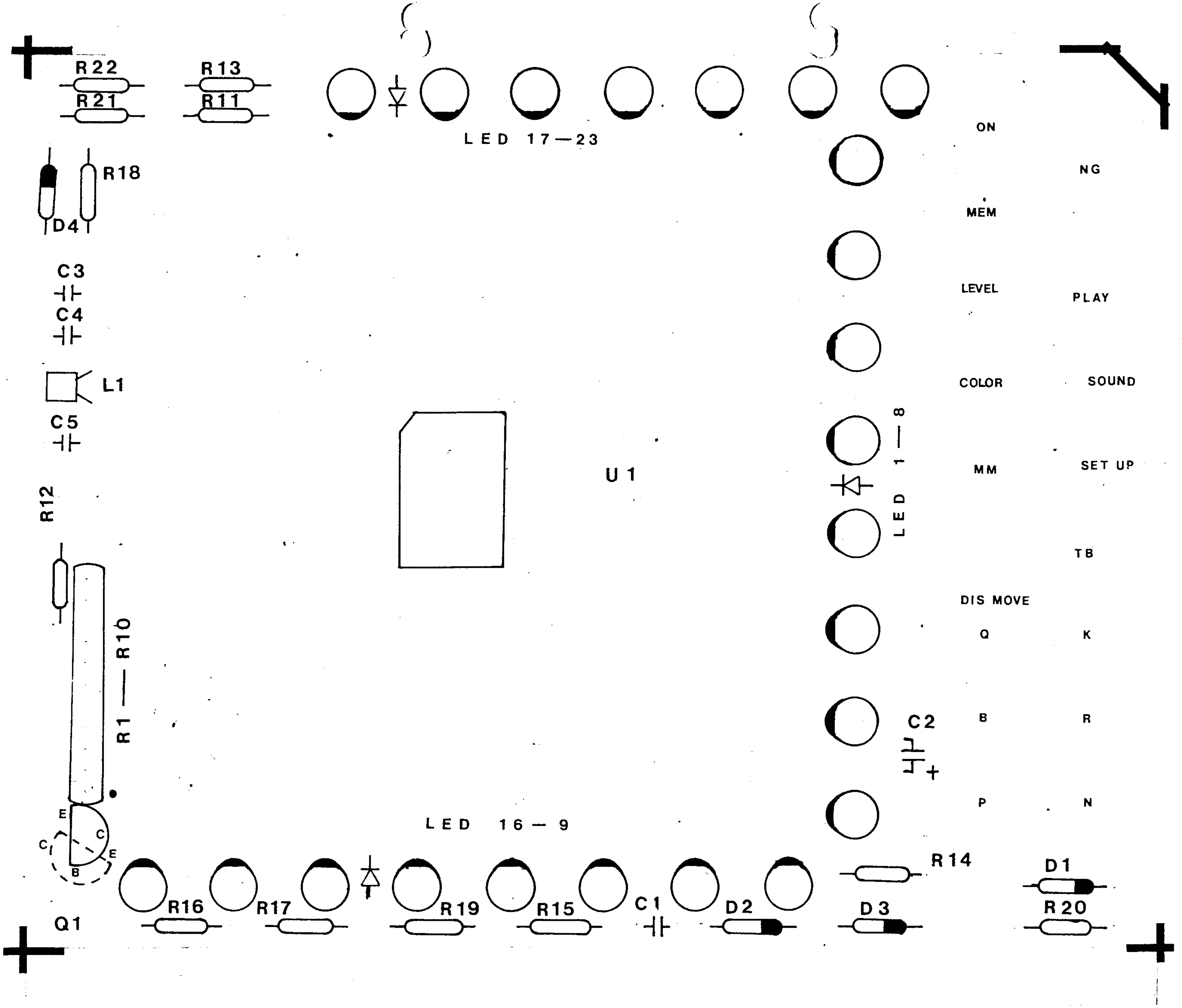

Reduced to 135 mm



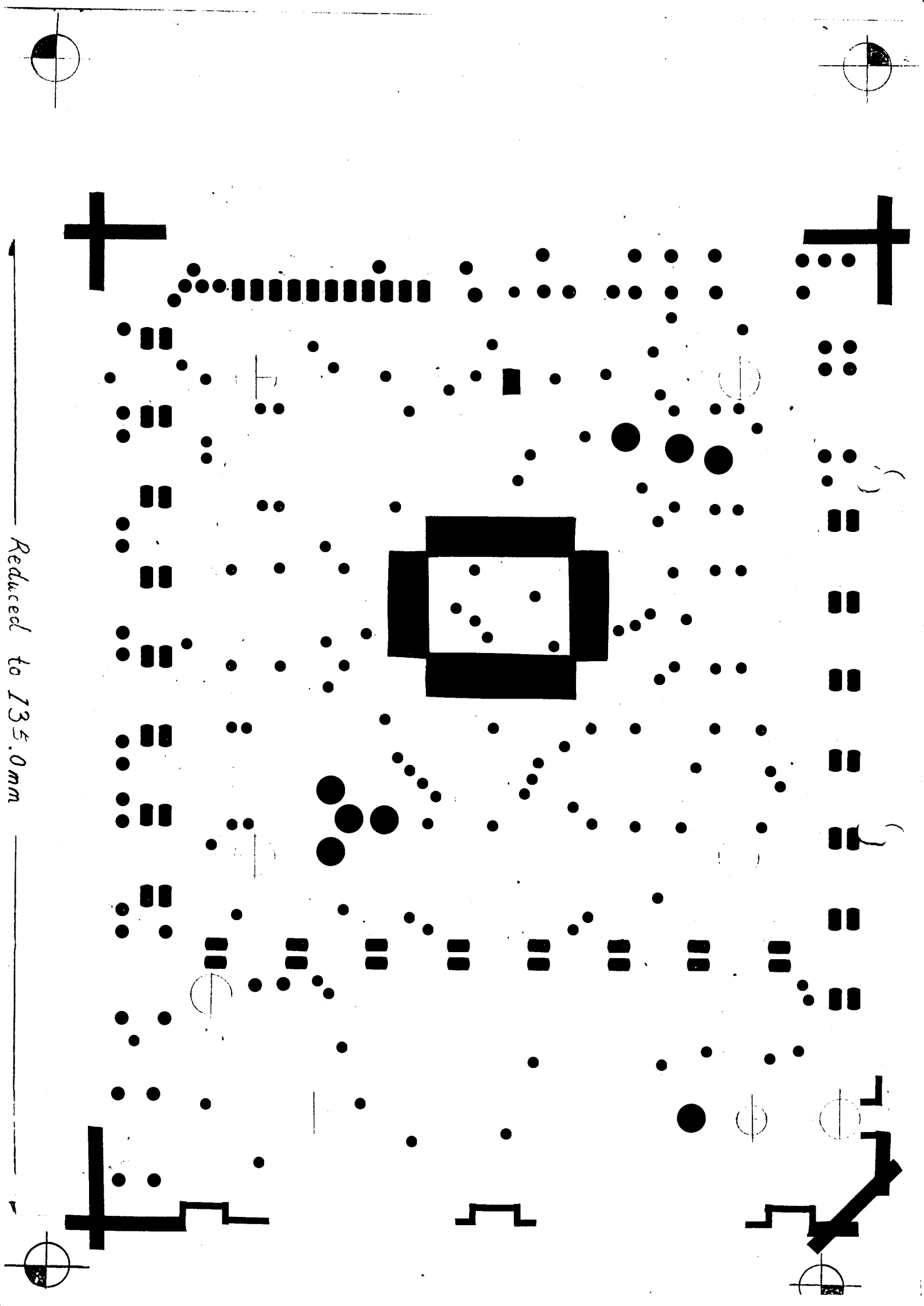
Reduced to 135.0mm



