



# IC-201

2 METER BAND

## SSB FM CW TRANSCEIVER



INSTRUCTION  
MANUAL

 ICOM

# TABLE OF CONTENTS

I.	SPECIFICATIONS .....	1
II	DESCRIPTION .....	2
III.	INSTALLATION .....	3
IV.	CONTROL FUNCTIONS .....	6
V.	OPERATION .....	9
VI.	VOLTAGE CHART .....	14
VII.	BLOCK DIAGRAM .....	16

## SECTION I - SPECIFICATIONS

### GENERAL:

Frequency Coverage	144.00 to 146.00 MHz
Number of Solid State Devices	Transistors 53 FET 16 IC 10 Diode 66
Modes	SSB (A3J), FM (F3), CW (A1)
Supply Voltage	DC 13.8V $\pm$ 15% AC117V or 220V $\pm$ 10% (IC-3PU)
Current Drain	Transmit: A3J (PEP 10W) 2.3A A1, F3 2.8A Receive: Max output 0.9A
Antenna Input	50ohms Unbalanced
Frequency Stability	Less than $\pm$ 2KHz at $-10^{\circ}\text{C}$ to $+60^{\circ}\text{C}$
Size	111 (H) x 230 (W) x 260 (D) mm
Weight	5.4 Kg

### TRANSMITTER:

Frequency Range	144.00 to 146.00 MHz VFO control with 4 fixed channels (11.385 to 12.385 MHz)
Modes	A3J (USB, LSB) A1, F3
TX Output	A3J 10W (PEP) A1, F3 10W
Carrier Suppression	40 dB or better
Side Band Suppression	40 dB or better/1KHz Mod (A3J)
Spurious Radiation	-60dB or less
Modulation System	A3J Balanced Modulation F3 Variable Reactance Phase Modulation
SSB Generation System	Filter Type
CW Keying System	Bias control (with monitor)
Maximum Frequency Deviation	$\pm$ 15 KHz (adjusted to $\pm$ 5KHz)
Microphone Impedance	500 ohms

### RECEIVER:

Frequency Range	144.00 to 146.00 MHz
Modes	A3J (USB, LSB) A1, F3
Reception System	A3J, A1, Single Superheterodyne F3, Double Superheterodyne
Intermediate Frequencies	A3J, A1 10.7 MHz F3, 1st 10.7 MHz, 2nd 455 KHz
Sensitivity	A3J, A1 $-6\text{dB}/\mu\text{V}$ S+N+D/N+D 30dB or more F3 $-4\text{dB}/\mu\text{V}$ at 20dB quieting S+N+D/N at $1\mu\text{V}$ input, 30dB or more
Squelch Threshold	$-8\text{dB}$ or less (F3)
Spurious Response	$-60\text{dB}$ or better
Selectivity	A3J, A1 $\pm$ 1.2KHz or more/ $-6\text{dB}$ $\pm$ 2.4KHz or less/ $-60\text{dB}$ F3 $\pm$ 8KHz or more/ $-6\text{dB}$ $\pm$ 16KHz or less/ $-60\text{dB}$

## SECTION II - DESCRIPTION



The ICOM IC-201 transceiver for 2m Band is a precision built high performance transceiver, providing SSB (USB and LSB), FM and CW modes of operation with an output power of 10 watts.

This is an extremely durable transceiver which has state of the art devices such as integrated circuits, field effect transistors, varactor and zener diodes engineered into a tight knit straight forward electronic design throughout both transmitter and receiver. Reliability, low current demand, compactness and ease of operation are the net result.

The dual conversion receiver with its FET front end and high-Q helical resonators boasts low noise and sensitivity of  $-6\text{dB}/\mu\text{V}$  or less. Audio reproduction is of an unusually high order of distortion free clarity. High stability is obtained by using permeability-tuned VFO and double tuning system (50KHz or 16KHz/T). The HC-attenuator is highly effective for crossmodulation interference.

The IC-201 FM and SSB modes have individual filters. Other features include tone control, marker for calibration 0, 500, 1000KHZ, wide band linear amplifier, VOX, Break-in circuit, CW monitor, dual power supplies (DC 13.8V and AC117V or 220V) and an ingenious final PA transistor protection device, APC (automatic protection circuit) is also incorporated in the final output circuitry. Should difficulties occur, (high SWR, ANT mismatch) the APC instantaneously disables the final PA.

All circuitry is constructed in a series of modules which are easily removable for servicing. The modules are housed in a sturdy plated brass frame, which is in turn housed in a rigid metal case, providing an extremely durable and rugged unit. Test points are brought up from all major circuits to facilitate maintenance checks and trouble shooting should the necessity arise.

A modern styled face plate, easy-to-read meters, and convenient controls with specialized design complete the unit's styling. The IC-201 is a welcome addition to any fixed station or automobile.

## SECTION III - INSTALLATION

### 3.1 UNPACKING

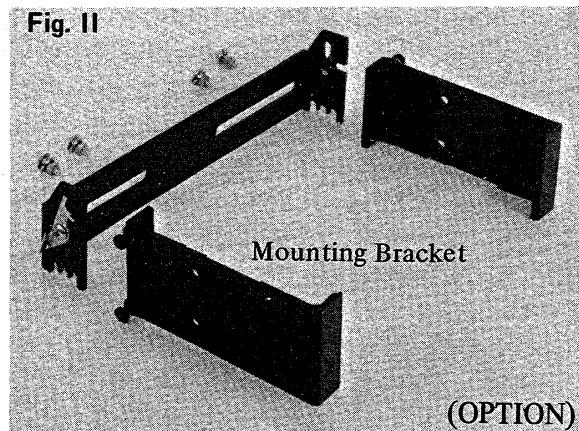
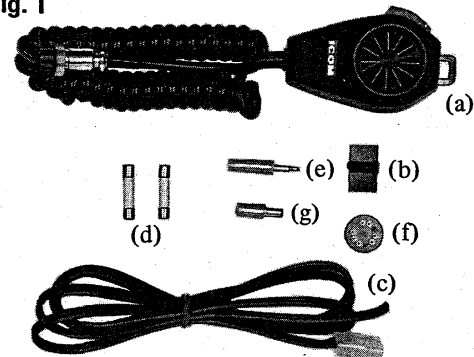
Carefully remove your transceiver from the packing carton and examine for signs of damage. Should any damage be apparent, notify the delivering carrier or dealer immediately, stating the full extent of the damage. It is recommended you keep the shipping cartons. In case storage or reshipment is necessary, they come in handy.

