

SERVICE MANUAL

SCHEMATIC DIAGRAMS

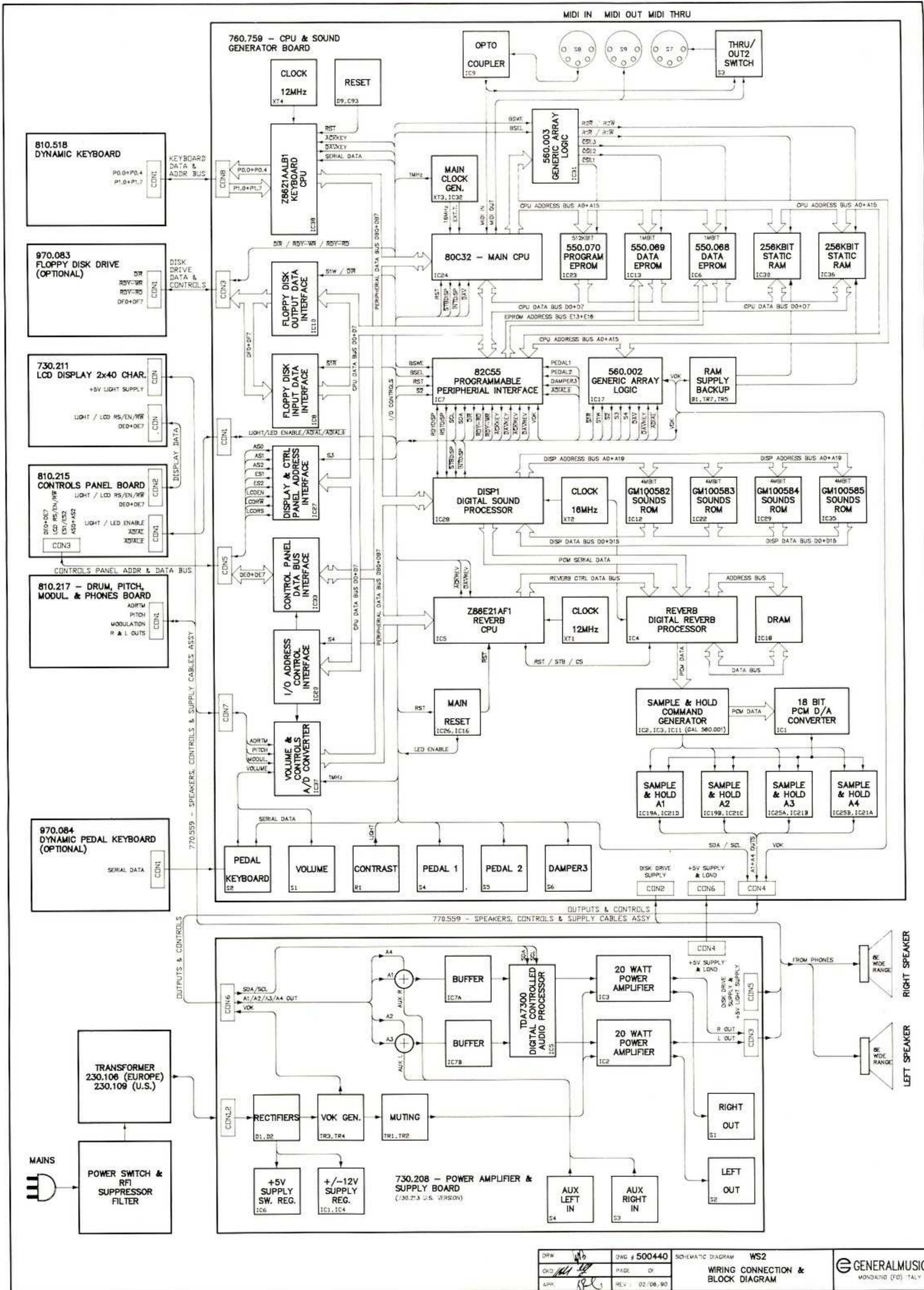
The logo consists of the letters 'W', 'S', and 'E' in a bold, stylized font. The 'W' is solid black with a white vertical stripe on its left side. The 'S' is solid black. The 'E' is outlined in black with a white fill. The letters are positioned horizontally and slightly overlap.

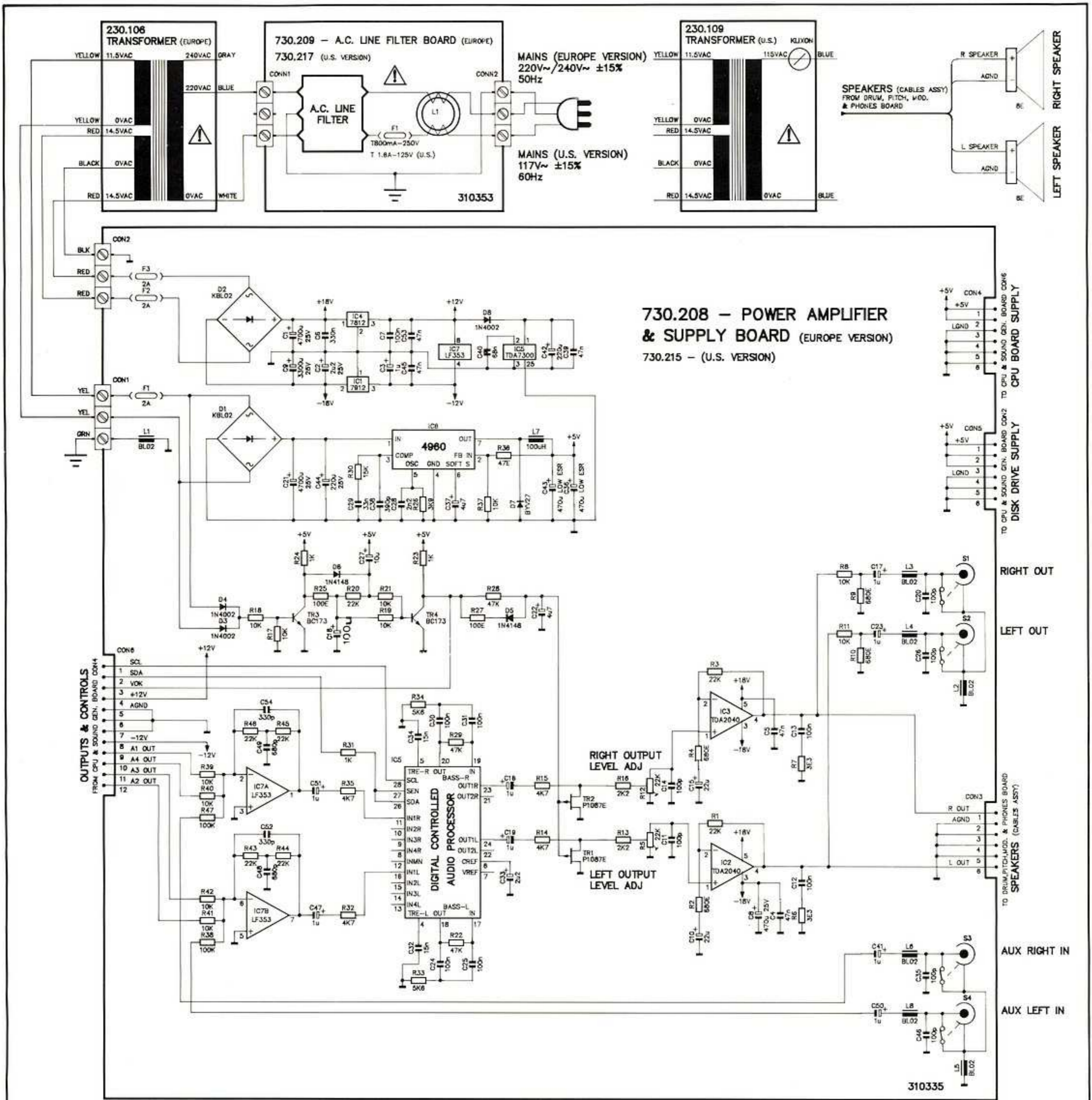
KEYBOARD WORKSTATION

scanned & processed by www.deepsonic.ch - 23.03.2012

 GENERALMUSIC

The logo features a stylized symbol on the left, which is a circle containing a horizontal line and a vertical line that meets the circle at the top and bottom, resembling a musical note or a specific brand mark.





ADJUSTMENT TABLE ⚠

| N. | ADJUSTMENT TYPE | TEST POINT | REG. "ON" | KEY PRESSED | OPERATION POINT | READING VALUES | NOTE |
|----|--------------------|-------------|-----------|-------------|---------------------|----------------|--|
| 1 | DAC MSB ADJ | R3 SIDE IC3 | GLOBAL 63 | C3 | R7 CPU & S.G. BOARD | SEE NOTE | SET THE OSCILLOSCOPE IN D.C. POSITION AT 20mV/DIV. 0.5ms/DIV., ACTIVE THE NOTE KEY WITH THE LOWEST PRESSURE AND TURN THE TRIMMER UNTIL TO HAVE SINUSOIDAL WAVE WITHOUT DISTORTION. |
| 2 | RIGHT OUTPUT LEVEL | R3 SIDE IC3 | GLOBAL 63 | C3 | R12 AMPLIFIER BOARD | 3vpp | SET THE OSCILLOSCOPE IN D.C. POSITION AT 0.5V/DIV. 5ms/DIV., ACTIVE THE NOTE KEY WITH THE HIGHEST PRESSURE, TURN THE TRIMMER UNTIL TO HAVE EXACTLY OUTPUT VOLTAGE. |
| 3 | LEFT OUTPUT LEVEL | R1 SIDE IC2 | GLOBAL 63 | C3 | R5 AMPLIFIER BOARD | 3vpp | SET THE OSCILLOSCOPE IN D.C. POSITION AT 0.5V/DIV. 5ms/DIV., ACTIVE THE NOTE KEY WITH THE HIGHEST PRESSURE, TURN THE TRIMMER UNTIL TO HAVE EXACTLY OUTPUT VOLTAGE. |

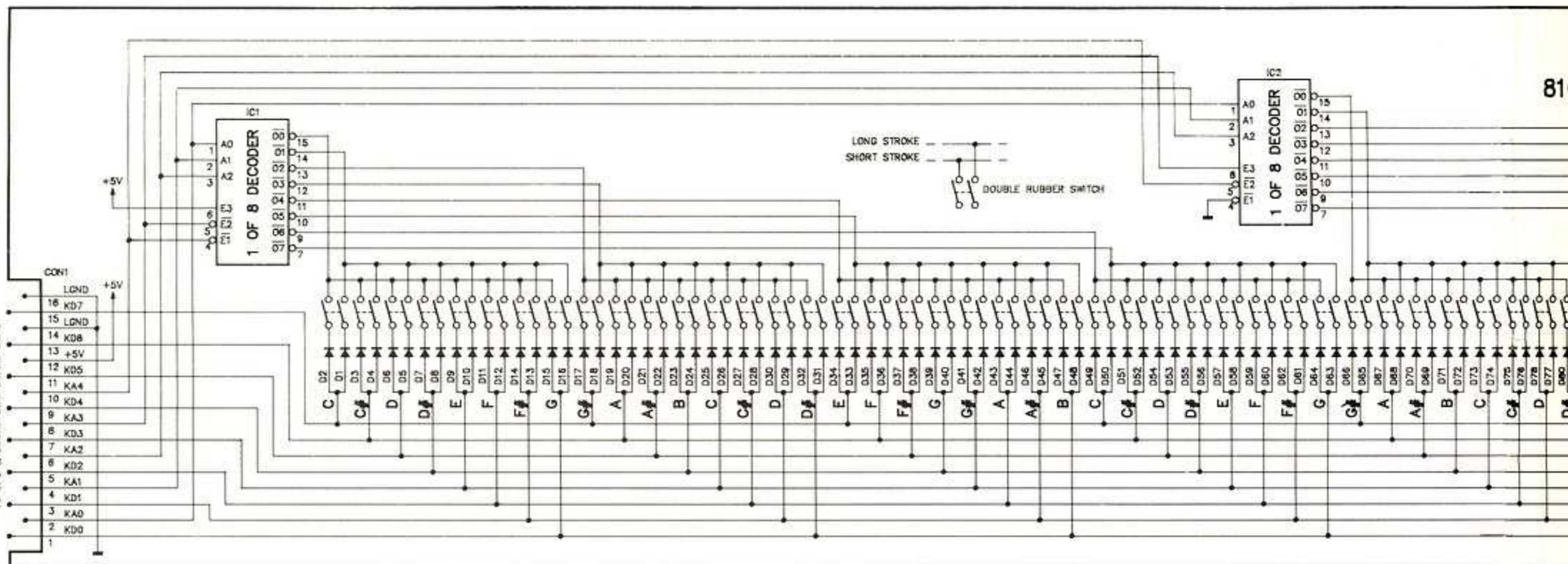
SCHEMATIC NOTES

- ALL NPN TRANSISTORS ARE BC173 (CODE 090182) UNLESS OTHERWISE SPECIFIED.
 - ALL PNP TRANSISTORS ARE BC307 (CODE 090192) UNLESS OTHERWISE SPECIFIED.
 - ALL DIODES ARE 1N4148 OR EQUIVALENT (CODE 080103) UNLESS OTHERWISE SPECIFIED.
 - ALL ELECTROLYTIC CAPACITORS ARE 16VDC RATED VOLTAGE UNLESS OTHERWISE SPECIFIED.
 - ALL RESISTORS 1/4W UNLESS OTHERWISE SPECIFIED.
 - ALL SWITCHES SHOW " OFF " POSITION.
 - ALL D.C. VOLTAGES MEASURED TO GROUND WITH A VOLTMETER 20,000Ω/V.
- ↑ SUPPLY VOLTAGE ● MALE CONNECTOR
 ↓ SUPPLY GROUND ○ FEMALE CONNECTOR
 > SOLDERING POINT • CONNECTING POINT

