MEPHISTO LCD MODULE

Saitek™

RD2

PROJECT : Mephisto LCD Modul 6. Generation (RD2)
DOC. NO. : RD2-PG-009
REV. : 0
DATE : 20 August, 1996

GENERAL PRODUCT SPECIFICATIONS FOR MEPHISTO LCD MODUL 6. GENERATION

A.	Operating voltage	:	4.5 - 5.5 volts
B.	Current consumption	:	Operating voltage = 5V 4 μA Typical 30 μA max
C.	Power consumption	:	150 μW max

PREPARED BY : K. H. AU

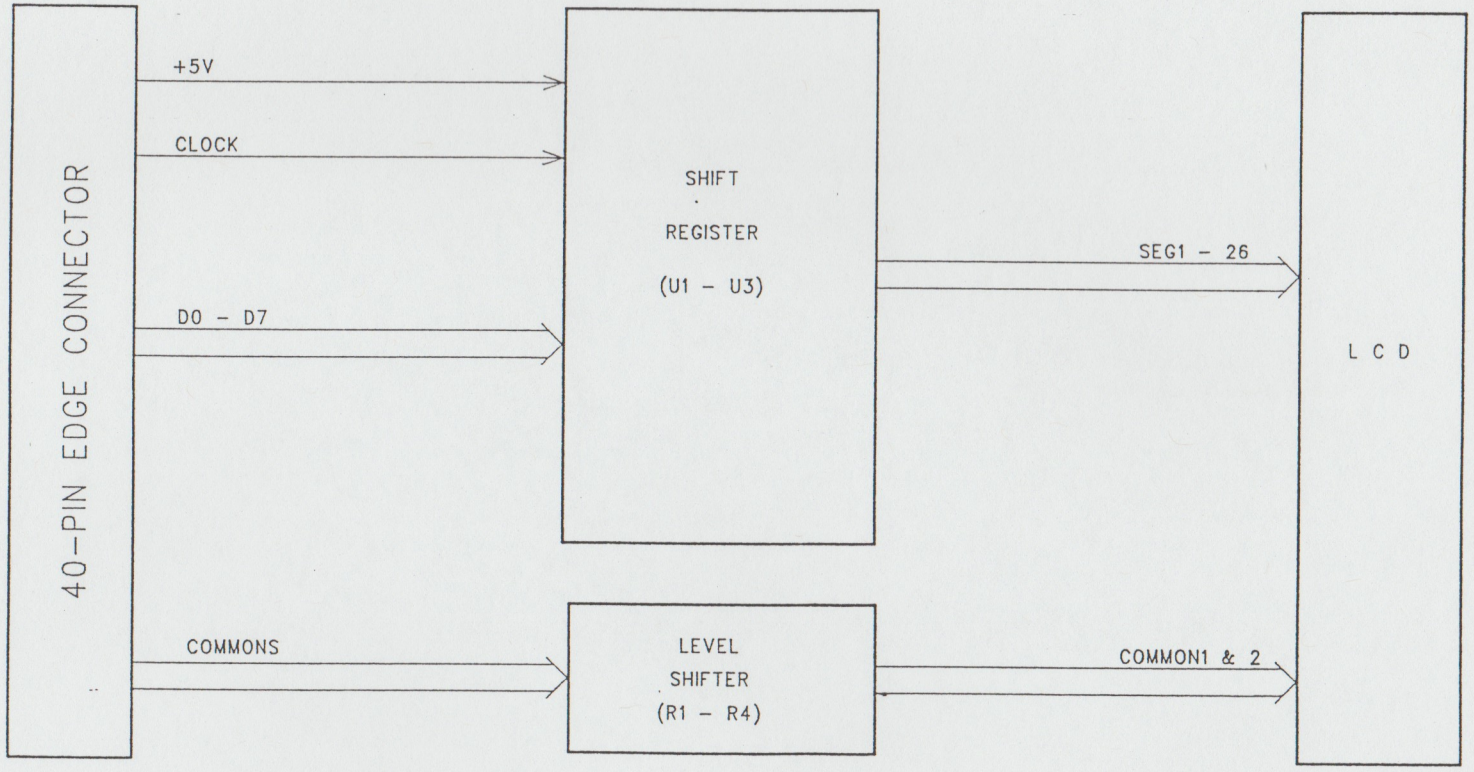
APPROVED BY :

DIST : BDM, QAM, SED, PE

Filename : RD2_PS.DOC

ORIGINAL

REVISION			
DATE	DESCRIPTION	ECN NO.	REV. NO.



APPROVALS	DATE	Saitek Ltd.
DRAWN	28/11/96	
Q.A.	28/11/96	BLOCK DIAGRAM
B.D.D.	28/11/96	TITLE: 473 LCD MODULE 6. GENERATION
		DWG. NO. RD2 - PE - 010 REV. 0

Dist: BDM, QAM, SED, IE

Project : LCD Module 6. Generation (RD2)
Doc. No. : RD2-PS-011
Rev. : 0
Date : 11 December, 1996

Trouble Shooting Chart For LCD Module 6. Generation

SYMPTOMS		POSSIBLE CAUSES
LCD malfunction or unit does not function	1.	Use known working Logic module and the Exclusive board for tests.
	2.	Check if Vcc is 4.5 V to 5.5 V.
	3.	Check if the 40-pin connector is bad contact or contaminated.
	4.	Check for broken wires between PCBs.
	5.	Check for short/open circuit on PCBs.
	6.	Check if LCD defective or misaligned.
	7.	Check for dust or oxide on gold fingers of PCB.
	8.	Check if there are square waves at pin2-5 and pin10-13 of U1, U2 and U3.
Excessive current drain Current > 30 μA	1.	Check for short circuit on PCB.
	2.	Check if the voltage level of a logic 'HIGH' at pin2-5 and pin10-13 of U1, U2 and U3 are within 4.5 V to 5.5 V.
	3.	Check for leakage on C1 to C4.