### 3.2 ACCESSORIES

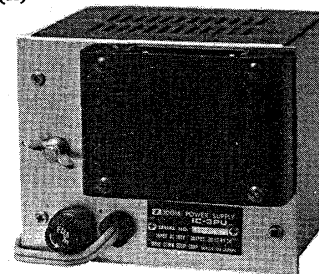
The following accessories are packed with the transceiver.

- (a) Microphone (500 ohms) . . . . .1
- (b) Microphone hook . . . . .1
- (c) DC power cord . . . . .1
- (d) Spare fuse (5A) . . . . .2
- (e) Speaker plug . . . . .1
- (f) 9 pin plug . . . . .1
- (g) Key plug . . . . .1
- (h) IC-3PU AC Power supply . . . . .1

Fig. I



(h)



### 3.3 LOCATION

The IC-201 is designed for high convenience in fixed station use. Beneath the front of the cabinet is a foldaway stand that can be used to tilt the set up, or folded flat when not in use. An optional automobile bracket matched with this transceiver is available for use in your automobile. Any place where it can be mounted with metal screws and bolts will work.

### 3.4 POWER REQUIREMENT

The transceiver is supplied ready to operate from regulated 13.8V DC, 3 ampere negative ground source, by simply plugging the DC cord provided in the same receptacle into the transceiver. AC source can be used by plugging the AC power supply, IC-3PU, into the transceiver.

When used as a fixed station, plug the IC-3PU in the space provided in the back of the case, tighten the locking screw, and then plug in the AC socket. Removing the IC-3PU when using the IC-201 in mobile operation, will make the IC-201 quite a bit lighter.

A convenient mobile Mounting Bracket is available as an option. It can be ordered from your dealer or distributor.

If an AC power supply other than the matching IC-3PU is used, be sure it is adequately regulated for both voltage and current. Low voltage while under load will not give satisfactory results from your transceiver. Receiver gain and transmitter output will be greatly impaired.

If supply voltage happens to decrease to less than 10.5V DC, the operation of the receiver will be suspended in order to prevent misoperation. This indication will be shown by the center meter light going out.

Inserting the IC-3PU in the transceiver automatically switches the supply source from external to the IC-3PU. The IC-3PU must be removed from the transceiver when a DC power supply is used.

**CAUTION: EXCESSIVE VOLTAGE (ABOVE 15V DC) WILL CAUSE DAMAGE TO YOUR TRANSCEIVER. BE SURE TO CHECK THE SOURCE VOLTAGE BEFORE PLUGGING IN THE SUPPLY CORD.**

Included with your transceiver is a DC power cord with plug attached. The RED wire is positive (+), the BLACK, negative (-). If your mobile installation permits, it is best to connect these directly to the battery terminals. This arrangement eliminates random noise and transient spikes sometimes found in automotive accessory wiring. If such an arrangement is not possible, then any convenient B+ lead in the interior of the vehicle and the negative frame can be utilized. Your transceiver provides an internal DC filter that will take out most of the transient noise. Remember, the unit operates on a negative ground system only. It cannot be used in a positive ground automobile. After making your connections, simply insert the plug into your transceiver.

### 3.5 ANTENNA

The most important single item that will influence the performance of any communication system is the antenna. For that reason, a good high quality gain antenna of 50 ohms impedance is recommended for fixed or mobile use, presuming low VSWR, of course.

When adjusting your antenna whether mobile or fixed, by all means follow the manufacturer's instructions. There are some pitfalls to be aware of. For example, do not attempt to adjust an antenna for lowest VSWR when using a diode VSWR meter not engineered for VHF applications. Such readings will invariably have error of 40% or more. Rather, use an in line watt meter similar to Drake WV-4 or Bird Model 23 with VHF cartridge. Further, when adjusting a mobile antenna, do with the motor running preferably above normal idling speed. This will insure proper voltage level to the transceiver.

Do not become alarmed if your transceiver fails to transmit at times during the antenna tune-up procedure. Remember, your transceiver has a built-in Automatic Protection Circuit (APC) that will disable the transmitter if excessive VSWR, a short coaxial line or connector, or other antenna deficiency is present. A quick check on a good 50 ohms dummy load will show the transceiver to be working. The difficulty will lie with the antenna or its transmission line.

### 3.6 MICROPHONE

A high quality dynamic microphone is supplied with your transceiver. Merely plug it into the proper receptacle on the front panel.

This microphone is of 500 ohms impedance with a normal output of 6mV. Should you wish to use a different microphone, make certain it is of equal impedance and output level.

### 3.7 EXTERNAL SPEAKER

An external speaker jack and plug is supplied with your unit, if another speaker or headset use is desired. In either case, the impedance should be 8 ohms. The use of external speaker jack will disable the internal speaker.

### 3.8 EXTRA CRYSTAL SOCKETS

The VFO provides transmit and receive operation on any frequency between 144.00MHz and 146.00MHz. It is convenient, however, to install a crystal for a regularly used frequency such as a club or a repeater frequency. There are 4 external crystal sockets under the Access Cover. They work at A, B, C, & D positions of the Function Switch. When the Course Switch is in the 144 or 145 position on the panels, the frequencies are given as follows:

$$F_x (\text{MHz}) = R_x \text{ freq} - \text{Chart freq}$$

COURSE	MODE		
	USB	LSB	FM. CW
144	132.6135	132.6165	132.6155
145	133.6135	133.6165	133.6155

The frequencies are tuned with the trimmers shown in Fig. VII. If the frequency counter can read as far as 144MHz, the frequencies may be tune in transmission status.

To order additional crystals, the following correlation data is provided. Remember to specify high activity as a prerequisite to your acceptance.

#### CRYSTAL SPECIFICATION:

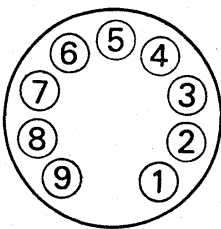
Calibration tolerance:  $20 \times 10^{-6}$  or less  
Holder type: HC-25/u  
Load capacitance: 20 pF  
Effective resistance: 40 ohms or less  
Driving level: 4mW  
Temperature:  $-10^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$

