TC 2100

Saitek™

DOC. NO. : SH19-PG-040
REV. : 0
DATE : 17 June, 1994
C.C. : QA

TRAVEL CHAMPION 2100 GENERAL PRODUCT SPECIFICATIONS

A.	Battery requirement	:	1.5 Volt (size 'AA' or 'UM-3') x 4 pcs Alkaline type recommended
B.	Operating voltage	:	4.4 – 6.8 Volts
C.	Adapter Operating Voltage	:	N/A
D.	Current consumption	:	a) Normal mode at V60 = 6V (with two LEDson) 30mA typical 50mA max. b) Memory mode at V60 = 6V 1.6μA typical 3.0μA max
E.	Power consumption	:	180mW typical 300mW max
F.	System clock frequency	:	20MHz +/-5% (at V60 = 6V)
G.	Top cover to be detchable the locking end cap	:	The strength to pull Less than 500g.
H.	Force to activate front switch	:	Less than 300g

PREPARED BY : Richard Law

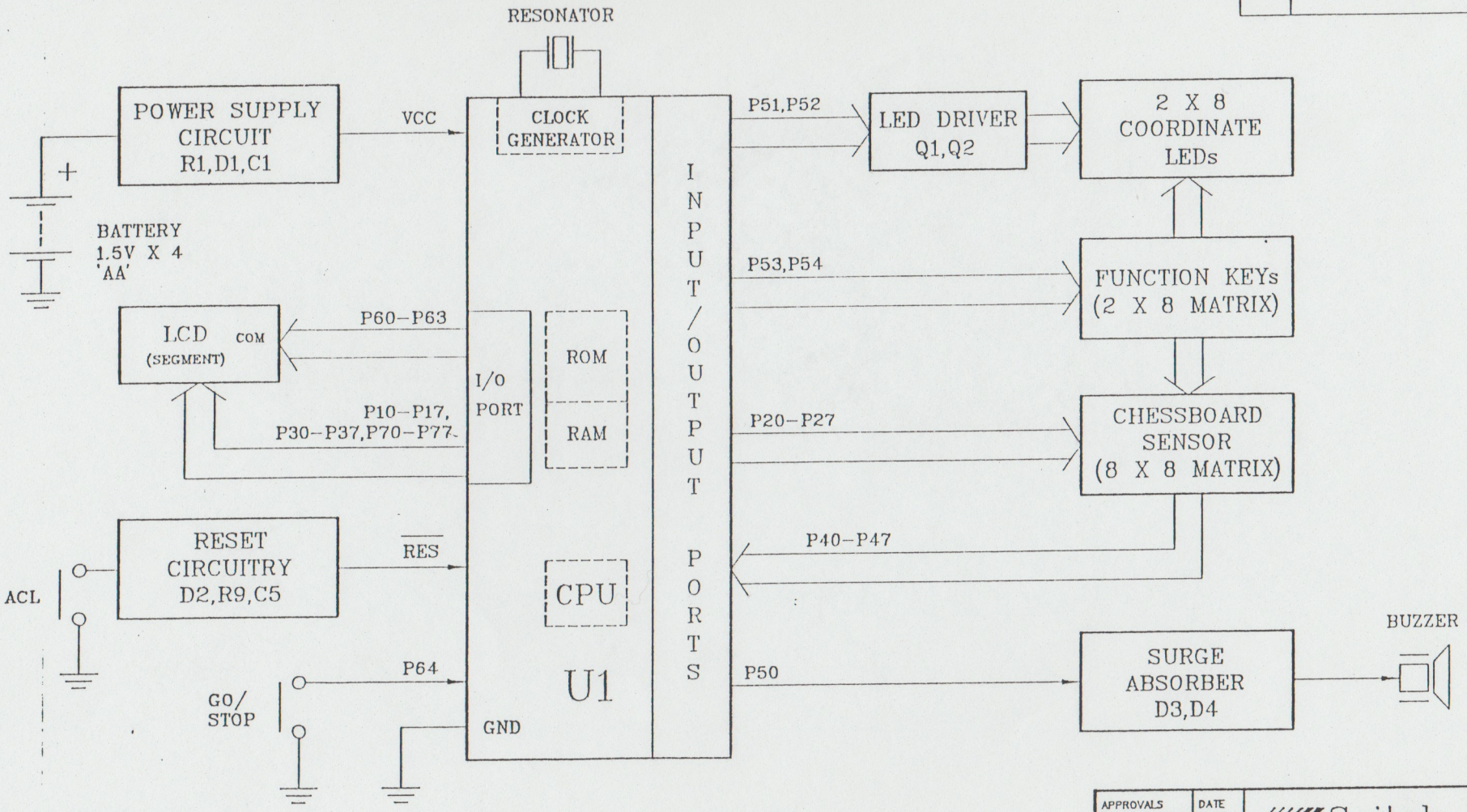
APPROVED BY :

DIST : QAM, SEE, SEA, IEM

Filename : /BDD1/SH19PS.Doc

ORIGINAL

REVISION			
DATE	DESCRIPTION	ECN NO.	REV. NO.



APPROVALS	DATE	Saitek Ltd.
DRAWN WALTER	18/8/94	
Q.A.	17.8.94	BLOCK DIAGRAM
B.D.D.		TITLE: TRAVEL CHAMPION 2100
		DWG. NO. SH19–PE–047 REV. 0

PROJECT : Travel Champanion 2100
DOC. NO. : SH19-PS-041
REV. : 0
DATE : 16.6.94

Adjustment Procedure for SH19

Object : To adjust system clock frequency

Equipment needed : Frequency counter or Oscilloscope capable of frequency measurement up to 30MHz.

