President Grant (8719)

Photofact

ALIGNMENT INSTRUCTIONS

CAUTION: Use isolation transformer or observe polarity when connecting test equipment.
Maintain line voltage at 120V AC. Allow a 15-minute warm-up period.
Adjustments made with 13.8-volt DC input.
Connect low sides of test equipment to ground unless specified otherwise.
Connect 50-ohm dummy load or antenna before keying transmitter.
Connect microphone.

Suggested Alignment Tools:	GC ELECTRONICS:
L36, L38	9091,8728-A,8728
CT1, CT2	8276,5000
L3, L13, L15	5009,8728-A,8728
L1, L2, L4 thru L10, L12, L14, L19 thru L23, L30. L31. L45 thru L48	9440

SYNTHESIZER ALIGNMENT

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of frequency counter thru 47pF to TP20 (IC1 Pin 7).	Ch. 19, AM		Check for 10.240MHz.
Input of oscilloscope to TP21 (L21 Secondary).	Ch. 19, AM	L21	Adjust for maximum.
Input of frequency counter to TP21 (L21 Secondary).	Ch. 19, USB Clarifier Midrange	CT1	Adjust for 33.9765MHz.
	Ch. 19, AM Clarifier Midrange	L23	Adjust for 33.975MHz.
	Ch. 19, LSB Clarifier Midrange	L22	Adjust for 33.9735MHz.
Input of DC meter to TP9.	Ch. 40, AM Clarifier Midrange	L19	Adjust for 3.6 volts.
Input of oscilloscope to TP1.	Ch. 19, AM Clarifier Midrange	L20	Adjust for maximum.
Input of frequency counter to TP1.	Ch. 19, USB Clarifier Midrange		Check for 34.7665MHz. Check all channels. (See Truth Chart for correct frequencies.)
	Ch. 19, AM Clarifier Midrange		Check for 34.765MHz. Check all channels. (See Truth Chart for correct frequencies.)
	Ch. 19, LSB Clarifier Midrange		Check for 34.7635MHz. Check all channels. (See Truth Chart for correct frequencies.)
Input of frequency counter to TP10.	Ch. 1, AM		Check for .790MHz. Check all channels. (See Truth Chart for correct frequencies.)
Input of frequency counter to TP3.	Ch. 19, USB	CT2	Adjust for 7.8015MHz ±5Hz -0Hz.
	Ch. 19, LSB	L30	Adjust for 7.7985MHz +0Hz -5Hz.
	Ch. 19, AM, XMT	L31	Disconnect TP7 and TP8. Adjust for 7.8000MHz ±5Hz. Reconnect TP7 and TP8.
Input of frequency counter to TP22 (TR9 Emitter).	Ch. 19, AM		Check for 7.345MHz.
Input of frequency counter to antenna jack.	Ch. 19, AM, XMT	VR5	Adjust for 27.185MHz.

RECEIVER ALIGNMENT

Connect an AC VTVM or AF wattmeter across speaker voice coil.
Adjust volume control to obtain a suitable indication.
Set generator output low enough to prevent AGC limiting.
RF Gain Maximum, Clarifier Midrange, Squelch MINIMUM, NB/ANL Off.

AM

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to TP23 (FET1 G1). 455kHz, 1000Hz @ 30% modulation.	Ch. 19, AM	L15,L13,L3	Adjust for maximum.
Output of signal generator thru .01uF to antenna jack. 27.185MHz, 1000Hz @ 30% modulation.	Ch. 19, AM	L10,L9,L8, L7,L6,L5,L4	Adjust for maximum. If necessary, readjust L3, L13 and L15.
Input of oscilloscope to TP25 (D1 Cathode). Inject a 100pps, 1uSec. pulse width signal.	Ch. 19, AM NB/ANL On	L2,L1	Adjust for maximum.

RECEIVER ALIGNMENT

Connect an AC VTVM or AF wattmeter across speaker voice coil.
Adjust volume control to obtain a suitable indication.
Set generator output low enough to prevent AGC limiting.
RF Gain Maximum, Clarifier Midrange, Squelch MINIMUM, NB/ANL Off.

SSB

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to TP24 (TR15 Emitter). 7.8005MHz, no modulation.	Ch. 19, USB	L14,L12,L10, L9,L8,L7	Adjust for maximum output.
Output of signal generator thru .01uF to antenna jack. 27.186MHz, no modulation.	Ch. 19, USB	L6,L5,L4	Adjust for maximum output. If necessary, readjust L7, L8, L9, L10, L12 and L14.

RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF wattmeter across speaker voice coil.
Adjust volume control to obtain a suitable indication.
RF Gain Maximum, Clarifier Midrange, Squelch MINIMUM, NB/ANL Off, MOD/S/RF S/RF.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to antenna jack. 27.185MHz, 1000Hz @ 30% modulation. Output 1000uV.	Ch. 19, AM Squelch Maximum	VR3	SQUELCH RANGE Adjust so that squelch just breaks.
Output of signal generator thru .01uF to antenna jack. 27.185MHz, 1000Hz @ 30% modulation. Output 100uV.	Ch. 19, AM	VR1	AM SIGNAL METER Adjust for 9 on S scale of meter.
Output of signal generator thru .01uF to antenna jack. 27.186MHz, no modulation. Output 100uV.	Ch. 19, USB	VR2	SSB SIGNAL METER Adjust for 9 on S scale of meter.

TRANSMITTER ALIGNMENT

Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.
NOTE: Be sure to check transmit frequency and power on all active channels after alignment of transmitter.
See page 4 for channel frequencies.

AM

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of spectrum analyzer or harmonic meter to antenna jack.	Ch. 19	L36	Adjust for MINIMUM at 54MHz.

TRANSMITTER ALIGNMENT

Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.
NOTE: Be sure to check transmit frequency and power on all active channels after alignment of transmitter.
See page 4 for channel frequencies.