NOTICE ⚠

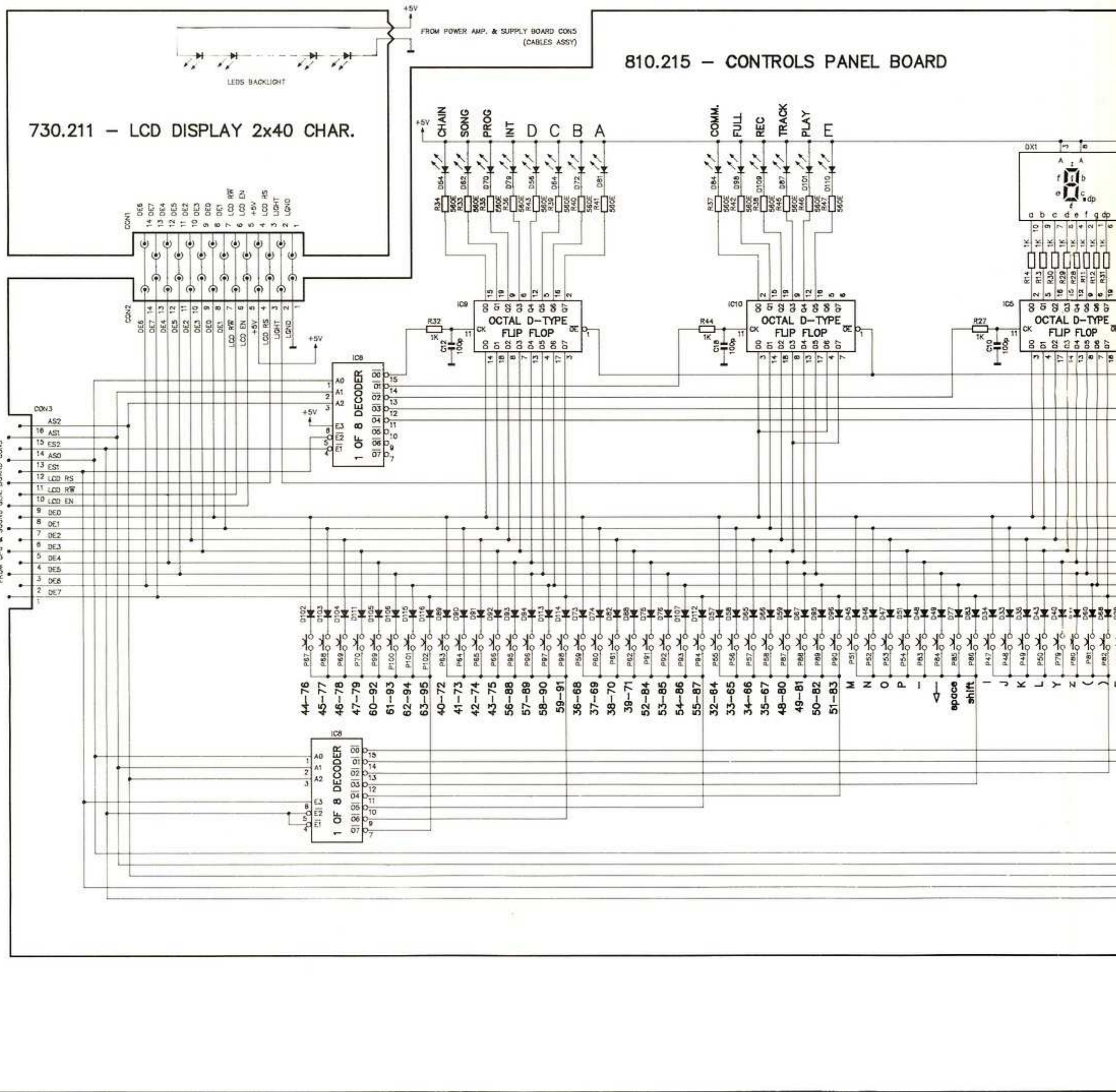
- SERVICE MUST BE CARRIED OUT BY QUALIFIED OPERATORS; ANY TAMPERING DONE BY UNQUALIFIED OPERATORS DURING THE GUARANTEE PERIOD WILL FORFEIT THE RIGHT TO GUARANTEE.
- FOR A CORRECT OPERATION OF THE INSTRUMENT, AFTER HAVING SWITCH IT OFF, BE CAREFUL TO WAIT AT LEAST 3 SECS. BEFORE SWITCHING IT ON AGAIN.
- TO IMPROVE THE ORGAN SPECIFICATIONS, THE SCHEMATIC DIAGRAMS MAY BE SUBJECT TO CHANGE WITHOUT NOTICE.

KEYBOARD ADDR & DATA BUS
TO CPU & SOUND GEN. BOARD CONN



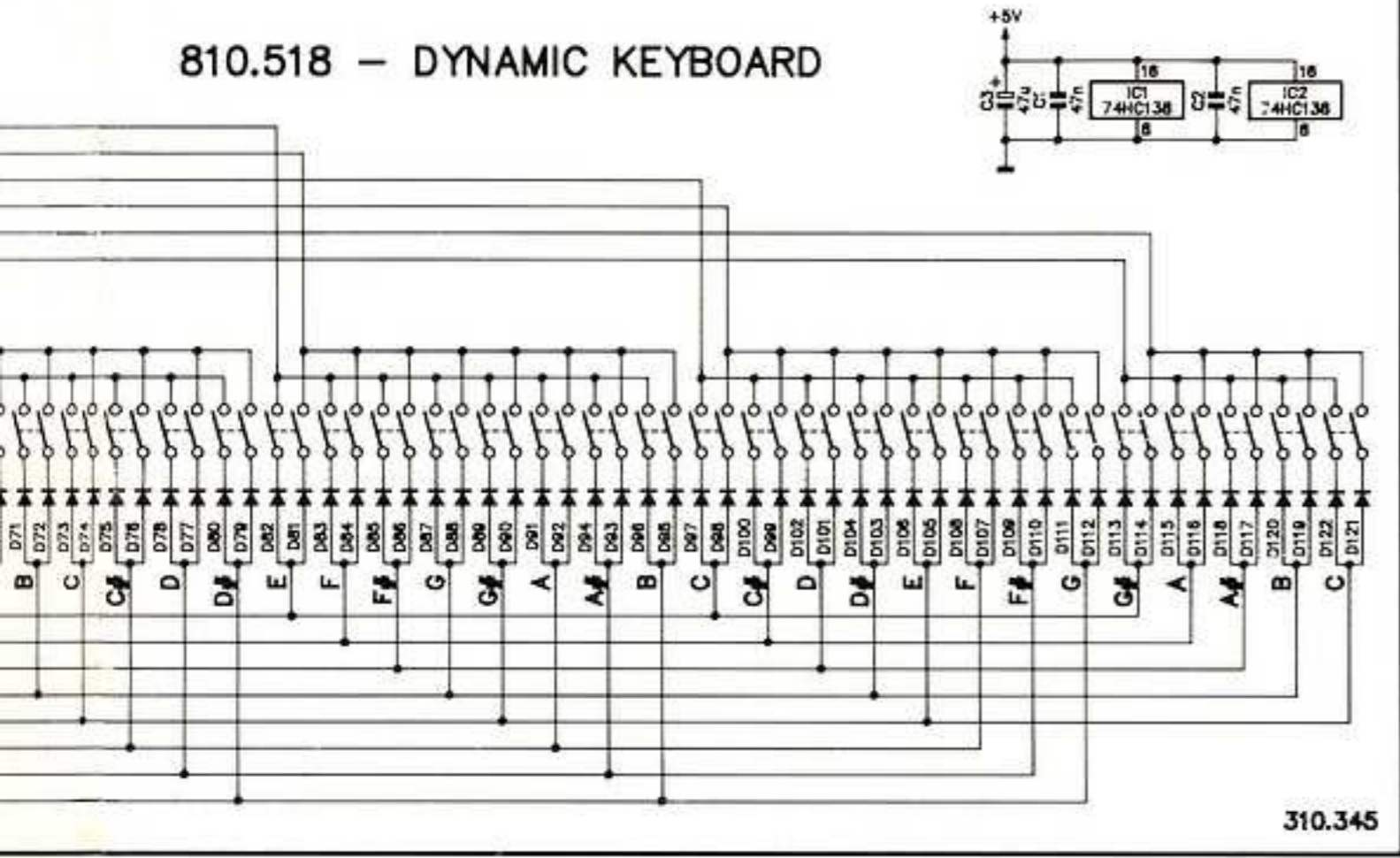
730.211 - LCD DISPLAY 2x40 CHAR.

