

DR-510T/E

Service Manual

SCHEMATHEEK
 Beh. T. Hultermans
 Postbus 4228
 5604 EE Eindhoven



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ALINCO ELECTRONICS INC.

SPECIFICATIONS

■ General

| | |
|--------------------------|--|
| Frequency Coverage | 144.0~148.0 MHz (DR-510T) 440.0~450.0 MHz 144.0~146.0 MHz (DR-510E) 430.0~440.0 MHz |
| Antenna Impedance | 50 ohms unbalanced |
| Power Supply Requirement | 13.8 Volts D.C. |
| Current Drain at 13.8 V | Receiving Squelched: does not exceed 500 mA Transmitting High: 45 W approx. 9.5 A at VHF 35 W approx. 10 A at UHF Low: 5 W approx. 4 A at VHF 5 W approx. 4 A at UHF |
| Dimension | 140 mm (W)×50 mm (H)×205 mm (D) (5½"×2"×8¼") |
| Weight | Approx. 1.7 kgs. (3.75 lbs.) |

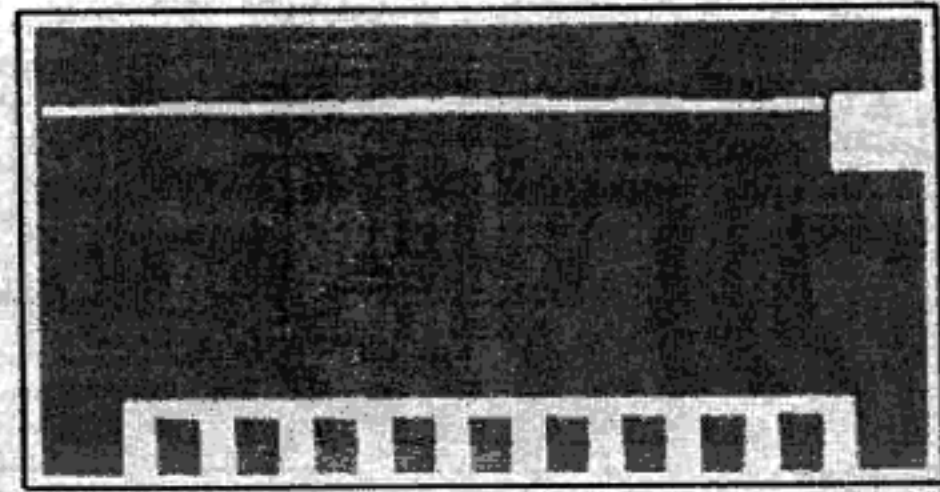
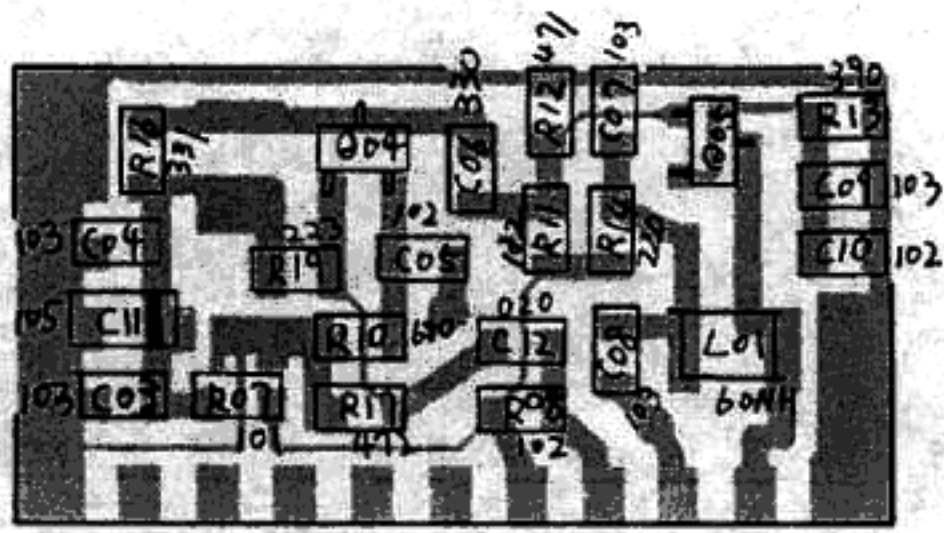
■ Transmitter

| | |
|--------------------------|---|
| Output Power | High: 45 Watts at VHF, 35 Watts at UHF Low: Approx. 5 Watts at both bands |
| Emission Mode | 16F3 |
| Modulation System | Variable Reactance F.M. |
| Max. Frequency Deviation | ±5 kHz |
| Spurious Emission | More than 60 dB below carrier |
| Microphone | Electret Condenser Microphone |
| Operating Mode | Simplex Duplex: ±600 kHz from receive frequency at VHF ±5, 1.6, 7.6 MHz from receive frequency at UHF (Odd offsets programmable) |
| DTMF Encoder | Built-in |

■ Receiver

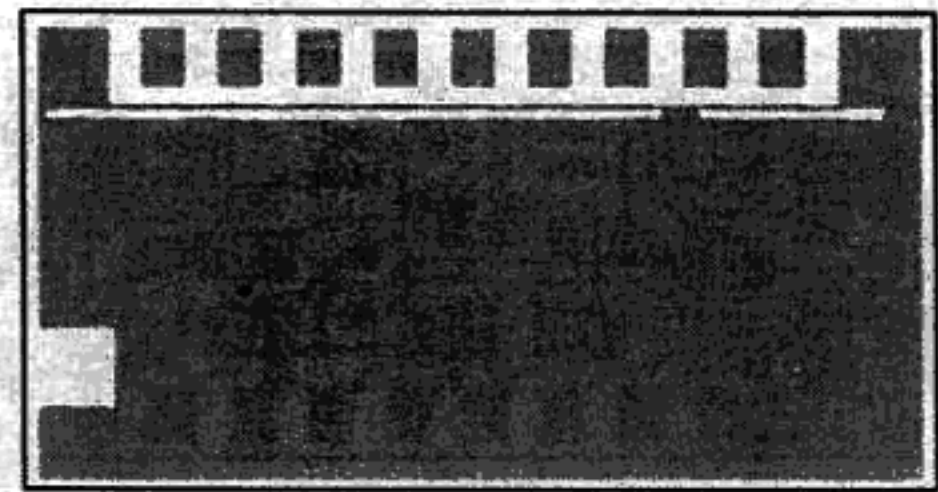
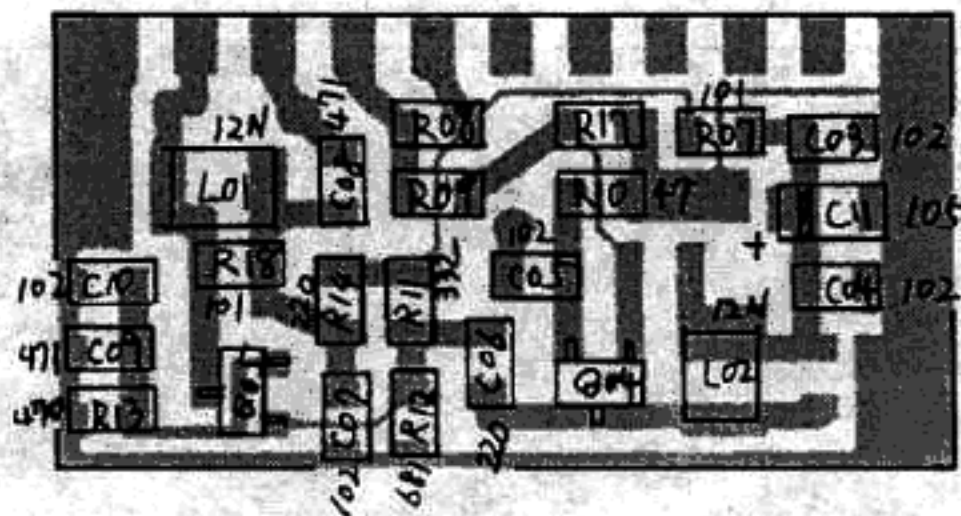
| | |
|------------------------|--|
| Receiving System | Superhetrodyne, dual conversion |
| Modulation Acceptance | 16F3 |
| Intermediate Frequency | 1st 10.7 MHz 2nd 455 kHz at VHF 1st 30.825 MHz 2nd 455 kHz at UHF |
| Sensitivity | 12 dB SINAD less than 0.16 μV |
| Selectivity | More than ±6 kHz at -6 dB Less than ±12 kHz at -60 dB |
| Audio Power Output | More than 1.5 Watts (8 ohms-10% Distortion) |
| Speaker Impedance | 8 ohms |

■ VHF DRIVE PC BOARD

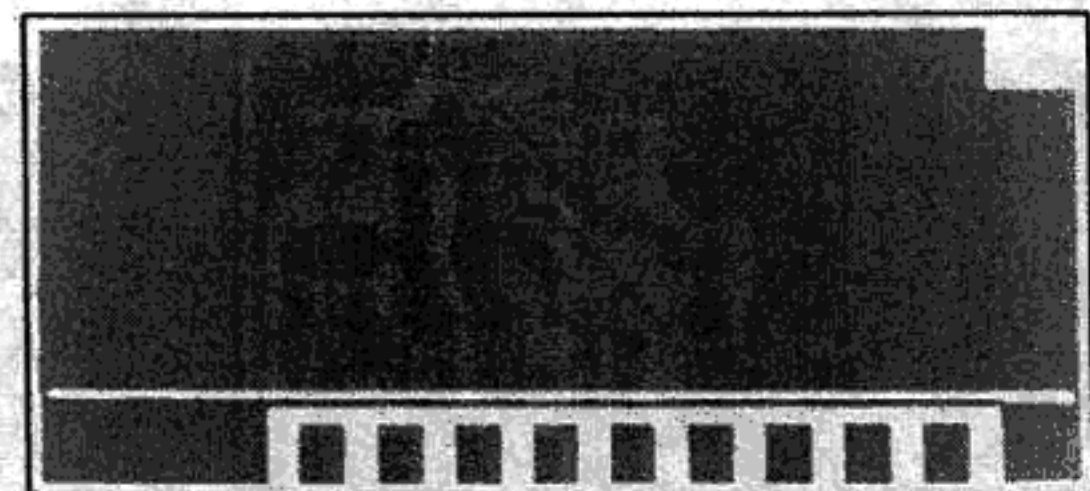
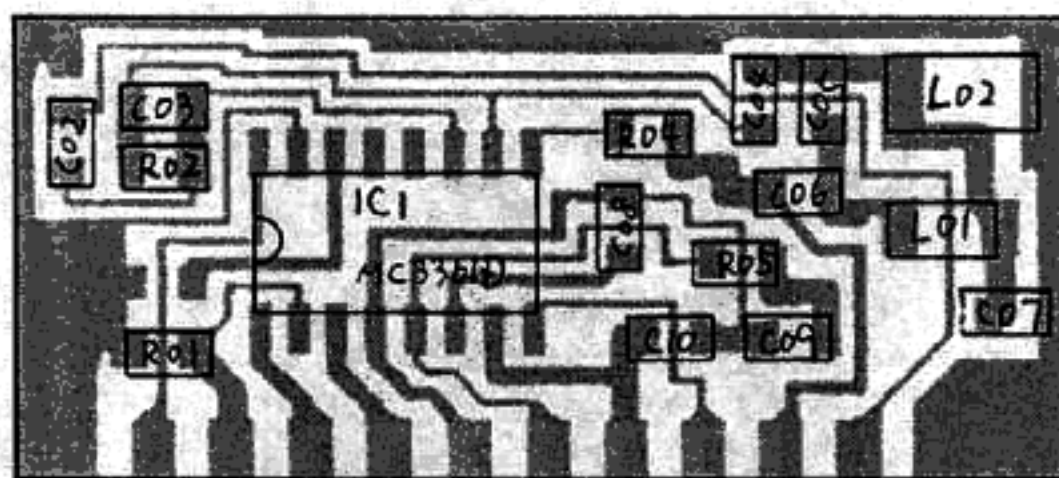


■ UHF DRIVE PC BOARD

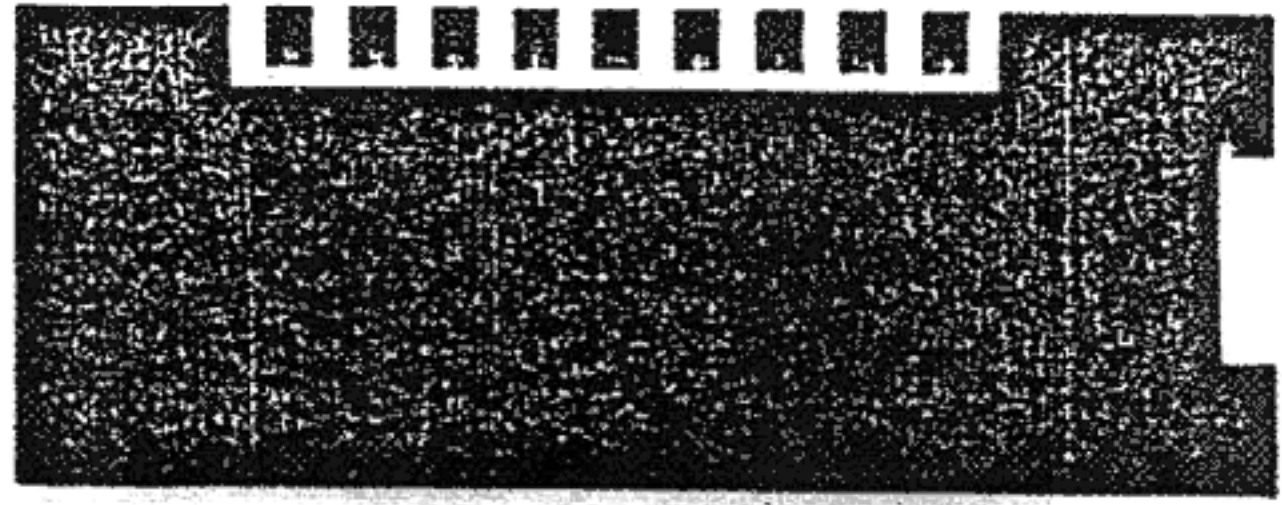
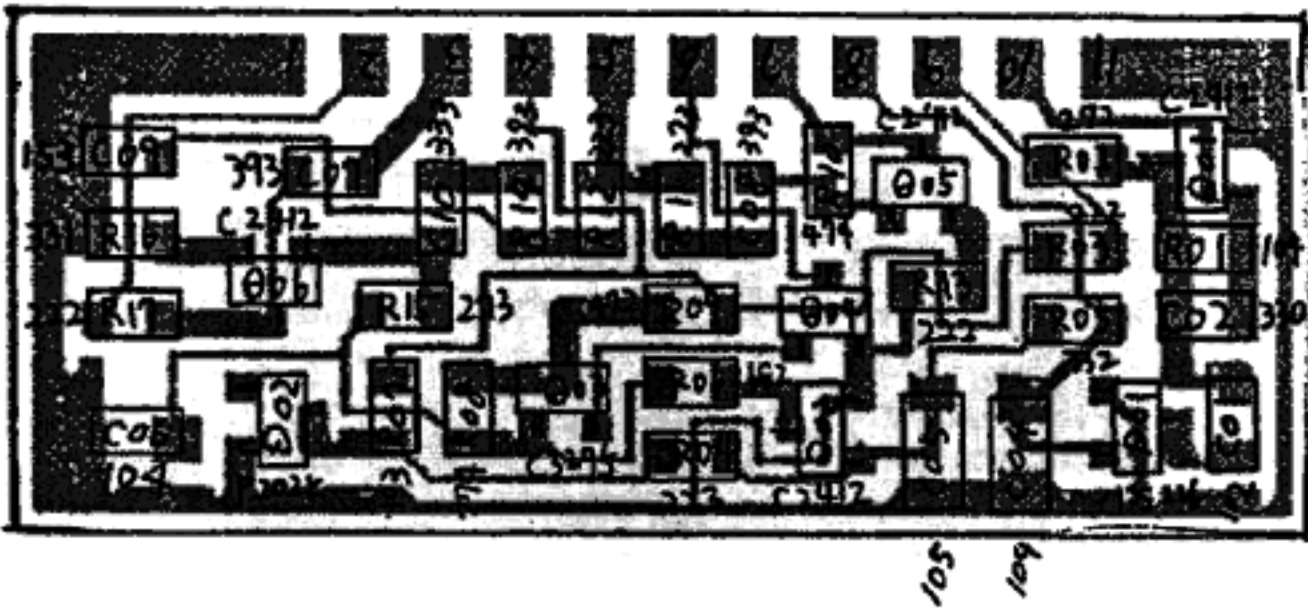
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■ IF PC BOARD

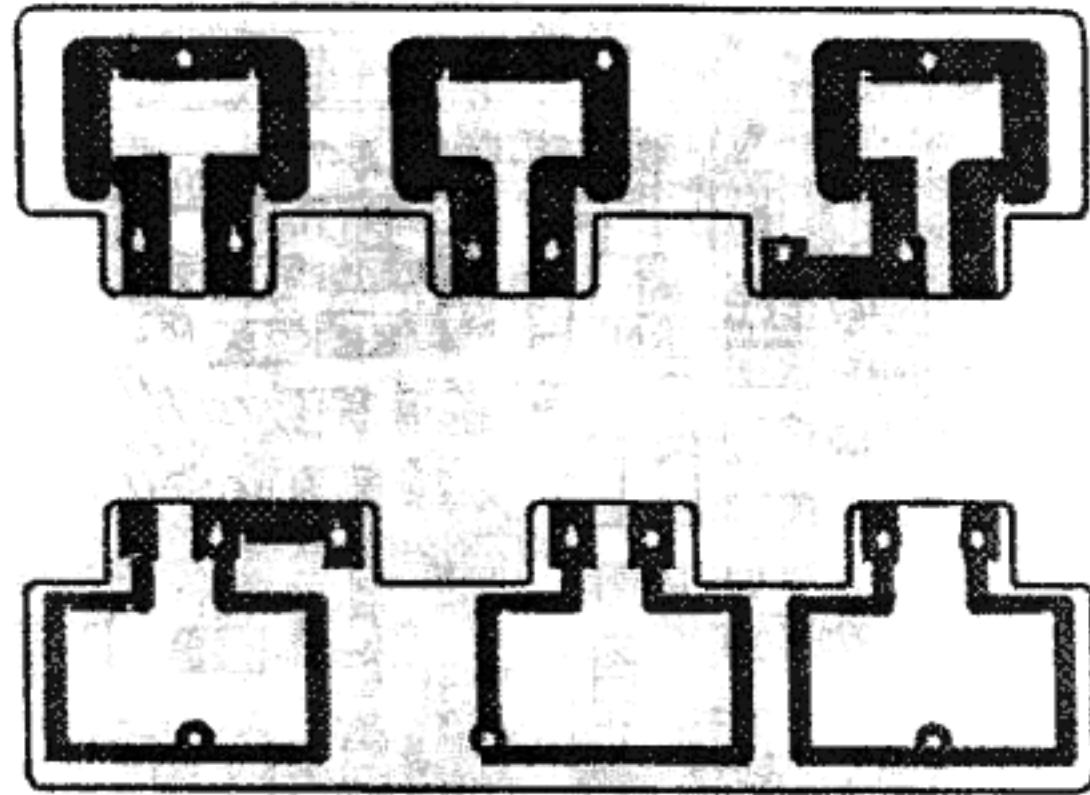
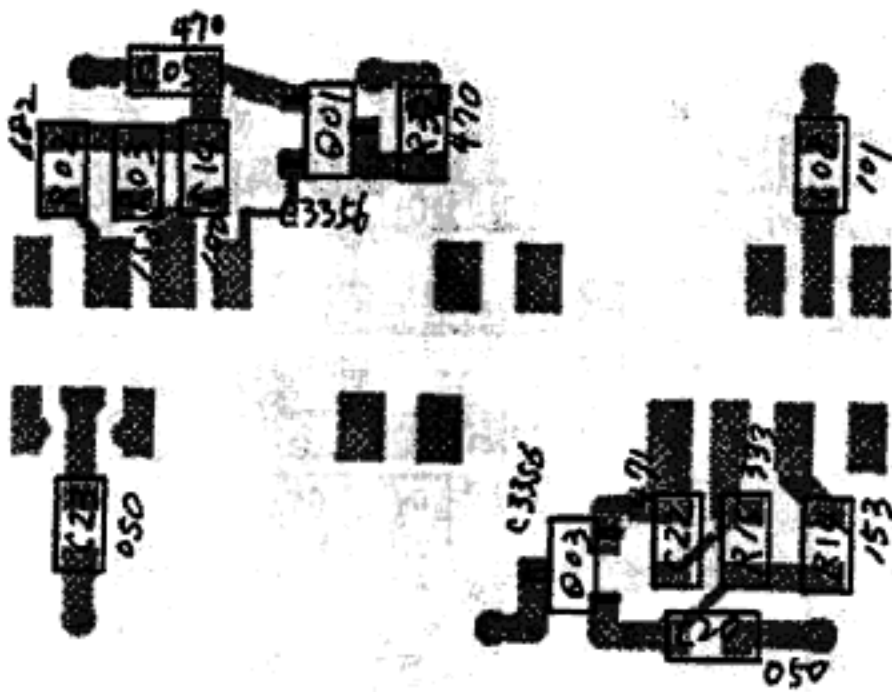