## SECTION IV - CONTROL FUNCTIONS

### 4.1 FRONT CONTROL

- (1) Function Switch: The Xtal A, B, C & D are for extra crystals. In the EXT position, the output frequency is controlled by another VFO connected to the accessory 9 pin-socket. VFO position is the Main VFO.
- (2) Power Switch: for AC and DC.
- (3) T-R Switch: T for Transmit and R for Receive.
- (4) SQL Control: Adjusts squelch threshold.
- (5) CAL: For calibration.
- (6) VOL: Controls audio volume.
- (7) MIC Gain: For adjusting modulation level.
- (8) RIT: For adjusting the receive frequency about  $\pm 4$ KHz.
- (9) COURSE: 144 position is for 144 to 145 MHz, 145 position is for 145 to 146MHz. The Duplx position, is for repeater use.
- (10) Center Meter: Indicates the error against the receive frequency for FM.
- (11) Tuning Knob: 1MHz is covered by a special dual speed system. One revolution of the knob covers 50KHz or 16KHz, depending on the speed.
- (12) Tuning Speed Ratio Selector: For selecting speed ratio.
- (13) Dial Plate Disengage Knob: Dial calibration can be fixed by turning to the left.
- (14) Indication Lamps: RED for Transmit and GREEN for Receive.
- (15) RF GAIN: For adjusting coupling ratio of Helical Cavity attenuator.
- (16) Tuning Dial: When the indication of the dial slips off with the actual frequency, the red indicator on the right or left slightly by the knob after removing in the counter clockwise direction. If the knob is removed, it must be replaced after the adjustment.
- (17) Mode Switch: For selection of either FM, USB, LSB and CW modes.
- (18) Meter: In the S & RF positions, the meter indicates the strength of an input signal in receive and the output power in transmit. As to the standing wave ratio, after the meter indicator is adjusted to the SET position on the meter by the SWR Set located inside (see Fig. VI), you can read the standing wave ratio on the meter by switching the SWR Switch to the SWR position.
- (19) Noise Blanking Switch:
- (20) VOX Switch: For voice control and CW keying control.
- (21) Head Phone Jack: Connects headset here.
- (22) MIC Socket: A 500 ohm microphone with push to talk switch is connected.
- (23) ACC Socket: For connecting accessories (see Fig. III)

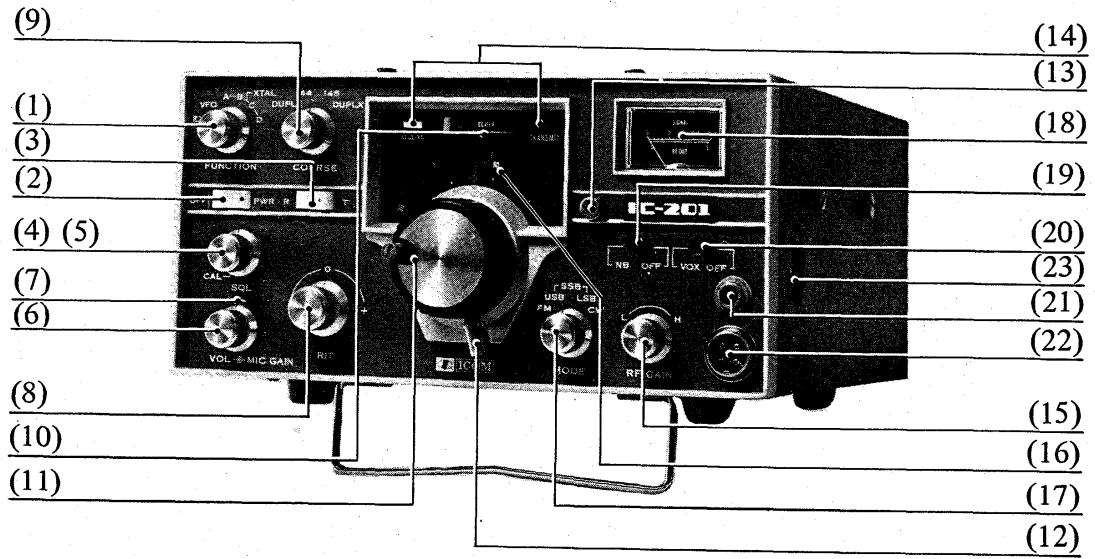
Fig. III



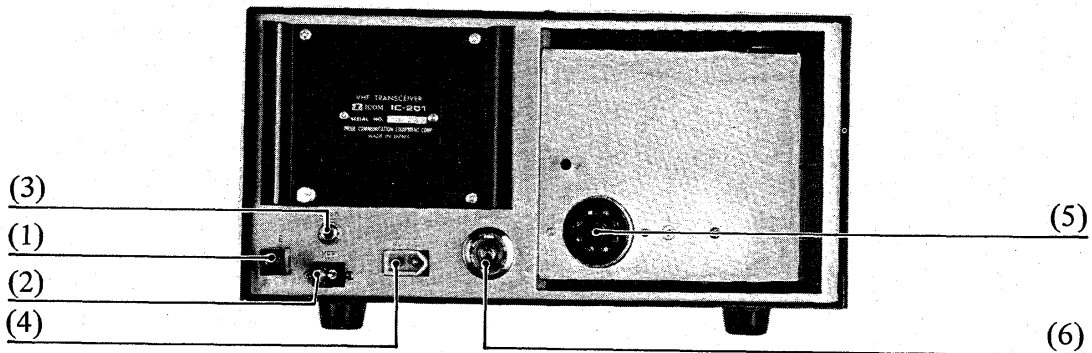
Pin No:	Connection
1.	Discriminator output voltage
2.	Regulated DC 9V
3.	DC 13.8V
4.	External Control
5.	AF detector output has no connection with AF Volume
6.	Modulator input
7.	External VFO
8.	Ground
9.	VFO and fixed channels OSC output



FRONT VIEW (Fig. IV)



BACK VIEW (Fig. V)



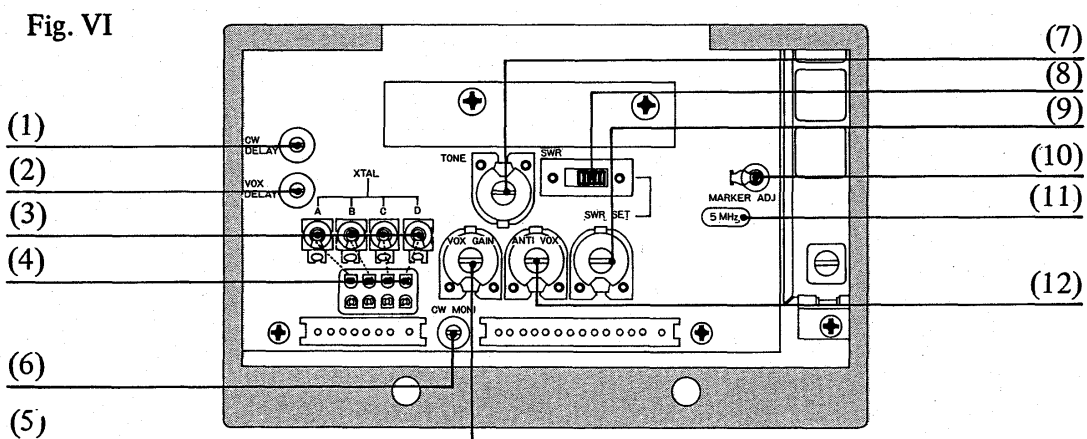
#### 4.2 REAR CONTROL

- (1) GND: Connect to ground to prevent a possible electric shock.
- (2) Key Jack: For CW keying.
- (3) EXT SPK Jack: The external speaker impedance should be 8 ohms. The use of the external speaker jack will disable the internal speaker.
- (4) DC Socket: A DC cord is provided. The RED wire is positive and the BLACK wire is negative.
- (5) AC Socket: Accepts the exclusive IC-3PU. By inserting the IC-3PU the power source is switched from the DC to the AC automatically. Remove the IC-3PU when using DC.
- (6) ANT: Connects with a 50 ohms load and accepts standard coaxial connector.