CONTROLS PANEL ADDR & DATA BUS
FROM CPU & SOUND GEN. BOARD CONN

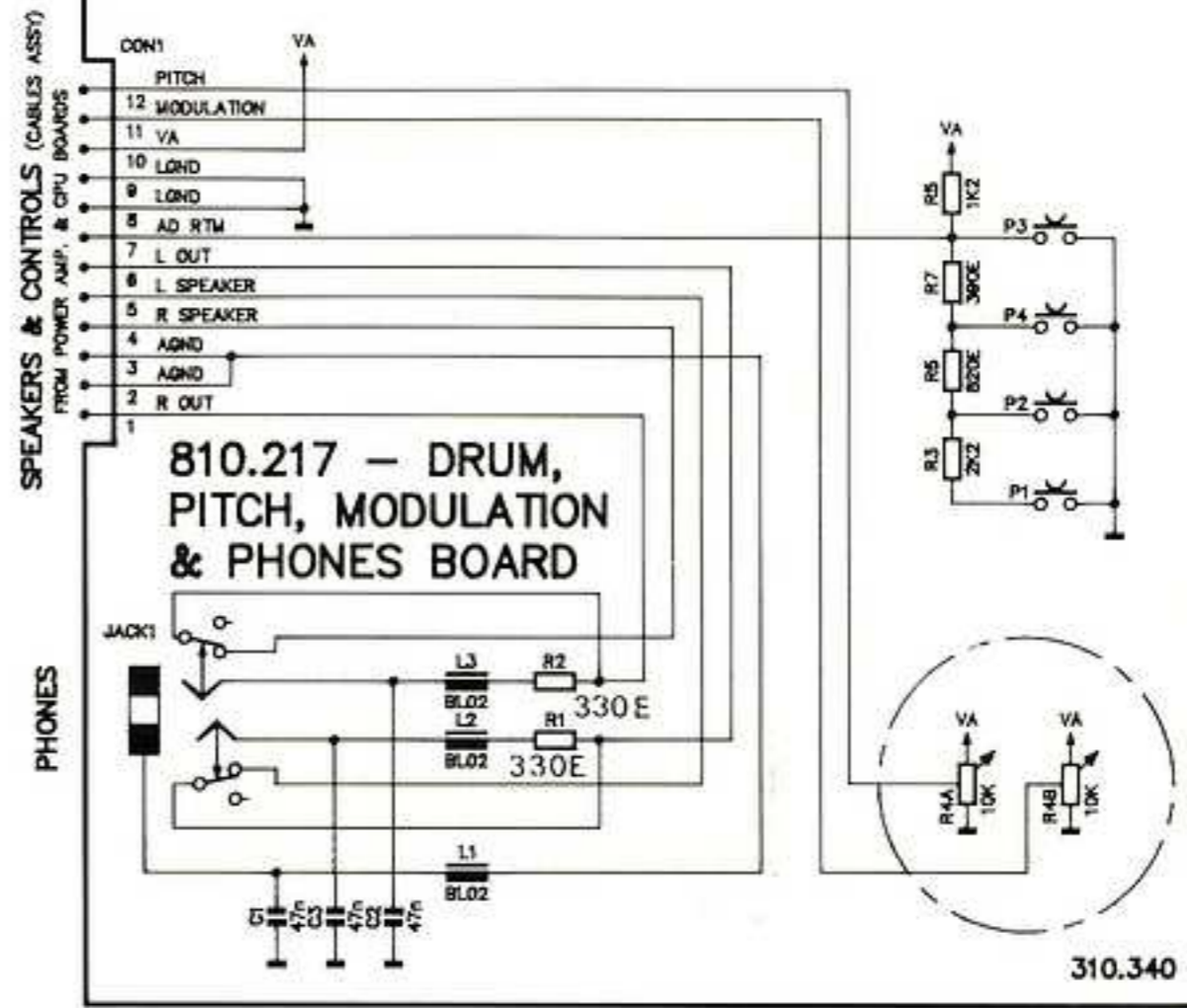


810.215 - CONTROLS PANEL BOARD

810.518 - DYNAMIC KEYBOARD

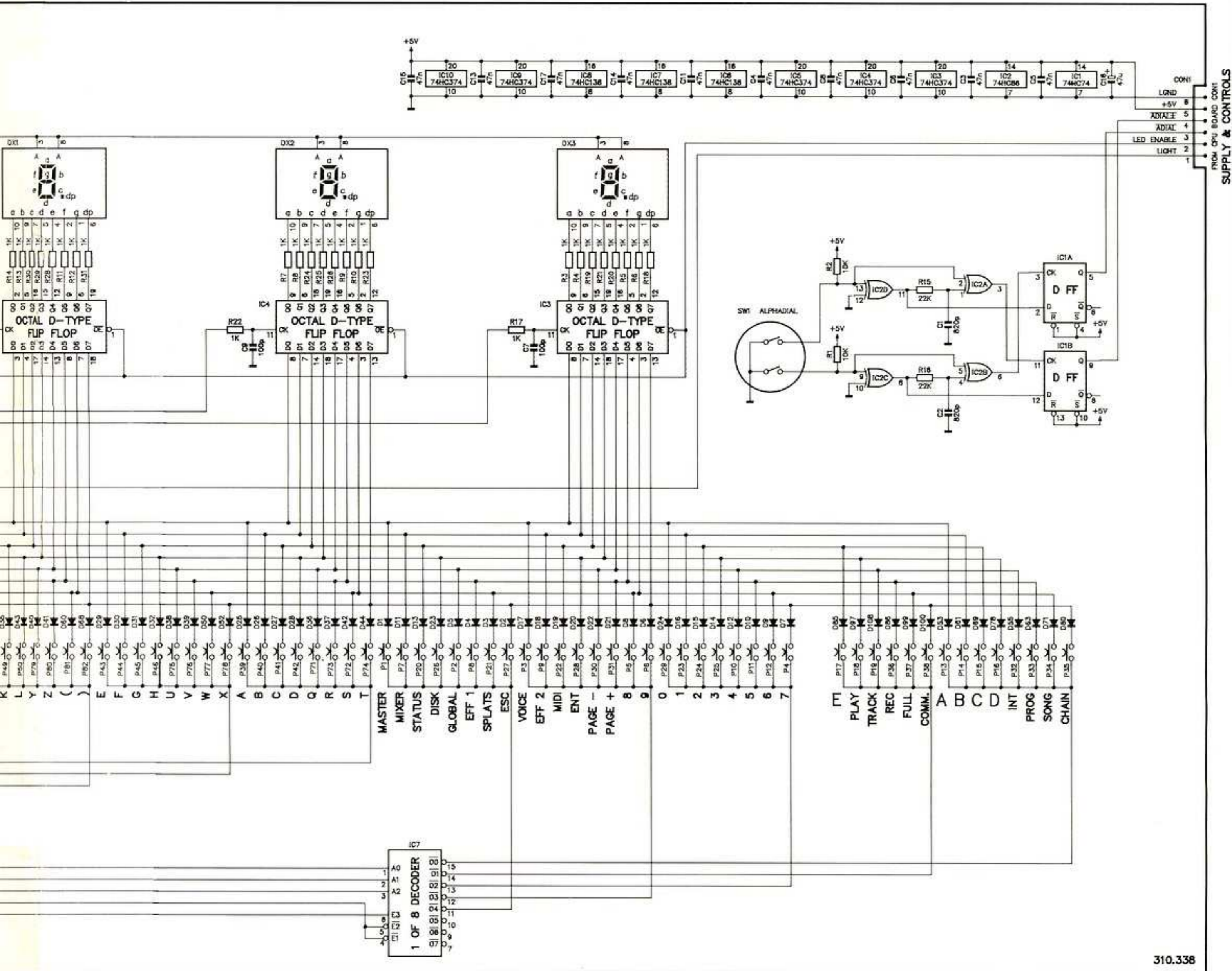


310.345



310.340

- SYNC/CONTINUE
- FILL IN
- START/STOP
- INTRO/END
- PITCH MODULATION



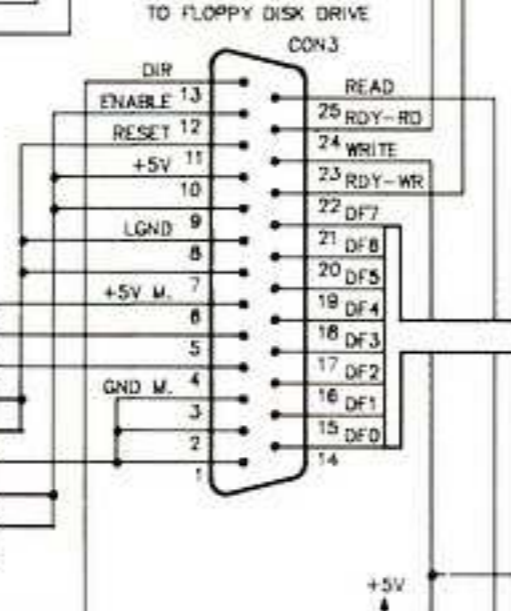
310.338

CPU & SOUND GENERATOR BOARD

760.758 - WS400
760.759 - WS2

NOTE: L18, L19, L20, L22, L23 ARE CONNECTED TO +5V SUPPLY TO PREVENT RADIO FREQUENCY EMISSION.

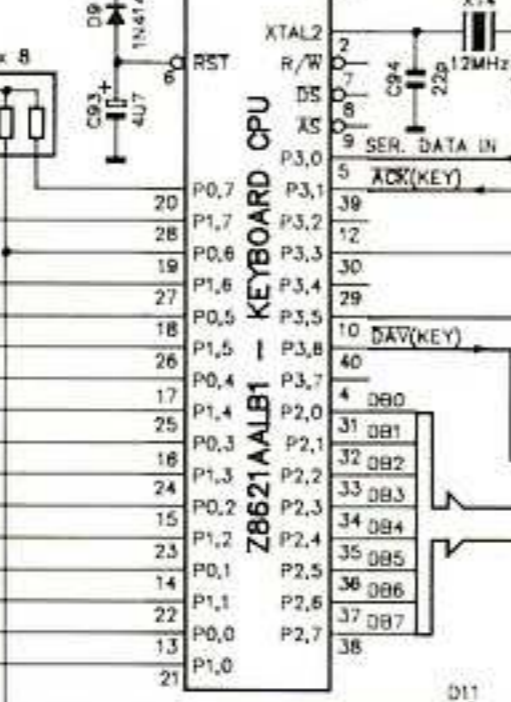
DISK DRIVE DATA & CONTROLS TO FLOPPY DISK DRIVE



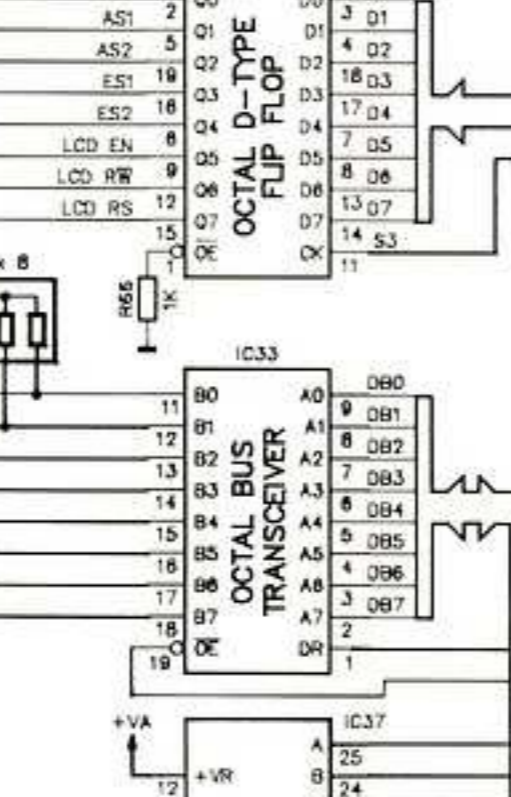
DISK DRIVE SUPPLY FROM P. AMP. & SUPPLY BOARD CONNS



KEYBOARD ADDR & DATA BUS TO DYNAMIC KEYBOARD CON1



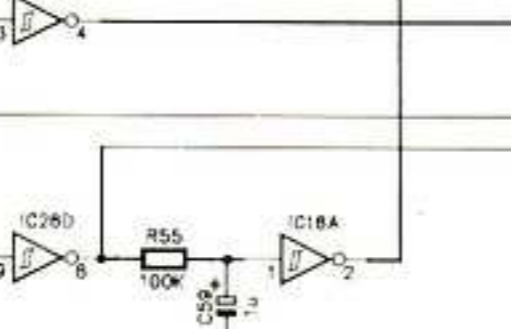
SUPPLY & CONTROLS PANEL ADDR & DATA BUS TO CONTROLS PANEL BOARD CON3



CONTRAST



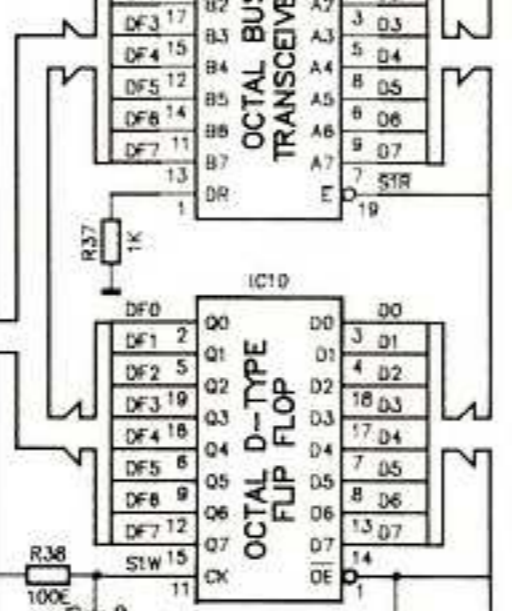
VOLUME DRUM CONTROLS TO PITCH MOD. BOARD CON1



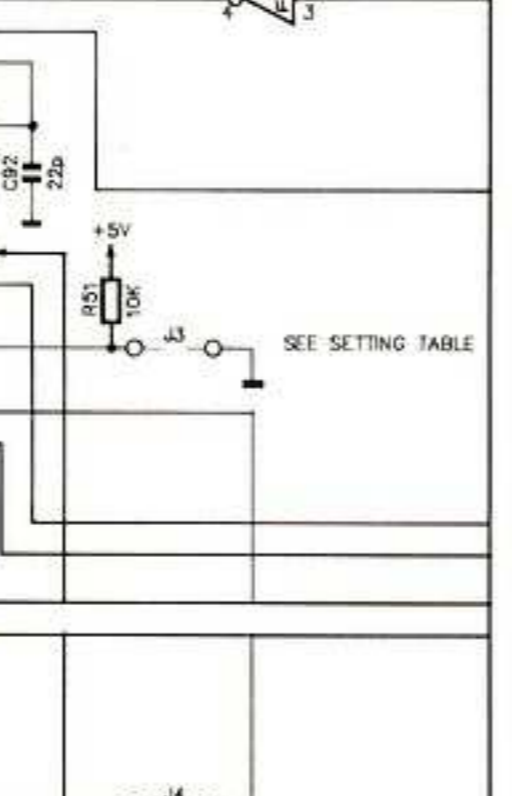
PEDAL KEYBOARD



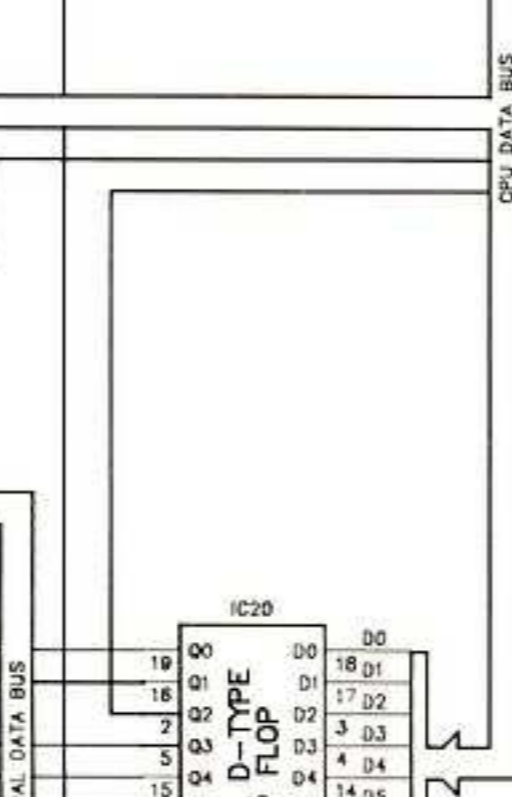
POWER SUPPLY CIRCUIT



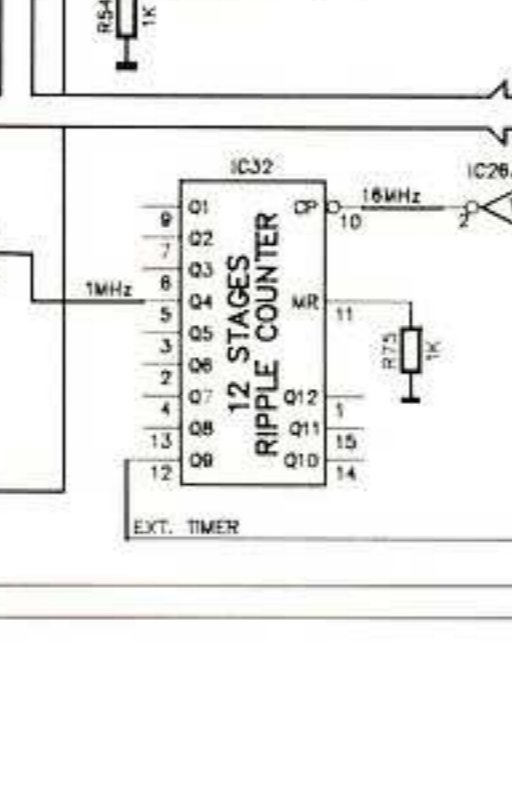
KEYBOARD CPU



CONTRAST



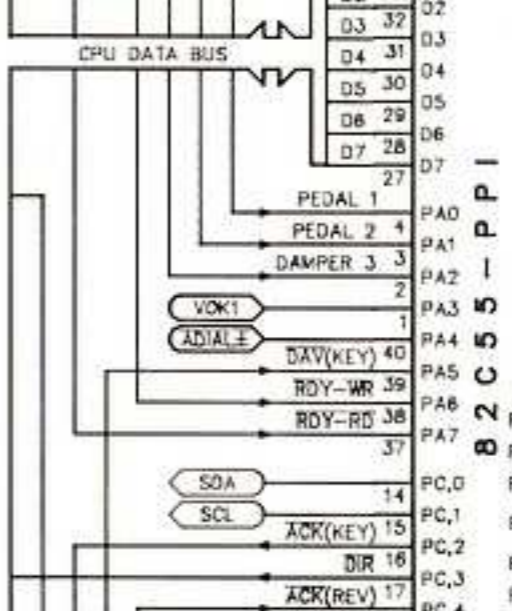
VOLUME DRUM CONTROLS TO PITCH MOD. BOARD CON1



