COLLINS

instruction book

Cedar Rapids Division | Collins Radio Company, Cedar Rapids, Iowa

KWM-2 and KWM-2A Transceivers

Collins Amateur Equipment Guarantee

The Collins Amateur Equipment described herein is sold under the following guarantee:

Collins agrees to repair or replace, without charge, any equipment, parts, or accessories which are defective as to workmanship or materials and which are returned to Collins at its factory or its designated Service Agency, transportation prepaired, provided:

(a) Buyer presents properly executed Warranty Verification Certificate.

(b) Notice of the claimed defect is given Collins or an authorized Service Agency, or an authorized Distributor, in writing, within 180 days from the date of purchase and goods are returned in accordance with Collins instructions.

(c) Equipment, accessories, tubes, and batteries not manufactured by Collins or from Collins designs are subject to only such adjustments as Collins may obtain from the supplier thereof.

(d) Any failure due to use of equipment for purposes other than those contemplated in normal amateur operations or in violation of Collins applicable Instruction Book shall not be deemed a defect within the meaning of these provisions.

This Warranty is void with respect to equipment which is altered, modified or repaired by other than Collins or Collins Authorized Service Agencies. However, alteration or modification in accordance with Collins Service Bulletins shall not affect this Warranty.

Collins reserves the right to make any change in design or to make additions to, or improvements in, Collins products without imposing any obligations upon Collins to install them in previously manufactured Collins products.

No other warranties, expressed or implied, shall be applicable to said equipment, and the foregoing shall constitute the Buyer's sole right and remedy under the agreements contained in these paragraphs. In no event shall Collins have any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

NOTICE: With each equipment or set of equipments purchased, the distributor should furnish a Warranty Verification Certificate. It is necessary that this certificate accompany the equipment when it is returned for warranty repairs. Be sure that you get it from your distributor.

Warranty Repairs

On the opposite page are listed the Service Agencies authorized to perform warranty repair on Collins Amateur Equipments.

If you should wish to return material or equipment direct to Collins under the guarantee, you should notify Collins, giving full particulars including the details listed below, insofar as applicable. If the item is thought to be defective, such notice must give full information as to nature of defect and identification (including part number if possible) of part considered defective. Upon receipt of such notice, Collins will promptly advise you respecting the return. Failure to secure our advice prior to the forwarding of the goods or failure to provide full particulars may cause unnecessary delay in handling of your returned merchandise.

ADDRESS:

Collins Radio Company
Amateur Product Office
Cedar Rapids, Iowa

INFORMATION NEEDED:

(A) Type number, name and serial number of equipment
(B) Date of delivery of equipment
(C) Date placed in service
(D) Number of hours of service
(E) Nature of trouble
(F) Cause of trouble if known
(G) Name of distributor from whom the equipment was purchased.

Equipment returned to the Service Agency or Collins for warranty repair must be accompanied with the Warranty Verification Certificate.

Out-of-warranty Repair, Modifications, Addition of Accessories, Alignment, etc.:

For information on service of this type write to the address shown below. If you wish to return your equipment for repairs, etc., without prior correspondence, be sure to include the following information attached to the equipment inside the packing carton:

(1) Complete instructions detailing work to be performed.
(2) Your return address.
(3) Method of shipment by which the equipment should be returned.
(4) Special instructions.

DIRECT YOUR CORRESPONDENCE TO:

Collins Radio Company
Service Repair Department
Third Street Building
Cedar Rapids, Iowa

HOW TO ORDER REPLACEMENT PARTS:

When ordering replacement parts, you should direct your order to one of the listed Collins distributors.

Please furnish the following information insofar as applicable:

INFORMATION NEEDED:

(A) Quantity required
(B) Collins part number (9 or 10 digit number) and description
(C) Item or symbol number obtained from parts list or schematic
(D) Collins type number, name and serial number of principal equipment
(E) Unit subassembly number (where applicable)

NOTE: See Distributor List.

1 August 1962

COLLINS AUTHORIZED AMATEUR DISTRIBUTORS AND SERVICE AGENCIES

ALABAMA

Ack Radio Supply Company
3101 4th Avenue South
Birmingham 5
Phone: FAirfax 2-0588
Rep: E. C. Atkerson
SEE ALSO: Atlanta, Georgia

*Beddow Engineering Services
2424 Tenth Avenue South
Birmingham
Phone: ALpine 1-7582
Rep: Dr. C. P. Beddow

ALASKA

Yukon Radio Supply, Inc.
(P.O. Box 406)
645 I Street
Anchorage
Rep: A. E. Peterson

ARIZONA

Elliott Electronics, Inc.
418 N. 4th Avenue
Tucson
Phone: MAin 4-2473
Rep: Jerry Flewelling

**Southwest Electronic Devices
(P.O. Box 3647)
140 S. 2nd Street
Phoenix
Phone: ALpine 2-1743
Rep: Herman A. Middleton

ARKANSAS

Lavender Radio & TV Supply Co., Inc.
(P.O. Box 1168)
522 E. 4th Street
Texarkana
Phone: 2-4195
Rep: Joe M. Lavender

Moory's Wholesale Radio & Appliance Co.
12th & Jefferson
DeWitt
Phone: WHitney 6-2820
Rep: Ed Moory

CALIFORNIA

Amrad Supply, Inc.
999 Howard Ave.
Burlingame
Phone: DIamond 2-5757
Rep: Dan Rodriquez

*Communication Receiver Service
5016 Maplewood
Los Angeles 4
Phone: HOllywood 2-2429
Rep: Charles C. Messman

Elmar Electronics
140 11th Street at Madison
Oakland 7
Phone: TE 4-3311 (TWX-OA73)
Rep: Elvin Feige/M. L. Chirone

**Henry Radio, Inc.
(P.O. Box 64398)
11240 W. Olympic Blvd.
Los Angeles 64
Phone: GRanite 7-6701
Rep: Ted Henry

Quement Industrial Electronics
(P.O. Box 527)
161 San Fernando
San Jose
Phone: CYpress 4-0464
Rep: Frank Quement

Radio Products Sales, Inc.
1501 S. Hill Street
Los Angeles 15
Phone: RIchmond 8-1271
Rep: Ken Rausin

Valley Electronic Supply Co.
1302 W. Magnolia Blvd.
Burbank
Phone: VIctoria 9-3944
Rep: Frank Eckert/Bud Rand

Western Radio & TV Supply Co.
(P.O. Box 1728)
1415 India Street
San Diego 1
Phone: BElmont 9-0361
Rep: A. W. Prather/Art Stewart

COLORADO

Radio Products Sales Co.
1237 - 16th St.
Denver 2
Phone: CHerry 4-6591
Rep: Walter Nettles/Willard Wright

CONNECTICUT

Corky's of Hartford, Inc.
203 Ann Street
Hartford
Phone: JAckson 7-1881
Rep: Edward C. Gedney

Radio Shack Corp. of Connecticut
230 Crown Street
New Haven 10
Phone: SPruce 7-6871
Rep: E. G. Alberino
SEE ALSO: Boston, Massachusetts

*Huntress Electronics
93 Talcott Road
West Hartford 10
Phone: ADams 6-0990
Rep: Bob Resconsin

DELAWARE

Willard S. Wilson, Inc.
403-405 Delaware Avenue
Wilmington 1
Phone: OLympia 5-4321
Rep: Willard S. Wilson

DISTRICT OF COLUMBIA

Electronic Wholesalers, Inc.
2345 Sherman Ave. N.W.
Washington 1
Phone: HUdson 3-5200
Rep: Ray Avey

FLORIDA

**Amateur Radio Center, Inc.
2805-7 N.E. 2nd Avenue
Miami
Phone: FRanklin 4-4101
Rep: Wiley Gilkison

**Broad Radio
7231 Central Avenue
St. Petersburg 10
Phone: 72314
Rep: Morton S. Broad

**Electronic Wholesalers, Inc.
61 N.E. 9th Street
Miami 32
Phone: FRanklin 7-2511
Rep: Frank Gantz

Electronic Wholesalers, Inc.
1301 Hibiscus Boulevard
Melbourne
Phone: PArkway 3-1441
Rep: Frank Gantz

Grice Electronics, Inc.
(P.O. Box 1911)
300 E. Wright St.
Pensacola
Phone: HEmlock 3-4616
Rep: F. G. Grice, Jr.

**Kinkade Radio Supply, Inc.
1719 Grand Central Avenue
Tampa
Phone: 8-6043
Rep: E. T. Kinkade

GEORGIA

Ack Radio Supply Co.
331 Luckie St. N.W.
Atlanta 13
Phone: JA 4-8477
Rep: T. E. Atkerson

Specialty Distributing Co., Inc.
763 Juniper St. N.E.
Atlanta 8
Phone: TRinity 3-2521
Rep: J. E. Eaton

HAWAII

**Honolulu Electronics
819 Keeaumoku Street
Honolulu 14
Phone: 995-466
Rep: Thomas Teruya

ILLINOIS

Allied Radio Corp.
100 N. Western Avenue
Chicago 80
Phone: HAymarket 1-6800
Rep: Jack Schneider/Hal Eisenberg

Klaus Radio & Electric Company
403 E. Lake St.
Peoria
Phone: RH 8-3401
Rep: Clifford Morris

Newark Electronics Corporation
223 W. Madison Street
Chicago 6
Phone: STate 2-2944
Rep: Les Wilkins/A. L. Poncher

INDIANA

Brown Electronics, Inc.
1032 Broadway
Fort Wayne
Phone: ANthony 3382
Rep: A. A. Brown

Graham Electronics Supply, Inc.
122 S. Senate St.
Indianapolis 4
Phone: MElrose 4-8487
Rep: Dick Seigel/H. H. Thompson/ G. M. Graham

Radio Distributing Co., Inc.
(P.O. Box 1499)
1212 High St.
South Bend 15
Phone: ATlantic 8-4665
Rep: William A. Davidson

IOWA

Bob and Jack's, Inc.
4507 Forest Avenue
Des Moines 11
Phone: BLackburn 5-0873
Rep: Robert M. Evans/Jack Landis

Radio Trade Supply Co.
1224 Grand Avenue
Des Moines 9
Phone: ATlantic 8-7237
Rep: Leo Vince Davis

World Radio Laboratories, Inc.
3415-27 W. Broadway
Council Bluffs
Phone: 32-81851
Rep: Alan McMillan/Leo Meyerson/ C. H. Williams

KANSAS

The Overton Electric Co., Inc.
522 Jackson Street
Topeka
Phone: CEntral 3-1367
Rep: S. D. Thacher

KENTUCKY

Radio-Electronic Equipment Co.
(P.O. Box 1212)
480 Skain Avenue
Lexington
Phone: 3-1577
Rep: A. A. Abraham

LOUISIANA

**Radio Parts, Inc.
807 Howard Avenue
New Orleans 12
Phone: JAckson 2-0217
Rep: Irvine J. Levi

MASSACHUSETTS

DeMambro Radio Supply, Inc.
1095 Commonwealth Avenue
Boston 15
Phone: ALgonquin 4-9000
Rep: Frank DeMambro

Graham Radio, Inc.
505 Main Street
Reading
Rep: Robert T. Graham, Sr.

