Sept 2007

~~[illegible]~~ CEL-230
aanwezig 300Hz
CFL-260
600Hz

INSTRUCTION MANUAL
FOR
MODEL JST-100 HF TRANSCEIVER

JRC

Japan Radio Co., Ltd.

Forword

Thank you for the purchase of your new model JST-100 TRANSCEIVER.
Before operating it please read this manual thoroughly in order to assure satisfactory performance of the equipment and prevent damage or fuilure.
This product has been produced under strict quality control. However should any trouble be found due to workmanship kindly contact the JRC office or JRC dealer.

CONTENTS

CHAPTER PAGE

1. PRECAUTION BEFORE USE
1.1 Accessories Check 1
1.2 Selection of Installation Location 1
1.3 Installation 1
1.3.1 Power Line Connection 1
1.3.2 Antenna Connection 1
1.3.3 Earthing 2
1.3.4 Microphone Connection 2
1.3.5 Key Connection 3
1.3.6 Speaker Connection 3
1.3.7 Electronic Keyer Connection 3
1.3.8 Antenna Tuner Connection 3
1.3.9 Linear Amplifier Connection 3
1.3.10 RTTY Equipment Connection 3
1.3.11 Accessory Connector 4
1.3.12 Memory Connector 4
1.3.13 Coupler Connector 6

2. OPERATING CONTROLS ON PANEL
2.1 Front Panel Controls 8
2.2 Rear Panel Description 11

3. OPERATION
3.1 Receiving Operation 13
3.1.1 Receiving Procedure 13
3.1.2 Reading the Frequency 13
3.1.3 Receiving SSB Signals 14
3.1.4 Receiving CW Signals 14
3.1.5 Receiving RTTY Signals 14
3.1.6 Receiving the Standard Wave 15
3.2 Receiving Functions 15
3.2.1 Attenuator 15
3.2.2 AGC Switch 15
3.2.3 RF Gain 15
3.2.4 Pass Band Tuning 15
3.2.5 IF Notch Filter 16
3.2.6 Noise Blanker 16
3.2.7 RIT Operation 16
3.3 Transmitting Operation 16
3.3.1 Transmitting Procedure 16
3.3.2 SSB Operation 17
3.3.3. CW Operation 17
3.3.4 RTTY Operation 18
3.4 Transmitting Function 18
3.4.1 VOX Operation 18
3.4.2 Speech Processor Function 18
3.5 Two VFO System 19
3.5.1 Simplex Operation 19
3.5.2 Split Operation –1, 2 20
3.5.3. Split Operation –3, 4 21
3.6 Use and Application of Internal Memory 22
3.6.1 Storing Frequency Data 22
3.6.2 Access to Frequency Data in Memory 23
3.6.3 Memory Finder 23
3.6.4. Precaution for Memory 25
3.7 Adjusting the Accessory Features 25
3.7.1 Adjusting the Anti-Trip for VOX 25
3.7.2 Adjusting the Side Tone for CW 25
3.7.3 Adjusting the Line Output Level 25
3.7.4 Adjusting the ALC 25
3.7.5 Reducing the Power to 50 Watts 26
3.7.6 External Antenna Jack, RX ANT 26

4. MAINTENANCE AND CHECK
4.1 Removing the Covers 27
4.2 Layout of Units 28
4.3 Taking out Units 28
4.4 10MHz Reference Frequency Adjustment 28
4.4.1 Adjustment Using Frequency Counter 28
4.4.2 Adjustment Using Standard Wave (JJY, WWV, etc) 28
4.5 Troubleshooting 28
4.5.1 Troubleshooting at Receive 30
4.5.2 Troubleshooting at Transmit 31
4.5.3 Troubleshooting about Frequency Control 32

5. OPTIONS
5.1 NBD-500G/U Power Supply 33
5.2 NFG-97 Antenna Tuner 33
5.3 NVA-88 Speaker 33
5.4 CHG-43 Desk Microphone 34
5.5 CHG-44 Hand Microphone 34
5.6 KY-3A Key 34
5.7 CFL-260 600Hz Filter 34
5.8 CFL-230 300Hz Filter 35
5.9 Mounting the Optional Filters 35

6. SPECIFICATIONS
6.1 General Specifications 36
6.2 Transmitter Section 36
6.3 Receiver Section 36

7. BLOCK DIAGRAM AND CIRCUIT DIAGRAMS 37

CHAPTER 1

PRECAUTION BEFORE USE

1.1 Accessories Check

The JST-100 is furnished with the following accessories. Check against the packing list.

Accessories:

Instruction manual	1
Microphone plug, 8-pin	1
Key plug, 2-pin	1
RCA type pin plug	2
Square plug, 12-pin	1
Fuse (30A for 100W-model, 5A for 10W-model)	2
DC power cable	1
PC board puller	2

> The JST-100 has been packed in an exclusively designed carton.
> We hope you retain it for reshipping upon repair or so.

1.2 Selection of Installation Location

Select a good ventilative place for installation. Avoid such a place as;

- Direct-sunlit places
- Hotair-exposed places
- Dusty places
- Vibrational places
- Moist places

Reserve a space around the transceiver as wide as practicable. Great care should be taken to ensure a sufficient ventilation for heat radiation from the rear heat sink.

1.3 Installation

Installation of the antenna and earth, connection of the power line, and interconnection with the peripheral units are necessary. Correct installation will ensure satisfactory operation of the transceiver.

> **CAUTION**
> In addition to the earthing of the antenna system, always connect the chassis of each unit to the earth ground to prevent electric shock and for safety.

1.3.1 Power Line Connection

The JST-100 operates from a DC source of +13.8V ±10%. The JST-100D, 100W-model, requires about 20A and the JST-100S, 10W-model about 5A.

First check the voltage and current capacity of an external power source to be connected. Connect using the furnished DC power cable, as shown in Figure 1.1.

For operation from an AC power line, the optional NBD-500 power supply are available.

1.3.2 Antenna Connection

The JST-100 operates at rated power when connected to a load resistance of 50 ohms.

Upon selection and installation work of the antenna, make every effort to match its impedance with 50 ohms, pure resistive as seen from the transceiver.

If impossible for 50 ohms, insert antenna tuner between the antenna terminal and feeder.

NOTE: Even if the load impedance is 50 ohms, a balanced type antenna always requires a balance-unbalance transformer.

When the transceiver is correctly matched with the feeder to result in SWR=1, the transceiver is capable of providing a rated output power to the feeder with suppressed spurious and other undesired radiations enough for emission of a clear signal.

If, on the contrary, the matching is poor to result in SWR higher than unity, part of output power will be reflected at the input end of the feeder. As the result, the power cannot fully be fed to antenna through the feeder and the transceiver may not provide the rated output power because of its load being different from 50 ohms, pure resistive. For example, the output

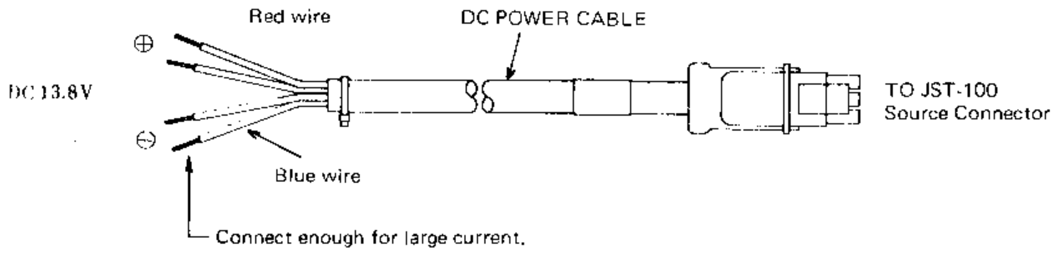


Figure 1.1 DC Power Line Connection

power will be reduced to 80 to 95% for a load of 75 ohms and 70 to 90% for a load of 100 ohms. For these reasons, adjust the antenna, feeder, earth, antenna tuner, etc. to approach SWR to 1.0 as closely as possible.

NOTE: Also take care of the impedance matching between the antenna and feeder as well as between the feeder and transceiver using the antenna tuner, etc.
If not matched between the antenna and feeder, the power cannot also fully be fed the antenna through the feeder.

Carefully stretch the antenna for impedance matching between the antenna and feeder enough to feed the power.

NOTE: The antenna tuner is not available to match the impedance between feeder and antenna, but for improving the matching condition between the transceiver and feeder.

To efficiently emit the power, not only take care of the antenna, but also give attention to the earth work. For a grounded type antenna, in particular, its earth or other substitute such as counterpoise and radial earth should be regarded as an important part of the antenna.

Even when using a balanced type antenna, connect its earth wire to the terminal E of the transceiver to suppress spurious and other undesired radiations and ensure the safety.

1.3.3 Earthing

Always a good ground connection is important for safety and reduction of interferences.

Use a thick cupper wire, cupper braided wire or cupper tape, and wire with the shortest run, as shown in Figure 1.2.

CAUTION
Never connect the earth wire to any gas pipe or cable duct.

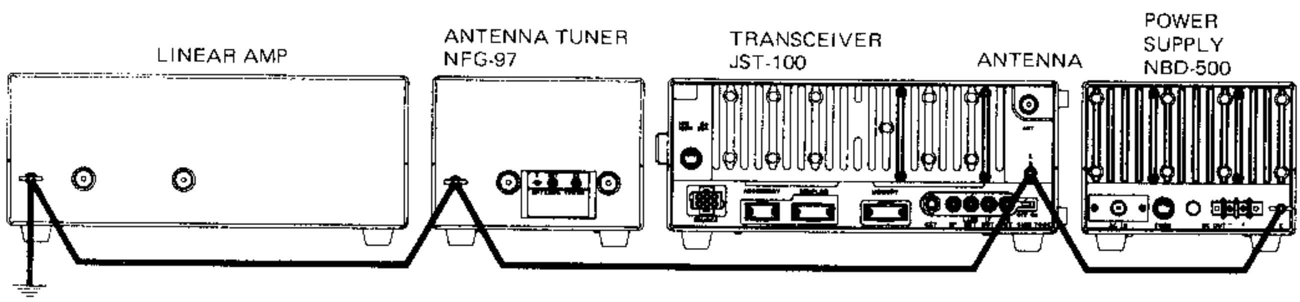


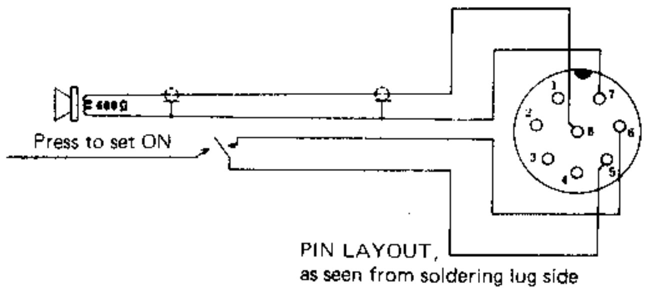
Figure 1.2 Earth Connection

1.3.4 Microphone Connection

For SSB operation, connect a microphone to the front panel MIC connector. Optional microphones are available: CHG-43 stand type and CHG-44 hand type.

Other type microphones will be also adaptable, if wired as shown in Figure 1-3. The furnished microphone plug is usable therefor.

Any microphone for the JST-100 must have an impedance of 600 ohms and sensitivity of –70dB (0db: 1V/μBAR 1kHz) or better.



NOTE: Do not wire Pins 1 through 4.

Figure 1.3 Microphone Connection

1.3.5 Key Connection

For CW operation, connect a key to the rear KEY connector. An optional key is available: KY-3A.

Other type keys are also adaptable with furnished key plug. Connect it as shown in Figure 1.4.

> **CAUTION**
> Do not apply an excessively high voltage or any negative voltage to the CW keying circuit, because of TTL level.

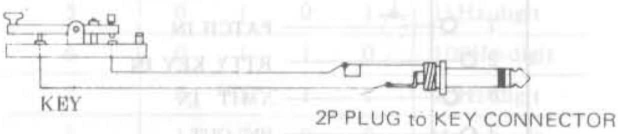


Figure 1.4 Key Connection

1.3.6 Speaker Connection

The JST-100 contains a small speaker. For better sound quality and higher sound volume, the optional speaker NVA-88, separate type, is available.

Connect the NVA-88 to the rear SP jack. This causes the internal speaker to be silenced.

When using other type speaker, select a speaker having an impedance of 4~8 ohms and maximum input 5W and use the furnished pin-plug.

1.3.7 Electronic Keyer Connection

The furnished key plug is available for connection of the electronics key. Connect the keyer as described in Paragraph 1.3.5, and shown in Figure 1.4.

Any open close relay type electronic keyer can be connected directly.

However when connecting other type keyer having an active output, take care of its polarity and amplitude; select any type providing a ground level of less than 0.5V with keying circuit of 2mA because of TTL keying circuitry in the transceiver.

> **CAUTION**
> Do not apply a higher voltage than +5V or negative voltage to the CW keying circuit. It may malfunction or fault.

1.3.8 Antenna Tuner Connection

If SWR is far higher than unity, preferably insert the optional antenna tuner, NFG-97, between the JST-100 and feeder.

Always connect the transceiver and antenna tuner to the earth ground for their satisfactory operation. The connection is shown in Figure 1.2.

1.3.9 Linear Amplifier Connection

Interconnect a linear amplifier. Having an antenna, earth, standby and ALC lines, as shown in Figure 1.5.

The linear amplifier should have an input impedance of 50 ohms. In case of other than 50 ohms, connect an antenna tuner between the JST-100 and linear amplifier to convert the impedance into 50 ohms.

For the standby signal to the linear amplifier, select either $\overline{\text{BK}}$ OUT line (earth level at transmission) or BK OUT line (open at transmission).

The rear panel ALC accessory connector is available for applying the ALC signal for automatically adjusting the driving level to the JST-100.

Two terminals ALC ⊕ or ALC ⊖ are provided for either polarity of the ALC signal. The ALC characteristics are shown in Table 1.1.

Table 1.1 ALC Control Characteristics

	ALC ⊖	ALC ⊕
Operation start voltage, typical	–4V*	+4.5V
Operation start voltage, variable range	–2.5~–5V	–
Control sensitivity per 10dB	0.5~1.0V	0.5~1.5V

NOTE: *Values measured with mid position of RV7 for ALC of CMB-63 OUTPUT unit.

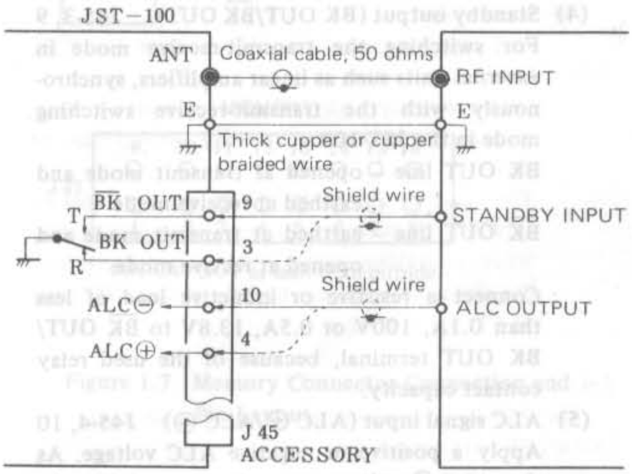


Figure 1.5 Linear Amplifier Connection

1.3.10 RTTY Equipment Connection

For RTTY operation, an RTTY equipment is necessary.

Three signal lines must be connected for the AF output signal, transmit keying signal and standby signal. The receive AF output signal is taken out from the transceiver rear panel LINE OUT connector at a level of –10dB, 600 ohms.

Both the keying signal and standby signal are applied through the rear panel ACCESSORY connector

J47 on the rear panel. The keying signal line is connected to Pin 2 of the ACCESSORY connector and the standby signal to Pin 8.

The applicable keying signal is a relay-switched on-off signal or TTL level "H" level for space (–85Hz) and "L" level for mark (+85Hz).

The standby signal is a relay-switched on-off signal or other at the TTL level (H-level – receive mode, L-level – transmit mode).

1.3.11 ACCESSORY Connector

The ACCESSORY connector J45 is located on the rear panel. The interconnection and layout of the connector pins are shown in Figure 1.6.

(1) PHONE PATCH input J45-1, 7
The input impedance is about 600 ohms. The standard input level ranges –10 to –20dBm, adjustable from panel microphone gain control.

(2) RTTY keying input J45-2
For the keying signal at TTL level from the RTTY.
"L" level – mark
"H" level (or open) – space

(3) Standby input ($\overline{\text{XMIT}}$ IN) J45-8
For an external standby switch for switching the transmit-receive mode of the JST-100. Apply a mechanical contact switching information of a relay or switch or TTL-level signal.
Contact open or high level – receive mode
Contact earthed or low level – transmit mode

(4) Standby output (BK OUT/$\overline{\text{BK}}$ OUT) J45-3, 9
For switching the transmit-receive mode in external units such as linear amplifiers, synchronously with the transmit-receive switching mode in the JST-100.
BK OUT line – opened at transmit mode and earthed at receive mode
$\overline{\text{BK}}$ OUT line – earthed at transmit mode and opened at receive mode
Connect a resistive or inductive load of less than 0.1A, 100V or 0.5A, 13.8V to $\overline{\text{BK}}$ OUT/BK OUT terminal, because of the used relay contact capacity.

(5) ALC signal input (ALC ⊕/ALC ⊖) J45-4, 10
Apply a positive or negative ALC voltage. As the ALC ⊕ voltage exceeds about 4.5V, the power begins to be reduced.
When the ALC ⊖ voltage lowers in excess of about 4V, the power begins to be reduce.
The ALC ⊖ input impedance is about 100kΩ and the ALC ⊕ input impedance about 100kΩ on SSB and about 1.5kΩ on CW and RTTY modes.

(6) Anti-trip input (ANTI TRIP IN) J45-5
Apply the speaker output signal from the receiver for the VOX operation combined with separate receiver.

(7) Side tone signal output (SIDE TONE OUT) J45-11
Provides a keying monitor tone during the CW operation.
This monitor tone can be switched on and off by the SIDE TONE switch on the rear panel.

(8) +13.8V DC output (13.8V) J45-12
Available for taking out the 13.8V. Its maximum current is 1A.

(9) Earth J45-6

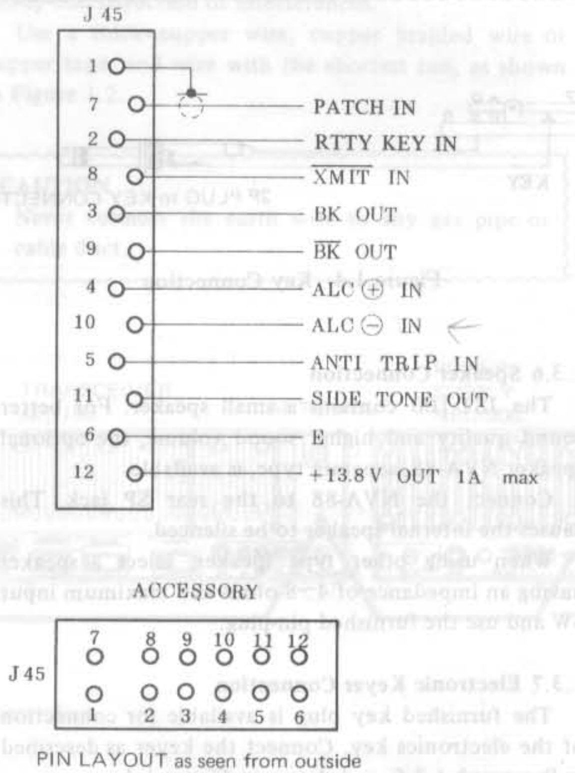


Figure 1.6 Accessory Connector Connection and Pin Layout

1.3.12 Memory Connector

The rear panel memory connector, MEMORY, J47 is available for controlling external data about transmit and receive frequencies and mode, during remote-control from outside.

For controlling from outside, set the MEMORY CH switch on the front panel to the EXT position.

How to enter such data and use the connector pins is described below.

(1) Entering Data
Enter a BCD 7-digit value, starting from the 10MHz-digit until the 10Hz-digit. Finally add a mode information.
The microprocessor (CPU) starts to process the data only when all the eight values have been entered, as shown in Table 1.2.
Before completion of new data entry, the

transceiver operates at the current frequency and modes.

Table 1.2

ENTRY ODER	DIGIT SELECT CODE D3	D2	D1	D0	DATA
1	0	0	0	1	10MHz-digit
2	0	0	1	0	1MHz-digit
3	0	0	1	1	100kHz-digit
4	0	1	0	0	10kHz-digit
5	0	1	0	1	1kHz-digit
6	0	1	1	0	100Hz-digit
7	0	1	1	1	10Hz-digit
8	1	0	0	0	Mode code

NOTE: Always enter a frequency data with seven digits.
When entering a 7MHz-frequency, for example, add "0" to the top as a 10MHz-digit value.

Before entry of the mode information, it must be coded as shown in Table 1.3.

NOTE: If entering other mode code, the CPU will operate in a mode registered at the EXT position of the MEMORY CH switch.

Table 1.3

MODE	MODE CODE	D7	D6	D5	D4
CW	1:	0	0	0	1
LSB	2:	0	0	1	0
USB	3:	0	0	1	1
RTTY	5:	0	1	0	1

There are two methods for registering the mode information in the EXT position of the MEMORY CH switch.

1) Depress the MEMO switch on the front panel to read the mode information.
2) Enter the mode code together with a frequency data from outside, according to Table 1.3.

When entering the data, an interrupt pulse must be applied to the CPU together.

(2) The connection to the memory connector and its pin layout are shown in Figure 1.7.

Drive the transceiver with signals at TTL level.

(3) Timing of Signals
The typical signal timing chart is shown in Figure 1.8.
For higher speeds of signals than shown in this chart, the operation may become unstable.

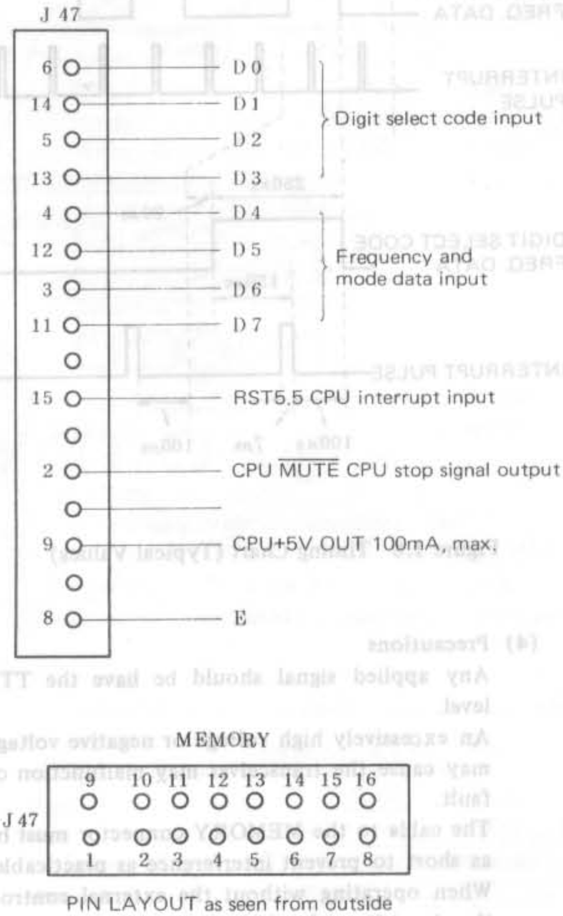


Figure 1.7 Memory Connector Connection and Pin Layout

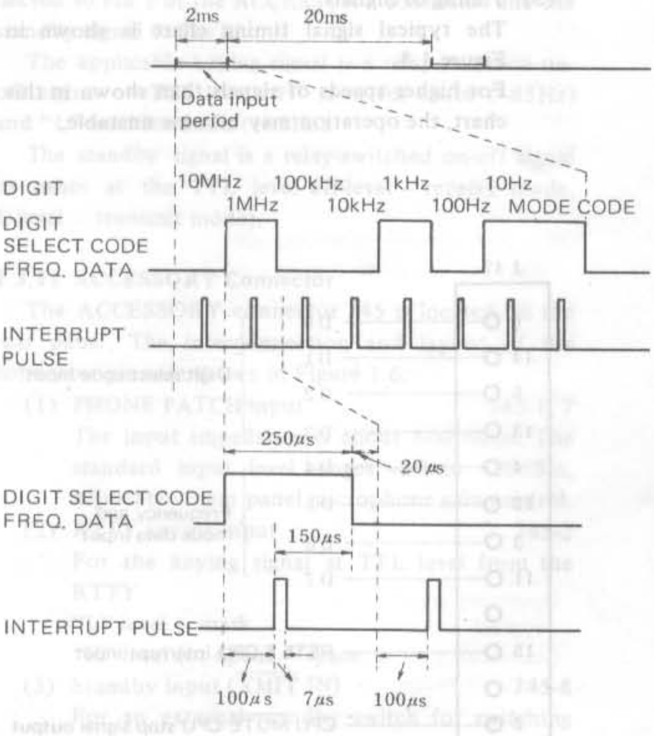


Figure 1.8 Timing Chart (Typical Values)

(4) Precautions

Any applied signal should be have the TTL level.

