

YAESU MODEL FT-227RA

The FT-227RA is an adaptation of the FT-227R which provides expanded memory capability as well as scanning capability. The scanner will search for a busy or clear channel, as desired, or will scan indefinitely until halted by a press of the microphone PTT switch.

The following changes in the FT-227R Instruction Manual should be observed. Apart from these changes, operation is identical to that of the FT-227R.

1. All references to "FT-227R" should read "FT-227RA".
2. The microphone supplied with the FT-227RA contains up/down scanner controls. The microphone plug and jack in the FT-227RA contain 6 pins, compared to 4 pins for the FT-227R.
3. The FT-227RA FUNCTION switch has memory positions M1, M2, M3, and M4, as shown. Also on the FUNCTION switch are $\pm 600\text{kHz}$ repeater positions.
4. The bottom of the cabinet contains the HI/LOW RF output switch, as well as the BUSY-MAN-CLEAR scanning select switch.
5. Page 18, "PLL CONTROL SECTION", should have its first paragraph modified to read: "The optical coupling system utilizes two photo-interruptors Q2 and Q3 (both ON-1105) to generate two signal outputs which are amplified by Q4 and Q5 (both 2SC1815Y) and applied to the PLL control unit.
6. The FT-227RA block diagram, schematic diagram, and parts list should be referred to for correct information.

FT-227RA OPERATION

For scanner operation, proceed as follows. Place the BUSY-MAN-CLEAR switch in the MAN position, and the MR switch should be OFF. Pressing the UP button for an instant will cause a shift of 10kHz upwards. Holding the UP button down for more than $\frac{1}{2}$ second will initiate scanning higher in frequency. Press the UP button once again to halt the scan at the desired frequency.

Pressing the DN switch in the same manner will cause scanning toward a lower frequency.

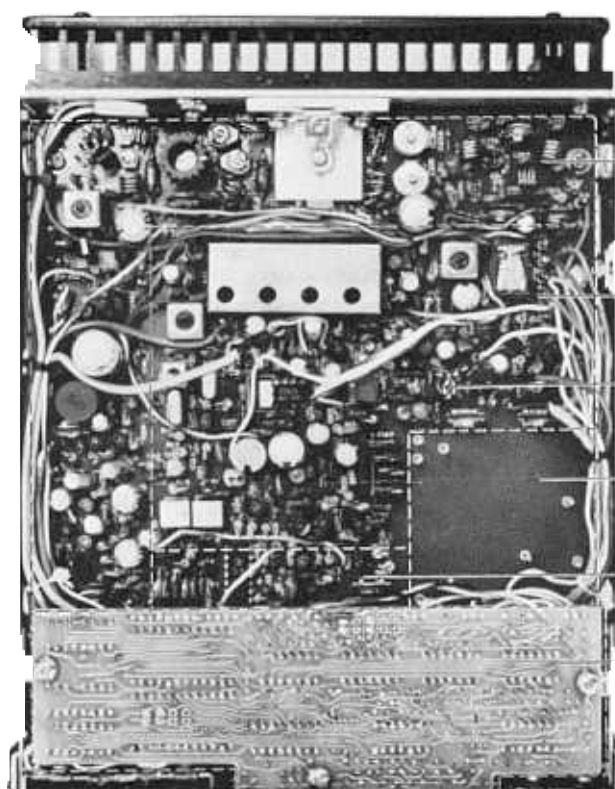
Placing the scanning select switch in the BUSY position will cause the scan to be halted whenever the squelch is tripped by a signal on the frequency being scanned. Placing the switch in the CLEAR position will cause the scan to be halted when the receiver is muted (no signal present). When the optional tone squelch is used, the scan will be halted according to the condition of the main squelch, not the tone squelch.

For memory operation, proceed as follows. Memory channels M1 — M3 are for simplex operation only. With the MR switch OFF, dial in the desired frequency, press M, and then the frequency will be stored in the channel selected by the FUNCTION switch. For instant return to the simplex frequency, press MR.

Memory channel M4 can be used for repeater operation. Store the repeater UPLINK (input) frequency in channel M4, then rotate the dial to the repeater downlink frequency. With the MR switch OFF, you will now be transmitting on the memorized frequency, and receiving on the dial frequency. Pressing the MR button puts you on the memorized frequency for both transmit and receive.

The $\pm 600\text{kHz}$ positions of the FUNCTION switch are used only for securing repeater offset on the dial frequencies.

For selection of 10 watts or 1 watt of RF output, place the HI/LOW switch in the HI or LOW position, respectively.



MAIN UNIT
TRANSMITTER
SECTION

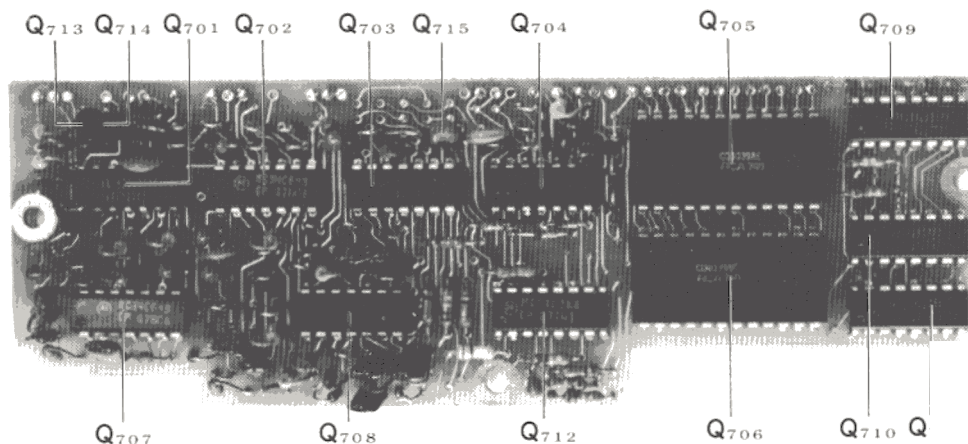
MAIN UNIT SECTION
RECEIVER

RED WIRE MUST BE CUT
— WHEN TONE SQUELCH UNIT
IS INSTALLED.

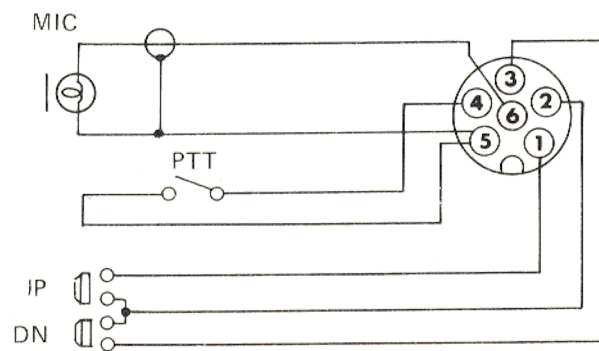
TONE SQUELCH UNIT
(WHEN INSTALLED)