Dist : BDM, QAM, SED, PE

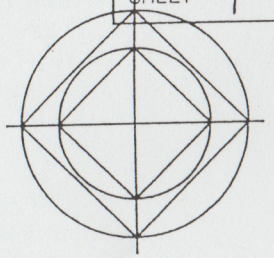
Filename : RD2TSC.DOC

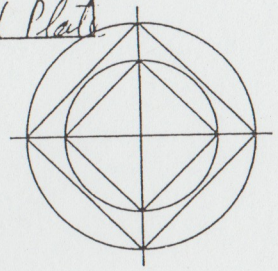
DATE	DRAWN	CHECK	BDD	QA
				APPROVED

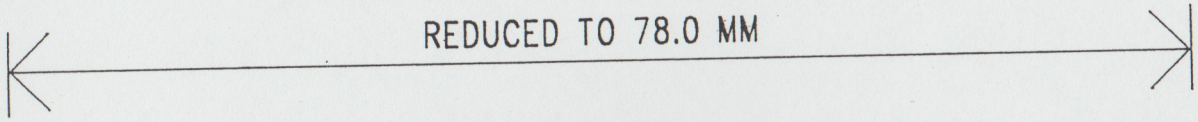
SIGNATURE	DATE	REV.	ITEM	WAS	IS

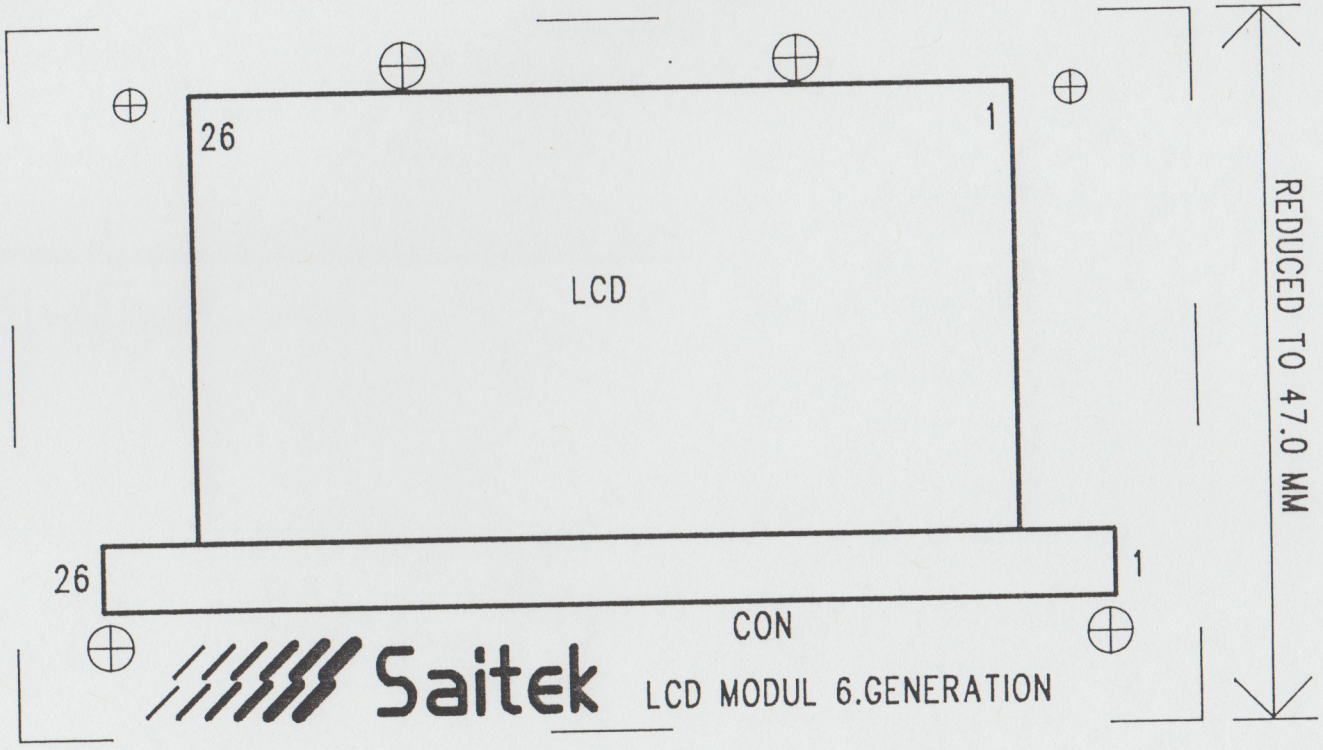
3/3

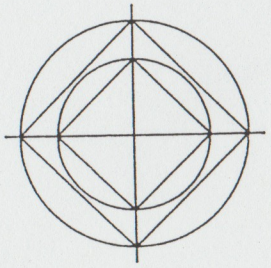
3RD ANGLE PROJECTION	SIGNATURE		DATE	REV.	ITEM	WAS / IS	DATE	DRAWN	CHECK	BDD	QA
						DESCRIPTION OF CHANGE				APPROVED	
TOLERANCES	DRAWN BY:	K. H. LEE	27/12/95	Saitek		TITLE: RD2 LCD PCB SILKSCREEN					
DIM.: ANGLE:	CHECK BY:	ALR	28/12/95								
SCALE: 2 : 1 UNIT: MM	ENGRG AUTH			DWG. NO.: RD2-PE-00655		PROJECT: RD2					
QUANTITY:	Q.A. APPD.		29.12	P/N.: N,1,4,7,3,0,1-,0,0,6,2,0							
SHEET 1 OF 4	BDD. APPD.		28/12/95	MATERIAL Paper Phenolic		FINISH Flash Gold Plate					