An excessively high voltage or negative voltage may cause the transceiver may malfunction or fault.

The cable to the MEMORY connector must be as short to prevent interference as practicable.

When operating without the external control, the signal lines should be held at the "H" level of TTL or opened.

1.3.13 Coupler Connector

The JST-100 is provided with a coupler connector COUPLER, J46 on the rear panel.

It provides an operating frequency or shift frequency, which is indicated frequency on the display and either numeral 1 or 2, representing the selected VFO-F1 or F2. They are gated out serially.

The connector also provides outgoing signals:

Data latch, standby, shift, +5V- and +13.8V-supply voltages,

and incoming signals:

ALC, ALC ⊕ , for controlling the transmit output power from external.

(1) Reading the frequency information

The frequency information consists of digit select codes D0 through D3 data A B C and D, and data latch pul

The data can be rea

circuit.

As shown in Figure 1.10, the frequency data are read at the negative going pulse of the data latch.

The JST-100 has a function called "SHIFT" for indicating the difference between two VFO frequencies. On SHIFT operation, SHIFT OUT signal is "H" and the frequency is not the operating frequency but a shift frequency.

(2) Other control lines

A transmit-receive switching signal (standby signal) output line, +5V-output line of 100mA at maximum, +13.8V-output line of 2A at maximum, and ALC ⊕ input control line are provided.

(3) Precautions

Each output signal is at the TTL level, except the 5V, 13.8V and ALC ⊕ IN signals, and capable of driving up to five LS type TTL input gates.

To prevent external interference, cables with electrostatic shield should be use with the shorted run.

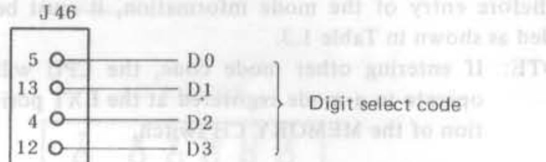


Figure 1.9 Coupler Connector Connection and Pin Layout

PG9HF
Cor L. van Soelen
Resedalaan 4
4382 PL Vlissingen
The Netherlands

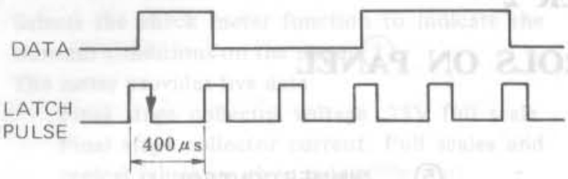


Figure 1.10 Latch Pulse Timing Chart

Table 1.4 Digit Select Code Table

DIGIT SELECT CODE					FREQUENCY DIGIT
	D3	D2	D1	D0	
0	0	0	0	0	10Hz
1	0	0	0	1	100Hz
2	0	0	1	0	1kHz
3	0	0	1	1	10kHz
4	0	1	0	0	100kHz
5	0	1	0	1	1MHz
6	0	1	1	0	10MHz
7	0	1	1	1	VFO
8	1	0	0	0	SHIFT

PG9HF
Cor L. van Soelen
Resedalaan 4
4382 PL Vlissingen
The Netherlands

CHAPTER 2

OPERATING CONTROLS ON PANEL

2.1 Front Panel Controls

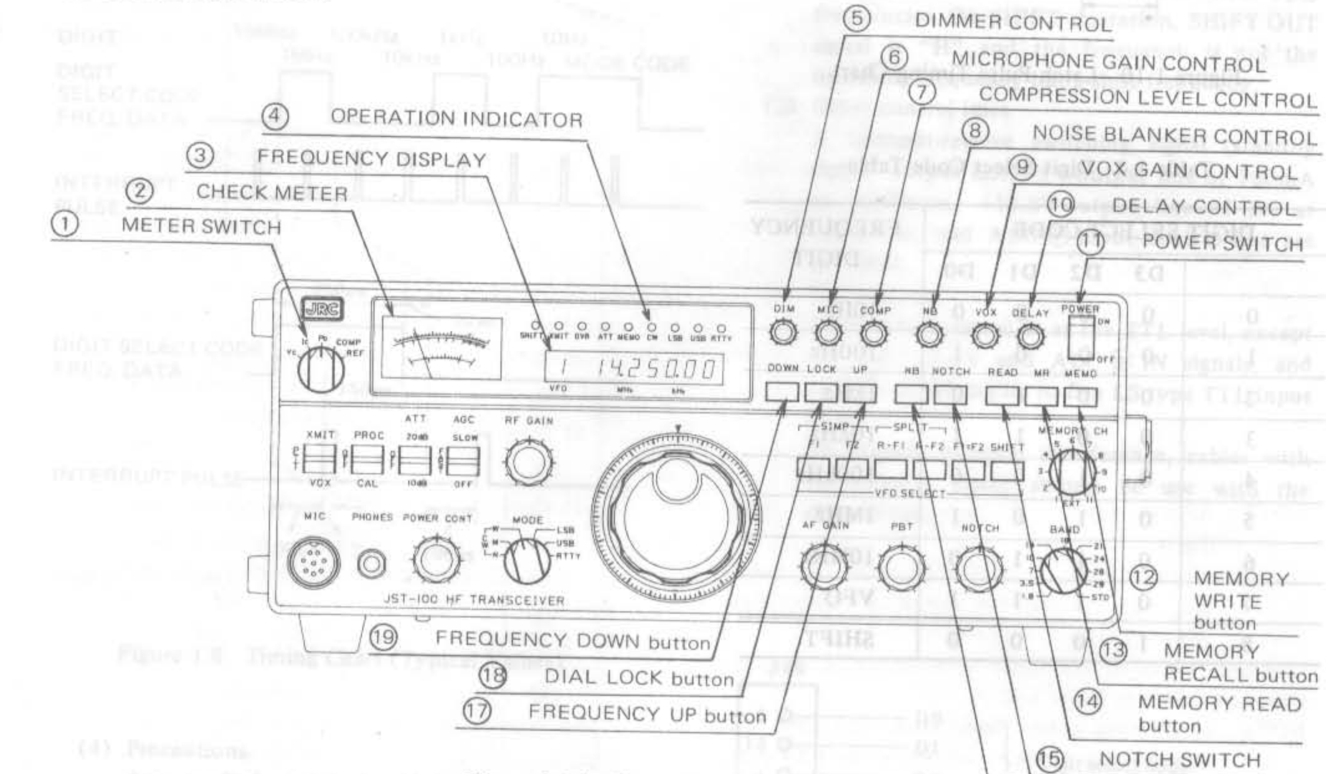


Figure 2.1A Upper Front Panel Controls

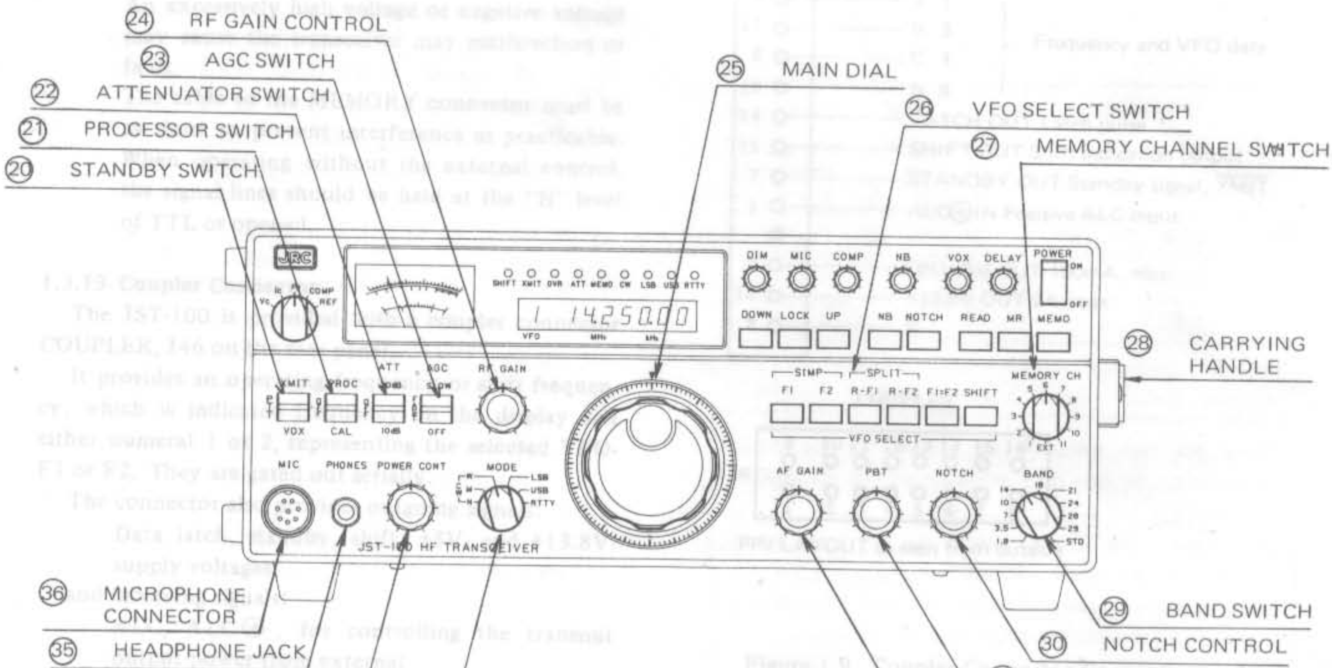


Figure 2.1B Lower Front Panel (

PG9HF
Cor L. van Soelen
Resedalaan 4
4382 PL Vlissingen
The Netherlands

(1) Meter select switch

Selects the check meter function to indicate the transmit conditions on the meter (2).

The meter provides five data:

Vc Final stage collector voltage. 25V full scale.

Ic Final stage collector current. Full scales and typical values are given below.

	Full scale	Typical reading
100W model	25A	15 – 20A
10W model	2.5A	1.8 – 2.2A

Po Transmitter output power.

Scale Percent of 100W or 10W across a pure resistive antenna load of 50 ohms.

NOTE: If the VSWR is too high, the reading may greatly differ from an actual value.

COMP Compression level of the RF speech processor.

REF Reflected power intensity at the antenna terminal.

Usable as an indicator upon the matching adjustment of the external antenna tuner and available for checking the antenna matching condition.

NOTE: Since the meter sensitivity is high enough for more fine adjustment, the output power will be satisfactory even if there appear a certain reading.

(2) Check meter

Acts as an S-meter during receive and as a transmit check meter.

The meter switch (1) changes the meter function during transmission.

(3) Frequency display

Consists of a fluorescent indicator tube with nine digits for indicating the transmit or receive frequency and the working VFO number.

The VFO number 1 or 2, representing the VFO-F1 or -F2, appears at the left ahead of the display. The operating frequency appears at the right seven digits for 10MHz to 10Hz.

As SHIFT mode, it indicates the frequency difference between the VFO-F1 and -F2.

(4) Operation indicator

Consists of nine light-emitting diodes (LED). They illuminate to indicate the internal operation modes, as described below.

SHIFT Indicate in SHIFT mode. Indicates frequency difference between the two VFO's on the display.

NOTE: If both VFO F1 and F2 are in different bands, the SHIFT LED will not illuminate.

XMIT Indicates in the transmit.

NOTE: Do not change the band and mode during illumination of the XMIT LED.

This LED also illuminates, when setting the processor switch (21) to the CAL condition.

OVR Indicates the voice input level. When excessively high, the red OVR LED illuminates. At optimum level, the LED twincles only at peaks.

ATT Illuminates in red, when using the attenuator inserted in the receiver input circuit.

In this condition the receiver sensitivity is low.

MEMO Indicates the internal memory is in the access status.

When depressing the MEMO switch (12) or MR switch (13), the MEMO LED illuminates for about 0.5 second.

This indicates the computer is correctly operating the memory operation.

When, depressing the READ switch (14) to make access to the memory channel, the MEMO LED also illuminates.

CW Indicates for CW mode.

LSB Indicates for LSB mode.

USB Indicates for USB mode.

RTTY Indicates for RTTY mode.

(5) Dimmer control

For adjusting the brightness of meter lamp, frequency display and operation indicators.

Adjust relative to the ambient lightness.

(6) Microphone gain control

For adjusting microphone amplifier gain.

With seeing the over-modulation indicator OVR (4), set for an optimum level in accordance with the operator's voice level and microphone sensitivity.

(7) Compression level control

For adjusting the compression level in the RF speech processor.

Set the meter switch (1) to the COMP position. Apply the voice signal from the microphone. Adjust the compression level control to increase the mean talk power density, without considerable deterioration of the sound quality.

An adequate compression level may be less than 10dB, approximately.

(8) Noise blanker level control

For adjusting the threshold level of the noise blanker.

Adjust for the best operation suited to the signal strength, type of noise, and noise level.

(9) VOX gain control

The transceiver goes to the transmit mode, when talking during the VOX.

An excessively high gain will cause the VOX to malfuction due to the ambient sound or noise. Set for a minimum required gain.

(10) Delay control

For adjusting the delay time required for returning to receive in SSB or CW VOX operation.

The delay time in SSB mode is approximately twice the time in the CW mode.

(11) Power switch

ON-OFF switch for DC 13.8V power source. When using either power supply, NBD-500 or

NBD-515, this switch is interlocked with the switch of the power supply.

⑫ Memory write button, MEMO
Depress to store the operating frequency and mode into a selected channel by the memory channel switch ㉗.
When depressing this switch, the MEMO LED on the indicator ④ momently illuminates to indicate the CPU has accepts the data.

⑬ Memory access button, MR
Depress to operate with memory data selected by the memory channel switch ㉗.
When depressing it, the MEMO LED on the indicator ④ momentary illuminates.

⑭ Memory read button, READ
Depress to read out frequency and mode data from selected memory channel, and operate the transceiver by the data.
When depressing the READ switch once again, the transceiver return to operate with F1 or F2.

⑮ Notch switch
Enables the notch control ㉚ to operate.

⑯ Noise blanker switch
Enables the noise blanker to operate.
Use in case such a noise as the automobile's ignition noise interferes.

⑰, ⑲ Frequency up/down button, UP/DOWN
Depress to quickly change the frequency.

⑱ Dial lock button, LOCK
Locks the operation of main dial and UP/DOWN switches electrically.
Available for preventing the frequency from being changed due to vibration or mis-operation.

⑳ Standby switch
Changes over the transmit and receive modes. Three positions are provided:

XMIT Manually switching receive to transmit.

PTT PTT switching receive to transmit.

VOX Voice operated switching in SSB.
During SSB operation, switched to transmit by a voice input and returns to receive with no voice.
On CW, the transceiver will turn to transmit if keying.
When keying ends, it will automatically return to receive. This is called "semi-break-in operation". The VOX switch is combined with the VOX gain control ⑨ and delay control ⑩.

㉑ Speech processor switch
Enables the speech processor to operate, which increases the mean talk power in SSB at selected compression level by control ⑦.
When setting to CAL, the transmit RF amplifier stage and associated circuits start to operate, except for the final stage.
This position is hence available for frequency calibration of separate receiver.

㉒ Attenuator switch
Changes the attenuation to OFF, 10dB and 20dB. If a heavy interference due to strong signals, set to the 10dB or 20dB. Normally set to the OFF.
When setting to the 10dB or 20dB, the ATT LED on the operation indicator ④ illuminates.

㉓ AGC switch
Selects the time constant in the AGC circuit.

SLOW Long time constant.
Available for normal SSB operation.

FAST Short time constant.
Available for CW operation and SSB operation receive of alternate under strong and weak signals upon the round QSO, selection of station, etc.

OFF AGC off, resulting in null time constant. Since the gain becomes maximum, the RF gain control ㉔ should be readjusted against a strong signal.

㉔ RF gain control
For adjusting the RF and IF gains. Normally set to fully clockwise position for maximum sensitivity. For a stronger signal, a rather lower RF gain.

㉕ Main dial
Changes the transmit and receive frequencies, in 10Hz steps.
Full rotation covers 10kHz.
NOTE: With depressed SHIFT button of the VFO select switch ㉖, full revolution of the dial covers approximately 5kHz.

㉖ VFO select switch
Selects either VFO, F1 or F2 for simplex and split operations.

F1 VFO-F1 for the simplex operation.

F2 VFO-F2 for the simplex operation.

R·F1 VFO, F1 for reception and F2 for transmission in the split operation.

R·F2 VFO, F2 for reception and F2 for transmission in the split operation.

F1=F2 Equal VFO, F1 and F2 frequency and mode.
When depressing F1 or R·F1, F2 frequency and mode is changed into F1.
When depressing F2 or R·F2, F1 frequency and mode is changed into F2.

SHIFT For displaying the freqeuncy difference between VFO, F1 and F2 on the frequency indicator ③.
Available when shifting the frequency.
For detailed information, refer to Paragraph 3.5 TWO VFO SYSTEM.

㉗ Memory channel switch
Selects one out of ⑪ channels and EXT position for controlling the frequency and mode through the rear panel MEMORY connector, J47.
NOTE: When not using the EXT position for the external frequency control, it may be usable as another memory channel in addition to the 11 channels, total 12 channels.

㉘ Carrying handle
For carrying the transceiver.

㉙ Band switch
Selects desired amateur band or the standard wave

of 10MHz.

NOTE: Do not set the position between the 1.8 and STD.

(30) Notch control

For adjusting the notch frequency.

(31) Pass-band tuning control

For adjusting the pass-band tuning frequency. When a radio interference exists near the signal under reception, this control is available to narrow the IF pass band at the lower or higher area. Normally place in the center click position.

For detailed information, refer to Paragraph 3.2.4.

(32) AF gain control

For adjusting the sound volume by changing the AF gain.

(33) Mode switch

Selects the operation mode (type of emission). Both CW-M and CW-N positions require the optional filters, CFL-260 and CFL-230, respectively.

(34) Power control

For changing the transmitter output power.

Fully clockwise is a maximum power, the rated power.

Counterclockwise rotation reduces the power to 1/10.

(35) Headphone jack

A headphone is plugged, whenever speaker is disconnected.

(36) Microphone connector

A refer to Paragraph 1.3.4 MICROPHONE CONNECTION.

2.2 Rear Panel Description

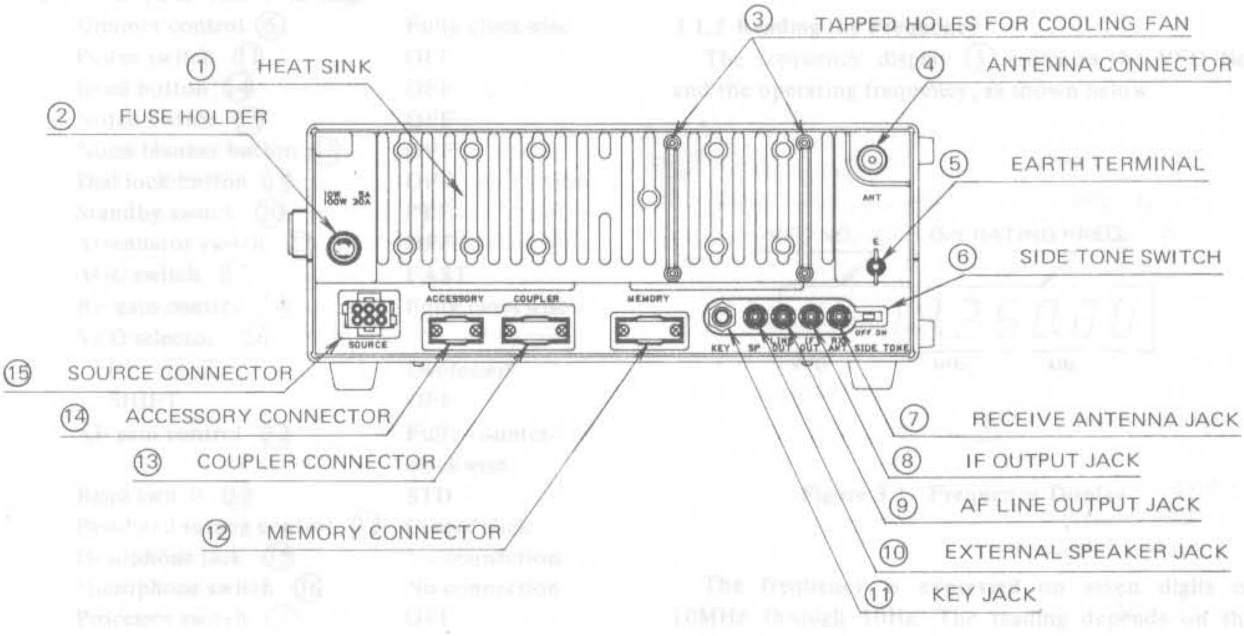


Figure 2.2 Rear Panel

(1) Fuse holder

100W model uses a fuse of 30A, 10W model a fuse of 5A.

If the fuse is blown, well investigate the cause and replace with a fuse of the same capacity.

(2) Heat sink

For radiation from the transmitter power amplifiers, voltage regulators.

Integrated with the entire rear panel.

(3) 3mm-tapped holes for cooling fan

Usable when long operating at heavy duty in RTTY.

The hole pitch is 70mm in vertical and horizontal.

(4) Antenna connector

M-type for transmit and receive antenna.

(5) Earth terminal

Connect the earthing wires of the antenna tuner, AC power supply and other peripheral units.

Also connect the main earthing wire between this earth terminal and earth mass.

(6) Side tone switch

For on and off the side tone for CW keying monitor.

(7) Receive antenna jack

For connection of a receive-only antenna to the JST-100 or an antenna to the separate type receiver. Refer to Paragraph 3.7.6.

(8) IF output jack

For IF output signal of 455kHz.

It passes through the IF filter and IF amplifier with AGC circuit, providing approximately 5m Vrms across a load of 75 ohms.

PG9HF
Cor L. van Soelen
Resedalaan 4
4382 PL Vlissingen
The Netherlands

⑨ AF line output jack

For receive AF output signal of about 0dBm. When recording this signal, insert an external attenuator of 40 to 60dB.

⑩ External speaker jack

Connect a speaker of 4 to 16 ohms and input of 3 watts through the furnished plug.

Any of the JRC speakers NVA-88, NVA-515 and NVA-505 is adaptable.

Whenever a plug is put into this jack, the internal speaker is disconnected.

⑪ Key jack

For connection of the CW key.

⑫ Memory connector

For external control of the frequency and mode. When setting the memory channel switch to the EXT position, the transceiver is operated at a frequency entered into the memory connector, including band and mode. See Paragraph 1.3.12.

⑬ Coupler connector

For the external antenna tuner, utilizing the internal frequency data.

The ALC signal may be applied to reduce the output power for matching. See Paragraph 1.3.13.

⑭ Accessory connector

For various input and output signals from and to external units. See Paragraph 1.3.11.

⑮ Power connector

For the power cable of 13.8V DC.

Use the furnished DC power cable, MPKC03379.

For AC power operation, connect the DC output cable of the NBD-500.

CHAPTER 3

OPERATION

3.1 Receiving Operation

3.1.1 Receiving Procedure

(1) Before connecting the power cable, set
POWER switch (11) to OFF
Standby switch (20) to PTT.
Then, connect the power cable to feed the DC power voltage of +13.8V.
NOTE: In case of operation from an AC power line, use the optional power supply, NBD-500.
NOTE: The antenna and earth must previously be connected according to Paragraphs 1.3.