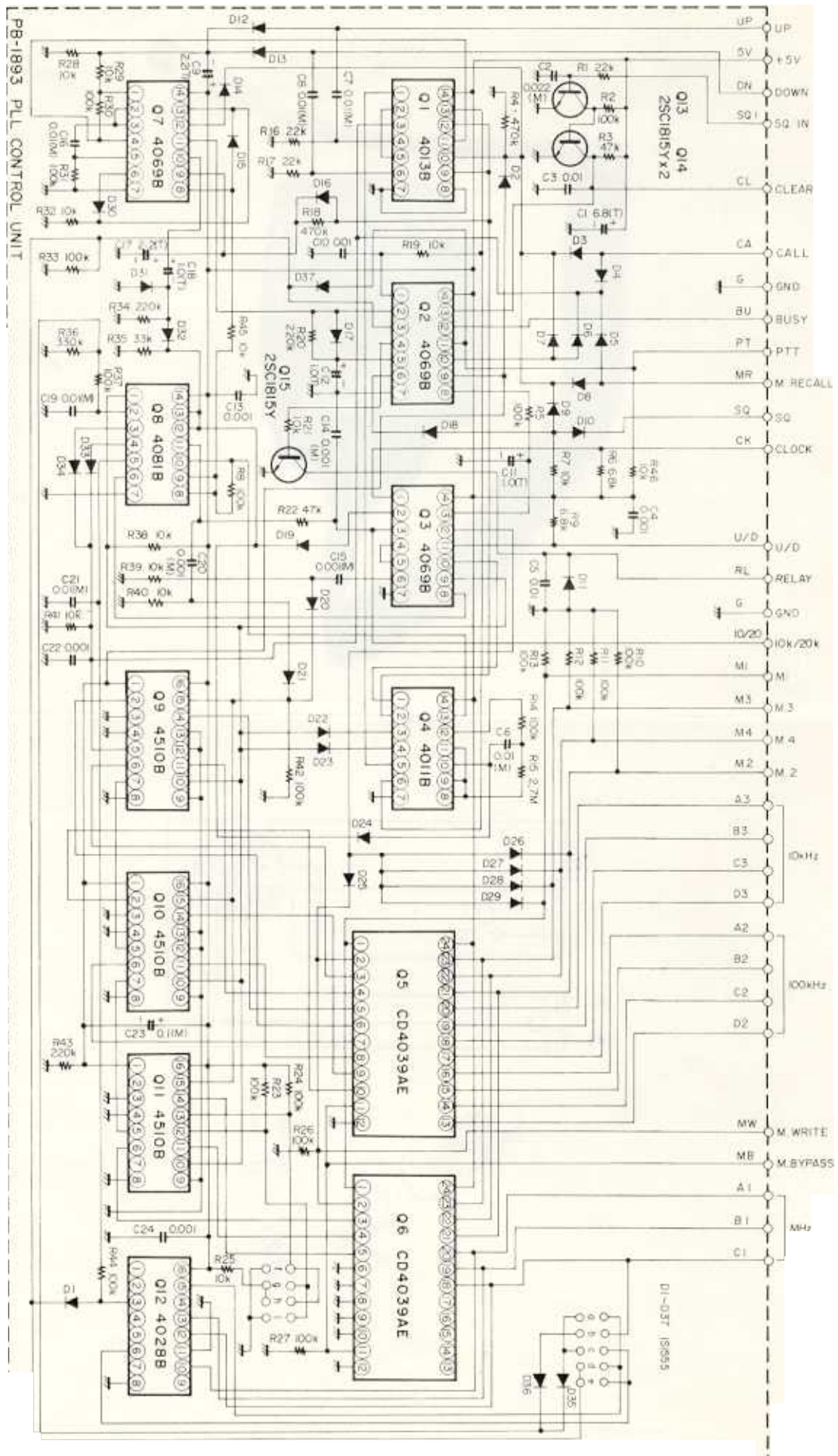
TONE BURST
SECTION

PLL CONTROL
UNIT



PLL CONTROL UNIT





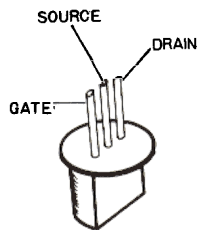
FT-227RA PARTS LIST

MAIN CHASSIS			PHOTO INTERRUPTER BOARD		
Symbol Number	Parts Number	Description	Symbol Number	Parts Number	Description
		TRANSISTOR		018500AZ	Photo interrupter board with components
Q1	22402353	2SD235	PB-1850	60318500	P.C. Board
		DIODE			TRANSISTOR
D5~7	21015550	Silicon 1S1555	Q4,5	22318154	2SC1815Y
D1	21090130	" U05B			
D2	21090111	Zener WZ050			
		RESISTOR	Q2,3	29090014	PHOTO INTERRUPTER ON1105
R2	41143100	Carbon film 1/4W TJ 10Ω			
R1	41143821	" " " " 820Ω			RESISTOR
R6	41143562	" " " " 5.6KΩ	R11,13	40143221	Carbon film 1/4W VJ 220Ω
R7	42124220	*Composition 1/2W GK 22Ω	R12,14	40143103	" " " " 10KΩ
		POTENTIOMETER			
VR1(with S1)	49800079	DM11A-5M1111 10KΩB/10KΩA			
		CAPACITOR			SWITCH BOARD
C1	31829150	Ceramic disc 50WV 15PF (SI.)	Symbol Number	Parts Number	Description
C10	30820102	" " " 0.001μF		018960AZ	SW board with components
C2,3	30820103	" " " 0.01μF	PB-1896	60318960	P.C. Board
C7	34120107	Electrolytic 10WV 100μF			
C6	34220106	" 16WV 10μF			DIODE
C3	34220226	" " 22μF	D8	21015550	Silicon 1S1555
C4	34220107	" " 100μF	D3,4	21090111	Zener WZ050
		INDUCTOR			RESISTOR
L1	55003160	# 220196	R3	40143103	Carbon film 1/4W VJ 10KΩ
		AF CHOKE			CAPACITOR
CH1	50000010	# 230012	C8,9	34220106	Electrolytic 16WV 10μF
		METER			SWITCH
M1(with PL6)	74000310	AP-120	S2,3,5	65000032	2U-EE-20
		SPEAKER	S4	65000044	2U-OA-20
SP1	76000013	SM-77K-Y			
		SWITCH			
S6,7	63000008	SSF-22-08B			
S8	63000011	SSH-23-08			
S1(with VR1)					
		RECEPTACLE			
J1	68020006	FM142S			
J2	68060002	FM146S			
J3	68050003	CS250			
J4	68000007	JSO239			
J5	68020012	SG8050			
		LAMP			
PL1-5,7	14000025	BQ054-32732B 14V 40mA			
PL6(with M1)					

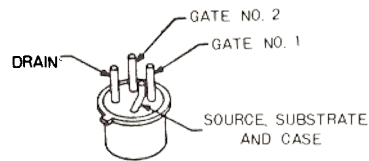
FT-227RA PARTS LIST

PLL CONTROL UNIT			ACCESSORIES		
Symbol Number	Parts Number	Description	Symbol Number	Parts Number	Description
	018930AZ	PLL Control unit with components		97000017	Microphone Assembly YE-17
PB-1893	60518930	P.C. Board			with Microphone hanger, screws
		IC & TRANSISTOR		67060001	Microphone plug FM-146P
Q704	25000114	IC MC14011B		67050003	ACC Plug CP0084
Q701	25000113	" MC14013B			
Q712	25000136	" MC14028B		96000020	Power cord Assembly #240028
Q702, 703, 707	25000178	" MC14069B		67020006	Power plug FM142P
Q708	25000093	" MC14081B		69020002	Fuse Holder SN1101
Q709~711	25000091	" MC14510B		73000003	Fuse 3A
Q705, 706	25000192	" CD4039AE			
Q713~715	22318154	Transistor 2SC1815Y		67020008	Sigarette Lighter Adapter
		DIODE		73000003	Fuse 3A
D701~737	21015550	Silicon 1S1555		67020003	External Speaker plug P-2240
		RESISTOR		93100046	Tap connector No.560
R714	40143472	Carbon film 1/4W VJ 4.7KΩ		80038631	Stand
R706, 709	40143682	" " " " 6.8KΩ			
R707, 719, 728, 729	40143103	" " " " 10KΩ		80038661	Mobile Bracket Assembly
R732, 738, 741, 746					with Set Screws
R721, 725, 739, 740, 745	41143103	" " " TJ 10KΩ			
R701, 716, 717	40143223	" " " VJ 22KΩ			
R735	41143333	" " " TJ 33KΩ			
R703, 722	40143473	" " " VJ 47KΩ			
R702, 705, 730, 731	40143104	" " " " 100KΩ			
R733, 737, 744					
R708, 710~713, 723	41143104	" " " TJ 100 KΩ			
R724, 726, 727, 742					
R720, 734	40143224	" " " VJ 220KΩ			
R744	41143224	" " " TJ 220KΩ			
R704, 718	40143474	" " " VJ 470KΩ			
R715	42144275	" composition 1/4W GK 2.7MΩ			
		CAPACITOR			
C704, 713, 722, 724	30820102	Ceramic disc 50WV 0.001μF			
C703, 705, 710	30820103	" " " 0.01μF			
C714, 715, 720	36825102	Mylar " 0.001μF			
C706~708, 716, 719	36825103	" " 0.01μF			
C721					
C702	36825223	" " 0.022μF			
C723	36526104	Tantalum 35WV 0.1μF			
C711, 712, 713	36526105	" " 1μF			
C709, 717	36526225	" " 2.2μF			
C701	36326685	" (N.L) 20WV 6.8μF			