■ SQUELCH PC BOARD

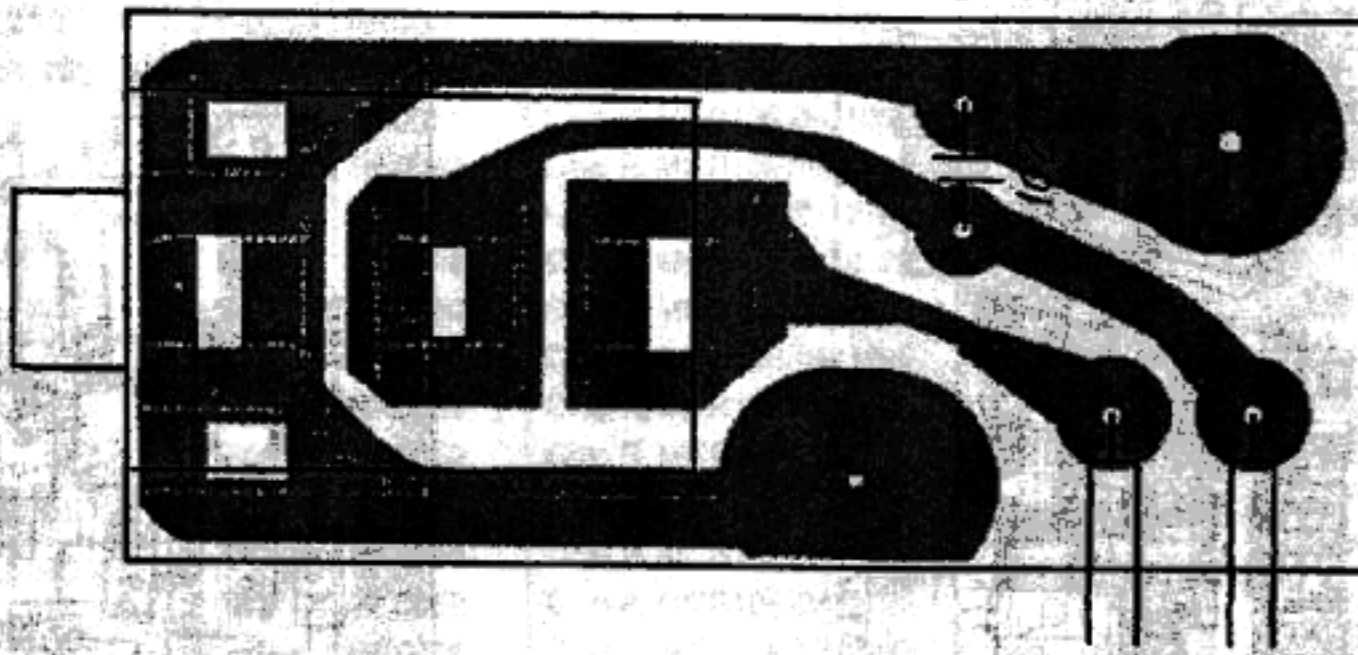


■ X'CON-SUB PC BOARD

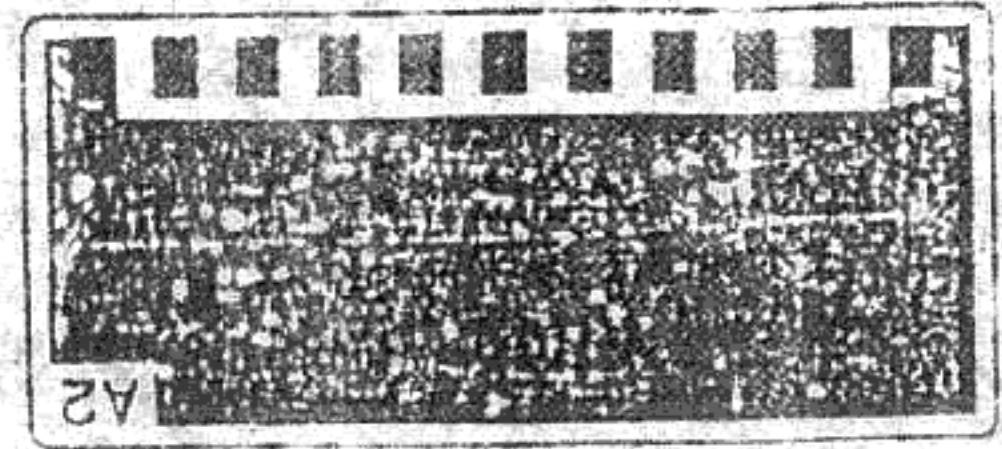
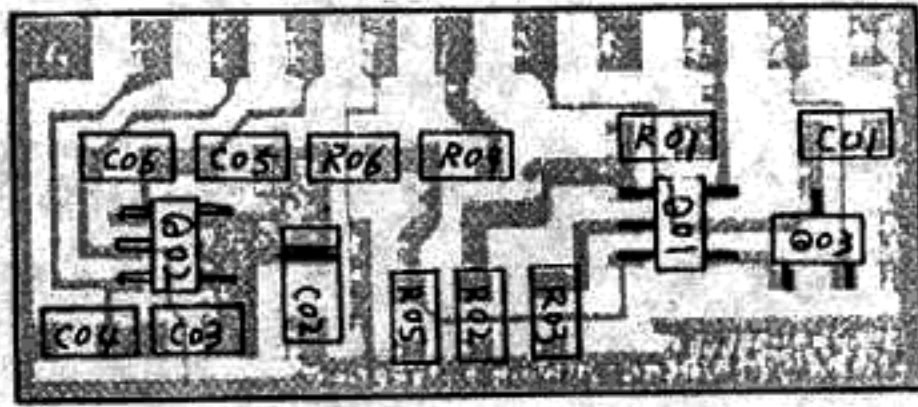
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■ EARPHONE JACK PC BOARD

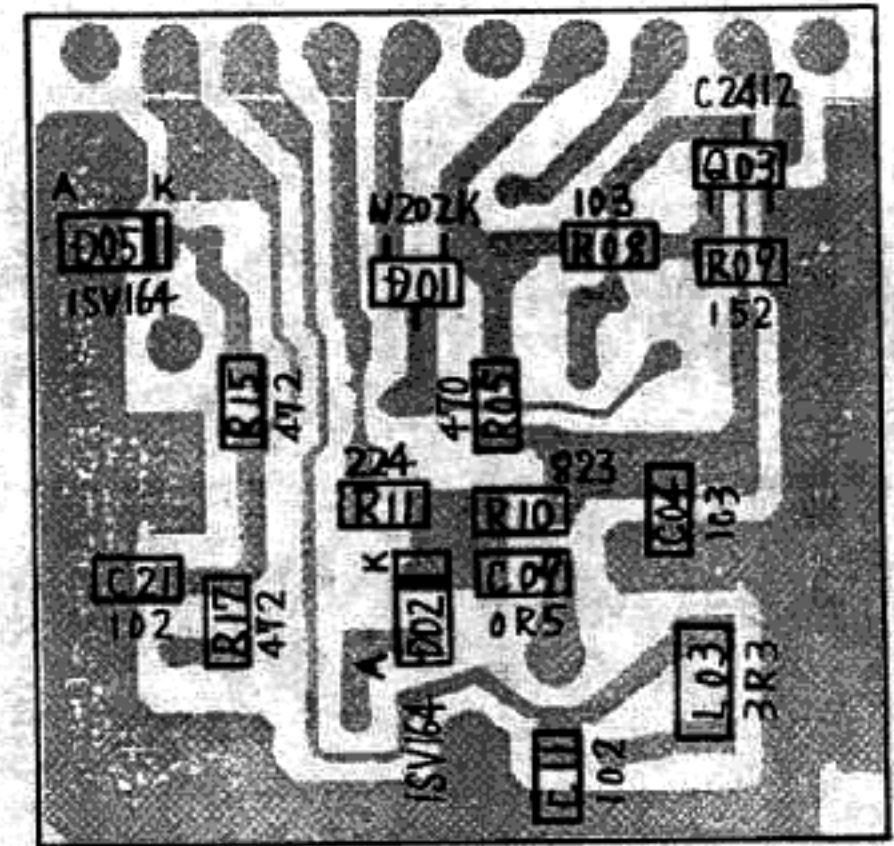
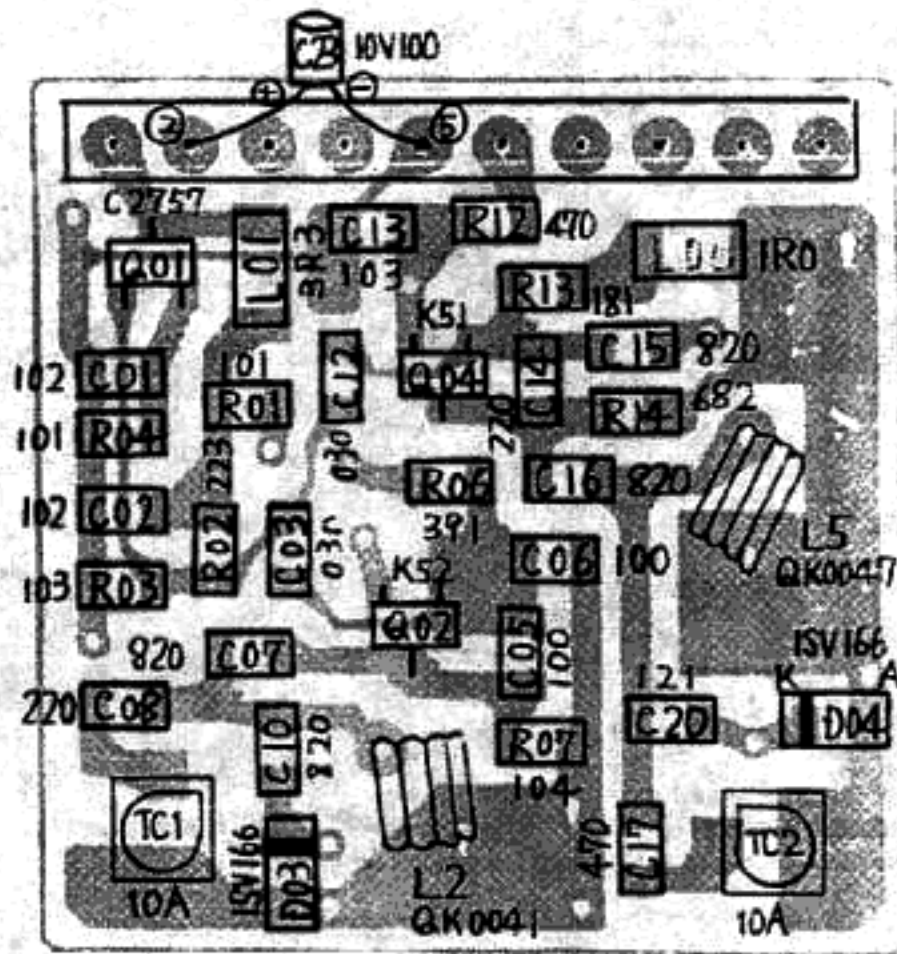


■ APC PC BOARD

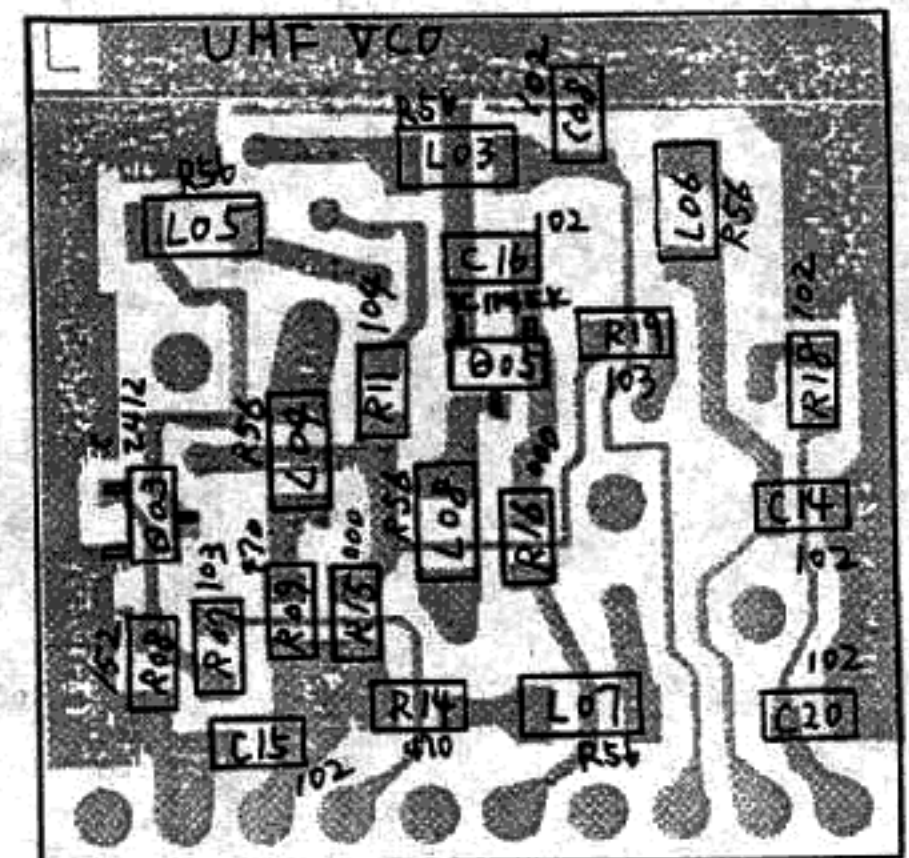
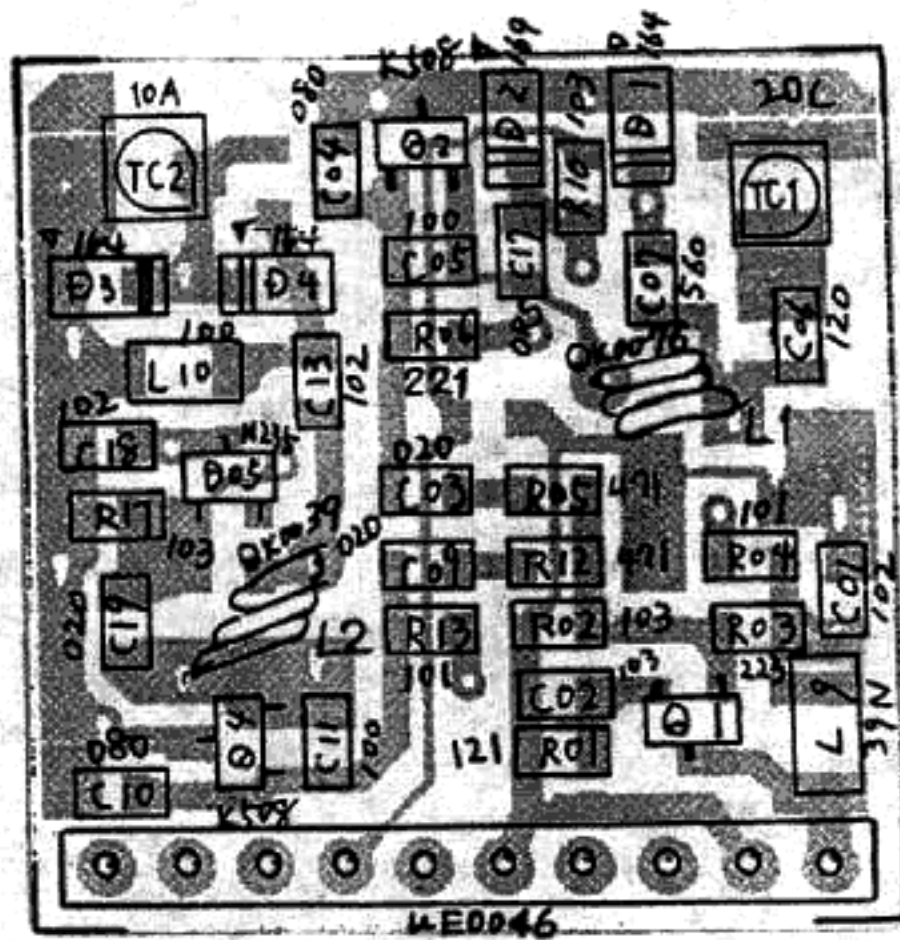


■ VHF VCO PC BOARD

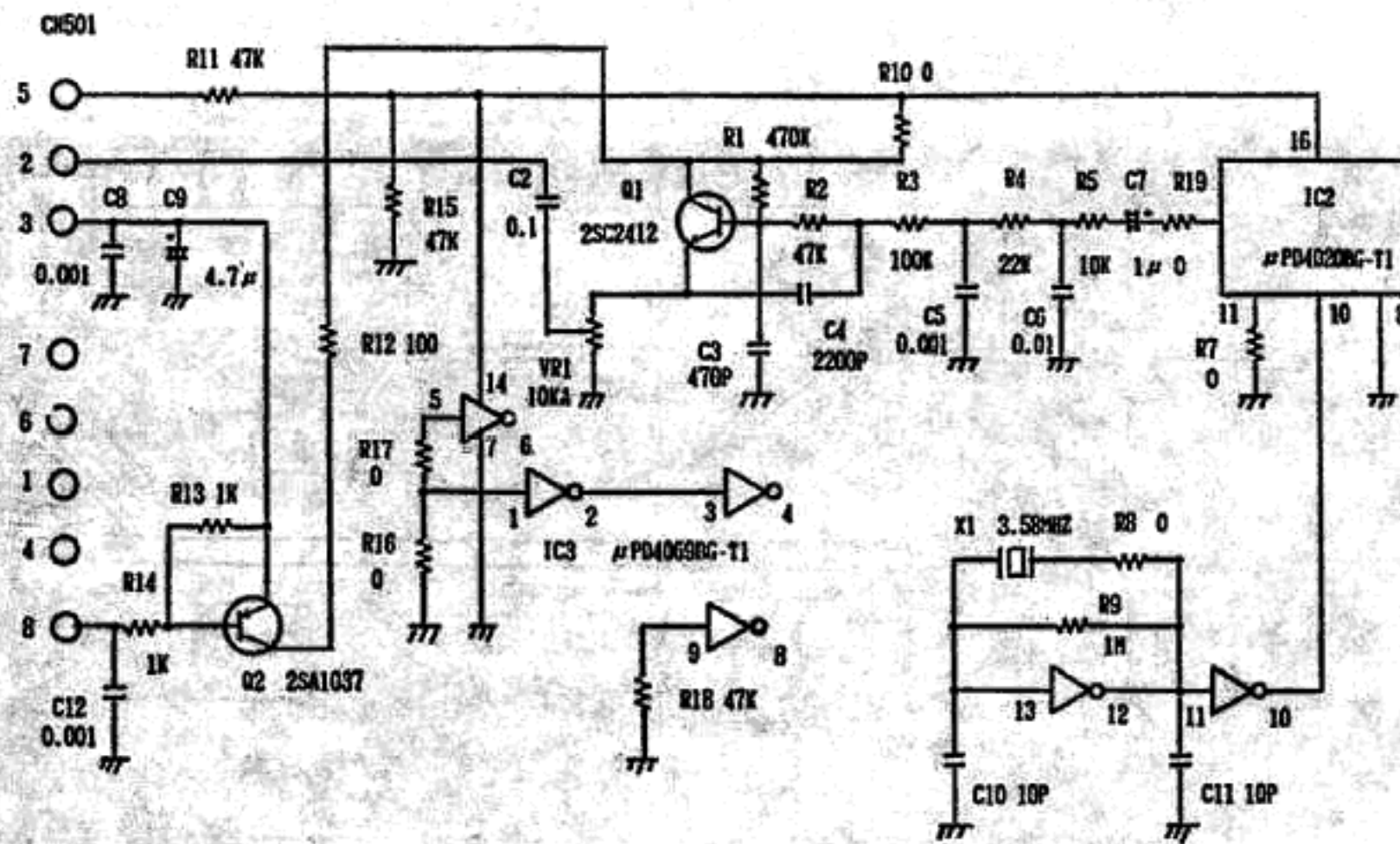
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■ UHF VCO PC BOARD