#### 4.3 ACCESS COVER

Twelve controls are installed inside as shown in Fig. VI.

- (1) Break-in time constant control. (CW DELAY)
- (2) VOX time constant control. (VOX DELAY)
- (3) Frequency adjusting trimmer for fixed channels.
- (4) Fixed channel-crystal sockets.
- (5) VOX Gain Control.
- (6) CW monitor volume control.
- (7) Tone Control.
- (8) SWR-Switch.
- (9) SWR-Set: In the S & RF position in transmit, the meter indicator must be set to the SET position by the control and the meter indicates the standing wave ratio in the SWR position of SWR Switch.
- (10) Marker adjusting Trimmer.
- (11) Marker Crystal.
- (12) Anti-VOX Control.



## SECTION V - OPERATION

### 5.1 INITIAL PREPARATION

- (a) Make sure the power switch is in the 'OFF' position and the T-R switch is in the 'R' position.
- (b) For AC operation using the exclusive IC-3PU, power supply, make sure the AC voltage of the IC-3PU is set for your AC line voltage. The IC-3PU is for 117V or 220V AC.
- (c) For DC operation, note the IC-3PU must be removed from the IC-201, then connect the DC power cord to the DC power source and black lead to the negative side. In the event that these leads are improperly connected, the IC-201 will not function. However, no damage will be incurred since protection provided in the IC-201 will cause the fuse to blow.
- (d) Don't remove and replace the power supply cord, antenna and external speaker with the power on.
- (e) If the fuses blow, a 1A for 220V AC or a 2A for 117V AC and a 5A in 13.8V DC should be used.
- (f) Connect the antenna to the antenna coax connector. Make sure the coax line is of the correct impedance (50 ohms) and is neither shorted nor open.
- (g) Turn the volume and squelch controls to the maximum counter clockwise position.

### 5.2 OPERATION

- (a) Place the function switch in the 'VFO' position, and the Course Switch in the 144, 145 or Duplex position.
- (b) Place the tuning scale at any frequency you desire.
- (c) Place the RIT in the 'O' position.
- (d) Turn the SQL control clockwise to just before the CAL position, if FM is desired.
- (e) It is advisable that the Noise Blanker be in the 'OFF' position.
- (f) Make sure the VOX switch is 'OFF'.
- (g) Turn RF Gain to the high (H) position.

### 5.3 RECEPTION

- (a) Turn the power switch on (before turning on, make sure the T-R Switch is in the R position.)
- (b) Slowly adjust the volume control to a suitable level.
- (c) Turn the tuning knob until the S meter reads maximum.  
In case, SSB does not receive normal sound, switch to USB, or LSB. For CW adjust the tuning knob until you hear a tone of about 1KHz. (This frequency is the same for the TX and RX frequency.) Tune the center meter to 'O' position for FM.
- (d) Carefully adjust the squelch control clockwise until the noise just disappears. This is the proper squelch threshold setting and must be done when no signal is present. Your transceiver will now remain silent until and in-coming signal is received which opens the squelch. If the Squelch is unstable due to the reception of weak or unstable stations, adjust the squelch control further until the proper threshold is obtained.
- (e) For FM, the center meter shows the difference between your receiver frequency and the frequency of the receiving signals. If there is some difference, you can compensate for it with the RIT control.

- (f) In the CAL position of the squelch control knob, the Marker will work. The Marker frequencies of 0, 500KHz, 1000KHz can be adjusted accurately by these frequencies on the dial scale.
- (g) Adjust the tone in receive as you desire with the tone control, located under the access cover.
- (h) If overload or cross modulation etc. occurs, adjust the RF Gain to the best level.

#### 5.4 TRANSMITTING

Please monitor the frequency before transmission.

- (a) Set the MIC gain control to 1/2 open.
- (b) Set the T-R switch to the 'T' position, or push the PTT button on the microphone and the set will transmit. At the same time, the red letters 'XMIT' will be lit, and the blue 'RECV' letters will go out. The S & RF meter will indicate the relative output power.
- (c) SWR Set: Turn the SWR set control under the Access Cover, until the meter needle reaches the SET position, with the meter in the S & RF position. Place the switch in the SWR position, and the meter will indicate SWR.
- (d) Select the Mode you wish to operate in.
- (e) FM: The needle indicator should be 'on' or near the 20 dB mark.
- (f) SSB: The needle-indicator moves most of the time when speaking and remains static when not speaking.
- (g) CW: It is possible to monitor your CW by connecting the Key jack to the CW plug at the back. (If the plug is taken off, the set will always transmit.)
- (h) MIC Gain: For deeper modulation, turn the MIC Gain more to the clockwise position.
- (i) VOX and Break-in: The VOX is for FM and SSB use and Break-in is for CW use.

Under Access Cover, the following settings can be adjusted.

Before adjustment set controls as follows:

- (a) VOX GAIN: Maximum counter clockwise.
- (b) ANTI VOX: Maximum counter clockwise.
- (c) VOX DELAY: Maximum clockwise.
- (d) CW DELAY: Maximum clockwise.
- (e) VOX SWITCH: Turn to VOX position.

VOX adjustment for FM and SSB:

- (1) Without pushing the PTT switch, talk into the microphone and adjust the VOX gain control until the IC-201 automatically switches to transmit.
- (2) The time it takes the set to return to receive, after you stop talking, is adjusted by the VOX time constant control. Turning the control counter clockwise shortens this time. adjust the time so that the VOX operates smoothly without returning to receive during normal pauses in speech.
- (3) The Anti-VOX control is set so the VOX does not operate from sound coming from the speaker.
- (4) Generally setting these controls for low gain provides smooth VOX operation.

CW Break-in adjust:

- (1) Set the mode switch in the CW position and the keyer will automatically switch the IC-201 to transmit.
- (2) As with the VOX circuit, the return to receive time is adjusted by the Break-in time constant control. Turning counter clockwise shortens this time.  
Remember to turnoff the VOX control switch when not using VOX.

