RIDER'S

COMBINATION

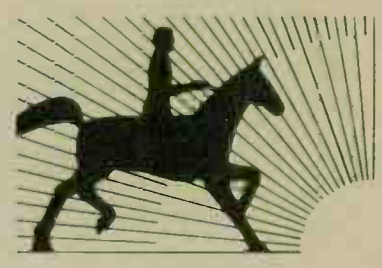
TELEVISION

TRANSISTOR RADIO

HOME RADIO

MANUAL

VOLUME 27



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*Combination TELEVISION and TRANSISTOR RADIO Manual

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BOOKS

Picture Book of TV Troubles, Vols. 1, 2, 3, 4, 5, 6, 7 - by Rider Staff
TV Repair Q & A, Vols. 1, 2, 3, 4, 5 - by Sidney Platt
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Television - How It Works - 2nd Ed. - (Cloth)
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Understanding Vectors and Phase (Paper) - by Rider & Uslan
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TV and Electronics as a Career - by Kamen & Dorf
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Fundamentals of Transistors - 2nd Ed. - by Leonard Krugman
Advanced TV Servicing Techniques - by The RETMA Pilot Training Course Teaching Staff
Advanced TV Servicing Techniques Lab Workbook - by The RETMA Staff
Color Television Receiver Practices (Paper) - by Hazeltine Corp. Lab. Staff
Color Television Receiver Practices (Cloth)
Technician's Guide to TV Picture Tubes - by Ira Remer
Color TV Dictionary - by J. Richard Johnson
How To Service Tape Recorders - by C. A. Tuthill
How To Use Test Probes - by Ghirardi & Middleton
Basic Vacuum Tubes And Their Uses (Paper) - by Rider & Jacobowitz
Basic Vacuum Tubes And Their Uses (Cloth) - by Rider & Jacobowitz
How To Install TV Antennas - by Samuel Marshall
Handbook of 630-Type TV Receivers - by Miller & Bierman
Selling Your TV-Radio Service - by GE Tube Dept.
Hi-Fi Loudspeakers & Enclosures (MARCO Cover) - by Abraham B. Cohen
Hi-Fi Loudspeakers & Enclosures (Cloth)
Radio Receiver Laboratory Manual - by Alex. W. Levey
How to Select and Use Your Tape Recorder - by David Mark
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Basics of Phototubes & Photocells - by David Mark
Introduction to Printed Circuits - by Robert L. Swiggett
Pictorial Microwave Dictionary - by V. J. Young & M. W. Jones
TV Tube Location & Trouble Guide (RCA) - by Rider Lab. Staff
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Sound-n-Sight Code Course - L. Robins and R. Harris
Novice Course: 0 to 8 words per minute
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TV Mfrs. Receiver Trouble Cures, Vols. 1, 2, 3, 4, 5, 6, 7, 8 - by Rider Staff
TV Field Service Manuals with Tube Locations, Vols. 1, 2, 3, 4, 5 - by Harold Alsberg
Radio Control for Model Builders, - W. Winters

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Blocking Oscillators
Wave Propagation
Superheterodyne Converters & I-F Amplifiers
L-C Oscillators
Antennas
Inverse Feedback
Low-Frequency Amplifiers
Phototubes
Advanced Magnetism And Electromagnetism
Resonant Circuits
Electrostatics
D-C Circuit Analysis
A-C Circuit Analysis
Vacuum Tube Rectifiers
Vacuum Tube Characteristics
Impedance Matching
Gas Tubes
Low-Frequency Amplifier Systems

Spanish Titles
High Fidelity Simplified, 2nd Ed. - by H. D. Weiler
Radio Troubleshooting Guidebook - by John F. Rider and J. R. Thompson
Repairing Television Receivers, Cloth Bound - C. Glickstein

Printed in U. S. A.

TELEVISION SECTION

Admiral

SERVICE DATA No. ST597-2

Supersedes Preliminary Data No. ST597-1 which should be destroyed.

for models using

16B1, 16AB1, 16D1, 16AD1, 16E1, 16AE1, 16G1, 16AG1, 16J1, 16K1, 16L1, 16AL1, 16U1C, 16AU1C, 16W1C, and 16AW1C CHASSIS

For Service Information covering the RT440A Son-R tuner and the 8G1 remote control amplifier used in models with remote tuning see Service Manual ST599-1.

For servicing printed wiring use Service Manual No. S559 and the special illustrations in this manual.

MODEL IDENTIFICATION CHART

MODEL NUMBER	TV CHASSIS	MODEL NAME	CHASSIS SERIES	VHF TUNER	UHF TUNER	LOCATION OF TUNING CONTROLS	TONE CONTROL(S)
T21E1 T21E1C	16G1 16G1C	Meredith	De Luxe 330	94E144-19		Hideaway Top	
TA21E1 TA21E1C	16AG1 16AG1C	Meredith	De Luxe 330	94E144-30	94D112-5 or 94D155-3	Hideaway Top	
T21E2 T21E2C	16G1 16G1C	Meredith	De Luxe 330	94E144-19		Hideaway Tap	
TA21E2 TA21E2C	16AG1 16AG1C	Meredith	De Luxe 330	94E144-30	94D112-5 or 94D155-3	Hideaway Top	
T21E3 T21E3C	16G1 16G1C	Meredith	De Luxe 330	94E144-19		Hideaway Top	
TA21E3 TA21E3C	16AG1 16AG1C	Meredith	De Luxe 330	94E144-30	94D112-5 or 94D155-3	Hideaway Top	
T21E21 T21E21C	16B1 16B1C	Asbury	Imperial 330	94E144-13		Front	Single
TA21E21 TA21E21C	16AB1 16AB1C	Asbury	Imperial 330	94E144-9	94D112-5 or 94D155-3	Front	Single
T21E22 T21E22C	16B1 16B1C	Asbury	Imperial 330	94E144-13		Front	Single
TA21E22 TA21E22C	16AB1 16AB1C	Asbury	Imperial 330	94E144-9	94D112-5 or 94D155-3	Front	Single
T21E23 T21E23C	16B1 16B1C	Asbury	Imperial 330	94E144-13		Front	Single
TA21E23 TA21E23C	16AB1 16AB1C	Asbury	Imperial 330	94E144-9	94D112-5 or 94D155-3	Front	Single
TH21E51C	16W1C	Claridge	Hi-Fi 330	94E144-13		Front	Bass-Treble
THA21E51C	16AW1C	Claridge	Hi-Fi 330	94E144-9	94D112-5 or 94D155-3	Front	Bass-Treble
TH21E52C	16W1C	Claridge	Hi-Fi 330	94E144-13		Front	Bass-Treble
THA21E52C	16AW1C	Claridge	Hi-Fi 330	94E144-9	94D112-5 or 94D155-3	Front	Bass-Treble
TH21E53C	16W1C	Claridge	Hi-Fi 330	94E144-13		Front	Bass-Treble
THA21E53C	16AW1C	Claridge	Hi-Fi 330	94E144-9	94D112-5 or 94D155-3	Front	Bass-Treble
*TR21E21	16J1	Asbury	Automatic 330	94D151-1		Front	Single
*TR21E22	16J1	Asbury	Automatic 330	94D151-1		Front	Single
*TR21E23	16J1	Asbury	Automatic 330	94D151-1		Front	Single
C21E2 C21E2C	16L1 16L1C	Stanford	De Luxe 330	94E144-26		Hideaway Top	
CA21E2 CA21E2C	16AL1 16AL1C	Stanford	De Luxe 330	94E144-27	94D112-5 or 94D155-3	Hideaway Top	
C21E3 C21E3C	16L1 16L1C	Stanford	De Luxe 330	94E144-26		Hideaway Top	
CA21E3 CA21E3C	16AL1 16AL1C	Stanford	De Luxe 330	94E144-27	94D112-5 or 94D155-3	Hideaway Top	
C21E6 C21E6C	16L1 16L1C	Cornell	De Luxe 330	94E144-26		Hideaway Top	
CA21E6 CA21E6C	16AL1 16AL1C	Cornell	De Luxe 330	94E144-27	94D112-5 or 94D155-3	Hideaway Top	
C21E7 C21E7C	16L1 16L1C	Cornell	De Luxe 330	94E144-26		Hideaway Top	
CA21E7 CA21E7C	16AL1 16AL1C	Cornell	De Luxe 330	94E144-27	94D112-5 or 94D155-3	Hideaway Top	
C21E12 C21E12C	16D1 or 16E1 16E1C	Windsor	Imperial 330	94E144-24		Front	†

*Remote tuning model using RT440A Son-R Tuner and 8G1 Remote Control Amplifier.
†Single tone control used in 16E1, 16E1C, 16AE1, 16AE1C and some early 16D1 and 16AD1 chassis.

MODEL IDENTIFICATION CHART (Cont.)

MODEL NUMBER	TV CHASSIS	MODEL NAME	CHASSIS SERIES	VHF TUNER	UHF TUNER	LOCATION OF TUNING CONTROLS	TONE CONTROL(S)
CA21E12 CA21E12C	16AD1 or 16AE1 16AE1C	Windsor	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	†
C21E13 C21E13C	16D1 or 16E1 16E1C	Windsor	Imperial 330	94E144-24		Front	†
CA21E13 CA21E13C	16AD1 or 16AE1 16AE1C	Windsor	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	†
C21E14 C21E14C	16D1 or 16E1 16E1C	Windsor	Imperial 330	94E144-24		Front	†
CA21E14 CA21E14C	16AD1 or 16AE1 16AE1C	Windsor	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	†
C21E16 C21E16C	16E1 16E1C	Geneva	Imperial 330	94E144-24		Front	Single
CA21E16 CA21E16C	16AE1 16AE1C	Geneva	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	Single
C21E17 C21E17C	16E1 16E1C	Geneva	Imperial 330	94E144-24		Front	Single
CA21E17 CA21E17C	16AE1 16AE1C	Geneva	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	Single
C21E22 C21E22C	16E1 16E1C	Vanderbilt	Imperial 330	94E144-24		Front	Single
CA21E22 CA21E22C	16AE1 16AE1C	Vanderbilt	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	Single
C21E23 C21E23C	16E1 16E1C	Vanderbilt	Imperial 330	94E144-24		Front	Single
CA21E23 CA21E23C	16AE1 16AE1C	Vanderbilt	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	Single
C21E24 C21E24C	16E1 16E1C	Vanderbilt	Imperial 330	94E144-24		Front	Single
CA21E24 CA21E24C	16AE1 16AE1C	Vanderbilt	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	Single
CH21E26C	16U1C	Stratford	Hi-Fi 330	94E144-24		Front	Bass-Treble
CHA21E26C	16AU1C	Stratford	Hi-Fi 330	94E144-22	94D112-5 or 94D155-3	Front	Bass-Treble
CH21E27C	16U1C	Stratford	Hi-Fi 330	94E144-24		Front	Bass-Treble
CHA21E27C	16AU1C	Stratford	Hi-Fi 330	94E144-22	94D112-5 or 94D155-3	Front	Bass-Treble
CH21E29C	16U1C	Stratford	Hi-Fi 330	94E144-24		Front	Bass-Treble
CHA21E39C	16AU1C	Stratford	Hi-Fi 330	94E144-22	94D112-5 or 94D155-3	Front	Bass-Treble
*CR21E12	16K1	Windsor	Automatic 330	94D151-2		Front	
*CR21E13	16K1	Windsor	Automatic 330	94D151-2		Front	
*CR21E14	16K1	Windsor	Automatic 330	94D151-2		Front	
L21E22 L21E22C	16E1 16E1C	Princeton	Imperial 330	94E144-24		Front	Single
LA21E22 LA21E22C	16AE1 16AE1C	Princeton	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	Single
L21E23 L21E23C	16E1 16E1C	Princeton	Imperial 330	94E144-24		Front	Single
LA21E23 LA21E23C	16AE1 16AE1C	Princeton	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	Single
L21E24 L21E24C	16E1 16E1C	Princeton	Imperial 330	94E144-24		Front	Single
LA21E24 LA21E24C	16AE1 16AE1C	Princeton	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	Single

*Remote tuning model using RT440A Son-R Tuner and 8G1 Remote Control Amplifier.
†Single tone control used in 16E1, 16E1C, 16AE1, 16AE1C and some early 16D1 and 16AD1 chassis.

FEATURES

The "Slim Line" television receivers covered in this manual have many electrical and mechanical differences over previous Admiral models. In designing these new receivers, performance and ease of service were the prime considerations. Admiral's new design techniques and use of the newly developed 21", short neck, 110° deflection picture tube have made it possible to produce a more compact, lightweight and easier to service television receiver.

These receivers were especially designed to provide excellent performance under all signal conditions. Use of newly developed multi-purpose tubes, improved sound detector circuit, germanium diode as the video detector and dual selenium diode as the horizontal sync discriminator and two selenium or silicon rectifiers as B+ power suply have made superb receiver performance possible with use of a minimum number of tubes.

A major portion of receiver circuit wiring is contained in two printed circuit wiring boards. Use of printed circuit wiring (made possible by Admiral's automation) permits uniform quality, improved performance and eliminates possibility of human errors in circuit wiring.

All tubes (except high voltage rectifier) have been specially designed for series heater operation. The heater of these tubes feature controlled warm-up characteristics and very low tolerance of the heater current. This prevents voltage and current surges during warm-up thereby improving life expectancy of tubes.

A Super Range Finder (threshold control for noise-gated AGC tube V401, 3BU8) is used for improved TV reception in fringe areas or in areas where there is interference.

All operating and set-up controls are accessible without need for removing cabinet back.

All tubes (except picture tube), detector diode, horizontal sync discriminator diode and B+ rectifiers are accessible for replacement after removing the cabinet back.

The picture window and face of the picture tube may be cleaned by merely removing the front bezel from cabinet.

An improved, short neck 110 degree magnetic deflection picture tube is used. The design of this tube permits a smaller dimensioned cabinet and lighter over-all weight. These new tubes do not require an ion trap, service attention is therefore minimized.

*An improved disc type turret VHF tuner is used. This tuner features an improved cascode RF amplifier with higher sensitivity, better signal-to-noise ratio and a minimum of local oscillator radiation. A 41 MC interference trap is contained in the antenna circuit of the tuner for attenuating RF interference from radio transmitters or other interference sources.

A three stage (41 MC) broadband IF amplifier is used. Use of a 41 MC IF amplifier rejects interferences common to other IF frequencies. Adjacent channel and accompanying sound traps are contained in the IF amplifier for eliminating possibility of interferences from adjacent channels or accompanying sound frequencies.

The sound detector is an improved version of the "quadrature grid-lock oscillator" circuit using a 3DT6 tube. This circuit features excellent limiting ability thus enabling high quality sound with constant sound level under all signal conditions, especially in fringe areas or in noisy areas where weak or fading signals occur.

A newly improved dual selenium diode (horizontal sync discriminator) is used. This new selenium diode is of the plug-in type for ease in replacement. The diode is capsuled in a cushion of silicone grease to provide protection against mechanical shock and twisting of leads which may result in intermittent or erratic operation due to poor internal contact.

*Models with Son-R remote tuning use a drum type turret tuner with neutrode RF amplifier.

SPECIFICATIONS

Picture Tube: Short neck rectangular, 110° magnetic deflection, electrostatic focus, gray filter faceplate, aluminized screen, no ion trap magnet required.

Operating Voltage: 110-120 volts, 60 cycle AC.

Wattage:
165 watts for standard VHF models.
175 watts for VHF models with Hi-Fi sound.
175 watts for standard VHF-UHF models.
185 watts for VHF-UHF models with Hi-Fi sound.
225 watts for VHF models with Son-R remote tuning.

Intermediate Frequencies:
Video IF; 45.75 MC
Sound IF; 41.25 MC
Intercarrier Sound IF; 4.5 MC

Input Impedance and Transmission Line: 300 ohm balanced (between antenna terminals) for either VHF or UHF inputs.

Indoor Antenna: Some models are equipped with built-in VHF and UHF antennas.

Fusible Resistor: A fusible resistor is used as the B+ and initial surge fuse. The fusible resistor is located below the high voltage compartment, see figures 6, 7 and 8. See chassis parts list for description and part number of fusible resistor.

Important Note: Later production sets with 16U1C, 16AU1C, 16W1C and 16AW1C chassis use a 1.6 ampere, slow-blow, type "N" fuse and a conventional wire wound resistor instead of a fusible resistor, see figure 7.

TUBE COMPLEMENT FOR ALL VHF CHASSIS EXCEPT 16U1C AND 16W1C

V101, V901	*	VHF Amplifier
V102, V902	5CG8	VHF Mixer and Oscillator
V201	3DT6	Sound Detector
V202	12CU5	Sound Output
V301	3BZ6	1st IF Amplifier
V302	3BZ6	2nd IF Amplifier
V303	3CB6	3rd IF Amplifier
V304	6AW8A	Video Amplifier, Sound IF Amplifier
V305	21CEP4A	Picture Tube
V401	3BU8	Noise Gate, Sync Separator, Gated AGC
V402	7AU7	Vertical Oscillator, Sync Inverter
V403	12DB5	Vertical Output
V404	6CG7	Horizontal Oscillator
V405	§	Horizontal Output
V406	19AU4GTA	Damper
V407	1B3GT	HV Rectifier

SILICON, SELENIUM AND GERMANIUM DIODES

CR301	Germanium Diode, type 1N60, 1N87 or 1N295 (Replace with same type used.)	Video Detector
CR401	93B5-4 Dual Selenium Diode	Horizontal Sync Discriminator
CR501	350 MA Selenium	B+ Rectifier
CR502	350 MA Selenium	B+ Rectifier

*4BC8 in all chassis except 16J1 and 16K1. 2BN4 in 16J1 and 16K1 chassis.

§25CD6GB tube in chassis without suffix letter "C" (chassis stamped Run 10 through Run 22). 12DQ6A tube in chassis with suffix letter "C" (stomped Run 23 or higher).

TUBE COMPLEMENT FOR 16U1C AND 16W1C VHF CHASSIS

V101	4BC8	VHF Amplifier
V102	5CG8	VHF Mixer and Oscillator
V201	3DT6	Sound Detector
V240	5AN8	Sound Amplifier, Phase Inverter
V241	5AQ5	Sound Output
V242	5AQ5	Sound Output
V301	3BZ6	1st IF Amplifier
V302	3BZ6	2nd IF Amplifier
V303	3CB6	3rd IF Amplifier
V304	6AW8A	Video Amplifier, Sound IF Amplifier
V305	21CEP4A	Picture Tube
V401	3BU8	Noise Gate, Sync Separator, Gated AGC
V402	6CG7	Vertical Oscillator, Sync Inverter
V403	12DB5	Vertical Output
V404	6CG7	Horizontal Oscillator
V405	12DQ6A	Horizontal Output
V406	19AU4GTA	Damper
V407	1B3GT	HV Rectifier

SILICON, SELENIUM AND GERMANIUM DIODES

CR301	Germanium Diode, type 1N60, 1N87 or 1N295 (Replace with same type used.)	Video Detector
CR401	93B5-4 Dual Selenium Diode	Horizontal Sync Discriminator
CR501	500 MA Silicon	B+ Rectifier
CR502	500 MA Silicon	B+ Rectifier

TUBE COMPLEMENT FOR 16AU1C AND 16AW1C VHF-UHF CHASSIS

V801	2AF4A	UHF Oscillator
V101	4BC8	VHF Amplifier, UHF 1st IF Amplifier
V102	5CG8	VHF Mixer and Oscillator, UHF 2nd IF Amplifier
V201	3DT6	Sound Detector
V240	5AN8	Sound Amplifier, Phase Inverter
V241	5AQ5	Sound Output
V242	5AQ5	Sound Output
V301	3BZ6	1st IF Amplifier
V302	3BZ6	2nd IF Amplifier
V303	3CB6	3rd IF Amplifier
V304	6AW8A	Video Amplifier, Sound IF Amplifier
V305	21CEP4A	Picture Tube
V401	3BU8	Noise Gate, Sync Separator, Gated AGC
V402	6CG7	Vertical Oscillator, Sync Inverter
V403	12DB5	Vertical Output
V404	6CG7	Horizontal Oscillator
V405	12DQ6A	Horizontal Output
V406	19AU4GTA	Damper
V407	1B3GT	HV Rectifier

SILICON, SELENIUM AND GERMANIUM DIODES

CR301	Germanium Diode, type 1N60, 1N87 or 1N295 (Replace with same type used.)	Video Detector
CR401	93B5-4 Dual Selenium Diode	Horizontal Sync Discriminator
CR501	500 MA Silicon	B+ Rectifier
CR502	500 MA Silicon	B+ Rectifier
CR801	Silicon Diode, type 1N82A	UHF Mixer

TUBE COMPLEMENT FOR ALL VHF-UHF CHASSIS EXCEPT 16AU1C AND 16AW1C

V801	2AF4A	UHF Oscillator
V101	4BC8	VHF Amplifier, UHF 1st IF Amplifier
V102	5CG8	VHF Mixer and Oscillator, UHF 2nd IF Amplifier
V201	3DT6	Sound Detector
V202	12CU5	Sound Output
V301	3BZ6	1st IF Amplifier
V302	3BZ6	2nd IF Amplifier
V303	3CB6	3rd IF Amplifier
V304	6AW8A	Video Amplifier, Sound IF Amplifier
V305	21CEP4A	Picture Tube
V401	3BU8	Noise Gate, Sync Separator, Gated AGC
V402	7AU7	Vertical Oscillator, Sync Inverter
V403	12DB5	Vertical Output
V404	6CG7	Horizontal Oscillator
V405	§	Horizontal Output
V406	19AU4GTA	Damper
V407	1B3GT	HV Rectifier

SILICON, SELENIUM AND GERMANIUM DIODES

CR301	Germanium Diode, type 1N60, 1N87 or 1N295 (Replace with same type used.)	Video Detector
CR401	93B5-4 Dual Selenium Diode	Horizontal Sync Discriminator
CR501	350 MA Selenium	B+ Rectifier
CR502	350 MA Selenium	B+ Rectifier
CR801	Silicon Diode, type 1N82A	UHF Mixer

§25CD6GB tube in chassis without suffix letter "C" (chassis stamped Run 10 through Run 22). 12DQ6A tube in chassis with suffix letter "C" (stamped Run 23 or higher).

TUBE COMPLEMENT FOR 8G1 REMOTE CONTROL AMPLIFIER USED WITH 16J1 AND 16K1 CHASSIS

V1	6AU6	1st Amplifier
V2	6AU8	2nd Amplifier, Tripler
V3	6BN6	Limiter
V4	6AL5	Discriminator
V5	6CM7	Relay Control, Relay Control
V6	6BJ7	Discriminator, Bias Rectifier
V7	6CM7	Relay Control
V8	6X4	Rectifier

DIFFERENCES BETWEEN CHASSIS

The television chassis covered in this manual are of universal design, both mechanically and electrically. All chassis utilize a 21", short neck 110 degree deflection picture tube with aluminized face plate. A series heater circuit is used in all chassis. The B+ power supply of all chassis (except Hi-Fi models) uses two 350 milliampere selenium rectifiers in a voltage doubler circuit. Hi-Fi models use two 500 milliampere, plug-in type, silicon rectifiers. All chassis (except Son-R models) use a disc type VHF tuner with cascode RF amplifier. Son-R models use a drum type VHF tuner with a neutrode RF amplifier.

A description of basic chassis differences is given in the paragraphs below and in the "Model Identification Chart"

Note: The basic difference between table and console models of the same chassis series is in the use of a different front escutcheon.

Important Note: The suffix letter "C" following the model or chassis number of a receiver indicates that a different horizontal output tube and horizontal output circuit is used. For complete information, see Production Change, Run 23.

Imperial 330 Chassis: This series includes the 16B1, 16D1, and 16E1 VHF (16 tube) chassis and the 16AB1, and 16AE1 VHF-UHF (17 tube) chassis. The 16B1 and 16AB1 chassis are used in table models; the 16D1, 16AD1, 16E1, and 16AE1 chassis are used in console models. All chassis have a tone control with exception of the 16D1 and 16AD1 chassis. All chassis use top tuning.

De Luxe 330 Chassis: This series includes the 16G1 and 16L1 VHF (16 tube) chassis and the 16AG1 and 16AL1 VHF-UHF (17 tube) chassis. The 16G1 and 16AG1 chassis are used in table models; the 16L1 and 16AL1 Chassis are used in console models. Both models use Hideaway top tuning. The chassis in this series do not have a tone control.

Hi-Fi 330 Chassis: This series includes the 16U1C and 16W1C VHF (18 tube) chassis and the 16AU1C and 16AW1C VHF-UHF (19 tube) chassis. The Hi-Fi sound amplifier of these receivers is contained in a separate subchassis which mounts to the top side of the main chassis. A dual tone control and a dial light are used in all chassis. The 16U1C and 16AU1C chassis are used in console models. The 16W1C and 16AW1C chassis are used in table models with a separate matching base; the speaker of these receivers is mounted in the cabinet base. All models use top tuning.

Automatic 330 Chassis: This series includes the 16J1 and 16K1 VHF (16 tube) chassis. The 8G1 remote control amplifier of these receivers is contained in a separate subchassis which mounts to the top side of the main chassis. The 16J1 chassis is used in table models; the 16K1 chassis is used in console models. Both models use top tuning. The 16K1 chassis has a tone control; the 16J1 chassis does not have a tone control.

SIGNIFICANCE OF SUFFIX LETTER "C"

The suffix letter "C" following the model and chassis number of a receiver, indicates that a different horizontal output tube and horizontal output circuit is used. An explanation is given below:

Models or chassis numbers without the suffix letter "C" use a type 25CD6GB tube as the horizontal output tube V405, see figure 67. Note: These chassis are stamped Run 10 through Run 22.

Models or chassis with the suffix letter "C" use a type 12DQ6A tube as the horizontal output tube V405, see figures 68 through 72. Note: These chassis are stamped Run 23 or higher.

A complete description of the above circuit differences is given under Production Changes, for chassis stamped Run 23.

OPERATING INSTRUCTIONS

The illustrations below show locations of main operating controls in models covered by this manual. Note: Models with Hideaway top tuning, have controls located in a recessed compartment at top of cabinet. All other models have controls located at front of set, directly above the picture window.

Instructions for operating the television receiver is given in figures below, follow steps 1 through 4 in order. For instructions on Son-R remote tuning, see Service Data No. ST599-1. For location of auxiliary controls and set-up adjustments, see figures 6 through 8.

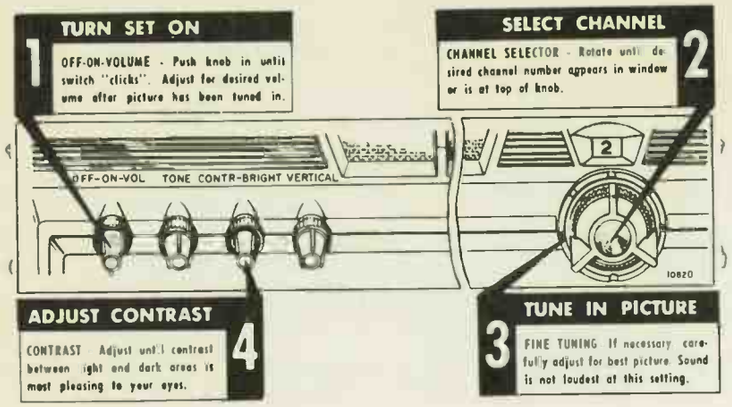


Figure 1. Operating Instructions for VHF Sets With Tone Control. Figures at Right Show Control Locations in Other Models.

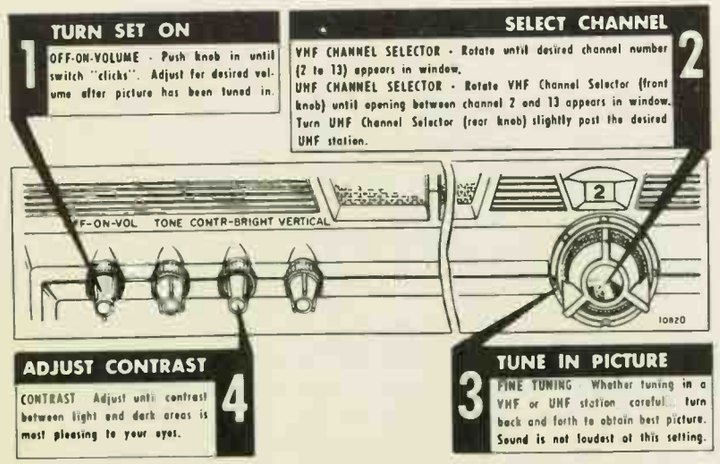


Figure 2. Operating Instructions for VHF-UHF Sets with Tone Control. Figures at Right Show Control Locations in Other Models.

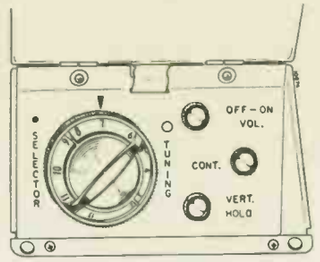


Figure 3. Controls in Models With Hideaway Top Tuning.

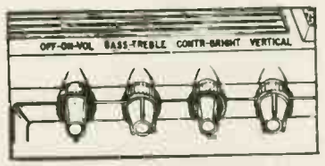


Figure 4. Left Hand Controls in Hi-Fi Models.

Figure 5. Left Hand Controls in Models Without Tone Control.

INSTALLATION ADJUSTMENTS

To insure best performance, it is important to make all checks and adjustments shown in the figures 6, 7 and 8. It is important that VHF Channel Slugs be adjusted upon installation and at every service call. For receivers with Son-R remote tuning, it is especially important to make all adjustments given under "Tuning Adjustments for Son-R Remote Control Receivers." Note: Removal of cabinet back is required only for adjustment of picture tilt and centering. Use a separate line cord (part number 89A22-1) when servicing.

Warning: The chassis of these receivers are connected directly to one side of the 117 volt, 60 cycle power line. Depending upon the position of the line cord plug in the wall outlet, the total AC line voltage may exist between the chassis and any grounded object. Do not touch the chassis unless adequate safety precautions are taken. Never touch the chassis and a ground (radiators, pipes, etc.) at the same time.

Do not ground chassis or connect test equipment directly to it, unless an isolation transformer is used. If an isolation transformer is not available, a neon lamp can be used to determine if the chassis is "hot". Connect an electrician's neon tester (General Cement's "Ne-o-lite" or equivalent) between the receiver chassis (not control shafts) and some grounded point, such as electrical conduit, water pipe, etc. If the neon lamp glows, the chassis is "hot" and the line cord plug should be reversed. Make the same check with the neon lamp connected between ground and the ground terminal of the test equipment. If the lamp glows, reverse the line cord to the test equipment.

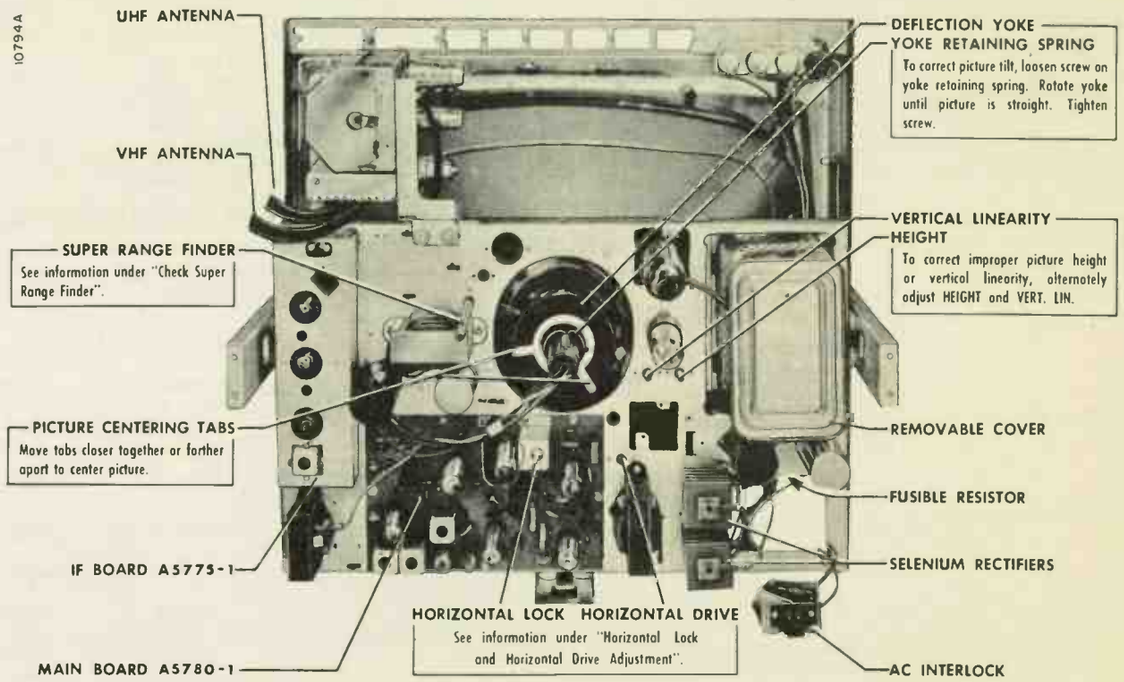


Figure 6. Rear View of Chassis Showing Adjustment Locations. UHF Antenna Terminals in VHF-UHF Sets Only. See Figures 7 and 8 for Chassis With Hi-Fi or Remote Control Amplifier.

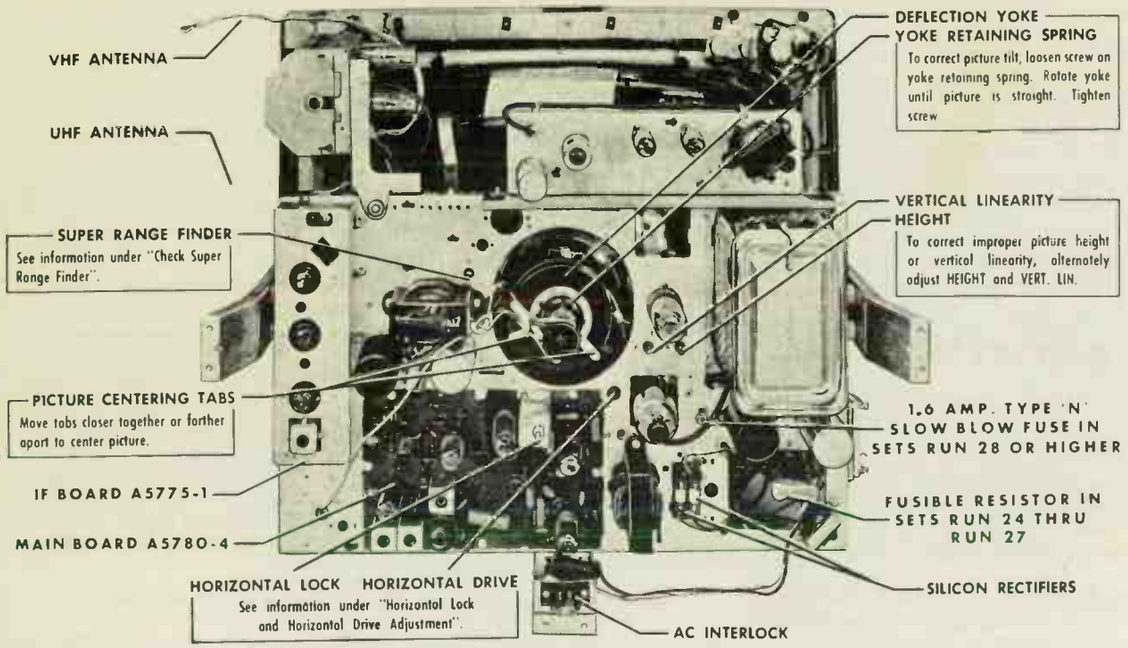


Figure 7. Rear View of 16U1C, 16AU1C, 16W1C and 16AW1C Chassis Showing Adjustment Locations. UHF Antenna Terminals in VHF-UHF Sets Only.

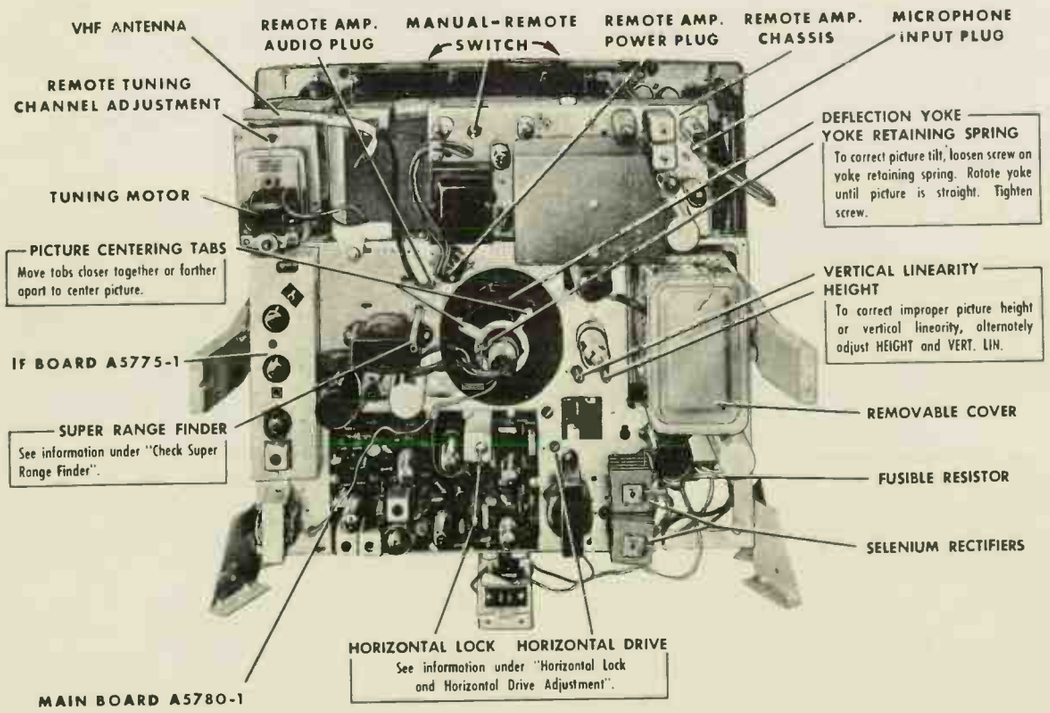


Figure 8. Rear View of 16J1 and 16K1 Chassis Showing Adjustment Locations.

PICTURE ADJUSTMENTS

Instructions for making picture adjustments are given in figures 6, 7 and 8. These adjustments should be made upon installation and checked at every service call.

VHF CHANNEL ADJUSTMENT FOR ALL SETS EXCEPT SON-R MODELS

VHF Channel adjustment of each station should be checked upon installation and at every service call. With proper adjustment, best picture is generally obtained at approximate center rotation of **Fine Tuning** control. Note: Channel adjustment does not require chassis removal.

Important: Always make adjustment on lowest channel first, then work up, in order of channel number to the highest channel. (For example, if channels 2, 9, 7 and 5 are received, adjust in this order: 2, 5, 7, 9.)

Before proceeding with adjustment, see figures 9 through 12 for location of VHF channel slugs, then adjust as follows:

a. Turn the set on and allow 15 minutes to warm up.

b. Set **VHF Channel Selector** for lowest channel to be adjusted. Set other controls for normal picture and sound.

c. Set **Fine Tuning** control at center of its range by rotating it approximately two turns in either direction and then one-quarter turn in the opposite direction.

d. For table models, remove Channel Selector, Fine Tuning and UHF Indicator knobs. For console models, remove escutcheon plate above channel knob after removing mounting screw at center of plate. Note: Later sets may use snap-in plate without mounting screw. To remove snap-in plate, insert blade end of non-metallic screwdriver against left side of channel window. With slight pressure, pull left side of plate away from cabinet.

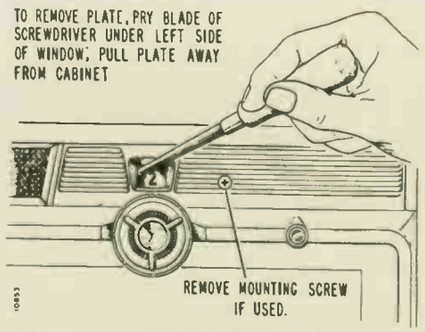


Figure 9. Method of Removing Snap-in Plate Without Mounting Screw.

e. Using a 1/8" blade, flexible, non-metallic tool (Admiral Part No. 98A30-19) carefully adjust the channel slug for best picture. (Note that sound is not loudest at this point.) Repeat procedure for remaining stations, adjusting them in order of their channel number (from lowest channel to highest channel).

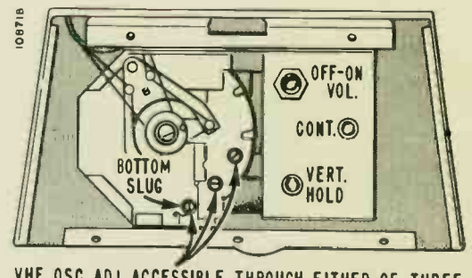


Figure 10. Top View of VHF Tuner In Hideaway Top Tuning Models. Control Panel Door and Well Assembly Removed.

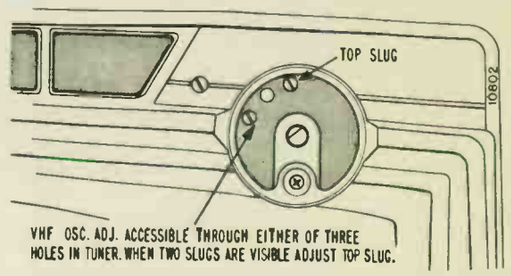


Figure 11. Front View of VHF Tuner In Table Models. Tuning Knobs Removed.

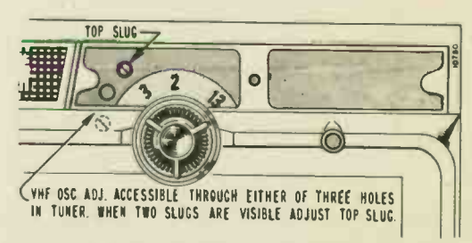


Figure 12. Front View of VHF Tuner In Console Models. Escutcheon Plate Removed.

VHF CHANNEL ADJUSTMENT FOR SON-R MODELS

VHF Channel adjustment of each station should be checked upon installation and at every service call. If adjustment is properly made, it is possible to tune from one station to another by merely turning the Channel Selector or with operation of the Son-R remote tuner.

To adjust VHF Channel Slugs, proceed as follows:

1. Turn the set on and allow 15 minutes to warm up.
2. Set **VHF Channel Selector** for a station; set other controls for normal picture and sound.
3. Set **Fine Tuning** control at center of its range by rotating it approximately half-way.
4. For table models, remove Channel Selector and Fine Tuning knobs. For console models, remove escutcheon plate above Channel Selector knob after removing mount-

ing screw at center of plate. Note: Later console models may use snap-in plate without mounting screw. To remove snap-in plate, insert blade end of a screwdriver against left side of channel window, see figure 9. With slight pressure, pull left side of plate away from cabinet.

5. Insert a 1/8" blade, flexible non-metallic tool (Part No. 98A30-19) through the hole adjustment to Channel Selector shaft (see figures 13 and 14). For each channel in operation, carefully adjust the channel slug for best picture. (Note that this is not the point at which the sound is loudest.)

   Caution: Only slight rotation of the slug will be required; turning the slug out too far will cause it to fall out of coil.

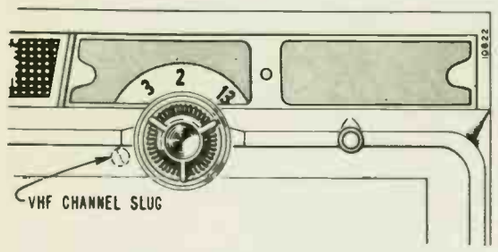


Figure 13. Front View of VHF Tuner in Console Models With Son-R Tuning. Escutcheon Plate Removed.

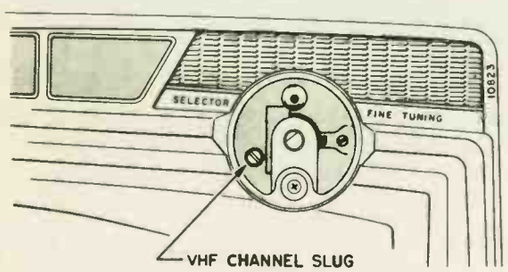


Figure 14. Front View of VHF Tuner In Table Models With Son-R Tuning. Knobs Removed.

SUPER RANGE FINDER ADJUSTMENT

The **Super Range Finder** control is used to improve TV reception in fringe areas and in areas where there is interference. **This control should be set fully counterclockwise (to the left), if satisfactory pictures can be obtained by using the main operating controls.**

Where the TV signal strength is weak, the picture can often be improved by turning the Range Finder part way to the right.

White flashes across the picture, or "snow" in the picture, can sometimes be minimized by careful adjustment of the Range Finder. **Caution:** If the Range Finder is turned too far to the right for a normal signal, the picture may have excessive contrast or may disappear completely.

If the signal strength changes, it may be desirable to change the setting of the Range Finder, however, it is generally possible to set it at a compromise position which gives reasonable reception for different signal strengths.

Important: Keep the **Super Range Finder** setting as far to the left as possible consistent with satisfactory pictures.

HORIZONTAL LOCK AND DRIVE ADJUSTMENT

A receiver which requires Horizontal Lock or Horizontal Drive adjustment can be corrected only by following in exact detail the procedure given here.

Note: If Horizontal Drive adjustment is not properly made, it may be difficult to obtain sufficient picture width and brightness. Also note that there is some interaction between these controls; **Horizontal Lock** adjustment having lesser effect. Make adjustment as follows:

1. Allow receiver to warm up for a few minutes. Tune in a station, set the **Brightness** and **Contrast** controls for normal picture. **Important:** Before proceeding, be sure that the **Super Range Finder** control (AGC) is adjusted according to instructions given in this manual.
2. Turn **Horizontal Drive** control fully clockwise. At this point, picture compression and/or foldover will appear near the center of the picture.
3. Very slowly turn the Horizontal Drive adjustment counterclockwise, just to the point at which picture foldover and/or compression disappears. Note that maximum width and brightness is also produced at this setting. **Caution:** Turning the **Horizontal Drive** control too far counterclockwise will shorten life of the horizontal output tube.
4. Reduce Contrast to minimum. If picture bends or loses horizontal sync, adjust the Horizontal Lock so that picture remains in sync and bending of vertical lines does not appear at top of picture. If Horizontal Lock adjustment was required, repeat steps 2 through 4.

TUNING ADJUSTMENTS FOR SON-R REMOTE CONTROL RECEIVERS

The following adjustments are required for smooth operation of Son-R remote control receivers. If adjustment is properly made, the channel tuning mechanism will stop only on channels operating in the area and skips all non-operating channels. To prevent sound blasting (excessive volume) the maximum volume level of the receiver should be pre-set as instructed below.

ADJUSTING POWER TUNING MECHANISM TO STOP ONLY ON OPERATING CHANNELS

To adjust Son-R controlled Power Tuning mechanism to stop only on TV channels operating in the area and skip non-operating channels, proceed as follows:

1. Turn receiver off and remove cabinet back.
2. Turn Channel Selector knob to a non-operating channel.
3. Locate recessed hole above tuning motor mounting plate. Turn adjustment screw (visible through hole, figure 15) fully to the left (counterclockwise) until tight. Perform steps 2 and 3 for each non-operating channel.
4. Turn Channel Selector knob to an operating channel. Turn adjustment screw fully to the right (clockwise) until tight. Perform this step for each operating channel.
5. Install cabinet back. Turn receiver on; set Remote-Manual switch at rear of set to Remote position.
6. Check channel tuning with "Son-R" remote tuner. Each time tuner push button is pressed for channel selection, the channel tuner should advance and stop on an operating channel only.

   If channel tuner should fail to skip a non-operating channel or stop on an operating channel, repeat adjustment procedure for that channel.

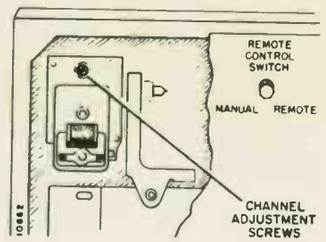


Figure 15. Rear View of Son-R Models Showing Channel Selection Screw Location.

PRE-SETTING MAXIMUM VOLUME LEVEL

When operating the receiver by remote control (using the Son-R tuner), the sound volume (loudness) is tunable to either of the four pre-set levels (mute, low, medium and loud volume). However, in order to obtain the proper loudness at each of these sound levels, it is first necessary to pre-set the highest volume level at which the receiver may be operated.

To pre-set volume level, set the Remote-Manual switch to the manual position. Tune in a channel with normal sound. Adjust Volume control for maximum sound volume and clearness required for comfortable listening. Do not turn Volume control from this setting. Return Remote-Manual switch to the remote position, operate Son-R tuner (on volume position) for changing volume level. Note: with each pressing of the push button on the Son-R tuner, sound volume will progressively change in loudness from mute (off), low volume, medium volume to high volume and repeat with continued pressing of the Son-R push button.

PICTURE TUBE HANDLING PRECAUTION

Warning: The newly developed picture tube used in these sets must be handled with much greater care because of its short, thin neck and wafer type base. ALWAYS lift picture tube by grasping firmly around face plate; NEVER LIFT TUBE BY ITS NECK. Use care when inserting socket to prevent bending pins. Before handling picture tube, remove static charge from it by shorting 2nd anode well to chassis ground with an insulated wire or screwdriver. WHEN TUBE IS REMOVED, ALWAYS PLACE IT FACE DOWN.

Due to the high vacuum and large surface area of picture tubes, extreme care must be exercised when handling these tubes. Shatterproof goggles, heavy gloves and a protective apron should be worn while handling or installing a picture tube. The picture tube must not be scratched, bumped or subjected to excessive pressure, as fracture of the glass may result in an explosion of considerable violence, which may cause injury or property damage.

PICTURE TUBE REPLACEMENT

The picture tube of these receivers is mounted directly to the front escutcheon as shown in figures 16 and 17. Note that the picture tube mounting in figure 16 is used only in early sets having the picture tube outer dag grounded directly to the front escutcheon. The picture tube mounting shown in figure 17 is used only in later production sets which have the picture tube outer dag grounded directly to chassis ground.

To replace a picture tube, proceed as follows:

1. Remove the chassis, picture tube and front escutcheon as a unit from the front of the cabinet as instructed under "Removing Chassis From Cabinet."
2. Remove knobs from front of set.
3. With the front escutcheon downward, place chassis face downward on a clean soft cloth. Caution: To prevent damage to front tuning controls, place chassis on table so that the control shafts overhang edge of table.
4. Remove static charge from picture tube by discharging second anode well to chassis ground with an insulated wire lead or screw driver.
5. Disconnect picture tube socket and second anode lead from picture tube. In Hi-Fi and Son-R models, disconnect plugs and sockets connecting from the chassis or amplifier to the front escutcheon.
6. Loosen clamp at rear of deflection yoke cap by loosening screw or nut on clamping band.
7. Disconnect brackets supporting front panel controls and VHF tuner by removing bracket mounting screws.
8. Remove screws which mount chassis support channels to channel mounting bosses at sides and bottom of the front escutcheon.
9. Carefully lift chassis up and away from picture tube and escutcheon. Warning: Use extreme caution when removing chassis from escutcheon and picture tube. Very carefully guide neck of picture tube out of yoke and away from chassis. Do not use force. If tube sticks, investigate cause before proceeding.
10. To remove picture tube from front escutcheon, loosen support wire retaining screw. Remove screws supporting tube mounting strap to front escutcheon.
11. To mount replacement tube, place tube on front escutcheon with second anode well located on right hand side, see figures 16 and 17. Reassemble mounting strap removed in step 10.
12. Reassemble chassis and deflection yoke over picture tube and front escutcheon. Important: Use extreme care to

prevent bending of pins on tube base or fracturing glass neck of picture tube.

13. Reassemble mounting screws to chassis support channels removed in step 8.
14. Connect second anode lead and picture tube socket. Connect all other connector if previously removed. Turn receiver on and make picture adjustments as instructed in figures 6 through 8. Important: After making picture adjustments, be sure to tighten clamping band at rear of deflection yoke cap.

Important Caution: If a metal bracket with insulated washers are used for supporting the front of the VHF tuner to the front escutcheon, be sure to properly replace insulating washers. Failure to replace all insulating washers will cause 117 volts AC to be applied to the front escutcheon and metal cabinet.

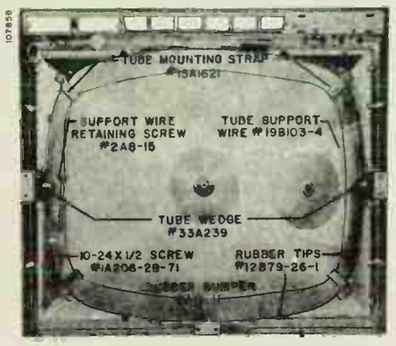


Figure 16. Rear View of Escutcheon and Picture Tube Mounting in Early Sets With Picture Tube Dag Grounded to Metal Cabinet and Escutcheon.

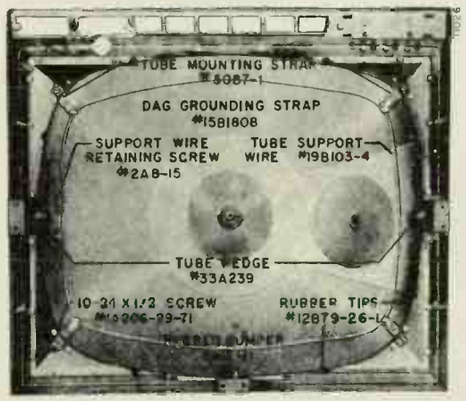


Figure 17. Rear View of Escutcheon and Picture Tube Mounting in Later Sets With Picture Tube Dag Grounded to Chassis.

REMOVING CHASSIS FROM CABINET

For servicing convenience, the chassis including picture tube and front escutcheon are removable as a unit from in front of the cabinet. To remove the chassis, proceed as follows:

1. Remove cabinet back. Disconnect antenna and speaker leads.
2. In models with Hideaway top tuning, remove tuning knobs from on top of cabinet.
3. At rear of cabinet, remove screws which mount side support channels to back sides of cabinet. Also remove screws which mount bottom support channels to rear or bottom of cabinet.
4. Remove chassis from cabinet by securely grasping sides of front escutcheon. If chassis does not come out freely it may be necessary to free chassis from inside of cabinet.
5. To reinstall chassis in cabinet, carefully insert chassis through front of cabinet. Very carefully guide chassis into cabinet so that mounting channels line up with holes at sides and bottom of cabinet. In metal cabinet models, the front edges of the cabinet must fit firmly into grooved surfaces at rear of metal escutcheon. In wood cabinet models, guide metal locating pins (at rear of escutcheon) into matching holes in cabinet.
6. After chassis and escutcheon are firmly seated in cabinet, reassemble mounting screws to side and bottom support channels.

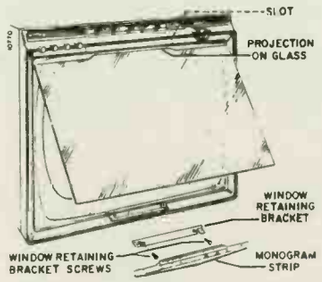


Figure 18. Illustration of Picture Window Mounting.

REMOVING PICTURE WINDOW

The picture window of these receivers is removable from the front of the cabinet. To remove the picture window, see figure 18 and proceed as follows:

a. Remove Admiral monogram strip located at bottom center section of window by pulling it away from cabinet.
b. Holding the window firmly in place, *carefully loosen* the two screws which mount the window retaining bracket at the bottom center of the window.
c. After removal of the retaining bracket, grasp the lower part of the window at the lower center. Gently pull outward and allow the window to slide downward from the position shown in figure 18 until it clears the cabinet. To avoid scratching window frame, keep bottom of glass away from lower part of frame.

To install the window after cleaning, proceed as follows:

a. Holding window at bottom, first slide projection at top of glass into slot at top of frame. See figure 18. Gently guide lower edge of glass into frame.
b. Holding window firmly in place, replace the window retaining bracket and tighten screws.
c. Insert Admiral monogram strip in its retaining clips and press down until the monogram strip is firmly in place.

TELEVISION ALIGNMENT

Warning: The chassis of this receiver is connected directly to one side of the 117 volt, 60 cycle power line. Depending upon the position of the line cord plug in the wall outlet, the total AC line voltage may exist between the chassis and any grounded object. Do not touch the chassis unless adequate safety precautions are taken. Never touch the chassis and a ground (radiators, pipes, etc.) at the same time.

Do not ground chassis or connect test equipment directly to it, unless an isolation transformer is used. If an isolation transformer is not available, a neon lamp can be used to determine if the chassis is "hot". Connect an electrician's neon tester (General Cement's "Ne-o-lite" or equivalent) between the receiver chassis (not control shafts) and some grounded point, such as electrical conduit, water pipe, etc. If the neon lamp glows, the chassis is "hot" and the line cord should be reversed. Make the same check with the neon lamp connected between ground and the ground terminal of the test equipment. If the lamp glows, reverse the line cord to the test equipment.

GENERAL

Complete alignment consists of the following individual procedures and should be performed in this sequence:

a. IF Amplifier Alignment.
b. 4.5 MC Sound IF Alignment.
c. VHF and Mixer Alignment.
d. Over-all VHF and IF Response Curve Check.
e. VHF Oscillator Adjustment.
*f. Alignment of UHF IF Input Coil and IF Pre-amplifier Response Curve Check.

TEST EQUIPMENT

To properly service receivers, it is recommended that the following test equipment be available.

Important: Many service instruments do not meet the requirements given below. A list of recommended equipment is available from Admiral distributors.

VHF Sweep Generator

Sweep generator must provide sweep frequencies from

18 to 90 MC range: } with at least
170 to 225 MC range: } 10 MC sweep width

Output: adjustable; at least .4 volt maximum output.

Output impedance: 300 ohms balanced to ground.

A sweep generator not having constant output voltage and linear sweep over the swept range, will produce curves which are widely different from the ideal curves shown on the following pages. If repeated difficulty is encountered in obtaining these curves, the sweep generator should be checked. A simple check is to observe the response curve for a set that is in alignment.

Before suspecting generator, be sure alignment instructions have been followed carefully.

*Note: This step is not performed on VHF only receivers.

Signal (Marker) Generator

18 to 90 MC frequency range.

170 to 225 MC frequency range.

Must have a built-in calibration crystal for checking dial accuracy.

ALIGNMENT TOOLS

The following alignment tools are required. They can be obtained from the Admiral distributor under the part numbers listed below:

NON-METALLIC (fiber) alignment screwdriver (11½" long, ⅛" diameter) Part No. 98A30-10.

NON-METALLIC alignment wrench (for hexagonal core IF slugs) Part No. 98A30-12.

NON-METALLIC alignment wrench (for small hexagonal core slug) Part No. 98A30-14.

Oscilloscope

Standard oscilloscope, preferably one with a wide band vertical deflection, vertical sensitivity at least .05 volt (RMS) per inch.

Vacuum-Tube Voltmeter

Preferably with low range (3 volt) DC zero center scale and a high voltage probe (30,000 volt range).

Isolation Transformer

117 volts input to 117 volts output; at least 200 watts.

Bias Supply

3 to 15 volts (battery or electronic).

IMPORTANT ALIGNMENT HINTS

The following suggestions should be performed if difficulty is experienced during the alignment procedure.

1. IF CIRCUIT INSTABILITY: When aligning the IF amplifiers, the VTVM pointer may swing when the hand is placed too near the IF transformers or when viewing the response curve, the curve may change shape with hand capacity. To correct either of these conditions, the following alignment hints should be tried:

   (a) Check the generator output leads to be certain that the unshielded portion (especially the grounded lead) is as short as practicable.

   (b) Be sure that a decoupling network is used at the video detector output and that the leads on the network are kept as short as possible; see figure 21.

   (c) The use of a 9" long hexagonal alignment tool will permit adjustment without encountering "hand capacity" effects. See "Alignment Tools".

2. KEEP GENERATOR OUTPUT LOW TO AVOID DISTORTION OF RESPONSE CURVES:

   (a) During video IF alignment, sweep and marker generator outputs should be set at a level not distorting response curves.

   In general, varying the sweep generator output should not affect the shape of the response curve; only the amplitude. It is advisable to calibrate the oscilloscope so that peak-to-peak amplitude of the observed response curve will be known. Note: The amplitude of the response curve at test point "V" should be no more than 3 volt peak-to-peak; and at test point "W" about .1 volt peak-to-peak.

   (b) Some generators have a built-in pad in the output cable. Be sure that the pad in the cable is properly connected in the circuit. Refer to the generator instruction manual for details.

   If a pad is not built in, the 12 db pad shown in figure 20 can be constructed and connected between the generator and the antenna terminals.

3. SPECIAL TUBE SHIELD: For injecting 41 MC IF signal for IF alignment use in insulated tube shield over the VHF Oscillator-Mixer tube. Insulate bottom of tube shield with masking tape, see figure 19.

4. USE RULED SCREEN OVER OSCILLOSCOPE FACE: If it is difficult to accurately judge the exact location of the different markers, a ruled screen can be used over the face of the oscilloscope CRT. Under certain conditions correct marker location tolerances cannot be maintained by visual judgment alone.

5. ALL ALIGNMENT CONNECTION POINTS AND ADJUSTMENTS ARE ACCESSIBLE FROM FRONT OR REAR OF CHASSIS: Therefore alignment may be made without need for removing picture tube and front escutcheon, see figures 24 and 25. Note: Alignment connection points on printed wiring board connect to pin type terminals. Connections from test equipment may be soldered to pin terminals during alignment. Important: If picture tube is removed during alignment, it will be necessary to connect a 10 ohm, 5 watt resistor across terminals 1 and 8 of the picture tube socket for completing the series heater circuit.

6. VOLTAGE CAUTION WHEN MAKING TUNER ALIGNMENT: B+ and heater voltages are present on the connector terminals located at the top side of tuners. To prevent possibility of short circuit or danger from shock, use extreme care to avoid contact with the connector terminals at top side of tuners.

Figure 19. Special Tube Shield for IF Alignment and IF Response Curve Check.

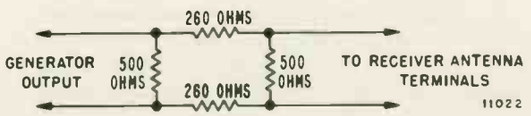


Figure 20. Circuit of 12 DB Attenuation Pad for Viewing Over-all VHF-IF Response Curve.

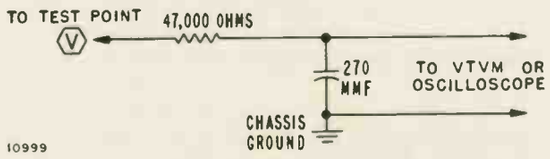


Figure 21. Decoupling Filter.

IF AMPLIFIER ALIGNMENT

- Connect isolation transformer between power line and receiver.
- Connect negative of 3.0 volt bias supply through 10K resistor to test point "T" (IF AGC), see figures 24 and 25, positive to chassis.
- Connect generator high side to 5CG8 mixer-osc. insulated tube shield, see figure 19. Connect low side to chassis near tube shield.
- Connect VTVM high side to test point "V" through a decoupling filter, see figures 21, 24 and 25.
- Connect a jumper wire across the antenna terminals.
- Set Channel Selector to channel 12 or other unassigned high channel, to prevent interference during alignment.
- Set Super Range Finder control fully to left (counterclockwise) and Contrast control fully to right (clockwise).
- Allow about 15 minutes for receiver and test equipment to warm up.
- Use a non-metallic alignment tool, part number 98A30-12.

Step	Signal Gen. Freq.	Instructions	Adjust
Before proceeding, be sure to check the signal generator used in alignment against a crystal calibrator or other frequency standard for absolute frequency calibration required for this operation.			
1	41.25 MC	If necessary, increase generator output and/or reduce bias to −1½ volts to obtain a definite indication on VTVM.	A1 for minimum.
2	47.25 MC		A2 for minimum.
3	42.3 MC	Use −3 volts bias. When adjusting, keep reducing generator output to prevent VTVM reading from exceeding 2 volts.	A3 for maximum.
4	45.3 MC		A4 and A5 for max.
5	41.5 MC		A6 for maximum.
6	42.0 MC		A7 for maximum.
7	43.5 MC		A8 for maximum.
8	To insure correct IF alignment, make "IF Response Curve Check".		

IF RESPONSE CURVE CHECK (Using sweep generator and oscilloscope)

Receiver Controls and Bias Battery	Sweep Generator	Marker Generator	Oscilloscope	Instructions
Set Channel Selector on channel 3 or an unassigned low channel. Contrast control fully to the left. Connect negative of 3 volt bias supply to test point "T" (IF AGC); positive to chassis.	Connect high side to 5CG8 mixer-osc. insulated tube shield, see fig. 19. Connect low side to chassis near tube shield. Set sweep frequency to 43 MC, and sweep width approximately 7 MC.	If an external marker generator is used, loosely couple high side to sweep generator lead on tube shield, low side to chassis. Marker frequencies indicated on IF Response Curve.	Connect high side to test point "V" through a decoupling filter, see figs. 21, 24 and 25.	Check curve obtained against ideal response curve in fig. 22. Note tolerances on curve. Keep marker and sweep outputs at very minimum to prevent overloading. A reduction in sweep output should reduce response curve amplitude without altering the shape of the response curve. If the curve is not within tolerance or the markers are not in the proper location on the curve, touch-up with IF slugs as instructed below. Important: If curve changes shape with hand capacity, see section 1 of "Important Alignment Hints."

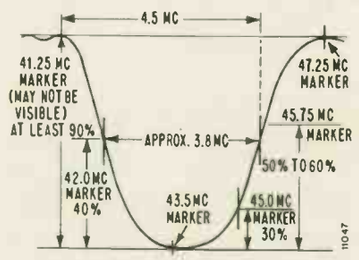


Figure 22. Ideal IF Response Curve.

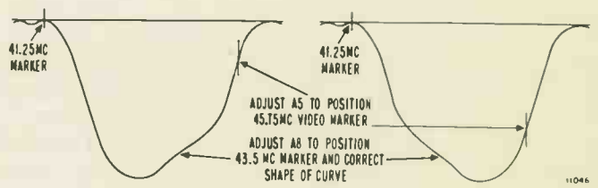


Figure 23. IF Response Curves, Incorrect Shape.

If it is necessary to adjust for approximate equal peaks and marker location, carefully adjust alignment slugs as instructed under the above figures. It should not be necessary to turn the slugs more than one turn in either direction.

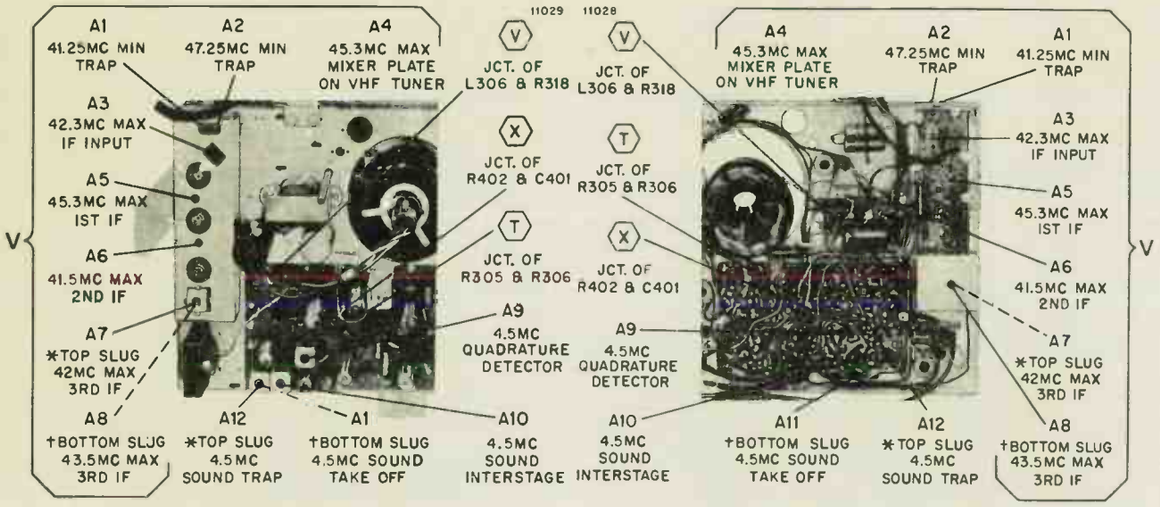


Figure 24. Component View of Printed Wiring Board Showing Test Point Locations and IF Alignment Data.

Figure 25. Wiring View of Printed Wiring Board Showing Test Point Locations and IF Alignment Data.

†Bottom slug is nearest bottom of shield can.
*Top slug is nearest top of shield can.

4.5 MC SOUND IF ALIGNMENT USING TELEVISION SIGNAL

For simplicity and required accuracy of the 4.5 MC signal frequency, the sound alignment procedure given in the manual uses a transmitted TV signal rather than test equipment.

Important: Note that step 3 of the sound IF alignment procedure requires the use of a strong transmitted TV signal. Steps 5 and 6 requires the use of a weak (attenuated) TV signal. Failure to use a television signal of the required level as instructed for each of the steps will cause incorrect alignment with resulting weak or distorted sound.

Make alignment adjustments as follows:

1. Remove cabinet back. Turn set on and allow 15 minutes for warm up.
2. Select the strongest TV station received. Adjust set for normal operation. Turn Super Range Finder Control fully to the left (counterclockwise). See figures 24 and 25 for adjustment locations.
3. Using a non-metallic alignment tool (for hexagonal core IF slugs, Admiral Part No. 98A30-12), very slowly turn slug "A9" several turns counterclockwise until a buzz is heard in the sound. Then turn it clockwise until the loudest and clearest sound is obtained. NOTE: There may be two points (approximately ½ turn apart) at which sound is loudest. The slug should be set at the center range of the second point of loudest sound noted as the slug is turned in (toward printed circuit board).
4. Set Contrast control fully to the left (counterclockwise). Reduce the signal to the antenna terminals until there is a considerable amount of hiss in the sound. For best results, it is recommended that a step attenuator be connected between the antenna and the antenna terminals. The signal can also be reduced by disconnecting the antenna and placing it in close proximity of the antenna terminals or tuner antenna lead-in.
5. Carefully adjust slug "A10" for loudest and clearest sound with minimum hiss level. If hiss disappears during alignment, reduce signal input to maintain hiss level; readjust "A10".
6. Carefully adjust slug "A11" for loudest and clearest sound with minimum hiss level. If hiss disappears during alignment, reduce signal input to maintain hiss level; readjust "A11". Caution: Adjustment "A11" is slug nearest bottom of shield can; use care so as not to disturb slug nearest top of shield can.
7. If the above steps are correctly made, no further adjustment should be required. However, if sound remains distorted at normal volume level when receiver is tuned for best sound, repeat entire procedure.

Caution: Do not readjust slug "A9" unless sound is distorted. If "A9" is readjusted, all steps in alignment procedure should be repeated exactly as instructed above.

ALIGNMENT OF 4.5 MC TRAP USING A TELEVISION SIGNAL

Beat interference (4.5 MC) appears in picture as very fine vertical or diagonal lines, very close together, having a "gauze-like" appearance, the pattern will vary with speech, forming a very fine herringbone pattern.

To align the 4.5 MC trap (slug adjustment A12), tune in a television station with beat interference pattern in picture. While closely observing the picture, adjust slug A12 for minimum interference pattern.

Important: A hexagonal non-metallic alignment tool (Admiral part number 98A30-12) is required for making adjustment. Note that adjustment A12 is top slug (nearest top of shield can); use caution so as not to disturb bottom slug (nearest bottom of shield can) as sound IF alignment will be affected.

ALIGNMENT INFORMATION FOR VHF TUNERS 94E144-9, -13, -19, -22, -24, -26, -27 AND -30

VHF tuners 94E144-13, -19, -24 and -26 are used in VHF only sets and VHF tuners 94E144-9, -22, -27 and -30 are used in VHF-UHF sets in conjunction with UHF tuner 94D112-5 or 94D155-3. Both VHF tuners are identical with exception that tuners in VHF-UHF sets have a UHF input socket, additional coils and components in the UHF detent position of the turret discs, see figures 27 and 29. When the VHF channel selector of these VHF tuners is in the UHF detent position (between channels 13 and 2) the tuner operates as a two stage low-noise 41 MC IF Pre-amplifier coupled between the mixer output of the UHF tuner and the 41 MC IF amplifier in the main chassis.

Note: Since these VHF tuners are all of the semi-incremental type (contains series inductance circuits) VHF channel selection is accomplished by adding or subtracting portions of inductance with rotation of the VHF Channel Selector (turret drum).

Since these tuners feature stable and trouble-free operation, tubes may generally be replaced without the need for alignment. However, tube selection is recommended when replacing the Oscillator-Mixer tube V102 (5CG8) for selecting a tube which will cause least oscillator frequency shift as noted with rotation of the Fine Tuning control.

VHF amplifier and Mixer alignment consists of checking the VHF response curve with a sweep generator and an oscilloscope, then comparing curves with the ideal curve given in figure 31. Adjustment of trimmer screws at top of tuner is generally adequate for proper alignment.

If individual channel coils have been altered from original shape, tracking adjustment (starting with highest channel) will be required. The chart and the illustrations given below show the location and function of individual coils or adjustments. Note that "gimmick" A15 (free lead of capacitor C116) is used for adjustment of bandwidth of low channels 2 through 6.

Bandwidth adjustment of high channels is accomplished by changing the spacing of VHF amplifier plate coils with respect to mixer grid coils.

Tilt adjustment (at center of curve) is accomplished by spreading or compressing coil turns in the mixer grid circuit.

Important: No attempt should be made to align the tuner until the balance of the receiver is known to be in proper operating condition and in proper alignment.

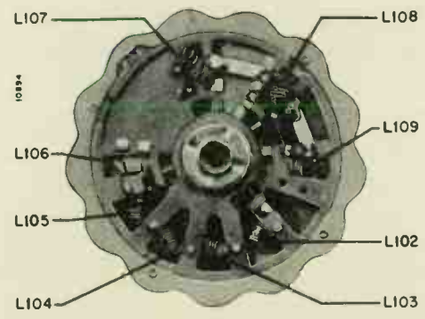


Figure 26. View of Antenna Rotor Disc in VHF Tuners 94E144-13, -19, -24 and -26.

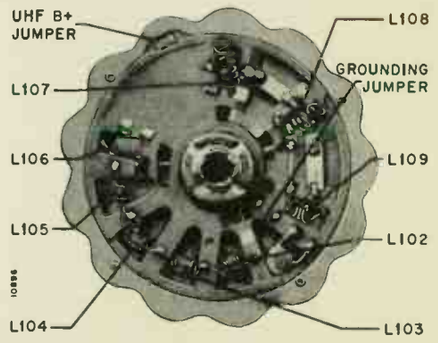


Figure 27. View of Antenna Rotor Disc in VHF Tuners 94E144-9, -22, -27 and -30.

COIL AND ADJUSTMENT IDENTIFICATION FOR VHF TUNERS 94E144-9, -13, -19, -22, -24, -26, -27 and -30

Sym. or Adj.	Function	Sym. or Adj.	Function
A4	Slug, Mixer IF Output (coil L140)	L124	Master VHF Amp. Plate Coil (Channels 2 through 6)
A14	Trimmer, Mixer Grid (capacitor C118)	L127	Master VHF Amp. Plate Coil (Channels 7 through 9)
A13	Trimmer, VHF Amplifier Plate (capacitor C110)	L130	Master VHF Amp. Plate Coil (Channels 10 and 11)
A15	Gimmick, Lead of Capacitor C116 (low band coupling adj.)	L133	Master VHF Amp. Plate Coil (Channels 12 and 13)
A16	Slug, Channel (oscillator) (coils L116, L122, L125, L128 and L131)	L111	Mixer Grid Coil (Channel 2)
A17	43.95 MC interference trap (coil L136)	L114	Mixer Grid Coil (Channel 3)
A18	UHF IF coil (coil L317)	L117	Mixer Grid Coil (Channel 4)
L102	Antenna Coil (Channel 2)	L120	Mixer Grid Coil (Channel 5)
L103	Antenna Coil (Channel 3)	L123	Master Mixer Grid Coil (Channels 2 through 6)
L104	Antenna Coil (Channel 4)	L126	Master Mixer Grid Coil (Channels 7 through 9)
L105	Antenna Coil (Channel 5)	L129	Master Mixer Grid Coil (Channels 10 and 11)
L106	Master Antenna Coil (Channels 2 through 6)	L132	Master Mixer Grid Coil (Channels 12 and 13)
L107	Master Antenna Coil (Channels 7 through 9)	L110	Oscillator Coil (Channel 2)
L108	Master Antenna Coil (Channels 10 and 11)	L113	Oscillator Coil (Channel 3)
L109	Master Antenna Coil (Channels 12 and 13)	L119	Oscillator Coil (Channel 5)
L112	VHF Amp. Plate Coil (Channel 2)	L116	Master Oscillator Coil (Channels 2 through 4)
L115	VHF Amp. Plate Coil (Channel 3)	L122	Master Oscillator Coil (Channels 5 and 6)
L118	VHF Amp. Plate Coil (Channel 4)	L125	Master Oscillator Coil (Channels 7 through 9)
L121	VHF Amp. Plate Coil (Channel 5)	L128	Master Oscillator Coil (Channels 10 and 11)
		L131	Master Oscillator Coil (Channels 12 and 13)
		L134	UHF IF Pre-Amplifier Coil
		L135	UHF IF Pre-Amplifier Coil

Figure 28. View of Oscillator-Mixer Rotor Disc in VHF Tuners 94E144-13, -19, -24 and -26.

Figure 29. View of Oscillator-Mixer Rotor Disc in VHF Tuners 94E144-9, -22, -27 and -30.

