



SERVICE MANUAL



MODELS M100
M100E

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M100 ALIGNMENT PROCEDURE

Equipment Required

FM Signal Generator
AC Voltmeter capable of reading 455 KHz
Frequency Counter
DC Voltmeter, preferably digital type

A. VCO Adjustment

1. Program 512 MHz into Channel 9.
2. Adjust L203 for a voltage of 14.0 volts at the Junction of R211 and C227 (Brown wire).
3. Program 144 MHz into Channel 9. Voltage at Junction of R211 and C227 should read 1.3 to 2.7 volts.
4. Program 50 MHz into Channel 9.
5. Adjust L201 for a voltage of 17.0 volts at Junction of R211 and C227.
6. Program 30 MHz into Channel 9. Voltage at Junction of R211 and C227 should read 1.8 to 3.2 volts.

B. Netting Adjustment (VCO Bd.)

1. Program 40.3 MHz into Channel 1.
2. Adjust C202 for a frequency of 51.0000 MHz (+150 Hz) at Junction of R224 and R225.

C. Receiver - Low Band

1. Program 39.8 MHz into Channel 1.
2. With Signal Generator (no modulation) accurately set on frequency, tune L102 and L103 (in that order) for MAXIMUM signal on TP101. Reduce generator's output if necessary to properly peak these coils.
3. Very carefully tune L112 for MAXIMUM signal on TP101.
4. Modulate signal with 1 KHz modulation 3 KHz deviation. Tune L114 for MAXIMUM audio.

D. Receiver - UHF Band

1. Program 465 MHz into Channel 1.
2. Accurately set Signal Generator to 465 MHz.
3. Adjust C136, C143, C132 and L108 (in that order) for MAXIMUM signal on TP101. Repeat until no improvement is noted.

E. Receiver - High Band

1. Program 159.9 MHz into Channel 1.
2. Set core of L106 in approximatey 6 turns from flush with top of coil form.
3. Accurately set Signal Generator to 159.9 MHz.
4. Tune L105, L106 and L107 (in that order) for MAXIMUM signal on TP101.

M100E ALIGNMENT PROCEDURE

A. VCO Adjustment

1. Program 512 MHz into Channel 9.
2. Adjust L203 for a voltage of 14.0 volts at the Junction of R211 and C227 (Brown wire).
3. Program 144 MHz into Channel 9. Voltage at Junction of R211 and C227 should read 1.3 to 2.7 volts.
4. Program 90 MHz into Channel 9.
5. Adjust L201 for a voltage of 17.0 volts at Junction of R211 and C227.
6. Program 66 MHz into Channel 9. Voltage at Junction of R211 and C227 should read 1.8 to 3.2 volts.

B. Netting Adjustment (VCO Bd.)

1. Program 77.7 MHz into Channel 1.
2. Adjust C202 for a frequency of 67.0000 MHz (+150 Hz) at Junction of R224 and R225.

C. Receiver - Mid Band

1. Program 78 MHz into Channel 1.
2. With Signal Generator (no modulation) accurately set on frequency, tune L102 and L103 (in that order) for MAXIMUM signal on TP101. Reduce generator's output if necessary to properly peak these coils.
3. Very carefully tune L112 for MAXIMUM signal on TP101.
4. Modulate signal with 1 KHz modulation 3 KHz deviation. Tune L114 for MAXIMUM audio.

D. Receiver - UHF Band

1. Program 465 MHz into Channel 1.
2. Accurately set Signal Generator to 465 MHz.
3. Adjust C136, C143, C132 and L108 (in that order) for MAXIMUM signal on TP101. Repeat until no improvement is noted.

E. Receiver - High Band

1. Program 159.9 MHz into Channel 1.
2. Set core of L106 in approximately 6 turns from flush with top of coil form.
3. Accurately set Signal Generator to 159.9 MHz.
4. Tune L105, L106 and L107 (in that order) for MAXIMUM signal on TP101.

M100 SPECIAL RF ALIGNMENT PROCEDURE
HIGH BAND (133-167 MHz), UHF (380-480 MHz)

NOTE: Connect jumper from Pin 34 of IC109 to ground. Holes are provided (see part placement), this jumper will allow you to enter frequencies outside the normal frequency range of the receiver.

A. VCO Adjustment

1. Program 480 MHz into Channel 9.
2. Adjust L203 for a voltage of 14.0 volts (DVM) at the Junction of R211 and C227 (Brown wire).
3. Program 135 MHz into Channel 9. Voltage at Junction of R211 and C227 should read 1.3 to 2.7 volts (DVM).

B. UHF Band (380-480 MHz)

1. Program 430.1 MHz into Channel 1.
2. Adjust C136, C143, C132 and L108 (in that order) for MAXIMUM signal on TP101. Repeat until no improvement is noted.
3. Check 12 db SINAD sensitivity or 14 db Quieting - (.6 uv).

C. High Band (133-167 MHz)

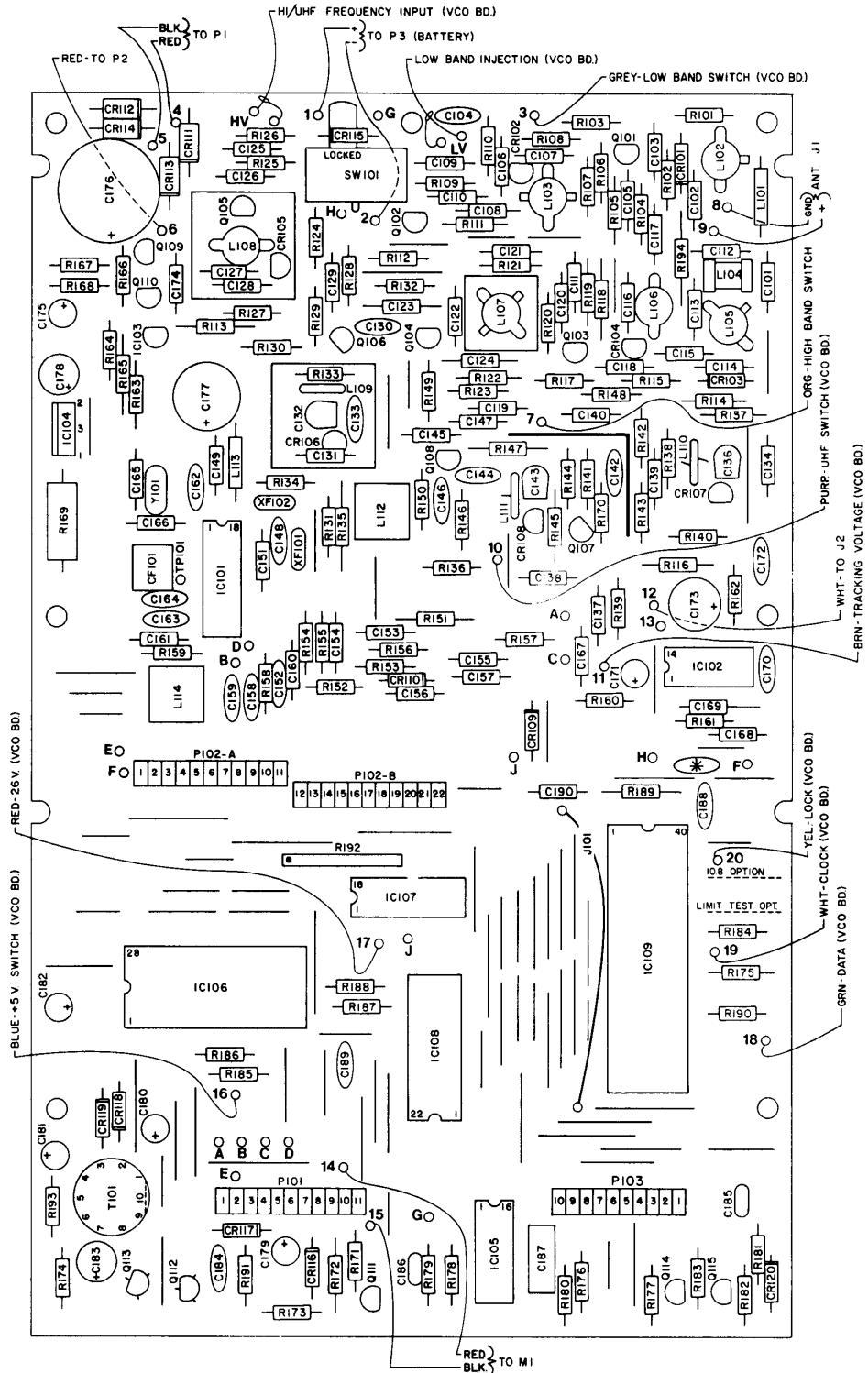
1. Program 145.9 MHz into Channel 1.
2. Set core of L106 in approximately 6 turns from flush with top of coil form.
3. Tune L105, L106 and L107 (in that order) for MAXIMUM signal on TP101.
4. Check sensitivity (.6 uv).