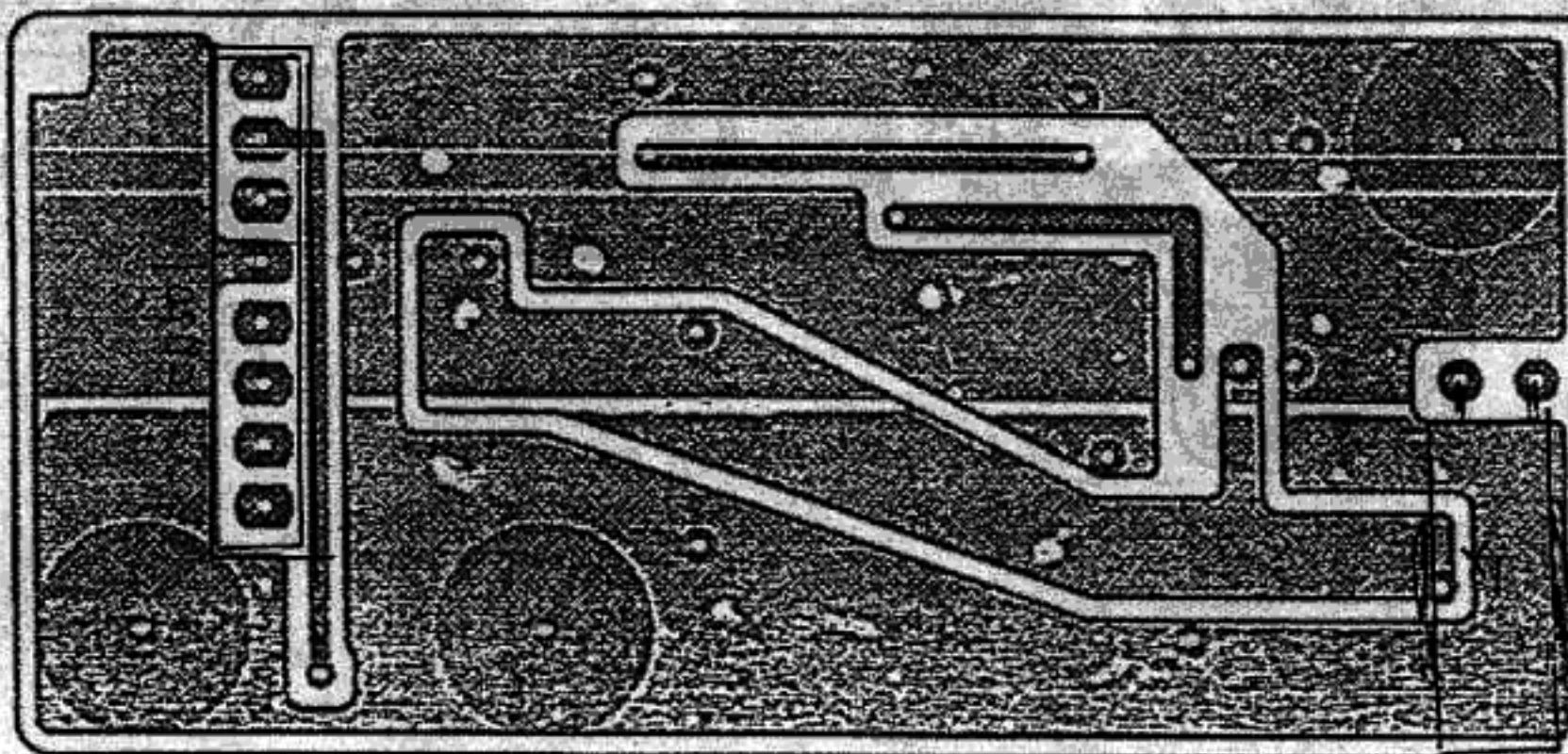
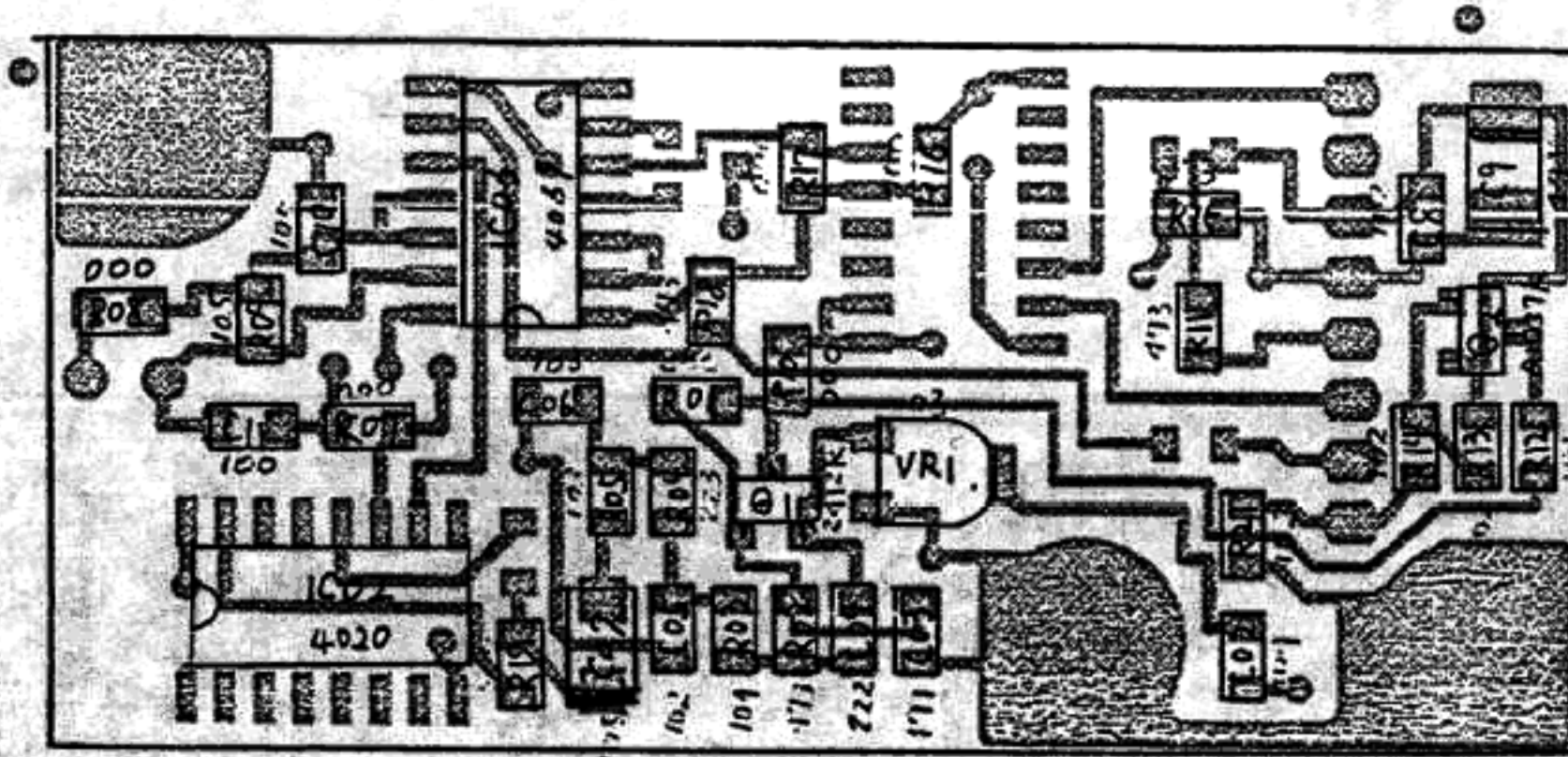


■ TONE BURST UNIT CIRCUIT DIAGRAM

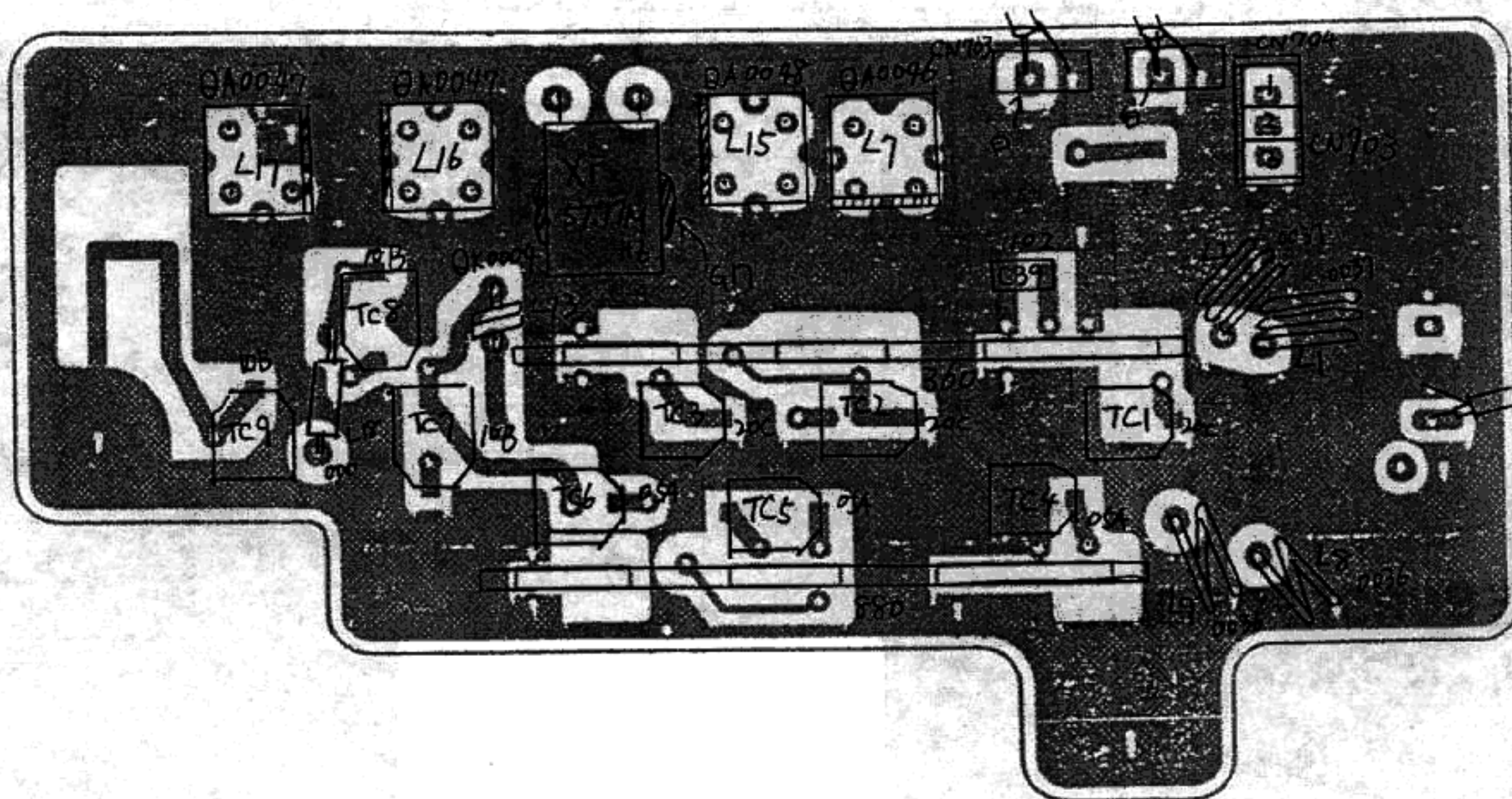


■ TONE BURST PC BOARD

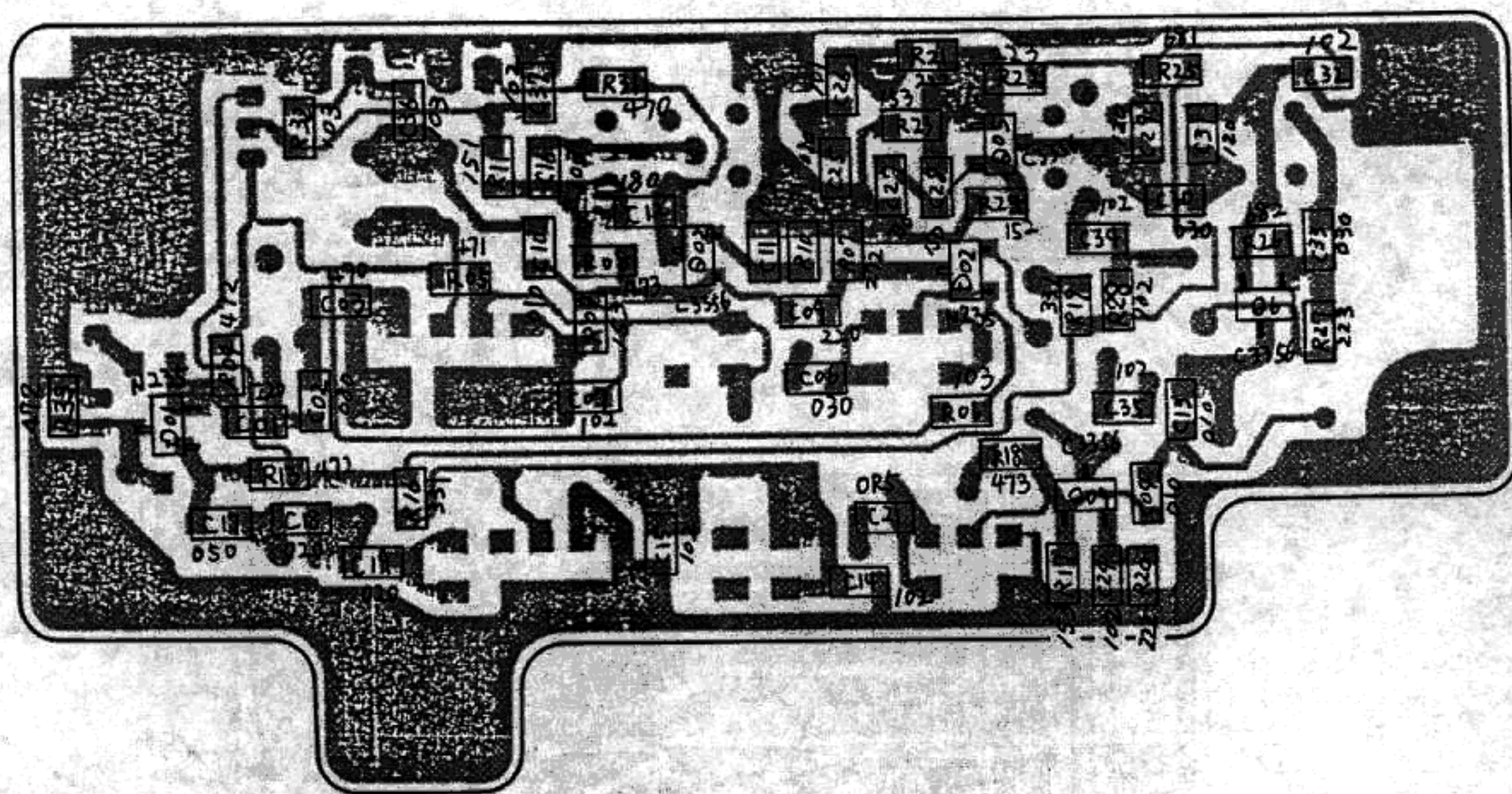
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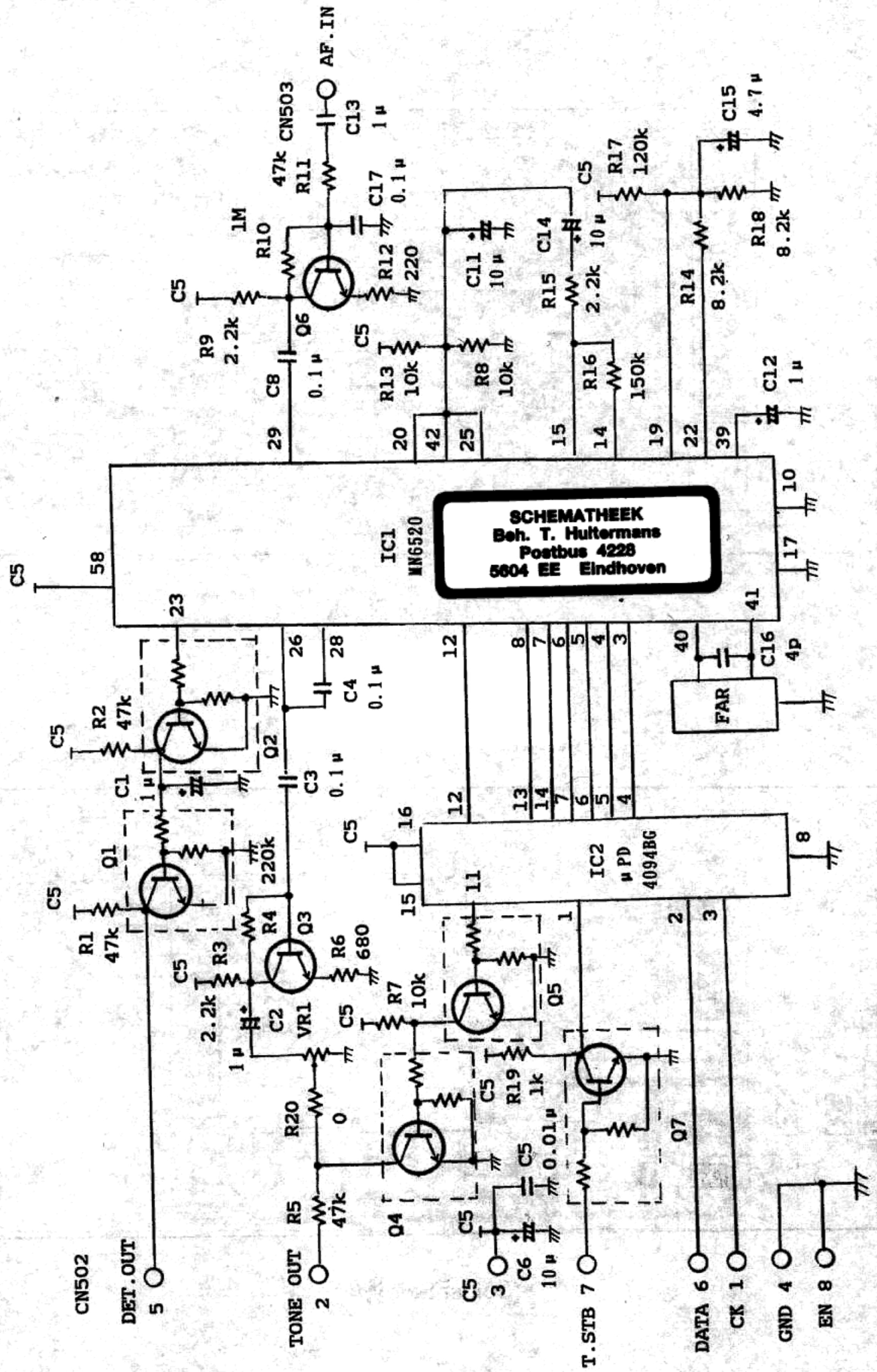
■ X'CON PC BOARD



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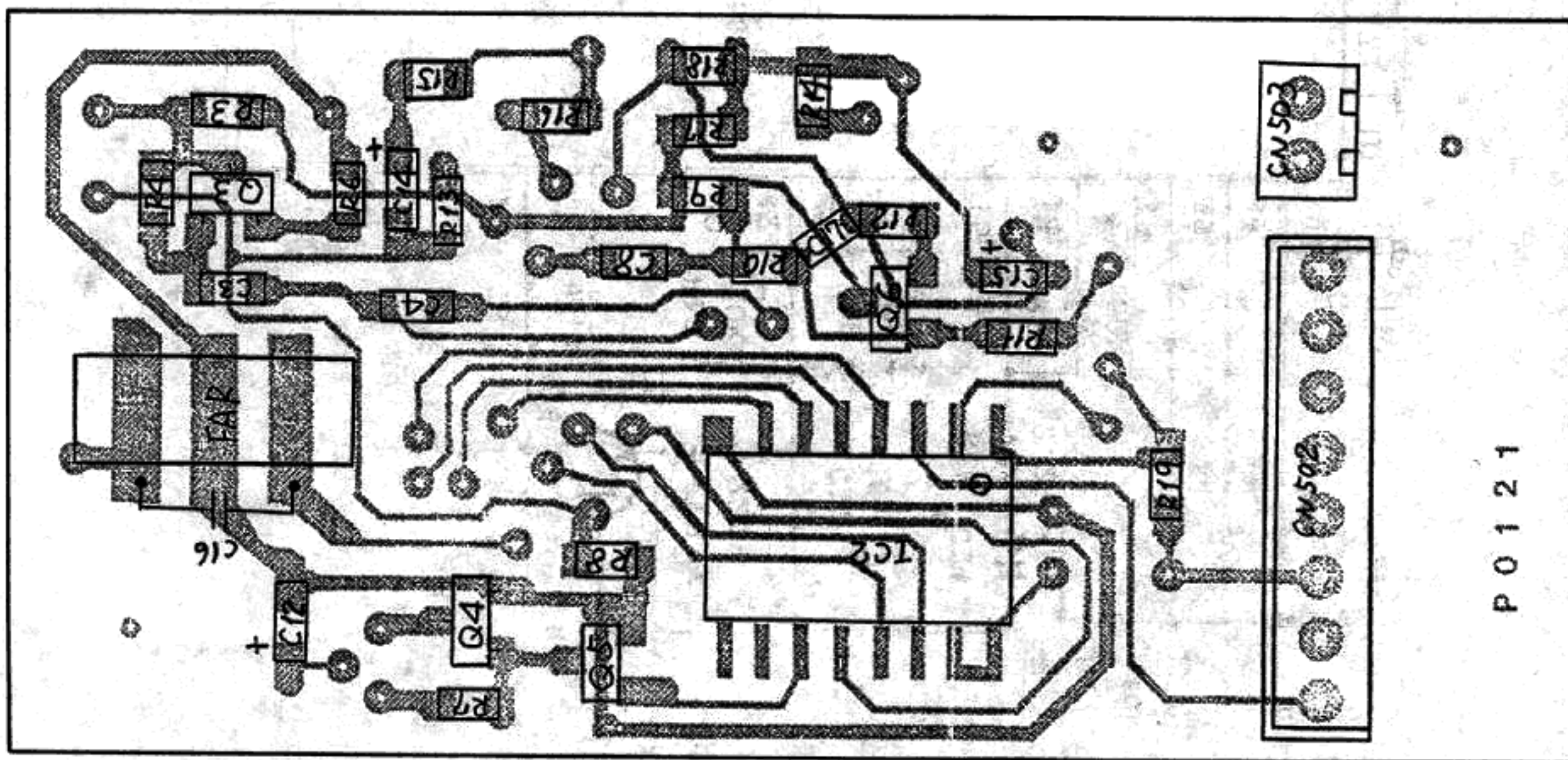