Procedure :

1. Disassemble unit by removing screws (5) on bottom cabinet.
2. Power up the unit (V60 = 6V)
3. Place probe of counter/scope at pin 9 of U1.
   If frequency measured is out of specified range (19-21MHz), replace C4 or C3 (S.O.T.) until counter/scope reading is within specification.
4. Reassemble unit.

PREPARED BY : Richard Law

APPROVED BY :

DIST : QAM, SEE, SEA, IEM

Filename : /BDD1/SH19PS.Doc

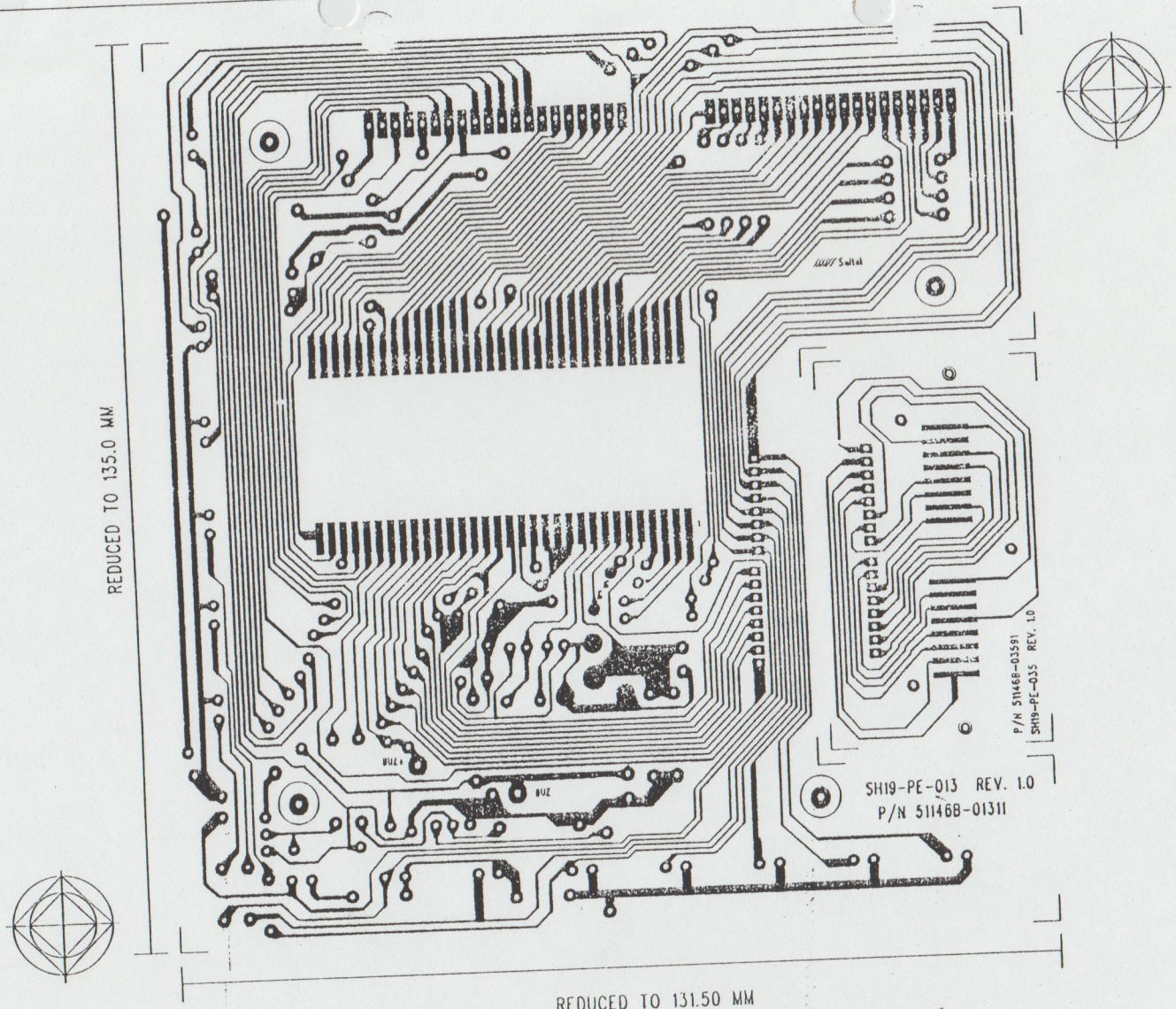
PROJECT : Travel Champanion 2100
DOC. NO. : SH19-PS-046
REV. : 0
DATE : 22.8.94

