

NOVAG INDUSTRIES LIMITED
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CONSTELLATION JR (ART NO. 852)

SERVICE MANUAL

C O N T E N T S

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2. Circuit Diagram
3. Component Location Diagram
 - a) PCB - Logic
 - b) LED & Switch
4. Parts List
5. Specification

CIRCUIT DESCRIPTION

852

Power supply:

Power transistor Q1 provides a DC 5v +/- 5% voltage to the CPU and the LED drivers Q2 to Q4 as well. To save power consumption, the R1 only gives a low biasing current to the Zener Diode D5 to generate a 5.6v reference voltage. D4 protects the Q1 and D4 while the battery is reverse polarity inserted.

Memory save:

Only operated with battery or adaptor installed. When the unit turned off, the NMI, RES and STBY of the CPU HD6301V1 are tied to ground and the biasing current of D5 is then driven from R2 which is much smaller than normal. The CPU still powered with a 5v DC but the total current consumption is restricted to 10uA.

Clock Generator:

The L1, C6 and C7 formed a tune circuit for the internal oscillator of the CPU to generate a lower than 4.0 mhz clock frequency. Duty cycle should be about 50/50.

Power-on-reset:

The R4 and C4 electrolytic capacitor keeps the CPU pin 4 at lower level, 0v, for approximate mSec until it charged up to 2.5V

Sound generator:

The transducer speaker driven directly from the output port P22 (pin 10) of CPU, the diode D2, D3 protect this port from high voltage spike created by acoustic feedback.

Chess and Keyboard:

1. electronics

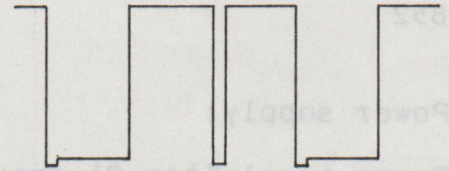
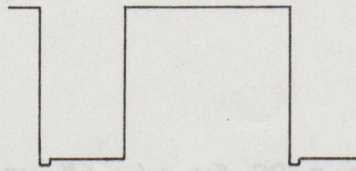
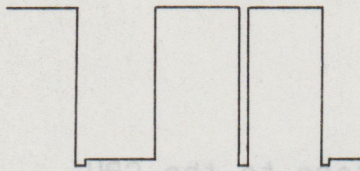
Many returned machines with so called keyboard problem are actually not caused by the membrane keyboard itself. The malfunction of the I/O ports of the CPU could also create the same problem. In order to save the repairing time, please go through all related points before replacing the keyboard sensor sheet. Here is an example:

After pressing the E2 square, the "E", "2" and "White" LEDs should light, will get the following diagrams from CPU.

pin17 P14

pin14 P11

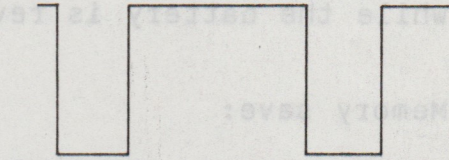
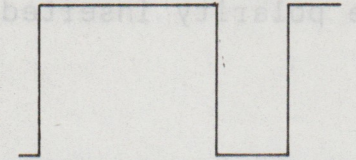
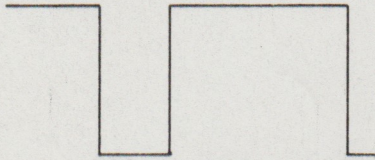
pin13 P10



pin31 P36

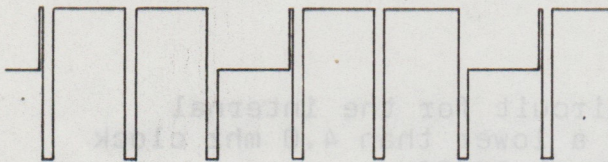
pin30 P37

pin32 P35



Holding down the "E2":

pin26 P43



If a row, column or even a certain square is out of order, before replacing a new keyboard one should check all relevant I/Os of the CPU are working correctly or not.

