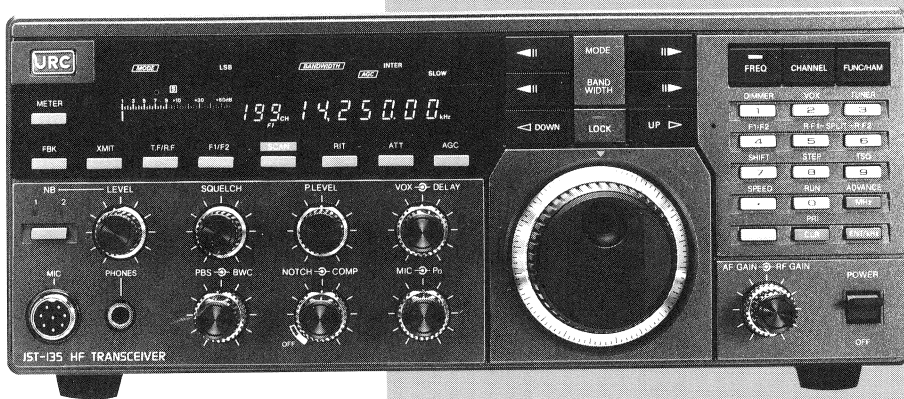


MODEL JST-135 SERVICE MANUAL

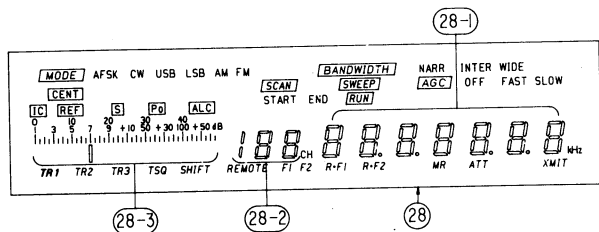
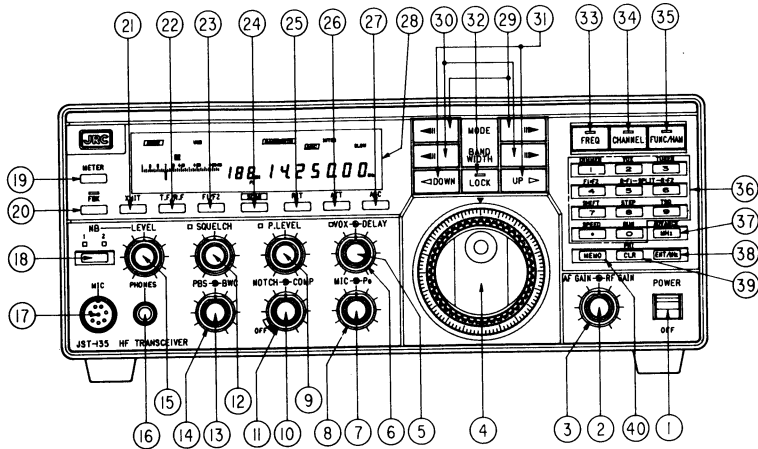


HF TRANSCEIVER



Japan Radio Co., Ltd.

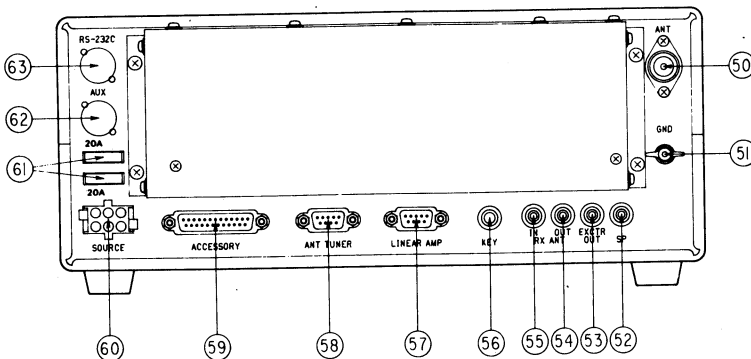
Parts Identification



Front Panel

- ① POWER switch
- ② AF GAIN control
- ③ RF GAIN control
- ④ TUNING control
- ⑤ VOX gain control
- ⑥ DELAY (VOX delay) control
- ⑦ MIC (microphone gain) control
- ⑧ Po (power) control
- ⑨ P LEVEL (pause level) control
- ⑩ NOTCH control
- ⑪ COMP (voice compressor) control
- ⑫ SQUELCH control
- ⑬ PBS (pass band shift) control
- ⑭ BWC (bandwidth) control
- ⑮ NB LEVEL (noise blanker level) control
- ⑯ PHONES (headphones) jack
- ⑰ MIC (microphone) connector
- ⑱ NB (noise blanker) control
- ⑲ METER switch
- ⑳ FBK (full-brake-in) switch
- ㉑ XMIT (standby) switch
- ㉒ T.F/R.F (transmit frequency/receive frequency) switch
- ㉓ F1/F2 (VFO select) switch
- ㉔ SCAN switch
- ㉕ RIT (receiver increment tuning) switch
- ㉖ ATT (attenuator) switch
- ㉗ AGC switch
- ㉘ Display
- ㉘-1 Frequency display
- ㉘-2 Channel display
- ㉘-3 Meter
- ㉙ MODE switch
- ㉚ BANDWIDTH switch
- ㉛ UP/DOWN switches
- ㉜ LOCK switch
- ㉝ FREQ (frequency) switch
- ㉞ CHANNEL switch
- ㉟ FUNC/HAM (function/ham band) switch
- ㊱ Ten keys
- ㊲ MHz switch
- ㊳ ENT/kHz (enter/kHz) switch
- ㊴ CLR (clear) switch
- ㊵ MEMO (memory) switch

Rear Panel



- ⑤① ANT (antenna) connector
- ⑤② GND (ground) terminal
- ⑤③ SP (external speaker) jack
- ⑤④ EXCTR OUT (exciter output) jack
- ⑤⑤ RX ANT OUT (receiving antenna output) jack
- ⑤⑥ RX ANT IN (receiving antenna input) jack
- ⑤⑦ KEY jack
- ⑤⑧ LINEAR AMP (linear amplifier) connector
- ⑤⑨ ANT TUNER (antenna tuner) connector
- ⑥① ACCESSORY connector
- ⑥② SOURCE (DC power) connector
- ⑥③ FUSES (DC fuse)
- ⑥④ AUX (auxiliary) connector
- ⑥⑤ RS-232C connector

Introduction

This manual contains information required for maintenance and/or repairment of the JST-135 HF Transceiver. For operating procedures, refer to the instruction manuals for JST-135 and optional equipment.

The JST-135 can be fitted with the following optional units:

| | |
|------------------------|---------|
| TONE SQ Unit | CCL-212 |
| BWC Unit | CFL-243 |
| NOTCH FOLLOW Unit | CDD-366 |
| ECSS Unit | CMF-78 |
| RS-232C INTERFACE Unit | CMH-741 |
| DAUGHTER BOARD Unit | CMH-742 |

This manual, however, describes the standard operation of the JST-135 without optional units, and the description of those optional units is followed. (excluding Daughter Board Unit CMH-742).

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1. SPECIFICATIONS

General

Transmitting

frequency range: 1.8 MHz band 1.8 to 2.0 MHz
 3.5 MHz band 3.5 to 4.0 MHz
 7 MHz band 7.0 to 7.3 MHz
 10 MHz band 10.1 to 10.15 MHz
 14 MHz band 14.0 to 14.35 MHz
 18 MHz band 18.068 to 18.168 MHz
 21 MHz band 21.0 to 21.45 MHz
 24 MHz band 24.89 to 24.99 MHz
 28 MHz band 28.0 to 29.7 MHz

Receiving frequency

range: 100 kHz to 30 MHz
 Operating mode: SSB (LSB, USB)
 CW
 AME (Single Side band with full carrier)
 FM
 AFSK

Frequency stability: Less than ± 10 PPM from 5-minute warm-up to 60 minutes
 Less than ± 2 PPM per hour after 60 minutes

Frequency increment: 10 Hz

Number of memory

channels: 200 channels
 Antenna impedance: 50Ω (unbalanced)
 Input voltage: 13.8 VDC $\pm 10\%$ (nominal 13.8V)
 Negative grounded

Power consumption: Approx. 1.5A (receiving with no signal)
 Approx. 33A (transmitting at 150W output)

Dimensions: 330 (330)W x 130 (142)H x 280 (391) Dmm
 Dimensions written in () include projecting parts and controls

Weight: Approx. 8.5 kg

Transmitter

Power output: 10 to 150W (continuously adjustable)

Carrier suppression: 50 dB or more

Undersired sideband suppression: 60 dB or more (at 1.5 kHz modulation)

Intermodulation: 3rd order: -38 dB or less

Frequency response: 400 to 2600 Hz (within 6 dB, SSB)

Microphone

impedance: 600Ω

Modulation system: SSB, AME, AFSK:
 Balanced modulation
 FM: Reactance modulation

Maximum frequency deviation (FM): ± 5 kHz

Receiver

Receiving system: SSB, CW, AM, AFSK:
 Triple superheterodyne
 FM: Double superheterodyne

Intermediate

frequency: 1st IF : 70.455 MHz
 2nd IF : 455 kHz
 3rd IF : 98 kHz

Sensitivity:

| | SSB, CW, AFSK | AM | FM |
|-------------|---------------|-------------|-------------|
| 0.1-0.5 MHz | 14 dB μ | 24 dB μ | — |
| 0.5-1.6 MHz | 6 dB μ | 16 dB μ | — |
| 1.6-30 MHz | -10 dB μ | 6 dB μ | -6 dB μ |

(at 12 dB SINAD for FM, at 10 dB S/N for other modes)

Image rejection: 70 dB or more

IF rejection: 70 dB or more

Selectivity:

| | - 6 dB | -60 dB |
|--------------------------|----------------|------------------------|
| SSB, CW(W), AFSK (INTER) | 2 kHz or more | 6 kHz or less |
| FM (WIDE) | 12 kHz or more | — |
| AM (INTER) | 6 kHz or more | -40 dB, 18 kHz or less |

Note: Maximum two optional filters can be mounted.

RIT range: ± 20 kHz

PBS range: ± 1 kHz

BWC minimum

bandwidth: Approx. 800 Hz (when mounting optional BWC unit)

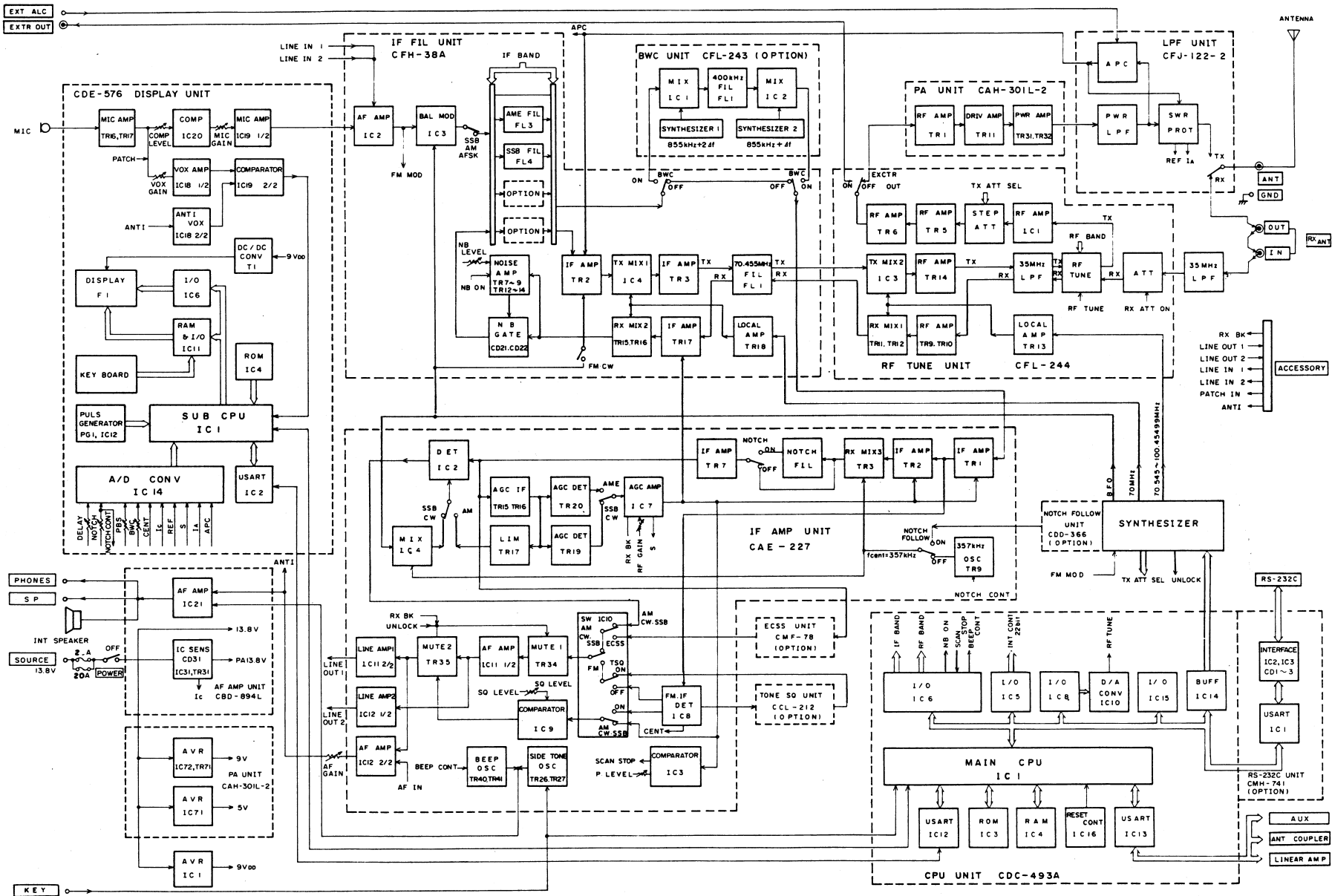
NOTCH filter

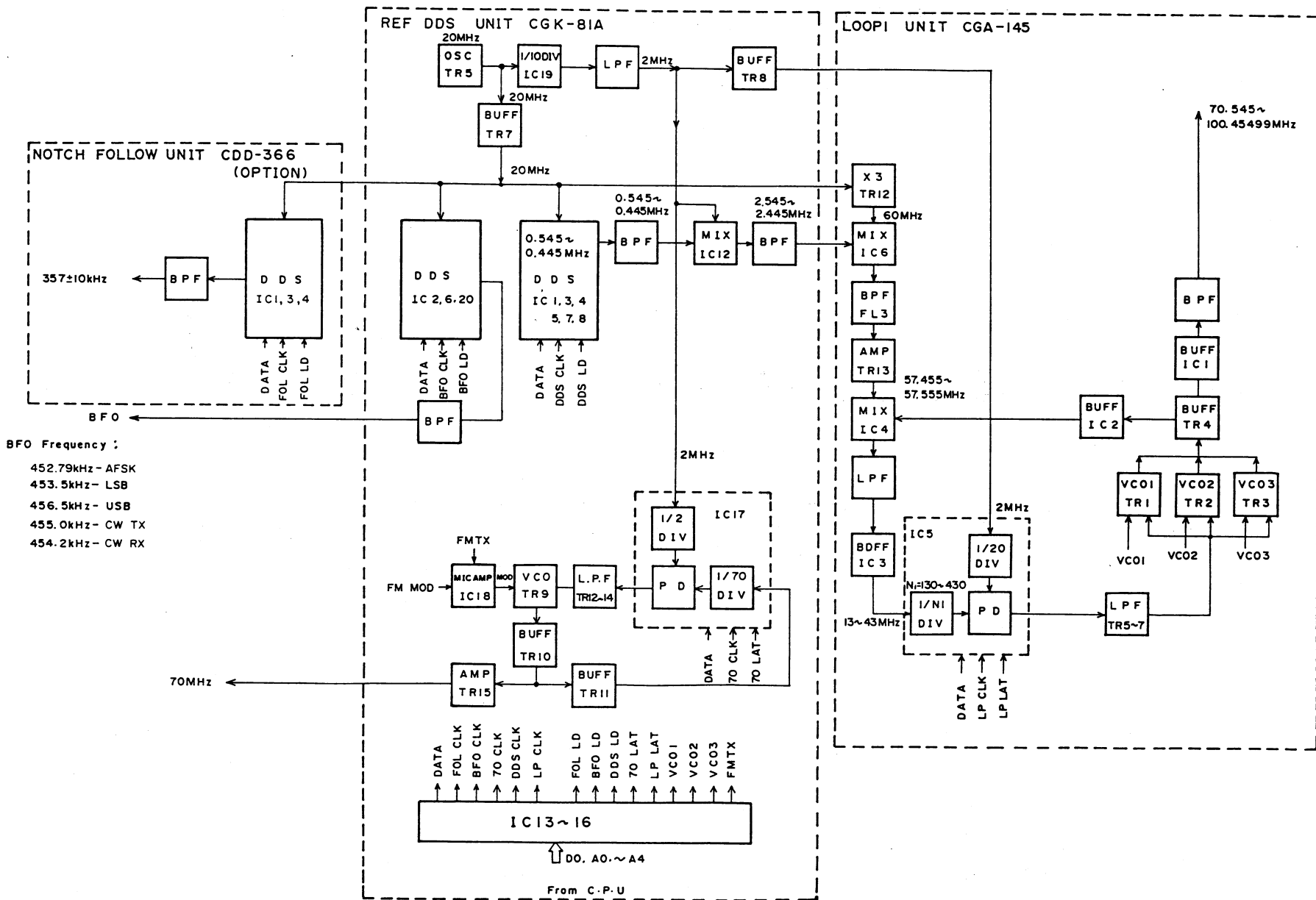
attenuation: Approx. 40 dB

AF output: 1W or more (at 4Ω load and with less than 10% distortion)