SH19 Trouble Shooting Chart

SYMPTOMS		POSSIBLE CAUSES
Unit cannot turn ON	1. 2. 3. 4. 5. 6.	Check if battery level is between 4.4 - 6.8V. Check if R1/D1 is functionally good. Look for broken wiring connections on PCB's. Check if R9/C5/D2 are functionally good. Check if ACL is shorted to GND. Check if U1 pin 9/10 is oscillating.
No sound	1. 2. 3.	Look for any broken wiring connection. Check if buzzer/D3/D4 is functionally good. Check if U1 is functionally good : - A train of pulses should be issued at U1 pin 25 when sound is emitted.
LCD missing or wrong LCD on	1. 2. 3. 4. 5.	Look for broken traces or short circuit on PCBs. Check if R5-R8 is functionally good. Check if no misalignment of LCD. Check for any dust/oxide on gold fingers. Check if U1/LCD is defective.
No LED or wrong LED lighted	1. 2. 3. 4.	Check if LED is functionally good. Check for any short or open circuit . Check if Q1/Q2 is functionally good. Check if U1 is functionally good.
Excessive current drain Current >60mA at power up. Current >300µA at memory mode.	1. 2.	Check for any short circuit . Check if capacitor C1 leakage.
Improper response	1. 2. 3. 4. 5.	Check for broken connections between sensor & PCB. Look for broken or shorted circuits on PCBs. Check for any dust/oxide on sensor PCB. Check if battery level is within specification. Check if U1 is functionally good.
No memory	1. 2.	Check if battery level is within specification. Check if U1 is functionally good.

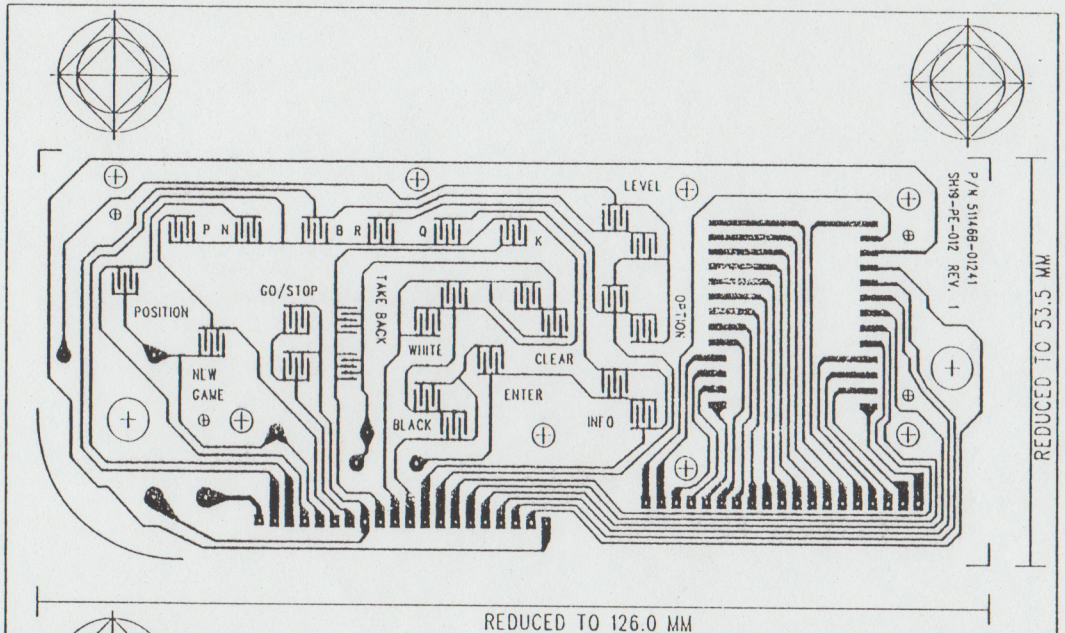
Dist : BDM1, [redacted]

Filename : /BDD1/SH19PS.Doc



REDUCED TO 131.50 MM

3RD ANGLE PROJECTION	SIGNATURE		DATE	1.0	1	Remove IC winding indication & 0.5mm hole to array pads					3
TOLERANCES	DR... BY	Walter Hsi	19/7/94	REV	ITEM	WAS / IS DESCRIPTION OF CHANGE	DATE	DRAWN	CHECK	EC / QA / RD APPROVED	
DIM ANGLE	CHECK BY		19.7.94								
SCALE 2:1 UNIT MM	ENGRG AUTH			Saitek		TITLE LOGIC PCB COPPER TRACE + SENSOR PCB COPPER TRACE					
QUANTITY	QA APPD		19.7.94	DWG NO SH19-PE-013CT			PROJECT SH19				
SHEET OF	RD APPD			P/N 92146B-00781							
				MATERIAL			FINISH				



No plating trace is allowed between "+" and "-" pad or trace

3RD ANGLE PROJECTION	SIGNATURE		DATE
TOLERANCES	DRAWN BY:	Walter	27/7/94
DIM.: ANGLE:	CHECK BY:		28.7.94
SCALE: 2:1 UNIT: MM	ENGRG AUTH		
QUANTITY:	Q.A. APPD.		
SHEET OF	B.D.D. APPD.		

REV.	ITEM	WAS	IS	DATE	DRAWN	CHECK	ED	QA	BDD
1		Modify "i" - trace for [illegible]					APPROVED		

