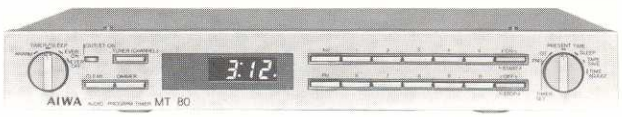
# SERVICE MANUAL

## MODEL NO.

### AUDIO PROGRAM TIMER

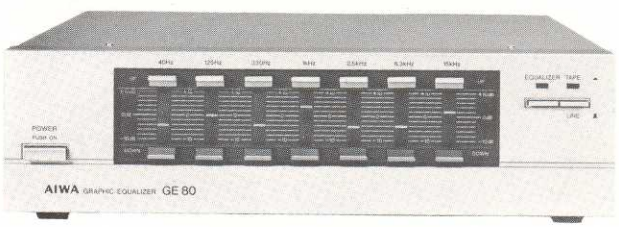
## MT-80




Code No. 21-800-000-03

### GRAPHIC EQUALIZER

## GE-80




Code No. 34-800-000-03

## TYPE. U

DATE OF ISSUE 12/1981

### SPECIFICATIONS

#### MT-80U

| | |
|---|---|
| **Type:** | Degital Audio Program Timer |
| **Semiconductors:** | 5 IC's, 14 transistors, 16 diodes, 4 LED's |
| **Power supply:** | AC 120V, 60 Hz |
| **Power consumption:** | 8W |
| **Dimensions:** | 250(W) x 36(H) x 262(D) mm (9 7/8" x 1 1/2" x 10 1/2") |
| **Weight:** | 1.6 kg (3.52 lbs.) |
| **Accuracy:** | ±15s./month (at 25°C) |
| **Timer accuracy:** | Within 0.02 s. of the displayed time |
| **Timer setting:** | 24 hours, in 1 minute steps, 2 ON/OFF cycles per 24 hours possible |
| **Sleep timer operation:** | 1 s. to 99 minutes, in 1 s. steps |
| **Zero reset control:** | 1 ~ 29 s. set back, 30 ~ 59 s. advanced. |

#### GE-80U

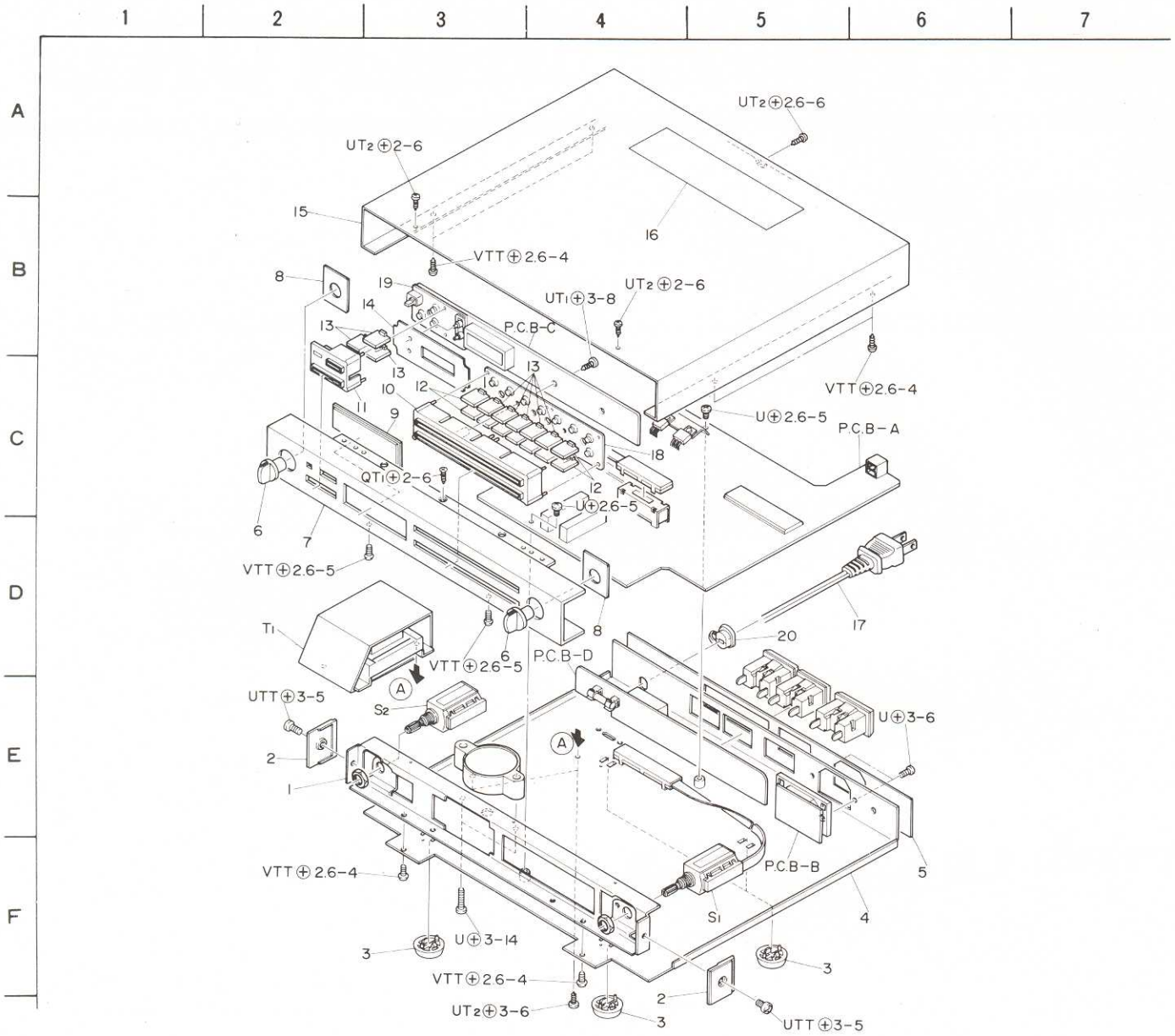
| | |
|---|---|
| **Semiconductors:** | 15 transistors, 2 diodes, 9 LEDs, |
| **Power supply:** | AC 120V, 60 Hz |
| **Power consumption:** | 5.5W |
| **Dimensions:** | 250(W) x 71(H) x 240(D) mm (9 7/8" x 2 3/4" x 9 1/2") |
| **Weight:** | 2 kg (4.40 lbs.) |
| **Frequency response:** | 10 Hz (−0.5dB)~35kHz (±0.5dB) |
| **Total harmonic distortion:** | Less than 0.03% (at OUTPUT 1V) |
| **Cross talk:** | More than 60 dB |
| **Equalizer frequency:** | 40, 125, 220, 1k, 2.5k, 6.3k, 15kHz ± 20% |
| **Equalizer variable range:** | Upper + 10 ± 1.5dB Lower −10 ± 1.5dB |
| **Input impedance:** | 50kΩ ± 30% |
| **Output impedance:** | 2.6kΩ ± 30% |
| **Inputs:** | 150mV (1000Hz) |
| **Outputs:** | 135 ± 8mV |
| **Output noise:** | Less than 0.015mV |
| **Output level:** | More than 5V |

- Specifications and external appearance are subject to change without due to product improvement.