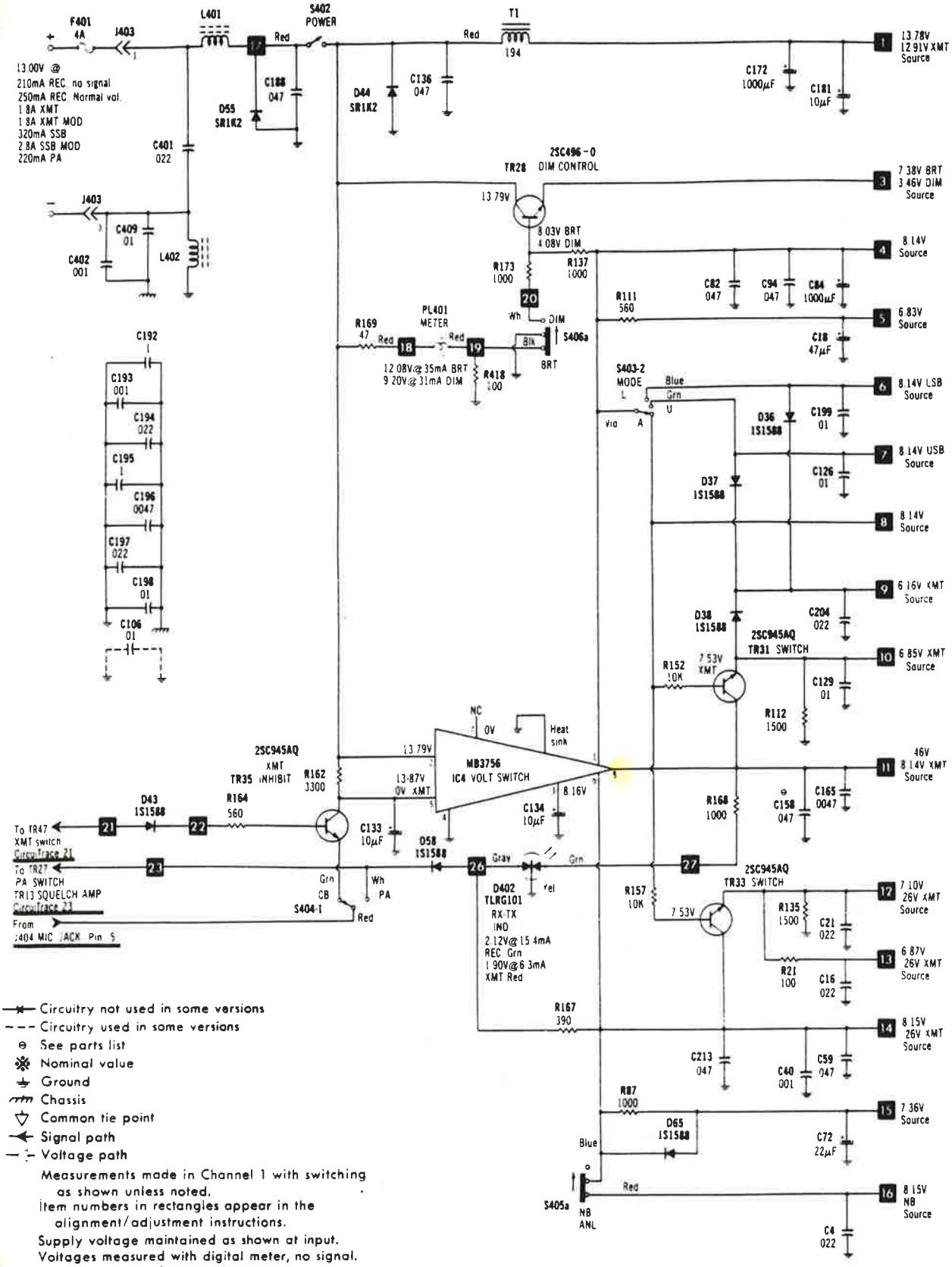
SSB

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Inject a 1000Hz, 100mV signal at mic input.	Ch. 19, USB Mike Gain Maximum	L47,L48,L46, L45,L38	Set VR11 fully clockwise. Adjust for maximum. Readjust VR11. See Transmitter Adjustments.

TRANSMITTER ADJUSTMENTS

Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.
NOTE: Be sure to check transmit frequency and power on all active channels after adjustment of transmitter.
See page 4 for channel frequencies.