Radio Shack Corp.
730 Commonwealth Avenue
Boston 17
Phone: REgency 4-1000
Rep: A. E. Coe

*Two-Way Radio Engineers, Inc.
109-115 Ward Street
Boston
Rep: Sherman M. Wolf

MICHIGAN

*Communication Service Company
201 South Lincoln
Charlotte
Phone: 1770-W
Rep: Bart Rypstra

M. N. Duffy & Co.
2040 Grand River Avenue W.
Detroit 26
Phone: WOodward 3-2270
Rep: M. N. Duffy/Bill Mains

Purchase Radio Supply
327 E. Hoover Avenue
Ann Arbor
Phone: NOrmandy 8-8696
8-8262
Rep: Roy J. Purchase

Warren Radio Company
1710 South Westnedge
Kalamazoo
Phone: FIreside 2-5720
2-7127
Rep: Frank Smith

MINNESOTA

Lew Bonn Company
1211 LaSalle Avenue
Minneapolis 3
Phone: FEderal 9-6351
Rep: Bob Woodrow/Don Gies/Joe Hotch

**Electronic Center, Inc.
107 3rd Avenue N.
Minneapolis 1
Phone: FEderal 8-8678
Rep: Ward Jensen

MISSISSIPPI

Swan Distributing Company, Inc.
(P.O. Box 2698)
342 N. Gallatin St.
Jackson
Phone: FLeetwood 2-5516
Rep: Leo A. Swan, Jr.

MISSOURI

Walter Ashe Radio Company
1125 Pine Street
St. Louis 1
Phone: CHestnut 1-1125
Rep: Joe Novak/Bill Dubord

Burstein-Applebee Co.
1012-1014 McGee Street
Kansas City 6
Phone: BAltimore 1-1155
Rep: R. H. Friesz/Bill Tagan

Henry Radio Company
211 North Main
Butler
Phone: ORchard 9-3127
Rep: Bob Henry/Helen DeArmond

MONTANA

Electric City Radio Supply
2815 - 10th Avenue South
Great Falls
Phone: GL 2-6236
Rep: Frank Anderson

NEW HAMPSHIRE

**Evans Radio
(P.O. Box 312)
Bow Junction, Route 3A
Concord
Phone: CApital 5-3358
Rep: Roger Britton

NEW JERSEY

Federated Purchaser, Inc.
1021 U. S. Rt. 22
Mountainside
Phone: ADams 2-8200
Rep: Hal Thorn

Hudson Radio & Television Corp. of New Jersey
35 Williams Street
Newark 2
Phone: MArket 4-5154
Rep: Joseph Prestia

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*SERVICE AGENCY ONLY
**ALSO AUTHORIZED SERVICE AGENCY

*Warner Engineering Co., Inc.
239 Lorraine Ave.
Upper Montclair
Phone: PIoneer 6-7900
Rep: Charles K. Atwater

NEW MEXICO

*Simms Communications, Inc.
1220 Morelia
Santa Fe
Phone: YUcca 2-9502
Rep: Preston W. Simms

NEW YORK

Adirondack Radio Supply
(P.O. Box 88)
185-191 W. Main St.
Amsterdam
Phone: VIctor 2-8350
Rep: Ward Hinkle

Ft. Orange Radio Distributing Co., Inc.
904-16 Broadway
Albany 7
Phone: HEmlock 6-8411
Rep: Harry Miller

Genessee Radio & Parts Co., Inc.
2550 Delaware Avenue
Buffalo 16
Phone: DE 9661
Rep: Martin Feigenbaum

Harrison Radio Corporation
225 Greenwich Street
New York 7
Phone: BArclay 7-7777
Rep: W. E. Harrison/Ben Snyder

Harvey Radio, Inc.
103 W. 43rd Street
New York 18
Phone: JUdson 2-1500
Rep: Harvey Sampson/George Zarrin

NORTH CAROLINA

Dalton-Hege Radio Supply Co., Inc.
938 Burke Street
Winston-Salem
Phone: PArk 5-8711
Rep: Wayne Yelverton

**Freck Radio & Supply Co.
38 Biltmore Avenue
Asheville
Phone: ALpine 3-3631
Rep: T. T. Freck

OHIO

Custom Electronics, Inc.
1918 South Brown Street
Dayton 9
Phone: BAldwin 3-3157
Rep: Richard Sauer/Jim Shupe

Pioneer Electronic Supply Co.
2103 E. 21st Street
Cleveland 15
Phone: SUperior 1-5277
Rep: J. Fred Ohman/Herb Farr

Selectronic Supplies, Inc
3185 Bellevue Road
Toledo 6
Phone: GReenwood 4-5477
Rep: Glen Eversole

Steinberg's Inc.
633 Walnut Street
Cincinnati 2
Phone: CHerry 1-1880
Rep: Jule Burnett

**Universal Service
114 N. Third Street
Columbus 15
Phone: CApital 1-2335
Rep: Francis R. Gibb

OKLAHOMA

General Electronics, Inc.
1032 Classen Blvd.
Oklahoma City
Phone: FO 5-1448
Rep: Fred F. Zelinger

Radio, Inc.
1000 South Main Street
Tulsa 19
Phone: GIbson 7-9124
Rep: E. R. Durham

OREGON

Portland Radio Supply Co.
1234 S.W. Stark Street
Portland 5
Phone: CApitol 8-8647
Rep: C. B. Lucas

PENNSYLVANIA

Cameradio Company
1121 Penn Avenue
Pittsburg 22
Phone: EXpress 1-4000
Rep: Harry Kaplin

Radio Electric Service Company
of Pa., Inc.
N.W. cor. 7th & Arch Sts.
Philadelphia 6
Phone: WAlnut 5-5840
Rep: Edward Miller

RHODE ISLAND

W. H. Edwards Company, Inc.
116 Hartford Avenue
Providence 9
Phone: GAspee 1-6158
Rep: Sal Infantolino

SOUTH DAKOTA

Burghardt Radio Supply
(P.O. Box 746)
621 4th Street S.E.
Watertown
Phone: TUrner 6-5749
Rep: Stan Burghardt

TENNESSEE

Electra Distributing Company
1914 West End Avenue
Nashville 4
Phone: ALpine 5-8444
Rep: Richard B. Harris

W. & W. Distributing Company
(P.O. Box 436)
644-646 Madison Avenue
Memphis
Phone: JAckson 7-4628
Rep: Mrs. S. D. Wooten, Jr.

TEXAS

Amateur Electronics, Inc.
2802 Ross Avenue
Dallas
Phone: RIverside 8-9198
Rep: Walter L. Jackson

**Busacker Electronic Equipment
Company, Inc.
(P.O. Box 13204)
1216 W. Clay Street
Houston 19
Phone: JAckson 6-2578
Rep: Garth L. Johnson

Central Electronics
4117 Maple Avenue
Dallas
Phone: LAkeside 6-8675
Rep: Red Walden

*Communications Service, Inc.
3209 Canton Street
Dallas 26
Phone: RIverside 7-1852
Rep: Cecil A. White, Jr.

Crabtree's Wholesale Electronics
2608 Ross Avenue
Dallas
Phone: RIverside 8-5361
Rep: R. B. Bryan/Russell Manship

Electronic Equipment & Engineering Co.
(P.O. Box 3687)
805 South Staples Street
Corpus Christi
Phone: TUlip 3-9271
Rep: R. N. Douglas

Hargis-Austin, Inc.
(P.O. Box 716)
410 Baylor Street
Austin
Phone: GReenwood 8-6618
Rep: Mrs. Paul Hargis/Joe Fooshe

**Howard Radio Company
1475 Pine Street
Abilene
Phone: ORchard 2-9501
Rep: R. L. Howard

McNicol, Inc.
811 N. Estrella Street
El Paso
Phone: LO 5-3992
Rep: C. C. McNicol

Modern Electronics Co.
(P.O. Box 1361)
2000 Broadway
San Antonio 6
Phone: CApitol 7-7388
Rep: H. O. Klumb

Radio & Television Parts Co.
1828 N. Saint Mary's St.
San Antonio 12
Phone: CApitol 7-7503
Rep: Don FitzSimon

WASHINGTON

**C & G Radio Electronics Co.
2502-6 Jefferson Avenue
Tacoma 2
Phone: BRoadway 2-3181
Rep: Lloyd Norberg/Cliff Osborne

C & G Radio Electronics Co.
2221 - 3rd Ave.
Seattle 1
Phone: MAin 4-4355
Rep: L. R. Norberg

Northwest Electronics Distributors
E. 730 First Avenue
Spokane 3
Phone: KE 4-2644
Rep: J. P. McGoldrick

Pringle Radio Wholesale Company
2101 Colby
Everett
Phone: ALpine 2-6303
Rep: M. U. Baker

WISCONSIN

Harris Radio Corporation
289 N. Main Street
Fond du Lac
Phone: WAlnut 2-4670
Rep: Harris E. Sterman/Terry Sterman

Amateur Electronic Supply
3832 West Lisbon Avenue
Milwaukee 8
Phone: WEst 3-3262
Rep: Terry Sterman/Steve Polyandy

Satterfield Electronics, Inc.
1900 S. Park Street
Madison 5
Phone: ALpine 7-4801
*Rep: A. W. Satterfield/W. E. Uhall/
Don Wentland*

COLLINS AUTHORIZED SERVICE AGENCIES

ALABAMA

*Beddow Engineering Services
2424 Tenth Avenue South
Birmingham
Phone: ALpine 1-7582
Rep: Dr. C. P. Beddow

ARIZONA

**Southwest Electronic Devices
(P.O. Box 3647)
140 S. 2nd Street
Phoenix
Phone: ALpine 2-1743
Rep: Herman A. Middleton

CALIFORNIA

*Communication Receiver Service
5016 Maplewood
Los Angeles 4
Phone: HOllywood 2-2429
Rep: Charles C. Messman

**Henry Radio, Inc.
(P.O. Box 64398)
11240 W. Olympic Blvd.
Los Angeles 64
Phone: GRanite 7-6701
Rep: Ted Henry

*SERVICE AGENCY ONLY
**ALSO AUTHORIZED SERVICE AGENCY

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*Huntress Electronics
93 Talcott Road
West Hartford 10
Phone: ADams 6-0990
Rep: Bob Resconsin

FLORIDA

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2805-7 N.E. 2nd Avenue
Miami
Phone: FRanklin 4-4101
Rep: Wiley Gilkison