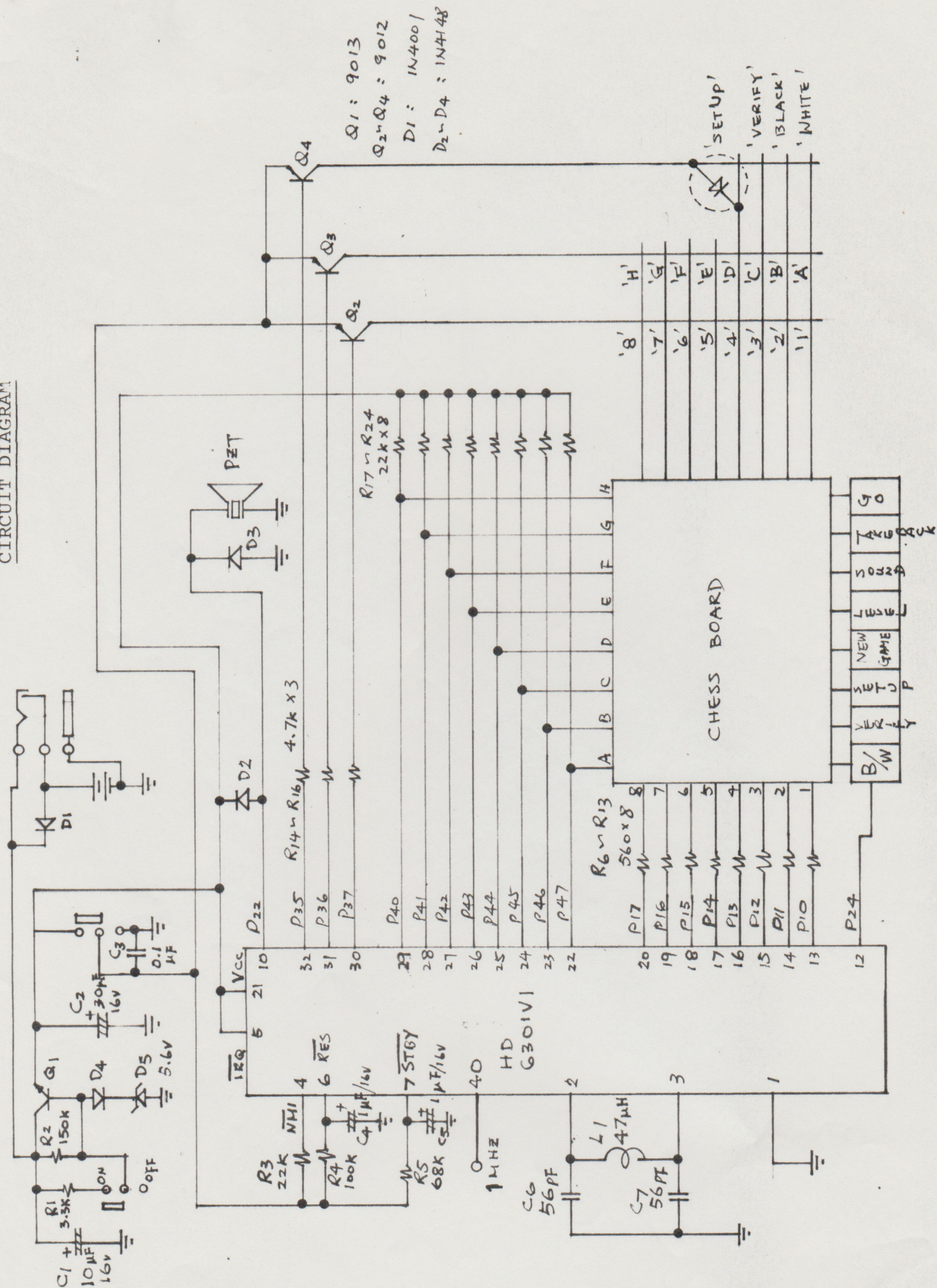
2. silver ink trace broken:

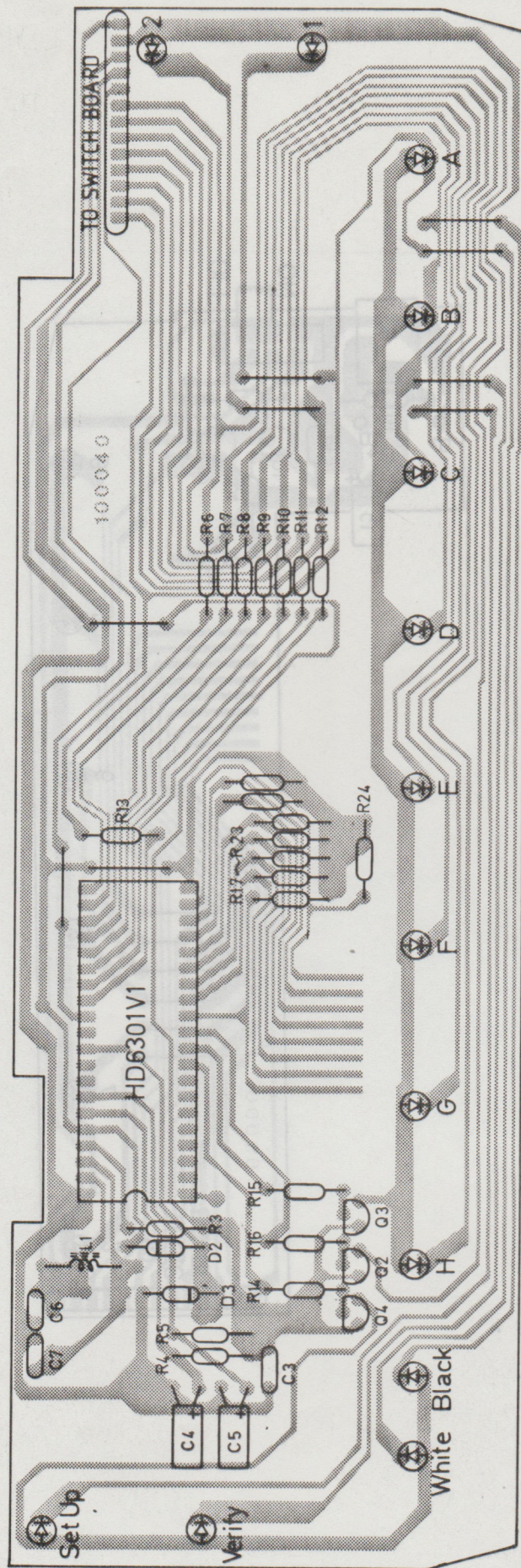
This usually happens at the tongue which can be easily repaired by reprinting the silver ink onto the wounded part instead of replacing it with a new keyboard. However, you have to wait for about half an hour after dry-off and protect it by covering with a piece of scotch tape. The "dry-off" process can be speeded up by some kind of heater such as a hair blower etc.

3. a square is too sensitive or shorted

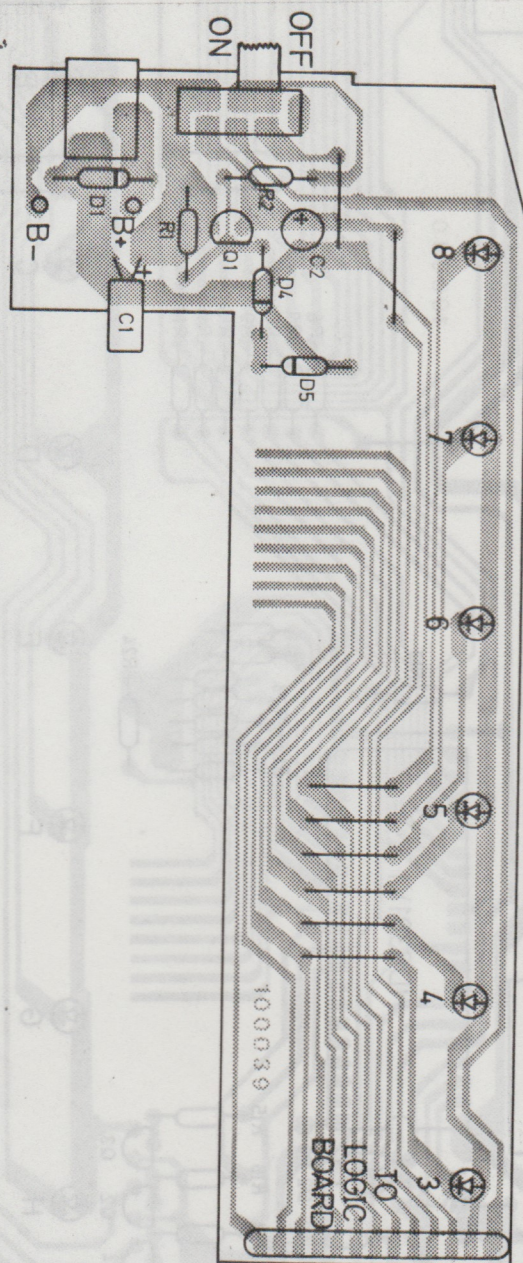
This can be caused by air bubbles or foreign material lodged between the spacer and mylar sheet of the keyboard. To solve this problem, firstly remove the overlay very carefully so that it can be reused at the latter stage. Then remove the foreign material from the middle layer and punch through the transparent area of each key pattern (be very careful not to destroy the silver ink trace!) with the help of a pin or a needle to free the airflow. All keyboards have already been punched through the mylar for the above purpose in later production.