(2) Front panel control settings:

Dimmer control (5)	Fully clockwise
Power switch (11)	OFF
Read button (14)	OFF
Notch button (15)	OFF
Noise blanker button (16)	OFF
Dial lock button (18)	OFF
Standby switch (20)	PTT
Attenuator switch (22)	OFF
AGC switch (23)	FAST
RF gain control (24)	Fully clockwise
VCO selector (26)	
F1	Depressed
SHIFT	OFF
AF gain control (32)	Fully counter-clockwise
Band switch (29)	STD
Pass-band tuning control (31)	Center click
Headphone jack (35)	No connection
Microphone switch (36)	No connection
Processor switch (21)	OFF

Other controls may be set to any positions.

(3) Set the power switch (11) to ON.
Set the band switch (29) to 7 (MHz) and the mode switch (33) to LSB.
Then, the LSB LED will illuminate and the frequency indicator (3) will display "7" at the MHz-digit. Slowly clockwise rotate the AF gain control until desired audio is heard from speaker.
When rotating the main dial (25), various signals will be receivable one after another.
The check meter (2) acts as an S-meter, providing a reading proportional to received signal strength.
Search for SSB signals in 7MHz amateur band.
When a natural voice is heard, the frequency display (3) will indicate its carrier frequency.

(4) Turn the mode switch (33) to receive an USB, CW or RTTY signal.
NOTE: For reception of the CW-M or CW-N signals, the optional filter must be previously incorporated.
Refer to Paragraphs 5.7 and 5.8.

(5) When wishing to receive a signal in other frequency band, turn the band switch (29).

(6) When wishing to greatly change the frequency, depress either frequency UP/DOWN switch (17) or (19). When wishing to leave the frequency unchanged, depress the lock switch (18).
When depressing once again, the dial is released from the lock.

3.1.2 Reading the Frequency

The frequency display (3) indicates the VFO No. and the operating frequency, as shown below.

Figure 3.1 Frequency Display

The frequency is expressed on seven digits of 10MHz through 10Hz. The reading depends on the selected mode as follows:

Mode	Reading on indicator (3)
USB or LSB	Suppressed carrier frequency in transmit and receive.
CW	Frequency of actually emitted signal in transmit. Frequency of received signal, which is demodulated into a sound of 800Hz, in receive.
RTTY	Center frequency of mark and space signal in transmit and receive frequency is demodulated into mark-space signal of 2210Hz in center frequency.
AM	Carrier frequency of received signal, while neither USB, LSB, CW nor RTTY LED illuminates (STD band only)

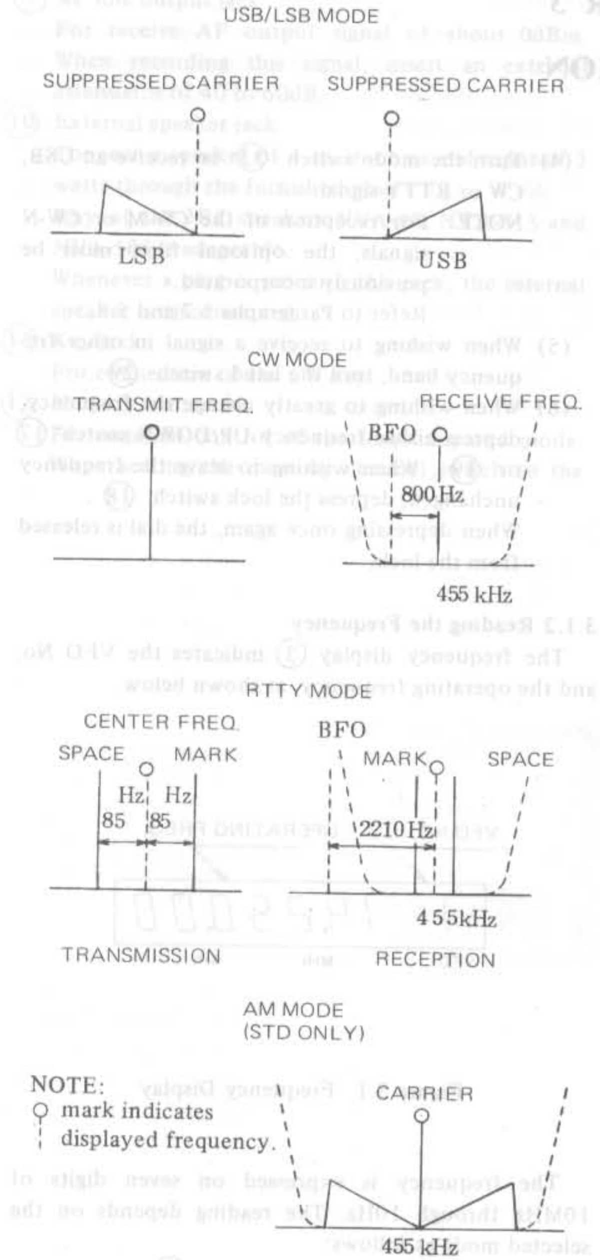


Figure 3.2 Frequency Display Depending on Operation Mode

3.1.3 Receiving SSB Signals

Front panel control settings:

AGC switch (23) SLOW
Band switch (29) Any
Mode switch (3) USB or LSB*

Leave other controls as set in Paragraph 3.1.1.

NOTE: It is customary in the amateur radio to use the LSB mode for signals of less than 10MHz and the USB mode for signals of 10MHz or higher.

Slowly rotate the main dial until desired SSB signal is clearly heard.

The frequency display will indicates its suppressed carrier frequency and the meter indicates the signal strength S. If the signal is as strong as +60dB or higher and the received sound is distorted, set the attenuator switch (22) to the 10dB or 20dB or counterclockwise rotate the RF gain control (24).

If interference is heavy and noise is much, operate the pass-band tuning control, notch filter, noise blanker, receive attenuator, etc. for improving the receiving condition.

For detailed information, refer to the respective descriptions on their features.

3.1.4 Receiving CW Signals

Front panel control settings:

Mode switch (33) CW-W
AGC switch (23) FAST
Band switch (29) Any

Leave other controls as they were set in Paragraph 3.1.1.

Slowly rotate the main dial until desired CW signal is heard.

NOTE: More CW signals are received in lower area of each band.

Adjust the dial such that the desired CW signal is heard with tone of 800Hz. The frequency display will indicate its frequency and the meter will indicates the signal strength S.

The optional CW filter will, if incorporated, eliminate interference and noise with the mode switch set to the CW-M or CW-N position, resulting in a clear sound of the desired signal only.

3.1.5 Receiving RTTY Signals

An demodulator is required for receiving an RTTY signal, which is typed out by means of a teletypewriter.

This section describes about the case where a demodulator in responsive to an AFSK signal of 2210Hz in center frequency is connected to the line output of the JST-100 to receive the RTTY signal.

Set the front panel switches as follows:

Mode switch (33) RTTY
AGC switch (23) FAST
Band switch (29) Any

Leave other controls as set in Paragraph 3.1.1.

With hearing the sound from the speaker, rotate the main dial (25) to search for an RTTY signal. Once the signal is acquired, first set the dial for a maximum reading on the S-meter. Then, finely adjust for audio of about 2210Hz with hearing the speaker sound. Further finely adjust the main dial with seeing the tune indicator on the demodulator.

The mark and space frequencies of the received RTTY signal are shifted up and down from the center frequency at the RF input, as shown in Figure 3.3 (a).

Their frequencies of the IF and AF signals converted from the received signal are shifted reversely to the RF signal, as shown in Figure 3.3 (b) and (c).

These charts show an example of RTTY signal with shift of 170Hz (±85Hz) from a center frequency f_{dspl}, which is provided by correct tuning.

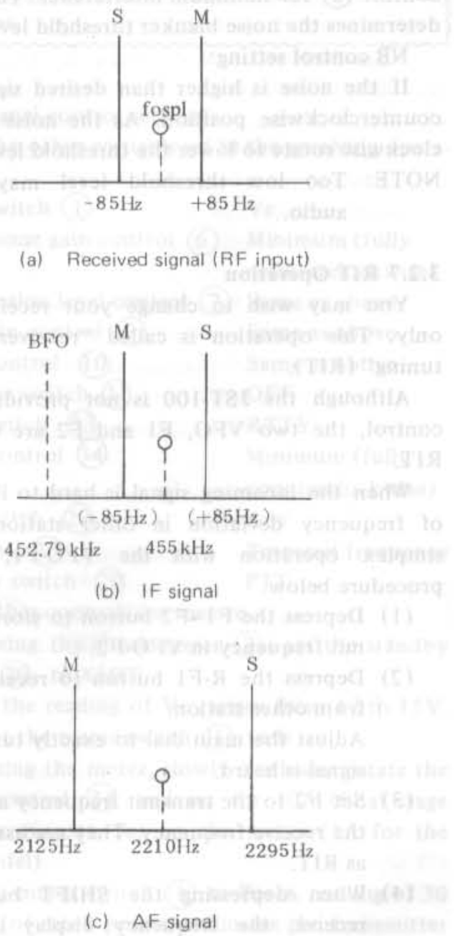


Figure 3.3

3.1.6 Receiving the Standard Wave

"Standard band", STD, is provided to efficiently receive the standard radio wave only.

When selecting the STD band,

(1) the mode automatically goes to AM (A3).
(2) the frequency automatically changes to 10.000.00 (10MHz).
(3) the frequency variable range is limited to 10kHz (±5kHz).
(4) other controls such as the VFO select switch 26, memory control switches, 12, 13, 14, etc. are disabled.

Set the panel controls as denoted in Paragraph 3.1.1, but the band switch 29 set to the STD position.

Then, the frequency indicator provides 10.000.00 and the transceiver is ready for reception of the standard wave.

NOTE: This wave may not be receivable at some times and some places.

3.2 Receiver Functions

This section describes the receiver functions for selecting desired signal from interference and noise.

3.2.1 Attenuator

The attenuator switch 22 is serviceable in case of heavy interference waves or too strong incoming signal. Depending on the degree of the interference or distortion, set the switch to 10dB or 20dB.

Normally place in the OFF position.

3.2.2 AGC Switch

Changes the AGC time constant.

Three positions are provided:

SLOW Long time constant for SSB signal.

FAST Short time constant for CW or AM signal, or alternate strong and weak signals during selecting desired station or round QSO.

OFF Disables the AGC circuit. Results in maximum gain.

Adjust the RF gain control 24 upon too strong signal.

3.2.3 RF Gain

The RF gain control will control the RF, first IF and second IF amplifiers.

When receiving a strong signal, the RF gain is lowered to reduce noise. Upon receipt of a CW signal, the RF gain is also reduced to provide clear sound.

3.2.4 Pass Band Tuning

The pass-band tuning is to narrow the IF pass-band width until the interference from adjacent undesired signals is out of band, without changing the receive frequency.

Refer to Figure 3.4 (a), where wanted signal in the LSB mode suffers from an interference at higher side of pass-band.

To eliminate the interference, the PBT control is rotated from its mid position until the interference is rejected, as shown in Figure 3.4 (b).

In case of an interference at lower side of pass-band, it can be also eliminated by rotating the PBT control reversely, as shown in Figure 3.4 (c) and (d).

This tuning is also applicable to the USB, CW and RTTY modes.

NOTE

The pass-band tuning will not function with the PBT control adjusted near to the mid position while the transceiver with the optional filters of 600Hz and 300Hz is operating in the CW mode.

NOTE

The pass-band tuning does also not function on the STD band (AM mode).

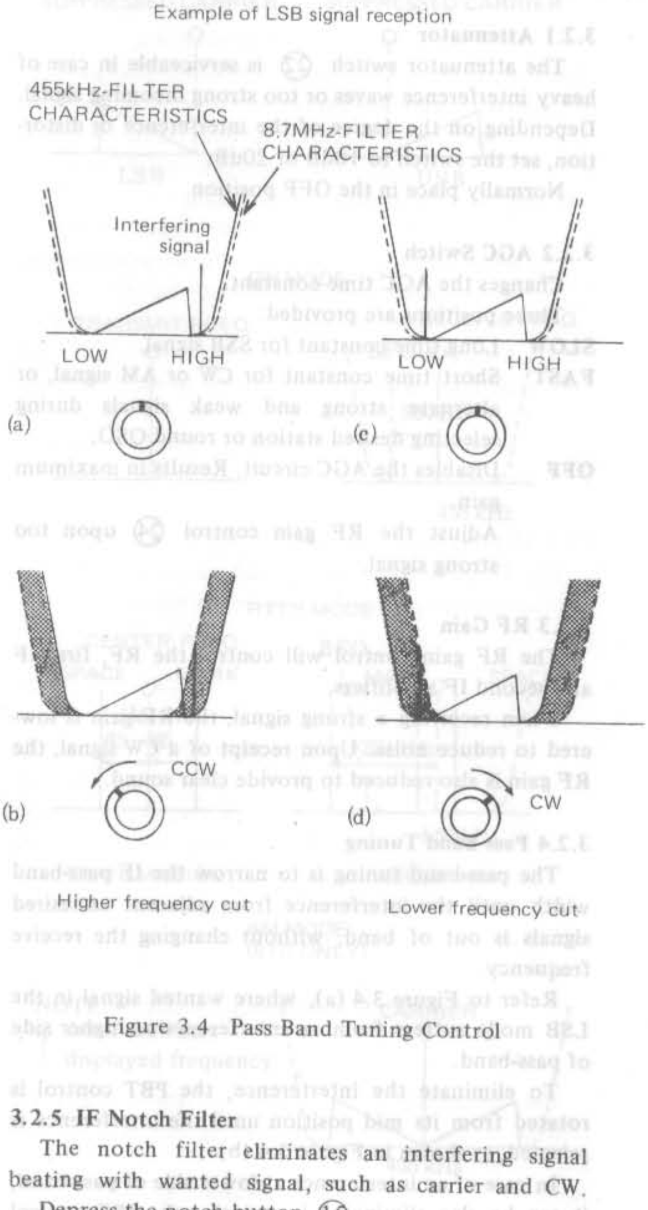


Figure 3.4 Pass Band Tuning Control

3.2.5 IF Notch Filter

The notch filter eliminates an interfering signal beating with wanted signal, such as carrier and CW. Depress the notch button 15.

Adjust the notch control 30 to the beat frequency.

Adjust the PBT control 31, if other interference exists in the pass band.

Figure 3.5 shows the frequency response of the notch filter.

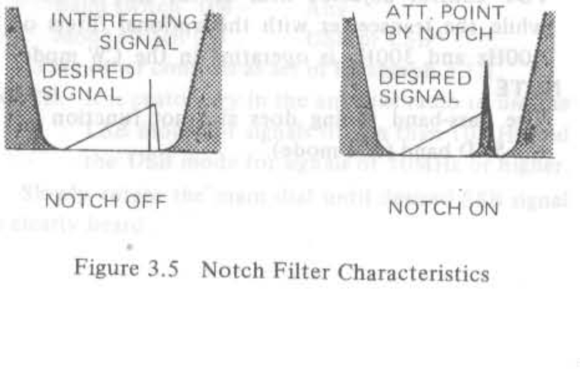


Figure 3.5 Notch Filter Characteristics

3.2.6 Noise Blanker, NB

The noise blanker (NB) is effective when an inpulse noise or sharp burst signal such as car's ignition noise is coming. Set the NB button to ON and adjust the NB control 8 for minimum interference. The NB control determines the noise blanker threshold level.

NB control setting:

If the noise is higher than desired signal, set to a counterclockwise position. As the noise level lowers, clockwise rotate to lower the threshold level.

NOTE: Too low threshold level may deteriorate audio.

3.2.7 RIT Operation

You may wish to change your receive frequency only. This operation is called "receiver incremental tuning" (RIT).

Although the JST-100 is not provided with RIT control, the two VFO, F1 and F2 are utilizable for RIT.

When the incoming signal is hard to listen because of frequency deviation in other station during the simplex operation with the VFO-F1, follow the procedure below.

(1) Depress the F1=F2 button to store your transmit frequency in VFO-F2.

(2) Depress the R-F1 button to receive the signal from other station.
Adjust the main dial to exactly tune until clear signal is heard.

(3) Set F2 to the transmit frequency and the F1 to the receive frequency. They are usable the same as RIT.

(4) When depressing the SHIFT button during receive, the frequency display indicates the frequency difference between transmit and receive.
Transmit frequency is reference for the difference.
During transmit, the frequency indicator displays your transmit frequency.

(5) When receiving to check the transmit frequency, depress the F2.

(6) When transmitting on the receive frequency, depress the F2.

(7) For the RIT operation on the exchanged transmit and receive frequencies, depress the R-F2.

3.3 Transmitting Operation

3.3.1 Transmitting Procedure

WARNING

1. Well read the instruction manual previously and be familiar with the operating procedure before on the air.
If wrong operating the transceiver, it may fault.
If abnormal, immediately turn off the power switch.

2. Preferably use a dummy load, if available, upon practice of the transmitting operation.
If an antenna is connected from necessity, always watch the band around your transmit frequency to avoid interference to other stations.

(1) Front panel control settings:
Leave the other controls set in the receiving operation.

Meter switch (1)	Vc
Microphone gain control (6)	Minimum (fully counterclockwise)
Compression level control (7)	Same as above
VOX gain control (9)	Same as above
Delay control (10)	Same as above
Processor switch (21)	OFF
Mode switch (33)	RTTY
Power control (34)	Minimum (fully counterclockwise)
Band switch (29)	Any
Main dial (25)	Transmit frequency
Standby switch (20)	PTT

Leave other controls for receive.

(2) With seeing the check meter (2), set the standby switch (20) to XMIT.
Be sure the reading of Vc ranges from 12 to 15V. Then, set the meter switch (1) to Ic.
With seeing the meter, slowly clockwise rotate the power control (34) and set for 10A (final stage collector current, Ic) on the meter (1A for the 10W-model).
Turn the meter switch (1) to Po. A reading of 30 to 50% (of rated power) indicates the transmitter is normal.
The following case requires certain measures:
○ If the reading of the collector current cannot reach 10A (1A for the 10W-model) by rotating the power control (34), read the meter with the meter switch (1) set to REF to check the reflected power.
A reading over the half of full scale on the meter suggests that antenna's SWR is worse. Check the antenna system.
A VSWR of 1.5 to 1 will reduce the transmitter power. For such case, preferably use an antenna tuner, NFG-97.
About this tuner, refer to Paragraph 5.2 and its instruction manual.

(3) After making sure of the normal output power, return the standby switch to PTT and the meter switch to Ic.
The emission in the SSB, CW and RTTY modes are described below.

3.3.2 SSB Operation

(1) Panel control settings:

Standby switch (20)	PTT
Mode switch (33)	USB or LSB
Power control (34)	Minimum (fully counterclockwise)
Microphone connector (36)	Connected to microphone
Band switch (29)	Any for transmission
Main dial (25)	* Transmit frequency

Leave other controls set as in Paragraph 3.1.1.

(2) Set the standby switch (20) to XMIT.
After the XMIT LED illuminates, the operator speaks as usual. With seeing the OVR LED clockwise rotate the MIC gain control (6) until the OVR LED twinkles in response to the peaks of voice.
Set it for optimum input level to the microphone. So long as the microphone remains unchanged or the voice level is not greatly changed, there is no need to readjust the MIC gain control.
NOTE: Do not use the MIC gain control (6) for adjusting the transmitter output power and compression level of the processor.
Instead of the standby switch (20), the PTT switch on the microphone may be used.

(3) With seeing the collector current, Ic, on the check meter, slowly clockwise rotate the power control (34).
Gradual increase of Ic up to 10 or 15A (1 to 1.5A for the 10W-model) in peak with clockwise rotation of the control indicate the output power reaches approximately 100 watts, PEP (10 watts, PEP). When turning the meter switch (1) to Po position, a reading of 50 to 80% will appear on the meter.

(4) After making sure of the normal output power, the transceiver is ready for transmitting.
After transmission is over, return the standby switch to PTT position to receive.

3.3.3 CW Operation

(1) Panel control settings:

Standby switch (20)	PTT
Processor switch (21)	OFF
Mode switch (33)	CW-W
Power control (34)	Minimum
Band switch (29)	Any for transmission
Key jack (11) on rear panel	Connected to key

(2) Turn the standby switch (20) to XMIT.
After the XMIT LED indicates, depress the key.
With seeing the collector current, Ic, on the check meter, slowly clockwise rotate the power control (34). Gradual increase of the reading on the meter up to 15 or 20A (2 or 2.5A for the 10W-model) with clockwise rotation of the control indicates the transmitter is normal. When turning the meter switch (1) to Po, a reading of 80 to 100% will appear.

(3) The transmitter emits an CW power during the key

is pressed.

When setting the SIDE TONE switch (6) to ON, the speaker produces the side tone available for keying monitor.

(4) When transmit is over, return standby switch to PTT.

3.3.4 RTTY Operation

(1) Follow the procedure as described in Paragraph 3.3.2 or 3.3.3 to make sure of normal transmission.

(2) Connect the RTTY line for keying the internal RTTY transmit circuit.
Refer to Paragraph 1.3.11.

(3) Panel control settings:

Standby switch (20)	PTT
Mode switch (33)	RTTY
Power control (34)	Minimum
Band switch (29)	Any for transmission
Main dial (25)	Center frequency of mark and space in RTTY signal to be transmitted
Meter switch (1)	Po

(4) Turn the standby switch (20) to XMIT.
Slowly clockwise rotate the power control (34) for desired power.
The 100-watt model is capable of continuously transmitting at 100 watts for about 10 minutes. For more long continuous operation, reduce the power to about 50%.
So far as the final stage collector current remains below 10A, the long continuous operation is allowable.

3.4 Transmitting Function

3.4.1 VOX Operation

The VOX function is applicable to SSB and CW operation (semi-break-in).

NOTE: The VOX cannot function in RTTY.

SSB Operation

(1) Set the standby switch (20) to VOX.
While talking to the microphone, adjust the VOX gain control (9) so that the transceiver turns to transmit by voice input and returns to receive as the voice ceases.

> **CAUTION**
> Too high VOX gain may cause the transceiver to respond to an ambient sound or noise, or not to return after the voice ceases.
> Set the VOX gain control to a possibly low level and talk with rather loud voice.

The transceiver switching can be seen from illumination of the XMIT red LED.

(2) A time delay may be applied to the VOX function to avoid returning to reception in response to every short break of voice such as pause.
The delay control (10) allows the delay time to be adjusted according to the operating condition. Clockwise rotation increases the delay time up to about 1.2 seconds.

(3) The VOX may function to turn to transmission in response to a receiving signal output from the speaker. In this case, reduce the speaker sound level or lower the VOX gain as low as practicable.
If the VOX still malfunctions, adjust the ANTI TRIP circuit gain.
For adjusting this, use RV3 marked "A-TRIP" in the RF AMP unit.
An adjusting hole located at the upper cover of the JSB-100 allows a screw-driver to make access to the control RV3, as shown in Figure 3.6.

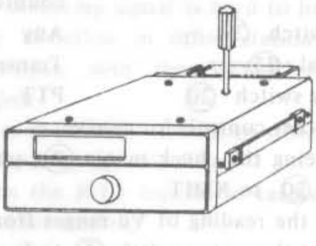


Figure 3.6 Adjusting the Anti-Trip

CW Operation

(1) Set the standby switch (20) to VOX position. Operate the key.
Then, the transceiver will automatically go into transmit and start to emit a CW signal. At this time, the XMIT LED on the operation display (4) will illuminate to indicate the transceiver being in transmission.
When the SIDE TONE switch (6) on the rear panel is placed in ON position, the keying monitor tone is heard from the speaker.

(2) When the keying is interrupted, the transceiver returns to receive after lapse of a certain time delay.
The delay control (10) allows the delay time to be adjusted (about 0.6 seconds at maximum).

3.4.2 Speech Processor Function

The speech processor is available to increase the mean talk power. The operator may encounter a circumstance where his words almost inaudible at a other station in the SSB because of a weak signal reaching the other station or heavy radio interference.

The JST-100 employs the so-called RF speech processor system, which limits the amplitude in the IF circuit and then eliminates undesired signals by means of a narrow-band crystal filter.