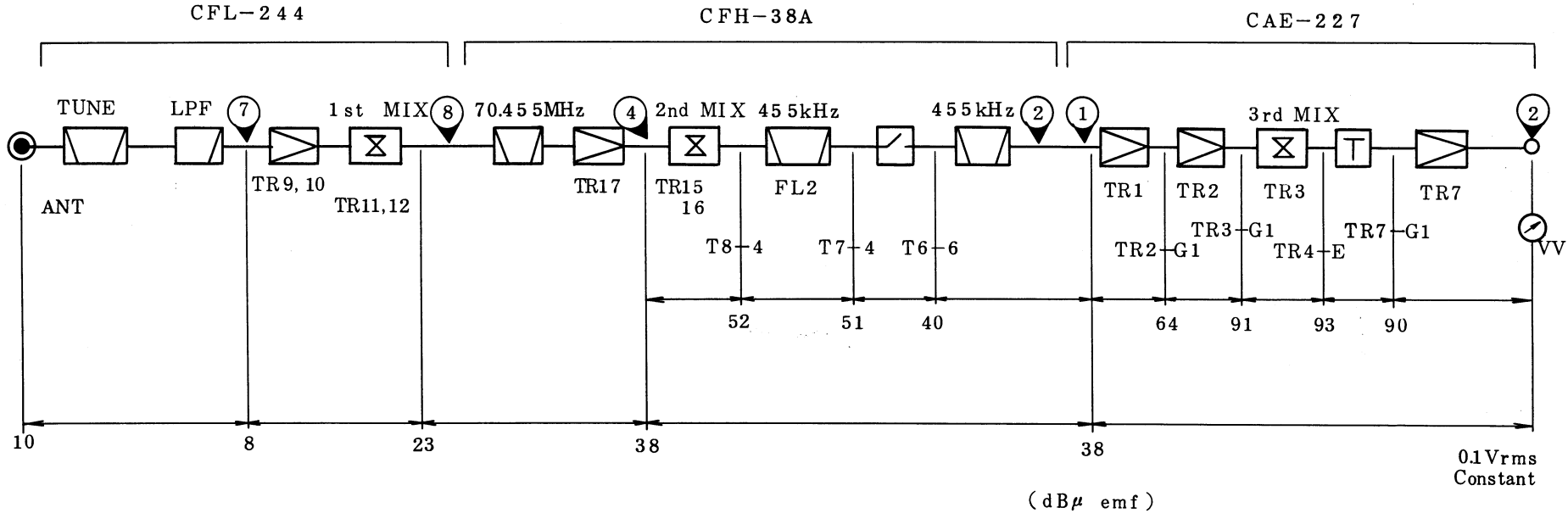
2. BLOCK DIAGRAM

2.1 Signal Flow





$F_r = 7.1\text{MHz}$
MODE : LSB
AGC : OFF

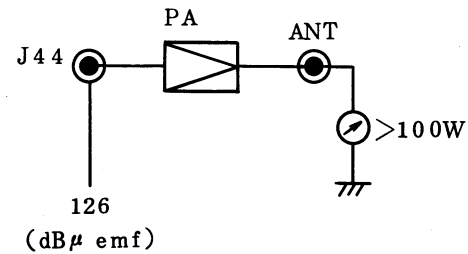
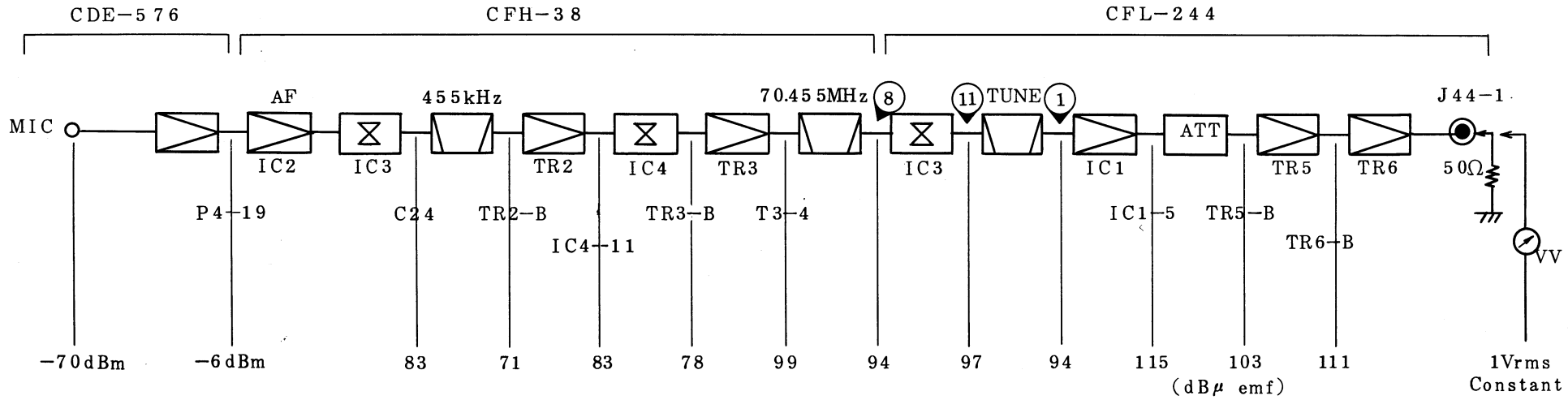


$F_t = 7.05\text{MHz}$

MODE : LSB

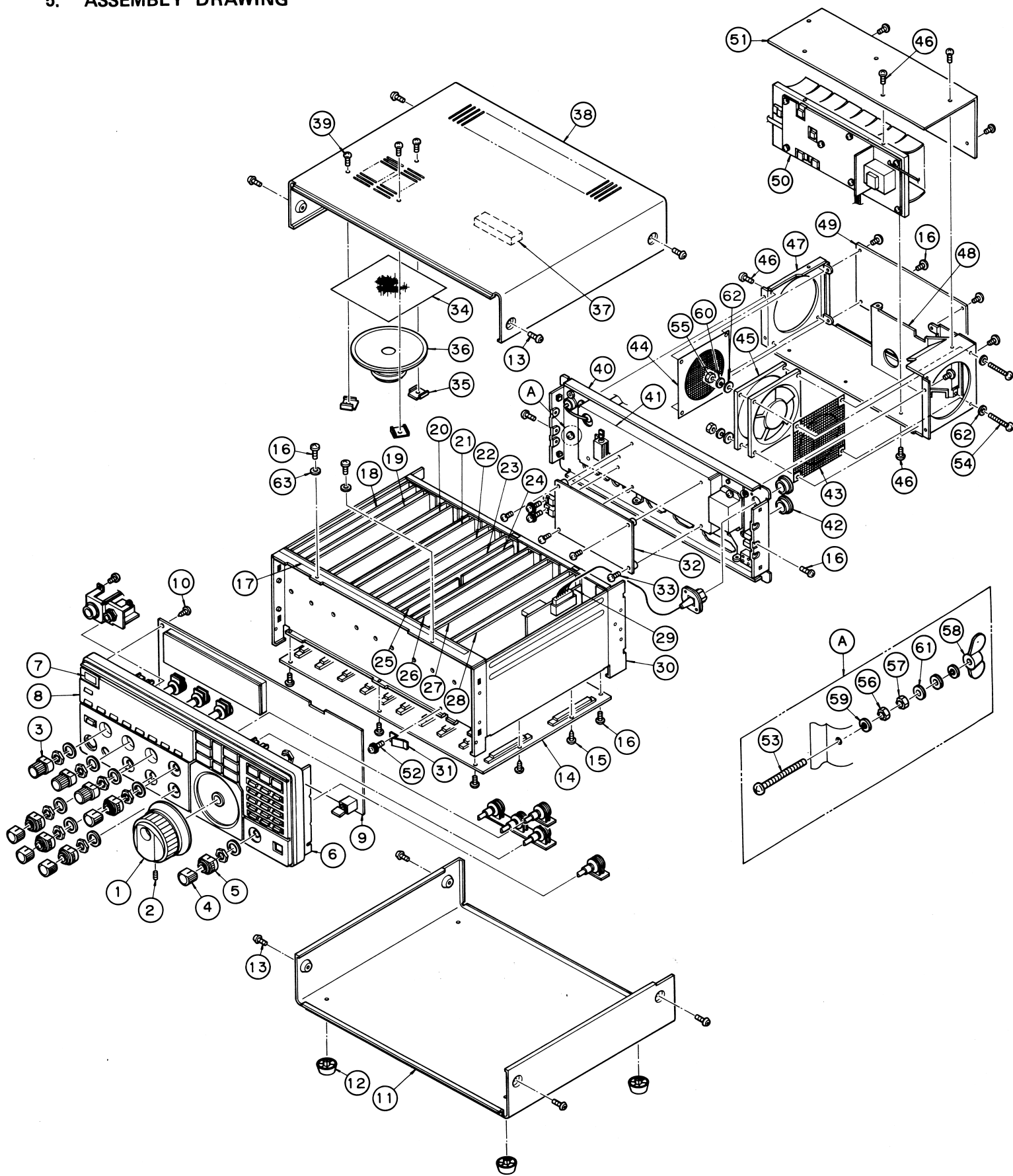
COMP : Min

MIC : Max



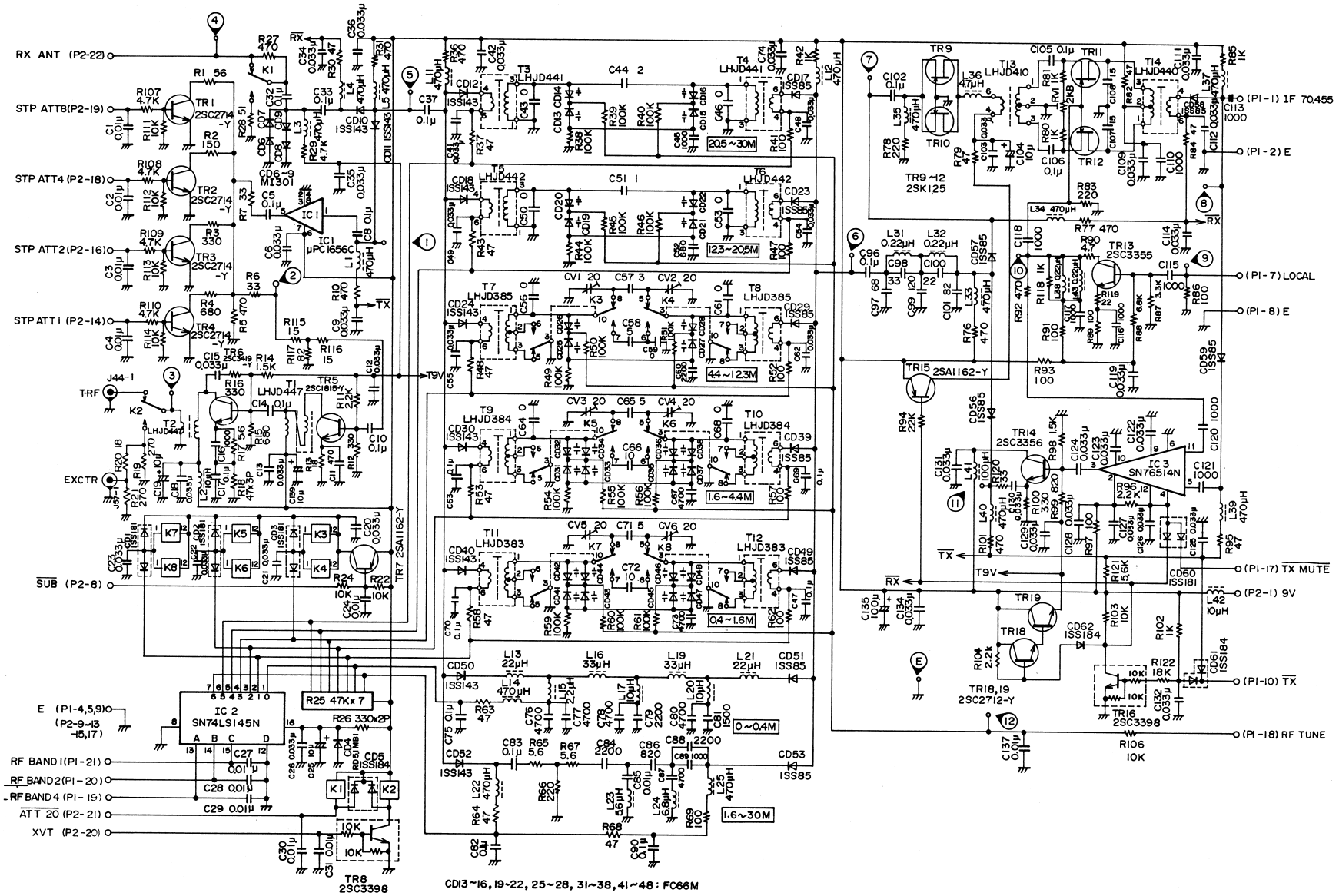
| LOCATION | DESCRIPTION | PART NUMBER | Q'TY | REMARKS |
|----------|------------------------|-------------|------|----------------|
| 1 | Dial | MPHD01145 | 1 | |
| 2 | Screw | BSHT030045 | 1 | 3T3x4 |
| 3 | Kneb | MPHD01135 | 3 | |
| 4 | Kneb | MTV000317 | 5 | |
| 5 | Kneb | MTV000318 | 5 | |
| 6 | Panel | MPBC07727 | 1 | |
| 7 | JRC badge | MPNL09514 | 1 | |
| 8 | Filter | MPOL00926 | 1 | |
| 9 | Display unit | CDE-576 | 1 | MDLW03760 |
| 10 | Screw | BRTG02970 | 7 | M3x8 FE ZMC |
| 11 | Cover bottom | MTD004496 | 1 | |
| 12 | Lag | BRKU00159 | 4 | N0. 1052 |
| 13 | Screw | BRTG03311 | 8 | M3x8 Bs BNM2 |
| 14 | Motherboard | CFQ-2625A | 1 | MDYW02679 |
| 15 | Screw | BRTG00970 | 20 | M2. 6x6 FE ZMC |
| 16 | Screw | BRTG01225 | 16 | M3x6 FE ZMC |
| 17 | Label | MPNN21126A | 1 | |
| 18 | RF Tune unit | CFL-244 | 1 | MDNW05951 |
| 19 | IF Filter unit | CFH-38A | 1 | MDNW05952 |
| 20 | BWC unit | CFL-243 | 1 | MDNW05954 |
| 21 | IF AMP unit | CAE-227 | 1 | MDHW00825 |
| 22 | ECSS unit | CMF-78 | 1 | MDMWO1524 |
| 23 | Daughter Board unit | CMH-742 | 1 | MDYW02680 |
| 24 | Tone SQ unit | CCL-212 | 1 | MDCW02209 |
| 25 | Notch Follow unit | CDD-366 | 1 | MDLW03761 |
| 26 | REF DDS unit | CGK-81A | 1 | MDEW00769 |
| 27 | Loop 1 unit | CGA-145 | 1 | MDEW00768 |
| 28 | CPU unit | CDC-493A | 1 | MDLW03759 |
| 29 | RS-232C Interface unit | CMH-741 | 1 | MDYW02681 |
| 30 | Chassis assy | MPBC07977 | 1 | |
| 31 | Accessory | 5ZKAHQ0006 | 1 | |
| 32 | AF AMP | CBD-894L | 1 | MDRW01698 |
| 33 | Screw | BRTG01227 | 4 | M3x10 FE ZMC |
| 34 | Speaker grill cloth | MTZ002537 | 1 | |
| 35 | Mounting plate | MTB099587A | 3 | |
| 36 | Speaker | 5USAC0002B | 1 | |
| 37 | Rubber | MTT021775 | 1 | |
| 38 | Cover top | MTD004495 | 1 | |
| 39 | Screw | BRTG02145 | 3 | MS3x8 Bs BLK |
| 40 | Back board | MTD004504 | 1 | |
| 41 | Mounting plate | MTD004506 | 1 | |
| 42 | Hole plug | BRNG00179 | 2 | DP-625 |
| 43 | Wire cloth | MPFM00340 | 1 | |
| 44 | Wire cloth | MPFM00339 | 1 | |
| 45 | Fan Motor | 6BFJD000004 | 1 | |
| 46 | Screw | BRTG02082 | 14 | M3x6 Bs BNM2 |
| 47 | Case | MTD004505 | 1 | |
| 48 | Draft plate | MTD004508A | 1 | |
| 49 | LPF unit | CFJ-122 | 1 | MDNW05950 |
| 50 | PA unit(100W) | CAH-301L-2 | 1 | MDTWO0834 |
| | PA unit(10W) | CAH-301L-1 | 1 | MDTWO0833 |
| 51 | Cover | MTD004507 | 1 | |
| 52 | Screw | BSNA03006B | 1 | ANK3x6 Bs |
| 53 | Screw | BSNK04020B | 1 | NK4x20 Bs |
| 54 | Screw | BSNK03025B | 4 | NK3x25 Bs |
| 55 | Nut | BSHN04000B | 2 | N4 Bs |
| 56 | Nut | BSHN03000B | 1 | N3 Bs |
| 57 | Nut | BSLN04000B | 1 | LN4 Bs |
| 58 | Wing Nut | BSBN04000B | 1 | BN4 Bs |
| 59 | Spring Lock Washer | BSSW04000S | 1 | SW4 |
| 60 | Spring Lock Washer | BSSW03000S | 2 | SW3 |
| 61 | Washer | BSSF04000B | 2 | W4 Bs |
| 62 | Washer | BSLW03000B | 6 | LW3 Bs |
| 63 | Washer | BSSF03000B | 2 | W3 Bs |