NOTE: On B (UHF Band) and C (High Band) Alignment: If your frequencies favor just a portion of the band, you can select a frequency near the center of frequencies of interest for tune-up and follow the above procedure.

10.8 MHz IF CONVERSION

1. Connect a jumper from Pin 37 of IC109 to ground. Holes are provided, (see parts placement).
2. Replace Y101 with a 10.345 MHz crystal, (Regency Part Number 2301-3151-605).
3. Replace XF101 and XF102 with a 10,8 MHz filter, (Regency Part Number 2705-3271-800).
4. Readjust L112; See Alignment, Step C3. (This step is not usually necessary for proper performance).

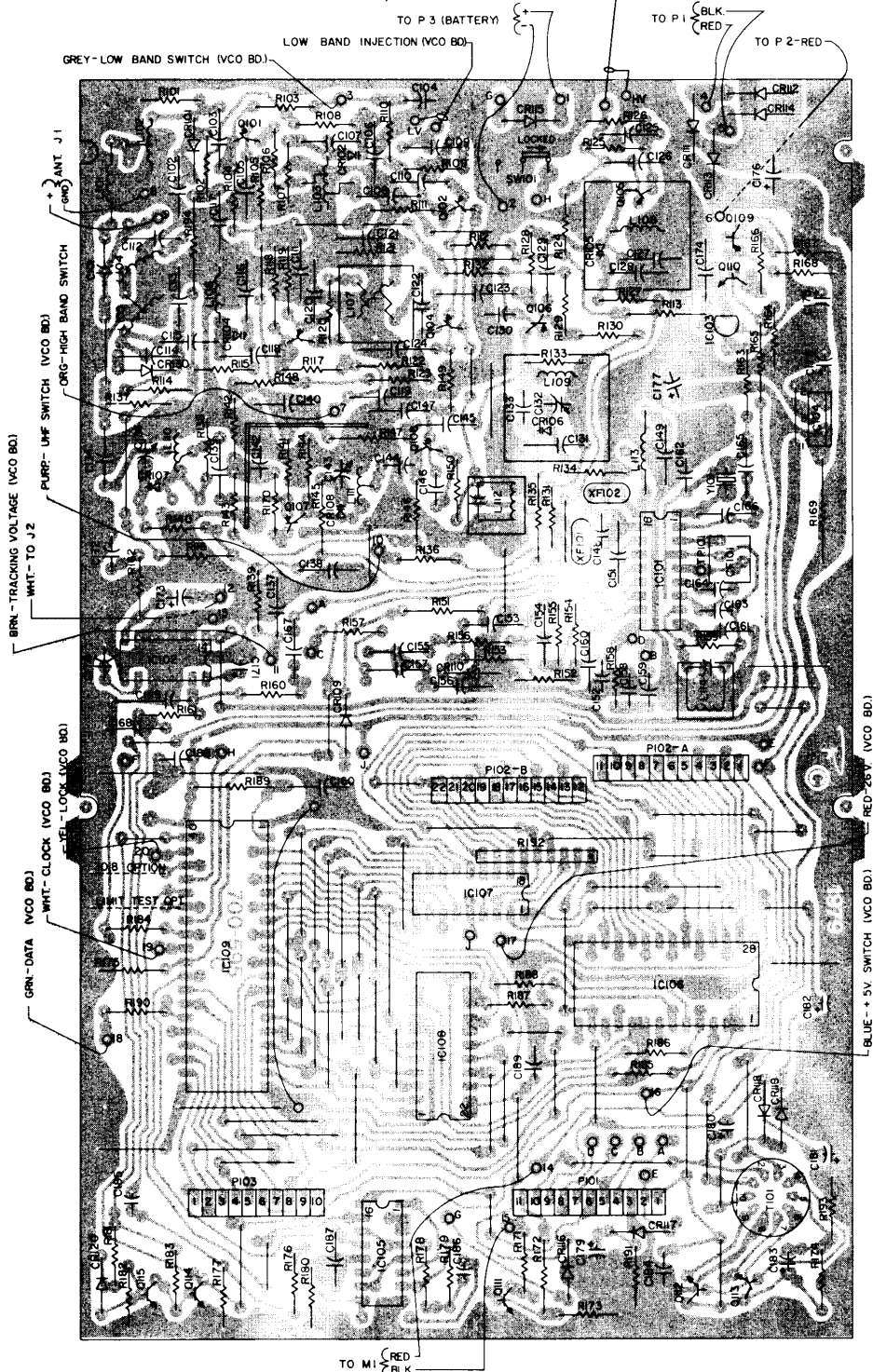
MAIN BOARD 700-595 C



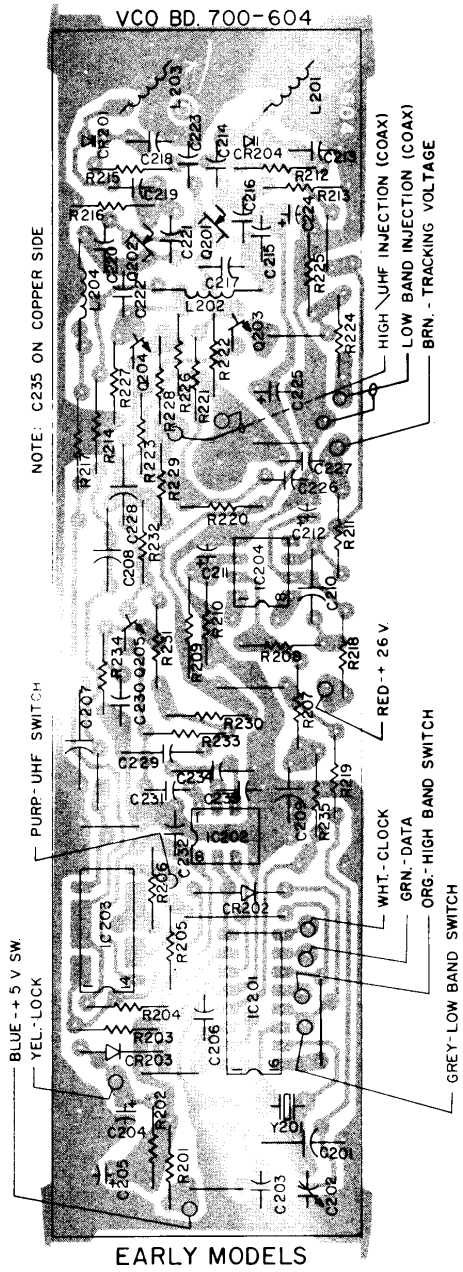
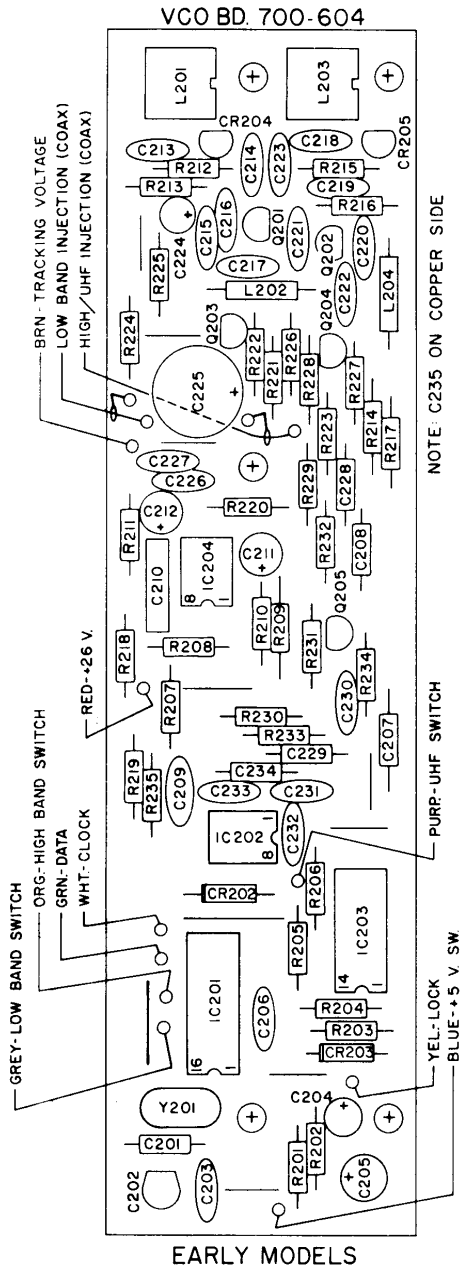
NOTE: LETTERS, EXCEPT HV & LV, DESIGNATE POINT-TO-POINT (JUMPER) WIRING ON BOARD.
 * C188 LOCATED IN THIS POSITION ON SOME MODELS.
 J101 NOT USED ON SOME MODELS.