Saitek

TITLE: COPPER TRACE

DWG. NO.: SH19-PE-012CT

PROJECT: SH19

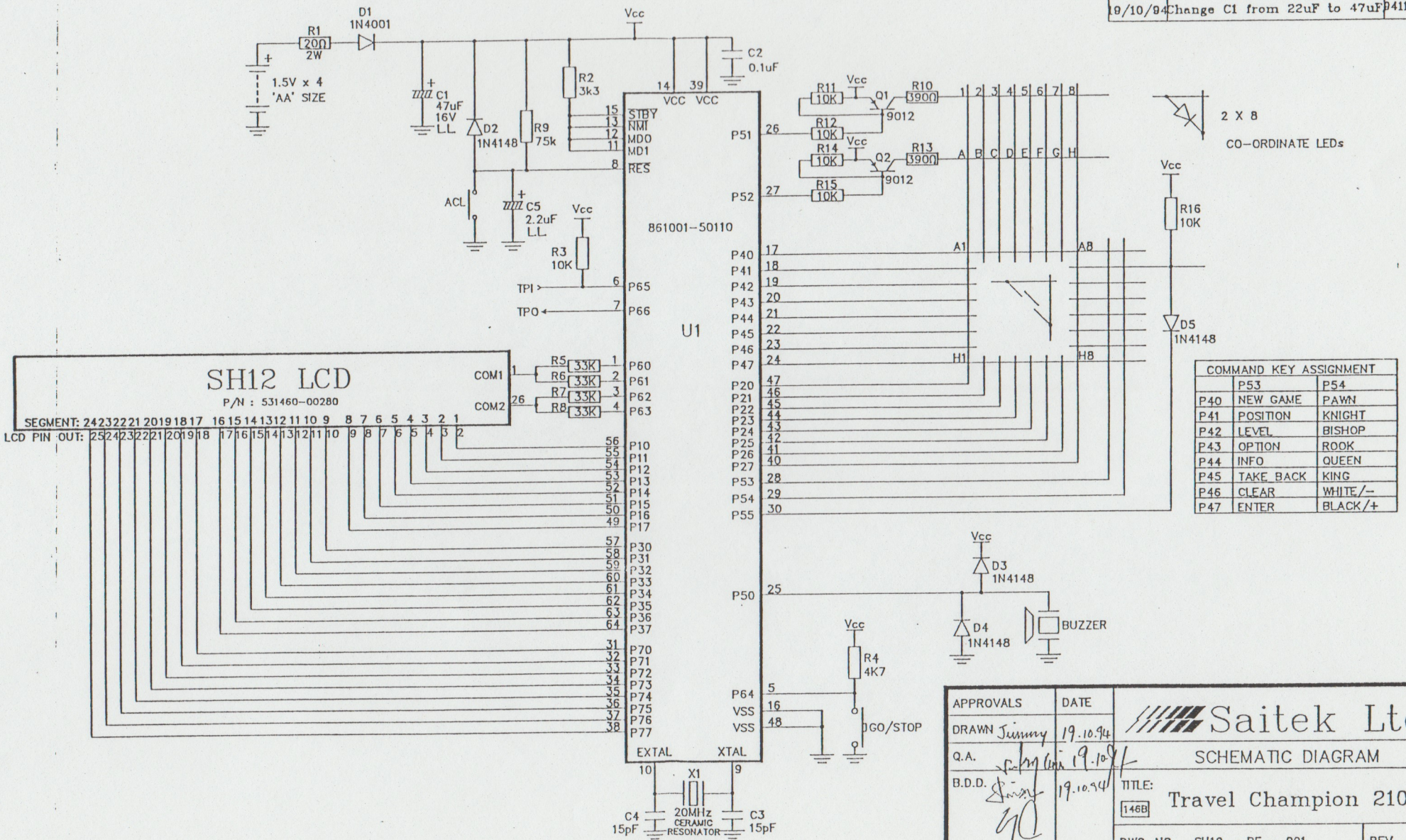
P/N.: 511468-01241

MATERIAL

FINISH

ORIGINAL

REVISION			
DATE	DESCRIPTION	ECN NO.	REV NO
19/10/94	Change C1 from 22uF to 47uF	94114	0.



COMMAND KEY ASSIGNMENT		
	P53	P54
P40	NEW GAME	PAWN
P41	POSITION	KNIGHT
P42	LEVEL	BISHOP
P43	OPTION	ROOK
P44	INFO	QUEEN
P45	TAKE BACK	KING
P46	CLEAR	WHITE/–
P47	ENTER	BLACK/+

APPROVALS	DATE
DRAWN Jimmy	19.10.94
Q.A.	19.10.94
B.D.D.	19.10.94

Saitek Ltd.

SCHEMATIC DIAGRAM

TITLE: Travel Champion 2100

146B

DWG. NO. SH19 – PE – 001

REV. 0.1

SAITEK

BILL OF MATERIALS

PROJECT : SH19 (TRAVEL CHAMPION 2100)

ART.NO. : 146B

REVISION : 3 FILENAME : \BDD#P02B\SH19

REVISION HISTORY

REVISION	DATE	BY	DESCRIPTION OF CHANGES
P1	14.03.94	ALBERT LEE	Preliminary BOM.
P2	27.05.94	C.N. LAU	Preliminary BOM. Update components in Guts assemblies and Casing assembly
P3	24.06.94	C.N. LAU	Preliminary BOM. Update sponge dimensions and chessmen color.
1	14.07.94	C.N. LAU	New release. Update logic + sensor PCB, sensor, "-" battery contact, washer and screw for front button.
2	13.09.94	C.N. LAU	Change per ECN 94093, 94095.
3	10.04.95	RICHARD LAW	Changes per ECN 95048. Update cost and label assembly format.