5. ASSEMBLY DRAWING



6. CIRCUIT DIAGRAM, COMPONENT LAYOUT AND PARTS LIST

| | | |
|------|------------------------------|------------|
| 6.1 | RF TUNE UNIT | CFL-244 |
| 6.2 | IF FILTER UNIT | CFH-38A |
| 6.3 | IF AMP UNIT | CAE-227 |
| 6.4 | 12 V PA UNIT | CAH-301L-2 |
| 6.5 | LPF UNIT | CFJ-122-2 |
| 6.6 | LOOP1 UNIT | CGA-145 |
| 6.7 | REF DDS UNIT | CGK-81A |
| 6.8 | CPU UNIT | CDC-493A |
| 6.9 | DISPLAY UNIT | CDE-576 |
| 6.10 | DISPLAY (VR) UNIT | CDE-576 |
| 6.11 | AF AMP UNIT | CBD-894L |
| 6.12 | TONE SQ UNIT | CCL-212 |
| 6.13 | BWC UNIT | CFL-243 |
| 6.14 | NOTCH FOLLOW UNIT | CDD-366 |
| 6.15 | ECSS UNIT | CMF-78 |
| 6.16 | RS-232C INTERFACE UNIT | CMH-741 |
| 6.17 | MOTHER BOARD | CFQ-2625A |
| | CHASSIS | JST-135 |
| | SIGNAL NOMENCLATURE OF UNITS | |



CD3-16, 19-22, 25-28, 31-38, 41-48: FC66M

Figure 6.1.1 RF TUNE UNIT CFL-244 Circuit Diagram

Figure 6.2.1 IF FILTER UNIT CFH-38A Circuit Diagram

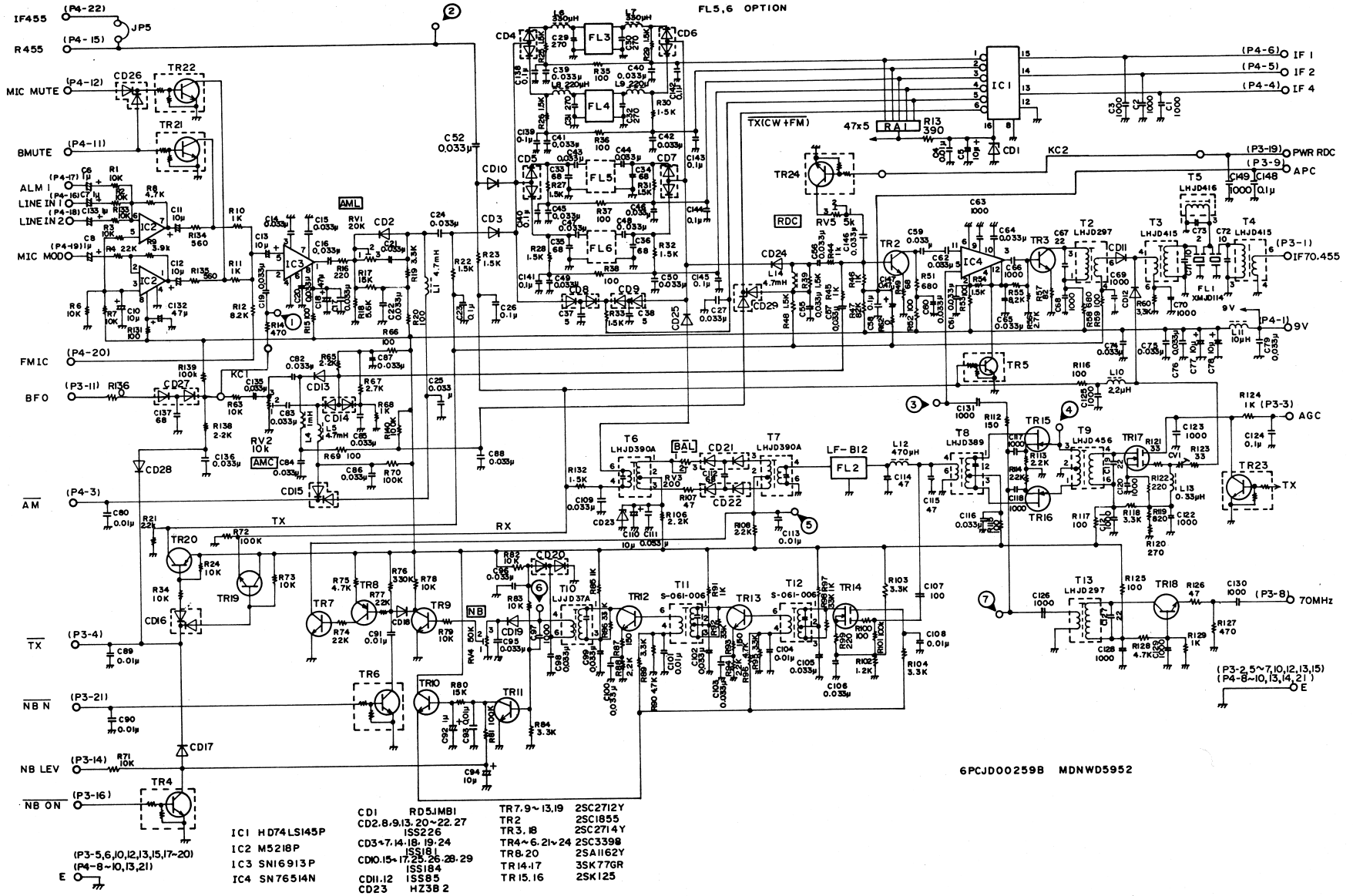
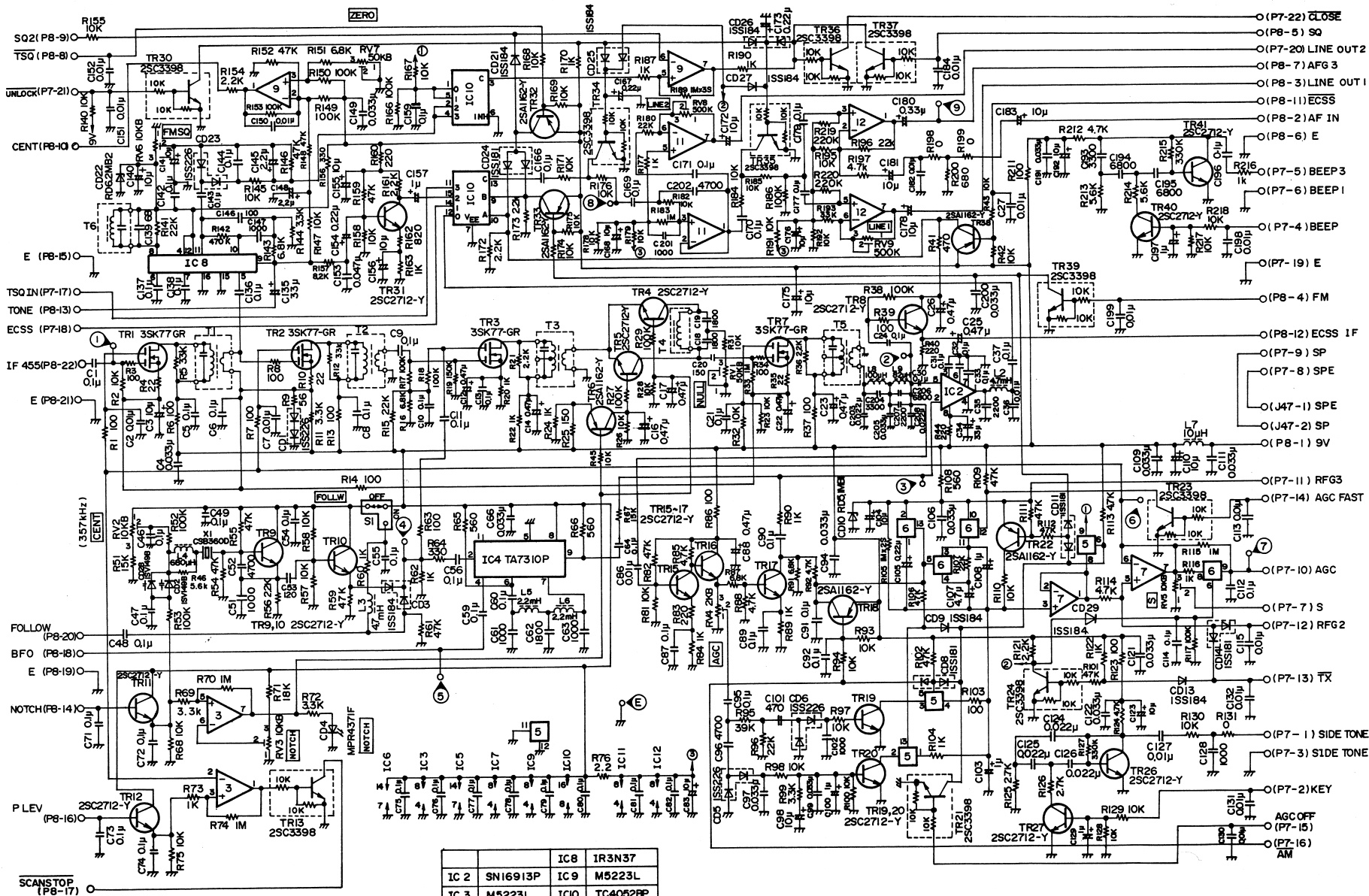
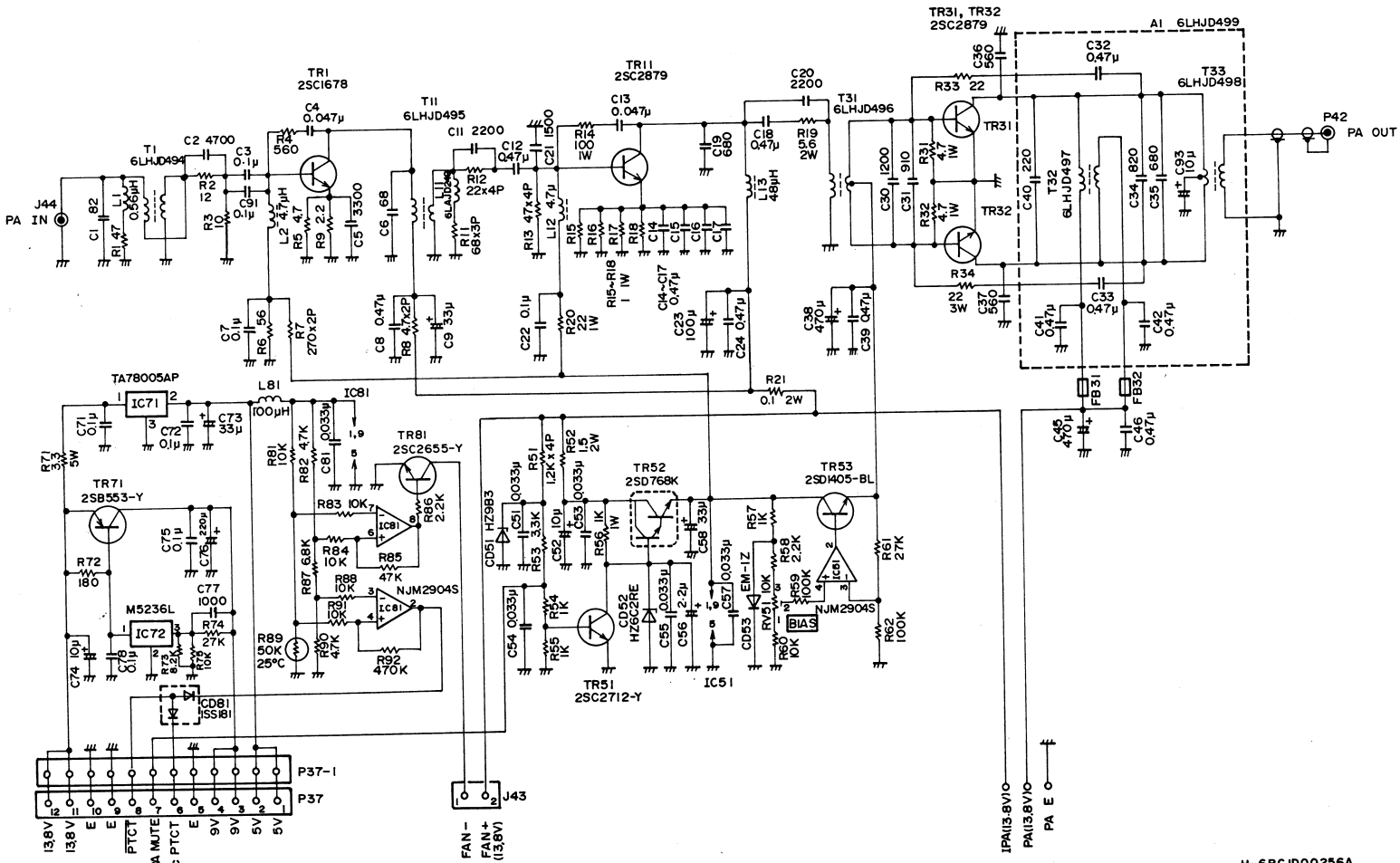


Figure 6.3.1 IF AMP UNIT CAE-227 Circuit Diagram



| | | | |
|------|----------|------|----------|
| IC 2 | SN16913P | IC 9 | M5223L |
| IC 3 | M5223L | IC10 | JC4052BP |
| IC 4 | TA7310P | IC11 | M5260L |
| IC 5 | TC4066BP | IC12 | M5260L |
| IC 6 | TC4066BP | | |
| IC 7 | M5223L | | |