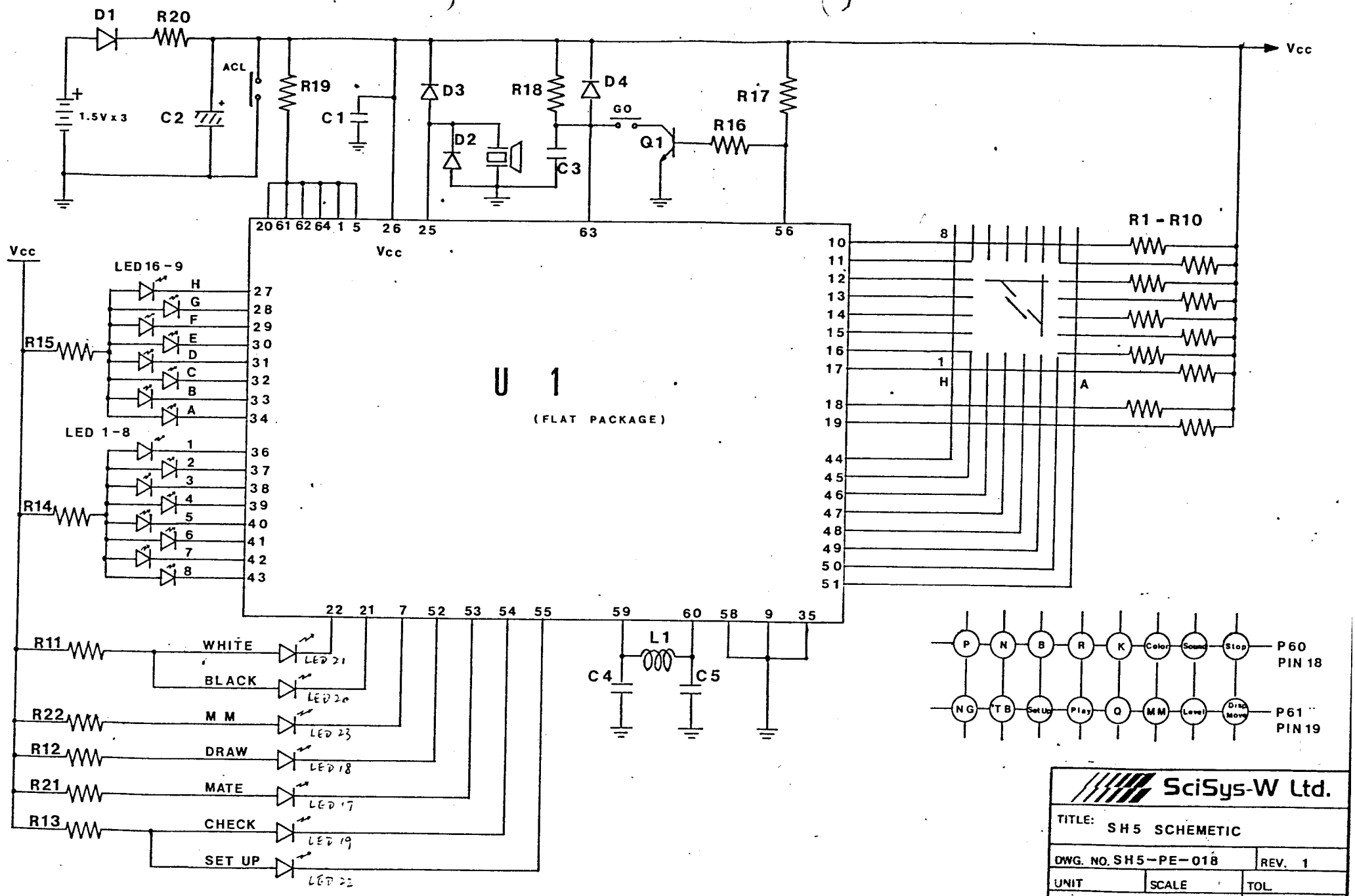
Reduced to 13·0mm



Reduced to 135



Reduced to 135.0mm



SciSys-W Ltd.		
TITLE: SH5 SCHEMETIC		
DWG. NO. SH5-PE-018		REV. 1
UNIT	SCALE	TOL.
MATERIAL		DATE 7/8/85
FINISH		DRAWN E.W.
APPD. BY	ENG	Q.A.