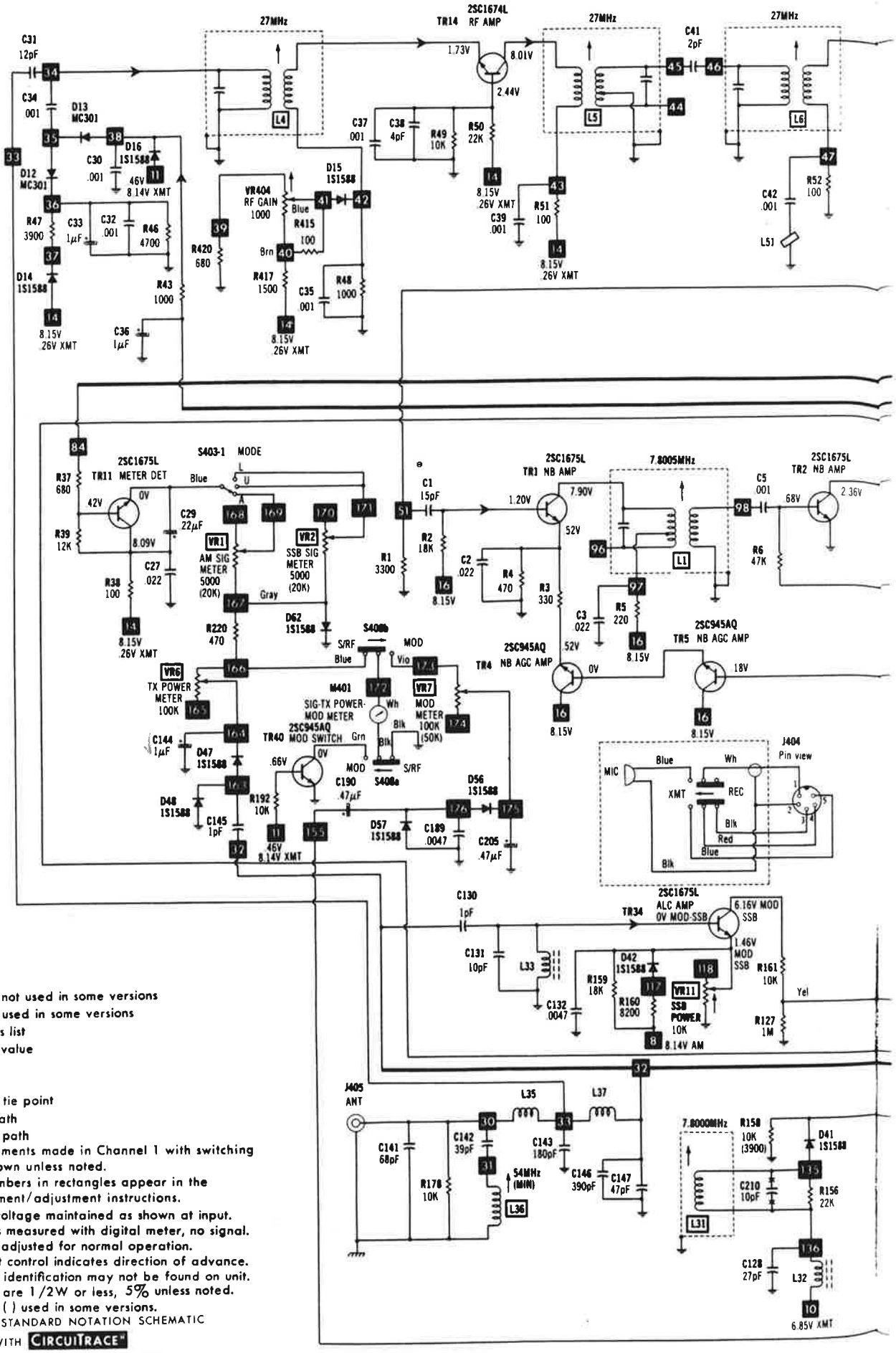
TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of oscilloscope to antenna jack. No signal input.	Ch. 19, USB	VR4	BALANCE Adjust for MINIMUM RF.
Insert DC current meter at TP8. No signal input.	Ch. 19, USB	VR9	BIAS Adjust for 25mA.
Insert DC current meter at TP7. No signal input.	Ch. 19, USB	VR8	BIAS Adjust for 50mA.
Input of RF wattmeter to antenna jack. Inject a 1000Hz, 100mV signal at mic input.	Ch. 19, USB Mike Gain Maximum	VR11	SSB POWER Adjust for 11 watts.
Input of RF wattmeter to antenna jack. No signal input.	Ch. 19, AM	VR10	AM POWER Adjust for 3.8 watts.
Input of RF wattmeter to antenna jack.	Ch. 19, AM MOD/S/RF S/RF	VR6	TX PWR METER Adjust VR6 so that TX PWR meter agrees with RF wattmeter.
Input of oscilloscope or modulation meter to antenna connector. Inject a 1000Hz signal at mic input.	Ch. 19, AM MOD/S/RF Modulation Mike Gain Maximum	VR7	MOD METER Adjust audio level to obtain approximately 100% modulation. Adjust VR7 to read in the 100% area on MOD scale of meter.



Circuitry not used in some versions
Circuitry used in some versions
⊖ See parts list
Nominal value
Ground
Chassis
Common tie point
Signal path
Voltage path

Measurements made in Channel 1 with switching as shown unless noted.
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltage maintained as shown at input.
Voltages measured with digital meter, no signal.
Controls adjusted for normal operation.
Arrow at control indicates direction of advance.
Terminal identification may not be found on unit.
Resistors are 1/2W or less, 5% unless noted.
Value in ( ) used in some versions.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE®



Circuitry not used in some versions
Circuitry used in some versions
⊖ See parts list
❋ Nominal value
Ground
Chassis
Common tie point
Signal path
Voltage path