Figure 6.4.1 12 V PA UNIT CAH-3011-2 Circuit Diagram



H-6PCJD00256A
MDT000834

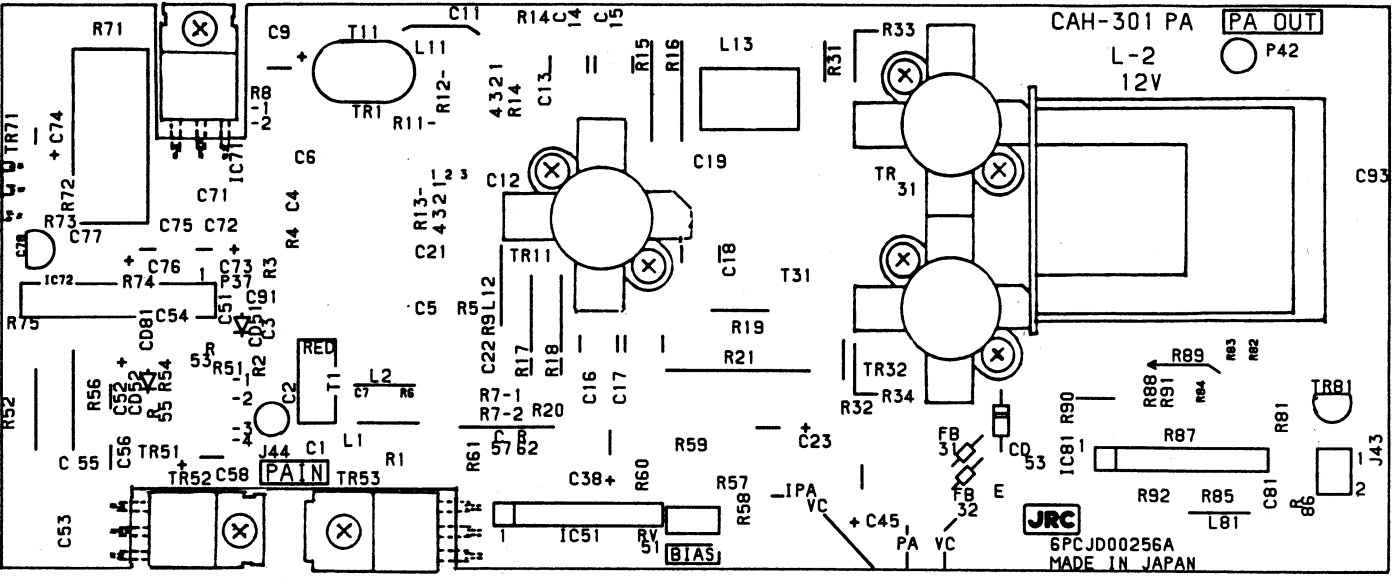
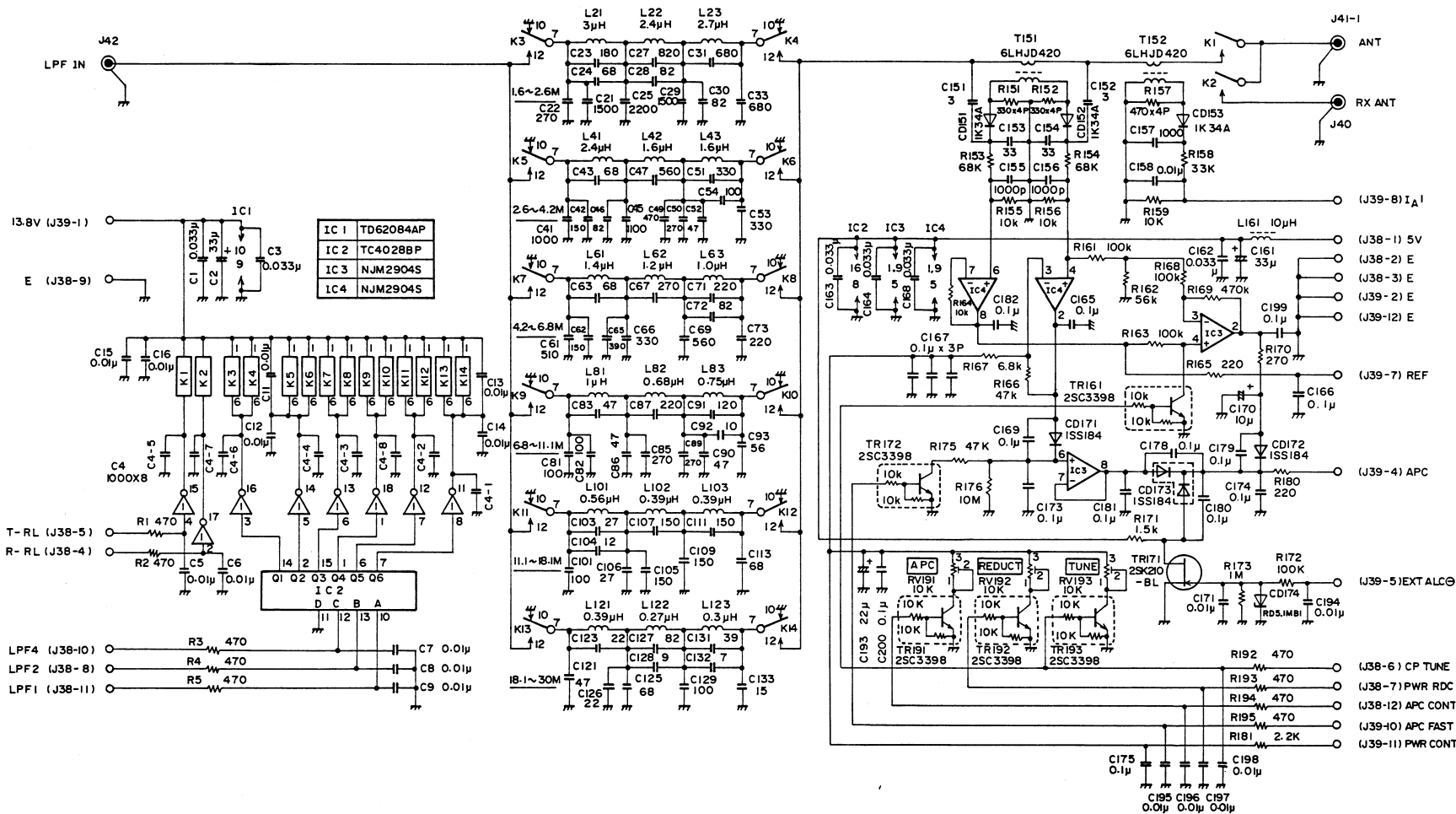