■ TONE SQUELCH SCHEMATIC DIAGRAM



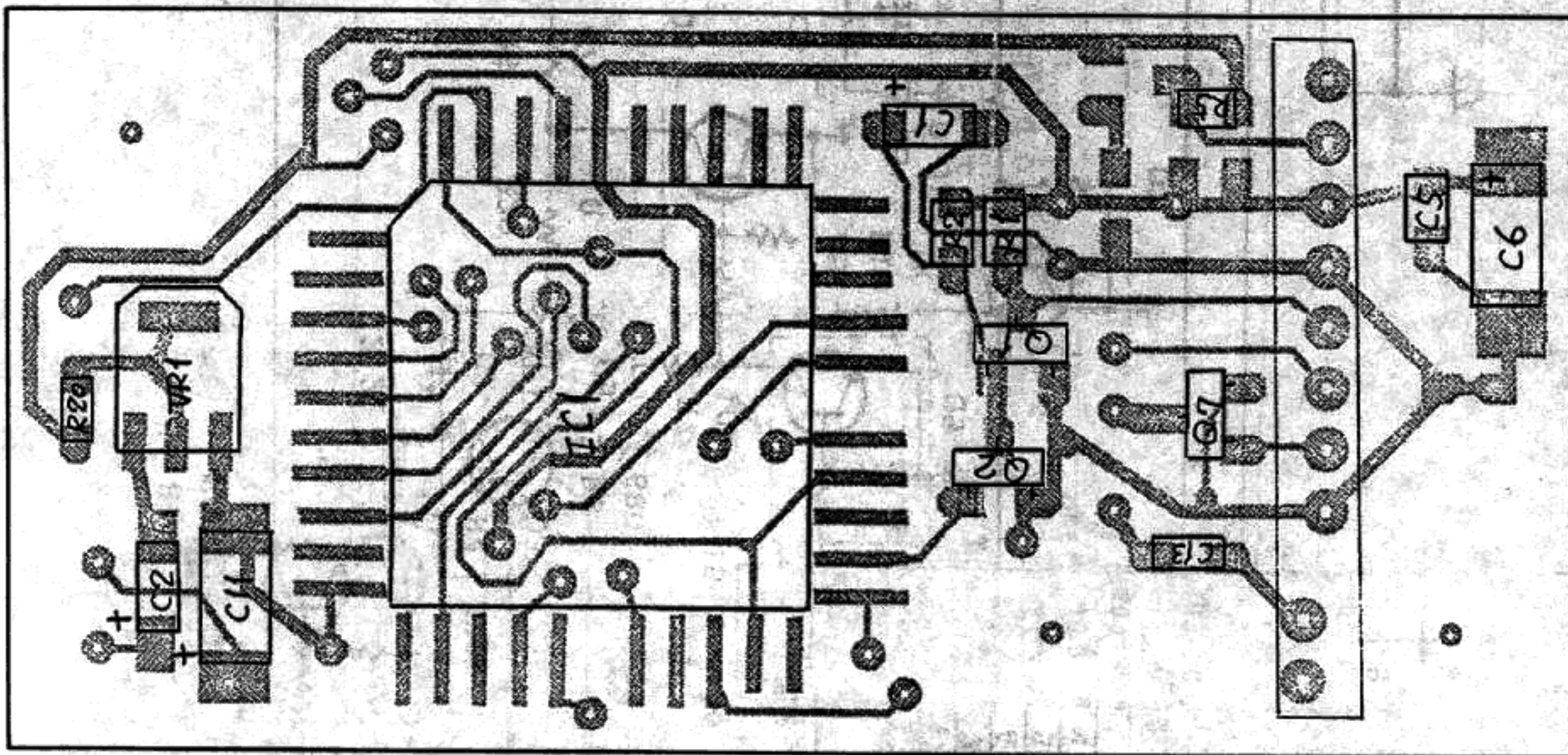
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■ TONE SQUELCH PC BOARD



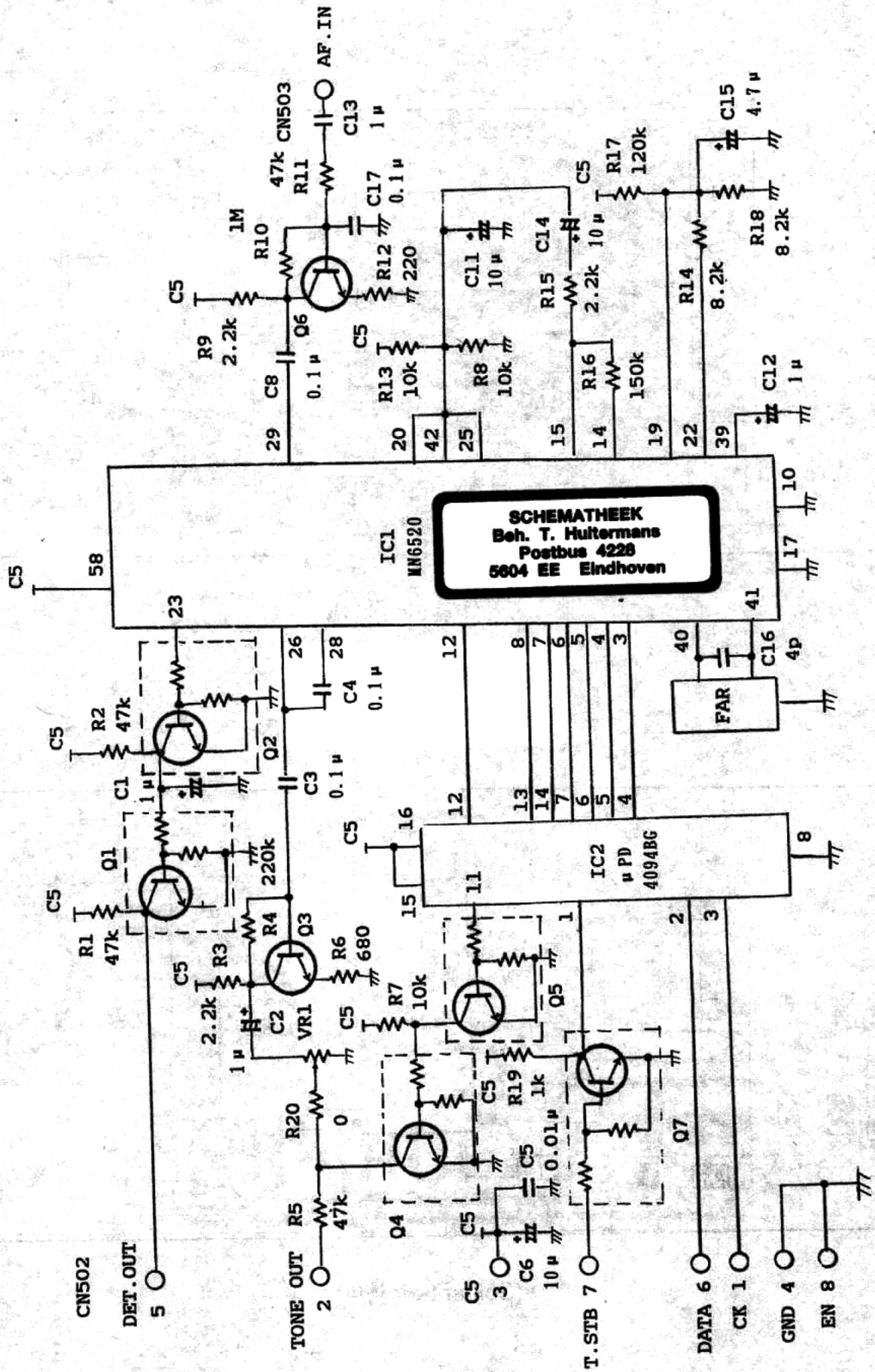
(Parts Side)

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(Solder Side)

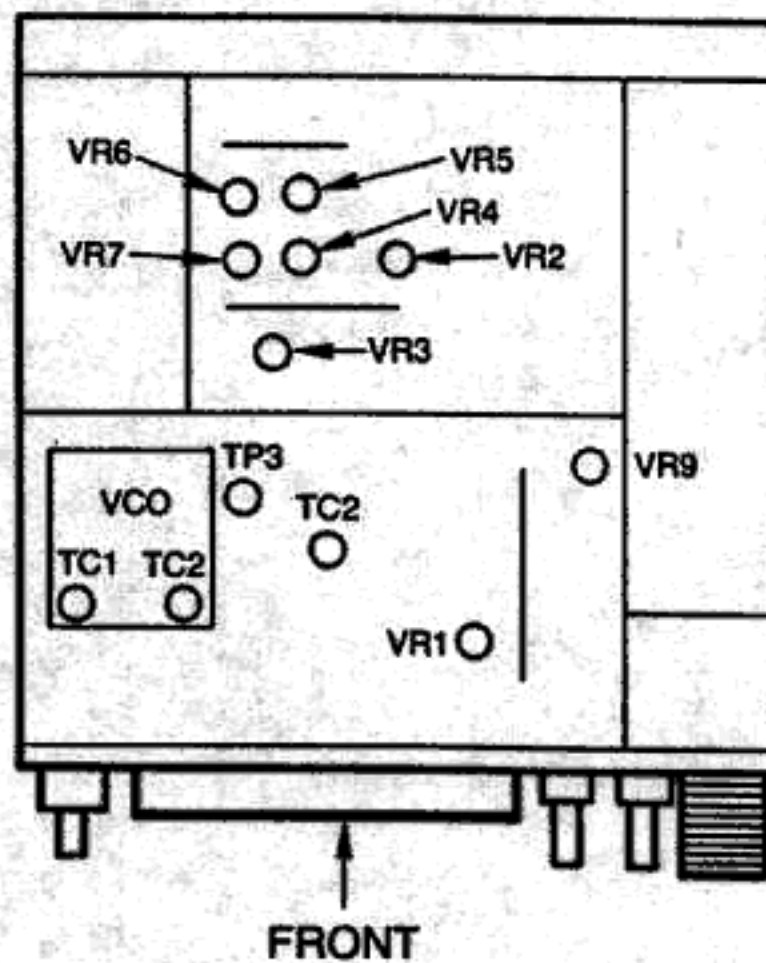
■ TONE SQUELCH SCHEMATIC DIAGRAM



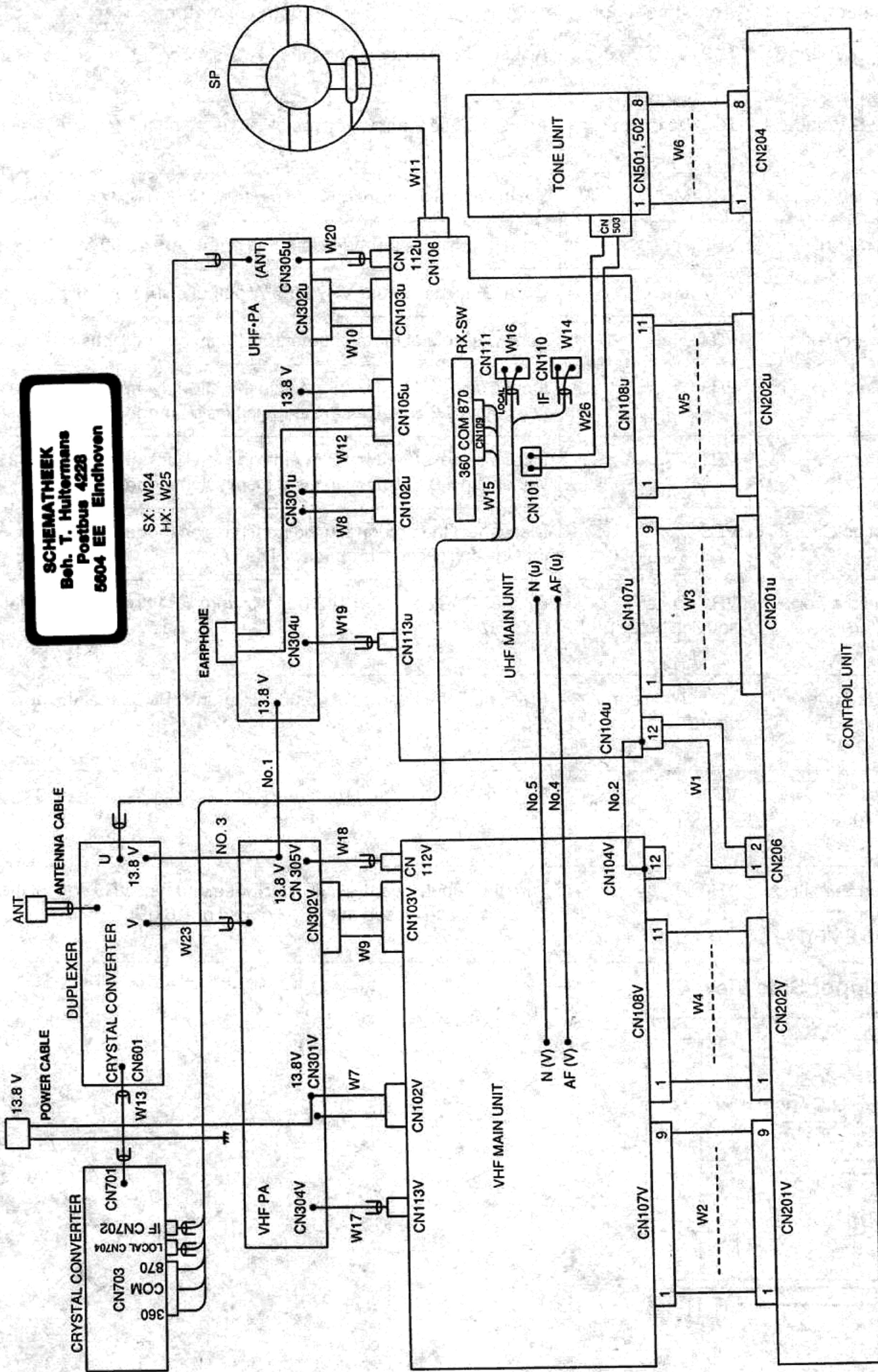
■ ADJUSTMENT (VHF)

| Item | Adjustment point | Adjustment method |
|--|--------------------------|--|
| VCO P/D Voltage (RX) | TC2 (VCO Box) | Adjust TC2 so that the voltage of TP3 is 4V on the receiving mode. |
| VCO P/D Voltage (TX) | TC1 (VCO Box) | Adjust TC1 so that the voltage of TP3 is 3V on the transmission mode. |
| Frequency | TC2 (Main Board) | Set the unit in the transmission mode at 145.00 MHz and adjust TC2. |
| Power output | VR6 (Hi) | On "HI" position, turn VR6 for 45 W output at 145.00 MHz. |
| | VR7 (Lo) | On "LO" position, turn VR7 for 5 W output at 145.00 MHz. |
| RF Power Meter | VR4 | Turn VR4 so that three segments will light on "LO" position. |
| Deviation | VR3 | Input a signal of 1 KHz/25 mV into the MIC jack and adjust VR3 so that you obtain 4.9 KHz/Dev in the transmission mode. |
| MIC Gain | VR2 | Input a signal of 1 KHz/10 mV into the MIC jack and adjust VR2 so that you obtain 4.0 KHz/Dev in the transmission mode. |
| Protection Circuit | VR5 | Disconnect the antenna in the transmission mode and adjust VR5 so that the current consumption will be 5A. |
| Subaudible Tone Deviation (DR-510T) | VR1 (Tone squelch board) | On the "ENC" mode at 146.00 MHz, turn VR1 so that the deviation is 0.7 KHz. |
| 1750 Hz Tone Deviation (DR-510E) | VR1 (Tone burst board) | Pressing Tone button at 145.00 MHz, turn VR1 so that the deviation is 3.5 KHz. |
| S-Meter (SG output: 3 dB μ EMF) | VR1 | Turn VR1 so that the \square begins to light. |
| Squelch Sensitivity (SG output: -6 dB μ EMF) | VR9 | Turn the squelch control fully clockwise and turn VR9 so that the squelch will be closed at the SG output of -6 dB μ . |