AIWA CO.,LTD. TOKYO JAPAN

AIWA

## EXPLODED VIEW



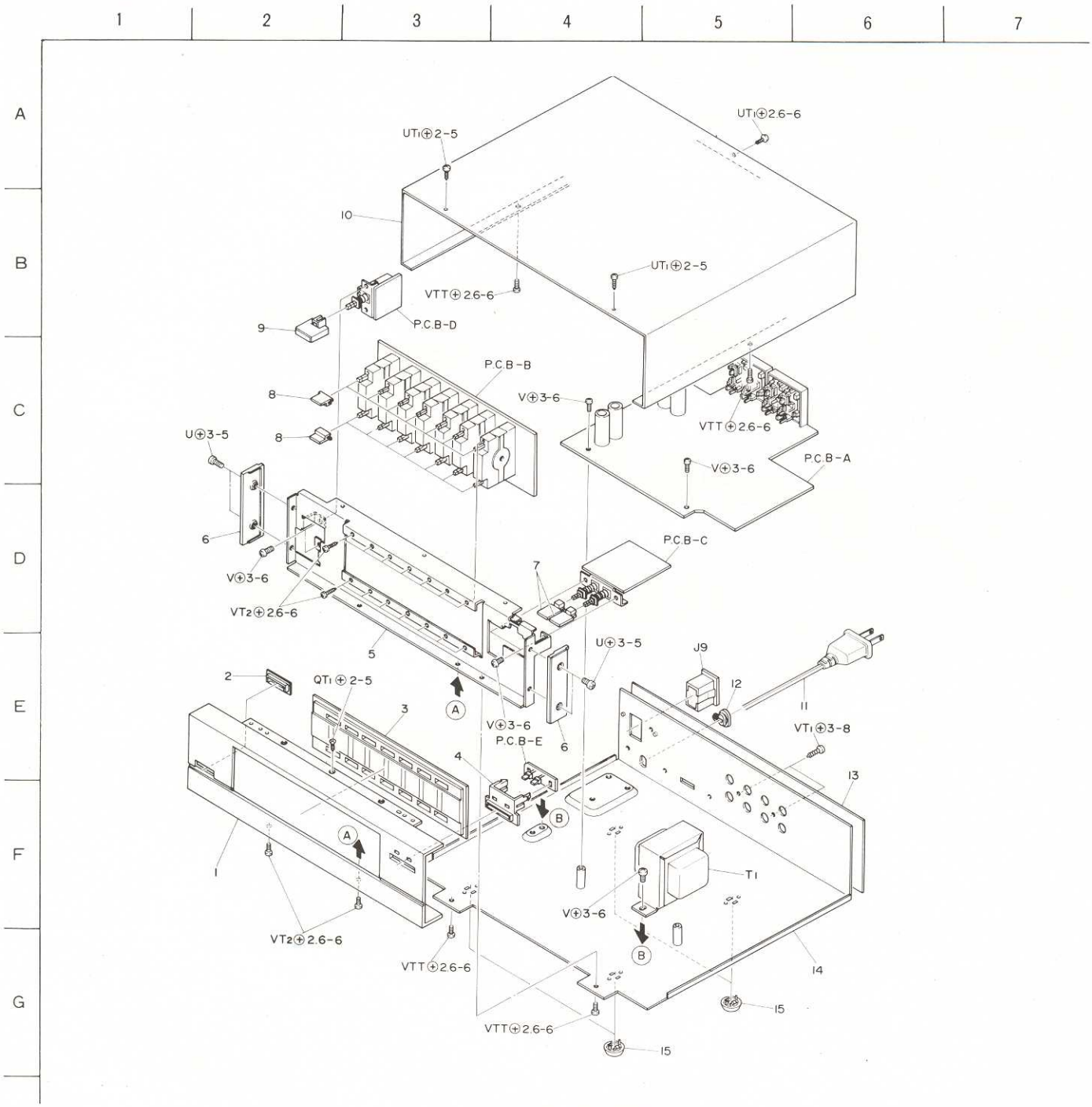

## PARTS LIST

### MECHANICAL PARTS

■ * mark in this part list shows exclusive part.

| Ref. No. | Part No. | Part No. Changed to | Description | Common Model | Q'ty |
|---|---|---|---|---|---|
| 1 | 82-753-201-01 | | Chassis, Front | MT-50 | 1 |
| 2 | 82-782-018-01 | | Panel, Side | * | 2 |
| 3 | 82-745-019-11 | | Foot | | 4 |
| 4 | 82-753-208-11 | | Amp. chassis H ass'y | MT-50 | 1 |
| 5 | 82-753-013-01 | | Jack plate | MT-50 | 1 |
| 6 | 82-782-005-01 | | Knob, Selector | * | 2 |
| 7 | 82-782-001-01 | | Panel, Front | | 1 |
| 8 | 82-753-214-11 | | Knob, Guide selector | MT-50 | 2 |
| 9 | 82-753-004-01 | | Window | MT-50 | 1 |
| 10 | 82-782-002-01 | | Guide A, Push-button | * | 1 |
| 11 | 82-782-003-01 | | Guide B, Push-button | * | 1 |
| 12 | 82-782-017-01 | | Push-key A (GRY) | * | 4 |
| 13 | 82-779-007-01 | | Push-key A | ST-R80 | 13 |
| 14 | 82-782-015-01 | | Display panel | * | 1 |
| 15 | 82-782-008-01 | | Cabinet, Steel | * | 1 |
| 16 | 82-782-011-01 | | Name plate Spec. | * | 1 |
| 17 | 87-034-929-01 | | AC power cord | | 1 |
| 18 | 82-782-601-01 | | Rubber switch A | * | 1 |
| 19 | 82-782-602-01 | | Rubber switch B | * | 1 |
| 20 | 87-085-101-01 | | Cord bushing | | 1 |

## EXPLODED VIEW




## PARTS LIST

### MECHANICAL PARTS

■ * mark in this part list shows exclusive part.

| Ref. No. | Part No. | Part No. Changed to | Description | Common Model | Q'ty | |
|---|---|---|---|---|---|---|
| 1 | 82-783-011-01 | | Panel, Front | * | 1 | |
| 2 | 82-783-021-01 | | Guide, Power | * | 1 | |
| 3 | 82-783-014-01 | | Window | * | 1 | |
| 4 | 82-783-022-01 | | Guide (EQ) | * | 1 | |
| 5 | 82-783-201-01 | | Front chassis | * | 1 | |
| 6 | 82-783-018-01 | | Panel, Side | * | 2 | |
| 7 | 82-781-004-01 | | Selector knob | SA-P80 | 2 | |
| 8 | 82-783-015-01 | | Push-button A | * | 14 | |
| 9 | 82-780-008-01 | | Button, Power | SA-C80 | 1 | |
| 10 | 82-783-017-01 | | Cabinet, Steel | * | 1 | |
| 11 | 82-783-614-01 | | AC power cord | * | 1 | |
| 12 | 82-783-220-01 | | Cord bushing | * | 1 | |
| 13 | 82-783-025-01 | | Jack plate | * | 1 | |
| 14 | 82-783-202-01 | | Chassis, Amp. | * | 1 | |
| 15 | 82-745-019-11 | | Foot | * | 4 | |

## ACCESSORIES/PACKAGE = MT-80U

| Ref. No. | Part No. | Part No. Changed to | Description | Common Model | Q'ty | |
|---|---|---|---|---|---|---|
| 1 | 82-782-853-01 | | Printed indiv., Packing | * | 1 | |
| 2 | 82-753-852-11 | | Cushion L, Printed indiv. | MT-50 | 1 | |
| 3 | 82-753-853-11 | | Cushion R, Printed indiv. | MT-50 | 1 | |
| 4 | 87-051-131-11 | | Poly-vinyl sack | | 1 | |
| 5 | 87-056-604-01 | | Poly-vinyl sack | | 1 | |
| 6 | 82-782-908-01 | | Instructions booklet | * | 1 | |
| 7 | 87-051-171-11 | | Poly-vinyl sack | | 1 | |
| 8 | 87-056-057-01 | | Service station list | | 1 | |
| 9 | 87-056-045-01 | | Guarantee card | | 1 | |
| 10 | 85-439-002-01 | | Syncrate cord CW-150K | | 1 | |
| 11 | 85-488-001-01 | | Connection cord CW-250K | | 1 | |
| 12 | 87-056-050-01 | | Safety instruction | | 1 | |

## ACCESSORIES/PACKAGE = GE-80U

| Ref. No. | Part No. | Part No. Changed to | Description | Common Model | Q'ty | |
|---|---|---|---|---|---|---|
| 1 | 82-783-851-01 | | Printed indiv., Packing | * | 1 | |
| 2 | 82-748-856-21 | | Cushion L, Printed indiv. | SA-C50 | 1 | |
| 3 | 82-748-857-31 | | Cushion R, Printed indiv. | SA-C50 | 1 | |
| 4 | 87-056-604-01 | | Poly-vinyl sack | | 1 | |
| 5 | 87-056-057-01 | | Service station list | | 1 | |
| 6 | 87-051-171-11 | | Poly-vinyl sack | | 1 | |
| 7 | 82-783-905-01 | | Instructions booklet | * | 1 | |
| 8 | 82-783-070-01 | | Connection cord | * | 2 | |
| 9 | 87-056-045-01 | | Guarantee card | | 1 | |
| 10 | 87-056-050-01 | | Safety instruction | | 1 | |

## ELECTRICAL MAIN PARTS LIST

| Symbol No. | Part No. | Description |
|---|---|---|
| | ≪MAIN CIRCUIT BOARD SECTION≫ | |
| PCB-A | * | Main circuit board |
| ⚡ IC1 | 87-027-685-01 | IC, TCP-4620-5002 |
| ⚡ IC2 | 87-027-747-01 | IC, MSM4001RS |
| ⚡ IC3 | 87-027-510-01 | IC, μPD4001 |
| IC4 | 87-027-614-01 | IC, TD62103P |
| IC5 | 87-027-616-01 | IC, TC4050BP |
| Q1,2 | 89-408-804-51 | Transistor, 2SD880Y(GR) |
| Q3,4 | 89-318-154-01 | Transistor, 2SC1815(Y) |
| Q5,6,7,8 9,10,11 12,13,14 | 89-110-154-01 | Transistor 2SA1015(Y) |
| D1 | 87-027-376-01 | Diode, 1B4B41 |
| D2,3,4, 7,8,9, 10,11,12 14 | 87-027-097-01 | Diode, 1S1555 |
| D13 | 87-027-369-01 | Zener diode, 05Z6.2L |
| L1 | 82-401-661-01 | Choke coil, 600μH |
| TC1 | 85-708-604-21 | Trimmer, 30pF |
| S1 | 82-753-613-01 | Slide switch (PRESET TIME) |
| S2 | 82-753-616-01 | Slide switch (TIMER/SLEEP) |
| J1 | 87-032-882-01 | Jack, 2.5φ (TAPE TIME) |
| X1 | 87-030-075-01 | Crystal resonator |
| | < **Resistor** > | |
| R6 | 87-025-283-01 | 12kΩ Metal film resistor |
| R7 | 87-025-292-01 | 6.8kΩ Metal film resistor |
| | < **Capacitor** > | |
| C1 | 87-015-459-01 | 1000μF 25V Electrolytic |
| | ≪REMOTE JACK CIRCUIT BOARD SECTION≫ | |
| PCB-B | * | Remote jack circuit board |
| J2 | 87-049-064-01 | Remote jack (REMOTE) |
| | ≪SWITCH CIRCUIT BOARD SECTION≫ | |
| PCB-C | 82-782-603-01 | Switch circuit board |
| D1 | 87-027-613-01 | LED, TLG-4125 |
| D2,3 | 87-027-377-01 | LED, GL2PR1 |
| D4 | 87-027-542-01 | LED, LN217RP |
| D5,6,7,8 | 87-027-097-01 | Diode, 1S1555 |
| S3,4,5,7, 8 | 82-782-602-01 | Rubber switch B (1, 2, 3, 4, 5, 6, 7, 8, 9, 10 AM, PM, ON/START, OFF/STOP) |
| S6,9,10 | 82-782-601-01 | Rubber switch A (TUNER, DIMMER, CLEAR) |
| | ≪AC OUTLET CIRCUIT BOARD SECTION≫ | |
| ⚠ PCB-D | 82-753-628-01 | AC outlet circuit board |
| ⚠ RY1 | 87-045-145-01 | Relay, G2L-113P |
| ⚠ J3,4,5 | 87-032-937-01 | AC outlet |
| ⚠ | 82-304-743-01 | 1P terminal |
| | ≪MISCELLANEOUS≫ | |
| ⚠ T1 | 82-753-622-01 | Power transformer |
| | 86-992-611-11 | Ceramic buzzer |
| S1 | 82-753-612-01 | Remote rotary A (PRESET TIME) |
| S2 | 82-753-615-01 | Remote rotary B (TIMER/SLEEP) |
| ⚠ | 87-034-929-01 | AC power cord |
| | 87-032-972-01 | Connector, 12P |
| | 82-753-617-11 | Flat cable, 12P |
| | 82-753-618-11 | Flat cable, 12P |
| | 82-753-619-01 | Flat cable, 4P |
| | 82-753-620-01 | Flat cable, 4P |