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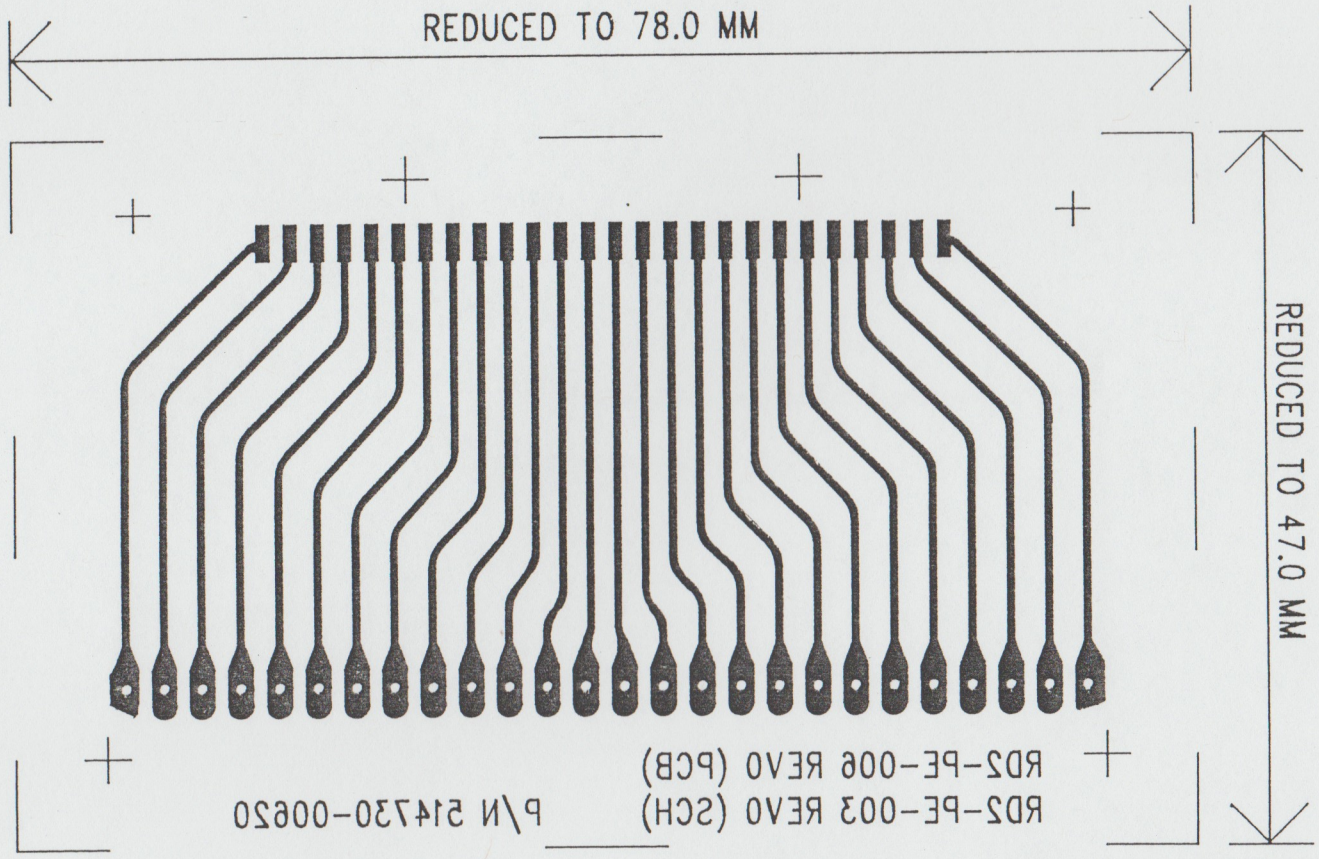
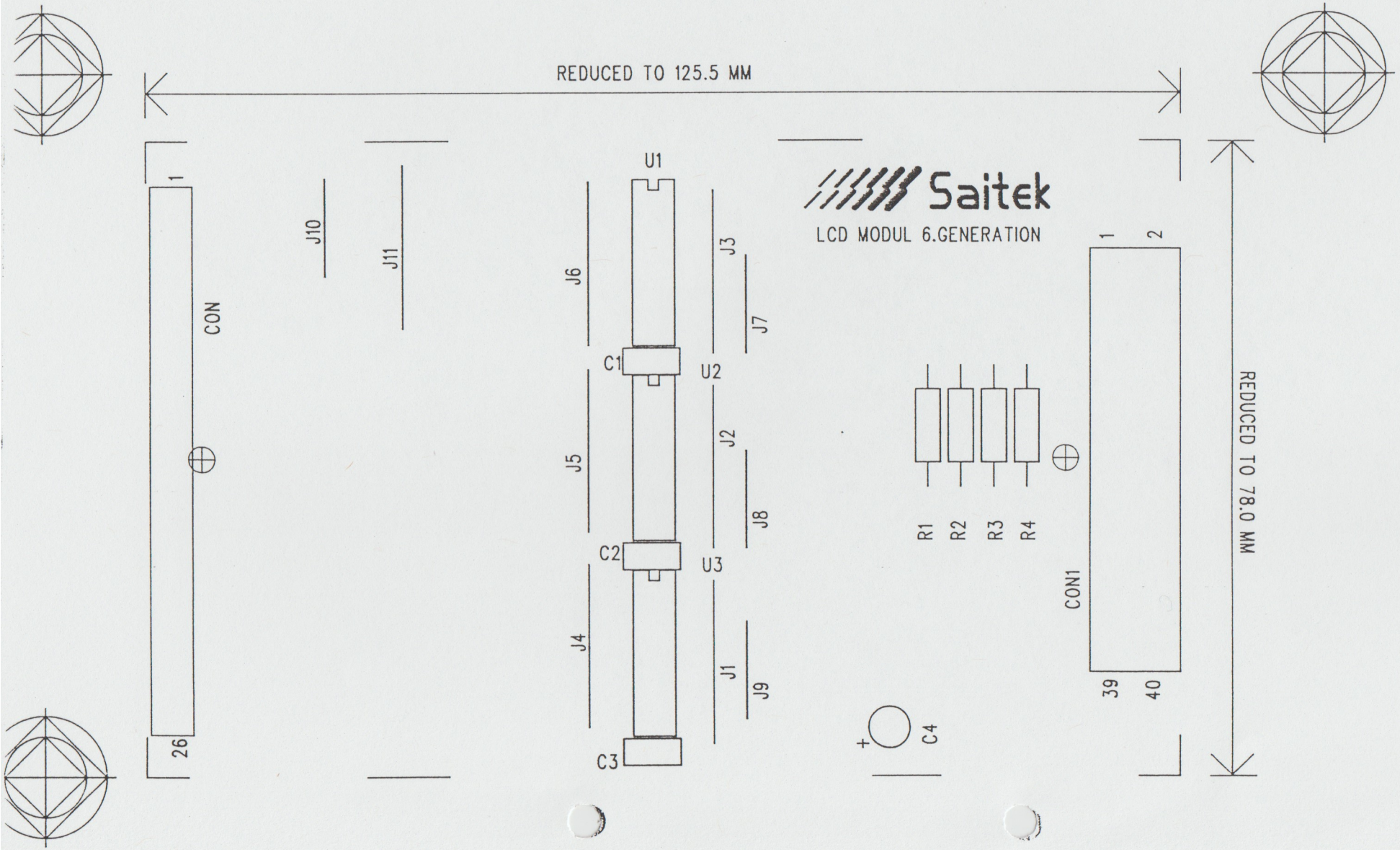
E-TEST REQUIREMENT	YES	NO
		✓