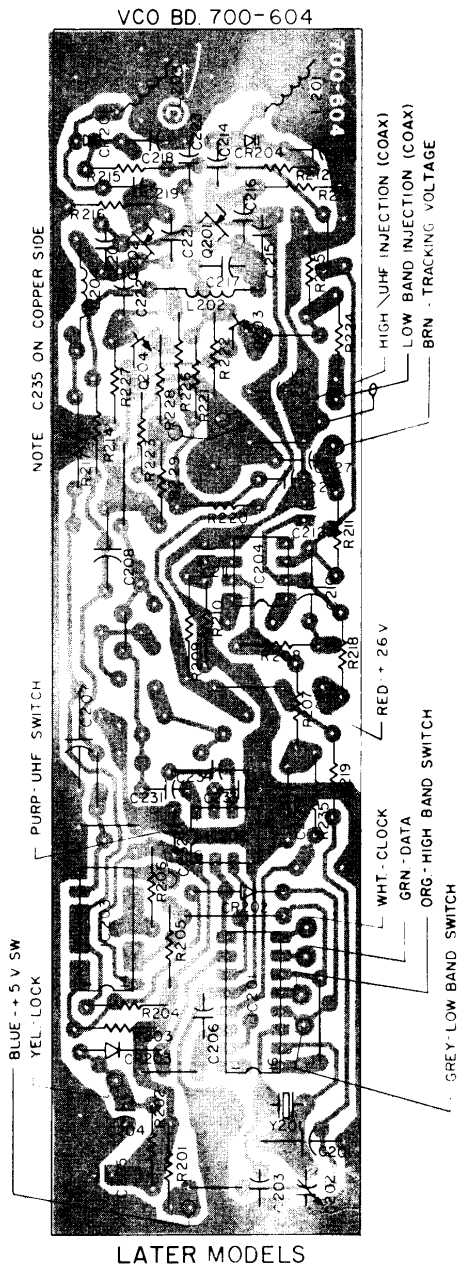
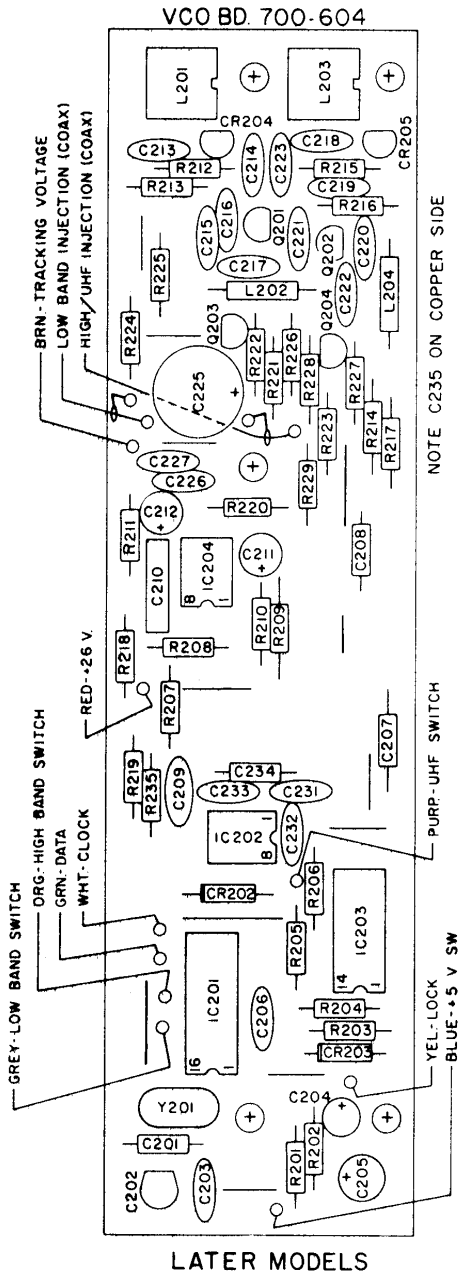
MAIN BOARD 700-595 C

H/VHF FREQUENCY INPUT (VCO BD.)

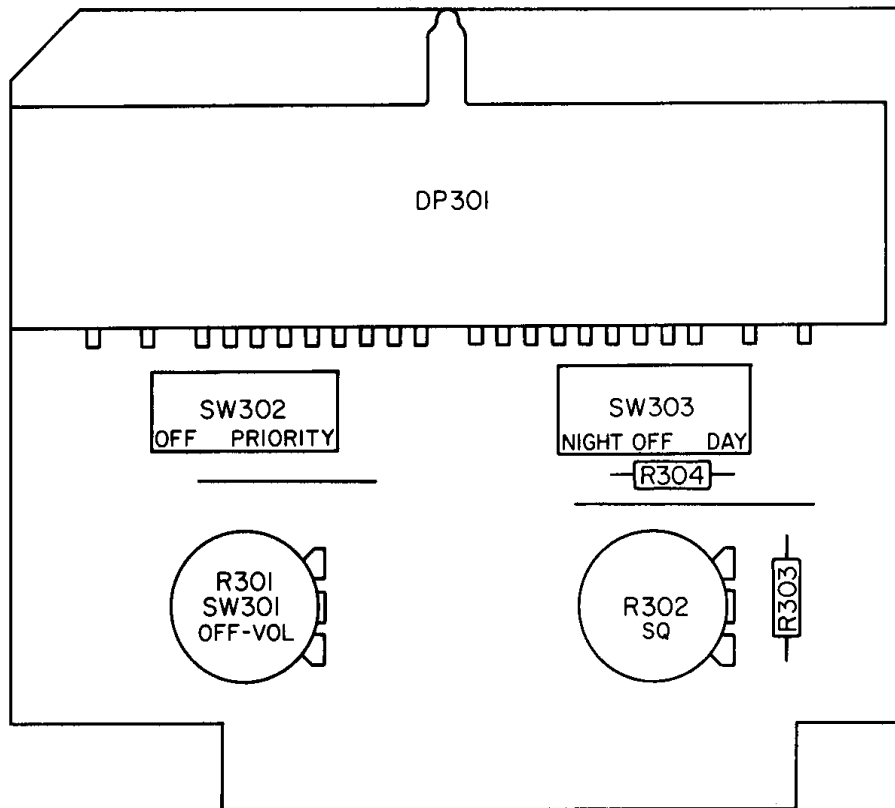


NOTE: LETTERS, EXCEPT HV & LV, DESIGNATE POINT-TO-POINT (JUMPER) WIRING ON BOARD.

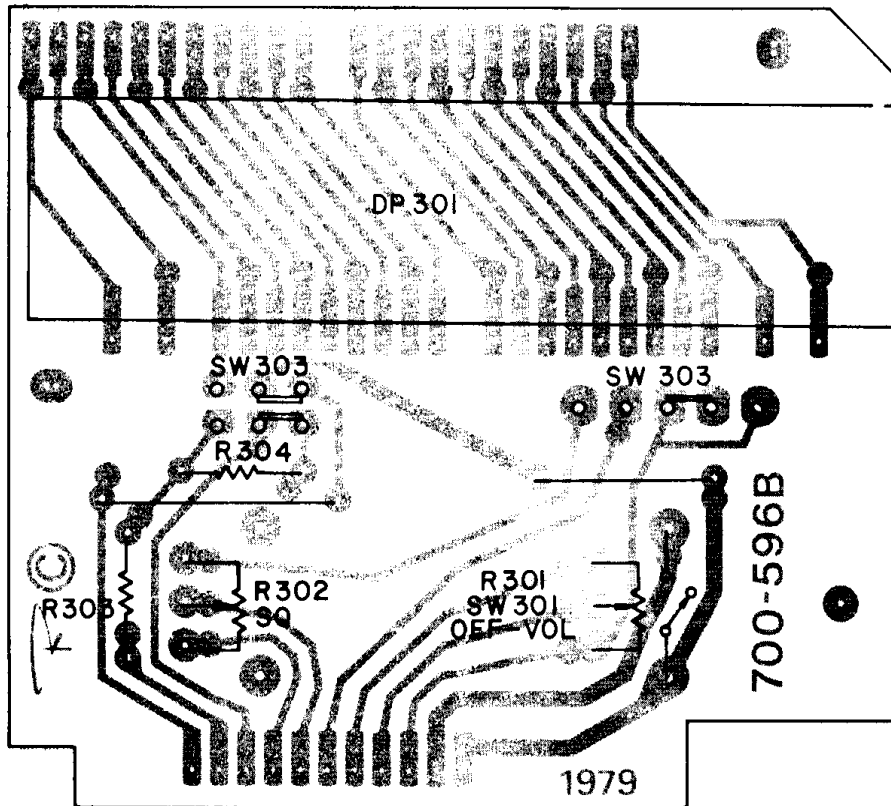




DISPLAY BD.
700-596



DISPLAY BD.
700-596



M100/M100E

MAIN BOARD

Voltages taken with DVM, Receiver on Manual, Channel 1.