Measurements made in Channel 1 with switching as shown unless noted.
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Voltages measured with digital meter, no signal.
Controls adjusted for normal operation.
Arrow at control indicates direction of advance.
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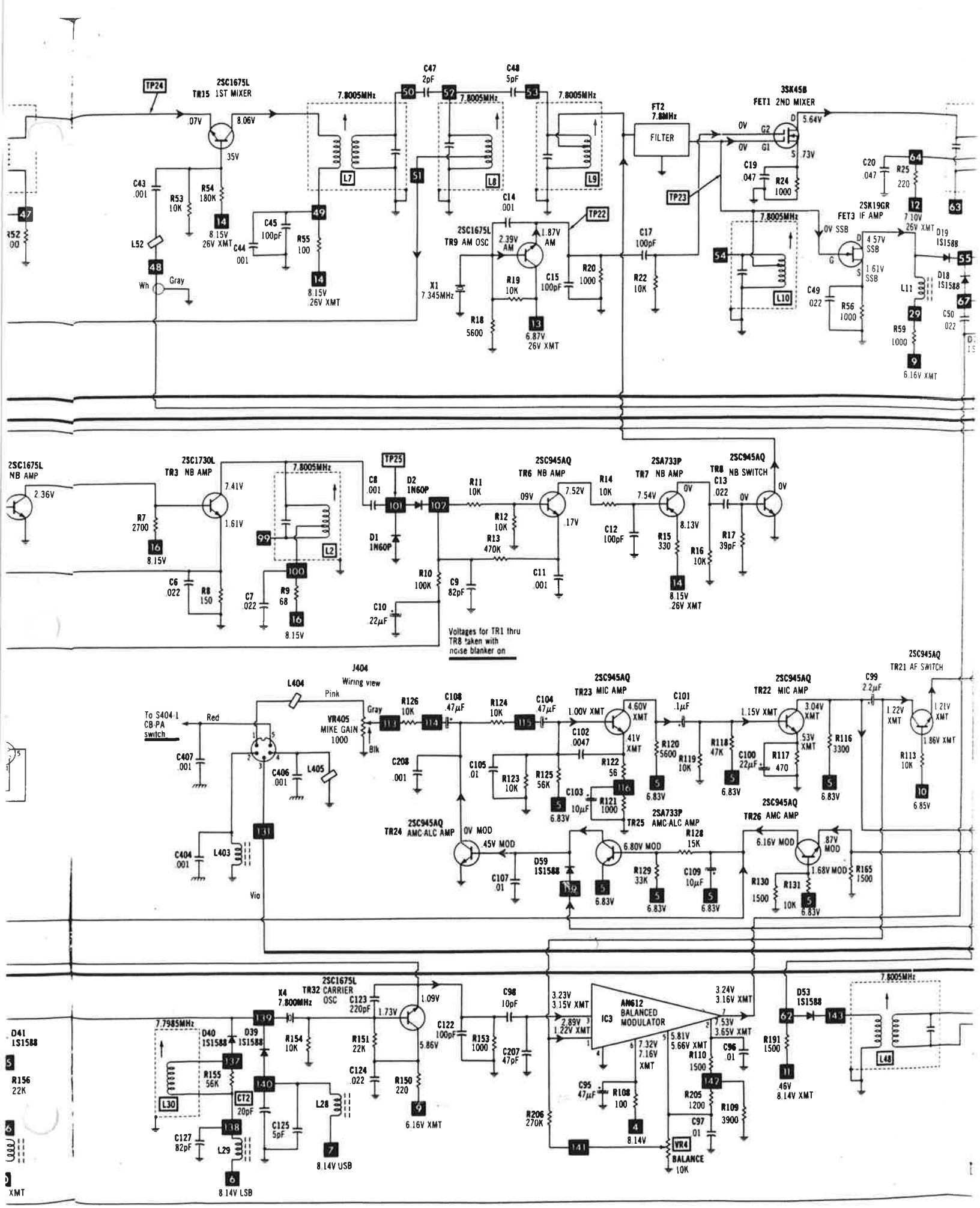