VHF AMPLIFIER AND MIXER ALIGNMENT FOR VHF TUNERS 94E144-9, -13, ETC.

- Connect isolation transformer between power line and receiver.
- Connect negative of 4.0 volt bias supply to test point "X" (RF AGC), positive to chassis. See figures 24 and 25.
- Set Super Range Finder control fully to left (counterclockwise) and Contrast control fully to right (clockwise).
- Connect sweep generator 300 ohm output to antenna terminals. If sweep generator does not have a built-in marker generator, loosely couple a marker generator to the antenna terminals. To avoid distortion of the response curve, keep sweep generator output at a minimum, marker pips just barely visible.
- Connect oscilloscope through a 15,000 ohm resistor to test point "W" on tuner. Keep scope leads away from chassis.
- Allow about 15 minutes for receiver and test equipment to warm up.
- Do not remove bottom shield during alignment.
- See figures 32 and 33 for adjustment locations and identification.

Step	Marker Gen. Freq. (MC)	Sweep Gen. Frequency	Instructions
1	193.25 MC (Video Carrier) 197.75 MC (Sound Carrier)	Sweeping Channel 10. See "Frequency Table".	Set Channel Selector to channel 10. Check response obtained with VHF response curve shown in figure 31. Alternately adjust A13 and A14 (figures 32 and 33) as required to obtain curve having maximum amplitude, symmetry and flat top appearance consistent with proper bandwidth and correct marker location.
2	83.25 MC (Video Carrier) 87.75 MC (Sound Carrier)	Sweeping Channel 6. See "Frequency Table".	Set Channel Selector to channel 6. Check response obtained with VHF response curve shown in figure 31. If curve is not within limits, compromise adjustment is required. Alternately adjust A13 and A14 as required to obtain curve having maximum amplitude, symmetry and flat top appearance consistent with proper bandwidth and correct marker location. After completing adjustment, recheck adjustment of step 1.
3	Set the sweep generator to sweep the channel to be checked. Set the marker generator for the corresponding video carrier frequency and sound carrier frequency.		Check each channel operating in the service area for curve shown below. In general, the adjustment performed in steps 1 and 2 are sufficient to give satisfactory response curves on all channels. However, if reasonable alignment is not obtained on an operating channel, repeat above steps as a compromise adjustment to favor the particular channel. If a compromise adjustment is made, other channels operating in the service area should be checked to make certain that they have not been appreciably affected. If windings of turret coils have been greatly disturbed, complete tracking adjustment may be required.

Figure 30. Front View of VHF Tuners 94E144-9, -13, Etc.

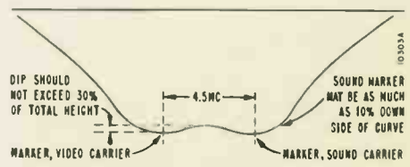


Figure 31. Ideal VHF Response Curve.

Note: Full skirt of curve will not be visible unless generator sweep width extends beyond 10 MC.

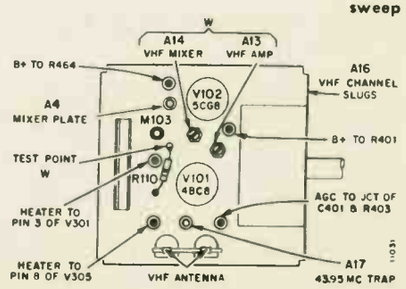


Figure 32. Top View of VHF Tuners 94D144-13, -19, -24 and 26 Showing Adjustment Locations.

ALIGNMENT OF UHF IF INPUT COIL AND IF PRE-AMPLIFIER RESPONSE CURVE CHECK

*Important: This alignment is seldom required. It should be made only if UHF reception is poor and after usual causes of poor reception have been checked. This alignment should be made after completing the preceding alignments.

- Connect isolation transformer between power line and receiver.
- Set Super Range Finder control fully to left (counterclockwise) and Contrast control fully to right (clockwise).
- Set VHF Channel Selector to UHF detent position, which is between channels 13 and 2.
- Connect negative of 4 volt bias supply to test point "X" RF AGC buss, positive to chassis. See figures 24 and 25.
- Connect UHF sweep generator 300 ohm output to antenna terminals. Loosely couple VHF marker generator to the antenna terminals. To avoid distortion of the response curve, keep sweep generator output at a minimum, marker pips just barely visible.
- Connect oscilloscope through a 10K resistor to test point "W" on VHF tuner (figures 33 and 34). Keep scope leads away from chassis.
- Allow about 15 minutes for receiver and test equipment to warm up.
- Bottom shield must be assembled to tuner while making response curve check.
- Use a non-metallic alignment tool, part number 98A30-14.

Step	Marker Gen. Freq. (MC)	Sweep Gen. Frequency	Instructions
1	45.75 MC (Video Carrier) 41.25 MC (Sound Carrier)	Set sweep at 700 MC, full sweep width	Adjust A18 to obtain equal peak amplitudes and symmetry, consistent with flat top appearance, proper band width and correct marker location; see figure 3
2	Same as Above	Same as Above	Connect oscilloscope to test point "V" through decoupling filter; figures 21, 24 and 25. Keep scope leads away from chassis. Increase bias voltage to —6 volts. Check response curve. If curve does not resemble figure 38, repeat step 1, making a compromise adjustment. If curve cannot be made to resemble figure 38, check to be sure all instructions have been followed. Check tubes V101 and V102 and repeat alignment. Important: After replacing tubes, it may be necessary to check "VHF Tuner Alignment".

*Alignment of the UHF IF input coil L137 (A18) can be made using a UHF television signal. Using a non-metallic alignment tool, very carefully adjust slug "A18" for the best picture, consistent with good sound.

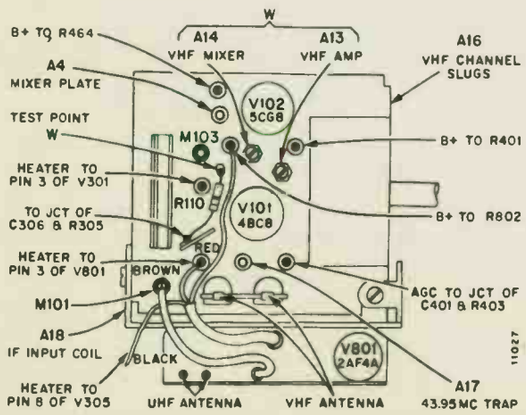


Figure 33. Top View of VHF Tuners 94E144-9, -22, -27, -30 and UHF Tuner 94D112-5 or 94D155-3 Showing Adjustment Locations.

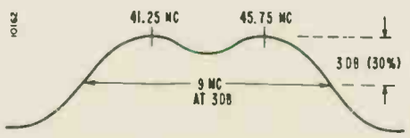


Figure 34. Ideal IF Pre-amplifier Response Curve.

ALIGNMENT INFORMATION FOR VHF TUNERS 94D151-1 AND 2

VHF tuners 94D151-1 and 94D151-2 are identical except for shaft length. These tuners are 13-position (12 channel) drum type VHF tuners, utilizing replaceable channel snap-in coils. A triode (2BN4) is used in a neutralized circuit as the VHF amplifier V901. A pentode-triode (5CG8) is used as the VHF mixer and oscillator V902.

These tuners have been designed for stable and trouble-free operation. Complete tuner alignment should seldom, if ever, be required. Tuner tubes may generally be replaced without need for alignment. However, tube selection is recommended when replacing the Oscillator-Mixer tube V902 (5CG8) for selecting a tube which will cause least oscillator frequency shift as noted with rotation of the Fine Tuning control.

VHF Amplifier and Mixer alignment consists of checking the VHF response curve with a sweep generator and oscilloscope. If response curve is not within limits shown in figure 36, alternately adjust RF plate and mixer grid trimmers A13 and A14 for obtaining a satisfactory curve. If a proper curve is obtainable with adjustment of A13 and A14, alignment is completed. However, if a proper curve cannot be obtained, adjustment of neutralizing trimmer A15 is required. Repeat adjustment of trimmers A13 and A14 each time after adjusting neutralizing trimmer A15.

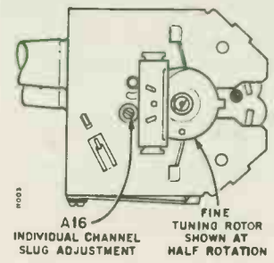


Figure 35. Front View of VHF Tuners 94D151-1 and -2.

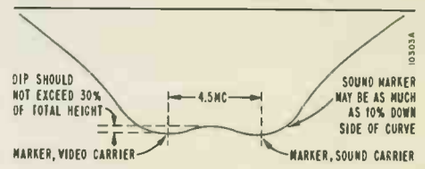


Figure 36. Ideal VHF Response Curve.

Note: Full skirt of curve will not be visible unless generator sweep width extends beyond 10 MC.

FREQUENCY TABLE FOR CHASSIS WITH 41 MC IF SYSTEM

Channel No.	Freq. Range MC	Picture Carrier MC	Sound Carrier MC	Osc. Freq. MC	Sweep Gen. Center Freq. MC
2	54-60	55.25	59.75	*101	57.5
3	60-66	61.25	65.75	*107	63.5
4	66-72	67.25	71.75	*113	69.5
5	76-82	77.25	81.75	*123	79.5
6	82-88	83.25	87.75	*129	85.5
7	174-180	175.25	179.75	*221	177.5
8	180-186	181.25	185.75	*227	183.5
9	186-192	187.25	191.75	*233	189.5
10	192-198	193.25	197.75	*239	195.5
11	198-204	199.25	203.75	*245	201.5
12	204-210	205.25	209.75	*251	207.5
13	210-216	211.25	215.75	*257	213.5
14	470-476	471.25	475.75	517	473.5
15	476-482	477.25	481.75	523	479.5
16	482-488	483.25	487.75	529	485.5
17	488-494	489.25	493.75	535	491.5
18	494-500	495.25	499.75	541	497.5
19	500-506	501.25	505.75	547	503.5
20	506-512	507.25	511.75	553	509.5
21	512-518	513.25	517.75	559	515.5
22	518-524	519.25	523.75	565	521.5
23	524-530	525.25	529.75	571	527.5
24	530-536	531.25	535.75	577	533.5
25	536-542	537.25	541.75	583	539.5
26	542-548	543.25	547.75	589	545.5
27	548-554	549.25	553.75	595	551.5
28	554-560	555.25	559.75	601	557.5
29	560-566	561.25	565.75	607	563.5
30	566-572	567.25	571.75	613	569.5
31	572-578	573.25	577.75	619	575.5
32	578-584	579.25	583.75	625	581.5
33	584-590	585.25	589.75	631	587.5
34	590-596	591.25	595.75	637	593.5
35	596-602	597.25	601.75	643	599.5
36	602-608	603.25	607.75	649	605.5
37	608-614	609.25	613.75	655	611.5
38	614-620	615.25	619.75	661	617.5
39	620-626	621.25	625.75	667	623.5
40	626-632	627.25	631.75	673	629.5
41	632-638	633.25	637.75	679	635.5
42	638-644	639.25	643.75	685	641.5
43	644-650	645.25	649.75	691	647.5
44	650-656	651.25	655.75	697	653.5
45	656-662	657.25	661.75	703	659.5
46	662-668	663.25	667.75	709	665.5
47	668-674	669.25	673.75	715	671.5
48	674-680	675.25	679.75	721	677.5
49	680-686	681.25	685.75	727	683.5
50	686-692	687.25	691.75	733	689.5
51	692-698	693.25	697.75	739	695.5
52	698-704	699.25	703.75	745	701.5
53	704-710	705.25	709.75	751	707.5
54	710-716	711.25	715.75	757	713.5
55	716-722	717.25	721.75	763	719.5
56	722-728	723.25	727.75	769	725.5
57	728-734	729.25	733.75	775	731.5
*58	734-740	735.25	739.75	781	737.5
59	740-746	741.25	745.75	787	743.5
60	746-752	747.25	751.75	793	749.5
61	752-758	753.25	757.75	799	755.5
62	758-764	759.25	763.75	805	761.5
63	764-770	765.25	769.75	811	767.5
64	770-776	771.25	775.75	817	773.5
65	776-782	777.25	781.75	823	779.5
66	782-788	783.25	787.75	829	785.5
67	788-794	789.25	793.75	835	791.5
68	794-800	795.25	799.75	841	797.5
69	800-806	801.25	805.75	847	803.5
70	806-812	807.25	811.75	853	809.5
71	812-818	813.25	817.75	859	815.5
72	818-824	819.25	823.75	865	821.5
73	824-830	825.25	829.75	871	827.5
74	830-836	831.25	835.75	877	833.5
75	836-842	837.25	841.75	883	839.5
76	842-848	843.25	847.75	889	845.5
77	848-854	849.25	853.75	895	851.5
78	854-860	855.25	859.75	901	857.5
79	860-866	861.25	865.75	907	863.5
80	866-872	867.25	871.75	913	869.5
81	872-878	873.25	877.75	919	875.5
82	878-884	879.25	883.75	925	881.5
83	884-890	885.25	889.75	931	887.5

* For oscillator frequencies from channels 2 to 13, frequency indicated is that of VHF oscillator. For oscillator frequencies higher than channel 13, frequency indicated is that of UHF oscillator with VHF oscillator inoperative.

VHF AMPLIFIER AND MIXER ALIGNMENT FOR VHF TUNERS 94D151-1 AND -2

- Connect isolation transformer between power line and receiver.
- Connect negative of 4.0 volts bias supply to test point "X" (RF AGC), positive to chassis. Use 15 volt bias for step 3 only. See figures 24 and 25.
- Set Super Range Finder control fully to left (counterclockwise) and Contrast Control fully to right (clockwise).
- Connect sweep generator 300 ohm output to antenna terminals. If sweep generator does not have a built-in marker generator, loosely couple a marker generator to the antenna terminals. To avoid distortion of the response curve, keep sweep generator output at a minimum, marker pips just barely visible. Full generator output is required for step 3.
- Connect oscilloscope through a 15,000 ohm resistor to test point "W" on tuner. Keep scope leads away from chassis.
- Allow about 15 minutes for receiver and test equipment to warm up.
- Do not remove bottom shield during alignment.
- See figure 37 for adjustment locations and identification.

Step	Marker Gen. Freq. (MC)	Sweep Gen. Frequency	Instructions
1	193.25 MC (Video Carrier) 197.75 MC (Sound Carrier)	Sweeping Channel 10. See "Frequency Table".	Set Channel Selector to channel 10. Use 4 volts bias. Check response obtained with VHF response curve shown in figure 36. Alternately adjust A13 and A14 (figure 37) as required to obtain curve having maximum amplitude, symmetry and flat top appearance consistent with proper bandwidth and correct marker location.
2	83.25 MC (Video Carrier) 87.75 MC (Sound Carrier)	Sweeping Channel 6. See "Frequency Table".	Set Channel Selector to channel 6. Use 4 volts bias. Check response obtained with VHF response curve shown in figure 36. If curve is not within limits, compromise adjustment is required. Alternately adjust A13 and A14 as required to obtain curve having maximum amplitude, symmetry and flat top appearance consistent with proper bandwidth and correct marker location. After completing adjustment, recheck adjustment of step 1. If satisfactory response curves are obtained, proceed with step 4 (skip step 3). If proper response curves are not obtained with adjustment of A13 and A14, proceed with step 3.
3 Neutralizing Adjustment	193.25 MC (Video Carrier) 197.75 MC (Sound Carrier)	Sweeping Channel 10. See "Frequency Table".	Set Channel Selector to channel 10. Use 15 volts bias. Increase sweep generator output to maximum and increase *oscilloscope gain as required for obtaining usable response curve. Adjust A15 for minimum response (amplitude). After adjusting A15, conclude by repeating steps 1, 2 and 4.
4	Set the sweep generator to sweep the channel to be checked. Set the marker generator for the corresponding video carrier frequency and sound carrier frequency.		Use 4 volts bias. Check each channel operating in the service area for curve shown in figure 36. In general, the adjustment performed in steps 1 and 2 are sufficient to give satisfactory response curves on all channels. However, if reasonable alignment is not obtained on an operating channel, repeat steps 1 and 2 as a compromise adjustment to favor the particular channel. If a compromise adjustment is made, other channels operating in the service area should be checked to make certain that they have not been appreciably affected.

*If usable response curve is not obtained, connect oscilloscope to test point "V" through decoupling filter, see Figures 21, 24 and 25. Note: IF amplifier must be in normal alignment. Adjust A15 for equal peak amplitudes with dip at center of curve.

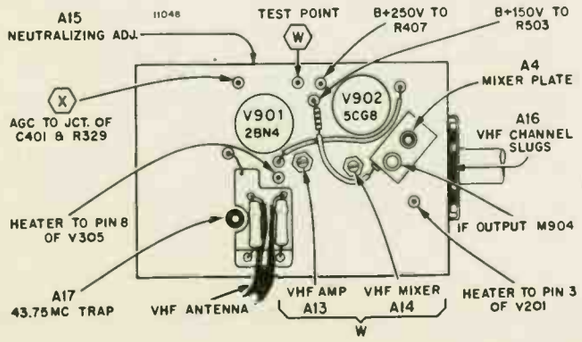


Figure 37. Top View of VHF Tuners 94D151-1 and -2 Showing Adjustment Locations.

OVER-ALL VHF AND IF RESPONSE CURVE CHECK

Receiver Controls and Bias Supply	Sweep Generator	Marker Generator	Oscilloscope	Instructions
Use isolation transformer between power line and receiver. Set Super Range Finder control fully to left (counterclockwise) and Contrast control fully to right (clockwise). Channel Selector on channel 12 or other unassigned high channel. Connect negative of 3V bias to test point "T" (IF AGC) and test point "X" (RF AGC), positive to chassis.	Connect to antenna terminals. Keep generator output as low as possible to prevent overloading.	If an external marker generator is used, loosely couple high side to sweep generator lead. Marker frequencies are shown in frequency table.	Connect to point "V" through a decoupling filter. See figures 21, 24 and 25.	Compare the response curve obtained against the ideal curve shown in figure 38. If the curve is not within tolerance, touch up the IF slugs as instructed below. It should never be necessary to turn slugs more than one turn in either direction. If the curve is satisfactory on the channel checked, all other channels should also be satisfactory. IMPORTANT: When sweep output is reduced, response curve amplitude on scope should also decrease, but curve shape should remain the same. If curve shape changes, reduce sweep output and/or the scope gain until the shape does not change.

Note that video marker on the "Over-all VHF-IF Response Curve" will appear on the opposite side of the curve as compared to the "Ideal IF Response Curve", figure 22. This is due to action of the mixer tube.

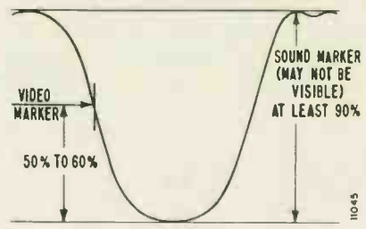


Figure 38. Ideal Over-all VHF and IF Response Curve.

Figure 39. Over-all VHF and IF Response Curves, Incorrect Shape.

VHF OSCILLATOR ADJUSTMENT USING A TRANSMITTED TELEVISION SIGNAL

It is always advisable to make VHF oscillator (channel) adjustments using a transmitted Television Signal as instructed under "VHF Channel Adjustment." If a television signal is not available, VHF oscillator (channel) adjustment can be made while observing the Over-all VHF and IF Response Curve. Align oscillator adjustments to position the video carrier marker 50 to 60 per cent down from the peak of the over-all response curve, see figure 38. For location of oscillator adjustments, see figures 10 through 14.

SERVICE HINTS

Also see "Production Changes".

TROUBLE SHOOTING

The television receivers covered in this manual incorporate the latest developments in circuitry and chassis construction. The different chassis covered are similar, with exception of tuners, B+ rectifiers and picture tube size. VHF-UHF chassis use a combination VHF-UHF tuner assembly. VHF chassis use only the VHF tuner.

A description of the different tuners used is given elsewhere in this manual. A description of B+ distribution is given in the paragraphs below.

As an aid in trouble shooting, views of the wiring side and component side of the printed circuit board is given in figures 48, 50 and 52. A view of the wiring side of the main chassis is given in figures 53 and 54.

B+ DISTRIBUTION

The B+ power supply of television chassis consists of a transformerless circuit utilizing two rectifiers in a half wave voltage doubler circuit. Efficient filtering with excellent voltage regulation is obtained through use of a pi type filter network consisting of two 100 mf electrolytic capacitors and an iron core filter choke. The B+ voltage at output of the filter network is approximately 250 volts. See B+ Distribution Diagrams, figures 40 through 43.

Note that the cathode of damper tube V406 supplies B+ boost voltage to horizontal output stage V405 and to the 1st anode of picture tube V305.

In chassis with single ended sound amplifier, the sound output tube V202 (12CU5), also operates as a voltage dropping tube for supplying 150 volts B+ to the VHF tuner, sound detector, 3rd IF amplifier and video amplifier circuits. The cathode of the sound output tube operates at approximately 150 volts positive with respect to chassis ground. If sound output tube becomes inoperative, both sound and picture are affected. See B+ Distribution Diagrams, figures 40 through 43.

Note also, that the 2nd IF amplifier V302 operates as a voltage dropping tube in addition to its regular function. B+ voltage to V301 and V302 (1st and 2nd IF amplifiers) is effectively connected in series since the cathode of V302 connects to the plate and screen of V301.

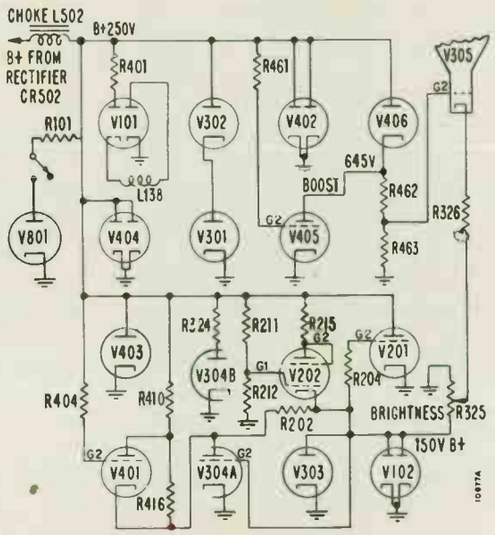


Figure 41. Simplified B+ Distribution Diagram for VHF-UHF Receivers With Single Ended Sound Amplifier.

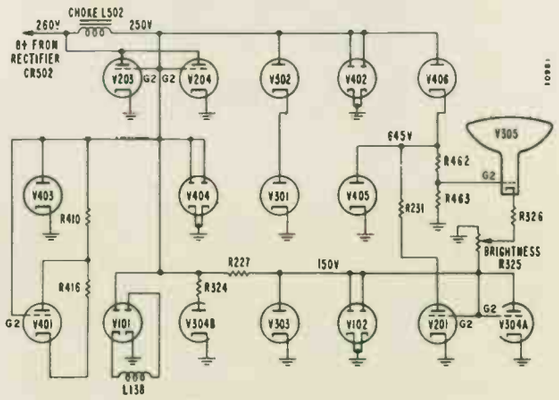


Figure 42. Simplified B+ Distribution Diagram for VHF Receivers With Push-Pull Sound Amplifier.

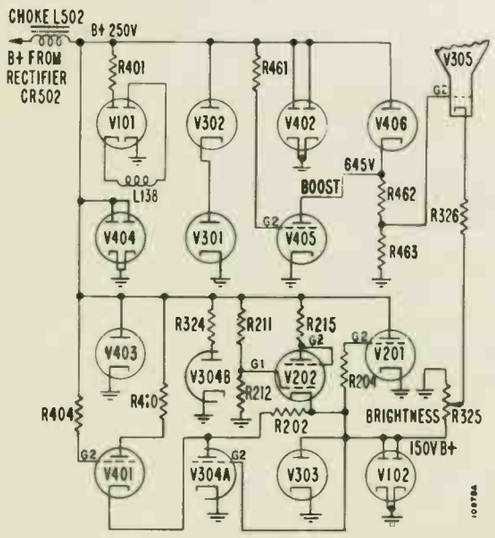


Figure 40. Simplified B+ Distribution Diagram for VHF Receivers With Single Ended Sound Amplifier.

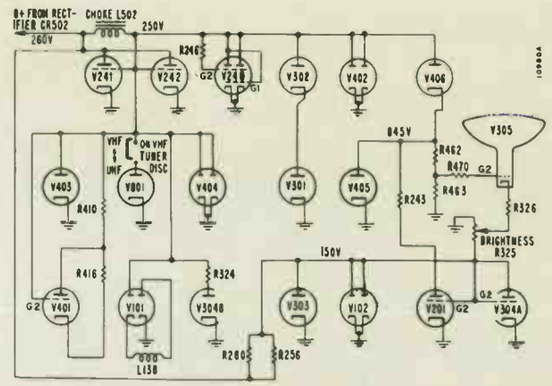


Figure 43. Simplified B+ Distribution Diagram for VHF-UHF Receivers With Push-Pull Sound Amplifier.

SERVICING TUBES

Important: To prevent possibility of electric shock, do not remove or install tubes unless the set is disconnected from the power line.

LOCATING A BURNED OUT TUBE

The heaters of tubes in this receiver (except V407 high voltage rectifier) are connected in a series circuit. If tubes do not light, check the interlock line cord to see that it is making good contact. Also check to see that tubes are firmly seated in sockets.

Note: The tube location diagrams on schematic pages contains a simplified diagram of tube heater connections. Through the use of tube location diagrams and the step by step procedure given at right, an "open heater" (burned out) tube can be quickly located without the need for substituting

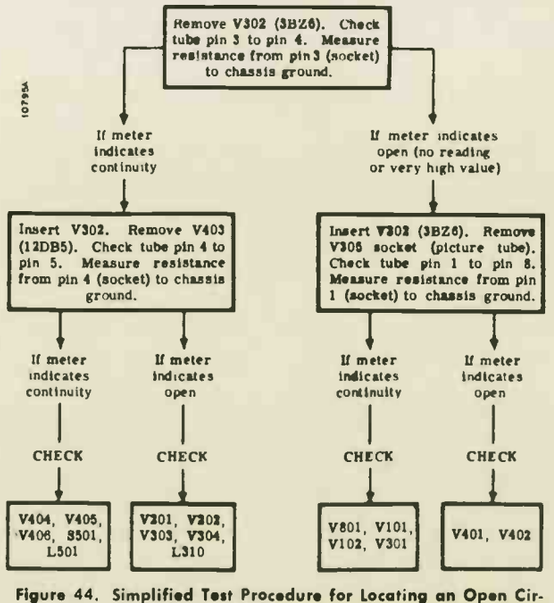


Figure 44. Simplified Test Procedure for Locating an Open Circuit Heater Tube in Sets With Single Ended Sound Amplifier. Note V801 in VHF-UHF Sets Only.

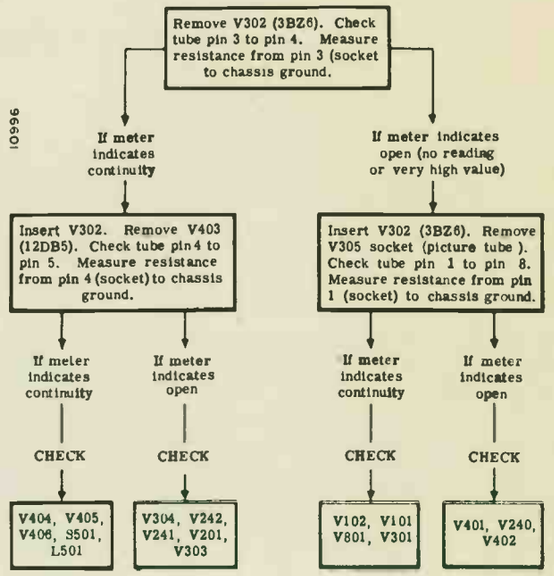


Figure 45. Simplified Test Procedures for Locating an Open Circuit Heater Tube in Sets With Push-Pull Sound Amplifier. Note V801 in VHF-UHF Sets Only.

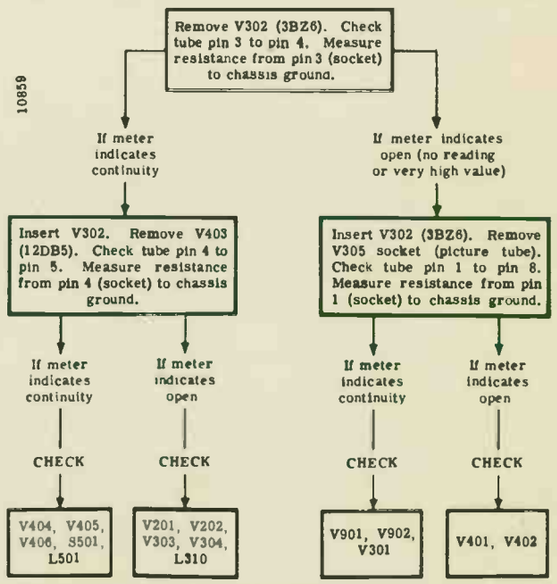


Figure 46. Simplified Test Procedure for Locating an Open Circuit Heater Tube in Sets With Son-R Remote Tuning.

CHASSIS 16AB1, AD1, AE1, AG1, AL1, AU1C, AW1C, B1, D1, E1, G1, J1, K1, L1, U1C, W1C(Late)

or testing of all tubes.

Measurements are made with an ohmmeter from tube socket pins to chassis ground with the tube removed. **Important:** The cabinet, control shafts, control panel brackets and picture tube mounting are insulated from the chassis; do not connect ohmmeter to these points. When taking ohmmeter readings, the heater string should have a total resistance, when cold, of approximately 25 ohms. If the ohmmeter reads approximately 25 ohms or less, the heater circuit is continuous; if the ohmmeter indicates a very high resistance (above 10,000 ohms), the heater circuit is open.

Note also, that a tube heater can measure good when cold, but will "open" upon application of power. In this case, measuring continuity of the heater circuit with power applied may be necessary. An AC voltmeter or an electrician's neon test lamp can be used to circuit trace (check voltage) the heater circuit with AC power applied. **Warning:** Before connecting AC power, be sure to observe the "Voltage Warning" on schematic pages.

Important: Socket pins are counted in a counterclockwise direction when viewed from the tube side of the socket. To prevent the possibility of electrical shock and damage to tube pins and socket contacts, do not remove or insert tubes unless the set is disconnected from the power line.

The tubes in this receiver can be serviced by simply removing the cabinet back.

SERVICING PRINTED WIRING

A major portion of the circuitry in these receivers is contained in two printed wiring boards. The smaller printed circuit board at side of chassis contains tubes and components in the video IF and video detector circuits. The larger printed circuit board at bottom of chassis contains tubes and components in the sound IF, sound detector, sound output, sync, AGC, video amplifier, vertical and horizontal sweep circuits. Note: In models with Hi-Fi sound amplifier, the sound amplifier, phase inverter and push-pull sound output are contained in a separate sub-chassis mounted at top of the main chassis, see figure 7.

Trouble shooting of printed circuit wiring is similar to that of conventionally wired sets. Complete instructions on the service and repair of printed circuit wiring is given in Service Manual No. S559, available from the Admiral Distributor.

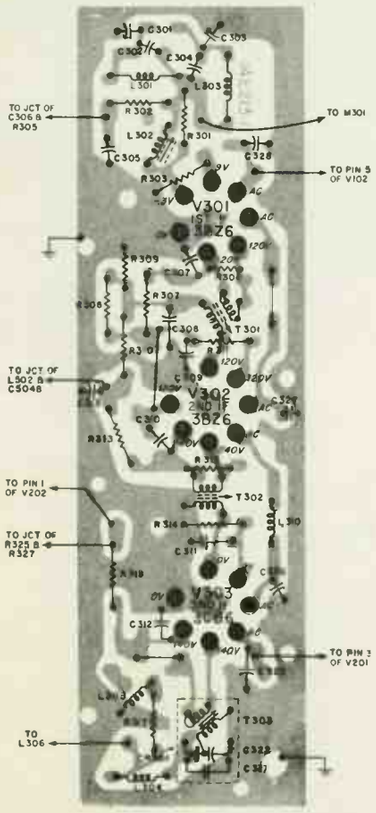


Figure 47. View of Wiring Side of Printed Wiring IF Board A5775-1. Gray area represents printed wiring; black symbols and lines represent components and connections on opposite side.

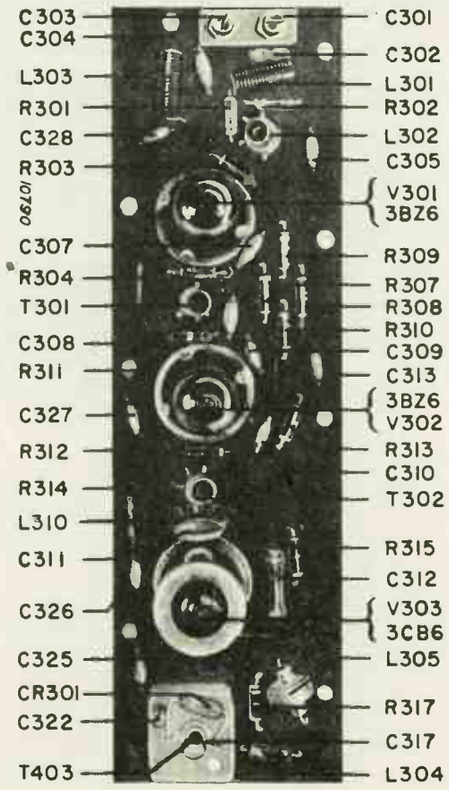


Figure 48. View of Component Side of Printed Wiring IF Board A5775-1.

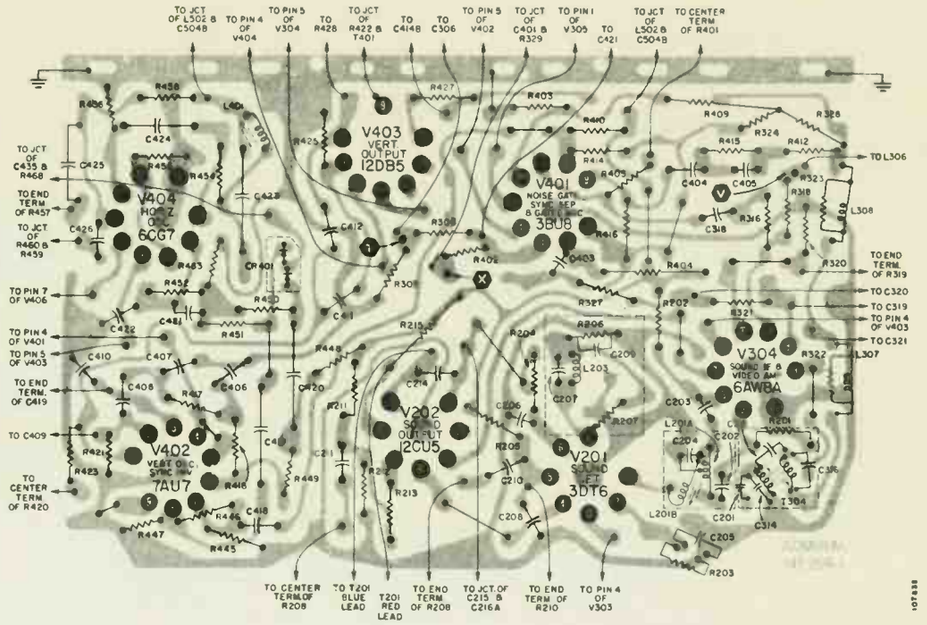


Figure 49. View of Wiring Side of Printed Wiring Board A5780-1 Used in All Chassis Except 16U1C, 16AU1C, 16W1C, and 16AW1C. Gray area represents printed wiring; black symbols and lines represent components and connections on opposite side.

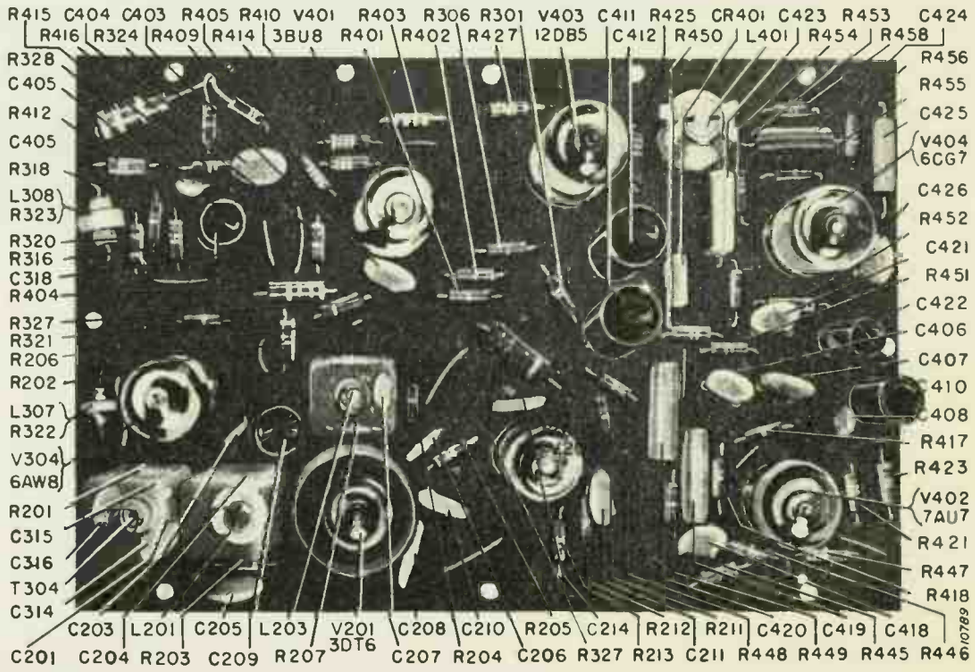


Figure 50. View of Component Side of Printed Wiring Board A5780-1 Used in All Chassis Except 16U1C, 16AU1C, 16W1C, and 16AW1C.

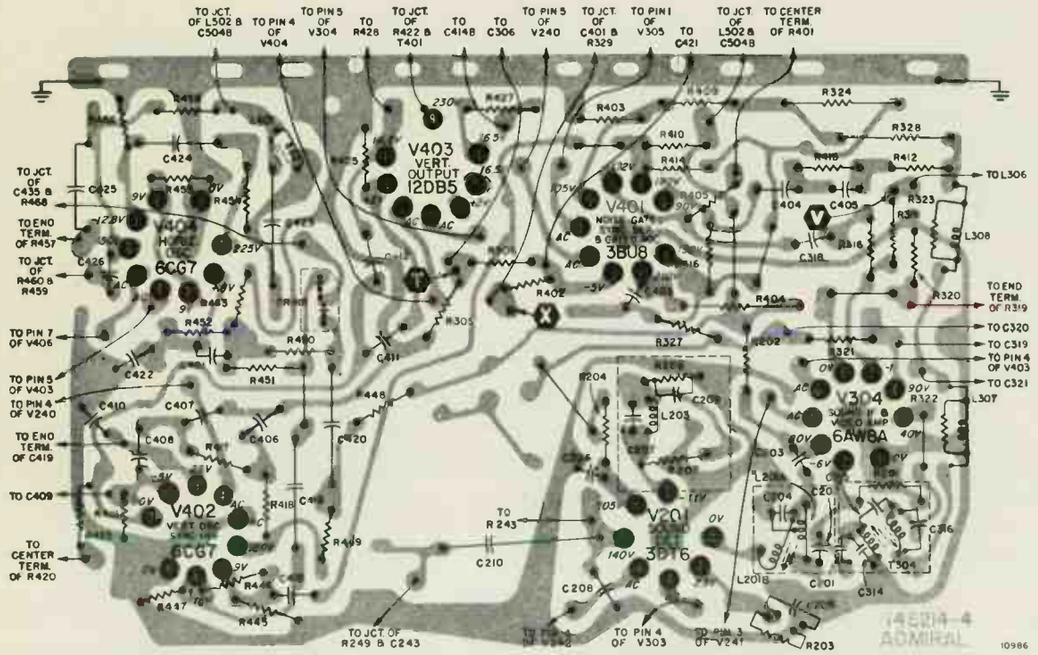


Figure 51. View of Printed Wiring Side of Main Board A5780-4 Used in 16U1C, 16AU1C, 16W1C and 16AW1C Chassis. Gray area represents printed wiring; black symbols and lines represent components and connections on opposite side.

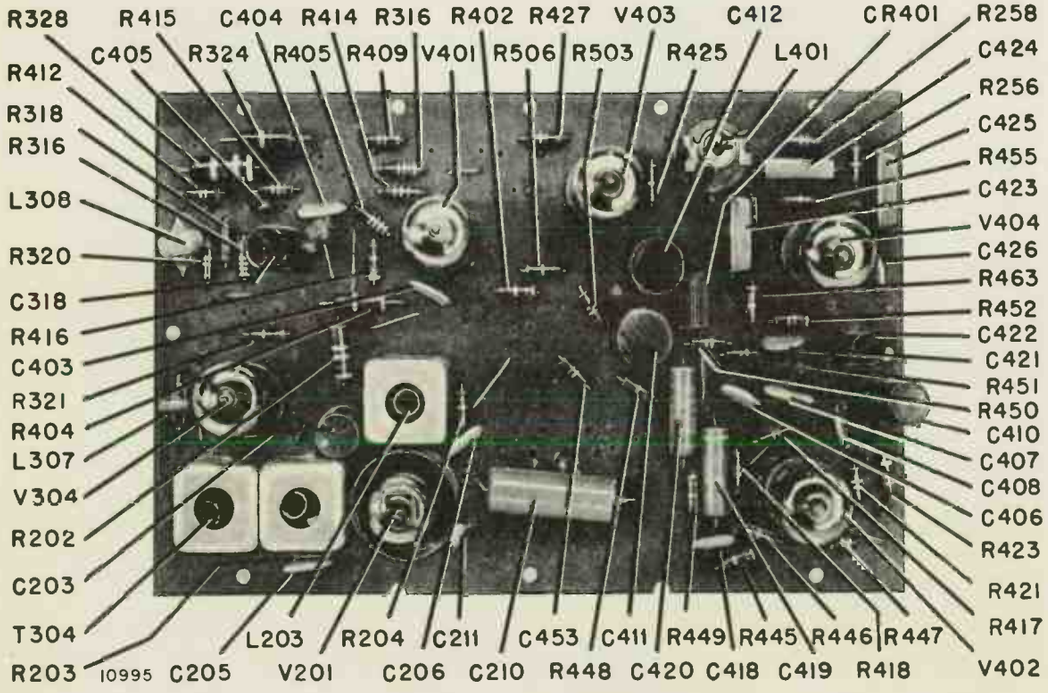


Figure 52. View of Component Side of Printed Wiring Board A5780-4 Used in 16U1C, 16AU1C, 16W1C, and 16AW1C Chassis.

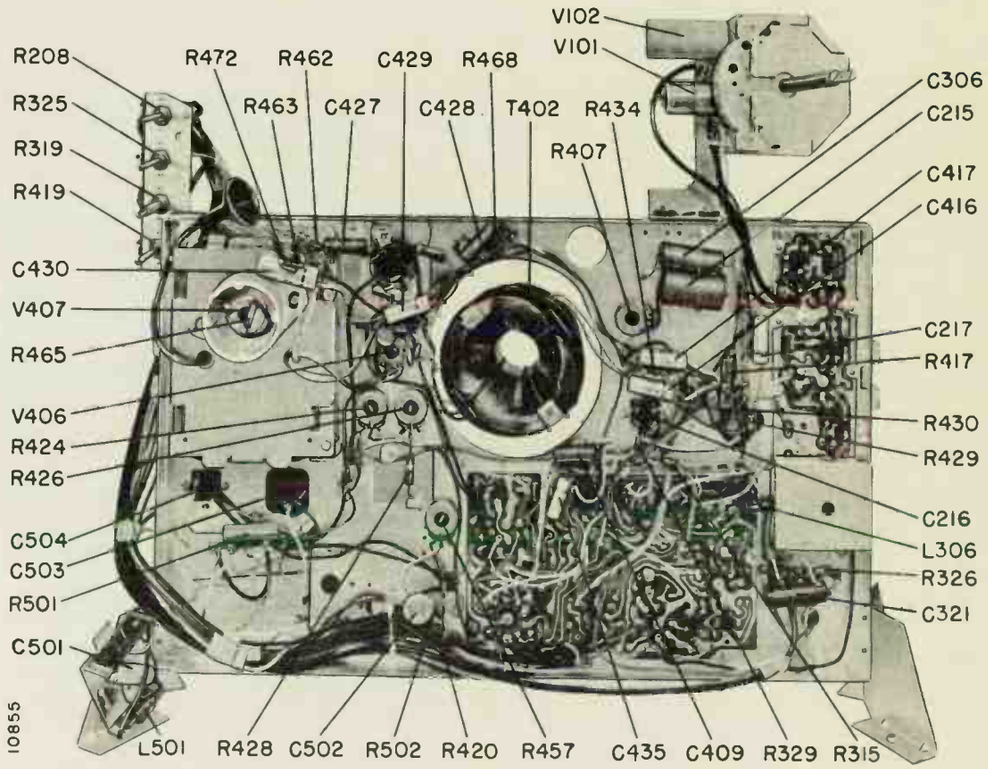


Figure 53. Wiring Side of Chassis With Single Ended Sound Amplifier.

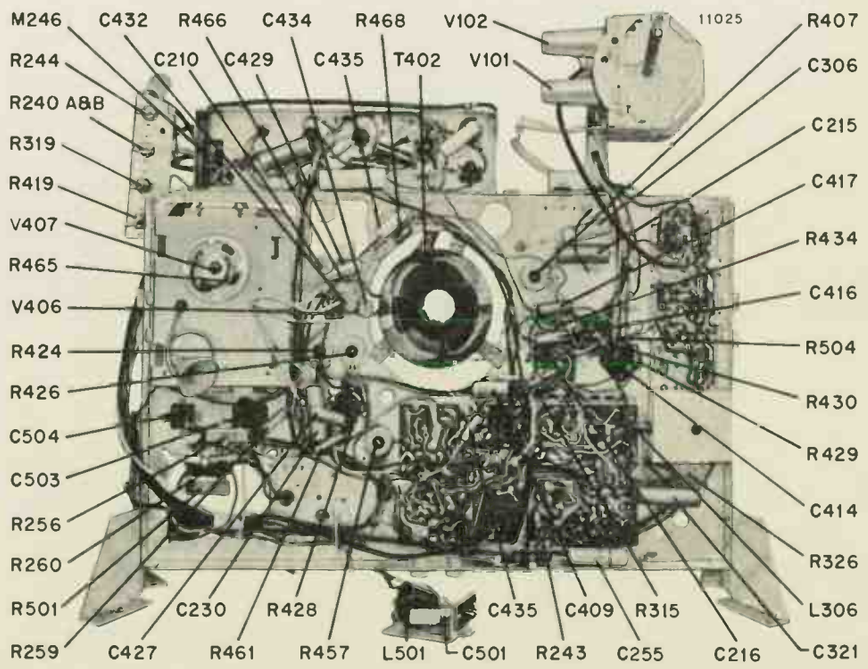


Figure 54. Wiring Side of Chassis With Push-Pull Sound Amplifier.

To simplify circuit tracing, identifying tube socket connections and locating component connection points, figures 47, 49 and 51 have been included in this manual. In figures 48, 50 and 52, components are shown schematically instead of pictorially. This illustration shows what would be seen if it were possible to look through the printed circuit wiring board and actually see the various components on the board.

Note that servicing of most components at top side of printed circuit board can be made without the need of removing the chassis from the cabinet. To gain access to the component side of the printed circuit board, remove cabinet back. For servicing wiring side of printed circuit board, or when making alignment or taking voltage, waveform or resistance measurements, it is necessary to remove the cabinet back.

Note: Important voltage and test point locations are stamped on surface of printed circuit board.

SERVICING GATED AGC CIRCUIT

The gated AGC circuit of these receivers utilizes a newly developed tube, type 3BU8. This tube combines the functions of a noise-gate, sync separator and gated AGC tube.

Note that the type 3BU8 tube is a twin pentode, having the cathode, screen and control grid common to both pentodes with separate plates and suppressor grids for each section. In operation, the control grid is common to both the sync separator and AGC functions of the tube. By applying an out-of-phase signal to the control grid, noise pulses drive the tube to cut-off, thus resulting in "clean" sync pulse separation and noise-free AGC.

Common symptoms of AGC trouble are, negative picture, raster with no picture or sound, intermittent sync or complete loss of sync, excessive contrast with buzz in sound, picture bending, and washed out picture.

In general, components in the AGC circuit are relatively trouble free and are seldom the cause of the AGC trouble. Past experience has shown that faulty tubes are generally the cause of AGC trouble. A faulty video detector diode (CR301) or defect in the horizontal pulse circuit to the AGC tube can also cause AGC trouble. **Important:** Before deciding that faulty components are the cause of AGC trouble, be sure that the Super Range Finder (AGC) control has been adjusted according to the instructions given in this manual. **Note:** Some later sets may not have a Super Range Finder Control.

When trouble shooting, tubes which can affect AGC operation should be checked first. Check tubes in VHF Tuner. Also check tubes V401, V301, V302, V303 and V304. A tube with leakage between elements or a tube which is gassy or presents grid emission will upset AGC operation, thus causing any of the symptoms mentioned in preceding paragraphs. Check tubes by replacing them with others known to be good or check tubes in a tube leakage tester for high resistance leakage, gas and grid emission.

After eliminating tubes as being the cause of AGC trouble, the next step would be to clamp the AGC buss with a negative voltage (variable 0 to 18 volts) from either a battery pack or an electronic bias supply. Connect negative lead of bias supply to test points "X" and "T", see figures 24 and 25. Connect positive to chassis ground. **Note:** It may be necessary to disable the AGC keyer section of V401 by connecting a .1 mf capacitor between the plate (pin 3) and chassis ground.

With AGC clamping voltage connected, vary negative bias voltage to a point where a normal picture is produced. If a picture with a normal contrast can be obtained, trouble can be assumed as being in the AGC circuit. Check tubes mentioned in paragraphs above. Check capacitors in AGC circuits for leakage or open circuit. Especially check capacitors C428 (.001 mf, 1.6 KV) and C405 (150 mmf, 500 volts). As a further aid in localizing a defective stage or component, make voltage and waveform measurements at video detector CR301 and AGC tube V401 as indicated on schematic pages.

Important: If a normal picture and sound cannot be produced with application of a negative clamping voltage to AGC test points, trouble can be considered as being in circuitry other than AGC. Check for common causes of trouble generally affecting AGC operation, such as a defective video detector diode CR301 or troubles in the VHF tuner, video IF or video amplifier circuitry.

VERTICAL SWEEP TROUBLES

Horizontal line (no vertical sweep): Check tubes V402 and V403. A shorted or open capacitor C409 or C416 will cause loss of vertical sweep. Replacement of C409 should be made using a .001 mf, 2,000 volt, ceramic disc capacitor, part number 65D10-181. Replace C416 with .047 mf, 400 volt, paper molded capacitor, part number 64B8-28.

Intermittent vertical sweep or bunching of horizontal trace lines: This trouble can be caused by an intermittently open or leaky coupling capacitor C411 (.1 mf.). This condition is sometimes aggravated by turning the sound volume up. Replace C411 with a .1 mf, 400 volt, upright, mylar dielectric, tubular, part number 64C16-30.

Vertical fold-over (at the bottom of the raster): This trouble commonly due to a weak tube or a defective component in the vertical oscillator or vertical output circuit. It can also be due to low B+ voltage or a defective vertical output transformer T401. Note: A resistance check of the vertical output transformer seldom reveals defects such as a shorted turn or leakage to ground or between windings. If in doubt, check by disconnecting leads from original transformer and connecting a replacement (test) transformer for substitution check.

NO RASTER, SOUND OK

After checking usual common causes of no raster (sound OK) and cause of trouble is not determined, be sure to check the following:

Check capacitor C422: If capacitor C422 (.022 mf.) should become leaky or shorted, complete loss of raster will result. Note: Capacitor C422 is located on the printed wiring board, see figures 49 through 52. It connects from pin 2 of the V404 (6CG7) to chassis ground.

Check capacitor C431: Shorting of capacitor C431 (.001 mf, 1,000 volts, ceramic) will result in no raster. Momentary arcing within the picture tube may cause capacitor C431 (.001 mf, ceramic) to breakdown, if the voltage rating is below 5,000 volts. When replacing capacitor C431, be sure to use a .001 mf, 5,000 volt, ceramic capacitor, part number 65D10-164.

To provide further protection to circuit components in the event of arcing in the picture tube, resistor R470 (100,000 ohms, ½ watt) should be moved from its original location and reconnected between pin 3 of the picture tube and focus terminal "A" (see note on schematic near high voltage rectifier). Also see Run 13 under Production Changes.

NO RASTER, LOSS OF HORIZONTAL SYNC OR INTERMITTENT SYNC

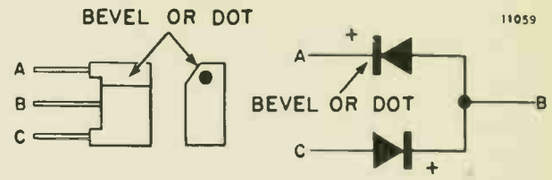
No raster, loss of horizontal sync or intermittent ("touchy") horizontal sync can be due to a faulty dual selenium diode (horizontal sync discriminator) CR401 or other component in the sync circuit or horizontal sweep circuit.

If a section of the dual selenium diode should become shorted or open, complete loss of raster or no horizontal sync will result. If the leads of the dual selenium diode should become loose or make poor contact in socket or if the diode is inserted incorrectly, loss of horizontal sync or intermittent horizontal sync will result. Important: When inserting diode, beveled corner of diode must line up with beveled corner of diode socket, see figure at right.

Check the dual selenium diode CR401 as instructed in paragraphs below. If the dual selenium diode is not at fault, check capacitors C405, C419, C420, C421 and C422 for short, leakage or open circuit. Check value of resistors R450 and R451 (100,000 ohms). As a further aid in localizing trouble, make an oscilloscope waveform check of the important test points in the sync, horizontal oscillator and horizontal output circuits. See Voltage and Waveform Data on schematic pages.

SERVICING HORIZONTAL SYNC DISCRIMINATOR (DUAL SELENIUM DIODE CR401)

A plug-in type dual selenium diode is used as the horizontal sync discriminator CR401. The diode sections of the horizontal sync discriminator are connected in series (front to back) as shown in figure below



Views of Horizontal Sync Discriminator CR401.

A faulty diode or poor contact between diode leads and socket can result in no raster, intermittent sync or loss of sync. To insure good contact of diode leads, scrape leads to remove accumulated wax or rosin.
Important: When inserting diode in socket, be sure to observe polarity indication. The beveled corner of the diode must line up with the beveled corner of the diode socket, see figure above.

Checking Dual Selenium Diode CR401

There are many ways of checking a dual selenium diode for determining if it is faulty. A simple and quick check can be made by measuring the diode using the RX100 scale of an ohmmeter or vacuum-tube voltmeter. Note: It is unnecessary to disconnect the diode leads from the circuit for making a resistance check, since the relative high shunting resistance of the circuit will have little effect on the resistance measurement.

When connecting an ohmmeter or VTVM (RX100 scale) in the forward direction across one section of the diode, the resistance will generally measure 2,000 to 5,000 ohms. When the ohmmeter or VTVM leads are reversed across the same diode section, the inverse resistance will be many thousand ohms.

SERVICING VIDEO DETECTOR (CR301)

In these receivers, a germanium diode (1N60, 1N87 or 1N295) is used as the video detector CR301. The detector diode is connected across the top terminals of the 3rd IF transformer T303. The detector diode is accessible for checking or replacement after removing the snap-on cover shield from the 3rd IF transformer.

Note: The germanium diode functions with excellent stability, has long life expectance and ability to withstand severe mechanical shock without damage. However, the diode may be permanently damaged by application of high current or excessive heat to the connecting leads. To avoid damage when soldering diode leads, clamp nose end of long nose pliers between the body of the diode and end of lead to be soldered. Any damaging heat will be conducted by the pliers and thus diverted from the diode.

A rough check for determining if a diode is open or shorted can be made using an ohmmeter. Check as follows: Disconnect one end of the diode from the circuit and connect an ohmmeter (Rx1000 scale) across the diode termi-

nals. A relatively low resistance (several hundred ohms or less) should be noted in one direction and a relatively high reading (many thousand ohms) should be noted in the other direction as the ohmmeter leads are reversed.

IMPORTANT: A defective detector diode will cause insufficient picture contrast, with weak or no sound, intermittent sync, no sync or AGC blocking. Connecting an oscilloscope to test point "V" will generally indicate no video, low video output with compression of sync pulses. **Note:** Normal peak-to-peak voltage at test point "V" output of video detector should be approximately 3.5 volts peak-to-peak. If the diode is suspected as being at fault, disconnect one end of the original diode and try a substitute diode, preferably of the same type number as the original. **Important:** Note polarity when connecting the diode.

POSSIBLE CAUSES OF ARCING

The following points should be checked should arcing be experienced.

a. Internal arcing can occur in the horizontal output or damper tubes.

b. Arcing can occur at the cavity for the high voltage connection on the picture tube to either the dag coating or to the chassis. This can result from moisture accumulation and can usually be cured by coating with one of the commercial insulators available in spray-type cans.

c. Improper dress of the high voltage lead either inside the high voltage can or between the can and the picture tube can result in arc-over. Reroute lead for greater clearance. **Note:** If arcing has occurred for any length of time it may be necessary to replace the lead or wrap it with a vinyl electrical tape.

d. In early sets, arcing can occur at filament leads of the high voltage rectifier tube socket. In later sets, socket connections were changed to prevent arcing. Rewire filament leads in accordance with circuit shown on schematic.

e. Arcing can be due to a shorted deflection yoke.

f. As a further preventive against arcing, it is recommended that the focus anode connection (from Pin 4 of V305) be placed at ground potential "B." In this position any arc-over that might occur within the picture tube will be dissipated directing to chassis ground, thus reducing audible arcing. **Note:** An occasional slight arcing within an electrostatic type picture tube can be considered as normal.

FAILURE OF 25CD6 DUE TO ARC-OVER IN 19AU4

In chassis stamped Run 10 through Run 21, arc-over between elements of the 19AU4GTA damper tube V406 can (under certain conditions) cause heater failure of the 25CD6GB horizontal output tube V405.

To reduce possiblity of repeated heater failure, due to arc-over, it is recommended the location of tube heater connections be interchanged as follows. Connect pin 7 of 19AU4GTA to high side of AC line (terminal of On-Off switch) and connect pin 8 to pin 2 of 25CD6GB. Connect pin 7 of 25CD6GB to pin 5 of 6CG7.

Note: Chassis stamped Run 22 or higher have this change incorporated. See schematics for revised heater circuit.

INSUFFICIENT WIDTH

If insufficient width is experienced, be sure to check the following before suspecting circuit components as being cause of trouble.

1. Check AC line voltage. Line voltage may be far below the normal 117 volts AC for proper operation.
2. Check picture centering. Picture may be over to one side.
3. Check horizontal drive adjustment. See adjustment procedure given elsewhere in this manual.
4. Horizontal output tube may be at fault. Try other tubes in checking for a tube which will provide greater width. Readjust horizontal drive each time when replacing tube.
   Note: Tube replacement may be required even though a tube tester does indicate that the tube is good. A tube that may produce insufficient width in one set may operate satisfactorily in another.

"CHRISTMAS TREE" EFFECT OR "SQUEEGING"

Squeeging is a spurious oscillation at less than the normal horizontal sweep frequency. It usually shows up as a "christmas tree" effect in the raster and the same time, produces a high pitched audible "tweet". "Squeeging", which may occur in some sets (stamped Run 10 through Run 13), can be corrected by changing R456 (in the horizontal discharge circuit) from its original value of 120,000 to 110,000 ohms, 5%.

Note: Resistor R456 is 110,000 ohms in sets stamped Run 14 or higher. If horizontal instability is apparent, check the horizontal oscillator tube V404 and horizontal sync discriminator CR401.

FAILURE OF RESISTOR R215

Failure of resistor R215 (220 ohms, 2 watts) can be due to shorted elements within the 3rd IF tube V303 (3CB6) or sound output tube V202 (12CU5). **Note:** Resistor R215 is located in the B+ circuit tubes V202 and V303.

If elements within the 3rd IF tube V303 are shorted, failure of resistor R315 (470 ohms, ½ watt) will also result. Note: Resistor R315 is located in the B+ circuit to V303. See figures 50 and 52 for location of resistor R315 on the printed wiring board.

ELIMINATING RF INTERFERENCE FROM POLICE OR OTHER SERVICES IN THE 40 MC BAND

A tunable RF interference trap (adjustment A17) is contained in the antenna circuit of the VHF tuners used with these receivers, see figures 32, 33 and 37. At the factory, trap adjustment A17, is aligned for minimum response at 43.95 MC. The trap attenuates interfering signals in the 41 MC IF frequency range. The trap should generally never require realignment in the field. However, if RF interference is experienced from radio transmitters or other sources at frequencies (harmonics or fundamentals) in the 41 MC range, the trap may be realigned to minimize the interference. The trap may be tuned while observing the picture. However, if the interference is intermittent, it will be difficult to adjust and the following procedure is recommended.

Adjust trap as follows:

a. Determine the exact frequency of the interfering signal.

b. Set channel selector to channel 2.

c. Connect VTVM to test point "V", see figures 24 and 25.

d. Set AM signal generator to exact frequency of interference. Increase signal generator output for 2 volt reading on VTVM.

e. Using a non-metallic alignment tool with 5/16" hexagonal shank (Admiral part number 98A 30-12), adjust trap A17 (see figures 32, 33 and 37) for minimum VTVM reading at test point "V".

Caution: It should not be necessary to turn the slug A17 more than a few turns in either direction. Do not turn the slug completely counterclockwise, as channel 2 interference may result.

OPERATING 16J1 AND 16K1 TELEVISION CHASSIS WITHOUT CONNECTION TO REMOTE CONTROL AMPLIFIER

The 117 volt AC power for operating the 16J1 and 16K1 television chassis, and the 8G1 remote control amplifier are interconnected through the various switches, relay contacts and connectors contained in the television and remote control amplifier chassis. Simplified illustrations of the 117 volt AC circuitry contained in each of the chassis is shown in Service Manual No. ST599-1.

To operate the 16J1 or 16K1 television chassis separately, without connection to the 8G1 remote control amplifier, it is necessary to connect a wire jumper between pins 5 and 7 of connector socket M507. A wire jumper must be added to complete the 117 volt AC circuit, normally connected through the remote control amplifier. An illustration of a connector plug with wire jumper connected is shown in the schematic.

HORIZONTAL BARS IN PICTURE WHEN CABINET OR CHASSIS IS TAPPED

Horizontal bars or bunching of vertical trace lines in raster when the cabinet or chassis is tapped, may be caused by a microphonic vertical output tube V403 (12DB5).

Tapping the vertical output tube lightly will aggravate this condition. Replace 12DB5 tube with another known to be good.

RASTER CORRECTOR MAGNETS USED IN DEFLECTION YOKE

The 110° deflection yoke used in these receivers contains four built-in raster correction magnets. These are permanent magnets used for preventing pin cushion distortion (bowing) at the top, bottom or sides of the raster. The raster correction magnets are contained in pockets molded in the plastic insulation at the front of the yoke coil.

Important: Do not disturbe position of magnets. Pin cushion distortion may be visible in the raster if the magnets are removed or are incorrectly placed (end for end).

AGC BLOCKING ON STRONG SIGNALS AND AT HIGH BRIGHTNESS SETTINGS

To prevent AGC blocking on strong signals and high brightness settings, change capacitor C428 (plate circuit of V401) from 300 mmf to .001 mf, 1600 volts, part number 64B2-32. Chassis stamped Run 11 or higher include this change. Also remove resistor R403 (390,000 ohms) connecting from pin 6 of V401 (3BU8) to chassis ground.

DISTORTION AND BUZZ IN SOUND

If the sound is distorted or has buzz, touch-up adjustment of 4.5 MC intercarrier sound IF amplifier is required. Instructions for making "4.5 MC Sound IF Alignment Using A Television Signal" is given on alignment pages.

Frequent need for sound touch-up adjustment may be due to frequency drift of quadrature coil L203. Drift may be eliminated by changing resistor R207 from 220,000 ohms to 100,000 ohms, ½ watt, 10%. After replacing resistor R207, make touch-up adjustment as mentioned above.

ELIMINATING CORONA AT ANODE BUTTON OF THE PICTURE TUBE

Under extreme conditions of high humidity, corona discharge may occur from the 2nd anode button of the picture tube to the dag coated area surrounding it.

If corona discharge is experienced, remove the electrostatic charge on the picture tube by shorting the 2nd anode button to the dag coating.

Clean the area surrounding the 2nd anode button with carbon tet and wipe dry. Then paint the area between the 2nd anode button and the dag coating with a good commercial high voltage insulating dope.

REPLACING NYLON INSULATING INSERTS

The control panel bracket and the chassis are mounted with self-tapping screws which thread into nylon insulating inserts.

Nylon inserts are used to insulate the control panel bracket and chassis mounting screws from the chassis, since the chassis connects to one side of the AC power line.

The illustration, figure 55, shows the method used to remove and replace a nylon insert.

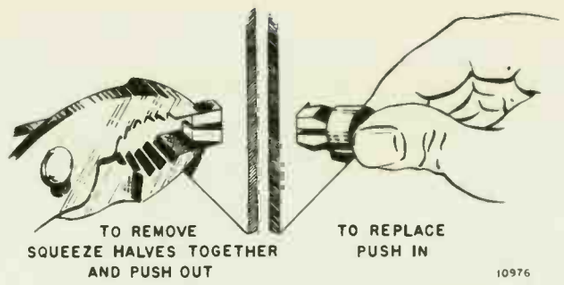


Figure 55. Method of Removing and Replacing Nylon Insulating Inserts.

VHF TUNERS 94E144-9, -13, -19, -22, -24, -26, -27 AND -30

GENERAL

These new Admiral tuners incorporate the latest advancements in mechanical design and circuitry of turret type VHF tuners. The tuner is approximately 20 per cent smaller than the conventional turret-type tuners. For simplicity of circuitry, servicing convenience and purposes of automation, the turret assembly is built in the form of two channel discs. All channel coils or inductors are contained on two turret discs and are easily accessible for servicing. The turret can be disassembled from the tuner by merely removing two retainer springs.

An antenna matching transformer (balun) is used to provide a more constant antenna input impedance at all VHF channels. Increased sensitivity, better over-all performance with improved picture quality result from the many circuit advances.

An improved type **Fine Tuning** control is used. The metal surface of the fine tuning rotor and the silver coated surface of the fine tuning stator form a variable capacitor. The normal range of the **Fine Tuning** control is plus or minus 2 MC for high channels and plus or minus 1 MC for low channels.

The tuned circuits of the cascode VHF amplifier V101 (4BC8) and mixer grid and oscillator circuits V102 (5CG8) are contained on the two low loss mica filled discs. Since this tuner is of the semi-incremental type (contains series inductance circuits) channel tuning is accomplished by adding or subtracting portions of inductance with rotation of the Channel Selector (turret drum). **Note:** Tuners 94-E144-13, -19, -24 and -26 are used in VHF only sets and Tuners 94E144-9, -22, -27 and -30 are used in conjunction with UHF Tuner 94D112-5 or 94D155-3 in VHF-UHF sets. The VHF tuners are identical with exception that tuners in VHF-UHF sets have a UHF input socket, additional coils and components in the UHF detent position of the turret disc, see figures 26 through 29.

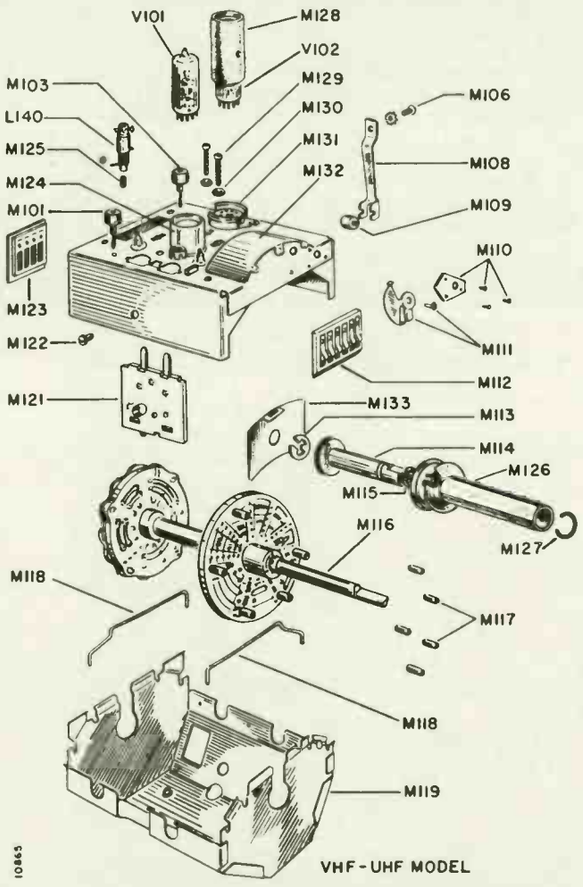


Figure 56. Exploded View of VHF Tuners 94E144-9, -22, -27 and -30.

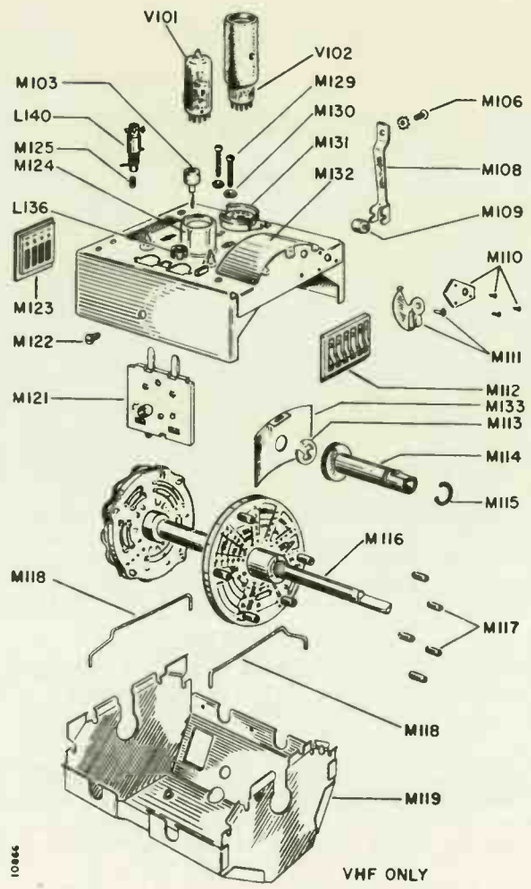


Figure 57. Exploded View of VHF Tuners 94E144-13, -19, -24, and -26.

SERVICING TUNERS

The simplified circuitry and mechanical construction of these tuners make them relatively trouble-free and easy to service. Tuner voltages (B plus, AGC and heater) may be measured from terminals on top side of tuner. See figures 32 and 33. All components at the underside of the tuner can be serviced without the removal of the turret assembly. See exploded view of tuner, figures 56 and 57.

Important: Location and lead dress of most components at the underside of the tuner are generally critical. Parts location, lead lengths of components and ground connections should be as originally made. When replacing components, it is important that they be replaced with parts of identical electrical characteristics and physical size. Refer to parts list for temperature coefficients, tolerances and other essential description.

Caution: The free end (lead A15) of the capacitor C116 is used as a low band coupling adjustment. Location of this lead is critical. When servicing tuner, avoid contact with coils or wiring leads.

CLEANING AND LUBRICATING TUNER CONTACTS

For cleaning rotating contacts of turret discs, remove bottom cover from tuner. Using a small stiff brush, apply a non-corrosive contact cleaner to all the contact points. With a soft canvas cloth, remove cleaner and buff contact points until surface is bright. After cleaning contacts, apply a thin film of switch contact oil, Admiral part number 98A64-1, to surfaces of contacts. Lubricate bearing surfaces of other moving parts with light vaseline or preferably Admiral part number 98A64-2 lubricant.

Caution: Do not use lubriplate or other similar lubricant containing zinc or cadmium.

REMOVING TURRET ASSEMBLY

To remove turret assembly, proceed as follows:

a. Remove bottom cover shield M119. See exploded view of tuner, figures 56 and 57.
b. Remove detent mounting screw M106 at side of tuner. Remove detent spring M108 and roller M109.
c. Remove turret shaft retaining springs M118 from inside of tuner, by pressing end of springs out of retaining tabs.
d. Remove the turret M116 from the tuner by grasping it at the shaft ends and carefully guide it out of the tuner.

Caution: Use care so as to avoid contact with coils or wiring leads on turret disc. Oscillator (upright) coils can be damaged or loosened by careless handling.

e. To reassemble turret in tuner, follow the above procedure in reverse, using care to avoid damage to stationary contacts M112, M123 and fine tuning rotor disc M111.

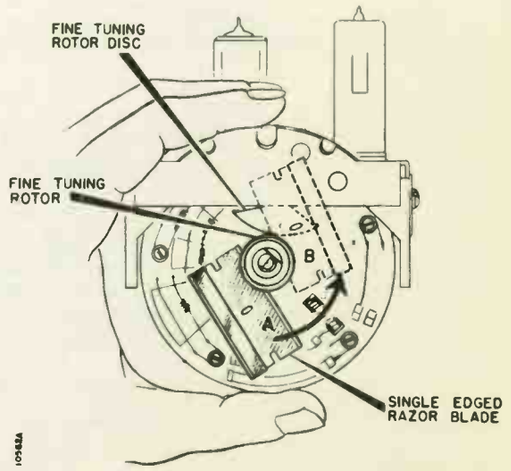


Figure 58. Front View of VHF Tuner Showing Method of Inserting Fine Tuning Disc and Fine Tuning Rotor.

f. To engage the fine tuning disc M111 into clutch surfaces of fine tuning rotor M114, insert the edge of a thin blade knife or a single edge razor blade between the plastic discs of the fine tuning rotor until the blade just contacts fine tuning disc; then carefully press disc into the rotor and remove blade.

ADJUSTING STATIONARY CONTACT SPRINGS

The stationary springs of the front and rear contact plates M112 and M123 can be adjusted if they make poor contact due to insufficient tension.

To adjust the contact springs, remove the turret assembly from the tuner, as instructed in paragraph on removing turret assembly.

Using a thin narrow blade screwdriver, adjust contact spring tension by carefully bending the contact springs upward until the clearance between the highest point on the spring extends about 9/64 of an inch above the plastic surface of the contact strip. With correct tension, the bowed portion of the contact spring should clear the plastic surface of the rotor disc by about 1/64 of an inch.

REPLACEMENT OF CERAMIC FEED-THROUGH CAPACITORS

The B+, heater and AGC leads of VHF tuners are terminated through ceramic feed-through capacitors. When soldering leads to VHF tuners, care should be exercised to prevent damage to the ceramic feed-through capacitors.

Replacement of ceramic feed-through capacitors may be required if silver coated surface is peeled, if ceramic is cracked, or if center conductor has loosened.

To replace a ceramic feed-through capacitor, proceed as follows:

1. Using diagonal cutters, clip off the terminals at each end of the capacitor. **Caution:** Be careful not to cut the connecting leads.
2. Remove the terminals from the connecting leads using a hot soldering iron.
3. Apply the tip of a hot soldering iron to the metal plate, surrounding the capacitor. When the solder melts, withdraw the capacitor.
4. Clean off excess solder from plate, then draw the iron tip over the hole, on the oscillator side of the shield, to cover surface of hole with a thin film of solder.
5. With the soldering iron held at one side of the metal plate (approximately 3/16 inches from the hole), quickly push the new capacitor into the hole as soon as the plate is heated sufficiently to melt solder.
6. Reconnect the leads to the capacitor terminals.

If resistor leads break while replacing capacitor, new resistors may be soldered in place using a pencil point soldering iron.

SERVICING VHF TUNERS 94D151-1 AND 94D151-2

*Tuners 94D151-1 and 94D151-2 are drum turret type VHF tuners with replaceable channel snap-in coils. This tuner has been especially designed for operation in connection with the automatic tuning mechanism of remote tuning models. This new tuner incorporates latest improvements in mechanical and electrical design of turret type VHF tuners. For simplicity of circuitry, servicing convenience and purposes of automation, the circuit wiring is contained on a printed wiring assembly. All components are visible and accessible for servicing convenience.

,A newly developed triode (2BN4) is used in a neutrode (neutralized) circuit as the VHF amplifier V901. A new pentode-triode (5CG8) is used as the VHF mixer and oscillator V902.

The antenna input circuit contains matching transformer T901 (ferrite core balun) which matches the 300 ohm balanced antenna input to the 75 ohm unbalanced input of the RF amplifier input circuit. Two resonant traps (series L901 and parallel L905) are contained in the antenna input circuit for obtaining optimum IF rejection over a range from 41 to 46 MC.

A "book type" Fine Tuning control is used. Physically, the fine-tuning circuit includes a stator area (printed on the printed wiring board) and a hinge with tip-dipped phosphor-bronze plate which combine to form the book type variable inductor-capacitor. The Fine Tuning control provides a fine tuning range from 2 to 4.5 MC for all channels in the VHF range. Excellent stability, improved sensitivity, and low noise factor combine to provide better over-all performance with improved picture quality.

The simplified circuitry and mechanical construction of this tuner make it relatively trouble free and easy to service. Tuner voltages (B plus, AGC and heater) may be measured from terminals on top side of tuner. The tuner circuitry is contained on a printed circuit wiring assembly. All components are accessible without need of turret removal. See exploded view of tuner, figure 59.

Trouble shooting of printed circuit wiring is similar to that of conventional wiring. Complete instructions on the service and repair of printed circuit wiring is given in Service Manual No. S559, available from your Admiral Distributor.

