INSTRUCTION MANUAL FOR IC-700T

GENERAL

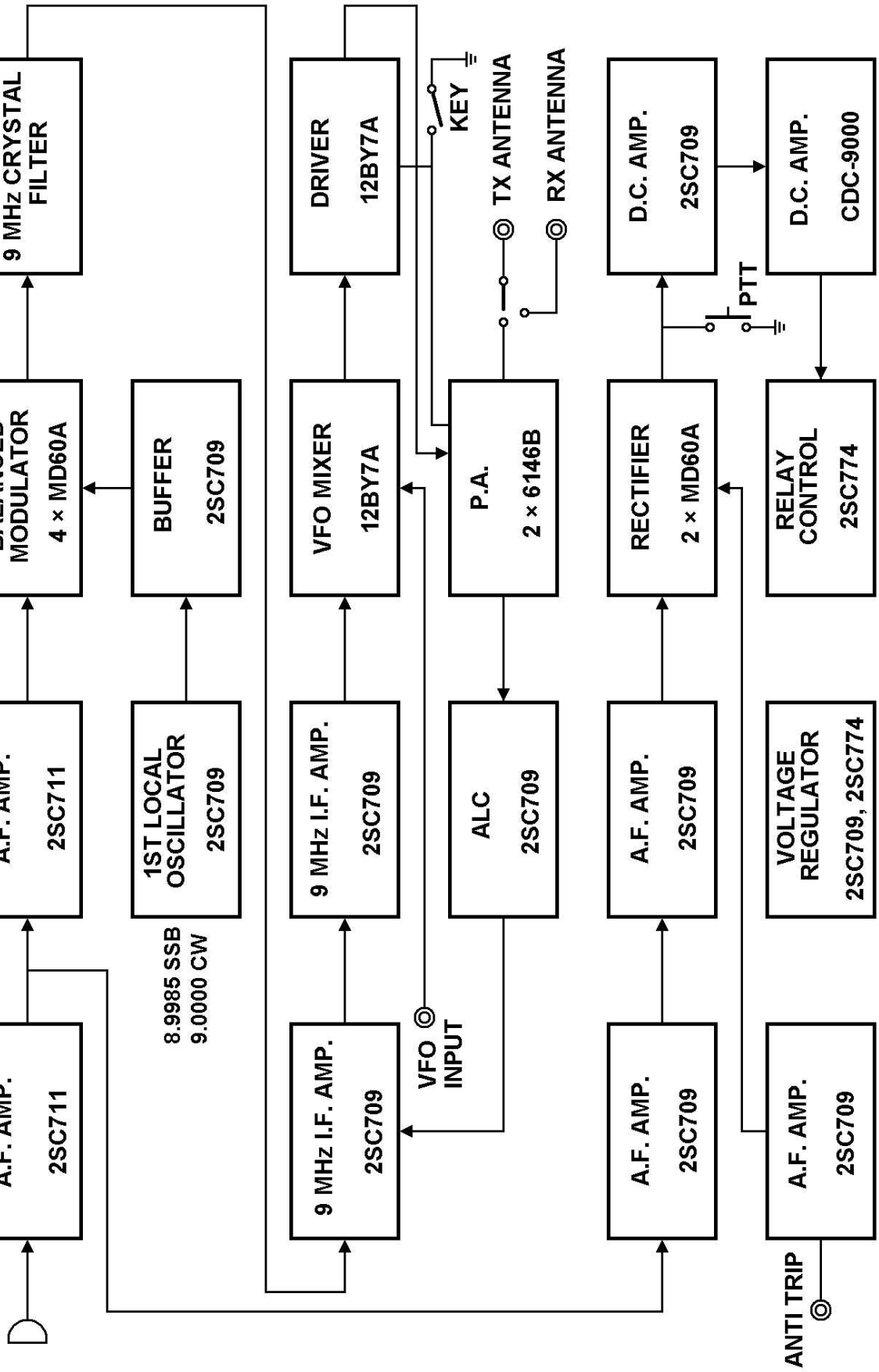
The Inoue IC-700T is a single sideband transmitter specifically designed for use as a transceiver with its companion IC-700R receiver. It uses the receiver VFO and offset tuning facility and by virtue of being mainly transistorized provides a complete compact and lightweight station.

The use of a 9 MHz crystal filter for SSB generation permits a single conversion design which results in minimal spurious signals.