The adjusting procedure with the speech processor is described below.

Set the meter switch ① to COMP position. Set the processor switch ㉑ to PROC position. With speaking to the microphone at a usual voice level, adjust the microphone gain control ⑥ so that the OVR LED on the operation display ④ twinkles in response to peaks of the voice.

With monitoring the compression level on the check meter ②, adjust the compression level control ⑦ and set for a compression level of 10dB, approx.

NOTE: Increase of the talk power with raised compression level is effective for improvement of the articulation.

However, too high talk power may rather deteriorate the quality of audio sound, resulting in poor articulation.

In addition, a higher power may cause splatters, which give interference to other stations. Preferably set to 10dB or less.

CAUTION

Do not raise the microphone gain for the purpose of increasing the talk power in the JST-100. Increase of the talk power will only cause the audio quality to be deteriorated, resulting in little improvement of the articulation.

3.5 TWO VFO System

The JST-100 incorporates a high-class and high-performance two-VFO system, which allows the operator to easily operate a variety of features available for not only basic operations but also high technics.

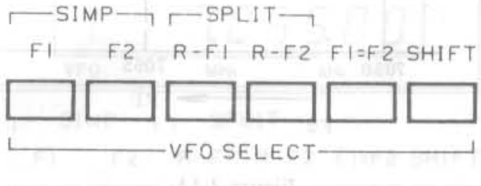


Figure 3.7

This section describes some basic operation methods among various methods utilizing the two-VFO system.

Basic operation of two-VFO system in JST-100:

Simplex operation	Utilizing the two VFO's as two independent channels.
Split operation	(1) Using the two VFO's when your station gives a transmit frequency to other station. (2) Using the two VFO's when your station gives a shift of transmit frequency to other station. (3) Using the two VFO's when other station gives a transmit frequency to your station. (4) Using the two VFO's when a partner station gives a shift of transmit frequency to your station.
RIT operation	Refer to Paragraph 3.2.7.
Example of frequency shift feature utilization	Refer to Paragraphs 3.5.2 and 3.5.3 Split Operations.

3.5.1 Simplex Operation

In split operation, use front panel standby switch ⑳ for manual switching. PTT switch on the microphone and VOX function are disabled.

The buttons F1 and F2 of the VFO select switch ㉖ select the respective independent VFO's. When depressing the button F1, Numeral 1 appears on the left end of the frequency display ③, indicating the VFO-F1 is selected. In addition, the indicator also indicates the frequency of VFO-F1 and the mode. Now, the transceiver is ready for transmission and reception using the selected VFO-F1. This is a simplex operation.

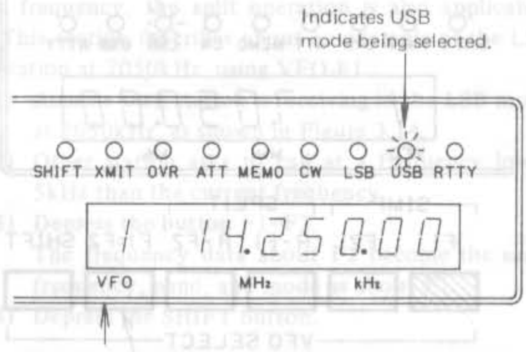


Figure 3.8

When depressing the other button F2, the VFO-F2 is selected and the data on the frequency display are switched to data associated with the VFO-F2.

As the result, the operator can enter frequency data with mode and band quite independently of F1's data.

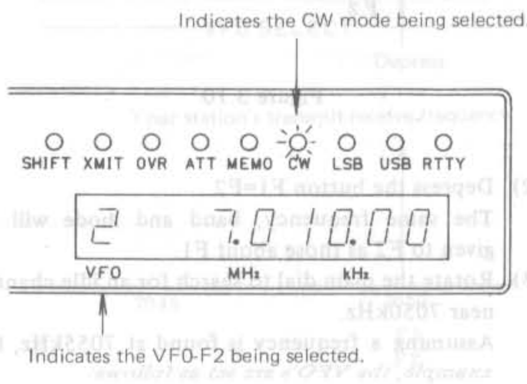


Figure 3.9

Thus, the operator can freely select either VFO-F1 or -F2 by a simple switching operation upon the simplex operation.

In particular, the bands and modes may be different from each other. This is a very convenient point.

3.5.2 Split Operation – 1, 2

The operator may be called from a number of stations to result in an interference – inaudible state. He will request other station among them to shift its transmit frequency a little, without changing the frequency of his own station.

The split operation is effective to this case. Description on the split operation will be made about an example of operation in the LSB mode at 7050kHz, using VFO-F1.

(1) Set the transceiver for the simplex operation in the LSB mode at 7050kHz, as shown in Figure 3.10.

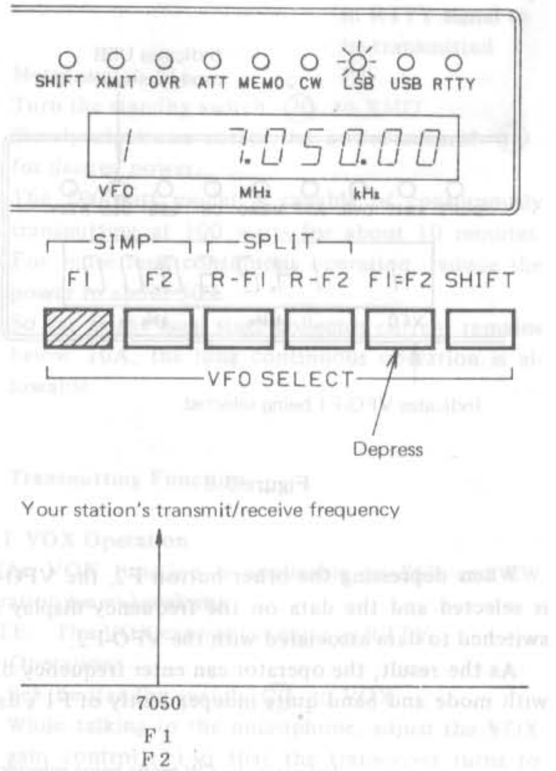


Figure 3.10

(2) Depress the button F1=F2.
The same frequency, band and mode will be given to F2 as those about F1.

(3) Rotate the main dial to search for an idle channel near 7050kHz.
Assuming a frequency is found at 7055kHz, for example, the VFO's are set as follows:
F1 7055kHz
F2 7050kHz

(4) Read the displayed frequency of 7055kHz.

(5) If desired, depress the SHIFT button to read the frequency difference between F1 and F2, say, shifted frequency, as shown in Figure 3.12.

(6) Depress the SHIFT button once again to return.

(7) Depress the R.F1 button.
The, the internal VFO's are set as follows:
Receive VFO-F1
Transmit VFO-F2
As the result, the transceiver is receiving at 7055kHz.
When turning to transmit, the transceiver works at 7050kHz.
Ask other station to transmit at 7055kHz or at a frequency higher 5kHz than your frequency.

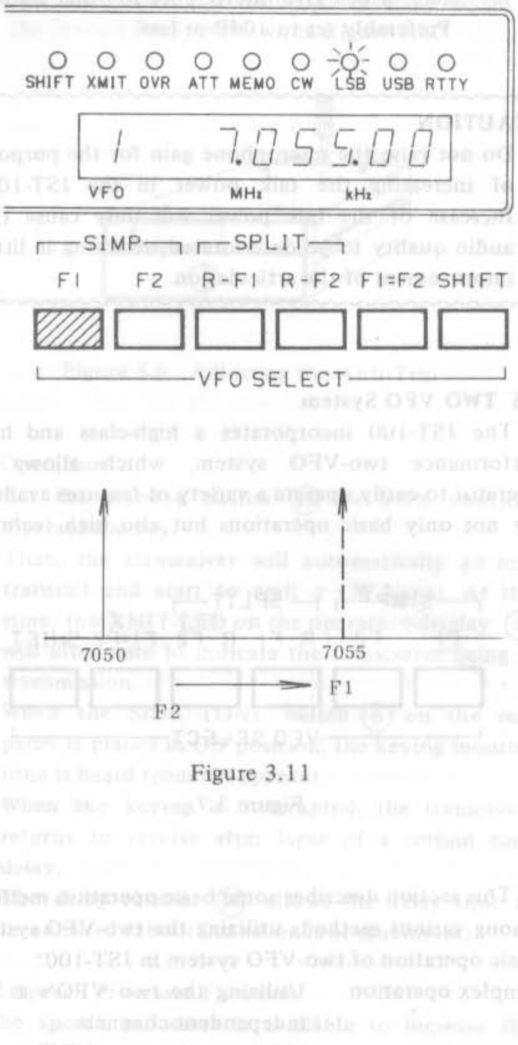


Figure 3.11

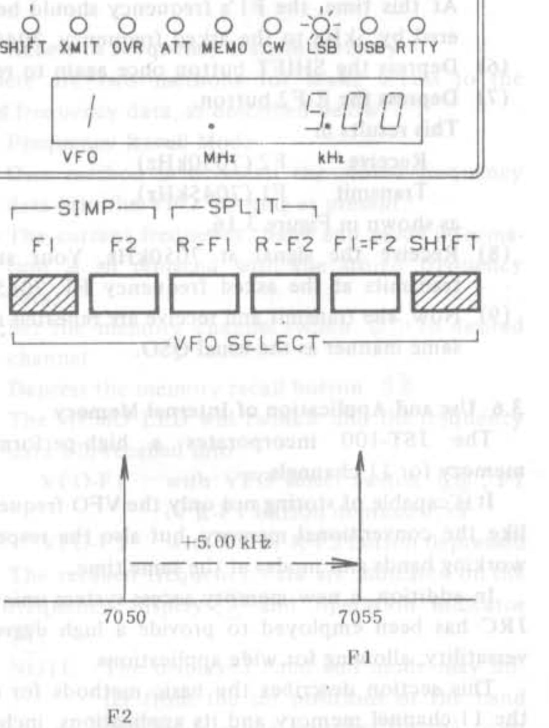


Figure 3.12

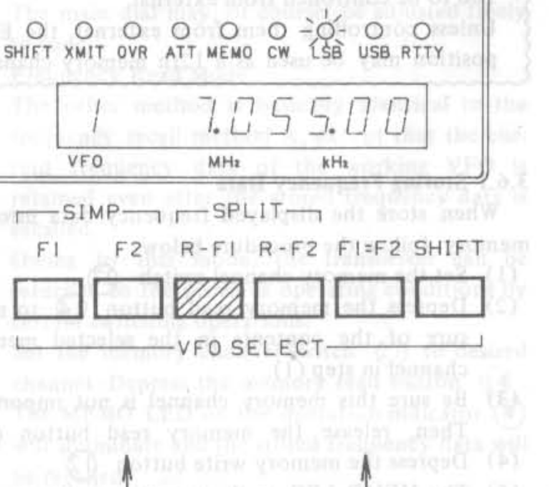


Figure 3.13

(8) When turning to receive, the frequency automatically changes to F1 and your station receives at the frequency given to other station.

(9) Now, QSO is made. If receive frequency drifts, adjust the main dial again. This has no effect upon the transmitting frequency.
NOTE: If rotating the main dial during transmission, the transmitting frequency will change.

(10) Since the VFO-F1 and VFO-F2 can be set to desired frequencies independently at all, including associated bands and modes, the JST-100 will normally work within allowable frequency range, even if
- any frequency,
- any bands or
- any modes.

NOTE: The SHIFT button for the shift frequency indication is enabled only when both F1 and F2 are set on the same band.

3.5.3 Split Operation – 3, 4

When other station asks to shift your station's transmit frequency, the split operation is also applicable.

This section describes about an example of the LSB operation at 7050kHz, using VFO-F1.

(1) Assume own station is receiving in the LSB mode at 7050kHz, as shown in Figure 3.14.

(2) Other station asks to call at a frequency lower 5kHz than the current frequency.

(3) Depress the button F1=F2.
The frequency data about F2 become the same frequency, band, and mode as about F1.

(4) Depress the SHIFT button.

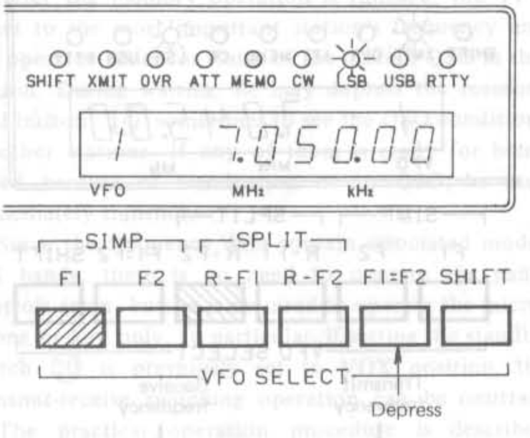


Figure 3.14

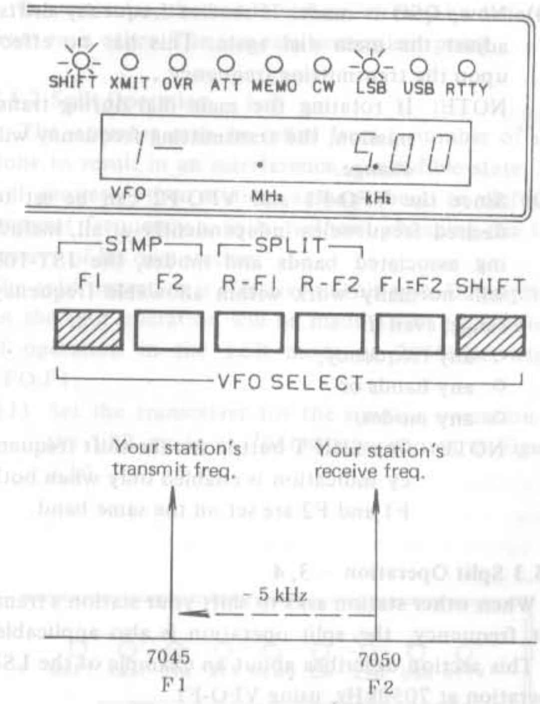


Figure 3.15

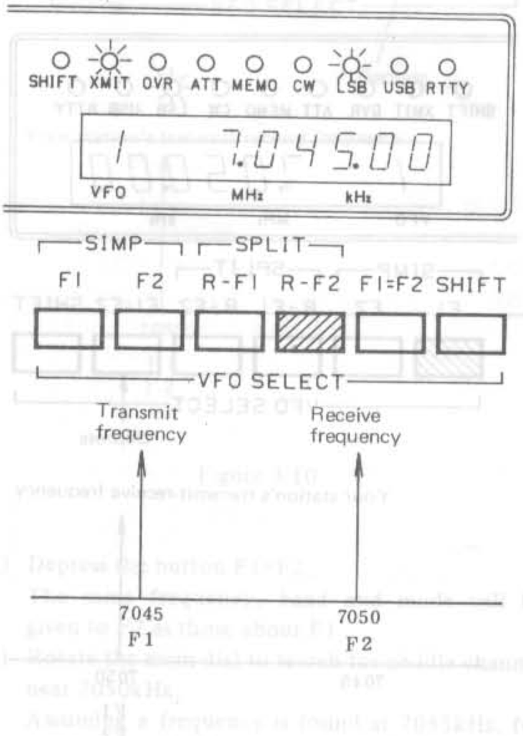


Figure 3.16

(5) With seeing the frequency display, set the main dial to the given frequency, the current frequency minus 5kHz, as shown in Figure 3.15.
At this time, the F1's frequency should be lowered by 5kHz to the asked frequency, 7045kHz.
(6) Depress the SHIFT button once again to return.
(7) Depress the R-F2 button.
This results in
Receive F2 (7050kHz)
Transmit F1 (7045kHz),
as shown in Figure 3.16.
(8) Receive the signal at 7050kHz. Your station transmits at the asked frequency F1, 7045kHz.
(9) Now, the transmit and receive are repeated in the same manner as the usual QSO.

3.6 Use and Application of Internal Memory

The JST-100 incorporates a high-performance memory for 11 channels.

It is capable of storing not only the VFO frequencies like the conventional memory, but also the respective working bands and modes at the same time.

In addition, a new memory access system unique to JRC has been employed to provide a high degree of versatility, allowing for wide applications.

This section describes the basic methods for using the 11-channel memory and its applications, including a memory finder feature.

NOTE
The EXT position of the memory channel switch 27 allows the frequency and mode in the JST-100 to be controlled from external.
Unless controlling them from external, the EXT position may be used as a 12th memory channel.

3.6.1 Storing Frequency Data

When store the displayed frequency data into the memory, follow the procedure below.

(1) Set the memory channel switch 27.
(2) Depress the memory read button 14 to make sure of the contents in the selected memory channel in step (1).
(3) Be sure this memory channel is not important. Then, release the memory read button 14.
(4) Depress the memory write button 12.
(5) The MEMO LED on the operation indicator 4 will instantaneously illuminate to indicate the memory operation has been finished.
(6) Now, the memory has been completed.
The frequency data, bands and modes are indicated on the frequency display 3 and stored in the memory channel selected in step (1) or (3).
These are accessible at any time.

The memory's power source is backed up with a lithium battery and hence the stored contents will not be erased even if the power supply for the JST-100 is cut off.

The lithium battery incorporated in the JST-100 has a capacity enough to back up for several years in usual.

3.6.2 Access to Frequency Data in Memory

There are two methods for make access to the stored frequency data, as described below.

(A) Frequency Recall Mode

One method is to recall the stored frequency data into the VFO working at present.

The current frequency, band and mode information is all replaced with the stored frequency data.

(1) Set the memory channel switch (27) to desired channel.

(2) Depress the memory recall button (13).

The MEMO LED will twinkle and the frequency data will recalled into

VFO-F1 with VFO select switch (26), F1 or R-F1 button depressed, or

VFO-F2 with F2 or R-F2 button depressed.

(3) The recalled frequency data are indicated on the frequency display (3) and operation indicator (4).

NOTE: The displayed band and mode may differ from the set positions of the band and mode select switches on the front panel.

In any case, the transceiver will operate, as indicated on both indicators.

(4) If desire of the band switch (29) and mode switch (33) are enabled to change the band and mode in the frequency data after recall.

The main dial may, of course, be adjusted freely to tune.

(B) Frequency Read Mode

The other method is basically identical to the frequency recall method A, except that the current frequency data of the working VFO is retained even after the stored frequency data is recalled.

Owing to this mode, the transceiver can be returned to the previous operating conditions by certain switching operations.

(1) Set the memory channel switch (27) to desired channel. Depress the memory read button (14).

The MEMO LED on the operation indicator (4) will illuminate and the stored frequency data will be recalled.

(2) Now, the transceiver is ready for transmission and reception.

The panel controls allow

the receive frequency to be changed, and

the transmit frequency, band and mode to be unchanged.

This is a split frequency operation.

(3) If wishing also to change the transmit frequency, depress the memory write button (12) once again.

Then, the contents in the memory will be changed into the current receive frequency. Thus, the transceiver is ready for transmitting the same frequency as the receive frequency.

(4) The memory read button (14) is of a lock type. When turning the memory channel switch (27) with leaving the read button depressed, the frequency data in the memory channels are read out one after another. This feature is very helpful for checking the memory contents or receiving on the stored frequencies one after another.

3.6.3 Memory Finder

The JST-100 is provided with a special feature named "memory finder" utilizing the contained memory.

When the frequency data are read out from the usual memory, the current frequency data would be erased. If wishing to remain the current data without erasing, they would have to be stored provisionally in other memory.

This requires complicated operations, including selection of a memory channel and command of write.

The JST-100 has employed a CPU for simplifying the operation. This is in the frequency read mode described in Paragraph 3.6.2, (B).

When wishing to make QSO to any station busy now during watching of the amateur band, for example, the operator would have to continue to receive until the current QSO is finished, or note its frequency on memo paper.

In such case, the JST-100 is capable of storing such frequencies in the memory channels one after another. Associated bands and modes may be different, of course, in this memory operation.

After the memory operation is finished, the VFO is set to the most important station's frequency and the operator waits for finish of the current QSO in this station. During waiting, he may depress the memory read button (14) sometimes to see the QSO conditions in other stations. If any of them is ready for being called because of termination of its QSO, he may immediately transmit.

Since the frequency data contain associated modes and bands, there is no need to operate the panel controls again, but he is required to operate the microphone or key only. In particular, if setting the standby switch (20) is previously set to VOX position, the transmit-receive switching operation can be omitted.

The practical operation procedure is described below.

(1) Depress the F1 button on the VFO select switch (26).

Set for the 7MHz band and CW mode.

Set the dial to 7005.00kHz, for example.

Watch under the above conditions.

(2) Set the memory channel switch (27) to "1".

(3) Depress the memory write button (12) to write the data of 7005.00kHz, CW in the memory.

Table 3.1 Memory Contents

MEMORY CHANNEL	FREQUENCY kHz	MODE
1	7005.00	CW
2	7010.10	CW
3	7090.00	LSB

(4) In the same manner, write data of 7010.10kHz, CW in Channel 2, and data of 7090.00kHz, LSB in Channel 3.

(5) Watch 14MHz and 21MHz bands also to write the frequencies in other stations.

Table 3.2 Memory Contents

MEMORY CHANNEL	FREQUENCY kHz	MODE
1	7005.00	CW
2	7010.10	CW
3	7090.00	LSB
4	14033.00	CW
5	14250.00	USB
6	21060.60	CS
·	·	·
·	·	·
11		

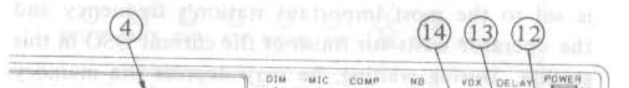


Figure 3.17

(6) Recall the data of 7005.00kHz, CW of Channel 1 into VFO-F1, for example.
Set the memory channel switch (27) to 1.
Instantaneously depress the memory recall button (13).

(7) Now, the current QSO at 7005.00kHz in CW mode is received.
If the QSO seems to continue long, proceed to the next step to see the states of other stored channels.

(8) Depress the memory read button (14).

(9) Turn the memory channel switch (27) to 2, 3, ... to check the condition of QSO.

(10) If QSO at 14250.00kHz in USB mode in Channel 5 is finished to make it ready for being called, immediately call it as desired.
Since the mode has been stored, there is no need to operate the front panel controls and switches.
Refer to Figure 3.18.

(11) When returning the memory read button to the initial position during operation in step (9), the initial data of 7005.00kHz, CW is recovered.

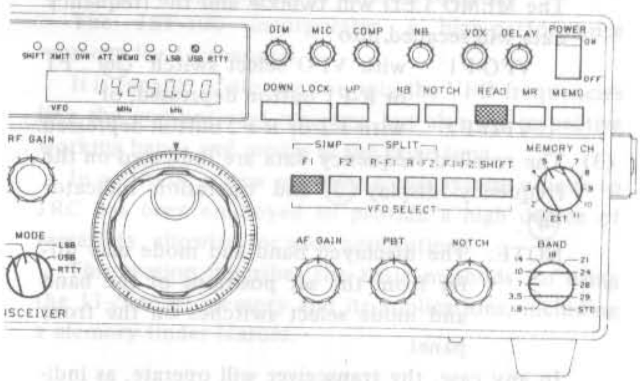


Figure 3.18

Another example is described below, where waiting a chance for calling DX station piled up.

The station is operating at 14033.00kHz, CW, for example, and identified by countries. It is good idea to queue in this case with making QSO with other station.

(1) Store the 14033.00kHz, CW into memory Channel 1.

(2) Change the band and mode to 21MHz band, USB. Make QSO with a local station by phone.

(3) Sometimes depress the memory read button (14) to listen the QSO condition in the DX stations in CW mode. If your station's turn still not likely comes, return the memory read button to the initial position and continue to the phone QSO on 21MHz.

(4) If your station's turn likely comes soon, once return the memory read button and send the final to the present partner station on 21MHz. Then, depress the memory recall button (13) to set the selected VFO to the frequency of 14033.00kHz in the CW mode for the DX station.
NOTE: If wishing to leave the current frequency data of 21MHz, USB, without erasing, then store the data into other memory channel than Channel 1 before depressing the recall button.