Figure 6.4.2 12 V PA UNIT CAH-301L-2 Component Layout

Figure 6.5.1 LPF UNIT CFJ-122-2 Circuit Diagram



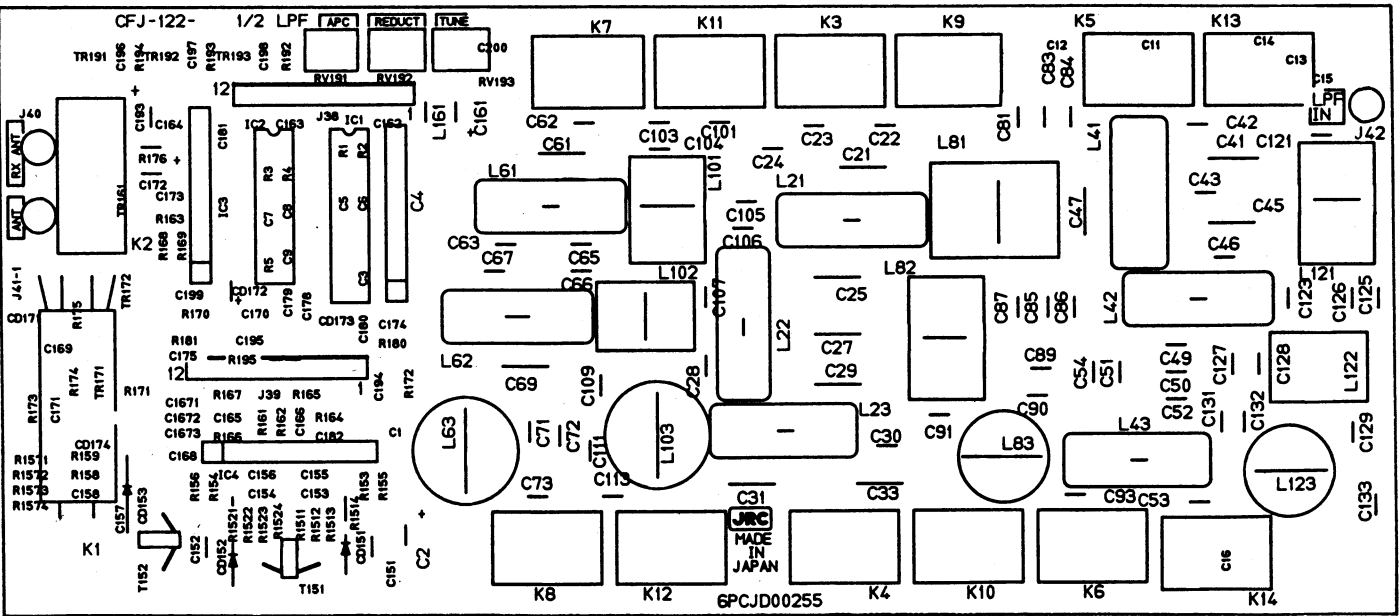


Figure 6.5.2 LPF UNIT CFJ-122-2 Component Layout

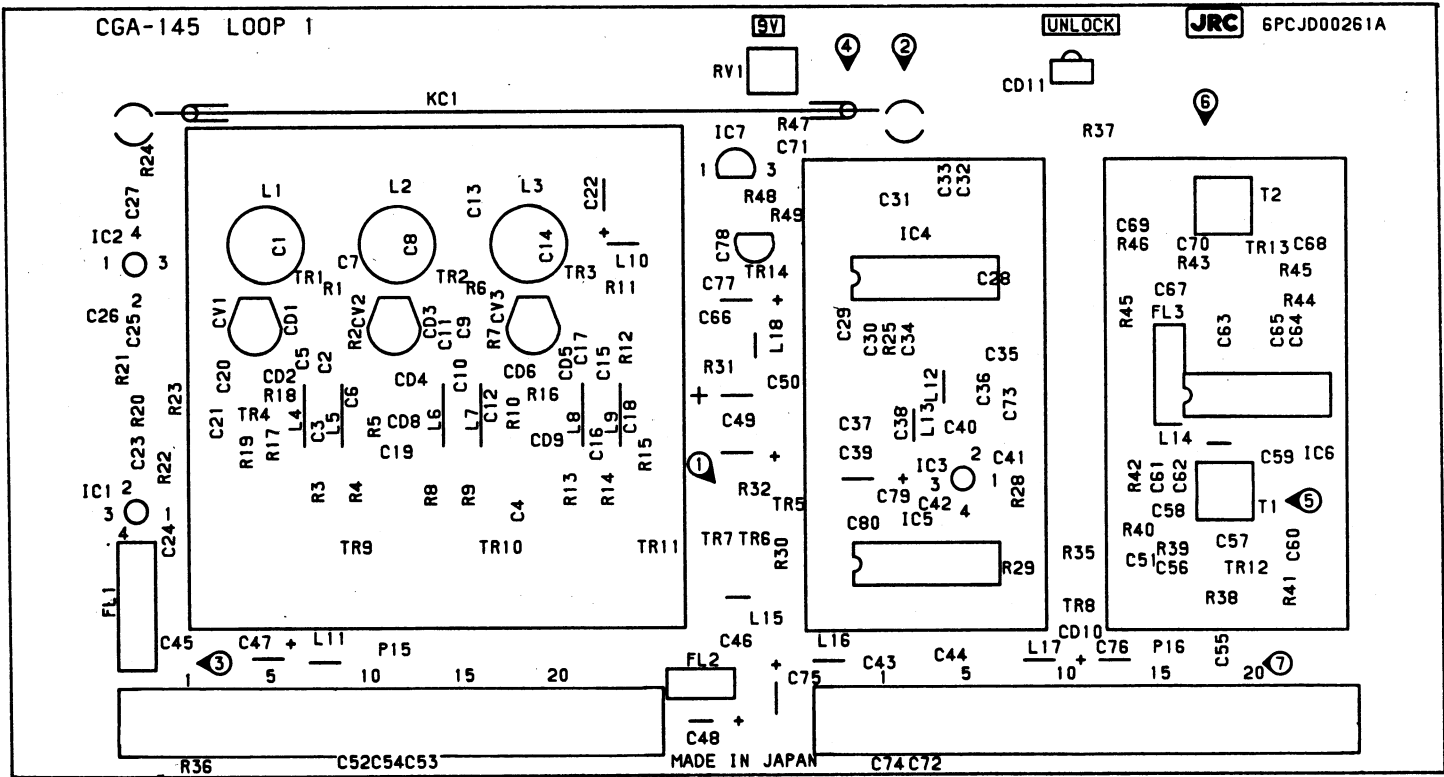


Figure 6.6.2 LOOP1 UNIT CGA-145 Component Layout

Figure 6.7.1 REF DDS UNIT CGK-81A Circuit Diagram

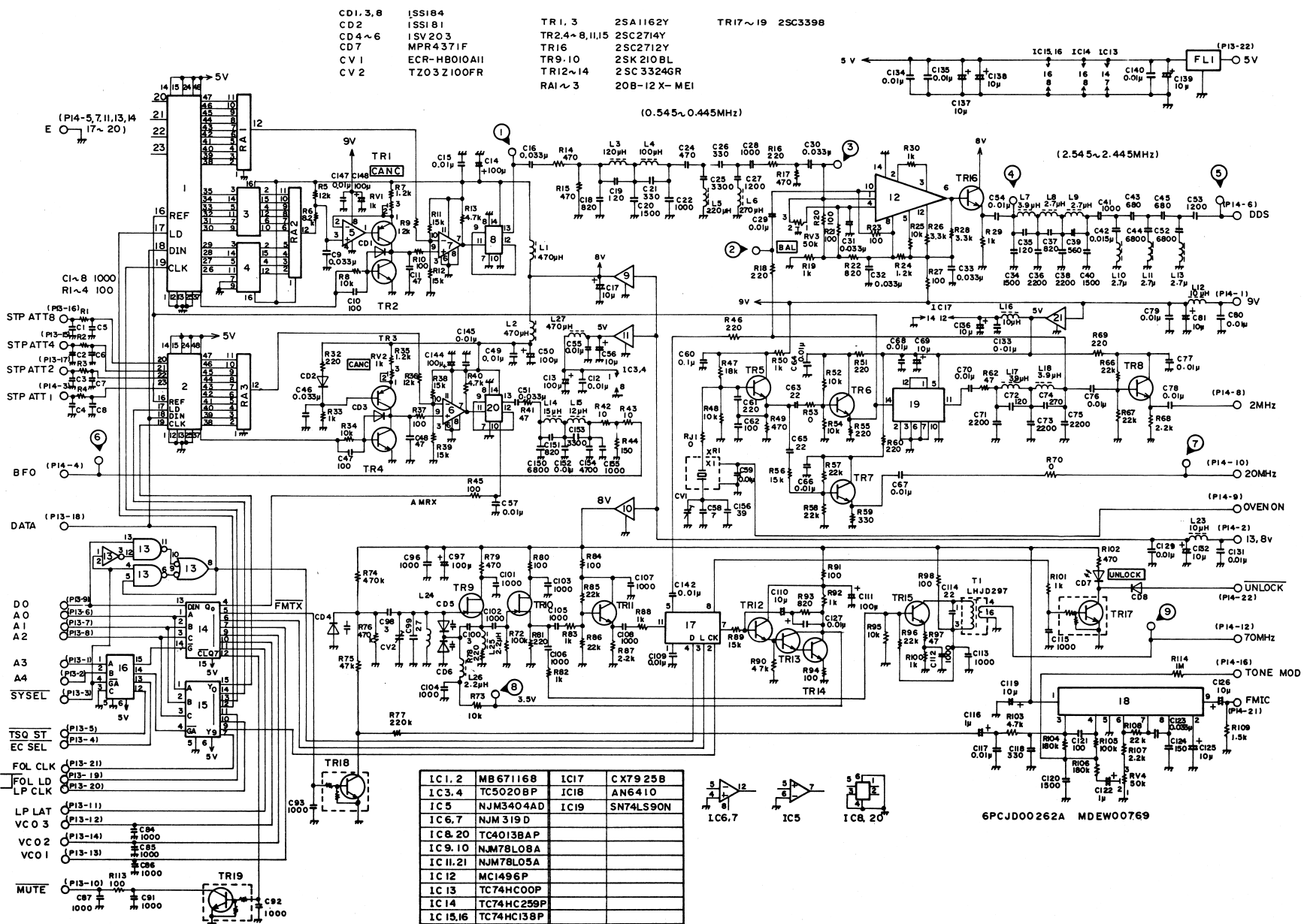


Figure 6.8.1 CPU UNIT CDC-493A Circuit Diagram

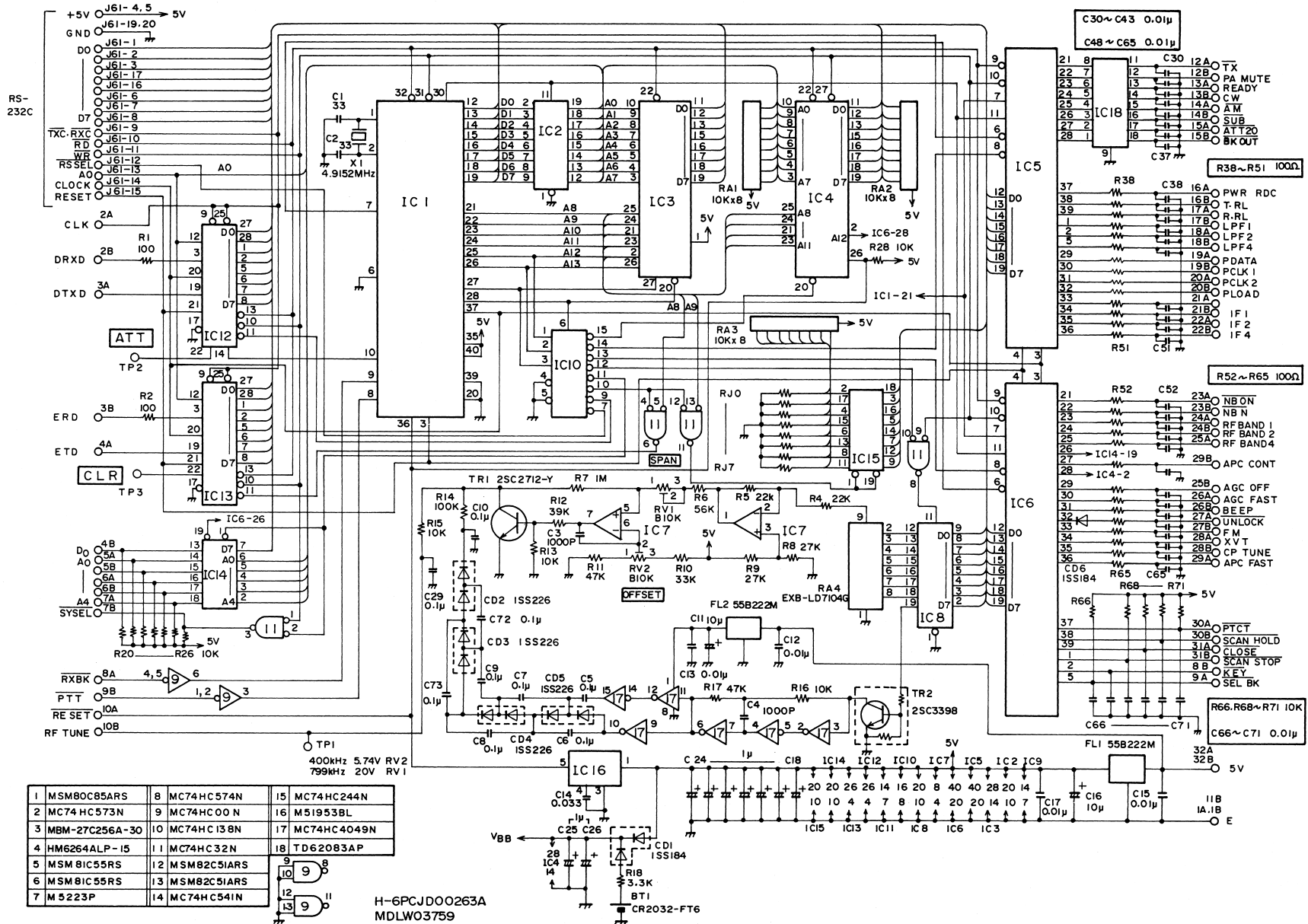
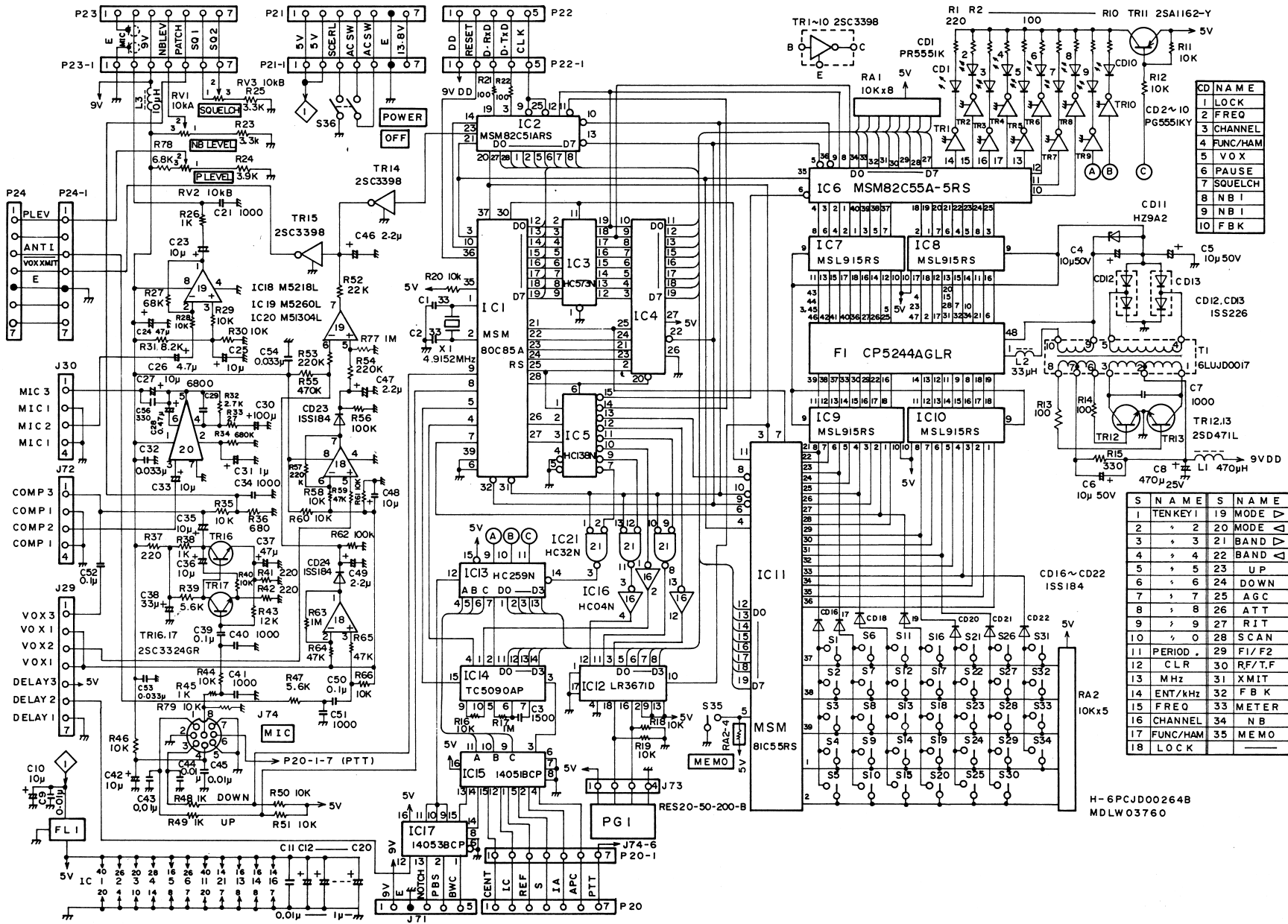


Figure 6.9.1 DISPLAY UNIT CDE-576 Circuit Diagram

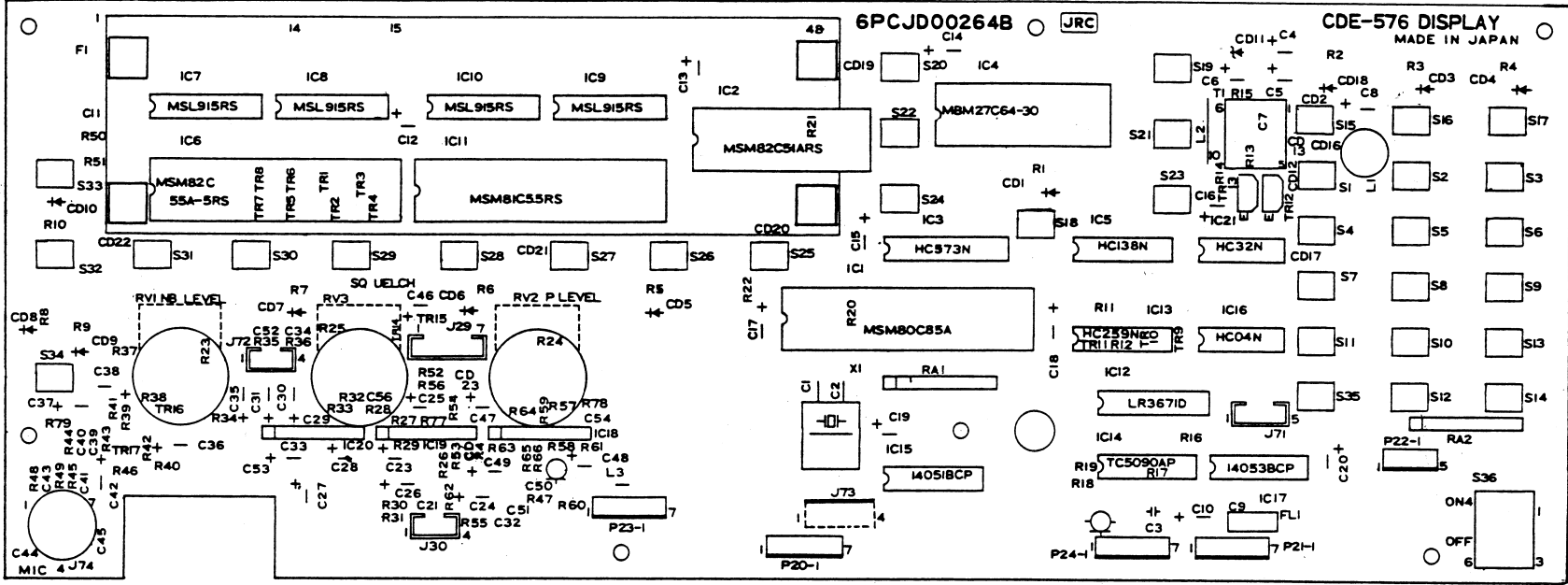


| CD NAME | NAME |
|---------|----------|
| 1 | LOCK |
| 2 | FREQ |
| 3 | CHANNEL |
| 4 | FUNC/HAM |
| 5 | VOX |
| 6 | PAUSE |
| 7 | SQUELCH |
| 8 | NBI |
| 9 | NBI |
| 10 | FBK |

| S | NAME | S | NAME |
|----|----------|----|--------|
| 1 | TENKEY | 19 | MODE |
| 2 | 2 | 20 | MODE |
| 3 | 3 | 21 | BAND |
| 4 | 4 | 22 | BAND |
| 5 | 5 | 23 | UP |
| 6 | 6 | 24 | DOWN |
| 7 | 7 | 25 | AGC |
| 8 | 8 | 26 | ATT |
| 9 | 9 | 27 | RTT |
| 10 | 10 | 28 | SCAN |
| 11 | PERIOD | 29 | F1/F2 |
| 12 | CLR | 30 | RF/T.F |
| 13 | MHz | 31 | XMIT |
| 14 | ENT/kHz | 32 | FBK |
| 15 | FREQ | 33 | METER |
| 16 | CHANNEL | 34 | NB |
| 17 | FUNC/HAM | 35 | MEMO |
| 18 | LOCK | | |