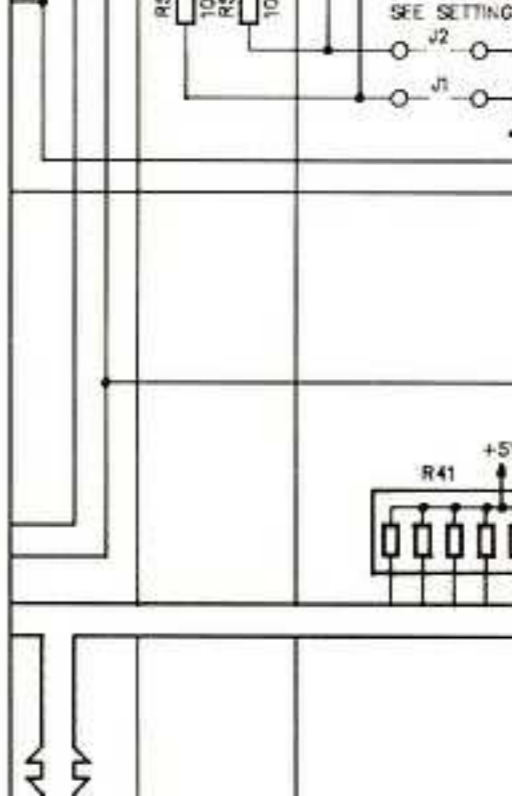
PEDAL KEYBOARD



DISK DRIVE DATA & CONTROLS TO FLOPPY DISK DRIVE



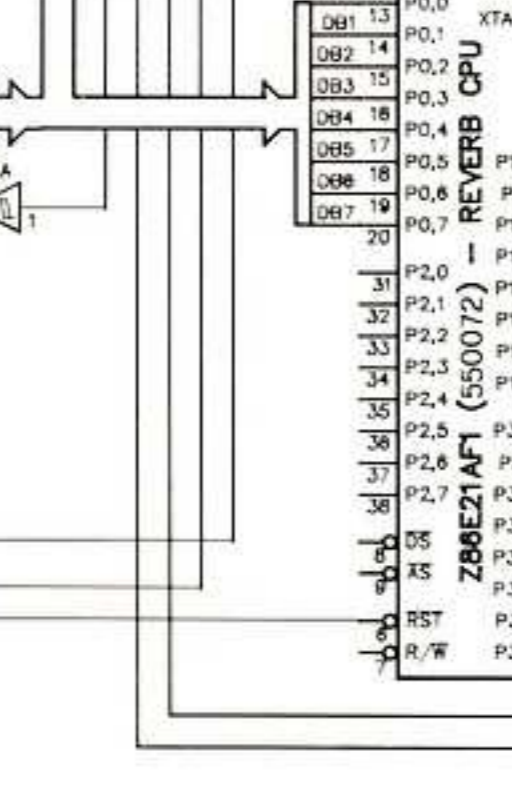
KEYBOARD CPU



CONTRAST



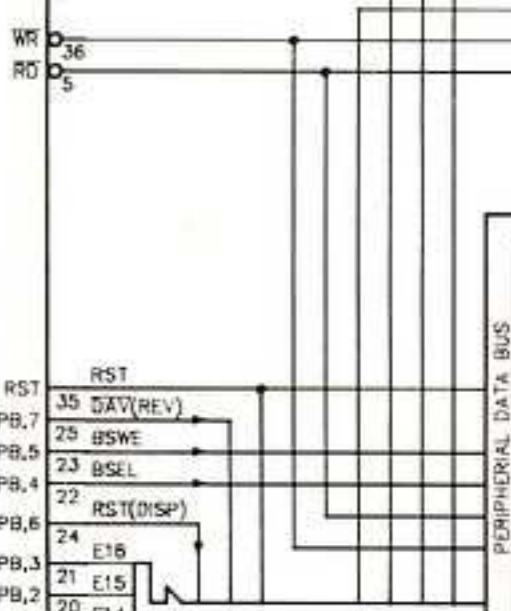
VOLUME DRUM CONTROLS TO PITCH MOD. BOARD CON1



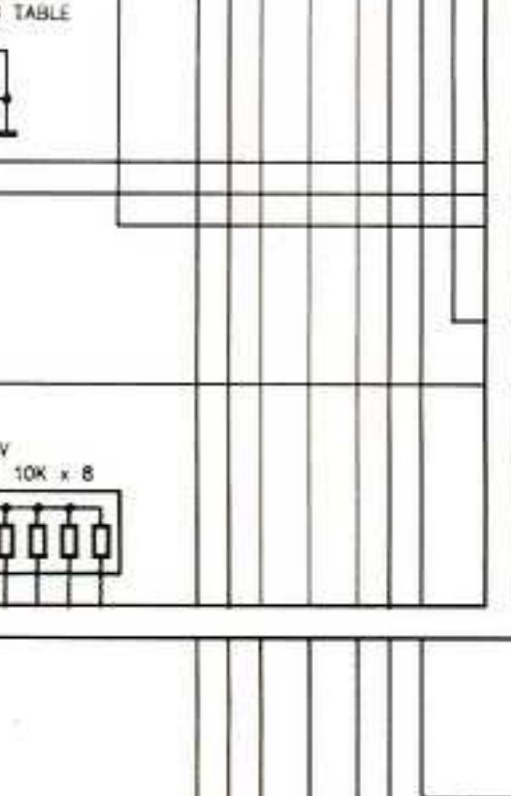
PEDAL KEYBOARD



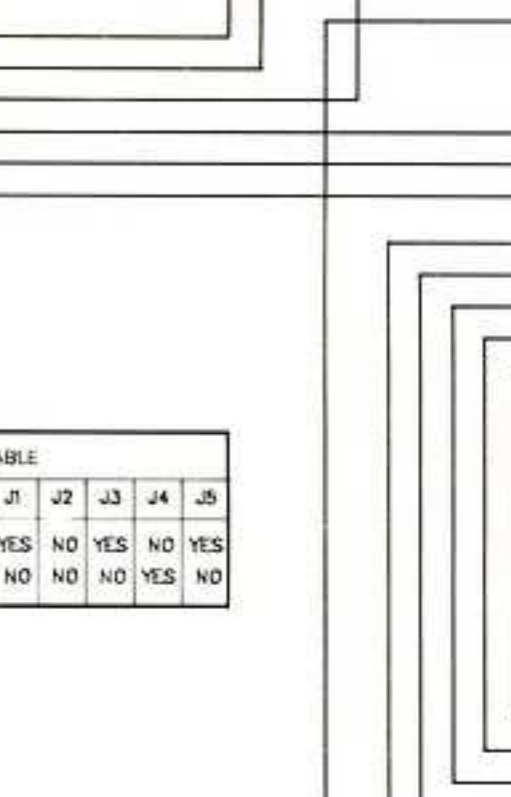
POWER SUPPLY CIRCUIT



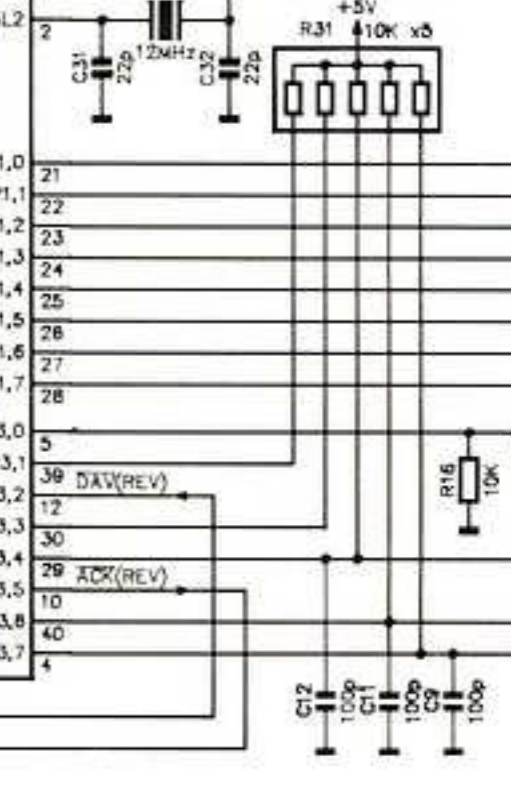
KEYBOARD CPU



CONTRAST



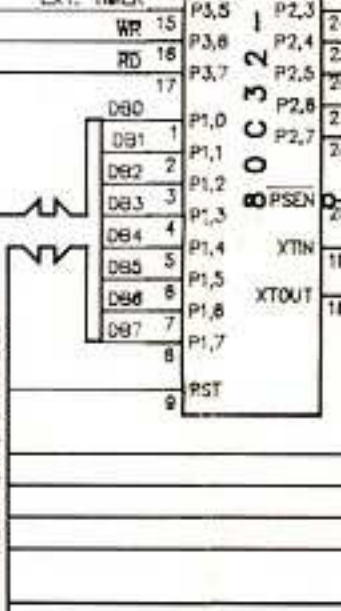
VOLUME DRUM CONTROLS TO PITCH MOD. BOARD CON1



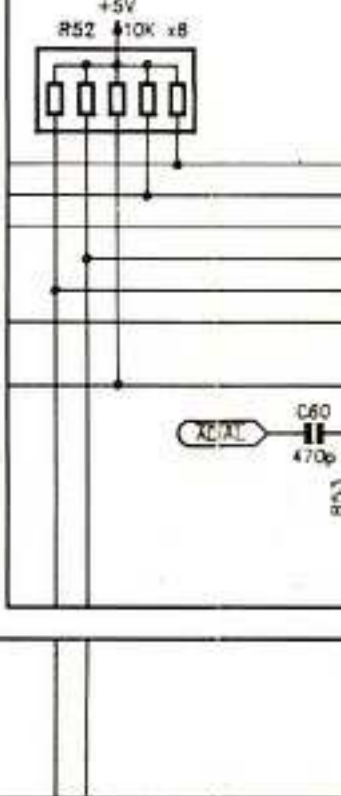
PEDAL KEYBOARD



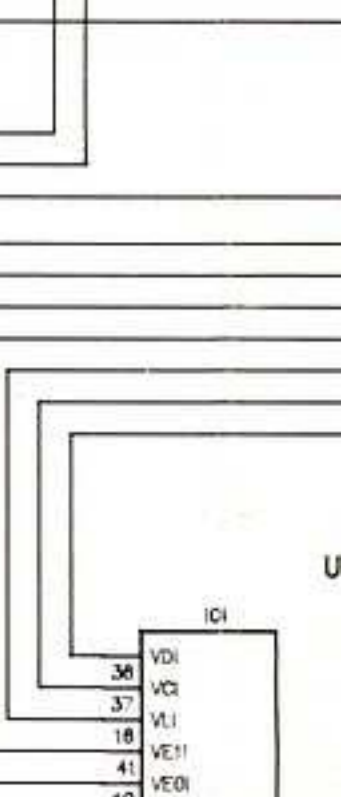
POWER SUPPLY CIRCUIT



KEYBOARD CPU



CONTRAST



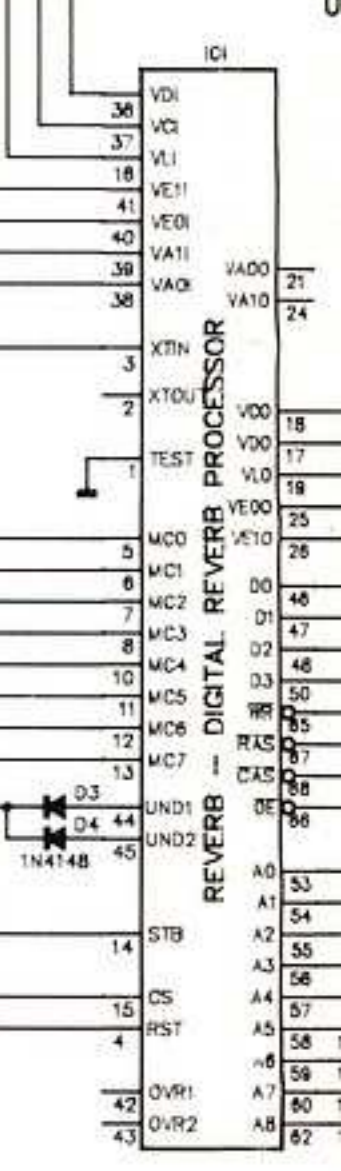
VOLUME DRUM CONTROLS TO PITCH MOD. BOARD CON1

