

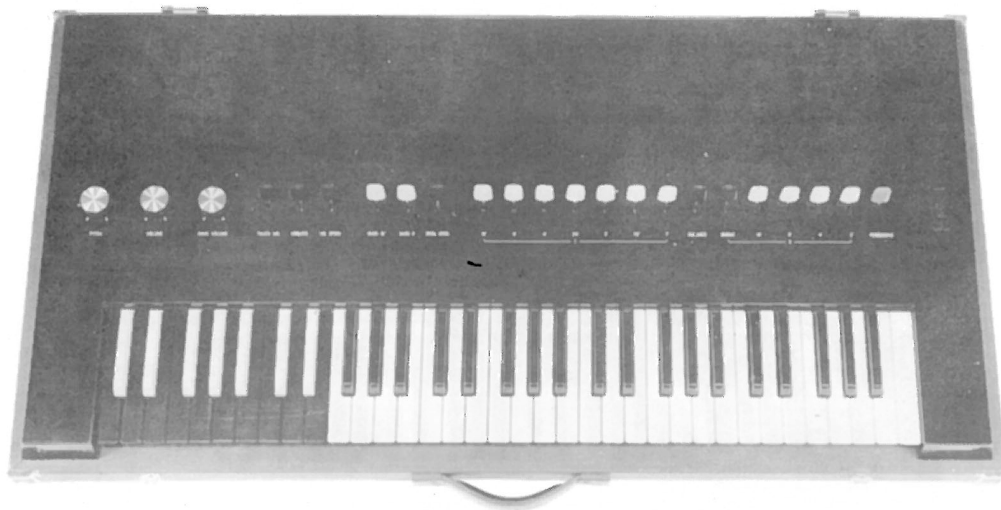
# YAMAHA COMBO ORGAN

YC-20

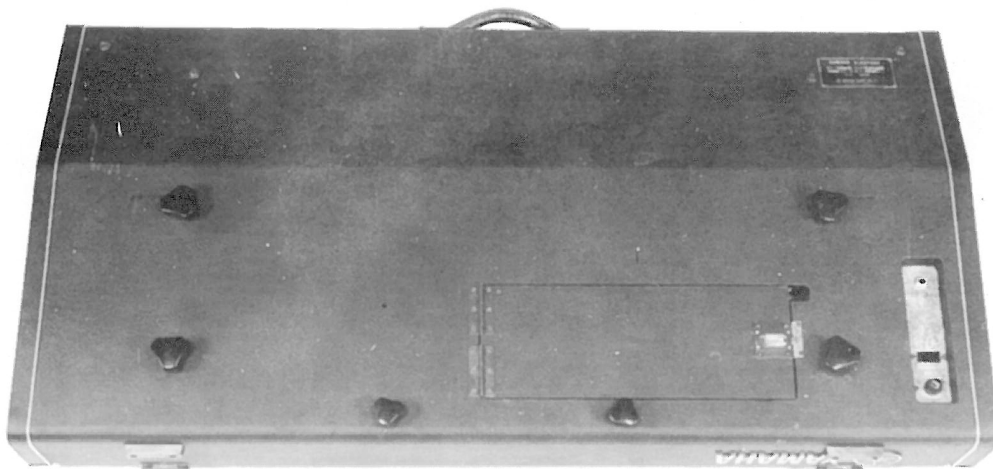
## SERVICE MANUAL



NIPPON GAKKI CO., LTD.  
HAMAMATSU, JAPAN



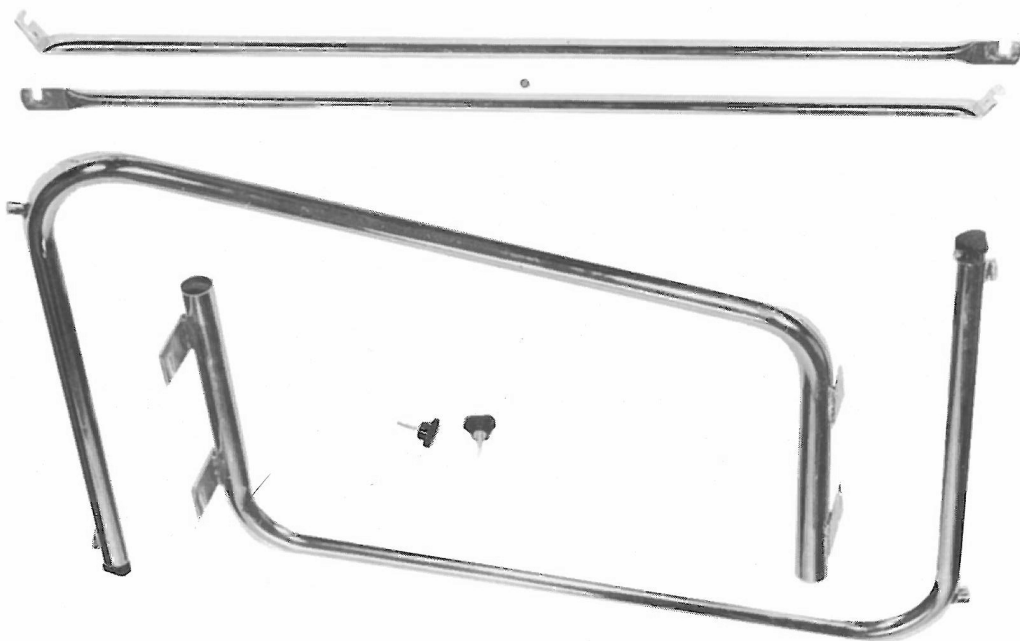
Exterior View 1 Top



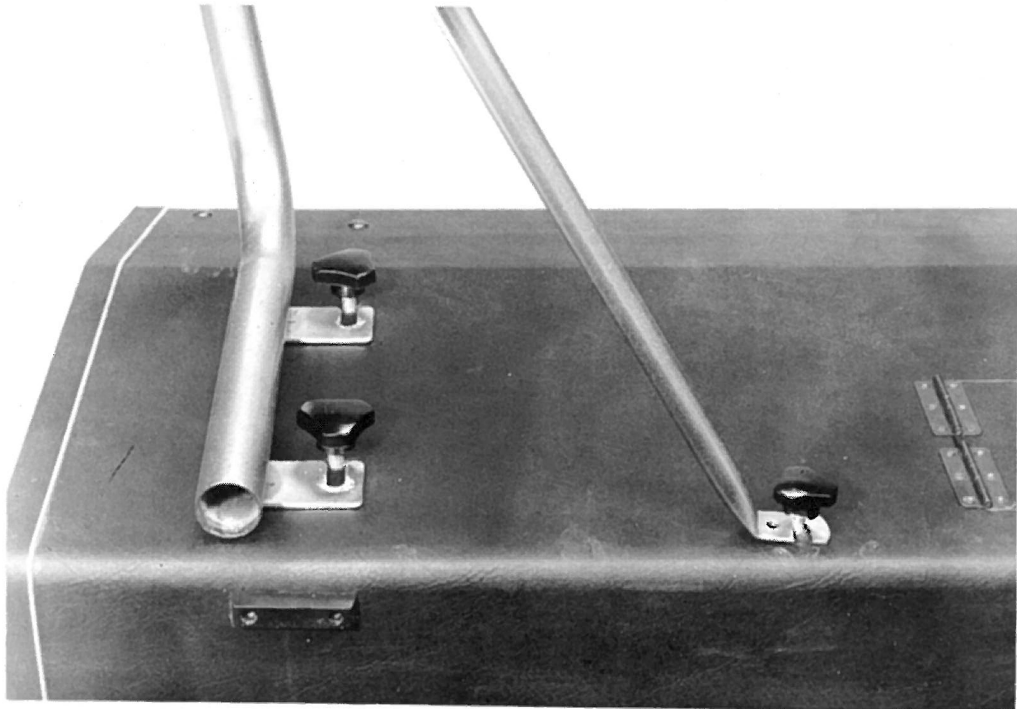
Exterior View 2 Bottom



**Interior**



**Legs**



**Leg Assembly**



# IMPORTANT

Please read this page first, otherwise there is a danger of causing damage which cannot be repaired.

Model YC-20 employs integrated circuits (ICs). For this reason, extreme care is required when making checks with testers or when exchanging parts.

1. Service is usually done by exchanging sheets, and replacement of parts within an individual integrated circuit is to be avoided. Therefore all troubles should be investigated through the output terminals.
2. If excessive voltage is supplied by mistake, great damage to the integrated circuits will result. Be sure the voltage is current and there are no short circuits when using a tester or other equipment.
3. Check for leakage from soldered points, gauges and sources of direct current. Use an effective insulating material for soldered points, etc. ; if there is any leakage from the AC line source to the soldered points, gauge terminals or case, the ICs will be destroyed. All service bench equipment should be grounded for safety.
4. Be sure the power source is turned off before exchanging any sheets.
5. Be very careful to avoid misconnections when changing sheets. After any repair, check all connections before plugging in the power cord. Be very careful about this point, for an error can result in total destruction of the ICs.

BE VERY CAREFUL ABOUT THE 24V LINE

6. Check that no IC touches the terminal of another sheet or anything else which carries current.
7. An IC can also be destroyed by a static electric charge, so do not touch the surface or rub the sheet during exchanges. ( the human body can contain up to 1000 volts of accumulated static electricity generated by rubbing clothes ). Make it a habit to hold the IC sheet by the outer part of the base plate.
8. When exchanging sheets always observe the correct polarity. If positive and negative sides are improperly connected, the IC will be destroyed.