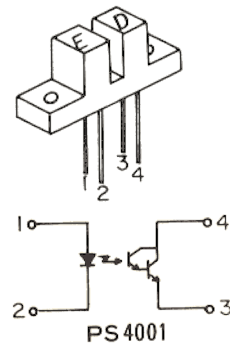
TRANSISTOR & IC CONNECTIONS



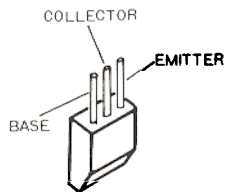
2SK19Y
2SK19GR



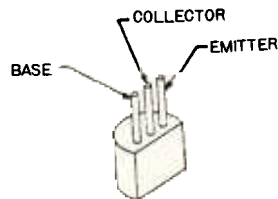
3SK40M
3SK51



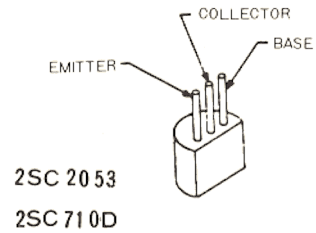
PS4001



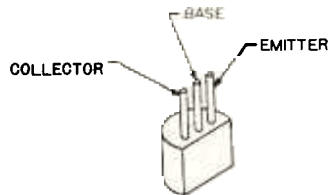
2SC535A



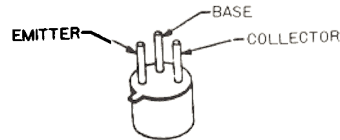
2SA564A



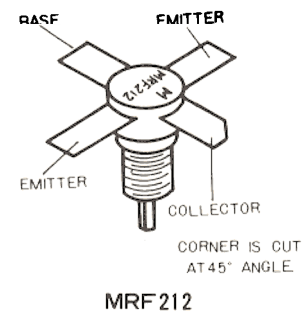
2SC2053
2SC710D



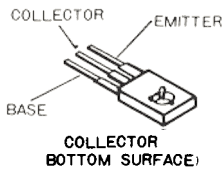
MPSA13



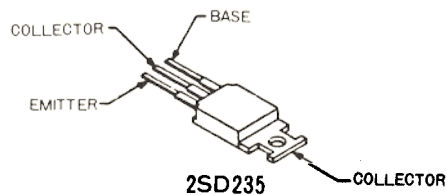
2SC730



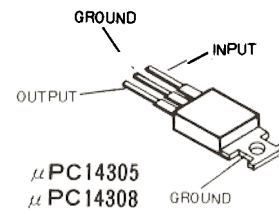
MRF212



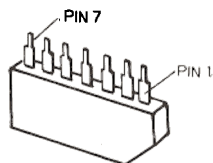
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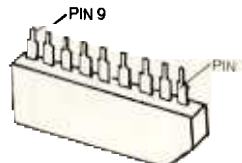
2SD235



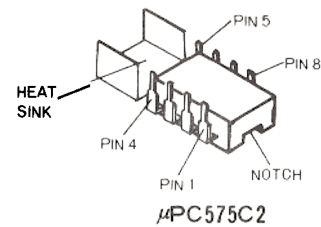
PC14305
PC14308



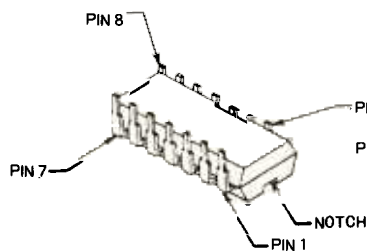
PC577H



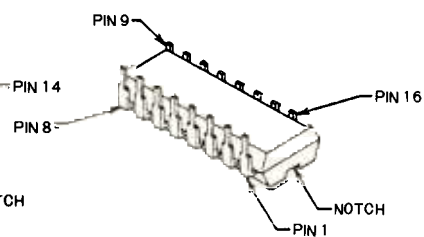
TC5081



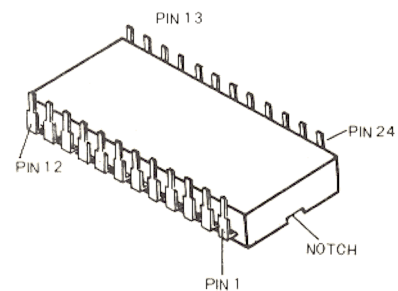
PC575C2



MC14011B
MC14081B



MSM561 MC14049B
MC14008B MC14510B
MC14028B MC14511B
MC14042B MC14519B



PD857C

Q308 (μ PD857C) PROGRAMMABLE DIVIDER CODE

Q308 PROGRAMMABLE INPUT PIN →			1	2	3	4	5	6	7	8	9	10	11
P/J305 →			4	5	6	7	8	9	10	11	12	13	14
P/J304 →			11	10	9	8	7	6	5	4	3	2	1
FREQUENCY ↓	DIAL DISPLAY ↓	PROGRAMMABLE DIVIDER RATIO ↓	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	P ₁₁
144.00	4.000	1/100	0	0	0	0	0	0	0	0	1	0	0
4.01	4.010	1/101	1	0	0	0	0	0	0	0	1	0	0
4.02	4.020	1/102	0	1	0	0	0	0	0	0	1	0	0
4.03	4.030	1/103	1	1	0	0	0	0	0	0	1	0	0
4.04	4.040	1/104	0	0	1	0	0	0	0	0	1	0	0
4.05	4.050	1/105	1	0	1	0	0	0	0	0	1	0	0
4.06	4.060	1/106	0	1	1	0	0	0	0	0	1	0	0
4.07	4.070	1/107	1	1	1	0	0	0	0	0	1	0	0
4.08	4.080	1/108	0	0	0	1	0	0	0	0	1	0	0
4.09	4.090	1/109	1	0	0	1	0	0	0	0	1	0	0
144.10	4.100	1/110	0	0	0	0	1	0	0	0	1	0	0
4.11	4.110	1/111	1	0	0	0	1	0	0	0	1	0	0
4.12	4.120	1/112	0	1	0	0	1	0	0	0	1	0	0
4.13	4.130	1/113	1	1	0	0	1	0	0	0	1	0	0
4.14	4.140	1/114	0	0	1	0	1	0	0	0	1	0	0
4.15	4.150	1/115	1	0	1	0	1	0	0	0	1	0	0
4.16	4.160	1/116	0	1	1	0	1	0	0	0	1	0	0
4.17	4.170	1/117	1	1	1	0	1	0	0	0	1	0	0
4.18	4.180	1/118	0	0	0	1	1	0	0	0	1	0	0
4.19	4.190	1/119	1	0	0	1	1	0	0	0	1	0	0
144.20	4.200	1/120	0	0	0	0	0	1	0	0	1	0	0
4.30	4.300	1/130	0	0	0	0	1	1	0	0	1	0	0
4.40	4.400	1/140	0	0	0	0	0	0	1	0	1	0	0
4.50	4.500	1/150	0	0	0	0	1	0	1	0	1	0	0
4.60	4.600	1/160	0	0	0	0	0	1	1	0	1	0	0
4.70	4.700	1/170	0	0	0	0	1	1	1	0	1	0	0
4.80	4.800	1/180	0	0	0	0	0	0	0	1	1	0	0
4.90	4.900	1/190	0	0	0	0	1	0	0	1	1	0	0
145.00	5.000	1/200	0	0	0	0	0	0	0	0	0	1	0
145.01	5.010	1/201	1	0	0	0	0	0	0	0	0	1	0
145.02	5.020	1/202	0	1	0	0	0	0	0	0	0	1	0
145.03	5.030	1/203	1	1	0	0	0	0	0	0	0	1	0
145.04	5.040	1/204	0	0	1	0	0	0	0	0	0	1	0
145.05	5.050	1/205	1	0	1	0	0	0	0	0	0	1	0
145.06	5.060	1/206	0	1	1	0	0	0	0	0	0	1	0
145.07	5.070	1/207	1	1	1	0	0	0	0	0	0	1	0
145.08	5.080	1/208	0	0	0	1	0	0	0	0	0	1	0
145.09	5.090	1/209	1	0	0	1	0	0	0	0	0	1	0
145.10	5.100	1/210	0	0	0	0	1	0	0	0	0	1	0
145.20	5.200	1/220	0	0	0	0	0	1	0	0	0	1	0
145.30	5.300	1/230	0	0	0	0	1	1	0	0	0	1	0
145.40	5.400	1/240	0	0	0	0	0	0	1	0	0	1	0
145.50	5.500	1/250	0	0	0	0	1	0	1	0	0	1	0
145.60	5.600	1/260	0	0	0	0	0	1	1	0	0	1	0
145.70	5.700	1/270	0	0	0	0	1	1	1	0	0	1	0
145.80	5.800	1/280	0	0	0	0	0	0	0	1	0	1	0
145.90	5.900	1/290	0	0	0	0	1	0	0	1	0	1	0
146.00	6.000	1/300	0	0	0	0	0	0	0	0	1	1	0
147.00	7.000	1/400	0	0	0	0	0	0	0	0	0	0	1
147.99	7.990	1/499	1	0	0	1	1	0	0	1	0	0	1

