

CIRCUIT DESCRIPTIONS

CPU IC1

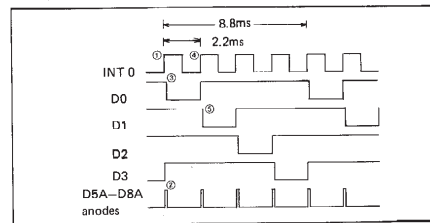
HD44790A44 is a 2K word by 4 bit one chip CMOS microcomputer equipped with internal LCD drivers.



SWITCH MATRIX (See Fig. below)

- The CPU enters external interrupt routine on a rising edge of INT CLK from IC2a, which also serves as a part of CY Sound Generator, and reads in TEMPO CLK and key switches through ports D0-D3 and through R00-R03.
- In reading the above, the CPU first turns ports D0-D3 "H", cutting off D5A-D8A, D5B-D8B and D1B-D4B, disconnecting the diodes from IC3 NAND gates and the ports R00-R03. With an H being applied on one input pin, each gate of IC3 will turn its output to "L" when the other input pin is H (closing of STOP, START or BANK, or during H period of TEMPO CLK). Ports R00-R03 are pulled up internally and go low when their mate IC3 outputs turn to L.
- Next, the CPU IC1 sets port D0 to "L" which pulls one inputs of IC3 down to low, turning all IC3 outputs to "H", reverse biasing D1A-D4A which in turn isolate IC3 from the read-in ports. Each of ports R00-R03 can be connected to port D0 through closed contacts (of CH, OH, SD or BD) and through DBB. Then the program returns to the main routine.
- On the next rising edge of INT CLK, the program enters interrupt routine again and gates IC3.
- Having reading IC3 outputs, this time the program sets D1 to L and reads SHIFT, CP, CY and AC switches through R0 ports.

The CPU repeats the same procedure for the remaining D ports and returns to ①, cycling TEMPO CLK, STOP, START and BANK readings at 2.2ms intervals, and other switch groups at 8.8ms intervals.

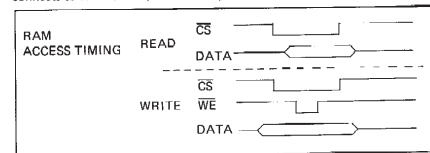


CPU HD44790A-44 PIN FUNCTIONS

Symbol	Name	Description
R00 R01 R02 R03	Input Port	Read in Key switches and TEMPO CLOCK.
R10 R11 R12 R13	I/O Port	External Memory Data Bus (Rhythm patterns A/B, Songs I/II)
R20 R21 R22 R23		External Memory Address Bus
R30 R31 R32 R33		P20-P23: Used as OUTPUT Port.
D0 D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15		Discrete I/O terminals
CH OH SD BD AC CY CPI CPI]		Output Trigger pulse to VOICES.
INT 0 INT 1	Interrupt Inputs	Interrupt Input for Switch Scanning OPEN-pulled up internally
RESET	Reset Input	Accepts 400ms-width pulse on Power-up.
HLT	Halt Input	When "low", the CPU retains all internal circuit status as they are.
TEST	Test Input	No customer usable terminal.
V1 V2 V3	LCD DC Supply Inputs	Used as LCD driver signals.
Vcc	DC Supply Input	+5V (±10%) also used as LCD DC supply
GND	Ground Input	GND
SEG 1 SEG 32	SEGMENT Outputs	Output LCD drive signals
COM 1 COM 4	Common Outputs	Output LCD drive signals in 1/4 duty, 1/3 bias.

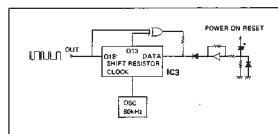
MEMORY BACKUP

IC2 μ PD444C is a 1K-word by 4 bits static RAM. It is used in DR-110 for storing BANKS A/B, SONGS I/II and STEPS 12/16 data. (BANKS C/D containing factory set rhythms are stored into CPU's internal ROM.) The RAM memory is backed up by built-in battery which bypasses power switch and connects to RAM's VCC, WE and CS pins.