H-6PCJ00264B
MDLW03760

Figure 6.9.2 DISPLAY UNIT CDE-576 Component Layout



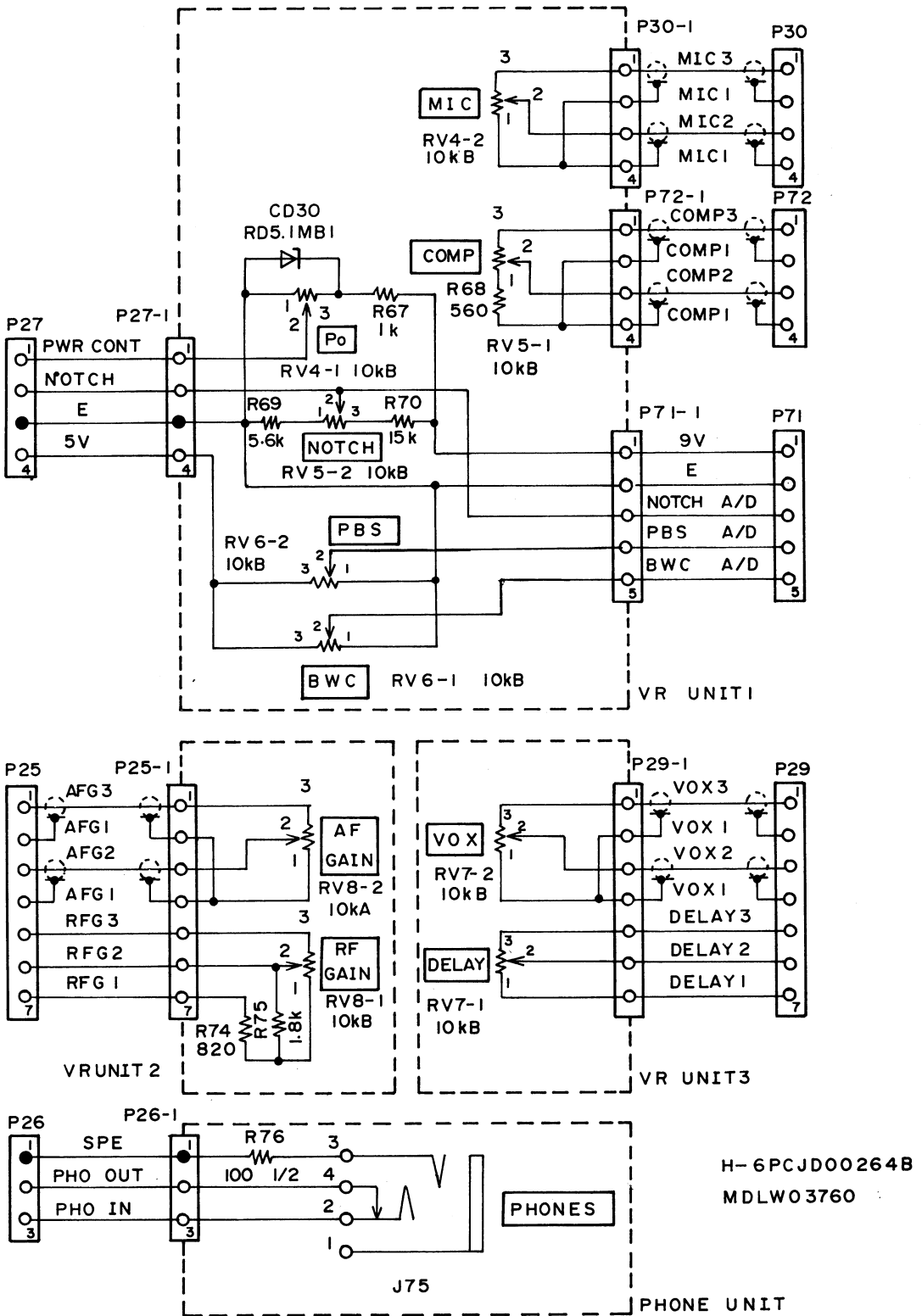


Figure 6.10.1 DISPLAY (VR) UNIT CDE-576 Circuit Diagram

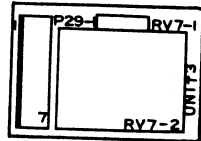
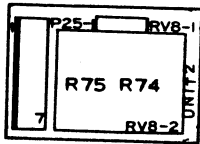
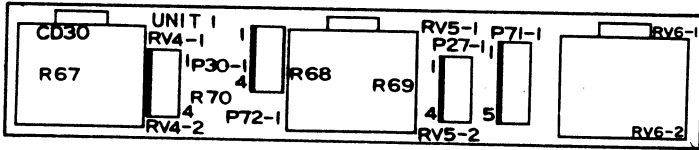
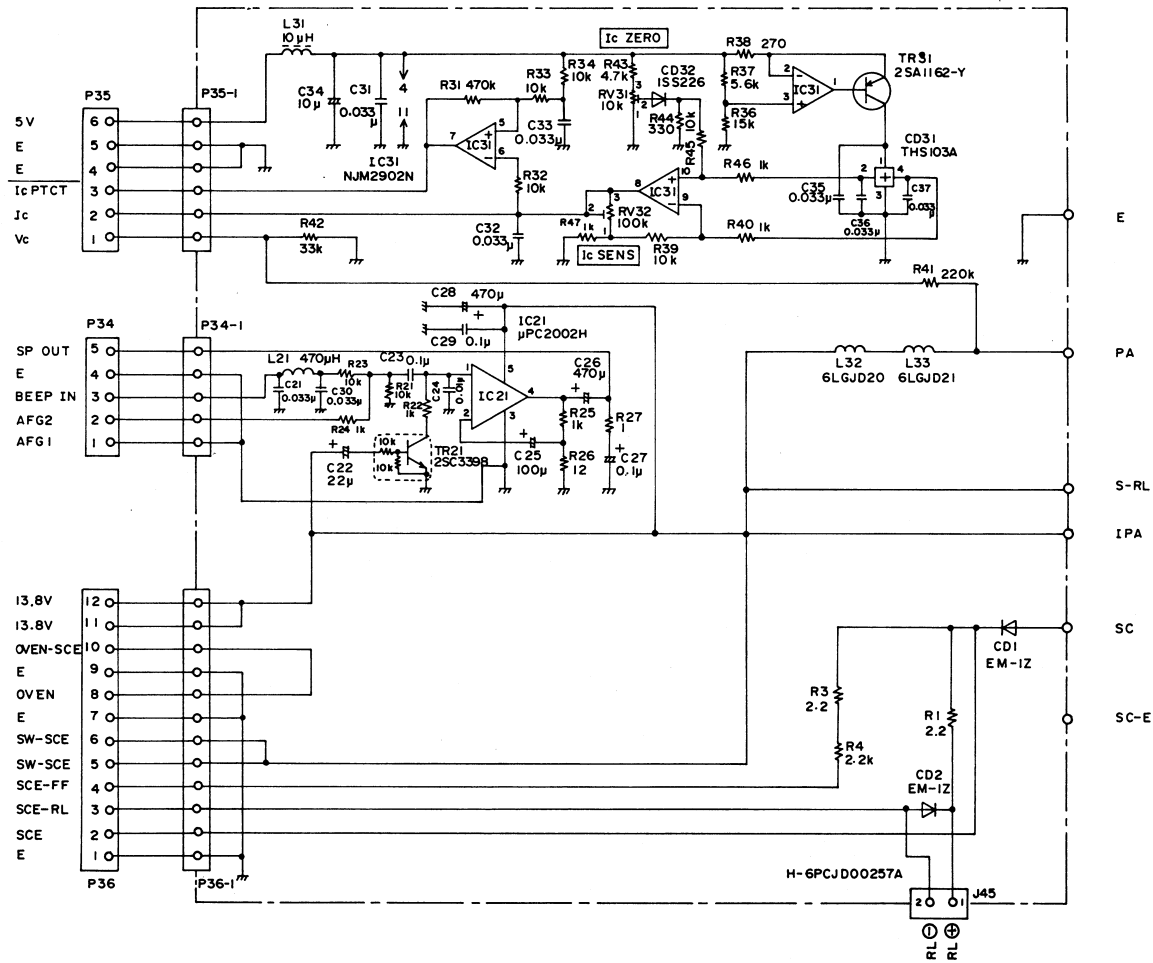


Figure 6.10.2 DISPLAY (VR) UNIT CDE-576 Component Layout

Figure 6.11.1 AF AMP UNIT CBD-894L Circuit Diagram



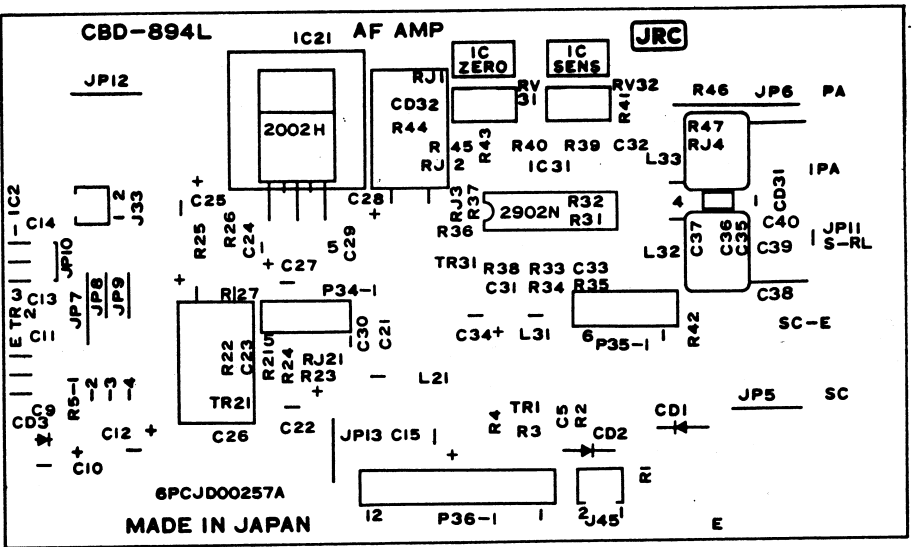
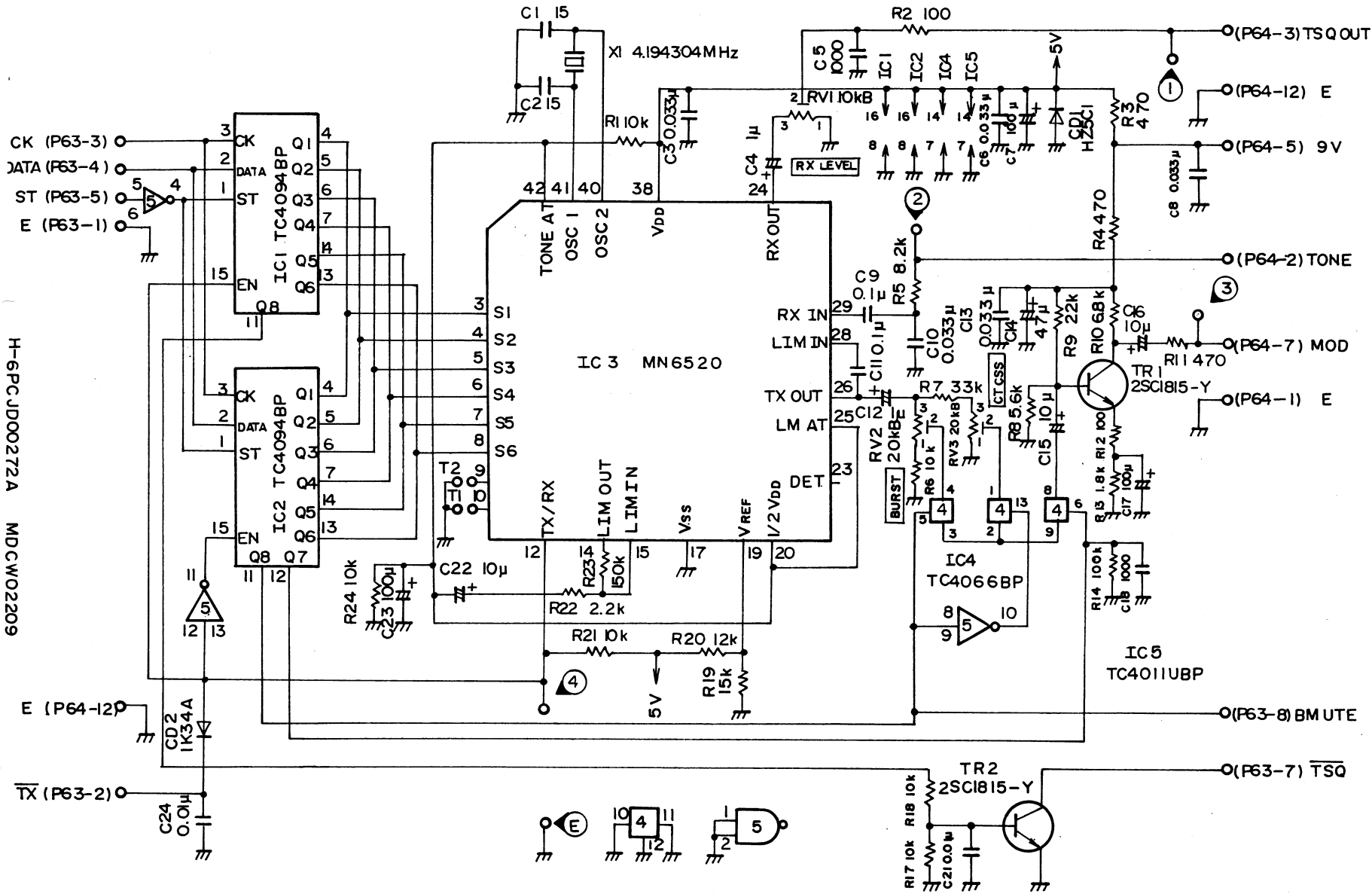


Figure 6.11.2 AF AMP UNIT CBD-894L Component Layout

Figure 6.12.1 TONE SQ UNIT CCL-212 Circuit Diagram



H-6PCJ000272A MDCW02209

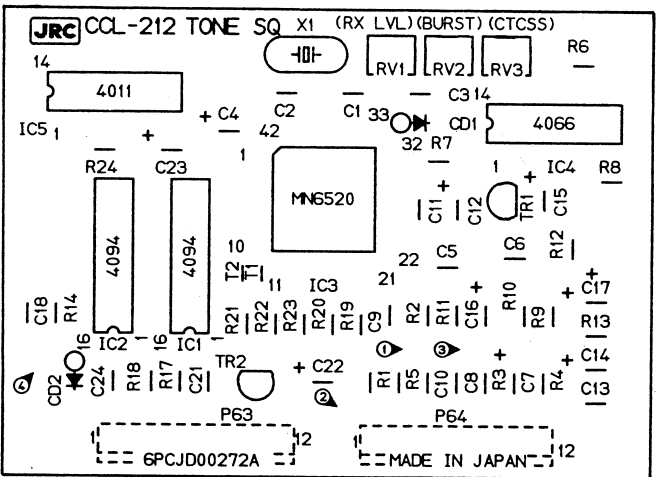
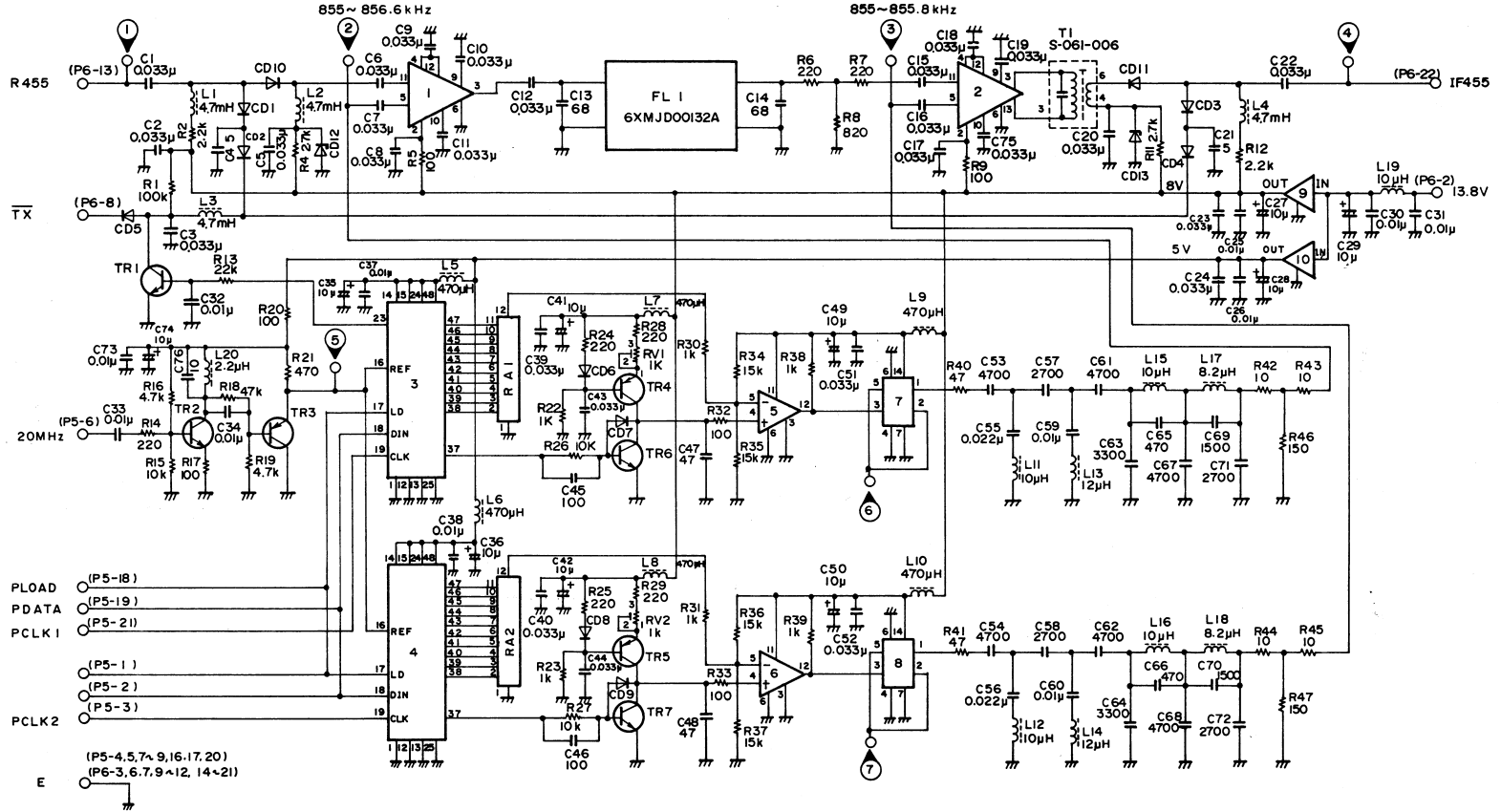


Figure 6.1.2.2 TONE SQ UNIT CCL-212 Component Layout

Figure 6.13.1 BWC UNIT CFL-243 Circuit Diagram



- | | | | |
|---------|-----------|-----------|-------------|
| IC 1, 2 | SN76514N | CD1 ~ 11 | IS 2076 |
| IC 3, 4 | MB671168P | CD12, 13 | HZ5C1 |
| IC 5, 6 | NJM319D | TR 1 | 2SC1815Y |
| IC 7, 8 | TC40138AP | TR 2, 6-7 | 2SC1923Y |
| IC 9 | NJM78L08A | TR 3 ~ 5 | 2SA1012Y |
| IC 10 | TA78005AP | RA 1, 2 | 20B-12X-ME1 |