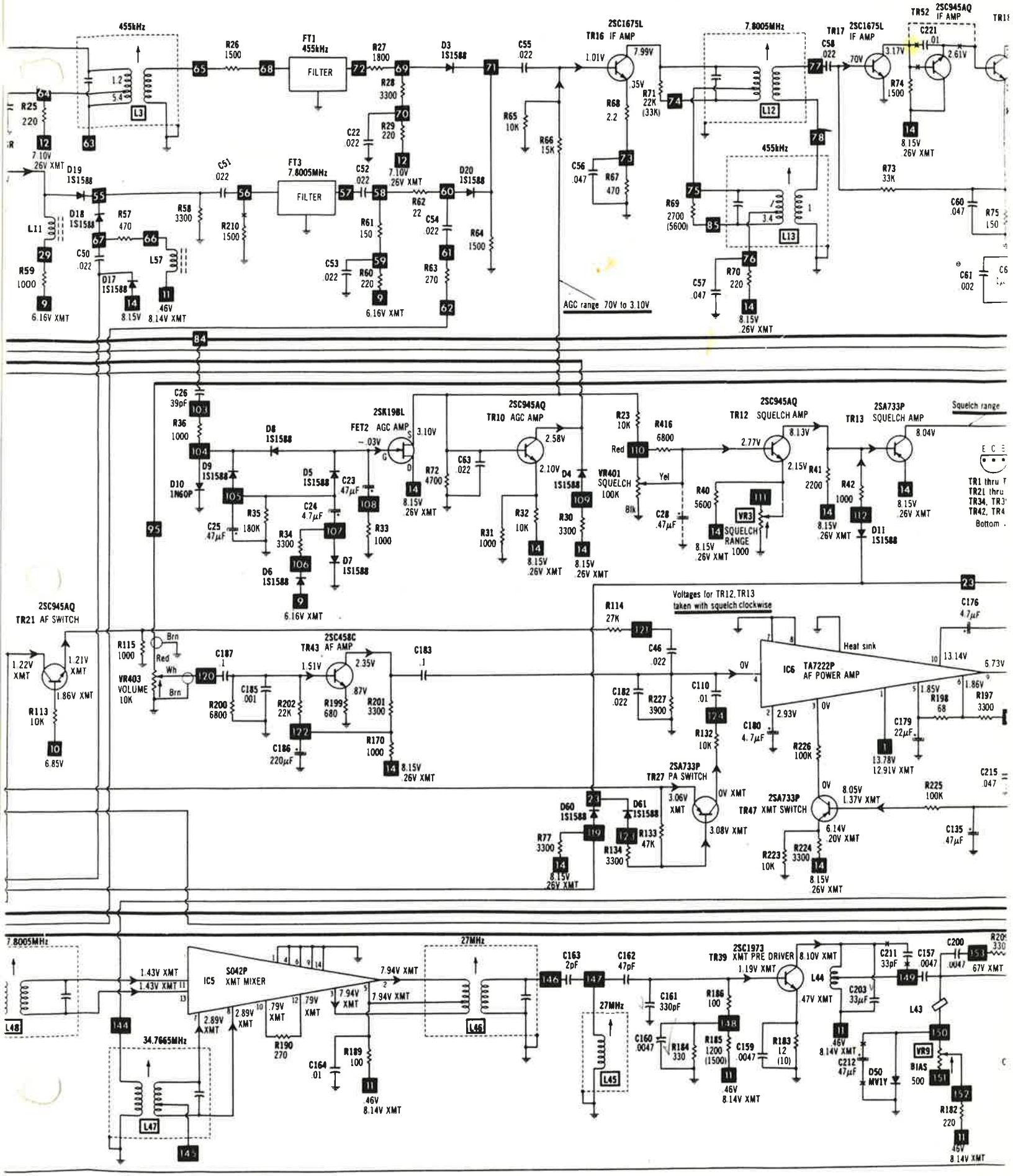
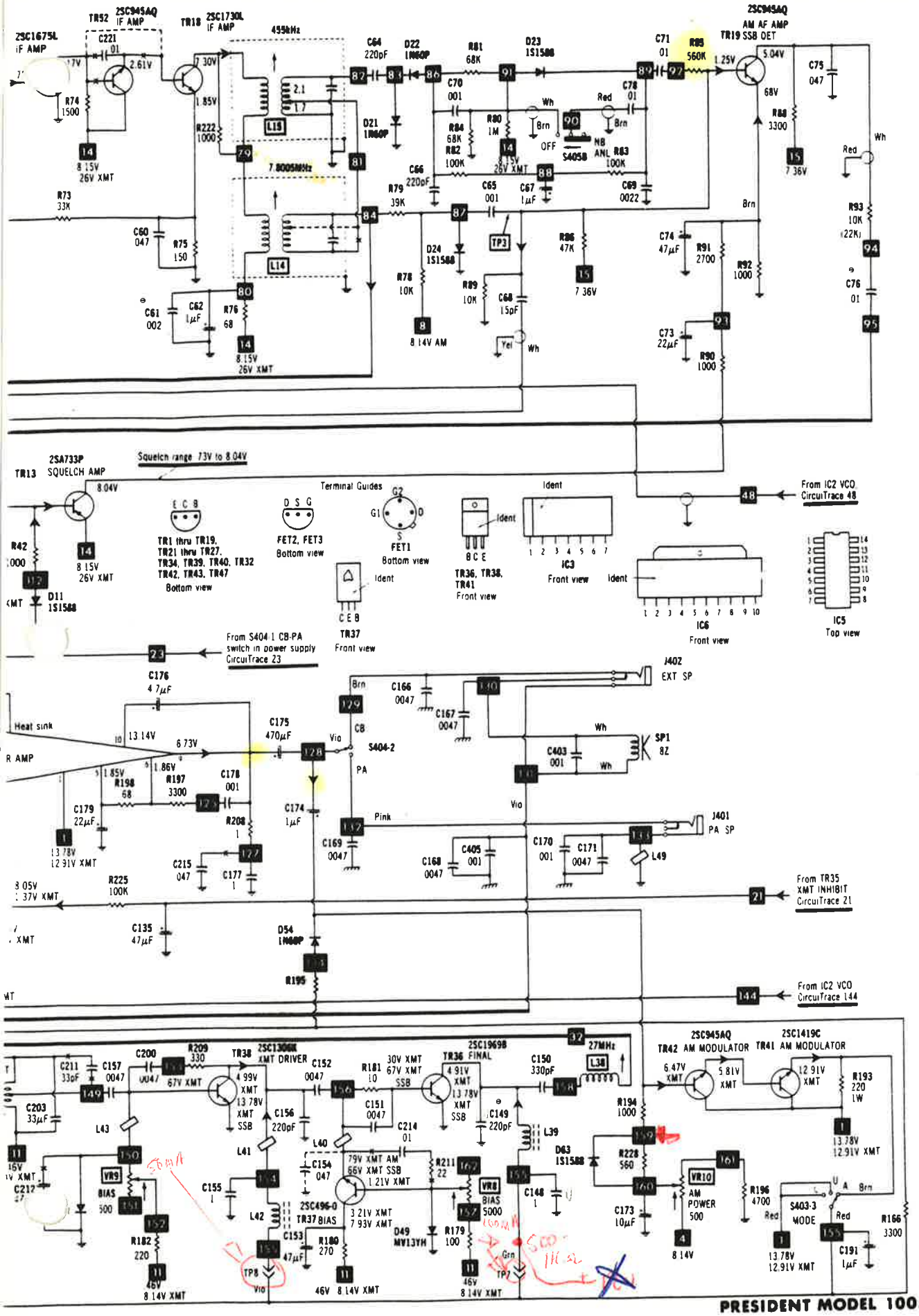
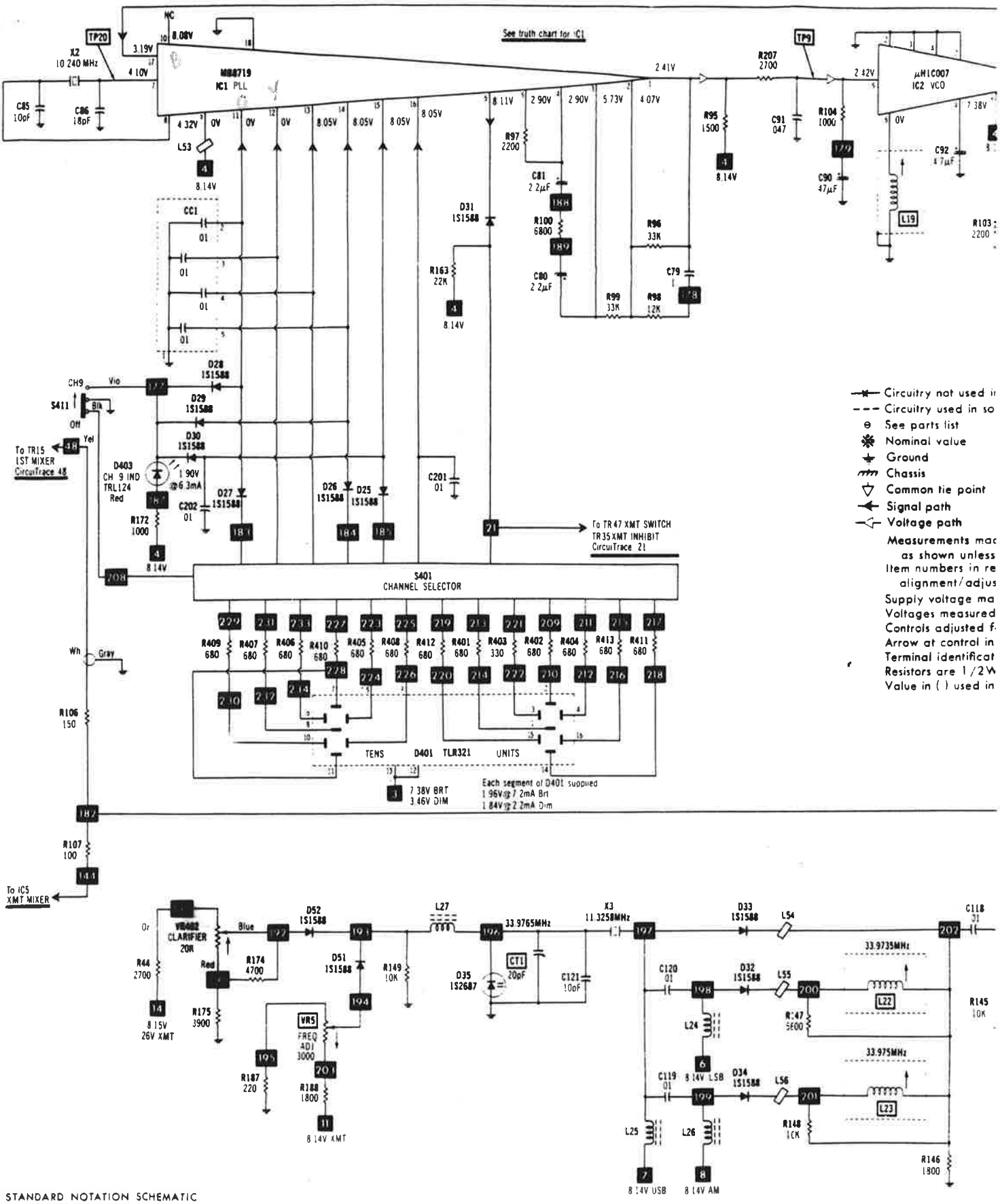
Value in ( ) used in some versions.