※ 1 HIGH LEVEL (5V)

※ 0 LOW LEVEL (0V)

ADDENDUM TO FT-227R INSTRUCTION MANUAL

This transceiver has been modified in order to make the tone access feature for repeater operation more convenient for repeater operation in your area. The following changes in operation of your unit should be noted.

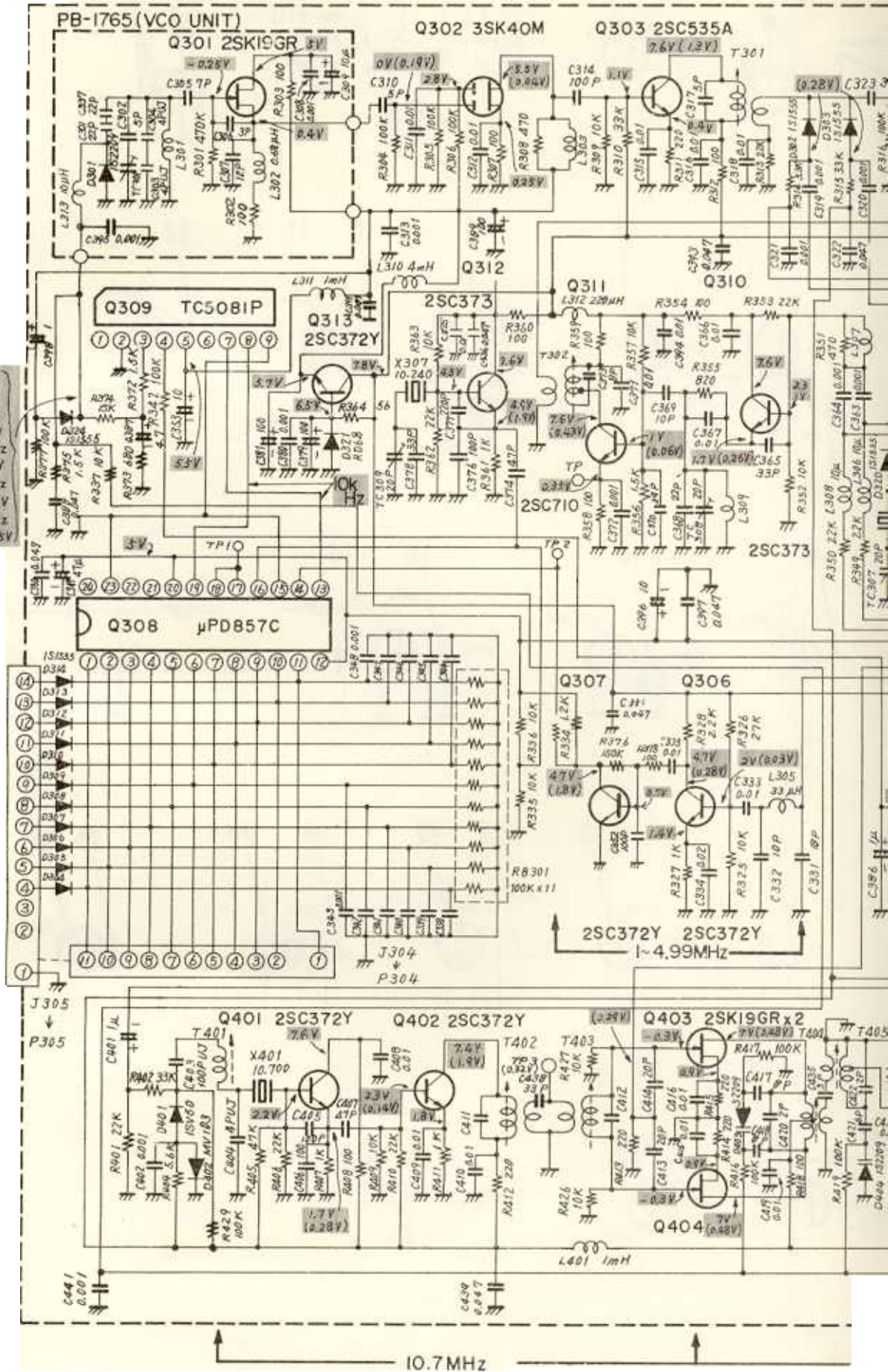
1. The TONE SQ feature has been eliminated.
2. The TONE BURST feature has been changed. The necessary tone for accessing repeaters is now provided through the front panel CALL button. Pressing this button activates the transceiver PTT relay and transmits a tone of 1750 Hz for as long as the button is depressed.
3. The rear panel BURST ON-OFF switch has been removed. The CALL feature is always in operation.
4. As in the original model, the audio frequency of the tone may be adjusted by varying VR207.