Upper Side View

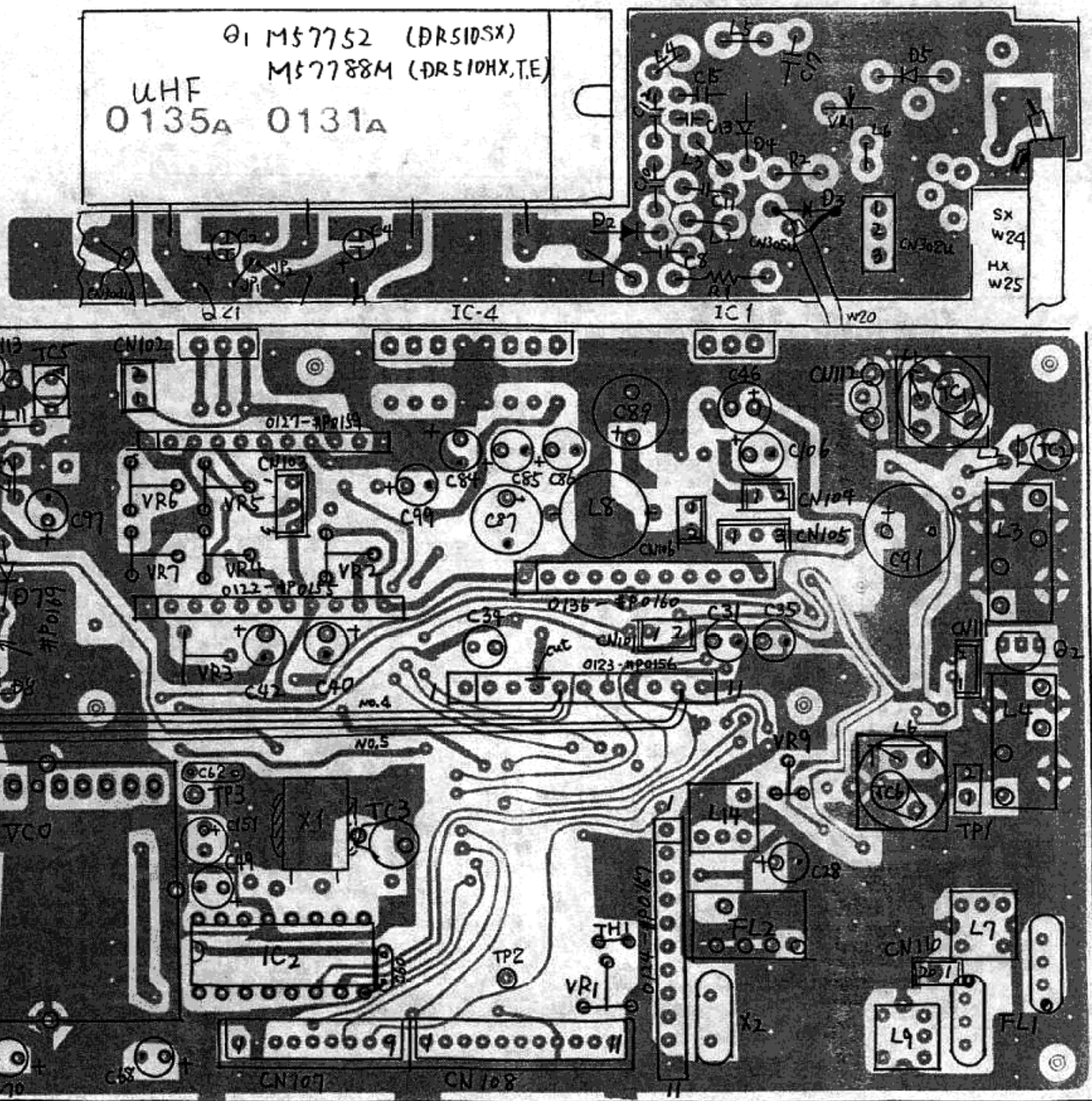


CONNECTION DIAGRAM



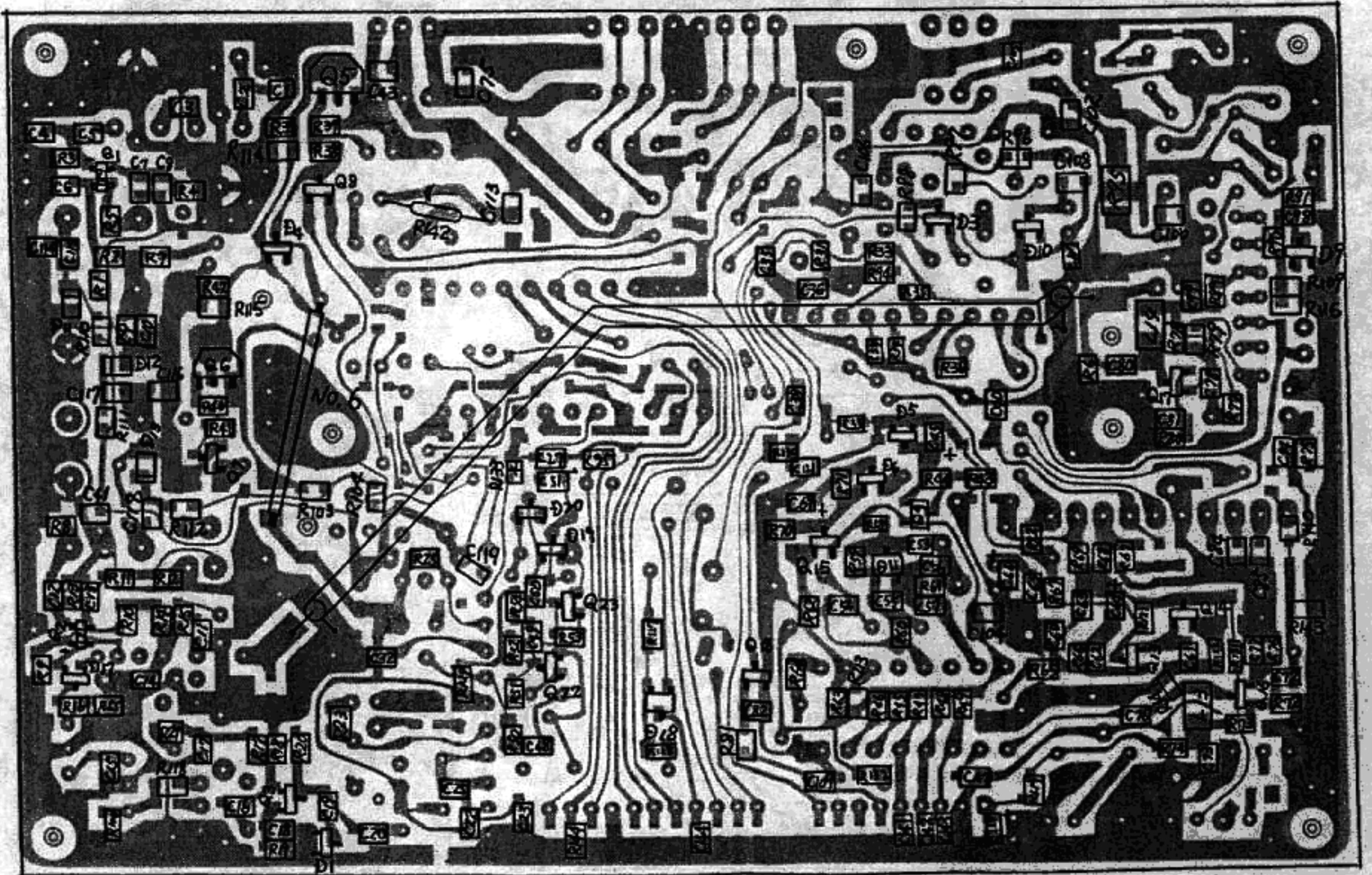
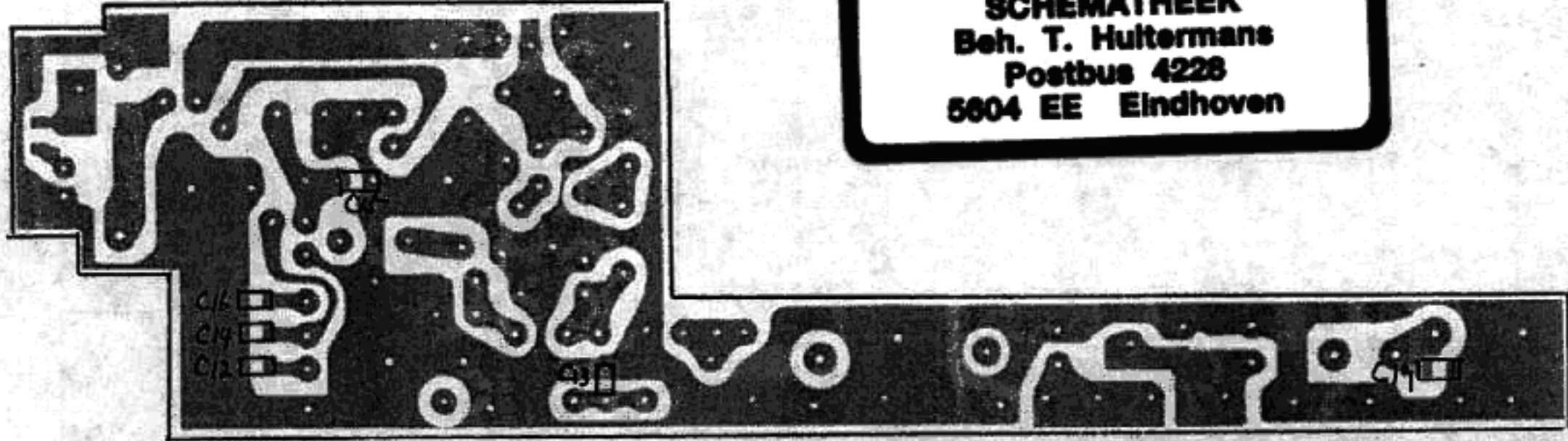
UHF PA AND MAIN PC BOARD

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(Part)

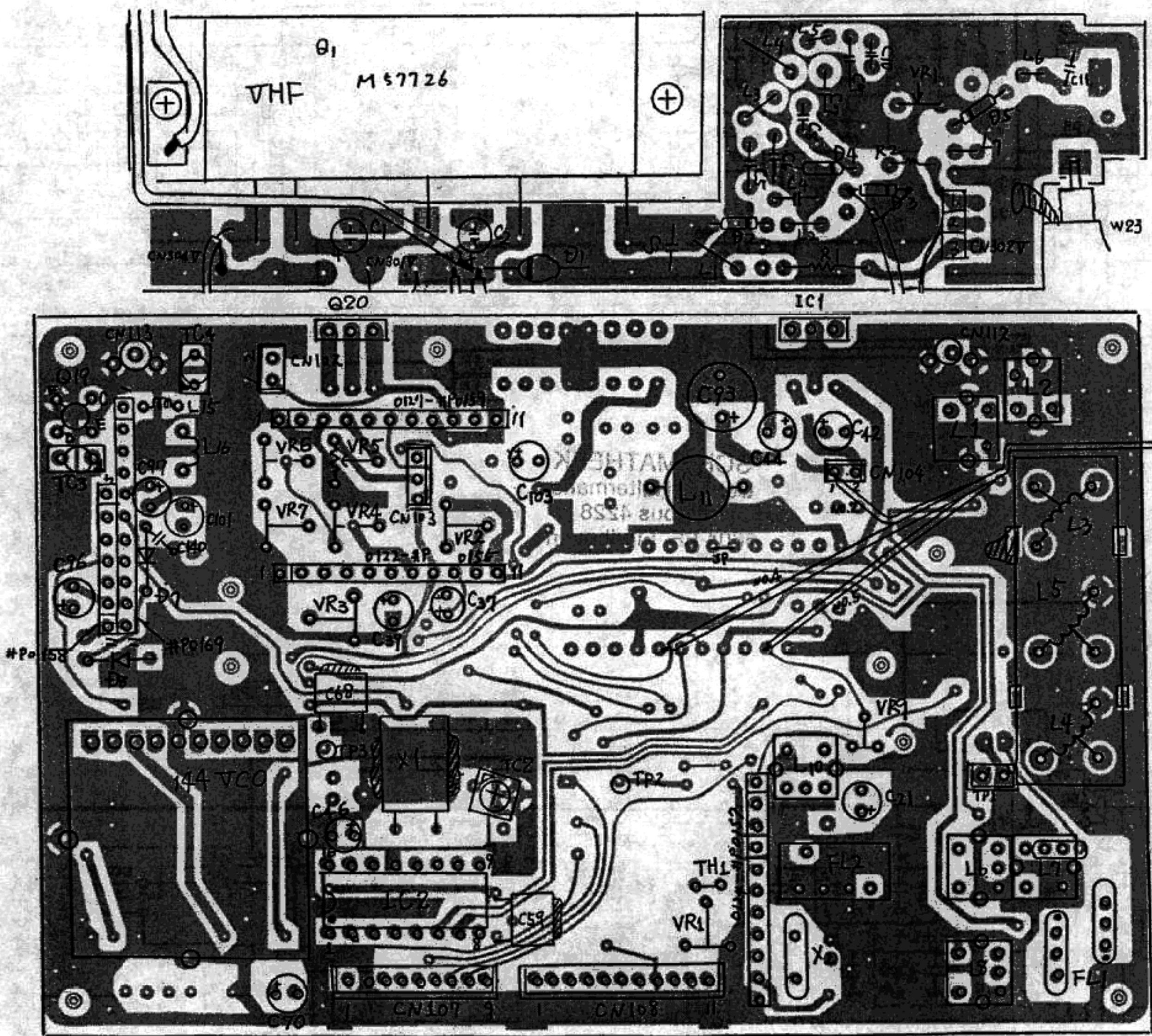
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(Solder)

■ VHF PA AND MAIN PC BOARD

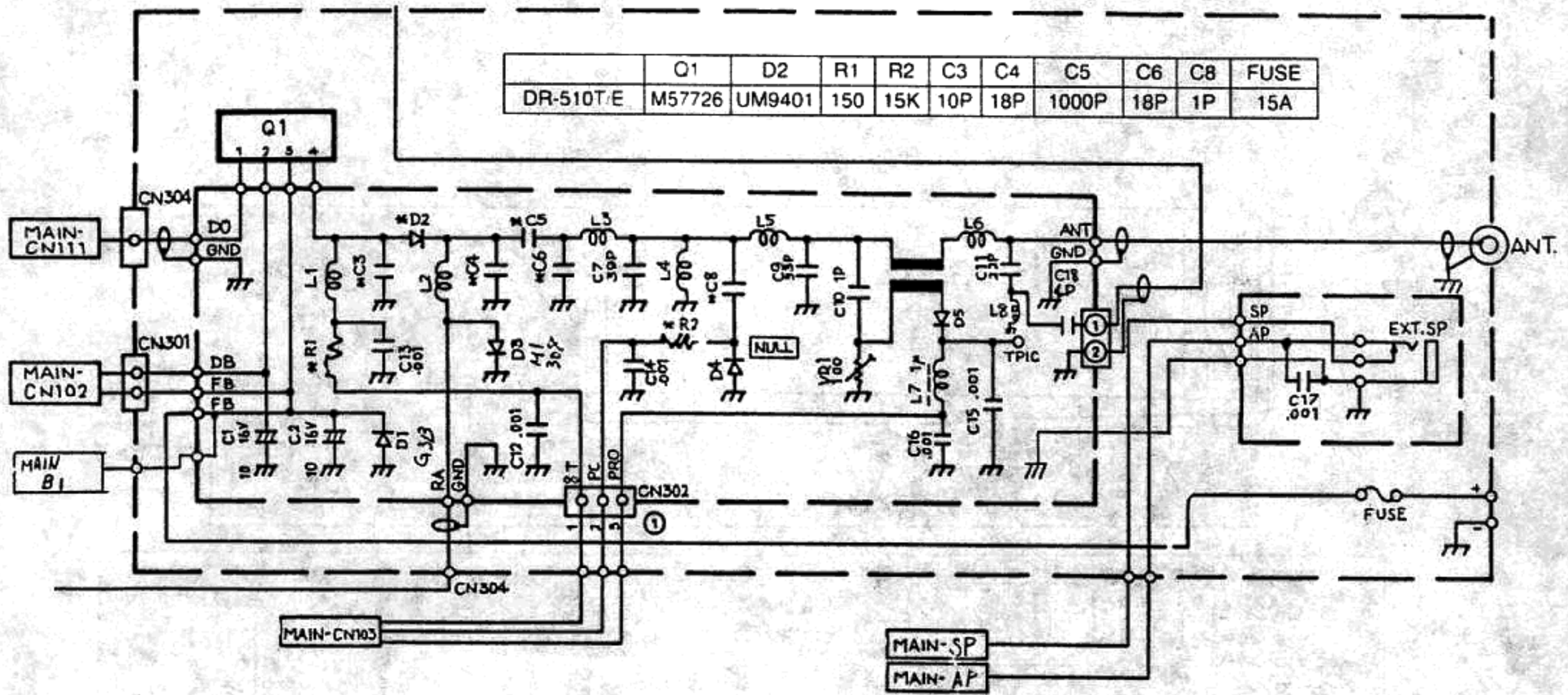
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(Part)

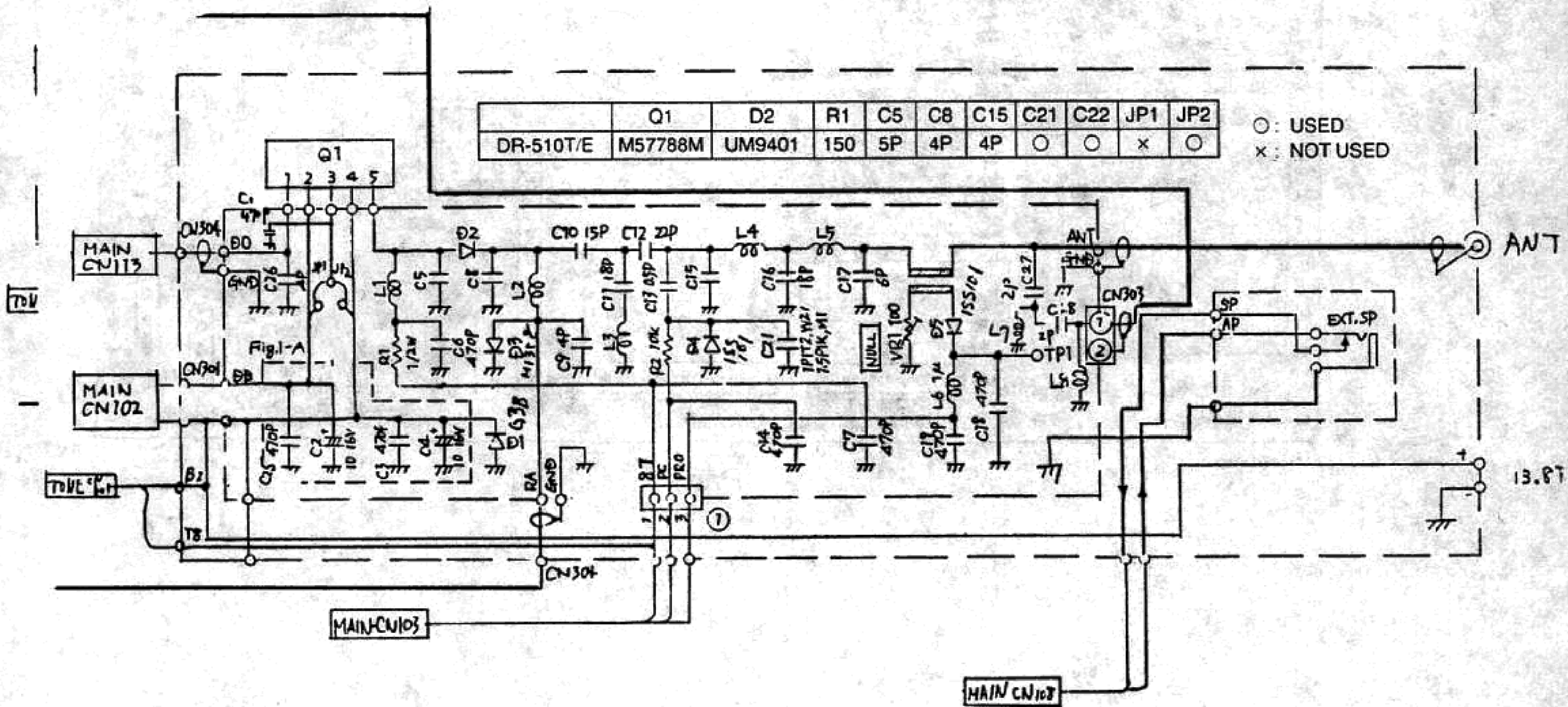
■ PA SCHEMATIC DIAGRAM

(VHF)