#### 5.5 FOR REPEATER USE

You can transmit at 600KHz below any receive frequency for repeater use by placing the Course Switch in the Duplx position. You may transmit at any frequency difference up to at least 600KHz above or below the receive frequency, by installing a crystal in the spare crystal socket in the pre-mix module in accordance with the formula shown as follows.

$$\text{Crystal Frequency} = \frac{\text{Lowest operating freq} \pm \text{offset} - 22.085}{8}$$

Crystal specifications are same as 3.8, except holder type: HC-18/u.

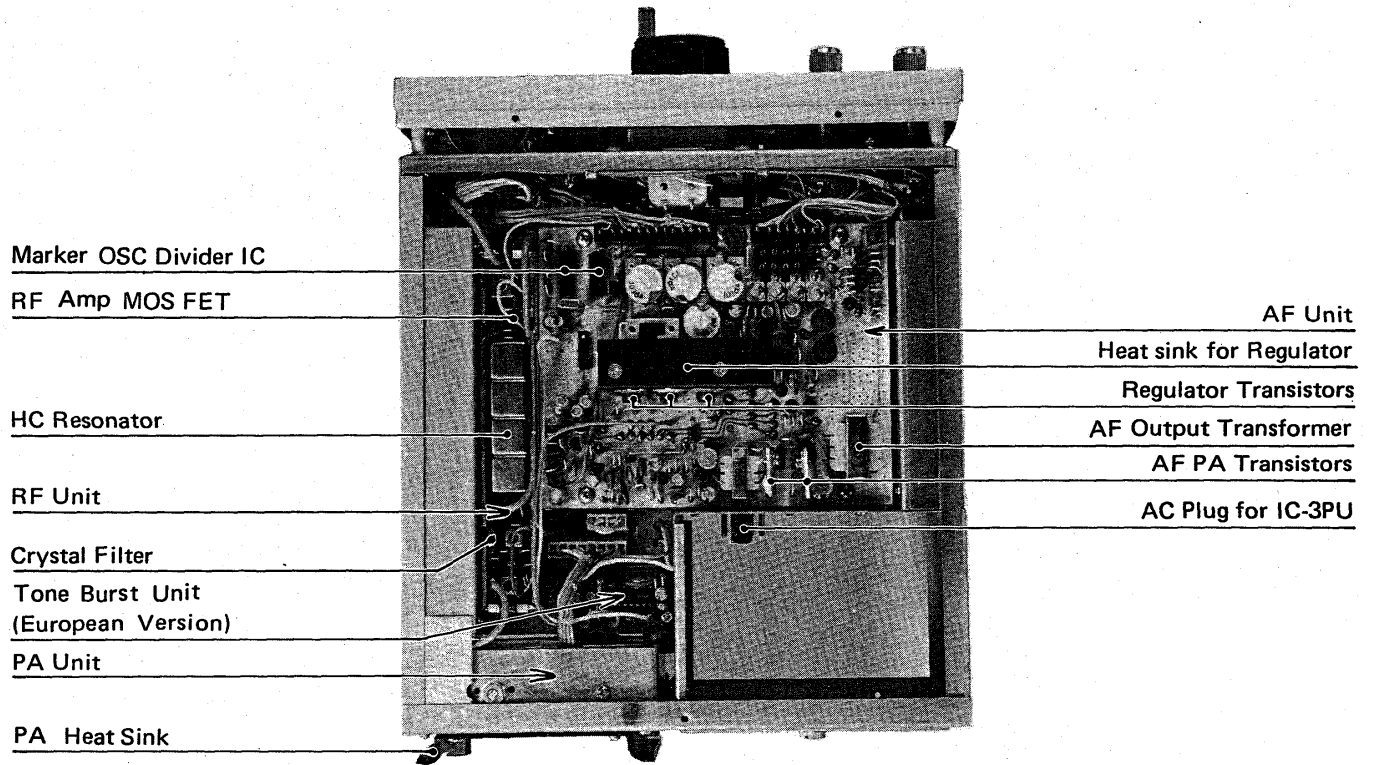
**CAUTION: BEFORE YOU INSTALL ANY SPARE CRYSTAL, FOR DUPLEX CHOOSE A FREQUENCY THAT WILL NOT ALLOW ANY POSITION OF THE VFO TO PRODUCE A FREQUENCY THAT IS OUT OF THE 144MHz TO 146MHz BAND WHILE USING THE NEWLY INSTALLED CRYSTAL.**

The necessity of completely realigning the unit is unlikely. The most common cause of breakdown is component failure. It is felt that the average owner would not have the necessary equipment and facilities to accomplish realignment in any case, if it did become necessary.

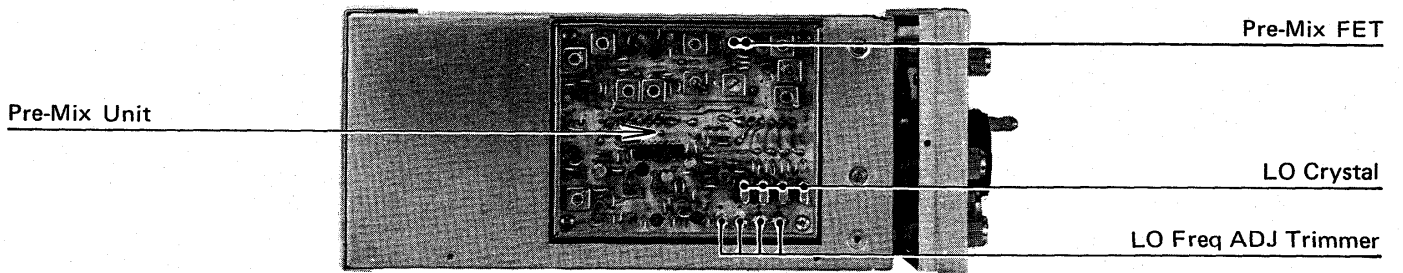
Great care and precision are employed in its manufacture, and service is provided to ensure it meets specifications. Adjustments not outlined here in, should not be undertaken by the owner. This equipment has been carefully aligned with very expensive and accurate equipment, including a Spectrum Analyzer to reduce Spurious Radiation.