3RD ANGLE PROJECTION	SIGNATURE		DATE	REV.	ITEM	WAS / IS	DATE	DRAWN	CHECK	BDD	QA
						DESCRIPTION OF CHANGE				APPROVED	
TOLERANCES	DRAWN BY:	K.H.LEE	27/12/95	Saitek		TITLE: RD2 LCD PCB COPPER SIDE					
DIM.: ANGLE:	CHECK BY:		28/12/95								
SCALE: 2:1 UNIT: mm	ENGRG AUTH			DWG. NO.: RD2-PE-006CS			PROJECT: RD2				
QUANTITY:	Q.A. APPD.			P/N.: 514730-00620							
SHEET 2 OF 4	BDD . APPD.		28/12/95	MATERIAL 1.6 MM PAPER PHEONLIC			FINISH FLASH GOLD PLATE				

3RD ANGLE PROJECTION	SIGNATURE	DATE	REV.	ITEM	WAS	IS	DATE	DRAWN	CHECK	BDD	QA
					DESCRIPTION OF CHANGE					APPROVED	
TOLERANCES	DRAWN BY: K. H. LEE	27/12/98	Saitek		TITLE: RD2 LOGIC PCB SILKSCREEN						
DIM.: ANGLE:	CHECK BY:	27/12/98									
SCALE: 2 : 1 UNIT: MM	ENGRG AUTH		DWG. NO.: RD2-PE-00555				PROJECT: RD2				
QUANTITY:	Q.A. APPD.	27/12/98	P/N.: 1,4,7,3,0,-,0,5,1,0								
SHEET 1 OF 4	BDD. APPD.	27/12/98	MATERIAL 1.6mm PAPER PHEONLIC				FINISH Base Copper				



3RD ANGLE PROJECTION	SIGNATURE		DATE	REV.	ITEM	WAS	IS	DATE	DRAWN	CHECK	BDD	QA
TOLERANCES	DRAWN BY:	K.H.LEE	27/12/95			DESCRIPTION OF CHANGE					APPROVED	
DIM.: ANGLE:	CHECK BY:		27/12/95									
SCALE: 2:1 UNIT: MM	ENGRG AUTH											
QUANTITY:	Q.A. APPD.		27/12/95									
SHEET 2 OF 4	BDD. APPD.		27/12/95									