**Broad Radio
7231 Central Avenue
St. Petersburg 10
Phone: 72314
Rep: Morton S. Broad

**Electronic Wholesalers, Inc.
61 N.E. 9th Street
Miami 32
Phone: FRanklin 7-2511
Rep: Frank Gantz

**Kinkade Radio Supply, Inc.
1719 Grand Central Avenue
Tampa
Phone: 8-6043
Rep: E. T. Kinkade

HAWAII

**Honolulu Electronics
819 Keeaumoku Street
Honolulu 14
Phone: 995-466
Rep: Thomas Teruya

LOUISIANA

**Radio Parts, Inc.
807 Howard Avenue
New Orleans 12
Phone: JAckson 2-0217
Rep: Irvine J. Levi

MASSACHUSETTS

*Two-Way Radio Engineers, Inc.
109-115 Ward Street
Boston
Rep: Sherman M. Wolf

MICHIGAN

*Communication Service Company
201 South Lincoln
Charlotte
Phone: 1770-W
Rep: Bart Rypstra

MINNESOTA

**Electronic Center, Inc.
107 3rd Avenue N.
Minneapolis 1
Phone: FEderal 8-8678
Rep: Ward Jensen

NEW HAMPSHIRE

**Evans Radio
(P.O. Box 312)
Bow Junction, Route 3A
Concord
Phone CApital 5-3358
Rep: Roger Britton

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*Warner Engineering Co., Inc.
239 Lorraine Ave.
Upper Montclair
Phone: PIoneer 6-7900
Rep: Charles K. Atwater

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*Simms Communications, Inc.
1220 Morelia
Santa Fe
Phone: YUcca 2-9502
Rep: Preston W. Simms

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**Freck Radio & Supply Co.
38 Biltmore Avenue
Asheville
Phone: ALpine 3-3631
Rep: T. T. Freck

OHIO

**Universal Service
114 N. Third Street
Columbus 15
Phone: CApitol 1-2335
Rep: Francis R. Gibb

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**Busacker Electronic Equipment
Company, Inc.
(P.O. Box 13204)
1216 W. Clay Street
Houston 19
Phone: JAckson 6-2578
Rep: Garth L. Johnson

*Communications Service, Inc.
3209 Canton Street
Dallas 26
Phone: RIverside 7-1852
Rep: Cecil A. White, Jr.

**Howard Radio Company
1475 Pine Street
Abilene
Phone: ORchard 2-9501
Rep: R. L. Howard

WASHINGTON

**C & G Radio Electronics Co.
2502-6 Jefferson Avenue
Tacoma 2
Phone: BRoadway 2-3181
Rep: Lloyd Norberg/Cliff Osborne

523-0176000-013311
3rd Edition, 1 March 1962

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Cedar Rapids Division | Collins Radio Company, Cedar Rapids, Iowa
Printed in U.S.A.

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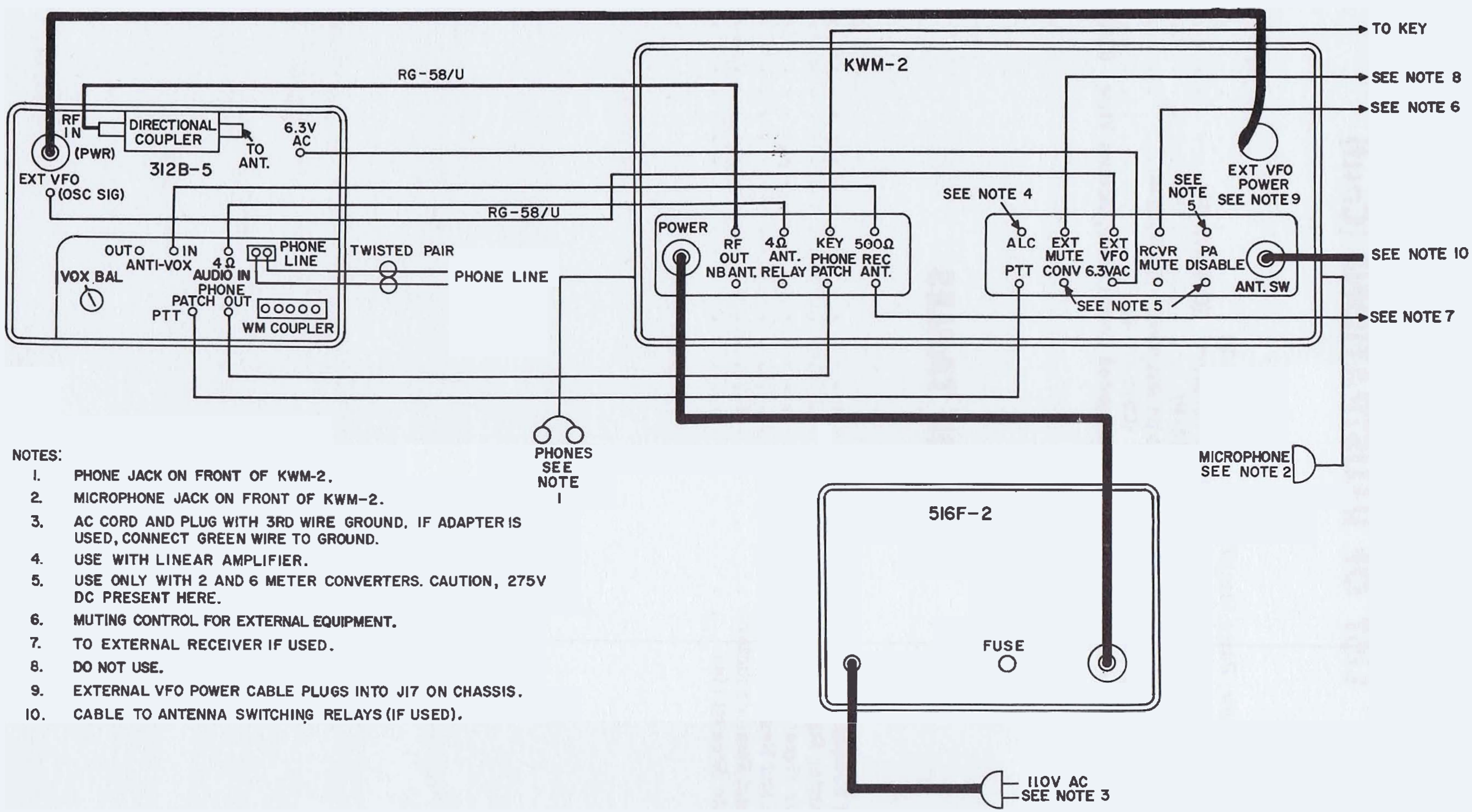


NOTES:

1. PHONE JACK ON FRONT OF KWM-2.
2. MICROPHONE JACK ON FRONT OF KWM-2.
3. AC CORD AND PLUG WITH 3RD WIRE GROUND. IF ADAPTER IS USED, CONNECT GREEN WIRE TO GROUND.
4. USE WITH LINEAR AMPLIFIER.
5. USE ONLY WITH 2 AND 6 METER CONVERTERS. CAUTION, 275V DC PRESENT HERE.
6. MUTING CONTROL FOR EXTERNAL EQUIPMENT.
7. TO EXTERNAL RECEIVER IF USED.
8. DO NOT USE.
9. EXTERNAL VFO POWER CABLE PLUGS INTO J17 ON CHASSIS.
10. CABLE TO ANTENNA SWITCHING RELAYS (IF USED).

Figure 1-1 Fixed Station Interco ections

SECTION I
INSTALLATION

1.1 UNPACKING.

Carefully lift the transceiver out of the packing material. Examine for visible damage. If transceiver has been damaged in shipment, save box and packing material, and notify the transportation company. Fill out and mail the equipment registration card. Check that all tubes and crystals are properly seated in sockets. Check tuning controls and switches for freedom of action. Remove shipping blocks from 516F-2 Power Supply; plug in tubes.

1.2 MOUNTING AND CABLING.

1.2.1 GENERAL.

For fixed station installation, refer to figure 1-1 or 1-3. For mobile installation, refer to figure 1-4. Traveling station interconnections are shown in figure 1-2.