⚠ Safety component symbol

This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

**C-MOS IC handling precaution**

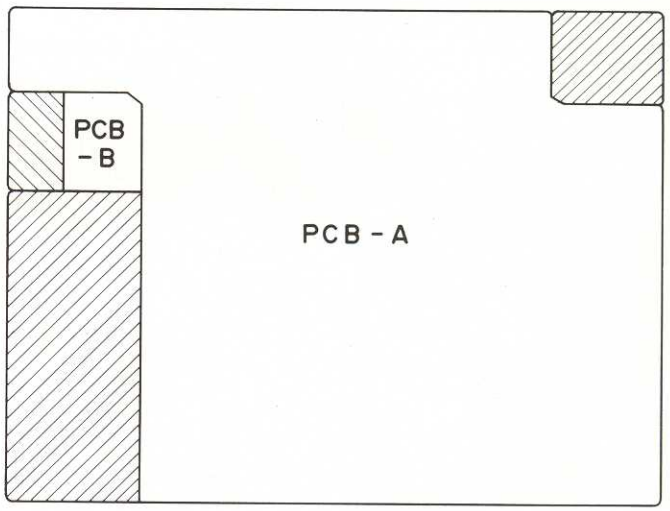
The C-MOS IC's construction makes this part susceptible to damage by static electricity and so take sufficient care in regard to following articles.

1. Need to be put on conductive sheet, to be put in a metallic box and to be wrapped by aluminium foil for transportation and deposit.
2. To use solder iron less than 40W (less than 260°C) of power consumption for soldering. But do not overheat more than 10 second.
3. Do not perform a conductivity test with a tester, etc. Refer to the circuit voltages of each part.
4. The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark ( ⚡ ).

### Note; Combination Circuit Board

The parts on the electrical parts list which are indicated by an asterisk (*) are supplied as one single combined circuit board. Therefore, they will not be supplied separately. If this becomes necessary, please order the entire circuit board.

**Combination circuit board 82-782-605-01**



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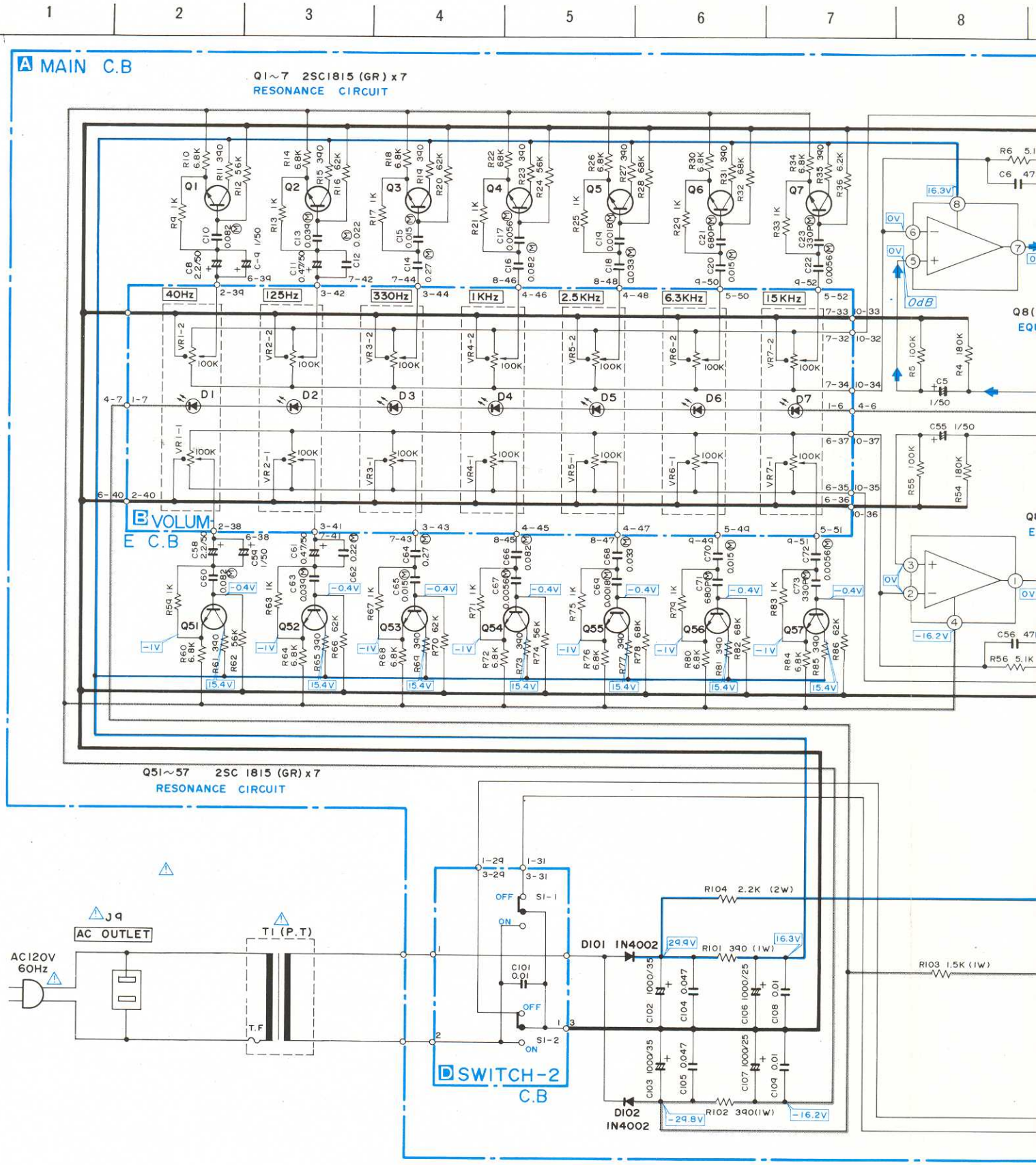
GE-80U