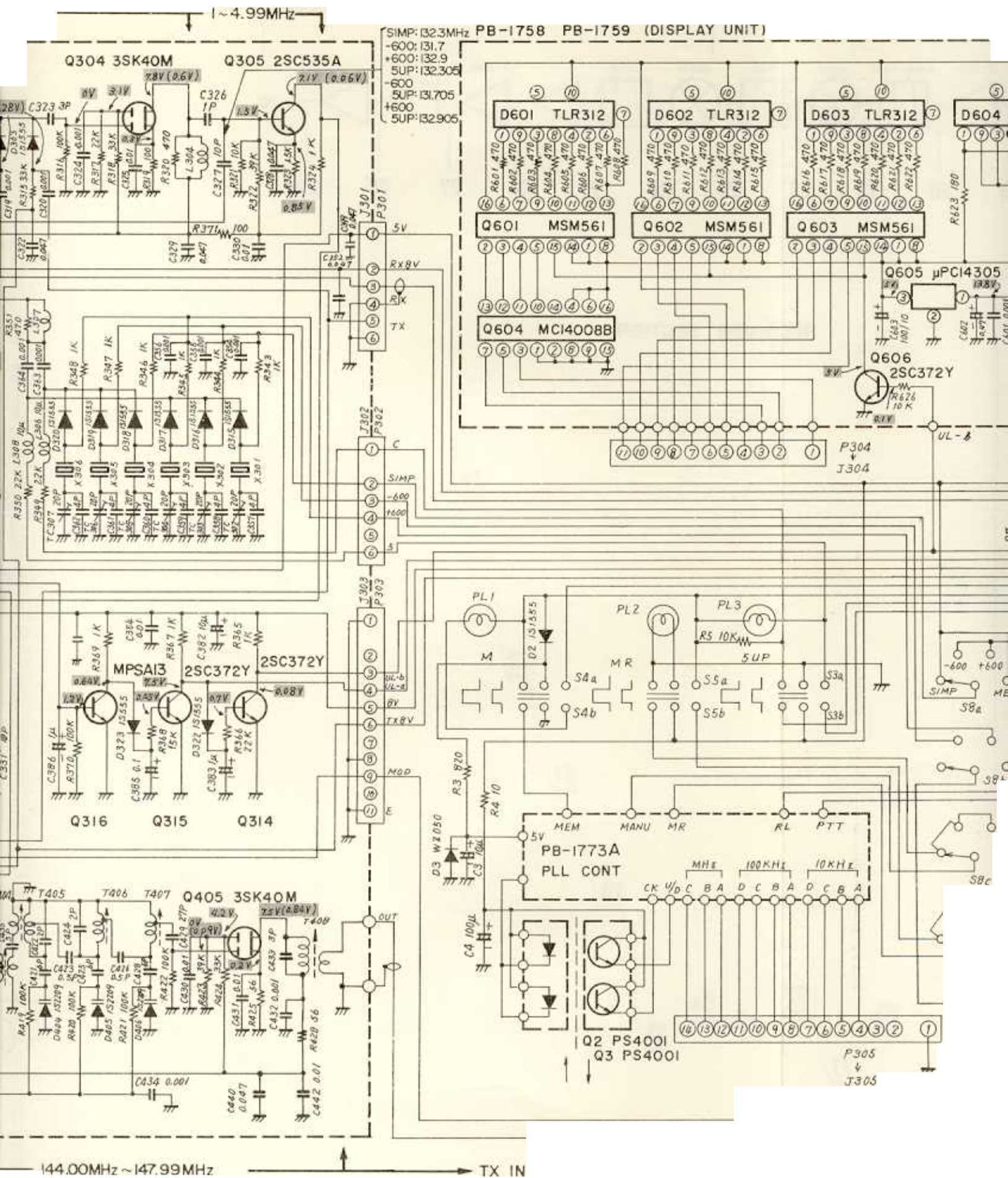
133.30 ~ 137.29 MHz

PB-1757 (PLL UNIT)

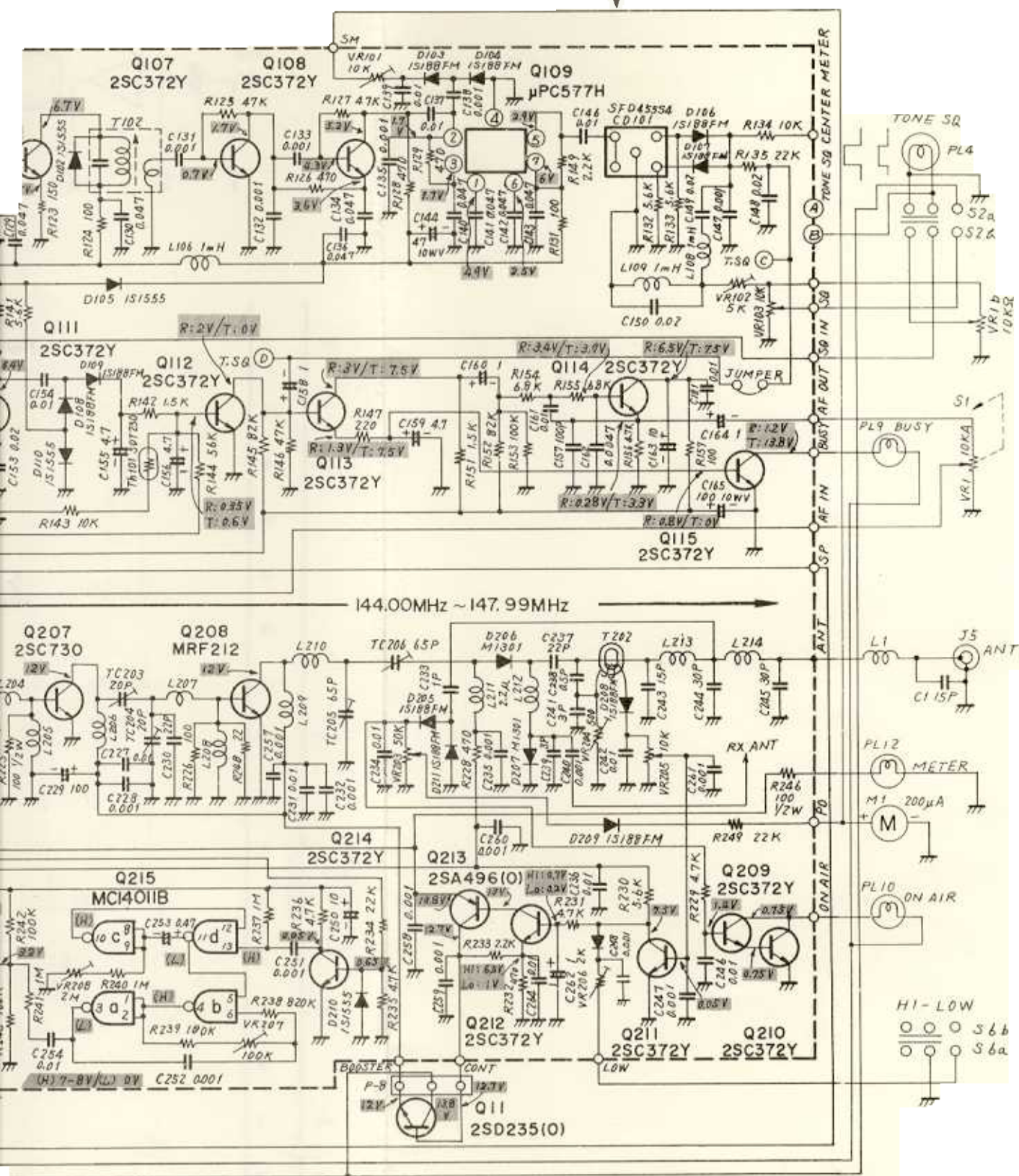
PB-1765 (VCO UNIT)