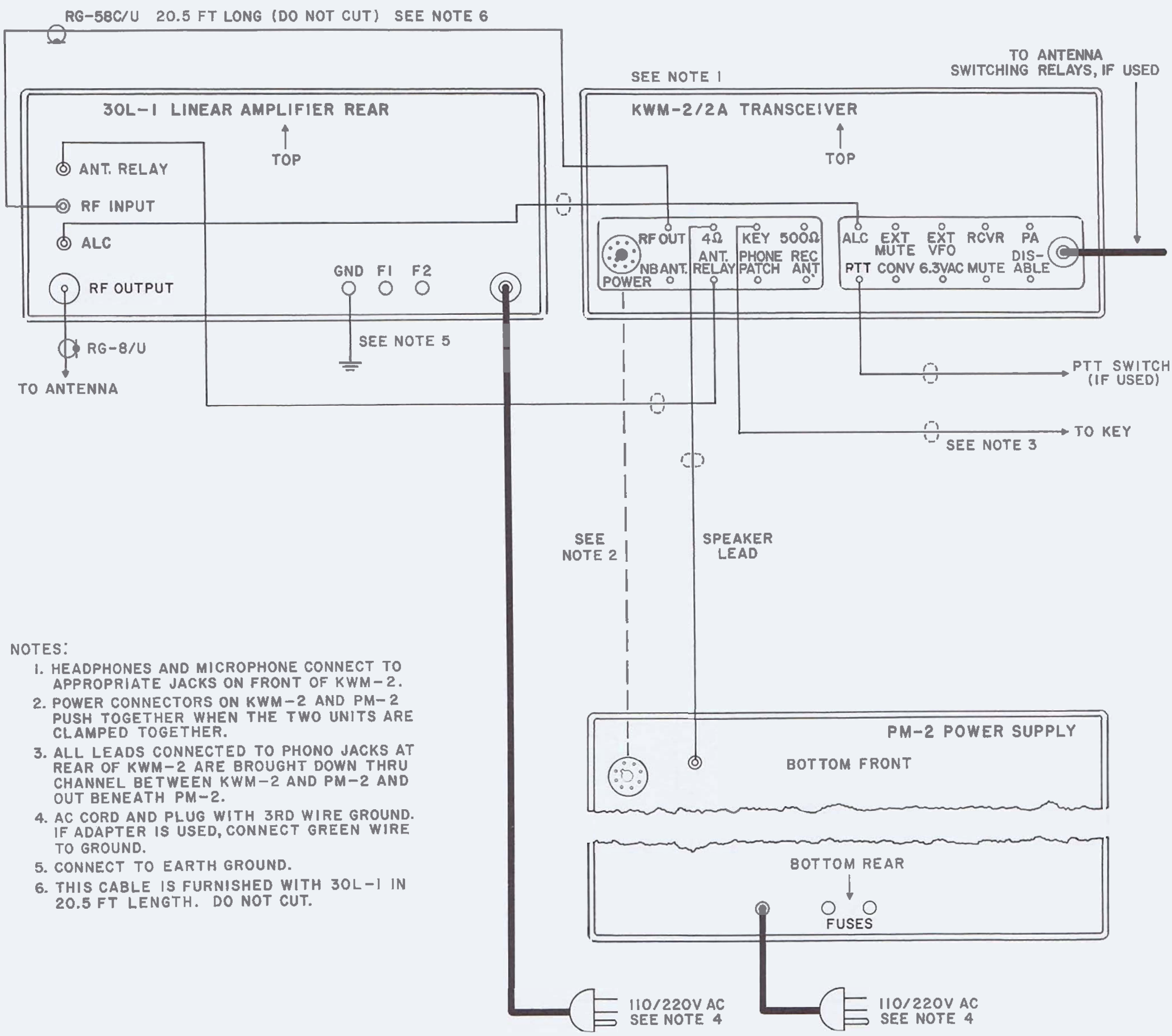
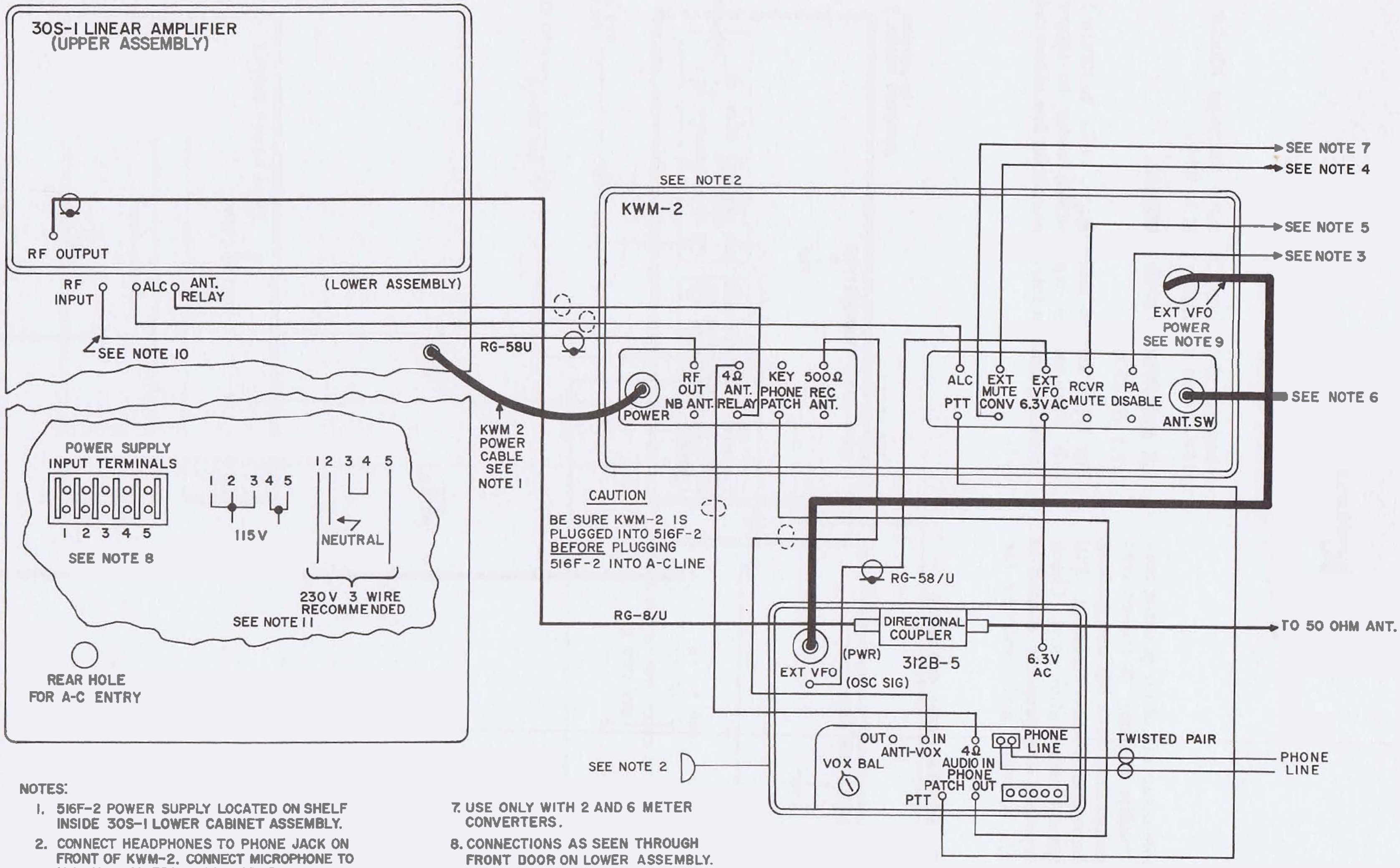


Figure 1-2. Traveling Station Interconnections with 30L-1



NOTES:

1. 516F-2 POWER SUPPLY LOCATED ON SHELF INSIDE 30S-1 LOWER CABINET ASSEMBLY.
2. CONNECT HEADPHONES TO PHONE JACK ON FRONT OF KWM-2. CONNECT MICROPHONE TO MIC JACK ON FRONT OF 312B-5
3. USE ONLY WITH 2 AND 6 METER CONVERTERS. (CAUTION +275V DC PRESENT HERE)
4. DO NOT USE.
5. EXTERNAL RECEIVER MUTING.
6. CABLE TO ANTENNA SWITCHING RELAYS. (IF USED)
7. USE ONLY WITH 2 AND 6 METER CONVERTERS.
8. CONNECTIONS AS SEEN THROUGH FRONT DOOR ON LOWER ASSEMBLY.
9. EXTERNAL VFO POWER CABLE PLUGS INTO J17 ON CHASSIS.
10. THIS CABLE IS FURNISHED WITH 30S-1 IN 20.5 FT LENGTH. DO NOT CUT.
11. 10 FT LENGTH OF 3 WIRE (EACH NO. 12) CONDUCTOR WITH LUGS ON ONE END. CONNECT OTHER END TO SWITCHBOX OR PLUG AS DESIRED.

Figure 1-3. High-Power Station Interconnections

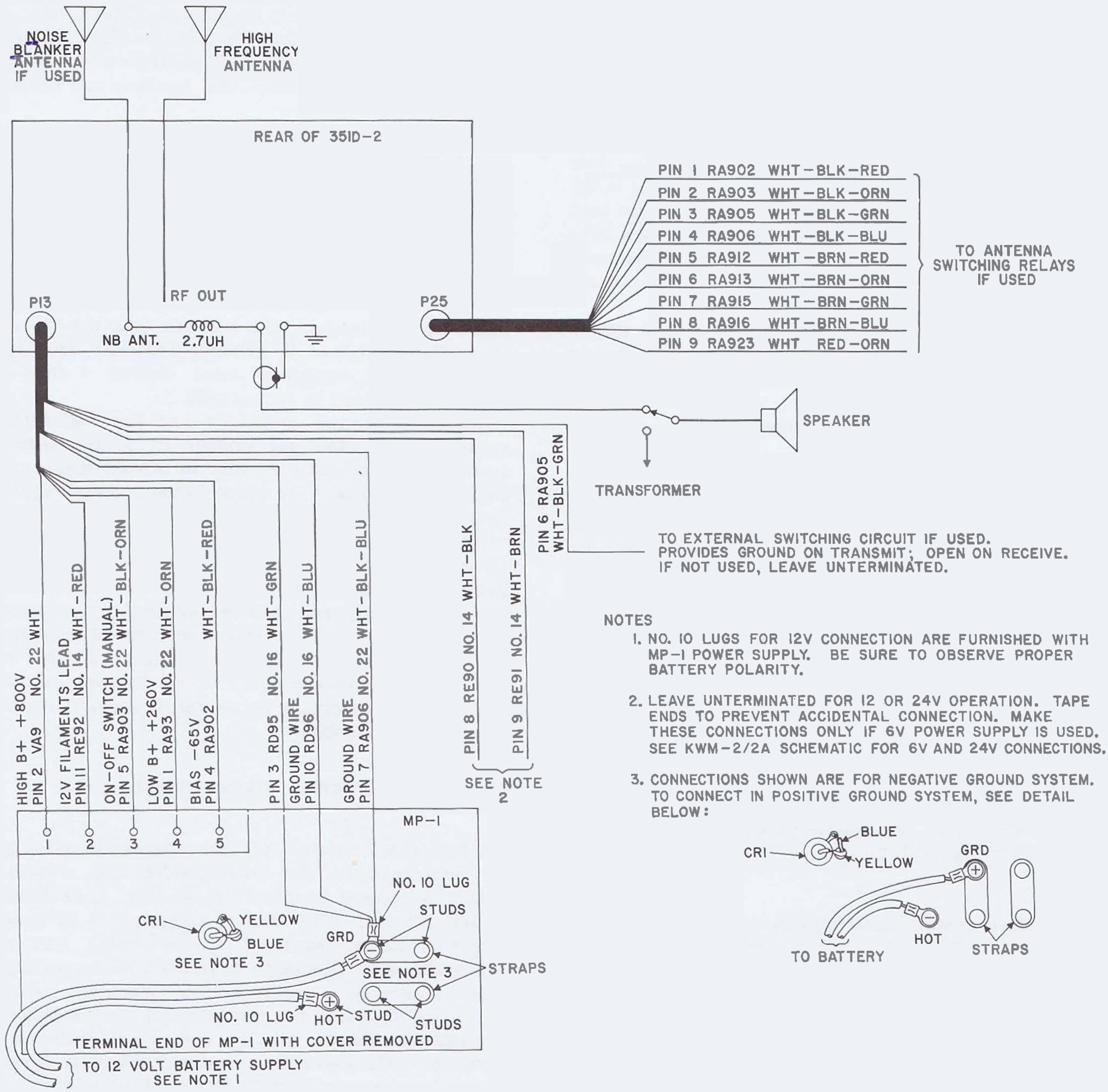


Figure 1-4. Mobile Station Interconnections

1.2.2 FIXED STATION INSTALLATION.

Connect associated equipment to the KWM-2 or KWM-2A as shown in figure 1-1 or 1-3. Connection at J25 may be used for automatic antenna changeover if desired. Switch S13 places a ground connection to the various pins of J25 to operate antenna changeover relays.

A low-impedance phone patch, such as the 189A-2, may be used by making the following change in the KWM-2/2A. Disconnect the two brown-white wires from pin F of terminal board E60 (refer to figure 7-3). Using an ohmmeter, determine which of the two wires is connected to PHONE PATCH jack J11. Connect this wire to pin 7 of V1. Resolder the other brown-white wire as originally connected.