RELATED DOCUMENTS	REV
Schematic dwg : SH19-PE-001	0

Prepared by : RICHARD LAW

Approved by : BDM1

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

Date issue : 11 APR 1995

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

SAITEK LTD. REPORTS BILL OF MATERIAL Run : 10/04/95 13:44 Pag.
Prog: KPSPC/6B03

99146B - SH19, TRAVEL CHAMPION 2100 Rev : 3

Level	Item	Chg	Stock Code	Rev	Cons	Description	Qty Per	Reference
1			98146B-00000	1		UNIT ASSEMBLY,FOR SH19	1.000	
2			91146B-00001	1		GUTS ASSEMBLY-LOGIC	1.000	
3			92146B-00781	1		MODULE,PCB,LOGIC+SENSOR CONNECTION,SH19	1.000	
4	1		51146B-01311			PCB,LOGIC,S.S.,1.6MM,PAPER PHENOLIC,SH19	1.000	
4	2		51146B-03591			PCB,SENSOR,S.S,1.6MM,PAPER PHENOLIC,SH19	1.000	
3	3		861001-50110		RC	MICROPROCESSOR,SX19,64 PINS SDIP,10MHZ	1.000	U1
3	4		670290-12GB0		RC	TRANSISTOR,PNP,9012G,CENTRE B	2.000	Q1,Q2
3	5		660001-11003		RC	LED,RED,DOME,D=3MM,TOSHIBA,TLR124	16.000	LD1-8,A-H
3	6		654148-10000			DIODE,SWITCHING,1N4148	4.000	D2-D5
3	7		654001-20000			DIODE,RECTIFIER,1N4001	1.000	D1
3	8		612005-61102			RESISTOR,FIXED,C-FILM,20,5%,2W	1.000	R1
3	9		613325-31102			RESISTOR,FIXED C-FILM,3K3,5%,1/4W	1.000	R2
3	10		614725-31102			RESISTOR,FIXED C-FILM,4K7,5%,1/4W	1.000	R4
3	11		611035-31102			RESISTOR,FIXED C-FILM,10K,5%,1/4W	6.000	R3,11;12;14-16
3	12		613335-31102			RESISTOR,FIXED,C-FILM,33K,5%,1/4W	4.000	R5-R8
3	13		617535-31102			RESISTOR,FIXED C-FILM,75K,5%,1/4W	1.000	R9
3	14		613915-31102			RESISTOR,FIXED C-FILM,390,5%,1/4W	2.000	R10,R13
3	15		62226Z-01615			CAPACITOR,E-CAP,22UF,+80-20%,16V	1.000	C1
3	16		62225Z-01616			CAPACITOR,E-CAP,2.2UF,+80-20%,16V,L.L.	1.000	C5
3	17		62104M-01011			CAPACITOR,C-CAP,0.1UF,20%,10V	1.000	C2
3	18		62150J-05014			CAPACITOR,C-CAP,NPO,15PF,+/-5%,50V	2.000	C3,C4
3	19		642000-03250		RC	RESONATOR,20MHZ,50PPM	1.000	X1
3	20		000050-80155			JUMPER,L=8MM,LL=15MM,D=0.5MM	10.000	J1-4,27-31,34
3	21		000051-20155			JUMPER,L=12MM,LL=15MM,D=0.5MM	7.000	J5-11
3	22		000051-20155			JUMPER,L=12MM,LL=15MM,D=0.5MM	4.000	J14,16,18,32
3	23		000052-00155			JUMPER,L=20MM,LL=15MM,D=0.5MM	3.000	J12,13,17
3	24		000051-70155			JUMPER,L=17MM,LL=15MM,D=0.5MM	11.000	J15,19-26,33,35
3	25		000030-01330			CONN ARRAY,N=8,L=20MM,P=2.0MM,E=3.5MM	2.000	LOGIC TO SENSOR
			91146B-00004	1		GUTS ASSEMBLY-KEYBOARD	1.000	
3	26		51146B-01241			PCB,KEYBOARD,S.S.,1.6MM,PAPER PHENOLIC	1.000	
3	27		000051-20155			JUMPER,L=12MM,LL=15MM,D=0.5MM	2.000	J1,J2
3	28		000050-80155			JUMPER,L=8MM,LL=15MM,D=0.5MM	1.000	J3
3	29		000030-01340			CONN ARRAY,N=19,L=62MM,P=2.0MM,E=3.5MM	2.000	TO LOGIC PCB
2			96146B-00000	1		CASING ASSEMBLY,FOR SH19	1.000	
3	30		531460-00280		RC	LCD,FOR SH12	1.000	
3	31	—	250000-00535		RC	ZEBRA CONNECTOR,SG,38X2X6.4,P=0.18MM	2.000	
3	32		000090-00460			FOAM PAD,38.5X17.5X4MM,FOR SH19 LCD	1.000	FOR LCD
3	33		32146B-00610		RC	OVERLAY,0.48MM TH'K,LENS,S'SCREEN,SH19	1.000	
3	34		31146B-01101		RC	31146B-00900BOARD,OPEN,SH19	1.000	
3	35		31146B-00900		RC	SENSOR,SEPARATOR,SH19	1.000	
3	36		000080-00050			WASHER,FIBRE,ID=3MM,OD=8MM,T=0.8MM	1.000	FRONT BUTTON
3	37		22146B-01800		RC	METAL,METAL SHAFT,BRASS,NI-PLT	2.000	
3	38		22146B-02400		RC	METAL,FRONT BUTTON SPRING	1.000	
3	39		22146B-02500		RC	METAL,COMPRESSION SPRING HINGE	2.000	
3	40		22146B-02700		RC	METAL,E-RING	2.000	
3	41	*	29146B-01501		RC	FOAM FRICTION PAD,CHESSBOARD,SH19	1.000	(ECN 95048)
3	42	—	25146B-00710		RC	RUBBER,CONDUCTIVE KEYPAD,SH19	1.000	