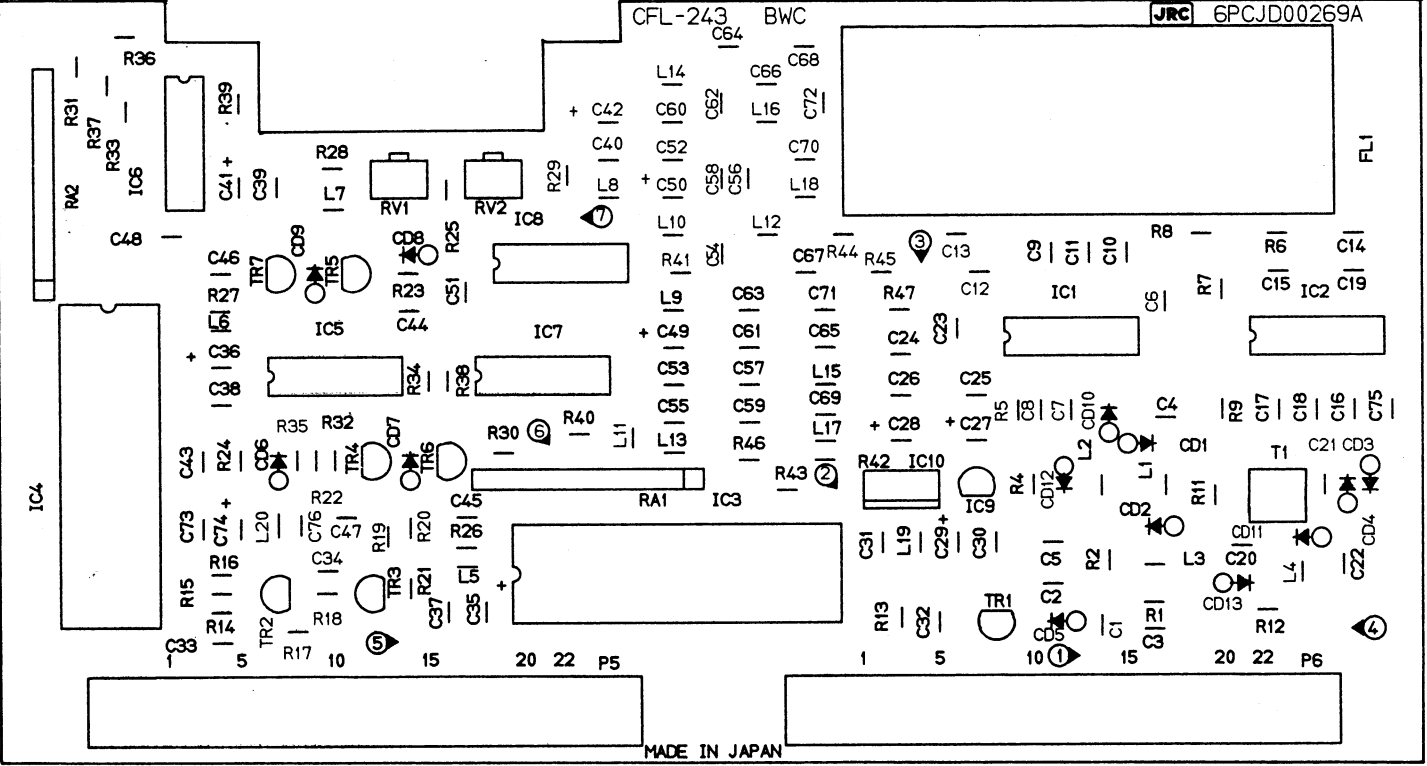
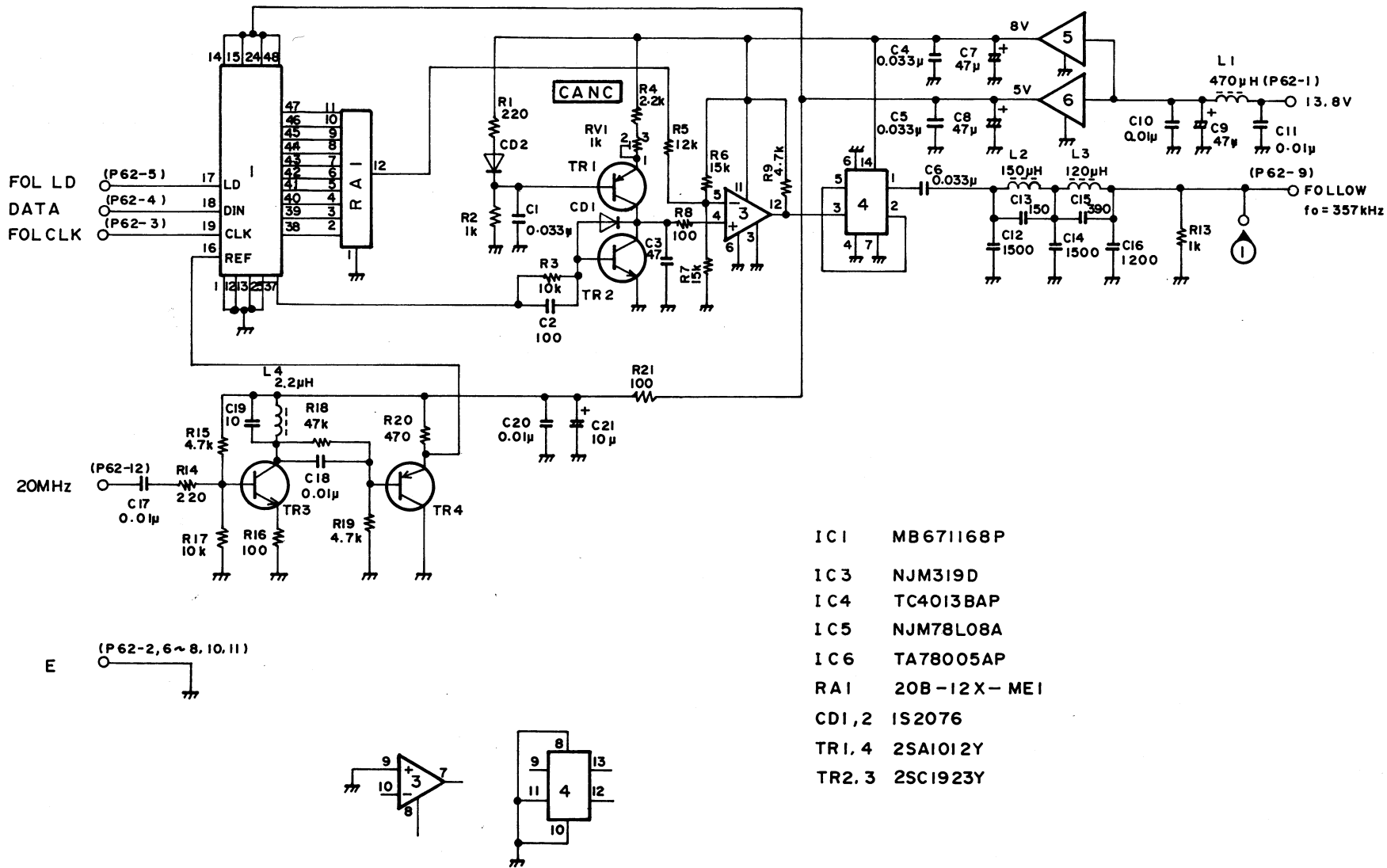


Figure 6.13.2 BWC UNIT CFL-243 Component Layout

Figure 6.14.1 NOTCH FOLLOW UNIT CDD-366 Circuit Diagram

6PCJDD00273A



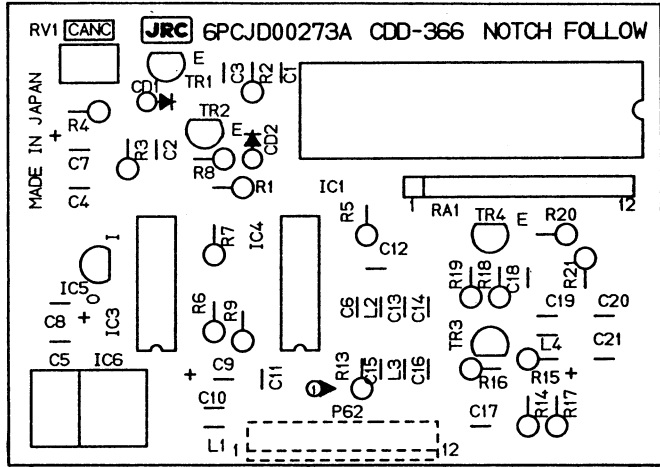


Figure 6.14.2 NOTCH FOLLOW UNIT CDD-366 Component Layout

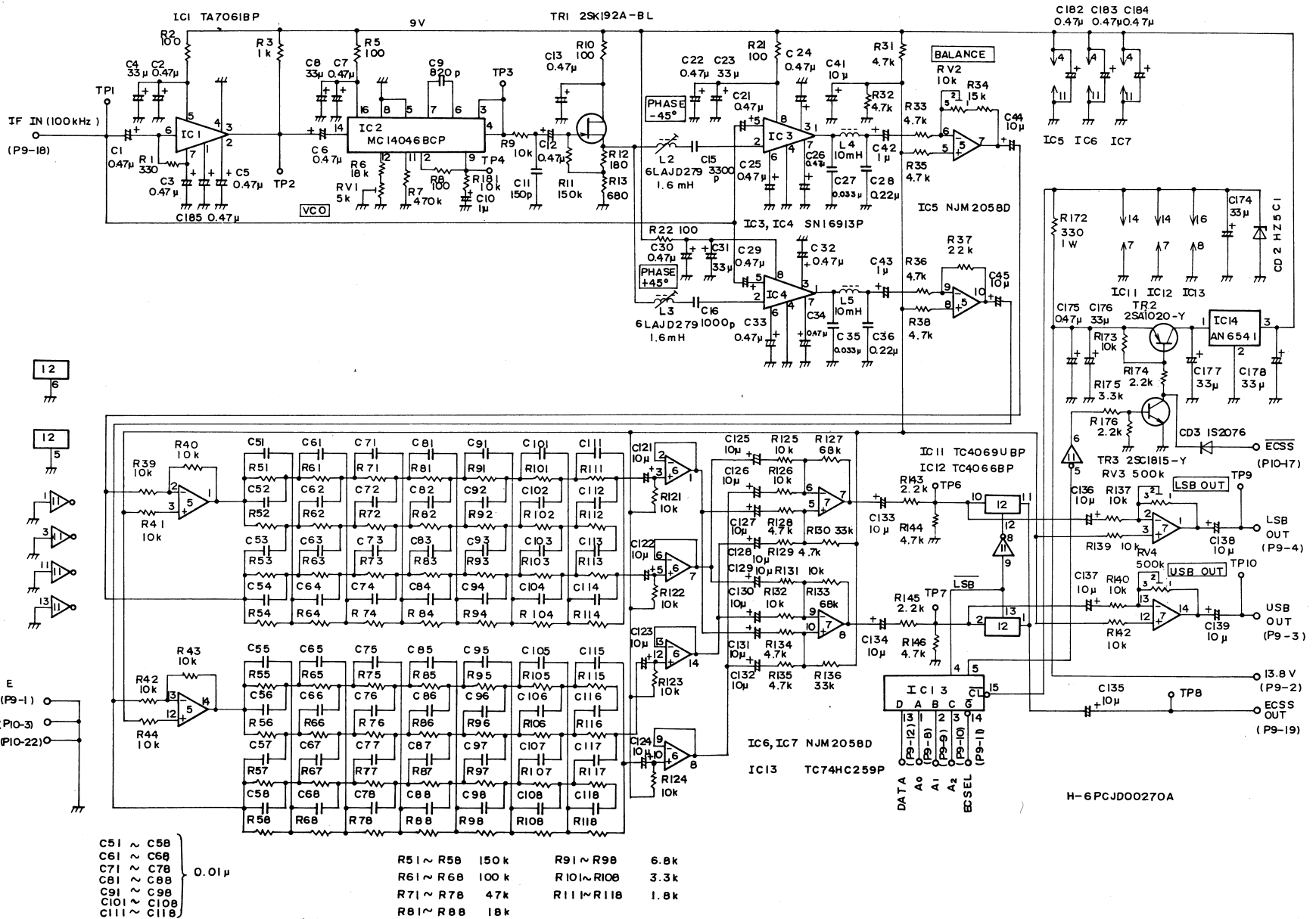


Figure 6.15.1 ECSS UNIT CMF-78 Circuit Diagram

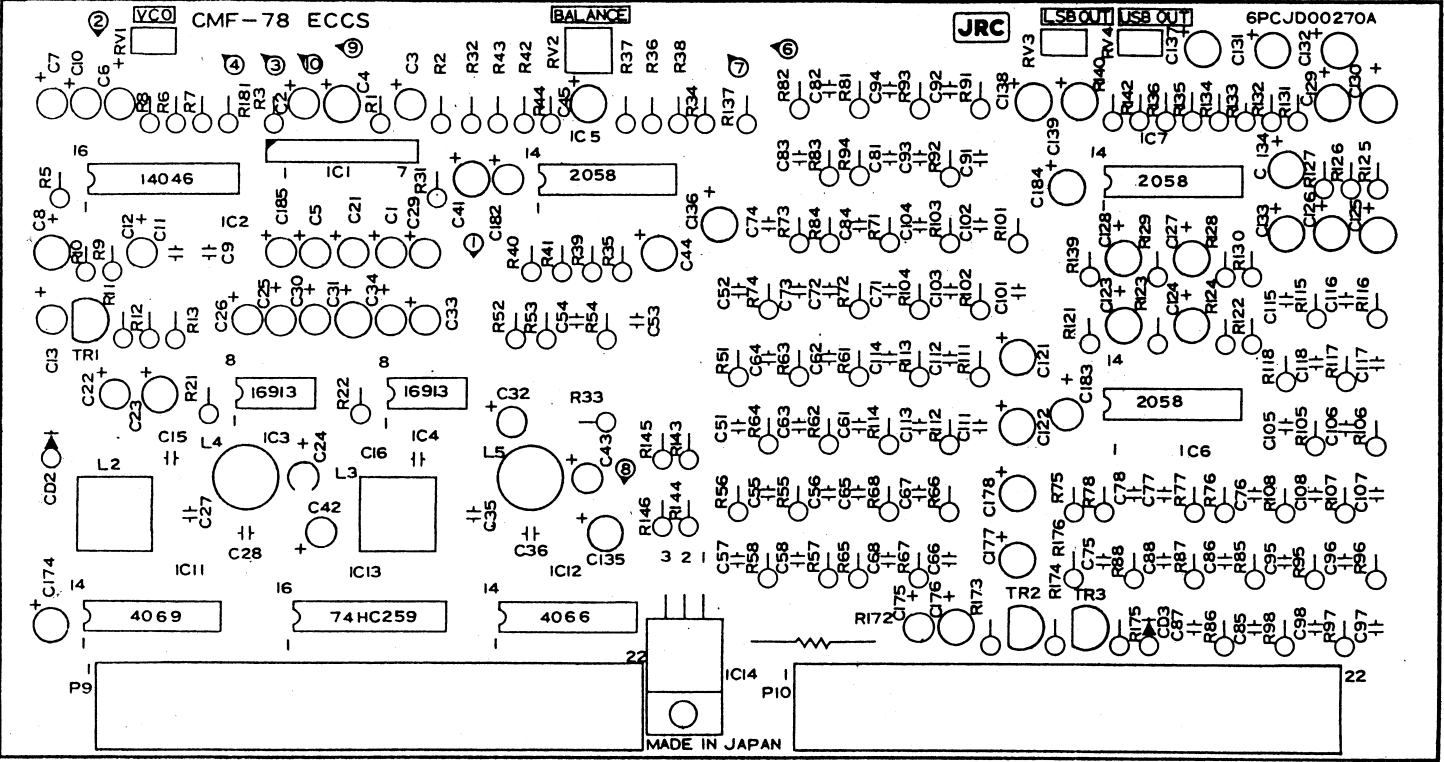
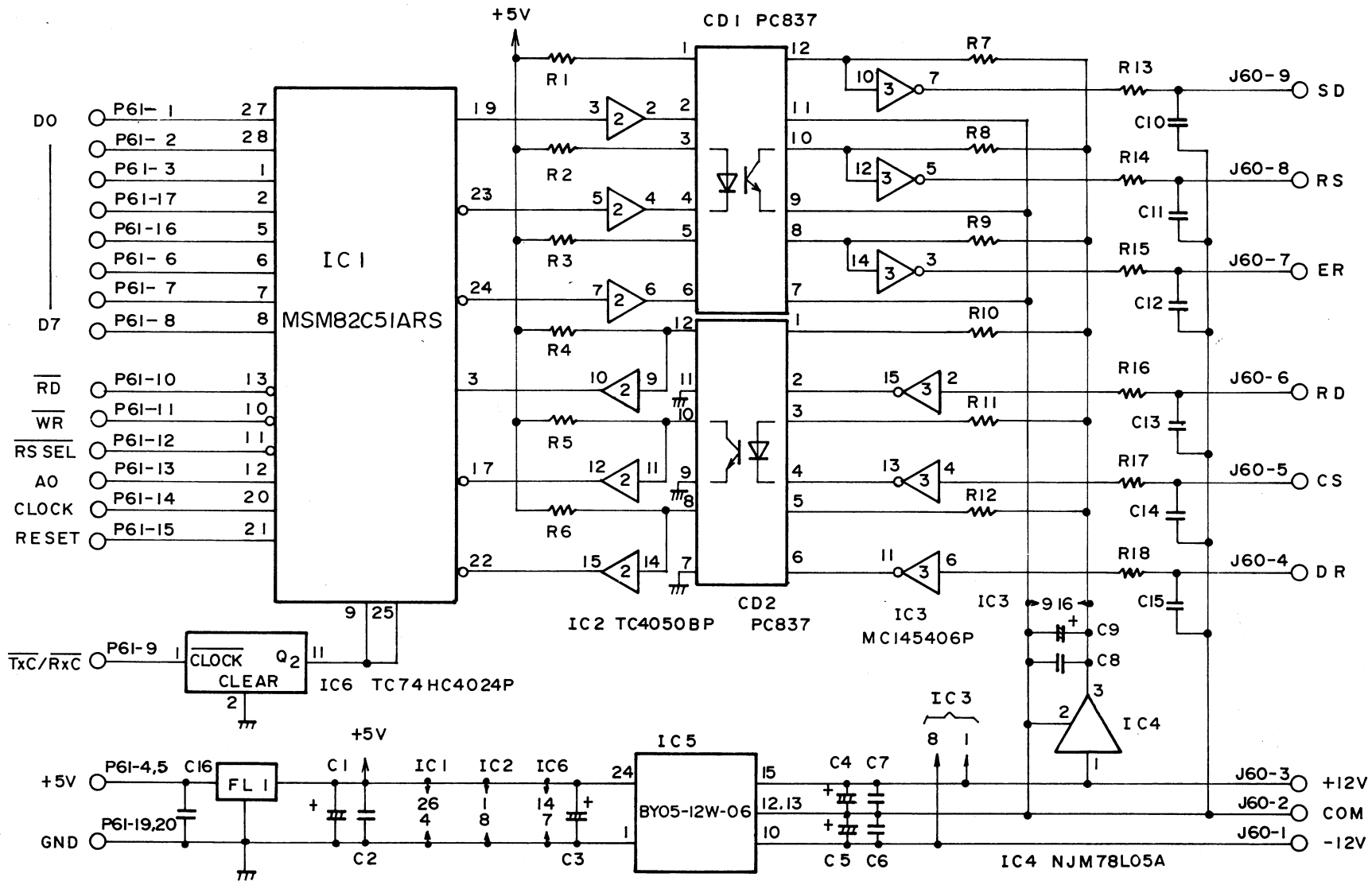