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# 1. Specifications

## 1. KEYBOARD

61keys C ~ c4 (17 Bass keys)

## 2. TONE LEVERS

Channel I 16' 8' 4' 2'  $2\frac{2}{3}$ ' 2' 1'  $3\frac{3}{5}$ ' 1'

Channel II 16' 8' 4' 2'

Manual Bass 16' 8'

## 3. EFFECT LEVERS

Touch Vibrato, Vibrato

Vibrato Speed, Bright (for Ch. II),

Percussive

## 4. OTHER CONTROLS

Pitch Control, Master Volume

Bass Volume, Manual-Bass

Balance, Power Switch (with pilot lamp)

Expression Pedal

## 5. ELECTRICAL RATINGS

Silicon Transistors 52

IC's 24

Diodes 7

Power Consumption 15W AC50 ~ 60Hz

## 6. DIMENSIONS

Width 102cm (40")

Depth 53cm (21")

Height 85cm (33") (set up)

Weight 27kg (60 lb)

## 7. FINISH

High gloss, polyester finish

## 8. AVAILABLE COLORS

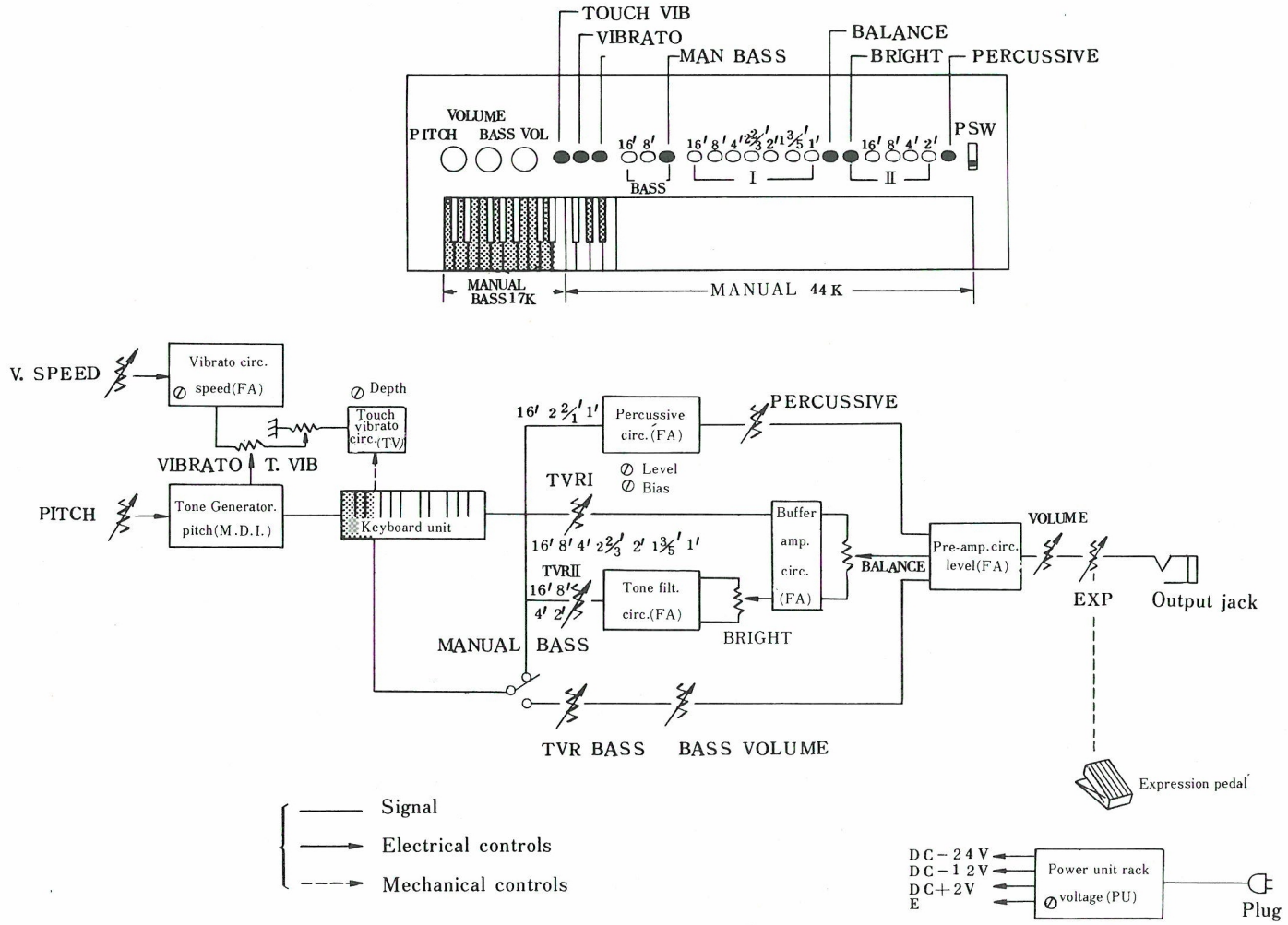
Red, Blue Pearl White or Black

## 9. VINYL CARRYING BAG

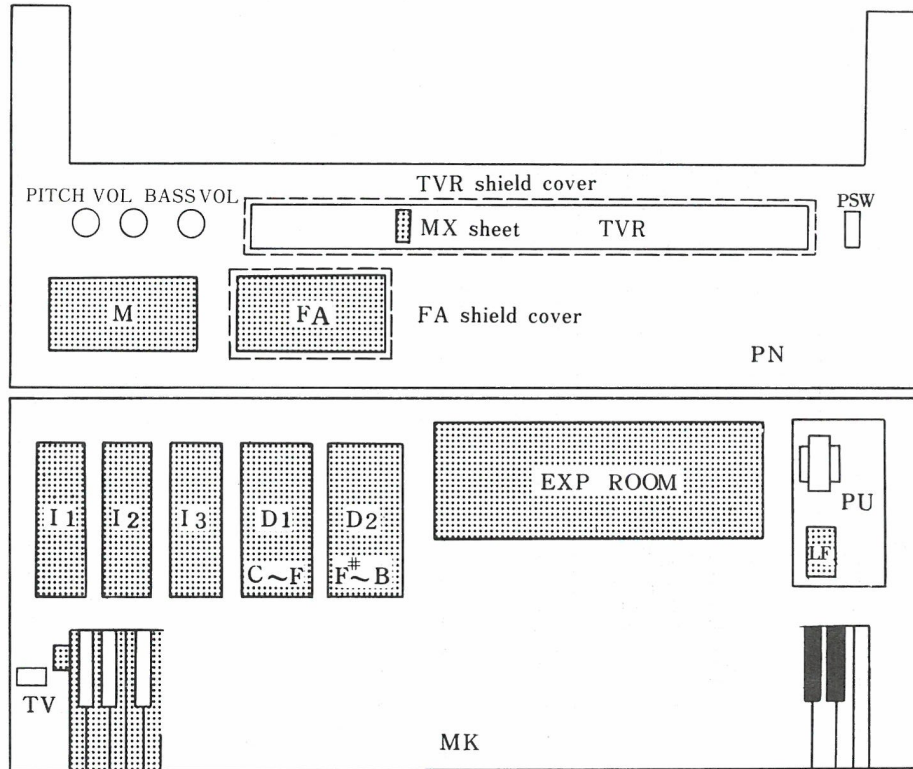
Provided for legs which are also included with the organ



2. Block Diagram

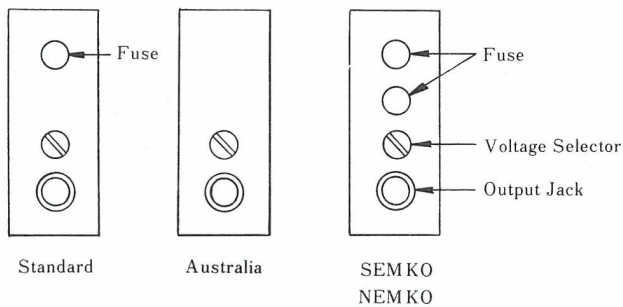


### 3. Unit Diagram

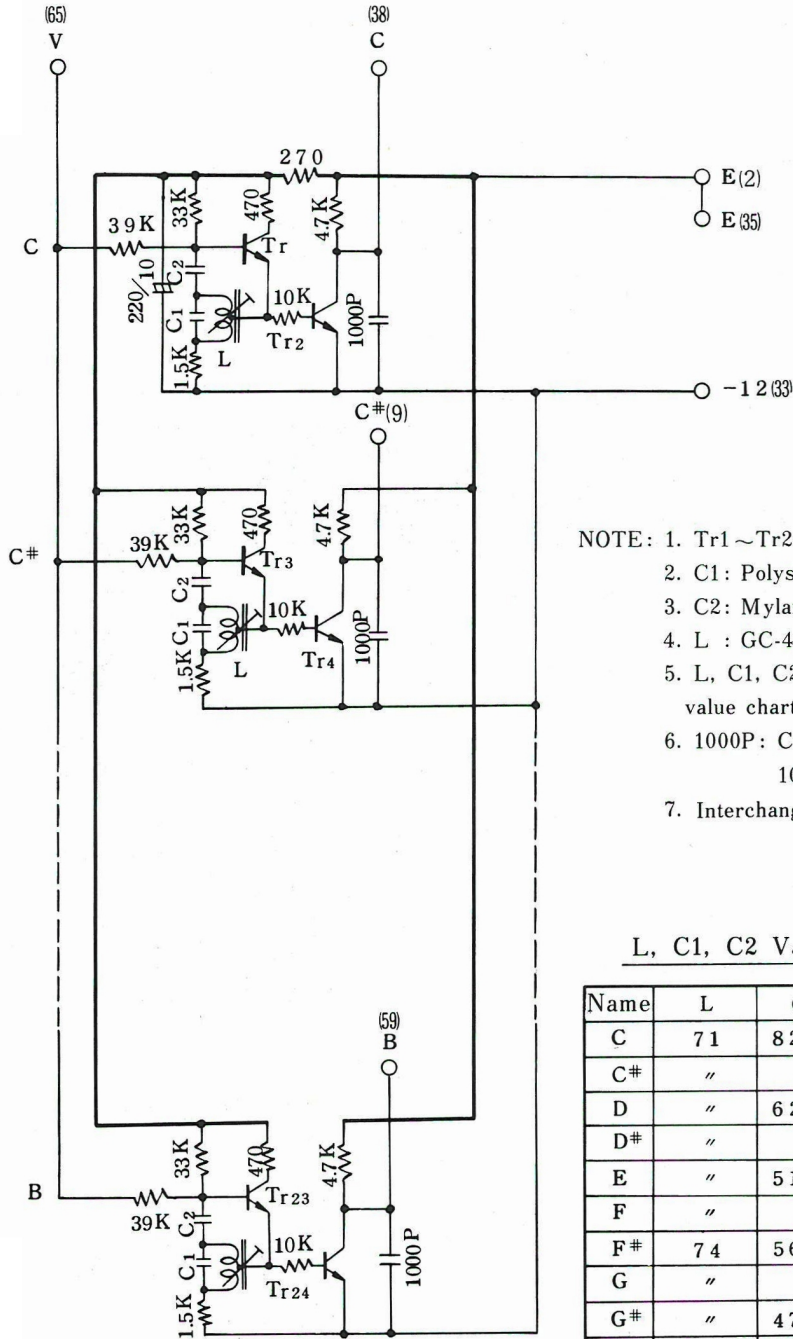


- NOTE: 1. The control panel section shows the fixing position of the rear side when opened.
2. Connector panel viewed from the bottom board.