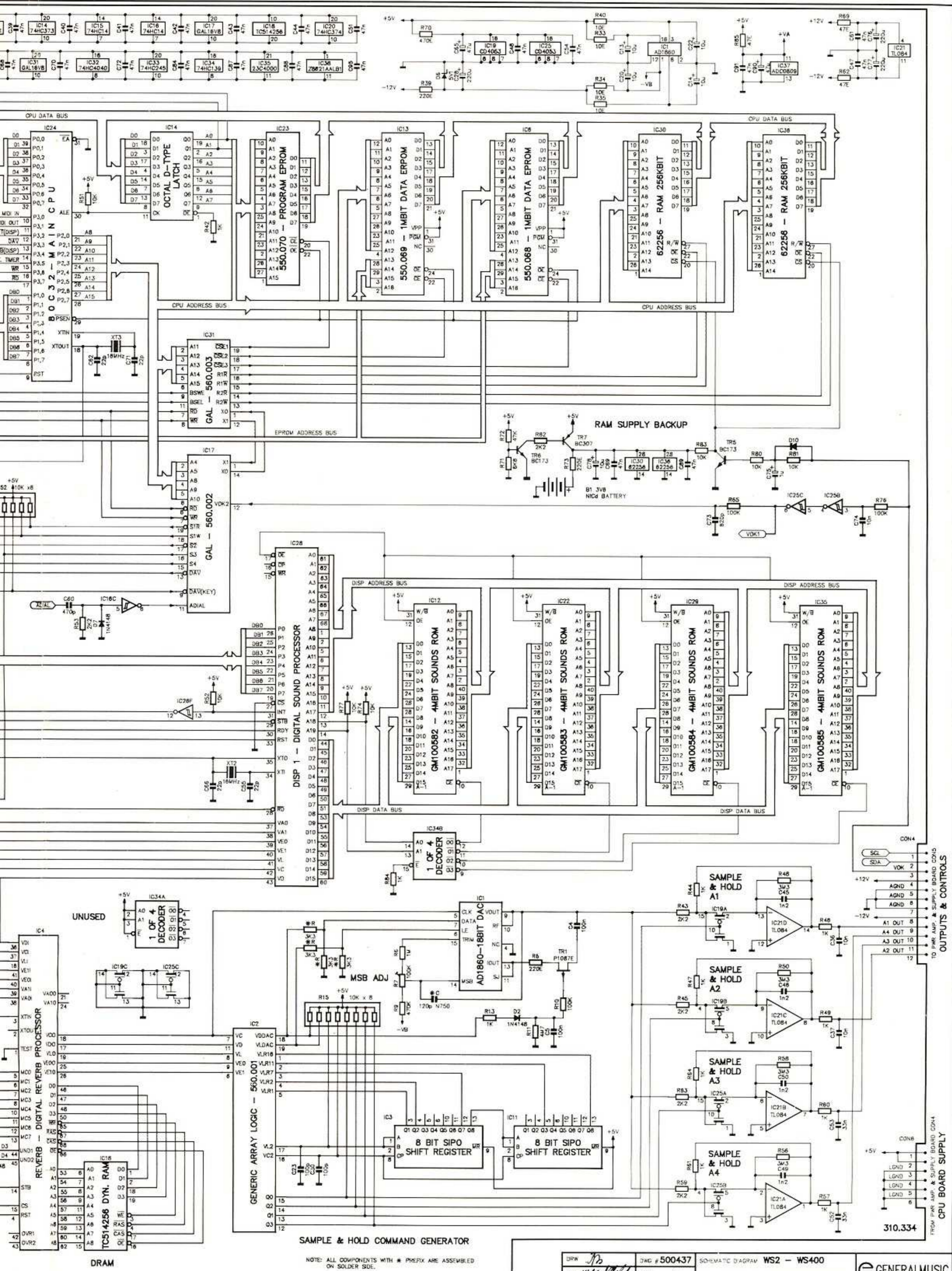


PEDAL KEYBOARD



| ORGAN | J1 | J2 | J3 | J4 | J5 |
|-------|-----|----|-----|-----|-----|
| WS400 | YES | NO | YES | NO | YES |
| WS2 | NO | NO | NO | YES | NO |





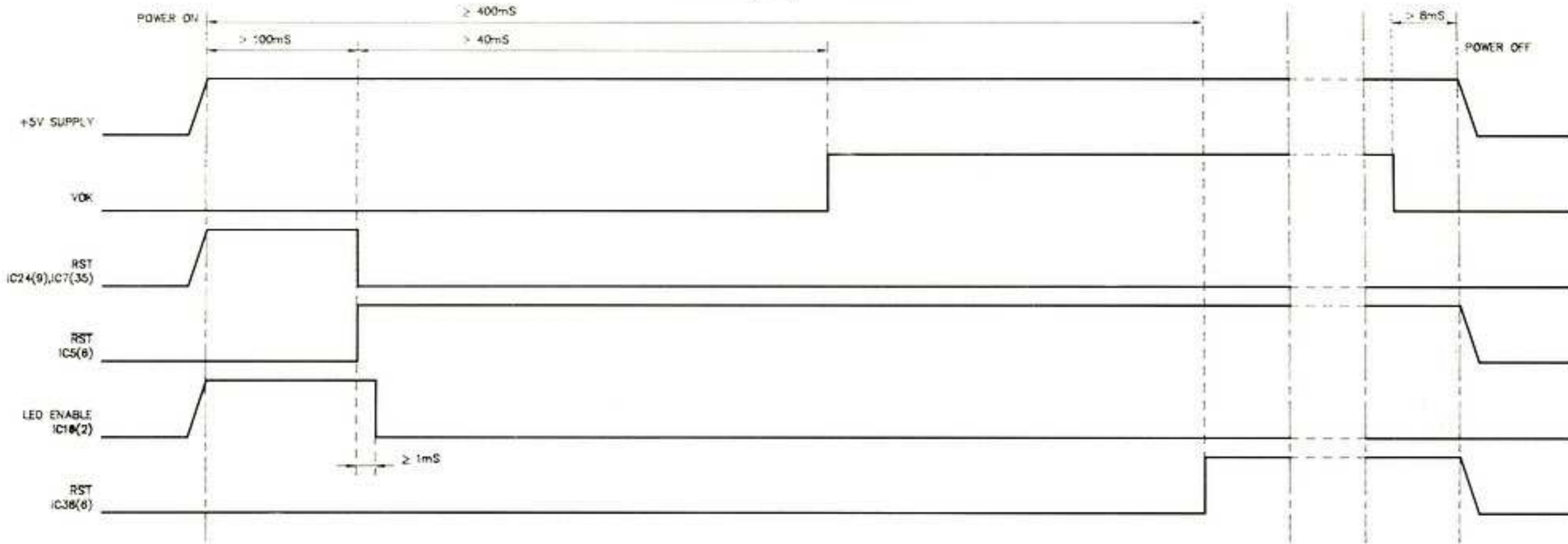
NOTE: ALL COMPONENTS WITH * PREFIX ARE ASSEMBLED ON SOLDER SIDE.

310.334

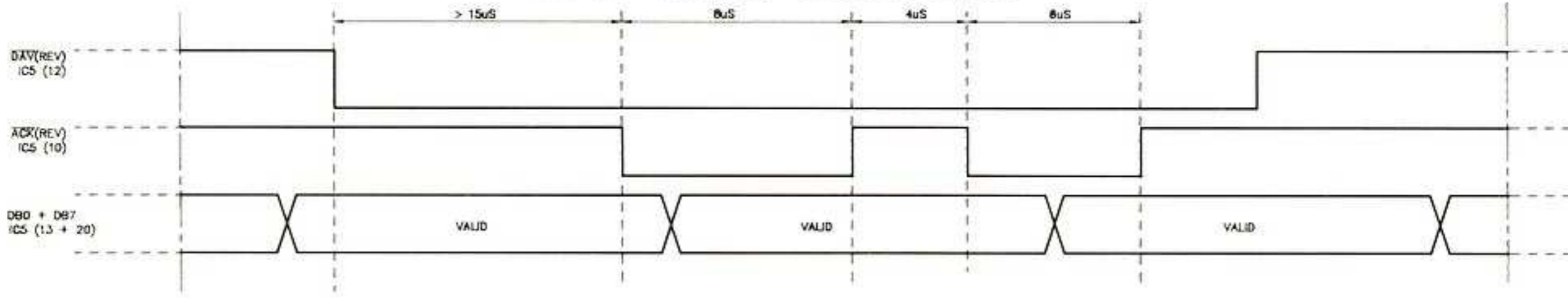
CON4
SCL
SDA
YOK 2
AGND 4
AGND 5
AGND 8
A1 OUT 7
A4 OUT 9
A3 OUT 10
A2 OUT 11
TO PWR AMP. & SUPPLY BOARD CON4

CON6
LDND 2
LDND 3
LDND 4
LDND 5
FROM PWR AMP. & SUPPLY BOARD CON4

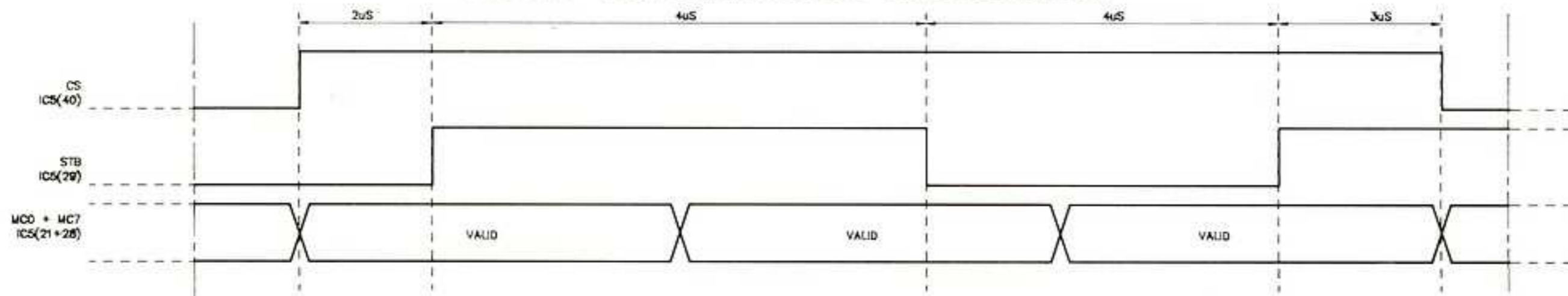
POWER ON/OFF, VOK & RESET



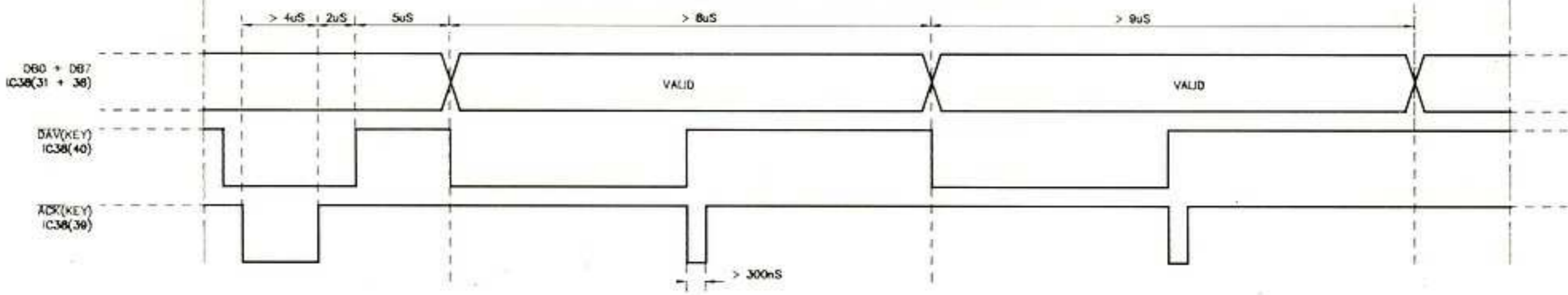
MAIN CPU - REVERB CPU DATA BUS & CONTROLS



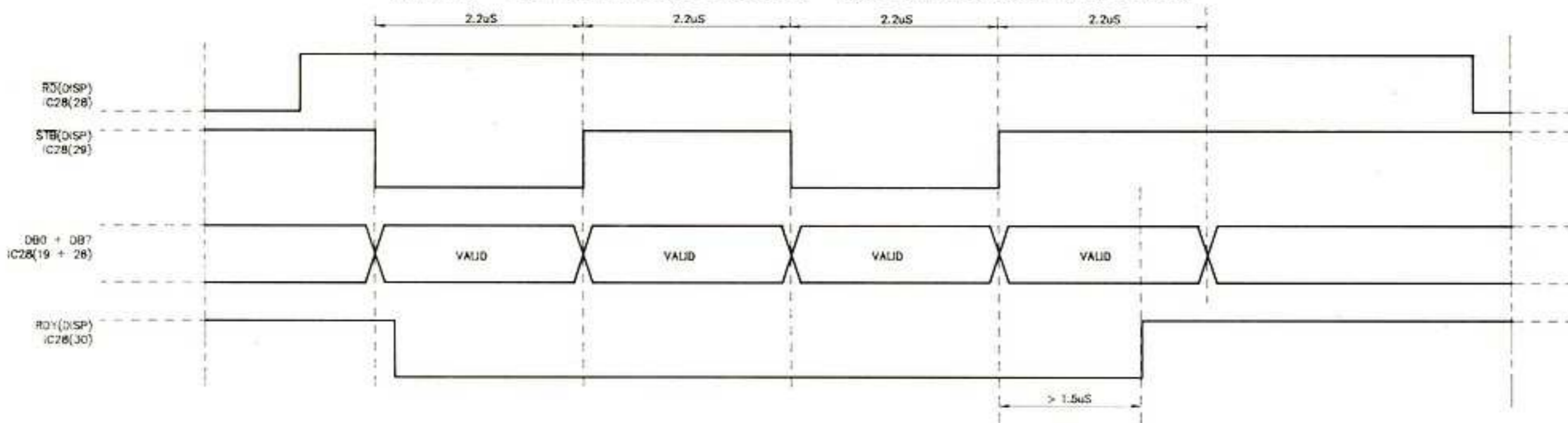
REVERB CPU - DIGITAL REVERB PROCESSOR DATA BUS & CONTROLS