Figure 6.15.2 ECSS UNIT CMF-78 Component Layout

Figure 6.16.1 RS-232C INTERFACE UNIT CMH-741 Circuit Diagram



H-6PCJD00274A
MDLW02681

| | |
|-----------------------------|-----------------------|
| C1, C3, C4, C5, C9 — 10µF | R1~R3, R10~R12— 680 Ω |
| C2, C6, C7, C8, C16— 0.01µF | R4~R9 — 4.7 kΩ |
| C10~ C15 — 0.001µF | R13~R18 — 100 Ω |

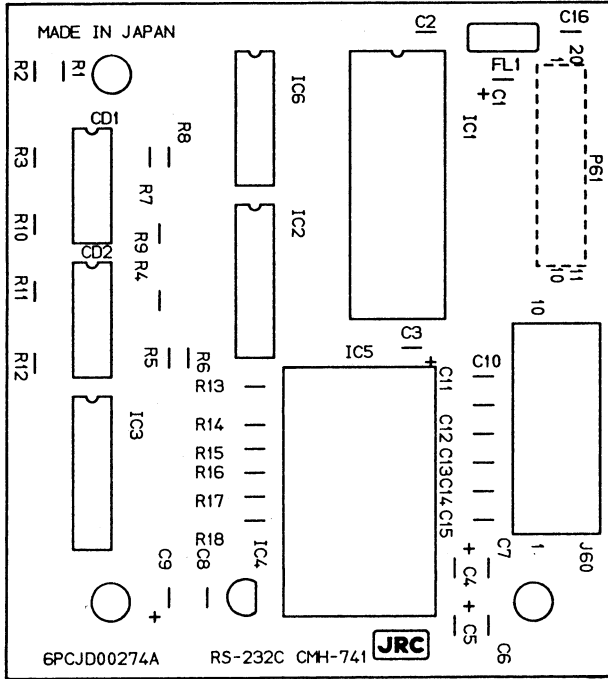
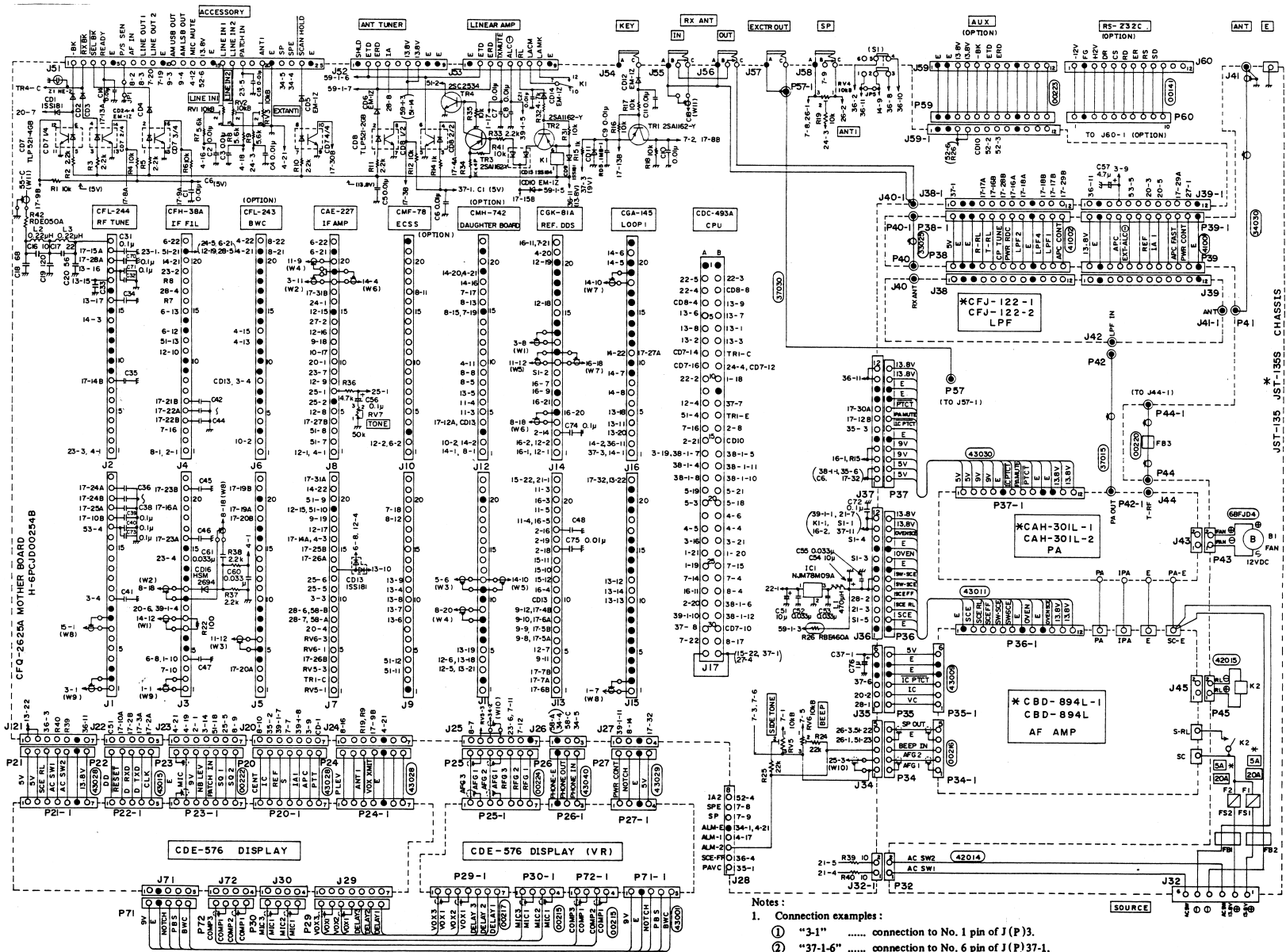


Figure 6.16.2 RS-232C INTERFACE UNIT CMH-741 Component Layout

Figure 6.17.1 MOTHER BOARD CFQ-2625A Circuit Diagram
CHASSIS JST-135 Circuit Diagram

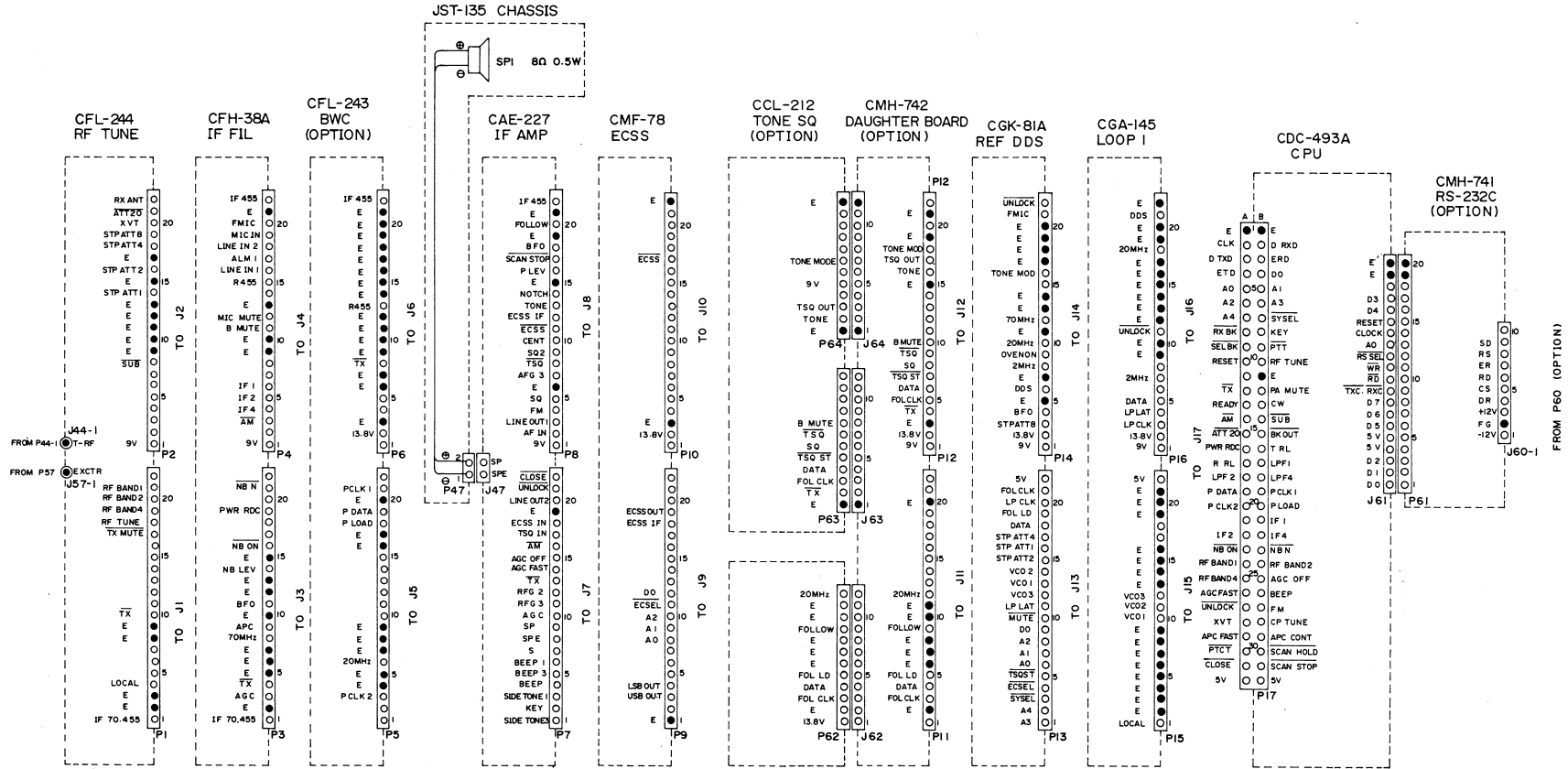


Notes:

1. Connection examples:

- ① "3-1" connection to No. 1 pin of J (P)3.
 - ② "37-1-6" connection to No. 6 pin of J (P)37-1.
 - ③ "R7" connection to R7.
 - ④ "K1-12" connection to No. 12 pin of K1.
2. Capacitance value not specified is 1000PF.

Figure 6.17.2 Signal Nomenclature of Units



CDD-366 NOTCH FOLLOW (OPTION)

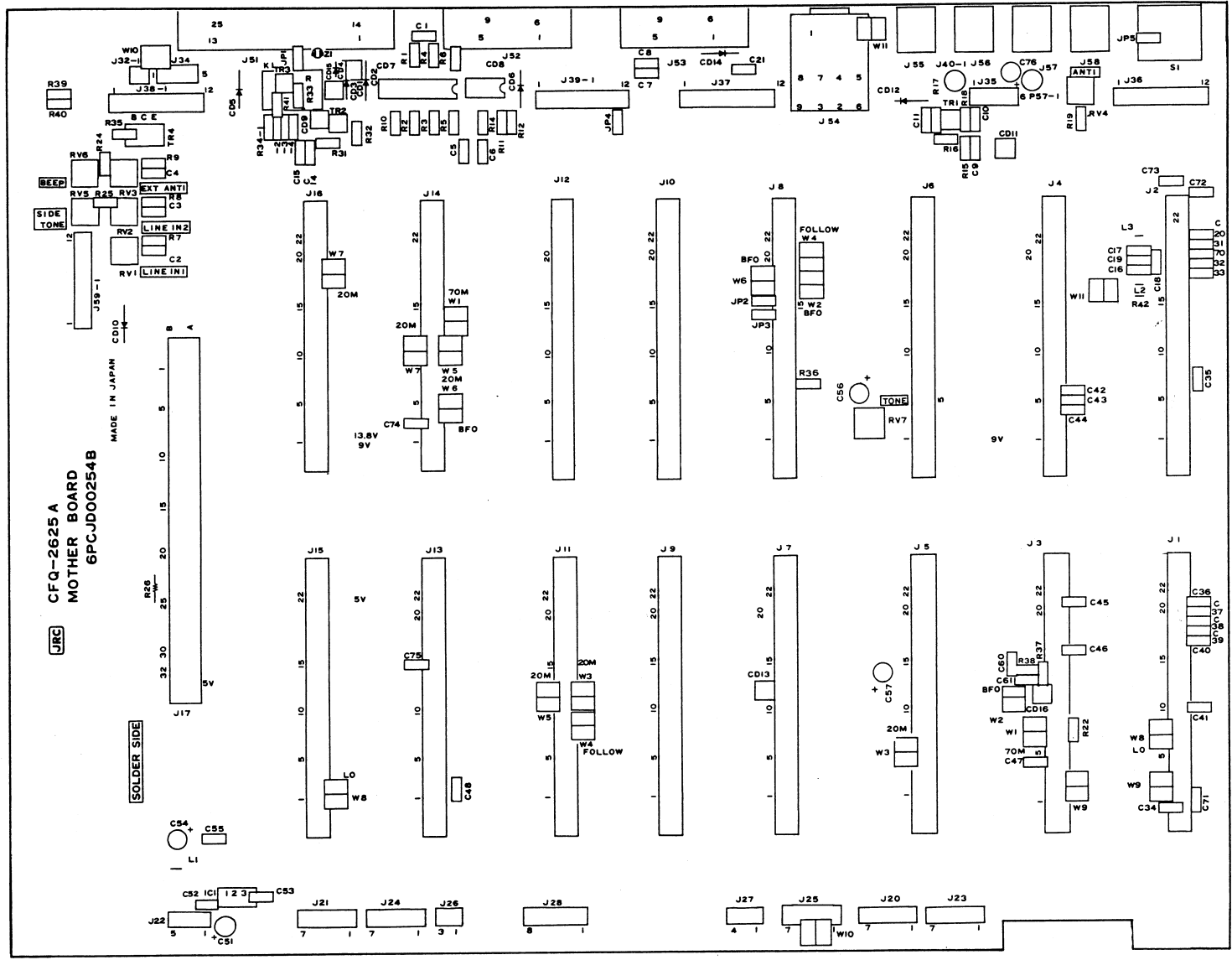


Figure 6.17.3 MOTHER BOARD CFQ-2625A Component Layout

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