Important: Location and lead dress of most components at the underside of the tuner are generally critical. Parts location, lead lengths of components and ground connections should be as originally made. When replacing components, it is important that they be replaced with parts of identical electrical characteristics and physical size. Refer to parts list for temperature coefficients, tolerances and other essential description.

*VHF tuners 9D151-1 and 94D151-2 are identical except for shaft length.

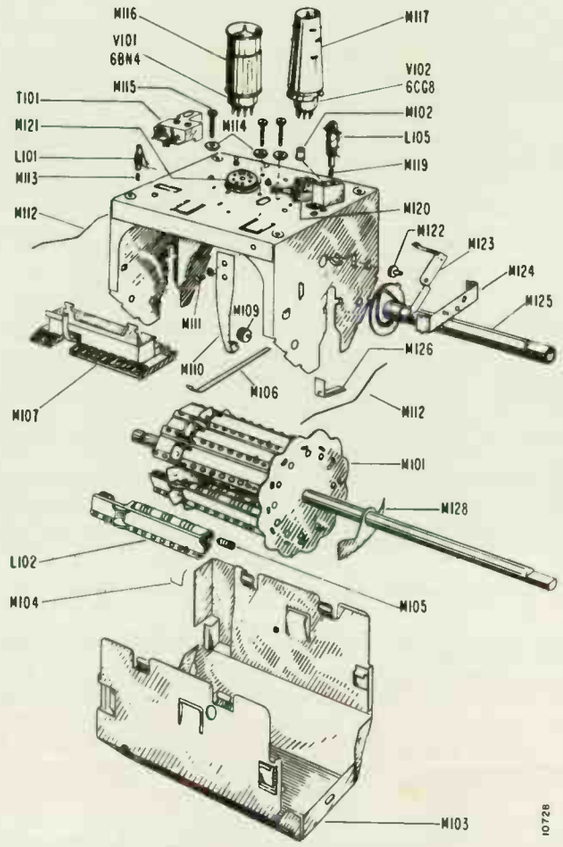


Figure 59. Exploded View of VHF Tuners 94D151-1 and 94D151-2.

REPLACEMENT OF PUSH-IN DISC TYPE CERAMIC CAPACITORS

Many of the capacitors used in the printed wiring circuit of this tuner are of push-in (leadless) ceramic disc type.

These capacitors are inserted between sections of printed circuit wiring and soldered, using low melting point solder.

When replacing a push-in type ceramic disc capacitor, care must be exercised to prevent damage to capacitor or the printed circuit wiring.

To remove a disc capacitor, use a low wattage soldering iron with a forked soldering tip (split tip). Apply the fork tip to sides of capacitor so as to melt solder at both sides simultaneously. When solder melts, immediately remove capacitor.

Replace disc capacitor in the same manner, using low melting point solder. Avoid application of excessive heat to capacitor or printed circuit wiring.

REMOVING CHANNEL COILS

The channel coils are held in the turret drum at one end by the protrusion on the coil form extending into the detent plate. The other end of the coil is held in the turret by the metal tab extending through the coil form.

To remove a channel coil, proceed as follows:

With the thumb of the left hand, press the metal tab (extending through the coil form) toward the rear of the tuner; at the same time, using the forefinger, lift the end of the coil form up and out of the drum.

Caution: Do not use force when removing channel coils from the turret as coils may be damaged. Use care so as not to disturb coil windings at the underside of the coil form.

CLEANING AND LUBRICATING TUNER CONTACTS

For cleaning rotating contacts of turret drum, remove bottom cover from tuner. Using a small stiff brush, apply a non-corrosive contact cleaner to all the contact points. With a soft canvas cloth, remove cleaner and buff contact points until surface is bright. After cleaning contacts, apply a thin film of switch contact oil, Admiral part number 98A-64-1, to surfaces of contacts. Lubricate bearing surfaces of other moving parts with light vaseline or preferably Admiral part number 98A64-2 lubricant.

Caution: Do not use lubriplate or other similar lubricant containing zinc or cadmium.

ADJUSTING CONTACT SPRINGS

The stationary contacts consist of contact springs M107, illustrated in Figure 59. The contact springs are inserted through the cut-outs molded in the contact strips. The stationary contacts (springs) are of the self-wiping type and should generally maintain their tension and provide good contact without further attention.

Should the stationary contact springs make poor contact due to insufficient tension, or dirty surface, remove several sets of coils from the turret. Rotate the turret to position making the bottom of the contact strip accessible for servicing. With a narrow blade screwdriver, adjust contact spring tension by carefully bending the bowed portion of the contact spring upward slightly until the shape of the spring conforms with the shape of other springs on the contact strip. If the free end of the contact spring slips out of the contact strip, the end may be reinserted by bowing the spring slightly and pressing inward. If a contact spring is damaged or bent badly, a replacement spring may be reinserted. Restore the spring to its original shape by comparing it with other springs. If the majority of contact springs are bent out of shape or damaged, tuner replacement is recommended.

REPLACEMENT OF CERAMIC FEED-THROUGH CAPACITORS

The B+, heater and AGC leads of this tuner are connected through ceramic feed-through capacitors. When soldering leads to the tuner, care should be exercised to prevent damage to the ceramic feed-through capacitors.

Replacement of ceramic feed-through capacitors may be required if silver coated surface is peeled, if ceramic is

cracked, or if center conductor has loosened.

To replace a ceramic feed-through capacitor, proceed as follows:

1. Apply the tip of a hot soldering iron to the top center conductor on feed-through. When the solder melts at bottom end (center conductor at printed circuit wiring), quickly grasp top end of center conductor with long-nose plier and work it completely out of the surrounding ceramic insulation.

2. Remove remainder of feed-through by applying tip of hot soldering iron to metal surface surrounding it at top side of chassis. When solder melts, quickly remove shell and excess solder. **Caution:** Do not allow solder or metal to fall in chassis.

3. To install replacement feed-through, apply tip of hot soldering iron to metal surface. After surface is hot enough to melt solder, quickly push replacement feed-through into chassis with end through hole in printed circuit board.

4. Resolder bottom center terminal of feed-through to printed circuit wiring; using a low wattage pencil point soldering iron. **Caution:** Application of excessive heat may cause damage to printed wiring.

UHF TUNERS 94D112-5 AND 94D155-3

General

Tuners 94D112-5 and 94D155-3 are all-channel continuous tuning UHF tuners, designed to operate in conjunction with the 13 position VHF tuner used in VHF-UHF models. Tuners 94D112-5 and 94D155-3 are identical with exception that tuner 94D155-3 has a mounting bracket riveted to it (not removable) for mounting the tuner to the VHF tuner.

The UHF tuners consist of a highly selective pre-selector circuit, UHF oscillator V801 (2AF4A) and a UHF mixer circuit using a newly developed low-noise crystal CR801 (1N82A). A single conversion circuit is employed with tubes in the VHF tuner operating as low-noise 41 MC IF preamplifiers coupled between the output of the UHF mixer circuit and the 41 MC IF amplifiers in the main chassis.

The preselector, oscillator and mixer circuits are each enclosed in a separate shielded compartment. Each of the circuits is continuously tunable with a ganged variable air dielectric capacitor.

A low end oscillator adjustment A20 is accessible through the hole in front of the tuner and a high end UHF oscillator adjustment A19 is accessible through the hole in the tuner cover plate, see figure 60.

SERVICING UHF TUNER

Simplified circuitry and mechanical construction make UHF tuner relatively trouble free and easy to service. Very little difficulty should be encountered in the servicing of UHF tuner other than replacement of a defective tube, defective mixer crystal or other components which are accessible without disturbing tuned circuits. For important service information, see paragraph on "UHF Trouble Shooting Hints".

Before suspecting trouble in the UHF tuner, make sure that the VHF portion of the receiver is operating properly by tuning in a VHF station. If a station is not available, VHF test equipment can be used to check the VHF portion of the receiver in the same manner as checking for a defective VHF booster. If VHF operation is satisfactory, and it is known that a UHF signal of considerable strength exists, it can be assumed that UHF antenna, UHF tuner or components in UHF position (between channels 13 and 2) of turret discs in VHF tuner are at fault. Also see "Recommended Checks for Determining Cause of Poor UHF Reception". **Note:** It is easy to be deceived in areas where a strong VHF signal exists. Whenever possible, check VHF receiver sensitivity before replacing a UHF tuner. See "Fringe Area Television Reception" booklet, Form No. S346 for instructions on checking sensitivity, expected sensitivity figures, and recommended equipment.

Caution: When servicing UHF tuner, use care so as not to disturb or bend capacitor blades as alignment will be affected. When replacing components, it is important that they be replaced with duplicates of the same electrical characteristics and physical size. Refer to Parts List for description and characteristics of components.

UHF TROUBLE SHOOTING HINTS

Recommended Check For Determining Cause Of Poor UHF Reception

Check the Antenna and Transmission Line. Check to see that UHF tuner antenna leads are not placed too close to the television chassis or are shorting at the antenna terminal strip or at the chassis.

Check UHF Oscillator Tube V801 (2AF4A) by substitution. When making tube replacement, try several tubes to find one which will cause the least frequency shift. Be sure that the tube and the tube shield are pressed down (seated) firmly.

In some instances, replacement of oscillator tube V801 may affect tuner calibration. If this occurs, touch-up of the UHF oscillator trimmer (at both ends of the tuning range) is recommended as instructed under "UHF Calibration (Oscillator Adjustment) Using A Television Signal".

Check UHF Mixer Crystal CR801. Try several mixer crystals, to select one which will produce the best picture with a minimum of snow. Be sure to observe crystal polarity and be sure that the crystal is seated firmly. **Caution:** Use care when replacing crystal, so as not to damage mounting clips.

Check Alignment of IF Preamplifier. IF preamplifier alignment should be checked since the sensitivity of the UHF tuner is dependent on the IF preamplifier response.

Check UHF Tuner Voltages. Measure all voltages supplied to UHF tuner. See schematic diagram, figures 69 and 71 for correct voltages.

Check Operation of UHF Oscillator V801. If the tuner remains inoperative after making all the preceding checks, determine whether the UHF oscillator is operating by measuring the injection current. Set UHF Channel Selector to approximate center of its range. Disconnect UHF IF output plug M801 from UHF IF input socket M101; see figure 33. Connect a DC milliammeter (0-10 MA range), negative to the center conductor of M801, positive to chassis. If the UHF oscillator is functioning, the reading obtained will be approximately 0.5 to 3.0 MA. If no reading is obtained, the oscillator tube is not functioning. Follow normal trouble shooting procedures until oscillation is obtained.

UHF OSCILLATOR ADJUSTMENT USING TELEVISION SIGNAL

Adjustment of the UHF oscillator can be made using the television signal(s). The oscillator should be adjusted for the best picture, consistent with good sound at the tuner dial setting for the received television channel by adjusting the appropriate UHF oscillator trimmer. UHF oscillator trimmer A20 has the greatest affect on the lower UHF channels. UHF oscillator trimmer A19 has the greatest affect on the higher UHF channels. (above Channel 50). See figure 60. Check the UHF dial calibration. The UHF tuner dial should be accurate with ± 2 channels or 12 MC. If it is not accurately calibrated, try readjustment of the UHF oscillator.

In most cases, it is preferable to sacrifice accuracy of UHF dial calibration for improved performance with a minimum amount of UHF tuner alignment. If only one channel is in use in the area, or if only a few channels are in use and reception on only one is poor, a compromise adjustment of the oscillator can be made. This is done by alternately adjusting the tuner dial and the appropriate UHF oscillator trimmer, to see if better performance may be had on a weaker channel without greatly affecting performance on the other received channel(s). A VTVM connected to test point "W" will facilitate adjustment of the UHF oscillator when rocking the tuning dial in this manner. Tune for a maximum VTVM reading.

REPLACING MIXER CRYSTAL CR801

The mixer crystal CR801 (1N82A), is located in the center compartment of the UHF tuner, see figure 60.

For removing the mixer crystal, it will be necessary to remove the tuner cover plate after straightening the locking tabs.

When removing the crystal, check the polarity markings so that the replacement crystal may be inserted in the same position as the original crystal.

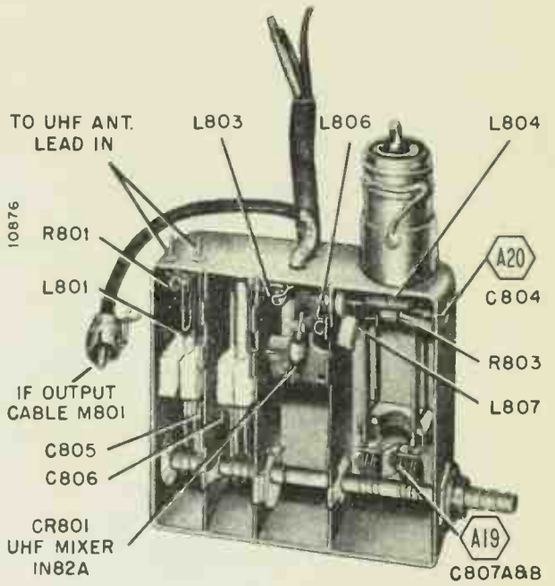


Figure 60. View of UHF Tuners 94D112-5 and 94D155-3, Cover Plate Removed.

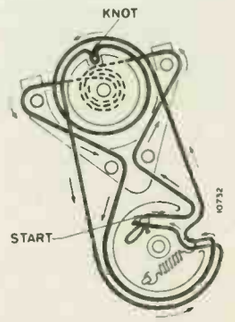


Figure 61. Tuning Drive Used on Early Production VHF-UHF Sets.

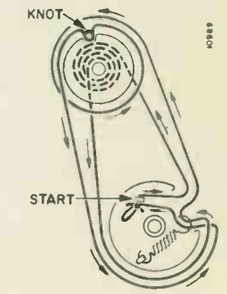


Figure 62. Tuning Drive Used on Later Production VHF-UHF Sets.

SERVICING UHF TUNING DRIVE

There are differences in the UHF tuning drive of early and later production VHF-UHF sets.

In early production sets, the UHF tuning drive operated at a tuning ratio of 3.7 to 1. see figure 61.

In later production sets, the rocker arm was removed and the drive cord was strung differently. In these sets, the tuning drive operates at a tuning ratio of 2.0 to 1, see figure 62.

Removal of the rocker arm, permits the tuning drive to operate at a lower tuning ratio for smoother UHF tuning.

SLIPPING OR BINDING TUNING DRIVE

The following points should be checked for remedying slipping or binding of the tuning drive in VHF-UHF models.

a. Check to make sure that Tuning control knobs do not bind against sides of cabinet opening and that they are fully engaged on control shafts. If necessary, loosen tuner mounting screws and reposition tuner to give proper shaft clearance. **Note:** Later production sets may use control knobs having longer shanks thus eliminating the possibility of insufficient engagement on the shafts.

b. Check pulley on UHF tuner. The front edge of the pulley hub should be flush with the end of the shaft. At this position the cord will not rub against the tuner or tend to "climb" and cross over the nylon pulley on the VHF tuner.

c. Check torque of UHF tuner rotor. If it is difficult to turn rotor shaft by hand, place a drop of oil on the front and rear shaft bearings. Do not adjust end play screw at the rear of tuner shaft since this will upset alignment.

d. Check rocker arm fingers (used on early models) for possible drag against front of VHF tuner. If fingers are bent too far outward (away from tuner) the cord will tend to "climb" and cross over on the brass pulley on VHF tuner, causing roughness or intermittent slippage.

e. If drive cord is slightly loose, cut off about 1/8 inch of the coil spring and replace the end of it under the lance.

Caution: Do not string drive cord tightly. Excessive tension on UHF tuner drum will cause wear on bearings with resulting misalignment.

PRODUCTION CHANGES

Production changes are coded RUN 10, RUN 11, etc., as given in the headings below. Run number (stamped on chassis indicates that this chassis has the change(s) incorporated which are explained under that particular run number heading below, as well as changes (lower run numbers) made prior to that time. At the start of production, all chassis were stamped RUN 10.

CHANGE TO PREVENT AGC BLOCKING ON STRONG SIGNALS AT HIGH BRIGHTNESS LEVELS

Chassis Stamped Run 11

To prevent AGC blocking on strong signals at high brightness levels, capacitor C428 (connecting from terminal 2 horizontal output transformer T403 to pin 3 of V401) was changed from 300 mmf. to .001 mf, 1,600 volts. part number 64B2-32.

RESISTOR R403 REMOVED TO MINIMIZE TENDENCY OF AGC OVERLOAD AT HIGH SIGNAL LEVELS AND RESISTOR R503 CHANGED FOR REDUCING VOLTAGE TO VHF OSCILLATOR

Chassis Stamped Run 12

To minimize tendency toward AGC overload at high signal levels, resistor R403 (390,000 ohms) was removed from between pin 2 of V401 (3BU8) and chassis ground.

At the same time above change was made, voltage to VHF oscillator V102 was reduced by changing resistor R503 from 470 ohms to 1,800 ohms. Lowering of B+ voltage to the VHF oscillator has lessened possibility of tuner interference radiation.

RESISTOR R470 RELOCATED FOR PREVENTING BREAKDOWN OF CAPACITOR C431 DUE TO ARCING IN PICTURE TUBE

Chassis Stamped Run 13

To prevent possible breakdown of capacitor C431 (.001 mf.) due to arcing in picture tube, resistor R470 was removed from between junction of resistors R462, R463 and focus terminal "A". Resistor R470 was reconnected between pin 3 of picture tube and focus terminal "A".

Note: When this change was made, voltage rating of capacitor C431 was changed from 1,600 volts to 5,000 volts.

RESISTOR R465 CHANGED FOR IMPROVED OPERATION OF HORIZONTAL OSCILLATOR

Chassis Stamped Run 14

For improved operation of horizontal oscillator V404 (6CG7), grid resistor R456 was changed from 120,000 ohms to 110,000 ohms, 1/2 watt, 5%.

RESISTOR R329 CHANGED FOR PREVENTING AGC OVERLOAD DUE TO TUBE VARIATION

Chassis Stamped Run 15

To prevent possibility of AGC overload due to variation in operating characteristics of 4BC8 tubes of different brands, resistor R329 was changed from 7.5 megohms to 10 megohms.

RESISTOR R207 CHANGED TO PREVENT FREQUENCY DRIFT WITH RESULTING SOUND DISTORTION

Chassis Stamped Run 16

To prevent frequency drift of 4.5 MC quadrature coil L203, with resulting sound distortion, resistor R207 was changed from 220,000 ohms to 100,000 ohms.

RESISTOR R471 ADDED TO FURTHER PREVENT BREAKDOWN OF C431 DUE TO PICTURE TUBE ARCING

Chassis Stamped Run 17

To further prevent breakdown of capacitor C431 due to picture tube arcing, resistor R471 (100,000 ohms) was added between focus terminal "A" to junction of resistors R470, R462 and R463.

Important: Also see changes made under Run 13.

RESISTOR R320 CHANGED FOR CENTERING USABLE RANGE OF CONTRAST CONTROL

Chassis Stamped Run 18

For centering usable range of Contrast control R319, resistor R320 (cathode of V304A) was changed from 470 ohms to 220 ohms.

This change makes it possible to obtain greater contrast at minimum setting of the Contrast control.

ALTERNATE VALUE USED FOR RESISTORS R470 AND R471

Chassis Stamped Run 19

Because of prevailing critical shortage of 100,000 ohm 1/2 watt, resistors, as an alternate, 120,000 ohm, 1/2 watt, resistors, were used for R470 and R471.

Note: This change was possible since circuitry was non-critical with regard to above change in resistance value.

Chassis Stamped Run 20

This run change has no service significance, since no electrical changes were made.

RESISTOR R115 ADDED FOR PREVENTING POSSIBILITY OF AGC OVERLOAD IN STRONG SIGNAL AREAS

VHF-UHF Chassis Stamped Run 21

For preventing possible AGC overload in strong signal areas, resistor R115 (1 megohm) was added at the top side of the VHF tuner, connecting from terminal of test point "W" to chassis ground. Note: In some later VHF tuners, resistor R115 was added internally, also connecting from test point "W" to chassis ground.

HEATER CIRCUIT CONNECTION OF TUBES V405 AND V406 INTERCHANGED

Chassis Stamped Run 22

For preventing possible damage to horizontal output tube V405 (25CD6GB) due to momentary arc-over in damper tube V406 (19AU4GTA), heater connections of these tubes were interchanged in the series heater circuit. Note that heater of tube V406 (19AU4GTA) now connects to the high side of the 117 volt AC line, see schematics.

DIFFERENT HORIZONTAL OUTPUT CIRCUIT USED IN SETS WITH SUFFIX LETTER "C" ADDED TO CHASSIS AND MODEL NUMBERS

Chassis Stamped Run 23

A different horizontal output circuit is used in 16 and 17 tube sets having the suffix letter "C" added to the chassis number. The changes in circuitry between sets without the suffix letter "C" (chassis stamped Run 10 through Run 22) and sets with suffix letter "C" (chassis stamped Run 23 or higher) are described below. **Important:** These circuit changes are not recommended for field service.

Horizontal output tube V405 was changed from type 25CD6GB to type 12DQ6A.

Horizontal output transformer T403 was changed from part number 79D77-3 to part number 79D77-2.

Grid resistor R459 was changed from 470,000 ohms to 1 megohm, 1/2 watt.

Screen suppressor resistor R464 (100 ohms) was removed from circuit.

Screen dropping resistor R461 was changed from 10,000 ohms to 8,200 ohms, 3 watts.

Filament dropping resistor R465 of high voltage rectifier V407 was changed from 1.8 ohms to 1.2 ohms.

Resistor R428 in cathode circuit of vertical output tube V403 was changed from 180 ohms to 220 ohms, 1 watt.

Heater voltage dropping resistor R505 was added between ON-OFF switch S501 and pin 7 of V406. Note: R505 is 21 ohms, 10 watts, part number 61B3-30 in VHF sets. R505 is 17 ohms, 10 watts, part number 61B3-31 in VHF-UHF sets.

CAPACITOR C505 ADDED FOR INCREASED BREAKDOWN SAFETY FACTOR OF RC NETWORK

Chassis Stamped Run 24

Capacitor C505 (.01 mf, 1.4 KV) was added in series with capacitor C502. Capacitor C502 was changed from .005 to .01 mf, 1.4 KV to make these components of equal value. These changes were made for increased breakdown safety factor of the RC network connecting from chassis ground to cabinet ground.

Note: The RC network in some early and later production sets may be a couplate, part number 63B10-3, see production change Run 26.

CAPACITORS C432 AND C433 CHANGED FOR IMPROVING EFFICIENCY OF HORIZONTAL OUTPUT CIRCUIT

VOLTAGE RATING OF C416 INCREASED

Chassis Stamped Run 25

For improving efficiency of the horizontal output circuit, capacitors C432 and C433 (connecting across horizontal yoke winding) were changed from 150 mmf to 210 mmf, 2 KV, part number 65D10-151.

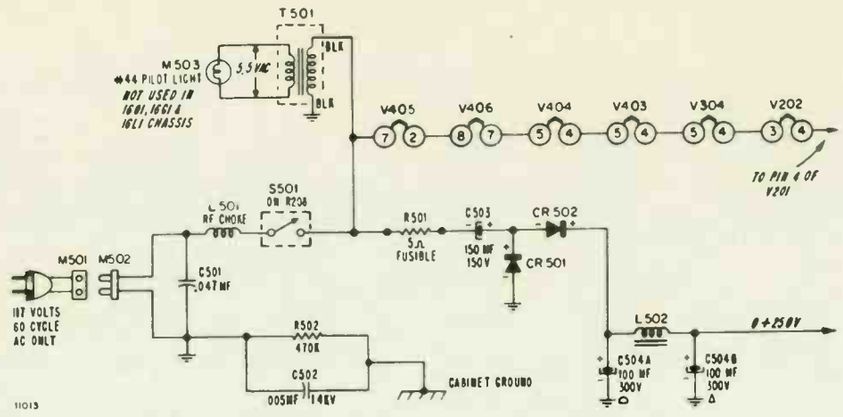


Figure 64. Heater Circuit in 16 and 17 Tube Sets Stamped Run 10 through Run 22. See Complete Schematics for Heater Circuit in Sets Stamped Run 23 or Higher (with suffix letter "C" added to chassis number).

This change has provided increased raster width with minimum variation of raster size throughout the range of the Brightness control.

At same time above change was made, voltage rating of capacitor C416 (.047 mf, connecting across vertical yoke winding) was changed from 200 volts to 400 volts. This change was made for improving breakdown safety factor of capacitor C416.

GROUNDING OF PICTURE TUBE DAG RELOCATED FOR PREVENTING STATIC DISCHARGE

COUPLATE USED FOR RC NETWORK

VOLTAGE RATING OF C409 INCREASED

Run 26 in All Chassis Except Hi-Fi Models

Connection of picture tube outer dag was removed from cabinet (front escutcheon) ground and is now connected to chassis ground. This change was made for preventing possibility of static discharge when metal cabinet or front escutcheon is touched. Note chassis which have the picture tube dag grounded to chassis use a dag grounding spring and insulated picture tube mounting brackets. Early and later picture tube mountings are shown in figures16 and17.

At the same time the above change was incorporated, the RC network (connecting from chassis to cabinet) was changed from individual components (R502, C502 and C505) to an individual couplate, part number 63B10-3.

For improved breakdown safety factor, voltage rating of capacitor C409 (.001 mf, ceramic) was changed from 1.6 KV to 2 KV. Capacitor C409 connects from pin 2 of V402 (6CG7) to resistor R422 (220,000 ohms).

CIRCUIT CHANGES TO PROVIDE MORE CONSTANT SOUND OUTPUT LEVEL THROUGHOUT RANGE OF TONE CONTROL

Run 27 in 16B1C, 16AB1C, 16E1C, 16AE1C and 16J1C Chassis

To provide more constant sound output level throughout the range of the tone control, the tone and volume control circuitry of later production sets (Run 27 or higher) was changed in accordance with the circuit shown in schematics. **Note:** Capacitor C213 was changed from .0047 mf to .001 mf. Resistor R209 was changed from 22,000 to 47,000 ohms.

Important: For tone and volume circuitry used in early set (chassis stamped Run 10 through Run 26) see inset figure on schematics.

CIRCUIT CHANGES FOR INCREASING RELIABILITY OF COMPONENTS IN B+ SUPPLY CIRCUIT

Run 28 in 16UC1, 16AU1C, 16W1C and 16AW1C Chassis

To increase reliablity of components in the B+ power supply circuit, resistor R501 was changed from a plug-in fusible type, to a standard wire wound type with 5% tolerance. See parts list for part numbers.

For added circuit protection, a 1.6 ampere, type N, slow blow fuse (part number 84B13-42) was added between resistor R501 and negative terminal of capacitor C503.

At the same time the above changes were made, an alternate type silicon rectifier was used for CR501 and CR502, see figures 65 and 66. **Note:** The alternate silicon rectifier is a pigtail type (part number 93A13) of different physical shape as compared to the cartridge type rectifier (part number 93A11). Both rectifiers have identical current rating (500 millian pere) and are directly interchangeable if replaced in identical pairs.

Warning: When replacing rectifiers, be sure to observe polarity indications shown in figures 65 and 66.

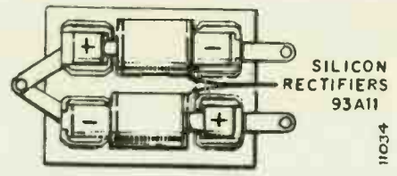


Figure 65. View of Fuse Holder Showing Position of Cartridge Type Selenium Rectifiers.

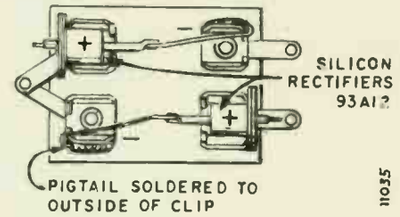


Figure 66. View of Fuse Holder Showing Position of Pigtail Type Selenium Rectifiers.

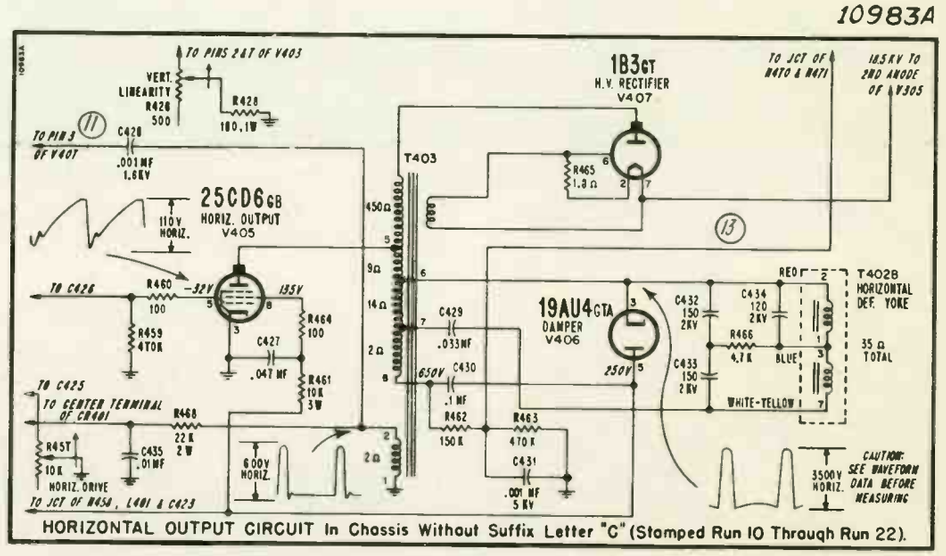


Figure 67. Horizontal Output Circuit in Chassis Without Suffix Letter "C" (Stamped Run 10 through Run 22). See Schematic Diagrams for Horizontal Output Circuit in Chassis with Suffix Letter "C" (Stamped Run 23 or Higher).

PARTS LIST

Important: This Parts List covers only television chassis, cabinets and associated parts. For Parts List covering the RT440A Son-r Tuner and 8G1 Remote Control Amplifier used in models with remote tuning, see Service Manual S599.

NOTE: Electrical components have symbols in 100 series, 200 series, etc., according to location on schematic. Order parts by part number and description from Admiral distributor.

RESISTORS

Sym.	Description	Part No.
R101	8,200 ohms, 3 watts, in VHF-UHF Chassis only	61B 24-347
R102	3,900 ohms, ½ watt	60B 8-392
R103	33 ohms, ½ watt	60B 8-330
R104	820,000 ohms, ½ watt	60B 8-824
R105	560,000 ohms, ½ watt	60B 8-564
R106	1,000 ohms, ½ watt	60B 8-102
R107	15 ohms, ½ watt, in VHF-UHF Chassis only	60B 8-150
R108	10,000 ohms, ½ watt	60B 8-103
R109	22,000 ohms, ½ watt	60B 8-223
R110	1 megohm, ½ watt	60B 8-105
R111	10,000 ohms, ½ watt	60B 8-103
R112	200,000 ohms to 1 megohm, part of Couplate M104	63A 11-1
R113	200,000 ohms to 1 megohm, part of Couplate M105	63A 11-1
R115	1 megohm, ½ watt	60B 8-105
R201	100,000 ohms, ½ watt	60B 8-104
R202	47,000 ohms, 1 watt	60B 14-473
R203	680 ohms, ½ watt	60B 8-681
R204	8,200 ohms, ½ watt	60B 8-822
R205	330,000 ohms, ½ watt	60B 8-334
R206	560,000 ohms, ½ watt	60B 8-564
R207	100,000 ohms, ½ watt	60B 8-104
R208	1 megohm VOLUME control, (includes On-Off switch S501) in 16B1, 16AB1, 16E1, 16AE1 chassis	75B 17-22
	in 16D1, 16AD1 chassis	75D 1-94
	in 16G1, 16AG1 chassis	75D 1-93
	in 16L1, 16AL1 chassis	75D 1-100
	in 16J1, 16K1 chassis	75B 38-2
R209	22,000 ohms, ½ watt in chassis stamped Run 10 through Run 26. 47,000 ohms, ½ watt in chassis stamped Run 27 or higher. See Run Change 27.	60B 8-223 / 60B 8-473
R210	2 megohms, TONE control	75D 13-95
R211	1 megohm, ½ watt, 5%	60B 7-105
R212	1.2 megohms, ½ watt, 5%	60B 7-125
R215	220 ohms, 2 watts	60D 20-221
R240A	1 megohm, BASS Dual	75B 17-29
R240B	1 megohm, TREBLE control	
R241	10,000 ohms, ½ watt	60B 8-103
R242	100,000 ohms, ½ watt	60B 8-104
R243	470,000 ohms, ½ watt	60B 8-474
R244	1 megohm VOLUME control. (includes switch S501)	75B 38-1
R245	10,000 ohms, ½ watt	60B 8-103
R246	2.2 megohms, ½ watt	60B 8-225
R247	470,000 ohms, ½ watt	60B 8-474
R248	300 ohms, ½ watt, 5%	60B 7-301

RESISTORS-Cont'd

Sym.	Description	Part No.
R249	100,000 ohms, ½ watt	60B 8-104
R250	470,000 ohms, ½ watt	60B 8-474
R251	20,000 ohms, ½ watt, 5%	60B 7-203
R252	470,000 ohms, ½ watt	60B 8-474
R253	12,000 ohms, ½ watt, 5%	60B 7-123
R254	470,000 ohms, ½ watt	60B 8-474
R255	270 ohms, 2 watts	60B 20-271
R256	2,500 ohms, 7 watts	61B 20-6
R257	22,000 ohms, ½ watt	60B 8-223
R258	47,000 ohms, ½ watt	60B 8-473
R259	10,000 ohms, 3 watts	61B 24-349
R260	10,000 ohms, 2 watts	60B 20-103
R261	20,000 ohms, ½ watt, 5%	60B 7-203
R301	4,700 ohms, ½ watt	60B 8-472
R302	1,000 ohms, ½ watt	60B 8-102
R303	47 ohms, ½ watt	60B 8-470
R304	39,000 ohms, ½ watt	60B 8-393
R305	150,000 ohms, ½ watt	60B 8-154
R306	2.2 megohms, ½ watt	60B 8-225
R307	470 ohms, ½ watt	60B 8-471
R308	22,000 ohms, ½ watt	60B 8-223
R309	220,000 ohms, ½ watt	60B 8-224
R310	220,000 ohms, ½ watt	60B 8-224
R311	68 ohms, ½ watt	60B 8-680
R312	4,700 ohms, ½ watt	60B 8-472
R313	470 ohms, ½ watt	60B 8-471
R314	150 ohms, ½ watt	60B 8-151
R315	470 ohms, ½ watt	60B 8-471
R316	47,000 ohms, ½ watt	60B 8-473
R317	3,900 ohms, ½ watt	60B 8-392
R318	100 ohms, ½ watt	60B 8-101
R319A	1,000 ohms, Contrast } Dual	
R319B	100,000 ohms, Brightness } Control in 16B1, 16AB1, 16E1, 16AE1, 16J1 and 16K1	75B 17-22
	(R319B is a single control in other chassis, see R325.)	
R319A	1,000 ohms, Contrast, Single Control in 16D1, 16AD1 chassis	75D 13-93
	in 16G1, 16AG1 chassis	75D 13-100
	in 16L1, 16AL1 chassis	75D 13-98
R320	220 ohms, ½ watt (R320 was 470 ohms in early sets; see Run Change 18.)	60B 8-221
R321	8,200 ohms, ½ watt	60B 8-822
R322	4,700 ohms	Part of L307
R323	10,000 ohms	Part of L308
R324	1,500 ohms, 1 watt	60B 14-152
R325	100,000 ohms, Brightness Control, in 16G1, 16AG1, 16L1, 16AL1 chassis	75D 20-101
	in 16D1, 16AD1 chassis	75D 13-94
	(See R219B for other chassis using a dual control.)	

RESISTORS-Cont'd

Sym.	Description	Part No.
R326	180,000 ohms, ½ watt	60B 8-184
R327	220 ohms, ½ watt	60B 8-221
R328	3,300 ohms, 2 watts	60B 20-332
R329	10 megohms, ½ watt (R329 was 7.5 megohms in early sets; see Run Change 15.)	60B 8-106
R402	4.7 megohms, ½ watt	60B 8-475
R403	390,000 ohms, ½ watt	60B 8-394
R404	8,200 ohms, 1 watt	60B 14-822
R405	390,000 ohms, ½ watt	60B 8-394
R406	150,000 ohms, ½ watt	60B 8-154
R407	100,000 ohms, SUPER RANGE FINDER control	75D 20-101
R408	47,000 ohms, ½ watt	60B 8-473
R409	10,000 ohms, ½ watt	60B 8-103
R410	47,000 ohms, ½ watt	60B 8-473
R412	15,000 ohms, ½ watt	60B 8-153
R414	56,000 ohms, ½ watt	60B 8-563
R415	270,000 ohms, ½ watt	60B 8-274
R416	4.7 megohms, ½ watt	60B 8-475
R417	15,000 ohms, ½ watt	60B 8-153
R418	15,000 ohms, ½ watt	60B 8-153
R419	200,000 ohms, VERTICAL HOLD control in 16B1, 16D1, 16E1, 16U1, 16AU1, 16W1, and 16AW1 Chassis	75D 13-92
	in 16G1 and 16AG1 Chassis	75D 20-97
	in 16L1 and 16AL1 Chassis	75D 13-97
	in 16J1 and 16K1 Chassis	75D 13-92
R420	56,000 ohms, ½ watt	60B 8-563
R421	220,000 ohms, ½ watt	60B 8-224
R422	220,000 ohms, ½ watt	60B 8-224
R423	470,000 ohms, ½ watt	60B 8-474
R424	1.5 megohms, HEIGHT control	75D 20-105
R425	2.2 megohms, ½ watt	60B 8-225
R426	500 ohms, VERTICAL LINEARITY control	75D 20-103
R427	100 ohms, ½ watt	60B 8-101
R428	180 ohms, 1 watt, in Chassis stamped Run 10 through Run 22. 220 ohms, 1 watt, in sets stamped Run 23 or higher	60B 14-181 / 60B 14-221
R429	18,000 ohms, 1 watt	60B 14-183
R430	470 ohms, 3 watts, glass type	61B 24-317
R431	220 ohms, ½ watt	Part of T402
R432	3.8 ohms, (measured cold), Thermistor (mounted on T402)	61A 27
R433	220 ohms, ½ watt	Part of T402
R434	39,000 ohms, ½ watt	60B 8-393
R445	4.7 megohms, ½ watt	60B 8-475
R446	2.2 megohms, ½ watt	60B 8-225
R447	3,300 ohms, ½ watt	60B 8-332
R448	5,600 ohms, ½ watt	60B 8-562
R449	6,800 ohms, ½ watt	60B 8-682
R450	100,000 ohms, ½ watt, 5%	60B 7-104
R451	100,000 ohms, ½ watt, 5%	60B 7-104
R452	470,000 ohms, ½ watt	60B 8-474
R453	4.7 megohms, ½ watt	60B 8-475
R454	5,600 ohms, ½ watt	60B 8-562
R455	1,000 ohms, ½ watt	60B 8-102
R456	110,000 ohms, ½ watt, 5% (R456 was 120,000 ohms in early sets; see Run Change 14.)	60B 7-114
R457	10,000 ohms, HORIZ. DRIVE control	75D 20-106
R458	82,000 ohms, ½ watt	60B 8-823
R459	470,000 ohms, ½ watt, in Chassis stamped Run 10 through Run 22. 1 megohm, ½ watt, in Chassis stamped Run 23 or higher	60B 8-474 / 60B 8-105

RESISTORS-Cont'd

Sym.	Description	Part No.
R460	100 ohms, ½ watt	60B 8-101
R461	10,000 ohms, 3 watts, in sets stamped Run 10 through Run 22, glass type	61B 24-349
	8,200 ohms, 3 watts, in sets stamped Run 23 or higher (see Run Change 23).	61B 24-347
R462	150,000 ohms, ½ watt	60B 8-154
R463	470,000 ohms, ½ watt	60B 8-474
R464	100 ohms, ½ watt	60B 8-101
R465	1.8 ohms, ½ watt, wire wound, in Chassis stamped Run 10 through Run 22	60B 28-46
	1.2 ohms, ½ watt, wire wound, in sets stamped Run 23 or higher. (see Run Change 23).	60B 28-64
R466	4,700 ohms, ½ watt	60B 8-472
R468	22,000 ohms, 2 watts	60B 20-223
R470	120,000 ohms, ½ watt	60B 8-124
R471	120,000 ohms, ½ watt (R470 and R471 were 100,000 ohms in some sets; see Run Change 19.)	60B 8-124
R472	120,000 ohms, ½ watt	60B 8-124
R501	5 ohms, 5 watts, fusible in 16L1, 16AL1, 16G1, 16AG1, 16J1, 16K1, 16B1, 16AB1, 16D1, 16AD1, 16E1 and 16AE1 Chassis	61B 28-3
	7.5 ohms, 5 watts, fusible in 16U1C and 16W1C Chassis stamped Run 24 through Run 27.	61A 19-1
	7.5 ohms, 10 watts, 5%, wire wound in 16U1C and 16W1C Chassis stamped Run 28 or higher	61B 20-25
	5 ohms, 5 watts, fusible in 16AU1C and 16AW1C Chassis stamped Run 24 through Run 27.	61B 28-3
	5 ohms, 10 watts, 5%, wire wound in 16AU1C and 16AW1C Chassis stamped Run 28 or higher	61B 20-24
	See Run Change 28.	
†R502	470,000 ohms, ½ watt	60B 8-474
R503	470 ohms, ½ watt in sets stamped Runs 10 and 11	60B 8-471
	1,800 ohms, ½ watt in sets stamped Run 12 or higher	60B 8-182
R504	2,200 ohms, 2 watts, in VHF Chassis, except 16J1, 16K1	60B 20-222
	8,200 ohms, 2 watts, in 16J1, 16K1 Chassis	60B 20-822
	1,800 ohms, 2 watts, in VHF-UHF Chassis	60B 20-182
R505	17 ohms, 10 watts, tapped candohm in VHF-UHF sets	61B 3-31
	21 ohms, 10 watts, candohm in VHF only sets	61B 3-30
R801	680,000 ohms, ½ watt	60B 8-684
R802	1,500 ohms, ½ watt	60B 8-152
R803	8,200 ohms, ½ watt	60B 8-822
R901	200,000 ohms to 1 megohm, ½ watt, part of couplate M901	63A 11-1
R902	200,000 ohms to 1 megohm, ½ watt, part of couplate M902	63A 11-1

†May be part of RC filter 63B10-3 in chassis stamped Run 10 through Run 23, and Run 26 or higher.

RESISTORS-Cont'd

Sym.	Description	Part No.
R903	4,700 ohms, ½ watt	60B 8-472
R904	2,200 ohms, ½ watt	60B 8-222
R905	1,000 ohms, ½ watt	60B 8-102
R906	220,000 ohms, ½ watt	60B 8-224
R907	3,900 ohms, ½ watt	60B 8-392
R908	1,000 ohms, ½ watt	60B 8-102
R909	10,000 ohms, ½ watt	60B 8-103
R910	6,800 ohms, ½ watt	60B 8-682
R911	10,000 ohms, ½ watt	60B 8-103

CAPACITORS

Sym.	Description	Part No.
C101	1,000 mmf, ceramic feed-through, in VHF-UHF Chassis only	65B 26-5
C102	120 mmf, 500 volts, 10%, ceramic disc, N1500 temp. coeff.	65D 10-136
C103	22 mmf, 500 volts, 10%, ceramic disc, N750 temp. coeff.	65D 10-134
C104	15 mmf, 500 volts, 10%, ceramic disc, N750 temp. coeff.	65D 10-135
C105	800 mmf, 500 volts, ceramic disc, in VHF-UHF Chassis only	65D 10-20
C106	8.2 mmf, 500 volts, 5%, ceramic disc, NPO temp. coeff.	65D 10-131
C107	3 mmf, 10%, composition	65B 28-030
C108	1,000 mmf, ceramic feed-through.	65B 26-5
C109	2.2 mmf, 500 volts, 10%, ceramic disc	65D 10-27
C110	.5 to 3 mmf, ceramic trimmer.	66A 38-6
C111	1,000 mmf, ceramic feed-through.	65B 26-5
C112	1,000 mmf, ceramic feed-through.	65B 26-5
C113	1,000 mmf, ceramic feed-through.	65B 26-5
C114	470 mmf, 500 volts, ceramic, part of couplate M104	63A 11-1
C115	470 mmf, 500 volts, ceramic, part of couplate M105	63A 11-1
C116	1.5 mmf, 10%, composition	65B 28-015
C117	47 mmf, 500 volts, 5%, ceramic disc, N1400 temp. coeff.	65D 10-73
C118	.5 to 3 mmf, ceramic trimmer.	66A 38-6
C119	1.0 mmf, 10%, composition	65B 28-010
C120	10 mmf, 500 volts, 5%, ceramic disc, N2200 temp. coeff.	65D 10-160
C121	1,000 mmf, 500 volts, cer. disc.	65D 10-53
C122	1,000 mmf, ceramic feed-through.	65B 26-5
C123	1,000 mmf, 500 volts, cer. disc.	65D 10-53
C124	1,000 mmf, ceramic feed-through.	65B 26-5
C125	1.5 mmf, 500 volts, 10%, composition	65B 28-015
C126	27 mmf, 500 volts, 10%, ceramic disc	65D 10-93
C201	47 mmf, 500 volts, 5%, ceramic disc, NPO temp. coeff.	65D 10-92
C202	4.5 mmf, 450 volts, 5%, composition	65B 27-045
C203	.001 mf, 500 volts, cer. disc.	65D 10-53
C204	82 mmf, 500 volts, 5%, ceramic disc, NPO temp. coeff.	65D 10-98
C205	.01 mf, 600 volts, ceramic disc.	65D 10-41
C206	.0047 mf, 500 volts, cer. disc.	65D 10-112
C207	18 mmf, 500 volts, 5%, ceramic disc, N220 temp. coeff.	65D 10-140
C208	300 mmf, 500 volts, ceramic disc, in all sets except 16U1C, 16AU1C, 16W1C, and 16AW1C	65D 10-41
C208	1,000 mmf, 500 volts, ceramic disc, in 16U1C, 16AU1C, 16W1C, and 16AW1C	65D 10-53

CAPACITORS-Cont'd

Sym.	Description	Part No.
C209	.047 mf, 200 volts, upright, 'mylar dielec	64C 16-55
C210	.01 mf, 600 volts, ceramic disc, in all sets except 16U1C, 16AU1C, 16W1C, and 16AW1C	65D 10-41
C210	.047 mf, 600 volts, mylar upright, in 16U1C, 16AU1C, 16W1C, and 16AW1C	64B 16-9
C211	.01 mf, 600 volts, ceramic disc.	65D 10-41
C212	.0047 mf, 500 volts, cer. disc.	65D 10-112
C213	.0047 mf, 500 volts, cer. disc in chassis stamped Run 10 through Run 26	65D 10-112
C213	1,000 mmf, 500 volts, cer. disc in chassis stamped Run 27 or higher. See Run Change 27.	65D 10-53
C214	.01 mf, 1,400 volts, cer. disc. (C214 was 600 volts, paper, in early sets.)	65D 10-65
C215	40 mf, 200 volts, electrolytic.	67A 25-2
C216A	60 mf, 200 volts	
C216B	20 mf, 200 volts	electrolytic. 67D 15-307
C216C	50 mf, 50 volts	
C216D	5 mf, 200 volts	
C217	.022 mf, 400 volts, 10%, mylar dielec	64C 24-36
C243	220 mmf, 500 volts, cer. disc.	65D 10-21
C244	.0022 mf, 500 volts, cer. disc.	65D 10-15
C245	.022 mf, 500 volts, cer. disc.	65D 10-28
C246	.0022 mf, 500 volts, cer. disc.	65D 10-15
C247	.047 mf, 400 volts, mylar dielec	64C 25-34
C248	.33 mf, 400 volts, paper.	64B 9-23
C249	50 mf, 300 volts, electrolytic.	67D 15-318
C251	.1 mf, 400 volts, mylar dielec.	64C 25-32
C252	.1 mf, 400 volts, mylar dielec.	64C 25-32
C253	50 mf, 25 volts, electrolytic.	67A 4-31
C254A	60 mf, 300 volts	
C254B	5 mf, 300 volts	electrolytic. 67D 15-309
C255	.047 mf, 1,000 volts, paper.	64B 2-30
C256	150 mmf, 500 volts, cer. disc.	65D 10-85
C301	.5 to 8 mmf, ceramic trimmer.	66A 38-8
C302	14 mmf, 500 volts, 2%, ceramic, NPO temp. coeff.	65D 6-40
C303	3 to 13 mmf, ceramic trimmer.	66A 38-7
C304	18 mmf, 500 volts, 5%, ceramic disc, NPO temp. coeff.	65D 10-121
C305	820 mmf, 500 volts, cer. disc.	65D 10-91
C306	1.0 mf, 100 volts, paper.	64A 10-3
C307	820 mmf, 500 volts, cer. disc.	65D 10-91
C308	820 mmf, 500 volts, cer. disc.	65D 10-91
C309	820 mmf, 500 volts, cer. disc.	65D 10-91
C310	820 mmf, 500 volts, cer. disc.	65D 10-91
C311	.005 mf, 500 volts, cer. disc.	65D 10-5
C312	560 mmf, 500 volts, 5%, ceramic, N3300 temp. coeff.	65D 6-131
C313	820 mmf, 500 volts, cer. disc.	65D 10-91
C314	47 mmf, 500 volts, 5%, ceramic disc, NPO temp. coeff.	65D 10-80
C315	4.7 mmf, 10%, composition	65B 28-047
C316	47 mmf, 500 volts, 5%, ceramic disc, NPO temp. coeff.	65D 10-92

CAPACITORS-Cont'd

Sym.	Description	Part No.
C317	6.8 mmf, 10%, composition	65B 41-068
C318	.1 mf, 200 volts, upright, mylar dielec	64C 16-53
C319	5 mf, 200 volts, electrolytic.	See C216D
C320	20 mf, 200 volts, electrolytic.	See C216B
C321	.22 mf, 400 volts, paper.	64B 8-24
C322	3.3 mmf, 500 volts, 10%, ceramic, NPO temp. coeff. (part of T303)	65D 6-89
C325	820 mmf, 500 volts, cer. disc.	65D 10-91
C326	820 mmf, 500 volts, cer. disc.	65D 10-91
C327	820 mmf, 500 volts, cer. disc.	65D 10-91
C328	820 mmf, 500 volts, cer. disc.	65D 10-91
C329	5 mf, 300 volts, electrolytic.	See C254B
C401	.022 mf, 400 volts, paper.	64B 8-30
C403	.01 mf, 500 volts, ceramic disc.	65D 10-41
C404	.01 mf, 500 volts, ceramic disc.	65D 10-41
C405	150 mmf, 500 volts, cer. disc.	65D 10-85
C406	.0047 mf, 500 volts, cer. disc.	65D 10-71
C407	.01 mf, 500 volts, ceramic disc.	65D 10-41
C408	.0022 mf, 500 volts, cer. disc.	65D 10-111
C409	.001 mf, 2 KV, ceramic disc. (C409 was .001 mf, 1.6 KV, mylar, in early sets.)	65D 10-181
C410	.047 mf, 200 volts, 10%, 2% drift, upright, mylar dielec	64C 15-155
C411	.1 mf, 400 volts, upright, mylar dielec	64C 16-30
C412	.1 mf, 400 volts, 2% drift, upright, mylar dielec	64C 16-130
C413	50 mf, 50 volts, electrolytic.	See C216C
C414A	50 mf, 300 volts	
C414B	10 mf, 300 volts	electrolytic. 67D 15-204
C416	.047 mf, 400 volts, paper. (C416 was 200 volts in early sets; see Run Change 25.)	64B 8-28
C417	.022 mf, 600 volts, 10%, paper.	64B 22-11
C418	.0047 mf, 500 volts, cer. disc.	65D 10-71
C419	.001 mf, 400 volts, 10%, paper.	64B 2-24
C420	.001 mf, 400 volts, 10%, paper.	64B 2-24
C421	.0047 mf, 500 volts, cer. disc.	65D 10-112
C422	.022 mf, 200 volts, upright, mylar dielec	64C 16-57
C423	3,900 mmf, 500 volts, 10%, mica.	65B 21-392
C424	390 mmf, 500 volts, 10%, mica.	65B 21-391
C425	680 mmf, 500 volts, 10%, mica.	65B 21-681
C426	.0047 mf, 500 volts, cer. disc.	65D 10-112
C427	.047 mf, 400 volts, paper.	64B 8-28
C427	300 mmf, 500 volts, ceramic, in sets stamped Run 10	65D 10-141
C428	.001 mf, 1,600 volts, in sets stamped Run 11 or higher	64B 2-32
C429	.033 mf, 600 volts, mylar dielec	64C 25-10
C430	.1 mf, 600 volts, paper.	64B 8-7
C431	.001 mf, 5,000 volts, cer. disc. (C431 was 1,600 volts in early sets.)	65D 10-164
C432	210 mmf, 2,000 volts, cer. disc.	65D 10-151
C433	210 mmf, 2,000 volts, cer. disc.	65D 10-151
C434	120 mmf, 2,000 volts, cer. disc.	65D 10-148
C435	.01 mf, 400 volts, paper.	64B 8-32
C501	.047 mf, 600 volts, mylar dielec	64B 2-36
†C502	.005 mf, 1,400 volts, ceramic disc, in Chassis stamped Run 10 through Run 23	65D 10-133
†C502	.001 mf, 1,400 volts, ceramic, in Chassis stamped Run 24 or higher	65D 10-65

CAPACITORS-Cont'd

Sym.	Description	Part No.
C503	150 mf, 150 volts, electrolytic.	67D 15-203
C504A	100 mf, 300 volts	
C504B	100 mf, 300 volts	electrolytic. 67D 15-306
†C505	.01 mf, 1,400 volts, ceramic.	65D 10-65
C801	1,000 mmf, ceramic feed-through.	94D 112-51
C802	1,000 mmf, ceramic feed-through.	94D 112-51
C810	1,000 mmf, ceramic feed-through.	94D 112-51
C804	Trimmer, Oscillator	94D 112-61
C805	Trimmer, Tuned Line	Not supplied
C806	Trimmer, Tuned Line	Not supplied
C807A	Trimmer and Stud	94D 112-59
C807B	Trimmer and Stud	
C809	Rotor, Tuning Capacitor	Not supplied
C813	33 mmf, ceramic feed-through.	94D 112-52
C903	120 mmf, 10%, 500 volts, ceramic.	94D 131-79
C904	30 mmf, 5%, 500 volts, ceramic feed-through	94D 131-80
C905	800 mmf, ceramic feed-through.	94D 131-97
C906	28 mmf, 10%, 500 volts, ceramic.	94D 131-81
C907	12 mmf, 10%, 500 volts, ceramic.	94D 131-95
C908	5-10 mmf, ceramic trimmer.	94D 151-83
C910	1,000 mmf, 500 volts, ceramic.	94D 131-82
C911	47 mmf, 5%, ceramic feed-through.	94D 131-86
C912	1-4.5 mmf, ceramic trimmer.	94D 131-83
C913	1-4.5 mmf, ceramic trimmer.	94D 131-83
C914	47 mmf, 10%, 500 volts, ceramic.	94D 131-87
C915	800 mmf, ceramic feed-through.	94D 131-97
C916	30 mmf, 500 volts, ceramic feed-through	94D 131-88
C917	1,000 mmf, 500 volts, ceramic, N750 temp. coeff.	94D 131-89
C918	800 mmf, ceramic feed-through.	94D 131-97
C919	3.0 mmf, 10%, 500 volts, ceramic, NPO temp. coeff.	94D 131-91
C920	6.8 mmf, 10%, 500 volts, ceramic, N330 temp. coeff.	94D 131-92
C921	2.0 mmf, 5%, 500 volts, ceramic, N550 temp. coeff.	94D 131-93
C922	1,000 mmf, 500 volts, ceramic.	94D 131-85
C923	800 mmf, ceramic feed-through.	94D 131-97
C924	800 mmf, ceramic feed-through.	94D 131-97
C925	800 mmf, ceramic feed-through.	94D 131-97
C926	800 mmf, ceramic feed-through.	94D 131-97

COILS AND TRANSFORMERS

Sym.	Description	Part No.
L102		
L103	Increment Antenna Coil,	
L104	Channels 2 through 5	73D 30-12
L105		
L106	Master Antenna Coil, Channels 2 through 6	73D 30-17
L107	Master Antenna Coil, Channels 7 through 9	73D 30-18
L108	Master Antenna Coil, Channels 10 and 11	73D 30-21
L109	Master Antenna Coil, Channels 12 and 13	73D 30-40
L112		
L115	Plate Increment Coil,	
L118	Channels 2 through 5	73D 30-19
L121		
L124	Master Plate Coil, Channels 2 through 6	73D 30-27
L127	Master Plate Coil, Channels 7 through 9	73D 30-8
L130	Master Plate Coil, Channels 10 and 11	73D 30-5

†May be part of RC filter 63B10-3 in chassis stamped Run 10 through Run 23, and Run 26 or higher.

COILS AND TRANSFORMERS Cont'd

Sym.	Description	Part No.
L133	Master Plate Coil, Channels 12 and 13	73D 30-25
L110, L113	Increment Oscillator Coil, Channels 2 and 3	73D 30-11
L116	Master Oscillator Coil, Channels 2 through 4	73D 30-37
L119	Increment Oscillator Coil, Channel 5	73D 30-34
L122	Master Oscillator Coil, Channels 5 and 6	73D 30-36
L125	Master Oscillator Coil, Channels 7 through 9	73D 30-1
L128	Master Oscillator Coil, Channels 10 and 11	73D 30-33
L131	Master Oscillator Coil, Channels 12 and 13	73D 30-32
L111, L114, L117, L120	Mixer Increment Coil, Channels 2 through 5	73D 30-20
L123	Master Mixer Coil, Channels 2 through 6	73D 30-38
L126	Master Mixer Coil, Channels 7 through 9	73D 30-45
L129	Master Mixer Coil, Channels 10 and 11	73D 30-1
L132	Master Mixer Coil, Channels 12 and 13	73D 30-31
L134	UHF IF Pre-Amplifier Coil	not supplied
L135	UHF IF Pre-Amplifier Coil	not supplied
L136	IF Trap Coil	73D 30-43
L137	UHF Input Coil	73D 30-41
L138	Peaking Coil	73A 2-9
L139	Peaking Mixer Coil	73D 30-29
L140	Mixer Output Coil	73D 30-44
L141	UHF Input Coupling Coil	73D 30-42
L201A, L201B	Phase Shift and Sound IF Coil	72B 186-1
L203	Quadrature Coil	72C 132-37
L301	47.25 MC Trap Coil	73B 37-3
L302	IF Input Coil	72C 132-31
L303	41.25 MC Trap Coil	73B 37-3
L304	RF Choke Coil (orange dot)	73B 24-7
L305	Video Peaking Coil	73B 5-20
L306	RF Choke Coil (yellow dot)	73B 31-3
L307	Video Peaking Coil (wound on R320)	73B 5-23
L308	Video Peaking Coil (wound on R321)	73B 5-36
L309	Heater Choke	73B 37-2
L310	Heater Choke	73B 37-2
L401	Horizontal Lock Coil	94C 17-4
L501	RF Choke Coil (brown dot)	73B 31-1
L502	Filter Choke (1.5 henry)	74B 18-23
L801	Loop, Antenna	94D 112-60
L802	Loop, RF Coupling	Not supplied
L803	Coil, IF Output	94D 112-54
L806	Loop, Oscillator Coupling	Not supplied
L807	Loop, Oscillator Coupling	Not supplied
L804	Choke, Heater	94D 112-53
L805	Coil, Cathode Choke	94D 112-56
L901	Trap Coil (series tuned)	94D 131-51
	Tuning Core (for L901)	94D 131-77

†Two types used; not interchangeable mechanically. Order proper yoke to match diameter to yoke cap.

COILS AND TRANSFORMERS-Cont'd

Sym.	Description	Part No.
L902	Channel Coil (stamped 2N4A, 3N4A, 4N4A, etc.)	
	for Channel #2	94D 131-52
	for Channel #3	94D 131-53
	for Channel #4	94D 131-54
	for Channel #5	94D 131-55
	for Channel #6	94D 131-56
	for Channel #7	94D 131-57
	for Channel #8	94D 131-58
	for Channel #9	94D 131-59
	for Channel #10	94D 131-60
	for Channel #11	94D 131-61
	for Channel #12	94D 131-62
	for Channel #13	94D 131-63
		For VHF Tuners 94D 151-1 and 94D 151-2
L903	Screen Coil	94D 131-65
L904	Mixer Plate Coil	94D 151-50
	Tuning Core (for L904)	94D 131-78
L905	Trap Coil (parallel tuned)	94D 131-64
T101	Antenna Transformer Assembly	700B 110-2
T201	Sound Output Transformer	79B 78-1
T241	Sound Output Transformer	79C 56-6
T301	1st IF Transformer	72C 132-38
T302	2nd IF Transformer	72C 132-38
T303	3rd IF Transformer (includes C322 and CR301) (T303 was part number 72B191-1 in early sets)	72B 191-2
T304	Sound Take-off Transformer	72C 185-2
T401	Vertical Output Transformer	79B 43-14
†T402	Deflection Yoke (less picture centering device and yoke cap)	
	yoke using 3¼" diameter cap	94D 150-3
	yoke using 3-3/4" diameter cap	94D 147-3
T403	Horizontal Output Transformer	
	in chassis stamped Run 10 thru Run 22	79D 77-3
	in chassis stamped Run 23 or higher	79D 77-2
T501	Transformer, Pilot Light	80B 52-3
T901	Antenna Input Assembly	94D 131-68

MISCELLANEOUS CHASSIS PARTS

For tuner parts, see separate headings.

CR301	Video Detector (Order same part number as original)	1N60, 1N87 or 1N295
CR401	Diode, Dual Selenium	93B 5-4
CR501	Rectifier	
	350 MA Selenium in all Chassis except 16U1C, 16AU1C, 16W1C, and 16AW1C	93A 4-4
	500 MA Silicon in 16U1C, 16AU1C, 16W1C, and 16AW1C Chassis	93A 11
CR502	Rectifier	
	350 MA Selenium in all Chassis except 16U1C, 16AU1C, 16W1C, and 16AW1C Chassis	93A 4-4
	500 MA Silicon in 16U1C, 16AU1C, 16W1C, and 16AW1C Chassis	93A 11

MISCELLANEOUS CHASSIS PARTS-Cont'd

Sym.	Description	Part No.
M201	Speaker	See CABINET PARTS LIST.
M202	Remote Amplifier Audio Socket	88A 1-1
M241	Plug, Sound Output	88A 2-1
M242	Socket, Sound Input	88A 1
M246	Socket, Sound Output	88A 5-6
M247	Plug, Speaker	88A 5-5
M301	IF Input Lead and Plug Assembly	89A 51-8
M501	Interlock Socket and Line Cord	89A 22-1
M502	Interlock Plug	88A 36
M503	Remote Amplifier Power Socket, 11 contact	87B 30-9
M504	Index Plate Assembly	700B 39
§M505, §M506	Gear Box, Motor, 117 Volts AC (Order Complete Assembly)	91C 18-3
M507	Socket, Remote Amplifier, 11 contact	87B 30-9
M510	Fuse, 1.6 ampere, type "N" slow-blow	84B 13-42
S501	Switch, On-Off Power	Part of Volume cont.
S502	Switch, Channel Indexing	77A 66
S503	Switch, Motor Disconnect	77A 67
	Clip, Tube Cap	
	for 12DQ6 tube	88C 16-73
	for 1B3 tube	88C 16-28
	Clip, Mtg. (for 93A11 Silicon Rect.)	84B 16-8
	Connector Lead, 2nd Anode	88D 16-72
	Cover Cap, Plastic (for high voltage V404 socket)	33D 206-2
	†Deflection Yoke (less picture centering device and yoke cap)	
	yoke using 3¼" diameter cap	94D 150-3
	yoke using 3-3/4" diameter cap	94D 147-3
	Insert, Plastic (used to insulate brackets and tuner from chassis and cabinet)	
	⅛" height	33B 150-25
	¼" height	33B 150-26
	5/16" height	33B 150-27
	7/32" height	33B 150-15
	†Picture Centering Device and Yoke Cap	
	Cap, 3¼" diameter for yoke 94D150-3	94C 152
	Cap, 3-3/4" diameter for yoke 94D147-3	94C 148-1
	Pilot Light Bulb #44	81A 1-5
	Plug, Dummy, 11 pin (for operating 16J1, 16K1 chassis without remote amp.)	88A 18-1
	Printed Circuit Board, Complete with components (less tubes)	
	§IF Board	A5775-1
	§Main Board (used in all chassis except 16U1C, 16AU1C, 16W1C, and 16AW1C)	A5780-1
	§Main Board (used in 16U1C, 16AU1C, 16W1C, 16AW1C chassis)	A5780-4
	Rod, Horizontal Adjust, Nylon	33B 218-5
	Rubber Bumper	
	11/16" high	12B 3-19
	41/64" high	12B 3-20
	Rubber Channel (8" lg.)	12A 80-2
	Rubber Strip (1"x1-3/4")	12B 39-26
	Shield, Anode (polyethylene 3"x3")	32A 349
	Shield, for Quadrature Coil	87B 64-3
	Shield Can, IF Transformer	87B 64-4
	Shield, Tube	87A 78

MISCELLANEOUS CHASSIS PARTS-Cont'd

Sym.	Description	Part No.
	Socket, Tube	
	7 pin miniature (3BZ6, 3CB6, 12CU5, 3DT6)	87D 35-23
	9 pin miniature (6AW8A)	87D 35-19
	9 pin miniature (6CG7)	87A 25-3
	9 pin ministure, mica filled (12DB5)	87A 25-2
	octal, plain (12DQ6, 25CD6)	87A 5-1
	octal, mica filled (12AX4)	87A 38-1
	High Voltage, mica filled (1B3)	33C 256
	Socket, Picture Tube	87B 83-4
	Socket, Pilot Light	82A 35-1
	Socket, Duo-diode Rectifier (for CR401)	87A 82
	Socket, Silicon Diode (93A11)	84B 16-8
	Spring, Deflection Yoke Clamping	18B 203-1
	Strap, Picture Tube Grounding	15B 1808
	Terminal Board, Antenna	
	for VHF sets	10A 38-1
	for VHF-UHF sets	10A 38-2

MISCELLANEOUS PARTS FOR VHF TUNERS 94E144-9, -13, -19, -22, -24, -26, -27 and -30. (SEE Fig. 56 & 57 for Illust. of parts.)

M106	Screw, Detent Spring Mtg. (#6-32x¼")	265-250-C2-2
M108	Spring, Detent	18C 140-3
M109	Roller Detent	27A 170
M110	Plate, Fine Tuning Stator (printed circuit)	32B 276
M111	Rotor Disc, Fine Tuning (includes mtg. rivet)	15C 1399
M112	Plate, 6 contact	A5309
M113	Spring Washer (Fine Tuning sleeve)	18B 183
M114	Sleeve and Clutch Disc Assembly, Fine Tuning	
	for tuner 94E144-9	700B 105-3
	for tuner 94E144-13	700B 104-6
	for tuner 94E144-19	700B 104-7
	for tuner 94E144-22	700B 105-6
	for tuner 94E144-24	700B 104-8
	for tuner 94E144-26	700B 104-9
	for tuner 94E144-27	700B 105-7
	for tuner 94E144-30	700B 105-5
M115	Retaining Ring (Retains Fine Tuning Sleeve)	4B 23-3-68
§M116	Turret Assembly (pre-aligned)	
	for VHF tuner 94E144-9	A5809
	for VHF tuner 94E144-13	A5811
	for VHF tuner 94E144-19	A5814
	for VHF tuner 94E144-22	A5871
	for VHF tuner 94E144-24	A5872
	for VHF tuner 94E144-26	A7170
	for VHF tuner 94E144-27	A7171
	for VHF tuner 94E144-30	A5813
M117	Slug, Tuning (for osc. coils)	71A 16
M118	Spring, Turret Retaining (front and rear)	19A 110
M119	Shield, Bottom Cover	15D 1407-3
M121	Board, Antenna Terminal (less components)	A5741
M123	Plate, 2 contact	A5308
M124	Socket, 9 pin miniature	87B 23-15
M125	Core, Powdered Iron (for L136)	71D 1-41
M126	Shaft, UHF	
	for tuner 94E144-9	29B 23-3
	for tuner 94E144-22	29B 23-6
	for tuner 94E144-27	29B 23-7
	for tuner 94E144-30	29B 23-5
M127	Retaining Ring (Retains UHF Shaft)	19A 124

§Orders for these parts will not be filled unless damaged part cannot be repaired economically and full details are given with order.

†Two types used; not interchangeable mechanically. Order matching yoke and picture centering device.

MISCELLANEOUS PARTS FOR VHF TUNERS-Cont'd

Sym.	Description	Part No.
M128	Shield, Tube (Asbestos-Metal) for 5CG8)	87B 66-2
M129	Screw, Trimmer (#4-36x5/8")	162-625-02-2
M130	Nut, Locking (for trimmers)	2B 6-47-71
M131	Drum, UHF (for tuners 94E144-9,-22,-27, and -30)	33B 227
M132	Shield, Top Cover (over osc-mixer section)	15B 1401
M133	Spring, Cover Grounding (bronze)	18A 185

MISCELLANEOUS PARTS FOR VHF TUNERS 94D151-1 and 94D151-2 SEE Fig.59 for Illust.of parts

M903	Fine Tuning Rotor "Book Type"	94D 110-94
M904	Receptacle, IF Output	94D 110-90
M905	Slug, Channel Oscillator (for L902)	98A 45-88
M906	Spring, Detent Grounding	94D 131-76
M907	Stator Bracket Assembly	94D 131-96
M908	Turret Assembly, less coils	
	for 94D151-1 tuner	94D 151-74
	For 94D151-2 tuner	94D 151-70
M909	Roller, Detent	94D 110-86
M910	Spring, Detent	94D 131-75
M911	Screw, Detent Retainer(6-32x¼")	265-250-C2-2
M912	Spring, Turret Shaft (front and rear support)	94D 131-70
M913	Core, Powdered Iron (for L901 Adjustment)	94D 131-77
M914	Nut, Trimmer Screw Locking	98A 45-31
M915	Screw, Trimmer (4-36x3/4")	94D 151-69
M916	Shield, Tube (collapsible type)	94D 151-50
M917	Shield, Tube (dome type)	94D 151-51

MISCELLANEOUS PARTS FOR VHF TUNERS 94D151-1 and 94D151-2-Cont'd

Description		Part No.
M918	Shield, Bottom	94D 151-96
M919	Core, Powdered Iron (for L905 Adjustment)	94D 131-78
M920	Socket, Tube (7 pin miniature)	94D 92-93
M921	Socket, Tube (9 pin miniature)	94D 110-91
M922	Rivet, M923 Retainer	94D 110-95
M923	Rotor Arm, Fine Tuning	94D 110-96
M924	Bracket, Fine Tuning Rotor Retainer	94D 110-92
M925	Shaft, Fine Tuning Assembly for 94D151-1 tuner	94D 151-72
	for 94D151-2 tuner	94D 151-71
M927	Spring, Slug Retainer	98A 45-52
M928	Cover, Bottom Shield	94D 151-97
M929	Spring, Wiper	94D 131-73

MISCELLANEOUS PARTS FOR UHF TUNERS 94D112-5 and 94D155-3

(See figure 60 for illustration of tuner.)

CR801	Silicon Diode (type IN82A)	94D 112-57
M801	IF Output Cable Assembly	94D 112-58
	Shield, Tube (2AF4A)	94D 112-50
	Stud, Trimmer	94D 112-59

TUNING DRIVE PARTS FOR TUNERS IN VHF-UHF SETS

Cord, Tuning	50A 1-3
Drum, Tuning,1 3/8" diameter drum	A5494
Screw, Drum Set (Cup point,6-32x3/16").	1A 5-54
Spring, Drive Cord Tension	19C 1-5

CABINET PARTS

Models may have suffix letter "C".

Description	C21E2 CA21E2 Mahogany	C21E3 CA21E3 Blond	C21E6 CA21E6 Mahogany	C21E7 CA21E7 Blond
Back, Cabinet (less line cord)				
for UHF	43E 298-23	43E 298-23	43E 298-23	43E 298-23
for VHF	43E 298-22	43E 298-22	43E 298-22	43E 298-22
*Cabinet				
Mahogany	*35E416-2	----------	*35E 416-22	----------
Blond	--------	*35E 416-3	----------	*35E 416-23
Clip, Cabinet Back Retaining	18A 159	18A 159	18A 159	18A 159
Clip, Glass Retaining, Tubular	2A 30-1	2A 30-1	2A 30-1	2A 30-1
Escutcheon, Cabinet Front (Molded)				
Gold Finish	23E 296-2	23E 296-2	23E 296-2	23E 296-2
Ferrule, Leg	---------	---------	37B 123-5	37B 123-5
Grille Cloth	36D 86-18	36D 86-18	36D 86-18	36D 86-18
Knobs and Asscciated Parts				
Tuning Knobs				
VHF Channel Selector	33D 237-20	33D 237-20	33D 237-20	33D 237-20
VHF-UHF Channel Selector	33D 237-19	33D 237-19	33D 237-19	33D 237-19
UHF Channel Indicator	33D 237-24	33D 237-24	33D 237-24	33D 237-24
Fine Tuning	33D 237-23	33D 237-23	33D 237-23	33D 237-23
Preference Control Knobs				
Contrast, Volume, Vertical	33A 175-5	33A 175-5	33A 175-5	33A 175-5
Volume Spacer	33C 230-1	33C 230-1	33C 230-1	33C 230-1
Knob Springs				
for Fine Tuning	18A 5-3	18A 5-3	18A 5-3	18A 5-3
for Channel Selector	18A 103	18A 103	18A 103	18A 103
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11	18A 5-11
for Preference Controls	18A 5-8	18A 5-8	18A 5-8	18A 5-8
*Legs, Cabinet				
Brass	37B 132-5	37B 132-5	---------	---------
Black, Molded	35E 416-53	35E 416-53	---------	---------
Mohogany	---------	---------	35E 416-56	---------
Blond	---------	---------	---------	35E 416-57
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4	89B 62-4
Monogram				
"A"	26C 68-1	26C 68-1	26C 68-1	26C 68-1
"Admiral"	23D 287-1	23D 287-1	23D 287-1	23D 287-1
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33C 281-1	33C 281-1
Retainer, Picture Window	15B 1589	15B 1589	15B 1589	15B 1589
Rod, Nylon, Horizontal Adj	33A 218-5	33A 218-5	33A 218-5	33A 218-5
Rubber Bumper (used on knob well)	12B 3-10	12B 3-10	12B 3-10	12B 3-10
Rubber Escutcheon Bumper	12B 79-26-1	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Strip (top glass mtg.)	12C 5-17	12C 5-17	12C 5-17	12C 5-17
Rubber Strip (corner glass mtg.)	12A 89-2	12A 89-2	12A 89-2	12A 89-2
Rubber Strip (bottom glass mtg.)	12C 5-53	12C 5-53	12C 5-53	12C 5-53
Screw, Cabinet Back Clip #5x3/8 RHWS	1A 7-16-71	1A 7-16-71	1A 7-16-71	1A 7-16-71
Screw, Channel Bracket Mtg. #10-32x5/8 HHSTS	1A 149-46-71	1A 149-46-71	1A 149-46-71	1A 149-46-71
Screw, Glass Retainer Mtg. #6-32x½	1A 206-12-71	1A 206-12-71	1A 206-12-71	1A 206-12-71
Speaker, 6"PM	78C 134-3	78C 134-3	78C 134-3	78C 134-3
Swivel Plate	----------	----------	37C 126	37C 126
Strap, Tube Mtg	15A 1621	15A 1621	15A 1621	15A 1621
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29	9B 29
Trim Plate, Gold Finish				
Right Side	23D 291-17	23D 291-17	23D 291-17	23D 291-17
Left Side	23D 291-18	23D 291-18	23D 291-18	23D 291-18
Well Assembly (complete)	700C 84-2	700C 84-3	700C 84-2	700C 84-3
Window, Picture (tinted)	21D 97-4	21D 97-4	21D 97-4	21D 97-4
Wedge, Picture Tube	33A 239	33A 239	33A 239	33A 239

*Orders for cabinets and certain matching parts will not be filled unless the damaged item cannot be economically repaired and unless full details are given with the order.