**DO NOT** adjust, replace parts, or perform any type of maintenance unless you are fully qualified to do so.

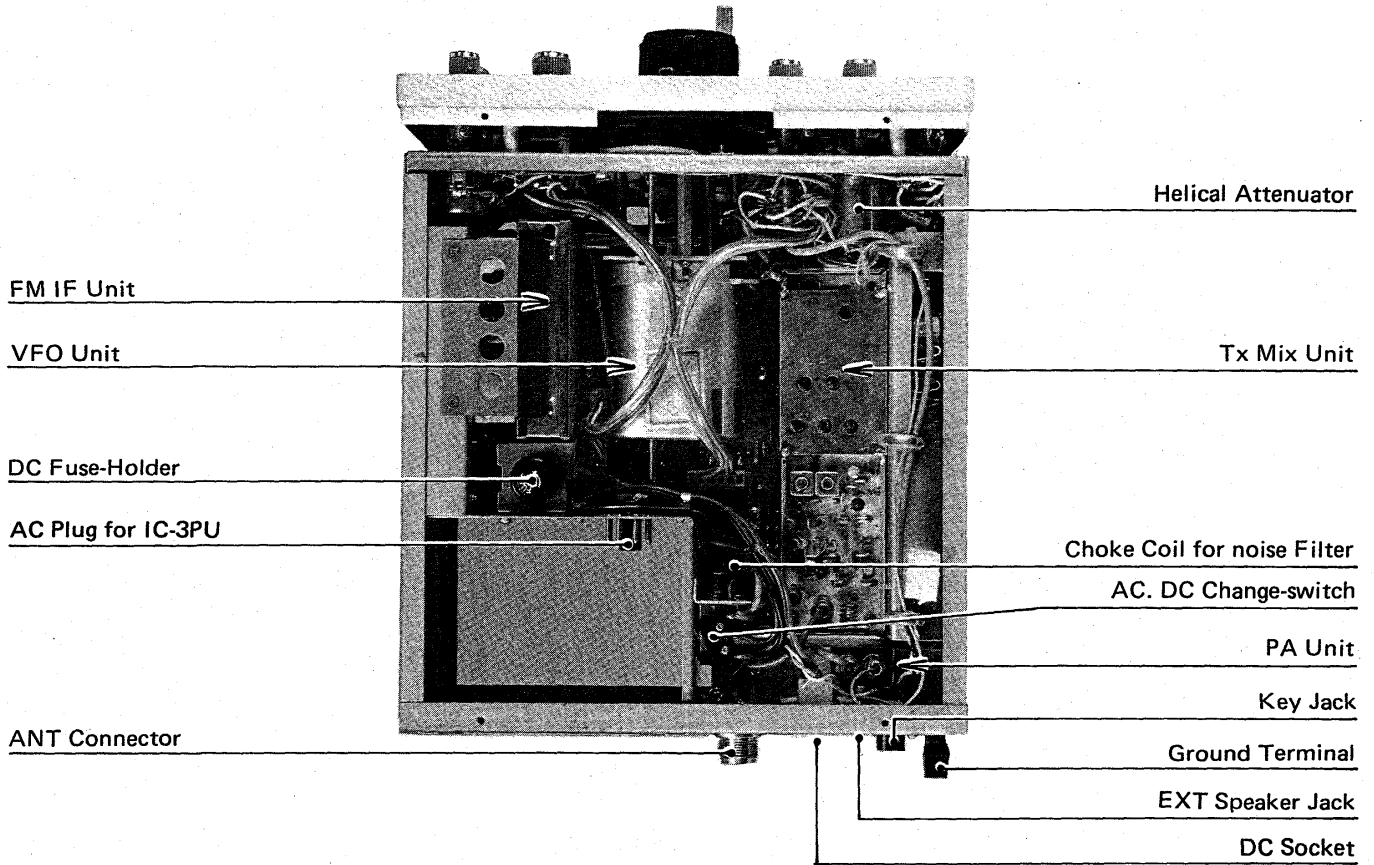
TOP VIEW (Fig. VII A)



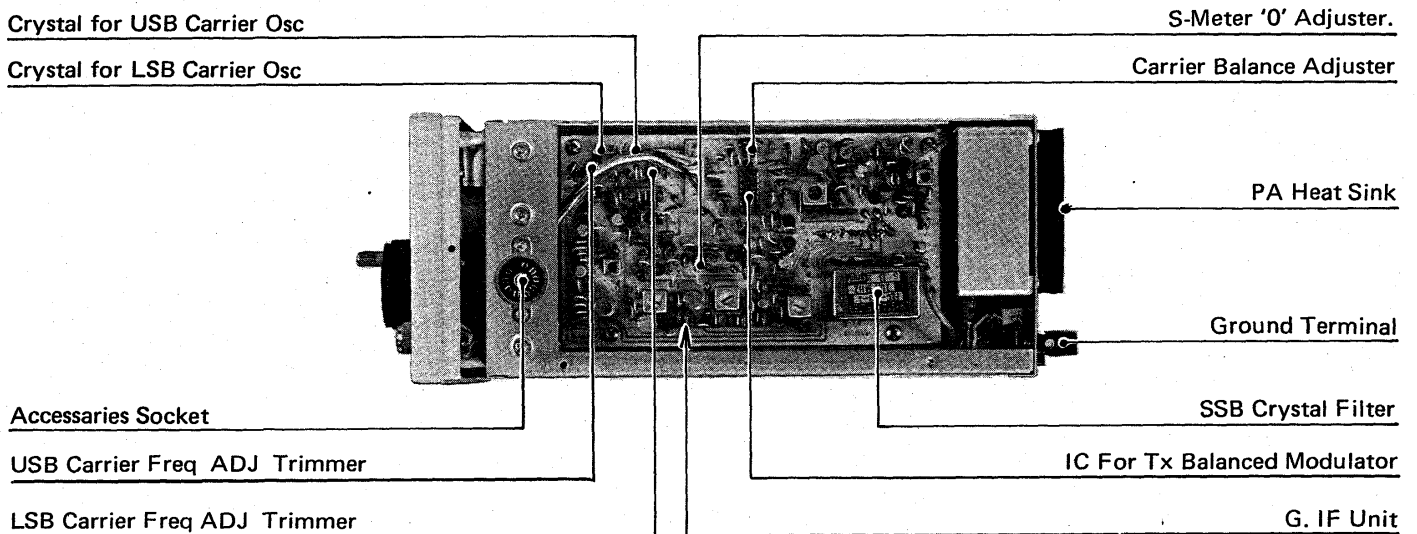
(Fig. VII B)



BOTTOM VIEW (Fig. VIII A)



(Fig. VIII B)