	E	B	C
Q101	5.1V	4.3	0.3 (Low Band)
Q102	6.5	5.7	0 (Hi Band)
Q103	5.0	4.3	0 (Hi Band)
Q104	6.5	5.7	0 (Hi Band)
Q105	6.1	5.3	0 (Low Band)
Q106	6.4	5.7	0
Q107	7.0	6.3	0 (UHF)
Q108	6.2	5.5	0.1
Q109	15.8	15.1	15.8
Q110	0	0.7	0.1
Q111	0	0	.16
Q112	0	0.9	5.0
Q113	0	0.9	5.0
Q114	0	0.1	0
Q115	0	0.8	0.1
IC101	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	8.0 7.5 7.6 8.0 1.0 1.1 1.1 8.0 4.8 4.2 7.7 6.3 2.4 0.1 6.8 0 0 2.1	
IC102	1 2 3 4 5 6 7 8 9 10 11 12 13 14	8.1 0.1 0 0 0 0 0 8.6 0 0 0 0 0 0 16	
IC103	1 2 3	15.7 0 8.1	
IC104	1 2 3	13.8 0 5.0	

MAIN BOARD (Continued)

IC105	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	5.0	0	0	5.0	0	5.0	0	0	5.0	0	5.0	0	0	5.0	5.0	5.0
IC106	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	-26	5.0	5.0	0.5	0.4	0.5	0.5	0	0	0	2.1	-20	-26	-17	-26	-24
	21	22	23	24	25	26	27	28								
	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24
IC107	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	15	13	15	13	5.0	1.5	1.3	1.5	1.3	1.4	1.0	1.6	0.5	0	-22	-11
IC108	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1.4	1.0	1.3	1.5	1.3	1.5	0	0	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1
IC109	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	0	2.1	1.5	1.3	1.6	1.3	4.9	2.1	2.1	1.9	1.9	5.0	0	5.0	5.0	0.5
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	0	0	0	0	0	5.0	5.0	5.0	5.0	6.7	5.0	5.0	0.2	5.0	5.0	5.0

VCO BOARD

	E(S)	B(C)	C(D)
Q201 (FET)	3.1	0	4.9
Q202 (FET)	3.0	0	4.9
Q203	1.5	2.3	3.5
Q204	1.8	2.3	3.5
Q205	1	1.7	2.6

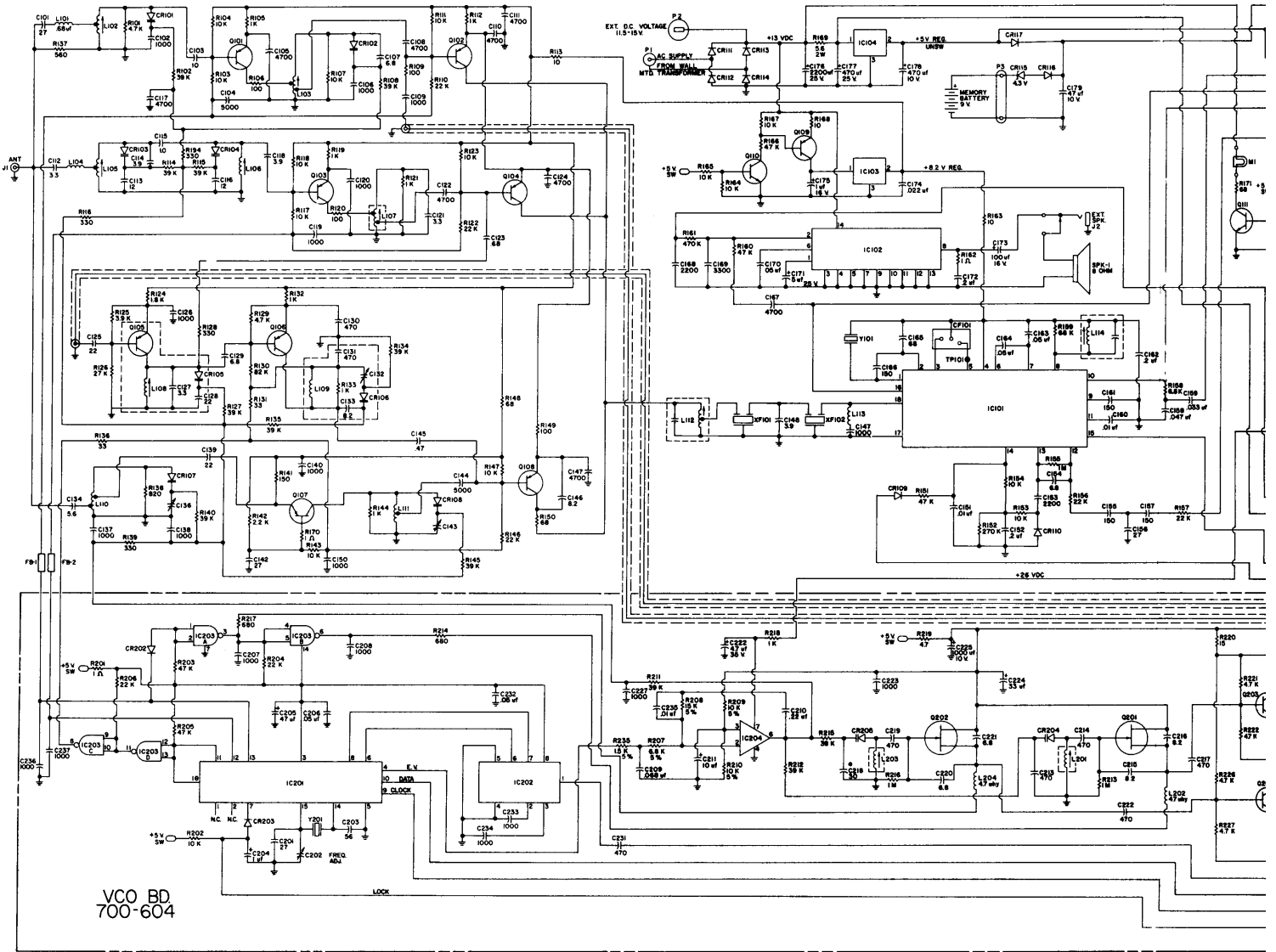
VCO BOARD (Continued)

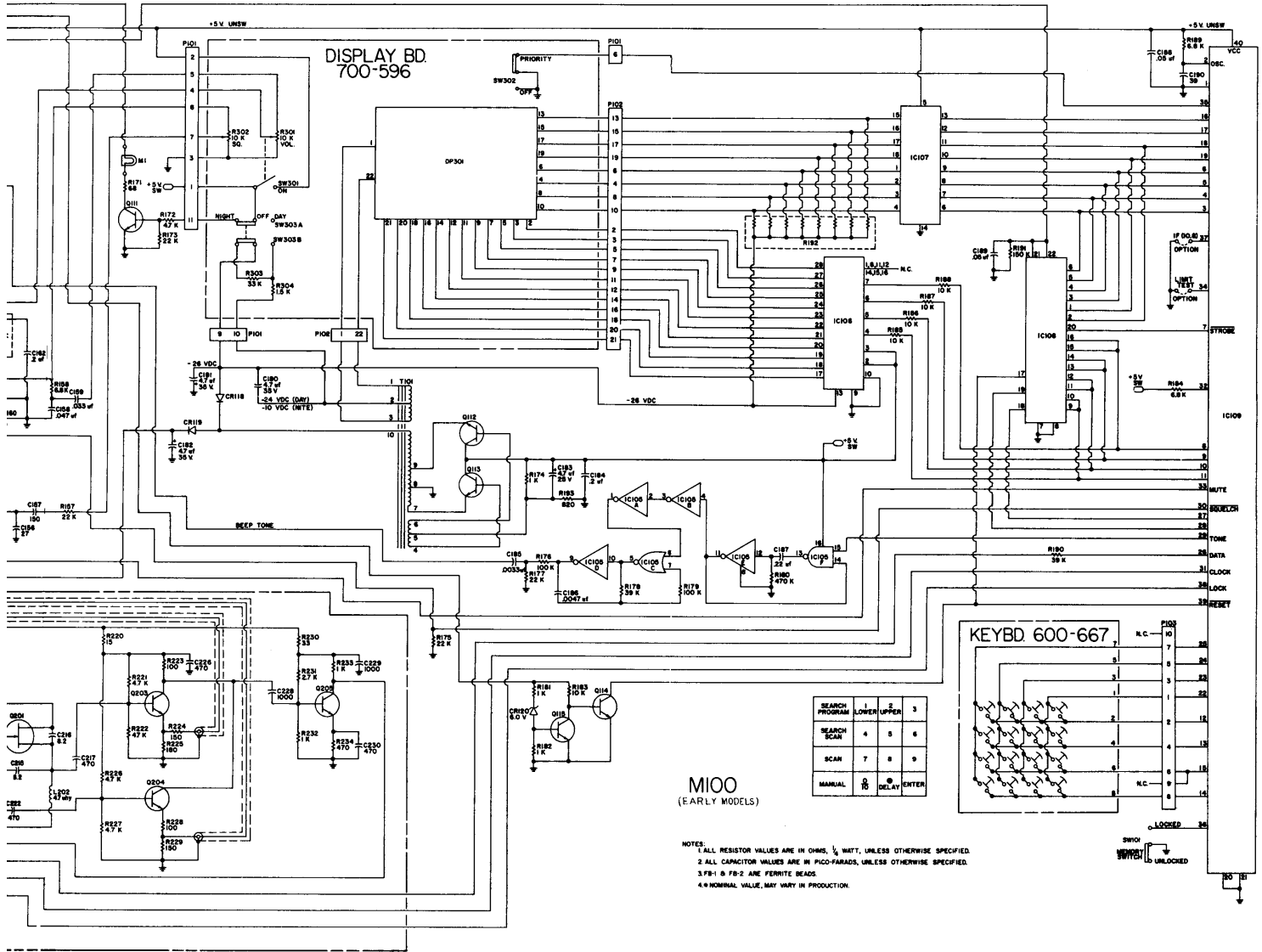
IC201 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
4.8 4.8 4.9 2.4 0 0 4.9 3.0 5.0 5.0 0.2 0.1 8.0 2.3 2.2 4.9