CABINET PARTS

Models may have suffix letter "C"

Description	C21E12 CA21E12 Mahogany	C21E13 CA21E13 Blond	C21E14 CA21E14 Sierra	C21E16 CA21E16 Mahogany	C21E17 CA21E17 Blond
Back, Cabinet (less line cord)					
for VHF	43E 298-1	43E 298-1	43E 298-1	43E 298-33	43E 298-33
for UHF	43E 298-13	43E 298-13	43E 298-13	43E 298-33	43E 298-33
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5	81A 1-5	81A 1-5
*Cabinet, Metal					
Sierra	-------	-------	*35E 396-4	-------	-------
Mahogany	*35E 396-2	-------	-------	*35E 419-2	-------
Blond	-------	*35E 396-3	-------	-------	*35E 419-3
Clip, Cabinet Back Retaining	18A 159	18A 159	18A 159	18A 159	18A 159
Clip, Window Retaining	2A 30-1	2A 30-1	2A 30-1	2A 30-1	2A 30-1
Escutcheon, Cabinet Front (molded)					
Gold finish	23E 286-1	23E 286-1	23E 286-1	23E 286-1	23E 286-1
Ferrule, Leg	-------	-------	-------	37B 123-5	37B 123-5
Grille, Metal (above picture window)	36B 80-1	36B 80-1	36B 80-1	36B 80-1	36B 80-1
Grille Cloth	36D 86-1	36D 86-20	36D 86-1	36D 86-19	36D 86-20
Jewel, Escutcheon (Beige)	82A 32-3	82A 32-3	82A 32-3	82A 32-3	82A 32-3
Knobs and Associated Parts					
Tuning Knobs					
for VHF only models					
§Drive Disc Assembly	33C 258-4	33C 258-4	33C 258-4	33C 258-4	33C 258-4
for VHF-UHF models					
§Drive Disc Assembly	33C 258-5	33C 258-5	33C 258-5	33C 258-5	33C 258-5
UHF Indicator	33C 257-3	33C 257-3	33C 257-3	33C 257-3	33C 257-3
for All models					
Fine Tuning (UHF Selector)	33D 231-16	33D 231-16	33D 231-16	33D 231-16	33D 231-16
VHF Selector	33D 231-13	33D 231-13	33D 231-13	33D 231-13	33D 231-13
Preference Control Knobs (Beige)					
Brightness	33C 230-5	33C 230-5	33C 230-5	33C 230-5	33C 230-5
Contrast, Volume	33C 230-2	33C 230-2	33C 230-2	33C 230-2	33C 230-2
Vertical, Tone	33C 230-3	33C 230-3	33C 230-3	33C 230-3	33C 230-3
Volume Spacer	33C 230-1	33C 230-1	33C 230-1	33C 230-1	33C 230-1
Knob Springs					
Conical, under push-button knob.	19D 1-40	19D 1-40	19D 1-40	19D 1-40	19D 1-40
Drive Disc Retainer	18A 214	18A 214	18A 214	18A 214	18A 214
for Fine Tuning	18A 5-14	18A 5-14	18A 5-14	18A 5-14	18A 5-14
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11	18A 5-11	18A 5-11
for VHF Selector	18A 103	18A 103	18A 103	18A 103	18A 103
for Volume	18A 191	18A 191	18A 191	18A 191	18A 191
*Leg, Cabinet					
Mahogany	*35E 396-52	-------	-------	*37D 168-26	-------
Blond	-------	*35E 396-53	-------	-------	*37D 168-28
Sierra	-------	-------	*35E 396-54	-------	-------
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4	89B 62-4	89B 62-4
Monogram					
"A"	26C 68-1	26C 68-1	26C 68-1	26C 68-1	26C 68-1
ADMIRAL	23D 287-2	23D 287-2	23D 287-2	23D 287-2	23D 287-2
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33C 281-1	33C 281-1	33C 281-1
Retainer, Window Glass	15B 1589	15B 1589	15B 1589	15B 1589	15B 1589
Rod, Nylon; Horizontal Adj.	33A 218-5	33A 218-5	33A 218-5	33A 218-5	33A 218-5
Rubber Escutcheon Bumper					
Small	12B 79-5-1	12B 79-5-1	12B 79-5-1	12B 79-5-1	12B 79-5-1
Large	12B 79-26-1	12B 79-26-1	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Pad (top glass mtg.)	12C 5-17	12C 5-17	12C 5-17	12C 5-17	12C 5-17
Rubber Pad (corner glass mtg.)	12A 89-2	12A 89-2	12A 89-2	12A 89-2	12A 89-2
(bottom glass mtg.)	12C 5-53	12C 5-53	12C 5-53	12C 5-53	12C 5-53
Screw					
#5x3/8 RHWS (mtg. cabt. back clips)	1A 7-16-71	1A 7-16-71	1A 7-16-71	1A 7-16-71	1A 7-16-71
#10-24x$\frac{1}{2}$ BHWS (mtg. tube strap)	1A 206-29-71	1A 206-29-71	1A 206-29-71	1A 206-29-71	1A 206-29-71
#10-24x$\frac{5}{8}$ (mtg. escutcheon)	1A 206-29-71	1A 206-29-71	1A 206-29-71	1A 206-29-71	1A 206-29-71
Shield, Pilot Light	84A 24-2	84A 24-2	84A 24-2	84A 24-2	84A 24-2
Speaker, 6" PM	78B 134-5	78B 134-5	78B 134-5	78B 134-4	78B 134-4
Strip, Wedge					
glass support	12A 84	12A 84	12A 84	12A 84	12A 84
corner glass mounting	12A 89-2	12A 89-2	12A 89-2	12A 89-2	12A 89-2
Swivel Plate	-------	-------	-------	37C 126	37C 126
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29	9B 29	9B 29
Trim Plate, Gold Finish					
Right side	23D 291-17	23D 291-17	23D 291-17	23D 291-17	23D 291-17
Left side	23D 291-16	23D 291-16	23D 291-16	23D 291-16	23D 291-16
Trim Strips					
Plain, Gold - Left side	21D 98-1	21D 98-1	21D 98-1	21D 98-1	21D 98-1
Plain, Gold - Right side	21D 98-2	21D 98-2	21D 98-2	21D 98-2	21D 98-2
Preference Controls	21D 98-7	21D 98-7	21D 98-7	21D 98-7	21D 98-7
"Selector"	21D 98-4	21D 98-4	21D 98-4	21D 98-4	21D 98-4
"Fine Tuning"	21D 98-5	21D 98-5	21D 98-5	21D 98-5	21D 98-5
Window, Picture (tinted)	21D 97-2	21D 97-2	21D 97-2	21D 97-2	21D 97-2

§Drive Disc Assembly includes proper VHF Indicator.

*Orders for cabinets and certain matching parts will not be filled unless the damaged item cannot be economically repaired and unless full details are given with the order.

CABINET PARTS

Models may have suffix letter "C".

Description	CH21E26C CHA21E26C Mahogany	CH21E27C CHA21E27C Blond	CH21E29C CHA21E29C Sierra
Back, Cabinet (less line cord)	43E 298-34	43E 298-34	43E 298-34
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5
*Cabinet			
Mahogany	*35E 427-2	--------	-------
Blond	--------	*35E 427-3	-------
Sierra	--------	--------	*35E 427-4
Escutcheon, Cabinet Front (Molded)			
Gold Finish	23E 286-1	23E 286-1	23E 286-1
Grille Cloth	36D 86-26	36D 86-27	36D 86-26
Jewel, Cabinet	82A 32-3	82A 32-3	82A 32-3
Knobs and Associated Parts			
Tuning Knobs			
for VHF only models			
§Drive Disc Assembly	33C 258-4	33C 258-4	33C 258-4
for VHF-UHF models			
§Drive Disc Assembly	33C 258-5	33C 258-5	33C 258-5
UHF Indicator	33C 257-3	33C 257-3	33C 257-3
for All models			
Fine Tuning (UHF Selector)	33D 231-16	33D 231-16	33D 231-16
VHF Selector	33D 231-13	33D 231-13	33D 231-13
Preference Control Knobs (Gold)			
Bass, Brightness	33C 230-10	33C 230-10	33C 230-10
Contrast, Volume, Treble	33C 230-7	33C 230-7	33C 230-7
Vertical	33C 230-8	33C 230-8	33C 230-8
Volume Spacer	33C 230-6	33C 230-6	33C 230-6
Knob Springs			
Conical, under push-button knob	19D 1-40	19D 1-40	19D 1-40
Drive Disc Retainer	18A 214	18A 214	18A 214
for Fine Tuning	18A 5-14	18A 5-14	18A 5-14
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11
for VHF Selector	18A 103	18A 103	18A 103
for Volume	18A 191	18A 191	18A 191
Legs, Cabinet	37D 168-2	37D 168-4	37D 168-4
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4
Monogram			
"A"	26C 68-1	26C 68-1	26C 68-1
"High Fidelity 330"	23D 287-9	23D 287-9	23D 287-9
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33C 281-1
Plug, Speaker, 3 prong	88A 5-7	88A 5-7	88A 5-7
Rod, Nylon, Horizontal Adj.	33A 218-1	33A 218-1	33A 218-1
Rubber Escutcheon Bumper	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Strip (top glass mtg.)	12C 5-17	12C 5-17	12C 5-17
Rubber Strip (corner glass mtg.)	12A 89-2	12A 89-2	12A 89-2
Shield, Pilot Light	82A 24-2	82A 24-2	82A 24-2
Speakers			
5" PM	78B 139-3	78B 139-3	78B 139-3
8" PM	78D 135-7	78D 135-7	78D 135-7
Spring Clip, Cabinet Back Retainer	18A 159	18A 159	18A 159
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29
Trim Plate, Gold Finish			
Right Side	23D 291-17	23D 291-17	23D 291-17
Left Side	23D 291-18	23D 291-18	23D 291-18
Window, Glass	21D 97-2	21D 97-2	21D 97-2

§ Drive Disc Assembly includes proper VHF Indicator.

* Orders for cabinets and certain matching parts will not be filled unless the damaged item cannot be economically repaired and unless full details are given with the order.

CHASSIS 16AB1, AD1, AE1, AG1, AL1, AU1C, AW1C, B1, D1, E1, G1, J1, K1, L1, U1C, W1C(Late)

CABINET PARTS

Models may have suffix letter "C".

Description	C21E22 CA21E22 Mahogany	C21E23 CA21E23 Blond	C21E24 CA21E24 Sierra
Back. Cabinet (less line cord)			
for VHF	43E 298-2	43E 298-2	43E 298-2
for UHF	43E 298-14	43E 298-14	43E 298-14
Back, Cabinet (less line cord)	43E 298-14	43E 298-14	43E 298-14
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5
*Cabinet			
Mahogany	*35E 397-2	----------	----------
Blond	---------	*35E 398-3	----------
Sierra	---------	----------	*35E 398-4
Clip, Cabinet Back Retaining	18A 159	18A 159	18A 159
Clip, Window Retaining	2A 30-1	2A 30-1	2A 30-1
Escutcheon, Cabinet Front (Molded)			
Gold Finish	23E 286-6	23E 286-6	23E 286-6
Ferule, Leg	37C 165	37C 165	37C 165
Grille Cloth	36D 86-2	36D 86-3	36D 86-4
Grille, Metal (above picture window)	36B 80-1	36B 80-1	36B 80-1
Jewel, Escutcheon (Beige)	82A 32-3	82A 32-3	82A 32-3
Knobs and Associated Parts			
Tuning Knobs			
for VHF only models			
§Drive Disc Assembly	33C 258-4	33C 258-4	33C 258-4
for VHF-UHF models			
§Drive Disc Assembly	33C 258-5	33C 258-5	33C 258-5
UHF Indicator	33C 257-3	33C 257-3	33C 257-3
for All models			
Fine Tuning (UHF Selector)	33D 231-16	33D 231-16	33D 231-16
VHF Selector	33D 231-13	33D 231-13	33D 231-13
Preference Control Knobs (Gold finish)			
Brightness	33C 230-10	33C 230-10	33C 230-10
Contrast, Volume	33C 230-7	33C 230-7	33C 230-7
Vertical, Tone	33C 230-8	33C 230-8	33C 230-8
Volume Spacer	33C 230-6	33C 230-6	33C 230-6
Knob Springs			
Conical, under push-button knob	19D 1-40	19D 1-40	19D 1-40
Drive Disc Retainer	18A 214	18A 214	18A 214
for Fine Tuning	18A 5-14	18A 5-14	18A 5-14
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11
for VHF Selector	18A 103	18A 103	18A 103
for Volume	18A 191	18A 191	18A 191
*Legs, Cabinet			
Mahogany	*35E 397-52	-------	-------
Black	----------	*35E 397-55	*35E 397-55
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4
Monogram			
"A"	26C 68-1	26C 68-1	26C 68-1
"Admiral"	23D 287-2	23D 287-2	23D 287-2
Plastic, Bottom Glass Mounting	33C 281-1	33D 281-1	33C 281-1
Plate, Pilot Light Mtg	15C 1617	15C 1617	15C 1617
Retainer (bottom glass mtg.)	15B 1589	15B 1589	15B 1589
Rod, Nylon, Horizontal Hold Adj	33A 218-5	33A 218-5	33A 218-5
Rubber Escutcheon Bumper	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Strip (top glass mtg.)	12C 5-17	12C 5-17	12C 5-17
Rubber Strip (corner glass mtg.)	12A 89-2	12A 89-A	12A 89-2
Screw, #5x3/8 RHWS (mtg. cab't. back clips)	1A 7-16-71	1A 7-16-71	1A 7-16-71
Screw, #10-24x½ BHWD (mtg. tube strap)	1A 206-29-71	1A 206-29-71	1A 206-29-71
Shield, Pilot Light	82A 24-2	82A 24-2	82A 24-2
Speakers			
8" PM (with plug terminal)	78B 135-3	78B 135-3	78B 135-3
8" PM (with socket terminal)	78D 135-5	78D 135-5	78D 135-5
Strap, Tube Mtg	15A 1621	15A 1621	15A 1621
Spring Clip, Cabinet Back Retainer	18A 159	18A 159	18A 159
Swivel Plate, Metal	37C 126	37C 126	37C 126
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29
Trim Plate, Gold Finish			
Right Side	23D 291-17	23D 291-17	23D 291-17
Left Side	23D 291-16	23D 291-16	23D 291-16
Window, Picture (tinted)	21D 97-2	21D 97-2	21D 97-2

§ Drive Disc Assembly includes proper VHF Indicator.
* Orders for cabinets and certain matching parts will not be filled unless the damaged item cannot be economically repaired and unless full details are given with the order.

CABINET PARTS

Models may have suffix letter "C".

Description	CR21E12 Mahogany	CR21E13 Blond	CR21E14 Sierra
Black, Cabinet (less line cord)	43E 298-21	43E 298-21	43E 298-21
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5
*Cabinet			
Mahogany	*35E 396-2	- - - - -	- - - - -
Blond	- - - - -	*35E 396-3	- - - - -
Sierra	- - - - -	- - - - -	*35E 396-4
Clip, Cabinet Back Retaining	18A 159	18A 159	18A 159
Clip, Tubular (picture window retainer)	2A 30-1	2A 30-1	2A 30-1
Escutcheon, Cabinet Front (Molded)			
Gold Finish	23E 286-1	23E 286-1	23E 286-1
Grille, Metal (above picture window)	36B 80-2	36B 80-2	36B 80-2
Grille Cloth	36D 86-1	36D 86-1	36D 86-1
Jewel, Escutcheon	82A 32-1	82A 32-1	82A 32-1
**Knobs and Associated Parts			
Tuning Knobs			
for VHF only models			
§Drive Disc Assembly	33C 258-4	33C 258-4	33C 258-4
Fine Tuning	33D 231-16	33D 231-16	33D 231-16
VHF Selector	33D 231-13	33D 231-13	33D 231-13
Preference Control Knobs (NOTE: Early production sets use beige plastic, later production use gold finish.)			
ON-OFF Volume, Spacer { Beige	33C 230-1	33C 230-1	33C 230-1
ON-OFF Volume, Spacer { Gold	33C 230-6	33C 230-6	33C 230-6
ON-OFF Volume, Contrast { Beige	33C 230-2	33C 230-2	33C 230-2
ON-OFF Volume, Contrast { Gold	33C 230-7	33C 230-7	33C 230-7
Brightness { Beige	33C 230-5	33C 230-5	33C 230-5
Brightness { Gold	33C 230-10	33C 230-10	33C 230-10
Vertical, Tone { Beige	33C 230-3	33C 230-3	33C 230-3
Vertical, Tone { Gold	33C 230-8	33C 230-8	33C 230-8
Remote-Manual (at rear)	33A 276	33A 276	33A 276
Knob Springs			
Conical, under push-button knob	19D 1-40	19D 1-40	19D 1-40
Drive Disc Retainer	18A 214	18A 214	18A 214
for Fine Tuning	18A 5-14	18A 5-14	18A 5-14
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11
for VHF Selector	18A 103	18A 103	18A 103
for Volume	18A 191	18A 191	18A 191
*Legs, Cabinet	*35E 396-52	*35E 396-53	*35E 396-54
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4
Microphone and Cable	78B 137	78B 137	78B 137
Monogram			
"A"	26C 68-1	26C 68-1	26C 68-1
"Admiral"	23D 287-5	23D 287-5	23D 287-5
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33C 281-1
Retainer, Bottom Glass Mounting	15B 1589	15B 1589	15B 1589
Rod, Nylon, Horizontal Hold Adj	33A 218-5	33A 218-5	33A 218-5
Rubber Bumper (used under pic. tube)	8A 12-11	8A 12-11	8A 12-11
Rubber Escutcheon Bumper	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Strip (top glass mtg.)	12C 5-17	12C 5-17	12C 5-17
Rubber Strip (corner glass mtg.)	12A 89-2	12A 89-2	12A 89-2
Screw, #5x3/8 RHWS (mtg. cabinet back clips)	1A 7-16-71	1A 7-16-71	1A 7-16-71
Screw, #10-24x½ (mtg. escutcheon)	1A 206-29-71	1A 206-29-71	1A 206-29-71
Shaft, Remote Control Switch	33B 170-8	33B 170-8	33B 170-8
Shield, Pilot Light	82A 24-2	82A 24-2	82A 24-2
Socket, Pilot Light	82A 30-1	82A 30-1	82A 30-1
Speaker, 6" PM	78C 134-5	78C 134-5	78C 134-5
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29
Trim Plate, Gold Finish			
Right Side	23D 291-17	23D 291-17	23D 291-17
Left Side	23D 291-16	23D 291-16	23D 291-16
Wedge, Picture Tube Mtg	33A 239	33A 239	33A 239
Window, Picture (tinted)	21D 97-2	21D 97-2	21D 97-2

§Drive Disc Assembly includes proper VHF Indicator.

*Orders for cabinets and certain matching parts will not be filled unless the damaged part cannot be repaired economically and full details are given with the order.

**Early production models which did not have Tone or Push-Button ON-OFF controls use knob part number 33D230-3 for the ON-OFF Volume, Contrast, Brightness and Vertical controls.

CABINET PARTS

Models may have suffix letter "C".

Description	L21E22 LA21E22 Mahogany	L21E23 LA21E23 Blond	L21E24 LA21E24 Sierra
Back, Cabinet (less line cord)			
for VHF	43E 298-7	43E 298-7	43E 298-7
for UHF	43E 298-17	43E 298-17	43E 298-17
Back, Cabinet (less line cord)	43E 298-17	43E 298-17	43E 298-17
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5
*Cabinet			
Mahogany	*35E 401-2	-------	-------
Blond	-------	*35E 401-3	-------
Sierra	-------	-------	*35E 401-4
Clip, Cabinet Back Mtg	18A 159	18A 159	18A 159
Clip, Window Retaining	2A 30-1	2A 30-1	2A 30-1
Escutcheon, Cabinet Front (Molded)			
Gold Finish	23E 286-1	23E 286-1	23E 286-1
Ferule, Leg	37C 165	37C 165	37C 165
Grille, Metal (above picture window)	36B 80-1	36B 80-1	36B 80-1
Grille Cloth	36D 86-9	36D 86-9	36D 86-9
Jewel, Escutcheon (Beige)	82A 32-3	82A 32-3	82A 32-3
Knobs and Associated Parts			
Tuning Knobs			
for VHF only models			
§Drive Disc Assembly	33C 258-4	33C 258-4	33C 258-4
for VHF-UHF models			
§Drive Disc Assembly	33C 258-5	33C 258-5	33C 258-5
UHF Indicator	33C 257-3	33C 257-3	33C 257-3
for all models			
Fine Tuning (UHF Selector)	33D 231-16	33D 231-16	33D 231-16
VHF Selector	33D 231-13	33D 231-13	33D 231-13
Preference Control Knobs			
Brightness	33C 230-5	33C 230-5	33C 230-5
Contrast, Volume	33C 230-2	33C 230-2	33C 230-2
Vertical, Tone	33C 230-3	33C 230-3	33C 230-3
Volume Spacer	33C 230-1	33C 230-1	33C 230-1
Knob Springs			
Conical, under push-button knob	19D 1-40	19D 1-40	19D 1-40
Drive Disc Retainer	18A 214	18A 214	18A 214
for Fine Tuning	18A 5-14	18A 5-14	18A 5-14
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11
for VHF Selector	18A 103	18A 103	18A 103
for Preference Controls	18A 191	18A 191	18A 191
*Legs, Cabinet Base Assem. (complete)			
Mahogany	*35E 401-52	-------	-------
Black	-------	*35E 401-53	*35E 401-53
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4
Monogram			
"A"	26C 68-1	26C 68-1	26C 68-1
"ADMIRAL"	23D 287-2	23D 287-2	23D 287-2
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33C 281-1
Plate, Pilot Light Mtg	15C 1617	15C 1617	15C 1617
Retainer (bottom glass mtg.)	15B 1589	15B 1589	15B 1589
Rod, Nylon, Horizontal Adj	33A 218-5	33A 218-5	33A 218-5
Rubber Escutcheon Bumper	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Strip, Top Glass Mtg	12C 5-17	12C 5-17	12C 5-17
Rubber Strip, Corner Glass Mtg	12A 89-2	12A 89-2	12A 89-2
Screw, #5x3/8 RHWS (mtg. cab't. back clips)	1A 7-16-71	1A 7-16-71	1A 7-16-71
Screw, #10-24x½ BHWD (mtg. tube strap)	1A 206-29-71	1A 206-29-71	1A 206-29-71
Shield, Pilot Light	82A 24-2	82A 24-2	82A 24-2
Speaker, 6" PM	78C 134-4	78C 134-4	78C 134-4
Strap, Tube Mounting	15B 1621	15B 1621	15B 1621
Swivel Plate, Metal	37C 126	37C 126	37C 126
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29
Trim Plate, Gold Finish			
Right Side	23D 291-17	23D 291-17	23D 291-17
Left Side	23D 291-18	23D 291-18	23D 291-18
Window, Picture (tinted)	21D 97-2	21D 97-2	21D 97-2

§Drive Disc Assembly includes proper VHF Indicator.

*Orders for cabinets and certain matching parts will not be filled unless full details are given with the order and unless the damaged part cannot be repaired economically.

CABINET PARTS

Models may have suffix letter "C".

Description	TH21E51C THA 21E51C Charcoal	TH21E52 C THA21E52C Mahogany	TH21E53C THA21E53C Blond
Back, Cabinet (less line cord)	43E 291-4	43E 291-4	43E 291-4
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5
*Cabinet, Metal			
Charcoal	*34E 123-6	---------	-------
Mahogany	---------	*34E 123-7	-------
Blond	---------	---------	*34E 123-8
Escutcheon, Cabinet Front (Molded)			
Gold Finish	23E 285-1	23E 285-1	23E 285-1
Feet, Cabinet	8A 12-5	8A 12-5	8A 12-5
Knobs and Associated Parts			
Tuning Knobs			
VHF Channel Selector	33D 231-4	33D 231-4	33D 231-4
VHF-UHF Channel Selector	33D 231-2	33D 231-2	33D 231-2
UHF Channel Indicator	33D 199-46	33D 199-46	33D 199-46
Fine Tuning	33D 231-8	33D 231-8	33D 231-8
Preference Control Knobs (Beige)			
Bass, Brightness	33C 230-5	33C 230-5	33C 230-5
Contrast, Volume, Treble	33C 230-2	33C 230-2	33C 230-2
Vertical	33C 230-3	33C 230-3	33C 230-3
Volume Spacer	33C 230-1	33C 230-1	33C 230-1
Knob Springs			
Conical, under push-button knob	19D 1-40	19D 1-40	19D 1-40
for Fine Tuning	18A 5-7	18A 5-7	18A 5-7
for Channel Selector	18A 103	18A 103	18A 103
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11
for Preference Controls	18A 191	18A 191	18A 191
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4
Monogram "High Fidelity 330"	23D 287-9	23D 287-9	23D 287-9
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33D 281-1
Plug, Speaker Cable	88A 5-5	88A 5-5	88A 5-5
Rod, Nylon, Horizontal Adj	33A 218-5	33A 218-5	33A 218-5
Rubber Escutcheon Bumper (small)	12B 79-5-1	12B 79-5-1	12B 79-5-1
(large)	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Strip (wedge glass support)	12A 84	12A 84	12A 84
Rubber Strip (corner glass mounting)	12A 89-2	12A 89-2	12A 89-2
Shield, Pilot Light	82A 24-2	82A 24-2	82A 24-2
Socket, Speaker (with 25" leads)	89A 6-4	89A 6-4	89A 6-4
Spring Clip Back Retainer	18A 161	18A 161	18A 161
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29
Trim Strips (see note below)			
Plain, Gold - Left Side	21D 98-1	21D 98-1	21D 98-1
Plain, Gold - Right Side	21D 98-2	21D 98-2	21D 98-2
Preference Controls	21D 98-7	21D 98-7	21D 98-7
"Selector"	21D 98-4	21D 98-4	21D 98-4
"Fine Tuning"	21D 98-5	21D 98-5	21D 98-5
Window, Glass	21D 96-2	21D 96-2	21D 96-2

PARTS FOR MATCHING BASES USED WITH ABOVE MODELS

	BTH21E51	BTH21E52	BTH21E53
Grille Cloth	36D 86-43	36D 86-44	36D 86-43
Monogram "A"	26C 68-1	26C 68-1	26C 68-1
Speakers, 5" PM	78B 139-3	78B 139-3	78B 139-3
8" PM	78D 135-7	78D 135-7	78D 135-7

NOTE: Trim strips can be fastened to escutcheon with PLI-O-BOND, a cement which can be obtained locally.

*Orders for cabinets and certain matching parts will not be filled unless full details are given with the order and unless the damaged part cannot be repaired economically.

CABINET PARTS

Models may have suffix letters "C".

Description	T21E1 TA21E1 Charcoal	T21E2 TA21E2 Bronze	T21E3 TA21E3 Beige
Back. Cabinet (less line cord and end bell)			
for VHF	43D 303-1	43D 303-2	43D 303-2
for UHF	43D 303-3	43D 303-4	43D 303-4
Back, Cabinet (less line cord and end bell)	43D 303-3	43D 303-3	43D 303-3
Bell, Cabinet Back	33C 228-1	33C 228-1	33C 228-1
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5
*Cabinet			
Charcoal	*34E 132-11	-------	-------
Bronze	-------	*34E 132-12	-------
Beige	-------	-------	*34E 132-13
Clip, Cabinet Back Mtg	18A 161	18A 161	18A 161
Clip, Window Retaining	2A 30-1	2A 30-1	2A 30-1
Escutcheon, Cabinet Front (Molded) Gold Finish	23E 296-2	23E 296-2	23E 296-2
Feet, Cabinet	8A 12-5	8A 12-5	8A 12-5
Grille, Speaker			
Flocked Black	36B 55-18	-------	-------
Flocked Burgundy	-------	36B 55-19	36B 55-19
Handgrip	-------	33C 270	33C 270
Knobs and Associated Parts			
Tuning Knobs			
VHF Channel Selector	33D 237-22	33D 237-22	33D 237-22
VHF-UHF Channel Selector	33D 237-21	33D 237-21	33D 237-21
UHF Channel Indicator	33D 237-24	33D 237-24	33D 237-24
Fine Tuning	33D 237-23	33D 237-23	33D 237-23
Preference Control Knobs			
Contrast, Volume, Vertical	33D 175-3	33D 175-3	33D 175-3
Volume Spacer	33C 230-1	33C 230-1	33C 230-1
Knob Springs			
for Fine Tuning	18A 5-3	18A 5-3	18A 5-3
for Channel Selector	18A 103	18A 103	18A 103
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11
for Preference Controls	18A 5-8	18A 5-8	18A 5-8
Legs, Cabinet	37D 168-2	37D 168-4	37D 168-4
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4
Monogram, "ADMIRAL"	23D 287-1	23D 287-1	23D 287-1
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33C 281-1
Retainer. Bottom Glass Mounting	15B 1589	15B 1589	15B 1589
Rod, Nylon, Horizontal Adj	33A 218-5	33A 218-5	33A 218-5
Rubber Escutcheon Bumper	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Pad, Bottom Glass Mtg	12C 5-53	12C 5-53	12C 5-53
Rubber Pad, Corner Glass Mtg	12A 89-2	12A 89-2	12A 89-2
Rubber Strip, Top Glass Mtg	12C 5-17	12C 5-17	12C 5-17
Rubber Wedge (used at top of window)	12A 84	12A 84	12A 84
Screw, Feet Mtg	1A 97-21-71	1A 97-21-71	1A 97-21-71
Screw, Speaker Mtg	1A 48-18-71	1A 48-18-71	1A 48-18-71
Screw, Escutcheon Mtg. #10-32x½	1A 206-29-71	1A 206-29-71	1A 206-29-71
Shaft, Plastic, Control	96A 26-3	96A 26-3	96A 26-3
Shield, Pilot Light	82A 24-2	82A 24-2	82A 24-2
Speaker, 4" PM	78B 136-1	78B 136-1	78B 136-1
Strap, Tube Mounting	15B 1621	15B 1621	15B 1621
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29
Trim Plate, Gold Finish			
Right Side	23D 291-17	23D 291-17	23D 291-17
Left Side	23D 291-18	23D 291-18	23D 291-18
Wedge, Picture Tube Mtg	33A 239	33A 239	33A 239
Well Assembly			
Charcoal	700C 84-1	-------	-------
Bronze	-------	700C 84-4	-------
Beige	-------	-------	700C 84-5
Window, Picture			
Clear Glass	21D 97-3	-------	-------
Tinted Glass	21D 97-4	21D 97-4	21D 97-4

*Orders for cabinets and certain matching parts will not be filled unless full details are given with the order and unless the damaged part cannot be repaired economically.

CABINET PARTS

Models may have suffix letter "C".

Description	TR21E21 Charcoal	TR21E22 Mahogany	TR21E23 Blond
Back, Cabinet (less line cord)	43E 291-5	43E 291-5	43E 291-5
Bearing, Plate	32A 335-2	32A 335-2	32A 335-2
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5
*Cabinet, Metal			
Charcoal	*34E 123-1	-------	-------
Mahogany	-------	*34E 123-2	-------
Blond	-------	-------	*34E 123-3
Clip, Cabinet Back Mtg	18A 161	18A 161	18A 161
Clip, Window Retaining	2A 30-1	2A 30-1	2A 30-1
Escutcheon, Cabinet Front (Molded) Gold Finish	23E 285-2	23E 285-2	23E 285-2
Feet, Cabinet	8A 12-5	8A 12-5	8A 12-5
Grille, Metal (above picture window)	36B 78-2	36B 78-2	36B 78-2
Insulator (for microphone clamp)	32A 281	32A 281	32A 281
Knobs and Associated Parts			
Tuning Knobs			
VHF Channel Selector	33D 231-4	33D 231-4	33D 231-4
Fine Tuning	33D 231-8	33D 231-8	33D 231-8
Preference Control Knobs (NOTE: Early production sets use beige plastic, later production use gold finish)			
ON-OFF-Volume, Spacer (Beige)	33C 230-1	33C 230-1	33C 230-1
(Gold)	33C 230-6	33C 230-6	33C 230-6
ON-OFF-Volume, Contrast (Beige)	33C 230-2	33C 230-2	33C 230-2
(Gold)	33C 230-7	33C 230-7	33C 230-7
Brightness (Beige)	33C 230-5	33C 230-5	33C 230-5
(Gold)	33C 230-10	33C 230-10	33C 230-10
Vertical, Tone (Beige)	33C 230-3	33C 230-3	33C 230-3
(Gold)	33C 230-8	33C 230-8	33C 230-8
Remote-Manual (at rear)	33A 260	33A 260	33A 260
Knob Springs			
Conical, under push-button knob	19D 1-40	19D 1-40	19D 1-40
for Fine Tuning	18A 5-7	18A 5-7	18A 5-7
for Channel Selector	18A 103	18A 103	18A 103
for Preference Controls	18A 191	18A 191	18A 191
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4
Microphone and Cable	78B 137	78B 137	78B 137
Monogram, "ADMIRAL"	23D 287-5	23D 287-5	23D 287-5
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33C 281-1
Rod, Nylon, Horizontal Adj	33A 218-5	33A 218-5	33A 218-5
Rubber Escutcheon Bumper (small)	12B 79-5-1	12B 79-5-1	12B 79-5-1
(large)	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Strip, Window Retainer	12C 5-53	12C 5-53	12C 5-53
Screen, Speaker, Flocked	36B 55-18	36B 55-19	36B 55-20
Screw, Mtg. Speaker, #3x3/4 BDHD	1A 28-22-70	1A 28-22-70	1A 28-22-70
Screw, Mtg. Escutcheon, #6-32x½ HHST	1A 206-12-71	1A 206-12-71	1A 206-12-71
Shaft, Manual-Remote	33B 170-9	33B 170-9	33B 170-9
Shield, Pilot Light	82A 24-2	82A 24-2	82A 24-2
Socket, Pilot Light	82A 35-1	82A 35-1	82A 35-1
Speaker, 6" PM	78B 134-3	78B 134-3	78B 134-3
Strip, Wedge, Glass Support	12A 84	12A 84	12A 84
Strip, Corner Glass Mounting	12A 89-2	12A 89-2	12A 89-2
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29
Trim Strips (see note below)			
Plain, Gold - Left Side	21D 98-1	21D 98-1	21D 98-1
Plain, Gold - Right Side	21D 98-2	21D 98-2	21D 98-2
Preference Controls	21D 98-6	21D 98-6	21D 98-6
"Selector"	21D 98-4	21D 98-4	21D 98-4
"Fine Tuning"	21D 98-5	21D 98-5	21D 98-5
Wedge, Picture Tube Mounting	33A 239	33A 239	33A 239
Window, Picture (tinted)	21D 96-2	21D 96-2	21D 96-2

NOTE: Trim strips can be fastened to escutcheon with PLI-O-BOND, a cement which can be obtained locally.

*Orders for cabinets and certain matching parts will not be filled unless full details are given with the order and unless the damaged part cannot be repaired economically.

CABINET PARTS

Models may have suffix letter "C".

Description	T21E21 TA21E21 Charcoal	T21E22 TA21E22 Mahogany	T21E23 TA21E23 Blond
Back, Cabinet (less line cord)			
for VHF	43E 291-1	43E 291-1	43E 291-1
for UHF	43E 291-3	43E 291-3	43E 291-3
Bearing Plate			
for VHF	32A 335-2	32A 335-2	32A 335-2
for UHF	32A 335-1	32A 335-1	32A 335-1
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5
*Cabinet, Metal			
Charcoal	*34E 123-1	-------	-------
Mahogany	-------	*34E 123-2	-------
Blond	-------	-------	*34E 123-3
Clip, Cabinet Back Mtg	18A 161	18A 161	18A 161
Clip, Window Retaining	2A 30-1	2A 30-1	2A 30-1
Escutcheon, Cabinet Front (Molded)			
Gold Finish	23E 285-1	23E 285-1	23E 285-1
Feet, Cabinet	8A 12-5	8A 12-5	8A 12-5
Grille, Metal (above picture window)	36B 78-1	36B 78-1	36B 78-1
Knobs and Associated Parts			
Tuning Knobs			
VHF Channel Selector	33D 231-3	33D 231-3	33D 231-3
VHF-UHF Channel Selector	33D 231-1	33D 231-1	33D 231-1
UHF Channel Indicator	33D 199-46	33D 199-46	33D 199-46
Fine Tuning	33D 231-8	33D 231-8	33D 231-8
Preference Control Knobs (NOTE: Early production sets use beige plastic, later production use gold finish)			
ON-OFF-Volume, Spacer (Beige)	33C 230-1	33C 230-1	33C 230-1
(Gold)	33C 230-6	33C 230-6	33C 230-6
ON-OFF-Volume, Contrast (Beige)	33C 230-2	33C 230-2	33C 230-2
(Gold)	33C 230-7	33C 230-7	33C 230-7
Brightness (Beige)	33C 230-5	33C 230-5	33C 230-5
(Gold)	33C 230-10	33C 230-10	33C 230-10
Vertical, Tone (Beige)	33C 230-3	33C 230-3	33C 230-3
(Gold)	33C 230-8	33C 230-8	33C 230-8
Knob Springs			
Conical, under push-button knob.	19D 1-40	19D 1-40	19D 1-40
for Fine Tuning	18A 5-7	18A 5-7	18A 5-7
for Channel Selector	18A 103	18A 103	18A 103
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11
for Preference Controls	18A 191	18A 191	18A 191
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4
Monogram, "ADMIRAL"	23D 287-2	23D 287-2	23D 287-2
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33C 281-1
Retainer, Picture Window, Bottom	15B 1589	15B 1589	15B 1589
Rod, Nylon, Horizontal Adj	33A 218-5	33A 218-5	33A 218-5
Rubber Escutcheon Bumper (small)	12B 79-5-1	12B 79-5-1	12B 79-5-1
(large)	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Pad, Corner Glass Mounting	12A 89-2	12A 89-2	12A 89-2
Rubber Strip, Wedge, Glass Support	12A 84	12A 84	12A 84
Rubber Strip, Window Retainer	12C 5-53	12C 5-53	12C 5-53
Screen, Speaker, Flocked	36B 55-18	36B 55-19	36B 55-20
Screw, Mtg. Speaker, #3x3/4 BDHD	1A 28-22-70	1A 28-22-70	1A 28-22-70
Screw, Mtg. Escutcheon, #6-32x½ HHST	1A 206-12-71	1A 206-12-71	1A 206-12-71
Shield, Pilot Light	82A 24-2	82A 24-2	82A 24-2
Socket, Pilot Light	82A 35-1	82A 35-1	82A 35-1
Speakers			
4" PM	-------	78B 136-4	78B 136-4
6" PM	78B 134-4	78B 134-4	78B 134-4
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29
Trim Strips (see note below)			
Plain, Gold - Left Side	21D 98-1	21D 98-1	21D 98-1
Plain, Gold - Right Side	21D 98-2	21D 98-2	21D 98-2
Preference Controls	21D 98-3	21D 98-3	21D 98-3
"Selector"	21D 98-4	21D 98-4	21D 98-4
"Fine Tuning"	21D 98-5	21D 98-5	21D 98-5
Wedge, Picture Tube Mounting	33A 239	33A 239	33A 239
Window, Picture (tinted)	21D 96-2	21D 96-2	21D 96-2

NOTE: Trim strips can be fastened to escutcheon with PLI-O-BOND, a cement which can be obtained locally.

*Orders for cabinets and certain matching parts will not be filled unless full details are given with the order and unless the damaged part cannot be repaired economically.

Warning: The chassis of this receiver is connected directly to one side of the 117 volt, 60 cycle power line. Depending upon the position of the line cord plug in the wall outlet, the total AC line voltage may exist between the chassis and any ground object. When installing or servicing, do not touch the chassis unless adequate safety precautions are taken. Never touch the chassis and a ground (radiators, pipes, etc.) at the same time.

Do not ground chassis or connect test equipment directly to it, unless an isolation transformer is used. If an isolation transformer is not available, a neon lamp can be used to determine if the chassis is "hot". Connect an electrician's neon tester (General Cement's "Ne-o-lite" or equivalent) between the receiver chassis (not control shafts) and some grounded point, such as electrical conduit, water pipe, etc. If the neon lamp glows, the chassis is "hot" and the line cord plug should be reversed. Make the same check with the neon lamp connected between ground and the ground terminal of the test equipment. If the lamp glows, reverse the line cord to the test equipment.

SCHEMATIC NOTES

② ③, . . . etc. indicate production changes covered by a Run number. Run numbers are stamped at the rear of the chassis. Brief description of Run changes given on schematic.

(A1), (A2), . . (Y), (Z), etc. indicate alignment points and connections.

Important: Before making waveform and voltage measurements, see instructions below.

Fixed resistor values shown in ohms ±10% tolerance, ½ watt; capacitor values shown in micromicrofarads ± 20% tolerance unless otherwise specified.

Note: K=x1000, MEG=x1,000,000, MF=microfarad.

CONDITIONS FOR OBSERVING WAVEFORMS

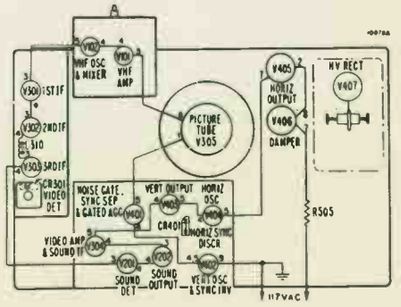
Caution: Pulsed high voltages are present on the caps of V405 and V407, and at pin 3 of V406. DO NOT attempt to observe waveforms at these points unless suitable test equipment is used. Waveforms at these points may be taken with a capacitive voltage divider probe. The waveform at pin 3 of V406 may also be taken by clipping or twisting the lead from the high side of the oscilloscope over the insulation on the lead connecting to pin 3. If the waveform is taken in this manner, its shape will be the same, but the peak-to-peak voltage will be somewhat lower, depending on the degree of coupling between oscilloscope and lead connecting to pin 3 of V406.

- Waveforms should closely resemble those shown on the schematic.
- Waveforms are taken with a transmitted signal input to the television chassis.
- Set all controls for a normal picture. After the receiver is set for a normal picture, turn the CONTRAST control fully clockwise.
- Oscilloscope sweep set at 30 cycles for vertical waveforms and at 7,875 cycles for horizontal waveforms to permit 2 cycles to be observed.
- Peak-to-peak voltages will vary slightly from those shown on the schematic, depending on the test equipment employed and chassis parts tolerance.

CONDITIONS FOR MEASURING VOLTAGES

Caution: Pulsed high voltages are present on the caps of V405 and V407, and at pin 3 of V406. DO NOT attempt to measure voltages at these points without suitable test equipment. A VTVM with a high voltage probe may be used when measuring picture tube 2nd anode voltage.

- Set the CHANNEL SELECTOR on an unused channel. CONTRAST and SUPER RANGE FINDER controls fully clockwise. All other controls counterclockwise. Do not disturb HORIZONTAL DRIVE or HORIZONTAL HOLD adjustments.
- Antenna disconnected and terminals shorted together.
- Line voltage: 117 volt AC.
- DC voltages measured with a VTVM between tube socket terminals and chassis, unless otherwise indicated.
- Voltages measured with tubes in socket.
- Voltages marked (*) will vary widely with control settings.



TUBE LOCATIONS AND HEATER CIRCUIT

†25CD6GB in chassis Run 10 thru 22; 12DQ6A in chassis Run 23 or higher.

V101—4BC8
V102—5CG8
V201—3DT6
V202—12CU5
V301—3BZ6
V302—3BZ6
V303—3CB6
CR301—1N60, 1N87 or 1N295
V304—6AW8A
V305—21CEP4A
CR401—Dual Selenium Diode 93B5-4
V401—3BU8
V402—7AU7
V403—12DB5
404—6CG7
405—†
V406—19AU4GTA
V407—1B3GT

CHASSIS 16AB1, AD1, AE1, AG1, AL1, AU1C, AW1C, B1, D1, E1, G1, J1, K1, L1, U1C, W1C(Late)

Figure 68. Schematic for 16B1, 16B1C, 16D1, 16E1, 16E1C, 16G1, 16G1C, 16L1, and 16L1C Television Chassis Stamped Run 10 Through Run 28. Horizontal Output Shown, Used Only in Sets with Suffix Letter "C" Added to Chassis Number. See Figure 57 for Horizontal Output Circuit in Chassis Without Suffix Letter "C" (Stamped Run 10 Through Run 22).

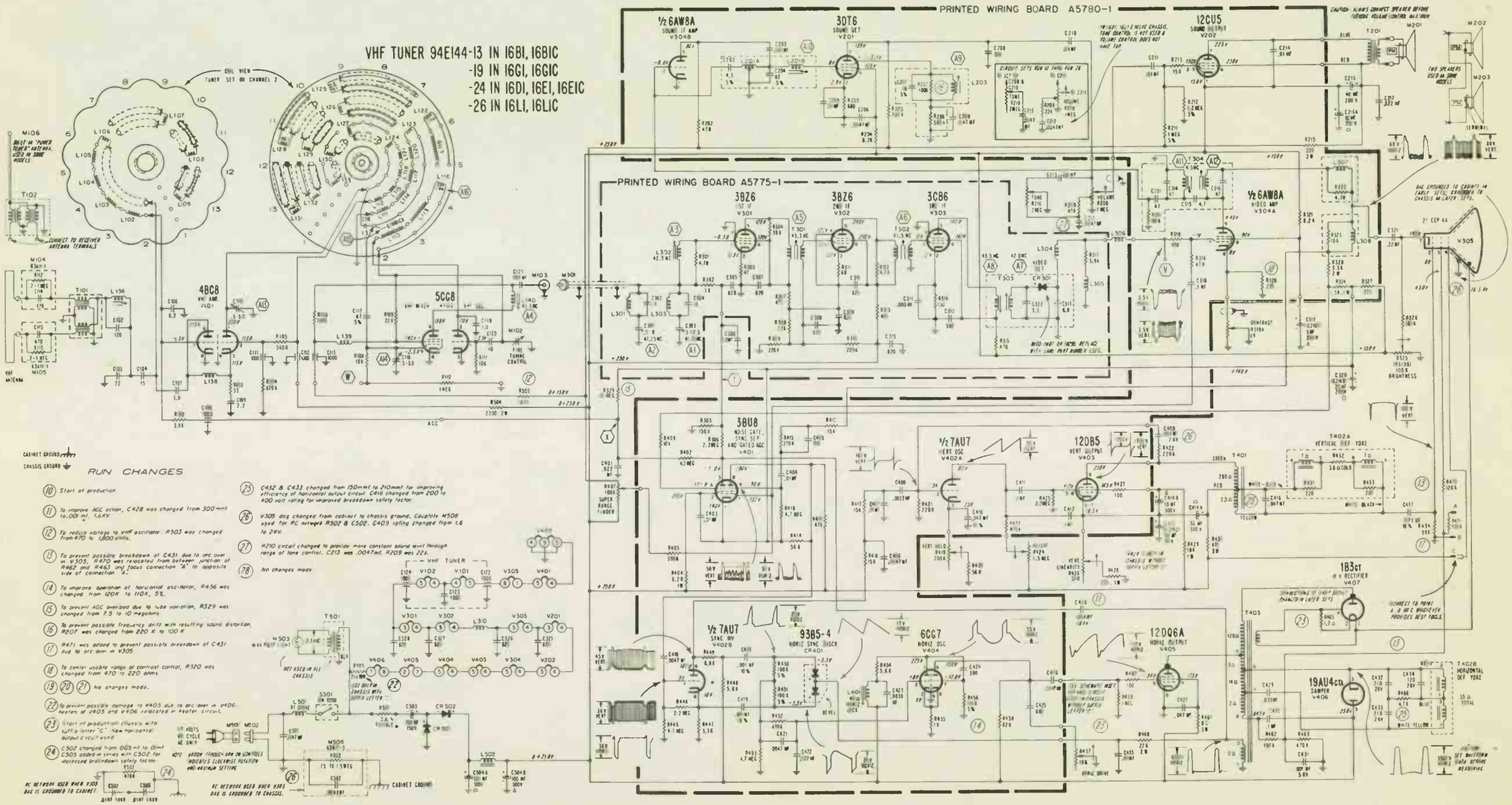
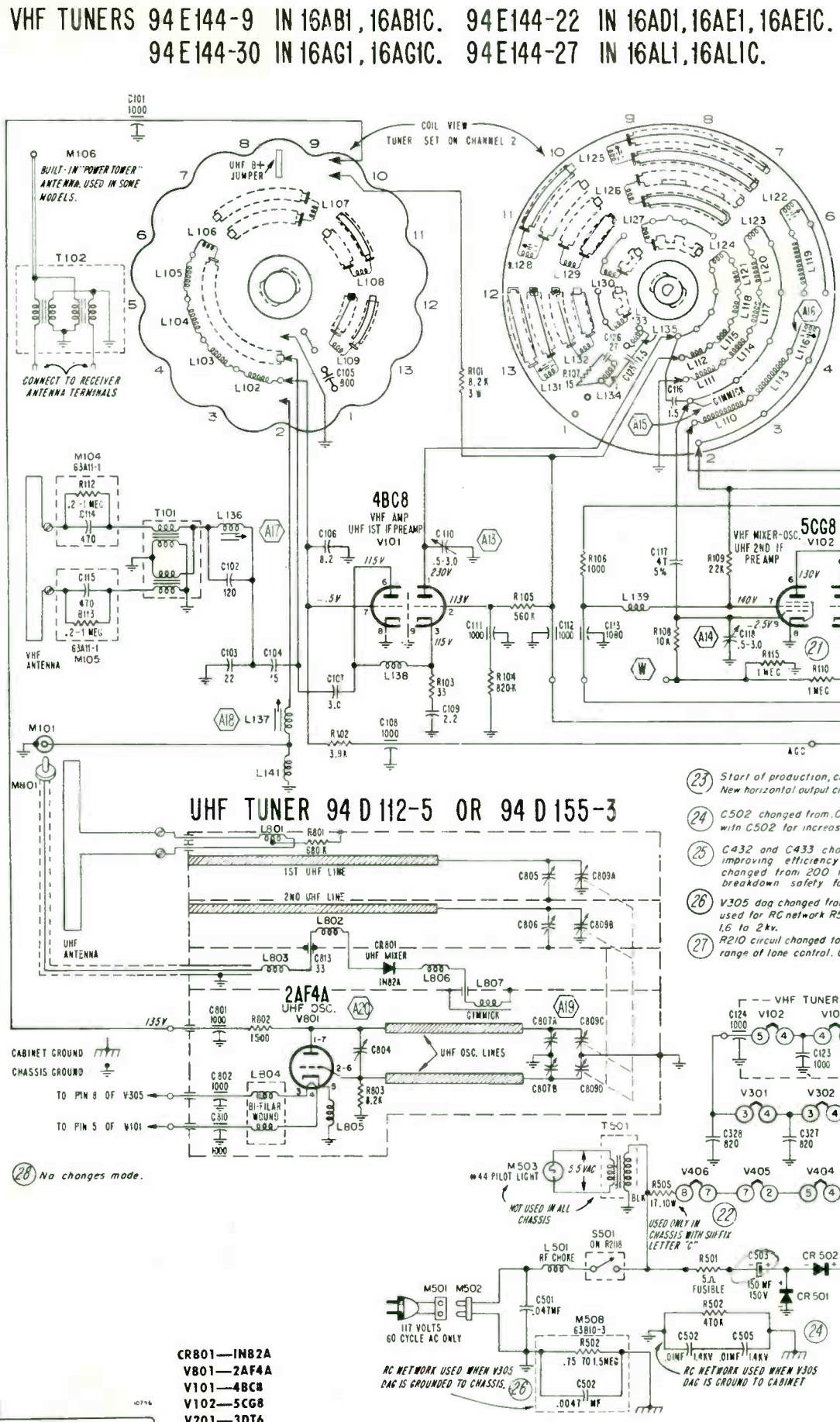


**Figure 69. Schematic for 16AB1, 16AB1C, 16AD1, 16AE1, 16AE1C, 16AG1, 16AG1C, 16A
Used Only in Sets with Suffix Letter "C" Added to Chassis Number. See Figure 57 fo**

VHF TUNERS 94E144-9 IN 16AB1, 16AB1C. 94E144-22 IN 16AD1, 16AE1, 16AE1C.
94E144-30 IN 16AG1, 16AG1C. 94E144-27 IN 16AL1, 16AL1C.



RUN CHANGES

(10) Start of production.

(11) To improve AGC action, C428 was changed from 300 mmf to .001 mf, 1.6 KV.

(12) To reduce voltage to VHF oscillator, R503 was changed from 470 to 1,800 ohms.

(13) To prevent possible breakdown of C431 due to arc over in V305, R470 was relocated from between junction of R462 and R463 and focus connection "A" to opposite side of connection "A"

(14) To improve operation of horizontal oscillator, R456 was changed from 120K to 100K, 5%

(15) To prevent AGC overload due to tube variation, R329 was changed from 7.5 to 10 ohms.

(16) To prevent possible frequency drift with resulting sound distortion, R207 was changed from 220K to 100K.

(17) R470 was added to prevent possible breakdown of C431 due to arc over in V305.

(18) To center usable range of contrast control, R320 was changed from 470 to 220 ohms.

(19) (28) No changes made.

(21) R115 added to prevent AGC overload in very strong signal areas.

(22) To prevent possible damage to V405 due to arc over in V406, heaters of V405 and V406 relocated in heater circuit.

(23) Start of production, chassis with suffix letter "C" New horizontal output circuit used.

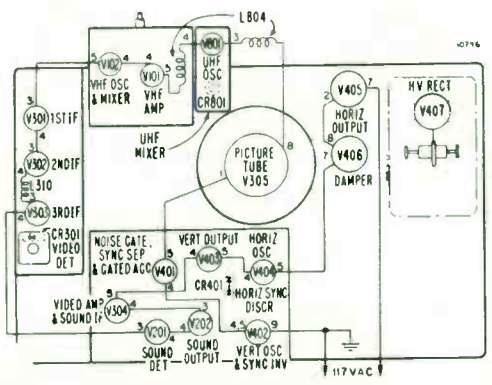
(24) C502 changed from .005 mf to .01 mf. C505 added in series with C502 for increased breakdown safety factor.

(25) C432 and C433 changed from 150 mmf. to 210 mmf. for improving efficiency of horizontal output circuit. C416 changed from 200 to 400 volt rating for improved breakdown safety factor.

(26) V305 dag changed from cabinet to chassis ground. Couplole M508 used for RC network R502 & C502. C409 rating changed from 1.6 to 2 kv.

(27) R210 circuit changed to provide more constant sound level through range of tone control. C213 was .0047 mf. R209 was 22k.

(28) No changes mode.

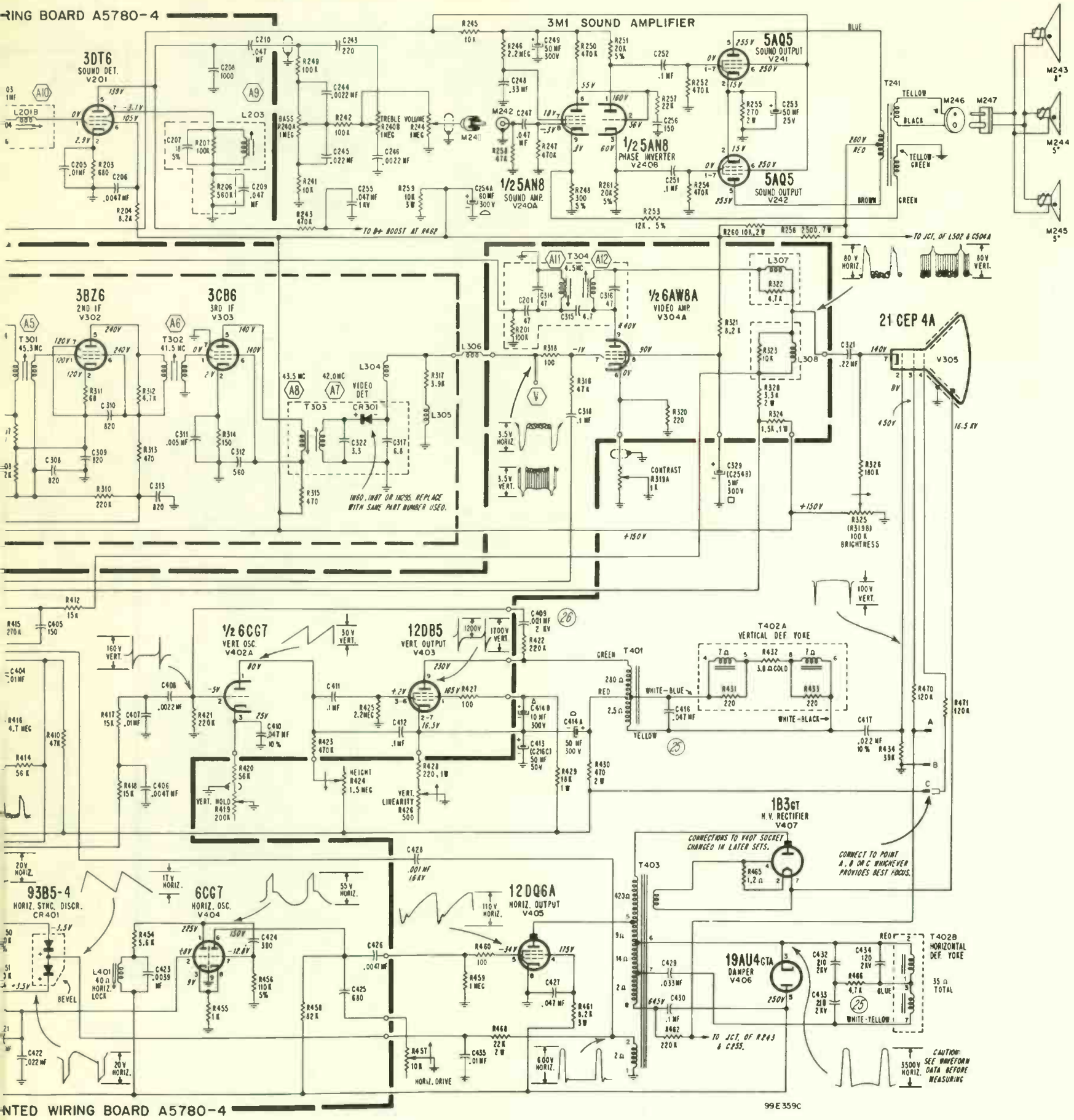


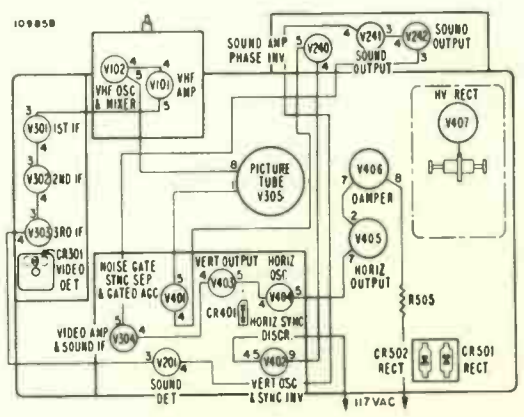
TUBE LOCATIONS AND HEATER CIRCUIT

CR801—IN82A
V801—2AF4A
V101—4BC8
V102—5CG8
V201—3DT6
V202—12CU5
V301—3BZ6
V302—3BZ6
V303—3CB6
CR301—1N60, 1N87 or 1N295
V304—6AW8A
V305—21CEP4A
CR401—Dual Selenium Diode 9385-4
V401—3BU8
V402—7AU7
V403—12DB5
V404—6CG7
V405— †
V406—19AU4GTA
V407—1B3GT

†25CD6GB in chassis Run 10 thru 22; 12DQ6A in chassis Run 23 or higher.

Television Chassis Stamped Run 24 Through Run 28.



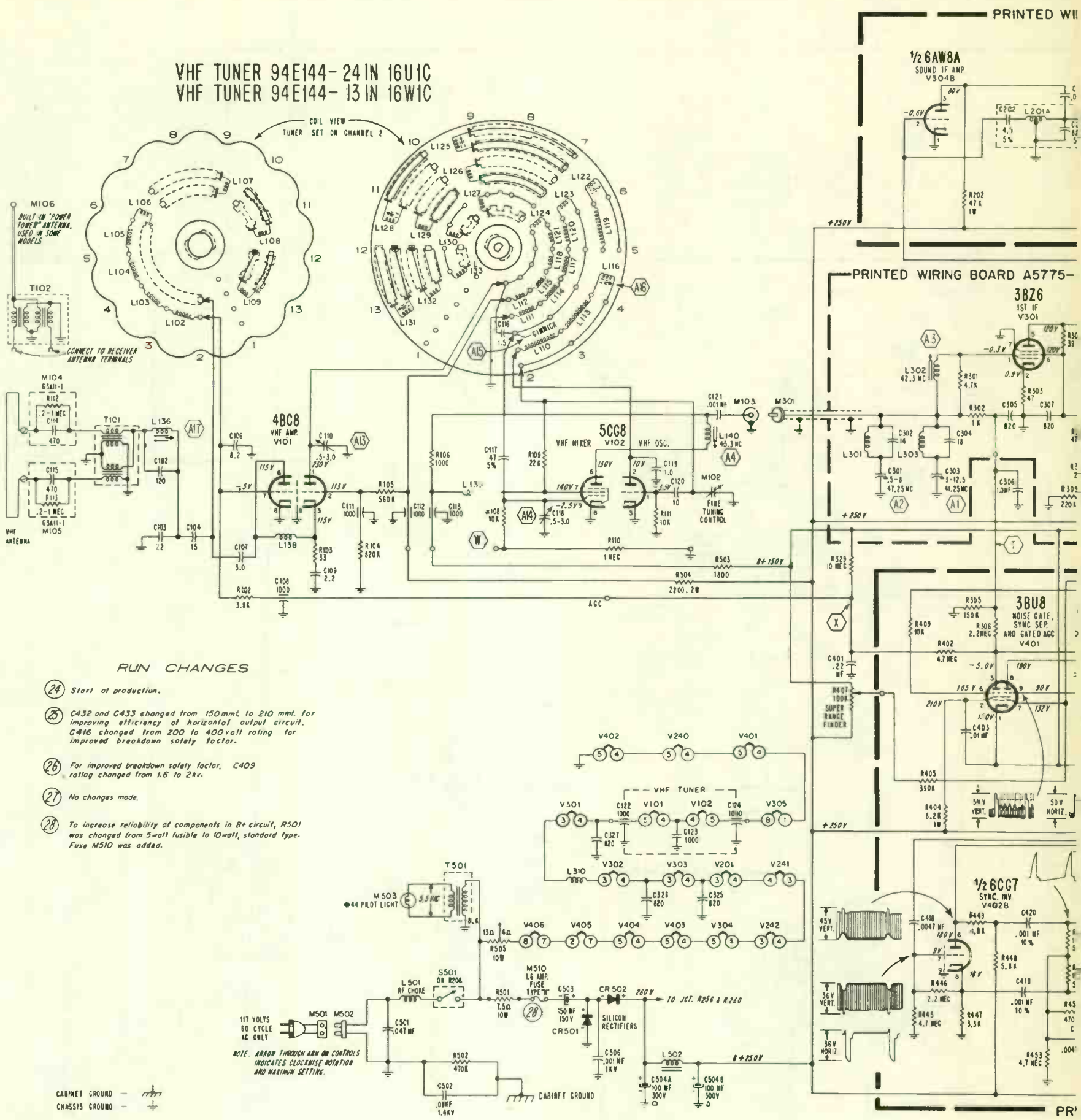


TUBE LOCATIONS AND HEATER CIRCUIT

V101—4BC8
V102—5CG8
V201—3DT6
V240—5AN8
V241—5AQ5
V242—5AQ5
V301—3BZ6
V302—3BZ6
V303—3CB6
CR301—1N60, 1N87 or 1N295
V304—6AW8A
V305—21CEP4A
CR401—Dual Selenium Diode 93B5-4
V401—3BU8
V402—6CG7
V403—12DB5
V404—6CG7
V405—12DQ6A
V406—19AU4GTA
V407—1B3GT

CHASSIS 16AB1, AD1, AE1, AG1, AL1, AU1C, AW1C, B1, D1, E1, G1, J1, K1, L1, U1C, W1C(Late)

Figure 70. Schematic for 16U1C and 16W1C T-



RUN CHANGES

(24) *Start of production.*

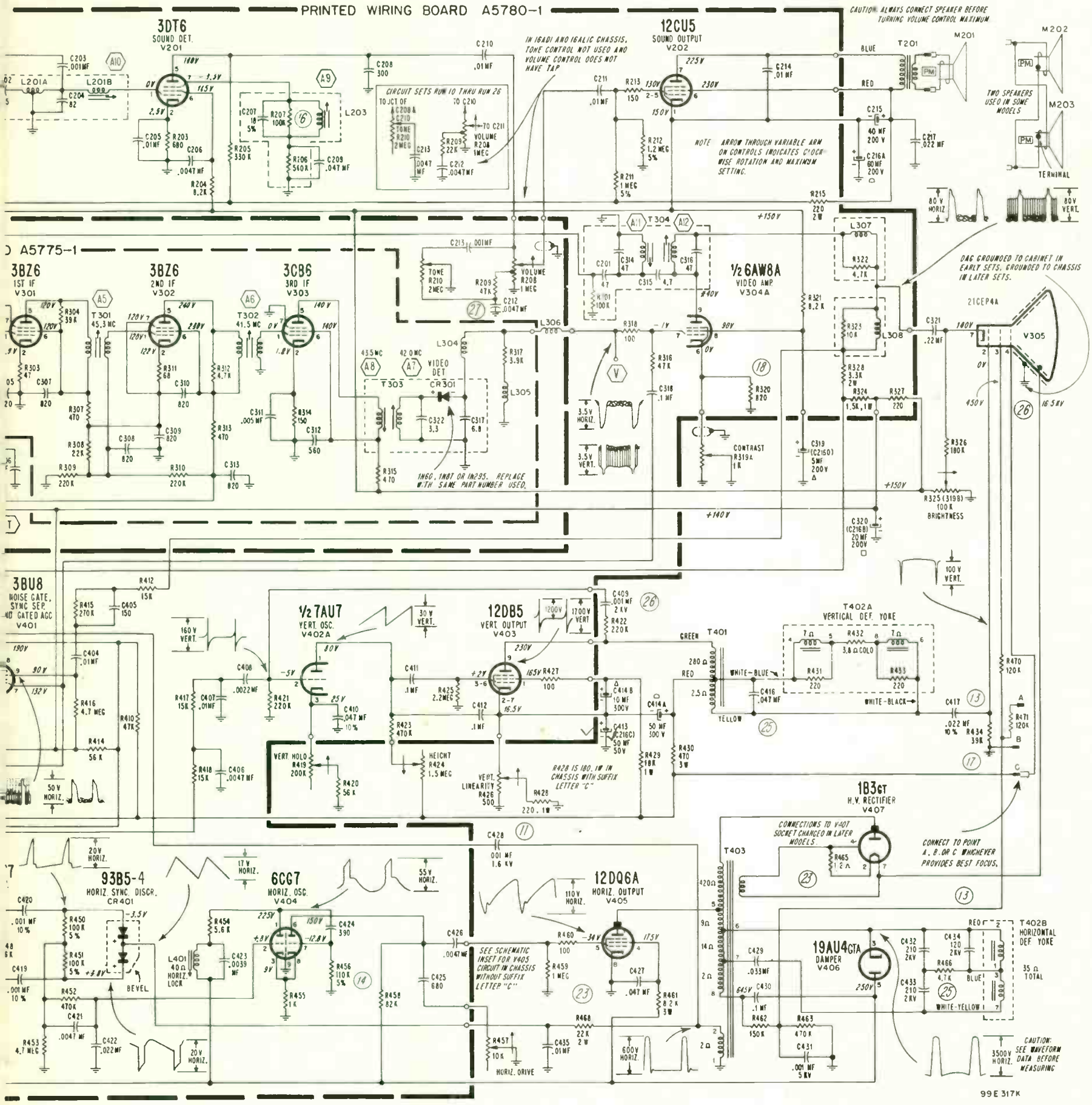
(25) *C432 and C433 changed from 150mmf. to 210 mmf. for improving efficiency of horizontal output circuit. C416 changed from 200 to 400volt rating for improved breakdown safety factor.*

(26) *For improved breakdown safety factor, C409 rating changed from 1.6 to 2kv.*

(27) *No changes made.*

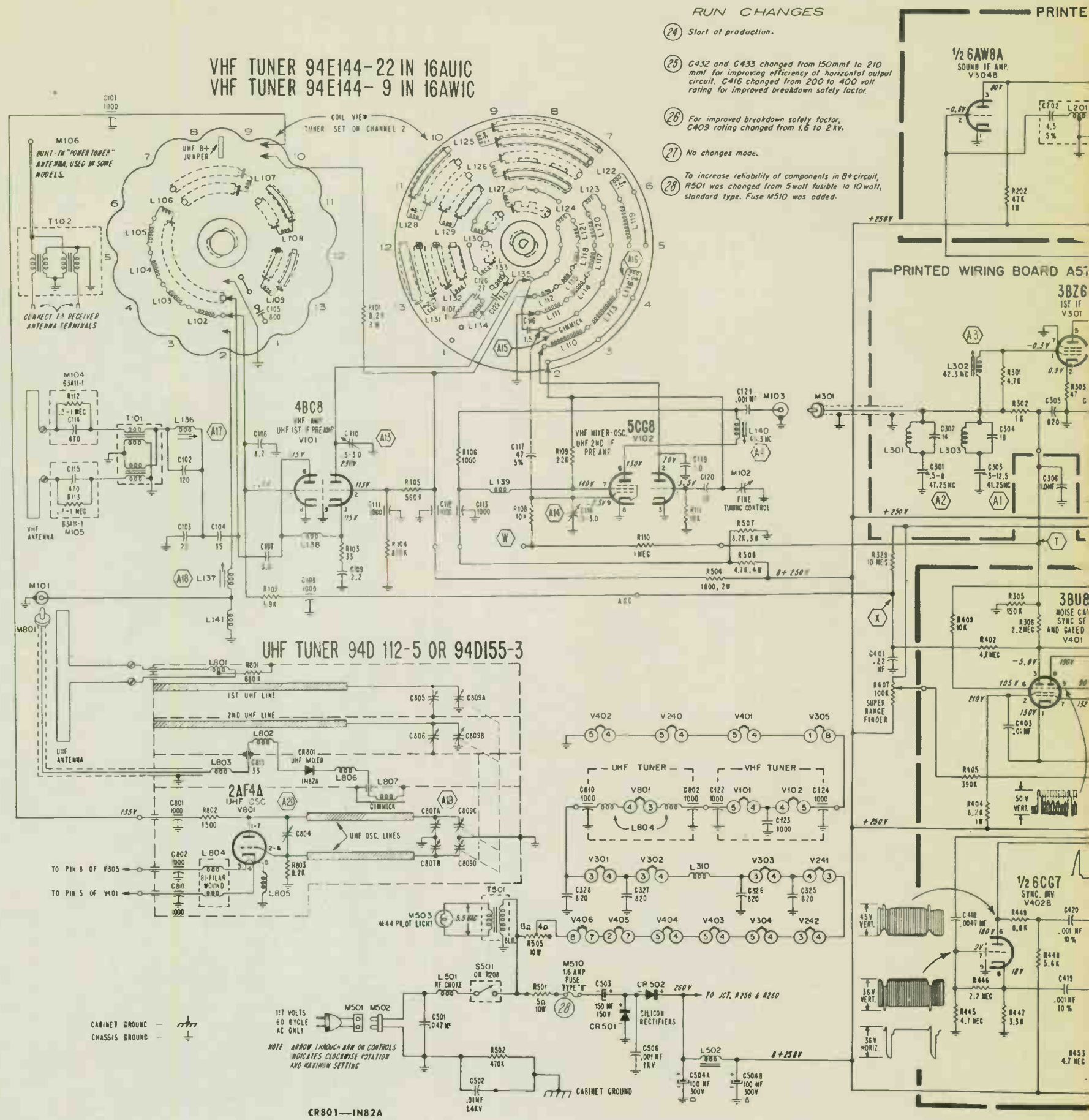
(28) *To increase reliability of components in B+ circuit, R501 was changed from 5watt fusible to 10watt, standard type. Fuse M510 was added.*

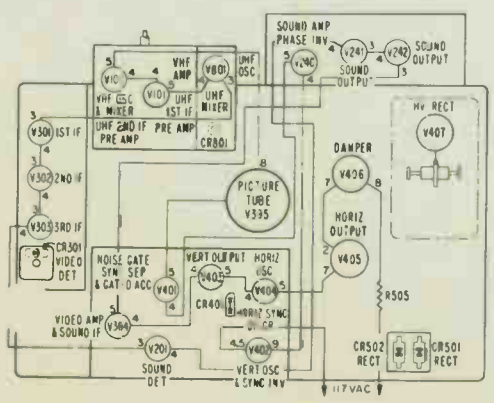
1, and 16AL1C Television Chassis Stamped Run 10 Through Run 28. Horizontal Output Shown, Horizontal Output Circuit in Sets Without Suffix Letter "C" (Stamped Run 10 Through Run 22).



CHASSIS 16AB1, AD1, AE1, AG1, AL1,
AU1C, AW1C, B1, D1, E1,
G1, J1, K1, L1, U1C, W1C(Late)

Figure 71. Schematic for 16AU1C and 16AW1C

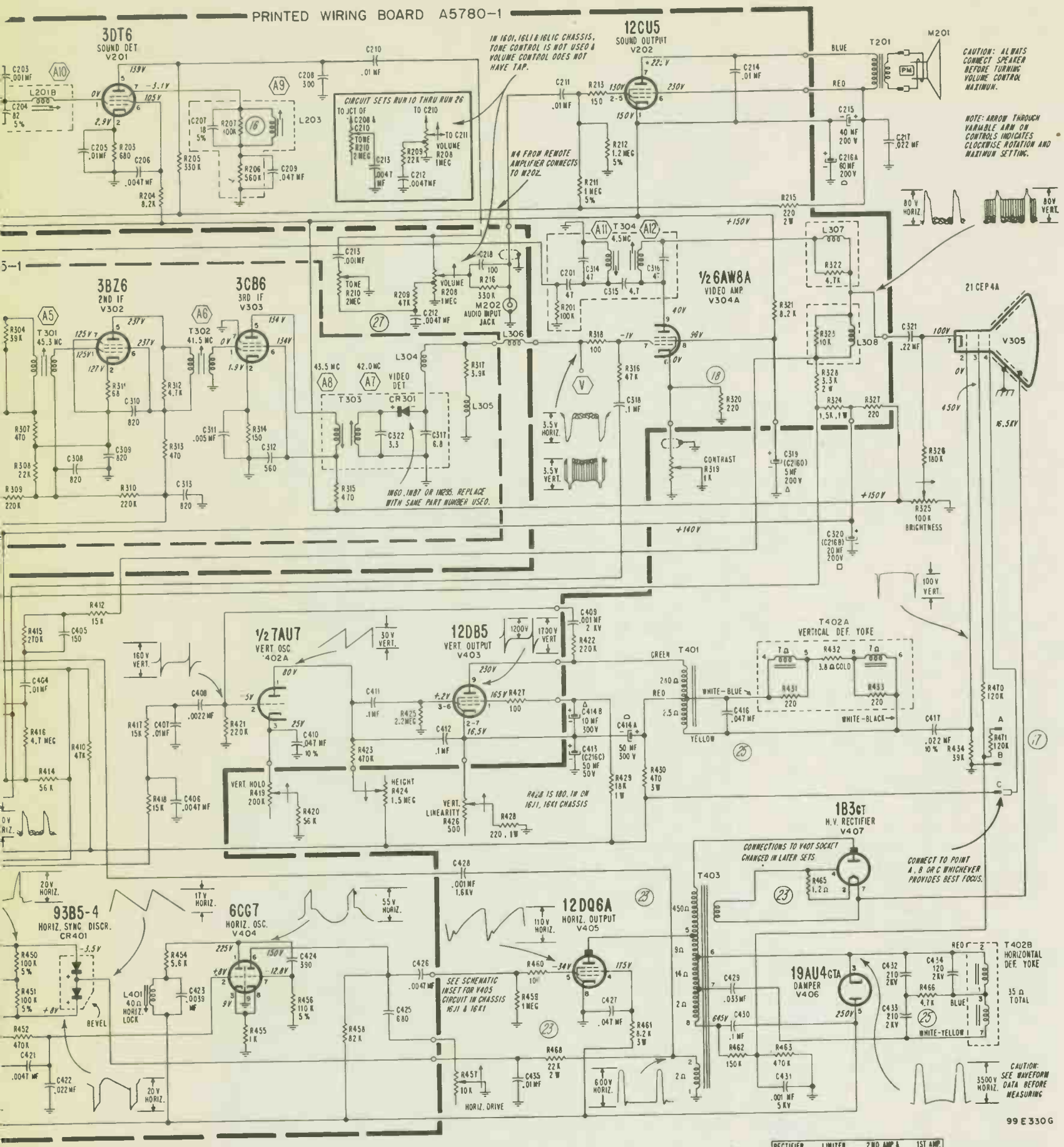


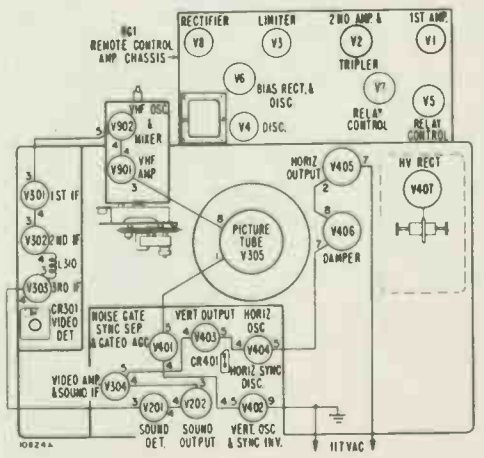


TUBE LOCATIONS AND HEATER CIRCUIT

CR801—1N82A
V801—2AF4A
V101—4BC8
V102—5CG8
V201—3DT6
V240—5AN8
V241—5AQ5
V242—5AQ5
V301—3BZ6
V302—3BZ6
V303—3CB6
CR301—1N60, 1N87 or 1N295
V304—6AW8A
V305—21CEP4A
CR401—Dual Selenium Diode 9385-4
V401—3BU8
V402—6CG7
V403—12DB5
V404—6CG7
V405—12DQ6A
V406—19AU4GTA
V407—1B3GT

**Run 28. Horizontal Output Shown, Used Only in Sets with Suffix Letter "C" Added to Chassis Num-
Without Suffix Letter "C" (Stamped Run 10 Through Run 22).**



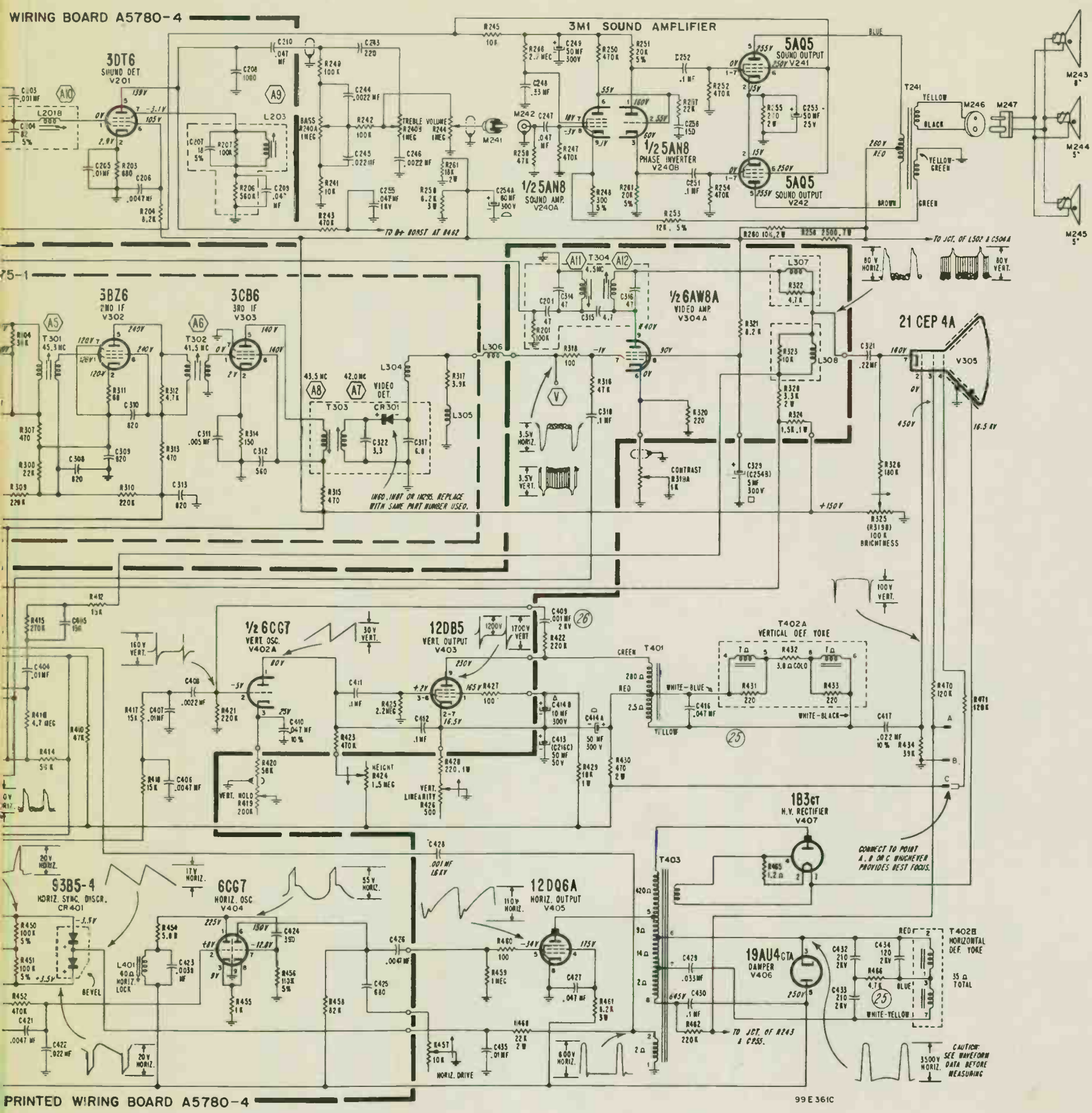


V901—2BN4
V902—5CG8
V201—3DT6
V202—12CU5
V301—3BZ6
V302—3BZ6
V303—3CB6
CR301—1N60, .1N87 or 1N295
V304—6AW8A
V305—21CEP4A
CR401—Dual Selenium Diode 93B5-4
V401—3BU8
V402—7AU7
V403—12DB5
V404—6CG7
V405—†
V406—19AU4GTA
V407—1B3GT

†25CD6GB in chassis Run 10 thru 22; 12DQ6A in chassis Run 23 or higher.