1.2.3 MOBILE INSTALLATION.

a. Select a location in the car to install the transceiver. Allow clearance on all sides to assure adequate ventilation. If vox operation is desired, leave enough space above the transceiver to allow opening the top cover for adjustment of VOX and ANTI-VOX gain controls, S-meter zero, etc. If 351D-2 Mobile Mount is to be used, drill holes and fasten the adapter bracket to transmission hump with self-tapping screws. Attach the mount to the bracket. Swing the cantilever supports forward. Install the side slides in KWM-2/2A according to 351D-2 Mobile Mount Installation Instructions. Remove the plastic dust covers from the 351D-2 plugs, and store them in the recesses of the mount. Slide the transceiver onto the mount and push back until the mount plugs have entered the transceiver sockets. Tighten the wing nuts on the sides of the transceiver. See 351D-2 Instruction Sheet for mobile mount installation.

b. Select location in car for mounting MP-1 Power Supply. This location must be as clean and dry as possible. Location in luggage compartment, under seat, or on passenger side of fire wall is satisfactory. Mounting in the engine compartment is not recommended.

c. Determine necessary length of power cable (Furnished with 351D-2 Mobile Mount) to connect the MP-1 to the KWM-2/2A, and cut to required length. Connect power supply, speaker, and microphone as shown in figure 1-4. If automatic antenna changeover is desired, connect relay coil ground returns to J25.

CAUTION

Before making connections to the automobile electrical system, make sure the primary circuits in the MP-1 are connected for proper ground polarity. Correct connections for either positive or negative ground systems are shown in figure 1-4.

The 440E-1 Power Cable may be used to connect the power supply to the transceiver when the 351D-2 is not used. See table 5-2 for ordering information.

d. If operation is to be in boat or plane having a 115-volt, 400-cps power supply, use 516F-2 Power Supply with C1 (0.05 uf) removed from across L1 in the filter circuit. If the operation is to be in boat or plane having 24-volt d-c power, modify the 516F-2 as above and use a dc-to-400 cps inverter capable of at least 475-watt load.

e. No mobile speaker is supplied. If desired, the speaker leads may be connected in parallel with the car radio voice coil terminals. If the car radio has a transistor output stage, connect the terminals of the car speaker as shown in figure 1-4. Break voice coil lead, and install a switch for transfer of speaker from car radio to KWM-2/2A. If installation is in boat or plane, use any good four-ohm speaker and mount as desired.

f. For suppression of noise encountered in mobile operation, the following suggestions may be helpful:

(1) Use resistor-type spark plugs.

(2) Install coaxial bypass capacitors at ignition coil, generator, and voltage-regulator leads. Use bracket-mounted coaxial capacitors in the battery and generator leads to the voltage regulator and a 0.005-uf (or smaller) disc ceramic or mica capacitor from the field lead to ground. DO NOT use larger than 0.005-uf capacitor here unless a four-ohm resistor is placed in series with it.

(3) If capacitor bypasses are not satisfactory, remove them, and use chokes in series with the leads from field and armature terminals of generator. Place these chokes as close to the voltage regulator as possible.

(4) For the field lead choke, wind 12 turns of no. 18 wire on a 1/4-inch diameter powdered-iron core. For the armature lead, wind 12 turns of no. 14 or larger wire on 1/4-inch diameter powdered-iron core.

(5) Ground the rear end of the exhaust pipe to the car body with copper braid, using a radiator hose clamp to secure the braid to the tailpipe. General information concerning noise suppression is available in current handbooks.

1.3 INITIAL CHECKS. (Refer to figure 2-1.)

Set MIC GAIN control (4) full counterclockwise until the switch clicks. Set OFF-ON-NB-CAL switch (1) to ON. Set meter switch (8) to PLATE, and EMISSION switch (2) to LOCK. The transceiver is in receive condition during warmup, so the meter will read full scale until filaments have come to temperature. This is normal S-meter action. When the S-meter falls back to zero, the circuits will have switched to transmit condition, and the meter will indicate PA plate current. Read the no-signal PA plate current. It should be approximately 40 ma. If plate current is other than 40 ma, adjust BIAS ADJUST potentiometer on top rear of power supply chassis to set plate current to 40 ma. If the transceiver is to be used with a linear amplifier, set bias to produce 50-ma idling plate current.

SECTION II
OPERATION

2.1 RECEIVER TUNING.

a. Refer to figure 2-1. Set function switch (1) to ON. This is the switch labeled OFF-ON-NB-CAL.

b. Set EMISSION switch (2) to desired sideband (USB or LSB position). Set BAND switch (3) to desired band. If KWM-2A, set crystal board selector (12) so desired set of bands appears in window.

c. Set the MIC GAIN control (4) full counterclockwise. Set R.F. GAIN control (10) full clockwise.

d. Set VOX GAIN control (under top cover) full counterclockwise.

e. Set ANTI-VOX GAIN control (under top cover) full counterclockwise.

f. Adjust the A.F. GAIN control (5) until some receiver noise is heard in speaker.

g. Adjust the EXCITER TUNING control (6) to white portion of scale indicating the desired band. Rock this control slightly to peak the receiver noise output. The transceiver is now ready to receive and the selected 200-kc band may be tuned with the tuning control. Dial frequency can be determined by adding the dial reading to the BAND switch (3) setting.

h. Turn function switch to CAL position. Tune dial to nearest 100-kc point (0, 100, or 200), and decrease R.F. GAIN control (10) as necessary for comfortable listening level. Adjust tuning until the calibrate signal is zero beat. When the calibrate signal is zero beat in the receiver, set the hairline on the 100-kc mark with the zero set knob. Set function switch (1) to ON and tune dial to the desired portion of the 200-kc band selected. If checking calibrate circuit against WWV is desired, see section IV, paragraph 4.5.2.3.

WARNING

During amateur operation, DO NOT operate transmit circuits while the transceiver is tuned to receive outside the amateur band in use. The transmit frequency is always locked to the receive frequency. Return tuning to within the band before transmitting.