99146B - SH19, TRAVEL CHAMPION 2100 Rev : 3

Level	Item	Chg	Stock Code	Rev	Cons	Description	Qty Per	Reference
3	43		250000-00150		RC	RUBBER ROD,48X2.9X2.8MM,COMPRESS KE951U	1.000	FOR SENSOR
3	44		222510-00500		RC	METAL,B-CONT,"+",PH.BRONZE,NI-PLT,ST3	1.000	
3	45		221468-04200		RC	METAL,B-CONT,"-",PH.BRONZE,NI-PLT,SH19	1.000	
3	46		000106-01205			SPONGE,60X12X5MM	1.000	FOR BATT. LID
3	47		000130-00270			BUZZER,D=27MM	1.000	
3	48		000010-00100			ACL,RESET CONTACT,D=10MM,CR STEEL	1.000	
3	49		000021-00100			RUBBER FOOT 3M,D6.5X1.6MM ADHESIVE	4.000	
3	50		000073-21434			SCREW,S/T,+PAN,M2.6X8MM,A	5.000	FOR CAB
3	51		000073-11424			SCREW,S/T,+BIND,M2.6X6MM	8.000	FOR KB PCB
3	52		000073-12414			SCREW,S/T,+BIND,M2.6X5MM,BT	5.000	FOR RETAINER
3	53		000073-21424			SCREW,S/T,+PAN,M2.6X6MM,A	4.000	FOR LOGIC PCB
3	54		000073-12414			SCREW,S/T,+BIND,M2.6X5MM,BT	3.000	FOR SENSOR PCB
3	55		000073-11014			SCREW,S/T,+BIND,M1.7X5MM,A	1.000	FRONT BUTTON
3	56		000060-15043			STRAND WIRE,BLACK,L=150MM,E=3.5MM,AWG28	1.000	BATT- TO -
3	57		000062-30043			STRAND WIRE,RED,L=300MM,E=3.5MM,AWG28	1.000	BATT+ TO +
3	58		000068-12043			STRAND WIRE,GREY,L=120MM,E=3.5MM,AWG28	2.000	BUZZ
3			951468-00000	1		CABINET SET,FOR SH19	1.000	
4	59	*/-	211468-00202		RC	PLASTIC,T-CAB,ABS,BLACK	1.000	(ECN 95048)
4	60	-	211468-00300		RC	PLASTIC,B-CAB,ABS,BLACK	1.000	
4	61	*/+	211468-04801		RC	PLASTIC,TOP COVER,22MM,ABS,BLACK	1.000	(ECN 95048)
4	62	-	211468-00500		RC	PLASTIC,BATTERY LID,ABS,BLACK	1.000	
4	63	*/-	211468-01601		RC	PLASTIC,FRONT BUTTON,ABS,BLACK	1.000	(ECN 95048)
4	64	-	211468-01700		RC	PLASTIC,END CAP,ABS,BLACK	2.000	
4	65	-	211468-00800		RC	PLASTIC,RETAINER,ABS,BLACK	1.000	
4	66		211468-04400		RC	PLASTIC,END CAP SEAL,ABS,BLACK	2.000	
1			941468-10000	1		PACKING ASSEMBLY,FOR SH19	1.000	
2	67		000123-30230			POLYBAG,330X230X0.045MM	1.000	FOR UNIT
2	68		000123-00200			POLYBAG,300X200X0.045MM	1.000	FOR MANUAL
2	69		360000-00230			LABEL,FOR SERIAL NO,ADHESIVE PAPER,SMALL	1.000	
2	70	*/+	451320-01300			INSERT,FOR SH23,PAPER	1.000	(ECN 95048)
2	71	*	45146B-03001			CARTON;10PCS/CTN,FOR SH19	.100	(ECN 95048)
2			241320-25400	1		CHESSMEN SET,SH23,20X2,257+258	1.000	(ECN 95048)
3	72	*/+	241320-25710		RC	CHESSMEN,SH23,20,L.GREY,PT#427C,S.PIN	1.000	
3	73	*/+	241320-25810		RC	CHESSMEN,SH23,20,D.GREY,PT#CG11C,S.PIN	1.000	
1			971468-00000	1		OPTIONS ASSEMBLY, SH19	1.000	
2	74		331468-02800		RC	RATING PLATE,FOR SH19,PVC,SWL	1.000	
2	75		411468-61000		RC	MANUAL,FOR SH19,E/F/G/D/I/S,SWL	1.000	
2	76	*/+	421468-61001		RC	GIFTBOX,FOR SH19,E/F/G/D/I/S,SWL	1.000	(ECN 95048)
2		*	370000-00000	1		LABEL ASSEMBLY	1.000	
3	77		370000-00103		RC	LABEL,COM#1,FOR SWL,ENGLISH,CE LABEL	.000	
3	78		370000-00410		RC	LABEL,COMMON,NO:4C,TRANSECOM,CHINA	.000	TRANSECOM
3	79		370000-00500		RC	LABEL,COMMON,NO:5,"MADE-IN CHINA",SCI	.000	SCI
3	80		370000-01001		RC	LABEL,COM#10,FOR OTTO GIFTBOX	.000	OTTO
3	81		370000-01100		RC	LABEL,COMMON,NO:11,FOR PLATETIME BOX	.000	PLATETIME
3	82		370000-01200		RC	LABEL,COMMON,NO:12,FOR SEARS,CAN	.000	SEARS
3	83		370000-01300		RC	LABEL,COMMON,NO:13,DICK SMITH ON BOX	.000	DICK SMITH