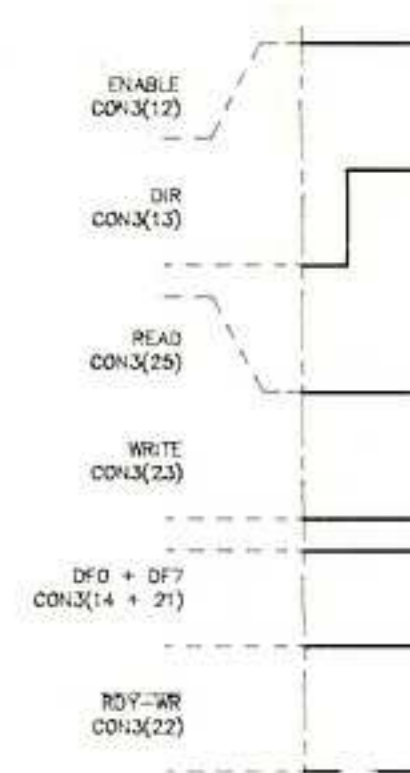
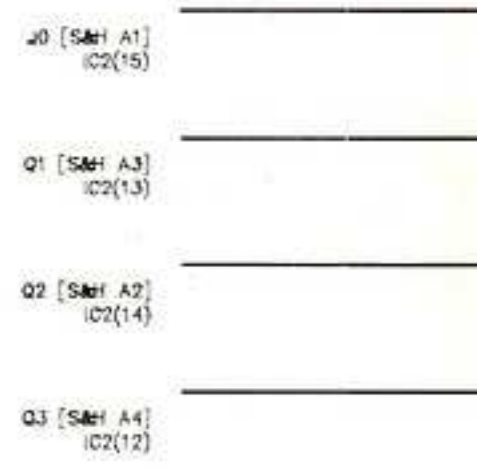
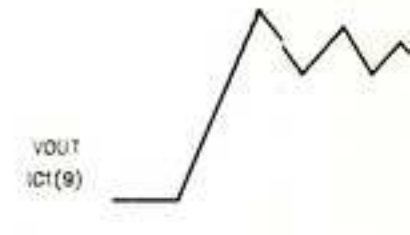
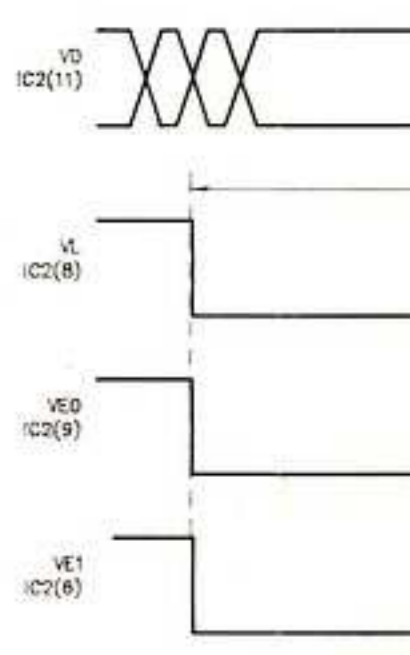
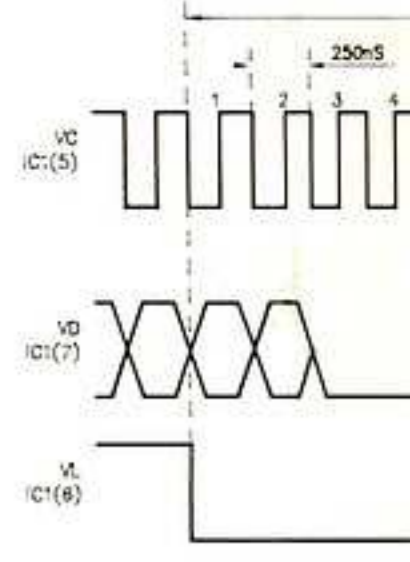
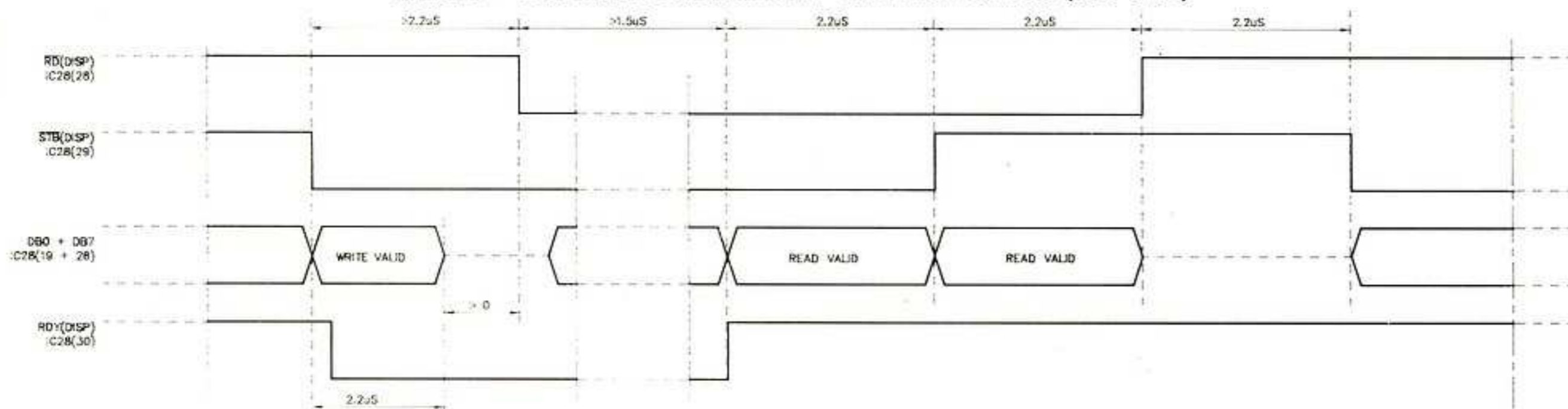
MAIN CPU - KEYBOARD CPU DATA BUS & CONTROLS



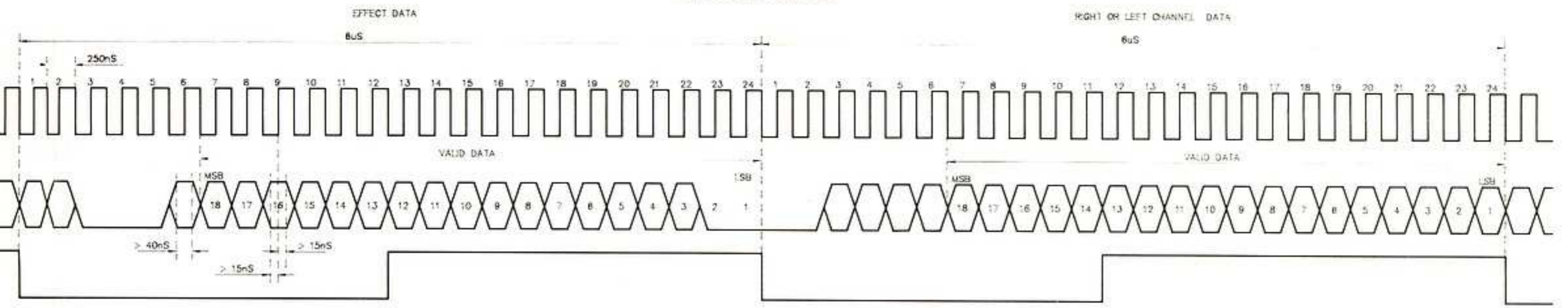
MAIN CPU - DISP1 DIGITAL SOUND PROCESSOR DATA BUS & CONTROLS (WRITE CYCLE)



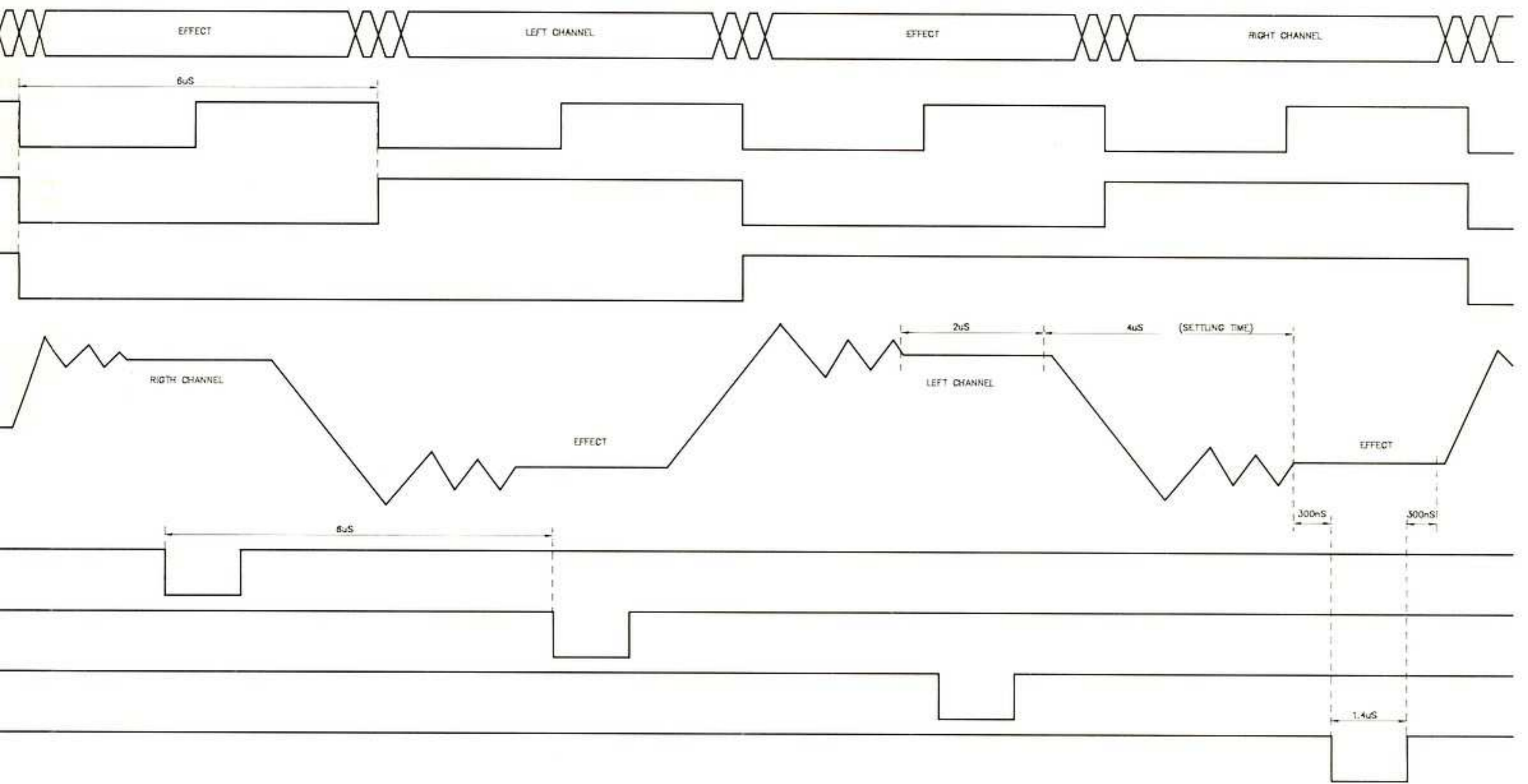
MAIN CPU - DISP1 DIGITAL SOUND PROCESSOR DATA BUS & CONTROLS (READ CYCLE)