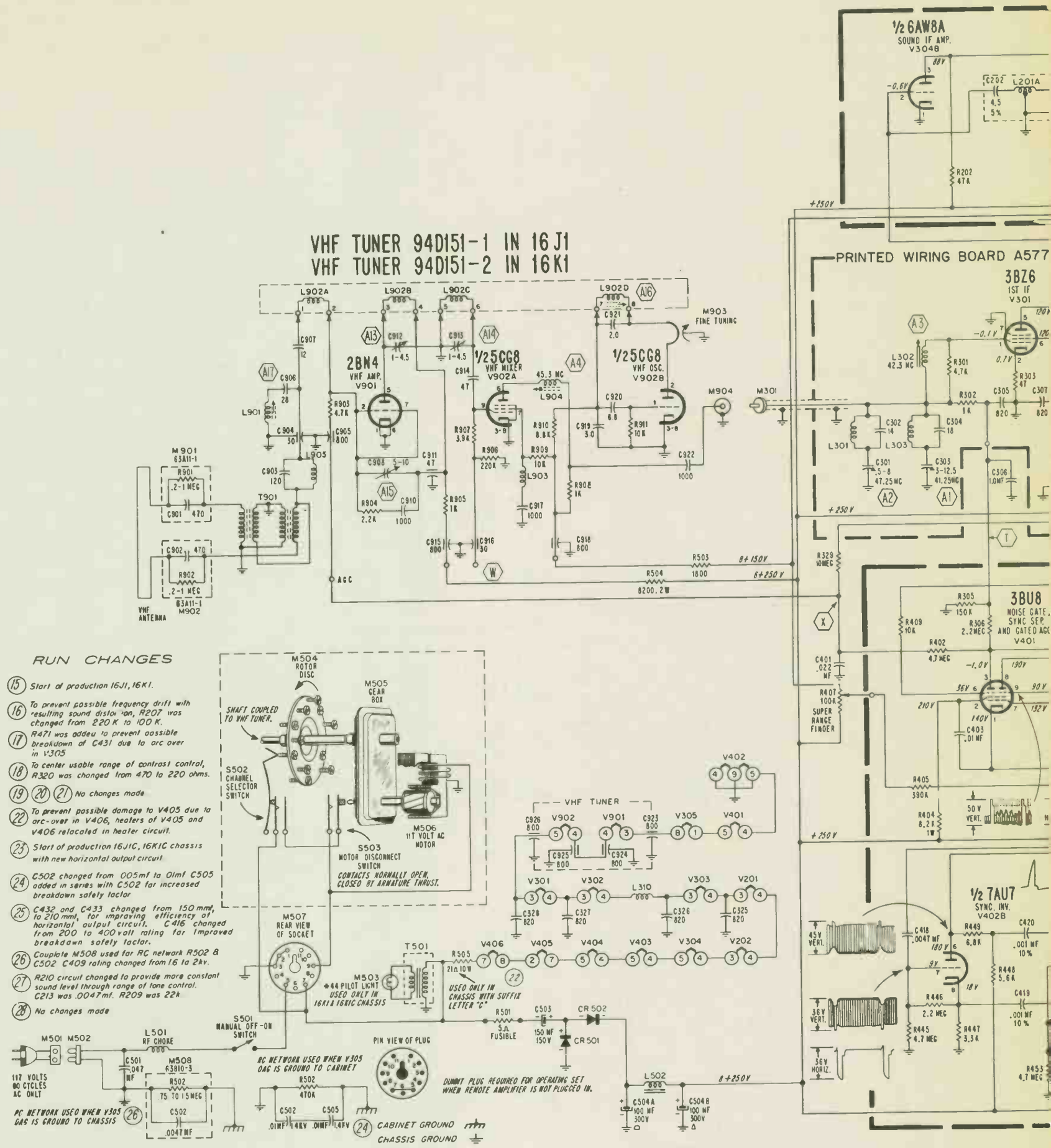
TUBE LOCATIONS AND HEATER CIRCUIT

Television Chassis Stamped Run 24 Through Run 28.



CHASSIS 16AB1, AD1, AE1, AG1, AL1, AU1C, AW1C, B1, D1, E1, G1, J1, K1, L1, U1C, W1C(Late)

Figure 72. Schematic for 16J1, 16J1C, 16K1, and 16K1C Television Chassis Stamped Run 15 Through-
ber. See Figure 57 for Horizontal Output Circuit in Sets V-



RUN CHANGES

(15) Start of production 16J1, 16K1.

(16) To prevent possible frequency drift with resulting sound distortion, R207 was changed from 220 K to 100 K.

(17) R471 was added to prevent possible breakdown of C431 due to arc over in V305

(18) To center usable range of contrast control, R320 was changed from 470 to 220 ohms.

(19) (20) (21) No changes made

(22) To prevent possible damage to V405 due to arc-over in V406, heaters of V405 and V406 relocated in heater circuit.

(23) Start of production 16J1C, 16K1C chassis with new horizontal output circuit.

(24) C502 changed from .005mf to .01mf C505 added in series with C502 for increased breakdown safety factor

(25) C432 and C433 changed from 150 mmf, to 210 mmf, for improving efficiency of horizontal output circuit. C416 changed from 200 to 400 volt rating for improved breakdown safety factor.

(26) Coupiate M508 used for RC network R502 & C502 C409 rating changed from 1.6 to 2kv.

(27) R210 circuit changed to provide more constant sound level through range of tone control. C213 was .0047mf. R209 was 22k

(28) No changes made

Admiral

SERVICE DATA SUPPLEMENT No. ST597-3

for models using

16B1, 16AB1, 16D1, 16AD1, 16E1, 16AE1, 16G1, 16AG1, 16J1, 16K1, 16L1, 16AL1, 16U1C, 16AU1C, 16R1C, 16AR1C, 16S1C, 16AS1C, 16W1C and 16AW1C CHASSIS

includes latest

PRODUCTION CHANGES, SERVICE HINTS, SCHEMATICS AND PARTS LIST FOR MODELS USING ABOVE CHASSIS

IMPORTANT

Use this supplement with Service Data No. ST597-2 when servicing any model using these chassis. This supplement contains necessary service data for the later production chassis. It also includes corrections and additions to earlier Service Data. For service information covering Son-r tuner RT440A and the 8G1 remote control amplifier used in models with remote tuning, see Service Manual No. S599.

MODEL IDENTIFICATION CHART

(For Model Numbers not listed below, refer to Model Identification Chart in Service Data No. ST597-2)

MODEL NUMBER	TV CHASSIS	MODEL NAME	CHASSIS SERIES	VHF TUNER	UHF TUNER	LOCATION OF TUNING CONTROLS	TONE CONTROL (S)
T21E2 T21E2C T21ED2	16G1 16G1C 16G1C	Meredith	De Luxe 330	94E144-19		Hideway Top	
T21E3 T21E3C T21E3D	16G1 16G1C 16G1C	Meredith	De Luxe 330	94E144-19		Hideway Top	
T21E3E T21E3F	16R1C 16R1CB	Meredith	De Luxe 330	94E144-13 94D151-1 or -5		Hideway Top	
T21E20E T21E20F	16R1C 16R1CB	Asbury	Imperial 330	94E144-13 94D151-1 or -5		Front	Single
TA21E20E	16AR1C	Asbury	Imperial 330	94E144-30	94D112-5 or 94D155-3	Front	Single
T21E21E T21E21F	16R1C 16R1CB	Asbury	Imperial 330	94E144-13 94D151-1 or -5		Front	
T21E22E T21E22F	16R1C 16R1CB	Asbury	Imperial 330	94E144-13 94D151-1 or -5		Front	
TA21E22E	16AR1C	Asbury	Imperial 330	94E144-9	94D112-5 or 94D155-3	Front	
T21E23E	16R1C 16R1CB	Asbury	Imperial 330	94E144-13 94D151-1 or -5		Front	
TA21E23E	16AR1C	Asbury	Imperial 330	94E144-9	94D112-5 or 94D155-3	Front	
*TR21E21 *TR21E21C	16J1 16J1C	Asbury	Automatic 330	94D151-1 or -5		Front	Single
*TR21E22 *TR21E22C	16J1 16J1C	Asbury	Automatic 330	94D151-1 or -5		Front	Single
*TR21E23 *TR21E23C	16J1 16J1C	Asbury	Automatic 330	94D151-1 or -5		Front	Single
C21E11E C21E11F	16S1C 16S1CB	Windsor	Imperial 330	94E144-24 94D151-2 or -6		Front	
CA21E11E	16AS1C	Windsor	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	
C21E12E C21E12F	16S1C 16S1CB	Windsor	Imperial 330	94E144-24 94D151-2 or -6		Front	
CA21E12E	16AS1C	Windsor	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	
C21E13E C21E13F	16S1C 16S1CB	Windsor	Imperial 330	94E144-24 94D151-2 or -6		Front	
CA21E13E	16AS1C	Windsor	Imperial 330	94E144-22	94D112-5 or 94D155-3	Front	
*CR21E12 *CR21E12C	16K1 16K1C	Windsor	Automatic 330	94D151-2 or -6		Front	
*CR21E13 *CR21E13C	16K1 16K1C	Windsor	Automatic 330	94D151-2 or -6		Front	
*CR21E14 *CR21E14C	16K1 16K1C	Windsor	Automatic 330	94D151-2 or -6		Front	
L21E22 L21E22C L21E22E L21E22F	16E1 16E1C 16S1C 16S1CB	Princeton	Imperial 330	94E144-24 94D151-2 or -6		Front	Single
L21E23 L21E23C L21E23E L21E23F	16E1 16E1C 16S1C 16S1CB	Princeton	Imperial 330	94E144-24 94D151-2 or -6		Front	Single

*Remote tuning model using RT440A Son-R Tuner and 8G1 Remote Control Amplifier.

SPECIFICATIONS

(For Special Features, see page 4 of Service Data No. ST597-2.)

Picture Tube: Short neck rectangular, 110° magnetic deflection, electrostatic focus, gray filter faceplate, aluminized screen, no ion trap magnet required.

Operating Voltage: 110-120 volts, 60 cycle AC.

Wattage:
165 watts for standard VHF models.
175 watts for VHF models with Hi-Fi sound.
175 watts for standard VHF-UHF models.
185 watts for VHF-UHF models with Hi-Fi sound.
225 watts for VHF models with Son-R remote tuning.

Intermediate Frequencies:
Video IF; 45.75 MC
Sound IF; 41.25 MC
Intercarrier Sound IF; 4.5 MC

Input Impedance and Transmission Line: 300 ohm balanced (between antenna terminals) for either VHF or UHF inputs.

Indoor Antenna: Some models are equipped with built-in VHF and UHF antennas.

Fusible Resistor: A fusible resistor is used as the B+ and initial surge fuse. The fusible resistor is located below the high voltage compartment. See chassis parts list for description and part number of fusible resistor.

Important Note: Later production sets with 16R1C, 16AR1C, 16S1C, 16AS1C, 16U1C, 16AU1C, 16W1C and 16AW1C chassis use a 1.6 ampere, slow-blow, type "N" fuse and a conventional wire wound resistor instead of a fusible resistor.

TUBE COMPLEMENT FOR ALL VHF CHASSIS EXCEPT 16U1C AND 16WIC

(For 16U1C and 16W1C chassis, see Service Data No. ST597-2.)

V101, V901	*	VHF Amplifier
V102, V902	5CG8	VHF Mixer and Oscillator
V201	3DT6	Sound Detector
V202	12CU5	Sound Output
V301	3BZ6	1st IF Amplifier
V302	3BZ6	2nd IF Amplifier
V303	3CB6	3rd IF Amplifier
V304	6AW8A	Video Amplifier, Sound IF Amplifier
V305	21CEP4A	Picture Tube
V401	3BU8	Noise Gate, Sync Separator, Gated AGC
V402	†	Vertical Oscillator, Sync Inverter
V403	12DB5	Vertical Output
V404	6CG7	Horizontal Oscillator
V405	§	Horizontal Output
V406	19AU4GTA	Damper
V407	1B3GT	HV Rectifier

SILICON, SELENIUM AND GERMANIUM DIODES

CR301	Germanium Diode, type 1N60, 1N87 or 1N295 (Replace with same type used.)	Video Detector
CR401	93B5-4 Dual Selenium Diode	Horizontal Sync Discriminator
CR501	350 MA Selenium	B+ Rectifier
CR502	350 MA Selenium	B+ Rectifier

*4BC8 in all chassis except 16J1, 16K1, 16R1CB and 16S1CB. 2BN4 in 16J1, 16K1, 16R1CB and 16S1CB chassis.
†7AU7 in all chassis except 16R1C, 16R1CB, 16S1C and 16S1CB. 6CG7 in 16R1C, 16R1CB, 16S1C and 16S1CB.
§25CD6GB tube in chassis without suffix letter "C" (chassis stamped Run 10 through Run 22). 12DQ6A tube in chassis with suffix letter "C" (stamped Run 23 or higher).

TUBE COMPLEMENT FOR 8G1 REMOTE CONTROL AMPLIFIER USED WITH 16J1 and 16K1 CHASSIS

V1	6AU6	1st Amplifier
V2	6AU8	2nd Amplifier, Tripler
V3	6BN6	Limiter
V4	6AL5	Discriminator
V5	6CM7	Relay Control, Relay Control
V6	6BJ7	Discriminator, Bias Rectifier
V7	6CM7	Relay Control
V8	6X4	Rectifier

TUBE COMPLEMENT FOR ALL VHF-UHF CHASSIS EXCEPT 16AU1C AND 16AW1C

(For 16AU1C and 16AW1C chassis, see Service Data No. ST597-2.)

V801	2AF4A	UHF Oscillator
V101	4BC8	VHF Amplifier, UHF 1st IF Amplifier
V102	5CG8	VHF Mixer and Oscillator, UHF 2nd IF Amplifier
V201	3DT6	Sound Detector
V202	12CU5	Sound Output
V301	3BZ6	1st IF Amplifier
V302	3BZ6	2nd IF Amplifier
V303	3CB6	3rd IF Amplifier
V304	6AW8A	Video Amplifier, Sound IF Amplifier
V305	21CEP4A	Picture Tube
V401	3BU8	Noise Gate, Sync Separator, Gated AGC
V402	†	Vertical Oscillator, Sync Inverter
V403	12DB5	Vertical Output
V404	6CG7	Horizontal Oscillator
V405	§	Horizontal Output
V406	19AU4GTA	Damper
V407	1B3GT	HV Rectifier

SILICON, SELENIUM AND GERMANIUM DIODES

CR301	Germanium Diode, type 1N60, 1N87 or 1N295 (Replace with same type used.)	Video Detector
CR401	93B5-4 Dual Selenium Diode	Horizontal Sync Discriminator
CR501	350 MA Selenium	B+ Rectifier
CR502	350 MA Selenium	B+ Rectifier
CR801	Silicon Diode, type 1N82A	UHF Mixer

†7AU7 in all chassis except 16AR1C and 16AS1C. 6CG7 in 16AR1C and 16AS1C.
§25CD6GB tube in chassis without suffix letter "C" (chassis stamped Run 10 through Run 22). 12DQ6A tube in chassis with suffix letter "C" (stamped Run 23 or higher).

DIFFERENCES BETWEEN CHASSIS

The television chassis covered in this manual are of universal design, both mechanically and electrically. All chassis utilize a 21", short neck 110 degree deflection picture tube with aluminized face plate. A series heater circuit is used in all chassis. The B+ power supply of all chassis (except Hi-Fi models) uses two 350 milliampere selenium rectifiers in a voltage doubler circuit. Hi-Fi models use two 500 milliampere, plug-in type, silicon rectifiers. All chassis (except 16J1, 16K1, 16R1CB and 16S1CB) use a disc type VHF tuner with cascode RF amplifier. The 16J1, 16K1, 16R1CB and 16S1CB chassis use a drum type VHF tuner with a neutrode RF amplifier.

A description of basic chassis differences is given in the paragraphs below and in the "Model Identification Chart"

Note: The basic difference between table and console models of the same chassis series is in the use of a different front escutcheon.

Imperial 330 Chassis: This series includes the 16B1, 16D1, 16E1, 16R1C, 16R1CB, 16S1C and 16S1CB VHF (16 tube) chassis and the 16AB1, 16AD1, 16AE1, 16AR1C and 16AS1C VHF-UHF (17 tube) chassis. The 16B1, 16-AB1, 16R1C, 16R1CB and 16AR1C chassis are used in table models; the 16D1, 16AD1, 16E1, 16AE1, 16S1C, 16-S1CB and 16AS1C chassis are used in console models. All chassis have a tone control with exception of some early 16D1 and 16AD1 chassis. All chassis use top tuning.

De Luxe 330 Chassis: This series includes the 16G1 and 16L1 VHF (16 tube) chassis and the 16AG1 and 16AL1 VHF-UHF (17 tube) chassis. The 16G1 and 16AG1 chassis are used in table models; the 16L1 and 16AL1 Chassis are used in console models. Both models use Hideaway top tuning. The chassis in this series do not have a tone control.

Hi-Fi 330 Chassis: This series includes the 16U1C and 16W1C VHF (18 tube) chassis and the 16AU1C and 16-AW1C VHF-UHF (19 tube) chassis. The Hi-Fi sound amplifier of these receivers is contained in a separate sub-chassis which mounts to the top side of the main chassis. A dual tone control and a dial light are used in all chassis. The 16U1C and 16AU1C chassis are used in console models. The 16W1C and 16AW1C chassis are used in table models with a separate matching base; the speaker of these receivers is mounted in the cabinet base. All models use top tuning.

Automatic 330 Chassis: This series includes the 16J1 and 16K1 VHF (16 tube) chassis. The 8G1 remote control amplifier of these receivers is contained in a separate sub-chassis which mounts to the top side of the main chassis. The 16J1 chassis is used in table models; the 16K1 chassis is used in console models. Both models use top tuning. The 16K1 chassis has a tone control; the 16J1 chassis does not have a tone control.

SIGNIFICANCE OF SUFFIX LETTER "B"

The suffix letter "B" following the chassis number of a receiver, indicates that a different VHF tuner is used. Chassis without suffix letter "B" use a disc type VHF tuner with cascode RF amplifier. Chassis with suffix "B" use a drum type VHF tuner with a neutrode RF amplifier. For complete information, see Production Changes

SIGNIFICANCE OF SUFFIX LETTER "C"

The suffix letter "C" following the model and chassis number of a receiver, indicates that a different horizontal output tube and horizontal output circuit is used.

Models or chassis numbers without the suffix letter "C" use a type 25CD6GB tube as the horizontal output tube V405 Note: These chassis are stamped Run 10 through Run 22.

Models or chassis with the suffix letter "C" use a type 12DQ6A tube as the horizontal output tube V405, see figures 67 through 72 in Service Data No. ST597-2. Note: These chassis are stamped Run 23 or higher.

A complete description of the above circuit differences is given in Service Data No. ST597-2 under Production Changes, for chassis stamped Run 23.

INSTALLATION ADJUSTMENTS FOR 16R1C, 16AR1C, 16S1C AND 16AS1C CHASSIS

(For other chassis, see Service Data ST597-2.)

To insure best performance, it is important to make all checks and adjustments shown in figure 73. It is important that VHF Channel Slugs be adjusted upon installation and at every service call. Note: Removal of cabinet back is required only for adjustment of picture tilt and centering. Use a separate line cord (part number 89A22-1 when servicing.

Warning: The chassis of these receivers are connected directly to one side of the 117 volt, 60 cycle power line. Depending upon the position of the line cord plug in the wall outlet, the total AC line voltage may exist between the chassis and any grounded object. Do not touch the chassis unless adequate safety precautions are taken. Never touch the chassis and a ground (radiators, pipes, etc.) at the same time.

Do not ground chassis or connect test equipment directly to it, unless an isolation transformer is used. If an isolation transformer is not available, a neon lamp can be used to determine if the chassis is "hot". Connect an electrician's neon tester (General Cement's "Ne-o-lite" or equivalent) between the receiver chassis (not control shafts) and some grounded point, such as electrical conduit, water pipe, etc. If the neon lamp glows, the chassis is "hot" and the line cord plug should be reversed. Make the same check with the neon lamp connected between ground and the ground terminal of the test equipment. If the lamp glows, reverse the line cord to the test equipment.

PICTURE ADJUSTMENTS

Instructions for making picture adjustments are given in figures 6, 7, 8 and 73. These adjustments should be made upon installation and checked at every service call.

VHF CHANNEL ADJUSTMENT FOR 16R1C, 16AR1C, 16S1C and 16AS1C CHASSIS

For adjustment procedure, see page 10 in Service Data No. ST597-2, under heading titled "VHF CHANNEL ADJUSTMENT FOR ALL SETS EXCEPT SON-R MODELS."

VHF CHANNEL ADJUSTMENT FOR FOR 16R1CB AND 16S1CB CHASSIS

VHF Channel adjustment of each station should be checked upon installation and at every service call. If adjustment is properly made, it is possible to tune from one station to another by merely turning the Channel Selector knob.

To adjust VHF Channel Slugs, proceed as follows:

1. Turn the set on and allow 15 minutes to warm up.
2. Set **VHF Channel Selector** for a station; set other controls for normal picture and sound.
3. Set **Fine Tuning** control at center of its range by rotating it approximately half-way.
4. For table models, remove Channel Selector and Fine Tuning knobs. For console models, remove escutcheon plate above Channel Selector knob after removing mounting screw at center of plate. Note: Later console models may use snap-in plate without mounting screw. To remove snap-in plate, insert blade end of a screwdriver against left side of channel window, see figure 9. With slight pressure, pull left side of plate away from cabinet.
5. Insert a 1/8" blade, flexible non-metallic tool (Part No. 98A30-19) through the hole adjustment to Channel Selector shaft. For each channel in operation, carefully adjust the channel slug for best picture. (Note that this is not the point at which the sound is loudest.)

   Caution: Only slight rotation of the slug will be required; turning the slug out too far will cause it to fall out of coil.

SUPER RANGE FINDER ADJUSTMENT, HORIZONTAL LOCK-ADJUSTMENT AND HORIZONTAL DRIVE ADJUSTMENT

These adjustments are the same for all chassis covered in this manual. For control locations see figures 6, 7, 8 and 73. For adjustment procedure, see page 11 of Service Data No. ST597-2.

NOTE: Super Range Finder control not used in 16R1, 16AR1, 16S1 and 16AS1 chassis stamped Run 29. Disregard adjustment procedure for Run 29 chassis.

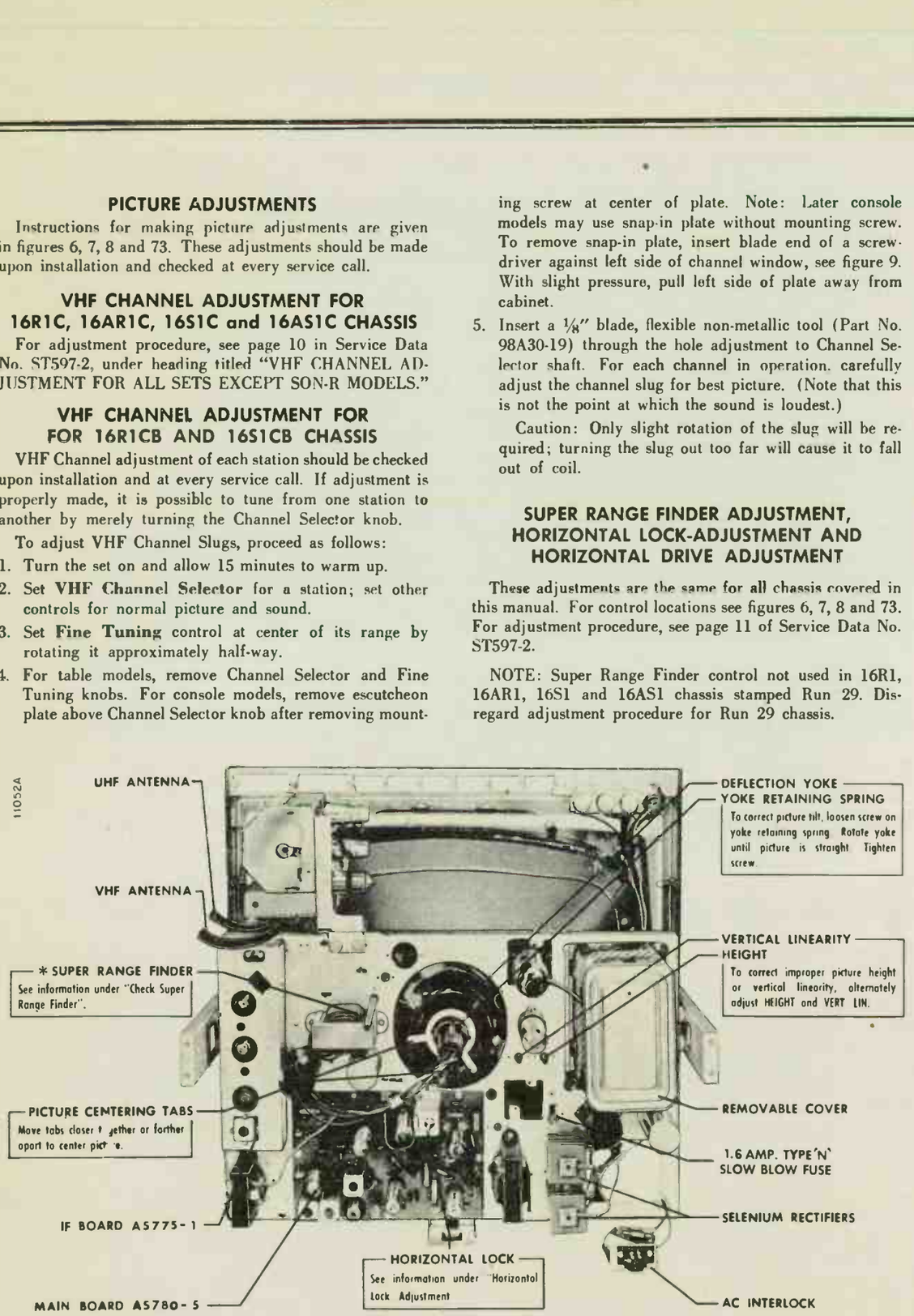


Figure 73. Rear View of 16R1C, 16AR1C, 16S1C and 16AS1C Chassis Showing Adjustment Locations. Note: Super Range Finder control not in chassis stamped Run 29. UHF Antenna Terminals in VHF-UHF sets only.

SERVICE HINTS

Also see "Service Hints" and "Production Changes" in Service Data Supplement No. ST597-2.

AUDIO HUM

Persistent audio hum (with or without TV signal) can be caused by high resistance leakage of coupling capacitor C203 (.001 mf, 500 volts, ceramic). Coupling capacitor C203 is connected from pin 3 of sound IF amplifier V304B to terminal of sound detector coil L201.

GEAR TOOTHED RASTER

Distortion at right side of raster, with dark vertical line having a "gear toothed" pattern may be due to a faulty horizontal lock coil, L401.

Other symptoms occurring with above trouble may be a great change in horizontal oscillator frequency when set is switched off-channel and a few seconds delay for the oscillator to lock-in when set is turned back to an operating channel.

INSTALLING UHF CHANNEL STRIPS IN VHF TUNERS 94D151-1, -2, -5 OR -6

Receivers using VHF tuners 94D151-1, -2, -5 or -6 can be easily adapted for UHF operation by insertion of a UHF channel coil strip in the vacant channel position of the tuner turret drum (between channels 13 and 2).

If more than one UHF channel can be received, additional UHF channel coil strips can be inserted in the tuner turret drum after removing unused VHF channel coil strips.

UHF channel coil strips (packed with installation and service instructions) are available from Admiral distri-

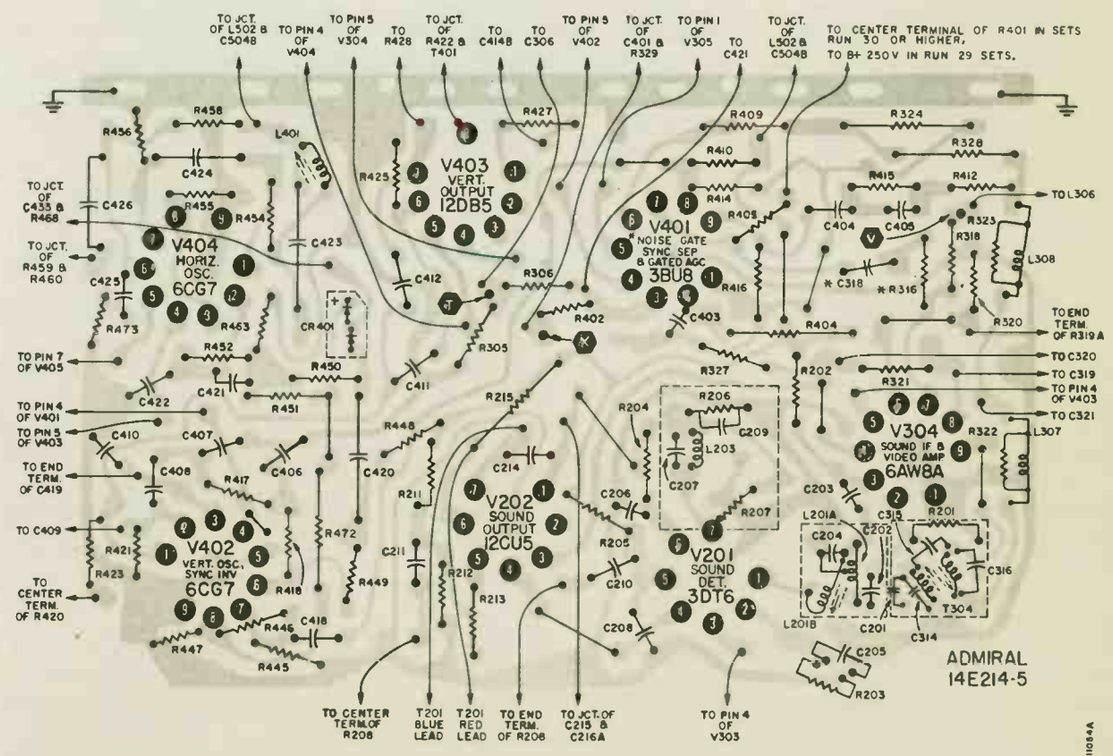


Figure 74. View of Printed Wiring Board AS780-5 used in 16R1, 16AR1, 16S1, 16AS1 Chassis. Note: Noise Gate Circuit in Chassis Stamped Run 30 or Higher. Gray Area Represents Printed Wiring; Black Symbols and Lines Represent Components and Connections on Opposite Side. See Service Manual No. ST597-2 for Other Printed Wiring Views.

butors, under part number N4D with UHF channel number preceding the part number.

Note: When adapting a VHF tuner for UHF operation, it is necessary to order the following parts in addition to UHF channel coil strips.

1. Antenna input assembly, part number 31T-3112-01

1. Antenna lead assembly, part number 700D54-5

2. Antenna terminal clips, part number 9B24-1

SERVICING PRINTED WIRING

A major portion of the circuitry in these receivers is contained in two printed wiring boards. The smaller printed circuit board at side of chassis contains tubes and components in the video IF and video detector circuits. The larger printed circuit board at bottom of chassis contains tubes and components in the sound IF, sound detector, sound output, sync, AGC, video amplifier, vertical and horizontal sweep circuits.

Trouble shooting of printed circuit wiring is similar to that of conventionally wired sets. Complete instructions on the service and repair of printed circuit wiring is given in Service Manual No. S559, available from the Admiral Distributor.

To simplify circuit tracing, identifying tube socket connections and locating component connection points, figures 47 through 54 are given in Service Data No. ST597-2. Figures 74 and 75 covering printed circuit boards used in 16R1C, 16AR1C. 16S1C and 16AS1C are given in this manual. Note: In these illustrations, components are shown schematically instead of pictorially. This illustrates what would be seen if it were possible to look through the printed circuit wiring board and actually see the various components on the board.

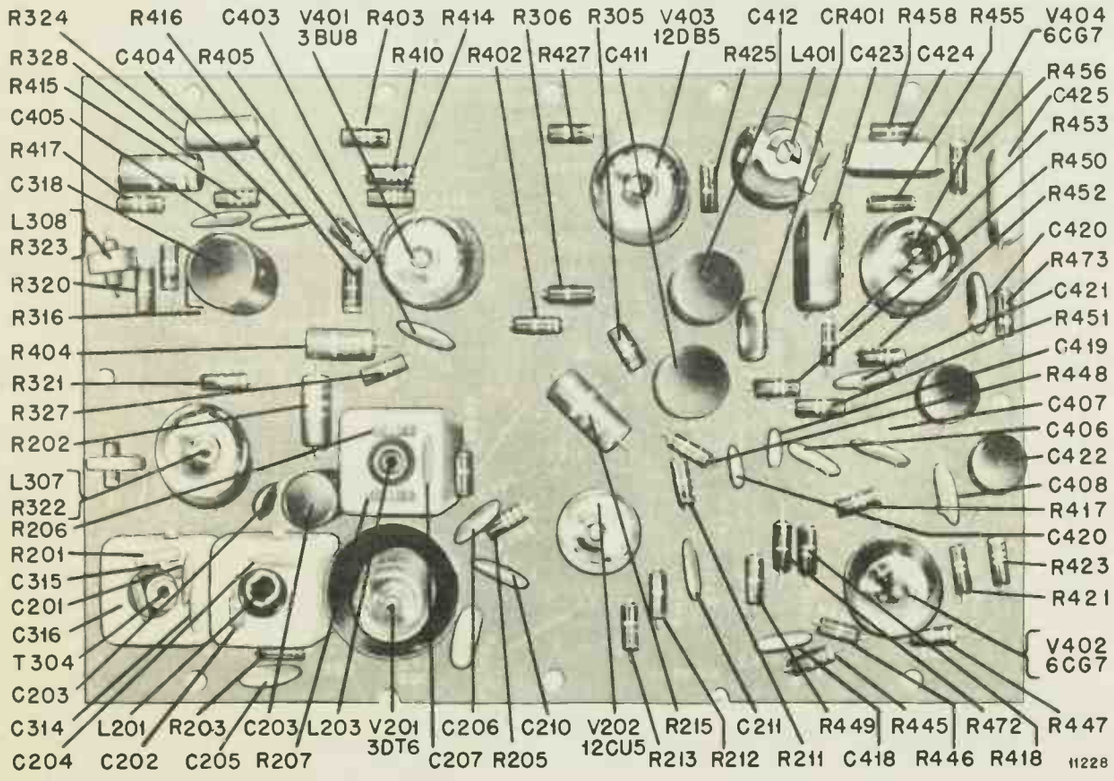


Figure 75. View of Component Side of Printed Wiring Board A5780-5 used in 16R1C, 16AR1C, 16S1C and 16AS1C Chassis. See Service Manual No. ST597-2 for other Printed Wiring Views.

LATEST PRODUCTION CHANGES

Production changes are coded RUN 10, RUN 11, etc., as given below. Run number (stamped on chassis) indicates that chassis has change(s) incorporated which are explained under that heading, as well as changes (lower run numbers) made prior to that time. At the start of production, chassis were stamped RUN 10. For earlier production changes, see Service Data No. ST597-2.

RUN 29 HAS NO SERVICE SIGNIFICANCE OTHER THAN INDICATING START OF PRODUCTION FOR 16R1C, 16S1C, 16AR1C; AND 16AS1C CHASSIS.

NOISE GATE CIRCUIT ADDED TO V401 (3BU8); PULSE VOLTAGE REDUCED AT V403 16R1C, 16S1C, 16AR1C, AND 16AS1C CHASSIS. STAMPED RUN 30.

A noise gate circuit was added to V401 (3BU8) which now includes this function in addition to its operation as sync separator and gated AGC tube. NOTE: The noise gate circuit includes the Super Range finder control R407, resistor R316 (47K) and capacitor C318 (.1 mf); see schematics, figure 80 through 82. See figure 76 for V401 (3BU8) circuit in chassis stamped Run 29.

To reduce pulse voltage at pin 9 (plate) of V403 (12DB5), capacitor C437 (.001 mf, 2 KV) with resistor R474 (39,000 ohms, 1 watt) connected in series was added across green lead and red lead of vertical output transformer T401.

ALTERNATE VHF TUNERS USED

Alternate VHF tuners were used in models using the 16J1, 16K1, 16R1 and 16S1 chassis as shown in the Model Identification Chart

Early 16J1 and 16K1 chassis use drum type tuners 94D151-1 and -2. Later 16J1 and 16K1 chassis use drum type tuners 94D151-5 and 94D151-6.

The 16R1C and 16S1C chassis use disc type turret tuners 94D144-9 and 94D144-24. Early 16R1CB and 16S1CB chassis use drum type turret tuners 94D151-1 and 94D151-2. Later 16R1CB and 16S1CB chassis use drum type tuners 94D151-5 and 94D151-6.

Note that there are circuit differences between tuners 94D151-1 and -2 as compared with tuners 94D151-5 and -6. Schematic of 94D151-1 and -2 tuners is given in figure 77. Schematic of 94D151-5 and -6 tuners is given in figures 81 and 83.

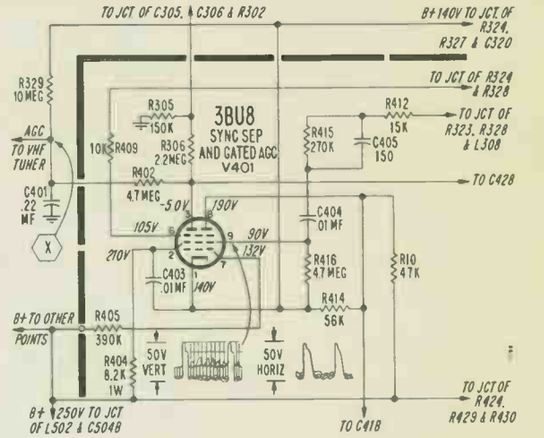


Figure 76. Sync Separator and Gated AGC Circuit Used in 16R1, 16AR1, 16S1 and 16AS1 Chassis Stamped Run 29. See Figure 81 for Circuit Used in Later Production Sets.

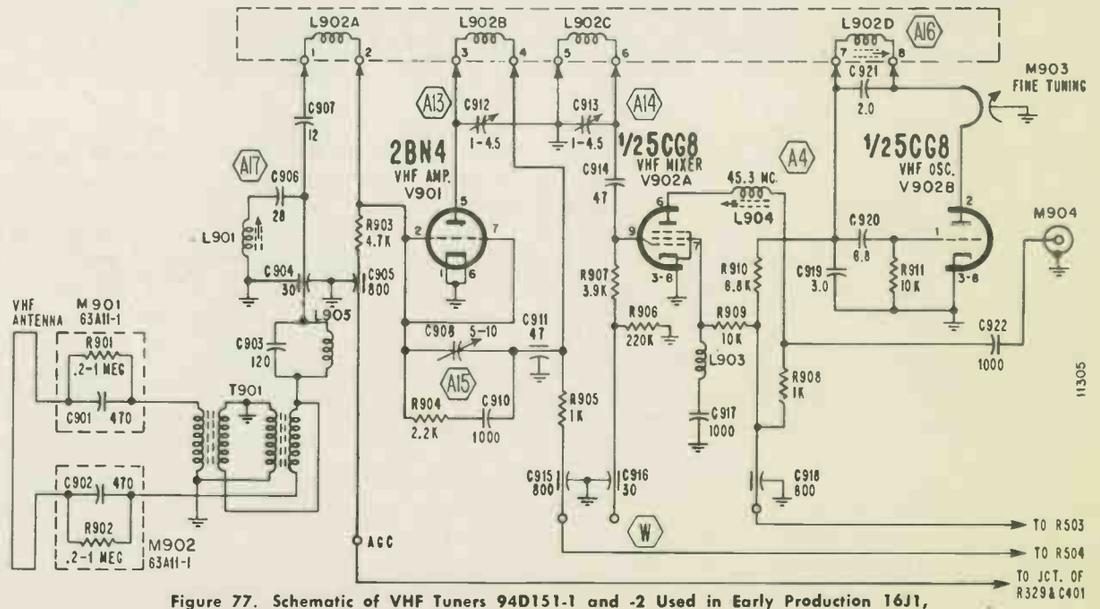


Figure 77. Schematic of VHF Tuners 94D151-1 and -2 Used in Early Production 16J1, 16K1, 16R1CB and 16S1CB Chassis. See Figures 81 and 83 for VHF Tuners 94D151-5 and -6 Used in Later Production Chassis.

VHF TUNERS 94D151

GENERAL

VHF tuners 94D151-1, -2, -5 and -6 are 13 position (12 VHF channel) drum type tuners, utilizing replaceable channel snap in coils. A triode (2BN4) is used in a neutralized circuit as the VHF amplifier V901. A pentode-triode (5CG8) is used as the mixer and oscillator V902.

Early production 16J1, 16K1, 16R1CB and 16S1CB chassis used VHF tuners 94D151-1 and -2. Later production 16J1, 16K1, 16R1CB and 16S1CB chassis used VHF tuners 94D151-5 and -6.

VHF tuners 94D151-1 and -2 are similar to VHF tuners 94D151-5 and -6 with exception of some circuit differences, see figures 77 and 81. Note also the VHF tuners 94D151-1 and -2 utilize a book type fine tuning control. VHF tuners 94D151-5 and -6 utilize a permeability tuned fine tuning control. See exploded views, figures 78 and 79.

ALIGNMENT INFORMATION COVERING VHF TUNERS 94D151-5 AND -6

VHF amplifier-mixer alignment and VHF oscillator adjustment for VHF tuners 94D151-5 and -6 are exactly the same as for VHF tuners 94D151-1 and -2. For tuner alignment information, refer to pages of Service Data No. ST597-2.

SERVICING VHF TUNERS 94D151-5 AND -6

The servicing of VHF tuners 94D151-5 and -6 is the same as for VHF tuners 94D151-1 and -2. For tuner servicing information, refer to pages in Service Data No. ST597-2. For exploded view of tuners 94D151-5 and -6, refer to figure 79.

Important: When servicing tuners, be sure to note the important differences described in the preceding paragraphs.

INSTALLING UHF CHANNEL STRIPS IN VHF TUNERS 94D151-1, -2, -5 AND -6

For above information, see "Service Hints"

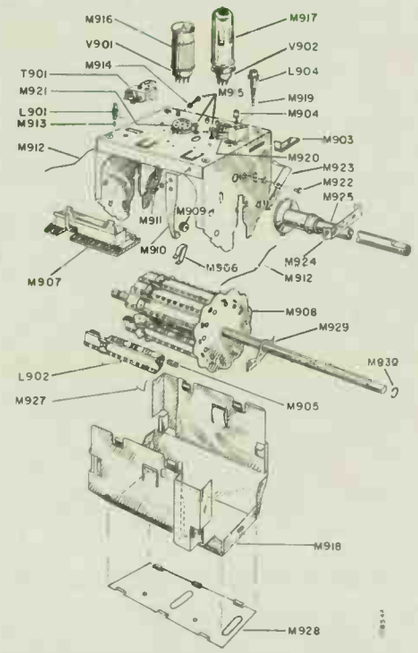


Figure 78. Exploded View of VHF Tuners 94D151-1 and -2 used in early 16J1, 16K1, 16R1CB and 1651CB Chassis.

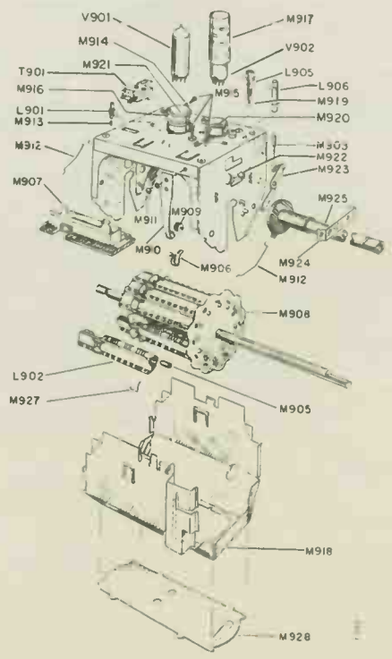


Figure 79. Exploded View of VHF Tuners 94D151-5 and -6 Used in Later 16J1, 16K1, 16R1CB and 16S1CB Chassis.

SUPPLEMENTARY PARTS LIST FOR MODELS USING 16B1, 16AB1, 16D1, 16AD1, 16E1, 16AE1, 16G1, 16AG1, 16J1, 16K1, 16L1, 16AL1, 16U1C, 16AU1C, 16R1C, 16AR1C, 16S1C, 16AS1C, 16W1C AND 16AW1C CHASSIS

This parts list includes corrections and additions to the parts list in Service Data No. ST597-2. Use this parts list FIRST; then refer to the parts list in Service Data No. ST597-2 for parts not listed here.

Electrical components have symbols in 100 series, 200 series, etc., according to location on schematic. Order parts by part number and description from Admiral distributor.

RESISTORS

Sym.	Description	Part No.
R207	100,000 ohms, ½ watt (R207 was 220 K in early sets. See Run Change 16.)	60B 8-104
R207	1 megohm, **Volume** control (includes On-Off switch S501) in 16B1, 16AB1, 16E1 and 16AE1 chassis	75B 17-22
	in 16D1, 16AD1, 16R1C, 16AR1C, 16S1C and 16AS1C chassis	75D 1-94
	in 16G1, 16AG1 chassis	75D 1-93
	in 16L1, 16AL1 chassis	75D 1-100
	in 16J1, 16K1 chassis	75B 38-2
R319A R319B	1,000 ohms, **Contrast** } Dual 100,000 ohms, **Brightness** } control in 16B1, 16AB1, 16E1, 16AE1, 16J1 and 16K1 chassis (R319B is a single control in other chassis, see R325.)	75B 17-22
R319A	1,000 ohms, **Contrast**, single control in 16D1, 16AD1, 16R1C, 16AR1C, 16S1C and 16AS1C chassis	75D 13-93
	in 16G1, 16AG1 chassis	75D 13-100
	in 16L1, 16AL1 chassis	75D 13-98
R325	100,000 ohms, **Brightness** control, in 16G1, 16AG1, 16L1 and 16AL1 chassis	75D 20-101
	in 16D1, 16AD1, 16R1C, 16AR1C, 16S1C and 16AS1C chassis (See R219B for other chassis using a dual control.)	75D 13-94
R407	100,000 ohms, **Super Range Finder** control	75D 20-101
R419	200,000 ohms, **Vertical Hold** control in 16B1, 16D1, 16E1, 16U1C, 16AU1C, 16R1C, 16AR1C, 16S1C, 16AS1C, 16W1C and 16AW1C chassis	75D 13-92
	in 16G1 and 16AG1 chassis	75D 20-97
	in 16L1 and 16AL1 chassis	75D 13-97
	in 16J1 and 16K1 chassis	75D 13-92
R454	5,600 ohms, ½ watt in all chassis except 16R1C, 16AR1C, 16S1C, 16AS1C	60B 8-562
	10,000 ohms, ½ watt in 16R1C, 16AR1C, 16S1C and 16AS1C chassis	60B 8-103
R455	1,000 ohms, ½ watt in all chassis except 16R1C, 16AR1C, 16S1C and 16AS1C	60B 8-102
	1,200 ohms, ½ watt in 16R1C, 16AR1C, 16S1C and 16AS1C chassis	60B 8-122
R456	110,000 ohms, ½ watt, 5%, in all chassis except 16R1C, 16AR1C, 16S1C and 16AS1C	60B 7-114
	47,000 ohms, ½ watt, in 16R1C, 16AR1C, 16S1C and 16AS1C chassis	60B 8-473
R461	10,000 ohms, 3 watts, in chassis stamped Run 10 through Run 22, glass type	61B 24-349
	8,200 ohms, 3 watts, in chassis stamped Run 23 or higher with exception of 16R1C, 16AR1C, 16S1C and 16AS1C (see Run Change 23)	61B 24-347
	12,000 ohms, 3 watts, in 16R1C, 16AR1C, 16S1C and 16AS1C chassis	61A 1-45
R468	22,000 ohms, 3 watts	61B 24-357
R473	15,000 ohms, ½ watt	60B 8-153
R474	39,000 ohms, 1 watt	60B 14-393

RESISTORS (Cont'd)

Sym.	Description	Part No.
R501	5 ohms, 5 watts, fusible in 16L1, 16AL1, 16G1, 16AG1, 16J1, 16K1, 16B1, 16AB1, 16D1, 16AD1, 16E1 and 16AE1 chassis	61B 28-3
	7.5 ohms, 5 watts, fusible in 16U1C and 16W1C chassis stamped Run 24 through Run 27	61A 19-1
	7.5 ohms, 10 watts, 5%, wire wound in 16U1C and 16W1C chassis stamped Run 28 or higher	61B 20-25
	5 ohms, 5 watts, fusible in 16AU1C and 16AW1C chassis stamped Run 24 through Run 27	61B 28-3
	5 ohms, 10 watts, 5%, wire wound in 16AU1C, 16AW1C, 16R1C, 16AR1C, 16S1C and 16AS1C chassis stamped Run 28 or higher	61B 20-24
R503	See Run Change 28. 470 ohms, ½ watt in sets stamped Runs 10 and 11	60B 8-471
	1,800 ohms, ½ watt in sets stamped Run 12 or higher	60B 8-182
R504	2,200 ohms, 2 watts, in VHF chassis, except 16J1, 16K1	60B 20-222
	8,200 ohms, 2 watts, in 16J1, 16K1 chassis	60B 20-822
	1,800 ohms, 3 watts, in VHF-UHF chassis	60B 20-182
	10,000 ohms, 3 watts, in VHF sets with 94D151 tuners	61B 24-349
R505	17 ohms, 10 watts, tapped candohm in VHF-UHF sets	61B 3-31
	21 ohms, 10 watts, candohm in VHF only sets	61B 3-30
R901	200,000 ohms to 1 megohm, ½ watt, part of couplate M901	63A 11-1
R902	200,000 ohms to 1 megohm, ½ watt, part of couplate M902	63A 11-1
R903	4,700 ohms, ½ watt in 94D151-1 and -2 tuners	60B 8-472
	22,000 ohms, ½ watt in 94D151-5 and -6 tuners	60B 8-223
R904	2,200 ohms, ½ watt	60B 8-222
R905	1,000 ohms, ½ watt	60B 8-102
R906	220,000 ohms, ½ watt	60B 8-224
R907	3,900 ohms, ½ watt	60B 8-392
R908	1,000 ohms, ½ watt	60B 8-102
R909	10,000 ohms, ½ watt	60B 8-103
R910	6,800 ohms, ½ watt in 94D151-1 and -2 tuners	60B 8-682
	3,900 ohms, ½ watt in 94D151-5 and -6 tuners	60B 8-392
R911	10,000 ohms, ½ watt in 94D151-1 and -2 tuners	60B 8-103
	3,900 ohms, ½ watt in 94D151-5 and -6 tuners	60B 8-392

CAPACITORS

Sym.	Description	Part No.
C304	18 mmf, 500 volts, 5%, ceramic disc, N220 temp. coeff	65D 10-140
C318	.1 mf, 600 volts, paper	64C 16-7
C401	.022 mf, 400 volts, paper, in all chassis except 16R1C, 16AR1C, 16S1C and 16AS1C	64B 8-30
	.22 mf, 400 volts, paper, in 16R1C, 16AR1C. 16S1C and 16AS1C chassis	64B 8-24
C421	.001 mf, 2 KV, ceramic	65D 10-181
C422	.002 mf, 200 volts, mylar dielec., in all chassis except 16R1C, 16AR1C, 16S1C and 16AS1C	64C 16-57
	.047 mf, 200 volts, mylar dielec., in 16R1C, 16AR1C. 16S1C and 16AS1C chassis	64C 16-55
C424	390 mmf, 500 volts, 10%, mica, in all chassis except 16R1C, 16AR1C, 16S1C and 16AS1C	65B 21-391
	820 mmf, 500 volts, 10%, mica, in 16R1C, 16AR1C, 16S1C and 16AS1C chassis	65D 10-91
C430	.1 mf, 600 volts, paper, in all chassis except 16R1C, 16AR1C, 16S1C and 16AS1C	64B 8-7
	.022 mf, 1.6 KV, paper, in 16R1C, 16AR1C, 16S1C and 16AS1C chassis	64B 2-43
C431	.001 mf, 5 KV, cer. disc, in all chassis except 16R1C, 16AR1C, 16S1C and 16AS1C	65D 10-164
	.047 mf, 1 KV, paper, in 16R1C. 16AR1C, 16S1C and 16AS1C chassis	64B 2-30
C432	210 mmf. 2 KV. cer. disc, in all chassis except 16R1C, 16AR1C, 16S1C and 16AS1C	65D 10-151
	330 mmf, 2 KV, cer. disc, in all 16R1C, 16AR1C, 16S1C and 16AS1C chassis	65D 10-186
C433	210 mmf. 2 KV, cer. disc. in all chassis except 16R1C, 16AR1C. 16S1C and 16AS1C	65D 10-151
	330 mmf, 2 KV, cer. disc, in all 16R1C, 16AR1C. 16S1C and 16AS1C chassis	65D 10-186
	(C432 and C433 were 150 mmf. in early sets. See Run Change 25.)	
C436	.047 mf, 1 KV, paper	64B 2-30
C437	.001 mf, 2 KV, ceramic	65D 10-181
†C502	.005 mf, 1,400 volts, ceramic disc, in chassis stamped Run 10 through Run 23	65D 10-133
	.01 mf, 1,400 volts. ceramic, in chassis stamped Run 24 or higher	65D 10-65
C503	150 mf, 200 volts, electrolytic	67D 15-234
C901	470 mmf, 500 volts, ceramic, part of couplate M901	63A 11-1
C902	470 mmf, 500 volts, ceramic, part of couplate M902	63A 11-1
C903	120 mmf, 10%, 500 volts, ceramic	94D 131-79
C904	30 mmf, 5%, 500 volts, ceramic feed-through	94D 131-80
C905	800 mmf, ceramic feed-through	94D 131-97
C906	28 mmf, 10%, 500 volts, ceramic	94D 131-81
C907	12 mmf, 10%, 500 volts, ceramic	94D 131-95
C908	5 to 10 mmf, ceramic trimmer	94D 151-83
C910	1,000 mmf, 500 volts, ceramic	94D 131-82
C911	47 mmf, 5%, ceramic feed-through	94D 131-86
C912	1 to 4.5 mmf, ceramic trimmer	94D 131-83
C913	1 to 4.5 mmf, ceramic trimmer	94D 131-83
C914	47 mmf, 10%, 500 volts, ceramic	94D 131-87
C915	800 mmf. ceramic feed-through	94D 131-97
C916	30 mmf, 500 volts, ceramic feed-through (C916 may be 40 mmf in some tuners)	94D 131-88
C917	1,000 mmf, 500 volts, ceramic, N750 temp. coeff	94D 131-89
C918	800 mmf, ceramic feed-through	94D 131-97
C919	3.0 mmf, 10%, 500 volts, ceramic, NPO temp. coeff	94D 131-91
C920	6.8 mmf, 10%, 500 volts, ceramic, N330 temp. coeff., in 94D151-1 and -2 tuners	94D 131-92
	18 mmf, 10%, 500 volts, ceramic, N330 temp. coeff., in 94D151-5 and -6 tuners	94D 131-127
C921	2.0 mmf, 5%, 500 volts, ceramic, N550 temp. coeff., in 94D151-1 and -2 tuners	94D 131-93
	1,000 mmf, 500 volts, ceramic, N750 temp. coeff., in 94D151-5 and -6 tuners	94D 131-89

†May be part of RC filter 63B 10-3 in chassis stamped Run 10 through Run 23, and Run 26 or higher.

CAPACITORS (Cont'd)

Sym.	Description	Part No.
C922	1,000 mmf, 500 volts, ceramic	94D 131-85
C923	800 mmf, ceramic feed-through	94D 131-97
C924	800 mmf, ceramic feed-through	94D 131-97
C925	800 mmf, ceramic feed-through	94D 131-97
C926	800 mmf, ceramic feed-through	94D 131-97
C927	7.5 mmf, 3%, 500 volts, cer., N150 temp. coeff	94D 131-126

COILS AND TRANSFORMERS

Sym.	Description	Part No.	
L901	Trap Coil (series tuned)	94D 131-51	
	Tuning Core (for L901)	94D 131-77	
L902	Channel Coil (stamped 2N4A, 3N4A, 4N4A, etc.)		
	for Channel #2	94D 131-52	For VHF Tuners 94D 151-1, -2, -5 and -6
	for Channel #3	94D 131-53	
	for Channel #4	94D 131-54	
	for Channel #5	94D 131-55	
	for Channel #6	94D 131-56	
	for Channel #7	94D 131-57	
	for Channel #8	94D 131-58	
	for Channel #9	94D 131-59	
	for Channel #10	94D 131-60	
	for Channel #11	94D 131-61	
	for Channel #12	94D 131-62	
	for Channel #13	94D 131-63	
L903	Screen Coil	94D 131-65	
L904	Mixer Plate Coil	94D 151-50	
	Tuning Core (for L904)	94D 131-78	
L905	Trap Coil (parallel tuned)	94D 131-64	
L906	Fine Tuning Coil	94D 131-90	
	Tuning Core (for L906)	94D 151-54	
L907	Heater Choke	73B 37-2	
T403	Horizontal Output Transformer in chassis stamped Run 10 thru Run 22	79D 77-3	
	in chassis stamped Run 23 or higher with exception of 16R1C, 16AR1C, 16S1C and 16AS1C chassis	79D 77-2	
	in 16R1C, 16AR1C, 16S1C and 16AS1C chassis	79D 77-4	
T301	1st IF Transformer	72C 132-39	
T302	2nd IF Transformer	72C 132-39	
T901	Antenna Input Assembly	94D 131-68	

MISCELLANEOUS CHASSIS PARTS

For tuner parts, see separate headings.

CR301	Video Detector (Order same part number as original)	IN60, IN87 or IN295
CR401	Diode, Dual Selenium	93B 5-4
CR501	Rectifier 350 MA Selenium in all chassis except 16U1C, 16AU1C, 16W1C and 16AW1C	93A 4-4
	500 MA Silicon in 16U1C, 16AU1C, 16W1C and 16AW1C chassis	93A 11 or 93A 12
CR502	Rectifier 350 MA Selenium in all chassis except 16U1C, 16AU1C, 16W1C and 16AW1C chassis	93A 4-4
	500 MA Silicon in 16U1C, 16AU1C, 16W1C and 16AW1C chassis	93A 11 or 93A 12
M508	Couplate (includes R502 and C502)	63A 10-1
M510	Fuse, 1.6 amp, Type N, Slow-blow	84A 13-42
	Cover, Bottom (for 1B3 socket)	33B 206-4
	Cup, Plastic Mounting (for 1B3 socket)	33C 280-3
	Printed Circuit Board, Complete with components (less tubes)	
	§IF Board (used in all chassis)	A5775-1
	§Main Board (used in all chassis except 16R1C, 16AR1C, 16S1C, 16AS1C, 16U1C, 16AU1C, 16W1C and 16AW1C)	A5780-1
	§Main Board (used in 16U1C, 16AU1C, 16W1C, 16AW1C chassis)	A5780-4
	§Main Board (used in 16R1C, 16AR1C, 16S1C and 16AS1C chassis)	A5780-5
	Socket, Fuse Holder	84A 12-12

§Orders for these parts will not be filled unless damaged part cannot be repaired economically and full details are given with order.

MISCELLANEOUS PARTS FOR VHF TUNERS 94D 151-1, -2, -5 and 94D 151-6

(See figures 78 and 79 for illustration of parts.)

Sym.	Description	Part No.
M901	Couplate (includes R901 and C901)	63A 11-1
M902	Couplate (includes R902 and C902)	63A 11-1
M903	Fine Tuning Rotor "Book Type"	94D 110-94
M904	Receptacle, IF Output	94D 110-90
M905	Slug. Channel Oscillator (for L902)	98A 45-88
M906	Spring, Detent Grounding	94D 151-80
M907	Stator Bracket Assembly	94D 131-96
M908	Turret Assembly, less coils	
	for 94D151-1 and -5 tuners	94D 151-74
	for 94D151-2 and -6 tuners	94D 151-70
M909	Roller, Detent	94D 110-86
M910	Spring, Detent	94D 131-75
M911	Screw, Detent Retainer (6-32 x ¼")	265-250-C2-2
M912	Spring, Turret Shaft (front and rear support)	
	for VHF tuners 94D151-1 and -2	94D 131-70
	for VHF tuners 94D151-5 and -6	94D 151-78
M913	Core, Powdered Iron (for L901 Adjustment)	94D 131-77
M914	Nut, Trimmer Screw Locking	98A 45-31
M915	Screw, Trimmer (4-36 x ¾")	94D 151-69
M916	Shield, Tube (collapsible type)	94D 151 50
M917	Shield, Tube (dome type)	94D 151-51
M918	Shield, Bottom	94D 151-96
M919	Core, Powdered Iron (for L904 Adjustment)	94D 131-78
M920	Socket, Tube (7 pin miniature)	94D 92-93
M921	Socket, Tube (9 pin miniature)	94D 110-91
M922	Rivet, M923 Retainer	94D 110-95
M923	Rotor Arm, Fine Tuning	
	for VHF tuners 94D151-1 and -2	94D 110-96
	for VHF tuners 94D151-5 and -6	94D 151-79
M924	Bracket, Fine Tuning Rotor Retainer	94D 110-92
M925	Shaft, Fine Tuning Assembly	
	for 94D151-1 and -5 tuners	94D 151-72
	for 94D151-2 and -6 tuners	94D 151-71
M927	Spring, Slug Retainer	98A 45-52
M928	Cover, Bottom Shield	94D 151-97
M929	Spring, Wiper	94D 131-73
M930	Fine Tuning Core	94D 151-54
	§VHF Tuner, Complete	
	for 16J1, 16R1CB chassis	94D 151-5
	for 16K1, 16S1CB chassis	94D 151-6

§Orders for these parts will not be filled unless damaged part cannot be repaired economically and full details are given with order.

SUPPLEMENT TO CABINET PARTS LIST COVERING THE FOLLOWING MODELS

(See Service Data No. ST597-2 for complete parts list.)

NOTE: Models may have suffix letter "C", "E" or "F".

Description	C21E2 CA21E2 Mahogany	C21E3 CA21E3 Blond	C21E6 CA21E6 Mahogany	C21E7 CA21E7 Blond
Leg, Mounting Plate	15B 1301	15B 1301	15B 1301	15B 1301
Nut (for mtg. legs to base)	2A 17-8-71	2A 17-8-71	2A 17-8-71	2A 17-8-71

SUPPLEMENT TO CABINET PARTS LIST COVERING THE FOLLOWING MODELS

(See Service Data No. ST597-2 for complete parts list.)

NOTE: Models may have suffix letter "C", "E" or "F".

Description	C21E22 CA21E22 Mahogany	C21E23 CA21E23 Blond	C21E24 CA21E24 Sierra
*Cross Member (for swivel base)			
Mahogany	*35E 397-8		
Black	———	*35E 397-8	*35E 397-8

*Orders for cabinets and certain matching parts will not be filled unless the damaged item cannot be economically repaired and unless full details are given with the order.

CABINET PARTS

Models may have suffix letter "C", "E" or "F".

Description	T21E20 TA21E20 Bronze	T21E21 TA21E21 Charcoal	T21E22 TA21E22 Mahogany	T21E23 TA21E23 Blond
Back, Cabinet (less line cord)				
for VHF	43E 291-1	43E 291-1	43E 291-1	43E 291-1
for UHF	43E 291-3	43E 291-3	43E 291-3	43E 291-3
Bearing Plate				
for VHF	32A 335-2	32A 335-2	32A 335-2	32A 335-2
for UHF	32A 335-1	32A 335-1	32A 335-1	32A 335-1
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5	81A 1-5
*Cabinet, Metal				
Bronze	*34E 123-4	———	———	———
Charcoal	———	*34E 123-1	———	———
Mahogany	———	———	*34E 123-2	———
Blond	———	———	———	*34E 123-3
Clip, Cabinet Back Mtg.	18A 161	18A 161	18A 161	18A 161
Clip, Window Retaining	2A 30-1	2A 30-1	2A 30-1	2A 30-1
Escutcheon, Cabinet Front (Molded) Gold Finish	23E 285-1	23E 285-1	23E 285-1	23E 285-1
Feet, Cabinet	8A 12-5	8A 12-5	8A 12-5	8A 12-5
Grille Cloth	36B 55-20	36B 55-18	36B 55-19	36B 55-20
Grille, Metal (above picture window)	36B 78-3	36B 78-3	36B 78-3	36B 78-3
Knobs and Associated Parts				
Tuning Knobs				
VHF Channel Selector	33D 231-3	33D 231-3	33D 231-3	33D 231-3
VHF-UHF Channel Selector	33D 231-1	33D 231-1	33D 231-1	33D 231-1
UHF Channel Indicator	33D 199-46	33D 199-46	33D 199-46	33D 199-46
Fine Tuning	33D 231-7	33D 231-7	33D 231-7	33D 231-7
Preference Control Knobs (NOTE: Early production sets use beige plastic, later production use gold finish)				
ON-OFF-VOLUME, Spacer (Beige)	33C 230-1	33C 230-1	33C 230-1	33C 230-1
(Gold)	33C 230-6	33C 230-6	33C 230-6	33C 230-6
ON-OFF-VOLUME, Contrast (Beige)	33C 230-2	33C 230-2	33C 230-2	33C 230-2
(Gold)	33C 230-7	33C 230-7	33C 230-7	33C 230-7
Brightness (Beige)	33C 230-5	33C 230-5	33C 230-5	33C 230-5
Brightness (Gold)	33C 230-10	33C 230-10	33C 230-10	33C 230-10
Vertical, Tone (Beige)	33C 230-3	33C 230-3	33C 230-3	33C 230-3
Vertical, Tone (Gold)	33C 230-8	33C 230-8	33C 230-8	33C 230-8
Knob Springs				
Conical, under push-button knob	19D 1-40	19D 1-40	19D 1-40	19D 1-40
for Fine Tuning	18A 5-7	18A 5-7	18A 5-7	18A 5-7
for Channel Selector	18A 103	18A 103	18A 103	18A 103
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11	18A 5-11
for Preference Controls	18A 191	18A 191	18A 191	18A 191
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4	89B 62-4
Monogram, "ADMIRAL"	23D 287-2	23D 287-2	23D 287-2	23D 287-2
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33C 281-1	33C 281-1
Retainer, Picture Window, Bottom	15B 1589	15B 1589	15B 1589	15B 1589
Rod, Nylon, Horizontal Adj.	33A 218-5	33A 218-5	33A 218-5	33A 218-5
Rubber Escutcheon Bumper (small)	12B 79-5-1	12B 79-5-1	12B 79-5-1	12B 79-5-1
Rubber Escutcheon Bumper (large)	12B 79-26-1	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Pad, Corner Glass Mounting	12A 89-2	12A 89-2	12A 89-2	12A 89-2
Rubber Strip, Wedge, Glass Support	12A 84	12A 84	12A 84	12A 84
Rubber Strip, Window Retainer	12C 5-53	12C 5-53	12C 5-53	12C 5-53
Screen, Speaker, Flocked	36B 55-18	36B 55-18	36B 55-19	36B 55-20
Screw, Mtg. Speaker, #3 x ¾ BDHD	1A 28-22-70	1A 28-22-70	1A 28-22-70	1A 28-22-70
Screw, Mtg. Escutcheon, #6-32 x ½ HHST	1A 206-12-71	1A 206-12-71	1A 206-12-71	1A 206-12-71
Shield, Pilot Light	82A 24-2	82A 24-2	82A 24-2	82A 24-2
Socket, Pilot Light	82A 35-1	82A 35-1	82A 35-1	82A 35-1
Speakers				
4" PM	———	———	78B 136-4	78B 136-4
6" PM	78B 134-4	78B 134-4	78B 134-4	78B 134-4
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29	9B 29
Trim Strips (see note below)				
Plain, Gold — Left Side	21D 98-1	21D 98-1	21D 98-1	21D 98-1
Plain, Gold — Right Side	21D 98-2	21D 98-2	21D 98-2	21D 98-2
Preference Controls	21D 98-3	21D 98-3	21D 98-3	21D 98-3
"Selector"	21D 98-4	21D 98-4	21D 98-4	21D 98-4
"Fine Tuning"	21D 98-5	21D 98-5	21D 98-5	21D 98-5
Wedge, Picture Tube Mounting	33D 239	33D 239	33D 239	33D 239
Window, Picture (tinted)	21D 96-2	21D 96-2	21D 96-2	21D 96-2

NOTE: Trim strips can be fastened to escutcheon with PLI-O-BOND, a cement which can be obtained locally.

*Orders for cabinets and certain matching parts will not be filled unless full details are given with the order and unless the damaged part cannot be repaired economically.

CABINET PARTS

Models may have suffix letters "C", "D", "E" or "F".

Description	T21E1 TA21E1 Charcoal	T21E2 TA21E2 Bronze	T21E3 TA21E3 Beige
Back, Cabinet (less line cord and end bell)			
for VHF	43D 303-1	43D 303-2	43D 303-2
for UHF	43D 303-3	43D 303-4	43D 303-4
Back, Cabinet (less line cord and end bell)	43D 303-3	43D 303-3	43D 303-3
Bell, Cabinet Back	33C 228-1	33C 228-1	33C 228-1
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5
*Cabinet			
Charcoal	*34E 132-11	———	———
Bronze	———	*34E 132-12	———
Beige	———	———	*34E 132-13
Clip, Cabinet Back Mtg.	18A 161	18A 161	18A 161
Clip, Window Retaining	2A 30-1	2A 30-1	2A 30-1
Escutcheon, Cabinet Front (Molded) Gold Finish	23E 296-2	23E 296-2	23E 296-2
Feet, Cabinet	8A 12-5	8A 12-5	8A 12-5
Grille, Speaker			
Flocked Black	36B 55-18	———	———
Flocked Burgundy	———	36B 55-19	36B 55-19
Handgrip (not used in all models)	———	33C 270	33C 270
Knobs and Associated Parts			
Tuning Knobs			
VHF Channel Selector	33D 237-22	33D 237-22	33D 237-22
VHF-UHF Channel Selector	33D 237-21	33D 237-21	33D 237-21
UHF Channel Indicator	33D 237-24	33D 237-24	33D 237-24
Fine Tuning	33D 237-23	33D 237-23	33D 237-23
Preference Control Knobs			
Contrast, Volume, Vertical	33D 175-3	33D 175-3	33D 175-3
Volume Spacer	33C 230-1	33C 230-1	33C 230-1
Knob Springs			
for Fine Tuning	18A 5-3	18A 5-3	18A 5-3
for Channel Selector	18A 103	18A 103	18A 103
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11
for Preference Controls	18A 5-8	18A 5-8	18A 5-8
Legs, Cabinet	37D 168-2	37D 168-4	37D 168-4
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4
Monogram, "ADMIRAL"	23D 287-1	23D 287-1	23D 287-1
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33C 281-1
Retainer, Bottom Glass Mounting	15B 1589	15B 1589	15B 1589
Rod, Nylon, Horizontal Adj.	33A 218-5	33A 218-5	33A 218-5
Rubber Escutcheon Bumper	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Pad, Bottom Glass Mtg.	12C 5-53	12C 5-53	12C 5-53
Rubber Pad, Corner Glass Mtg.	12A 89-2	12A 89-2	12A 89-2
Rubber Strip, Top Glass Mtg.	12C 5-17	12C 5-17	12C 5-17
Rubber Wedge (used at top of window)	12A 84	12A 84	12A 84
Screw, Feet Mtg.	1A 97-21-71	1A 97-21-71	1A 97-21-71
Screw, Speaker Mtg.	1A 48-18-71	1A 48-18-71	1A 48-18-71
Screw, Escutcheon Mtg. #10-32 x ½	1A 206-29-71	1A 206-29-71	1A 206-29-71
Shaft, Plastic, Control	96A 26-3	96A 26-3	96A 26-3
Shield, Pilot Light	82A 24-2	82A 24-2	82A 24-2
Speaker, 4" PM	78B 136-1	78B 136-1	78B 136-1
Strap, Tube Mounting	15B 1621	15B 1621	15B 1621
Terminal, Antenna (snap-in type)	9B 29	9B 29	9B 29
Trim Plate, Gold Finish			
Right Side	23D 291-17	23D 291-17	23D 291-17
Left Side	23D 291-18	23D 291-18	23D 291-18
Wedge, Picture Tube Mtg.	33A 239	33A 239	33A 239
Well Assembly			
Charcoal	700C 84-1	———	———
Bronze	———	700C 84-4	———
Beige	———	———	700C 84-5
Window, Picture			
Clear Glass	21D 97-3	———	———
Tinted Glass	21D 97-4	21D 97-4	21D 97-4

*Orders for cabinets and certain matching parts will not be filled unless full details are given with the order and unless the damaged part cannot be repaired economically.

CABINET PARTS

Models may have suffix letter "C", "E" or "F".