IC202 1 2 3 4 5 6 7 8
2.3 2.3 3.8 0 0 3.0 4.9

IC203 1 2 3 4 5 6 7 8 9 10 11 12 13 14
4.9 4.9 0.2 0.2 0.2 3.1 0 8.0 0.1 0.1 5.0 5.0 4.9

IC204 1 2 3 4 5 6 7 8
0 2.3 2.3 0 0 7.9 21 9.2





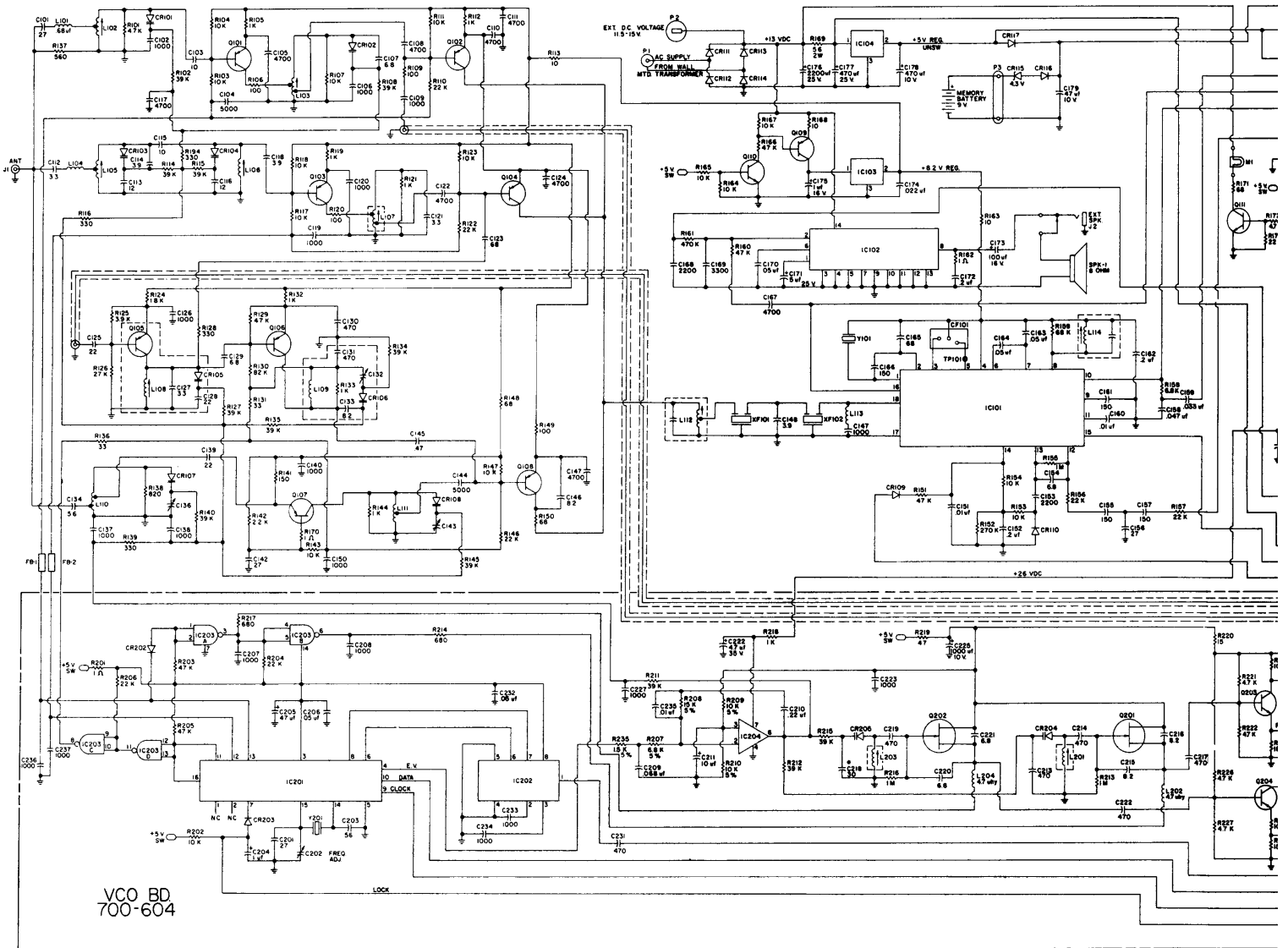
DISPLAY BD
700-596

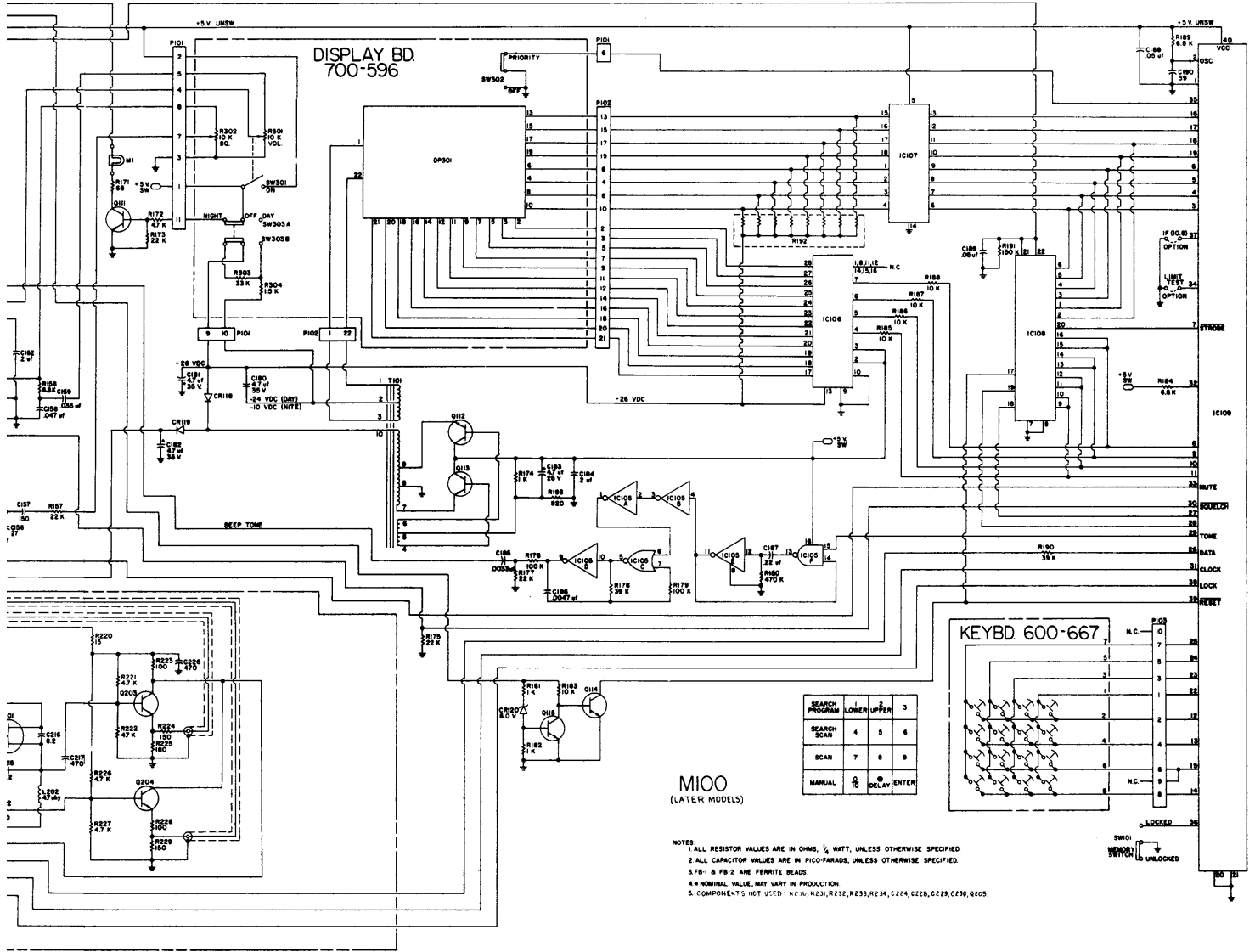
KEYBD 600-667

MIOO
(EARLY MODELS)

SEARCH PROGRAM	1	2	3
SEARCH SCAN	4	5	6
SCAN	7	8	9