## SCHEMATIC DIAGRAM



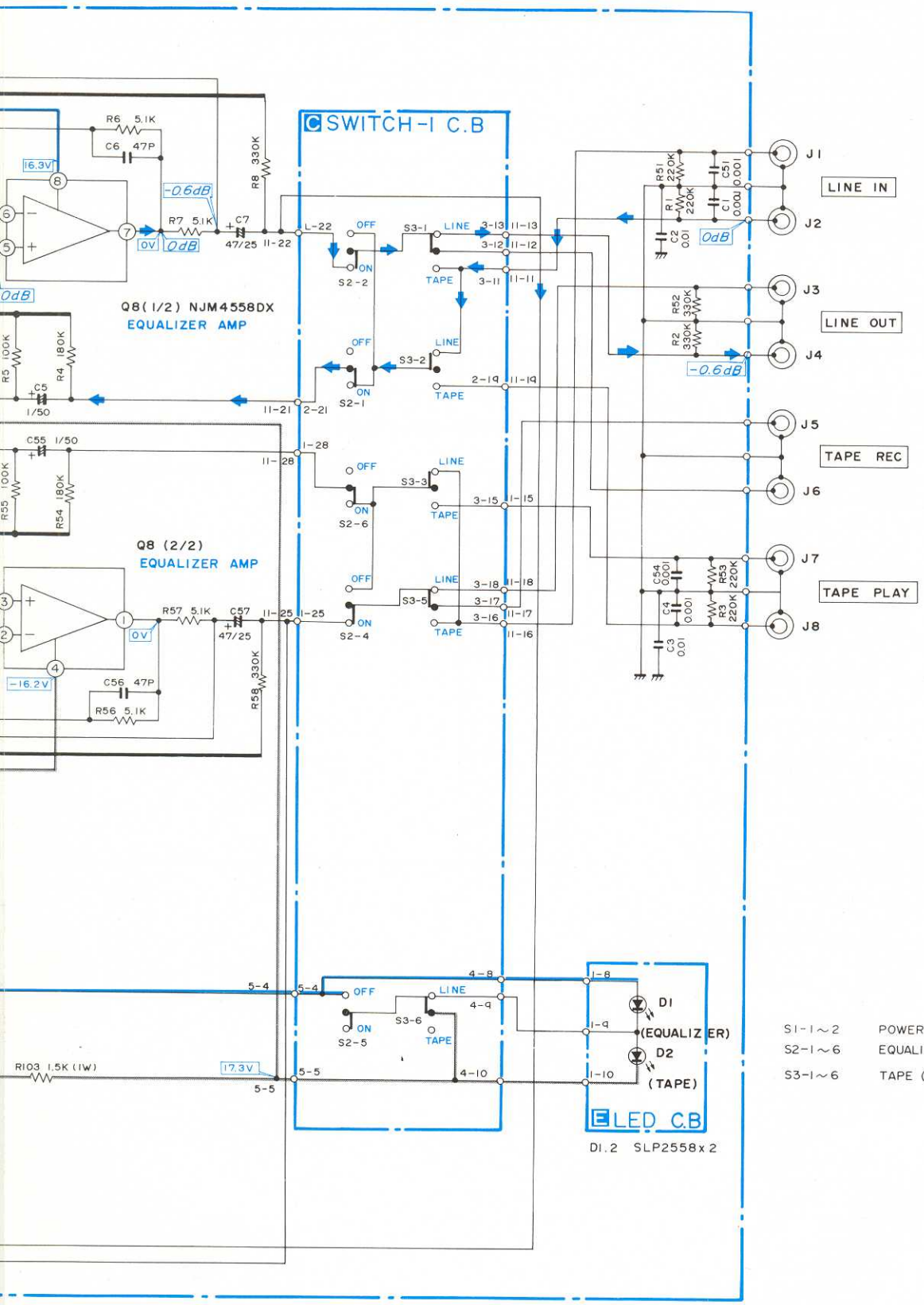

**NOTES:**

1) B (+) power supply
2) Signal path
3) The voltage is the reference value measured with a tester (20 k-ohms/V DC) when there are no signals.
4) Resistors with no designation have a rated power of 1/4W and a tolerance of ±5%.
5) Capacitors with no designation have a dielectirc strneght of less than 50WV.
6) The only capacitor tolerance indicated are ±5% (J) and ±10% (K).
7) Ceramic capacitor symbols:
   - For temperature compensation (SL)
   - High dielectric constant system (YY)
   - High dielectric constant system (YW, YP, YZ)
8) Explanation of symbols
   - (M) Mylar capacitor
   - Fuse resistor

⚠ Safety component sy
This symbol is given to
to maintain the safety o
made to conform to
Therefore, when replac
symbol, make absolutel
signated part.

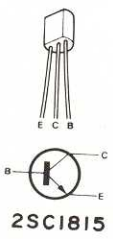
- This schematic diagram
notice in the interests of

8 9 10 11 12 13 14 15




S1-1～2 POWER (OFF)
S2-1～6 EQUALIZER (ON)
S3-1～6 TAPE (LINE)

afety component symbol
symbol is given to important parts which serve aintain the safety of the product, and which are to conform to special safety specifications. efore, when replacing a component with this ol, make absolutely sure that you use a de- ed part.
schematic diagram is subject to change without e in the interests of improved performance.




2SC1815

## ELECTRICAL MAIN PARTS LIST

| Symbol No. | Part No. | Description |
|---|---|---|
| ≪ MAIN CIRCUIT BOARD SECTION ≫ | | |
| PCB-A | * | Main circuit board |
| Q1,2,3,4, 5,6,7,51 52,53,54 55,56,57 | 89-318-155-01 | Transistor, 2SC1815 (GR) |
| Q8 | 87-027-629-01 | IC, NJM 4558DX |
| D101,102 | 82-783-602-01 | Diode, IN 4002 |
| J1,2,3,4, 5,6,7,8 | 87-049-055-01 | 4P Pin jack (LINE IN, LINE OUT TAPE REC, TAPE PLAY) |
| ≪ VOLUME CIRCUIT BOARD SECTION ≫ | | |
| PCB-B | * | Volume circuit board |
| VR1,2,3,4, 5,6,7 | 82-783-606-01 | LED, Push-volume (40Hz, 125Hz, 330Hz, 1kHz, 2.5kHz, 6.3kHz, 15kHz) |
| D1,2,3,4, 5,6,7 | | |
| ≪ SWITCH-1 CIRCUIT BOARD SECTION ≫ | | |
| PCB-C | * | Switch-1 circuit board |
| S2,3 | 82-783-604-01 | Push-switch (EQUALIZER, TAPE) |
| ≪ SWITCH-2 CIRCUIT BOARD SECTION ≫ | | |
| PCB-D | * | Switch-2 circuit board |
| S1 | 82-783-605-01 | Push-switch (POWER) |
| ≪ LED CIRCUIT BOARD SECTION ≫ | | |
| PCB-E | * | LED circuit board |
| D1,2 | 82-783-603-01 | LED, SLP-255B (EQUALIZER, TAPE) |
| ≪ MISCELLANEOUS ≫ | | |
| ⚠ T1 | 82-783-613-01 | Power transformer |
| ⚠ J9 | 82-783-045-01 | AC outlet |
| ⚠ | 82-783-614-01 | AC power cord |
| | 82-783-220-01 | Cord bushing |
| ⚠ | 82-783-607-01 | Pin, 3P |

⚠ Safety component symbol
This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

Note; Combination Circuit Board
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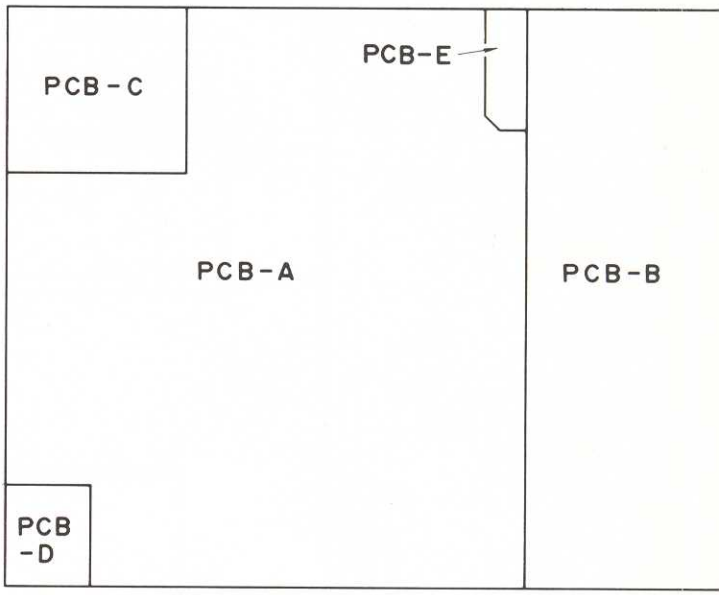
**Combination circuit board 82-783-601-01**



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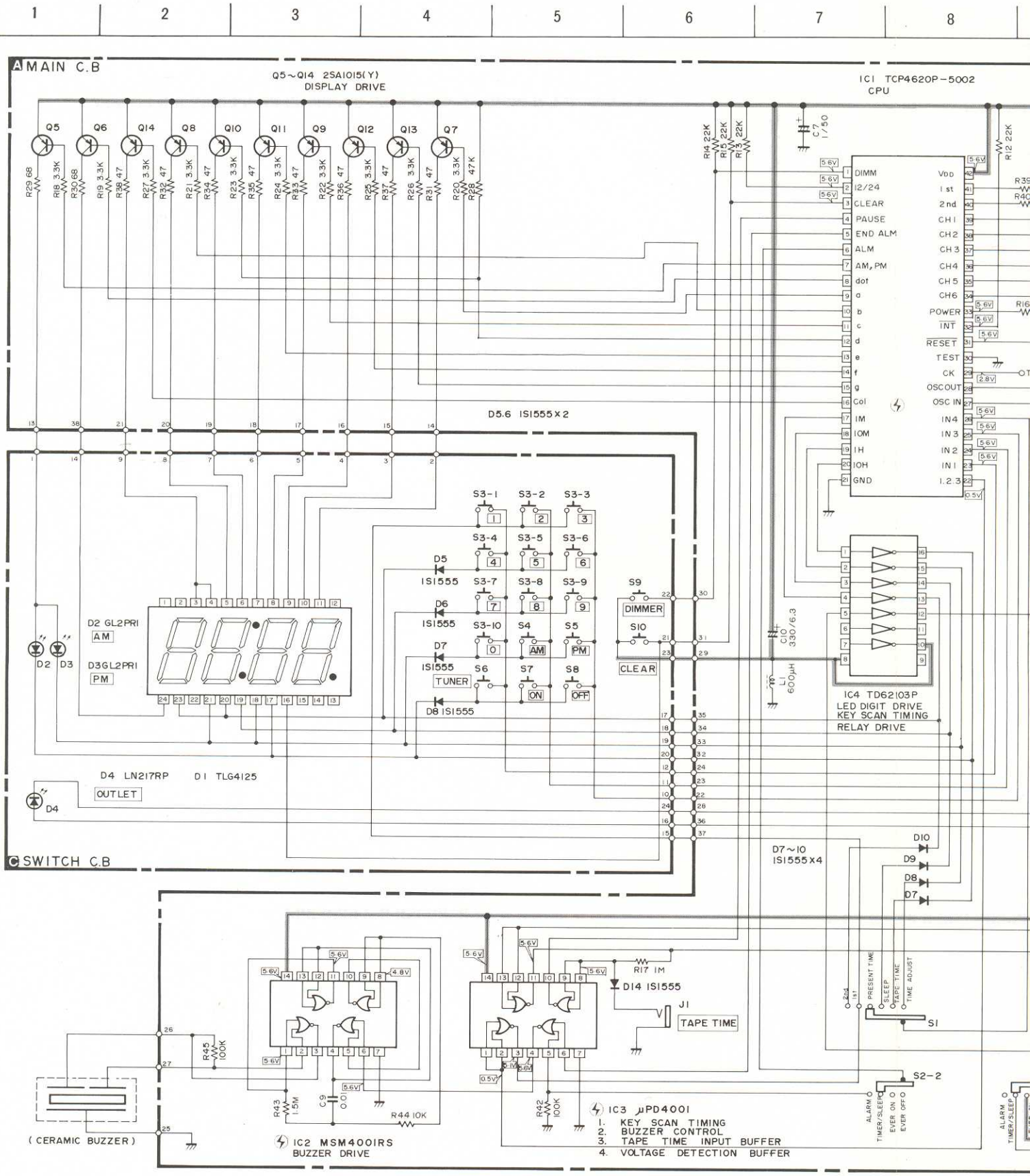
MT-80U