## SECTION VI VOLTAGE CHART

RF

T: TRANSMIT R: RECEIVE

NO	TYPE	GATE	SOURCE	DRAIN	NOTES
Q1	3SK48	0(G1) 6(G2)	0.15	9.2	R
Q2	2SK19	0	1.4	9.6	R
Q3	MEM616	0(G1) 6.4(G2)	0.3	9.5	R

PRE. MIX

NO.	TYPE	BASE (GATE)	EMITTER (SOURCE)	COLLECTOR (DRAIN)	NOTES
Q1	2SC372	3.6	2.4	7.7	
Q2	2SC372	3.1	1.5	6.9	
Q3	2SC372	1.8	1.3	3.2	
Q4	2SC372	1.3	1.4	7.8	
Q5	2SC763	1.4	1.4	9.1	
Q6	2SC763	0.9	0.4	9.0	
Q7	2SK19	(-0.1)	(0.5)	(8.8)	
Q8	2SK19	(-0.1)	(0.5)	(8.8)	

NO.	TYPE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	NOTES
IC 1	MC3301P	0.6	-	-	-	4.7	0.6	0	0.6	4.4	4.7	0.6	0.6	0.6	9.7	T, FM

GIF

NO.	TYPE	BASE (GATE)	EMITTER (SOURCE)	COLLECTOR (DRAIN)	NOTES
Q1	2SK19	(0)	(1.6)	(9.8)	R
Q2	2SA562	9.2	9.8	4.8	R
Q3	2SC373	0.2	0.2	9.0	R
Q4	2SC711	0.2	0	4.3	R
Q5	2SK19	(0)	(1.0)	(8.0)	R
Q6	MEM616	0(G1) 4.2(G2)	(1.1)	(9.3)	R
Q7	2SC1312	2.0	1.5	5.6	R
Q8	2SA562	1.1	1.6	0	R
Q9	2SK19	(0)	(0)	(7.3)	R
Q10	2SK19	(0)	(0)	(4.3)	T
Q11	2SC372	0	0	4.3	T
		0.8	0	0	R
Q13	2SC372	2.0	1.5	9.6	
Q14	2SC372	2.3	1.8	9.6	

NO.	TYPE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	NOTES
IC1	LM3028AH	4.3	-	0	-	4.3	8.0	8.0	8.0							R
IC2	LM703LH	6.7	-	1.5	0	1.5	-	6.7	7.2							R
IC3	LM703LH	7.6	-	1.5	0	1.5	-	7.6	8.2							R
IC4	LM3028AH	5.8	1.2	0	-	5.8	6.8	5.0	6.8							R, SSB
IC5	MC1496L	2.6	2.0	2.0	2.6	2.4	7.7	-	5.0	-	5.0	-	7.7	-	0	T

VFO

NO	TYPE	BASE (GATE)	EMITTER (SOURCE)	COLLECTOR (DRAIN)	NOTES
Q1	MK10	(0)	(1.2)	(6.0)	VFO
Q2	MK10	(0)	(1.5)	(3.2)	VFO
Q3	2SC710	3.6	3.2	6.5	VFO



T. MIX

NO	TYPE	BASE (GATE)		EMITTER (SOURCE)		COLLECTOR (DRAIN)		NOTES
Q2	MEM616	0(G1)5.5(G2)		(0.2)		(13.0)		T
Q3	2SC372	0		0		5.5		T
Q4	MRF604	0.7		0		13.0		T

NO	TYPE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	NOTES
IC 1	MC1496L	3.2	2.5	2.5	3.2	1.5	8.9	-	5.7	-	5.7	-	8.9	-	0	T

AF

NO.	TYPE	BASE (GATE)		EMITTER (SOURCE)		COLLECTOR (DRAIN)		NOTES
Q1	2SC1210	5.2		4.8		9.8		CAL ON
Q2	2SD360	10.7		10.0		13.8		
Q3	2SD360	10.7		10.0		13.8		T
Q4	2SC372	1.6		0.8		10.7		T
Q5	2SD360	10.7		10.0		13.8		R
Q6	2SC372	1.6		1.0		8.8		
Q7	2SC372	2.7		2.1		7.0		
Q8	2SC372	0.7		0		9.0		
Q9	2SC373	0		0		2.3		SSB, FM
Q10	2SC1312	1.0		0.4		1.6		
Q11	2SC372	1.6		1.0		4.2		
Q13	2SC373	0		0		9.8		
Q14	2SC373	9.8		9.4		10.0		CW, KEYING
Q15	2SC373	0		0		10.5		SSB, FM
Q16	2SC372	2.0		1.6		9.8		SSB, FM
Q17	2SA562	9.8		9.8		0		SSB, FM
Q18	2SK30A	(0)		(2.0)		(9.8)		SSB, FM
Q19	2SC373	2.3		1.7		6.4		SSB, FM
Q20	2SC711	1.7		1.1		5.0		CW, KEYING
Q21	2SC1312	1.0		0.4		1.4		R
Q22	2SC1210	1.4		0.8		8.5		R
Q23	2SD360	0.6		0		13.8		R
Q24	2SD360	0.6		0		13.8		R

NO.	TYPE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	NOTES
IC 1	M53290P	1.9	0	0	0	4.8	0	0	1.5	1.5	0	0.8	1.9	0	1.4	CAL
IC 2	M53200P	0.8	0.8	2.8	0.8	2.8	3.5	0	1.4	1.2	1.6	1.2	1.4	1.4	4.8	CAL