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE®

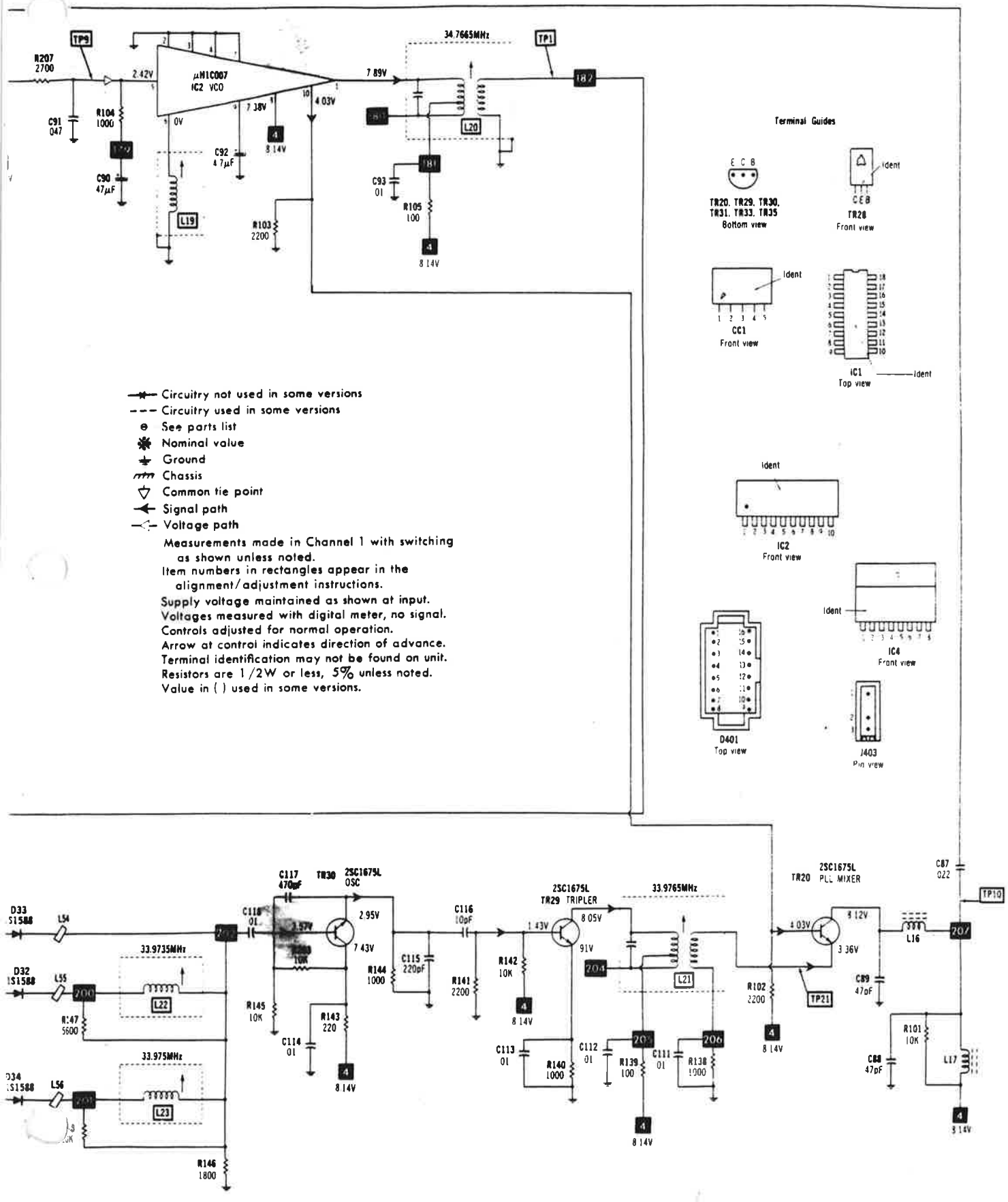

TP24
2SC1675L
TR15 1ST MIXER
7.8005MHz
C47 2pF
C48 5pF
FT2 7.8MHz
FILTER
3SK45B
FET1 2ND MIXER
TP23
TP22
2SC1675L
TR9 AM OSC
X1 7.345MHz
2SK19GR
FET3 IF AMP
2SC1730L
TR3 NB AMP
2SC1675L
NB AMP
TP25
2SC945AQ
TR6 NB AMP
2SA733P
TR7 NB AMP
2SC945AQ
TR8 NB SWITCH
Voltages for TR1 thru TR8 taken with noise blanker on
J404
Wiring view
L404
To S404-1 CB-PA switch
VR405 MIKE GAIN 1000
2SC945AQ
TR23 MIC AMP
TR22 MIC AMP
2SC945AQ
TR21 AF SWITCH
TR24 AMC-ALC AMP
2SA733P
AMC-ALC AMP
TR26 AMC AMP
2SC1675L
TR32 CARRIER OSC
X4 7.800MHz
7.7985MHz
IC3 AN612 BALANCED MODULATOR
VR4 BALANCE 10K
D41 1S1588
D40 1S1588
D39 1S1588
D59 1S1588
D53 1S1588
D19 1S1588
D18 1S1588
L30
L28
L29
L48
CT2 20pF
8.14V USB
8.14V LSB
6.16V XMT
8.14V XMT


455kHz
FT1 455kHz FILTER
R26 1500
R27 1800
D3 1S1588
C55 .022
2SC1675L TR16 IF AMP
7.8005MHz
TR17 2SC1675L IF AMP
TR52 2SC945AQ IF AMP
C58 022
C221 .01
R74 1500
R71 22K (33K)
R68 2.2
R28 3300
R29 220
C22 .022
C56 .047
R67 470
R65 10K
R66 15K
L12
L13
455kHz
R73 33K
C60 .047
R75 150
C61 .002
R69 2700 (5600)
R70 220
C57 .047
AGC range 70V to 3.10V
FT3 7.8005MHz FILTER
C51 022
C52 022
R62 22
C54 .022
R61 150
R60 220
C53 .022
R63 270
R64 1500
D19 1S1588
D18 1S1588
D17 1S1588
D20 1S1588
R57 470
R58 3300
R210 1500
C50 .022
L11
L57
R59 1000
C26 39pF
R36 1000
D8 1S1588
D9 1S1588
D10 1N60P
D5 1S1588
C23 47μF
C24 4.7μF
C25 47μF
R35 180K
R34 3300
D6 1S1588
D7 1S1588
R33 1000
2SK19BL FET2 AGC AMP
R72 4700
C63 .022
2SC945AQ TR10 AGC AMP
R31 1000
R32 10K
D4 1S1588
R30 3300
R23 10K
R416 6800
VR401 SQUELCH 100K
C28 .47μF
2SC945AQ TR12 SQUELCH AMP
R40 5600
VR3 SQUELCH RANGE 1000
R41 2200
R42 1000
D11 1S1588
2SA733P TR13 SQUELCH AMP
Squelch range
TR1 thru T
TR21 thru
TR34, TR3
TR42, TR4
Bottom .
Voltages for TR12, TR13 taken with squelch clockwise
2SC945AQ TR21 AF SWITCH
VR403 VOLUME 10K
R115 1000
R113 10K
C187 .1
R200 6800
C185 .001
2SC458C TR43 AF AMP
R202 22K
R199 680
R201 3300
C186 220μF
R170 1000
C183 .1
R114 27K
C46 .022
C182 .022
R227 3900
C110 .01
R132 10K
IC6 TA7222P AF POWER AMP
Heat sink
C180 4.7μF
R226 100K
C179 22μF
R198 68
R197 3300
C176 4.7μF
C215 .047
R225 100K
C135 47μF
2SA733P TR27 PA SWITCH
D60 1S1588
D61 1S1588
R77 3300
R133 47K
R134 3300
2SA733P TR47 XMT SWITCH
R223 10K
R224 3300
7.8005MHz
IC5 S042P XMT MIXER
34.7665MHz
R190 270
R189 100
C164 .01
27MHz
C163 2pF
C162 47pF
C161 330pF
C160 .0047
R184 330
R186 100
R185 1200 (1500)
C159 .0047
2SC1973 TR39 XMT PRE DRIVER
R183 12 (10)
L44
L45
L46
L47
L48
C211 33pF
C157 .0047
C200 .0047
C203 33μF
L43
C212 47μF
D50 MV1Y
VR9 BIAS 500
R182 220
R201
67V XMT
46V 8.14V XMT
8.15V 26V XMT
6.16V XMT
7.10V 26V XMT
1.43V XMT
7.94V XMT
2.89V XMT
.79V XMT
1.19V XMT
8.10V XMT
47V XMT
13.14V
6.73V
1.85V
1.86V
2.93V
13.78V
12.91V XMT
8.05V
1.37V XMT
6.14V
20V XMT
3.08V XMT
3.06V XMT
1.22V XMT
1.21V XMT
1.86V XMT
6.85V
2.58V
2.10V
2.77V
2.15V
8.13V
8.04V
3.10V
1.51V
2.35V
.87V
1.01V
7.99V
.35V
3.17V
70V
2.61V
3.4V
.03V