## SCHEMATIC DIAGRAM




**NOTES:**

1) ▬ B (+) power supply
2) The voltage is the reference value measured with a tester (20 k-ohms/V DC) when there are no signals.
3) Resistors with no designation have a rated power of 1/4W and a tolerance of ±5%.
4) Capacitors with no designation have a dielectirc strneght of less than 50WV.
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6) Ceramic capacitor symbols:
   - For temperature compensation (SL)
   - High dielectric constant system (YY)
   - High dielectric constant system (YW, YP, YZ)
   - Semiconductor ceramic

⚠ Safety component
This symbol is given
to maintain the safety
made to conform to
Therefore, when rep
symbol, make absolu
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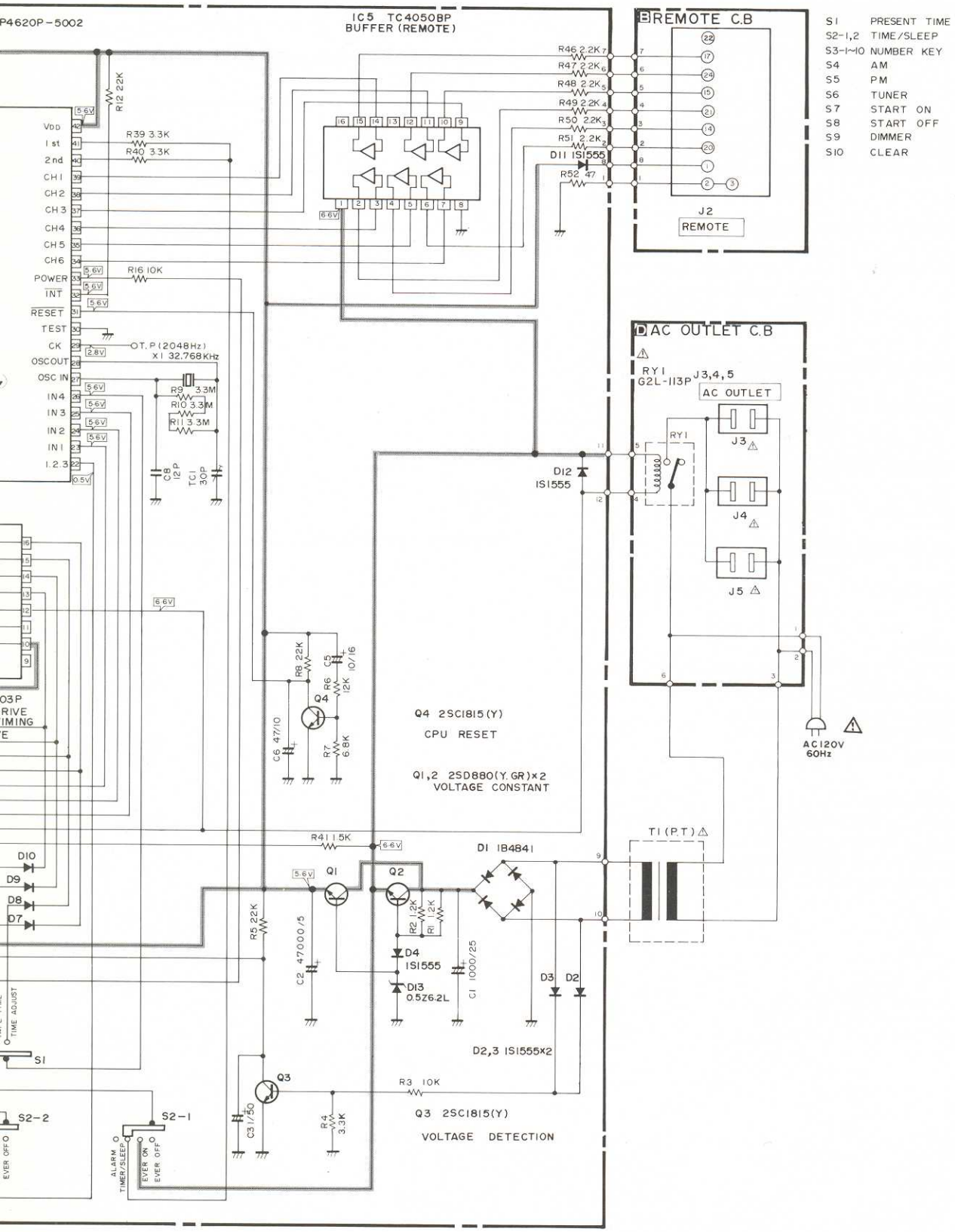
• This schematic diagra
notice in the interests




△ Safety component symbol

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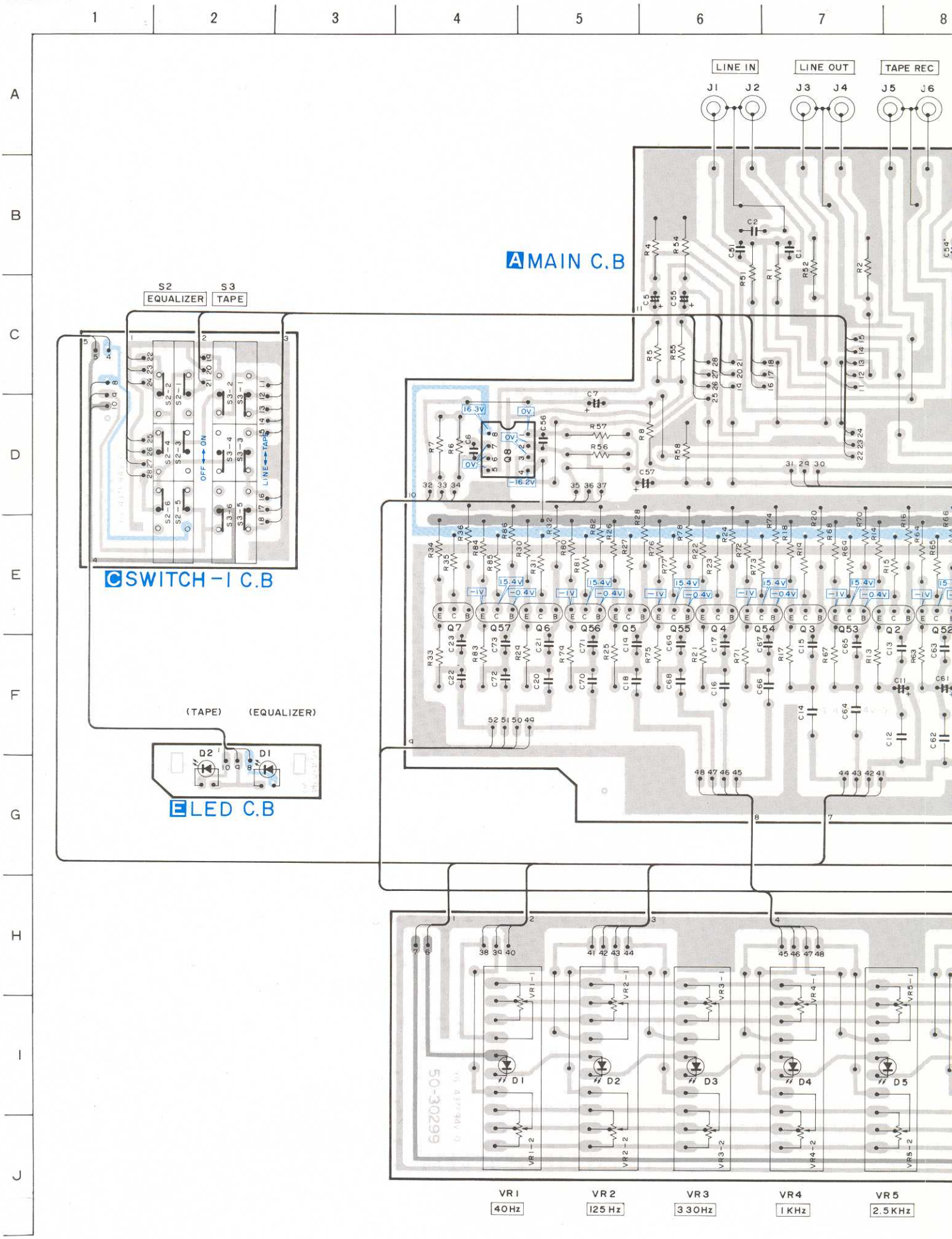
This schematic diagram is subject to change without notice in the interests of improved performance.