Description	C21E11 CA21E11 Walnut	C21E12 CA21E12 Mahogany	C21E13 CA21E13 Blond	C21E14 CA21E14 Sierra	C21E16 CA21E16 Mahogany	C21E17 CA21E17 Blond
Back, Cabinet (less line cord)	43E 298-13	43E 298-13	43E 298-13	43E 298-13	43E 298-13	43E 298-13
Bulb, Pilot Light #44	81A 1-5	81A 1-5	81A 1-5	81A 1-5	81A 1-5	81A 1-5
*Cabinet, Metal						
Sierra	———	———	———	*35E 396-34	———	———
Mahogany	———	*35E 396-32	———	———	*35E 419-2	———
Walnut	*35E 396-31	———	———	———	———	———
Blond	———	———	*35E 396-33	———	———	*35E 419-3
Clip, Cabinet Back Retaining	18A 159	18A 159	18A 159	18A 159	18A 159	18A 159
Clip, Window Retaining	2A 30-1	2A 30-1	2A 30-1	2A 30-1	2A 30-1	2A 30-1
Escutcheon, Cabinet Front (molded)						
Gold finish	23E 286-1	23E 286-1	23E 286-1	23E 286-1	23E 286-1	23E 286-1
Ferrule, Leg	———	———	———	———	37B 123-5	37B 123-5
Grille, Metal (above picture window)	36B 80-1	36B 80-1	36B 80-1	36B 80-1	36B 80-1	36B 80-1
Grille Cloth	36D 86-1	36D 86-1	36D 86-1	36D 86-1	36D 86-19	36D 86-20
Jewel, Escutcheon (Beige)	82A 32-3	82A 32-3	82A 32-3	82A 32-3	82A 32-3	82A 32-3
Knobs and Associated Parts						
Tuning Knobs						
for VHF only models						
§Drive Disc Assembly	33C 258-4	33C 258-4	33C 258-4	33C 258-4	33C 258-4	33C 258-4
for VHF-UHF models						
§Drive Disc Assembly	33C 258-5	33C 258-5	33C 258-5	33C 258-5	33C 258-5	33C 258-5
UHF Indicator	33C 257-3	33C 257-3	33C 257-3	33C 257-3	33C 257-3	33C 257-3
for ALL models						
Fine Tuning (UHF Selector)	33D 231-16	33D 231-16	33D 231-16	33D 231-16	33D 231-16	33D 231-16
VHF Selector	33D 231-24	33D 231-24	33D 231-24	33D 231-24	33D 231-24	33D 231-24
Preference Control Knobs (Beige)						
Brightness	33C 230-5	33C 230-5	33C 230-5	33C 230-5	33C 230-5	33C 230-5
Contrast, Volume	33C 230-2	33C 230-2	33C 230-2	33C 230-2	33C 230-2	33C 230-2
Vertical, Tone	33C 230-3	33C 230-3	33C 230-3	33C 230-3	33C 230-3	33C 230-3
Volume Spacer	33C 230-1	33C 230-1	33C 230-1	33C 230-1	33C 230-1	33C 230-1
Knob Springs						
Conical, under push-button knob	19D 1-40	19D 1-40	19D 1-40	19D 1-40	19D 1-40	19D 1-40
Drive Disc Retainer	18A 214	18A 214	18A 214	18A 214	18A 214	18A 214
for Fine Tuning	18A 5-14	18A 5-14	18A 5-14	18A 5-14	18A 5-14	18A 5-14
for UHF Indicator	18A 5-11	18A 5-11	18A 5-11	18A 5-11	18A 5-11	18A 5-11
for VHF Selector	18A 103	18A 103	18A 103	18A 103	18A 103	18A 103
for Volume	18A 191	18A 191	18A 191	18A 191	18A 191	18A 191
*Leg, Cabinet						
Walnut	*35E 396-51	———	———	———	———	———
Mahogany	———	*35E 396-52	———	———	*37D 168-26	———
Blond	———	———	*35E 396-53	———	———	*37D 168-28
Sierra	———	———	———	*35E 396-54	———	———
Line Cord and Interlock Socket	89B 62-4	89B 62-4	89B 62-4	89B 62-4	89B 62-4	89B 62-4
Monogram						
"A"	26C 68-1	26C 68-1	26C 68-1	26C 68-1	26C 68-1	26C 68-1
ADMIRAL	23D 287-2	23D 287-2	23D 287-2	23D 287-2	23D 287-2	23D 287-2
Plastic, Bottom Glass Mounting	33C 281-1	33C 281-1	33C 281-1	33C 281-1	33C 281-1	33C 281-1
Retainer, Window Glass	15B 1589	15B 1589	15B 1589	15B 1589	15B 1589	15B 1589
Rod, Nylon, Horizontal Adj	33A 218-5	33A 218-5	33A 218-5	33A 218-5	33A 218-5	33A 218-5
Rubber Escutcheon Bumper						
Small	12B 79-5-1	12B 79-5-1	12B 79-5-1	12B 79-5-1	12B 79-5-1	12B 79-5-1
Large	12B 79-26-1	12B 79-26-1	12B 79-26-1	12B 79-26-1	12B 79-26-1	12B 79-26-1
Rubber Pad (top glass mtg.)	12C 5-17	12C 5-17	12C 5-17	12C 5-17	12C 5-17	12C 5-17
Rubber Pad (corner glass mtg.)	12A 89-2	12A 89-2	12A 89-2	12A 89-2	12A 89-2	12A 89-2
(bottom glass mtg.)	12C 5-53	12C 5-53	12C 5-53	12C 5-53	12C 5-53	12C 5-53
Screw						
#5 x ⅜ RHWS (mtg. cabt. back clips)	1A 7-16-71	1A 7-16-71	1A 7-16-71	1A 7-16-71	1A 7-16-71	1A 7-16-71
#10-24 x ½ BHWS (mtg. tube strap)	1A 206-29-71	1A 206-29-71	1A 206-29-71	1A 206-29-71	1A 206-29-71	1A 206-29-71
#10-24 x ½ (mtg. escutcheon)	1A 206-29-71	1A 206-29-71	1A 206-29-71	1A 206-29-71	1A 206-29-71	1A 206-29-71
Shield, Pilot Light	84A 24-2	84A 24-2	84A 24-2	84A 24-2	84A 24-2	84A 24-2
Speaker, 6" PM	78B 134-5	78B 134-5	78B 134-5	78B 134-5	78B 134-4	78B 134-4
Strip, Wedge						
glass support	12A 84	12A 84	12A 84	12A 84	12A 84	12A 84
corner glass mounting	12A 89-2	12A 89-2	12A 89-2	12A 89-2	12A 89-2	12A 89-2
Swivel Plate	———	———	———	———	37C 126	37C 126
Terminal, Antenna (snap-in type)	9B 29-1	9B 29-1	9B 29-1	9B 29-1	9B 29-1	9B 29-1
Trim Plate, Gold Finish						
Right side	23D 291-17	23D 291-17	23D 291-17	23D 291-17	23D 291-17	23D 291-17
Left side	23D 291-16	23D 291-16	23D 291-16	23D 291-16	23D 291-16	23D 291-16
Trim Strips						
Plain, Gold — Left side	21D 98-1	21D 98-1	21D 98-1	21D 98-1	21D 98-1	21D 98-1
Plain, Gold — Right side	21D 98-2	21D 98-2	21D 98-2	21D 98-2	21D 98-2	21D 98-2
Preference Controls	21D 98-7	21D 98-7	21D 98-7	21D 98-7	21D 98-7	21D 98-7
"Selector"	21D 98-4	21D 98-4	21D 98-4	21D 98-4	21D 98-4	21D 98-4
"Fine Tuning"	21D 98-5	21D 98-5	21D 98-5	21D 98-5	21D 98-5	21D 98-5
Trim Strip (button set)	23B 301	23B 301	23B 301	23B 301	23B 301	23B 301
Wedge, Picture Tube Mounting	33D 239	33D 239	33D 239	33D 239	33D 239	33D 239
Window, Picture (tinted)	21D 97-2	21D 97-2	21D 97-2	21D 97-2	21D 97-2	21D 97-2

§Drive Disc Assembly includes proper VHF Indicator.

*Orders for cabinets and certain matching parts will not be filled unless the damaged item cannot be economically repaired and unless full details are given with the order.

SCHEMATIC NOTES

①, ②, . . . etc. indicate production changes covered by a Run number. Run numbers are stamped at the rear of the chassis. Brief description of Run changes given on schematic.

Ⓐ1, Ⓐ2, ... Ⓣ, Ⓥ, etc., indicate alignment points and connections.

Important: Before making waveform and voltage measurements, see instructions below.

Fixed resistor values shown in ohms ±10% tolerance. ½ watt; capacitor values shown in micromicrofarads ± 20% tolerance unless otherwise specified.

Note: K=x1000, MEG=x1,000,000, MF=microfarad.

VOLTAGE WARNING

The chassis of this receiver is connected directly to one side of the 117 volt, 60 cycle power line. Depending upon the position of the line cord plug in the wall outlet, the total AC line voltage may exist between the chassis and any ground object. When installing or servicing, do not touch the chassis unless adequate safety precautions are taken. Never touch the chassis and a ground (radiators, pipes, etc.) at the same time.

Do not ground chassis or connect test equipment directly to it, unless an isolation transformer is used. If an isolation transformer is not available, a neon lamp can be used to determine if the chassis is "hot". Connect an electrician's neon tester (General Cement's "Ne-o-lite" or equivalent) between the receiver chassis (not control shafts) and some grounded point, such as electrical conduit, water pipe, etc. If the neon lamp glows, the chassis is "hot" and the line cord plug should be reversed. Make the same check with the neon lamp connected between ground and the ground terminal of the test equipment. If the lamp glows, reverse the line cord to the test equipment.

PICTURE TUBE HANDLING PRECAUTION

The newly developed picture tube used in these sets must be handled with much greater care because of its short, thin neck and wafer type base. ALWAYS lift picture tube by grasping firmly around face plate; NEVER LIFT TUBE BY ITS NECK. Use care when inserting socket to prevent bending pins. Before handling picture tube, remove static charge from it by shorting 2nd anode well to chassis ground with an insulated wire or screwdriver. WHEN TUBE IS REMOVED, ALWAYS PLACE IT FACE DOWN.

Due to the high vacuum and large surface area of picture tubes, extreme care must be exercised when handling these tubes. Shatterproof goggles, heavy gloves and a protective apron should be worn while handling or installing a picture tube. The picture tube must not be scratched, bumped or subjected to excessive pressure, as fracture of the glass may result in an explosion of considerable violence, which may cause injury or property damage.

CONDITIONS FOR OBSERVING WAVEFORMS

Caution: Pulsed high voltages are present on the caps of V405 and V407, and at pin 3 of V406. DO NOT attempt to observe waveforms at these points unless suitable test equipment is used. Waveforms at these points may be taken with a capactive voltage divider probe. The waveform at pin 3 of V406 may also be taken by clipping or twisting the lead from the high side of the oscilloscope over the insulation on the lead connecting to pin 3. If the waveform is taken in this manner, its shape will be the same, but the peak-to-peak voltage will be somewhat lower, depending on the degree of coupling between oscilloscope and lead connecting to pin 3 of V406.

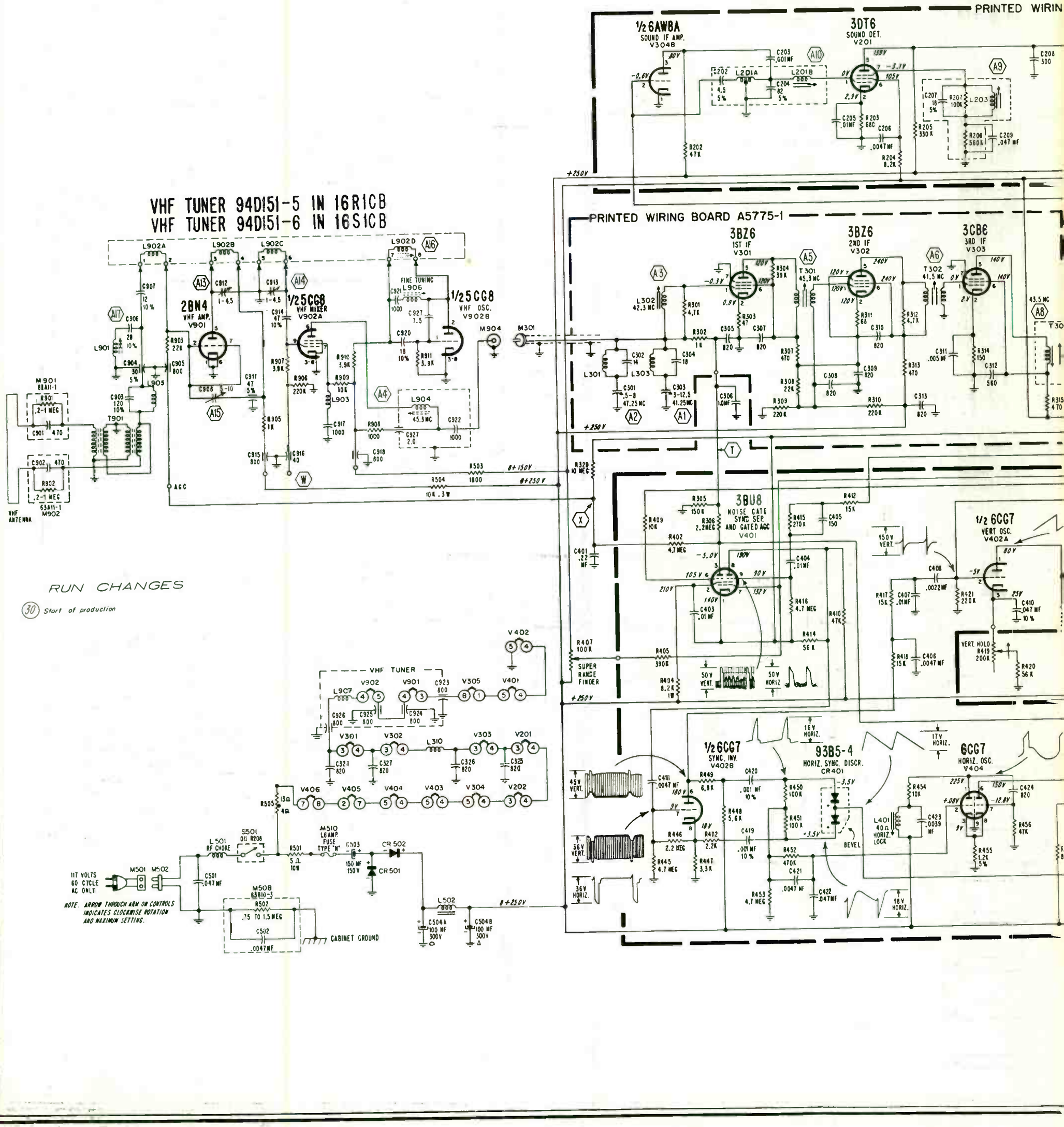
- Waveforms should closely resemble those shown on the schematic.
- Waveforms are taken with a transmitted signal input to the television chassis.
- Set all controls for a normal picture. After the receiver is set for a normal picture, turn the CONTRAST control fully clockwise.
- Oscilloscope sweep set at 30 cycles for vertical waveforms and at 7,875 cycles for horizontal waveforms to permit 2 cycles to be observed.
- Peak-to-peak voltages will vary slightly from those shown on the schematic, depending on the test equipment employed and chassis parts tolerance.

CONDITIONS FOR MEASURING VOLTAGES

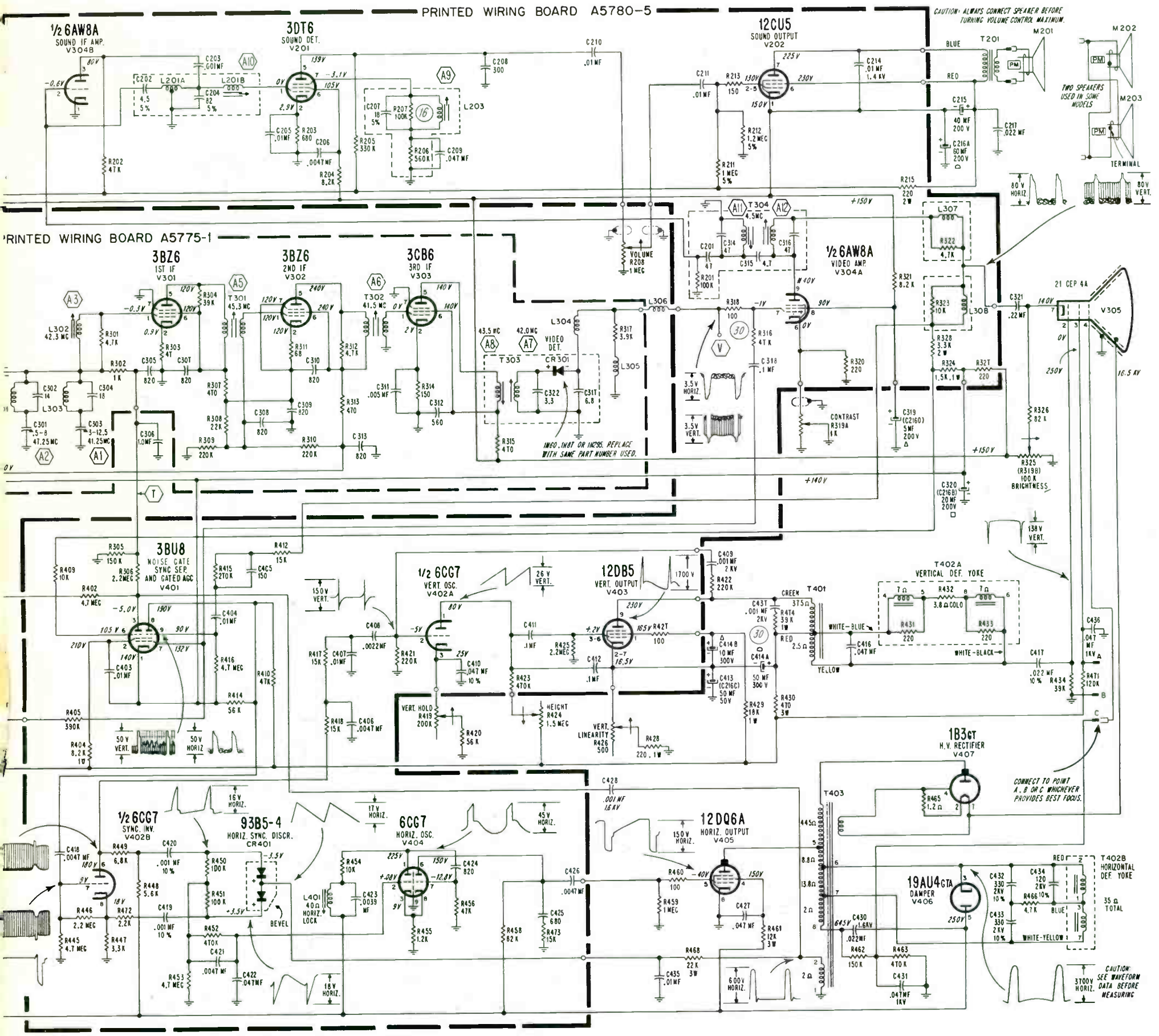
Caution: Pulsed high voltages are present on the caps of V405 and V407, and at pin 3 of V406. DO NOT attempt to measure voltages at these points without suitable test equipment. A VTVM with a high voltage probe may be used when measuring picture tube 2nd anode voltage.

- Set the CHANNEL SELECTOR on an unused channel. CONTRAST and SUPER RANGE FINDER controls fully clockwise. All other controls counterclockwise. Do not disturb HORIZONTAL DRIVE or HORIZONTAL HOLD adjustments.
- Antenna disconnected and terminals shorted together.
- Line voltage: 117 volt AC.
- DC voltages measured with a VTVM between tube socket terminals and chassis, unless otherwise indicated.
- Voltages measured with tubes in socket.
- Voltages marked (*) will vary widely with control settings.

Figure 81. Schematic for 16R1CB and 16S1CB Television Chassis Stamped Run 30. See Figure 77 for Schematic of V

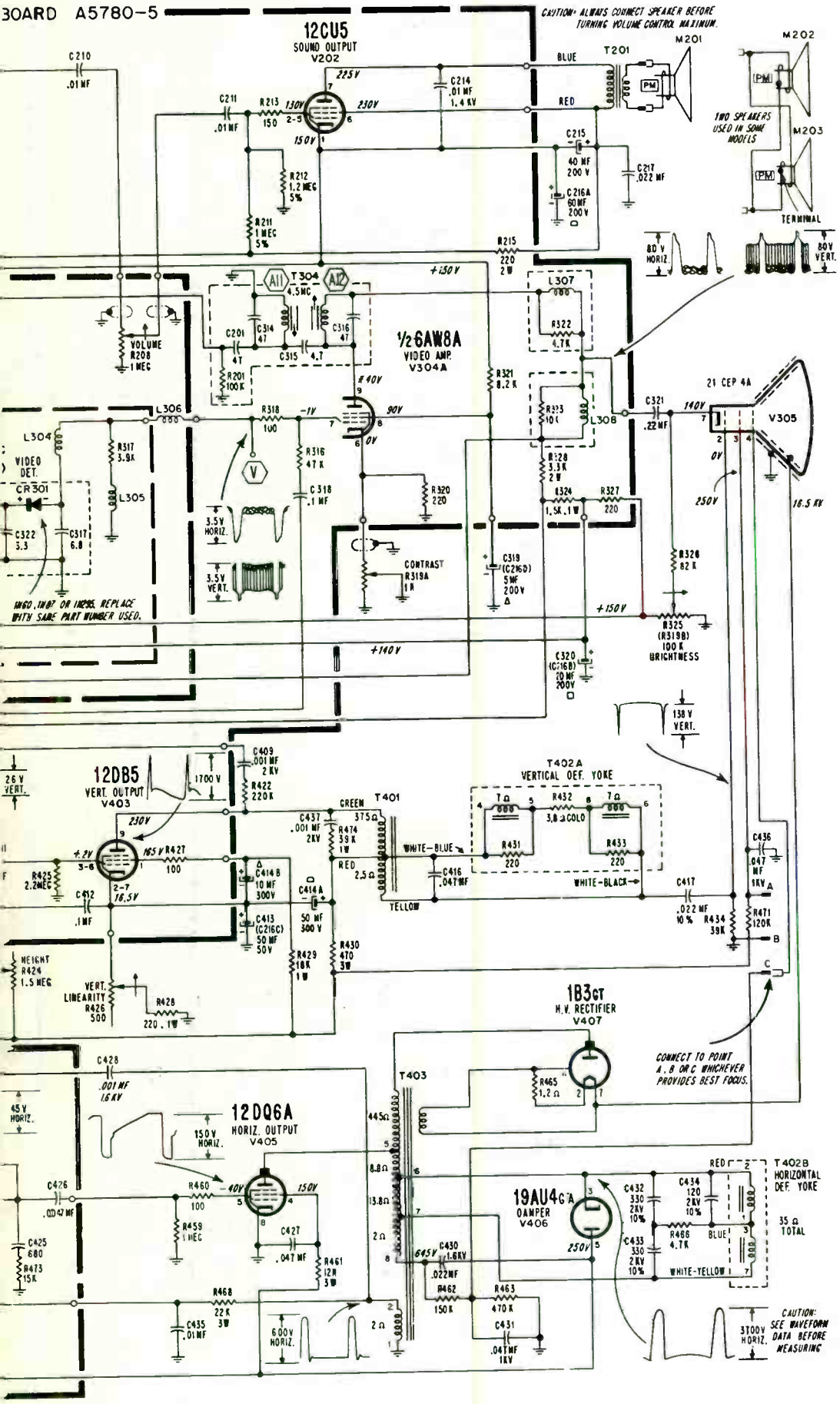


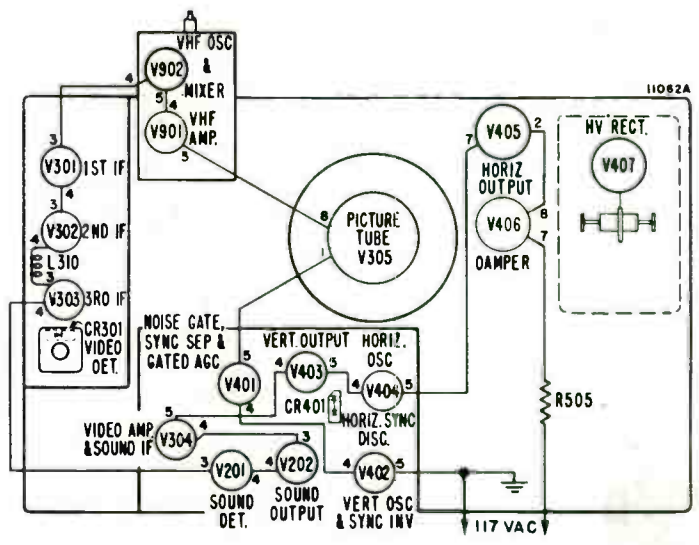
sis Stamped Runs 29 and 30. See Figure 76 for Sync Separator and Gated AGC Circuit Used in Chassis Stamped Run 29.



CHASSIS 16AB1, AD1, AE1, AG1, AL1,
AR1C, AS1C, AU1C, AW1C,
B1, D1, E1, G1, J1, K1, L1,
R1C, S1C, U1C, W1C (Supp.)

Tuners 94D151-1 and -2, Used in Early Production.





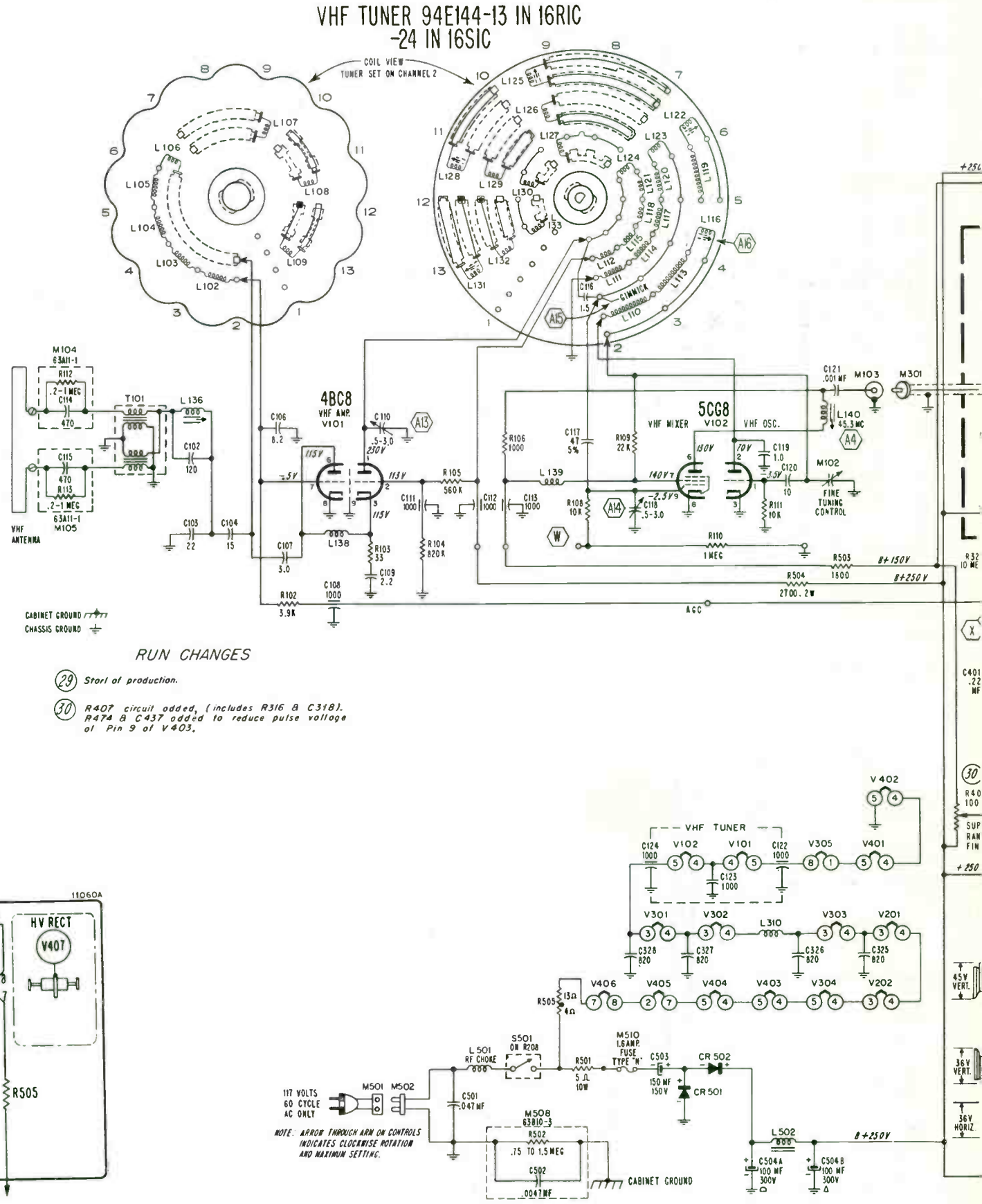
TUBE LOCATIONS AND HEATER CIRCUIT

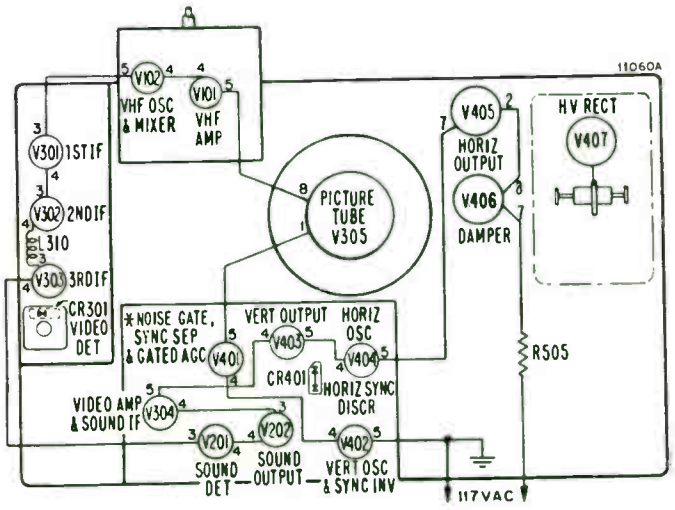
TUBE COMPLEMENT

V901—2BN4	V303—3CB6	V401—3BU8
V902—5CG8	CR301—1N60, 1N87	V402—6CG7
V201—3DT6	or 1N295	V403—12DB5
V202—12CU5	V304—6AW8A	V404—6CG7
V301—3BZ6	V305—21CEP4A	V405—12DQ6A
V302—3BZ6	CR401—Dual Selenium Diode 93B5-4	V406—19AU4GTA
		V407—1B3GT

CHASSIS 16AB1, AD1, AE1, AG1, AL1, AR1C, AS1C, AU1C, AW1C, B1, D1, E1, G1, J1, K1, L1, R1C, S1C, U1C, W1C (Supp.)

Figure 80. Schematic for 16R1C and 16S1C Television Cha



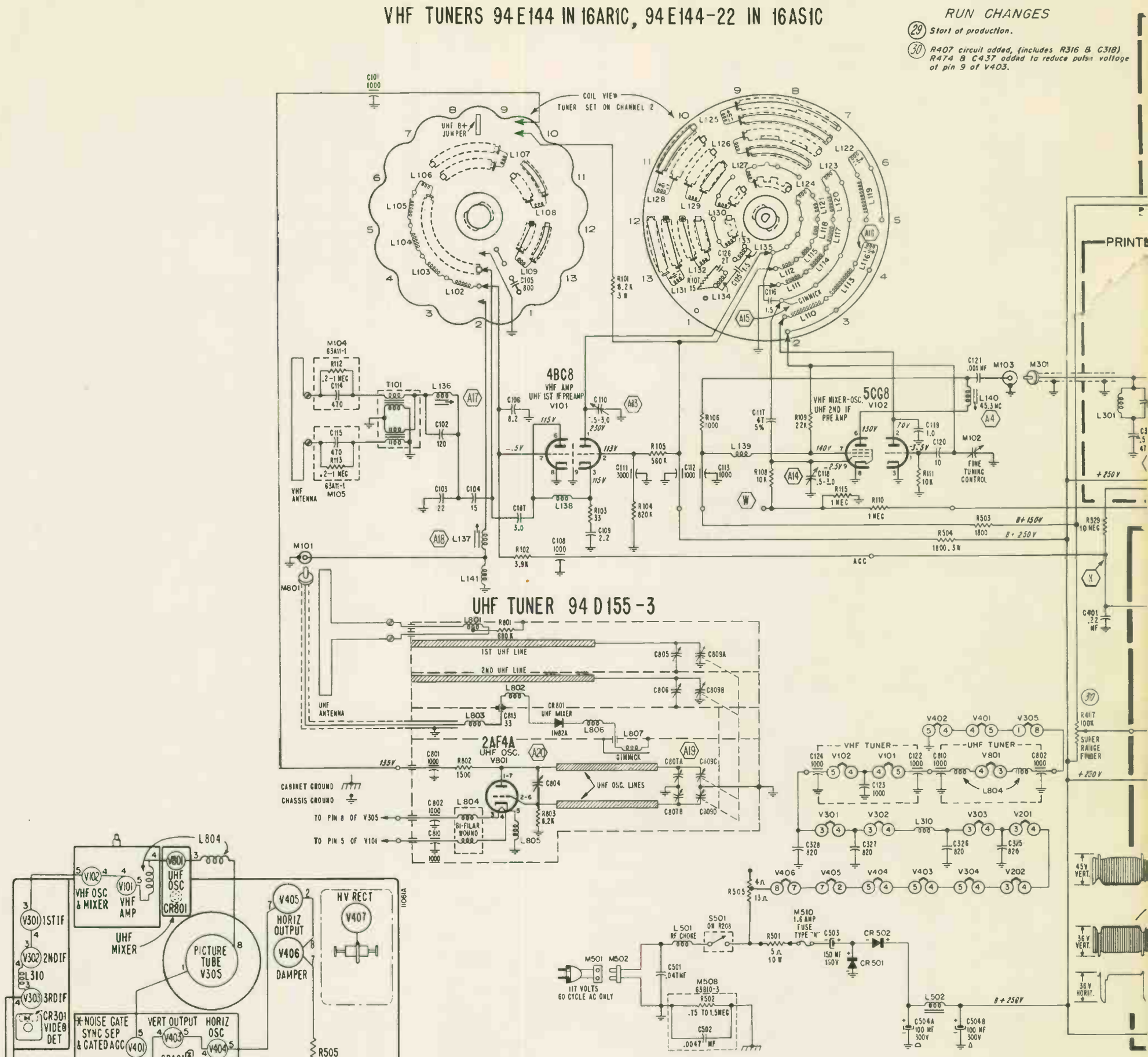


TUBE LOCATIONS AND HEATER CIRCUIT

TUBE COMPLEMENT

V101—4BC8
V102—5CG8
V201—3DT6
V202—12CU5
V301—3BZ6
V302—3BZ6
V303—3CB6
CR301—1N60, 1N87 or 1N295
V304—6AW8A
V305—21CEP4A
CR401—Dual Selenium Diode 93B5-4
V401—3BU8
V402—6CG7
V403—12DB5
V404—6CG7
V405—12DQ6A
V406—19AU4GTA
V407—1B3GT

Figure 82. Schematic for 1



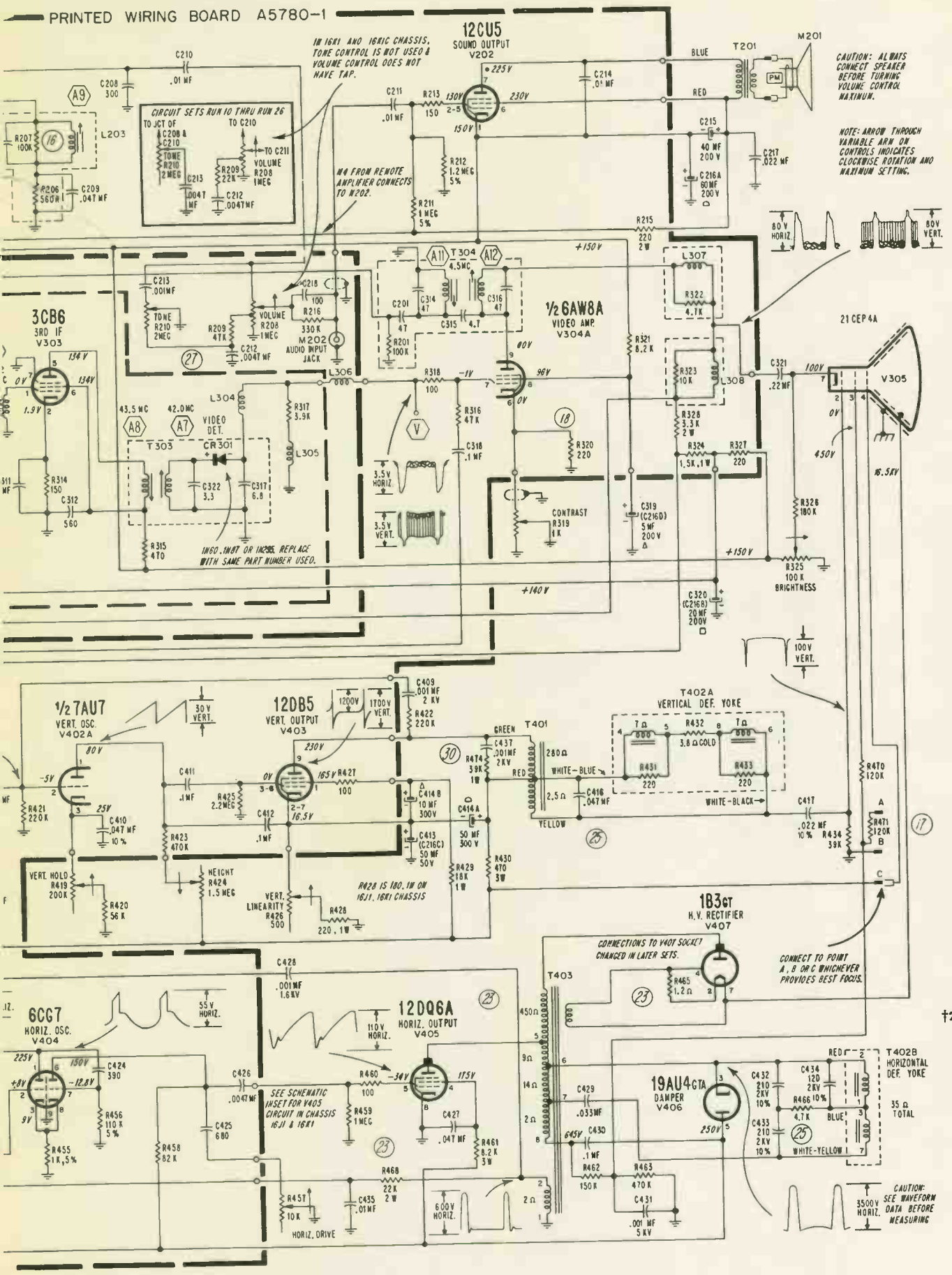
TUBE LOCATIONS AND HEATER CIRCUIT

TUBE COMPLEMENT

CR801—IN82A	V303—3CB6	V401—3BU8
V801—2AF4A	CR301—1N60, 1N87	V402—7AU7
V101—4BC8	or 1N295	V403—12DB5
V102—5CG8	V304—6AW8A	V404—6CG7
V201—3DT6	V305—21CEP4A	V405— †
V202—12CU5	CR401—Dual Selenium	V406—19AU4GTA
V301—3BZ6	Diode 93B5-4	V407—1B3GT
V302—3BZ6		

†25CD6GB in chassis Run 10 thru 22; 12DQ6A in chassis Run 23 or higher.

'n 30. Horizontal Output Circuit Shown, Used only Horizontal Output Circuit in Sets without Suffix Letter 1-1 and -2 Used in Early Production.



TUBE LOCATIONS AND HEATER CIRCUIT

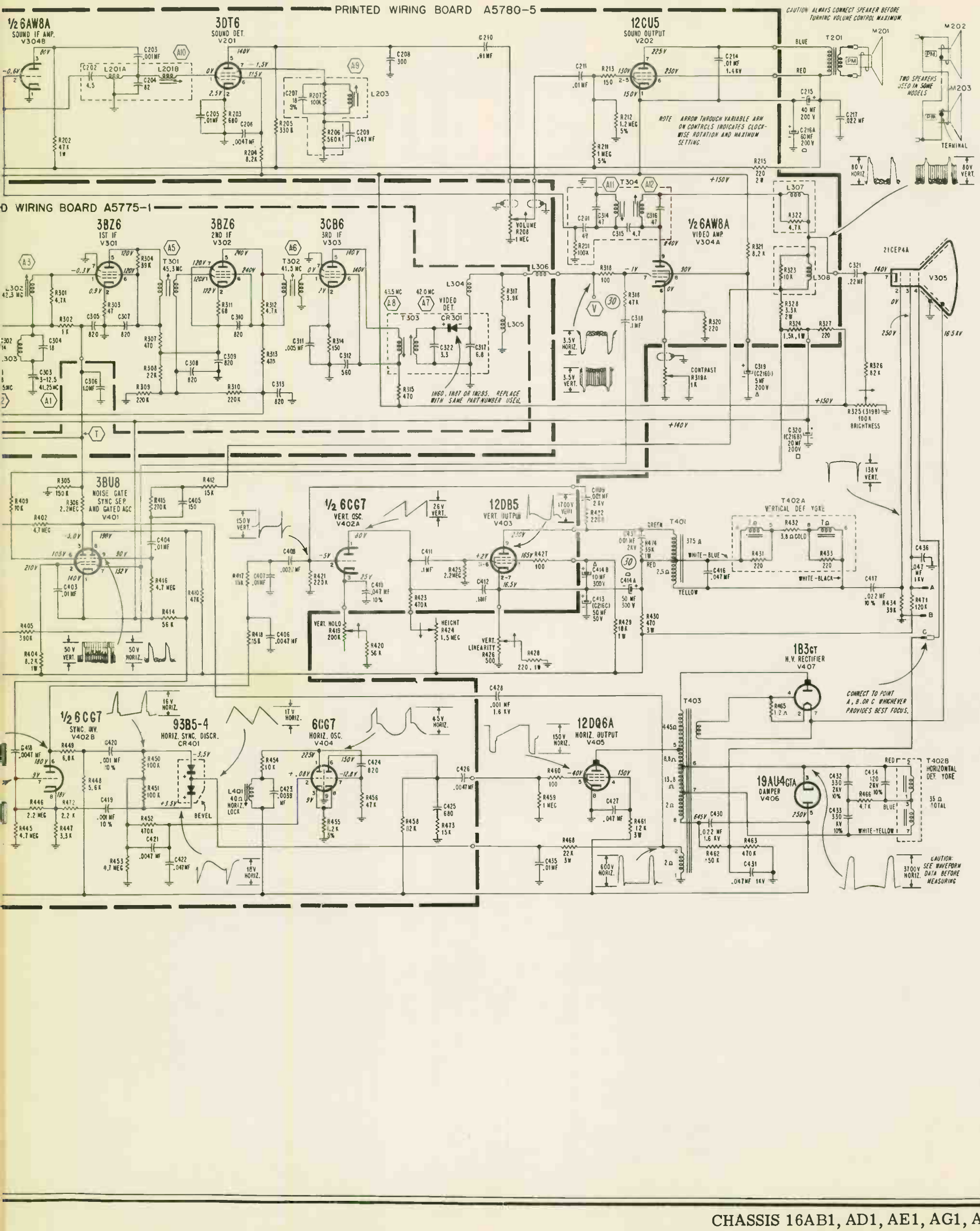
TUBE COMPLEMENT

V901—2BN4	CR301—1N60, 1N87 or 1N295	V402—7AU7
V902—5CG8	V303—3CB6	V403—12DB5
V201—3DT6	V304—6AW8A	V404—6CG7
V202—12CU5	V305—21CEP4A	V405— †
V301—3BZ6	CR401—Dual Selenium Diode 93B5-4	V406—19AU4GTA
V302—3BZ6	V401—3BU8	V407—1B3GT

†25CD6GB in chassis Run 10 thru 22; 12DQ6A in chassis Run 23 or higher.

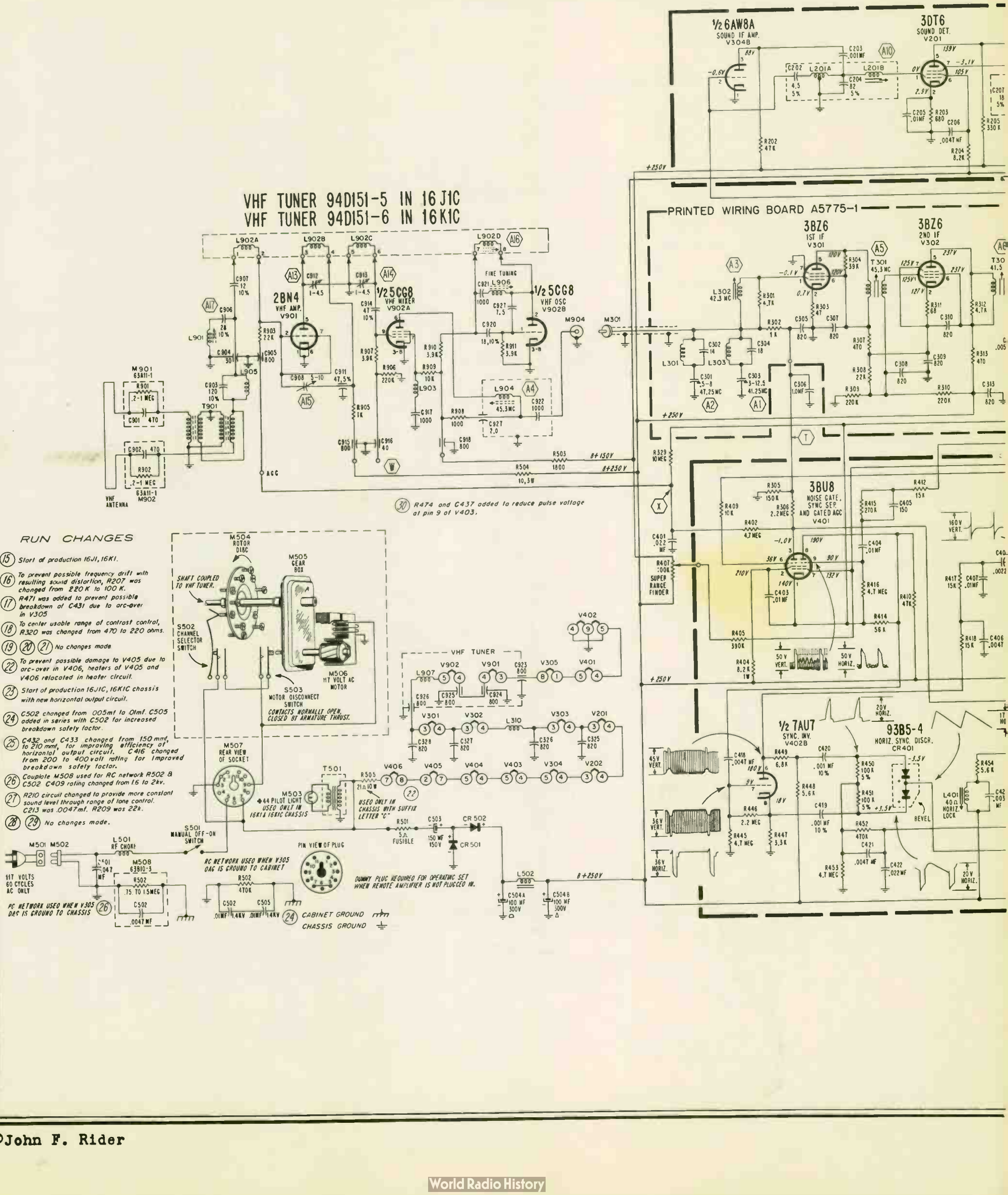
CHASSIS 16AB1, AD1, AE1, AG1, AL1, AR1C, AS1C, AU1C, AW1C, B1, D1, E1, G1, J1, K1, L1, R1C, S1C, U1C, W1C (Supp.)

16AR1C and 16AS1C Television Chassis Stamped Run 30.



CHASSIS 16AB1, AD1, AE1, AG1, AL1,
AR1C, AS1C, AU1C, AW1C,
B1, D1, E1, G1, J1, K1, L1,
R1C, S1C, U1C, W1C (Supp.)

Figure 83. Schematic for 16J1, 16J1C, 16K1 and 16K1C Television Chassis Stamped Run 15 through Ru in Sets with suffix Letter "C" Added to Chassis Number. See Figure 57 in Service Data No. ST597-2 for E "C" (Stamped Run 15 Through Run 22). See Figure 77 for Circuitry of VHF Tuners 94D15



(30) R474 and C437 added to reduce pulse voltage at pin 9 of V403.

RUN CHANGES

(15) Start of production 16J1, 16K1.

(16) To prevent possible frequency drift with resulting sound distortion, R207 was changed from 220 K to 100 K.

(17) R471 was added to prevent possible breakdown of C431 due to arc-over in V305

(18) To center usable range of contrast control, R320 was changed from 470 to 220 ohms.

(19) (20) (21) No changes made.

(22) To prevent possible damage to V405 due to arc-over in V406, heaters of V405 and V406 relocated in heater circuit.

(23) Start of production 16J1C, 16K1C chassis with new horizontal output circuit.

(24) C502 changed from .005mf to .01mf. C505 added in series with C502 for increased breakdown safety factor.

(25) C432 and C433 changed from 150 mmf, to 210 mmf, for improving efficiency of horizontal output circuit. C416 changed from 200 to 400 volt rating for improved breakdown safety factor.

(26) Couplate M508 used for RC network R502 & C502 C409 rating changed from 1.6 to 2kv.

(27) R210 circuit changed to provide more constant sound level through range of tone control. C213 was .0047mf. R209 was 22k.

(28) (29) No changes made.

Admiral

SERVICE DATA SUPPLEMENT NO. ST832-2

for models using

15A2, 15A2C, 15B2, 15B3, 15D1B and 15UA2 TV CHASSIS 4G3 and 4H3 Remote Control Amplifier

and

Son-r Tuners S11A and S21A

IMPORTANT

Use this supplement with Service Data No. ST832-1 when servicing any model using these chassis. This supplement contains necessary service data for all chassis covered by ST832-1 and ST832-2. It also includes corrections and additions for ST832-1. For complete alignment instructions for all chassis, refer to TELEVISION ALIGNMENT section.

MODEL IDENTIFICATION CHART

MODEL NUMBER	TV CHASSIS	MODEL NAME	VHF TUNER	UHF TUNER	POWER TOWER ANTENNA
P17F1C	15A2C	Rockwell	94D164-3	———	NO
P17F2C	15A2C	Rockwell	94D164-3	———	YES
P17F3C	15A2C	Rockwell	94D164-3	———	YES
P17UF1	15UA2	Rockwell	94E163-2	94D162-3	NO
P17UF2	15UA2	Rockwell	94E163-2	94D162-3	YES
P17UF3	15UA2	Rockwell	94E163-2	94D162-3	YES
PL17F31B	15D1B	Custom	94E163-1	———	YES
PL17F32B	15D1B	Custom	94E163-1	———	YES
PL17F33B	15D1B	Custom	94E163-1	———	YES
PL17F41B	15D1B	Executive	94E163-1	———	YES
PL17F42B	15D1B	Executive	94E163-1	———	YES
PL17F43B	15D1B	Executive	94E163-1	———	YES

SPECIFICATIONS

Warning: Parts of the chassis are connected directly to one side of the 117 volt, 60 cycle power line. Depending upon the position of the line cord plug in the wall outlet, the total AC line voltage may exist between parts of the chassis and any grounded object. Do not touch the chassis unless adequate safety precautions are taken. Never touch the chassis and a ground (radiators, pipes, etc.) at the same time.

NOTE: Chassis 15D1B except for the chassis isolation brackets at top of chassis is connected to one side of the 60 cycle power line. Portions of chassis 15A2, 15A2C, 15B2, 15B3 and 15UA2 (the tuner mounting bracket, the bracket on which the high voltage compartment is mounted, and the bracket on which the Damper (V405) and Horizontal Output (V404) tubes are mounted) are connected to one side of the AC line. When chassis ground is used as a connection point for test equipment on chassis 15A2, 15A2C, 15B2, 15B3 or 15UA2, be sure to clip the common (ground) lead to one of these three brackets.

Do not ground chassis or connect test equipment directly to it, unless an isolation transformer is used. If an isolation transformer is not available, a neon lamp can be used to determine if the chassis is "hot". Connect an electrician's neon tester (General Cement's "Ne-o-lite" or equivalent) between the receiver chassis (not control shafts) and some grounded point, such as electrical conduit, water pipe, etc. If the neon lamp glows, the chassis is "hot" and the line cord plug should be reversed. Make the same check with the neon lamp connected between ground and the ground terminal of the test equipment. If the lamp glows, reverse the line cord to the test equipment.

Specifications for chassis covered by this supplement are the same as in ST832-1 except as noted below:

Picture Tube: 17DSP4 picture tube has a shorter neck (4⅛") than the 17CWP4 (4½").

Wattage:

155 watts for 15A2C chassis.
170 watts for 15UA2 chassis.
175 watts for 15D1B chassis.

CORRECTIONS TO ST832-1

in figure 4 the frequency for the "On-Off-Volume" Resonator should be 38.285KC and the frequency for the Channel Resonator should be 39.285KC.

in figure 19. pin 8 of V4A (⅔ 6BJ8) should be pin 3.

The tube complement listed on page 18 should be shown on page 19, the tube complement on page 19 should be shown on page 20, and tube complement on page 20 should be shown on page 18.

CHASSIS DIFFERENCES

The chassis covered by this Service Manual Supplement are similar in circuitry to those covered by ST832-1. Chassis 15UA2 is quite similar to chassis 15A2. 15UA2 uses

94D162-3 UHF tuner in conjunction with 94E163-2 VHF tuner to provide VHF and UHF television reception. Chassis 15A2C is the same as chassis 15A2 except VHF tuner 94D164-3 was used.

Chassis 15D1B, although similar in circuitry to the other chassis, is constructed mechanically different. Only one Etched Circuit Board is used with chassis 15D1B. Chassis 15D1B uses 94E163-1 VHF tuner as does chassis 15A2. Servicing procedures for 15D1B are, in many cases, identical with procedures for the other chassis.

TUBE COMPLEMENT FOR 15A2C, 15D1B AND 15UA2 TV CHASSIS

V101	2CY5	VHF Amplifier (15D1B)
V901	2ER5	VHF Amplifier (15A2C, 15UA2) UHF IF Pre-amp (15UA2)
V102, V902	5CG8	VHF Mixer and Oscillator (15A2C, 15D1B, 15UA2) UHF IF Pre-amp (15UA2)
V201	3DT6	Sound Detector
V202	12CU5	Sound Output
V301	3BZ6	1st IF Amplifier
V302	3DK6	2nd IF Amplifier
V303	6AW8A	Video Amplifier Sound IF Amplifier
V304	17CWP4 17DSP4	Picture Tube (15A2C, 15UA2) Picture Tube (15D1B)
V401	3BU8	Noise Gate Sync Separator Gated AGC
V402	10DE7	Vertical Oscillator Vertical Output
V403	6CG7	Horizontal Oscillator
V404	12DQ6A	Horizontal Output
V405	12AX4GTA	Damper
V406	1G3GT	HV Rectifier
V801	2AF4A	UHF Oscillator (15UA2)

SEMICONDUCTOR DIODES

CR301	Germanium Diode 1N87 or 1N87A	Video Detector
CR401	Selenium Dual Diode 93B 5-6	Horizontal Phase Detector
CR501	Silicon Diode 93B12	B+ Rectifier
CR502	Silicon Diode 93B12	B+ Rectifier
CR801	Silicon Diode 1N82A	UHF Mixer (15UA2)

OPERATING INSTRUCTIONS

MAIN OPERATING CONTROLS — Models using chassis 15A2, 15A2C, 15B2, 15B3, 15UA2.

The main operating controls are located at the front of the cabinet; see figures 23, 24, 25 and 26. Figure 23 gives instructions for sets using 15A2 and 15A2C chassis, figure 24 for sets using 15B2 chassis, figure 25 for 15B3 chassis and figure 26 for 15UA2 chassis. For tuning, perform steps 1 through 4 in order for the applicable set.

MAIN OPERATING CONTROLS — Models using chassis 15D1B.

The main operating controls are located at the top and right side of these cabinets; see figures 27 and 28 and follow steps 1 through 4, in order, for tuning the set.

AUXILIARY CONTROLS

The location of auxiliary controls on chassis 15A2, 15A2C, 15B2, 15B3 and 15UA2 are shown in figure 29. Follow the instructions on the illustration to adjust the auxiliary controls. Removal of the cabinet back is required for adjustment of the AGC control.

The location of auxiliary controls on chassis 15D1B is shown with the Main Operating controls on figure 27 and 28. Follow instructions in the illustration for adjustment of these controls. NOTE: See figure 31 for location of AGC control and Circuit Breaker RESET button.

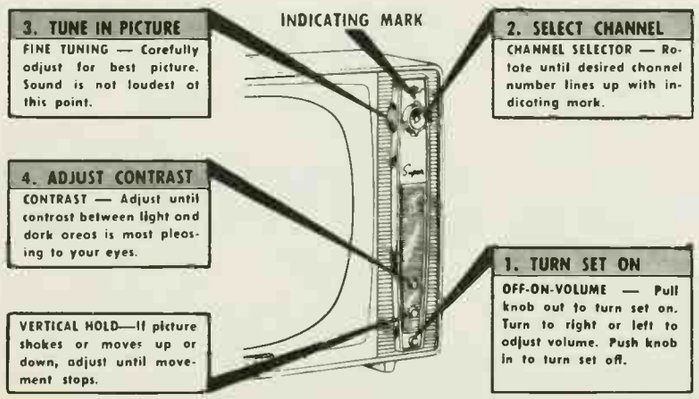


Figure 23. Tuning Instructions for Models using TV Chassis 15A2 and 15A2C.

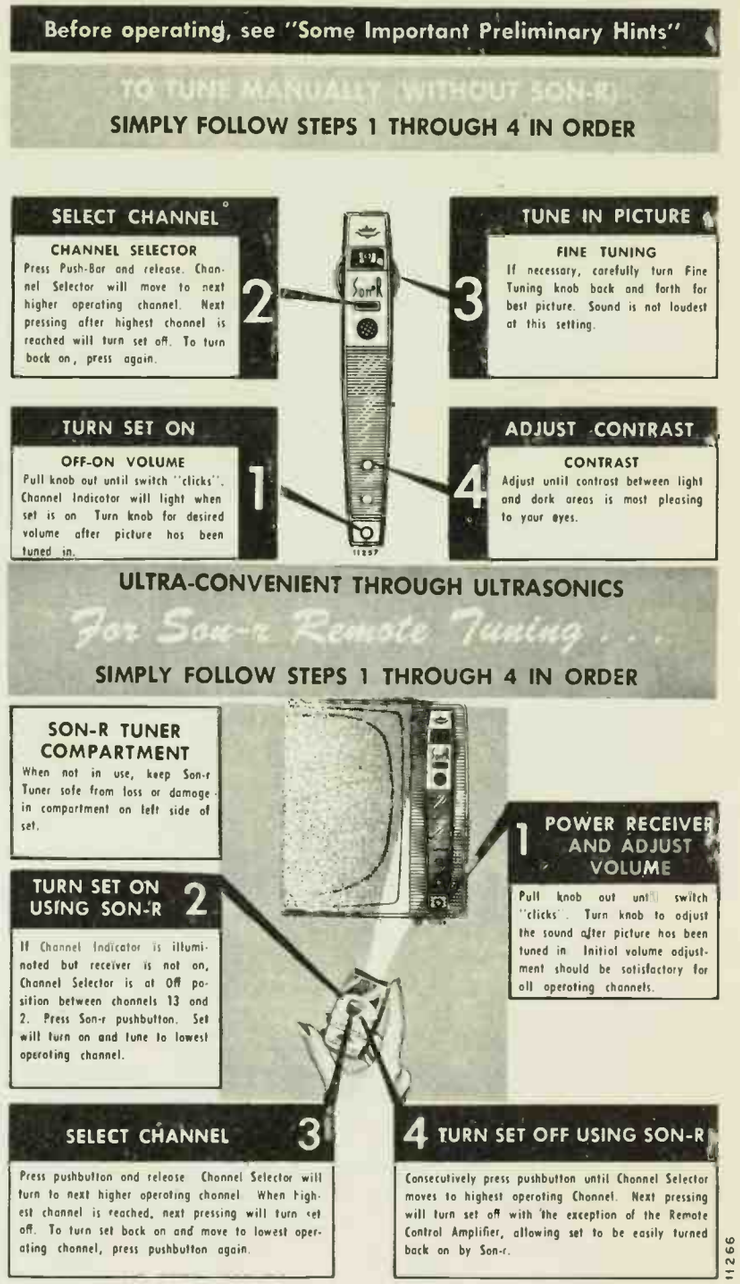


Figure 24. Tuning Instructions for Models using TV Chassis 15B2.

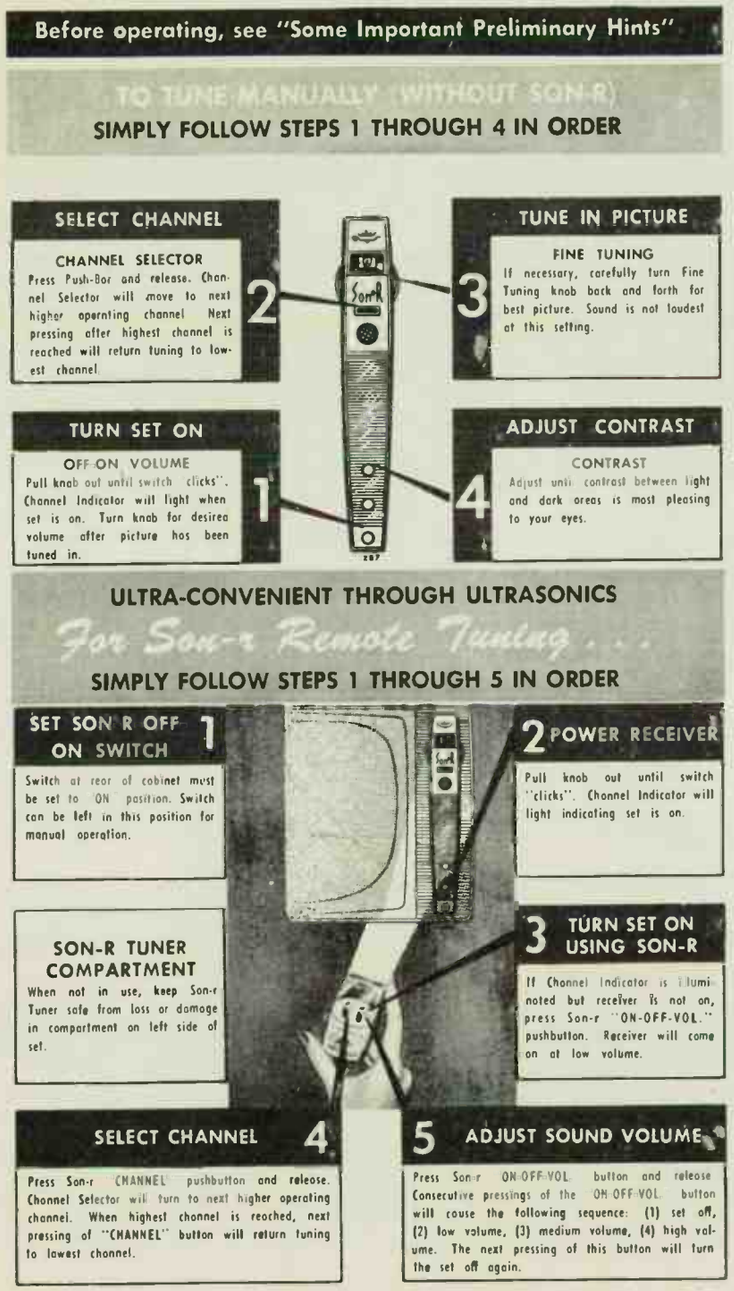


Figure 25. Tuning Instructions for Models using TV Chassis 15B3.

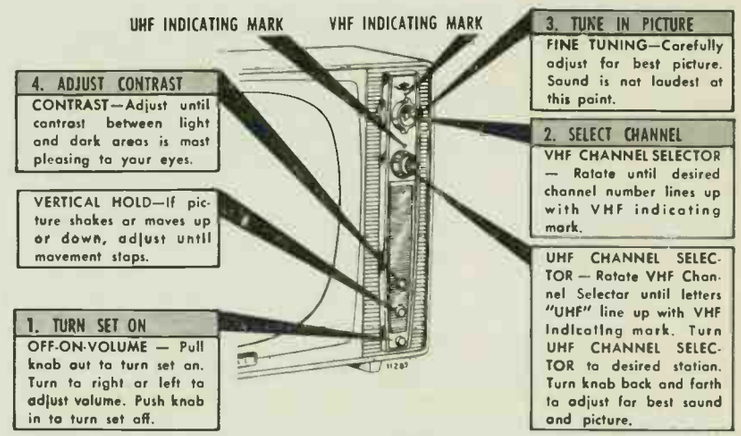


Figure 26. Tuning Instructions for Models using TV Chassis 15UA2.

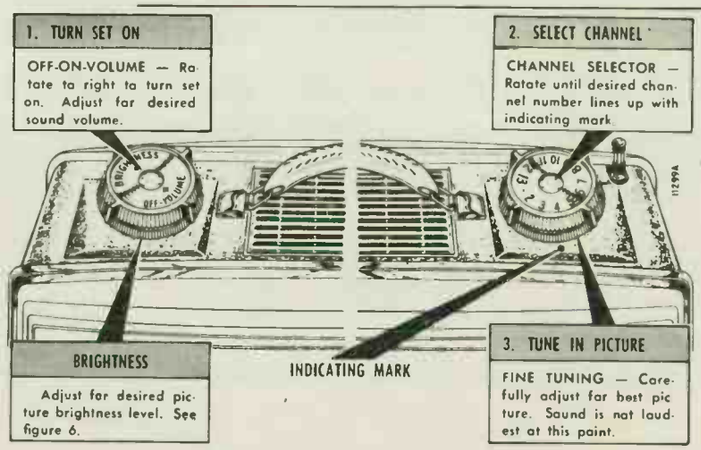


Figure 27. Top Oblique View of Models using TV Chassis 15D1B. Location of controls shown.

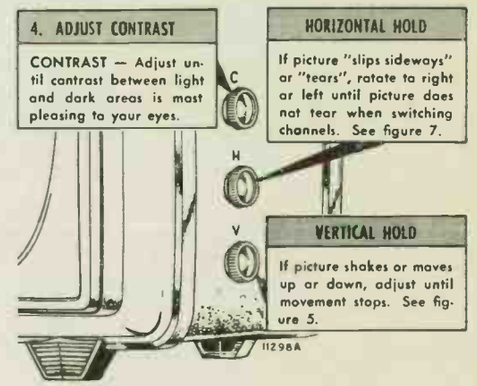


Figure 28. Side Oblique View of Models using TV Chassis 15D1B. Location of controls shown.

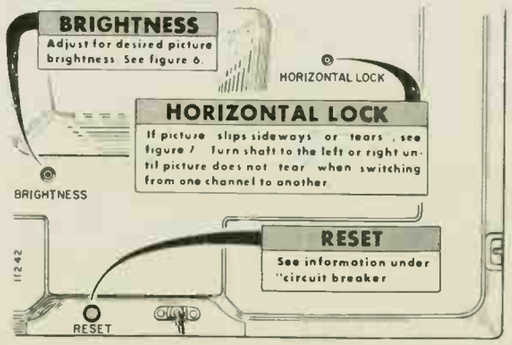


Figure 29. Auxiliary Controls; Chassis 15A2, 15A2C, 15B2, 15B3 and 15UA2.

INSTALLATION ADJUSTMENTS
15A2C, 15D1B and 15UA2 CHASSIS

Installation adjustments for models using TV chassis 15D1B are given in the following paragraphs. Installation adjustments for models using chassis 15A2C and 15UA2 are the same as for chassis covered in ST832-1. Figure 31 is the rear view of chassis 15D1B showing adjustment locations. Figure 30, in this supplement, shows the rear view of TV chassis 15UA2. Adjustment locations are shown on the illustration.

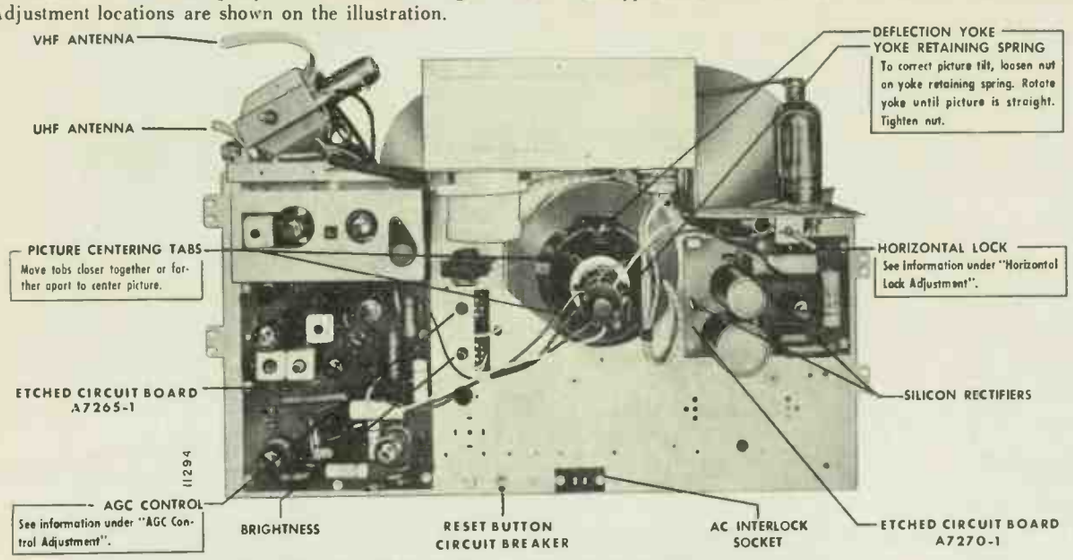


Figure 30. Rear View of Chassis 15UA2 Showing Adjustment Locations.

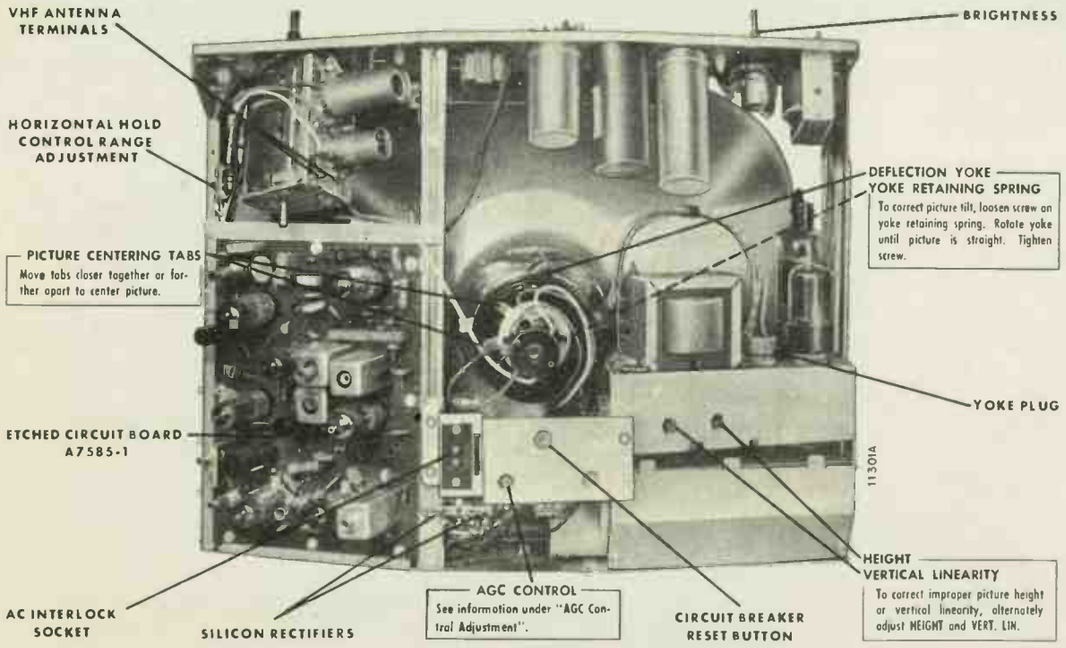


Figure 31. Rear View of Chassis 15D1B Showing Adjustment Locations.

VHF CHANNEL SLUG ADJUSTMENTS

Check channel slug adjustment for each VHF station received. To check channel slugs, perform the following adjustment procedure. Refer to figure 32.

1. Turn set on and allow 15 minutes to warm up.
2. Select an operating channel. Set other controls for normal sound and picture. Remove **Channel Selector Fine Tuning** knobs. Remove plastic well located underneath **Fine Tuning** knob. Reinstall **Fine Tuning** knob and turn to right or left until adjustment slug becomes visible through hole in tuner case. Remove **Fine Tuning** knob.
3. Insert a 1/8" blade flexible non-metallic alignment tool (part number 98A30-13) in hole in tuner. Carefully adjust slug for best picture. Note that sound is not loudest at this point. CAUTION: Only slight rotation of slug will be required for adjustment. Turning slug too far counterclockwise will cause it to fall out of the coil.
4. Select other operating channels and repeat adjustment procedure.
5. After making adjustments, replace plastic well and knobs.

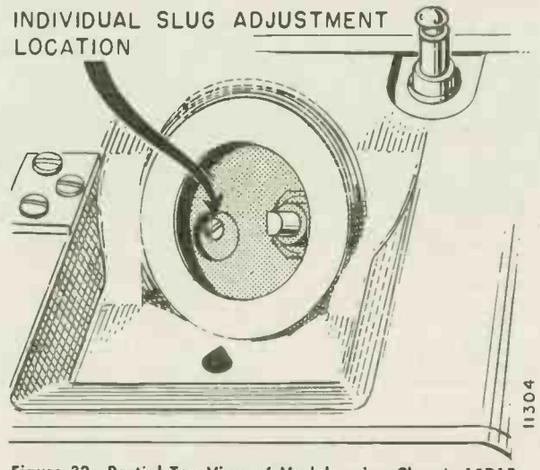


Figure 32. Partial Top View of Models using Chassis 15D1B Showing Channel Adjustment Slug Locations.

AGC CONTROL ADJUSTMENT

Improper **AGC** control adjustment may result in an overloaded picture. Picture overload can be recognized by bending and or tearing of the picture or buzz in the sound output. Also, loss of the picture or a weak washed-out picture can result from improper AGC adjustment. However, these same conditions can be caused by other troubles in the set.

If adjustment is required, it should be performed exactly as described below:

1. Turn set on and allow 15 minutes to warm up.
2. Select strongest station in the area.
3. Set **Contrast** control for normal picture and **Brightness** control to maximum (fully to right).
4. Set **AGC** control (at rear of chassis) to minimum fully to left.
5. If picture has disappeared when **AGC** control is set to left, turn **AGC** to right until a weak picture is obtained. Adjust **Horizontal Lock** (at rear of set) and **Vertical Hold** (at front of set) for a steady picture without bending of vertical lines at top of picture.
6. Very slowly turn **AGC** control to right until picture just begins to bend, tear, shift or until buzz is heard in sound Then, slowly turn **AGC** control to left to a point at which overload of picture and/or buzz in sound is removed. Turn **AGC** control an additional 10 degrees (approx.) to left.
7. Check picture at maximum contrast on all channels. Picture should not overload and should reappear immediately after changing channels.

IMPORTANT: AGC adjustment should always be made on strongest TV station received.

HORIZONTAL SWEEP ADJUSTMENT

Make adjustment if picture "slips sideways" or "tears" when switching channels. If the Horizontal Oscillator tube V403 (6CG7) is replaced, the **Horizontal Hold** control may require adjustment.

1. Allow a few minutes for set to warm up. Tune in weakest station. set **Brightness** and **Contrast** controls for normal picture.
2. Adjust **Horizontal Hold** control to sync the horizontal sweep circuit. If the picture cannot be locked-in at approximately the mid-rotation setting of the **Horizontal Hold** control, perfom the following steps for complete horizontal sweep circuit alignment.
3. Connect a jumper wire from junction of R452 (680K) and R453 (1 Meg) to ground to short out oscillator control voltage from Horizontal Phase Detector, CR401. Connect a jumper wire across C452 (.0039 MF) on Etched Circuit Board. This effectively shorts out the **Horizontal Lock** coil L401.

   Adjust **Horizontal Hold** control until one horizontal blanking bar (from top to bottom of picture) appears on the screen. This bar may waver back and forth slightly which is normal. If this condition is not reached when **Horizontal Hold** control is at approximately mid-rotation, change the position of the built-in jumper that is connected between R458 and R469. Short R458 or R469 with jumper or leave both unshorted to obtain one horizontal blanking bar when **Horizontal Hold** control is set to approx. mid-rotation.
4. Remove jumper from C452 (.0039 MF). Adjust **Horizontal Lock** coil, L401, until the horizontal blanking bar appears on the screen. Remove remaining jumper wire. Picture will lock into sync. If picture does not

lock-in, trouble shooting of horizontal circuitry is necessary to find source of trouble.

CHASSIS REMOVAL (15A2, 15A2C, 15B2, 15B3 and 15UA2)

1. Remove **Contrast, Vertical** and **Off-On-Volume** control knobs from front of cabinet. On chassis 15A2, 15A2C and 15UA2, remove **Channel Selector** knob (s) from front of set. On all chassis, use finger-tip pressure at top and bottom of escutcheon (front of set); pull outward to remove escutcheon.
2. On chassis 15A2, 15A2C and 15UA2, remove **Fine Tuning** knob. On chassis 15B2 and 15B3, remove Indicator disc and **Fine Tuning** knobs.
3. Disconnect antenna terminal board. Remove seven screws around edge of cabinet back. Place cabinet face down on a padded surface and remove all screws on bottom of cabinet. Remove cabinet back carefully. Remove one chassis mounting screw at each side of chassis rear.
4. Set television upright. Disconnect picture tube socket, yoke plug and microphone input plug on chassis 15B2 and 15B3. Remove the remaining two chassis mounting screws. Slide chassis part way out of the cabinet and disconnect high voltage connector from picture tube. Remove chassis fully from cabinet. Feed microphone cable through chassis when removing chassis (15B2 and 15B3 chassis).