CIRCUIT DIAGRAM





a) PCB - LOGIC (d)



b) LED & SWITCH

BILL OF MATERIALS

MODEL : 852 CONSTALLATION JR

A) ASSEMBLY : MAIN PCB

ITEM	NVG P/N	DESCRIPTION	QTY	UNIT PRC (US\$)
1	010013	CPU HD6301V1	1	10.40
2	050008	3MM LED (RED)	17	0.10
3	050009	3MM LED (GREEN)	3	0.10
4	100039	PCB - LED & SWITCH	1	0.80
5	100040	SINGLE SIDE PCB - LOGIC	1	1.20
6	130010	2P2T SLIDE SWITCH	1	0.10
7	350007	FEMALE TYPE PHONE JACK 5.5MM OD x 2.0MM ID	1	0.15
8	410021	SILICON RUBBER FOR K/B	2	0.05
9	530087	METAL CLAMP - FOR K/B	2	0.05
10	200001	27MM TRANSDUCER	1	0.16
11		INDUCTANCE COIL 47UH	1	0.10
12		NPN G.P. TRANS. ED1702N or EQV	1	0.10
13		PNP G.P. TRANS. ED1802N or EQV	3	0.10
14		SWITCHING DIODE 1N4148 or EQV	3	0.02
15		RECTIFIER DIODE 1N4001 or EQV	1	0.02
16		ZENER DIODE 5.6V 5%	1	0.10
17		12MM JUMPER	17	0.01
18		56pF 25V CERAMIC CAP.	2	0.01
19		0.1UF 16V CERAMIC CAP	1	0.05
20		1UF 16V ELECTROLYTIC CAP.	2	0.05
21		10UF 16V ELECTROLYTIC CAP.	1	0.05
22		33UF 16V ELECTROLYTIC CAP.	1	0.05
23		5% 1/4W RES. 560 OHM	8	0.001
24		5% 1/4W RES. 3.3 KOHM	1	0.001

MODEL : 852 CONSTALLATION JR

A) ASSEMBLY : MAIN PCB

ITEM	NVG P/N	DESCRIPTION	QTY	UNIT	PRC (US\$)
25		5% 1/4W RES. 4.7 KOHM	3		0.001
26		5% 1/4W RES. 22 KOHM	9		0.001
27		5% 1/4W RES. 150 KOHM	1		0.001
28		5% 1/4W RES. 68 KOHM	1		0.001
29		5% 1/4W RES. 100 KOHM	1		0.001

B) ASSEMBLY : HOUSING

1	110011	8 X 9 KEYBOARD	1		6.00
2	530085	BATTERY PLATE (+)	6		0.05
3	530086	BATTERY SPRING (-)	3		0.05
4	530088	METAL INLAY	1		0.40
5	600135	TOP HOUSING	1		1.50
6	600136	BOTTOM HOUSING	1		1.20
7	600137	BATTERY DOOR	1		0.80
8	800013	OVERLAY	1		3.20
9		RUBBER FEET	4		0.04
10		WOODGRAIN STRIP	1		0.12
11		SCREW	UD		0.01
12		STRANDED WIRE	4		0.02
13		BATTERY FOAM PAD 58 x 28 x 3	1		0.04
14		BATTERY FOAM PAD 35 x 28 x 3	1		0.04

C) ASSEMBLY : PACKING

<u>ITEM</u>	<u>NVG P/N</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>UNIT</u>	<u>PRC (US\$)</u>
1	600043	CHESS SET (MAGNETIC) - BLACK	1]	
2	600095	CHESS SET (MAGNETIC) - WHITE	1]	3.00
3	960058	Brief Instruction Sheet	1		0.04
4	970096	INSTRUCTION MANUAL	1		0.40
5	980001	WARRANTY CARD	1		0.10
6	990070	GIFT BOX	1		0.80
7		POLYBAG (FOR UNIT)	1		0.08
8		RATING LABEL W/SERIAL NO.	1		0.10
9		BUBBLE PACK	1		0.15
10		CARTON SLEEVE	1		0.08
11		CARTON - EXPORT	1/10		1.50
12		SLEEVE	2		0.08

HD6301V1, HD63A01V1, HD63B01V1

CMOS MCU (Microcomputer Unit)

The HD6301V1 is an 8-bit CMOS single-chip microcomputer unit, Object Code compatible with the HD6801. 4kB ROM, 128 bytes RAM, Serial Communication Interface (SCI), parallel I/O ports and multi function timer are incorporated in the HD6301V1. It is bus compatible with HMCS6800. Execution time of key instructions are improved and several new instructions are added to increase system throughput. The HD6301V1 can be expanded up to 65k words. Like the HMCS6800 family, I/O level is TTL compatible with +5.0V single power supply. As HD6301V1 is fabricated by the advanced CMOS process technology, power dissipation is extremely reduced. In addition to that, HD6301V1 has Sleep Mode and Standby Mode at lower power dissipation mode. Therefore flexible low power consumption application is possible.