#### Connector Panel



## 4. Master Oscillator Circuit (M sheet)

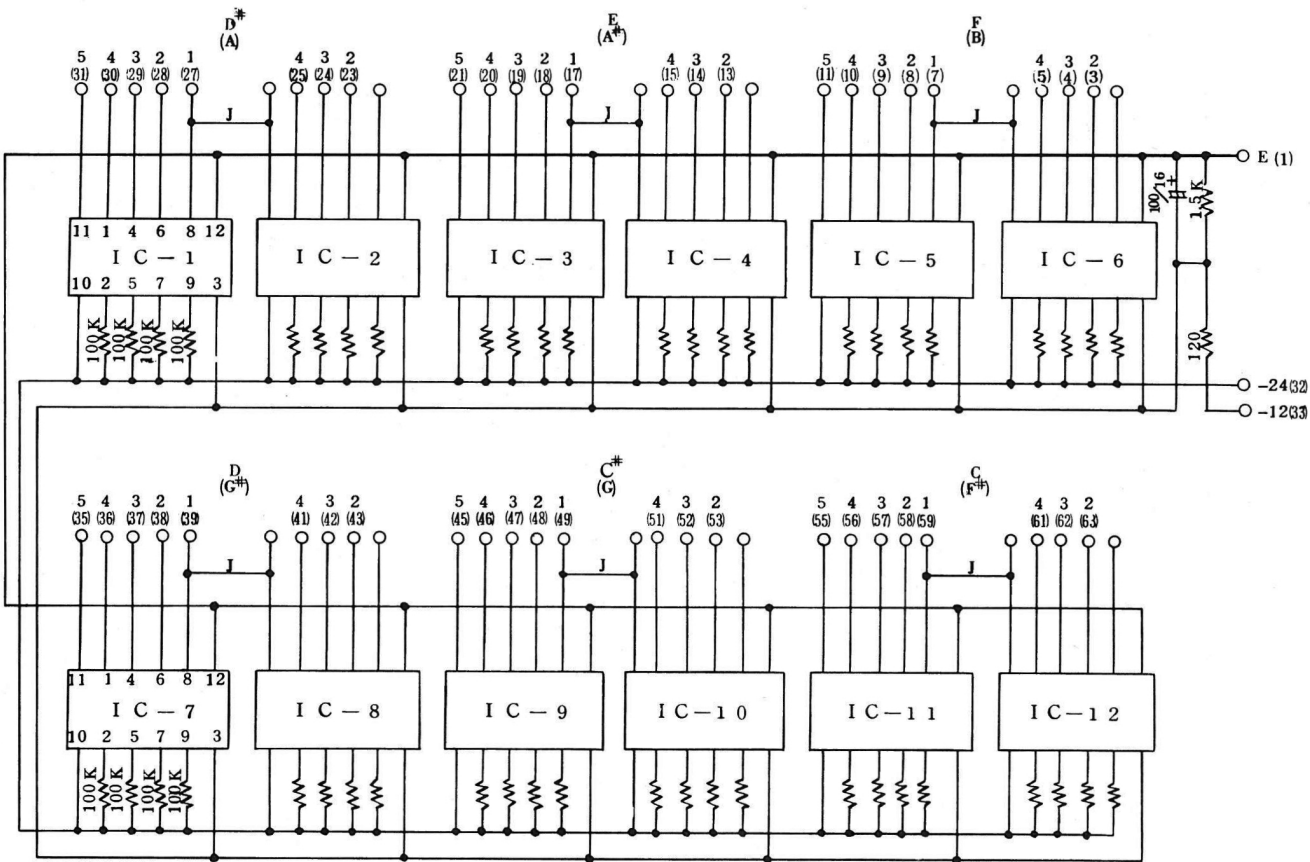


- NOTE: 1. Tr1 ~ Tr24: 2SC458L  
 2. C1: Polysthyrene  $\pm 5\%$   
 3. C2: Mylar capacitor  $\pm 7\%$   
 4. L : GC-4174, GC-4271  
 5. L, C1, C2: according to value chart  
 6. 1000P: Ceramic capacitor 1000K, (875~1150P)  
 7. Interchangeable with YC-30

L, C1, C2 Value Chart

| Name | L  | C1    | C2          |
|------|----|-------|-------------|
| C    | 71 | 8200P | 0.011 $\mu$ |
| C#   | "  | "     | "           |
| D    | "  | 6200  | 0.01        |
| D#   | "  | "     | "           |
| E    | "  | 5100  | 0.0091      |
| F    | "  | "     | "           |
| F#   | 74 | 5600  | 0.0082      |
| G    | "  | "     | "           |
| G#   | "  | 4700  | 0.0068      |
| A    | "  | "     | "           |
| A#   | "  | 3600  | 0.0062      |
| B    | "  | "     | "           |

## 5. Divider Circuit (D sheet) (IC)

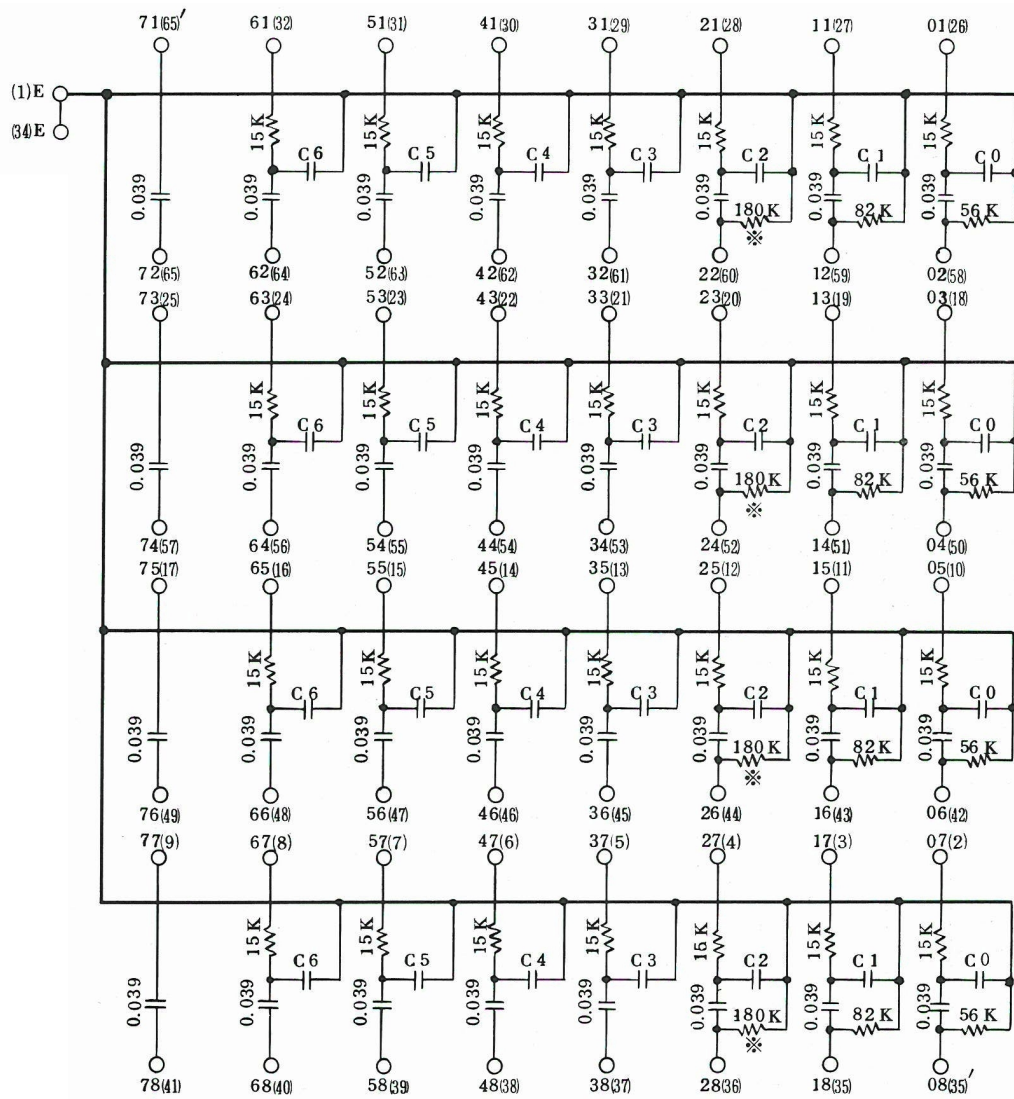


NOTE: 1. Integrated Circuit IC1-IC12 HD-711M

2. J: tin plated wire

3. Interchangeable with YC-30

## 6. Wave Transformer Circuit (I1 I2 I3 sheet)



| Sheet | Tone  | C <sub>6</sub> | C <sub>5</sub> | C <sub>4</sub> | C <sub>3</sub> | C <sub>2</sub> | C <sub>1</sub> | C <sub>0</sub> |
|-------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| I 1   | CC <sup>#</sup> DD <sup>#</sup>               | 0.0047         | 0.01           | 0.022          | 0.047          | 0.082          | 0.12           | 0.15           |
| I 2   | EF <sup>#</sup> F <sup>#</sup> G <sup>#</sup> | 0.0039         | 0.0082         | 0.018          | 0.039          | 0.068          | 0.1            | 0.15           |
| I 3   | G <sup>#</sup> AA <sup>#</sup> B <sup>#</sup> | 0.0027         | 0.0056         | 0.012          | 0.027          | 0.056          | 0.082          | 0.12           |