SAITEK LTD. REPORTS BILL OF MATERIAL Run : 10/04/95 13:44 Page
Prog: KPSPC/6B03

991468 - SH19, TRAVEL CHAMPION 2100 Rev : 3

Level	Item	Chg Stock Code	Rev	Cons	Description	Qty Per	Reference
3	84	370000-01620		RC	LABEL,COM#16,FOR SWL,GERMAN,CE LABEL	.000	REF. TO QA
3	85	370000-04001		RC	ADDEMDUM,COM#40,FOR GERMAN MANUAL,PAPER	.000	GERMAN
3	86	370000-05100		RC	STICKER,COM#51,CE LABEL,FOR NECKERMANN	.000	NECKERMANN
3	87	370000-07600		RC	STICKER,COM#78,GREEN POINT,GERMAN,20MM	.000	GERMAN
3	88	370000-08600		RC	ADDENDUM,COM#86,FOR ALL,RECYCLE,QUELLE	.000	QUELLE
3	89	430063-01000		RC	ADDENDUM,E,FOR SUKL SHIPMENT,HELP LINE	.000	SYSTEMA
3	90	370000-11201		RC	ADDENDUM,COM#112,DISTRIBUT.LIST,E,CHS&IG	.000	ENGLISH
3	91	370000-14100		RC	STICKER,COM#141,FOR L'WOODS CARTON,PAPER	.000	L'WOODS QTY=3
3	92	370000-17500		RC	STICKER,COM#175,TOY SYMBOL	.000	FOR NO TOY SYMB
3	93	370000-04900		RC	STICKER,COM#49,GREEN POINT,GERMAN LARGE	.000	
3	94	430048-01002		RC	CARD GUARANTEE, E, CONTEMPORARY GAMES	.000	CCC
3	95	430004-51000		RC	CARD,WARRANTY,E/G/F/D/S,SWL,CHESS	.000	CHESS PRODUCTS
3	96	430008-51000		RC	CARD,WARRANTY,E/G/F/D/S,SWL,NON CHESS	.000	NON-CHESS
3	97	430113-02000		RC	CARD,GUARANTEE,GERMAN,H&G	.000	GERMANY & AUST.
3	98	370000-09200		RC	CARD,COM#92,GUARANTEE,TRANSECOM	.000	TRANSECOM
3	99	430064-02000		RC	CARD,GUARANTEE,SCHNEIDER,G	.000	SCHNEIDER
3	100	430016-01005		RC	LEAFLET,CONSUMER,1994,ENGLISH,SWL	.000	ENG. COUNTRIES
3	101	430017-02006		RC	LEAFLET,CONSUMER,1994,GERMAN,SWL	.000	GERMANY
3	102	430021-01004		RC	LEAFLET,CONSUMER,1994,ENGLISH,DIXONS	.000	DIXONS
3	103	430026-01003		RC	CARD,ACCESSORY ORDER,E,SCI	.000	SCI
1	104	40AMC			ASSEMBLER MATERIAL CHARGE	[illegible]	
1	105	40ALC			ASSEMBLER LABOUR CHARGE	[illegible]	

Material Subtotal
Assembler Charge
Assembler Labour Charge
Non-consigned material Cost
Material Discrepancy Allowance

1.3 Pin Assignments and Functions

1.3.1 Pin Arrangement

Figure 1-2 shows the pin arrangement of the H8/325 Series in the DC-64S and DP-64S packages. Figure 1-3 shows the pin arrangement in the FP-64A package. Figure 1-4 shows the pin arrangement in the CP-68 package.