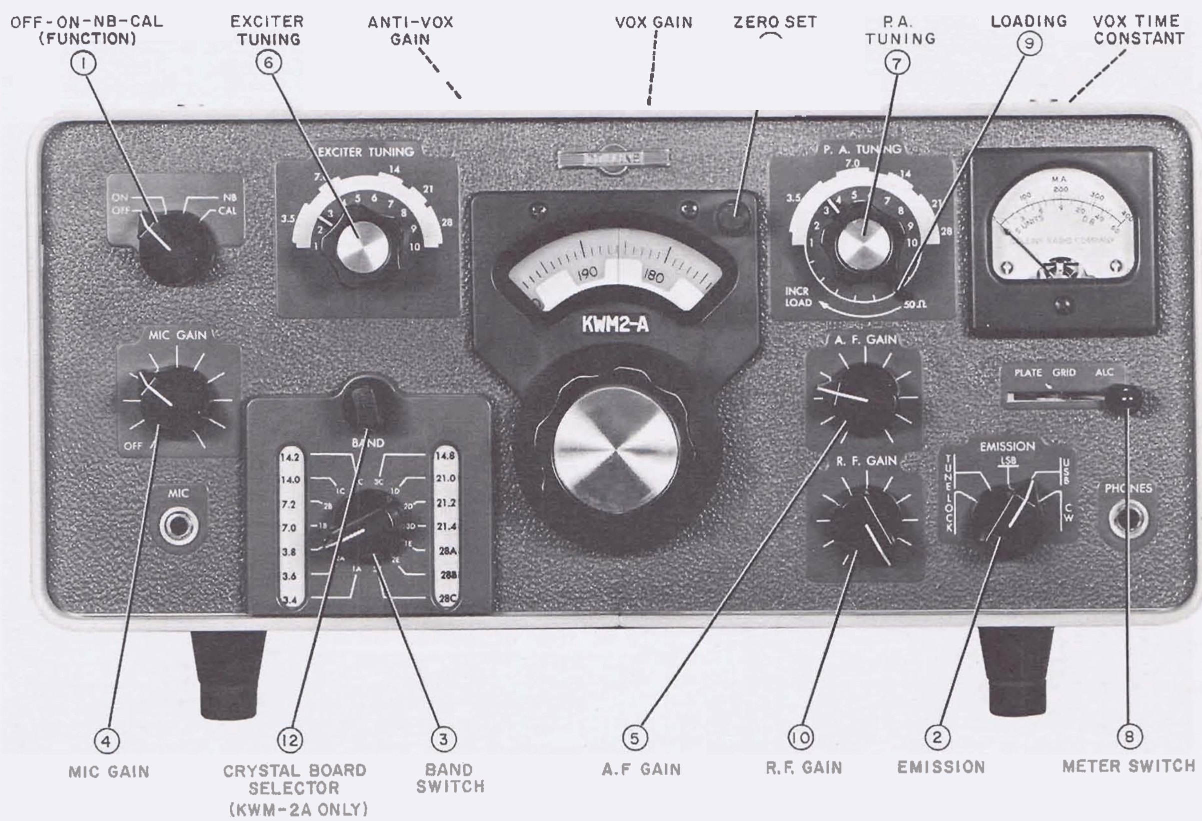


Figure 2-1. Operating Controls

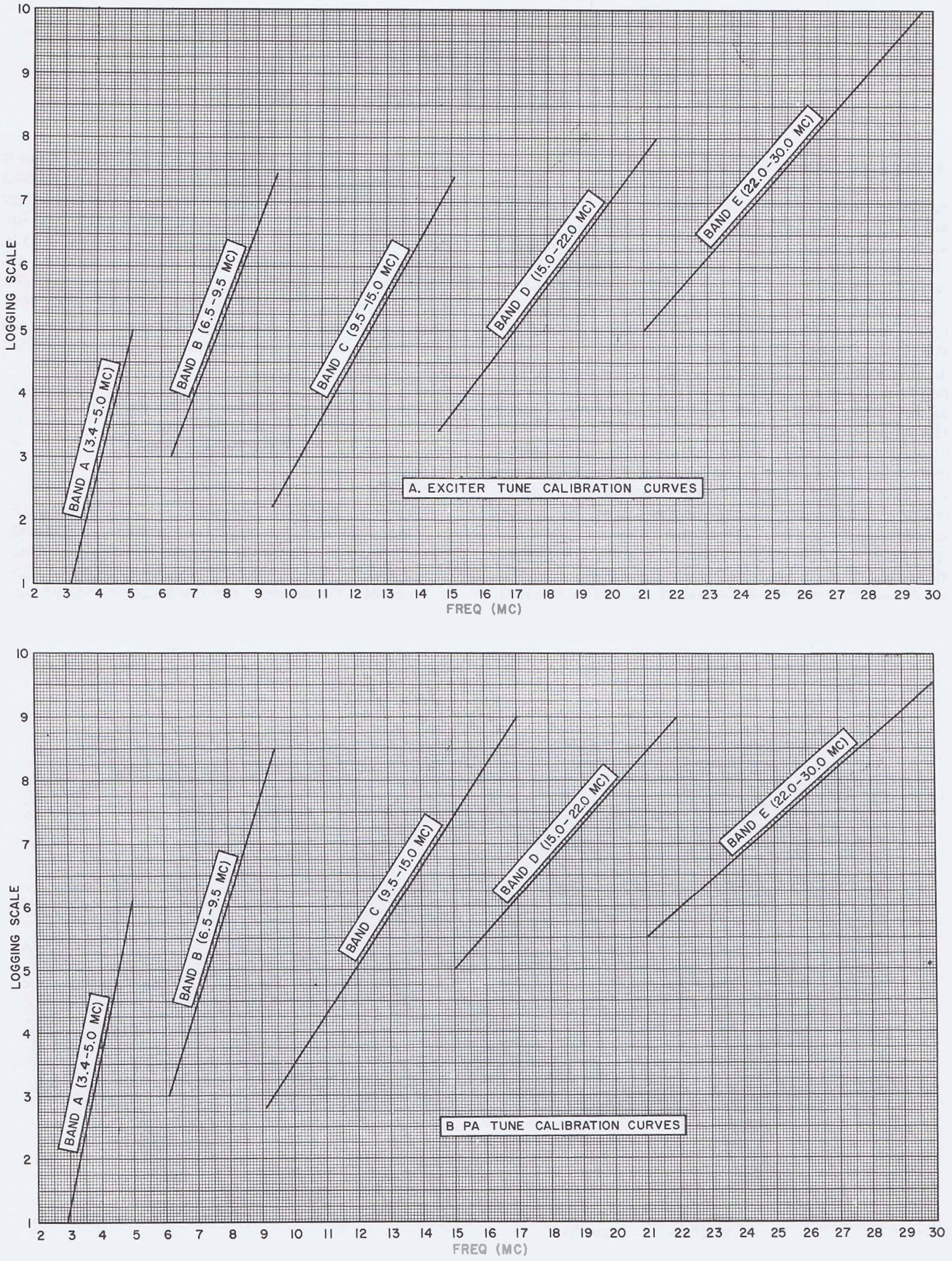


Figure 2-2. Logging Scale Calibration Curves

2.2 TRANSMITTER TUNING.

2.2.1 GENERAL.

a. Set up for receive function as in paragraph 2.1.
b. Set EMISSION switch (2) to TUNE position.
c. Set P.A. TUNING control (7) to white portion of dial indicating the desired band (for amateur operation). If the transceiver is being operated outside amateur bands, ignore the amateur band markings on the dial scale, and set the control according to the logging scale charts of figure 2-2.
d. Set meter switch (8) to PLATE position.
e. Advance the MIC GAIN control (4) full clockwise, and rock the EXCITER TUNING control (6) until maximum plate current is obtained.
f. IMMEDIATELY dip the plate current with the P.A. TUNING control (7).
g. Return the MIC GAIN control (4) to full counterclockwise position.
h. Set meter switch (8) to GRID position.
i. Advance MIC GAIN control (4) until grid current is obtained.
j. Rock the EXCITER TUNING control (6) to obtain a peak in grid current indication.
k. Turn MIC GAIN off.
l. Set EMISSION switch to LOCK position.
m. Advance MIC GAIN to provide a grid current reading of approximately 1/3 scale.
n. Set meter switch to PLATE position.
o. Alternately dip plate current with P.A. TUNING control, and adjust loading with INCR LOAD control until plate current is 230 ma at the dip. When operating the transceiver with a linear amplifier, load to only 200 ma.
p. Set EMISSION switch to desired operating position.

CAUTION

If transceiver frequency is changed by any great amount, be sure to redip the power amplifier plate current and check the loading. This will be most important on the 80- and 40-meter bands. Some operating experience will indicate the amount of frequency excursion possible without readjustment.

2.2.2 SINGLE-SIDEBAND OPERATION.

a. Set up receiver operation and transmitter operation completely as in paragraphs 2.1 and 2.2.1.
b. Close-talk into the microphone, increasing VOX GAIN control setting until vox relay just operates. For vox operation, it is desirable to close-talk the microphone to prevent background noises from tripping the KWM-2/2A into transmit function.
c. Set meter switch (8) to ALC position. Increase setting of MIC GAIN control (4) to obtain S6 average reading on voice.
d. Leave MIC GAIN control (4) as set in step c above. Leave microphone in normal operating position. Set function switch to CAL position, tune in calibrate signal, and adjust A.F. GAIN control (5) for comfortable listening level.
e. Adjust the tuning control for approximately 1000-cps beat note. If the vox relay trips, increase ANTI-VOX GAIN setting to minimum point necessary to prevent speaker output from tripping vox. It may be necessary to increase VOX GAIN setting slightly after this antivox gain adjustment in order to compensate for the antivox gain.

NOTE

Do not use more vox gain or more antivox gain then necessary to control vox operation. If vox circuits transfer between words, increase the release time constant by turning VOX TIME CONSTANT control (under top cover) clockwise. If less release time is desired, turn the control counterclockwise.

f. Set function switch to ON position. The KWM-2/2A is now ready for transmit operation in SSB service. Speaking into the microphone transfers from receive function to transmit function through the vox circuit action. If the receiver is tuned to a different frequency, the transmitter is tuned to the new receiver frequency.
g. After changing frequency on the lower bands (below 10 mc), set EMISSION switch (2) to LOCK position and make the following checks:

(1) Set meter switch (8) to GRID position.
(2) Rock EXCITER TUNING control (6) slightly to check that PA grid drive is peaked.
(3) Set meter switch (8) to PLATE, and check dip in PA plate current with P.A. TUNING control (7).
(4) Set EMISSION switch back to the desired operating position.

2.2.3 CW OPERATION.

a. Set the function switch to ON.
b. Set up receiver and transmitter operation completely as in paragraphs 2.1 and 2.2.1.
c. Depress key and adjust A.F. GAIN control (5) for comfortable monitoring level.
d. Hold key down, and increase VOX GAIN control setting until the vox relay operates. If it is desired to change the release time constant, adjust the VOX TIME CONSTANT potentiometer, R43. Clockwise rotation of this control increases the release time. This control is located on a bracket under the top cover, behind the meter.
e. Set meter switch (8) to ALC position. While sending a series of dots, adjust MIC GAIN control (4) for S2 meter indication of alc.
f. When receiving, leave the A.F. GAIN control (5) set for comfortable monitoring level, and adjust the receive level with the R.F. GAIN control (10). When the KWM-2/2A is receiving, the received signal is indicated in S-units. The S-meter will read correctly with the R.F. GAIN (10) at less than maximum setting,

provided the received signal level is high enough to actuate the S-meter. For example, if the R.F. GAIN control (10) is set for no-signal reading of S8 and reads S9 with signal, the received signal is S9.

NOTE

The CW output signal frequency is 1500 cps higher than the dial reading.

2.2.4 MOBILE OPERATION.

Vox and antivox circuits will operate in mobile operation, but push-to-talk operation is recommended, since high-level background noises will produce undesirable vox switchover. Set VOX GAIN and ANTI-VOX GAIN controls full counterclockwise before installation. If vox operation is desired, leave clearance in installation so top cover can be opened. For mobile operation, load the power amplifier to 210-ma plate current.

2.3 OPERATION OUTSIDE AMATEUR BANDS.

2.3.1 SELECTION OF CRYSTALS.

The crystals supplied provide for complete coverage of all amateur bands except the 10-meter band for which only one crystal is furnished (for 28.5 to 28.7 mc). Two extra sockets are provided for additional crystals in the 10-meter band. Figure 2-3 shows crystal socket locations. Select these crystals as follows:

a. If the lower edge of the desired 200-kc band is 11.8 mc or less, the required frequency is equal to the lower edge of the desired band plus 3.155 mc. As an example, if the desired band is 4.0 to 4.2 mc, 4.0 mc plus 3.155 mc equals 7.155 mc.

b. If lower edge of desired 200-kc band is 12.00 mc or higher, the required crystal frequency is half the sum of the lower edge of desired band and 3.155 mc. As an example, if the desired band is 14.4 to 14.6 mc:

$$\frac{14.4 + 3.155}{2} = 8.7775 \text{ mc.}$$

The plate circuit of the oscillator is tuned to twice the crystal frequency when required injection frequencies are this high.

CAUTION

Avoid transmitter operation between 5.0 and 6.5 mc. In this range, the second harmonic of the variable i-f frequency is nearly the same as desired frequency. In transmit function, some of this energy will pass through the tuned circuits and become spurious emission.

c. Plug substitute or extra crystals into the appropriate socket on the mounting board according to bandswitch position and total coverage columns in table 2-1. The example cited in step b above calls for placement of the crystal in one of the sockets marked C. If two additional 10-meter crystals are used, they must be plugged into the sockets marked E. Table 2-1 lists crystal socket designations, switch positions (BAND), crystal frequencies furnished, and frequency range limitations. For extra coverage crystals available, see section VI, Parts List.

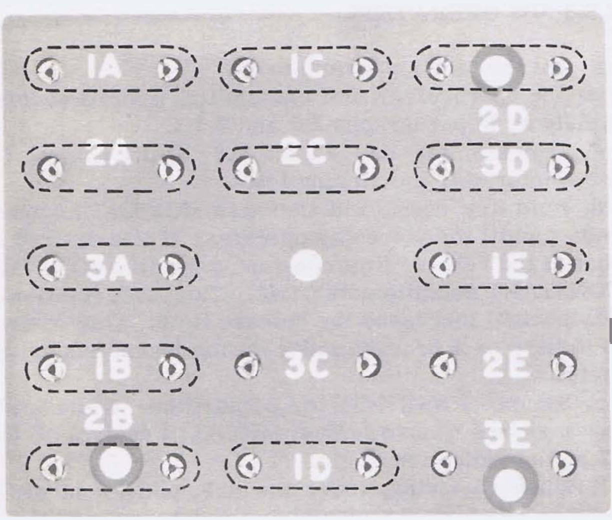


Figure 2-3. Crystal Socket Locations

The KWM-2A is equipped with an extra crystal mounting board and a front-panel switch to allow selection of either board. The crystal mounting board for extra-band operation is located on the top of the chassis. If amateur band operation is not needed, extra-band crystals may be substituted in the crystal mounting board under the chassis. BE SURE the crystals are plugged into appropriate sockets according to information of table 2-1 and figure 2-3. The transmitter can be operated at other frequencies outside the specified amateur bands or at other 10-meter frequencies by plugging the proper crystals into the mounting boards.

Mark the desired lower band edge information on the white card in the band-switch windows. Make sure this information is marked in the appropriate switch positions.