SPECIFICATIONS

MODES:	SSB (A3J LSB on 3.5 and 7 MHz, USB on 14, 21 and 28 MHz) AM (A3H) CW (A1)
RANGES:	3.5–4.0 MHz, 7.0–7.5 MHz, 14.0–14.5 MHz, 21.0–21.5 MHz, 28.0–28.5 MHz, 28.5–29.0 MHz, 29.0–29.5 MHz
POWER INPUT:	150 W PEP
SPURIOUS RADIATION:	Better than 40 dB
CARRIER SUPPRESSION:	Better than 40 dB
UNWANTED SIDEBAND SUPPRESSION:	Better than -50 dB at 1 kHz
AUDIO RESPONSE:	Less than 60 dB from 300–2700 Hz
OUTPUT IMPEDANCE:	50–75 Ohm
KEYING:	BIAS keying
VOX, anti-trip and amplified ALC built-in	
POWER REQUIREMENTS:	(Supplied by IC-700PS) 400–600 VDC @ 200 mA 250–300 VDC @ 50 mA -100 VDC @ 20 mA 12–15 VDC @ 0.5 A 12.6 VAC or DC @ 2 A
DIMENSIONS:	6.3" high × 10" wide × 9.25" deep
WEIGHT:	11 lbs

IC-700T BLOCK DIAGRAM



CIRCUIT DESCRIPTION

A.F. AMP:
The input from the microphone is amplified in a low noise 2SC711 circuit and part of the signal used to activate the VOX circuit, the remainder being further amplified by another 2SC711 before going in to the balanced modulator.

1st LOCAL OSCILLATOR:
This is the carrier oscillator, crystal controlled, using a 2SC709 transistor to produce either a carrier at 8998.5 kHz for SSB or at 9000.0 kHz for CW. This then passes to a 2SC709 buffer amplifier before going to the balanced modulator. Part of the output is fed to the I.F. amplifier via the carrier level control to give a controlled amount of carrier insertion.

BALANCED MODULATOR:
This is of the ring type employing four MD60A diodes and incorporates a variable resistor and a trimmer for carrier null. These have been adjusted as part of the pre-sales check and should remain in adjustment for a considerable period.

FILTER
This is a very good quality 9 MHz crystal filter, 2.4 kHz wide and having a shape factor better than 1.8:1. Negligible pass band ripple results in an excellent signal. The output of this filter is a 9 MHz USB signal.

I.F. AMPLIFIERS
The 9 MHz USB signal is amplified by two 2SC709 I.F. amplifiers, amplified AGC being applied to the first. For AM and CW a controlled amount of carrier is allowed into the I.F. amplifiers via the carrier control.

MIXER
The output of the I.F. amplifier is applied to the grid of the 12BY7A mixer and is mixed with the output from the receiver VFO which is fed into the 12BY7A cathode to give the final frequency of the correct sideband.

DRIVER
A neutralized 12BY7A stage giving adequate drive for the PA.

ALC
IF the P.A. is overdriven, grid current will flow and produce a voltage across the grid leak. This voltage is amplified in a SC709 stage and rectified by two MD60A diodes in a voltage doubler. the resulting bias is applied to the 1st I.F. amplifier to lower its gain. This ALC action is inoperative in the CW position.

VOX
A portion of the output of the first audio amplifier passes through the VOX gain control and is further amplified by 2SC709 audio amplifiers and is rectified. The resultant DC voltage is further amplified by a 2SC709 DC amp. followed by a CDC900 DC amp. and used to control the 2SC744 transistor which actuates the send/receive relay. In order to prevent the receiver speaker from actuating the VOX, audio from the speaker voice coil is amplified in a 2SC709 stage, rectified to produce a negative bias which is applied to the 2SC709 DC amplifier.

OPERATION

USING THE IC-700PS AND IC-700R

1.) Before interconnecting, plug the IC-700PS into the main and switch on. Check that the pilot light goes on. Switch off and unplug.

2.) Connect the IC-700PS and IC700T together by means of the cable with octal connections. If a p.s.u. other than the IC-700PS is used, the connections to the octal socket are:

Pin 1 = Earth
Pin 2 = 12.6 VAC (or DC)
Pin 3 = +400–600 VDC
Pin 4 = +250–300 VDC
Pin 5 = -100 VDC
Pin 6 = Power switch
Pin 7 = Power switch
Pin 8 = +12 VDC

3.) Interconnect the cables supplied referring to "Cable Interconnection Diagram"

4.) Antenna: It is essential to use a 50 to 75 Ohm Antenna - anything else requires an ATU. and SWR bridge. An aerial mismatch can result in costly damage to the PA.