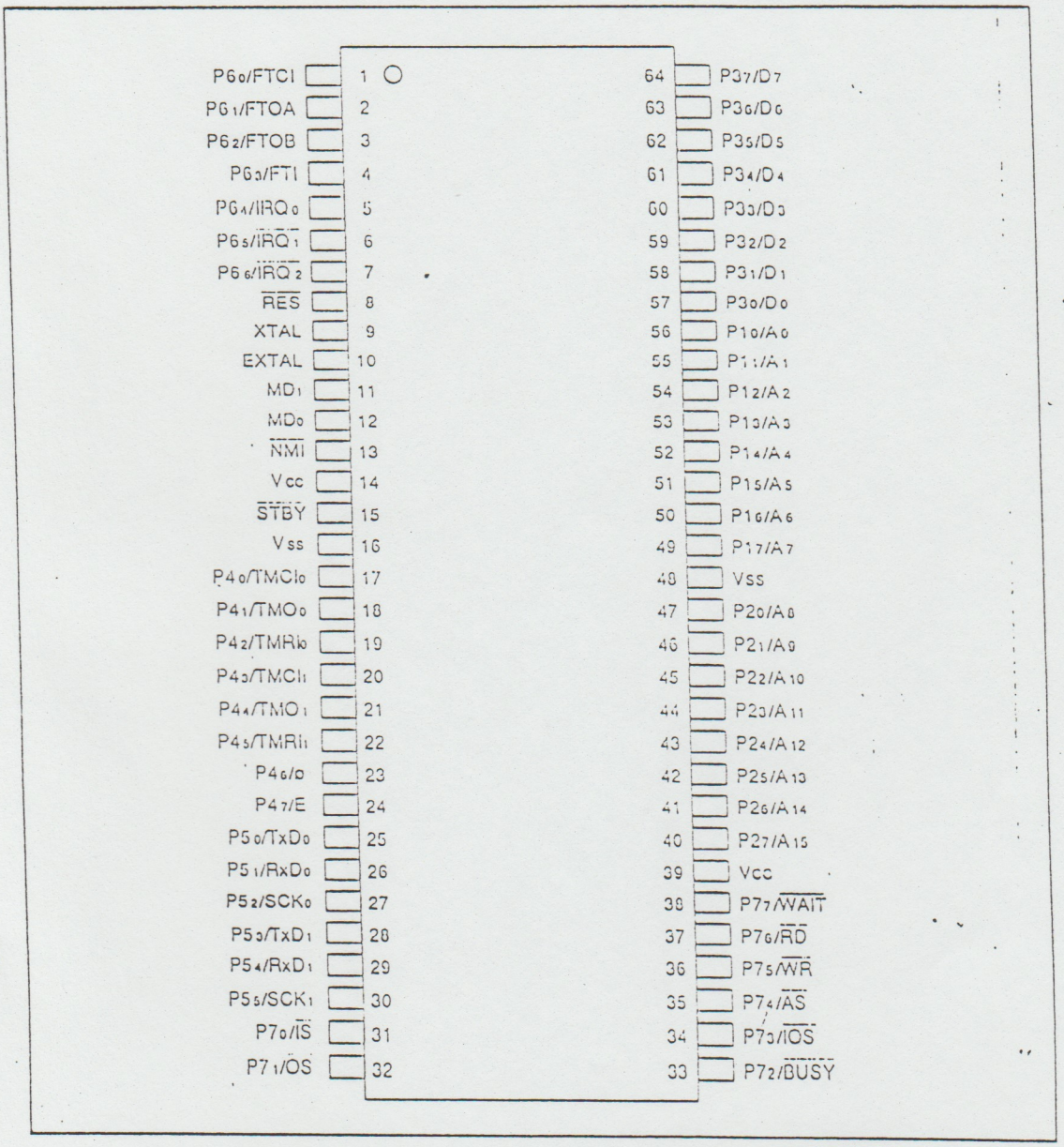


Figure 1-2. Pin Arrangement (DC-64S, DP-64S, Top View)

8. FUNCTIONAL TEST PROCEDURE FOR TRAVEL CHAMPION 2100

Purpose	Procedure	Observation
1. Power up	- Insert 4 AA size batteries into the battery compartment	- See Table 1 - New game sound is emitted after scanning of LEDs and LCD. - LCD shows 0:00:00
2. QC test mode	- Press ACL - Press and hold ENTER for one second while LCD and LEDs scanning as Table 1	- LCD shows tESt for a while. - LCD and LEDs scanning according to Table 1 repetitively.
	- Press ENTER	- LCD shows F: 10 and LEDs of square A6 is turned ON.
	- Press function key according to Table 2	- See Table 2

Purpose	Procedure	Observation
	- Press 64 chessboard in sequences	- A beep sound is emitted for each key pressed. - LCD shows CHS:-- where -- means the coordinates of the chessboard square pressed. - The corresponding square LEDs are turned on steadily.
3. Reset unit	- Press ACL	- Same as 1
4. Multimove	- Press OPTION	- LCD shows +Auto
	- Press ENTER	- LCD shows -Auto
	- Press CLEAR	- The white clock starts counting.
	- Press square F2, F4, E7, E5, G2, G4 in sequences	- Coordinate LEDs come on with a beep sound for each keypressed and LCD shows the corresponding move.
	- Press ENTER	- D8 LEDs are on and LCD shows d8-H4
	- Press D8	- H4 LEDs are on and LCD shows as above

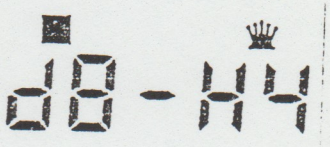
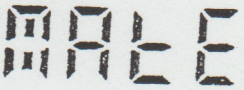
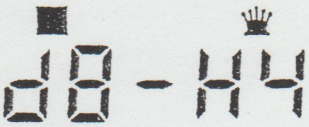
Purpose	Procedure	Observation
	- Press H4	- LCD shows  and  alternatively, then after a white, white clock is displayed on LCD
5. Check memory	- Press GO/STOP	- All LEDs come off - LCD blank
	- Press NEWGAME twice	- No response
	- Press GO/STOP	- White clock counting up
	- Press TAKEBACK	- H4 LEDs are on - LCD shows 
	- Press H4	- D8 LEDs are on and LCD shows as above
	- Press D8	- Black clock stop counting
6. Test finished	- Remove batteries from battery compartment	- All LEDs and LCD segment are OFF.

Table 1

Sequences	LCD shows	Column LEDs ON
1		A1
2		B2
3		C3
4		D4
5		E5
6		F6
7		G7
8		H8

Table 2

Function Key Pressed	LEDs turned on
♔	A1
♕	B1
♖	C1
♗	D1
♘	E1
♙	F1
NEWGAME	A2
OPTION	B2
INFO	C2
POSITION	D2
WHITE	E2
BLACK	F2
TAKEBACK	A3
CLEAR	B3
LEVEL	C3
ENTER	D3

Note:
1. LCD is blanked during function key test.
2. A beep sound is emitted for each keypressed.