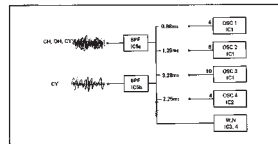
During the power OFF HLT pin of IC1 CPU is kept L, maintaining all its input and output pins high impedance, isolating its circuits from peripheral circuits and thus retains all the data so far obtained. When the CPU is re-powered, it initializes internal circuits but still keeps some data intact.

NOTE: Intermittent DC supply (such as loose AC adaptor or battery connection or quick turning OFF-ON of the power switch) may upset Power-ON Reset when a transient of DC voltage is shorter than the time constant of RESET circuit. The resultant will be loss of noise sound.



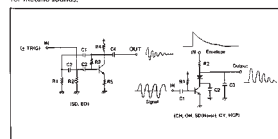
CY SOUND GENERATOR

Four generators oscillate at different frequencies which are determined based on analyses of live symbol sounds. Interrelations between frequencies are so critical that slight deviation of one frequency can cause best sound or distortion. To let the generators stay in a specific frequency, C1, C4, C12 and C13 should be less than 5% of tolerance.

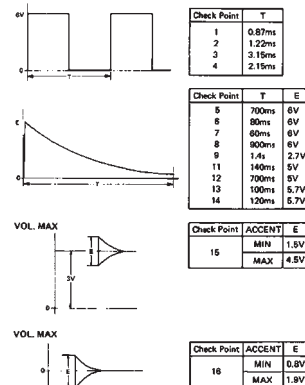


VOICE GENERATORS

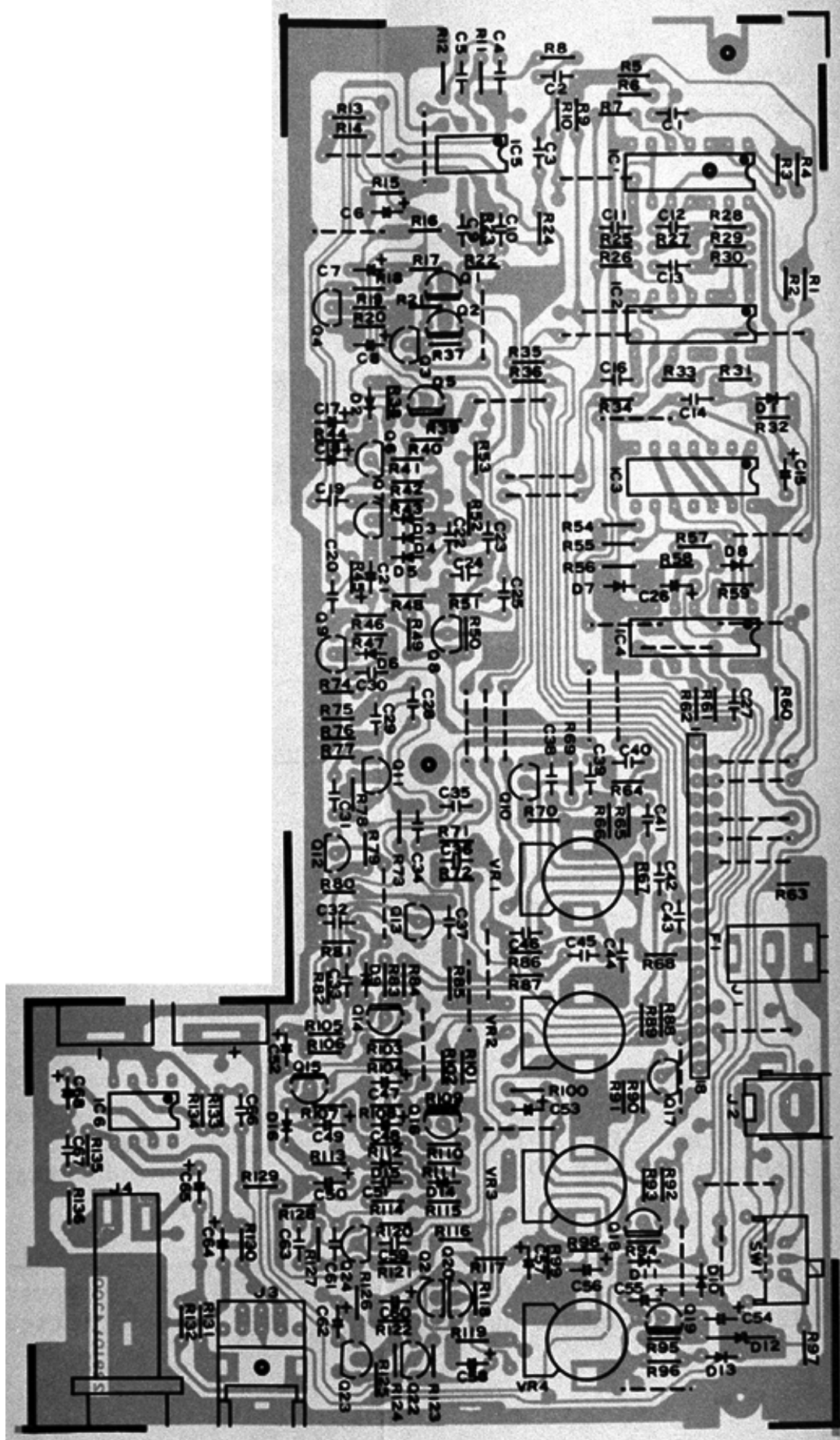
The voice generators are categorized into two groups: Damping oscillator for drum sound and a combination of Sine type VCA and Envelope generator for metallic sounds.