144 MHz
- 1.7V
145 MHz
- 2.3V
146 MHz
- 3.0V
147 MHz
- 3.7V
148 MHz
- 4.5V





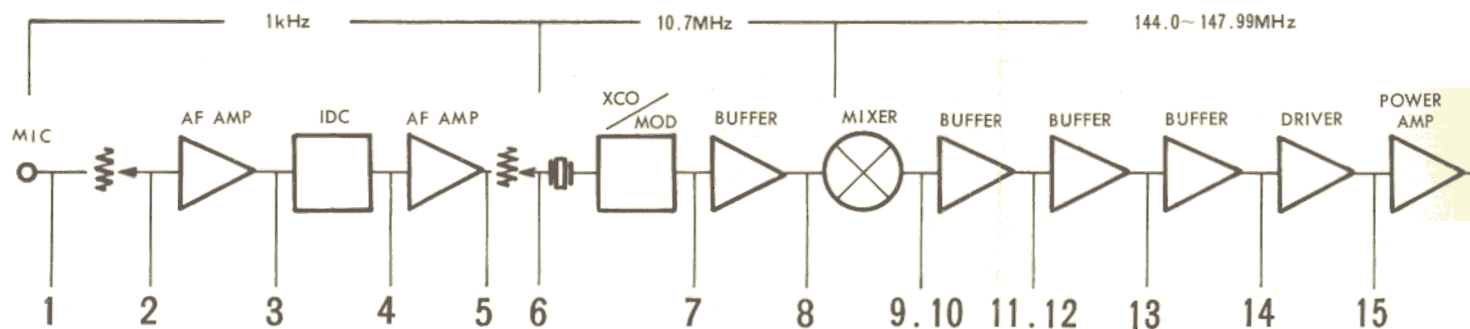
455 kHz



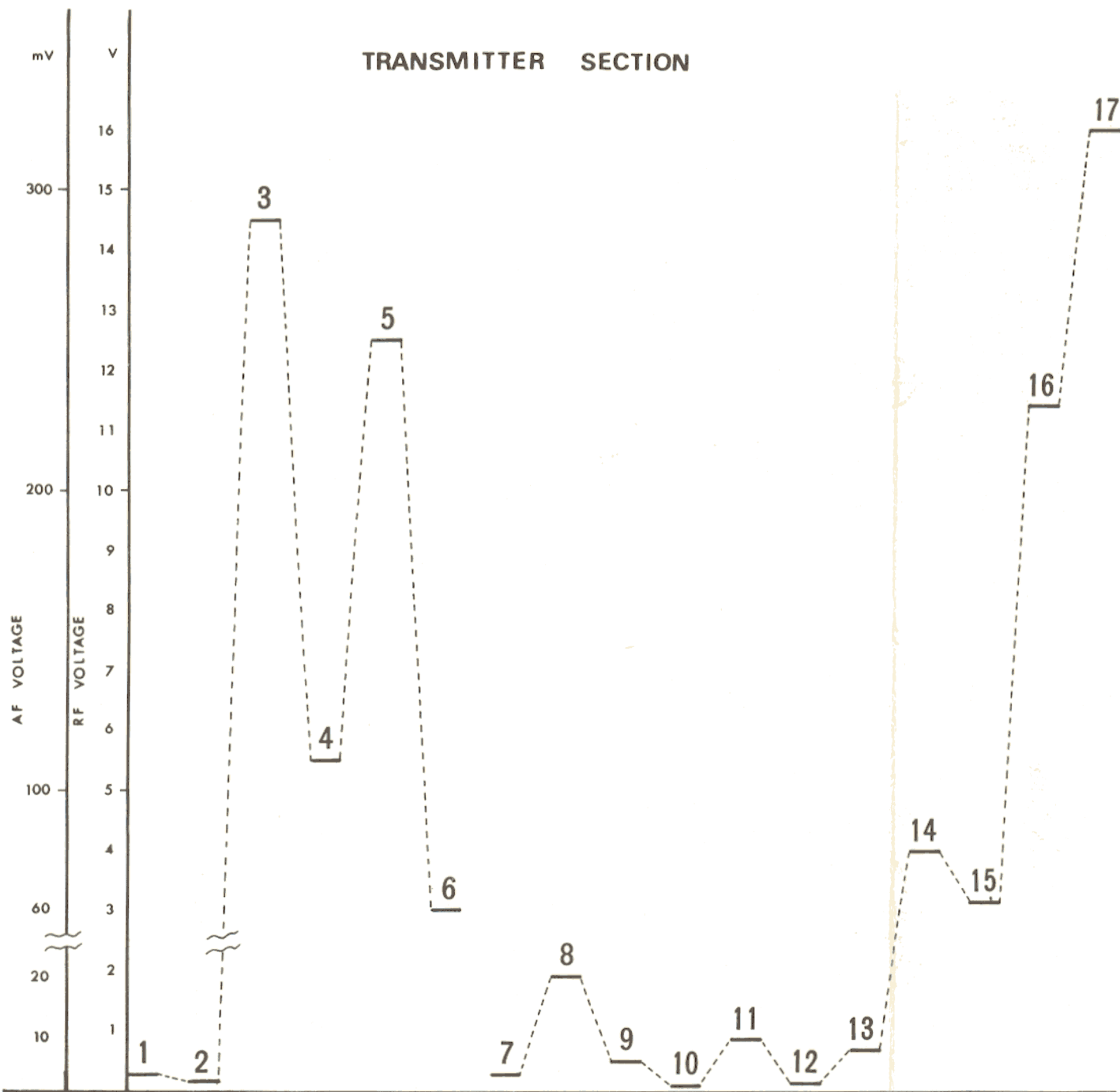
NOTES

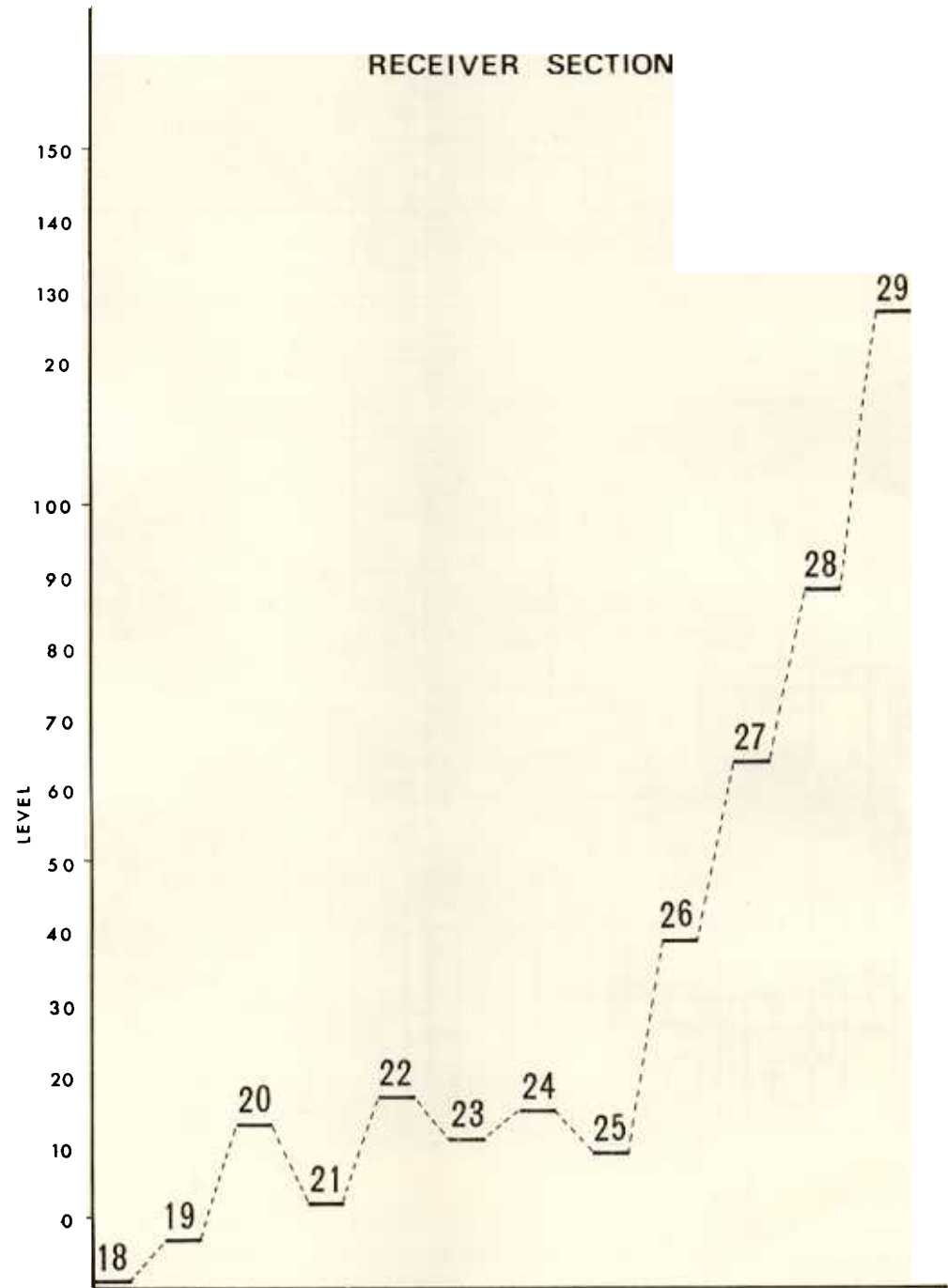
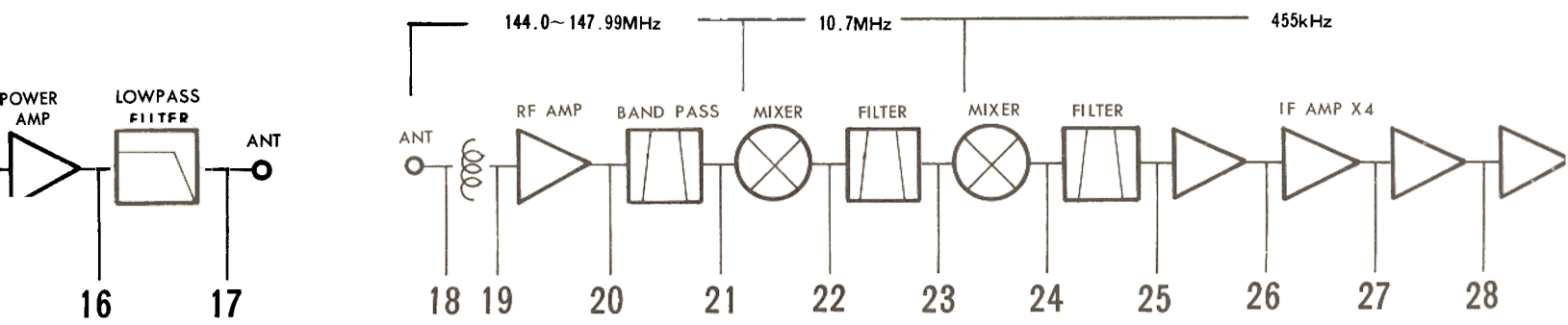
1. ALL RESISTORS ARE IN 1/4W UNLESS OTHERWISE NOTED.
2. ALL CAPACITORS ARE IN μF UNLESS OTHERWISE NOTED.
3. ALL ELECTROLYTIC CAPACITORS ARE 16WV UNLESS OTHERWISE NOTED
4. % VALUE IS NOMINAL.