PICTURE TUBE REPLACEMENT (CHASSIS 15A2, 15A2C, 15B2, 15B3 and 15UA2)

Before replacing picture tube, refer to "CHASSIS REMOVAL" for 15A2, 15A2C, 15B2, 15B3 and 15UA2, and remove television chassis from cabinet. Remove retaining screw and dag shorting spring (see figure 33). Remove tube support wires from cabinet. See "PICTURE TUBE HANDLING PRECAUTION" before removing picture tube.

When installing picture tube in cabinet, replace tube support wires and retaining screw. Make sure that all tube retaining brackets are in place.

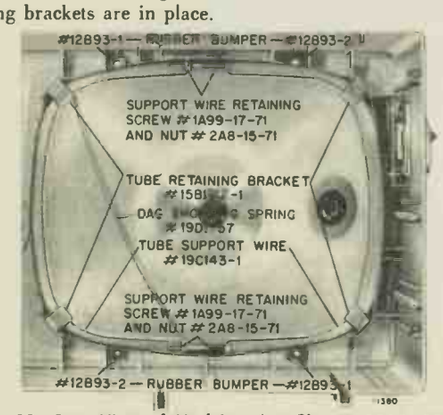


Figure 33. Rear View of Models using Chassis 15A2, 15A2C, 15B2, 15B3 and 15UA2 with Chassis Removed. Method of picture tube mounting shown.

CHASSIS REMOVAL (15D1B)

1. Remove four knobs and two plastic cups from control shaft openings at top of cabinet. Remove three knobs at right side of cabinet.
2. At rear of set, disconnect VHF antenna leads from antenna terminals. Lay the cabinet face down on a soft cloth. Remove four screws from rear of cabinet back at top. Remove three screws from bottom of cabinet back and three chassis retaining screws from bottom of cabinet. Carefully lift cabinet back from cabinet. Disconnect VHF transmission line from terminals of VHF tuner. Set cabinet back aside.
3. Disconnect speaker wires, yoke plug and picture tube socket. Remove High Voltage plug from picture tube. Place cabinet in upright position. Remove four screws that hold top of chassis to top of set.
4. Carefully remove bottom of chassis from cabinet first. Be sure that Power Tower antenna clears hole in top of cabinet when lifting chassis out of cabinet. The yoke is held to the picture tube by a clamp.

PICTURE TUBE REPLACEMENT (15D1B)

Refer to figure 34 for view of picture tube mounted into cabinet.

Remove a support wire retaining screw and nut at either side of picture tube. Remove the support wires from the tube retaining brackets. Carefully lift picture tube from cabinet. When installing picture tube, position the support wires and tube retaining brackets as shown in figure 34. Make sure mylar shield is in place. Replace screw and nut that holds the support wires together.

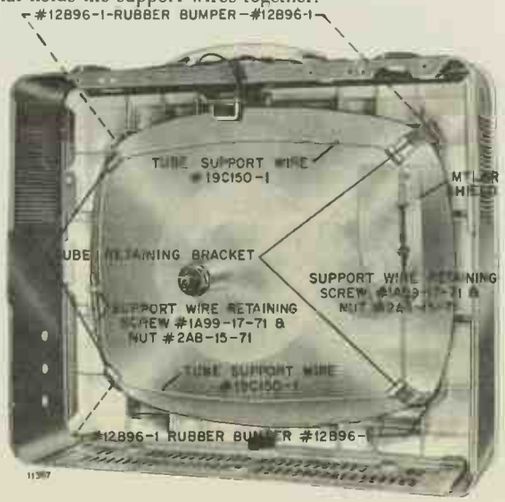


Figure 34. Rear View of Models using Chassis 15D1B with Chassis Removed. Method of picture tube mounting shown.

TELEVISION ALIGNMENT

WARNING: See "Warning Note" on page 22.

GENERAL

Complete alignment consists of the following individual procedures and should be performed in this sequence:

a. IF Amplifier Alignment.
b. 4.5 MC Sound IF Alignment.
c. VHF and Mixer Alignment.
d. Over-all VHF and IF Response Curve Check.
e. VHF Oscillator Adjustment.
*f. Alignment of UHF IF Input Coil and IF Pre-amplifier Response Curve Check.

TEST EQUIPMENT

To properly service receivers, it is recommended that the following test equipment be available.

Important: Many service instruments do not meet the requirements given below. A list of recommended equipment is available from Admiral distributors.

VHF Sweep Generator

Sweep generator must provide sweep frequencies from 18 to 90 MC range: } with at least
170 to 225 MC range: } 10 MC sweep width

Output: Adjustable; at least .4 volt maximum output.

Output impedance: 300 ohms balanced to ground.

A sweep generator not having constant output voltage and linear sweep over the swept range, will produce curves which are widely different from the ideal curves shown on the following pages. If repeated difficulty is encountered in obtaining these curves, the sweep generator should be checked. A simple check is to observe the response curve for a set that is in alignment.

Before suspecting generator, be sure alignment instructions have been followed carefully.

Signal (Marker) Generator

18 to 90 MC frequency range.
170 to 225 MC frequency range.
Must have a built-in calibration crystal for checking dial accuracy.

Oscilloscope

Standard oscilloscope, preferably one with a wide band vertical deflection, vertical sensitivity at least .05 volt (RMS) per inch.

Vacuum-Tube Voltmeter

Preferably with low range (3 volt) DC zero center scale and a high voltage probe (30,000 volt range).

Bias Supply

3 to 15 volts (battery or electronic).

ALIGNMENT TOOLS

The following alignment tools are required. They can be obtained from the Admiral distributor under the part numbers listed below:

NON-METALLIC (fiber) alignment screwdriver (11½" long, ⅛" diameter) Part No. 98A30-10.

NON-METALLIC alignment wrench (for hexagonal core IF slugs) Part No. 98A30-12.

NON-METALLIC alignment wrench (for small hexagonal core slug) Part No. 98A30-14.

*Note: This step is not performed on VHF only receivers.

IMPORTANT ALIGNMENT HINTS

The following suggestions should be performed if difficulty is experienced during the alignment procedure.

1. IF CIRCUIT INSTABILITY: When aligning the IF amplifiers, the VTVM pointer may swing when the hand is placed too near the IF transformers or when viewing the response curve, the curve may change shape with hand capacity. To correct either of these conditions, the following alignment hints should be tried:
   (a) Check the generator output leads to be certain that the unshielded portion (especially the grounded lead) is as short as practicable.
   (b) Be sure that a decoupling network is used at the video detector output and that the leads on the network are kept as short as possible; see figure 37.
   (c) The use of a long hexagonal alignment tool will permit adjustment without encountering "hand capacity" effects. See "Alignment Tools".
2. KEEP GENERATOR OUTPUT LOW TO AVOID DISTORTION OF RESPONSE CURVES:
   (a) During video IF alignment, sweep and marker generator outputs should be set at a low level so as not to distort the response curve.

   In general, varying the sweep generator output should not affect the shape of the response curve; only the amplitude. It is advisable to calibrate the oscilloscope so that peak-to-peak amplitude of the observed response curve will be known. Note: The amplitude of the response curve at test point "V" should be no more than 3 volts peak-to-peak; and at test point "W" about .1 volt peak-to-peak.
   (b) Some generators have a built-in pad in the output cable. Be sure that the pad in the cable is properly connected in the circuit. Refer to the generator instruction manual for details.

   If a pad is not built in, the 12 db pad shown in figure 36 can be constructed and connected between the generator and the antenna terminals.
3. SPECIAL TUBE SHIELD: For injecting 41 MC IF signal for IF alignment use an insulated tube shield over the VHF Oscillator-Mixer tube. Insulate bottom of tube shield with masking tape, see figure 35.

4. USE RULED SCREEN OVER OSCILLOSCOPE FACE: If it is difficult to accurately judge the exact location of the different markers, a ruled screen can be used over the face of the oscilloscope CRT. Under certain conditions correct marker location tolerances cannot be maintained by visual judgment alone.
5. VOLTAGE CAUTION WHEN MAKING TUNER ALIGNMENT: B+ and heater voltages are present on the connector terminals located at the top side of tuners. To prevent possibility of short circuit or danger from shock, use extreme care to avoid contact with the connector terminals at top side of tuners.

ALIGNMENT OF 4.5 MC TRAP USING A TELEVISION SIGNAL

Beat interference (4.5 MC) appears in picture as very fine vertical or diagonal lines, very close together, having a "gauze-like" appearance, the pattern will vary with speech, forming a very fine herringbone pattern.

To align the 4.5 MC trap (slug adjustment A9), tune in a television station with beat interference pattern in picture. While closely observing the picture, adjust slug A9 for minimum interference pattern.

Important: A hexagonal non-metallic alignment tool (Admiral part number 98A30-12) is required for making adjustment. Note that adjustment A9 is rear slug (nearest rear of shield can); use caution so as not to disturb front slug (nearest etched circuit board) as sound IF alignment will be affected.

Figure 35. Special Tube Shield for IF Amplifier Alignment and IF Response Curve Check.

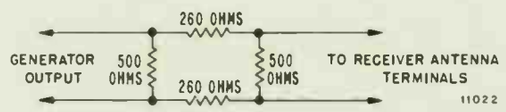


Figure 36. Circuit of 12DB Attenuation Pad for Viewing Overall VHF IF Response Curve.

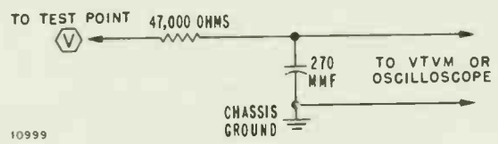


Figure 37. Decoupling Filter.

IF AMPLIFIER ALIGNMENT

- Connect isolation transformer between power line and receiver.
- Connect negative of 3 volt bias supply through 10K resistor to test point "T" (IF AGC) and "X" (RF AGC), see figure 40 or 41. Connect positive to chassis.
- Connect generator high side to 5CG8 mixer-osc. insulated tube shield, see figure 35. Connect low side to chassis near tube shield.
- Connect VTVM high side to test point "V" through a decoupling filter, see figure 37.
- Set Channel Selector to channel 12 to prevent interference during alignment.
- Connect a jumper wire across the antenna terminals.
- Set Contrast control fully to the right (clockwise).
- Set AGC control fully to the left (counterclockwise).
- Allow about 15 minutes for receiver and test equipment to warm up.
- Use a non-metallic alignment tool, part No. 98A30-13.

Step	Signal Gen. Freq.	Instructions	Adjust
Before proceeding, be sure to check the signal generator used in alignment against a crystal calibrator or other frequency standard for absolute frequency calibration required for this operation.			
1	42.7MC	If necessary, increase generator output and/or reduce bias to —1½ volts to obtain a definite indication on VTVM.	A2 for maximum
2	44.2MC		A1 for maximum
3	Repeat Step 1.		
4	44.3MC	If necessary, keep reducing generator output so that VTVM reading will be 1.5 to 2.5 volts above no signal voltage reading.	A3 for maximum
5	Place short across IF input coil L301.		
6	44.8MC	See figs. 42 & 45 for A5 location.	A5 for maximum
7	Remove short from L301.		
8	42.7MC		A4 for maximum
9	47.25MC	Chassis 15D1B only. Same as steps 1 and 2.	A14 for minimum
10	To insure correct IF Alignment, make "IF Response Curve Check."		

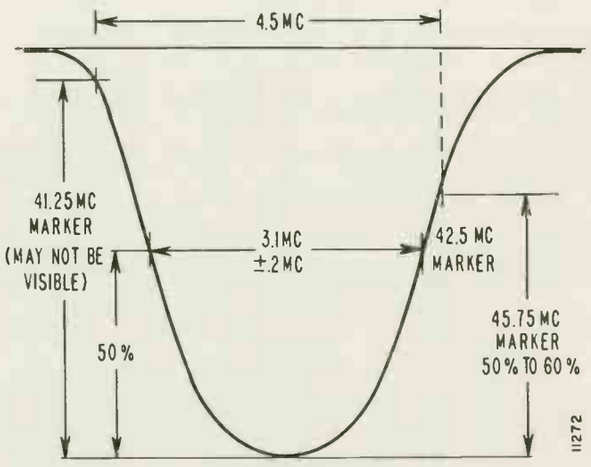


Figure 38. Ideal IF Response Curve.

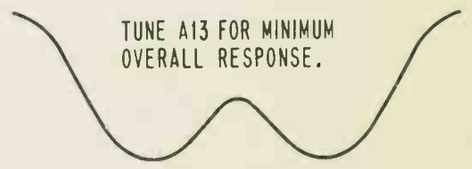


Figure 39. 41MC IF Trap Adjustment.

FREQUENCY TABLE FOR CHASSIS WITH 41 MC IF SYSTEM

Channel No.	Freq. Range MC	Picture Carrier MC	Sound Carrier MC	Osc. Freq. MC	Sweep Gen. Center Freq. MC
2	54-60	55.25	59.75	*101	57.5
3	60-66	61.25	65.75	*107	63.5
4	66-72	67.25	71.75	*113	69.5
5	76-82	77.25	81.75	*123	79.5
6	82-88	83.25	87.75	*129	85.5
7	174-180	175.25	179.75	*221	177.5
8	180-186	181.25	185.75	*227	183.5
9	186-192	187.25	191.75	*233	189.5
10	192-198	193.25	197.75	*239	195.5
11	198-204	199.25	203.75	*245	201.5
12	204-210	205.25	209.75	*251	207.5
13	210-216	211.25	215.75	*257	213.5
14	470-476	471.25	475.75	517	473.5
15	476-482	477.25	481.75	523	479.5
16	482-488	483.25	487.75	529	485.5
17	488-494	489.25	493.75	535	491.5
18	494-500	495.25	499.75	541	497.5
19	500-506	501.25	505.75	547	503.5
20	506-512	507.25	511.75	553	509.5
21	512-518	513.25	517.75	559	515.5
22	518-524	519.25	523.75	565	521.5
23	524-530	525.25	529.75	571	527.5
24	530-536	531.25	535.75	577	533.5
25	536-542	537.25	541.75	583	539.5
26	542-548	543.25	547.75	589	545.5
27	548-554	549.25	553.75	595	551.5
28	554-560	555.25	559.75	601	557.5
29	560-566	561.25	565.75	607	563.5
30	566-572	567.25	571.75	613	569.5
31	572-578	573.25	577.75	619	575.5
32	578-584	579.25	583.75	625	581.5
33	584-590	585.25	589.75	631	587.5
34	590-596	591.25	595.75	637	593.5
35	596-602	597.25	601.75	643	599.5
36	602-608	603.25	607.75	649	605.5
37	608-614	609.25	613.75	655	611.5
38	614-620	615.25	619.75	661	617.5
39	620-626	621.25	625.75	667	623.5
40	626-632	627.25	631.75	673	629.5
41	632-638	633.25	637.75	679	635.5
42	638-644	639.25	643.75	685	641.5
43	644-650	645.25	649.75	691	647.5
44	650-656	651.25	655.75	697	653.5
45	656-662	657.25	661.75	703	659.5
46	662-668	663.25	667.75	709	665.5
47	668-674	669.25	673.75	715	671.5
48	674-680	675.25	679.75	721	677.5
49	680-686	681.25	685.75	727	683.5
50	686-692	687.25	691.75	733	689.5
51	692-698	693.25	697.75	739	695.5
52	698-704	699.25	703.75	745	701.5
53	704-710	705.25	709.75	751	707.5
54	710-716	711.25	715.75	757	713.5
55	716-722	717.25	721.75	763	719.5
56	722-728	723.25	727.75	769	725.5
57	728-734	729.25	733.75	775	731.5
58	734-740	735.25	739.75	781	737.5
59	740-746	741.25	745.75	787	743.5
60	746-752	747.25	751.75	793	749.5
61	752-758	753.25	757.75	799	755.5
62	758-764	759.25	763.75	805	761.5
63	764-770	765.25	769.75	811	767.5
64	770-776	771.25	775.75	817	773.5
65	776-782	777.25	781.75	823	779.5
66	782-788	783.25	787.75	829	785.5
67	788-794	789.25	793.75	835	791.5
68	794-800	795.25	799.75	841	797.5
69	800-806	801.25	805.75	847	803.5
70	806-812	807.25	811.75	853	809.5
71	812-818	813.25	817.75	859	815.5
72	818-824	819.25	823.75	865	821.5
73	824-830	825.25	829.75	871	827.5
74	830-836	831.25	835.75	877	833.5
75	836-842	837.25	841.75	883	839.5
76	842-848	843.25	847.75	889	845.5
77	848-854	849.25	853.75	895	851.5
78	854-860	855.25	859.75	901	857.5
79	860-866	861.25	865.75	907	863.5
80	866-872	867.25	871.75	913	869.5
81	872-878	873.25	877.75	919	875.5
82	878-884	879.25	883.75	925	881.5
83	884-890	885.25	889.75	931	887.5

* For oscillator frequencies from channels 2 to 13, frequency indicated is that of VHF oscillator. For oscillator frequencies higher than channel 13, frequency indicated is that of UHF oscillator with VHF oscillator inoperative.

IF RESPONSE CURVE CHECK (Using sweep generator and oscilloscope) AND IF TRAP (A13) ALIGNMENT

Receiver Controls and Bias Battery	Sweep Generator	Marker Generator	Oscilloscope
Set TV tuner on channel 12 and Contrast control fully to left. Connect negative of 3 volt bias supply to test points "T" (IF AGC) and "X" (RF AGC), positive to ground.	Use same connections as for procedure above. Set sweep frequency to 43MC, and set sweep width to approximately 7 MC.	If an external marker generator is used, loosely couple high side to sweep generator lead on tube shield, low side to chassis. Marker frequencies indicated on IF Response Curve.	Connect high side to test point "V" thru a decoupling filter, see figures 37 and 40 or 41.

Instructions

Check curve obtained against ideal response curve in fig. 38. Note tolerances on curve. Keep marker and sweep outputs at very minimum to prevent overloading. A reduction in sweep output should reduce response curve amplitude without altering the shape of the response curve. If the curve is not within tolerance or the markers are not in the proper location on the curve, touch-up with IF slugs as instructed below.

Important: If curve changes shape with hand capacity, see section 1 of "Important Alignment Hints".

If video IF carries marker (45.75MC) does not fall at 55% (± 5%) on curve, position it properly with slight adjustment of A5. If curve is not symmetrical, make a slight adjustment of A2 to obtain symmetry on sides of curve.

For VHF sets, position tuner at channel 2. Feed IF sweep generator to VHF terminals through 300 ohm matching pad. Adjust A13 on chassis 15A2, 15A2C, 15UA2 and 15D1B or A14 on chassis 15B2 and 15B3 for minimum overall IF response. See figure 39. On some sets using VHF tuner 94D164-3, a fixed IF trap is used and adjustment of A14 does not apply.

For VHF-UHF receivers, set tuner to UHF position. Feed IF sweep generator to VHF antenna terminals through 300 ohm matching pad. Adjust A13 for minimum overall response. See figure 39. NOTE: More than two peaks may appear on response curve of VHF-UHF sets.

4.5 MC SOUND IF ALIGNMENT USING TELEVISION SIGNAL

For simplicity and required accuracy of the 4.5 MC signal frequency, the sound alignment procedure given in the manual uses a transmitted TV signal rather than test equipment.

Important: Note that step 3 of the sound IF alignment procedure requires the use of a strong transmitted TV signal. Steps 5 and 6 requires the use of a weak (attenuated) TV signal. Failure to use a television signal of the required level as instructed for each of the steps will cause incorrect alignment with resulting weak or distorted sound.

Make alignment adjustments as follows:

1. Remove cabinet back. Turn set on and allow 15 minutes for warm up.
2. Select the strongest TV station received. Adjust set for normal operation. See figure 40 or 41 for adjustment locations.
3. Using a non-metallic alignment tool (for hexagonal core IF slugs, Admiral Part No. 98A30-12), very slowly turn slug "A6" several turns counterclockwise until a buzz is heard in the sound. Then turn it clockwise until the loudest and clearest sound is obtained. NOTE: There may be two points (approximately ½ turn apart) at which sound is loudest. The slug should be set at the center range of the first point of loudest sound noted as the slug is turned in (toward etched circuit board).
4. Set Contrast control fully to the left (counterclockwise). Reduce the signal to the antenna terminals until there is a considerable amount of hiss in the sound. For best results, it is recommended that a step attenuator, be connected between the antenna and the antenna terminals. The signal can also be reduced by disconnecting the antenna and placing it in close proximity of the antenna terminals or tuner antenna lead-in.

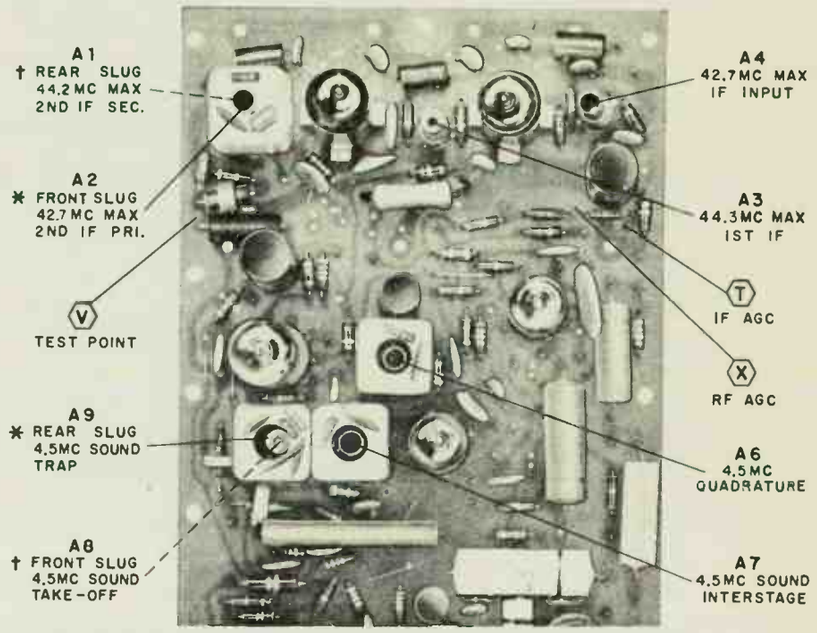


Figure 40. Rear View of Etched Circuit Board A7265-1 (Chassis 15A2, 15A2C, 15B2, 15B3 and 15UA2) Showing Test Point Locations and IF Alignment Data.

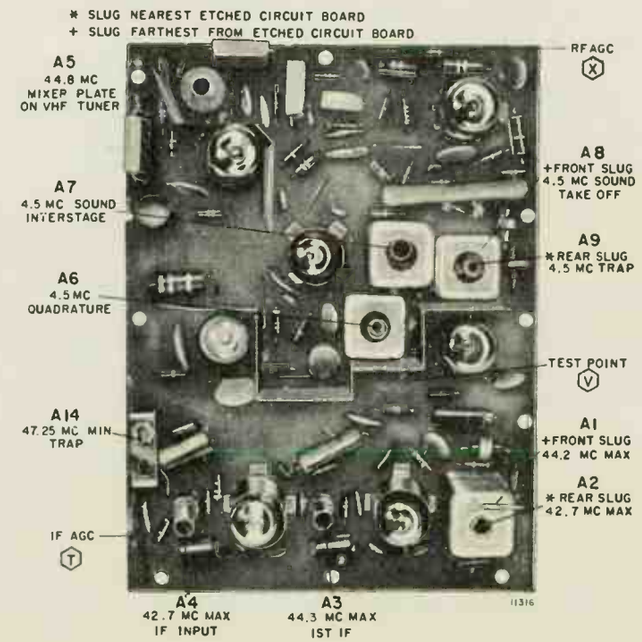


Figure 41. Rear View of Etched Circuit Board A7585-1 (Chassis 15D1B) Showing Test Point Locations and IF Alignment Data.

5. Carefully adjust slug "A7" for loudest and clearest sound with minimum hiss level. If hiss disappears during alignment, reduce signal input to maintain hiss level; readjust "A7".
6. Carefully adjust slug "A8" for loudest and clearest sound with minimum hiss level. If hiss dissappears during alignment, reduce signal input to maintain hiss level; readjust "A8". Caution: Adjustment "A8" is slug nearest bottom of shield can; use care so as not to disturb slug nearest top of shield can.
7. If the above steps are correctly made, no further adjustment should be required. However, if sound remains distorted at normal volume level when receiver is tuned for best sound, repeat entire procedure.

Caution: Do not readjust slug "A6" unless sound is distorted. If "A6" is readjusted, all steps in alignment procedure should be repeated exactly as instructed above.

ALIGNMENT INFORMATION FOR VHF TUNER

94E163-1 & -2

VHF tuner 94E163-1 is used in VHF only sets and VHF tuner 94E163-2 is used in VHF-UHF sets in conjunction with UHF tuner 94D162-3. Both tuners are identical except that 94E163-2 tuner has an additional channel strip mounted on the tuner drum and "UHF Input Assembly" mounted at rear of tuner. When tuner 94E163-2 is set to UHF position (between channels 13 and 2) the tuner operates as a two stage low-noise 41MC IF pre-amplifier. The UHF tuner IF output signal is amplified by the pre-amplifier and fed to the 41MC IF system on the main chassis. The VHF oscillator is inoperative during UHF reception.

Tuner tubes may be replaced without need of tuner alignment. However, when replacing the Oscillator-Mixer tube V102 (5CG8), select a tube which will cause least oscillator frequency shift as noted with rotation of Fine Tuning control.

VHF amplifier and mixer alignment consists of checking the VHF response curve with sweep generator and oscilloscope, then comparing curves with ideal curve given in figure 46. Adjustment of trimmer screws at top of tuner is generally adequate for proper alignment.

IMPORTANT: No attempt should be made to align the tuner until the balance of the receiver is known to be in proper operating condition and in proper alignment.

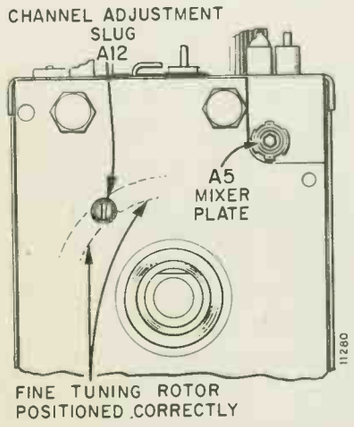


Figure 42. Front View of 94E163-1 and -2 Tuners.

94D164-3

An exploded view of this tuner is shown in figure 59. A listing of replaceable parts for this tuner appears in the "Parts List" section of this manual.

VHF tuner 94D164-3 is used in VHF sets that have motor-driven tuning and VHF only models using 15A2C chassis. The motor-driven tuning is actuated by Son-r remote control or Push Bar channel selector switch on front of set. The 94D164-3 tuner shaft is extended from rear of tuner case and is double-flatted to provide linkage to a driving motor assembly.

Tuner tubes may be replaced without need of tuner alignment. However, when replacing the Oscillator-Mixer tube V902 (5CG8), select a tube that causes least oscillator frequency shift as noted with rotation of Fine Tuning control.

VHF amplifier and mixer alignment consists of checking the VHF response curve with sweep generator and oscilloscope then comparing curves with ideal curve given in figure 46.

Adjustment of trimmer screws at top of tuner is generally adequate for proper alignment. IMPORTANT: No attempt should be made to align the tuner until the balance of the receiver is known to be in proper operating condition and in proper alignment.

An exploded view of this tuner is shown in figure 60. A listing of replaceable parts for this tuner appears in the "Parts List" section of this manual.

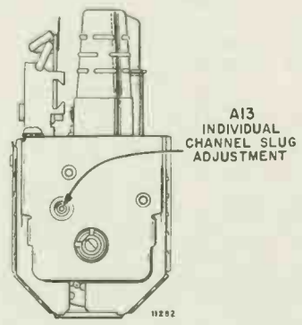


Figure 43. Front View of 94D164-3 Tuner.

VHF AMPLIFIER AND MIXER ALIGNMENT FOR VHF TUNERS 94E163-1, -2 and 94D164-3

- Connect isolation transformer between power line and receiver.
- Connect negative of 3.0 volt bias supply to test point "X" (RF AGC), positive to chassis. See figures 40 or 41.
- Connect sweep generator 300 ohm output to antenna terminals. If sweep generator does not have a built-in marker generator, loosely couple a marker generator to the antenna terminals. To avoid distortion of the response curve, keep sweep generator output at a minimum, marker pips just barely visible.
- Connect oscilloscope through a 15,000 ohm resistor to test point "W" on tuner. Keep scope leads away from chassis.
- Allow about 15 minutes for receiver and test equipment to warm up.
- Do not remove bottom shield during alignment.
- See figures 44 or 45 or adjustment locations and identification.

Step	Marker Gen. Freq. (MC)	Sweep Gen. Freguency	Instructions
1	193.25 MC (Video Carrier) 197.75 MC (Sound Carrier)	Sweeping Channel 10. See "Frequency Table".	Set Channel Selector to channel 10. Check response obtained with VHF response curve shown in figure 46. Alternately adjust A10 and A11 (figures 44 and 45) as required to obtain curve having maximum amplitude, symmetry and flat top appearance consistent with proper bandwidth and correct marker location.
2	83.25 MC (Video Carrier) 87.75 MC (Sound Carrier)	Sweeping Channel 6. See "Frequency Table".	Set Channel Selector to channel 6. Check response obtained with VHF response curve shown in figure 46. If curve is not within limits, compromise adjustment is required. Alternately adjust A10 and A11 as required to obtain curve having maximum amplitude, symmetry and flat top appearance consistent with proper bandwidth and correct marker location. After completing adjustment, recheck adjustment of step 1.
3 Neutralizing Adjustment 94D164 VHF Tuners only	193.25 MC (Video Carrier) 197.75 MC (Sound Carrier)	Sweeping Channel 10. See "Frequency Table".	Set Channel Selector to channel 10. Use 15 volts bias. Increase sweep generator output to maximum and increase *oscilloscope gain as required for obtaining usable response curve. Adjust A12 for minimum response (amplitude). After adjusting A12, conclude by repeating steps 1, 2 and 4.
4	Set the sweep generator to sweep the channel to be checked. Set the marker generator for the corresponding video carrier frequency and sound carrier frequency.		Use 3 volts bias. Check each channel operating in the service area for curve shown in figure 46. In general, the adjustment performed in steps 1 and 2 are sufficient to give satisfactory response curves on all channels. However, if reasonable alignment is not obtained on an operating channel, repeat steps 1 and 2 as a compromise adjustment to favor the particular channel. If a compromise adjustment is made, other channels operating in the service area should be checked to make certain that they have not been appreciably affected.

*If usable response curve is not obtained, connect oscilloscope to test point "V" through decoupling filter, see Figures 37 and 45. Note: IF amplifier must be in normal alignment. Adjust A12 for equal peak amplitudes with dip at center of curve.

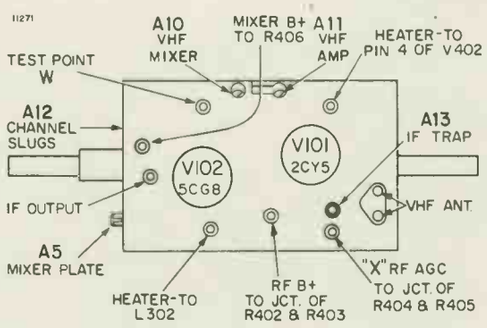


Figure 44. Top View of VHF Tuners 94E163-1 and -2 Showing Alignment Points and Adjustment Locations.

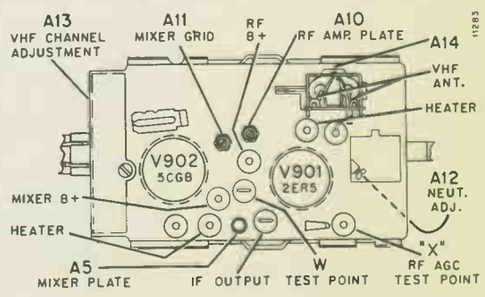


Figure 45. Top View of VHF Tuner 94D164-3 Showing Adjustment Locations.

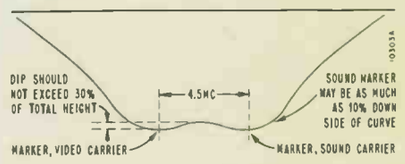


Figure 46. VHF Response Curve.
Note: Full skirt of curve will not be visible unless generator sweep width extends beyond 10MC.

OVER-ALL VHF AND IF RESPONSE CURVE CHECK

Receiver Controls and Bias Supply	Sweep Generator	Marker Generator	Oscilloscope	Instructions
Set AGC control fully to the left (counter-clockwise). Channel Selector on channel 12 or other unassigned high channel. Connect negative of 3V bias to test point "T" (IF AGC) and test point "X" (RF AGC), positive to chassis.	Connect to antenna terminals. Keep generator output as low as possible to prevent overloading.	If an external marker generator is used, loosely couple high side to sweep generator lead. Marker frequencies are shown in frequency table.	Connect to point "V" through a decoupling filter. See figures 37 and 40 or 41.	Compare the response curve obtained against the ideal curve shown in figure 47. If the curve is not within tolerance, touch up the IF slugs as instructed below. It should never be necessary to turn slugs more than one turn in either direction. If the curve is satisfactory on the channel checked, all other channels should also be satisfactory. IMPORTANT: When sweep output is reduced, response curve amplitude on scope should also decrease, but curve shape should remain the same. If curve shape changes, reduce sweep output and/or the scope gain until the shape does not change.
		Note that video marker on the "Over-all VHF-IF Response Curve" will appear on the opposite side of the curve as compared to the "Ideal IF Response Curve", figure 38. This is due to action of the mixer tube.		

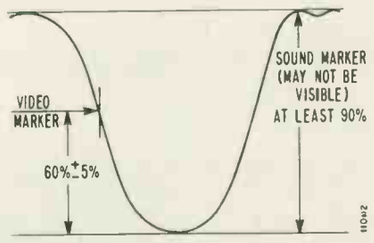


Figure 47. Ideal Overall VHF and IF Response Curve.

VHF OSCILLATOR ADJUSTMENT USING A TRANSMITTED TELEVISION SIGNAL

It is always advisable to make VHF oscillator (channel) adjustments using a transmitted Television Signal as instructed under "VHF Channel Adjustment." If a television signal is not available, VHF oscillator (channel) adjustment can be made while observing the Over-all VHF and IF Response Curve. Align oscillator adjustments to position the video carrier marker 50 to 60 per cent down from the peak of the over-all response curve, see figure 47. For location of oscillator adjustments, see figure 42 or 43.

ALIGNMENT OF UHF IF INPUT COIL AND IF PRE-AMPLIFIER RESPONSE CURVE CHECK (94E163-2)

*Important: This alignment is seldom required. It should be made only if UHF reception is poor and after usual causes of poor reception have been checked. This alignment should be made after completing the preceding alignments.

- Set AGC control fully to the left (counterclockwise).
- Set VHF Channel Selector to UHF detent position, which is between channels 13 and 2.
- Connect negative of 3 volt bias supply to test point "X" RF AGC buss, positive to chassis. See figure 40.
- Connect UHF sweep generator 300 ohm output to antenna terminals. Loosely couple VHF marker generator to the antenna terminals. To avoid distortion of the response curve, keep sweep generator output at a minimum, marker pips just barely visible.
- Connect oscilloscope through a 10K resistor to test point "W" on VHF tuner (figure 44). Keep scope leads away from chassis.
- Allow about 15 minutes for receiver and test equipment to warm up.
- Bottom shield must be assembled to tuner while making response curve check.
- Use a non-metallic alignment tool, part number 98A30-14.

Step	Marker Gen. Freq. (MC)	Sweep Gen. Frequency	Instructions
1	45.75 MC (Video Carrier) 41.25 MC (Sound Carrier)	Set sweep at 700 MC, full sweep width	Adjust A14 to obtain equal peak amplitudes and symmetry, consistent with flat top appearance, proper band width and correct marker location; see figures 48 and 49.
2	Same as Above	Same as Above	Connect oscilloscope to test point "V" through decoupling filter; figure 40. Keep scope leads away from chassis. Connect 3 volts bias to IF AGC test point "T". Check response curve. If curve does not resemble figure 47, repeat step 1, making a compromise adjustment. If curve cannot be made to resemble figure 47, check to be sure all instructions have been followed. Check tubes V101 and V102 and repeat alignment. Important: After replacing tubes, it may be necessary to check "VHF Tuner Alignment".

*Alignment of the UHF IF input coil L807 (A14) can be made using a UHF television signal. Using a non-metallic alignment tool, very carefully adjust slug "A14" for the best picture, consistent with good sound.

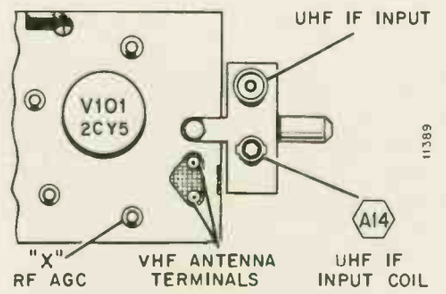


Figure 48. Top Rear Partial View of VHF Tuner 94E163-2 Showing UHF IF Input and UHF IF Input Coil Adjustment, A14.

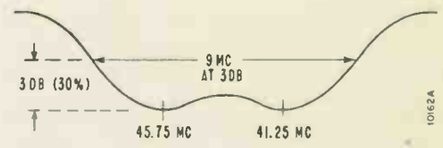


Figure 49. Ideal Pre-amplifier Response Curve.

GENERAL

Factory alignment of 4H3 and 4G3 remote control amplifiers consists of alignment of amplifier input coil (L1) and discriminator transformer (T1). Factory alignment is made using a signal generator with frequency range of 37 to 42 kilocycles with calibration of plus or minus 20 cycles. If a signal generator meeting these requirements is not available, an "ALTERNATE ALIGNMENT PROCEDURE" for 4G3 and 4H3 are given on page 40 using the Simpson Model 407 Remote Aligner (crystal controlled signal generator), available from Admiral distributors.

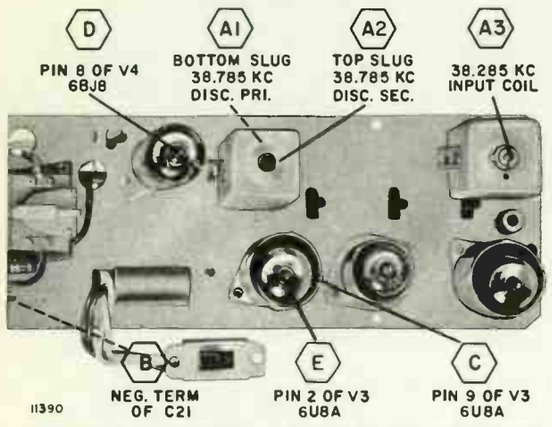


Figure 50. Partial Top View of Remote Amplifier Chassis 4G3 Showing Alignment Points and Adjustment Locations.

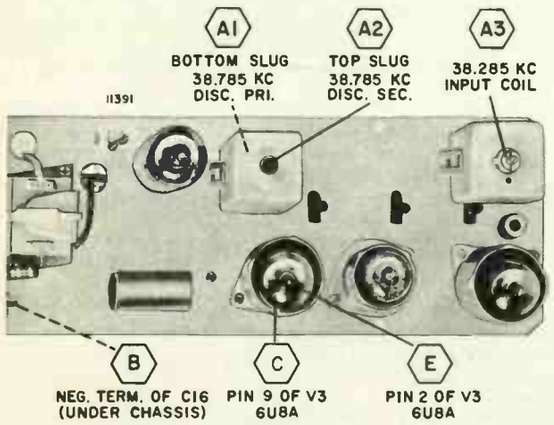


Figure 51. Partial Top View of Remote Amplifier Chassis 4H3 Showing Alignment Points and Adjustment Locations.

ALIGNMENT CAUTION

Circuitry of remote control amplifier is designed for stable, trouble-free operation. The tuned circuits (L1 and T1) have been carefully aligned at the factory and are generally unaffected by tube or component replacement. Faulty operation is seldom caused by misalignment.

Need for amplifier alignment may be indicated by limited tuning range (having to stand close to operate television with Son-r hand-held tuner) on one or both functions, amplifier too responsive to extraneous noise, or, on 4G3 chassis, misregistration (wrong function operated when Son-r tuning button is depressed). Caution: Before deciding that amplifier alignment is at fault, be sure to check for identical cause of trouble being due to faulty Son-r hand-held tuner, defective microphone, tubes or other components in the amplifier.

TEST EQUIPMENT

To properly align remote control amplifiers, it is recommended that the following test equipment be available:

*Signal Generator

Frequency Range: 37 to 42 Kilocycles.

Calibration Accuracy: Plus or minus 20 cycles.

Output: Adjustable from 0 to 1 volt. Output calibration at 1 microvolt and .5 volt.

SIMPSON MODEL 407 REMOTE ALIGNER (SIGNAL GENERATOR)

Generator frequencies provided: As determined by 5 position selector switch.

Position A: 38.285KC
Position B: 39.285KC
Position C: 40.805KC
Position D: 41.805KC
} Crystal frequencies plus or minus 20 cycles.

Position E: Frequency(s) determined by insertion of external plug-in crystal(s).

Note: Positions A, B and E will be used for "Factory Alignment Procedure." A crystal to be used in this alignment (38.785KC) is available from your Admiral distributor.

Generator Output (Two outputs provided):

1. Direct: Continuously variable from approximately 100 microvolts to a least 1 volt.
2. Through 100,000 to 1 probe: Continuously variable from 0 to at least 10 microvolts.

Vacuum-Tube Voltmeter

Input impedance: 10 megohms. Preferably with low range (3 volts), DC zero center scale, and high impedance (100 megohms) probe. If VTVM does not have a 100 megohm probe, a probe may be constructed by connecting a 100 megohm resistor (part number 60B15-107) in series with center conductor of probe.

Shielded Capacitor

A 910 mmf capacitor enclosed within a metal shield is required for coupling signal generator output to microphone input cable of remote control amplifier. The shield may be made, using a 7/8 inch ID metal tube and two phono type connector sockets. Locate the 910 mmf (part number 65B20-911) capacitor inside the tube and solder each lead end to the center connection on each phono connector. See figure 52.

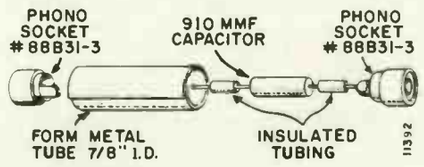


Figure 52. Shielded Capacitor (with Phono Connector Socket and Plug) Required for Coupling Signal Generator to Microphone Input Cable.

FACTORY ALIGNMENT PROCEDURE

Important: A signal generator meeting the requirements listed under Test Equipment is required for performing factory alignment procedure. The Simpson Model 407 Remote Aligner may be used for this alignment procedure, provided that an additional crystal (to cover additional frequency requirement) is procured.

- Remove remote amplifier chassis from television chassis. Be sure that power and switching connections remain connected.
- Chassis 4H3: Disconnect wire connected to pin 9 of V3B. Connect jumper wire from —20V bias (jct. of C16, R21 and R22) to pin 9 of V3B.
  Chassis 4G3: Disconnect wires from pin 8 on V4B and pin 9 on V3B. Connect jumper wires from —20V bias (jct. of C21, R31 and R32) to pin 8 on V4B and pin 9 on V3B.
- Disconnect V304 (picture tube) socket. Turn television and test equipment on and allow 15 minutes warm up.

NOTE: Television circuits are disabled during remote amplifier alignment. On chassis 4G3, set Son-r Off-On switch (S1) to "ON" position.

1. Connect ground lead of VTVM to test point "B", connect VTVM 100 megohm probe to test point "C", connect generator output to test point "E" through a 0.1 mf capacitor and generator common lead to ground. Keep generator output low and use low scale on VTVM (3 VDC or 5 VDC).
2. Detune "A2" (slug at top of can) flush with top of can. Set generator to 38.785 KC. Adjust "A1" (slug at bottom of can) for maximum.
3. Increase generator output to 0.5 volt. Adjust "A2" for null (zero point).
4. With 0.5 volt generator output at 38.285KC, the indication at point "C" should be at least +26VDC. On chassis 4G3, connect VTVM 100 megohm probe to test point "D". Set generator output to 0.5 volt at 39.285KC. VTVM indication at "D" should be at least +26 VDC. Reduce generator setting to minimum and turn television off.
5. Remove jumper wires from between bias point and control tube grid(s). Reconnect chassis wiring to V3B grid (pin 9) and, on chassis 4G3, to V4B grid (pin 8). Turn television set on.
6. Set VTVM to +100 VDC or +150 VDC scale. Connect VTVM across winding of relay K1, positive probe (without 100 megohm) at B+ terminal on winding.
7. The generator is now to be acoustically or capacitively coupled to amplifier chassis input.
   ACOUSTICAL COUPLING: With generator output at minimum and frequency at 38.285KC, connect Son-r microphone (part number 78B137-2) to generator output. Place this microphone approximately 1 inch from Son-r microphone at front of receiver.
   CAPACITIVE COUPLING: With generator output at minimum and frequency at 38.285KC, connect generator output cable to input jack M3 on amplifier chassis through shielded capacitor.
8. *Carefully* increase generator output until VTVM indicates +30 VDC to +35 VDC. Do not allow VTVM reading to increase above +40 VDC. Adjust "A3" to peak and reduce generator output as necessary to keep reading between +30 VDC and +35 VDC. Alternately adjust "A2" and reduce generator setting until "A3" is adjusted to peak.
9. After completing above steps, disconnect VTVM from relay coil and turn generator off. If "CAPACITIVE COUPLING" was used, disconnect output of generator from M3 on amplifier chassis and reconnect M1. Reconnect V304 (picture tube) socket and allow television to warm up. Proceed with operational check using the hand-held Son-r remote tuner. At distances from 10 to 20 feet, check operation of remote control function(s).

4H3 ALTERNATE ALIGNMENT PROCEDURE

Important: This alignment requires the use of Simpson Model 407 Remote Aligner (specifications given under "Test Equipment"). — 4H3 chassis removal is not required for this alignment —

PRELIMINARY INSTRUCTIONS

- Use an isolation transformer between power line and TV set during alignment.
- With set turned off, remove B+ (red) lead from relay terminal board. This is necessary to keep the relay from being actuated during alignment.
- Remove V3 (6U8A) and plug a 9 pin adaptor socket into V3 socket. Plug V3 into adaptor socket.
- Connect VTVM between pin 2 of V3 and chassis. Set VTVM to minus 3 volt scale.
- Disconnect microphone cable from M3.
- Turn TV set, signal generator, and VTVM on and allow 15 minutes warm up. Set TV B+ and filament circuits "open" by setting VHF tuner to "OFF" position (between channels 13 and 2).

See figure 51 for location of adjustment and alignment points.

ALIGNMENT STEPS

1. Set generator switch to position "A" (38.285KC) and connect the fixed attenuator probe through a .001 mf *shielded* capacitor to the microphone input connector M3.
2. Adjust input coil L1 (A3) for maximum VTVM reading. Control generator output so that meter will read less than 3 volts. Remove V3 (6U8A) and adaptor socket. Replace V3 and shield.
3. Set VTVM to minus 30 volt range and connect it between pin 11 of socket (M4) and chassis. Adjust primary and secondary of T1 (A1 and A2) for maximum dip on VTVM. (This will be the least negative voltage obtainable.)
4. Disconnect VTVM and generator and reconnect B+ (red) lead to relay board.
5. Connect microphone plug to microphone input socket.
6. Check operation of TV by actuating the hand unit.

4G3 ALTERNATE ALIGNMENT PROCEDURE

Important: This alignment requires the use of Simpson Model 407 Remote Aligner (specifications given under "Test Equipment"). — 4G3 chassis removal is not required for this alignment —

PRELIMINARY INSTRUCTIONS

- Use an isolation transformer between power line and TV set during alignment.
- With set turned off, remove B+ (red) leads from each relay on 4G3 chassis. This is necessary to keep relays from being actuated during alignment.
- Remove V3 (6U8A) and plug a 9 pin adaptor socket in V3 socket. Plug V3 into adaptor socket.
- Connect VTVM between pin 2 of V3A (test point E) and ground. Set VTVM to minus 3 volt scale.
- Disconnect microphone cable from M3.
- Turn TV set, signal generator, and VTVM on and allow 15 minutes warm up.
- Set Son-r Off-On switch to "ON" position. See figure 50 for location of adjustments and alignment points.

ALIGNMENT STEPS

1. Set generator switch to position "A" (38.285KC) and connect the fixed attenuator probe through a .001 mf *shielded* capacitor to microphone input connector M3.
2. Adjust input coil L1 (A3) for maximum VTVM reading. Control generator output so that meter will read less than 3 volts.
3. Remove adaptor socket and replace V3 (6U8A) and shield in socket; remove V4 (6BJ8) and plug adaptor socket in V4 socket. Plug 6BJ8 in adaptor socket. Set VTVM to minus 30 volt range and connect between pin 8 of V4 (Test point C) and ground. Set generator to position "A" (38.285KC). Adjust primary and secondary of T1 (A1 and A2) for maximum dip on VTVM. (This will be the least negative voltage obtainable.)
4. Disconnect VTVM and generator and reconnect B+ (red) leads to each relay.
5. Remove 9 pin adaptor socket and plug V4 (6BJ8) into proper socket on chassis.
6. Check operation of TV by actuating both rods in the hand unit.

SERVICE HINTS

CIRCUIT BREAKERS

Circuit Breaker (part number 84B17-4) is used on all chassis covered by ST832-1 and ST832-2. This device is thermally operated. If an overload B+ current is drawn by TV circuitry, the thermal element in the breaker heats up and opens the power supply B+ circuit. By allowing several minutes to elapse for the thermal element to cool and then pressing the "RESET" button (rear of set), the breaker is again set for normal operation. NOTE: TV filaments will remain lit when the Circuit Breaker is either open or closed.

Do not attempt to defeat circuit breaker action by holding the "RESET" button down; the breaker will remain open. Only by pressing and releasing the button will the circuit breaker be reset properly.

If Circuit Breaker continues to open after resetting several times, check the power supply electrolytics (C502, C504A & B, and C505) for leakage or short-circuit. Also, check the Silicon Rectifiers (CR501 and CR502) and capacitors C503 and C508.

TV B+ DISTRIBUTION
15A2, 15A2C, 15B2, 15B3 and 15UA2

B+ is provided by a transformerless half wave voltage doubler circuit. A pi type filtering network gives excellent filtering. B+ 270V, B+ 250V and B+ 145V are provided for TV circuitry. Simplified B+ distribution diagrams are shown in figures 53 and 54. B+ 145V is supplied to V102 (V902), V301, V302 and V303. The cathode circuits of V202 and V401 are normally operated 145 volts positive with respect to ground.

The sound output tube V202 (12CU5) acts as a voltage dropping tube and regulator for 145V B+. If the sound output tube (V202) becomes inoperative, both sound and picture are affected.

Note: The cathode of the damper tube (V405) supplies B+ boost voltage 600V to the horizontal output tube (V404). Plate voltage for V402A (½ 10DE7) and first anode of picture tube (V304) are supplied with a boosted B+ voltage from the B+ boost voltage divider network consisting of R461, R462 and R463.

B+ for chassis 4G3 is switched by K501 on the TV chassis. The availability of B+ for circuitry in chassis 4G3 is controlled by the setting of K501.

B+ for chassis 4H3 is switched by the cam-operated switch (S505) mounted behind the VHF tuner. B+ for the 15B2 TV chassis is also controlled by S505.

15D1B

B + distribution for TV chassis 15D1B is quite similar to B+ distribution for the other chassis. See figure 54 for 15D1B B+ distribution diagram.

S11A AND S21A DISASSEMBLY

By removing two screws from bottom of tuner, the top can be lifted off. Refer to figures 57 and 58 for exploded views of S11A and S21A Son-r tuners. The listing of replaceable parts for both tuners is on page 53.

When reassembling tuner, make sure that the rod springs are seated in the notches at top and bottom of resonator bar(s). Also be sure that the front edge(s) of the tension spring are seated correctly behind the actuator lever(s). Improper seating of front edge of tension spring will cause improper triggering of remote function of set.

IMPROVED TUNING MOTOR USED ON REMOTE CONTROL SETS

Run 12 television chassis 15B2 and 15B3 use an improved Tuning Motor and Gear Assembly, M507, (Part No. 91D42-2). This assembly is interchangeable with Motor assemblies used on Run 10 and Run 11 sets.

If replacement of the motor rotor (armature) is desired on Run 10 and Run 11 sets, order Part No. 91D42-54 (Rotor and Steel Pinion Assembly).

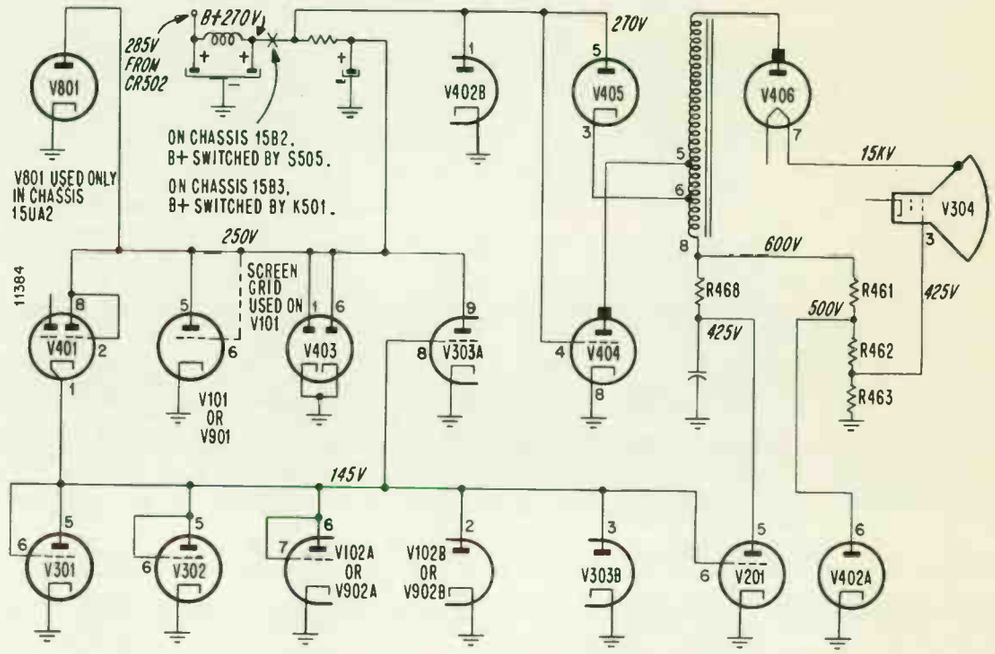


Figure 53. Simplified B+ Distribution Diagram. TV Chassis 15A2, 15A2C, 15B2, 15B3 and 15UA2.

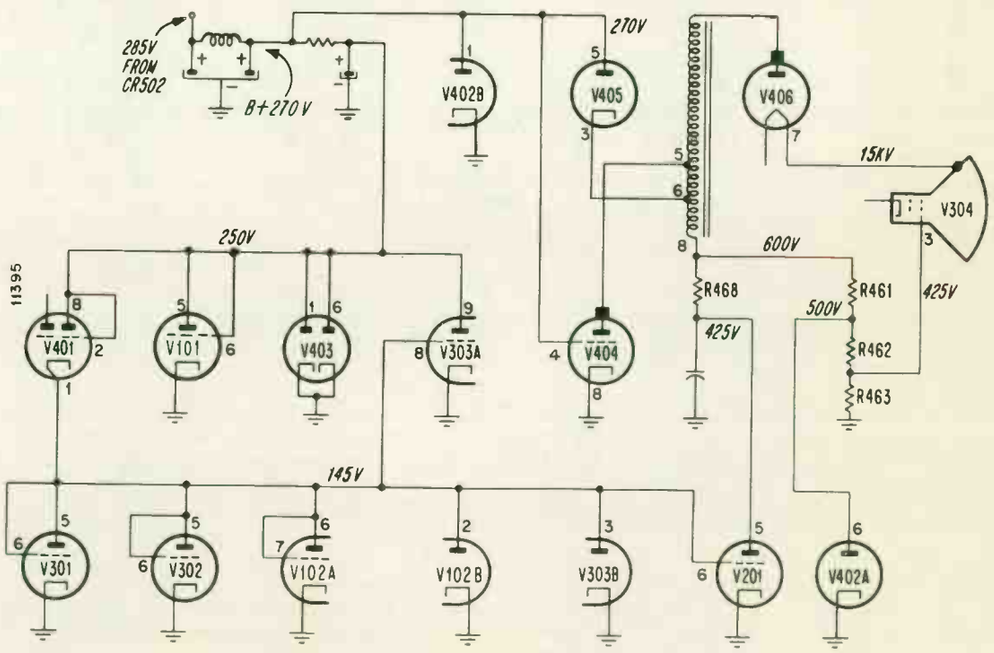


Figure 54. Simplified B+ Distribution Diagram. TV Chassis 15D1B.

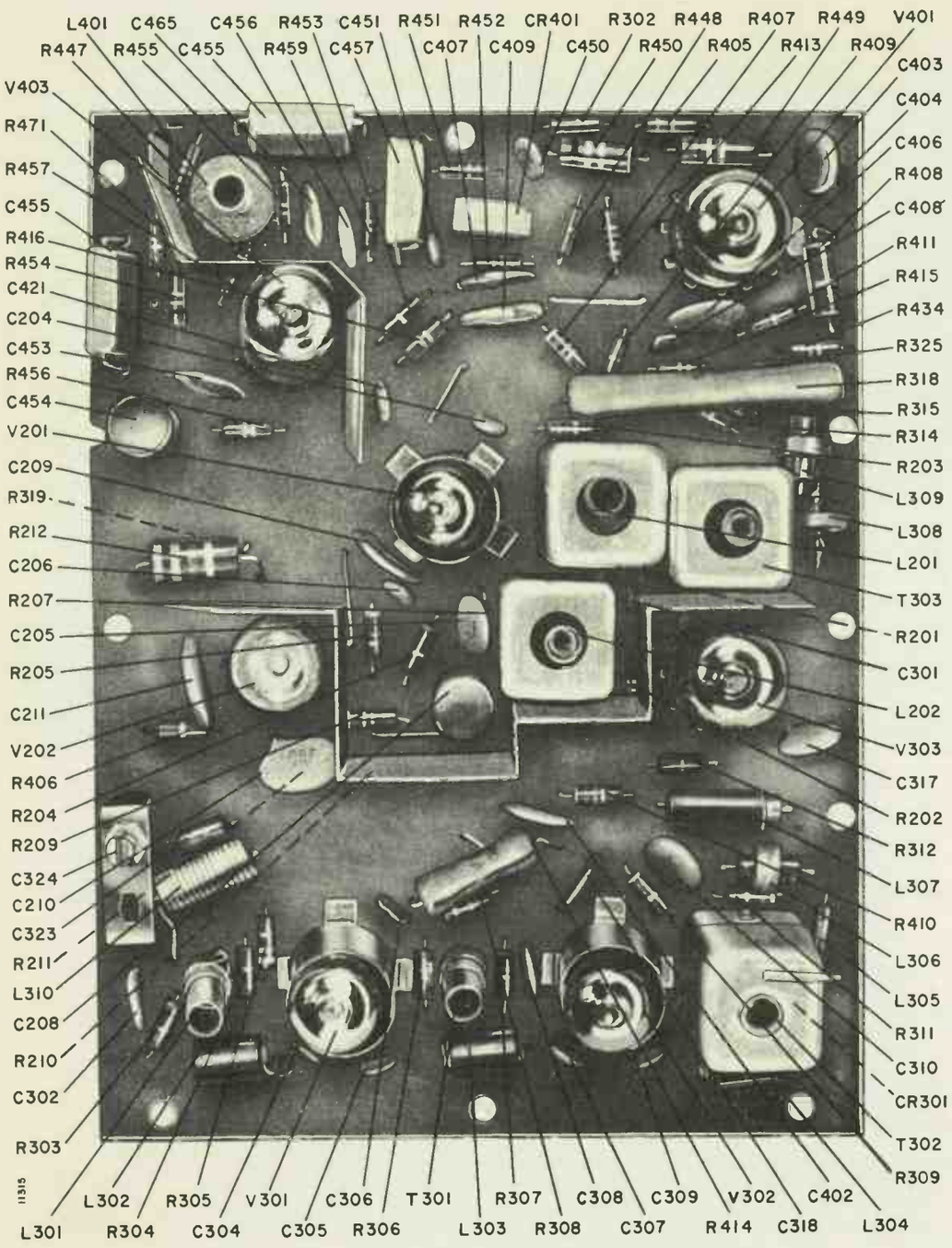
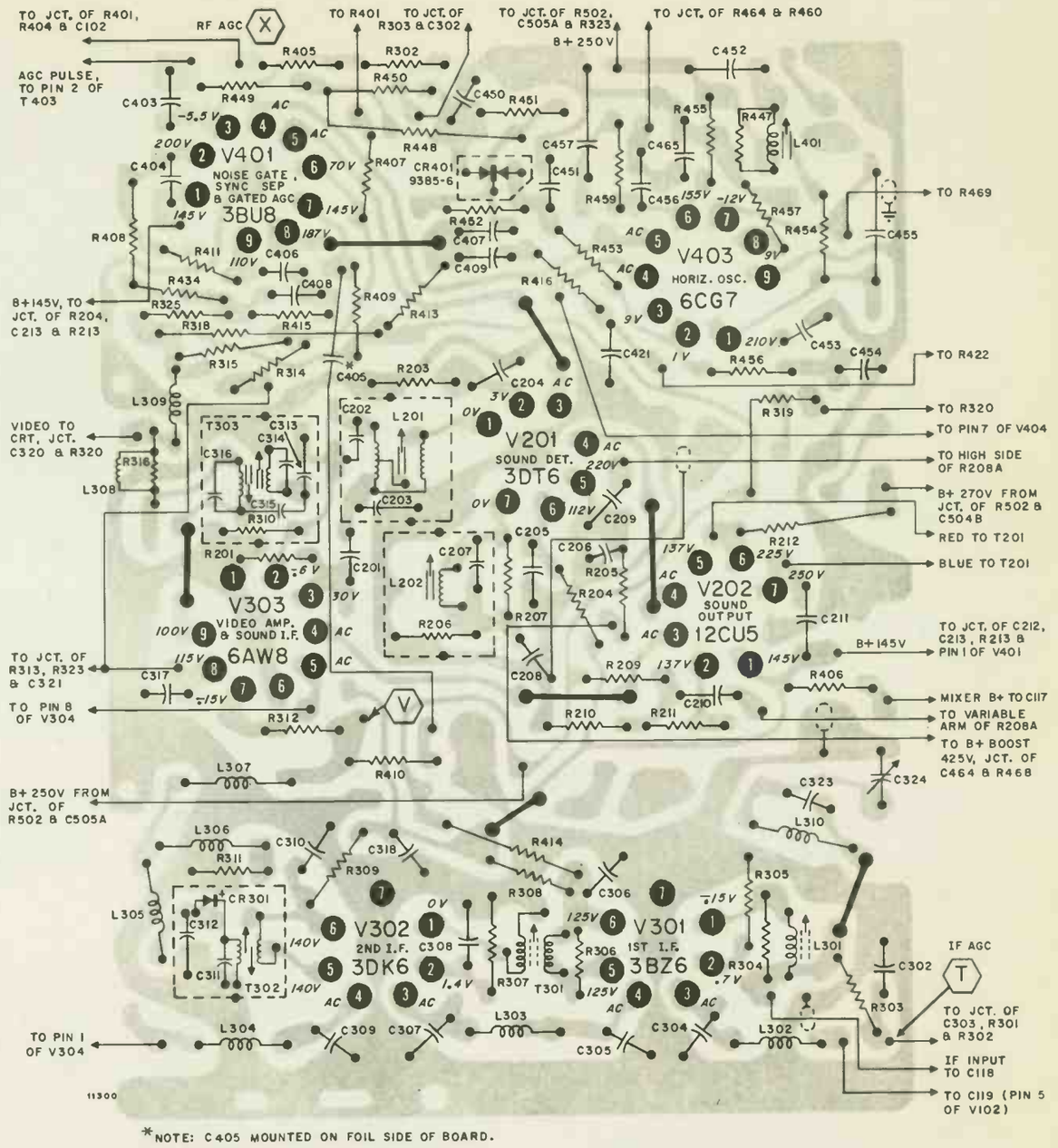


Figure 55. View of Component Side of Etched Circuit Board A7585-1. A7585-1 is used with TV chassis 15D1B.



*NOTE: C405 MOUNTED ON FOIL SIDE OF BOARD.

Figure 56. View of Etched Wiring Side of ETCHED CIRCUIT BOARD A7585-1. Gray area represents etched wiring; black symbols and lines represent components and connections on opposite side. A7585-1 is used with TV chassis 15D1B.

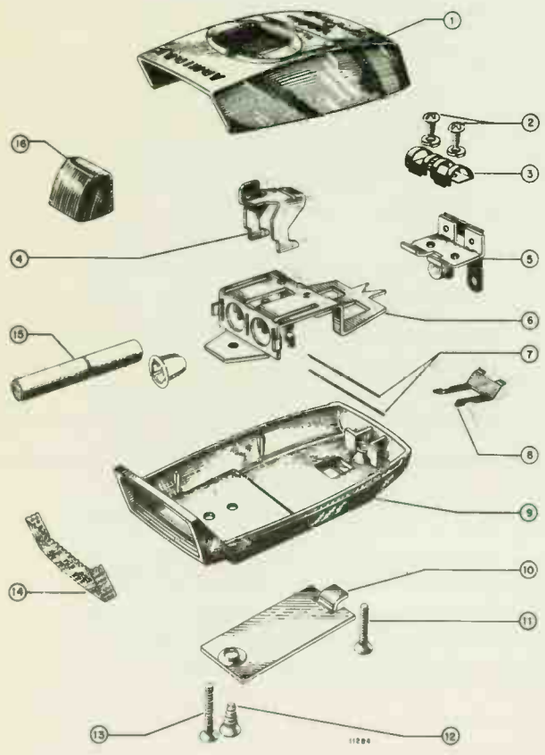


Figure 57. Exploded View of Son-r Tuner S11A. See Parts List for part numbers and descriptions.

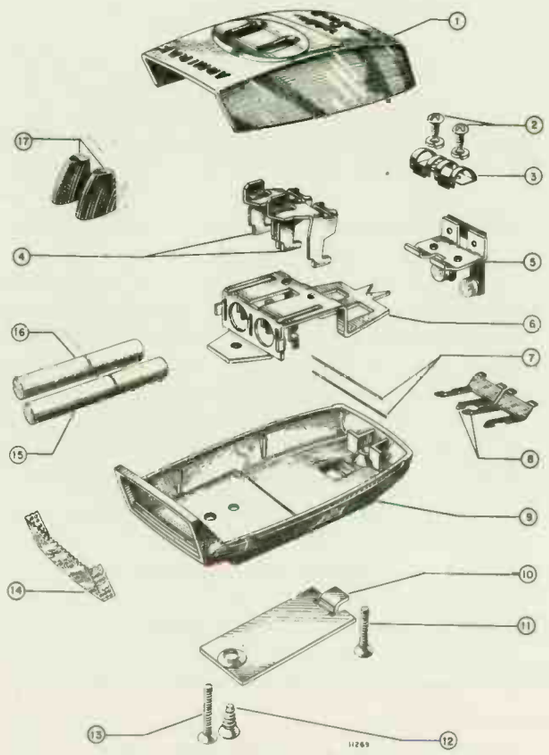


Figure 58. Exploded View of Son-r Tuner S21A. See Parts List for part numbers and descriptions.

REMOVING CHANNEL COILS

Channel coils are fastened onto the turret drum at each end. On early production tuners, two neoprene bands were used with circular fiber end discs to hold the channel coils in place. In later production tuners, semi-rigid metal discs are used at each end of the turret drum to hold the channel coils.

Early Production Tuners (Fiber Retaining Discs):

When removing a channel coil, press the fiber retaining disc away from the end of the coil. Stretch both neoprene bands away from turret drum and slip the channel coil out from under the bands. Do not allow the neoprene bands to rub on the channel coil, because the proper placement of wiring on channel coils may be disturbed.

Later Production Tuners (Metal Retaining Discs):

Carefully press metal retaining disc away from channel coil to be removed. Lift channel coil out of its position on the turret drum.

Caution: Do not use force when removing channel coils from the turret. Be careful not to disturb the position of the coils on the coil form.

REMOVING TURRET DRUM

To gain access to the inside of the tuner for servicing:

1. Remove tuner bottom cover. Unsolder the two lateral metal braces at bottom of tuner. Unsolder shaft retaining plate at rear of tuner. On some tuners, the retaining plate is held with a screw.
2. Disconnect the two screws at the front of the tuner near the top of the case.
3. Carefully lift out tuner drum and Fine Tuning assembly. Caution: Grasp the detent spring and detent roller when removing drum assembly.
4. See the partial illustration on figure 59 for proper placement of detent spring and detent roller during tuner reassembly.

CLEANING AND LUBRICATING TUNER CONTACTS

For cleaning contacts of snap-in coils on turret drum, remove the cover and use a small stiff brush to apply a non-corrosive contact cleaner to all contacts. Warning: Do not allow contact cleaner to drip or run onto coils that are adjacent these contacts. With a soft canvas cloth, remove cleaner and buff the contacts until they are clean and bright. After cleaning contacts, apply a thin film of switch contact oil, Admiral part number 98A64-1, to contact surfaces. Lubricate bearing surfaces of other moving parts with light vaseline or preferably Admiral Lubricant, part number 98A64-2. Caution: Do not use lubriplate or other similar lubricants containing zinc or cadmium.

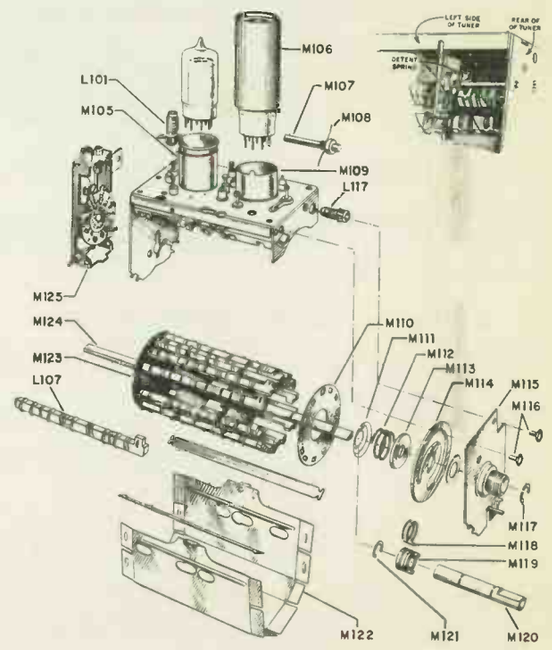


Figure 59. Exploded View of VHF Tuners 94E163-1 and -2. Partial illustration shows placement of detent spring and detent roller.

VHF TUNERS 94E163-1 AND -2

GENERAL

VHF tuners 94E163-1 and -2 are 13 position (12 VHF channel) drum type tuners. An expedient feature is the replaceable channel snap-in coils. A tetrode type 2CY5 vacuum tube (V101) provides low noise and high gain of the VHF input signal. A pentode-triode (5CG8) is used as the mixer and oscillator V102.

The 94E163-1 and -2 are identical with the exception that the 94E163-2 tuner has a snap-in channel coil in the UHF detent position (between VHF channels 13 and 2) that disables the VHF oscillator and allows V101 and V102 to act as UHF IF preamplifiers. Also, the 94D163-2 tuner has a UHF input assembly at the rear of the tuner which provides UHF IF (41MC) input circuitry and B+ switching for the separate UHF tuner.

The VHF input circuit contains an impedance matching transformer (T101). The network containing C103 (10 mmf) and variable coil (L101) acts as a 41MC IF trap.

The simplified circuitry and mechanical construction of this tuner makes it relatively trouble-free and easy to service. Tuner voltages (RF B+, Mixer-Osc. B+, AGC and heater) may be measured from terminals on top of tuner. By removing the drum and Fine Tuning mechanism, all components are accessible for servicing. Important: Location and lead dress of most components at the underside of tuner are generally critical. If a part is replaced, be sure to position the replacement parts, dress the leads, and make ground connections, if necessary, just the same as the original tuner wiring. When replacing components, it is important that they be replaced with parts of identical electrical characteristics and physical size. Refer to the "Parts List for temperature coefficients, tolerances, and other descriptions as well as the replacement part numbers.

SERVICING VHF TUNER 94D164-3

VHF tuner 94D164-3 is a new miniaturized drum type turret tuner with replaceable snap-in channel coils. This tuner is especially adapted for operation in connection with the power tuning mechanism of remote tuning models as well as for VHF only sets. This new tuner incorporates latest improvements in mechanical and electrical design of turret type VHF tuners. For simplicity of circuitry, servicing convenience and purposes of automation, the circuit wiring is contained on a printed wiring assembly. All components are visible and accessible for servicing.

A newly developed triode tube (2ER5) with frame grid construction and beam forming plates is used as a neutralized VHF amplifier stage (V901) in this tuner. Due to the mechanical construction and physical mounting of the frame grid within the tube and the inclusion of beam forming plates, an extremely rugged tube is formed. Also, higher stage gain with a lower noise figure is realized. A pentode-triode (5CG8) tube is used as the VHF mixer and oscillator V902.

The antenna input circuit contains matching transformer T901 (ferrite core balun) which matches the 300 ohm balanced antenna input to the 75 ohm unbalanced input of the RF amplifier input circuit. Two resonant traps (series L903 and parallel L902) are contained in the antenna input circuit for obtaining optimum IF rejection over a range from 41 to 46MC. In later production sets, a VHF input circuit using a fixed IF rejection filter network is used. See schematic diagrams of chassis 15B2 and 15B3.

A variable inductor Fine Tuning control is used. The moveable core has a wire shaft extending from it which is attached to the variable arm of the Fine Tuning control. The use of this Fine Tuning control assures a more uniform range of the Fine Tuning control for all VHF channels.

The simplified circuitry and mechanical construction of this tuner make it relatively trouble free and easy to service. Tuner voltages (B plus, AGC and heater) may be measured from terminals on top side of tuner. The tuner circuitry is contained on a printed circuit wiring assembly. All components are accessible without need of turret removal. See exploded view of tuner, figure 60.

Trouble shooting of printed circuit wiring is similar to that of conventional wiring. Complete instructions on the service and repair of printed circuit wiring is given in Service Manual No. S559, available from your Admiral Distributor.

Important: Location and lead dress of most components at the underside of the tuner are generally critical. Parts location, lead lengths of components and ground connections should be as originally made. When replacing components, it is important that they be replaced with parts of identical electrical characteristics and physical size. Refer to parts list for temperature coefficients, tolerances and other essential description.

REPLACEMENT OF PUSH-IN DISC TYPE CERAMIC CAPACITORS

Many of the capacitors used in the printed wiring circuit of this tuner are of push-in (leadless) ceramic disc type.

These capacitors are inserted between sections of printed circuit wiring and soldered, using low melting point solder.

When replacing a push-in type ceramic disc capacitor, care must be excercised to prevent damage to capacitor or the printed circuit wiring.

To remove a disc capacitor, use a low wattage soldering iron with a forked soldering tip (split tip). Apply the fork tip to sides of capacitor so as to melt solder at both sides simultaneously. When solder melts, immediately remove capacitor.

Replace disc capacitor in the same manner, using low melting point solder. Avoid application of excessive heat to capacitor or printed circuit wiring.

REMOVING CHANNEL COILS

The channel coils are held in the turret drum at one end by the protrusion on the coil form extending into the detent plate. The other end of the coil is held in the turret by the metal tab extending through the coil form.

To remove a channel coil, proceed as follows:

With the thumb of the left hand, press the metal tab (extending through the coil form) toward the rear of the tuner; at the same time, using the forefinger, lift the end of the coil form up and out of the drum.

Caution: Do not use force when removing channel coils from the turret as coils may be damaged. Use care so as not to disturb coil windings at the underside of the coil form.

CLEANING AND LUBRICATING TUNER CONTACTS

For cleaning rotating contacts of turret drum, remove bottom cover from tuner. Using a small stiff brush, apply a non-corrosive contact cleaner to all the contact points. With a soft canvas cloth, remove cleaner and buff contact points until surface is bright. After cleaning contacts, apply a thin film of switch contact oil, Admiral part number 98A-64-1, to surfaces of contacts. Lubricate bearing surfaces of other moving parts with light vaseline or preferably Admiral part number 98A64-2 lubricant.

Caution: Do not use lubriplate or other similar lubricant containing zinc or cadmium.

ADJUSTING CONTACT SPRINGS

The stationary contacts consist of contact springs M923, illustrated in figure 60. The contact springs are inserted through the cut-outs molded in the contact strips. The stationary contacts (springs) are of the self-wiping type and should generally maintain their tension and provide good contact without further attention.

Should the stationary contact springs make poor contact due to insufficient tension, or dirty surface, remove several sets of coils from the turret. Rotate the turret to position making the bottom of the contact strip accessible for servicing. With a narrow blade screwdriver, adjust contact spring tension by carefully bending the bowed portion of the contact spring upward slightly until the shape of the spring conforms with the shape of other springs on the contact strip. If the free end of the contact spring slips out of the contact strip, the end may be reinserted by bowing the spring slightly and pressing inward. If a contact spring is damaged or bent badly, a replacement spring may be reinserted. Restore the spring to its original shape by comparing it with other springs. If the majority of contact springs are bent out of shape or damaged, tuner replacement is recommended.

REPLACEMENT OF CERAMIC FEED-THROUGH CAPACITORS

The B+, heater and AGC leads of this tuner are connected through ceramic feed-through capacitors. When soldering leads to the tuner, care should be exercised to prevent damage to the ceramic feed-through capacitors.