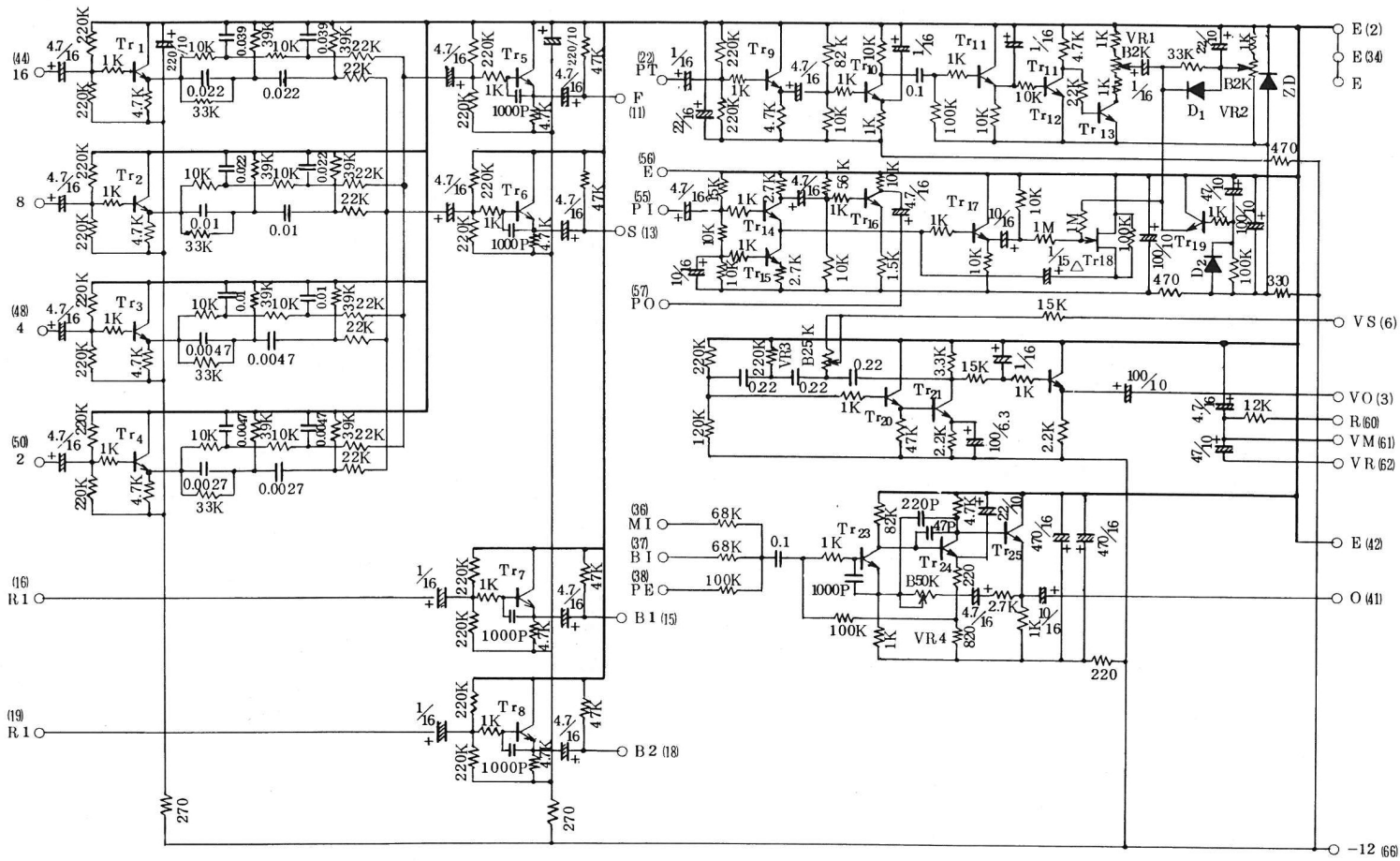
C Value Chart

NOTE: 1. See the table for C.

2. Resistors with \* 180K (four) are not installed in Sheet 13.

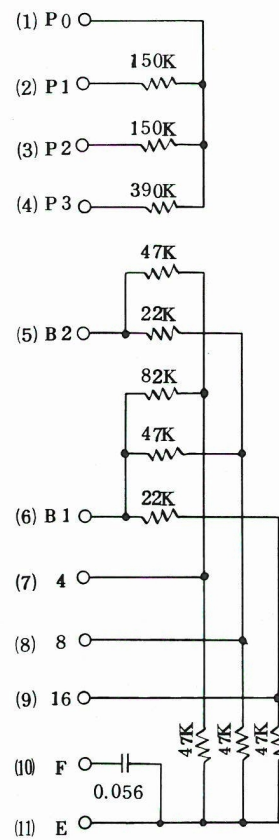
3. Interchangeable with YC-30

# 7. Tone Filter Circuit (FA sheet)

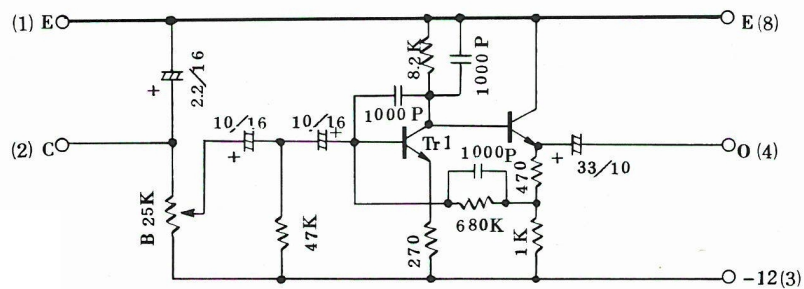


NOTE: 1. Tr1 ~ Tr17, Tr19 ~ Tr22: 2SC458  
 FET (Tr18) : 2SK17(Y)  
 Tr23 ~ Tr25 : 2SC649 or 2SC369  
 2. D: IS446  
 ZD: IS1715  
 3. 47P, 220P: Ceramic capacitor ± 10%  
 1000P : Ceramic capacitor 1000K(875 ~ 1150P)  
 4. Δ mark: Solid aluminu capacitor

## 8. Mixing Circuit (MX sheet)



## 9. Touch Vibrato Circuit (TV sheet)



- NOTE: 1. Tr: 2SC458L(B)  
 2. 1000P: Ceramic capacitor 1000K (875 ~ 1150P)  
 3. Interchangeable with YC-30

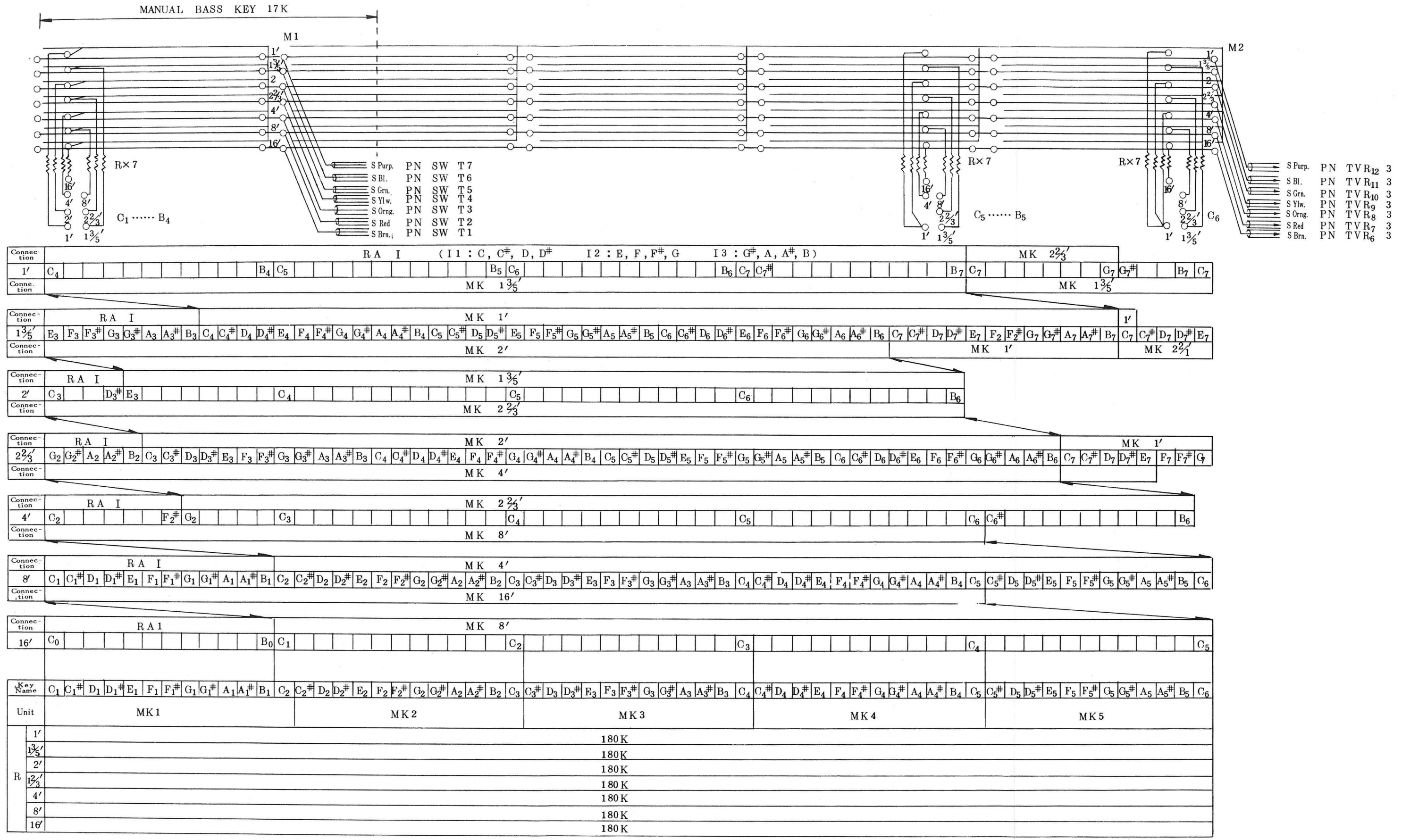
10. Rack Diagram (RA)