MANUAL	10	DELAY	ENTER

- NOTES:
 1. ALL RESISTOR VALUES ARE IN OHMS, $\frac{1}{2}$ WATT, UNLESS OTHERWISE SPECIFIED.
 2. ALL CAPACITOR VALUES ARE IN PICO-PARADS, UNLESS OTHERWISE SPECIFIED.
 3. FB-1 & FB-2 ARE FERRITE BEADS.
 4. * NOMINAL VALUE, MAY VARY IN PRODUCTION.

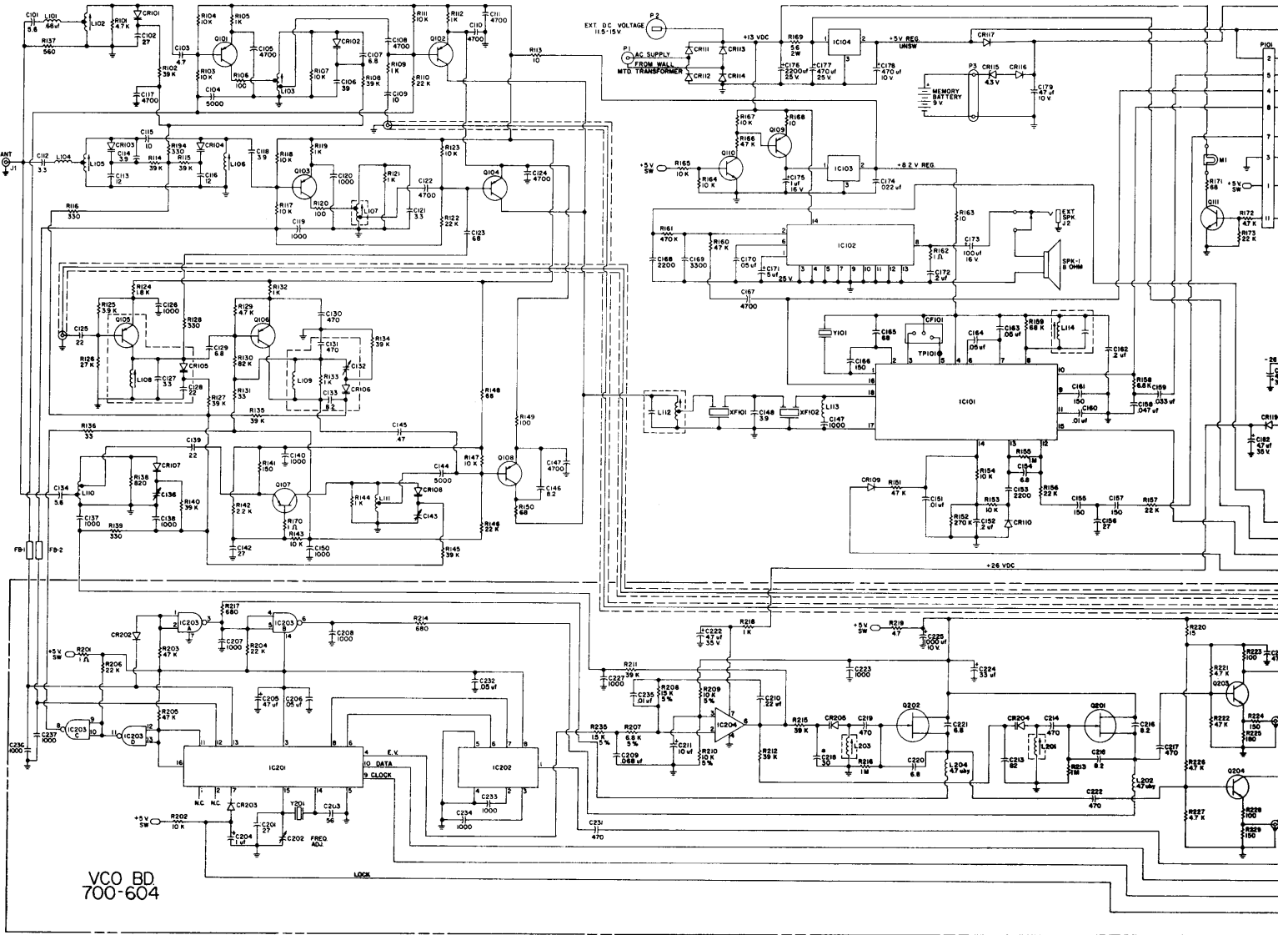


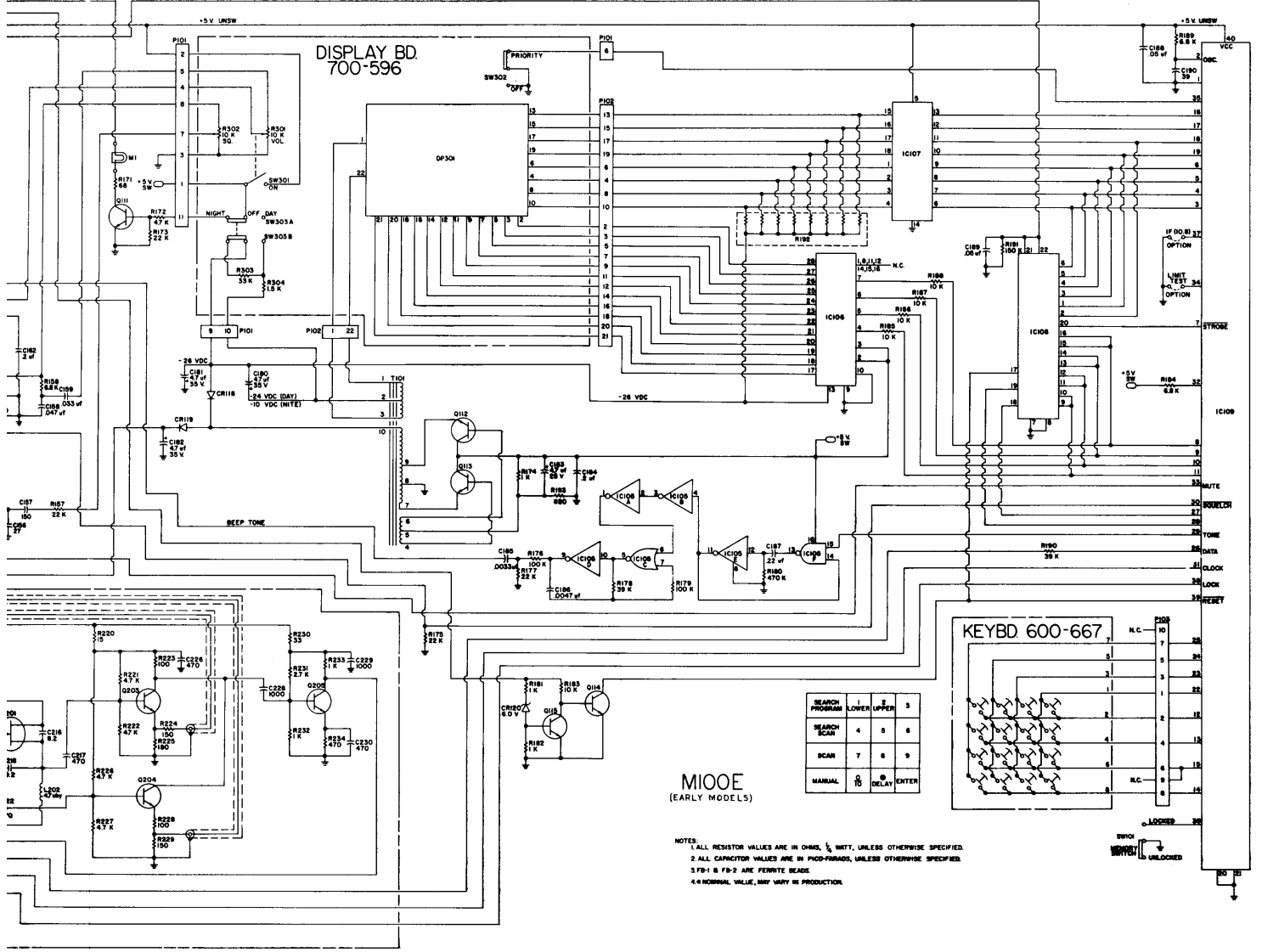


M100
(LATER MODELS)