Saitek

TITLE: RD2 LOGIC PCB COPPER SIDE

DWG. NO.: RD2-PE-00FCS

PROJECT: RD2

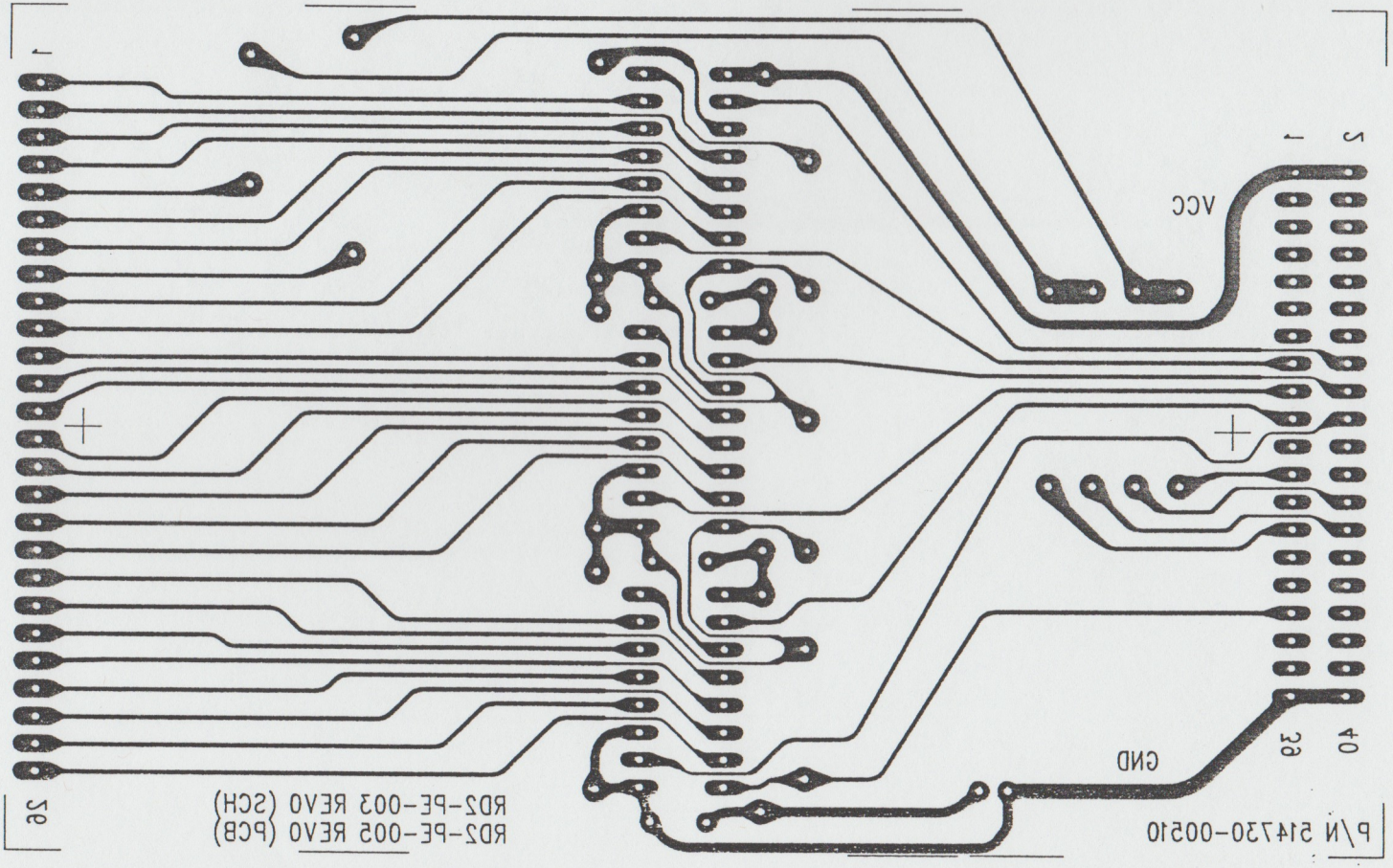
P/N.: N,1,4,7,3,0,-,0,0,N,1,0

MATERIAL 1.6mm PAPER PHEONLIC

FINISH Bare Copper

E-TEST REQUIREMENT	YES	NO
		✓

REDUCED TO 125.5 MM



REDUCED TO 78.0 MM

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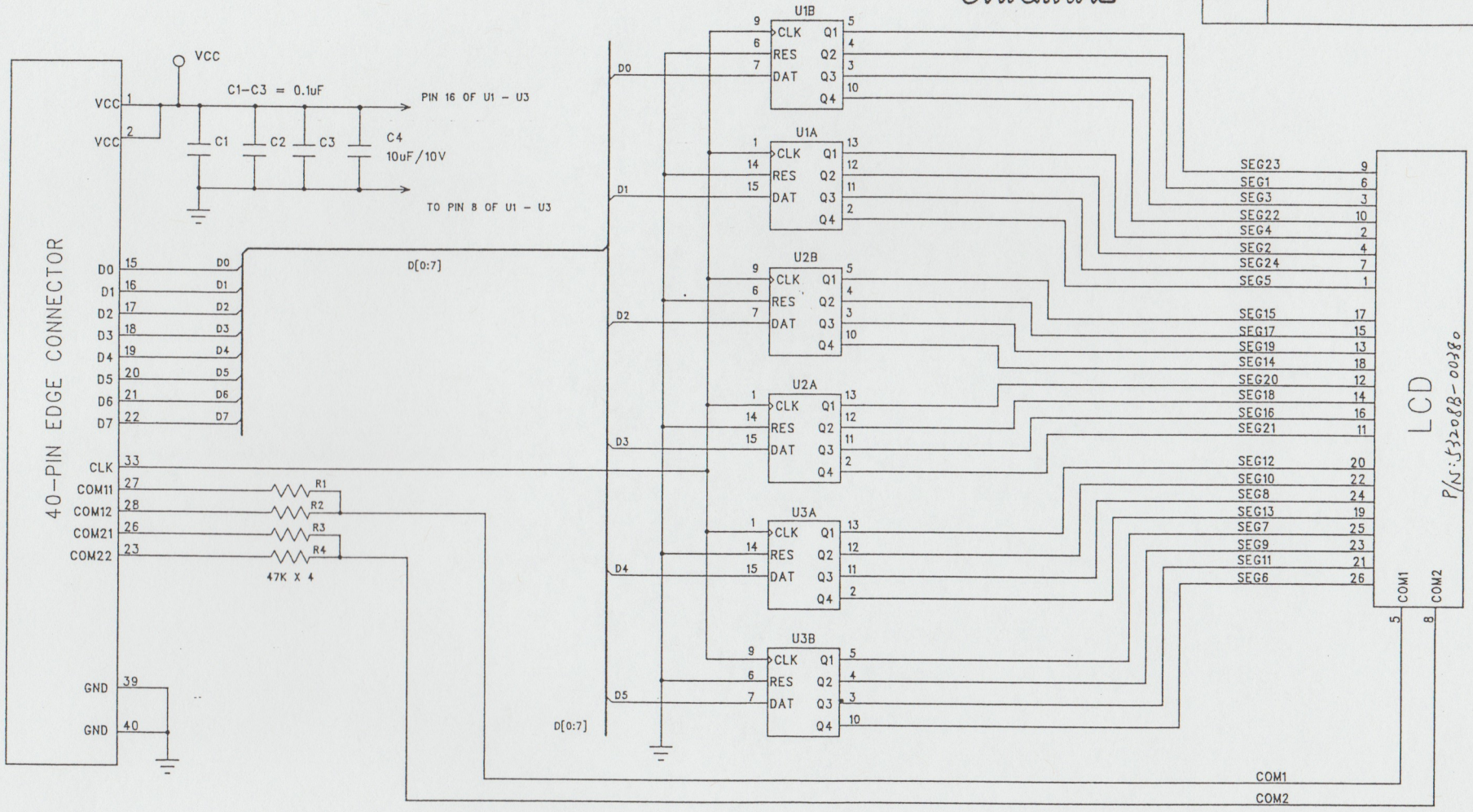
ORIGINAL