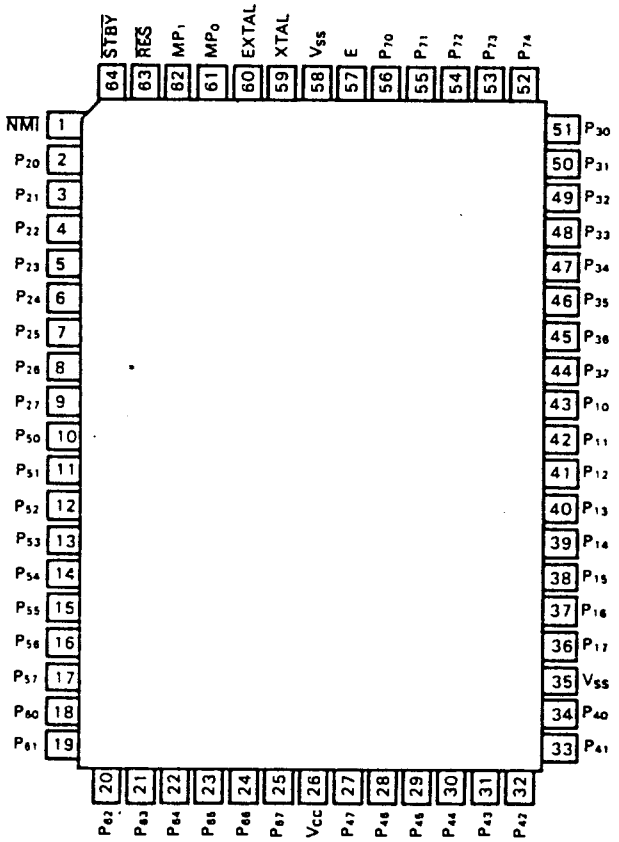
EXPRESS 16K (SH5)
CREATED 01 AUG 85
SCHEMATIC DWG : SH5-PE-018
LOGIC PCB NO. : SH5-PE-009

REV. 4
UPDATED 19 DEC 85
REV. 1
REV. 3

	ITEM DESCRIPTION	QTY.	REFERENCE
	*** MCU ***		
1	I.C. HD6301Y0 - SX5	1	U1
	*** LOGIC BOARD ASSEMBLY ***		
	PCB; LOGIC (D-SIDED)	1	
1	TRANSISTOR 9014	1	Q1
	DIODE: 1N4148	3	D1-D3
1	1N60	1	D4
1	LED (3mm, RED)	16	LED1-LED16
1	LED (3mm, GREEN)	7	LED17-LED23
	RESISTORS (1/4W 5% C-FILM):		
	100	5	R11-R13,R21-R22
	1.2K	2	R14-R15
	220K	2	R16,R17
	75K	1	R18
	10K	1	R19
	22	1	R20
1	RESISTOR ARRAY 10Kx10	1	R1-R10
	CAPACITORS:		
	0.1uF CER.	2	C1,C3
	47uF TAN.	1	C2
	5 - 50pF CER. (TYP. 10pF) +/- 5% NPO	2	C4,C5
1	COIL INDUCTOR (29uH, 38.5T)	1	L1
	*** ELECTRO-MECHANICAL ACCESSORIES ***		
	PIEZO ELECTRIC BUZZER (DIA. 27mm)	1	
	STRANDED WIRE, AWG28, 4mm STRIPPED & TINNED AT BOTH ENDS:		
	RED L=45mm (BATT+ TO VBATT)	1	
	BLACK L=90mm (BATT- TO GND)	1	
	GREY L=150mm (BUZZER)	2	
1	BATTERY SPRING CONTACT "+"	1	
1	BATTERY CONTACT "-"	1	
	SCREWS (SELF TAP, CROSS RECESS BINDING HEAD, TYPE BT):		
	M2.6x8 (FOR CAB)	4	
	M2.0x6 (FOR PCB)	2	
	M2.6x6 (FOR PCB)	4	
1	RATING PLATE (PVC)	1	
	ACL RESET CONTACT DISC 10mm	1	
	BATTERY DOOR SPONGE (45x15x7mm)	1	
1	CONDUCTIVE RUBBER PAD	1	
1	FOAM RUBBER FRICTION PAD	1	
1	INSTRUCTION INLAY	1	
1	BATTERY LABEL	1	
	RUBBER FOOT (Dia 6.5x2mm)	4	