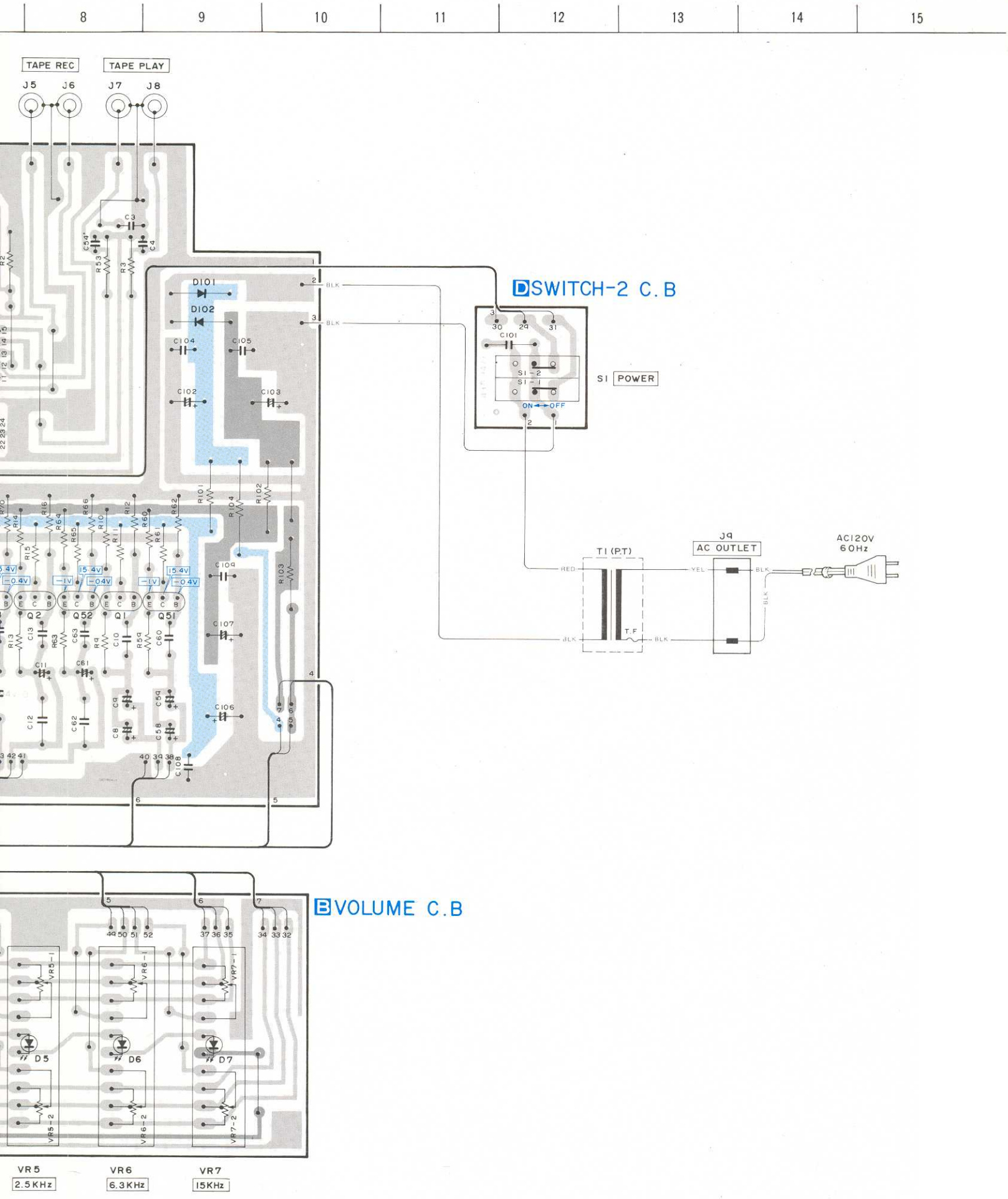
The ICs on the electrical parts which are indicated by an C MOS IC symbol mark ( ⚡ ).

NOTES (1) B(+) Pattern B (−) Pattern Others pattern
(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when t

## WIRING

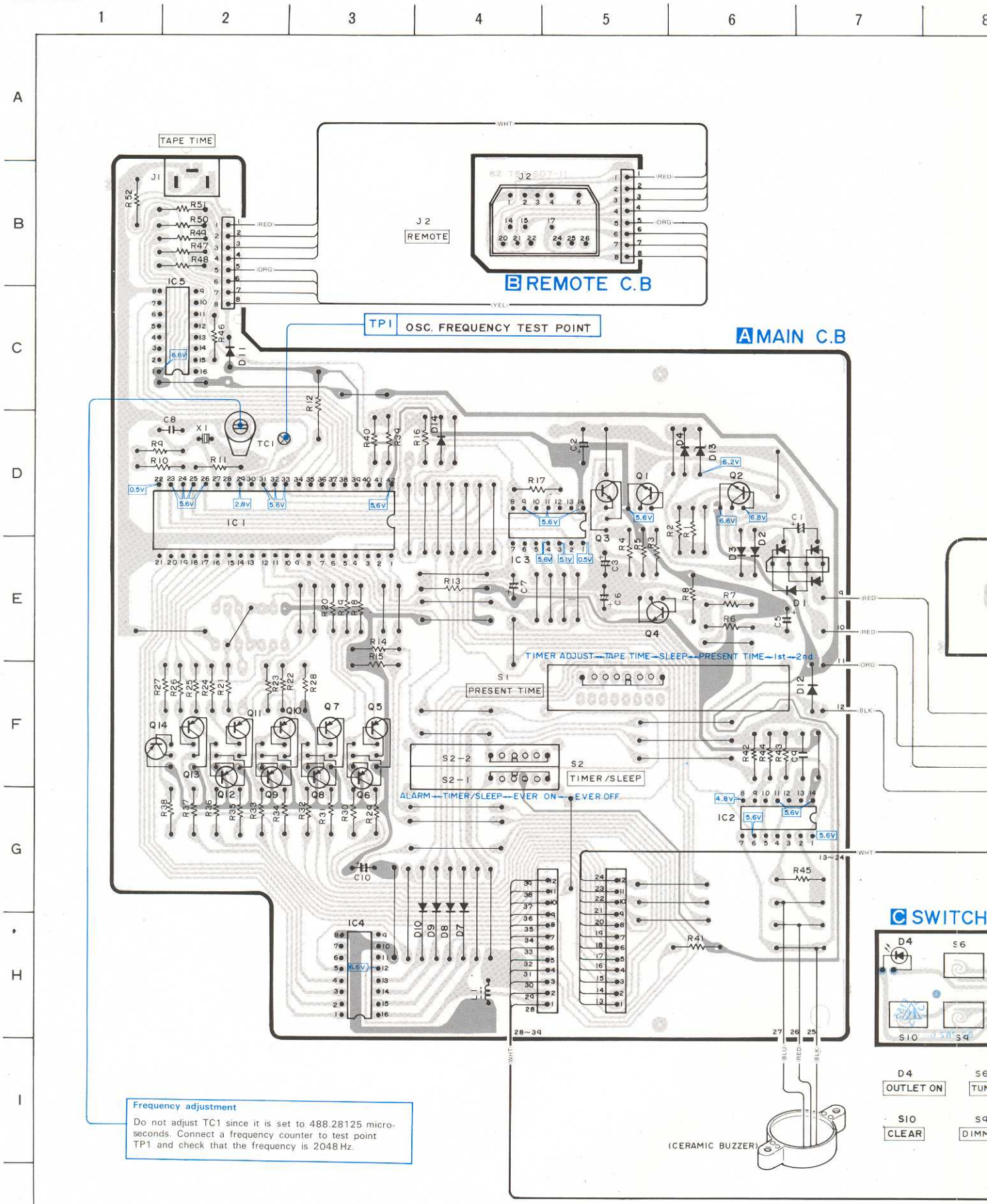


/V DC) when there are no signals.



NOTES (1) B(+) Pattern Component side pattern Others pattern
(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no sign

## WIRING



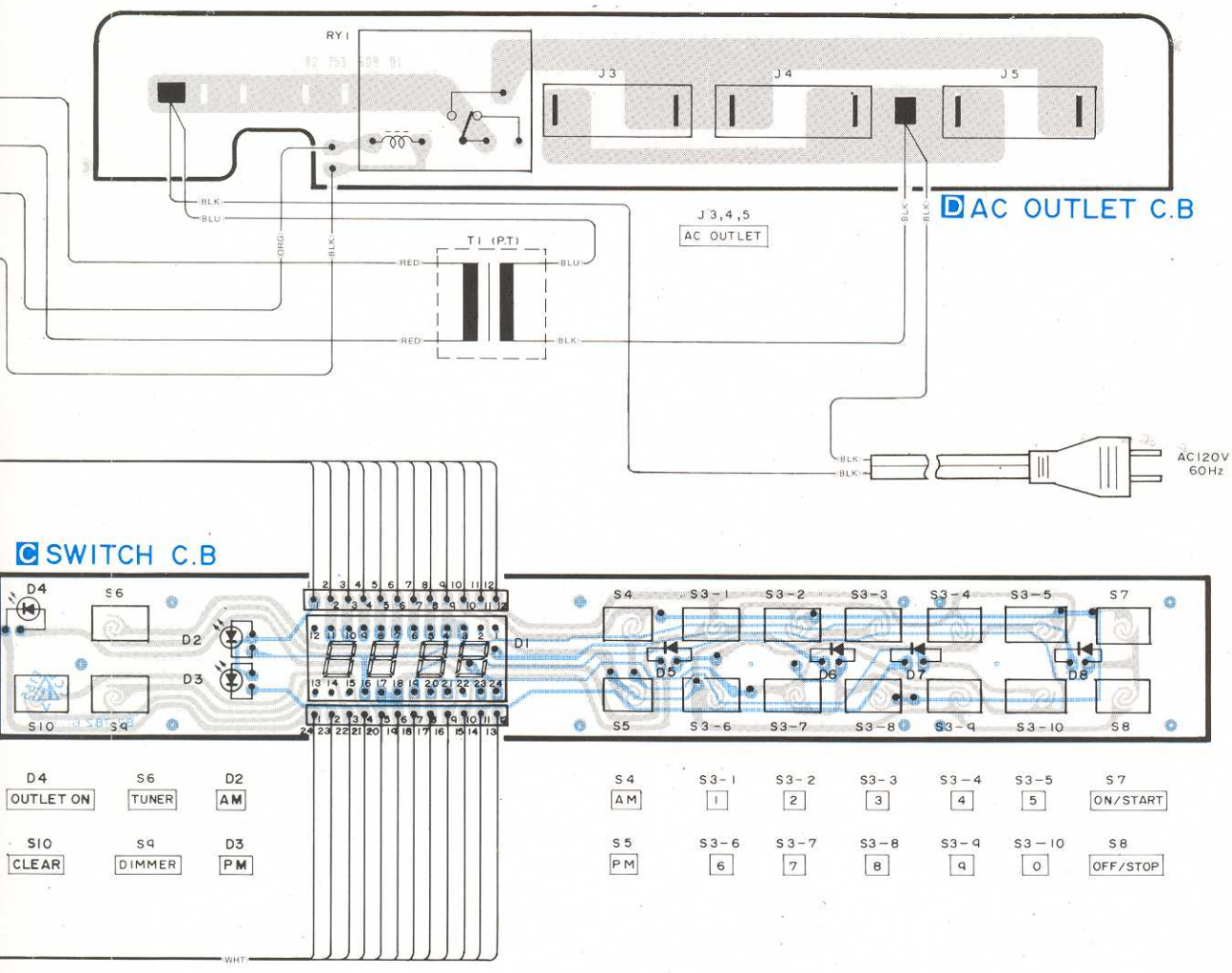

**C-MOS IC handling precaution**

The C-MOS IC's construction makes this part susceptible to damage by static electricity and so take sufficient care in regard to following articles.