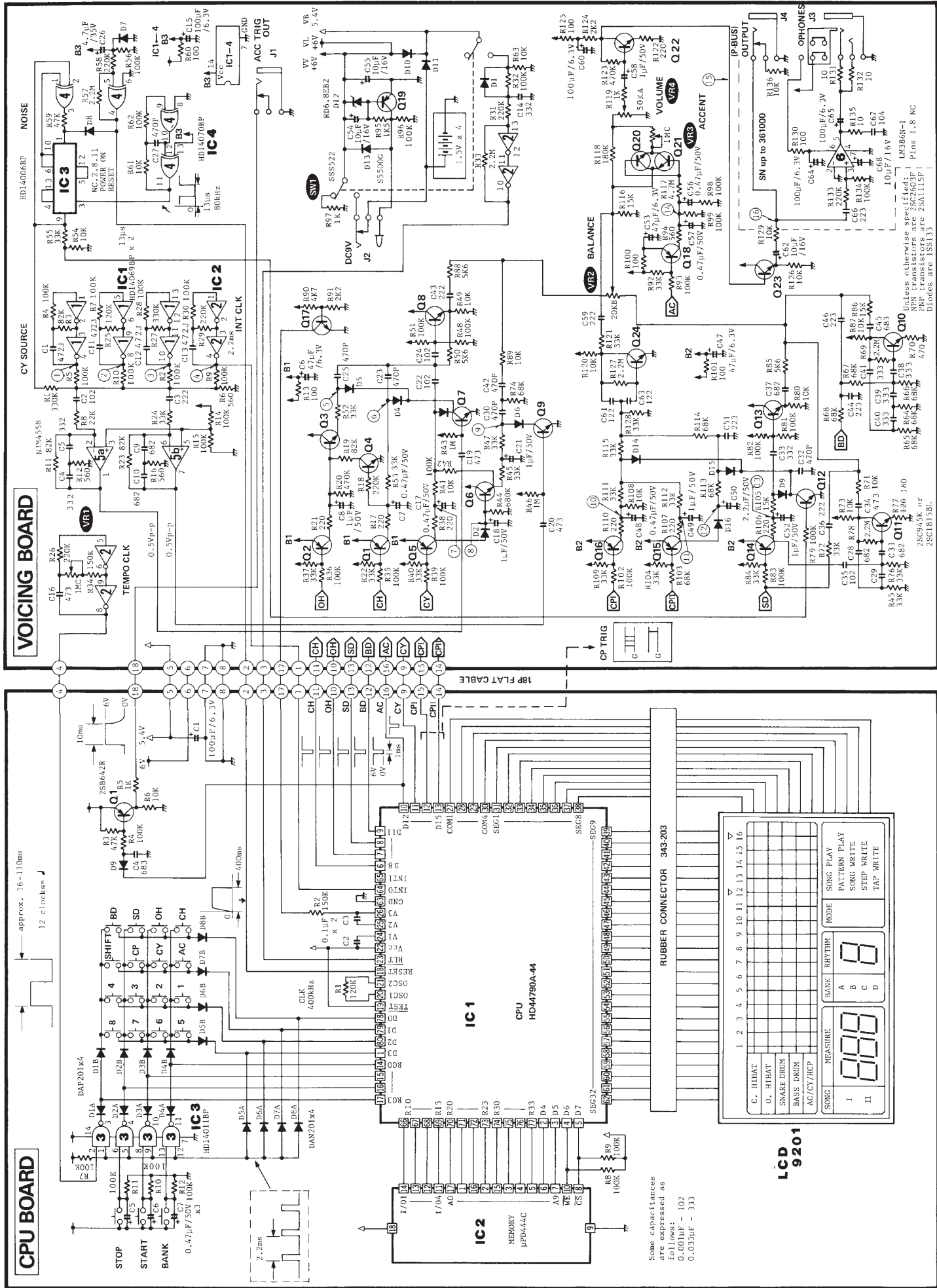
WAVEFORMS



7313204006
(pcb 2291084300)
SN up to 361000



DR 110 CIRCUIT DIAGRAM



C. HIBAT
O. HIBAT
SNARE DRUM
BASS DRUM
AC/CY/HCP

SONG MEASURE		BANK		RHYTHM		MODE		SONG PLAY	
I	II	A	B	C	D	1	2	3	4
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

SONG PLAY
PATTERN PLAY
SONG WRITE
STEP WRITE
TAP WRITE

LCD 9201

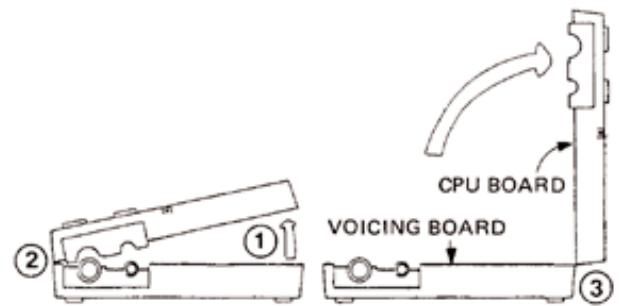
Some capacitance values are expressed as follows:
 0.001uF - 102
 0.033uF - 333

Unless otherwise specified:
 NPN transistors are 2SC2603F Pins 1-8 NC
 PNP transistors are 2SA1115F
 Diodes are 1S8193

DISASSEMBLY

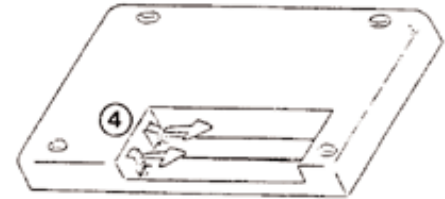
Exposing PCBs

1. Remove 4 rotary knobs.
2. Remove 3 x 12mm P type screws on Bottom case.