SEARCH PROGRAM	1	2	
SEARCH SCAN	4	5	6
SCAN	7	8	9
MANUAL	0	10	ENTER

- NOTES
1. ALL RESISTOR VALUES ARE IN OHMS, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
 2. ALL CAPACITOR VALUES ARE IN PICO-FARADS, UNLESS OTHERWISE SPECIFIED.
 3. FB-1 & FB-2 ARE FERRITE BEADS
 4. * NOMINAL VALUE, MAY VARY IN PRODUCTION.
 5. COMPONENTS NOT USED: R210, R231, R232, R233, R234, C224, C228, C229, C230, Q205.





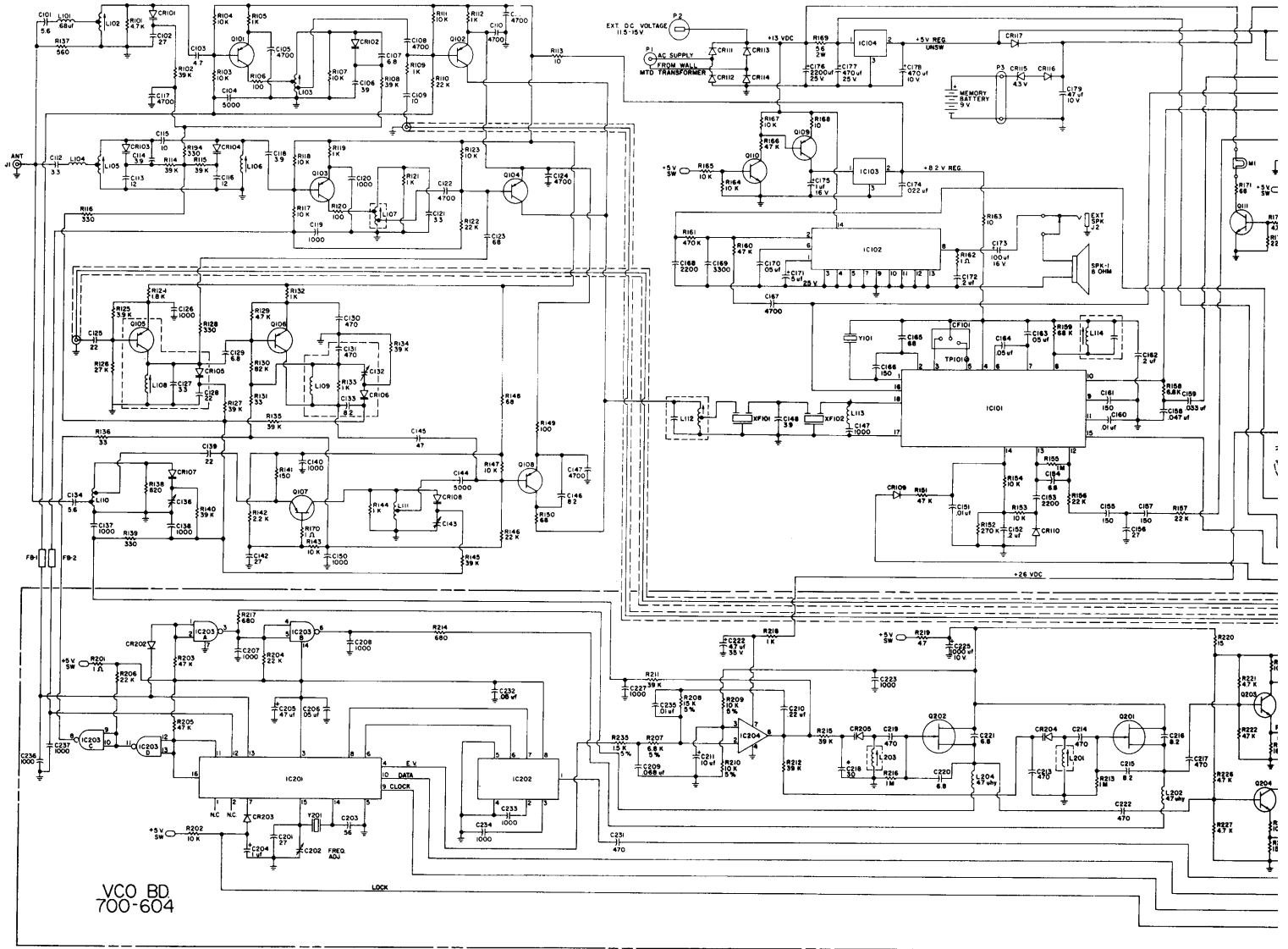
DISPLAY BD.
700-596

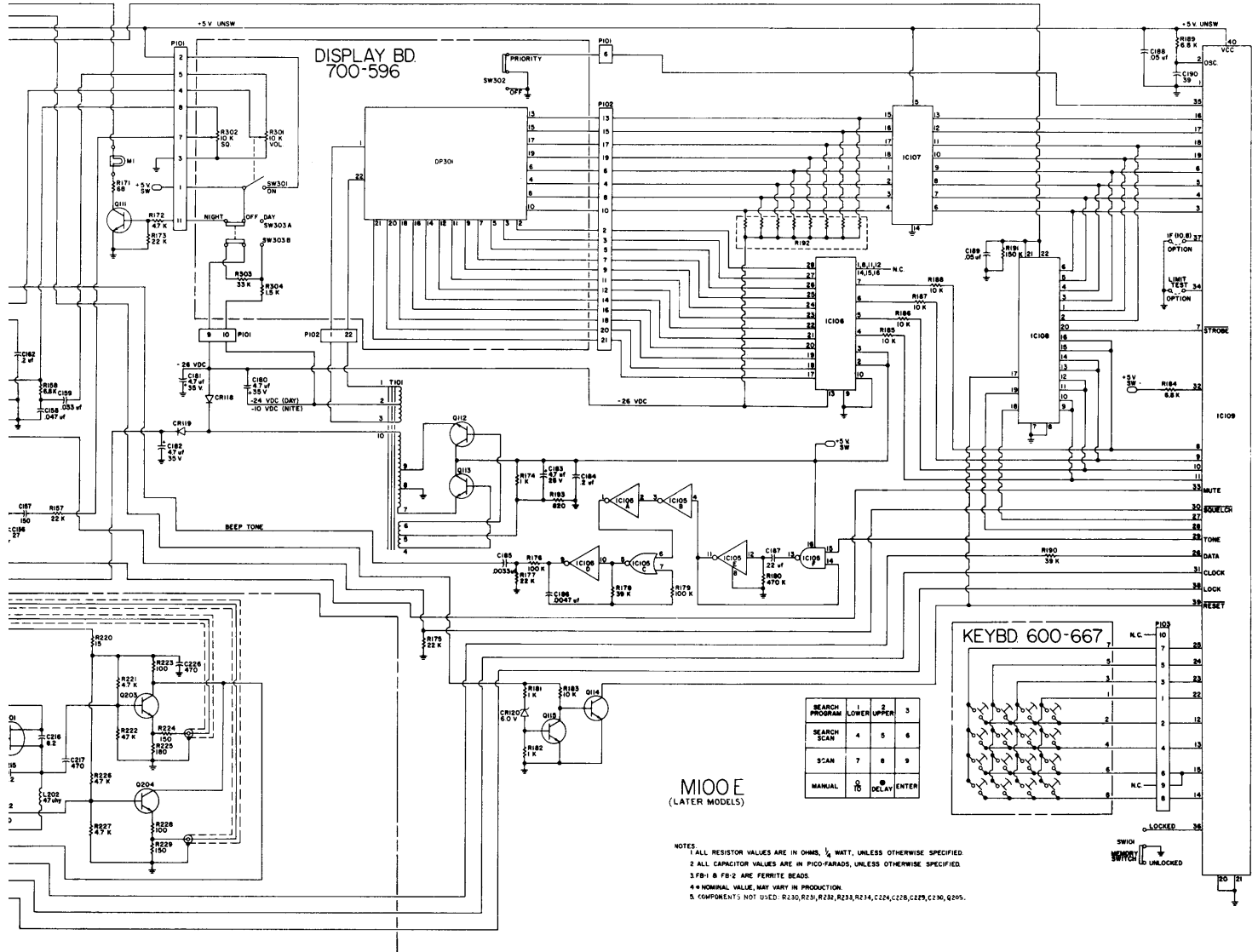
KEYBD 600-667

MIOOE
(EARLY MODELS)