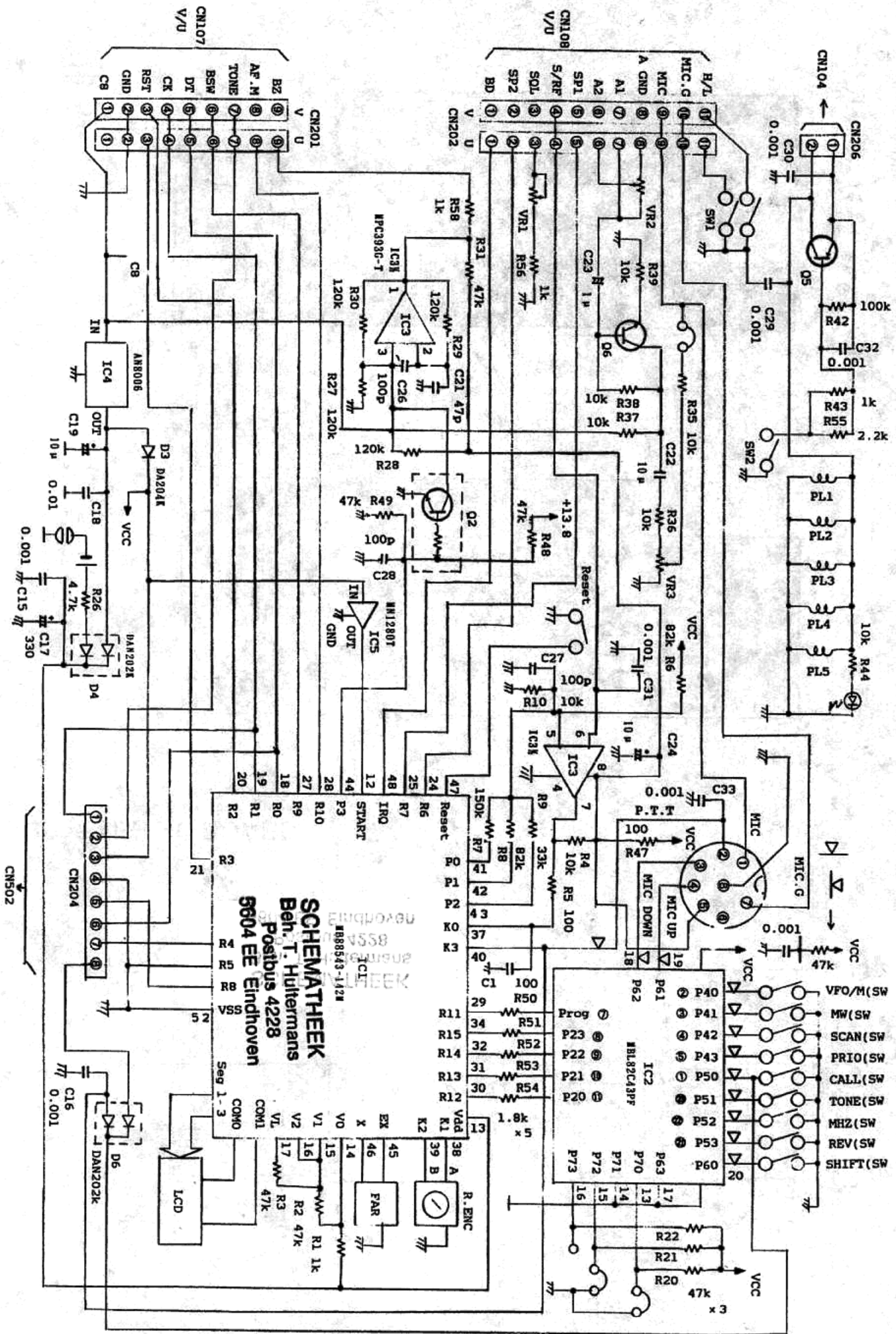


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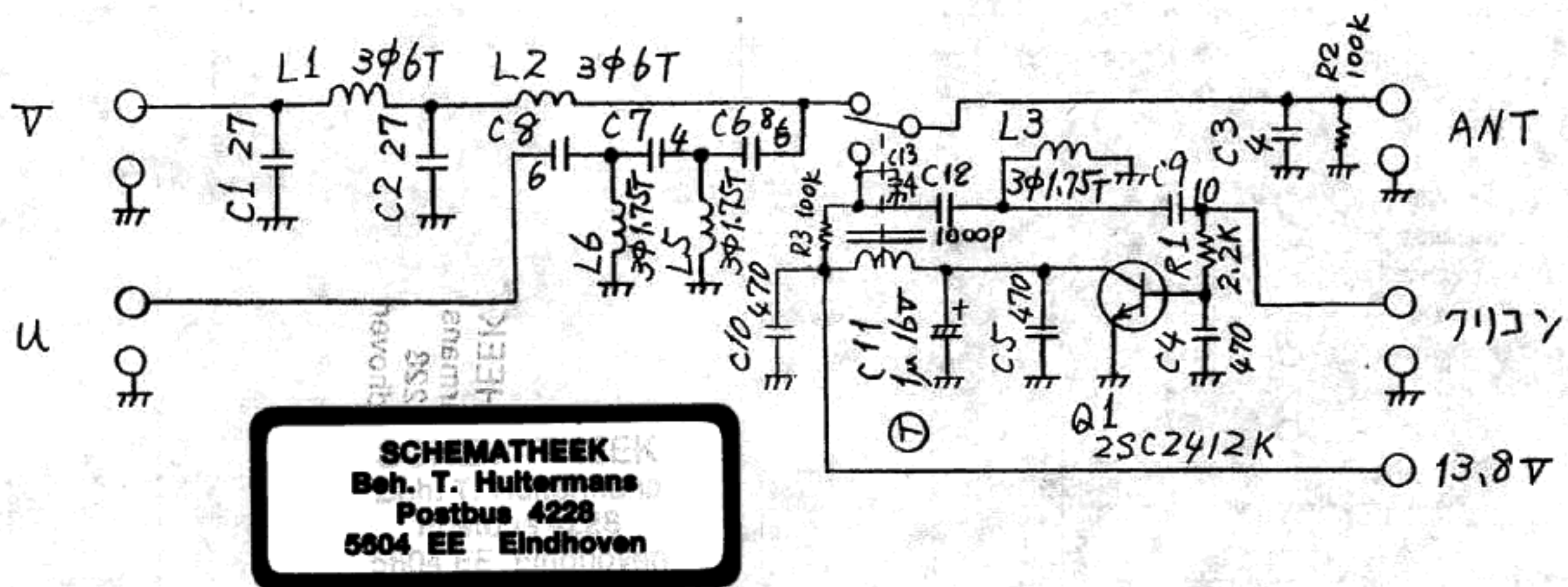
(UHF)



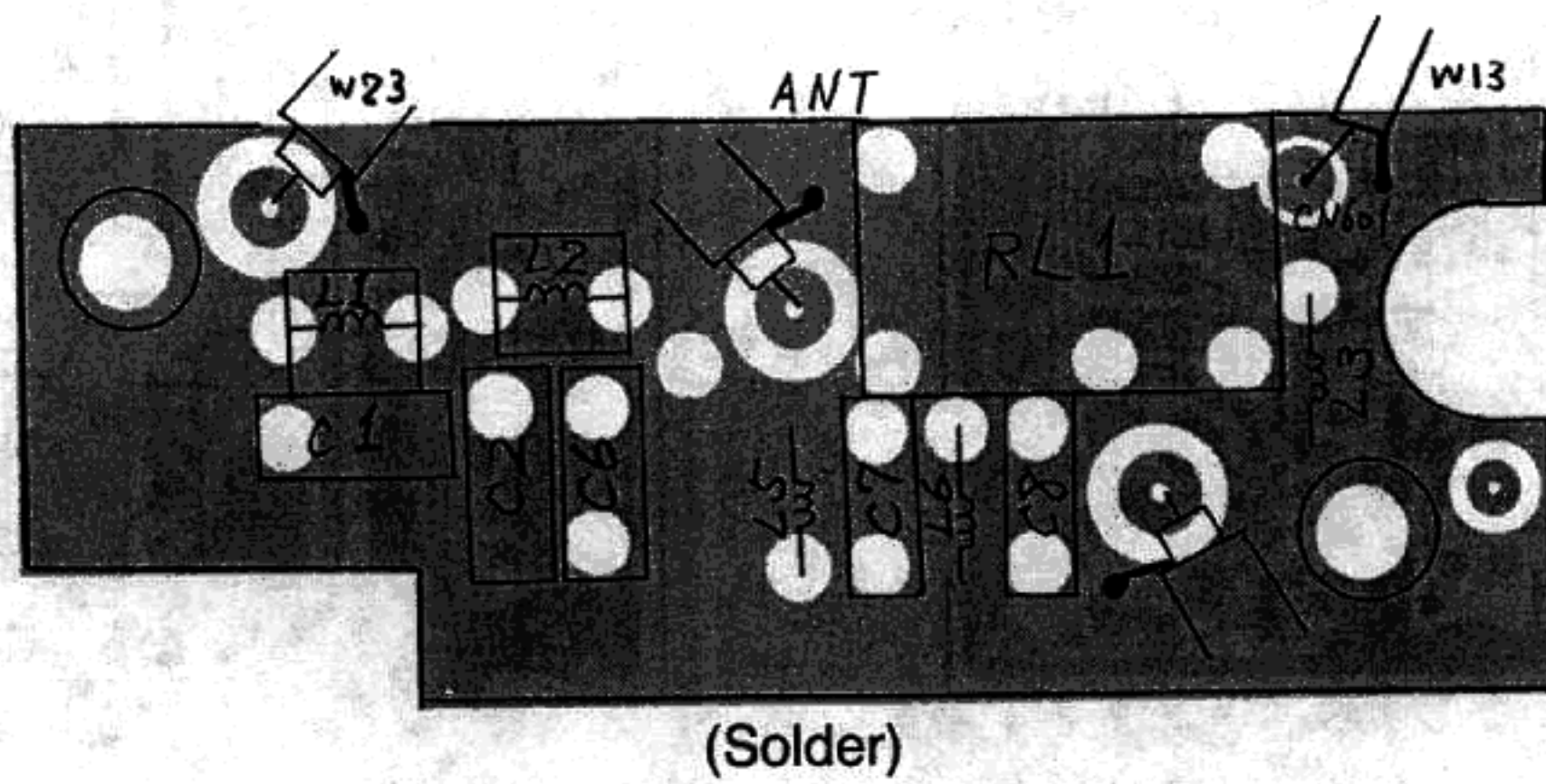
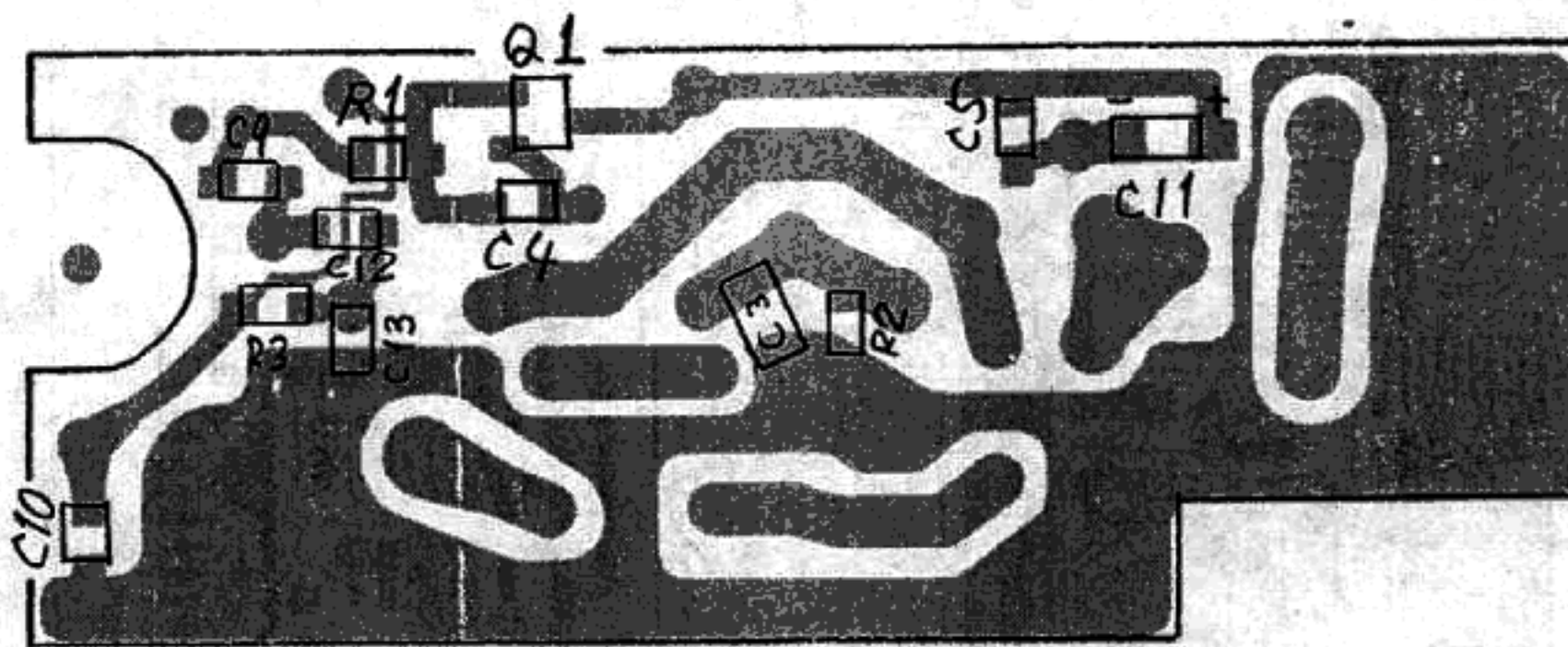
■ CONTROL SCHEMATIC DIAGRAM



■ DUPLEXER SCHEMATIC DIAGRAM

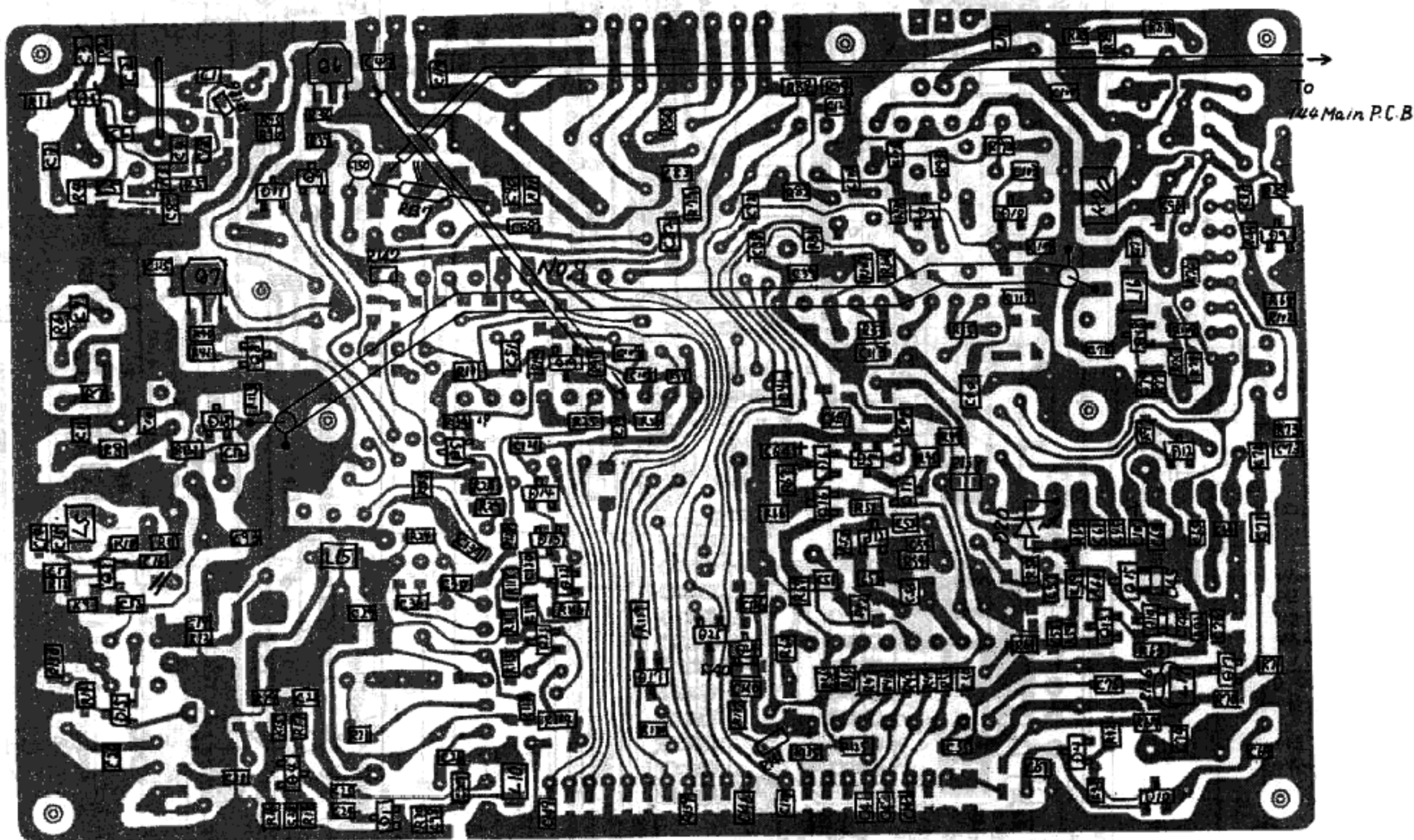
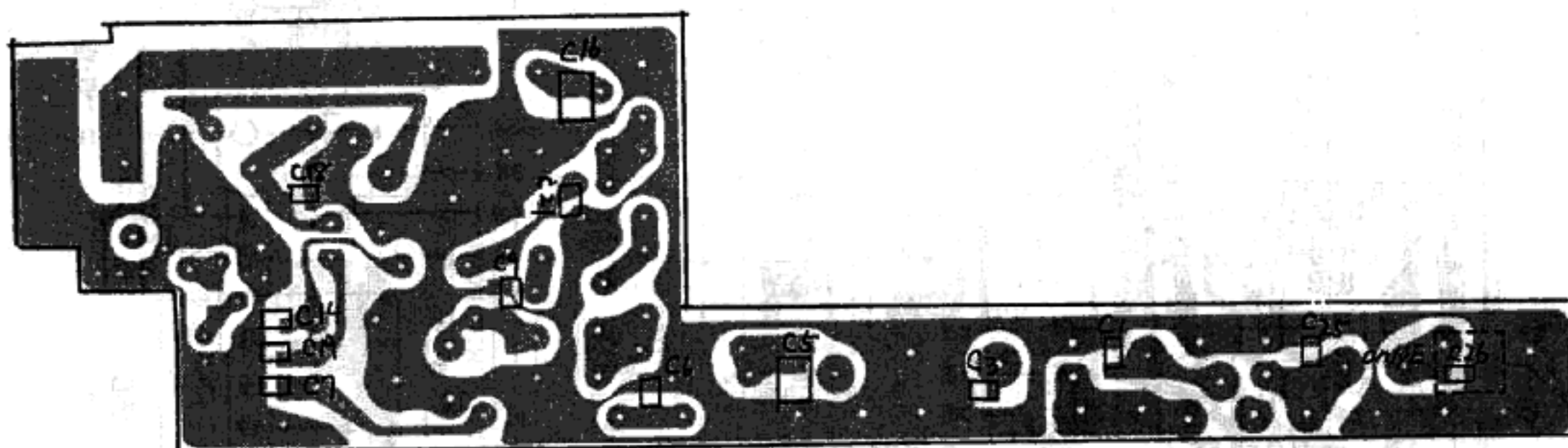


■ DUPLEXER PC BOARD



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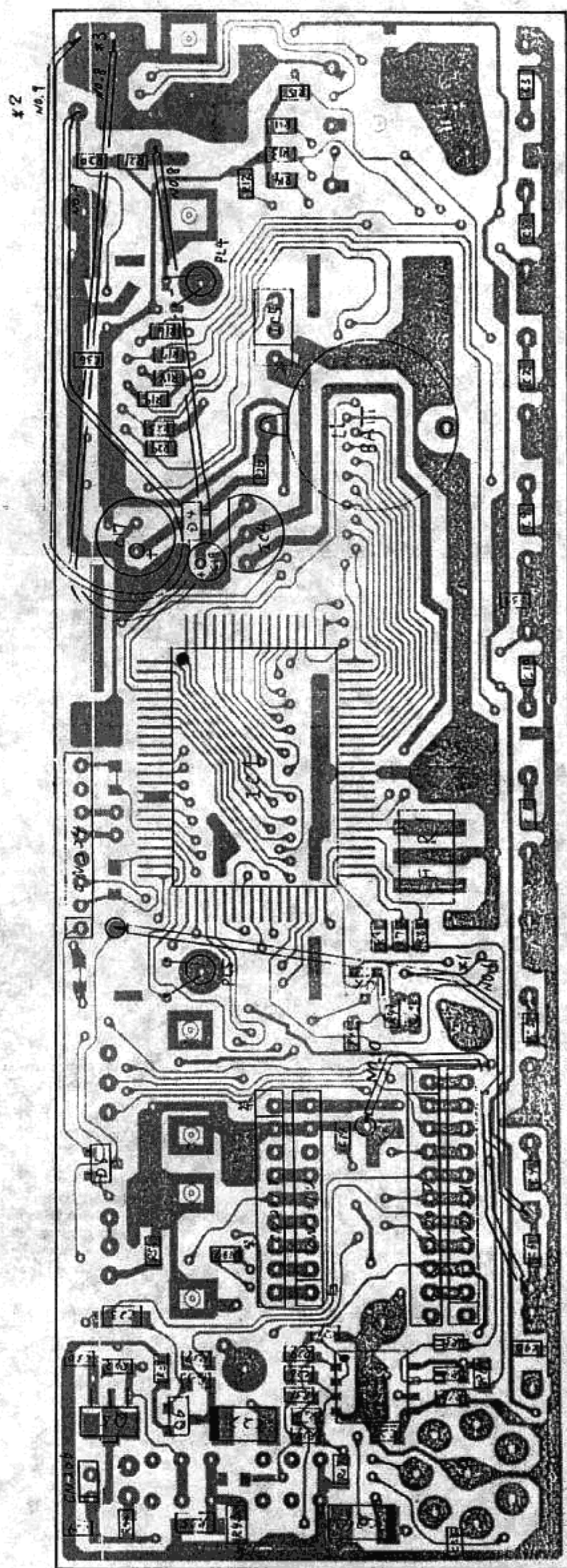
SCHEMATA OF BOARD



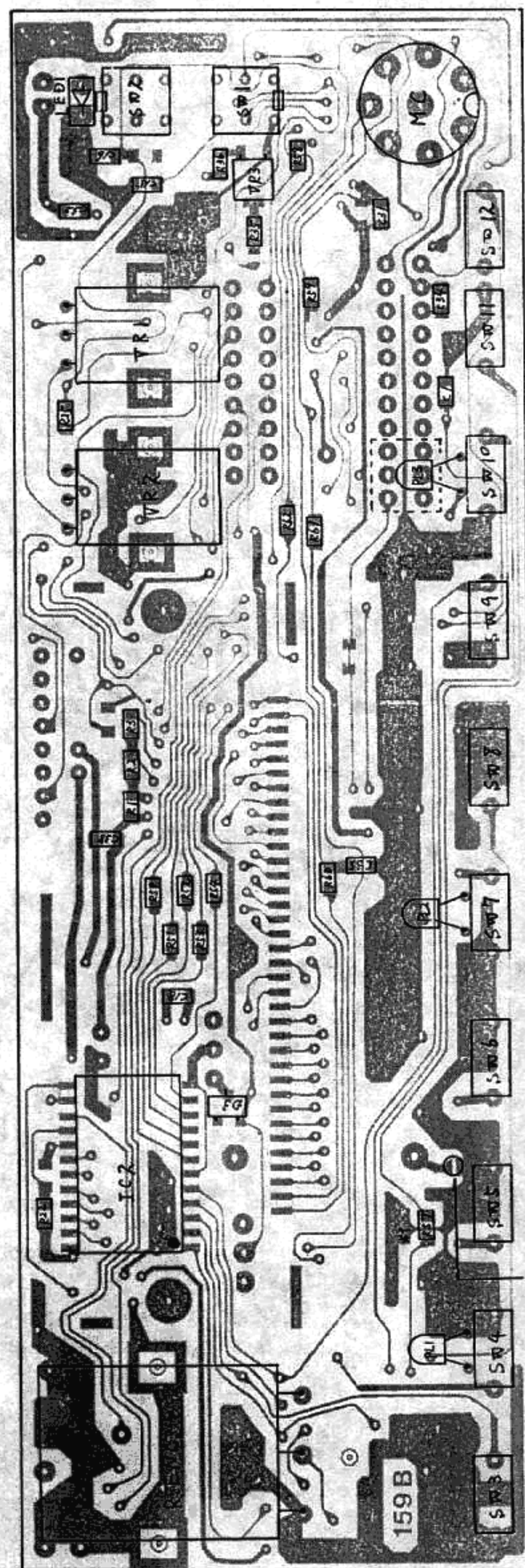
(Solder)