	*** SENSOR & OVERLAY ***	
1	SENSOR: CHESSBOARD	1
1	OVERLAY: CHESSBOARD (LEXAN)	1
1	OVERLAY: LOGO (LEXAN)	1
	*** PLASTIC & CHESS ***	
1	PLASTIC CABINET SET (SPRAY-PAINTED):	1
	TOP CABINET	1
	BOTTOM CABINET	1
	COVER (SILK SCREEN)	1
	BATTERY DOOR	1
	KEY TOP SET (HOT GREY & RED)	1
1	CHESS SET (SUB-MINI/PEG)	1
	*** PACKAGING ***	
	BUBBLE-BAG (260x170mm)	1
1	PU BAG	1
1	INSTRUCTION MANUAL	1
1	GIFTBOX	1
	SHIPPING CARTON	1/20
	SERIAL NO. LABEL	1

- **HD6301Y0F, HD63A01Y0F, HD63B01Y0F**



(Top View)

FUNCTIONAL TEST PROCEDURE FOR EXPRESS 16K

Insert three UM-3 size batteries into the battery compartment and then perform the following tests.

	PURPOSE	PROCEUDRE	OBSERVATION
1.	QC test mode: Check all I/O keys	- Press PLAY key while power up - Press 64 chess squares - Press Function keys	- Each LED will be scanned. - No sound, No LED after scanning. - Corresponding Row and Column LEDs come on with a beep. - Following LEDs come on with a beep: NEW GAME A ROOK 4 MULTI-MOVE F PLAY D KNIGHT 2 COLOR 6 SOUND 7 PAWN 1 LEVEL G SET-UP C BISHOP 3 STOP 8 TAKE BACK B QUEEN E GO (NO RESPONSE) KING 5 DISPLAY MODE H
2.	Reset unit	- Press ACL	WHITE LED comes on after scanning of the LEDs followed by a high-low tone.
3.	Check MULTI-MOVE	- Press MULTI-MOVE - Press F2, F4 - Press E7, E5 - Press G2, G4	MULTI-MOVE LED comes on. The corresponding 'FROM' square LEDs will come on when you press the square.
4.	Check CHECK, MATE	- Press D8, H4	WHITE, MULTI-MOVE, CHECK, MATE LEDs come on.
5.	Check MEMORY	- Press STOP, NEW GAME - Press GO	All LEDs come off. WHITE, MULTI-MOVE, CHECK, MATE LEDs come on.

Following tests are optional for production line 100% check

6.	Check TAKE BACK	- Press TAKE BACK - Press H4 - Press D8	Row 4, Col.H LEDs come on. Row 8, Col.D LEDs come on. Take back a move.
7.	Check PLAY	- Press PLAY - Press D8 - Press H4	Row 8 and Col.D LEDs come on. Row 4 and Col.H LEDs come on. WHITE, MULTI-MOVE, CHECK, MATE LEDs come on.
8.	Check NEW GAME	- Press NEW GAME	Exit MM mode for next test with MM LED comes off.

PURPOSE	PROCEUDRE	OBSERVATION
9. Check PIECE and COLOR keys	- Press KING	WHITE Col.E and Row 1 LEDs come on.
	- Press QUEEN	WHITE Col.D and Row 1 LEDs come on.
	- Press ROOK	WHITE Col.A and Row 1 LEDs come on.
	- Press BISHOP	WHITE Col.C and Row 1 LEDs come on.
	- Press KNIGHT	WHITE Col.B and Row 1 LEDs come on.
	- Press PAWN	WHITE Col.A and Row 2 LEDs come on.
	- Press COLOR	BLACK Col.A and Row 7 LEDs come on.
10. Check SET UP and chessboard squares	- Press SET UP, NEW GAME and PAWN keys	WHITE and SET UP LEDs come on.
	- Press 64 squares randomly	Coordinate LEDs come on accordingly.
11. Reset unit for next test	- Press SET UP and NEW GAME keys	WHITE LED comes on.
12. Check LEVEL	- Press LEVEL key four times	The corresponding level LED comes on for each press, with Row 4 LED light up at last.
13. Check SOUND key	- Press SOUND	There should be no beep sound when pressing key (except DM key) in the following test.
14. Check DISPLAY MOVE	- Press DISPLAY MOVE key - Press A2, A3	Enter your first move. Then the 'BLACK' LED blinks and the computer shows its move by turning on the FROM square for 3 seconds and the TO square for one second.
15. Finish	- Remove batteries	All LEDs come off.

*** End of test ***