REVISION			
DATE	DESCRIPTION	ECN NO.	REV. NO.



U1 - U3 : CD4015B

APPROVALS	DATE	Saitek Ltd.
DRAWN	28/11/96	
Q.A.	29.11.96	SCHEMATIC DIAGRAM

CHG MOD:NW

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SAITEK

BILL OF MATERIALS

PROJECT	:	RD2	(Mephisto LCD Module)
ART.NO.	:	473	
SHIP VER.	:	EV	
REVISION	:	1	

REVISION HISTORY

REVISION	DATE	BY	DESCRIPTION OF CHANGES
1	3/4/96	K.H. AU	First BOM.

RELATED DOCUMENTS	REV
Schematic dwg : RD2-PE-003	0

Prepared By : _____
Abraham Au

Approved by : _____
BDM

Distribution :
+1.00 [X] MMM, FAM, SE, QAM
+0.10 [ ] MMM, FAM, SE, QAM
+0.01 [ ] MMM, IEM

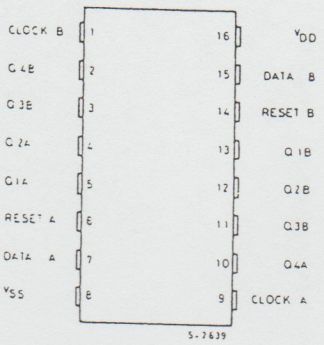
Date issue : 6 APR 1996

CHG MOD:NW=new component; *=desc/PN/Ref changed +/-=cost up/down; C/NC=consigned/non-consigned; +/-Q=QTY up/down

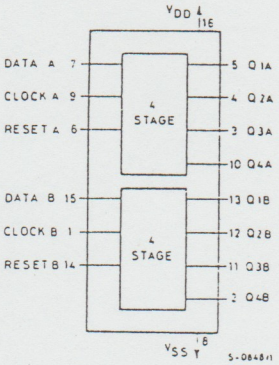
994730 - RD2, MEPHISTO LCD MODUL Rev : 1

Level	Item	Chg	Stock Code	Rev	Cons	Description	Qty Per	Reference
1			984730-00000	1		UNIT ASSEMBLY,FOR RD2	1.000	
2			914730-00001	1		GUTS ASSEMBLY, -LOGIC,FOR RD2	1.000	
3	1		514730-00510			PCB,LOGIC,S.S.,1.6MM,PAPER PHEONLIC,RD2	1.000	
3	2		750008-04015		RC	IC,DUAL 4-BIT SHIFT REGISTER,	3.000	U1-U3
3	3		62104M-01611			CAPACITOR,C-CAP,0.1UF,+/-20%,16V	3.000	C1-3
3	4		62106Z-0161X			CAPACITOR,E-CAP,10UF,+80%/-20%,16V,MINI	1.000	C4
3	5		000190-00027			CONNECTOR, EDGE, 40PIN, BENDED LEADS	1.000	CON1
2			914730-00003	1		GUTS ASSEMBLY, -LCD, FOR RD2	1.000	
3	6		514730-00620			PCB,LCD,S.S.,1.6MM,PAPER PHEONLIC,RD2	1.000	
3	7		000030-01400			CONN ARRAY,N=11,L=40MM,P=2.54MM,E=3.5MM	3.000	
2			964730-00000	1		CASING ASSEMBLY, FOR RD2	1.000	
3			954730-00000	1		CABINET SET,FOR RD2	1.000	
4	8		214610-00120		RC	PLASTIC,T.CAB,ABS,BLACK,W/SILKSCREEN,RD2	1.000	
4	9		214610-00200		RC	PLASTIC, B CABINET, ABS, BLACK, RM18	1.000	
3	10		53208B-00380		RC	LCD,FOR ST12B	1.000	
3	11		250000-00524		RC	ZEBRA CONNECTOR,SG,52X2,2X4.7,P=0.18MM	1.000	
3	12		212080-01100		RC	PLASTIC,SUPPORT FRAME,HIPS	1.000	
3	13		000073-11424			SCREW,S/T,+BIND,M2.6X6MM,A	4.000	
1			944730-10000	1		PACKING ASSEMBLY,FOR RD2	1.000	
2	14		000122-40130			POLYBAG,240X130X0.045MM	1.000	
2	15		424730-61100		RC	GIFTBOX, FOR RD2, G/F/F/D/I/S	1.000	
2	16		454660-00700			INSERT, FOR RM20, CORRUGATED PAPER	1.000	
2	17		360000-00220			LABEL,FOR SERIAL NO,ADHESIVE PAPER,STD.	1.000	
2	18		454660-00800			CARTON, FOR RM20, 20PCS/CTN	.050	
2	19		370000-00000			LABEL ASSEMBLY	1.000	