CONTROL PC BOARD

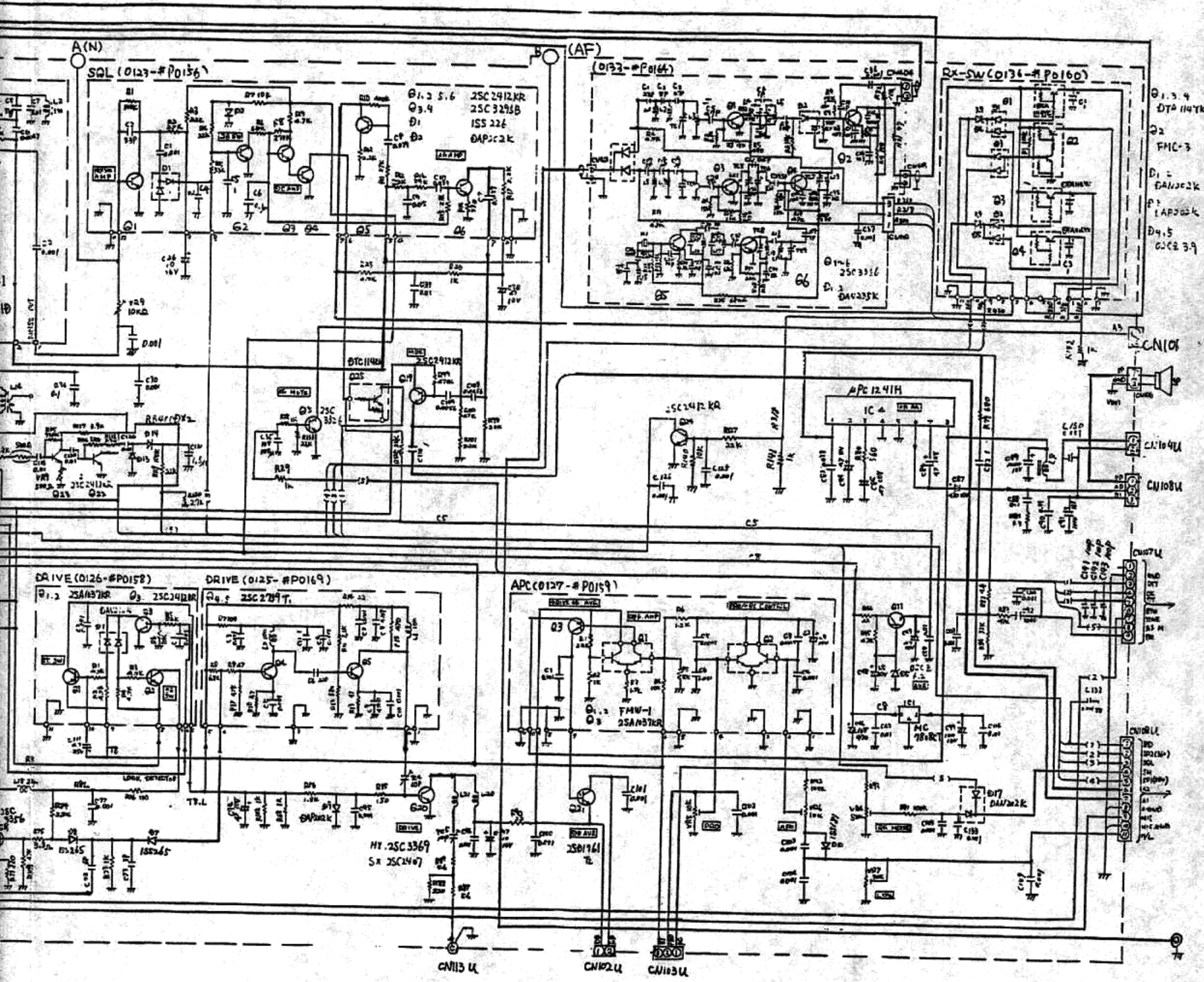
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(Part)

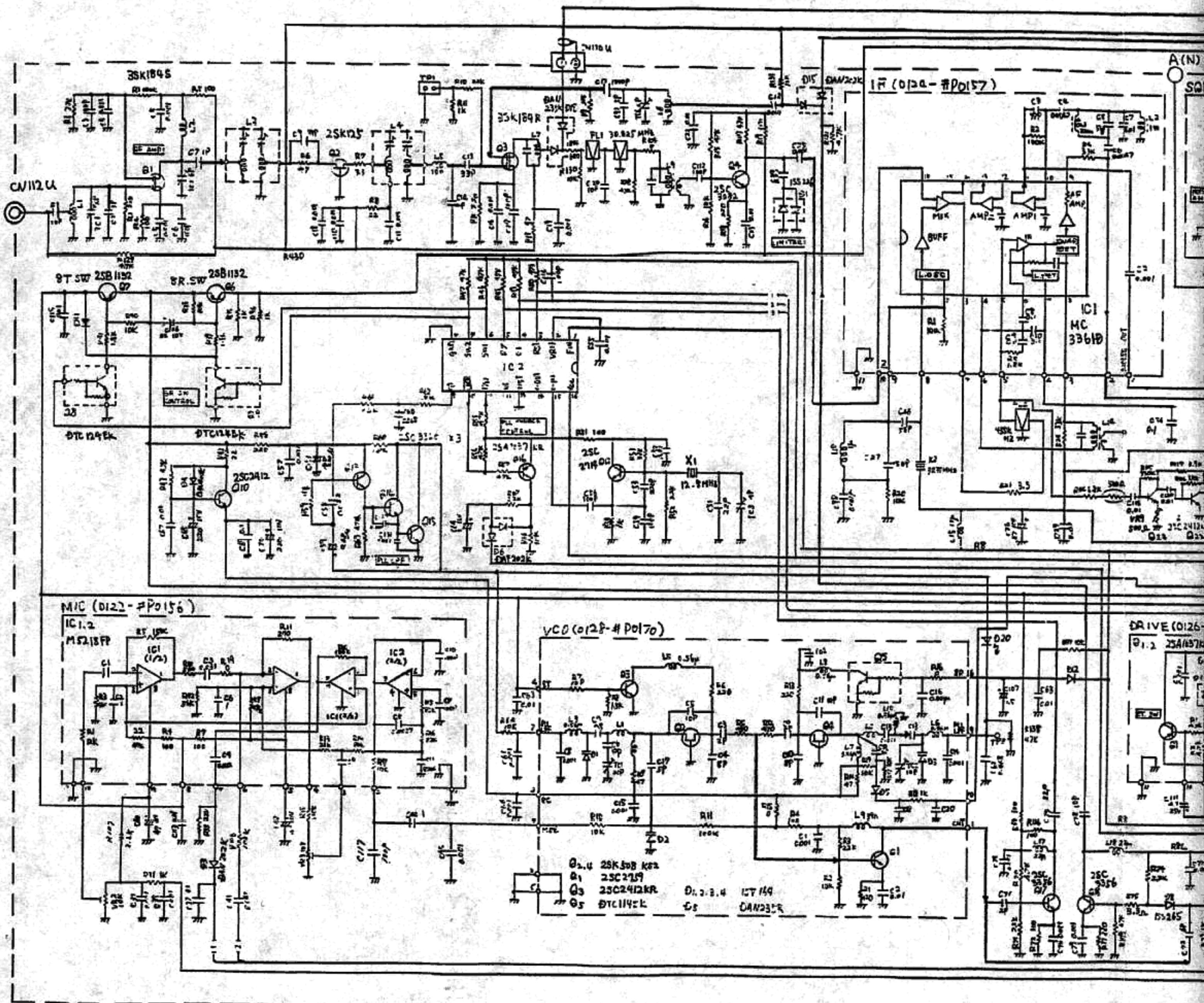


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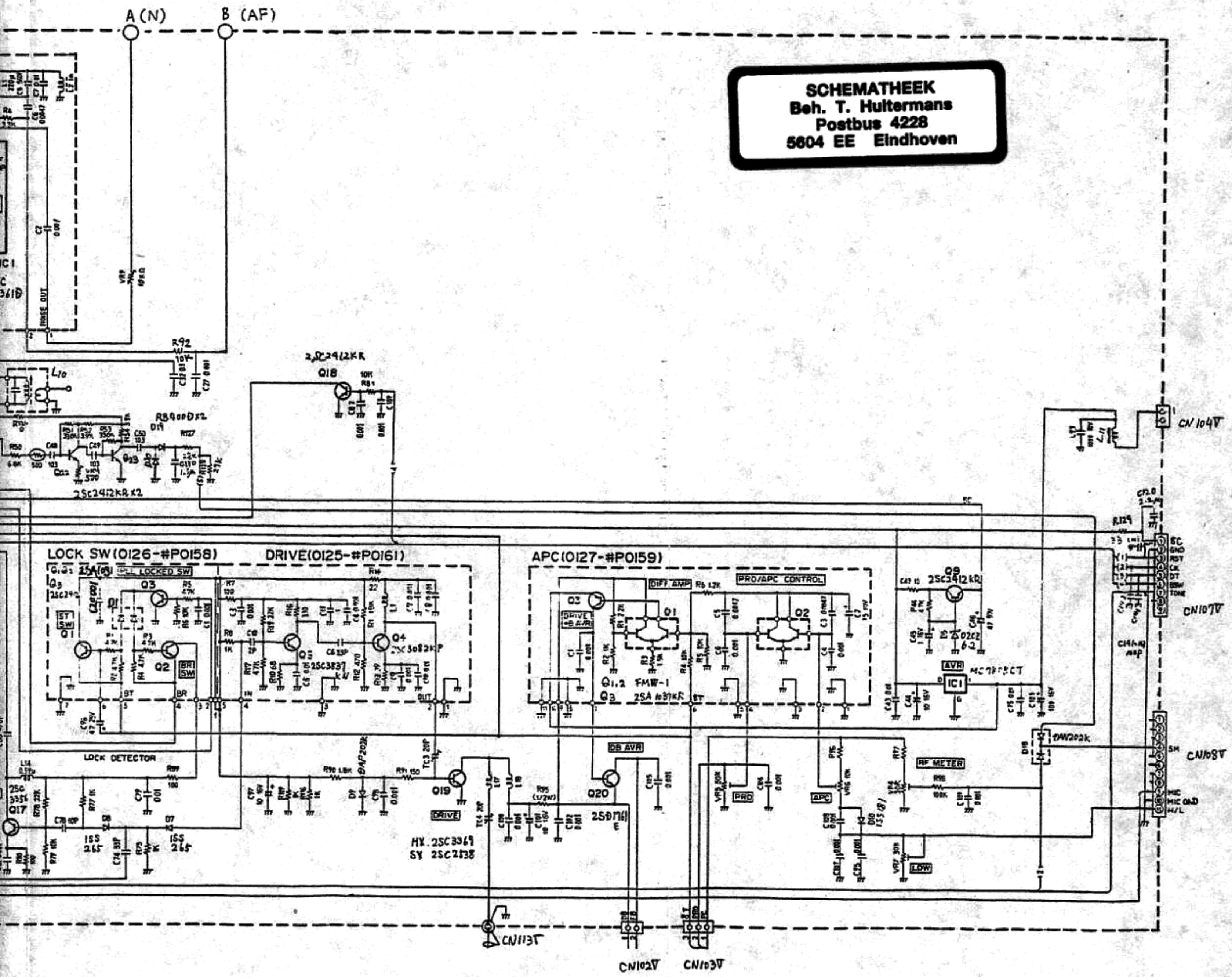


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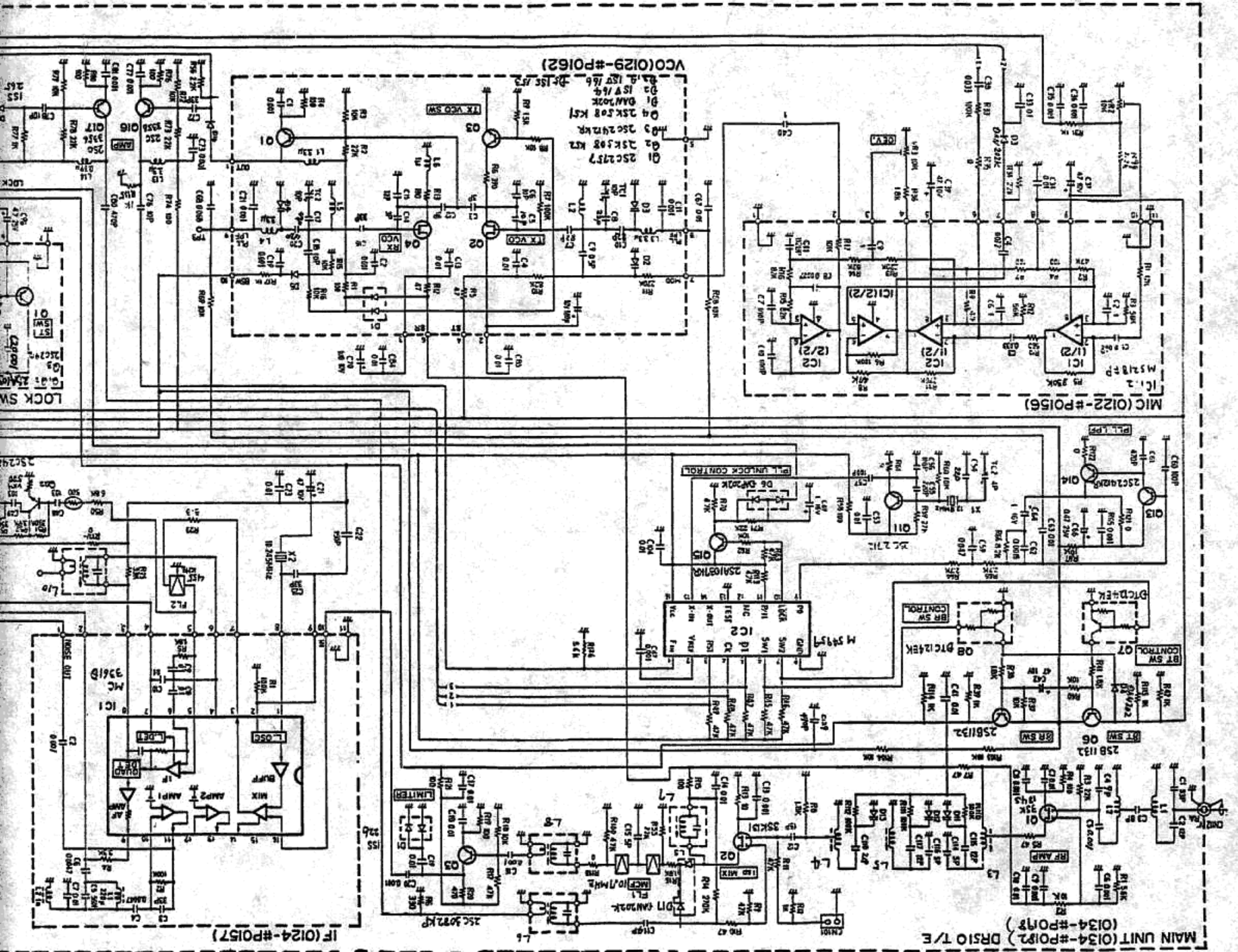
■ UHF MAIN SCHEMATIC DIAGRAM



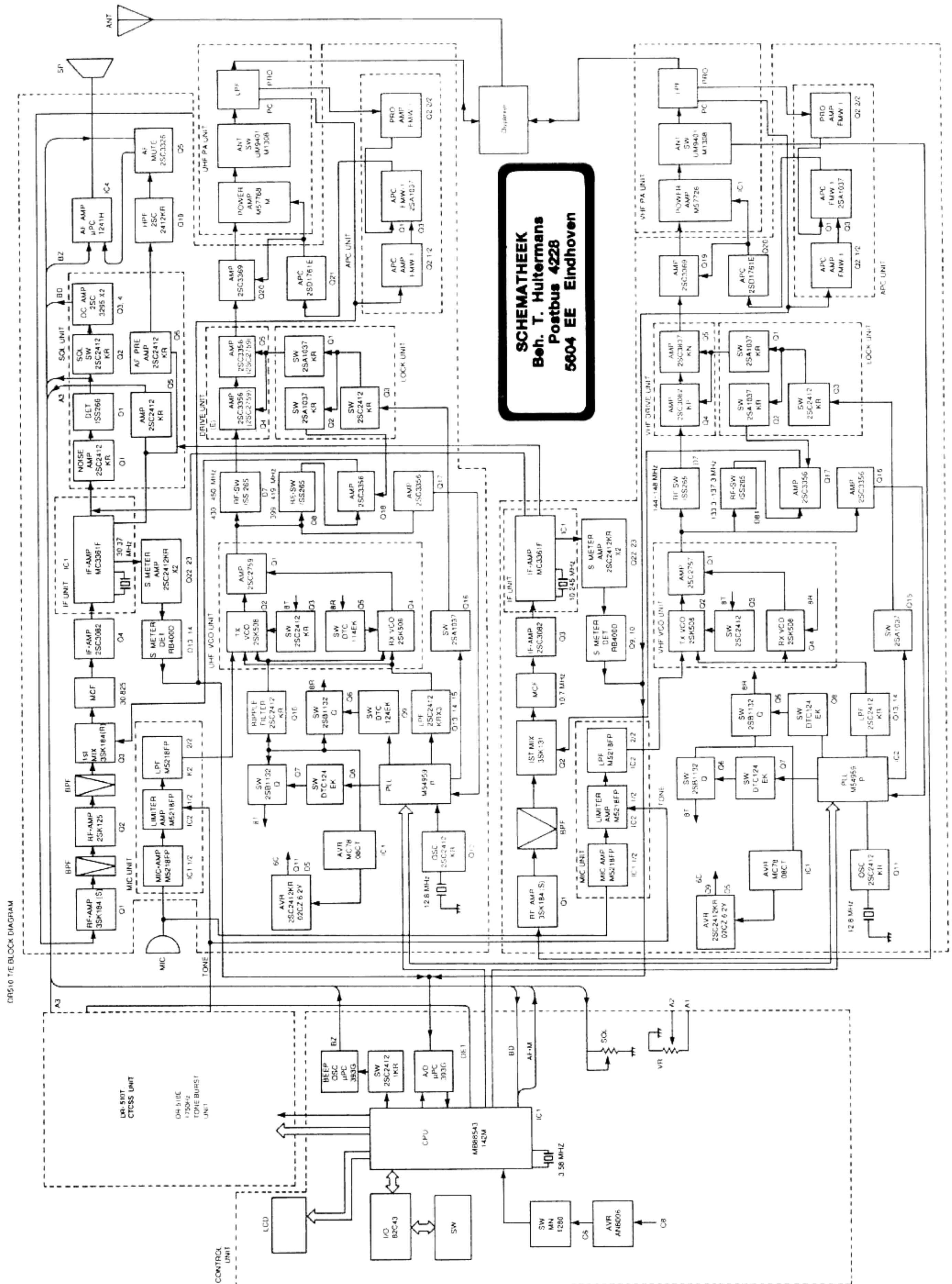
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■ VHF MAIN SCHEMATIC DIAGRAM