| I 1       |            |       | I 2        |         |       | I 3        |         |        | D 1        |         |     | D 2        |         |     |            |         |   |
|-----------|------------|-------|------------|---------|-------|------------|---------|--------|------------|---------|-----|------------|---------|-----|------------|---------|---|
| Blk. 12   | Blk. 12    | E     | Blk. 12    | Blk. 12 | E     | Blk. 12    | Blk. 12 | E      | Blk. 12    | Blk. 12 | E   | Blk. 12    | Blk. 12 | E   | Blk. 12    | Blk. 12 | E |
| MK TV (8) | RA I2 E(1) |       | RA I3 E(1) |         |       | RA D1 E(1) |         |        | RA D2 E(1) |         |     | RA D1 E(1) |         |     | RA D1 E(1) |         |   |
| 34        | E          | 08    | 08         | 07      |       | 08         | 07      |        | 08         | 07      |     |            |         |     |            |         |   |
| 35        | Ylw.       | 18    | Ylw.       | 18      | Gry.  | Gry.       | 18      | Pink   | Pink       | 18      | 5   | Orng.      |         | 5   | Wh.        |         |   |
| 36        | 28         | "     | 28         | "       | "     | "          | "       | "      | "          | "       | 4   | "          | Bl.     | 4   | "          |         |   |
| 37        | 38         | "     | 38         | "       | "     | "          | "       | "      | "          | "       | 3   | "          | "       | 3   | "          |         |   |
| 38        | 48         | "     | 48         | "       | "     | "          | "       | "      | "          | "       | 2   | "          | "       | 2   | "          |         |   |
| 39        | 58         | "     | 58         | "       | "     | "          | "       | "      | "          | "       | 1   | "          | "       | 1   | "          |         |   |
| 40        | 68         | "     | 68         | "       | "     | "          | "       | "      | "          | "       |     | Bl.        |         |     | Pink       |         |   |
| 41        | 78         | "     | 78         | "       | "     | "          | "       | "      | "          | "       | 4   | Orng.      |         | 4   | Wh.        |         |   |
| 42        | 06         | Orng. |            | 06      | Purp. |            | 06      | L.Bl.  |            | 06      | 3   | "          |         | 3   | "          |         |   |
| 43        | 16         | "     | 16         | "       | Purp. | 16         | "       | L.Bl.  | 16         | "       | 2   | "          |         | 2   | "          |         |   |
| 44        | 26         | "     | 26         | "       | "     | 26         | "       | "      | 26         | "       |     |            |         | 5   | "          |         |   |
| 45        | 36         | "     | 36         | "       | "     | 36         | "       | "      | 36         | "       | 5   | Red        |         | 5   | Gry.       |         |   |
| 46        | 46         | "     | 46         | "       | "     | 46         | "       | "      | 46         | "       | 4   | "          | Grn.    | 4   | "          |         |   |
| 47        | 56         | "     | 56         | "       | "     | 56         | "       | "      | 56         | "       | 3   | "          |         | 3   | "          |         |   |
| 48        | 66         | "     | 66         | "       | "     | 66         | "       | "      | 66         | "       | 2   | "          |         | 2   | "          |         |   |
| 49        | 76         | "     | 76         | "       | "     | 76         | "       | "      | 76         | "       | 1   | "          |         | 1   | "          |         |   |
| 50        | 04         | Red   |            | 04      | Bl.   |            | 04      | L.Grn. |            | 04      |     |            | Grn.    | 1   | L.Bl.      |         |   |
| 51        | 14         | "     | 14         | "       | Bl.   | 14         | "       | L.Grn. | 14         | "       | 4   | Red        |         | 4   | Gry.       |         |   |
| 52        | 24         | "     | 24         | "       | "     | 24         | "       | "      | 24         | "       | 3   | "          |         | 3   | "          |         |   |
| 53        | 34         | "     | 34         | "       | "     | 34         | "       | "      | 34         | "       | 2   | "          |         | 2   | "          |         |   |
| 54        | 44         | "     | 44         | "       | "     | 44         | "       | "      | 44         | "       |     |            |         | 5   | "          |         |   |
| 55        | 54         | "     | 54         | "       | "     | 54         | "       | "      | 54         | "       | 5   | Brn.       |         | 5   | Purp.      |         |   |
| 56        | 64         | "     | 64         | "       | "     | 64         | "       | "      | 64         | "       | 4   | "          | Ylw.    | 4   | "          |         |   |
| 57        | 74         | "     | 74         | "       | "     | 74         | "       | "      | 74         | "       | 3   | "          | "       | 3   | "          |         |   |
| 58        | 02         | Brn.  |            | 02      | Grn.  |            | 02      | Wh.    |            | 02      | 2   | "          |         | 4   | "          |         |   |
| 59        | 12         | "     | 12         | "       | Grn.  | 12         | "       | Wh.    | 12         | "       | 1   | "          |         | 1   | "          |         |   |
| 60        | 22         | "     | 22         | "       | "     | 22         | "       | "      | 22         | "       |     | Ylw.       |         | 1   | L.Grn.     |         |   |
| 61        | 32         | "     | 32         | "       | "     | 32         | "       | "      | 32         | "       | 5   | Brn.       |         | 2   | Purp.      |         |   |
| 62        | 42         | "     | 42         | "       | "     | 42         | "       | "      | 42         | "       | 4   | "          |         | 4   | "          |         |   |
| 63        | 52         | "     | 52         | "       | "     | 52         | "       | "      | 52         | "       | 3   | "          |         | 4   | "          |         |   |
| 64        | 62         | "     | 62         | "       | "     | 62         | "       | "      | 62         | "       |     |            |         | 5   | "          |         |   |
| 65        | 72         | "     | 72         | "       | "     | 72         | "       | "      | 72         | "       |     |            |         |     |            |         |   |
| 66        | 71         | "     | 71         | "       | "     | 71         | "       | "      | 71         | "       |     |            |         |     |            |         |   |
| 66        | -12        | "     |            |         |       |            |         |        |            |         | -12 | Red 12     |         | -12 | Red 12     |         |   |

| I 1 | I 2 | I 3 | D 1 | D 2 |
|-----|-----|-----|-----|-----|
|-----|-----|-----|-----|-----|



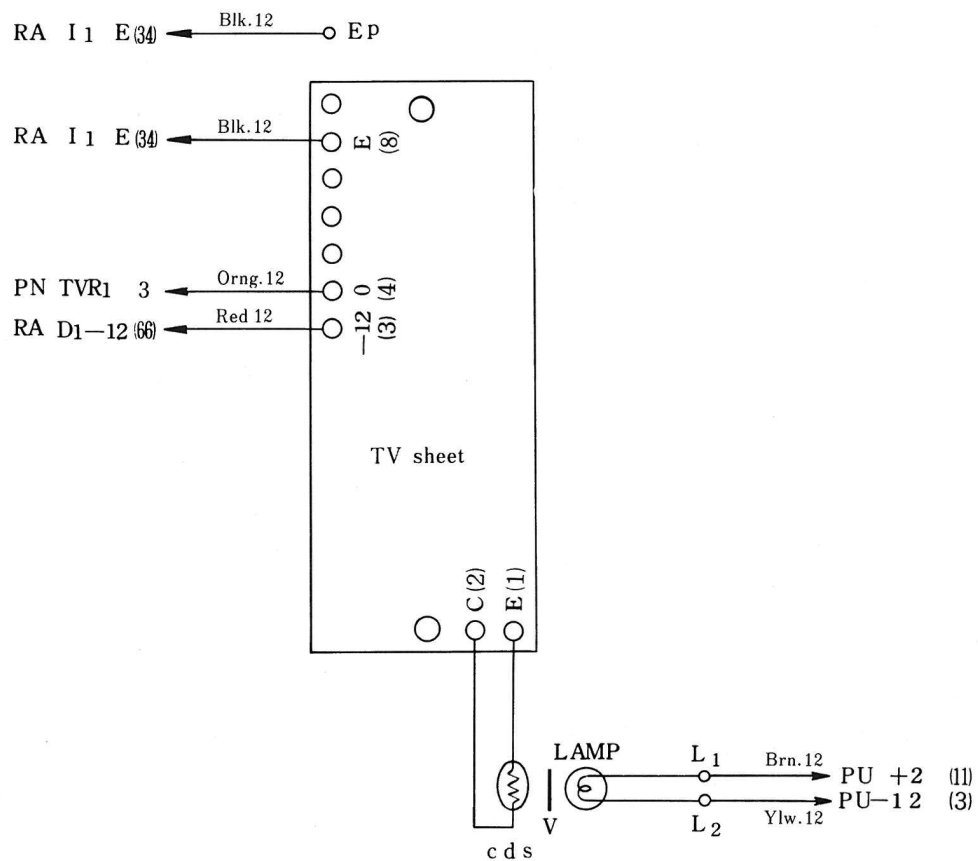
# 11. Manual Keyboard Diagram (MK)