3.6.4 Precaution for Memory

When depressing the frequency UP button ⑰ to clear an error, which is caused in CPU, the memory contents become all "7.000.00MHz, CW".

3.7 Adjusting the Accessory Features

The JST-100 is provided with a number of accessory features.

Some of them require adjustments upon operation and includes the anti-trip, side tone frequency and level, line output level, ALC, power reduction to 50 watts, and connection of antennal to external receiver. This section described about these features.

3.7.1 Adjusting the Anti-Trip for VOX

The anti-trip feature is to prevent the transceiver from turning to the transmit phase in response to the sound from the speaker during the VOX operation. The level of the anti-trip is adjusted below.

As shown in Figure 3.19, adjust anti-trip as low threshold as no VOX is responsive to speaker sound, using screw-driver inserted into top cover hole.

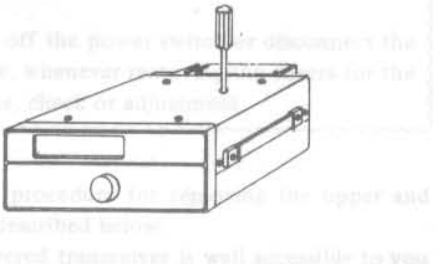


Figure 3.19 Anti-Trip Adjustment

3.7.2 Adjusting the Side Tone for CW

Remove the top cover, and adjust the variable resistor RV8 marked "SIDE TONE-F" on the AF AMP unit, CAB-259, for desired side tone frequency.

Adjust RV7 marked the SIDE TONE for desired monitor produced from the speaker.

NOTE: How to remove the upper cover and layout of the units are described in Chapter 4, MAINTENANCE AND CHECK.

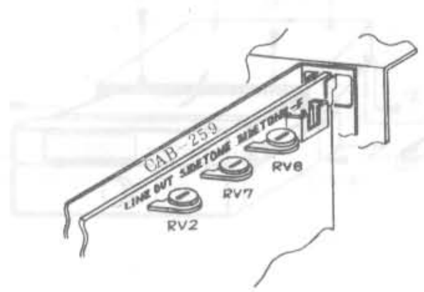


Figure 3.20

3.7.3 Adjusting the Line Output Level

The rear LINE OUT connector ⑨ provides AF signal of about −10dBm.

It passes through CW or SSB AF active filter after demodulation.

Adjust RV2 marked LINE OUT of AF AMP for required line output level.

3.7.4 Adjusting the ALC

The linear amplifier or the like provides a negative-going ALC signal, ALC ⊖. Its operation starting level is adjusted as described below.

Adjust the variable resistor RV7 marked ALC on CMB-63 OUTPUT unit for optimum level.

The ALC voltage with the RV7 set to center position, the maximum point, relates to the transmitter output power, as listed in Table 3.3.

NOTE
If the ALC ⊖ signal lowers below −8V, the input impedance will decrease to approximately 10 kilo-ohms, though usually approximately 100 kilo-ohms.

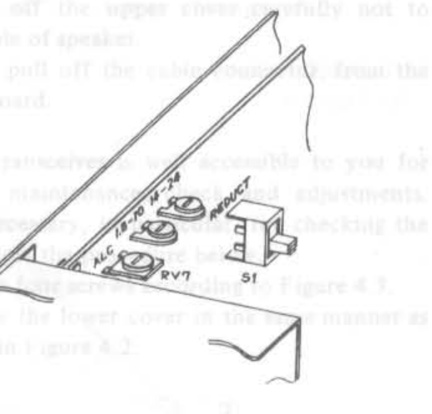


Figure 3.21

Table 3.3

ALC VOLTAGE	TRANSMIT POWER
−3 V	100W
−3.5	100
−4	100
−4.5	50
−5	10
−5.5	2
−6	2 or less

3.7.5 Reducing the Power to 50 Watts

The CMB-63 OUTPUT unit is provided with a slide switch S1 marked "REDUCT" for reducing the output power.

Press the switch S1 upward the output power is limited to 50 watts on all bands, 1.8 to 24MHz. The switch is located as shown in Figure 3.21, described in Paragraph 3.7.4.

3.7.6 External Antenna Jack, RX ANT

Located on the rear. Available for connection of an external receiver, when using the antenna connected to JST-100, as it was.

Whenever using two antennas, one for receiver is connected to RX ANT jack (in sprit operation) with CFL-175 BPF unit antenna switch, ANT SW, set to OFF.

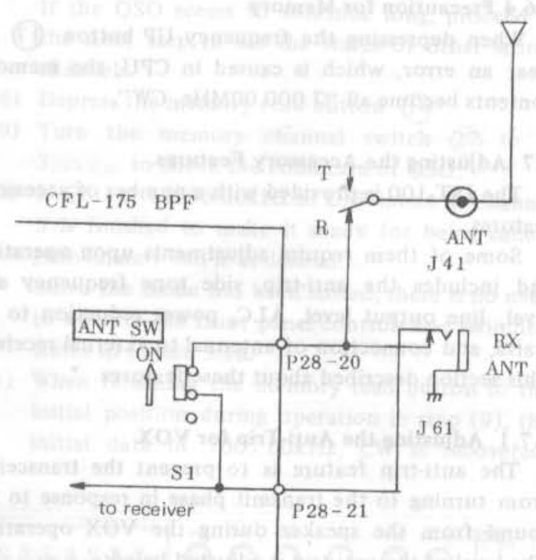


Figure 3.22

CHAPTER 4
MAINTENANCE AND CHECK

The JST-100 was completely adjusted and subjected to the severe inspections.

There is, therefore, no need to readjust before use.

It is, however, important to make daily maintenance and record the operating conditions during normal operation.

The daily maintenance is helpful to maintain the proper performance of the transceiver.

The recording of conditions is serviceable for earlier finding of failure.

Detailed adjustments than described in this chapter necessitate well trained techniques and high-class measuring instruments.

If required, consult the sales office where you bought the transceiver or JRC.

4.1 Removing the Covers

> NOTE:
> Always set off the power switch or disconnect the power cable, whenever removing the covers for the maintenance, check or adjustment.

Follow the procedure for removing the upper and lower covers, described below.

Thus uncovered transceiver is well accessible to you for the usual maintenance, check and adjustments.

NOTE: Do not further disassemble.

(1) Remove ten screws in the order of (1) to (3), according to Figure 4.1.

(2) With pushing the upper cover backward, hold it up until taken off.

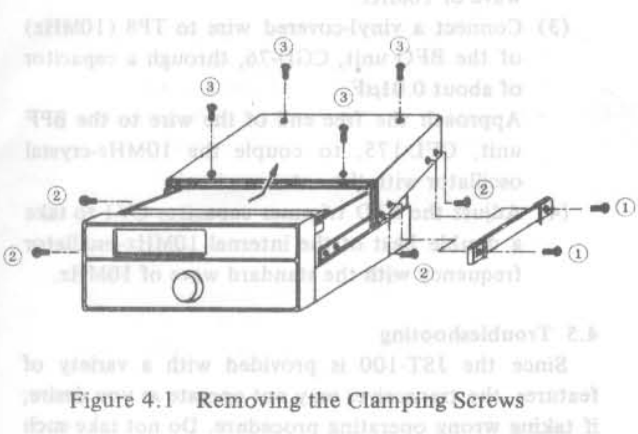


Figure 4.1 Removing the Clamping Screws

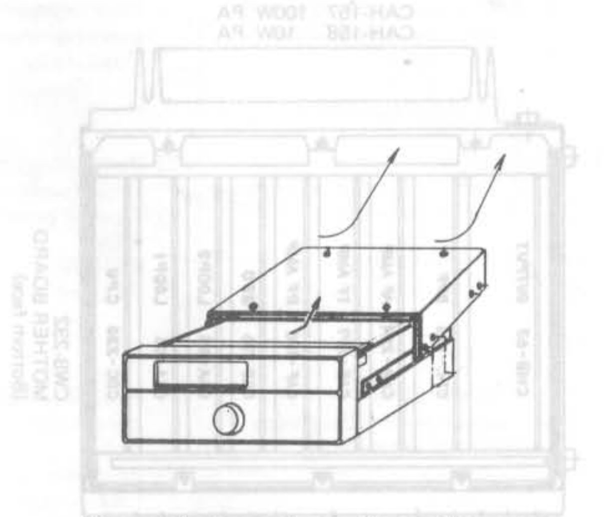


Figure 4.2 Removing the Upper Cover

WARNING

The upper cover mounts the speaker.

Slowly take off the upper cover carefully not to break the cable of speaker.

If necessary, pull off the cable connector, from the internal PC board.

Now, the transceiver is well accessible to you for all the usual maintenance, check and adjustments. However, if necessary, in particular, for checking the lower face, follow the procedure below.

(3) Remove four screws according to Figure 4.3.

(4) Remove the lower cover in the same manner as shown in Figure 4.2.

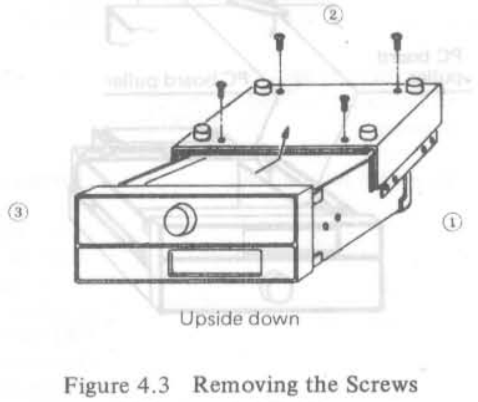


Figure 4.3 Removing the Screws

4.2 Layout of Units

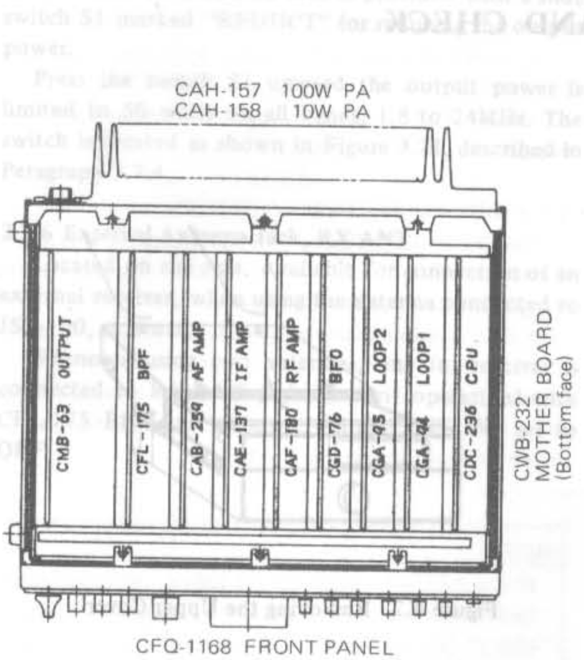


Figure 4.4 Layout of Units

4.3 Taking Out Units

See Figure 4.5.

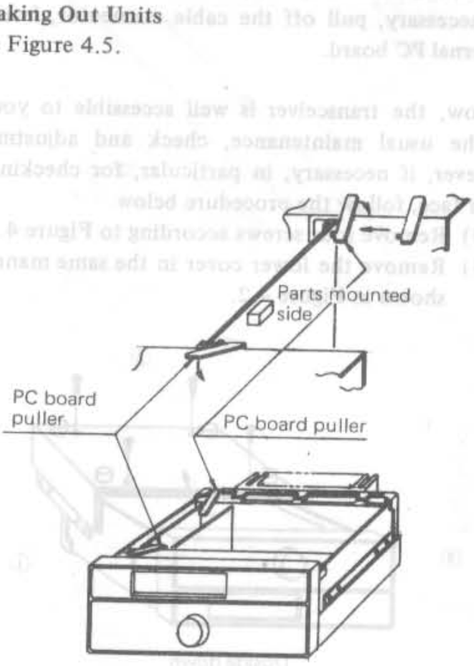


Figure 4.5 Taking Out Units

(1) Insert furnished PC board pullers into two upper corner holes of PC board from parts mounted side.

(2) Set the shaft of each puller on edge of chassis and depress to pull off the board.

(3) Slowly take out the board after pull off.

4.4 10MHz Reference Frequency Adjustment

NOTE
Warm up enough with the upper cover attached, before adjustment.

4.4.1 Adjustment Using Frequency Counter

(1) Uncover the BFO unit, CGD-76.

(2) Connect a frequency counter to TP8 (10MHz) of the BFO unit, CGD-76.

(3) Find a hole marked "10MHz" on the shield case.
Insert a small screw-driver into the hole and set a trimmer capacitor CV1 in the hole for a frequency of 10MHz.

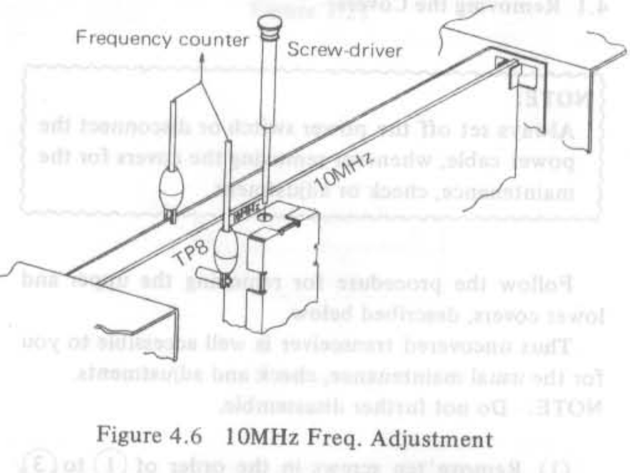


Figure 4.6 10MHz Freq. Adjustment

4.4.2 Adjustment Using Standard Wave (JJY, WWV, etc.)

(1) Set the band switch to STD position for receive frequency of 10,000.00kHz.

(2) Connect the antenna to receive the standard wave of 10MHz.

(3) Connect a vinyl-covered wire to TP8 (10MHz) of the BFO unit, CGD-76, through a capacitor of about 0.01μF.
Approach the free end of the wire to the BPF unit, CFL-175, to couple the 10MHz-crystal oscillator with the antenna circuit.

(4) Adjust the STD trimmer capacitor CV1 to take a double beat of the internal 10MHz-oscillator frequency with the standard wave of 10MHz.

4.5 Troubleshooting

Since the JST-100 is provided with a variety of features, the transceiver may not operate as you desire, if taking wrong operating procedure. Do not take such case for a failure.

To avoid this, read the associated operating procedures described in the instruction manual, once again.

Paragraphs 4.5.1 through 4.5.3 describe various symptoms caused by mis-operations and mistakes in the installation, handling and operations. Any of these symptoms is not failure.

We hope you will well investigate them, before asking for repair.

If, however, the transceiver will still not normally operate, investigate the symptom thoroughly and contact with the Sales Office where you bough the transceiver or JRC.

ASKING A FAVOR OF YOU

Please inform us of the condition of trouble in details as far as possible upon request of a repair for the best servicing.

Would you give us helpful information to the following questions?

Example:

* Does the failure occur sometimes (once per hour) or continuously?
* Does the failure occur in specific band(s) only or every band?
* Does the failure occur at specific frequencies only or every frequency?
* Does the failure occur in specific modes only or every mode?
* Does the failure occur during transmit or receive or both?
* Is the symptom changed by disconnecting associated peripheral units?
* Does the failure occur just after power switch-on or after a long use?
* Does the failure tend to occur at hot time or cold time?
* Does the reading(s) on the check meter change, compared with that under the normal condition?
* Is the power line voltage normal? Is the voltage, in particular, at the transmit time normal?

4.5.1 Troubleshooting at Receive

NO.	SYMPTOM	POSSIBLE CAUSE	REMEDY
1	No display and no sound with power switch-on	(1) Poor connection at power connector (2) Fuse blown (3) Poor connection at power supply (4) Fuse of power supply blown (5) DC power supply reversed in polarity	(1) Check the connection at the connector. (2) Investigate causes and then replace with new fuse of the same capacity. If it is blown again, a failure has occurs. Ask for repair. (3) Completely connect the connector. (4) Same as (2). (5) Connect red wires of DC power cable to (+) terminal and blue wires to (–) terminal. If the power supply polarity is reversed, no power is on.
2	No sound with power switch set on; frequency display satisfactory	(1) Headphone already connected to headphone jack. (2) Processor switch set to CAL position. (3) Transceiver being transmitting with standby switch set to XMIT position. (4) Band switch set between 1.8 and STD position. (5) Both AF gain and RF gain controls set to fully counterclockwise positions. (6) Both band switch and memory channel switch set to half positions.	(1) Disconnect the headphone. (2) Set processor switch to OFF or ON position (3) Set standby switch to PTT position. (4) Turn to other position. (5) Adjust for desired sound volume. (6) Set to correct positions.
3	Dim meter illumination, frequency display and LED	Dimmer control set to minimum position.	Set for desired illumination.
4	Poor receiver sensitivity and low reading on S-meter	(1) Attenuator switch set to 10dB or 20dB position. (2) No antenna connected, or antenna wire broken at mid portion.	(1) Set to OFF position. (2) Check the antenna and feeder.
5	Poor receiver sensitivity and high reading on S-meter	RF gain control set too low.	Clockwise rotate the control to higher level position.
6	Poor SSB receive tone	(1) Notch switch set to ON (2) AGC switch set to OFF (3) Noise blanker control set to fully clockwise position (4) PBT control deviating from mid position (5) Wrong mode switch position	(1) Set the switch to OFF position or set notch frequency to interfering beat. (2) Set AGC switch to SLOW or FAST. (3) Counterclockwise rotate and set for low noise without distortion of sound. (4) Set PBT control to mid position (center click). (5) Set to USB or LSB position, depending on receive signal. NOTE: CW or RTTY position does not provide correct demodulation of SSB signal because of inadequate carrier point for demodulation.
7	Extremely high cut in SSB or CW reception.	PBT control set to inadequate position	Set PBT control to mid position (center click), except receive suffering from interference.

NO.	SYMPTOM	POSSIBLE CAUSE	REMEDY
8	No frequency changed by rotation of main dial. No frequency changed by depressing frequency UP or DOWN switch.	Dial lock button already depressed.	Depress the button once again to release from lock.
9	No MHz-digit of frequency displayed	SHIFT button in VFO select switches already depressed	Depress SHIFT button once again to release.
10	Cannot receive with mode switch set to CW-M or CW-N position.	Reception in CW-M or CW-N mode necessitates optional CW filter.	For CW-M, use optional filter of 600Hz, CFL-260. For CW-N, use optional filter of 300Hz, CFL-230.

4.5.2 Troubleshooting at Transmit

NO.	SYMPTOM	POSSIBLE CAUSE	REMEDY
1	No output power with standby switch set to XMIT	(1) Power control set to minimum (2) Processor switch set to CAL (3) Frequency deviating far from amateur band (4) Band switch set to 18, 24 or STD position	(1) Clockwise rotate for adequate power. (2) Set to OFF position. (3) Change the frequency to within amateur band. (4) Transmission not possible on these bands.
2	No output power in SSB mode	(1) MIC gain control set to minimum (2) Poor microphone or poor contact of microphone connector.	(1) Clockwise rotate MIC gain control for desired level. (2) Check the microphone.
3	Cannot transmit by keying in CW mode.	(1) Standby switch placed in PTT position (2) No key plug inserted into KEY jack.	(1) Set standby switch to XMIT or VOX position. (2) Well insert.
4	Low final stage collector current and high reading of REF on meter during transmit. Low output power.	(1) Antenna not connected or grounded (2) Too high VSWR in	(1) Check the antenna system. (2) Adjust the antenna system to lower VSWR or use antenna tuner (NFG-97, for example).
5	Poor SSB transmit tone	(1) Distortion caused by too high microphone input level. Overmodulation indicator LED OVR continuously illuminating. (2) Too high compression level when using speech processor.	(1) Lower microphone gain until indicator OVR twinkles. (2) Check compression level on meter and adjust for about 10dB. Or set processor switch to OFF.

4.5.3 Troubleshooting about Frequency Control

NO.	SYMPTOM	POSSIBLE CAUSE	REMEDY
1	Blinking numeral 1~4 at 10Hz-digit when setting power switch to ON	Error in memory data existing in microcomputer. (1) Numeral 1 blinking: Error in band data (2) Numeral 2 blinking: Error in frequency data (3) Numeral 3 blinking: Error in mode data (4) Numeral 4 blinking: Damage to contents in RAM.	(1)~(3) Depress frequency UP button. Automatically initializes, after four repetitions of blink. In any case, memory contents are set to 7.000MHz, CW, after initialization. Band and mode of each of VFO-F1 and F2 are the same as panel mode and band switches are set.
2	Cannot change both band and mode by operating band switch and mode switch	Memory READ button already depressed.	Depress the memory READ button once again to initial.
3	Mode and frequency changed at transmit and receive	VFO select switch set to SPLIT, R-F1 or R-F2	Set for simplex F1 or F2.

Cor van Soelen PG9HF
http://www.pg9hf.nl
JO11SK

CHAPTER 5

OPTIONS

5.1 NBD-500G/U Power Supply

The Model NBD-500G/U is a voltage regulated power supply for fixed station.

This option has been designed to fully display the proper performance of the transceiver, with taking account of the safety, in addition to the appearance design matched to the JST-100 transceiver.

Specifications:

Input Voltage	220V AC ±10%, 50/60Hz, single phase (NBD-500G) 120V AC ±10%, 50/60Hz, single phase (NBD-500U)
Output voltage	+13.8V DC, 20A (intermittent)
Dimensions	180(W) x 130(H) x 273(D)mm
Weight	9kg, approx.

Figure 5.1 NBD-500G/U

5.2 NFG-97 Antenna Tuner

This option is composed of a matching circuit integrated with a measuring circuit.

The matching circuit converts an antenna impedance with high SWR into 50 ohms.

The measuring circuit measures the SWR, forward power and reflected power.

This tuner has independent selectable positions of 10MHz, 18MHz and 24MHz bands for the WARC bands.

Specifications:

Band Available	9 amateur bands of 1.8 through 29.7MHz and through, WARC Bands included
Maximum Transmitter Power	200 watts, CW (200 watts, PEP for 1.8MHz band)
Matching Range	VSWR 3.0 to 1, at maximum (unbalanced)
Input Impedance	50 ohms
Power Measurement	200W/20W/2.5W full scale
VSWR Measurement	1:10 at maximum
Dimensions	180(W) x 130(H) x 273(D) mm
Weight	3.3kg, approx.

Figure 5.2 NFG-97

5.3 NVA-88 Speaker

Separate type speaker designed to match with the main unit, JST-100.

Specifications:

Input Impedance	4 ohms, nominal
Maximum Input Power	3 watts
Dimensions	180(W) x 130(H) x 273(D) mm
Weight	2.5kg, approx.

Figure 5.3 NVA-88

5.4 CHG-43 Desk Microphone

Specifications:

Sensitivity	−73 ±3dB (0dB=1V/μBar, 1000Hz)
Impedance	600 ohms, nominal
Directivity	Non-directional
Weight	750g, approx.

Figure 5.4 CHG-43

5.5 CHG-44 Hand Microphone

Specifications:

Sensitivity	−73 ±3dB (0dB=1V/μBar, 1000Hz)
Impedance	600 ohms, nominal
Directivity	Non-directional
Weight	200g, approx.

Figure 5.5 CHG-44

5.6 KY-3A Key

Specifications:

Dimensions	85(W) x 75(H) x 150(D)mm
Weight	900g, approx.

Figure 5.6 KY-3A

5.7 Filter CFL-260, 600Hz

Mechanical filter provides a sharp selectivity in the CW signal reception and very effective for rejection radio interferences.

This filter is operable only by mounting it on the IF AMP unit of JST-100.

Specifications:

Input/Output Impedance	1 kiloohms	
Bandwidth	6dB;	0.7kHz
Typical	60dB;	2.3kHz

NOTE: For mounting, refer to Paragraph 5.9.
Furnished printed circuit board not used.

Figure 5.7 CFL-260

5.8 Filter CFL-230, 300Hz

Consisting of a crystal filter having a more sharp selectivity suited for reception of CW signal.

This filter is operable only by mounting it on the IF AMP unit of JST-100.

Specifications:

Input/Output Impedance	600 ohms, 60pF	
Bandwidth	6dB;	0.32kHz
Typical	60dB;	1.4kHz

NOTE: For mounting, refer to Paragraph 5.9.
Furnished printed circuit board not used.