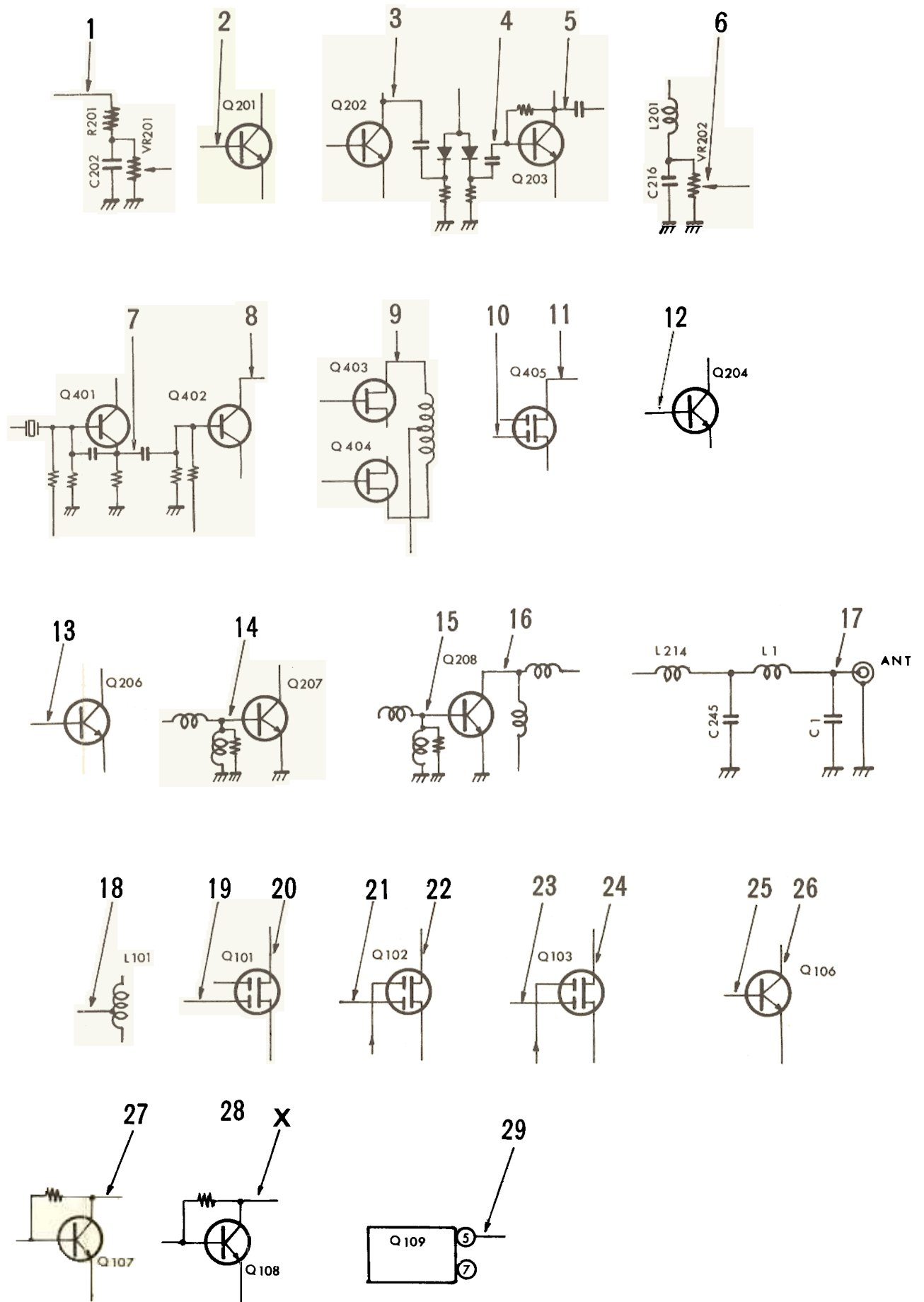
FT-227R
CIRCUIT DIAGRAM



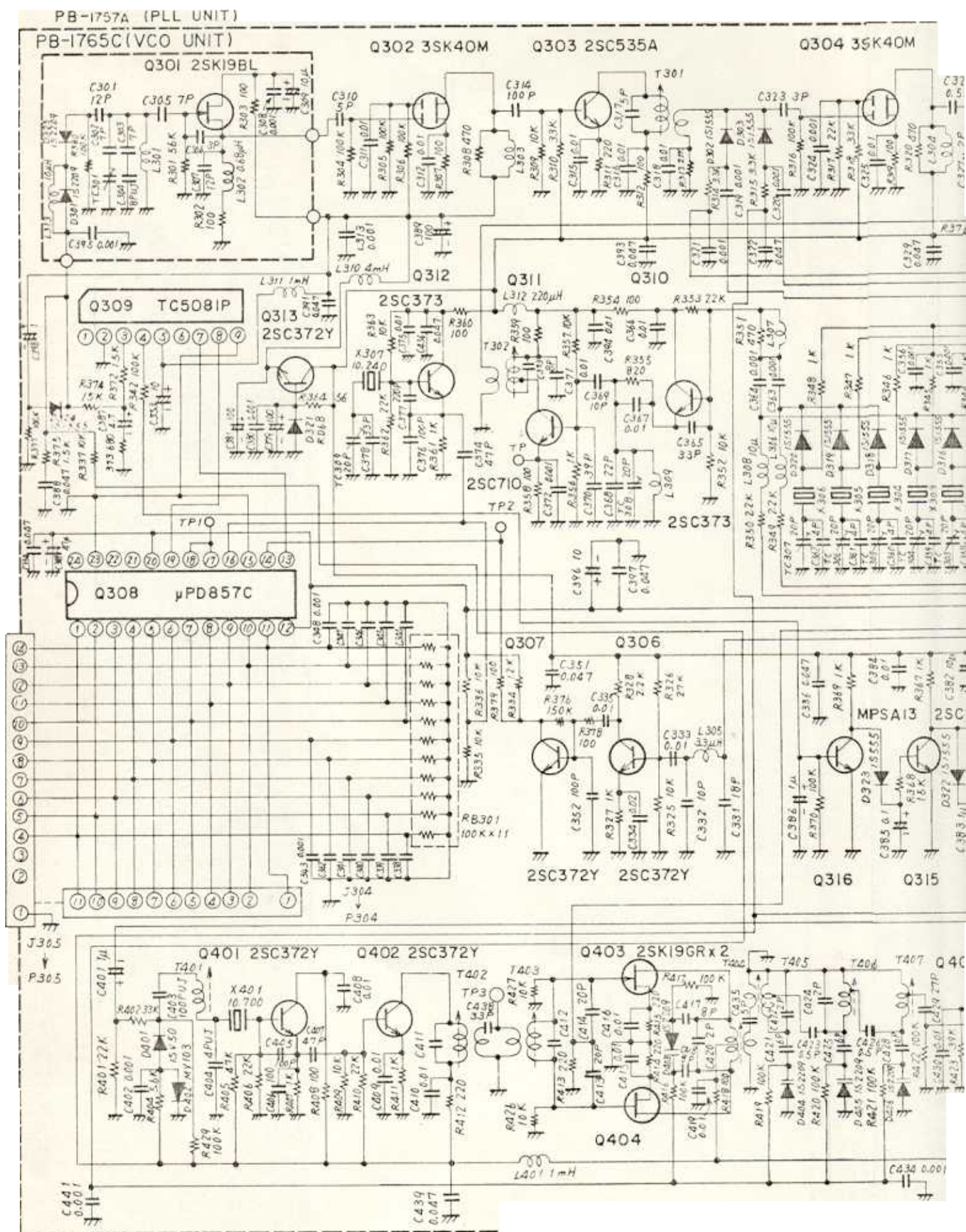
TRANSMITTER SECTION



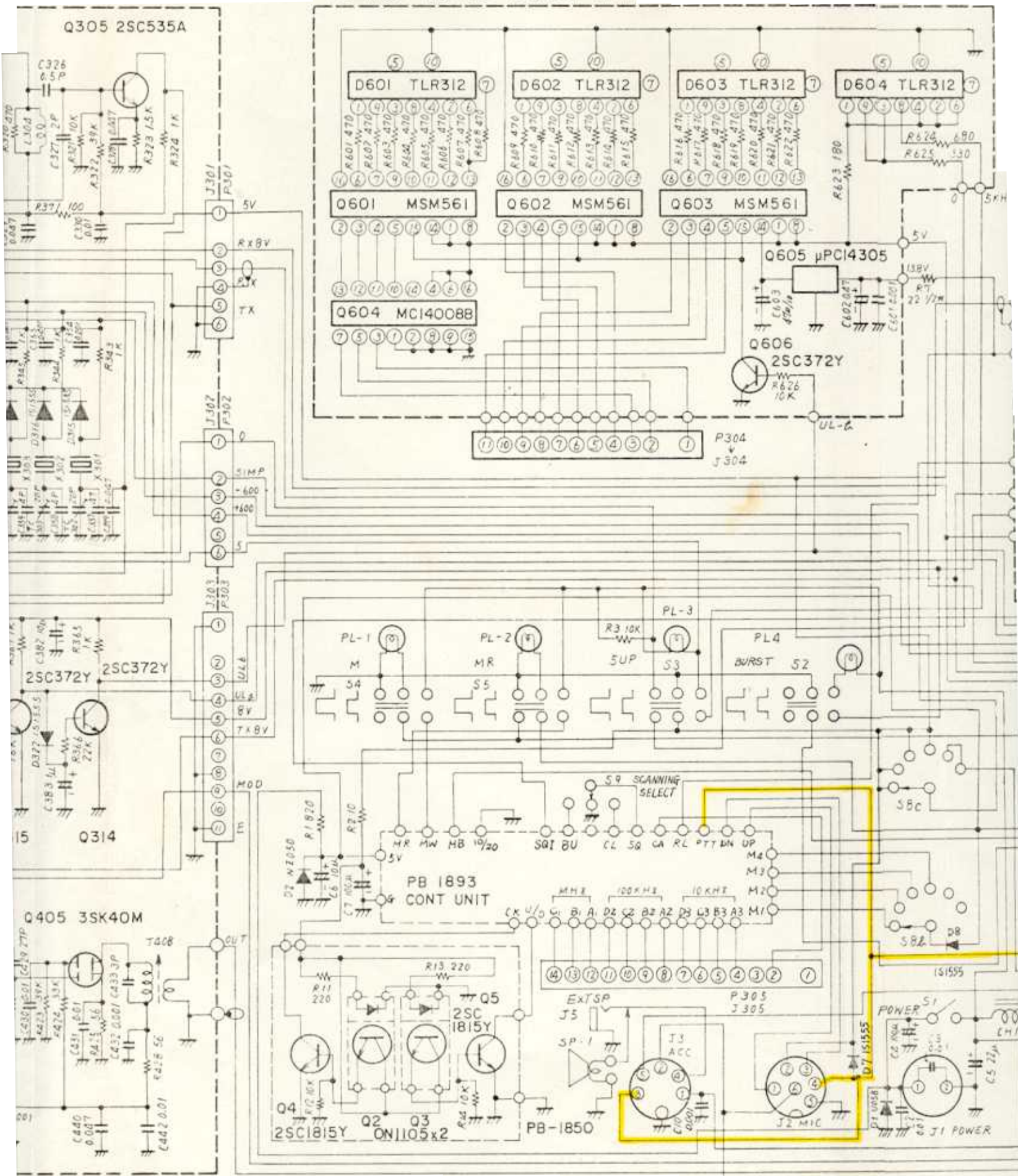