TR52 2SC945AQ IF AMP
TR18 2SC1730L IF AMP
2SC1675L IF AMP
455kHz
7.8005MHz
L15
L14
C221 01
R74 1500
R222 1000
R73 33K
C60 047
R75 150
C61 002
C62 1µF
R76 68
C64 220pF
D22 1N60P
R81 68K
D23 1S1588
C70 001
R84 68K
R82 100K
R80 1M
D21 1N60P
C66 220pF
R79 39K
C65 001
C67 1µF
C69 0022
D24 1S1588
R78 10K
R89 10K
C68 15pF
TP3
R86 47K
C71 01
R85 560K
C78 01
S405B
NB
ANL
R83 100K
2SC945AQ AM AF AMP TR19 SSB DET
C75 047
R88 3300
R93 10K (22K)
C76 01
C74 47µF
R91 2700
R92 1000
C73 22µF
R90 1000
8.14V AM
8.15V 26V XMT
7.36V
5.04V
1.25V
68V
Wh
Red
Brn
Yel
OFF
2SA733P TR13 SQUELCH AMP
Squelch range 7.3V to 8.04V
8.04V
D11 1S1588
TR1 thru TR19, TR21 thru TR27, TR34, TR39, TR40, TR32 TR42, TR43, TR47
Bottom view
FET2, FET3
FET1
TR36, TR38, TR41
Front view
IC3
IC6
IC5
Top view
TR37
Terminal Guides
Ident
From IC2 VCO CircuitTrace 48
From S404-1 CB-PA switch in power supply CircuitTrace 23
C176 4.7µF
C175 470µF
Heat sink
R AMP
13.14V
6.73V
1.85V
1.86V
R198 68
R197 3300
C178 001
C179 22µF
R208 1
C215 047
C177 1
13.78V 12.91V XMT
R225 100K
C135 47µF
D54 1N60P
R195
S404-2
CB
PA
Via
C166 0047
C167 0047
C403 001
C174 1µF
C169 0047
C168 0047
C405 001
C170 001
C171 0047
L49
J402 EXT SP
SP1 8Z
J401 PA SP
From TR35 XMT INH181T CircuitTrace 21
From IC2 VCO CircuitTrace 144
2SC1306R XMT DRIVER
TR38
2SC1969B
TR36 FINAL
27MHz
L38
C150 330pF
C149 220pF
C152 0047
R181 10
C151 0047
C214 01
C156 220pF
C154 047
C155 1
C153 47µF
R180 270
R182 220
R209 330
C200 0047
C157 0047
C211 33pF
C203 33µF
C212
L43
L40
L41
L42
L39
D63 1S1588
R211 22
R179 100
D49 MV13YH
C148 1
R228 560
R194 1000
C173 10µF
VR9 BIAS 500
VR8 BIAS 5000
VR10 AM POWER 500
2SC496-0 TR37 BIAS
TP8
TP7
2SC945AQ TR42 AM MODULATOR
2SC1419C TR41 AM MODULATOR
R193 220 1W
R196 4700
S403-3 MODE
R166 3300
C191 1µF
6.47V XMT
5.81V XMT
12.91V XMT
13.78V 12.91V XMT
79V XMT AM
66V XMT SSB
1.21V XMT
3.21V XMT
7.93V XMT
4.99V XMT 13.78V XMT SSB
4.91V XMT 13.78V XMT SSB
67V XMT
30V XMT 67V XMT SSB
45V 8.14V XMT
46V 8.14V XMT
8.14V
50mA
100mA
500 1H 2L



PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE®


TP9
R207 2700
2.42V
μM1C007 IC2 VCO
7.89V
34.7665MHz
TP1
182
4.03V
7.38V
0V
C91 047
R104 1000
C90 47μF
C92 4.7μF
8.14V
L19
L20
C93 01
R105 100
R103 2200
Circuitry not used in some versions
Circuitry used in some versions
See parts list
Nominal value
Ground
Chassis
Common tie point
Signal path
Voltage path
Measurements made in Channel 1 with switching as shown unless noted.
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltage maintained as shown at input.
Voltages measured with digital meter, no signal.
Controls adjusted for normal operation.
Arrow at control indicates direction of advance.
Terminal identification may not be found on unit.
Resistors are 1/2W or less, 5% unless noted.
Value in ( ) used in some versions.
Terminal Guides
E C B
TR20, TR29, TR30, TR31, TR33, TR35
Bottom view
Ident
C E B
TR28
Front view
Ident
1 2 3 4 5
CC1
Front view
IC1
Top view
Ident
Ident
IC2
Front view
Ident
IC4
Front view
D401
Top view
J403
Pin view
D33 1S1588
L54
D32 1S1588
L55
33.9735MHz
L22
R147 5600
D34 1S1588
L56
33.975MHz
L23
R146 1800
C117 470pF
TR30 2SC1675L OSC
C118 01
2.57V
2.95V
7.43V
R145 10K
R143 220
C114 01
8.14V
R144 1000
C115 220pF
C116 10pF
R141 2200
2SC1675L TR29 TRIPLER
1.43V
8.05V
9.1V
33.9765MHz
L21
R142 10K
8.14V
C113 01
R140 1000
C112 01
R139 100
C111 01
R138 1000
2SC1675L TR20 PLL MIXER
4.03V
8.12V
3.36V
L16
R102 2200
TP21
8.14V
C87 022
TP10
C89 47pF
C88 47pF
R101 10K
L17
8.14V