2.3.2 ADJUSTMENT OF TUNED CIRCUITS.

For operation outside amateur bands, disregard amateur band markings on EXCITER TUNING and P.A. TUNING scales and use logging scales. Figure 2-2 shows logging scale calibration curves. Operation at frequencies outside the amateur bands will result in slightly decreased receiver sensitivity and transmitter PA grid drive, unless the tuned circuits of the transceiver are retuned to peak their responses in the desired portions of the high-frequency spectrum. For moderate excursions from the amateur bands the decrease in performance is minor, and realignment of the r-f circuits is usually not necessary unless optimum performance is desired.) Adjustment of the trimmer capacitors only will normally be sufficient to peak the response outside the amateur bands. Figure 4-1 shows the location of these adjustments. The letter portions of the capacitor designations correspond to the frequency ranges listed in the total coverage column of table 2-1. For example, the E trimmers are normally peaked on 10 meters, but may be reset to favor another portion of band E which covers 22.0 to 30.0 mc.

At the extremities of some bands the PA loading may be either too heavy or too light. This condition can be corrected by the following procedure:

a. Remove the top cover from the PA compartment.

WARNING

Dangerous voltages are present with power on. Be sure that all power is disconnected before working in this compartment.

b. Temporarily disconnect the existing wire from the rear stator terminal of the two-gang loading capacitor.

c. Connect a jumper wire between front and rear stator terminals, and replace the compartment cover.

NOTE

The 50 Ω mark on the loading control will no longer be correct after this modification is made.

TABLE 2-1. CRYSTAL FREQUENCIES AND OPERATING BANDS

BAND-SWITCH POSITION	FREQUENCY BAND	CRYSTAL SUPPLIED	CRYSTAL SOCKET CONNECTED	TOTAL COVERAGE
1A - 3.4	3.4 - 3.6 mc	6.555 mc	1A	A 3.4 - 5.0 mc
2A - 3.6	3.6 - 3.8 mc	6.755 mc	2A	
3A - 3.8	3.8 - 4.0 mc	6.955 mc	3A	
1B - 7.0	7.0 - 7.2 mc	10.155 mc	1B	B 6.5 - 9.5 mc
2B - 7.2	7.2 - 7.4 mc	10.355 mc	2B	
1C - 14.0	14.0 - 14.2 mc	8.5775 mc	1C	C 9.5 - 15.0 mc
2C - 14.2	14.2 - 14.4 mc	8.6775 mc	2C	
3C - 14.8	14.8 - 15.0 mc	8.9775 mc	3C	
1D - 21.0	21.0 - 21.2 mc	12.0775 mc	1D	D 15.0 - 22.0 mc
2D - 21.2	21.2 - 21.4 mc	12.1775 mc	2D	
3D - 21.4	21.4 - 21.6 mc	12.2775 mc	3D	
1E - 28A	28.5 - 28.7 mc	15.8275 mc	1E	E 22.0 - 30.0 mc
2E - 28B	As selected	Not furnished	2E	
3E - 28C	As selected	Not furnished	3E	

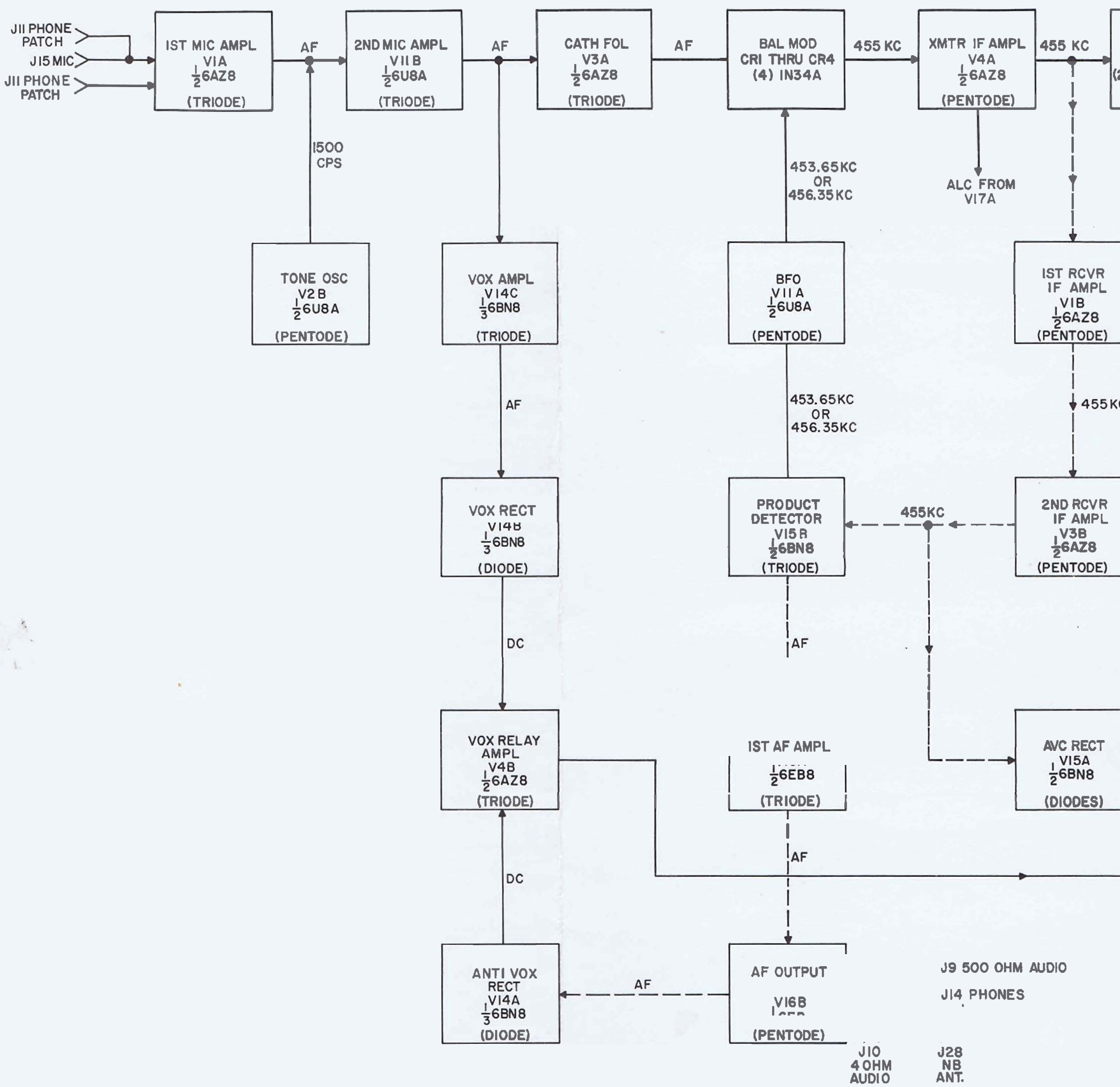
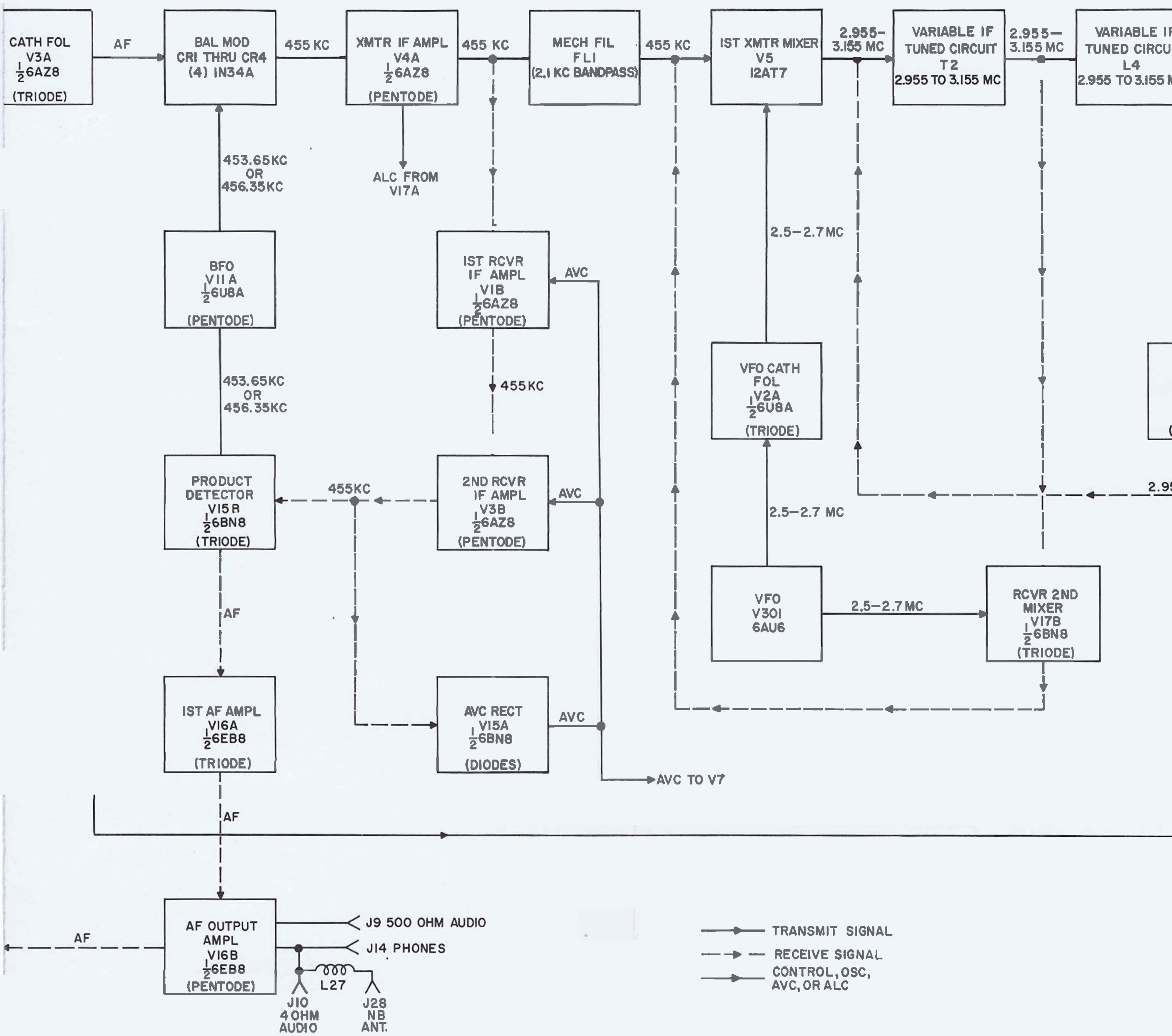
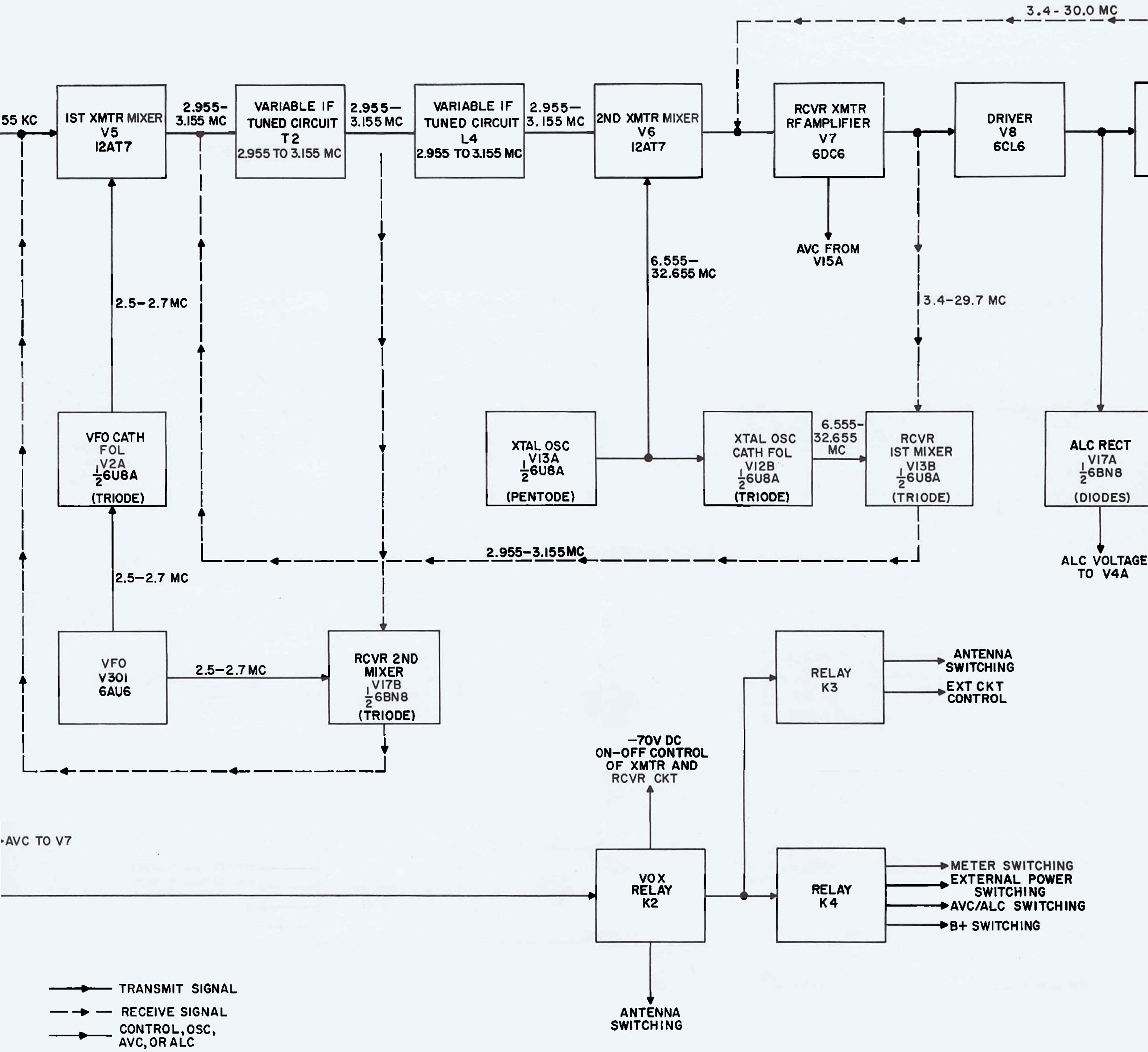