PCM SERIAL DATA BUS

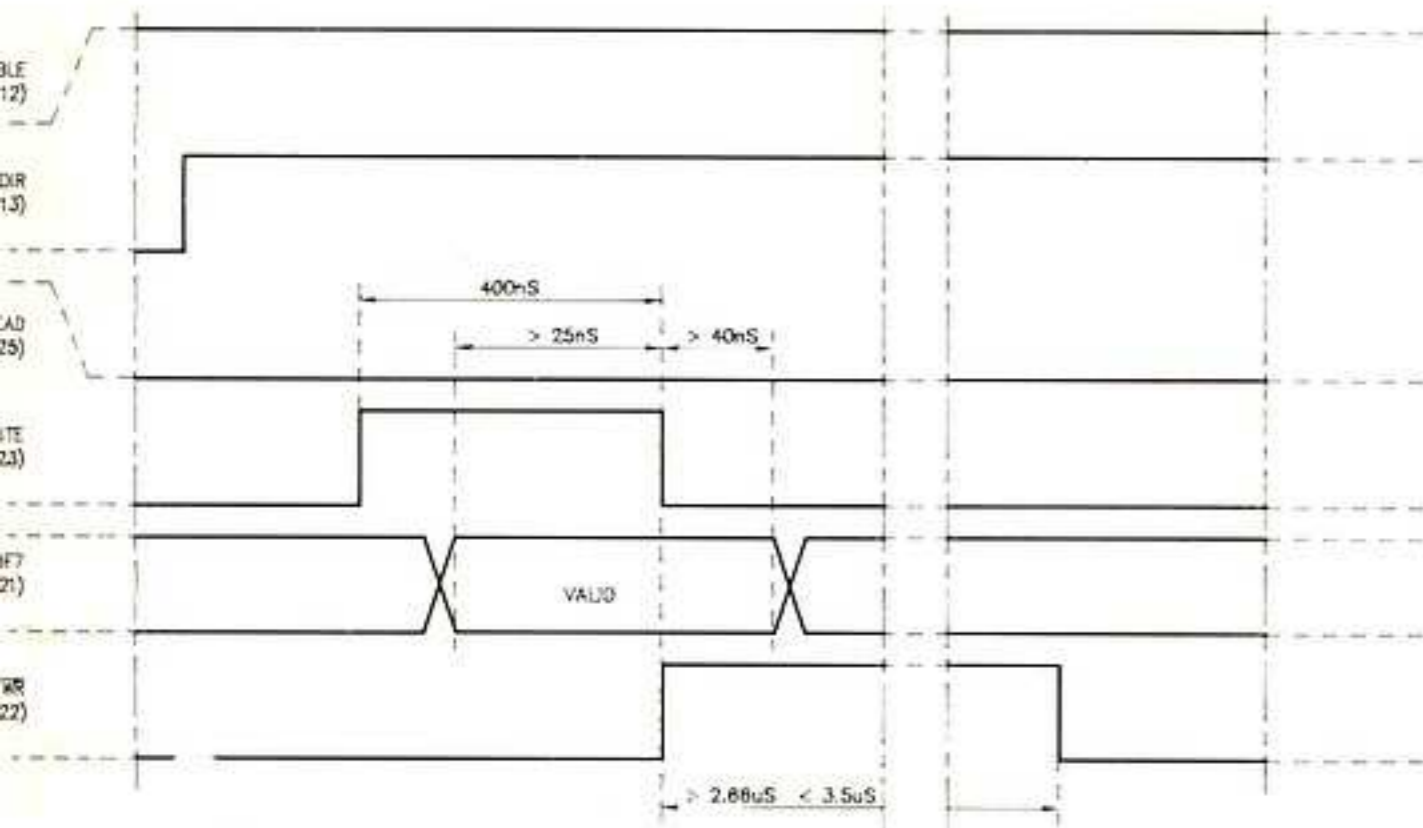


SAMPLE & HOLD

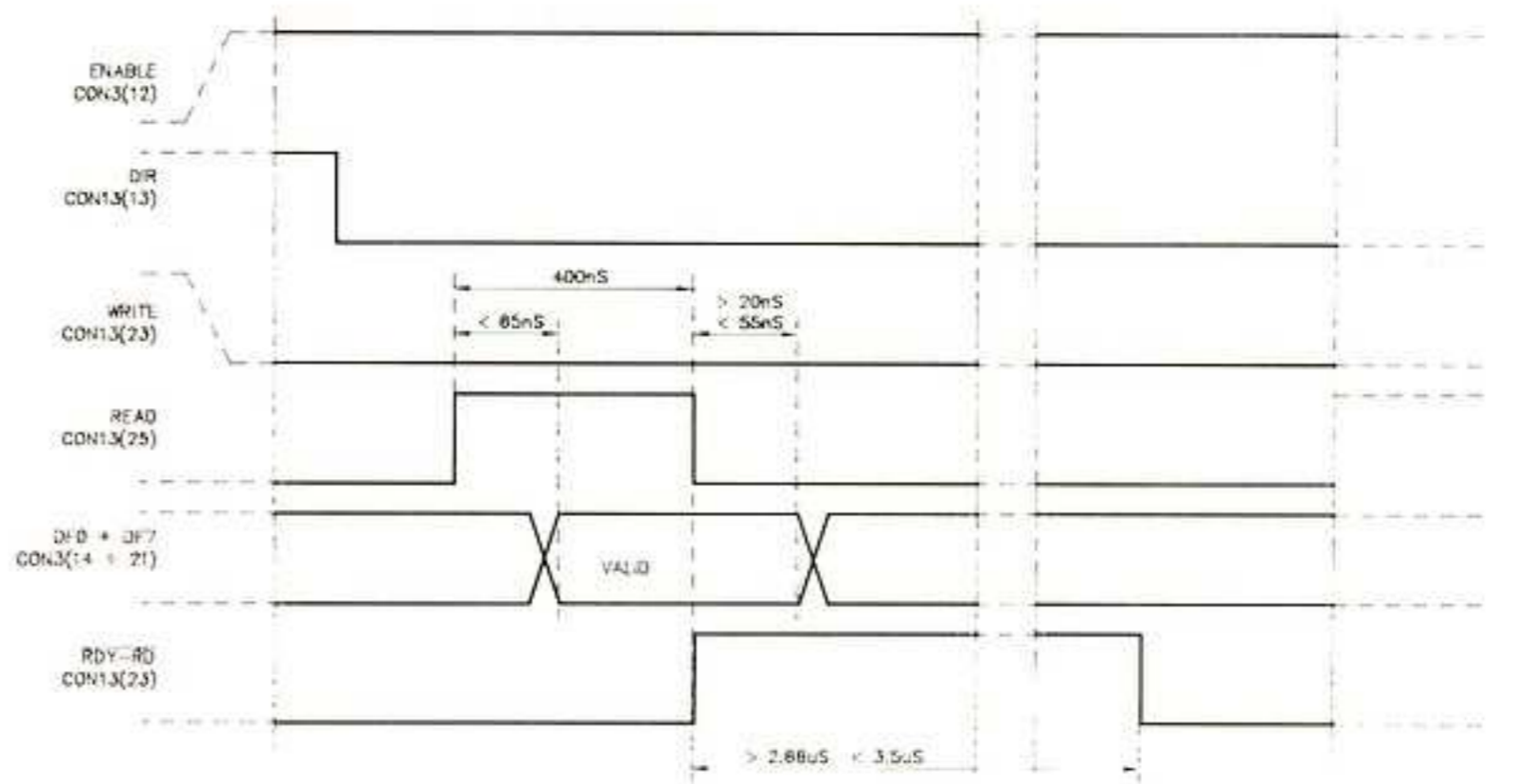


SYSTEM - DISK INTERFACE DATA BUS & HANDSHAKE

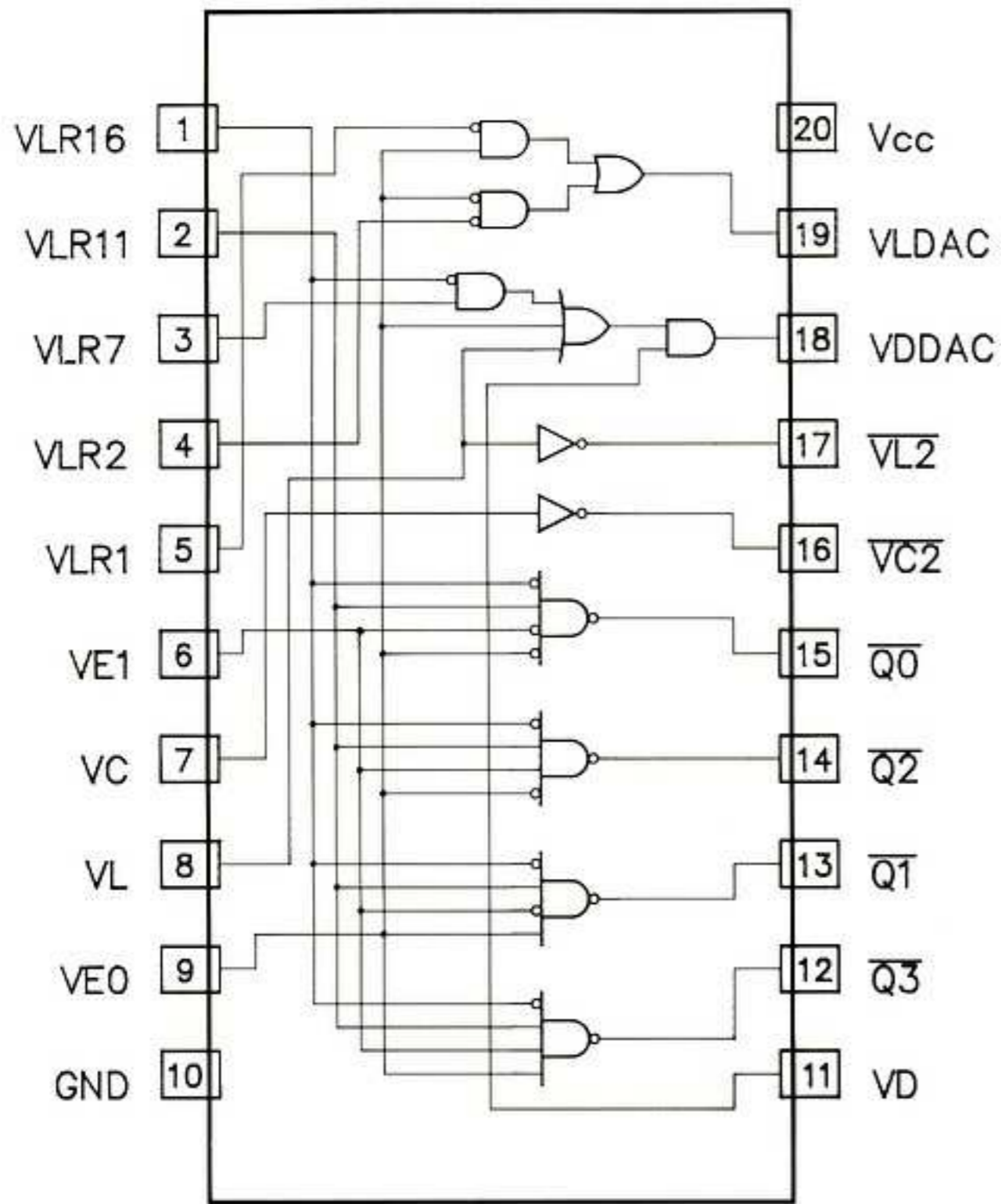
WRITE CYCLE



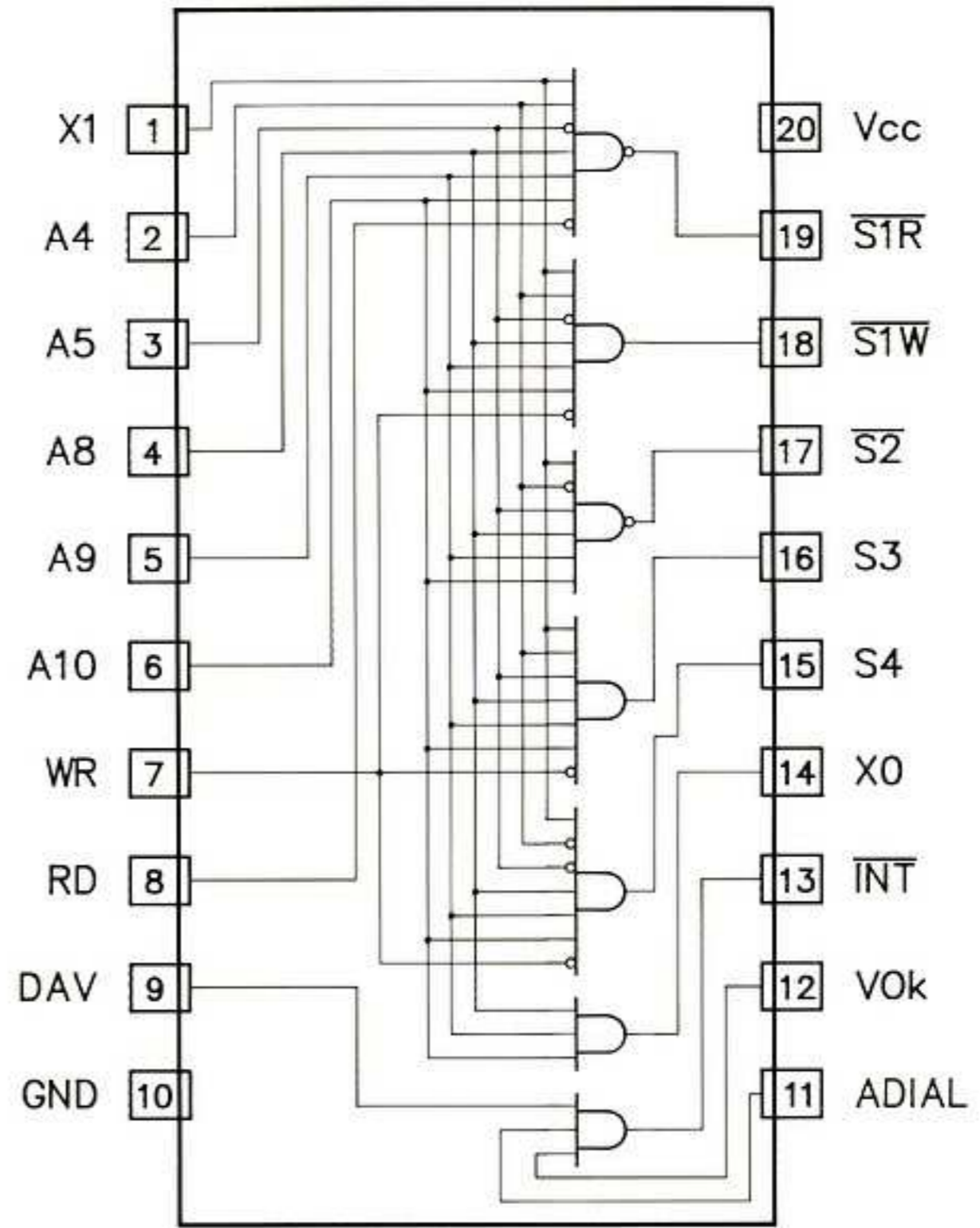
READ CYCLE



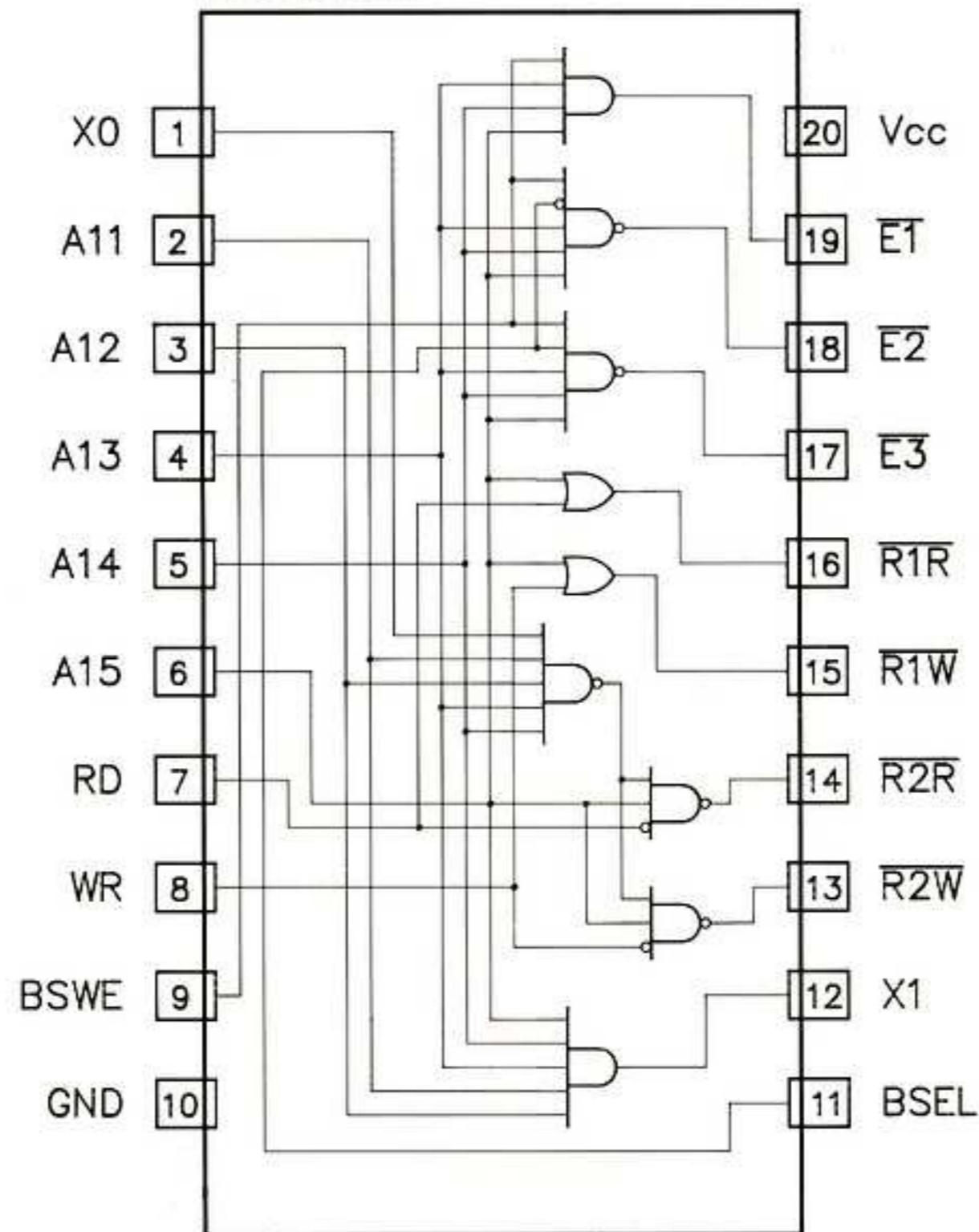
560.001



560.002



560.003



WS2

PART LIST

| DESCRIPTION | CODE |
|----------------------------------|--------|
| ENGLISH OWNER'S MANUAL (GB,U.S.) | 970094 |
| FRENCH OWNER'S MANUAL (F) | 970092 |
| GERMAN OWNER'S MANUAL (D) | 970093 |
| DUTCH OWNER'S MANUAL (NL) | 970095 |
| SPANISH OWNER'S MANUAL (E) | 970096 |
| ITALIAN OWNER'S MANUAL (I) | 970091 |