NOTE: 1. Break contact

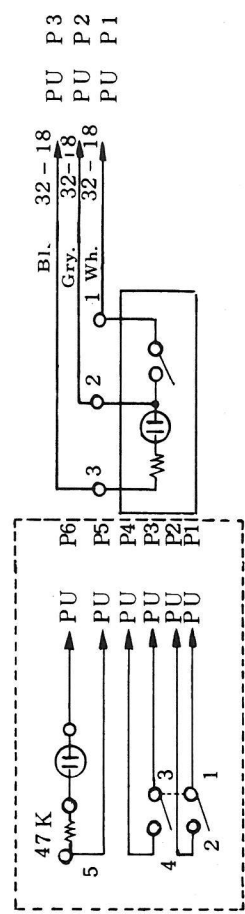
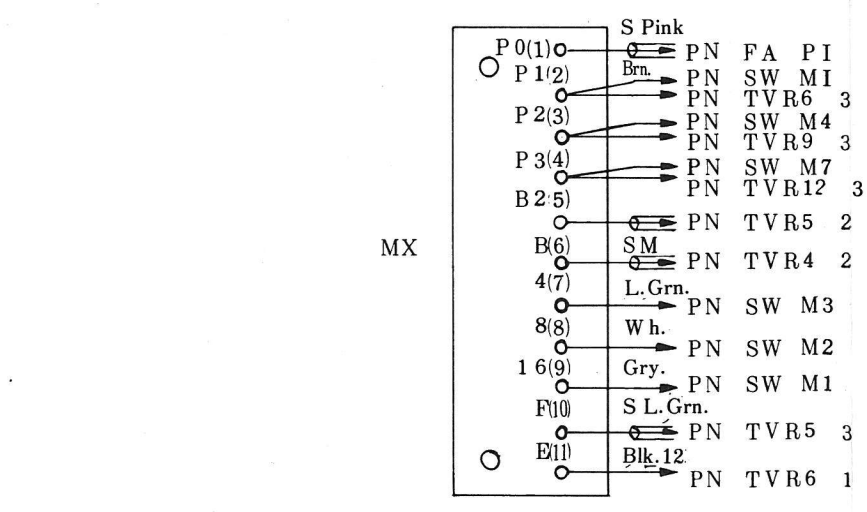
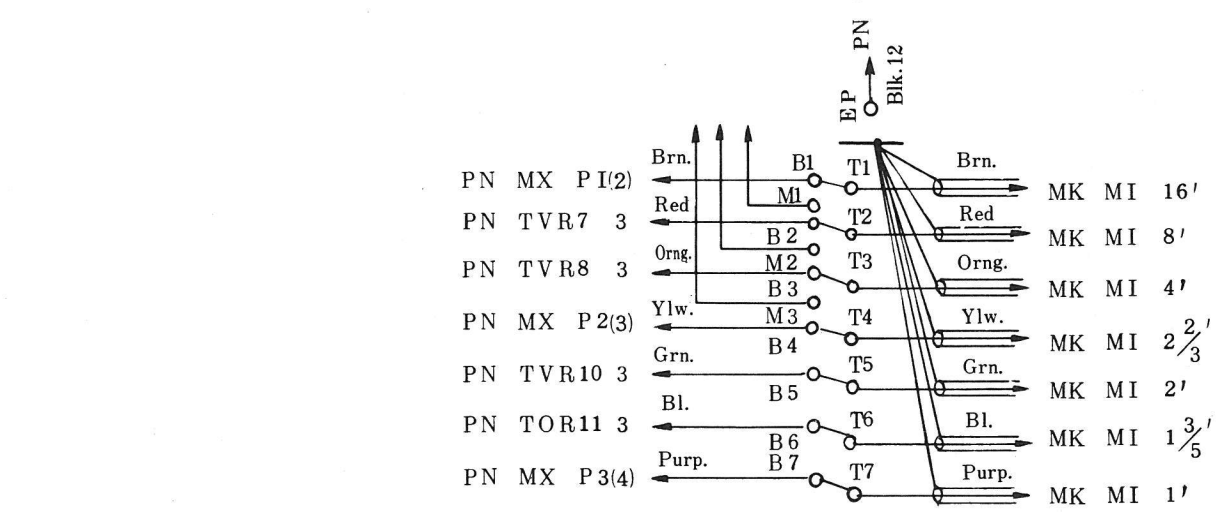
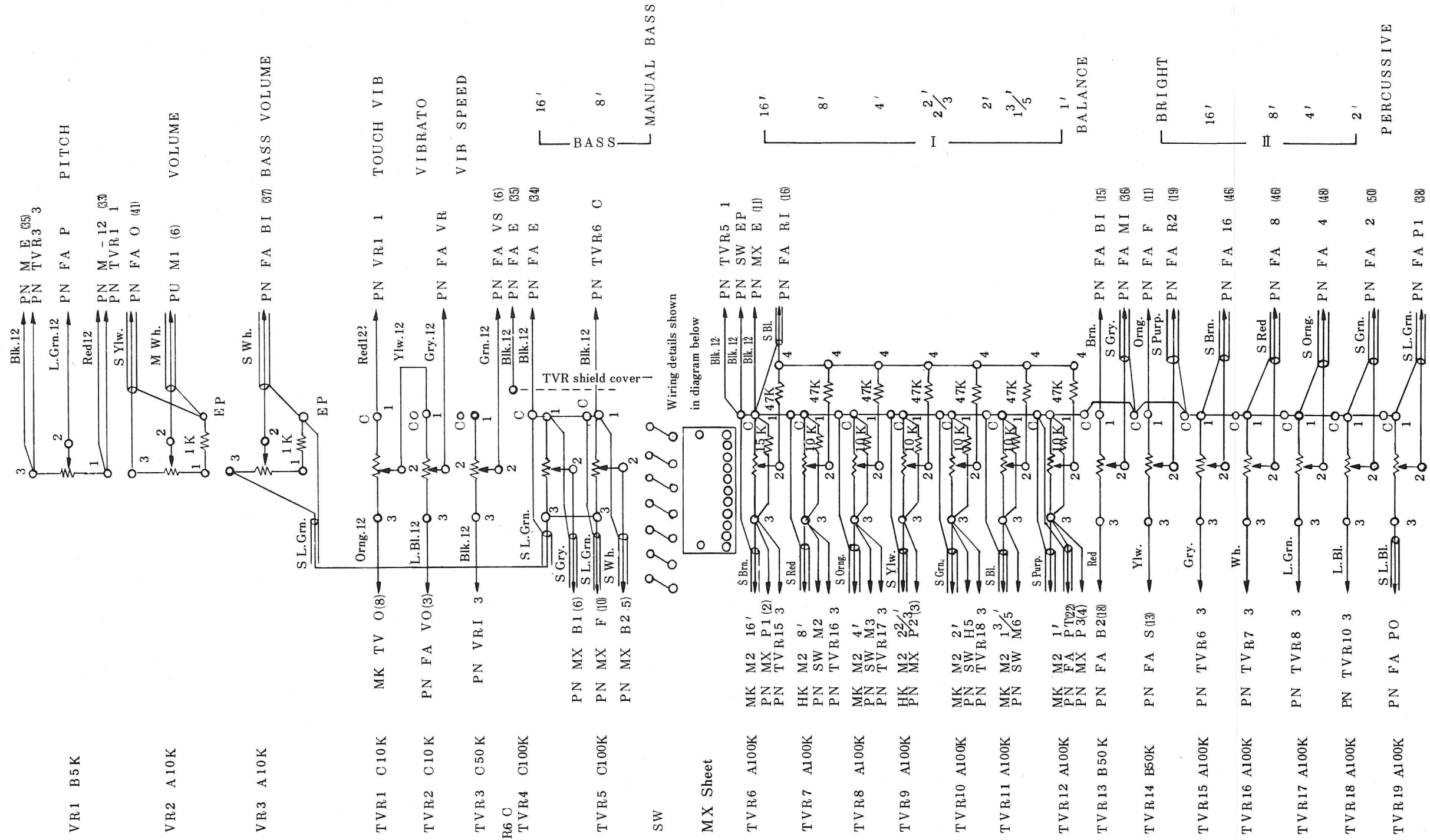
Scan by ALEX

## 12. Manual Keyboard Diagram (TV sheet)



NOTE: 1. LAMP: 24V 5W

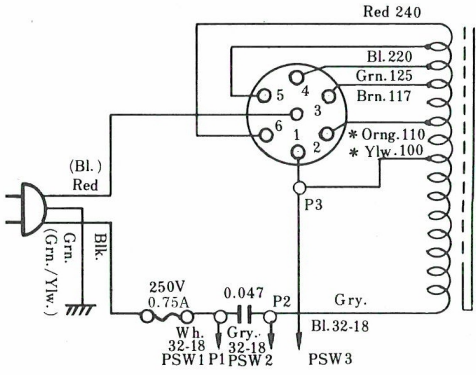
# 13. Panel Diagram (TVR)



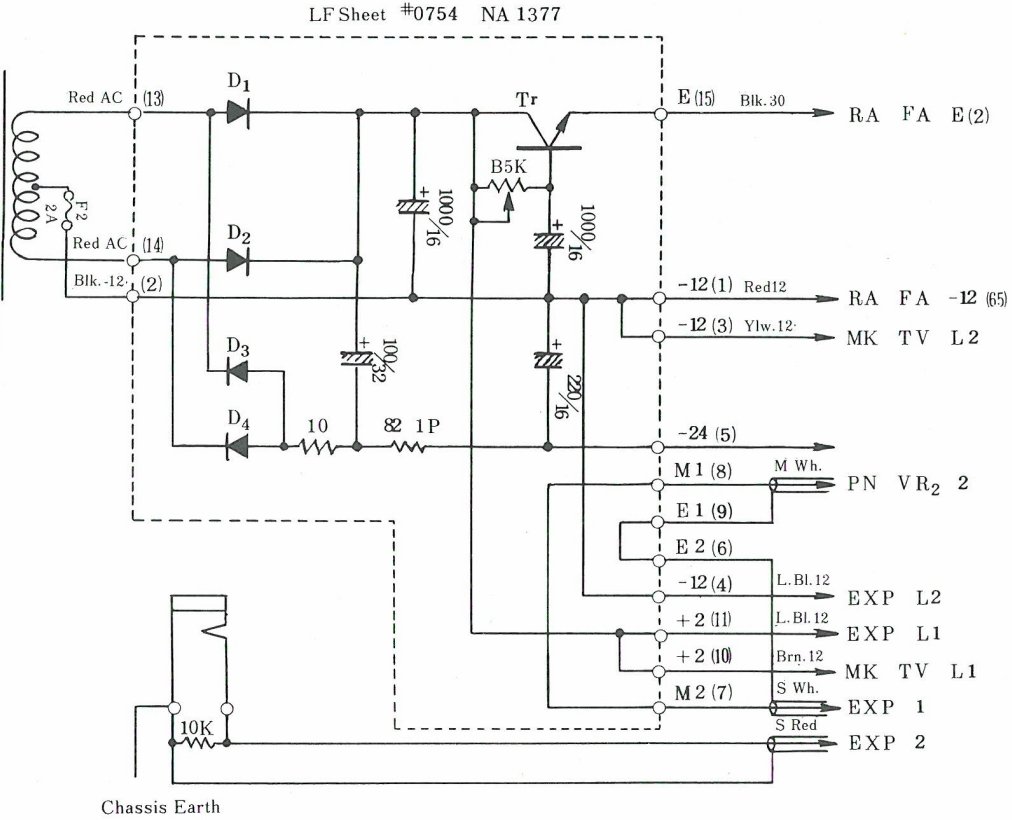
Blue 32-18, Black 32-18, etc., show CSATR-32 AWG # 18 (UL 1015 AWG # 18).