CONNECTION DIAGRAM



FUNCTIONAL DIAGRAM

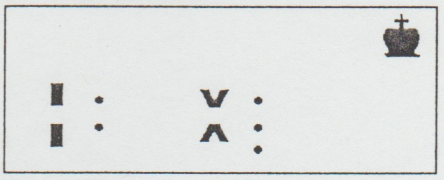
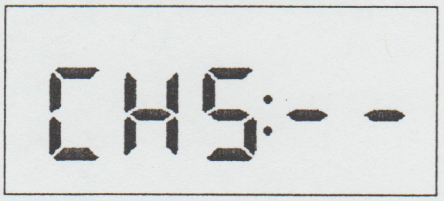


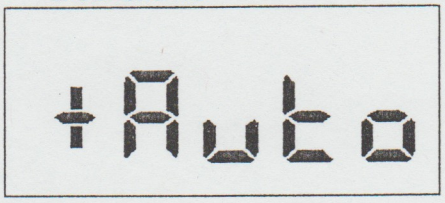
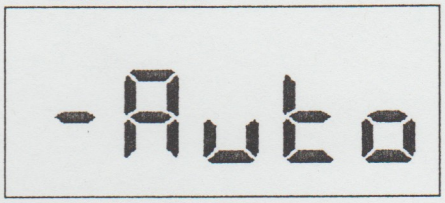
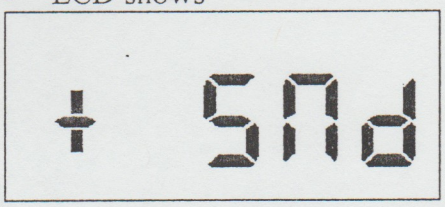
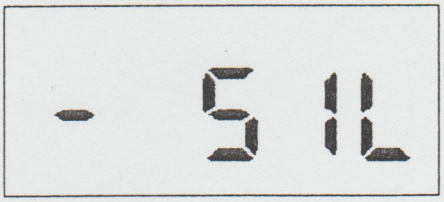
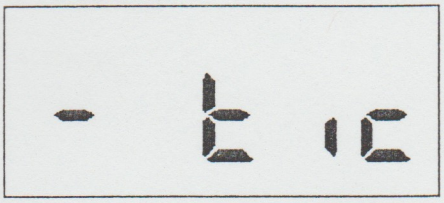
RECOMMENDED OPERATING CONDITIONS

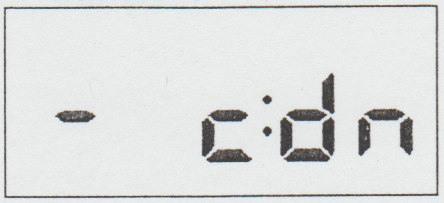
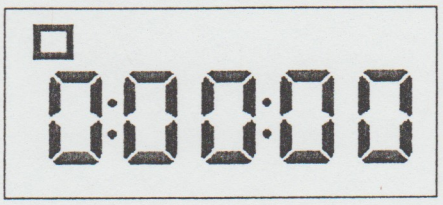
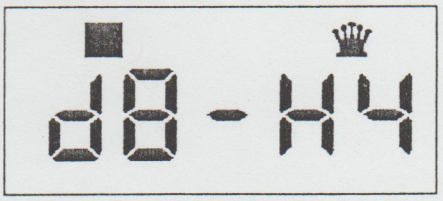
V_{DD}	Supply voltage: HCC types	3 to 18	V
	HCF types	3 to 15	V
V_I	Input voltage	0 to V_{DD}	V
T_{op}	Operating temperature: HCC types	-55 to 125	°C
	HCF types	-40 to 85	°C

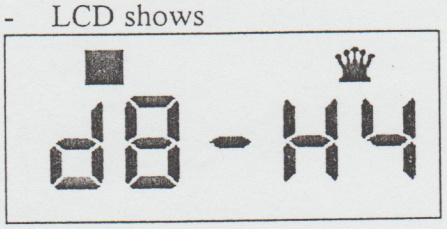
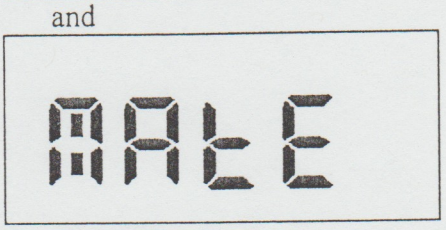
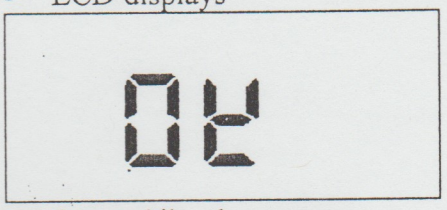
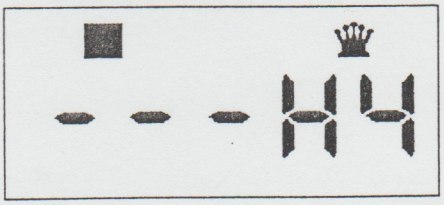
9. FUNCTIONAL TEST PROCEDURE FOR RM19 WITH RD2

Make sure that the ON/OFF switch of RW9 is at OFF position before any module is inserted into the unit, then insert the MMVI Module (RM19 logic unit) and LCD Module (RD2-Mephisto 6. GENERATION LCD MODUL) into the slots. Hence insert the energized adapter into DC socket.