3. Open Top case, first at the rear end ①, gently push rearwards (unlock), then open at the front end ②. Insert a cloth between panels to protect the rear surface of top panel from scratching. This allows troubleshooting for both PCBs while maintaining the unit operative from built-in drycells.



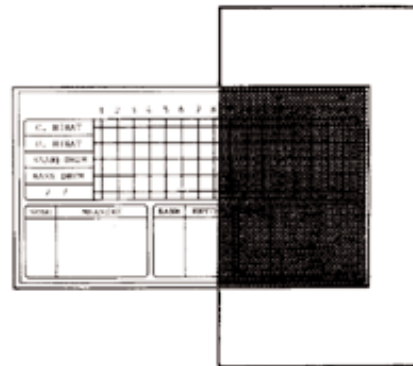
Dismounting VOICING Board

1. Remove Battery compartment cover and remove the dry cells.
2. Unlatching Battery clips ④, raise Bottom case.



LCD ASSEMBLY

Avoid unnecessary service to LCD Ass'y,
When reassembling, make sure that the face (not rear) of Rear Polarizer touches LCD.
The correct layer makes display dark when the LCD and polarizer are placed crosswise.



Cushion (2226033600)

REAR POLARIZER (12029826)

RUBBER CONNECTOR (13439237)

LCD 9201 (15029411)

RUBBER SWITCH SHEET (12479715)

TOP CASE (2201062900)