SEARCH PROGRAM	1	2	3
SEARCH SCAN	4	5	6
MANUAL	7	8	9
	0	DELAY	ENTER

- NOTES:
1. ALL RESISTOR VALUES ARE IN OHMS, $\frac{1}{2}$ WATT, UNLESS OTHERWISE SPECIFIED.
 2. ALL CAPACITOR VALUES ARE IN MICRO-FARADS, UNLESS OTHERWISE SPECIFIED.
 3. FB-1 & FB-2 ARE FERRITE BEADS.
 4. NORMAL VALUE, MAY VARY IN PRODUCTION.





DISPLAY BD
700-596

KEYBD 600-667

MIOOE
(LATER MODELS)

SEARCH PROGRAM	1	2	3
SEARCH SCAN	4	5	6
SCAN	7	8	9
MANUAL	0	ENTER	
	10	DELAY	

- NOTES
- 1 ALL RESISTOR VALUES ARE IN OHMS, 1/4 WATT, UNLESS OTHERWISE SPECIFIED.
 - 2 ALL CAPACITOR VALUES ARE IN PICO-FARADS, UNLESS OTHERWISE SPECIFIED.
 - 3 FB-1 & FB-2 ARE FERRITE BEADS.
 - 4 * NOMINAL VALUE, MAY VARY IN PRODUCTION.
 5. COMPONENTS NOT USED: R130, R131, R234, R235, C224, C225, C226, C227, C228, Q205.

M100/M100E PARTS LIST

MAIN BOARD

<u>Item No.</u>	<u>Description</u>	<u>Part No.</u>
TRANSISTORS		
Q101, Q102, Q103 Q104, Q105, Q106, Q108	PNP	4801-0000-026
Q107	PNP	4801-0000-029
Q109	PNP (White Top)	4801-0000-060
Q110, Q114, Q115	NPN	4801-0000-016
Q111, Q112, Q113	NPN	4801-0000-005

DIODES

CR101, CR103	Varactor	4809-0000-018
CR102, CR104, CR105, CR106	Varactor	4809-0000-004
CR107, CR108	Varactor	4809-0000-005
CR109, CR110, CR118, CR119	Silicon, Signal	4805-1241-200
CR111, CR112, CR113, CR114	Silicon, Rectifier	4806-0000-004
CR115	Zener, 4.3V	4808-0000-039
CR116, CR117	Germanium-Junction, Signal	4807-1233-900
CR120	Zener, 6.0V	4808-0000-025

INTEGRATED CIRCUITS

IC101	IF	3130-6056-500
IC102	Audio	3130-3157-614
IC103	Regulator, 8V	3130-0000-014
IC104	Regulator, 5V	3130-0000-022
IC105	Logic	3130-3193-509
IC106	Display Driver	3130-3297-601
IC107	Display Driver	3130-3281-602
IC108	Memory	3130-3296-801
IC109	Processor, M100	3130-6060-307
IC109	Processor, M100E	3130-6060-308

M100/M100E PARTS LIST

MAIN BOARD

<u>Item No.</u>	<u>Description</u>	<u>Part No.</u>
COILS		
L101	RF Choke	1803-3293-801
L102	Ant, Low Band, M100, White	1800-3283-903
C102	Ant, Low Band, M100E, Orange	1800-3152-013
L103	RF Out, M100, Orange	1800-3283-904
L103	RF Out, M100E, Violet	1800-3152-012
L104	RF Choke, Brown	1803-5125-903
L105	Ant, High Band, Primary, Brown	1800-3152-001
L106	Ant, High Band, Secondary, Red	1800-3152-002
L107	RF Out, High Band, Yellow	
L108	Buffer, White	1800-3152-009
L109	Osc. 450 MHz	1800-3160-003
L110	Ant, UHF	1800-3255-201
L111	RF Out, UHF	1800-3160-005
L112	IF	1803-3268-201
L113	RF Choke	1800-6055-801
L114	IF	1800-6055-402
T101	Transformer, Drum/Ring	5604-5151-200

CAPACITORS

C101* C156, C139	27 PF, 5%	1538-0270-508
C102* C106* C109*	1000 PF, 20%	1538-0102-703
C119, C120, C126, C137, C138, C140, C149		
C103*	10 PF, 5%	1538-0100-508
C105, C108, C110, C111, C117, C122, C124, C147	4700 PF, 30%	1538-0472-806
C107, C129, C154	6.8 PF, 10%	1538-0689-608
C112, C121, C127	3.3 PF, 10%	1538-0339-608
C113, C116	12 PF, 5%	1538-0120-508
C114, C118	3.9 PF, 10%	1538-0399-608
C115	1.0 PF, 10%	1510-0010-900
C123	0.68 PF, 10%	1510-0688-900
C125	22 PF, 5%	1538-0220-508
C128	18 PF, 5%	1538-0180-508
C131	470 PF, 10%	1518-0471-601
C134	5.6 PF, 10%	1538-0569-608
C145	0.47 PF, 10%	1510-0478-900
C151, C160, C167	0.01 MF, 30%	1538-0103-804

*

See next page for M100E values

M100/M100E PARTS LIST

MAIN BOARD

<u>Item No.</u>	<u>Description</u>	<u>Part No.</u>
CAPACITORS CONTINUED		
C153, C168	2200 PF, 30%	1538-0222-806
C155, C157, C161, C166	150 PF, 10%	1538-0151-601
C165	68 PF, 5%	1538-0680-524
C169	3300 PF, 30%	1538-0332-806
C174	0.022 MF, 30%	1538-0223-804
C190	39 PF, 5%	1538-0390-508
C132, C136, C143	Trimmer, 2.5-7 PF	1517-3295-301
C101	5.6 PF, 10% M100E	1538-0569-608
C102	27 PF, 5% M100E	1538-0270-508
C103	4.7 PF, 10% M100E	1538-0479-608
C106	39 PF, 5% M100E	1538-0390-508
C109	10 PF, 5% M100E	1538-0100-508

CRYSTALS AND FILTERS

Y101	Crystal, 10.245 MHz	2301-3151-601
Y101 (Alternate Part)	Crystal, 11.155 MHz	2301-3151-602
XF101, XF102	Filter, Crystal, 10.7 MHz	2705-3232-200
CF101	Filter, Ceramic, 455 KHz	2700-3274-100

SWITCH

SW101	Slide, Memory Lock	5113-5155-201
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VCO BOARD

TRANSISTORS

Q201, Q202	FET	4811-0000-020
Q203, Q204, Q205	NPN	4801-0000-035

INTEGRATED CIRCUITS

IC201	Logic	3130-6068-000
IC202	Logic	3130-6060-604
IC203	Logic	3130-3157-644
IC204	OP AMP	3130-3167-917

M100/M100E PARTS LIST

VCO BOARD

<u>Item No.</u>	<u>Description</u>	<u>Part No.</u>
DIODES		
CR202, CR203	Germanium-Junction, Signal	4807-1233-900
CR204, CR205	Varactor	4809-0000-005
COILS		
L201	LVCO, M100	1800-5149-703
L201	LVCO, M100E	1800-5149-702
L202, L204	RF Choke	1803-3268-211
L203	VCO	1800-5149-702
CAPACITORS		
C201	27 PF, 5%	1538-0270-508
C207, C208, C228, C229, C234	1000 PF, 20%	1538-0102-703
C202	Trimmer, 4-11 PF	1517-3295-302
CRYSTAL		
Y201	11.2 MHz	2338-3283-201
CONTROL/DISPLAY BOARD		
RESISTORS		
R301	Variable, 10K, Vol. and Sw.	4751-3294-801
R302	Variable, 10K, Squelch	4751-3278-101
SWITCHES		
SW302	Slide, SPDT, Priority	5113-5154-001
SW303	Slide, DPDT, Brightness	5113-5152-201
MISCELLANEOUS		
DP301	Display, 12 Digit	2000-6067-301
	Keyboard	2001-6066-701
M301	Lamp, 2162D	3901-0000-011