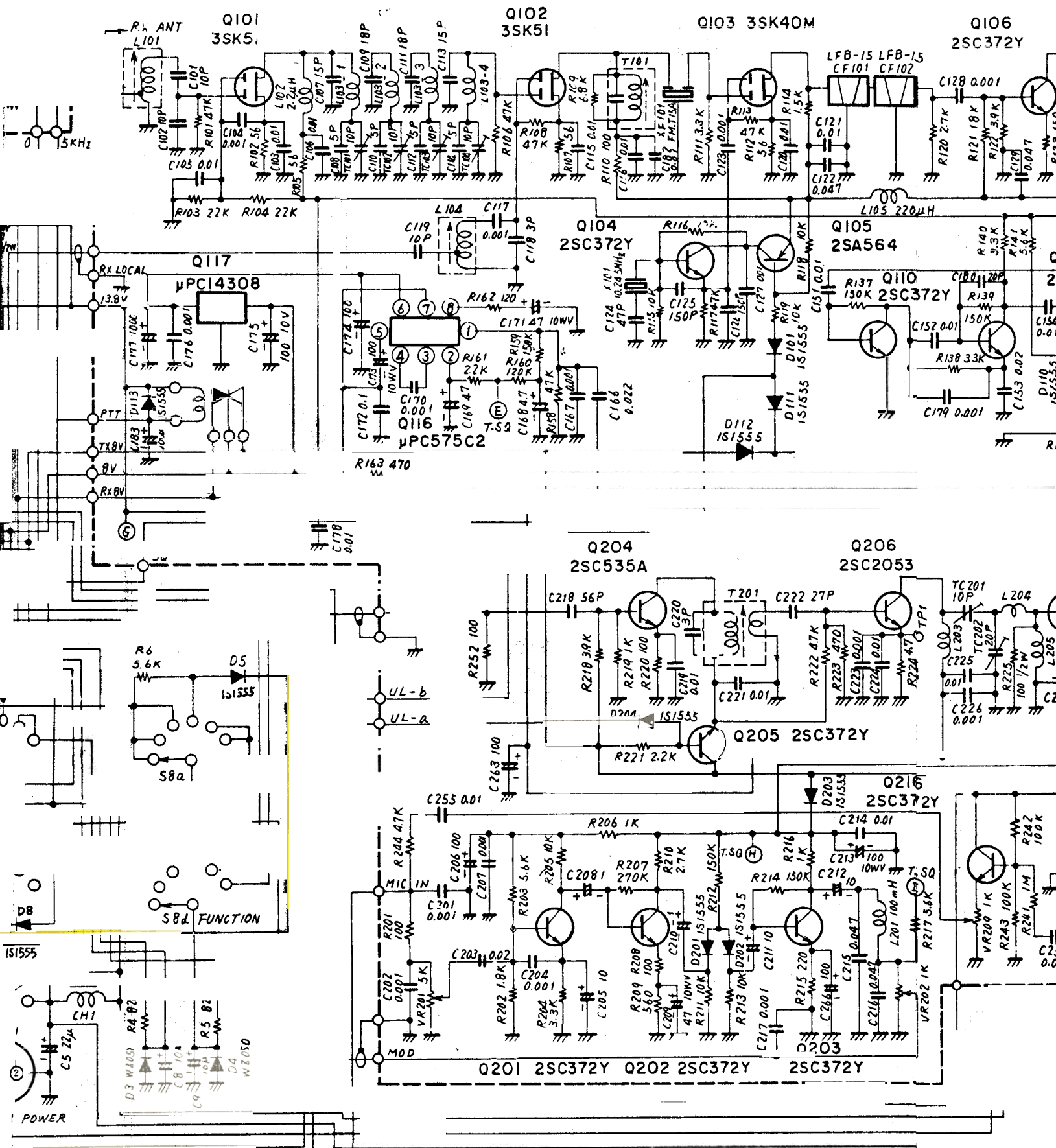
LEVEL DIAGRAM



PB-1758 PB-1759 (DISPLAY UNIT)



PB-1659C (MAIN UNIT)



FT-227RA
CIRCUIT DIAGRAM