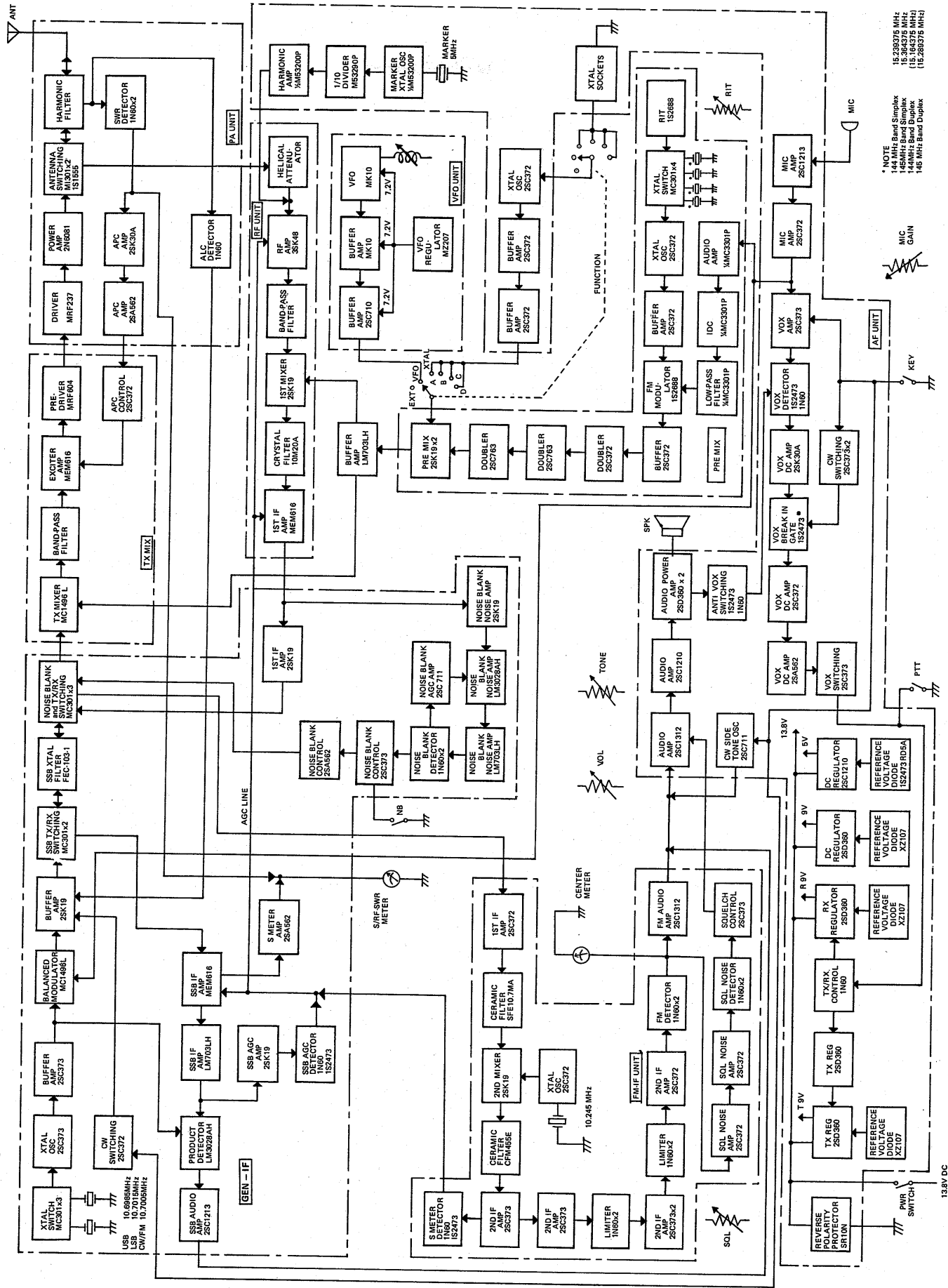
FM. IF

NO	TYPE	BASE (GATE)		EMITTER (SOURCE)		COLLECTOR (DRAIN)		NOTES
Q1	2SC372	1.5		0.9		9.5		R, FM
Q2	2SK19	(0)		(1.4)		(8.5)		R, FM
Q3	2SC373	1.5		0.9		9.0		R, FM
Q4	2SC373	0.6		0		1.4		R, FM
Q5	2SC373	3.7		3.6		4.8		R, FM
Q6	2SC373	6.6		5.8		8.0		R, FM
Q7	2SC372	4.0		3.4		8.9		R, FM
Q8	2SC372	2.4		2.6		9.1		R, FM
Q9	2SC372	1.8		1.2		9.6		R, FM
Q10	2SC372	1.4		0.8		2.2		R, FM
Q11	2SC373	0.2		0		1.4		R, FM
Q12	2SC1312	4.1		3.7		5.1		R, FM

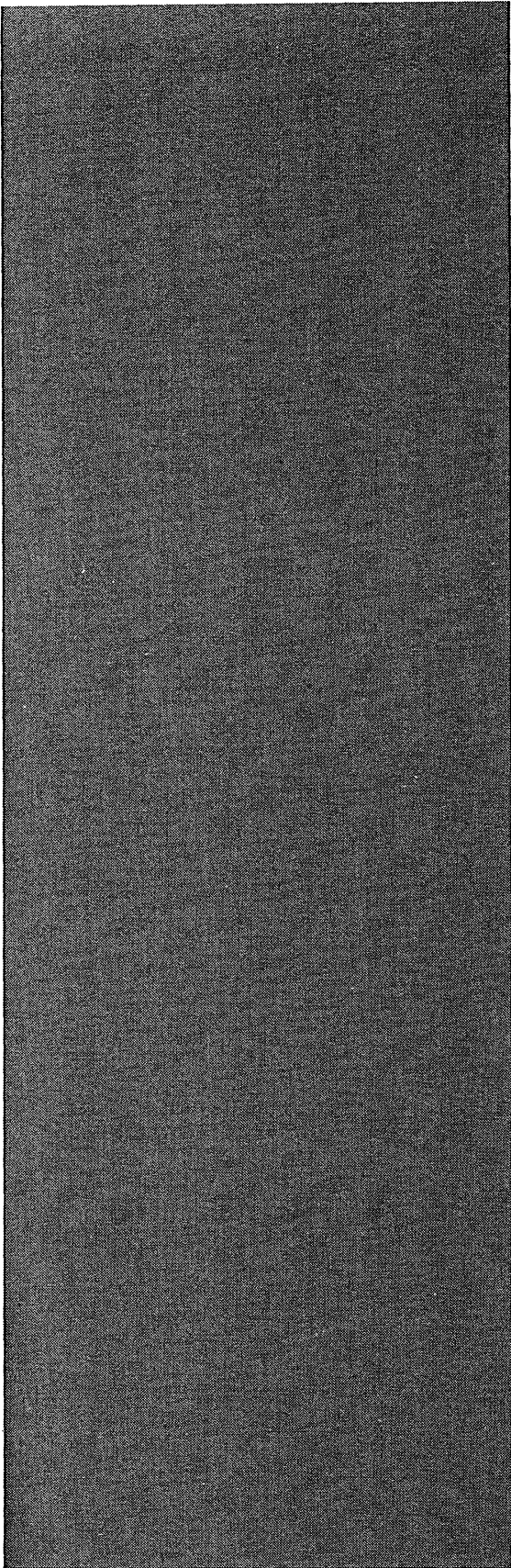
PA

NO.	TYPE	BASE (GATE)		EMITTER (SOURCE)		COLLECTOR (DRAIN)		NOTES
Q1	MRF237	0.7		0		13.8		T, SSB
Q2	2N6081	0.7		0		13.8		T, SSB
Q3	2SK30A	(0)		(1.5)		(9.7)		T, SSB
Q4	2SA562	9.7		9.9		0		T, SSB

# SECTION VII - BLOCK DIAGRAM



\* NOTE  
 15.238375 MHz  
 144 MHz Band Simplex  
 15.364375 MHz  
 145MHz Band Simplex  
 15.164375 MHz  
 144MHz Band Duplex  
 10.289375 MHz  
 145 MHz Band Duplex



**INOUE COMMUNICATION EQUIPMENT CORPORATION**

**1-6-19, KAMIKURATSUKURI, HIRANO-KU,  
OSAKA JAPAN**