Figure 5.8 CFL-230

5.9 Mounting the Optional Filters

(1) Take out the IF amplifier unit, CAE-137, according to the procedure denoted in Paragraphs 4.1 through 4.3.

(2) Mount the optional filters, CFL-260 and/or CFL-230 on the IF AMP unit, as shown in Figure 5.9. Solder the filters.

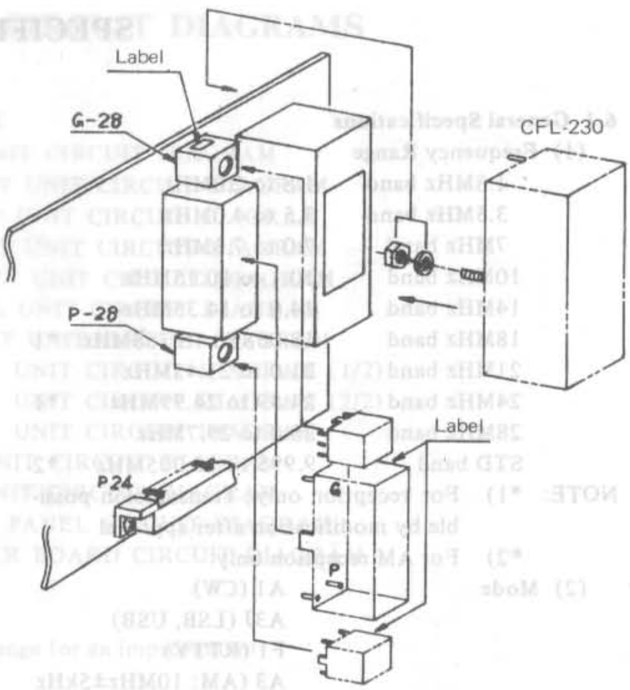


Figure 5.9 Mounting the Optional Filters

(3) Mount the IF AMP unit in the JST-100. Completely connect the unit to the connector until being flush with other mounted units.

(4) Before mounting the upper cover energize the JST-100 to receive in the CW-M and/or CW-N modes. This is to make sure of normal operation.

(5) Mount the upper cover in the reverse manner to step (1).

CHAPTER 6

SPECIFICATIONS

6.1 General Specifications

(1) Frequency Range

1.8MHz band	1.8 to 2.0MHz	
3.5MHz band	3.5 to 4.0MHz	
7MHz band	7.0 to 7.3MHz	
10MHz band	10.1 to 10.15MHz	
14MHz band	14.0 to 14.35MHz	
18MHz band	18.068 to 18.168MHz	*1
21MHz band	21.0 to 21.45MHz	
24MHz band	24.89 to 24.99MHz	*1
28MHz band	28.0 to 29.7MHz	
STD band	9.995 to 10.005MHz	*2

NOTE: *1) For reception only; Transmission possible by modification after approval

*2) For AM reception only

(2) Mode	A1 (CW) A3J (LSB, USB) F1 (RTTY) A3 (AM: 10MHz±5kHz reception only)
(3) Frequency Increment	10Hz step
(4) Memory Capacity	11 channels
(5) Antenna Impedance	50 ohms
(6) Power Voltage	13.8V DC ±10% (13.8V nominal) negative grounded
(7) Power Consumption	2A, approx. for reception with no signal; 20A, approx. for transmission at output of 100 watts (JST-100D) 5A, approx. for transmission at output of 10 watts (JST-100S)
(8) Dimensions	W 330(348) x H 130 (145) x D 273(347)mm ( ): including projection
(9) Weight	10kg, approx.
(10) Operating Temperature Range	0°C to +40°C

6.2 Transmitter Section

(1) Output Power	JST-100D: 100 watts JST-100S: 10 watts
(2) Carrier Suppression	50dB or more
(3) Undesired Sideband Suppression	60dB or better at 1500Hz modulation
(4) Spurious radiation	–40dB or better
(5) IMD	–31dB or better relative to PEP
(6) Audio Response	400 to 2600Hz within 6dB, A3J
(7) Frequency stability	Within ±10ppm in 5 to 60 minutes, after power-on; within ±2ppm per hour, thereafter
(8) Microphone Impedance	600 ohms
(9) Modulation Input Level	–60 to –20dBm required for rated output power
(10) Modulation Type	Balanced modulation
(11) RTTY Frequency Shift	170Hz (±85Hz)

6.3 Receiver Section

(1) Receiving System	Double-superheterodyne
(2) Intermediate Frequency	First IF: 70.455MHz Second IF: 455kHz IF for PBT: 8.7MHz
(3) Sensitivity	For S/N=10dB, CW, SSB, RTTY; –10dBμ (0.3μV) or less AM: 16dBμ (6μV) or less
(4) Image Rejection	70dB or better
(5) IF Rejection	70dB or better

(6) Selectivity, typical

MODE	–6dB	–60dB
SSB, CW(W), RTTY	2.3kHz	4.3kHz
CW (M)*	0.7kHz	2.3kHz
CW (N)*	0.32kHz	1.4kHz

NOTE: *) Option

(7) AF Output Power	1 watt or more, 4 ohm-load, distortion of 10%

CHAPTER 7

BLOCKDIAGRAM AND CIRCUIT DIAGRAMS

FIGURE 7.1	BLOCK DIAGRAM	
FIGURE 7.2	CFL-175	BPF UNIT CIRCUIT DIAGRAM
FIGURE 7.3	CAF-180	RF AMP UNIT CIRCUIT DIAGRAM
FIGURE 7.4	CAE-137	IF AMP UNIT CIRCUIT DIAGRAM
FIGURE 7.5	CAB-259	AF AMP UNIT CIRCUIT DIAGRAM
FIGURE 7.6	CAH-157	100W PA UNIT CIRCUIT DIAGRAM
FIGURE 7.7	CAH-158	10W PA UNIT CIRCUIT DIAGRAM
FIGURE 7.8	CMB-63	OUTPUT UNIT CIRCUIT DIAGRAM
FIGURE 7.9	CGA-94	LOOP 1 UNIT CIRCUIT DIAGRAM (1/2)
FIGURE 7.10	CGA-94	LOOP 1 UNIT CIRCUIT DIAGRAM (2/2)
FIGURE 7.11	CGA-95	LOOP 2 UNIT CIRCUIT DIAGRAM
FIGURE 7.12	CGD-76	BFO UNIT CIRCUIT DIAGRAM
FIGURE 7.13	CDC-236	CPU UNIT CIRCUIT DIAGRAM
FIGURE 7.14	CFQ-1168	FRONT PANEL CIRCUIT DIAGRAM
FIGURE 7.15	CWB-232	MOTHER BOARD CIRCUIT DIAGRAM

Circuit and components subject to change for an improvement without notice.