| ACCESSORIES | |
|------------------------|--------|
| MUSIC STAND | 170893 |
| 2 M LENGTH MIDI CABLE | 130301 |
| WS2 CARRYING BAG | 970087 |
| WS2 HOME STAND | 970082 |
| WS2 BENCH | 970088 |
| WS2 STAGE STAND | 970081 |
| WS2 DYNAMIC PEDALBOARD | 970084 |
| MULTI SWITCH PEDAL | 970080 |
| SINGLE SWITCH PEDAL | 970012 |
| VOLUME PEDAL | 970013 |
| 3.5 DISK DRIVE | 970083 |

| CABINET ELECT. & MECH. PARTS ASSEMBLY | |
|---|--------|
| TOP PLASTIC CHASSIS | 650967 |
| BOTTOM PLASTIC CHASSIS (GEM) | 650966 |
| BOTTOM PLASTIC CHASSIS (BACHMANN) | 650989 |
| DISK DRIVE PLASTIC SUPPORT | 340231 |
| DISK DRIVE OPENING COVER (WITHOUT DISK DRIVE) | 340230 |
| ADESIVE ANTISLIDE RUBBER FOOT | 190015 |
| SPEAKER LABYRINTH | 340229 |
| BOTTOM LABYRINTH PACKING | 210075 |
| TOP LABYRINTH PACKING | 210076 |
| BE 16W WIDE RANGE SPEAKER | 220091 |
| SPEAKER ACOUSTIC FOAM | 210064 |
| METAL SPEAKER GRID | 660142 |

| TRANSFORMER ASSEMBLY | |
|--|--------|
| TRANSFORMER ASSEMBLY (EUROPE VERSION) | 730210 |
| TRANSFORMER ASSEMBLY (U.S. VERSION) | 730213 |
| MAINS SOCKET | 140203 |
| POWER SWITCH | 110285 |
| TRANSFORMER 220/240VAC (EUROPE VERSION) | 230106 |
| TRANSFORMER 117VAC (U.S. VERSION) | 230109 |
| A.C. LINE FILTER BOARD (EUROPE VERSION) (310353PC) | 730209 |
| A.C. LINE FILTER BOARD (U.S. VERSION) (310353PC) | 730217 |
| DOUBLE COIL RF FILTER | 230528 |
| A.C. LINE FILTER | 110602 |
| FUSE CLIP (EUROPE VERSION) | 110113 |
| FUSE CLIP (U.S. VERSION) | 110114 |
| T800mA-250V FUSE (EUROPE VERSION) | 110015 |
| T1.6A-250V FUSE (U.S. VERSION) | 110055 |

| WIRING CONNECTIONS | |
|---|--------|
| MAINS CORD (EUROPE VERSION) | 130274 |
| MAINS CORD (U.S. VERSION) | 130276 |
| SPEAKERS, CONTROLS & SUPPLY CABLES ASSY | 770559 |
| FLAT CABLES : | |
| 14 WIRES - 25 Cm LENGTH (CTRL PANEL BOARD CON2 - LCD DISPLAY) | 840553 |
| 16 WIRES - 45 Cm LENGTH (CONTROLS PANEL ADDR & DATA BUS) | 840532 |
| 6 WIRES - 45 Cm LENGTH (SUPPLY & CONTROLS) | 840161 |
| 16 WIRES - 17 Cm LENGTH (KEYBOARD ADDR & DATA BUS) | 840556 |
| 12 WIRES - 12 Cm LENGTH (OUTPUTS & CONTROLS) | 840253 |
| 6 WIRES - 12 Cm LENGTH (CPU BOARD SUPPLY) | 840153 |
| 25 WIRES - 30 Cm LENGTH (DISK DRIVE DATA & CONTROLS) | 840555 |

| KEYBOARD ELECT. & MECH. ASSY 720268 | |
|---|--------|
| MECHANICAL KEYBOARD ASSY | 500041 |
| C KEY | 150983 |
| D KEY | 150984 |
| E KEY | 150985 |
| F KEY | 150986 |
| G KEY | 150987 |
| A KEY | 150988 |
| B KEY | 150989 |
| LAST C KEY | 151000 |
| SHARP KEY | 151001 |
| KEYS RETURN SPRING | 160154 |
| DYNAMIC KEYBOARD CONTACT BOARD (310345PC) | 810518 |
| 12 CONTACT RUBBER STRIP | 340211 |
| 13 CONTACT RUBBER STRIP | 340212 |

| CONTROLS PANEL ELECT. & MECH. ASSEMBLY | |
|--|--------|
| LCD DISPLAY | 730211 |
| PLEXIGLASS DISPLAY SCREEN (GEM) | 650962 |
| PLEXIGLASS DISPLAY SCREEN (BACHMANN) | 650990 |
| 3x4 PUSH CAPS EDIT KEYBOARD | 650972 |
| 3x4 PUSH CAPS GLOBAL KEYBOARD | 650973 |
| "A" "B" "C" TRIPLE PUSH CAP | 650974 |
| "D" "E" DUAL PUSH CAP | 650976 |
| "int STYLE" "prog STYLE" "song PATT" TRIPLE PUSH CAP | 650975 |
| "chain COMPOSE" "REC" DUAL PUSH CAP | 650977 |
| "play TRACKS" "track TEMPO" DUAL PUSH CAP | 650978 |
| "full GLOBAL" "comm CHORDS" DUAL PUSH CAP | 650979 |
| 4 PUSH CAP STRIP (STYLES,VOICES) | 340257 |
| ALPHADIAL KNOB | 340232 |
| ALPHADIAL | 110253 |
| CONTROLS PANEL BOARD (310338PC) | 810215 |
| INTEGRATED CIRCUIT: 74HC138 1 OF 8 DECODER | 100606 |
| 74HC374 OCTAL D-TYPE FLIP-FLOP | 100612 |
| 74HC74 DUAL D-TYPE FLIP-FLOP | 100614 |
| 74HC86 QUAD 2-INPUT EXOR GATE | 100620 |
| HDN1105 7 SEGMENTS DISPLAY | 080717 |
| IN-LINE 5PIN DISPLAY SOCKET | 140603 |
| RED LED | 080711 |
| LED SPACER | 340091 |
| MICROSWITCH (0.2mm ACTING-STROKE) | 140520 |

| DESCRIPTION | CODE |
|---|--------|
| DRUM, PITCH, MODULATION & PHONES ASSY | 720269 |
| HEMISPHERICAL KNOB (PITCH-MODULATION) | 340237 |
| M3 THREADED INSERT-BUSH FOR KNOB | 120682 |
| DRUM KEYS PLASTIC SUPPORT | 340239 |
| "START-STOP" PUSH CAP | 650968 |
| "INTRO-END" PUSH CAP | 650969 |
| "SYNC-CONTINUE" PUSH CAP | 650970 |
| "FILL IN" PUSH CAP | 650971 |
| DRUM KEYS RETURN SPRING | 160152 |
| DRUM, PITCH, MODULATION & PHONES BOARD (310340PC) | 810217 |
| MICROSWITCH (0.5mm ACTING-STROKE) | 140519 |
| 10K+10K JOYSTICK | 070700 |
| FEMALE JACK SOCKET | 140207 |
| BL02 DOUBLE COIL FOR RFI SUPPRESSION | 230527 |

| CPU & SOUND GENERATOR BOARD (310334PC) 760759 | |
|--|--------|
| INTEGRATED CIRCUIT: 74HC14 HEX INVERTING SCHMITT TRIGGER | 100618 |
| 74HC139 DUAL 1 OF 4 DECODER | 100623 |
| 74HC164 8BIT SERIAL IN PARALLEL OUT SHIFT REGISTER | 100607 |
| 74HC245 OCTAL BUS TRANSCEIVER | 100610 |
| 74HC373 OCTAL D-TYPE LATCH | 100611 |
| 74HC374 OCTAL D-TYPE FLIP-FLOP | 100612 |
| 74HC4040 12 STAGES RIPPLE COUNTERS | 100617 |
| TCS14256 256Kx4BIT DYNAMIC RAM | 100586 |
| CD4053 TRIPLE 2-CHANNEL MULTIPLEXER | 100566 |
| GAL-560001 16VB GENERIC ARRAY LOGIC (PROGRAMMED) | 560001 |
| GAL-560002 16VB GENERIC ARRAY LOGIC (PROGRAMMED) | 560002 |
| GAL-560003 16VB GENERIC ARRAY LOGIC (PROGRAMMED) | 560003 |
| 6N138 OPTOCOUPLER | 100035 |
| AD1860 18BIT PCM DIGITAL TO ANALOG CONVERTER | 100593 |
| TL084 QUAD J-FET INPUT OPERATIONAL AMPLIFIER | 100084 |
| 80C32-16 MAIN CPU | 100579 |
| DISP1 DIGITAL SOUND PROCESSOR | 100580 |
| REVERB DIGITAL REVERB PROCESSOR | 100581 |
| GM100582 uPD23C4000 MASKED SOUND ROM | 100582 |
| GM100583 uPD23C4000 MASKED SOUND ROM | 100583 |
| GM100584 uPD23C4000 MASKED SOUND ROM | 100584 |
| GM100585 uPD23C4000 MASKED SOUND ROM | 100585 |
| 82C55 PROGRAMMABLE PERIPHERAL INTERFACE | 100587 |
| 550068 uPD27C1001 DATA EPROM | 550068 |
| 550069 uPD27C1001 DATA EPROM | 550069 |
| 550070 27512 PROGRAM EPROM | 550070 |
| Z8621AALB1 MASKED KEYBOARD CPU | 100725 |
| Z8621AF1 MASKED REVERB CPU | 550072 |
| 62256 256KBIT STATIC RAM | 100576 |
| ADC0809 8BIT ANALOG TO DIGITAL CONVERTER | 100574 |
| P1087E P-CHANNEL FET | 090856 |
| BC307 PNP TRANSISTOR | 090192 |
| BC173 NPN TRANSISTOR | 090182 |
| 5V1 0.5W ZENER DIODE | 080232 |
| 1N4148 SIGNAL DIODE | 080103 |
| 16MHz CERAMIC RESONATOR | 010702 |
| 12MHz CERAMIC RESONATOR | 010700 |
| 10Kx8 RESISTOR ARRAY | 050492 |
| 10Kx5 RESISTOR ARRAY | 050494 |
| 1K "CONTRAST" POTENTIOMETER WITH KNOB | 070123 |
| 3.6V NiCd BATTERY | 110282 |
| "THRU-OUT2" SWITCH | 110287 |
| FEMALE JACK STEREO SOCKET | 140207 |
| FEMALE 5 POLES DIN SOCKET | 140212 |
| FEMALE 6 POLES DIN SOCKET | 140216 |
| BL02 DOUBLE COIL FOR RFI SUPPRESSION | 230527 |

| POWER AMPLIFIER & SUPPLY BOARD (310335PC) (EUROPE VERSION) 730208 | |
|---|--------|
| POWER AMPLIFIER & SUPPLY BOARD (310335PC) (U.S. VERSION) | 730215 |
| INTEGRATED CIRCUIT: TDA2040 20W AUDIO POWER AMPLIFIER | 100013 |
| 7912 NEGATIVE 12V REGULATOR | 100043 |
| 7812 POSITIVE 12V REGULATOR | 100045 |
| LF353 DUAL J-FET INPUT OPERATIONAL AMPLIFIER | 100061 |
| L4960 2.5A POWER SWITCHING REGULATOR | 100900 |
| TDA7300 DIGITAL CONTROLLED AUDIO PROCESSOR | 100909 |
| P1087E P-CHANNEL FET | 090856 |
| BC173 NPN TRANSISTOR | 090182 |
| KBL02 DIODE BRIDGE | 080605 |
| BYV27 2A 100V FAST RECOVERY TIME RECTIFIER DIODE | 080170 |
| 100uH SWITCHING COIL | 230524 |
| 470uF LOW RF IMPEDANCE CAPACITOR | 030950 |
| FEMALE RCA PLUG SOCKET | 140213 |

NOTE: ANY REQUEST FOR NOT ABOVE MENTIONED PART MUST ENCOMPASS SPECIFIC DESCRIPTION INCLUDING : 1) MODEL NAME, 2) SECTION, 3) EVENTUAL MODULE CODE, 4) SCHEMATIC DIAG. REFERENCE.