Replacement of ceramic feed-through capacitors may be required if silver coated surface is peeled, if ceramic is cracked, or if center conductor has loosened.

To replace a ceramic feed-through capacitor, proceed as follows:

1. Apply the tip of a hot soldering iron to the top center conductor on feed-through. When the solder melts at bottom end (center conductor at printed circuit wiring), quickly grasp top end of center conductor with long-nose plier and work it completely out of the surrounding ceramic insulation.

2. Remove remainder of feed-through by applying tip of hot soldering iron to metal surface surrounding it at top side of chassis. When solder melts, quickly remove shell and excess solder. **Caution:** Do not allow solder or metal to fall in chassis.

3. To install replacement feed-through, apply tip of hot soldering iron to metal surface. After surface is hot enough to melt solder, quickly push replacement feed-through into chassis with end through hole in printed circuit board.

4. Resolder bottom center terminal of feed-through to printed circuit wiring; using a low wattage pencil point soldering iron. **Caution:** Application of excessive heat may cause damage to printed wiring.

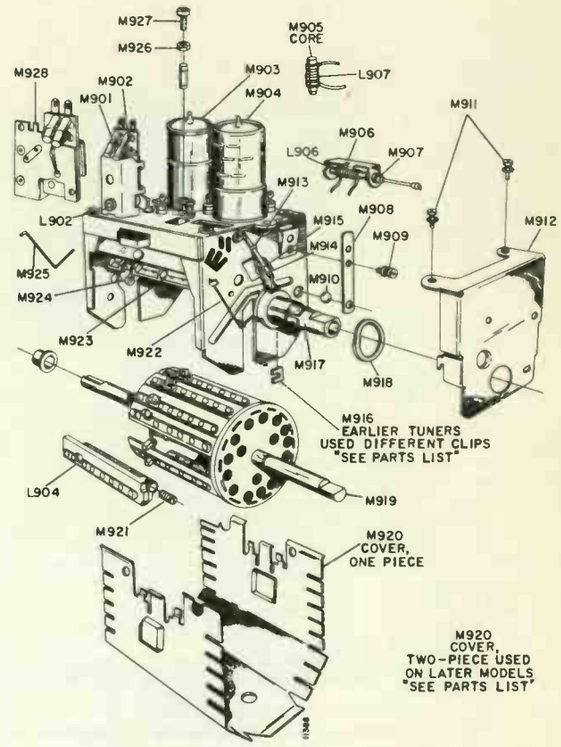


Figure 60. Exploded View of VHF Tuner 94D164-3.

THE UHF TUNER 94D162-3

GENERAL

Tuner 94D162-3 is an all-channel continuous tuning UHF tuner, designed to operate in conjunction with a 13 position VHF tuner.

The UHF tuner consists of a highly selective pre-selector circuit, UHF oscillator V801 (2AF4A) and a UHF mixer circuit using a newly developed low-noise crystal CR801 (1N82A). A single conversion circuit is used in the UHF tuner. The UHF IF output at M802 is coupled to M801. When the VHF tuner is set to the "UHF" position, both VHF tubes, V101 and V102, function as a low-noise 41MC IF preamplifier and feed the UHF IF into the 41MC IF system in the main chassis.

The preselector, oscillator and mixer circuits are each enclosed in a separate shielded compartment. Each of the circuits is continuously tunable with a ganged variable air dielectric capacitor.

A low end oscillator adjustment A18 is at top (side) of tuner and the high end UHF oscillator adjustment tab A19 is accessible after removing cover plate, see figure 61.

SERVICING UHF TUNER

Simplified circuitry and mechanical construction make UHF tuner relatively trouble free and easy to service. Very little difficulty should be encountered in servicing other than replacement of a defective tube, defective mixer crystal or other components which are accessible without disturbing tuned circuits. For important service information, see paragraph on "UHF Trouble Shooting Hints".

Before suspecting trouble in the UHF tuner, make sure that the VHF portion of the receiver is operating properly by tuning in a VHF station. If a station is not available, VHF test equipment can be used to check the VHF portion of the receiver. If VHF operation is satisfactory, and it is known that a UHF signal of considerable strength exists, it can be assumed that UHF antenna, UHF tuner or components in UHF position (between channels 13 and 2) in VHF tuner are at fault.

Note: It is easy to be deceived in areas where a strong VHF signal exists. Whenever possible, check VHF receiver sensitivity before replacing a UHF tuner. See "Fringe Area Television Reception" booklet, Form No. S346 for instruc-

tions on checking sensitivity, expected sensitivity figures, and recommended equipment.

Caution: When servicing UHF tuner, use care not to disturb or bend capacitor blades as alignment will be affected. When replacing components, it is important that they be replaced with duplicates of the same electrical characteristics and physical size. Refer to Parts List for description and characteristics of components.

UHF TROUBLE SHOOTING HINTS

Recommended Checks For Determining Cause of Poor UIIF Reception

Check the Antenna and Transmission Line. Check to see that UHF tuner antenna leads are not placed too close to the television chassis and are not shorting at the antenna terminal strip or at the chassis.

Check UHF Oscillator Tube V801 (2AF4A) by substitution. When making tube replacement, try several tubes to find one which will cause the least frequency shift. Be sure that the top section of tube shield is pulled up fully.

In some instances, replacement of oscillator tube V801 may affect tuner calibration. If this occurs, touch-up the UHF oscillator trimmer (at both ends of the tuning range) as recommended under "UHF Oscillator Adjustment Using Television Signals."

Check UHF Mixer Crystal CR801. Try several mixer crystals, to select one which will produce the best picture with a minimum of snow. Be sure to observe crystal polarity and be sure that the crystal is seated firmly. **Caution:** Use care when replacing crystal, to prevent damage to mountings.

Check Alignment of IF Preamplifier. IF preamplifier alignment should be checked since the sensitivity of the UHF tuner is dependent on the IF preamplifier response.

Check UHF Tuner Voltage. Measure B+ voltage supplied to UHF tuner. See schematic for correct value.

Check Operation of UHF Oscillator V801. If the tuner remains inoperative after making all the preceding checks, determine whether the UHF oscillator is operating by measuring the injection current. Set UHF Channel Selector to approximate center of its range. Disconnect UHF IF output plug M803 from UHF IF input socket M801. Connect a DC milliammeter (0-10 MA range), negative to the center conductor of M803, positive to chassis. If the UHF oscillator is functioning, the reading obtained will be approximately 0.5 to 3.0 MA. If no reading is obtained, the oscillator tube is not functioning. Follow trouble shooting procedures until oscillation is obtained.

UHF OSCILLATOR ADJUSTMENT USING TELEVISION SIGNALS

Adjustment of the UHF oscillator can be made using a television signal. The oscillator should be adjusted for the best picture, consistent with good sound at the tuner dial setting for the received television channel by adjusting the appropriate UHF oscillator trimmer. UHF oscillator trimmer A18 has the greatest effect on the lower UHF channels. UHF oscillator tab A20 has the greatest effect on the higher UHF channels, (above channel 50). See figure 61. Check the UHF dial calibration. The UHF tuner dial should be accurate within ± 3 channels or 18 MC. If it is not accurately calibrated, try readjustment of the UHF oscillator.

In most cases, it is preferable to sacrifice accurary of UHF dial calibration for improved performance with a minimum amount of UHF tuner alignment. If only one channel is in use in the area, or if only a few channels are in use and reception on only one is poor, a compromise adjustment of the oscillator can be made. This is done by alternately adjusting the tuner dial and the appropriate UHF oscillator trimmer, to see if better performance may be had on a weaker channel without greatly affecting performance on the other received channel(s). A VTVM connected to test point "W" will facilitate adjustment of the UHF oscillator when rocking the tuning dial in this manner. Tune for a maximum VTVM reading.

REPLACING MIXER CRYSTAL CR801

The mixer crystal CR801 (1N82A), is located in the center compartment of the UHF tuner, see figure 61.

For removing the mixer crystal, it will be necessary to remove the tuner cover plate after removing cover retaining spring.

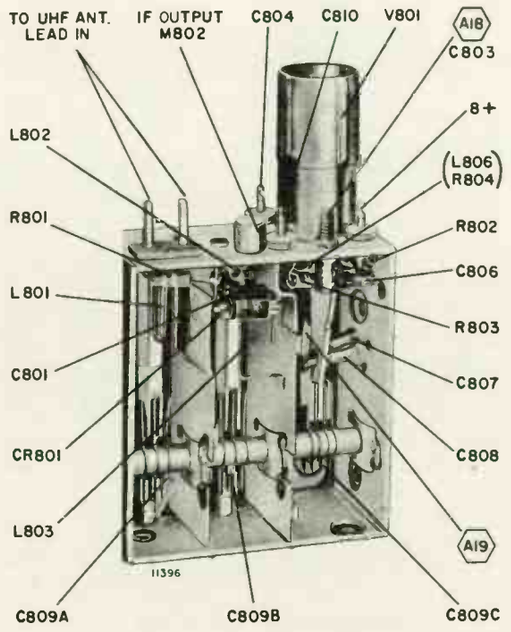


Figure 61. Side View of UHF Tuner 94D162-3 with Cover Removed. Location of components and adjustments shown.

PRODUCTION CHANGES

Production changes are coded RUN 10, RUN 11, etc., as given in the headings below. Run number (stamped on chassis) indicates that this chassis has the change(s) incorporated which are explained under that particular run number heading below, as well as all changes (lower run numbers) made prior to that time.

For start of production Run Number on a particular chassis, see "RUN CHANGES" column on schematic for that chassis.

Run 11 in 15B2 and 15B3 Chassis:

TUNER DETENT SWITCH, S503, ADDED TO MOTOR CIRCUIT

For increased accuracy of detenting, S503 (Tuner Detent switch) added in parallel with S502. S503 is mounted at front of tuner and is actuated by movement of detent ball at front of tuner.

Run 12 in 15B2 and 15B3 Chassis:

IMPROVED TUNING MOTOR AND GEAR ASSEMBLY USED

An improved tuning motor rotor (armature) with steel pinion shaft used for operating VHF tuner during manual and remote operation.

SUPPLEMETARY PARTS LIST FOR MODELS USING 15A2, 15A2C, 15B2, 15B3, 15D1B, AND 15UA2 TELEVISION CHASSIS AND 4G3, AND 4H3 REMOTE CONTROL AMPLIFIER CHASSIS

This parts list includes corrections and additions to the parts list in Service Data No. ST832-1. Use this list first then refer to the parts list in Service Data No. ST832-1 for parts not listed here.

RESISTORS

Sym.	Description	Part No.
R101	.3 to 1 megohm	Part of M101
R102	100,000 ohms, ½ watt	60B 8-104
R103	22,000 ohms, 1 watt (early production)	60B 14-223
	18,000 ohms, 1 watt (later production)	60B 14-183
R104	10,000 ohms, ½ watt	60B 8-103
R105	22,000 ohms, ½ watt	60B 8-223
R106	1 megohm, ½ watt	60B 8-105
R107	10,000 ohms, ½ watt	60B 8-103
R108	22,000 ohms, ½ watt	60B 8-223
R109	39,000 ohms, ½ watt	60B 8-393
R110	1,000 ohms, ½ watt	60B 8-102
R111	15,000 ohms, ½ watt (early production)	60B 8-153
	22,000 ohms, ½ watt (later production)	60B 8-223
R112	.75 to 1.5 megohms	Part of M151
R117	.3 to 1 megohm	Part of M102
R118	.3 to 1 megohm	Part of M103
R208	1 megohm, **Volume** control (incl. S501; 15A2C, 15UA2)	75D 44-1
R208A	3 megohms, **Volume** (dual control; incl.	
R208B	100,000 ohms, **Brightness** S501 (15D1B)	75B 11-35
R304	6,800 ohms, ½ watt, 5% (15D1B)	60B 7-682
R322	100,000 ohms, **Brightness** control (15D1B)	See R208B
R324	120,000 ohms, ½ watt (15D1B)	60B 8-124
R403	5,600 ohms, 4 watts (15D1B, 15A2C, 15UA2)	61B 24-443
R419	300,000 ohms, **Vert. Hold** (15D1B)	75D 20-120
R421	2.5 megohms, **Vert. Height** (15D1B)	75D 20-123
R435	150,000 ohms, ½ watt (15A2, 15A2C, 15B2, 15B3, 15UA2)	60B 8-154
	750 ohms, **Vert. Lin.** control (15D1B)	75D 20-124
R436	100,000 ohms, ½ watt (15D1B)	60B 8-104
R447	56,000 ohms, ½ watt (15D1B)	60B 8-563
R448	2.2 megohms, ½ watt (15D1B)	60B 8-225
	56,000 ohms, ½ watt (15A2C, 15UA2)	60B 8-563
R451	680,000 ohms, ½ watt (15D1B)	60B 8-684
	270,000 ohms, ½ watt (15A2C, 15UA2)	60B 8-274
R458	47,000 ohms, ½ watt (15A2C, 15UA2)	60B 8-473
	33,000 ohms, ½ watt (15D1B)	60B 8-333

RESISTORS (Cont'd)

Sym.	Description	Part No.
R465	18,000 ohms, ½ watt (15D1B)	60B 8-183
R470	25,000 ohms, **Horizontal Hold** control (15D1B)	75D 20-121
R501	51 ohms, 20 watts, candohm (15D1B)	61B 3-34
	47 ohms, 20 watts, candohm (15A2C, 15UA2)	61B 3-25
R801	680,000 ohms, ½ watt	60B 8-684
R802	100 ohms, ½ watt	60B 8-101
R803	5,600 ohms, ½ watt	60B 8-562
R804	12,000 ohms	Part of L806
R805	11,000 ohms, 3 watts	61B 24-350
R806	3,900 ohms, ½ watt	60B 8-392
R807	150,000 ohms, ½ watt	60B 8-154
R901	47,000 ohms, ¼ watt	60B 2-473
R902	1,000 ohms, ¼ watt	60B 2-102
R903	2,700 ohms, ¼ watt	60B 2-272
R904	220,00 ohms, ¼ watt	60B 2-224
R905	1,000 ohms, ¼ watt	60B 2-102
R906	4,700 ohms, ½ watt	60B 8-472
R907	4,700 ohms, ¼ watt	60B 2-472
R908	.3 to 1 megohm	Part of M902
R909	.3 to 1 megohm	Part of M901
R910	91,000 ohms, ½ watt, 5%	60B 7-913
R911	47 ohms, ¼ watt	60B 2-470
R912	.75 to 1.5 megohms	Part of M951

CAPACITORS

Sym.	Description	Part No.
C101	470 mmf, 1.5KV	Part of M101
C102	.001 mf, ceramic, feed-through	94E 163-80
C103	10 mmf, 500 volts, 10%, cer. disc	94E 163-81
C104	10 mmf, 500 volts, 10%, cer. disc	94E 163-81
C105	6.8 mmf, 10%, composition	65B 28-068
C106	.33 mmf, 10%, composition	65B 28-0033
C107	Trimmer, VHF Amp. Plate	Not supplied
C108	Trimmer, VHF Mixer Grid	Not supplied
C109	10 mmf, 500 volts, 10%, cer. disc	94E 163-81
C110	100 mmf, ceramic, feed-through	94E 163-80
C111	.001 mf, 500 volts, cer. disc	65D 10-6
C112	.001 mf, ceramic, feed-through	94E 163-80

CAPACITORS (Cont'd)

Sym.	Description	Part No.
C113	.001 mf, ceramic, feed-through	94E 163-80
C115	10 mmf, 500 volts, 5%, cer. disc, N330 temp. coeff	65D 10-179
C116	10 mmf, 500 volts, 10%, cer. disc	94E 163-81
C117	.001 mf, ceramic, feed-through	94E 163-80
C118	.001 mf, 500 volts, cer. disc	65D 10-6
C119	.001 mf. ceramic, feed-through	94E 163-80
C120	.001 mf, ceramic, feed-through	94E 163-80
C121	.001 mf, ceramic, feed-through	94E 163-80
C122	.001 mf, ceramic, feed-through	94E 163-80
C123	.0047 mf, 1.5KV	Part of M151
C213A	60 mf, 200 volts	
C213B	5 mf, 200 volts } electrolytic (15UA2)	67D 15-332
C213C	100 mf, 50 volts	
C213	60 mf, 200 volts, electrolytic (15D1B)	See C505B
C320	5.1 mmf, 10%, composition (15UA2)	65B 28-051
	6.8 mmf, 10%, composition (15D1B)	65B 27-068
C321	5 mf, 200 volts, electrolytic (15D1B)	See C505C
	5 mf, 200 volts, electrolytic (15UA2)	See C213B
C418	100 mf, 50 volts, electrolytic (15D1B)	See C505D
	100 mf, 50 volts, electrolytic (15UA2)	See C213C
C421	470 mmf, 500 volts, cer. disc	65D 10-70
C422	.047 mf, 1KV, tubular	64B 2-30
C461	250 mmf, 2KV, 10%, cer. disc, N1500 temp. coeff. (15D1B)	65D 10-204
	300 mmf, 2KV, 10%, cer. disc, N1500 temp. coeff. (15UA2)	65D 10-202
C462	250 mmf, 2KV, 10%, cer. disc, N1500 temp. coeff. (15D1B)	65D 10-204
	300 mmf, 2KV, 10%, cer. disc, N1500 temp. coeff. (15UA2)	65D 10-202
C501	.047 mf (15D1B)	†63B 12-1
	.1 mf (15UA2)	†63B 12-7
C502	150 mf, 200 volts, electrolytic (15D1B)	67D 15-234
	150 mf, 200 volts, electrolytic (15UA2)	67D 30-47
C505A	50 mf, 350 volts	
C505B	60 mf, 200 volts	
C505C	5 mf, 200 volts } electrolytic (15D1B)	67D 15-333
C505D	100 mf, 50 volts	
C505	50 mf, 350 volts, electrolytic (15UA2)	67D 30-8
C507	.047 mf, 600 volts, tubular (15D1B)	63B 12-1
C508	.001 mf, 1KV, cer. disc	65D 10-147
C801	33 mmf, 10%, ceramic	94D 162-60
C802	.001 mf, ceramic, feed-through	94D 162-57
C803	135 mmf, 10%, ceramic	94D 162-53
C804	.001 mf, ceramic, feed-through	94D 162-57
C805	.5 to 3.0 mmf, trimmer	94D 162-52
C806	1.5 mmf, 10%, ceramic, N1400 temp. coeff	94D 162-54
C807	.5 mmf, 10%, ceramic, N750 temp. coeff	94D 162-55
C808	.5 mmf, 5%, ceramic, N750 temp. coeff	94D 162-56
C810	.001 mf, ceramic, feed-through	94D 162-57
C811	.001 mf, 500 volts, 10%, cer. disc	65D 10-58
C812	.001 mf, ceramic, feed-through	94D 162-57
C813	.001 mf, ceramic, feed-through	94D 162-57
C901	120 mmf, 500 volts, 10%, cer. disc, N1500 temp. coeff	65D 10-136
C902	15 mmf, 500 volts, 10%, cer. disc, N750 temp. coeff	65D 10-135
C903	30 mmf, ceramic, feed-through	94E 164-94
C904	28 mmf, 10%	94E 164-95
C905	1,000 mmf, ceramic, feed-through	94E 164-96
C906	1.8 to 7 mmf, ceramic trimmer	94E 164-97
C907	1,000 mmf, ceramic, feed-through	94E 164-96
C908	100 mmf, ceramic, feed-through	94E 164-98
C909	.5 to 3.5 mmf, ceramic trimmer (incl. screw and lock nut)	94E 164-99
C910	.5 to 3.5 mmf. ceramic trimmer (incl. screw and lock nut)	94E 164-99
C911	33 mmf, feed-through	94E 164-100
C912	18 mmf, 10%, N220 temp. coeff.	94E 164-101
C913	7.25 mmf, +¼ —½ mmf	94E 164-102
C914	1,000 mmf, ceramic, feed-through	94E 164-96
C915	1,000 mmf, 500 volts, cer. disc	65D 10-6
C916	470 mmf, 1.5KV	Part of M902
C917	470 mmf, 1.5KV	Part of M901
C918	.001 mf, ceramic, feed-through	94E 164-104
C919	.001 mf, ceramic, feed-through	94E 164-104
C920	.001 mf, ceramic, feed-through	94E 164-104
C921	28 mmf, 10%	94E 164-103
C922	.001 mf, 500 volts, cer. disc	65D 10-6
C923	.0047 mf, 1.5KV	Part of M951

CAPACITORS (Cont'd)

Sym.	Description	Part No.
C924	27 mmf	Part of M928
C925	27 mmf	Part of M928
C926	27 mmf	Part of M928
C927	27 mmf	Part of M928

†Order by this description and part number only.

COILS AND TRANSFORMERS

L101	Coil. IF Trap (less core)	94E 163-82
L102	Channel Coil, Channel 2	94E 163-83
L103	Channel Coil, Channel 3	94E 163-84
L104	Channel Coil, Channel 4	94E 163-85
L105	Channel Coil, Channel 5	94E 163-86
L106	Channel Coil, Channel 6	94E 163-87
L107	Channel Coil, Channel 7	94E 163-88
L108	Channel Coil, Channel 8	94E 163-89
L109	Channel Coil, Channel 9	94E 163-90
L110	Channel Coil, Channel 10	94E 163-91
L111	Channel Coil, Channel 11	94E 163-92
L112	Channel Coil, Channel 12	94E 163-93
L113	Channel Coil, Channel 13	94E 163-94
L115	Choke, RF	94E 163-95
L116	Choke, RF	94E 163-96
L117	Coil, IF Output	94E 163-78
L801	Antenna Coupling Coil	Not supplied
L802	IF Output Coil	94D 162-61
L803	Crystal Coupling Loop	Not supplied
L804	Heater Choke Coil	94D 162-65
L805	Heater Choke Coil	94D 162-65
L806	Cathode Choke Coil (incl. R804)	94D 162-63
L807	UHF IF Input Coil	94E 163-98
L808	Shunt UHF Input Coil	94E 163-99
L809	Channel Coil, UHF IF Conversion (fits in position between VHF channels 13 and 2)	94E 163-100
L901	Coil. RF Choke	94D 164-64
L902	Coil, Trap	94D 164-65
L903	Coil, Trap	94D 164-66
L904	Coil, Channel (stamped 2GG4, 3GG4, 4GG4, etc.)	
	for Channel #2	94D 164-52
	for Channel #3	94D 164-53
	for Channel #4	94D 164-54
	for Channel #5	94D 164-55
	for Channel #6	94D 164-56
	for Channel #7	94D 164-57
	for Channel #8	94D 164-58
	for Channel #9	94D 164-59
	for Channel #10	94D 164-60
	for Channel #11	94D 164-61
	for Channel #12	94D 164-62
	for Channel #13	94D 164-63
	(for VHF Tuner 94D 164-3)	
L905	Coil, Mixer Screen	94D 164-67
L906	Coil, Fine Tuning	94D 164-68
L907	Coil, Mixer Plate	94D 164-69
L908	Coil, IF Trap	Part of M928
L909	Coil, IF Trap	Part of M928
L910	Coil, IF Trap	Part of M928
T101	VHF Input Transformer	94E 163-77
T102	Transformer, Balun (part of "Power Tower" ant. assy.)	700B 169
T901	Transformer, Balun	700B 169
T902	Transformer, Balun (part of "Power Tower" ant. assy.)	700B 169

MISCELLANEOUS CHASSIS PARTS (15A2, 15A2C, 15B2, 15B3 and 15UA2)

‡M507	Motor and Gear Assembly, Tuning (Chassis 15B2 and 15B3)	91D 42-2
M510	Pilot Light, #1847 (15B2, 15B3)	81B 1-19
S502	Switch, Motor Disconnect	91C 35-54
S503	Switch, Tuner Detent	77A 101-2
S505	Switch, ON-OFF-POWER	77B 95-1
	Button, Nylon Indexing (White Plastic; 15B2, 15B3)	91C 35-51
	Button, Nylon Indexing (colored plastic; 15B2)	91C 35-52
	Cam, Tear Drop (fits on rear of tuner shaft; 15B2)	33B 332-2
	Clip, Tube Cap	
	for V404 (incl. cover and wire lead)	88D 16-80
	for V406 (incl. cover)	88D 16-28
	Connector, 2nd Anode (incl. suction cup and lead)	89D 16-79
	Cover Cap, Plastic (for high voltage socket)	33B 206-4
	Escutcheon, Shield	
	15A2, 15A2C	32C 424-1
	15B2, 15B3	32C 424-2
	15UA2	32C 424-3
	Etched Circuit Board (incl. components; less tubes)	
	IF, Sound, Vertical and Sync Circuits	A7265-1
	Power Supply and Horizontal Osc.	A7270-1
	Inserts, Chassis Insulating, Plastic	
	square hole	33B 150-15
	¼" thick head	33B 150-26
	½" thick head	33B 150-25
	Motor Rotor and Pinion Assembly (15B2, 15B3)	91D 42-54
	Picture Centering Device and Yoke Cap	94C 152-1
	Rod, Horizontal Adjust, Nylon	33A 218-8
	Set Screw (for connecting index wheel to tuner shaft)	91C 35-53
	Screw, 8x⅝" HWHHST (for fastening yoke clamp)	1A 97-23-71
	Screw (for mtg. S502)	91C 35-55
	Shield, Anode (polyethylene)	33B 321-1
	Shield, Push Button Switch (15B2, 15B3)	32C 432-1
	Socket, Tube	
	7 Pin Miniature (for V201, V202, V301 or V302)	87D 35-23
	9 Pin Miniature (for V303, V401 or V403)	87D 35-19
	9 Pin Miniature, mica-filled (for V402)	87D 35-40
	Octal (for V404)	87A 5-1
	Octal, mica-filled (for V405)	87A 84-1
	Octal, molded (for V406)	33C 280-3
	Octal (with leads; for V304)	87B 83-6
	Socket, Pilot Light (with leads)	82A 40-1
	Spacer, Microphone (fishpaper; 15B2, 15B3)	32B 447-1
	Spring, Deflection Yoke Clamping	18A 220-1-71

‡Orders for these parts will not be filled unless damaged part cannot be repaired economically and full details are given with order.

MISCELLANEOUS CHASSIS PARTS (CHASSIS 15D1B)

Sym.	Description	Part No.
CR301	Video Detector (replace with type used)	1N87 or 1N87A
CR401	Diode, Dual Selenium	93B 5-6
CR501	Rectifier, Silicon (500 MA)	93B 12
CR502	Rectifier, Silicon (500 MA)	93B 12
M101	Couplate (incl. R101 and C101)	63B 10-4
M151	Couplate (incl. R112 and C123)	63B 10-3
M401	Plug, Octal, Deflection Yoke	88B 23-5
M402	Socket, Octal, Deflection Yoke	87A 84-1
M501	Line Cord and Plug (6 ft.)	89B 90-2
M502	Interlock, Male	88A 36
M503	Circuit Breaker	84B 17-4
S501	Switch, Off-On Power	Part of R208A
	Bracket, Interlock	15C 1977-1
	Centering Device (used with deflection yoke)	94C 166-1
	Connector, H.V. (to V304)	88D 16-54
	Connector, H.V. (plate cap of V404)	88D 16-80
	Cover, Cup (fits onto bottom of H.V. cup)	33B 206-4
	Etched Circuit Board (incl. components; less tubes)	
	IF, Sound, Sync, and Hor. Osc. circuits	A7585-1
	Grommet, Insulator, Plastic, White (for chassis isolation)	33B 150-15
	Nut, Hex, 4-40 (for mtg. T403)	2A1-6-71
	Palnut, ½-20 (for mtg. tuner shaft to chassis)	2C 6-19-71
	Palnut, ⅜-32 (for mtg. Off-Volume & Brightness controls)	2C 6-42-71
	Shield, Insulator, Phenolic (shields Volume control)	32A 430-1
	Shield, Insulator, Phenolic (shields Contrast, Horizontal and Vertical controls)	32A 445-1
	Socket, CRT (with leads)	87B 83-7
	Socket, Octal	
	(for V404)	87A 5-1
	(for V405) molded	87A 84-1
	(for V406)	33C 280-3
	Socket, 9 Pin Miniature (for V402)	87B 25-2
	Spring, Dag Shorting	19B 148-1

4H3 AND 4G3 REMOTE AMPLIFIER CHASSIS RESISTORS

R27	In chassis 4H3, R27 may be 1 megohm, ½ watt (part no. 60B8-105), or 1 megohm, ½ watt (part no. 60B8-105) and 2 megohms, ½ watt (part no. 60B8-205) connected in parallel, or 680,000 ohms, ½ watt (part no. 60B8-684)	
	In chassis 4G3, R27 may be 470,000 ohms, ½ watt (part no. 60B8-474) or 1 megohm, ½ watt (part no. 60B8-105)	

MISCELLANEOUS CHASSIS PARTS

Sym.	Description	Part No.
*K1	Relay, On-Off-Channel (4H3 chassis)	83B 27-1
*K2	Relay, Channel (4G3 chassis)	83B 27-1

*Orders for complete relay will not be filled unless damaged relay cannot be repaired economically and full details are given with order.

MISCELLANEOUS PARTS FOR UHF TUNER 94D162-3

(See figure 61 for side view of tuner.)

CR801	Silicon Diode (type 1N82A)	94D 162-71
M802	Socket, IF Output	94D 162-67
M803	Cable Assembly (incl. 2 plugs)	89A 79-1
	Lead Assembly, Antenna (incl. pins)	95C 16-34
	Mounting Bracket and Drive Assembly	94D 162-90
	Plug (used with M803)	88A 2-9
	Screw, Set (used to hold clutched gears to tuner shaft)	94D 162-79
	Screw, Trimmer	94D 162-94
	Spring (used with clutched gears on tuner shaft)	94D 162-78
	Spring, Cover Retaining	94D 162-92

MISCELLANEOUS PARTS FOR VHF TUNER 94E163-1 and -2

(See figure 59 for exploded view of tuner.)

M101	Couplate (incl. C101 and R101)	63B 10-4
M102	Couplate (incl. C124 and R117)	63B 10-4
M103	Couplate (incl. C125 and R118)	63B 10-4
M107	Roller, Detent	94E 163-58
M108	Spring, Detent Roller	94E 163-70
M109		Not supplied
M110	Disc, Coil Retaining, Front	
	Fishpaper (early production)	94E 163-67
	Metal (later production)	94E 163-101
M111	Disc, Flanged	94E 163-65
M112	Spring	94E 163-64
M113	Clutch Ring	94E 163-63
M114	Disc, Dielectric (Fine Tuning)	94E 163-59
M115	Front Plate	94E 163-50
M120	Shaft, Fine Tuning (fiber)	94E 163-74
M122	Cover, Bottom	94E 163-57
M123	Disc, Coil Retaining, Rear	
	Fiber (early production)	94E 163-68
	Metal (later production)	94E 163-102
M124	Turret and Shaft Assembly	94E 163-103
M151	Couplate (incl. R112 and C123)	63B 10-3
	Core (for L101)	94E 163-104
	Core (for L117)	94E 163-105
	Core (for L107)	94E 163-106

MISCELLANEOUS PARTS FOR VHF TUNER 94D164-3

(See figure 60 for exploded view of tuner.)

M901	Couplate (incl. R909 and C917)	63B 10-4
M902	Couplate (incl. R908 and C916)	63B 10-4
M903	Shield, Tube (collapsible type)	94D 164-70
M904	Shield, Tube (dome type)	94D 164-71
M905	Core (for Mixer Plate Coil L907)	94D 164-51
M906	Bracket, Fine Tuning Coil Mtg.	94D 164-72
M907	Core, Powdered Iron (for L906 adjustment)	94D 164-73
M908	Spring, Detent	94D 164-74
M909	Screw, Detent Spring Mtg.	94D 164-75
M910	Ball, Detent	94D 164-76
M911	Screw, Front Retaining Bracket Mtg.	94D 164-77
M912	Bracket, Front Retaining	94D 164-78
M913	Spring, Fine Tuning	94D 161-79
M914	Arm, Fine Tuning	94D 164-80
M915	Pivot, Fine Tuning Arm	94D 164-81
M916	Lock Bearing	94D 164-82
M917	Shaft and Cam Assembly, Fine Tuning	94D 164-83
M918	Spring Washer	94D 164-84
M919	Turret Assembly, less coils	94D 161-85
M920	Cover, Bottom { One-piece / Two-piece	94D 164-86 / 94D 161-94
M921	Slug, Channel Oscillator (for L904)	94D 164-87
M922	Spring, Drum Retaining, Front	94D 164-88
M923	Stator Bracket Assembly (incl. contacts)	94D 161-89
M924	Bracket and Ground Spring Assembly	94D 164-90
M925	Spring, Drum Retaining, Rear	94D 164-91

Sym.	Description	Part No.
M926	Nut, Trimmer Screw Locking	94D 164-92
M927	Screw, Trimmer	94D 164-93
M928	VHF Input Assembly (incl. C924, C925, C926, C927, L908, L909, L910 and T901; used on later production chassis)	94D 164-95
M951	Couplate (incl. R912 and C923)	63B 10-3

PARTS FOR SON-R TUNERS S11A AND S21A
(See figures 57 and 58 for exploded views of tuners.)

1.	Housing, Top	S11A	23E 350-2
		S21A	23E 350-1
2.	Screw, Spring (#4-40x3/16" RHMS PH)		1A 100-12-71
3.	Spring, Tension		18B 230-2
4.	Lever, Actuator		15B 1857-1
5.	Hammer Assembly	S11A	A7571
		S21A	A7570
6.	Frame, Rod		15C 1956-1
7.	Spring, Rod		19A 142-3
8.	Spring, Actuator		18B 229-1
9.	Housing, Bottom		33E 324-1
10.	Plate, Bottom		15C 1957-1
11.	Screw, Mounting, Rear (#4x5/8" OH ST PH)		1A 136-6-70
12.	Screw, Frame Mounting (#6x3/8" FH PH)		1A 94-6-70
13.	Screw, Mounting, Front (#4x7/8" FH ST PH)		1A 94-31-70
14.	Grille, Metal, Gold		36B 100-1
15.	Resonator Bar, **ON-OFF CHANNEL** (1.852" long, S11A)		28B 118-8
	Resonator Bar, **CHANNEL** (1.799" long, S21A)		28B 118-7
	Button, Push (S11A)		33B 329-1
16.	Resonator Bar, **ON-OFF-VOL** (1.852" long, S21A)		28B 118-8
17.	Button, Push (S21A)		33B 318-1
*Son-r Tuner, Complete			S11A
*Son-r Tuner, Complete			S21A

*Orders for complete Son-r tuner will not be filled unless the damaged tuner cannot be repaired economically and full details are given with order.

SUPPLEMENTARY CABINET PARTS
Note: CORRECTIONS TO "CABINET PARTS" LIST IN ST832-1.

Note: CORRECTIONS TO "CABINET PARTS" LIST IN ST832-1. The part number of the following are:

Description	Part No.
Escutcheon, Metal (Gold)	
Models P17F1, P17F2, or P17F3	20D 23-1
Models PS17F12, PS17F13, PS17F22, or PS17F23	20D 23-2
Knobs, Tuning	
"Vertical Hold" or "Contrast" (all models)	20D 24-2
"Off-On-Volume" (all models)	20D 24-1
"Fine Tuning" (Models PS17F12, PS17F13, PS17F22, or PS17F23)	33D 306-3

Use this listing for all models covered in ST832-1 and models P17F1C, P17F2C, P17F3C, P17UF1, P17UF2 and P17UF3 covered in this supplementary manual.

Description	Part No.
Bracket, Microphone Mtg. (PS17F12, 13, 22 & 23)	15B 1947-2
Bracket, Son-r Well (PS17F12, 13, 22 & 23)	15B 1946-1
Bracket, Picture Tube Retaining	15B 1912-1
Bumper, Rubber (tube mtg; See figure 32 for mtg. position)	12C 93-1 / 12C 93-2
Crest (Black-and Gold; 1¼" wide)	23D 344-1
Nut, 10-32x3/8" (for mtg. tube retaining wire)	2A 8-15-71
Screw	
#6x3/8" BHST (ant. terminal board mtg.)	1A 27-7-71
#6-32x¼" HWHST (for mtg. Son-r Well Bracket)	1B 51-2-71
#6x½" HWHST (for securing chassis to cabinet bottom, for mtg. cabinet back to cabinet, and for mtg. carrying handles)	1A 97-8-71
#8x3/8" HWHST (for mtg. "Power Tower" ant.)	1A 97-21-71
#8x¾" HWHST (for mtg. "Power Tower" ant.)	1A 97-22-71
10-32x2½" RHMS (for mtg. tube retaining wire)	1A 99-17-71
6-32x3/8" HHST (for securing chassis to cabt. bottom)	1A 118-12-71
#6x3/8" HWHST (ant. terminal board mtg.)	1B 221-4-71
Spring, Cabinet Grounding	18B 243-1
Spring Clamp, Yoke	18A 220-1
Spring, Dag Shorting	19D 1-57
Wire, Picture Tube Retaining	19C 1-43

CABINET PARTS

The cabinet parts listing for models P17F1C, P17F2C, and P17F3C are the same as for P17F1, P17F2, and P17F3 respectively as listed in ST832-1 and this supplement.

Description	P17UF1 Gray	P17UF2 Gray & White	P17UF3 Red & White
Antenna, Hide Away Power Tower	———	69C 234-1	69C 234-1
Antenna, Terminal Board (includes terminals)	10B 42-2	10B 42-2	10B 42-2
Back, Cabinet	15E 1914-1	15E 1914-1	15E 1914-1
*Cabinet (less back)	34E 139-1	34E 139-2	34E 139-3
Escutcheon, Metal (Gold)	20D 23-1	20D 23-1	20D 23-1
Knobs, Tuning			
"Vertical Hold" or "Contrast"	20C 24-2	20C 24-2	20C 24-2
"Off-On-Volume"	20C 24-1	20C 24-1	20C 24-1
"Fine Tuning" (VHF)	33D 306-2	33D 306-2	33D 306-2
"Fine Tuning" (UHF)	33D 307-3	33D 307-3	33D 307-3
Channel Selector (VHF)	33D 307-4	33D 307-4	33D 307-4
Channel Selector (UHF)	33D 307-2	33D 307-2	33D 307-2
Line Cord and Interlock Socket	89A 22-1	89A 22-1	89A 22-1
Trim Strip (Gold, lower)	23C 341-1	23C 341-1	23C 341-1
Trim Strip (Gold, upper)	23D 342-2	23D 342-2	23D 342-2
Window, Picture (glass)	20D 120-2	20D 120-2	20D 120-2

*Orders for certain cabinet parts will be filled only if damaged items cannot be repaired. When ordering, describe condition of cabinet or part in detail.

CABINET PARTS

Description	PL17F31B Tan & White	PL17F32B Aquamarine & White	PL17F33B Red & White	PL17F41B Tan Leatherette & White	PL17F42B White Leatherette	PL17F43B Black Leatherette
Antenna, "Power Tower"	69C 238-1	69C 238-1	69C 238-1	69C 238-1	69C 238-1	69C 238-1
Back, Cabinet						
White	33E 337-1	33E 337-1	33E 337-1	33E 337-1	33E 337-1	———
Black	———	———	———	———	———	33E 337-2
Baffle, Speaker	32C 457-1	32C 457-1	32C 457-1	32C 457-1	32C 457-1	32C 457-1
Bracket, Tube Retaining	15B 1912-1	15B 1912-1	15B 1912-1	15B 1912-1	15B 1912-1	15B 1912-1
Bumper, Rubber (picture tube mtg.)	12B 96-1	12B 96-1	12B 96-1	12B 96-1	12B 96-1	12B 96-1
Cabinet, Wrap-around (incl. bottom plate)						
Brown	750D 180-1	———	———	———	———	———
Green	———	750D 180-2	———	———	———	———
Red	———	———	750D 180-3	———	———	———
Tan	———	———	———	750D 180-4	———	———
White	———	———	———	———	750D 180-5	———
Black	———	———	———	———	———	750D 180-6
Cap, Cover, Brass (fits over handle mtg. plate)	37C 196-3	37C 196-3	37C 196-3	37C 196-3	37C 196-3	37C 196-3
Clip, Antenna Terminal	18B 245-2	18B 245-2	18B 245-2	18B 245-2	18B 245-2	18B 245-2
Escutcheon, Front						
White	23D 351-1	23D 351-1	23D 351-1	23D 351-1	23D 351-1	———
Black	———	———	———	———	———	23D 351-2
Escutcheon, Speaker						
Brown	20D 29-1	———	———	———	———	———
Green	———	20D 29-2	———	———	———	———
Red	———	———	20D 29-3	———	———	———
Tan	———	———	———	20D 29-4	———	———
White	———	———	———	———	20D 29-5	———
Black	———	———	———	———	———	20D 29-6
Handle, Carrying (with mtg. plates and rings)						
White	37C 196-1	37C 196-1	37C 196-1	37C 196-1	37C 196-1	———
Black	———	———	———	———	———	37C 196-2
Knob, Control						
Brightness	33D 340-6	33D 340-6	33D 340-6	33D 340-6	33D 340-6	33D 340-6
Channel Selector	33D 340-1	33D 340-1	33D 340-1	33D 340-1	33D 340-1	33D 340-3
Fine Tuning	33D 340-5	33D 340-5	33D 340-5	33D 340-5	33D 340-5	33D 340-5
Off-Volume	33D 340-2	33D 340-2	33D 340-2	33D 340-2	33D 340-2	33D 340-4
Vertical, Contrast, or Horizontal	33D 345-1	33D 345-1	33D 345-1	33D 345-1	33D 345-1	33D 345-1
Monogram, Escutcheon	23B 361-1	23B 361-1	23B 361-1	23B 361-1	23B 361-1	23B 361-1
Nut, 10-32x3/4" Picture Tube Retaining Wire Mtg.	2A 8-15-71	2A 8-15-71	2A 8-15-71	2A 8-15-71	2A 8-15-71	2A 8-15-71
Screws						
#6¾" HWHST (for mtg. front escutcheon to cabinet)	1A 157-12-71	1A 157-12-71	1A 157-12-71	1A 157-12-71	1A 157-12-71	1A 157-12-71
#6x3/8" BHSLST (ant. terminal)	1A 27-7-71	1A 27-7-71	1A 27-7-71	1A 27-7-71	1A 27-7-71	1A 27-7-71
6-32x½" BH PHMS (for mtg. cabt. carrying handle)	1C 191-533-71	1C 191-533-71	1C 191-533-71	1C 191-533-71	1C 191-533-71	1C 191-533-71
#8x3/8"HWHST (for mtg. top of chassis to cabinet; for mtg. bottom of back to cabt.; for mtg. front escutcheon to cabt.)	1B 221-14-71	1B 221-14-71	1B 221-14-71	1B 221-14-71	1B 221-14-71	1B 221-14-71
#8x5/8" HWHST (for mtg. chassis bottom to cabt.)	1A 97-21-71	1A 97-21-71	1A 97-21-71	1A 97-21-71	1A 97-21-71	1A 97-21-71
8-32x3/4" BH PH ST (for mtg. top of cabt. back to cabt.)	1A 56-26-72	1A 56-26-72	1A 56-26-72	1A 56-26-72	1A 56-26-72	1A 56-26-72
10-32x2½" PH MS (for fastening picture tube retaining wires)	1A 99-17-71	1A 99-17-71	1A 99-17-71	1A 99-17-71	1A 99-17-71	1A 99-17-71
Shield, Anode (mylar)	32B 463-1	32B 463-1	32B 463-1	32B 463-1	32B 463-1	32B 463-1
Shield, Plastic, Gray (cup-shaped)	33B 351-1	33B 351-1	33B 351-1	33B 351-1	33B 351-1	33B 351-1
Speaker, 3"x5" PM, 3.2 ohms voice coil impedance	78C 158-1	78C 158-1	78C 158-1	78C 158-1	78C 158-1	78C 158-1
Window, Glass, Tinted	21D 130-2	21D 130-2	21D 130-2	21D 130-2	21D 130-2	21D 130-2
Wire, Tube Retaining	19C 150-1	19C 150-1	19C 150-1	19C 150-1	19C 150-1	19C 150-1

*Orders for certain cabinet parts will be filled only if damaged items cannot be repaired. When ordering, describe condition of cabinet or part in detail.

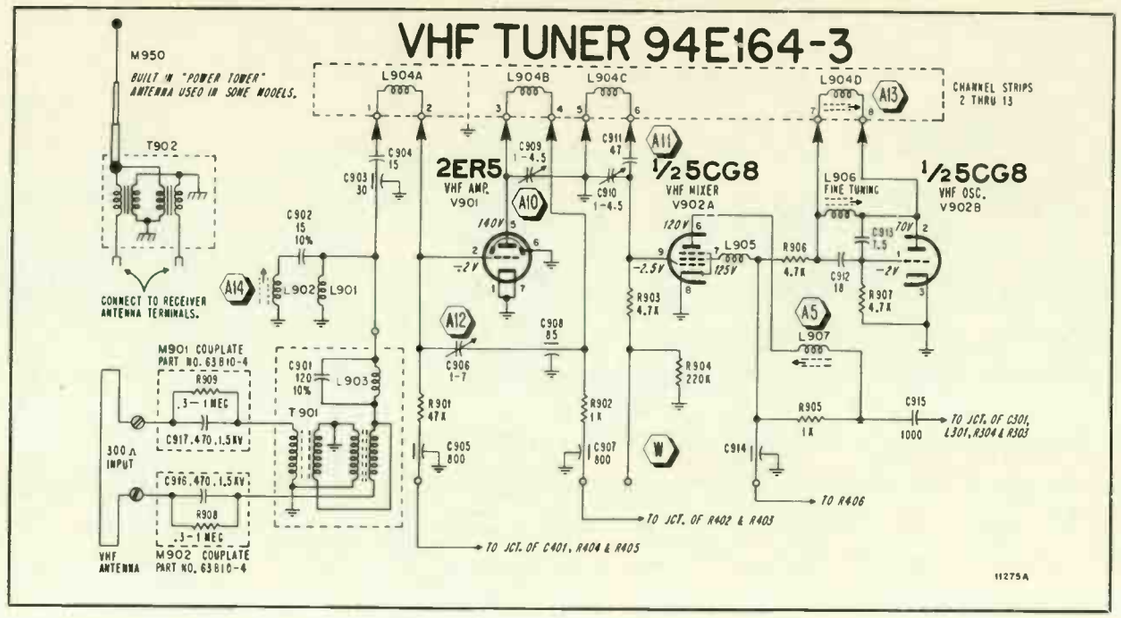


Figure 62A. VHF Tuner 94D164-3 used with Television Chassis 15A2C. Except for Tuner, Chassis 15A2C is the same as Chassis 15A2.

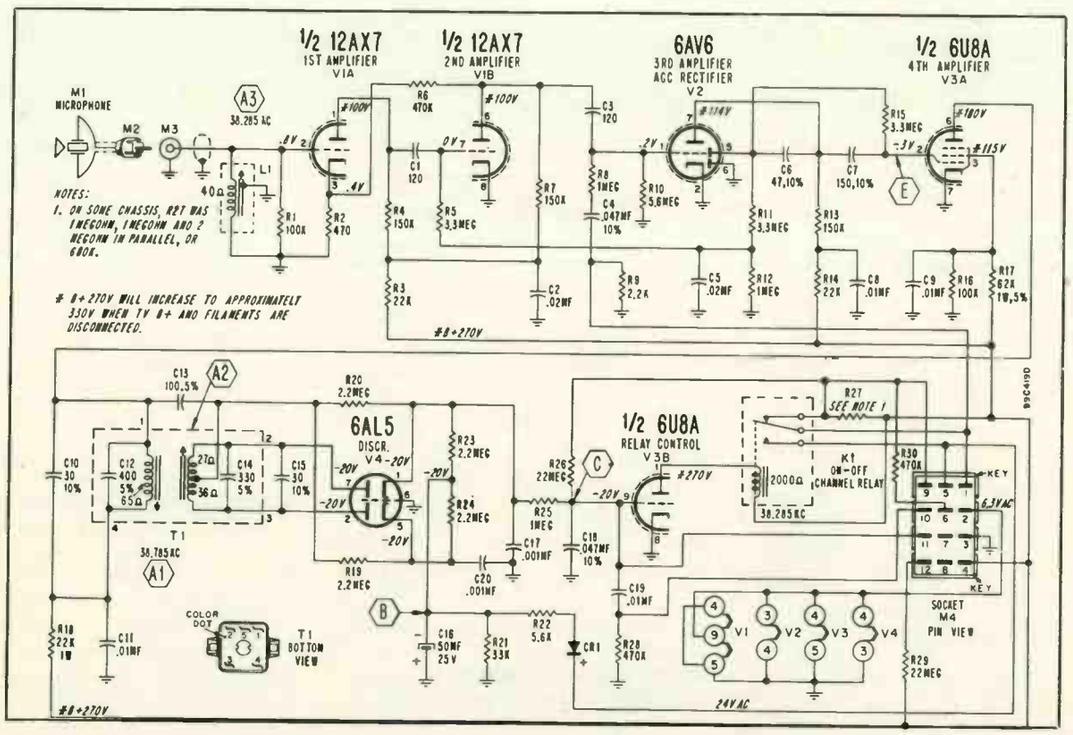


Figure 62B. Schematic for 4H3 Remote Control Amplifier Chassis.
NOTE: Chassis 4H3 used with television chassis 15B2.

ALIGNMENT CAUTION

Circuitry of the remote control amplifier has been designed for stable, trouble free operation. The tuned circuits have been carefully aligned at the factory and are generally unaffected by tube or component replacement. In general, faulty operation is seldom caused by misalignment. However, note that lead dress and location of components in most tuned circuits are critical and alignment may be affected to some degree. When servicing, avoid contact with coils or lead dress. Do not disturb adjustment cores of coils or transformers.

If alignment should be required, correct alignment can only be made using the equipment and procedure outlined in this manual.

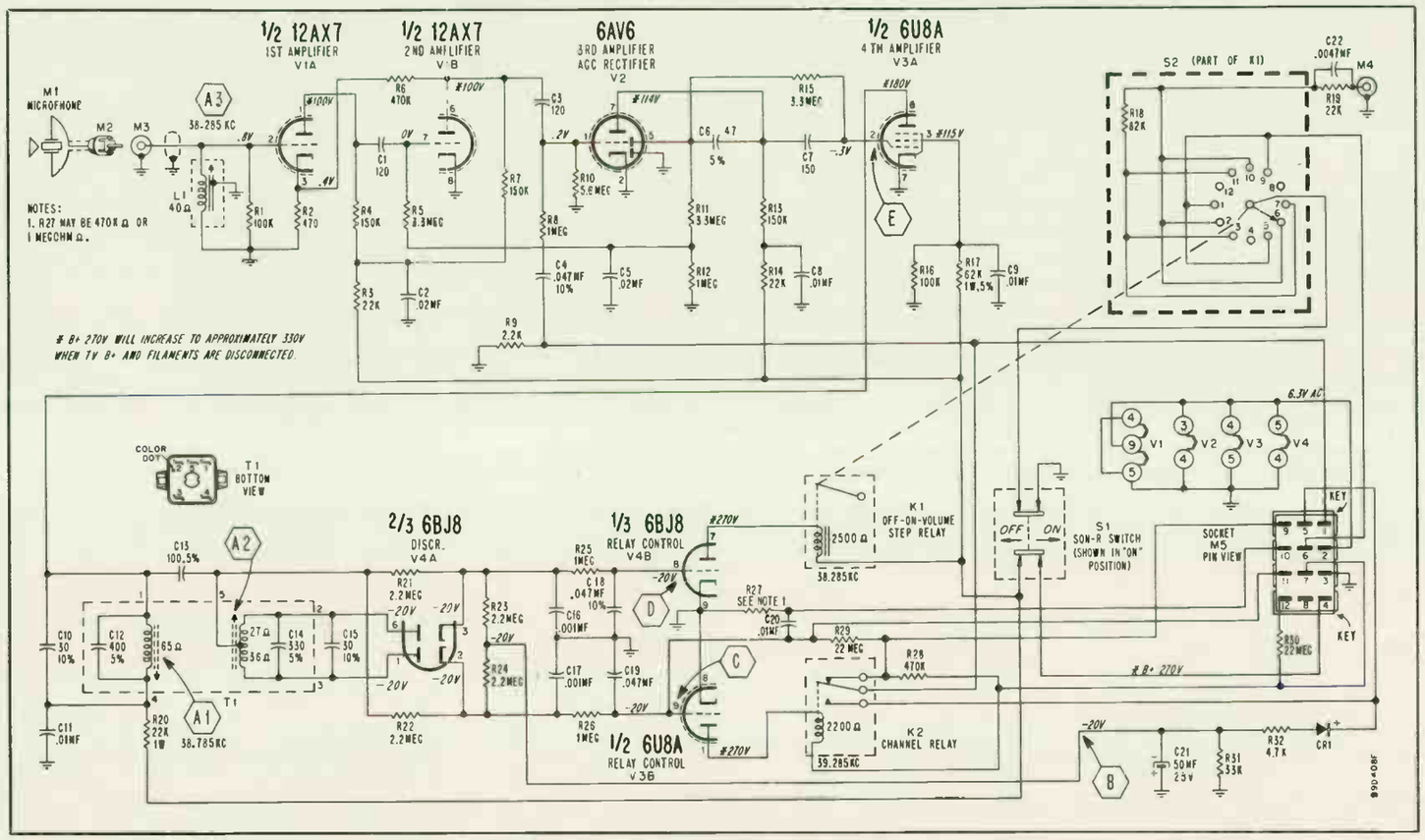
SCHEMATIC NOTES

Fixed resistor values shown in ohms ± 10% tolerance, ½ watt; capacitor values shown in micromicrofarads ± 20%, unless specified.
NOTE: K = x 1,000, MEG = x 1,000,000, MF = microfarad.

CONDITIONS FOR MEASURING VOLTAGES

- Microphone connected.
- Line Voltage: 117 volts, AC.
- DC voltages measured with a VTVM between tube socket terminals and chassis, unless otherwise indicated.
- All voltages measured with tubes in sockets. Remote amplifier chassis may be removed from TV chassis for voltage measurements.

Figure 63. Schematic for 4G3 Remote Control Amplifier Chassis.
NOTE: Chassis 4G3 used with television chassis 15B3.



ALIGNMENT CAUTION

Circuitry of the remote control amplifier has been designed for stable, trouble free operation. The tuned circuits have been carefully aligned at the factory and are generally unaffected by tube or component replacement. In general, faulty operation is seldom caused by misalignment. However, note that lead dress and location of components in most tuned circuits are critical and alignment may be affected to some degree. When servicing, avoid contact with coils or lead dress. Do not disturb adjustment cores of coils or transformers.

If alignment should be required, correct alignment can only be made using the equipment and procedure outlined in this manual.

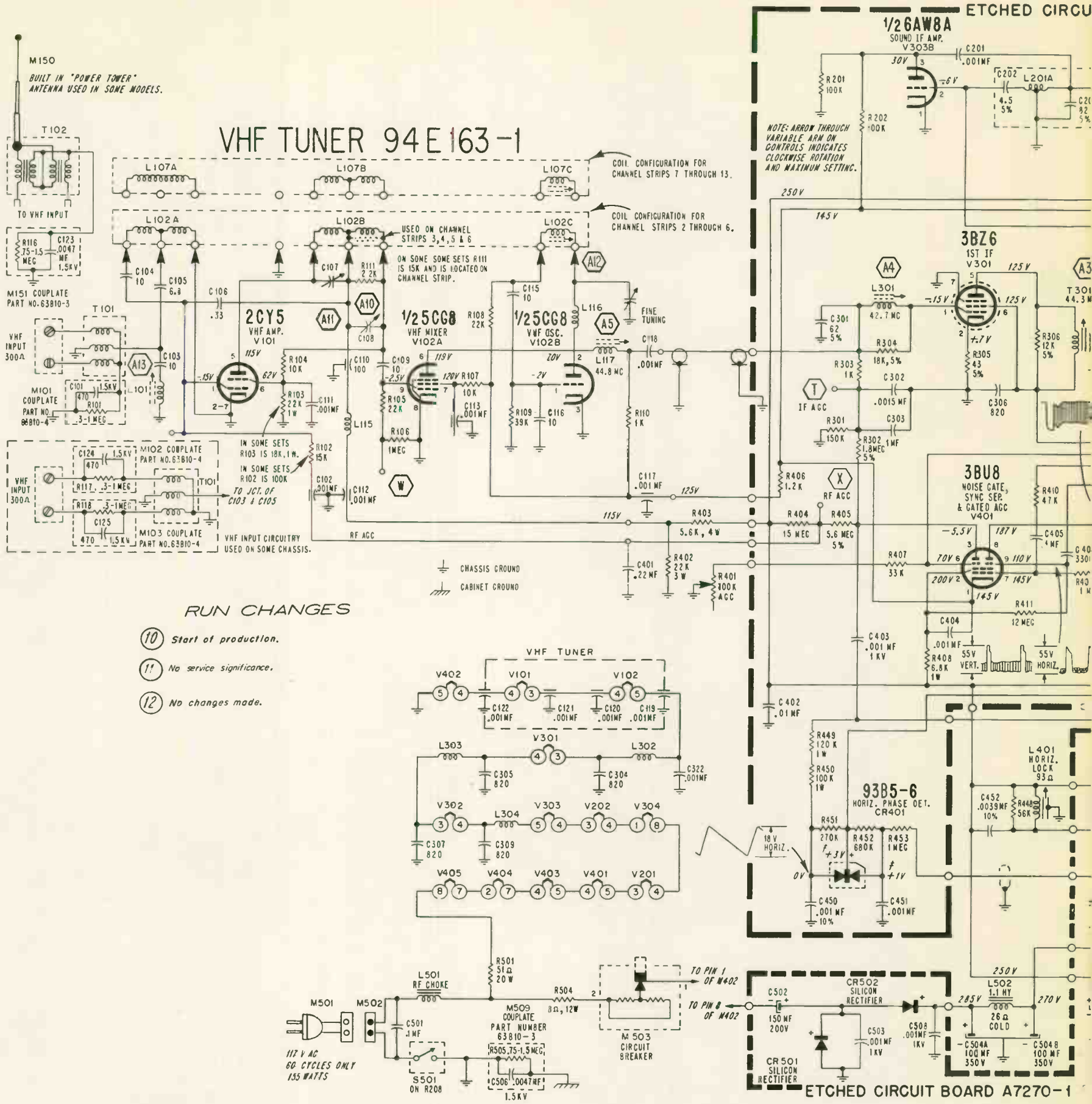
SCHEMATIC NOTES

Fixed resistor values shown in ohms ± 10% tolerance, ½ watt; capacitor values shown in micromicrofarads ± 20%, unless specified.
NOTE: K = x 1,000, MEG = x 1,000,000, MF = microfarad.

CONDITIONS FOR MEASURING VOLTAGES

- Son-r OFF-ON switch to "ON" position.
- Microphone connected.
- Line Voltage: 117 volts, AC.
- DC voltages measured with a VTVM between tube socket terminals and chassis, unless otherwise indicated.
- All voltages measured with tubes in sockets. Use of adapter sockets when measuring voltages will eliminate need for removing amplifier from TV chassis.

Figure 64. Sc



RUN CHANGES

(10) Start of production.

(11) No service significance.

(12) No changes made.

SCHEMATIC NOTES

②, ③, . . . etc. indicate production changes covered by a Run number. Run numbers are stamped at the rear of the chassis. Brief description of Run changes given on schematic.

Ⓐ1, Ⓐ2, . . Ⓨ, Ⓩ, etc. indicate alignment points and connections.

Important: Before making waveform and voltage measurements, see instructions below.

Fixed resistor values shown in ohms ±10% tolerance, ½ watt, capacitor values shown in micromicrofarads ± 20% tolerance unless otherwise specified.

NOTE: K=x 1000, MEG=x 1,000,000, MF=microfarad.

CONDITIONS FOR OBSERVING WAVEFORMS

Warning: Pulsed high voltages are present at the caps of V404 and V406, and at pin 3 of V405. **Do not** attempt to observe waveforms at these points unless suitable test equipment is used.

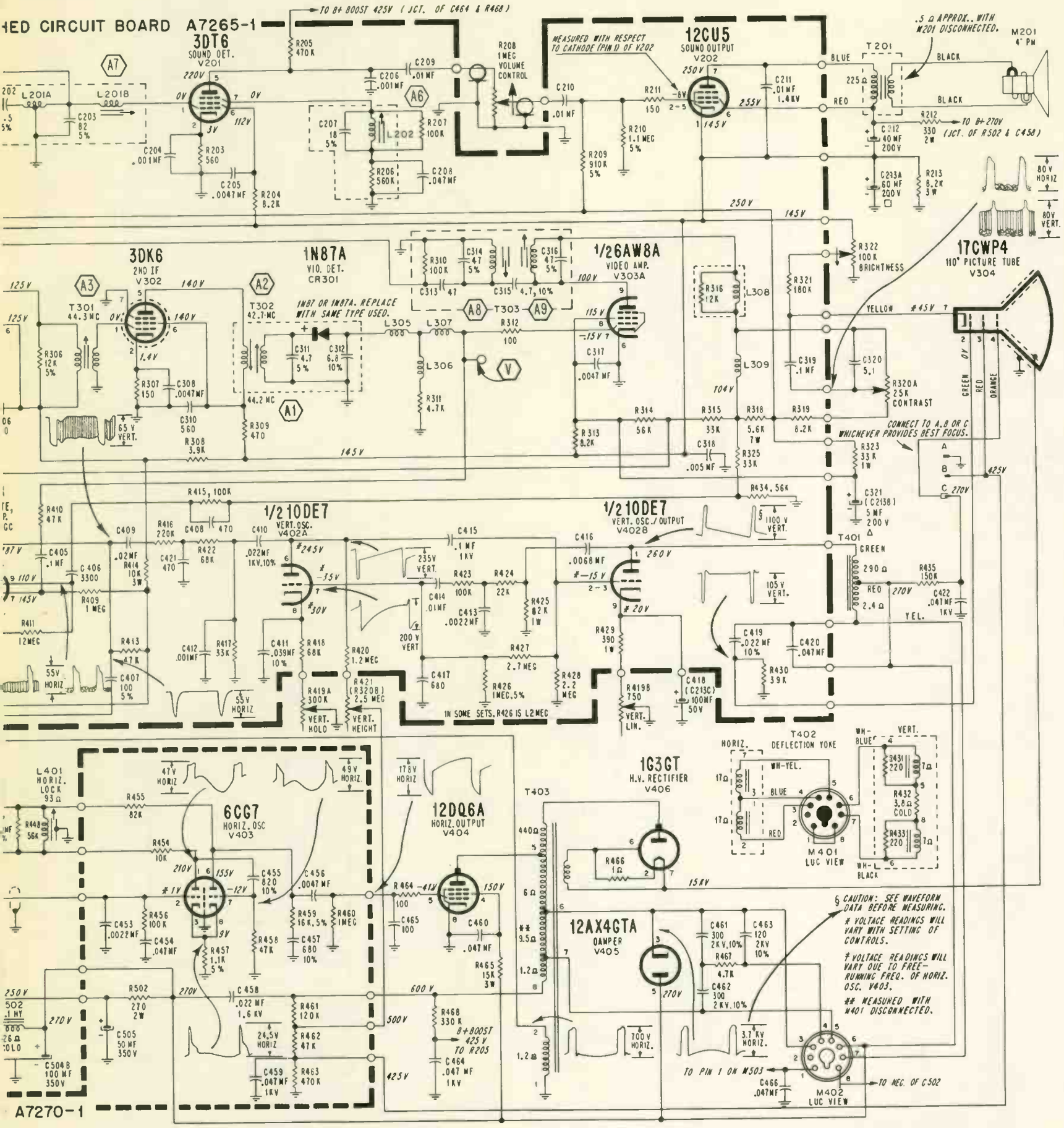
- Set tuning controls for normal picture. Do not disturb **AGC** and **Horiz. Lock** adjustments. After receiver is set for normal picture, turn the **Contrast** control fully clockwise. On chassis 15B3, set Son-r **Off-On** switch to "OFF" position.
- Oscilloscope sweep is set at 30 cycles for vertical waveforms and at 7,875 cycles for horizontal waveforms to permit 2 complete cycles to be observed.
- Peak-to-peak voltages will vary from those shown on the schematic, depending on the input signal strength, test equipment employed and chassis parts tolerance.
- Waveforms were taken with a comparatively strong transmitted signal input to the television chassis.

CONDITIONS FOR MEASURIN

Warning: Pulsed high voltages are pre and V406, and at pin 3 of V405. **Do not** att at these points without suitable test equipme voltage probe should be used when measurir voltage.

- Set the **Channel Selector** on an unuse trol fully clockwise. All other controls full disturb **AGC** and **Horiz. Lock** adjustm
- Antenna disconnected and terminals sho
- Line voltage: 117 volts AC.
- DC voltages measured with a VTVM betw and chassis, unless otherwise indicated.
- All voltages measured with tubes in sockets is recommended.

tamped Run 12.



MEASURING VOLTAGES

tages are present at the caps of V404 . **Do not** attempt to measure voltages test equipment. A VTVM with a high hen measuring picture tube 2nd anode

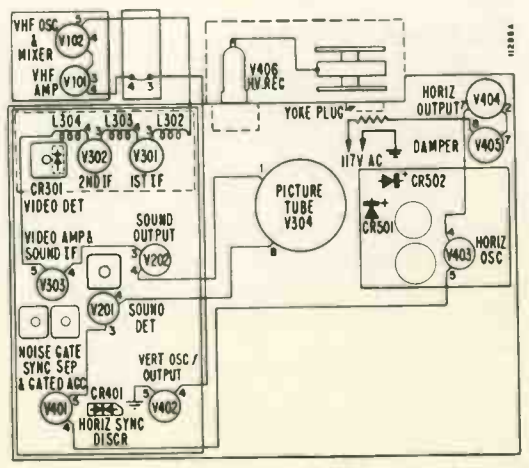
on an unused channel. **Contrast** con- r controls fully counterclockwise. Do not Lock adjustments.
terminals shorted together.

a VTVM between tube socket terminals ise indicated.
ith tubes in sockets. Use of adapter

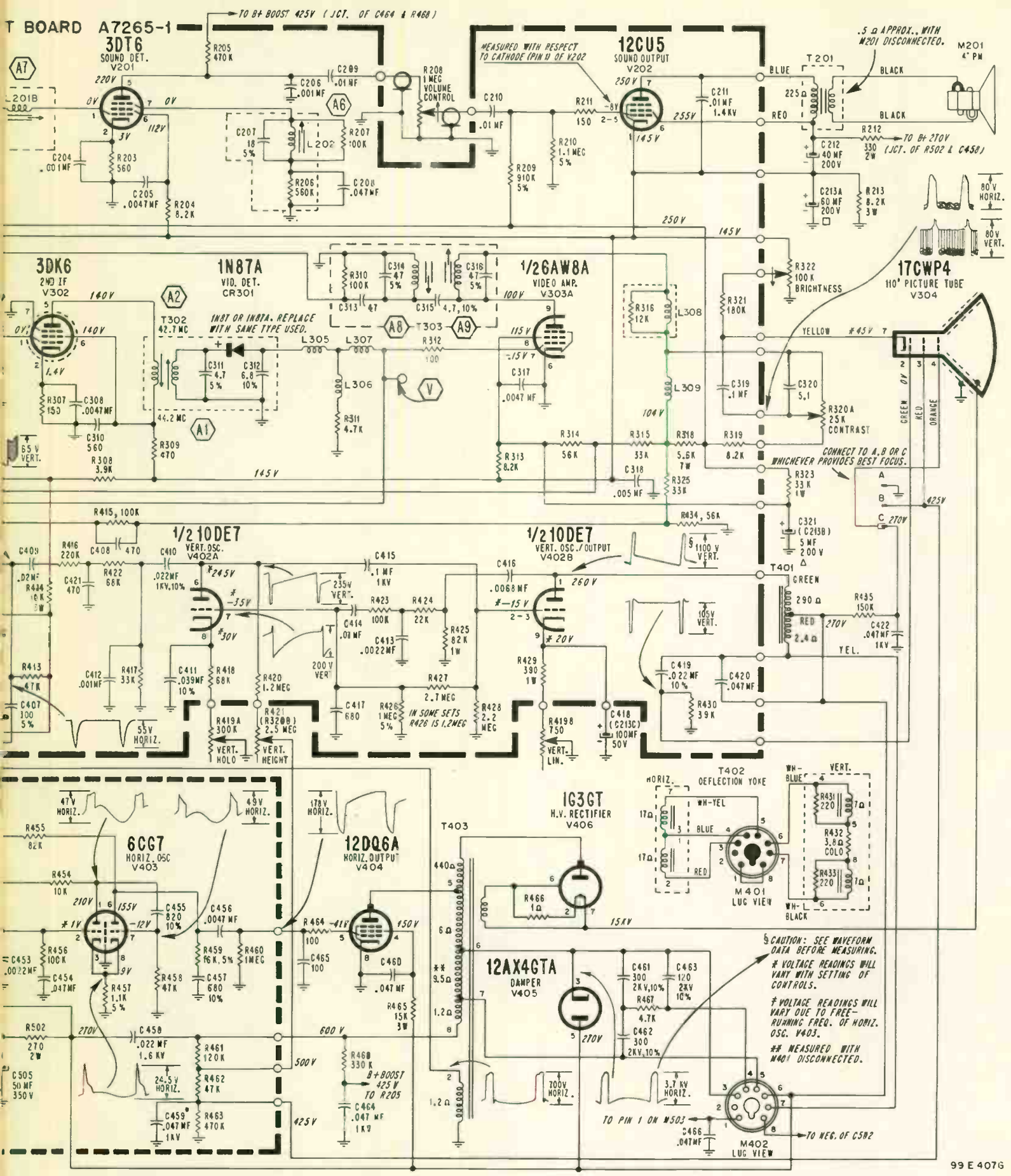
TUBE COMPLEMENT

V101—2CY5	V304—17CWP4	V801—2AF4A
V102—5CG8	V401—3BU8	CR301—1N87 or 1N87A
V201—3DT6	V402—10DE7	CR401—93B5-6
V202—12CU5	V403—6CG7	CR501—93B12
V301—3BZ6	V404—12DQ6A	CR502—93B12
V302—3DK6	V405—12AX4GTA	CR801—1N82A
V303—6AW8A	V406—1G3GT	

TUBE LOCATIONS TV CHASSIS 15UA2



nematic for 15A2 Television Chassis Stamped Run 12.



G VOLTAGES

ent at the caps of V404
empt to measure voltages
it. A VTVM with a high
g picture tube 2nd anode

channel. **Contrast** con-
counterclockwise. Do not
nts.
ted together.

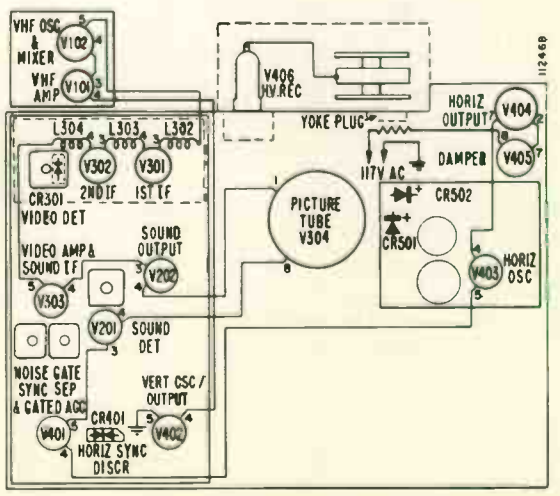
een tube socket terminals

ockets. Use of adapter

TUBE COMPLEMENT

V101—2CY5	V304—17CWP4	CR301—1N87 or 1N87A
V102—5CG8	V401—3BU8	CR401—93B5-6
V201—3DT6	V402—10DE7	CR501—93B12
V202—12CU5	V403—6CG7	CR502—93B12
V301—3BZ6	V404—12DQ6A	
V302—3DK6	V405—12AX4GTA	
V303—6AW8A	V406—1G3GT	

TUBE LOCATIONS
TV CHASSIS 15A2



CHASSIS 15A2, A2C, B2, B3, D1B, UA2
CHASSIS 4G3, 4H3 REMOTE CONTROL AMPLIFIER
SON-R TUNERS S11A AND S21A

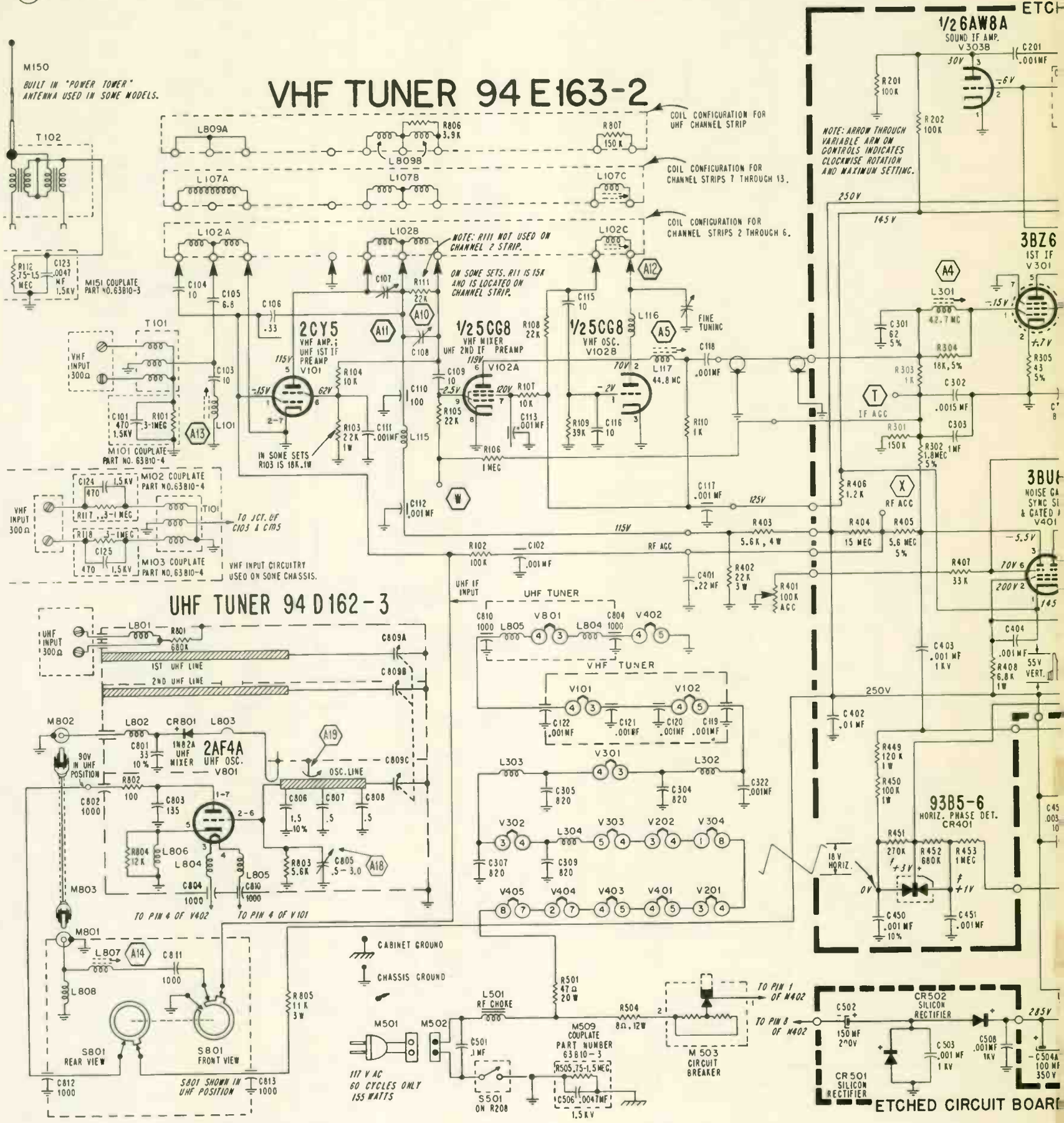
RUN CHANGES

(10) Start of production.

(11) No service significance.

(12) No changes made.

Figure 65. Schematic for 15UA2 Television Chassis S



SCHEMATIC NOTES

(2), (3), . . . etc. indicate production changes covered by a Run number. Run numbers are stamped at the rear of the chassis. Brief description of Run changes given on schematic.

(A1), (A2), . . (Y), (Z), etc. indicate alignment points and connections.

Important: Before making waveform and voltage measurements, see instructions below.

Fixed resistor values shown in ohms ±10% tolerance, ½ watt, capacitor values shown in micromicrofarads ± 20% tolerance unless otherwise specified.

NOTE: K=x 1000, MEG=x 1,000,000, MF=microfarad.

CONDITIONS FOR OBSERVING WAVEFORMS

Warning: Pulsed high voltages are present at the caps of V404 and V406, and at pin 3 of V405. **Do not** attempt to observe waveforms at these points unless suitable test equipment is used.

- Set tuning controls for normal picture. Do not disturb **AGC** and **Horiz. Lock** adjustments. After receiver is set for normal picture, turn the **Contrast** control fully clockwise.
- Oscilloscope sweep is set at 30 cycles for vertical waveforms and at 7,875 cycles for horizontal waveforms to permit 2 complete cycles to be observed.
- Peak-to-peak voltages will vary from those shown on the schematic, depending on the input signal strength, test equipment employed and chassis parts tolerance.
- Waveforms were taken with a comparatively strong transmitted signal input to the television chassis.

CONDITIONS FOR

Warning: Pulsed high v and V406, and at pin 3 of V4 at these points without suitab voltage probe should be used voltage.

- Set the **Channel Selecto** trol fully clockwise. All oth disturb **AGC** and **Horiz.**
- Antenna disconnected and
- Line voltage: 117 volts A
- DC voltages measured with and chassis, unless otherv
- All voltages measured w sockets is recommended.