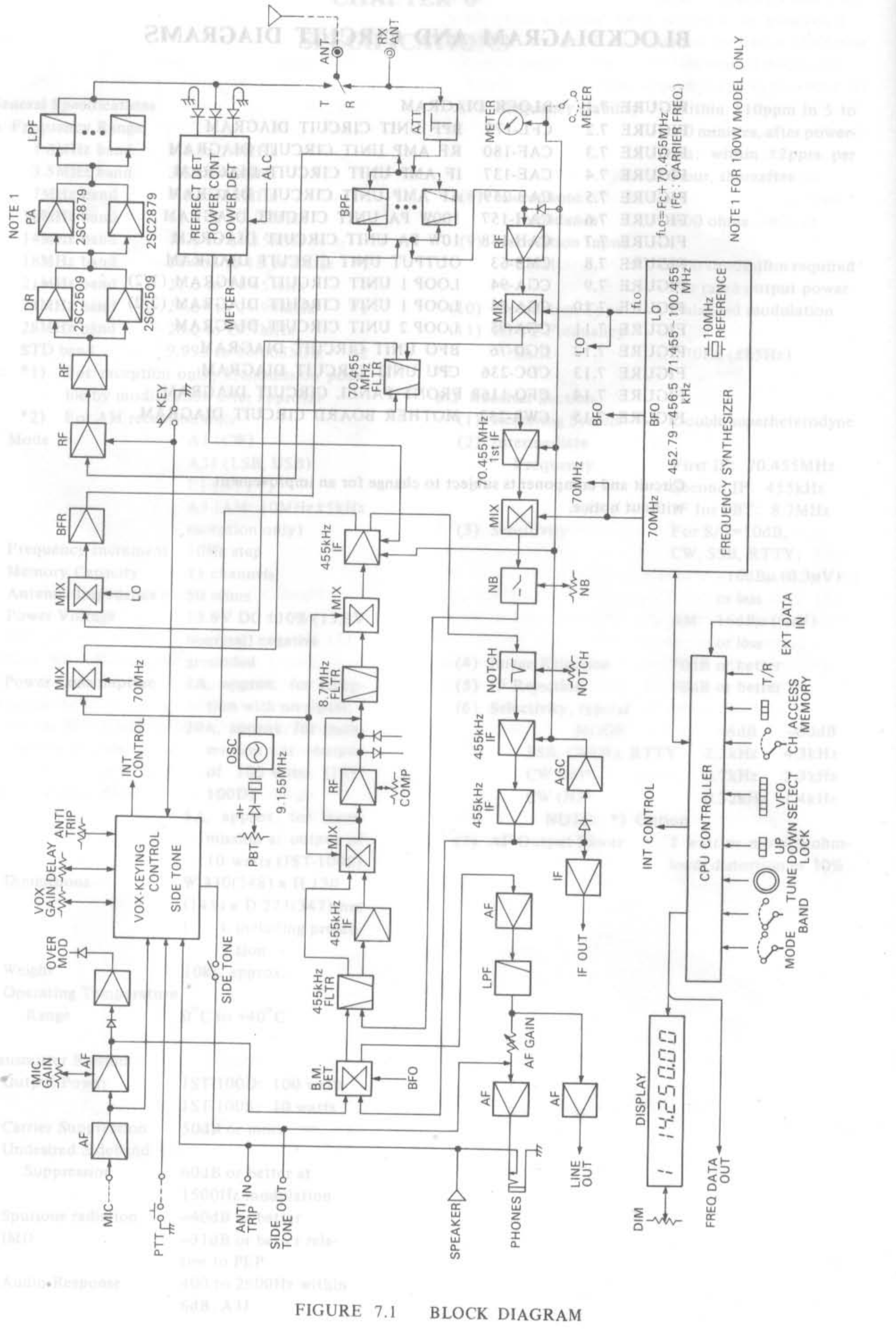


FIGURE 7.1 BLOCK DIAGRAM

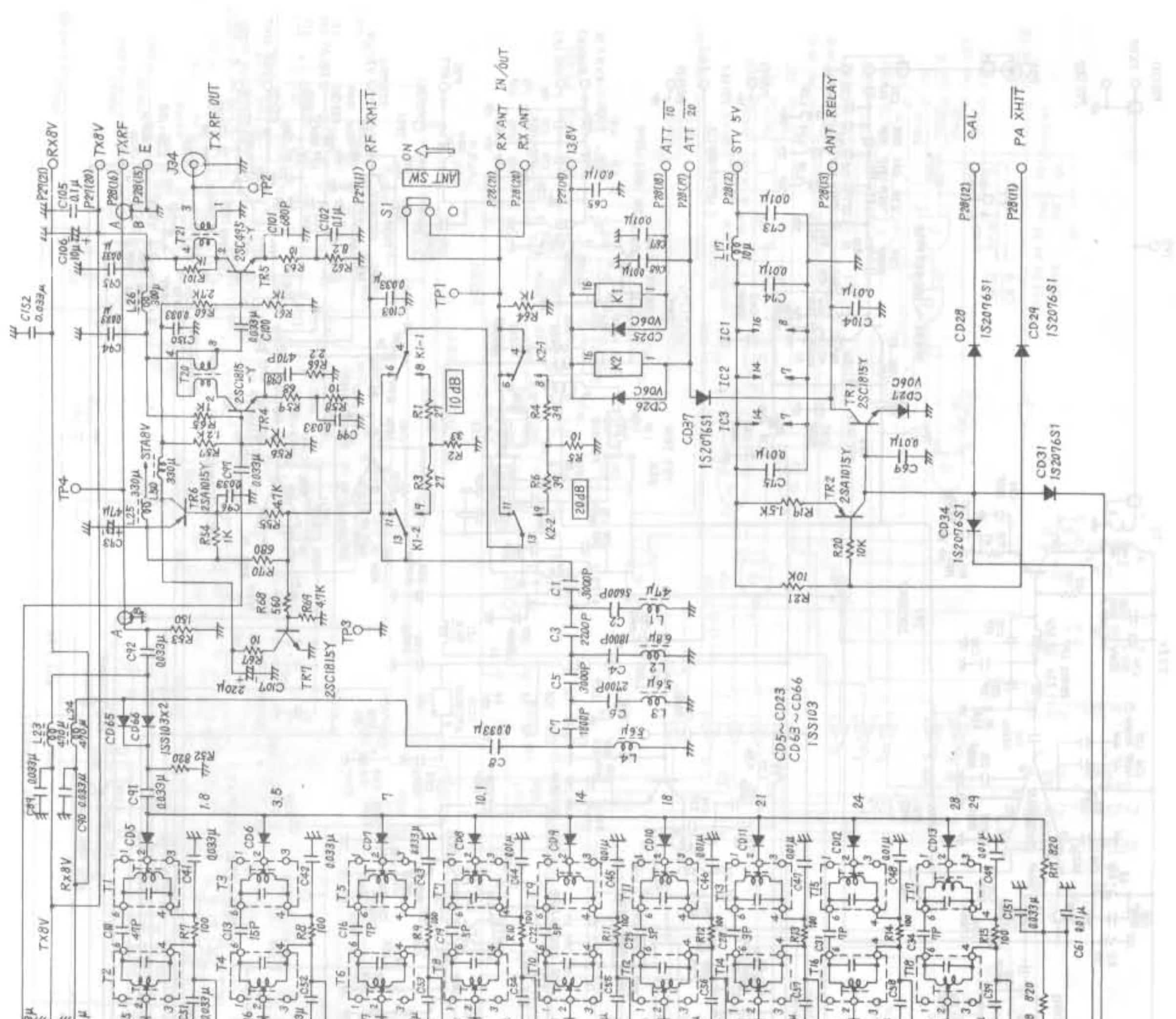


FIGURE 7.2 CFL-175 BPF UNIT CIRCUIT DIAGRAM

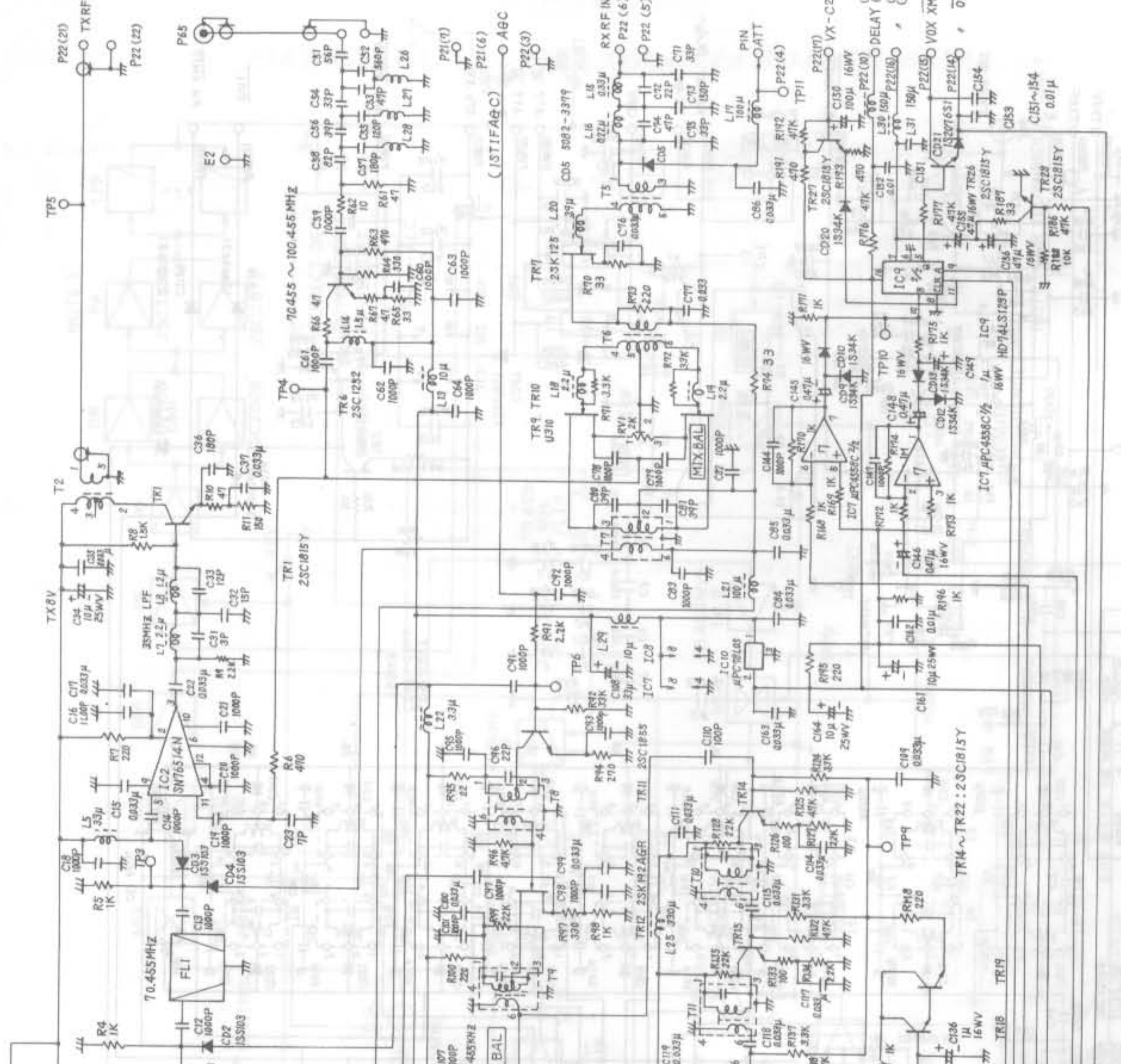


FIGURE 7.3 CAF-180 RF AMP UNIT CIRCUIT DIAGRAM

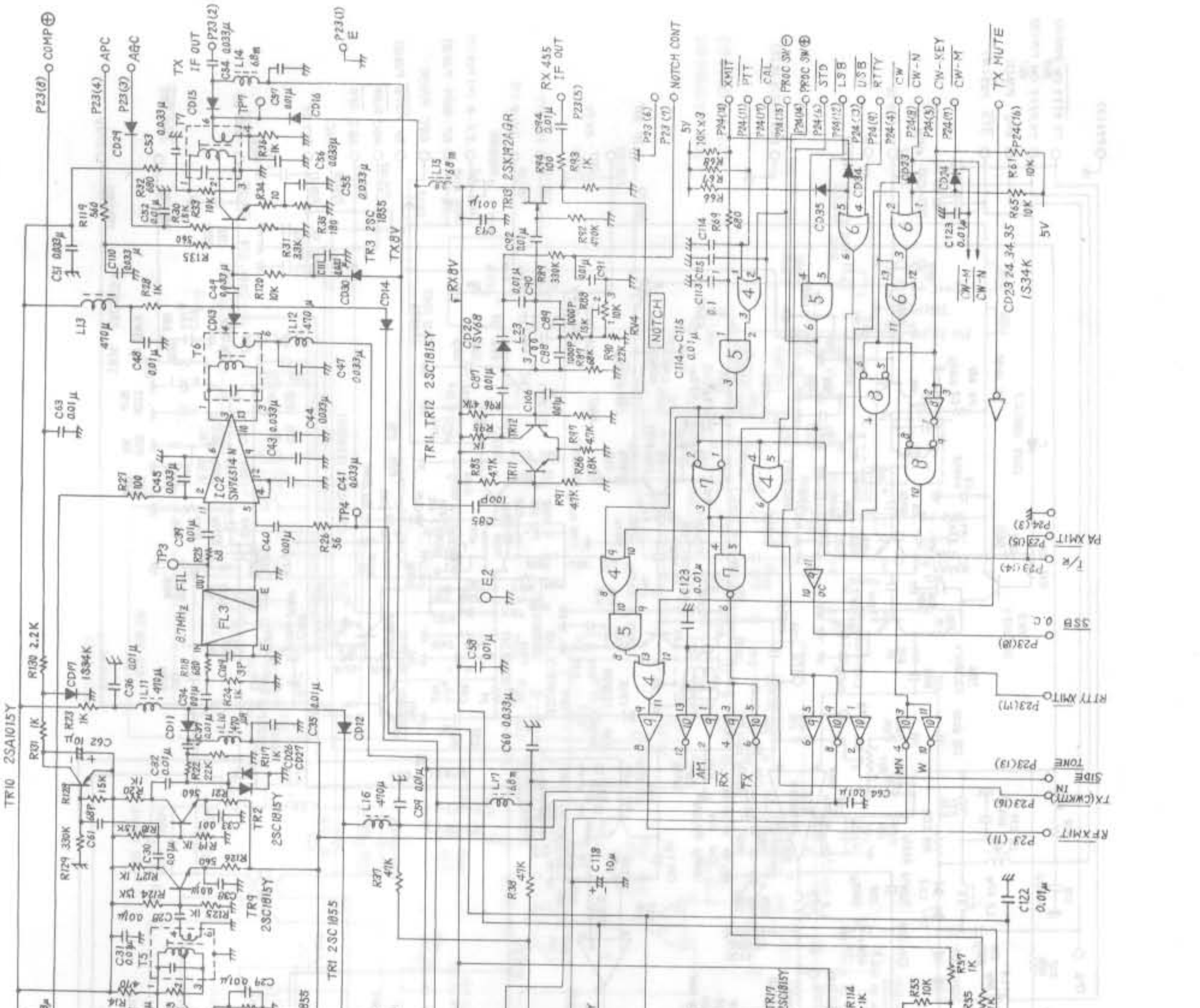


FIGURE 7.4 CAE-137 IF AMP UNIT CIRCUIT DIAGRAM

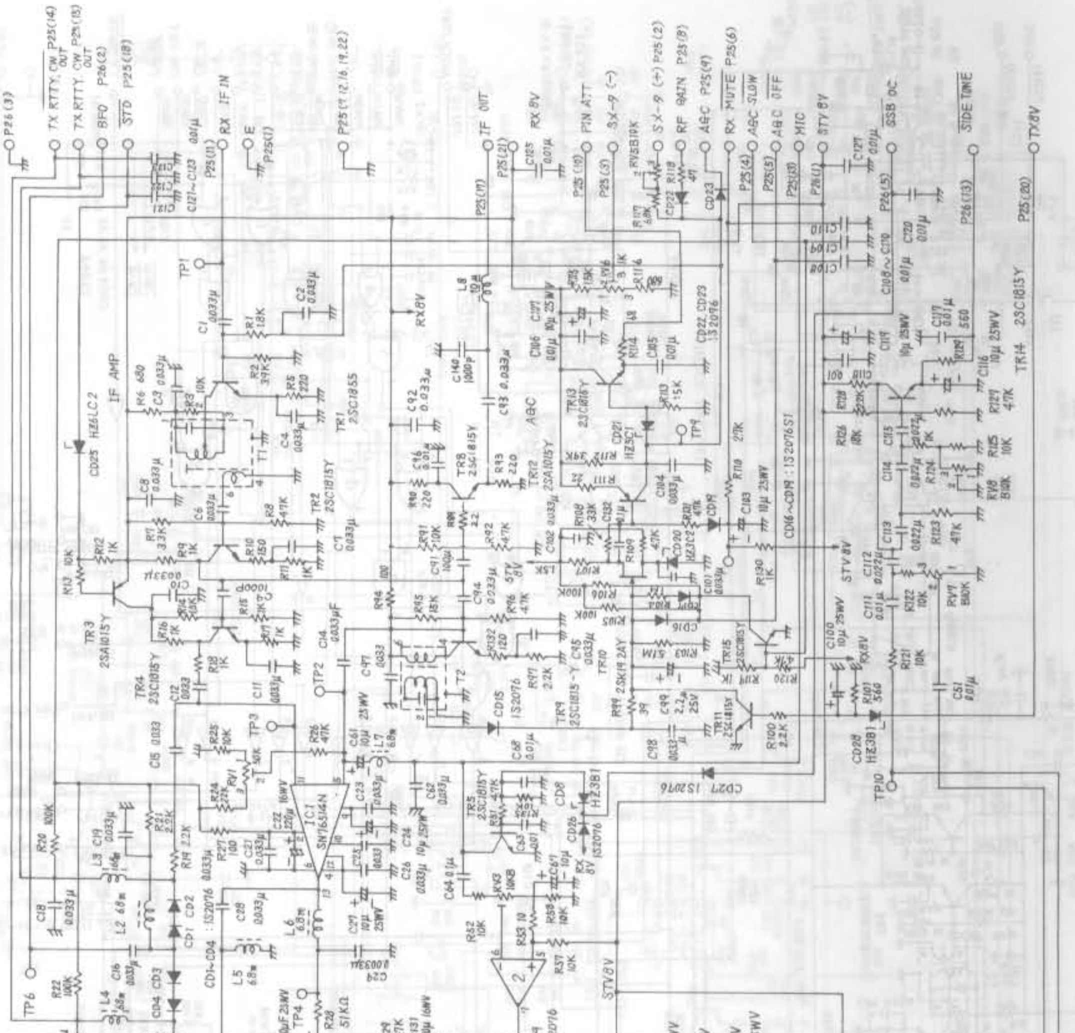


FIGURE 7.5 CAB-259 AF AMP UNIT CIRCUIT DIAGRAM

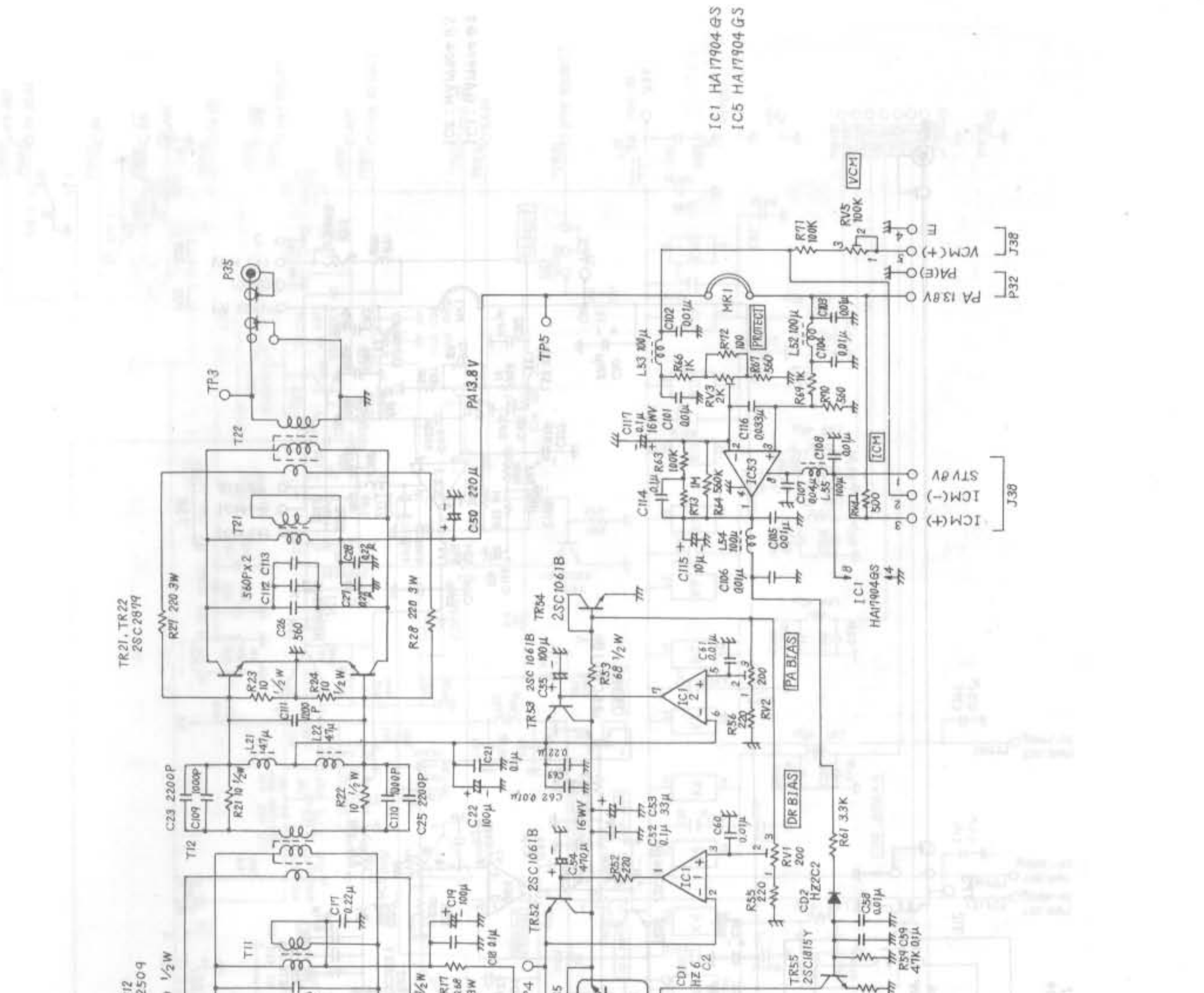


FIGURE 7.6 CAH-157 100W PA UNIT CIRCUIT DIAGRAM

Cor van Soelen PG9HF
http://www.pg9hf.nl
JO11SK

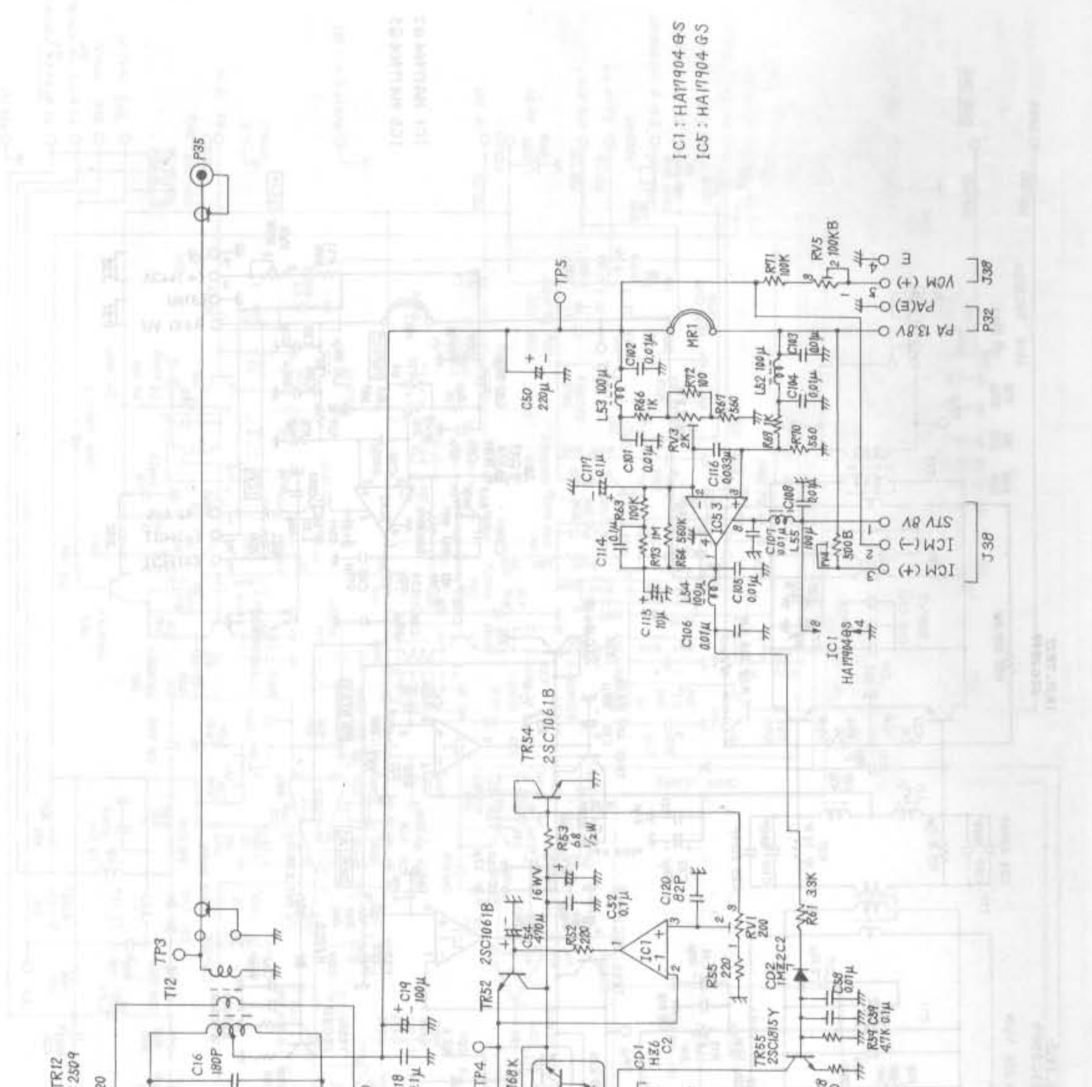


FIGURE 7.7 CAH-158 10W PA UNIT CIRCUIT DIAGRAM

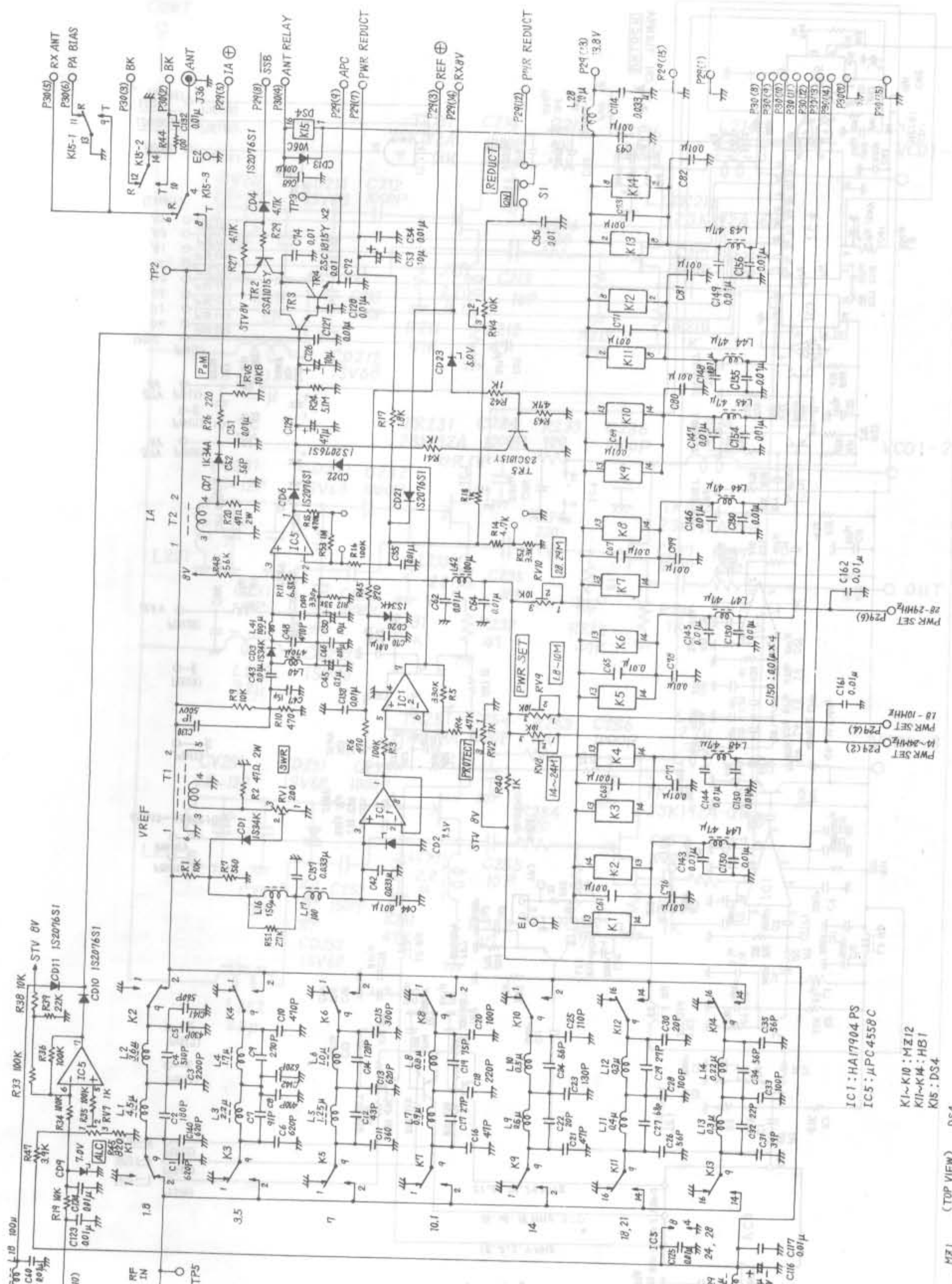


FIGURE 7.8 CMB-63 OUTPUT UNIT CIRCUIT DIAGRAM

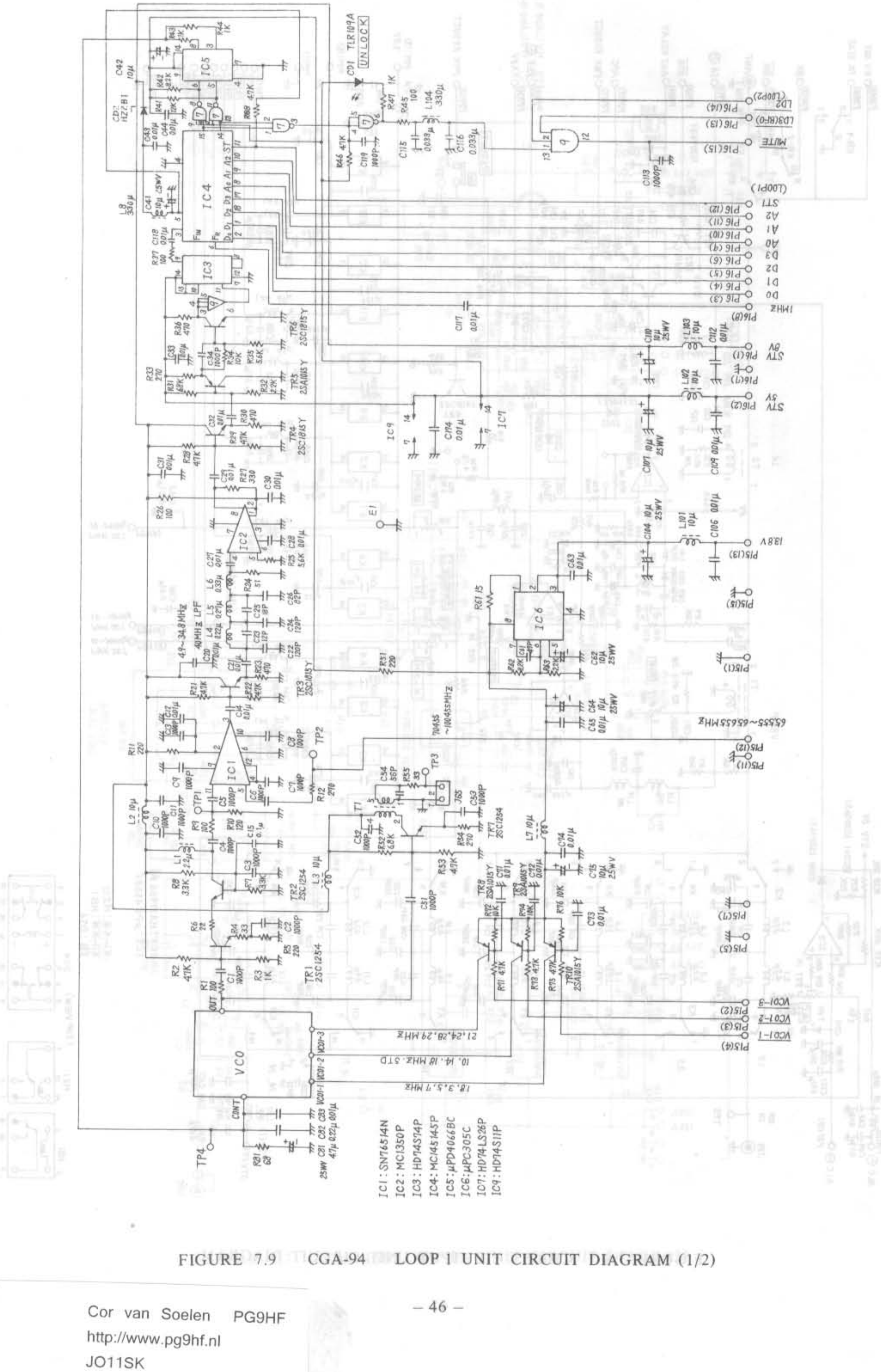


FIGURE 7.9 CGA-94 LOOP 1 UNIT CIRCUIT DIAGRAM (1/2)

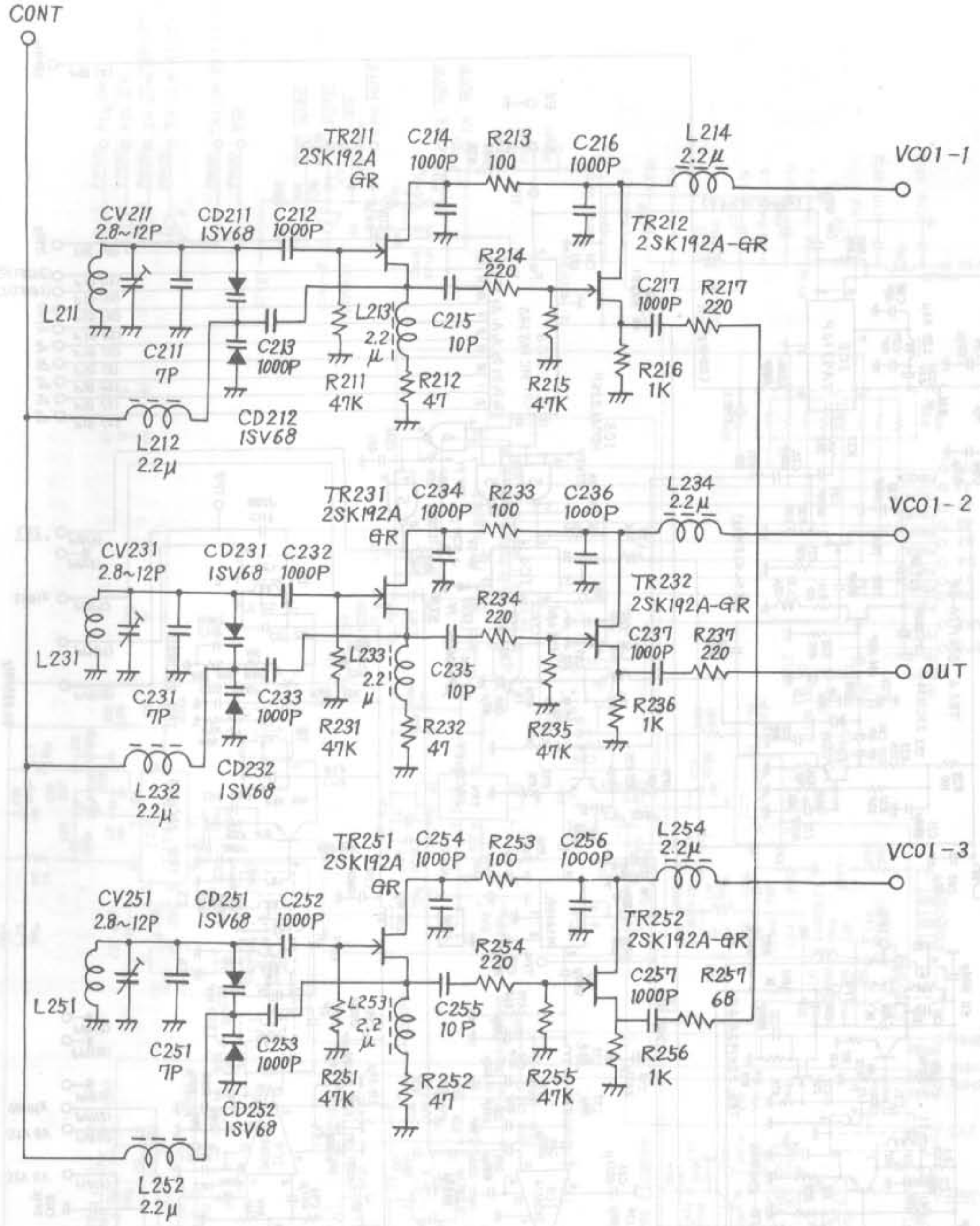


FIGURE 7.10 CGA-94 LOOP 1 UNIT CIRCUIT DIAGRAM (2/2)