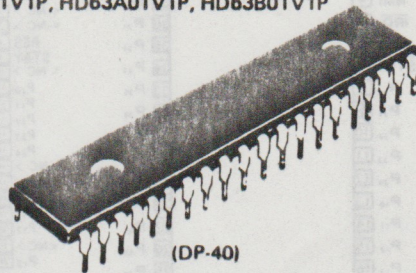
FEATURES

- Object Code Upward Compatible with HD6801 Family
- Abundant On-Chip Functions Compatible with HD6801V0:
4kB ROM, 128 Bytes RAM, 29 Parallel I/O Lines, 2 Lines of Data Strobe, 16-bit Timer, Serial Communication Interface
- Low Power Consumption Mode: Sleep Mode, Standby Mode
- Minimum Instruction Execution Time
 $1\mu s$ ($f=1\text{MHz}$), $0.67\mu s$ ($f=1.5\text{MHz}$), $0.5\mu s$ ($f=2\text{MHz}$)
- Bit Manipulation, Bit Test Instruction
- Protection from System Upset: Address Trap, On-Code Trap
- Up to 65k Words Address Space
- Wide Operation Range
 $V_{CC}=3$ to 6V ($f=0.1\sim 0.5\text{MHz}$),
 $f=0.1$ to 2.0MHz ($V_{CC}=5\text{V}\pm 10\%$)

TYPE OF PRODUCTS

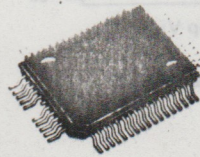
Type No.	Bus Timing
HD6301V1	1 MHz
HD63A01V1	1.5 MHz
HD63B01V1	2 MHz

HD6301V1P, HD63A01V1P, HD63B01V1P



(DP-40)

HD6301V1F, HD63A01V1F, HD63B01V1F



(FP-54)

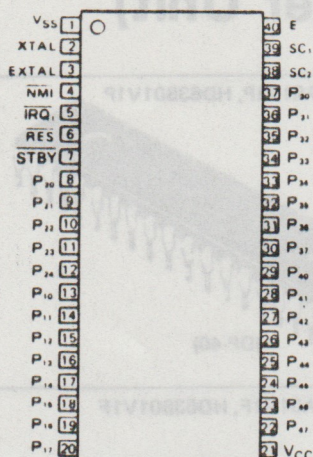
HD6301V1CG, HD63A01V1CG, HD63B01V1CG



(CG-40)

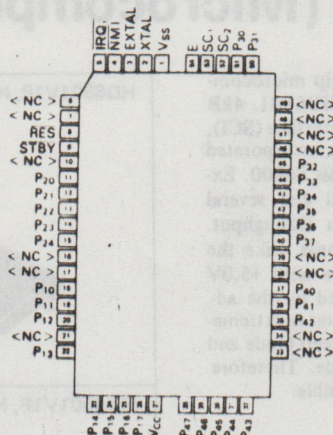
■ PIN ARRANGEMENT

● HD6301V1P, HD63A01V1P,
HD63B01V1P



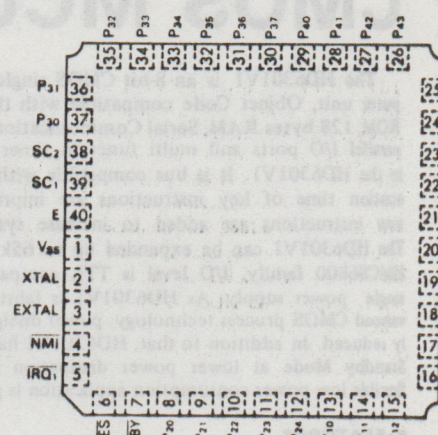
(Top View)

● HD6301V1F, HD63A01V1F,
HD63B01V1F



(Top View)

● HD6301V1CG, HD63A01V1CG, HD63B01V1CG



(Top View)

■ BLOCK DIAGRAM