■ BLOCK DIAGRAM

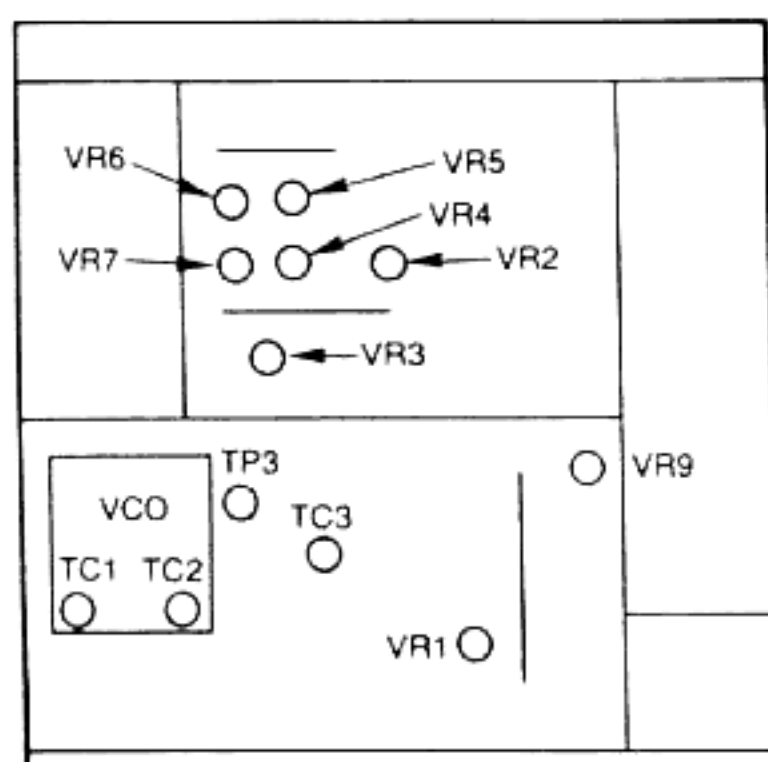


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■ ADJUSTMENT (UHF)

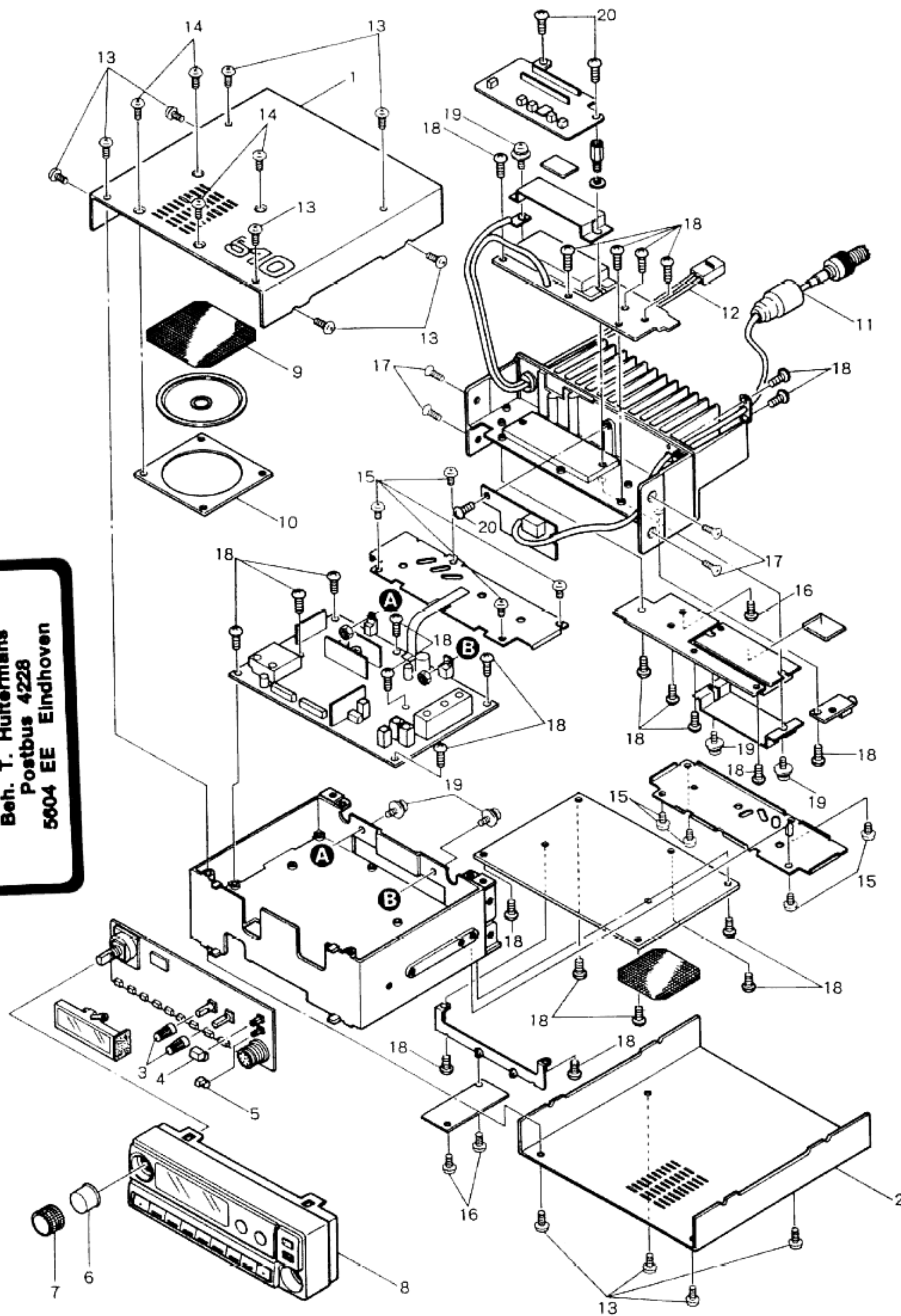
| Item | Adjustment point | Adjustment method |
|--|--------------------------|--|
| VCO P/D Voltage (RX) | TC2 (VCO Box) | Adjust TC2 so that the voltage of TP3 is 2 V on the receiving mode |
| VCO P/D Voltage (TX) | TC1 (VCO Box) | Adjust TC1 so that the voltage of TP3 is 1 V on the transmission mode. |
| Frequency | TC3 (Main Board) | Set the unit in the transmission mode at 435.00 MHz (T: 445.00 MHz) and adjust TC3. |
| Power output | VR6 (Hi) | On "HI" position, turn VR6 for 35 W output at 435 (T: 445) MHz. |
| | VR7 (Lo) | On "LO" position, turn VR7 for 5 W output at 145.00 MHz. |
| RF Power Meter | VR4 | Turn VR4 so that three segments will light on "LO" position. |
| Deviation | VR3 | Input a signal of 1 KHz/25 mV into the MIC jack and adjust VR3 so that you obtain 4.9 KHz/Dev in the transmission mode. |
| MIC Gain | VR2 | Input a signal of 1 KHz/10 mV into the MIC jack and adjust VR2 so that you obtain 4.0 KHz/Dev in the transmission mode. |
| Protection Circuit | VR5 | Disconnect the antenna in the transmission mode and adjust VR5 so that the current consumption will be 4A. |
| Subaudible Tone Deviation (DR-510T) | VR1 (Tone squelch board) | On the "ENC" mode at 435.00 MHz, (T: 445.00 MHz), turn VR1 so that the deviation is 0.7 KHz. |
| 1750 Hz Tone Deviation (DR-510E) | VR1 (Tone burst board) | Pressing Tone button at 435.00 MHz (T: 445.00 MHz), turn VR1 so that the deviation is 3.5 KHz. |
| S-Meter (SG output: 3 dB μ EMF) | VR1 | Turn VR1 so that the 1 begins to light. |
| Squelch Sensitivity (SG output: -6 dB μ EMF) | VR9 | Turn the squelch control fully clockwise and turn VR9 so that the squelch will be closed at the SG output of -6 dB μ . |

Lower Side View



■ CABINET PARTS LOCATION

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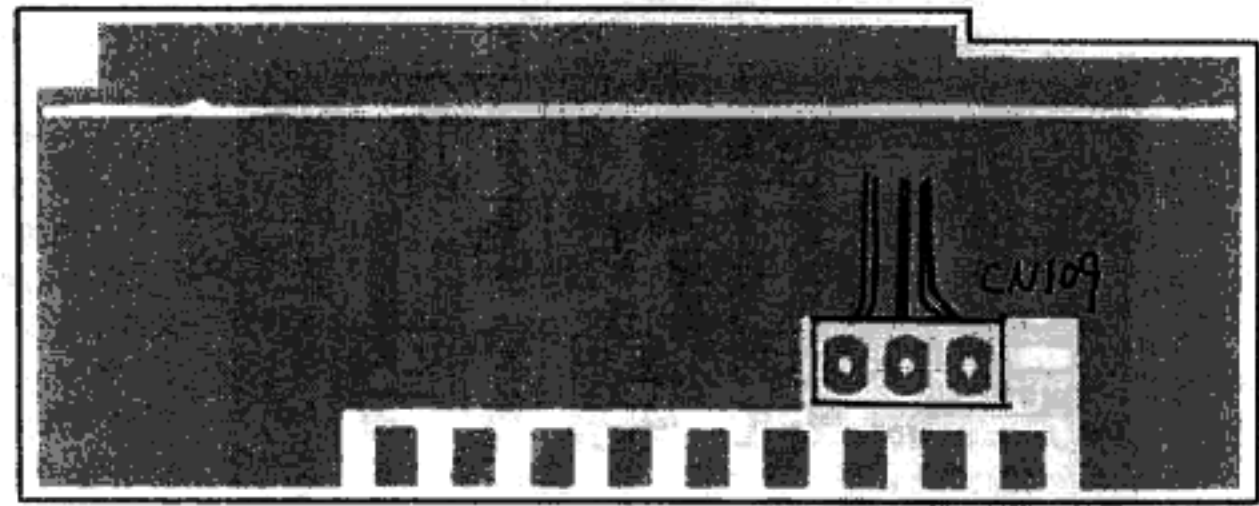
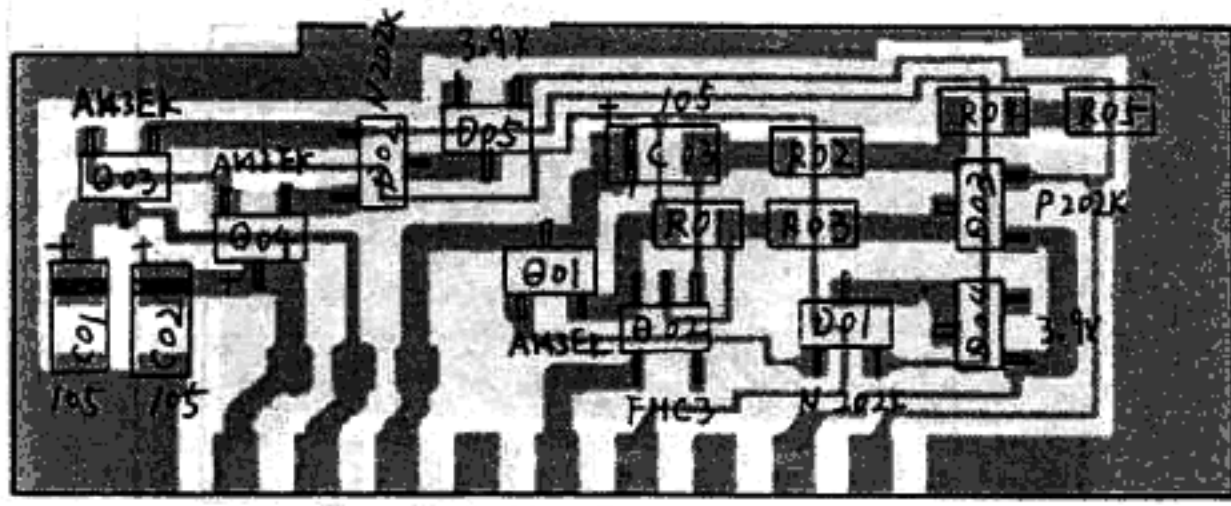


| Ref. No. | Part Code | Part Name and Number |
|-------------------------|-----------|----------------------|
| Mechanical Parts | | |
| 1 | KU0059 | Upper Case |
| 2 | KS0031 | Lower Case |
| 3 | NK0010 | Vol Knob |
| 4 | NP0015 | Power Knob |
| 5 | NP0016 | HI/LO Knob |
| 6 | NK0009 | Dial Knob |
| 7 | ND0004 | Dial Cover |
| 8 | KM0055 | Front Panel |
| 9 | FF0013 | SP Sheet |
| 10 | ST0009 | SP Metal Crasp |
| 11 | UE0053 | Coaxial Cable |
| 12 | UA0002 | DC Power Cable |

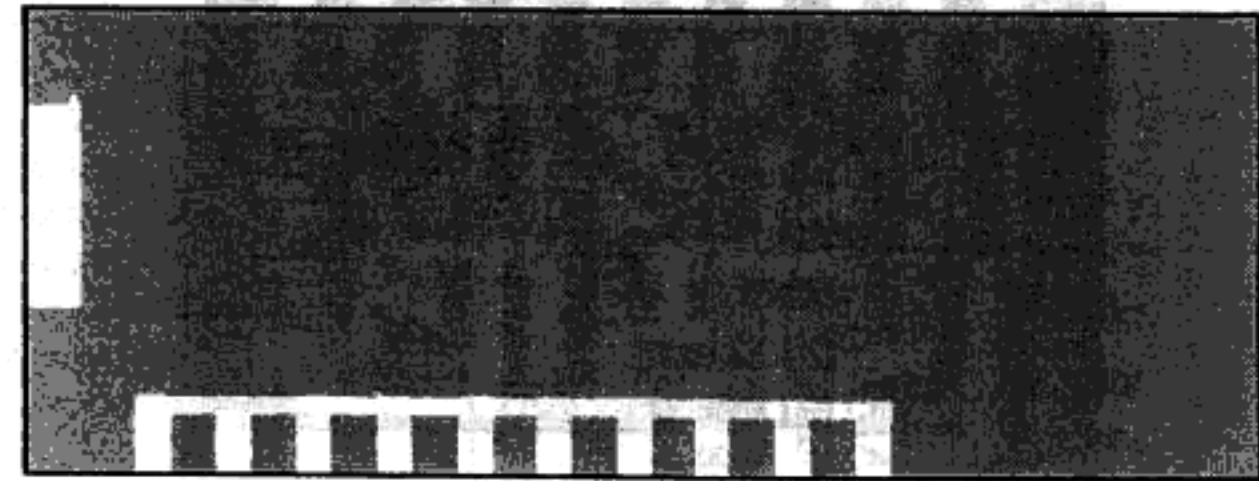
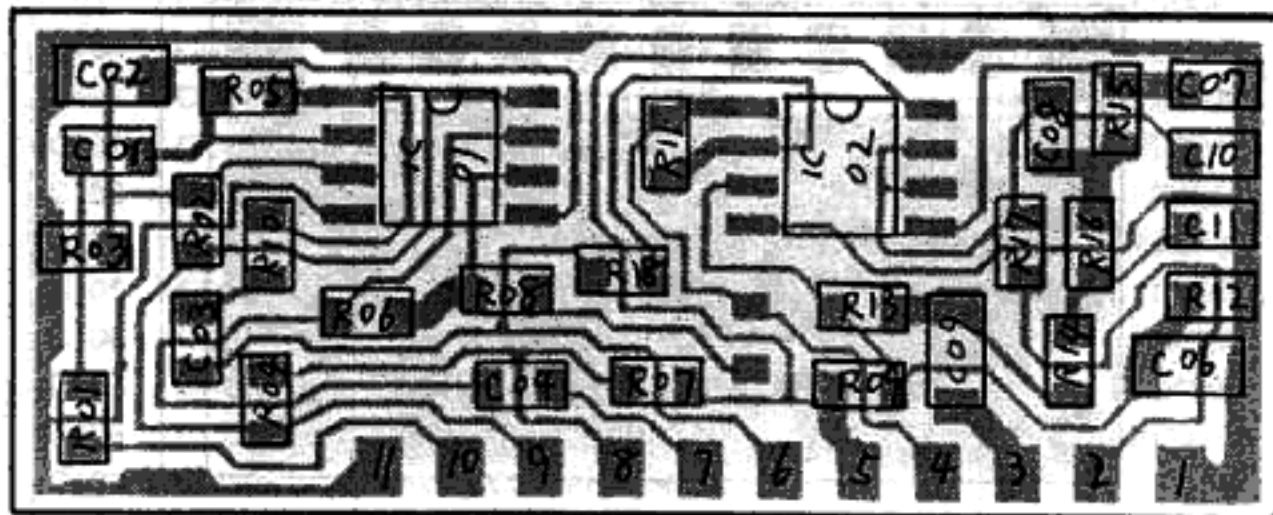
| Screws | | |
|---------------|--------|-------------|
| 13 | AA0031 | M2.6x5 |
| 14 | AA0003 | M2.6x5 |
| 15 | AF0011 | M2.6x4 |
| 16 | AF0027 | M2x4 |
| 17 | AA0022 | M3x6 |
| 18 | AJ0015 | 2.6x6 (tap) |
| 19 | AD0001 | M3x8 |
| 20 | AA0028 | M2.6x5 |

| Ref. No. | Part Code | Part Name and Number |
|----------|-----------|-----------------------------------|
| C1 | CU0071 | Chip C, C2012CH1H101J |
| C2 | CU8016 | Chip C, C2012B1H102K |
| C3 | CU8016 | Chip C, C2012B1H102K |
| C4 | CU8016 | Chip C, C2012B1H102K |
| C5 | CU8016 | Chip C, C2012B1H102K |
| C6 | CU8016 | Chip C, C2012B1H102K |
| C7 | CU8016 | Chip C, C2012B1H102K |
| C8 | CU8016 | Chip C, C2012B1H102K |
| C9 | CU8016 | Chip C, C2012B1H102K |
| C10 | CU8016 | Chip C, C2012B1H102K |
| C14 | CU8016 | Chip C, C2012B1H102K |
| C15 | CU8016 | Chip C, C2012B1H102K |
| C16 | CU8016 | Chip C, C2012B1H102K |
| C17 | CE0057 | Chemical C, 6.3 V 330 μ F MS9 |
| C18 | CU8028 | Chip C, C2012B1H103K |
| C19 | CE0044 | Chemical C, 16 V 10 μ F MS5 |
| C21 | CU8024 | Chip C, C2012B1H471K |
| C22 | CS0051 | Chip Tantal, TMC1C106TR |
| C23 | CU8038 | Chip C, CM316Y5V105Z25VAT |
| C24 | CS0051 | Chip Tantal, TMC1C106TR |
| C26 | CU0071 | Chip C, C2012CH1H101J |
| C27 | CU0071 | Chip C, C2012CH1H101J |
| C28 | CU0071 | Chip C, C2012CH1H101J |
| C29 | CU8016 | Chip C, C2012B1H102K |
| C30 | CU8016 | Chip C, C2012B1H102K |
| C31 | CU8016 | Chip C, C2012B1H102K |
| C32 | CU8016 | Chip C, C2012B1H102K |
| C33 | CU8016 | Chip C, C2012B1H102K |
| C34 | CU8016 | Chip C, C2012B1H102K |
| C35 | CU8016 | Chip C, C2012B1H102K |
| C36 | CU8016 | Chip C, C2012B1H102K |
| C38 | CU8016 | Chip C, C2012B1H102K |
| C39 | CU8016 | Chip C, C2012B1H102K |
| C40 | CU8016 | Chip C, C2012B1H102K |
| PL1 | EP0004 | Lamp, BQ031-30674A |
| PL2 | EP0004 | Lamp, BQ031-30674A |
| PL3 | EP0004 | Lamp, BQ031-30674A |
| PL4 | EP0003 | Lamp, BQ031-30403A |
| PL5 | EP0003 | Lamp, BQ031-30403A |
| VR1 | RV0010 | Volume, EVU-F2AF20B54 |
| VR2 | RV0009 | Volume, EVU-F2AF20B14 |
| VR3 | RV0036 | Volume, CVR-42A-102AW1D |
| SW1 | UQ0011 | Push SW, ESB-64801 |
| SW2 | UQ0011 | Push SW, ESB-64801 |
| SW3 | UQ0013 | Tact SW, EVQ-QEC-04K |
| SW4 | UQ0013 | Tact SW, EVQ-QEC-04K |
| SW5 | UQ0013 | Tact SW, EVQ-QEC-04K |
| SW6 | UQ0013 | Tact SW, EVQ-QEC-04K |
| SW7 | UQ0013 | Tact SW, EVQ-QEC-04K |
| SW8 | UQ0013 | Tact SW, EVQ-QEC-04K |
| SW9 | UQ0013 | Tact SW, EVQ-QEC-04K |
| SW10 | UQ0013 | Tact SW, EVQ-QEC-04K |
| SW11 | UQ0013 | Tact SW, EVQ-QEC-04K |
| SW12 | UQ0013 | Tact SW, EVQ-QEC-04K |
| IC1 | XA0072 | IC, MB88543-142M |
| IC2 | XA0022 | IC, MBL82C43PF |
| IC3 | XA0033 | IC, MPC393G-T |
| IC4 | XA0074 | IC, AN8006 |
| IC5 | XA0073 | IC, MN1280-T |
| FAR1 | XB0001 | FAR, C4CA03580000K01 |
| D3 | XD0061 | Diode, DA204K T96 |
| D4 | XD0040 | Diode, DAN202K T96 |
| D6 | XD0040 | Diode, DAN202K T96 |
| LED1 | XL0020 | LED, TLG211 |
| Q2 | XU0015 | Transistor, DTC144TK T96 |
| Q5 | XT0088 | Transistor, 2SA1213Y |
| Q6 | XT0037 | Transistor, 2SC2412K T96R |

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