SEMKO specification



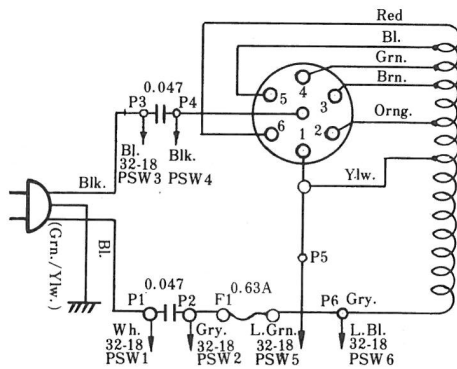
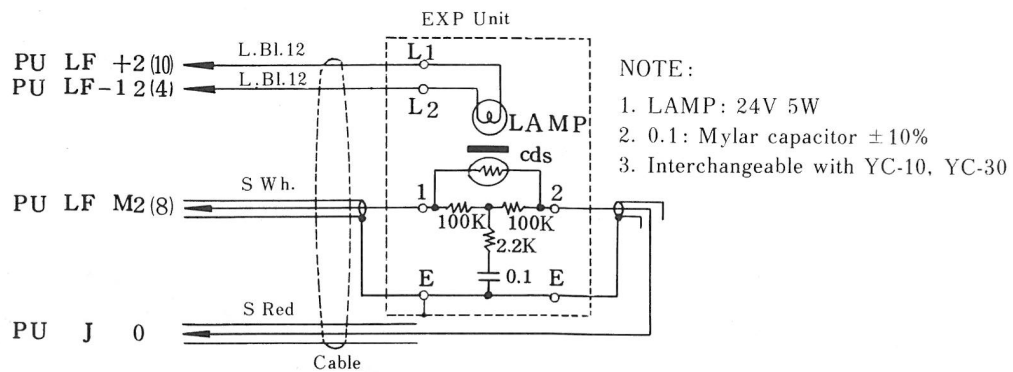


- NOTE: 1. D1 D2: 10D-1  
 2. D3 D4: SM-150S  
 3. 0.047: 0.047µ 600V Oil Capacitor  
 4. Power transformer: GAO160  
 5. Tr: Transistor 2SD90  
 6. Inside dotted lines: LF sheet  
 7. 32-18: CSA TR-32#18  
 8. Use only SEMKO or NEMKO fuse F2  
 9. Figures in parentheses refer to NEMKO  
 10. Parts marked with asterisks are not connected with CSA or UL methods.

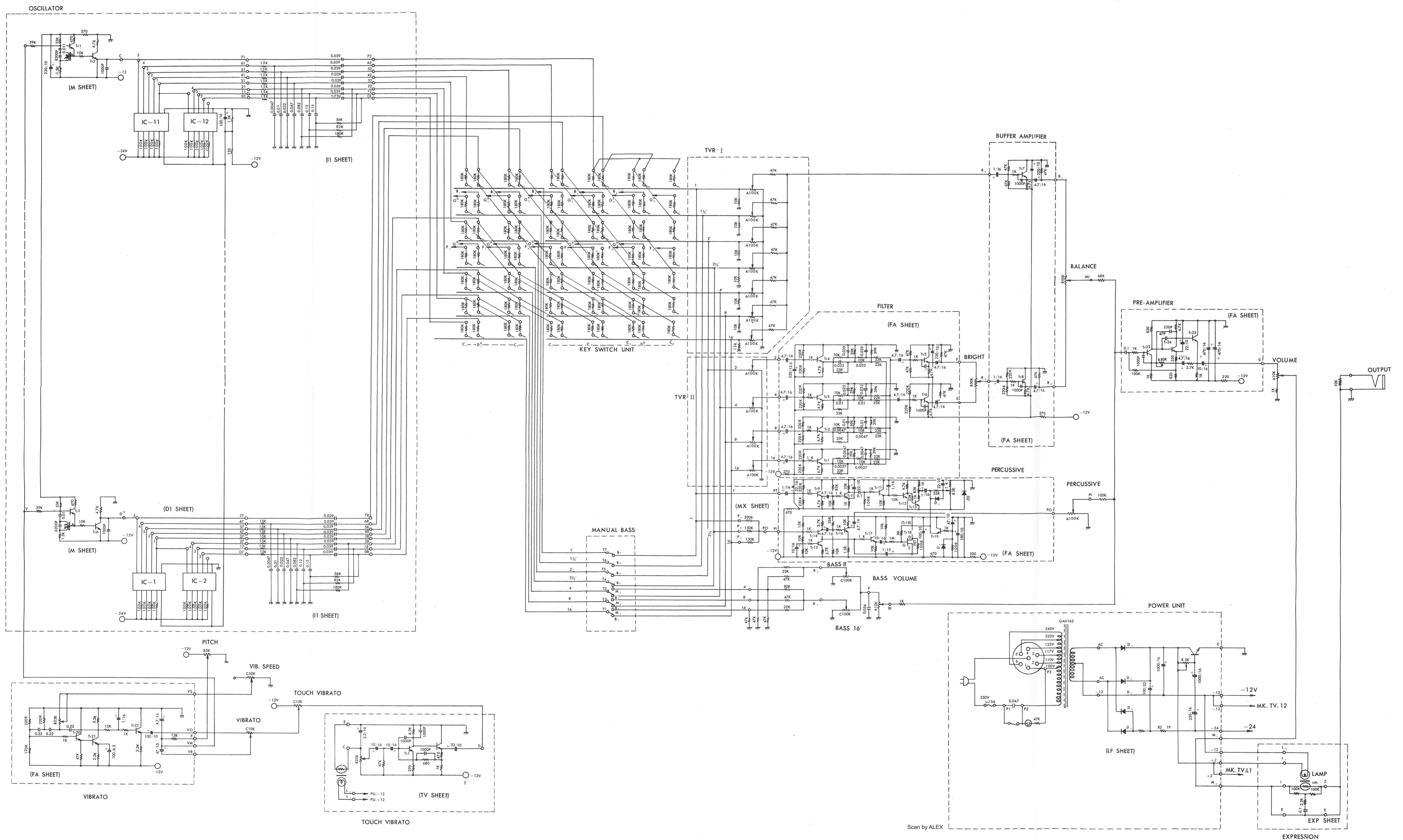


15. Power Supply Unit Diagram (PU)

# 16. Expression Unit (EXP)



# 17. OVERALL CIRCDIT DIAGRAM OF MODEL YC-20



YC-20 Parts List



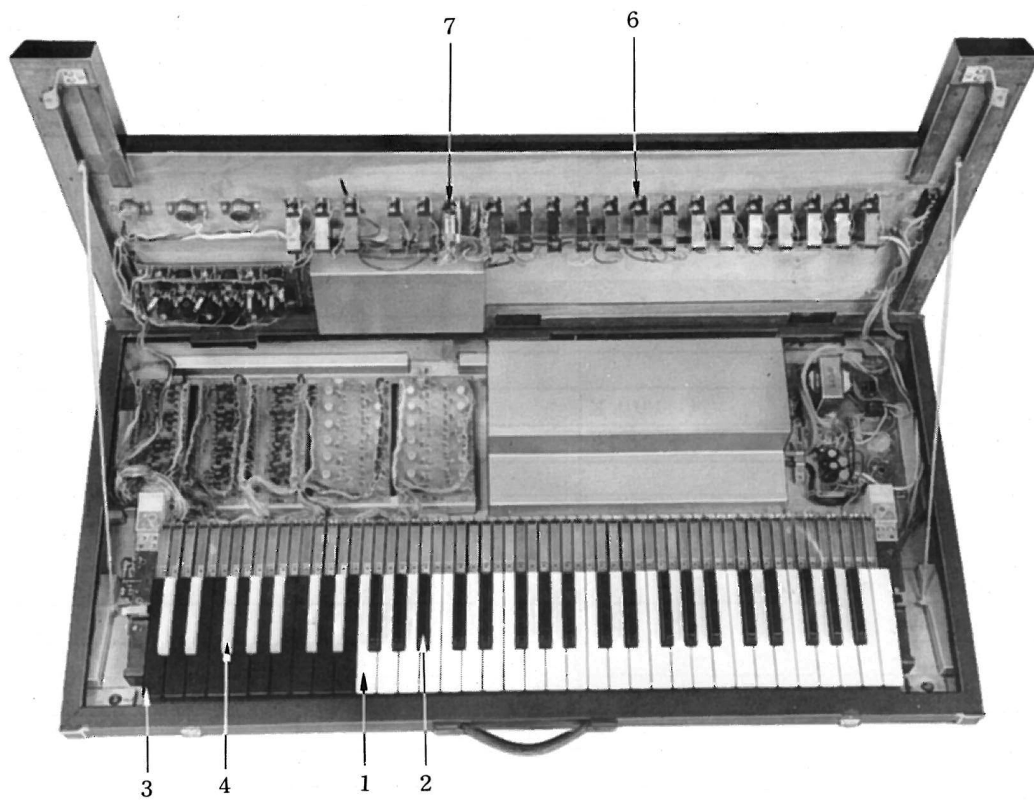
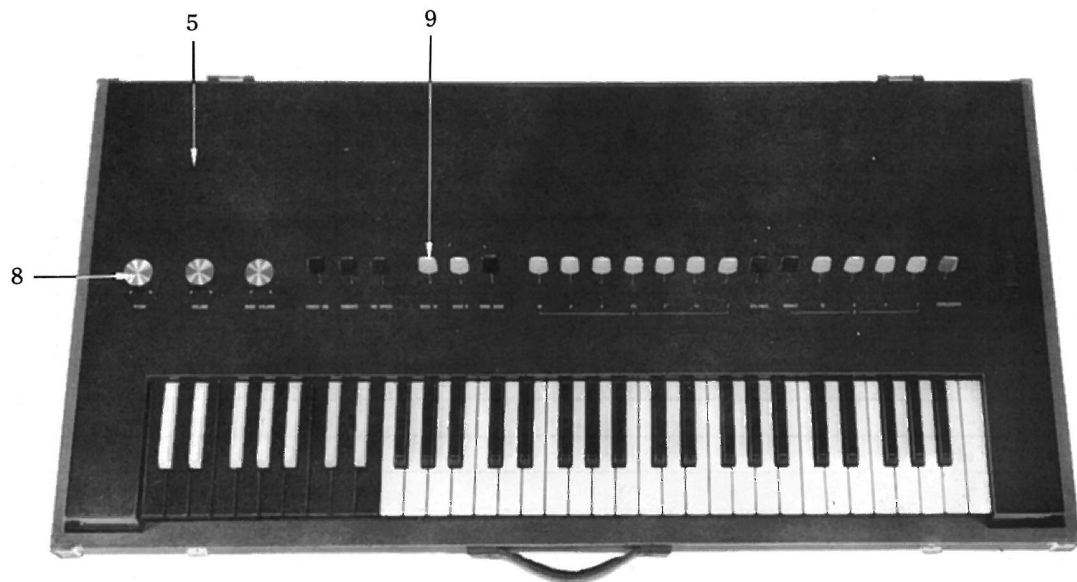