1. Need to be put on conductive sheet, to be put in a metallic bo and to be wrapped by aluminium foil for transportation an deposit.
2. To use solder iron less than 40W (less than 260° C) of powe consumption for soldering. But do not overheat more than 1 second.

here are no signals.

8 9 10 11 12 13 14 15

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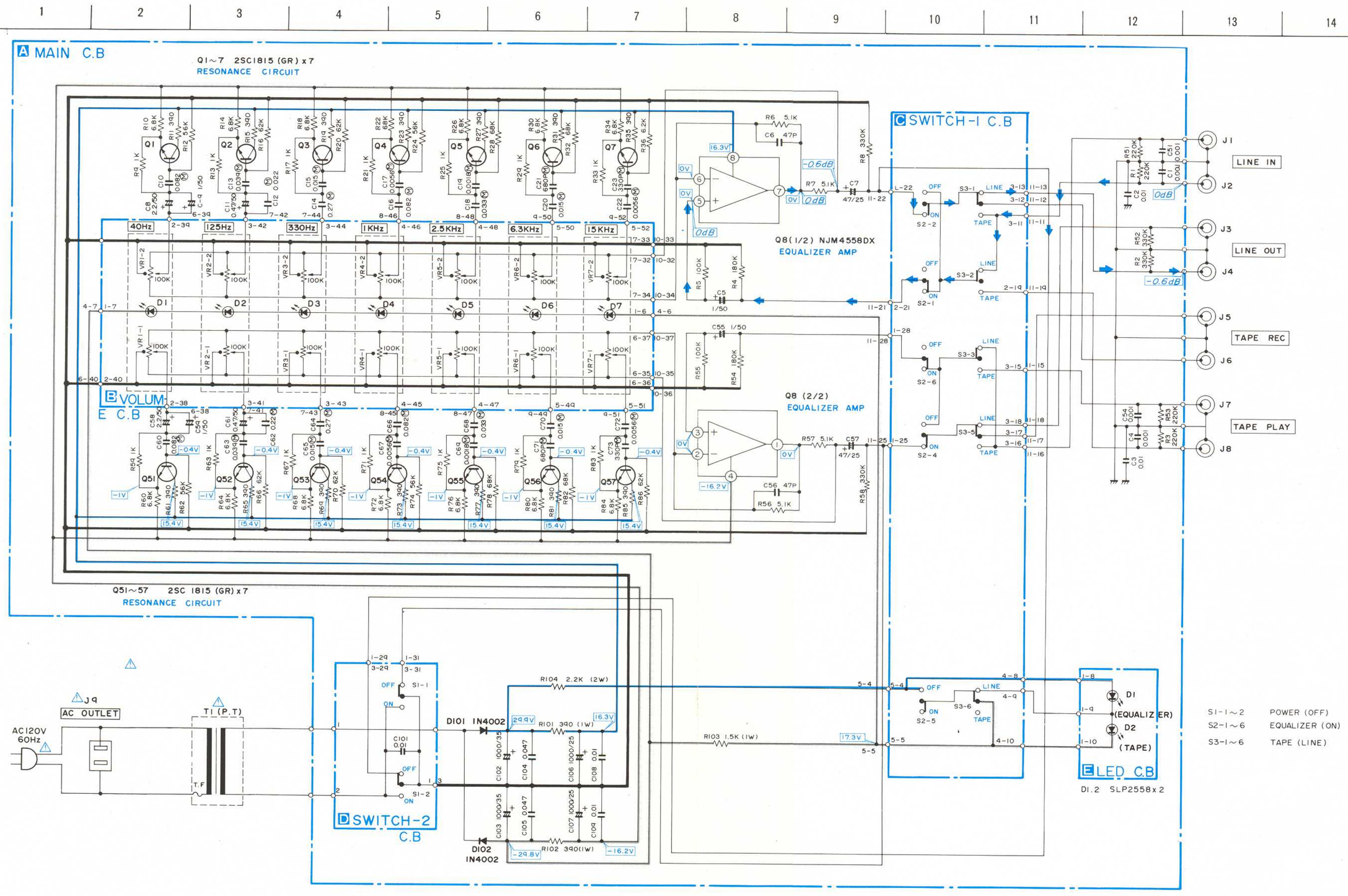
3. Do not perform a conductivity test with a tester, etc. Refer to the circuit voltages of each part.
4. The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark ( ⚡ ).

## SCHEMATIC DIAGRAM

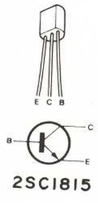



**NOTES:**

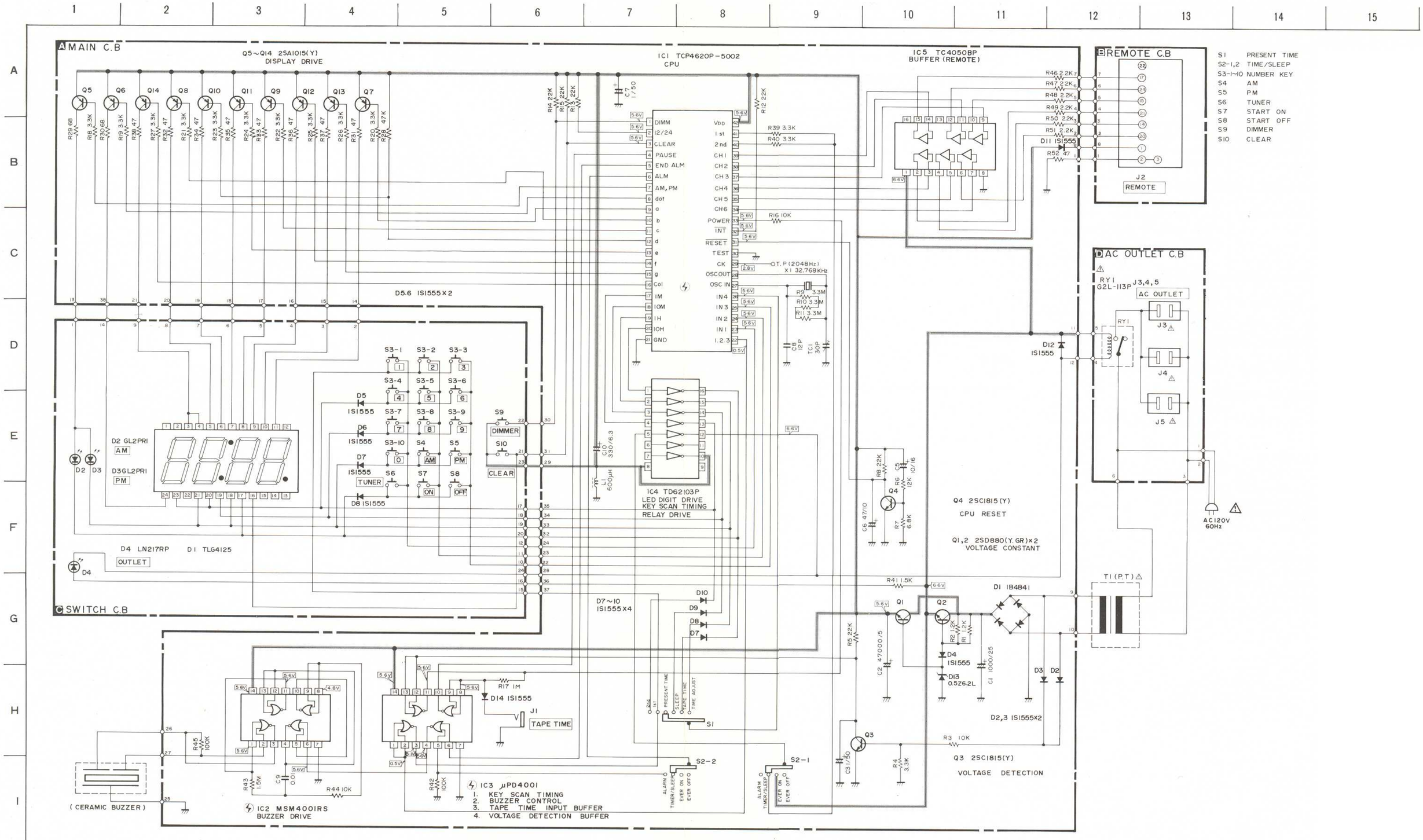
1) B (+) power supply
2) Signal path
3) The voltage is the reference value measured with a tester (20 k-ohms/V DC) when there are no signals.
4) Resistors with no designation have a rated power of 1/4W and a tolerance of ±5%.
5) Capacitors with no designation have a dielectirc strneght of less than 50WV.
6) The only capacitor tolerance indicated are ±5% (J) and ±10% (K).
7) Ceramic capacitor symbols:
   - For temperature compensation (SL)
   - High dielectric constant system (YY)
   - High dielectric constant system (YW, YP, YZ)
8) Explanation of symbols
   - Mylar capacitor
   - Fuse resistor

⚠ Safety component symbol
This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

- This schematic diagram is subject to change without notice in the interests of improved performance.