5.) Microphone: Either a crystal or high impedance (10 k) dynamic, connect as shown in the diagram.
For PTT-operation, the VOX gain is turned counter-clockwise. Pressing the PTT switch then switches everything from "receive" to "transmit".

LOADING UP

1.) SSB

CONTROLS	POSITION
SEND / RECV	Receive
Meter	I.P. (plate current)
Mic. gain	Fully counter clockwise
VOX gain	PTT
Function	SSB
Carrier	Fully counter clockwise
Band select	Desired band
Drive tune	Near the appropriate band
P.A. tune	Near the appropriate band
P.A. load	0
IC-700R	Must be on the same band

Switch on and allow the heaters to warm up. Switch SEND/RECV switch to send or press PTT switch. The meter should read between 50 and 70 mA. If it does not, the bias must be adjusted (check first that the meter is switched to IP and **NOT** RF). Assuming the idling current is correct at about 50–70 mA, insert some carrier by tuning the carrier control clockwise. Only a slight increase in IP is necessary – there is no point in hammering the PA tubes with lots of carrier. Peak the Drive Tune – here again, avoid making life hard for the PA by reducing carrier so that the meter indicates about 100 mA. Tune the PA tune for dip. From the time your PTT is switched on, do the load-up procedure QUICKLY, keeping the plate current well down. This way your PA will last a long, long time.

The next step is to switch the meter to read RF and peak the PA load and possibly the PA tune for maximum reading. Here again, do not insert more carrier than is necessary for just an indication of R.F. and remember that the meter reading is purely relative – it varies from band to band, aerial to aerial, and on the amount of carrier inserted. Switch the meter back to read plate current (IP) and reduce carrier to zero.
The final step is to talk in the microphone while advancing the mic. gain until voice peaks are within 100 to 125 mA on the meter.

2.) VOX:
Leave the SEND/RECV switch to receive. Increase the VOX Gain control to the point where speaking into the microphone activates the VOX circuitry. There is no necessary to press the PTT switch.

3.) ANTI TRIP:
This will not normally require adjustment but should the loudspeaker tend to activate the VOX, remove the transmitter cover and find the ATT gain. This is a small preset skeleton pot on the top of the chassis close to the VFO input. Adjust this preset so that the speaker will not actuate the VOX. Note that in common with virtually every transceiver on the market there is some interaction between the receiver AF gain, mic gain and ATT gain, so it is up to you to experiment until you find the setting which suit your microphone.

4.) USE OF RIT
In the OFF position, both transmitter and receiver frequencies are the same, but if the RIT is switched on, the receiver frequency can be shifted a few kHz either side of the transmit frequency.

5.) AM OPERATION
Load up as for SSB then insert carrier until the meter in the IP position reads 80 to 100 mA. Reduce mic gain - a report from another station will enable you to find the right position for the mic gain. VOX and PTT are the same as for SSB.

6.) CW OPERATION
Connect a key to the rear panel jack. Turn the function switch to CW and SEND/RECV switch to SEND. Press the key, load up as for SSB and increase the carrier insertion until the meter reads 200 mA plate current.
Note that remote switching can be done by using the connections for the mike PTT.

USE WITH OTHER RECEIVERS

This can be done provided the receiver can deliver 1½ to 2½ volt (RMS) of R.F. to the transmitter VFO input, and the receiver oscillator can tune as follows:

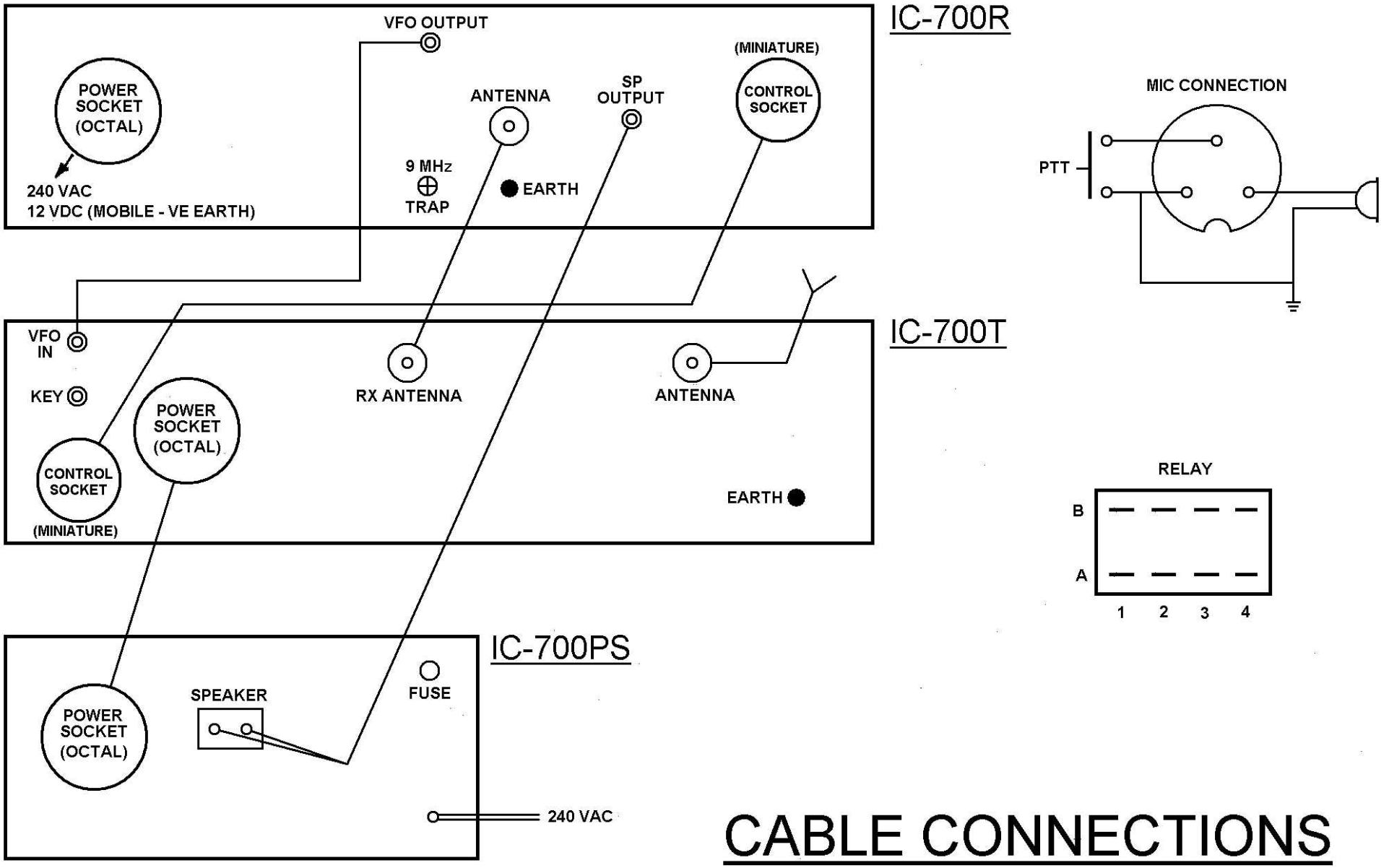
Transmit frequency	Oscillator frequency
3.5 – 4.0	12.5 – 13.0 or 5.5 – 5.0
7.0 – 7.5	16.0 – 16.5
14.0 – 14.5	5.0 – 5.5
21.0 – 21.5	12.0 – 12.5
28.0 – 30.0	19.0 – 21.0