## 1. Sheets and Related Parts

| No. | Part No. | Part Name                    | Specifications | Remarks |
|-----|----------|------------------------------|----------------|---------|
|     | NA 1486  | Circuit Board # 0794 (M)     |                |         |
|     | 1384     | # 0736-3 (D 1)               |                |         |
|     | 1384     | # 0736-3 (D 2)               |                |         |
|     | 1381     | # 0777-3 (I 1)               |                |         |
|     | 1382     | # 0777-4 (I 2)               |                |         |
|     | 1383     | # 0777-5 (I 3)               |                |         |
|     | 1352     | # 0693-2 (F A)               |                |         |
|     | 1353     | # 0694-1 (M X)               |                |         |
|     | NA 1475  | Circuit Board # 0791-1 (T V) |                |         |
|     | 1377     | # 0754 (L F)                 |                |         |
|     |          | Mylar Capacitor 0.0027       | 50 V ± 10%     |         |
|     |          | 0.0039                       | "              |         |
|     |          | 0.0047                       | "              |         |
|     |          | 0.0056                       | "              |         |
|     |          | 0.0082                       | "              |         |
|     |          | 0.01                         | "              |         |
|     |          | 0.012                        | "              |         |
|     |          | 0.018                        | "              |         |
|     |          | 0.022                        | "              |         |
|     |          | 0.027                        | "              |         |
|     |          | 0.039                        | "              |         |
|     |          | 0.047                        | "              |         |
|     |          | 0.056                        | "              |         |
|     |          | 0.068 μF                     | 50 V ± 10%     |         |

| No. | Part No. | Part Name                          | Specifications            | Remarks |
|-----|----------|------------------------------------|---------------------------|---------|
|     |          | Mylar Condensor 0.082 $\mu$ F      | 50 V $\pm$ 10%            |         |
|     |          | 0.1                                | "                         |         |
|     |          | 0.12                               | "                         |         |
|     |          | 0.15                               | "                         |         |
|     |          | 0.22                               | "                         |         |
|     |          | Mylar Capacitor 0.0062 $\mu$ F     | 50 V $\pm$ 7%             |         |
|     |          | 0.0068                             | "                         |         |
|     |          | 0.0082                             | "                         |         |
|     |          | 0.0091                             | "                         |         |
|     |          | 0.01                               | "                         |         |
|     |          | 0.011                              | "                         |         |
|     |          | Polysthyren Capacitor 3600PF       | Verticale 5%              |         |
|     |          | 4700                               | "                         |         |
|     |          | 5100                               | "                         |         |
|     |          | 5600                               | "                         |         |
|     |          | 6200                               | "                         |         |
|     |          | 8200                               | "                         |         |
|     |          | Oil Capacitor 0.047 $\mu$ F        | 450 V                     |         |
|     |          | 0.047                              | 600 V                     |         |
|     |          | Chemical Capacitor 16 V 1 $\mu$ F  |                           |         |
|     |          | 2.2                                |                           |         |
|     |          | 4.7                                |                           |         |
|     |          | 10                                 |                           |         |
|     |          | 10 V 22                            |                           |         |
|     |          | 16 V 22                            |                           |         |
|     |          | 10 V 33                            |                           |         |
|     |          | 10 V 47                            |                           |         |
|     |          | 6.3V 100                           |                           |         |
|     |          | 10 V 100                           |                           |         |
|     |          | 16 V 100                           |                           |         |
|     |          | 10 V 220                           |                           |         |
|     |          | 16 V 470                           |                           |         |
|     |          | Aluminium Capacitor 15 V 1 $\mu$ F | $\pm$ 20%                 |         |
|     |          | Ceramic Capacitor 47 P F           | 50 V $\pm$ 10%            |         |
|     |          | 220                                | "                         |         |
|     |          | 1000                               | 50 V $\pm$ 10%            |         |
|     | GC 4271  | Master Coil                        | YAMAHA                    |         |
|     | 4174     | " "                                | "                         |         |
|     |          | Variable Resistor B 2 K            | 18 K 3-1                  |         |
|     |          | B 25 K                             | "                         |         |
|     |          | B 50 K                             | "                         |         |
|     |          | Carbon Resistor 120 $\Omega$       | $\frac{1}{4}$ P $\pm$ 10% |         |
|     |          | 220                                | "                         |         |
|     |          | 270                                | "                         |         |
|     |          | 330                                | "                         |         |
|     |          | 470                                | "                         |         |
|     |          | 680                                | "                         |         |
|     |          | 820                                | "                         |         |
|     |          | 1 K                                | "                         |         |
|     |          | 1.5                                | "                         |         |
|     |          | 2.2                                | "                         |         |
|     |          | 2.7                                | "                         |         |
|     |          | 3.3                                | "                         |         |

## 2. Manual Keyboard and Control Panel Parts



## 2. Manual Keyboard and Control Panel Parts

| No. | Part No. | Part Name             | Specifications | Remarks |  |
|-----|----------|-----------------------|----------------|---------|--|
| 1   | CB 0282  | White Keys (White)    | C • F          |         |  |
|     | 0283     | " " "                 | D              |         |  |
|     | 0284     | " " "                 | B • E          |         |  |
|     | 0285     | " " "                 | G              |         |  |
|     | 0286     | " " "                 | A              |         |  |
|     | 0287     | " " "                 | C'             |         |  |
| 2   | 0288     | Black Keys (Black)    |                |         |  |
| 3   | CB 0282  | White Keys (Black)    | C • F          |         |  |
|     | 0283     | " " "                 | D              |         |  |
|     | 0284     | " " "                 | B • E          |         |  |
|     | 0285     | " " "                 | G              |         |  |
|     | 0286     | " " "                 | A              |         |  |
| 4   | 0288     | Black Keys (White)    |                |         |  |
|     | AA 0845  | Key Spring            | For White Key  |         |  |
|     | 0846     | " "                   | For Black Key  |         |  |
|     | CC 3010  | Key Felt (Red)        | Small          |         |  |
|     | 3009     | " "                   | Large          |         |  |
|     | AA 0843  | Key Arm               | # 0843         |         |  |
|     | NB 0823  | Switch Unit           | ( 13K )        | 7-MK    |  |
|     | 0824     | " "                   | ( 12K )        | 7-MQ    |  |
|     | 0825     | " "                   | ( 12K )        | 7-MQ    |  |
|     | NB 0661  | Touch Vibratio Pickup |                |         |  |
|     | BC 0095  | Tip Contact           |                |         |  |
|     | AA 1474  | Shielding Cover       |                |         |  |
| 5   | NB 0836  | Control Panel         |                |         |  |
|     |          |                       |                |         |  |
| 6   | HC 0101  | Tone / Volume         | A 100 K        | TVR-6   |  |
|     | 0099     | "                     | B 50 K         | TVR-9   |  |
|     | 0225     | "                     | C 10 K         | TVR-6   |  |
|     | 0100     | "                     | C 50 K         | TVR-6   |  |
| 7   | NB 0829  | Switch                | # 0829         | 3T-4B   |  |
|     | HC 0202  | Variable Resistor     | A 10 K         | RV24YN  |  |
|     | 0211     | " "                   | B 5 K          | "       |  |
| 8   | CB 1021  | Knob                  | # 1021         | Round   |  |
|     |          |                       |                |         |  |
|     |          |                       |                |         |  |
| 9   | 0718     | " (White)             |                |         |  |
|     | 0719     | " (Black)             |                |         |  |
|     | 0720     | " (Red)               |                |         |  |
|     | HC 0103  | Tone / Volume         | C 100 K        | TVR-6   |  |
|     | KA 0079  | Switch                | # 0079         |         |  |
|     | CB 0764  | Lamp Holder           |                |         |  |
|     | IE 0002  | Neon Tube             | (SEMKO)        | NE-2    |  |
|     | CB 0166  | Indicator Pilot Eye   | # 0166         |         |  |
|     | AA 0783  | Volume Mountie Plate  |                |         |  |
|     | NB 0853  | Dust Cover            |                |         |  |
|     |          | 3 EXP Pedal           |                |         |  |
|     | NB 0802  | EXP Pedal Unit        |                |         |  |
|     |          |                       |                |         |  |
|     |          |                       |                |         |  |
|     |          |                       |                |         |  |
|     |          |                       |                |         |  |
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|     |          |                       |                |         |  |
|     |          |                       |                |         |  |
|     |          |                       |                |         |  |
|     |          |                       |                |         |  |





## 4. Exterior Parts