## SCHEMATIC DIAGRAM




**NOTES:**

1) ▩ B (+) power supply
2) The voltage is the reference value measured with a tester (20 k-ohms/V DC) when there are no signals.
3) Resistors with no designation have a rated power of 1/4W and a tolerance of ±5%.
4) Capacitors with no designation have a dielectirc strneght of less than 50WV.
5) The only capacitor tolerance indicated are ±5% (J) and ±10% (K).
6) Ceramic capacitor symbols:
   - For temperature compensation (SL)
   - High dielectric constant system (YY)
   - High dielectric constant system (YW, YP, YZ)
   - Semiconductor ceramic

⚠ Safety component symbol
This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

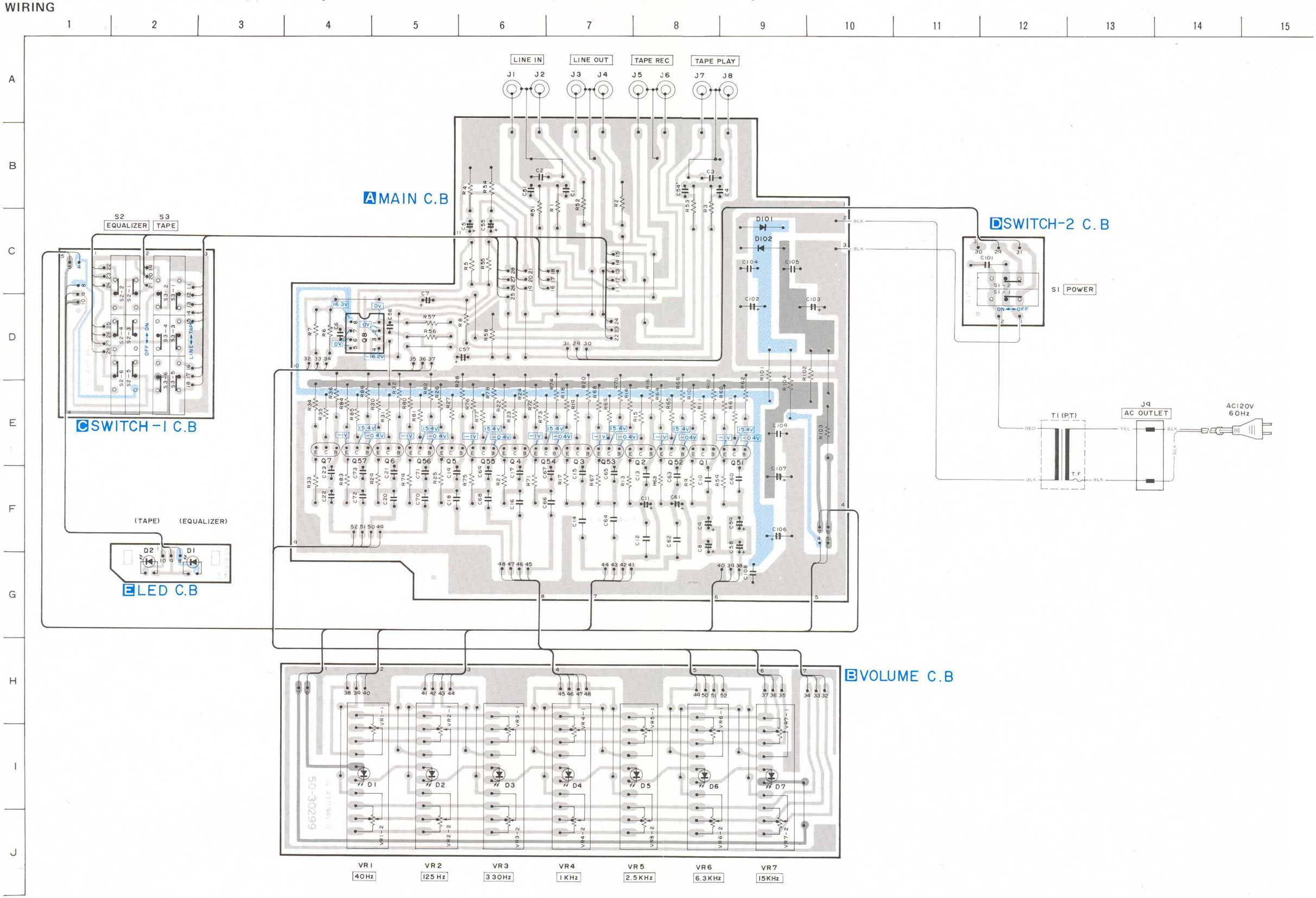
• This schematic diagram is subject to change without notice in the interests of improved performance.

The ICs on the electrical parts which are indicated by an C MOS IC symbol mark ( ⚡ ).

NOTES (1) B(+) Pattern B (–) Pattern Others pattern

(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.

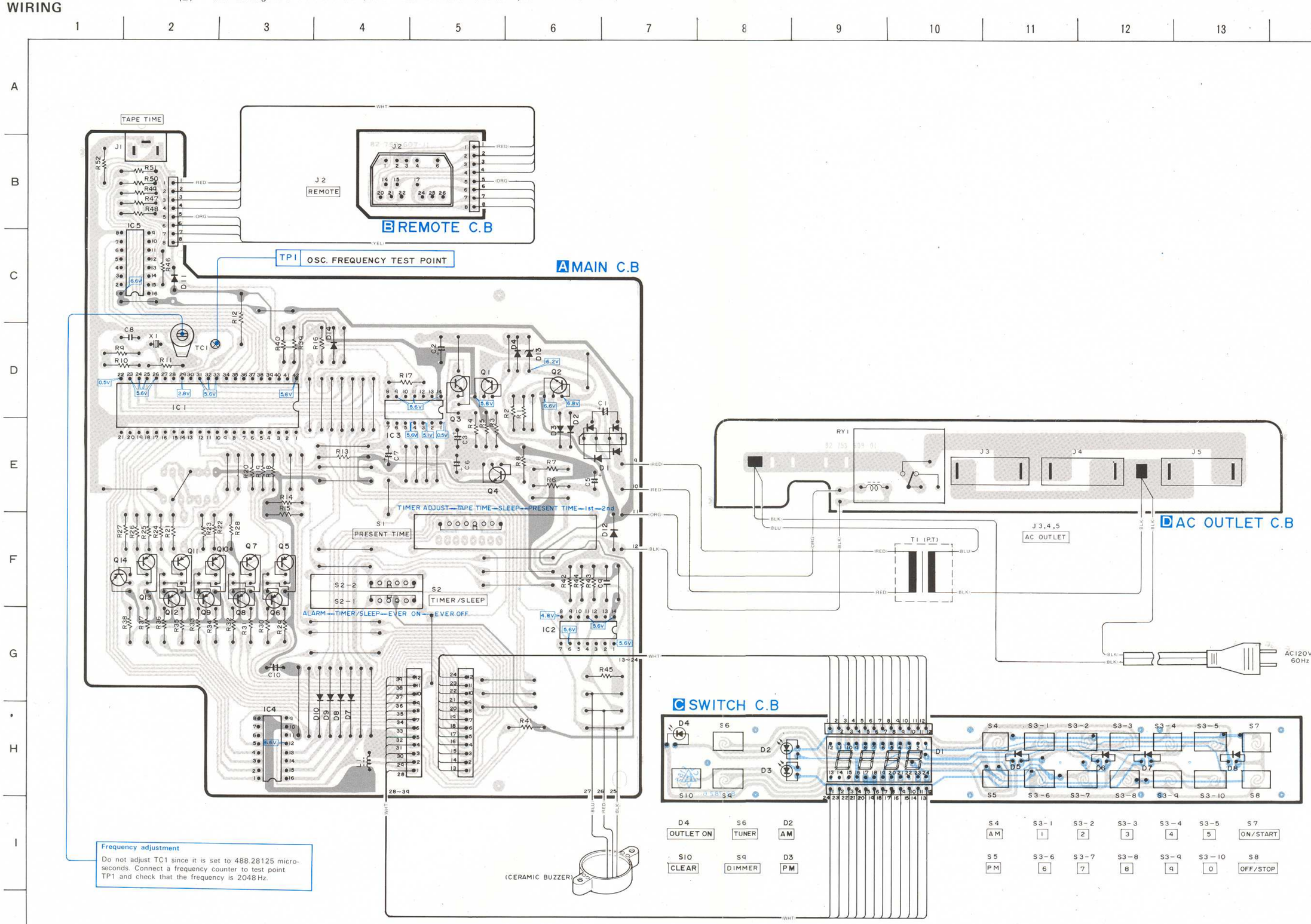
## WIRING



NOTES (1) B(+) Pattern Component side pattern Others pattern

(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.

## WIRING




**Frequency adjustment**

Do not adjust TC1 since it is set to 488.28125 micro-seconds. Connect a frequency counter to test point TP1 and check that the frequency is 2048 Hz.

**C-MOS IC handling precaution**

The C-MOS IC's construction makes this part susceptible to damage by static electricity and so take sufficient care in regard to following articles.

1. Need to be put on conductive sheet, to be put in a metallic box and to be wrapped by aluminium foil for transportation and deposit.
2. To use solder iron less than 40W (less than 260°C) of power consumption for soldering. But do not overheat more than 10 second.
3. Do not perform a conductivity test with a tester, etc. Refer to the circuit voltages of each part.
4. The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark ( ⚡ ).