MUTING THE RECEIVER

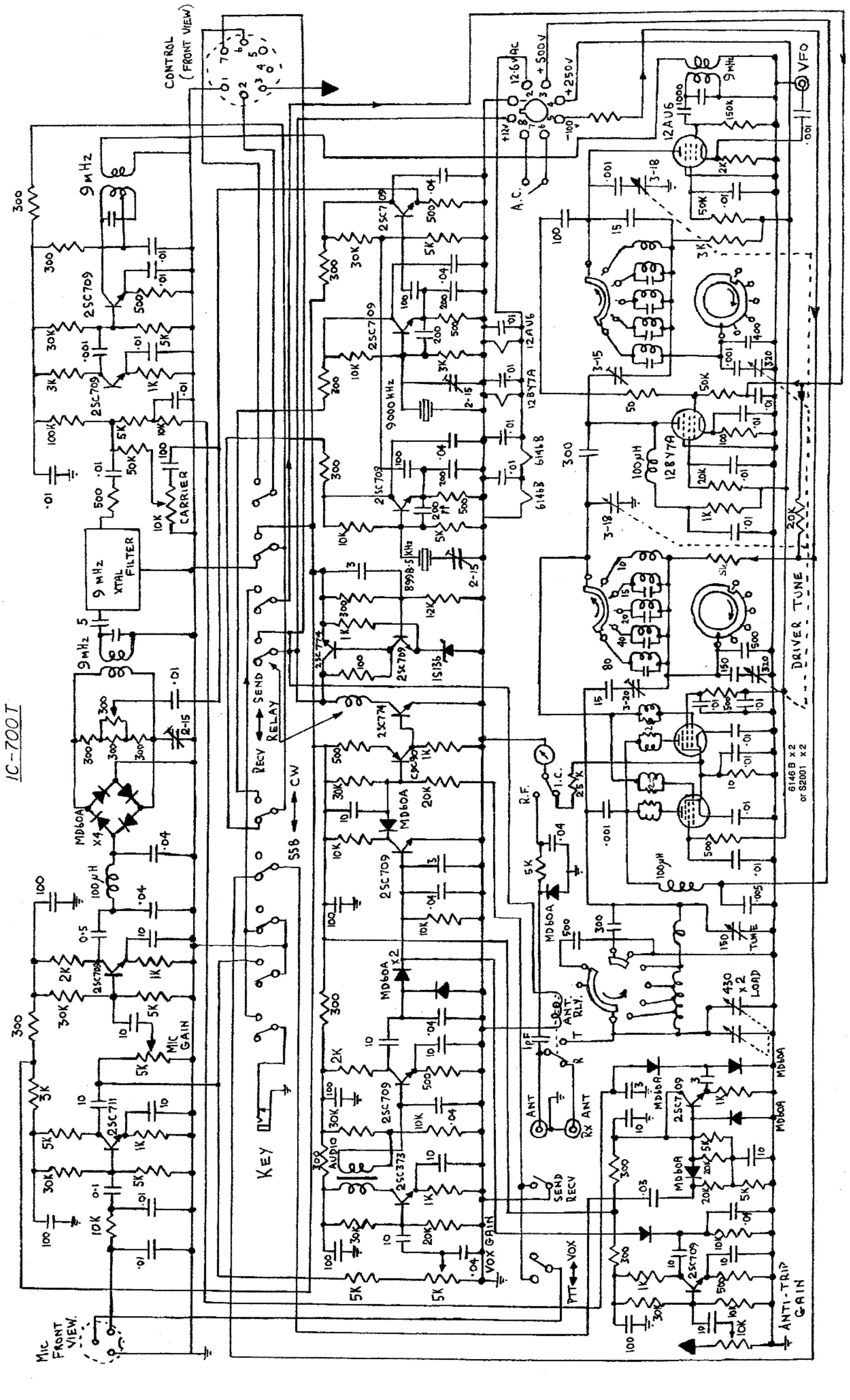
1.) Pin 1 on the control socket is earthed and pin 7 carries +12 VDC during transmit periods and zero voltage on receive. It can thus be used to operate a relay.

2.) Pin 2 & 6 on the control socket are shorted during transmit periods and open on receive. This can be altered to the opposite by changing the appropriate contact on the transmitter relay from A1 to B1 (see diagram of relay contacts). This can be used to kill the RX B+.

3.) There is -100 V bias available at pin 5 of the POWER socket. This can be connected to pin 6 of the control socket. During transmit periods pin 2 and 6 of the control socket are shorted -hence -100 V bias is available at pin 2 during transmit periods for RX bias muting.



CABLE CONNECTIONS


IC-700T
CONTROL (FRONT VIEW)
MIC FRONT VIEW
KEY
9 MHz XTAL FILTER
CARRIER
MIC GAIN
VOX GAIN
ANTI-TRIP GAIN
SEND RELAY
RECV
SEND
CW
SSB
PTT
VOX
ANT
RX ANT
ANT. RLY.
DRIVER TUNE
TUNE
LOAD
VFO
A.C.
12.6V AC
+500V
+250V
-100V
6146B x2 or S2001 x2
12BY7A
12AU6
2SC709
2SC711
2SC373
2SC774
MD60A
1S1136
9000 kHz
8998.5 kHz
R.F.
I.C.