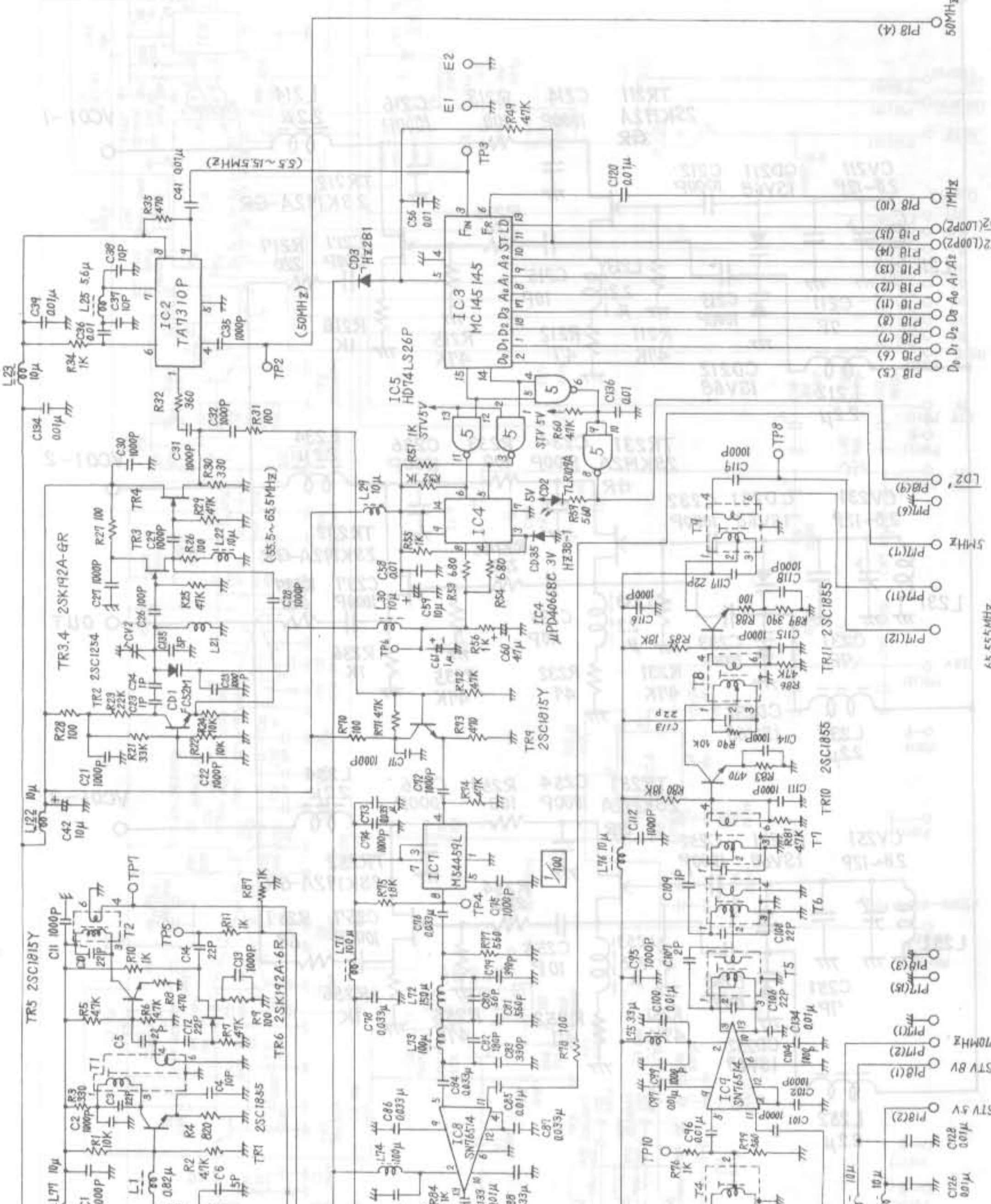


FIGURE 7.11 CGA-95 LOOP 2 UNIT CIRCUIT DIAGRAM

Cor van Soelen PG9HF
http://www.pg9hf.nl
JO11SK

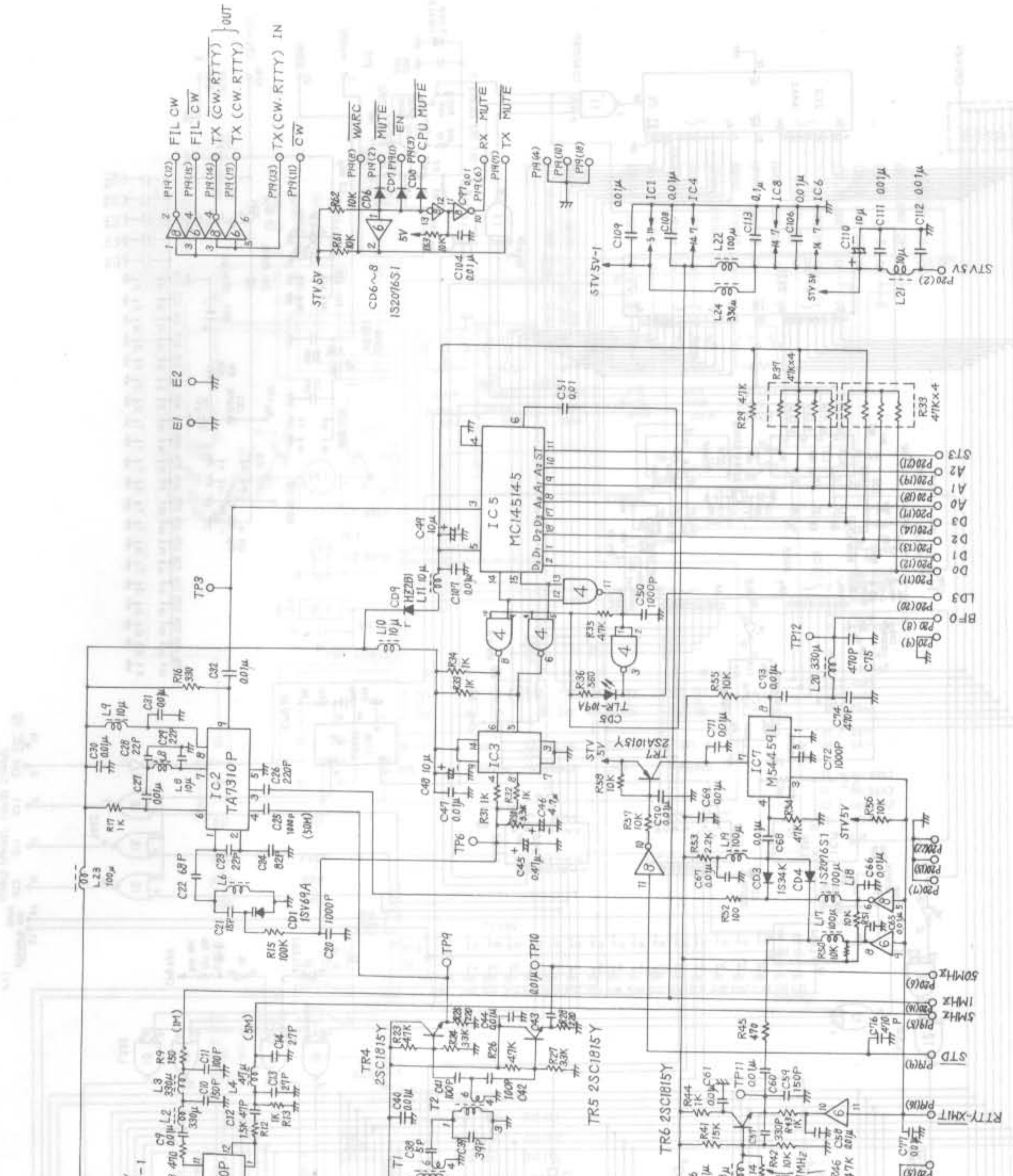


FIGURE 7.12 CGD-76 BFO UNIT CIRCUIT DIAGRAM

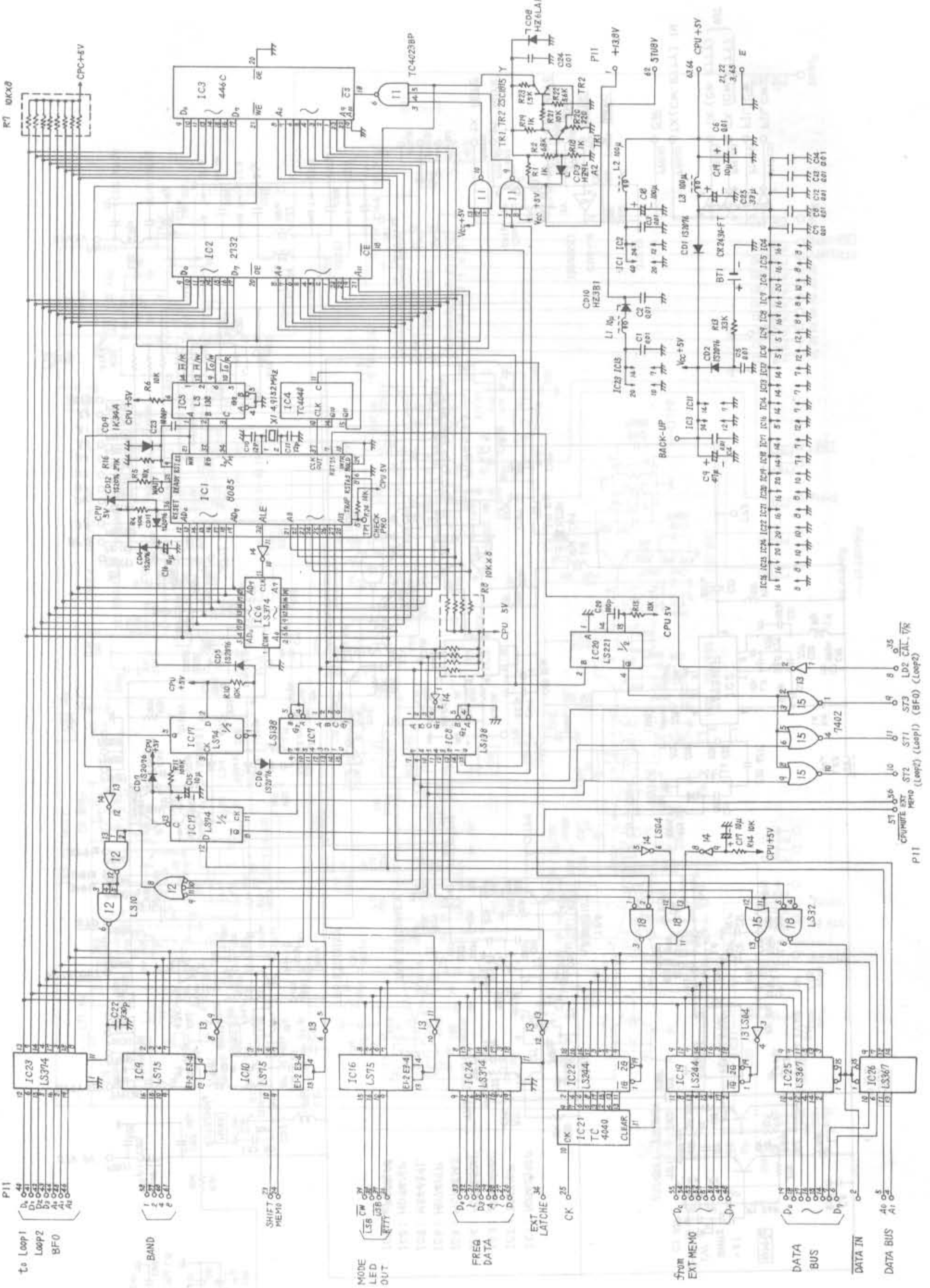
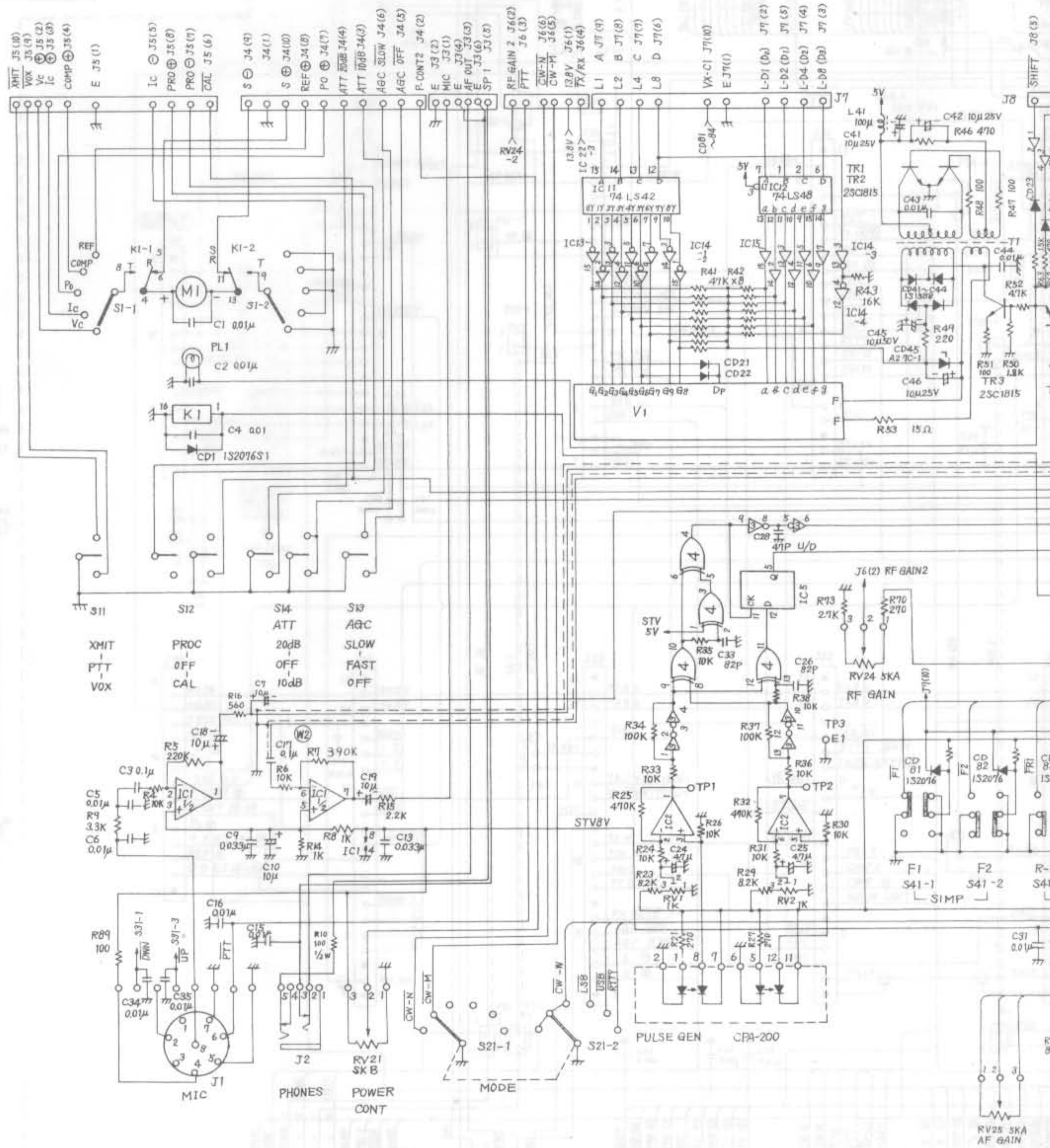


FIGURE 7.13 CDC-236 CPU UNIT CIRCUIT DIAGRAM



Cor van Soelen PG9HF
http://www.pg9hf.nl
JO11SK

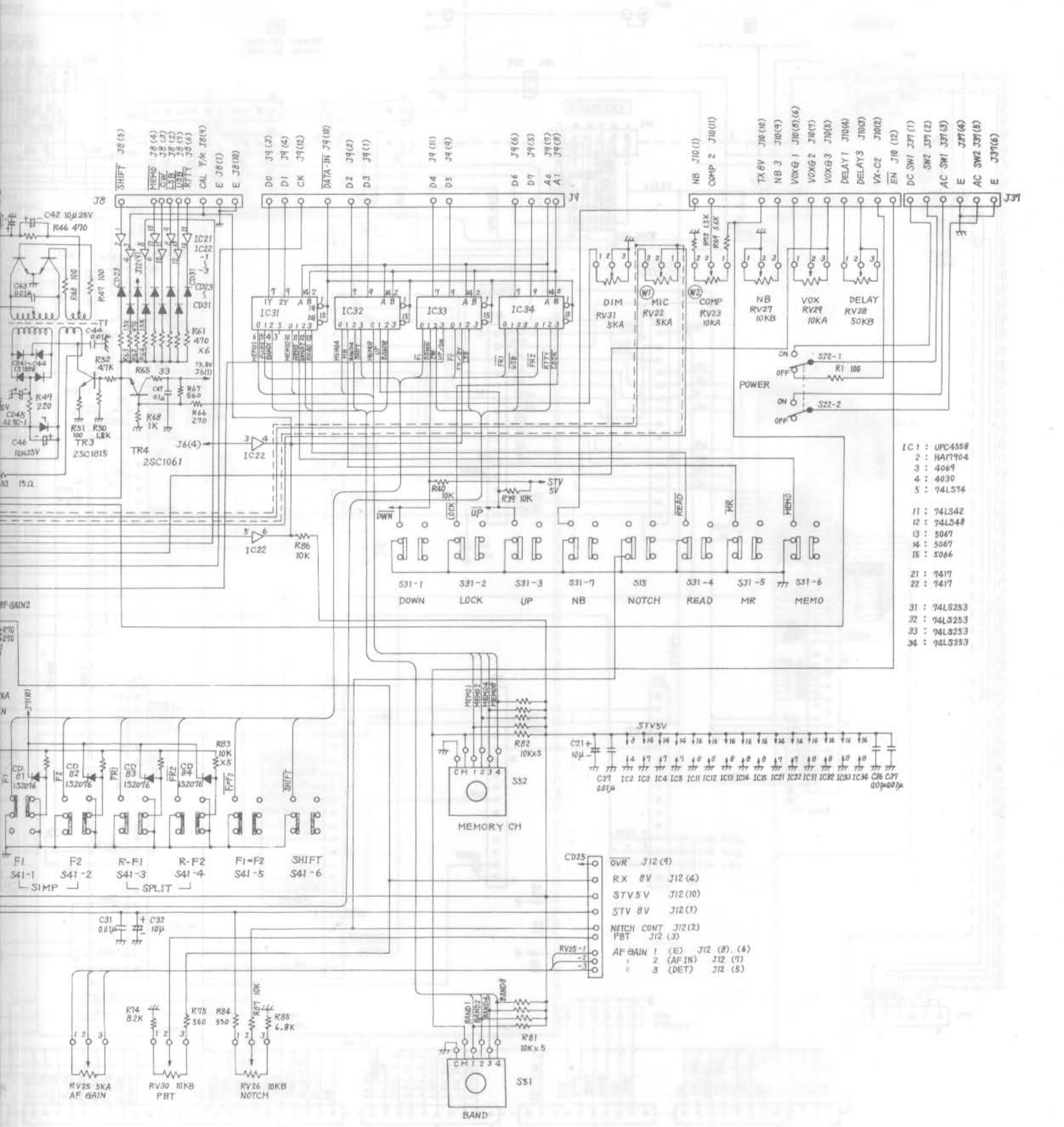
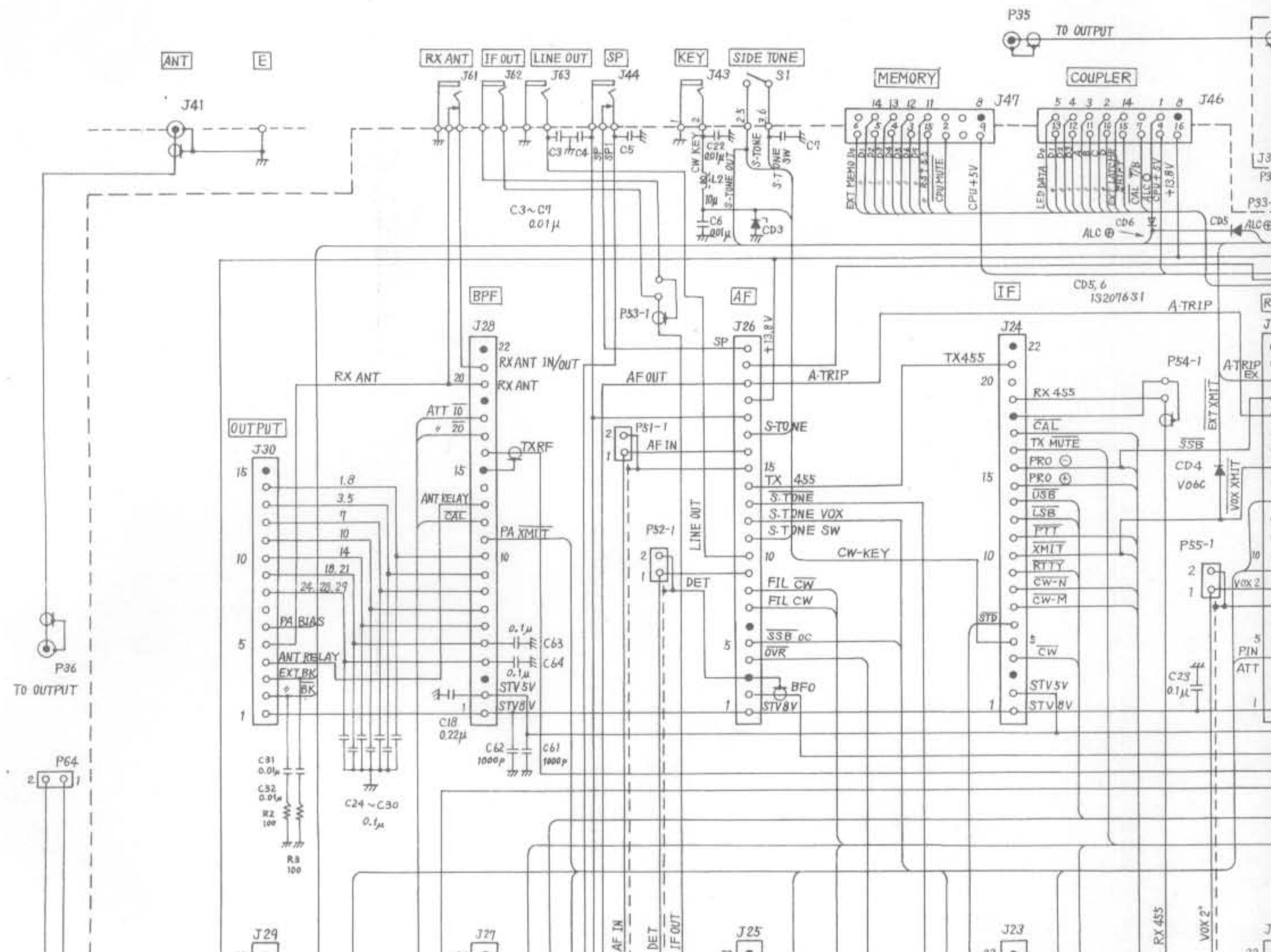


FIGURE 7.14 CFQ-1168 FRONT PANEL CIRCUIT DIAGRAM



Cor van Soelen PG9HF
http://www.pg9hf.nl
JO11SK

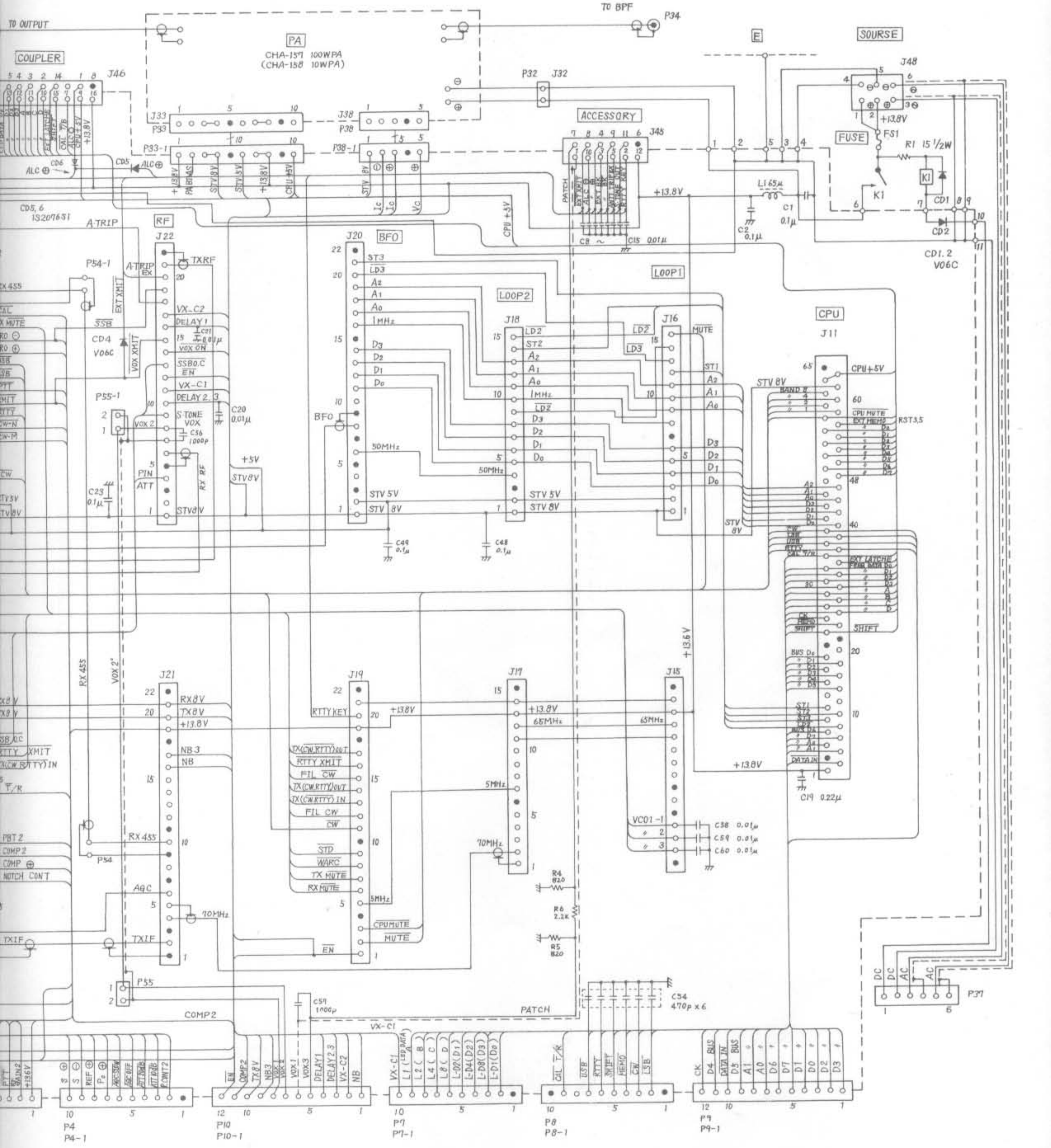


FIGURE 7.15 CWB-232 MOTHER BOARD CIRCUIT DIAGRA