Purpose	Procedure	Observation
1. QC mode (make sure that no chesspiece is located on the chessboard)	- Slide the ON/OFF switch to ON position while pressing □/← and ■/→ key at the same time for 2 seconds.	- LCD and LEDs scanning (see Table 3)
	- Press ♟ key	- LCD and LEDs scanning as Table 3 without sequence 9, 10. - LCD shows 
	- Place a RW9 chesspieces on square A1 to H8 sequentially (make sure to remove all chesspiece before testing the function keys on next step)	- Corresponding square LED is on and LCD shows  where -- is the coordinate of the square
	- Press function keys as shows in Table 4	- See Table 4

Purpose	Procedure	Observation
2. Newgame and set options	- Press **NEWGAME**	- LCD and LED scanning, see Table 3 without step 9 and 10 (If "Err: E" is shown on LCD, refer to section 7.3)
	- Setup pieces at Newgame position	- Newgame sound
	- Press **OPT**	- LCD shows 
	- Press **ENT**	- LCD shows 
	- Press ■/➔ (if "-Snd" is displayed instead, then press **ENT** once to modify the display)	- LCD shows 
	- Press ■/➔ (if "+SiL" is displayed instead, then press **ENT** once to modify the display)	- LCD shows 
	- Press ■/➔ twice (if "+tic" is displayed instead, then press **ENT** once to modify the display)	- LCD shows 

Purpose	Procedure	Observation
	- Press ■/➔ (if "+c:dn" is displayed instead, then press **ENT** once to modify the display)	- LCD shows 
	- Press **CL**	- LCD shows 
3. Multimove	- Move F2, F4, E7, E5, G2, G4 in sequence	- Coordinate LEDs come on with a "Beep" for each key press and LCD shows corresponding move.
	- Press **ENT**	- D8 LED and H4 LED are flashing alternatively and LCD shows 
	- Pick up the piece on square D8	- H4 LED is on and LCD shows as above

Purpose	Procedure	Observation
	- Place the piece on square H4	- LCD shows  and  alternatively (after a while white clock is counting up)
	- Press **CL**	- white clock counting up
5. Check memory	- Press **SAVE**	- LCD displays  for a while, then return to previous clock (stopped) with one of the chess piece symbol is displayed on LCD
	- Slide the **ON/OFF** switch to **OFF** position	- All LEDs come off - LCD blank
	- Press **NEWGAME** twice	- No response
	- Slide the **ON/OFF** switch to **ON** position	- LCD and LEDs scanning as Table 3 (without step 9, 10) - LCD display as before without the chess piece symbol
	- Pick up the Black Queen on H4	- H4 LEDs are on and - LCD shows 

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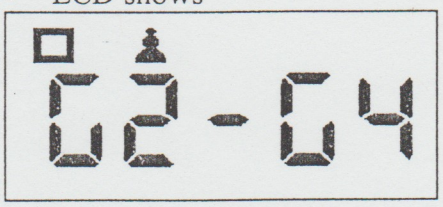
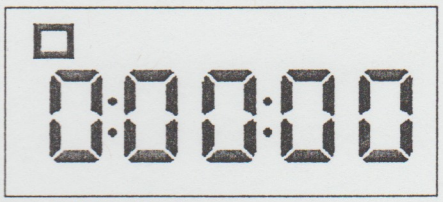
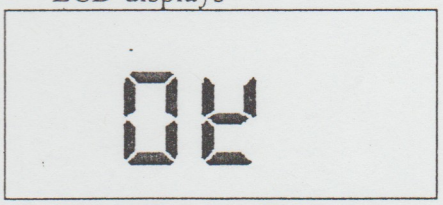
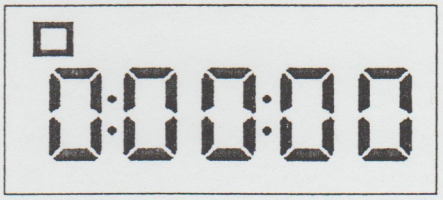
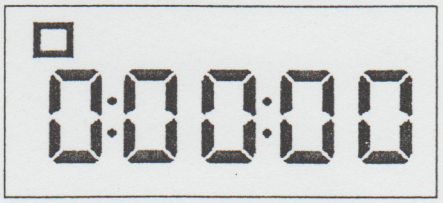
Purpose	Procedure	Observation
	- Put down the Black Queen on D8	- LCD shows 
		- G4 and G2 LEDs are flashing alternatively
	- Press **CL**	- Black clock starts counting up
	- Press **NEWGAME**	- New game sound is emitted
		- LCD shows 
	- Press **SAVE**	- LCD displays  for a while then LCD shows 
6. Power off	- Slide the ON/OFF switch to OFF position - Slide the ON/OFF switch to ON position	- All LEDs come off - LCD blanks - LCD and LED scanning as Table 3 (without step 9 and 10) - LCD then shows  (If "Err:E" is displayed, the EEPROM or unit is defective)

Table 3

Sequence	LCD shows	Row /LED to be ON
1		Row 1
2		Row 2
3		Row 3
4		Row 4
5		Row 5
6		Row 6
7		Row 7
8		Row 8
9	tESt	None
10	F: 10	Square A6

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Table 4

Function Key Press	LCD displays	Function Key Press	LCD displays
♟	11	LEV	6
♞	12	INFO	5
♝	13	POS	8
♜	14	□ / ←	2
♛	15	■ / →	1
♚	16	ENT	10
SAVE	4	CL	9
OPT	7		

* A beep sound is given out for each key press.
* Pressing <NEWGAME> will exit QC test mode.