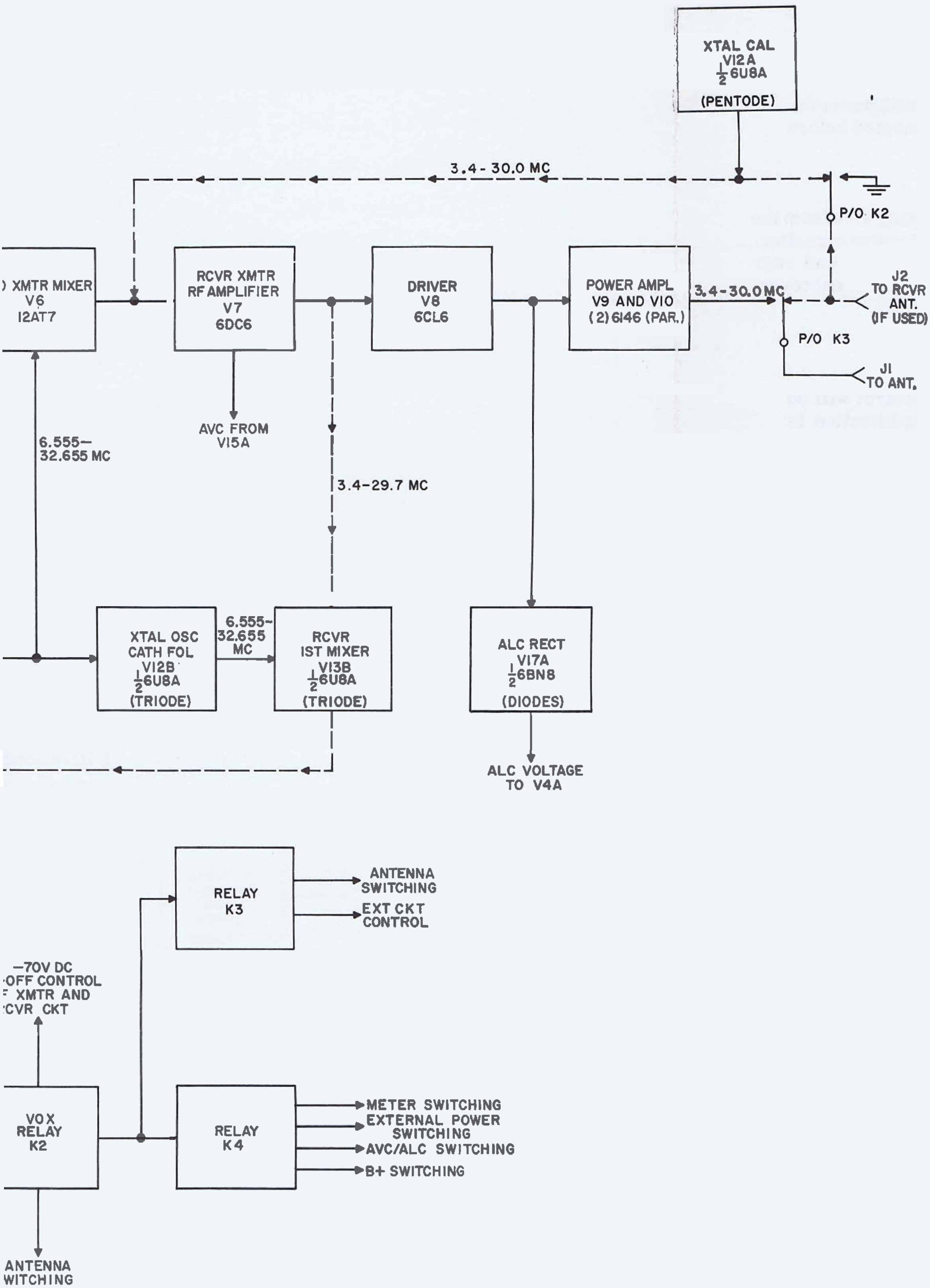
Figure 3-1. KWM-2 and KWM-2A Block Diagram



CATH FOL
V3A
½6AZ8
(TRIODE)
AF
BAL MOD
CRI THRU CR4
(4) IN34A
455 KC
XMTR IF AMPL
V4A
½6AZ8
(PENTODE)
455 KC
MECH FIL
FLI
(2.1 KC BANDPASS)
455 KC
IST XMTR MIXER
V5
12AT7
2.955-
3.155 MC
VARIABLE IF
TUNED CIRCUIT
T2
2.955 TO 3.155 MC
2.955—
3.155 MC
VARIABLE IF
TUNED CIRCU
L4
2.955 TO 3.155 M
453.65KC
OR
456.35KC
ALC FROM
V17A
2.5—2.7 MC
BFO
V11 A
½6U8A
(PENTODE)
IST RCVR
IF AMPL
V1B
½6AZ8
(PENTODE)
AVC
455KC
VFO CATH
FOL
V2A
½6U8A
(TRIODE)
453.65KC
OR
456.35KC
PRODUCT
DETECTOR
V15B
½6BN8
(TRIODE)
455KC
2ND RCVR
IF AMPL
V3B
½6AZ8
(PENTODE)
AVC
2.5—2.7 MC
AF
VFO
V301
6AU6
2.5—2.7 MC
RCVR 2ND
MIXER
V17B
½6BN8
(TRIODE)
IST AF AMPL
V16A
½6EB8
(TRIODE)
AVC RECT
V15A
½6BN8
(DIODES)
AVC
AVC TO V7
AF
AF
AF OUTPUT
AMPL
V16B
½6EB8
(PENTODE)
J9 500 OHM AUDIO
J14 PHONES
L27
J10
4 OHM
AUDIO
J28
NB
ANT.
TRANSMIT SIGNAL
RECEIVE SIGNAL
CONTROL, OSC,
AVC, OR ALC

ck Diagram


55 KC
IST XMTR MIXER V5 12AT7
2.955- 3.155 MC
VARIABLE IF TUNED CIRCUIT T2 2.955 TO 3.155 MC
2.955- 3.155 MC
VARIABLE IF TUNED CIRCUIT L4 2.955 TO 3.155 MC
2.955- 3.155 MC
2ND XMTR MIXER V6 12AT7
3.4-30.0 MC
RCVR XMTR RF AMPLIFIER V7 6DC6
DRIVER V8 6CL6
AVC FROM V15A
6.555- 32.655 MC
3.4-29.7 MC
2.5-2.7 MC
VFO CATH FOL V2A 1/2 6U8A (TRIODE)
XTAL OSC V13A 1/2 6U8A (PENTODE)
XTAL OSC CATH FOL V12B 1/2 6U8A (TRIODE)
6.555- 32.655 MC
RCVR IST MIXER V13B 1/2 6U8A (TRIODE)
ALC RECT V17A 1/2 6BN8 (DIODES)
2.955-3.155 MC
ALC VOLTAGE TO V4A
2.5-2.7 MC
VFO V301 6AU6
2.5-2.7 MC
RCVR 2ND MIXER V17B 1/2 6BN8 (TRIODE)
RELAY K3
ANTENNA SWITCHING
EXT CKT CONTROL
-70V DC ON-OFF CONTROL OF XMTR AND RCVR CKT
AVC TO V7
VOX RELAY K2
RELAY K4
METER SWITCHING
EXTERNAL POWER SWITCHING
AVC/ALC SWITCHING
B+ SWITCHING
ANTENNA SWITCHING
TRANSMIT SIGNAL
RECEIVE SIGNAL
CONTROL, OSC, AVC, OR ALC


XTAL CAL V12A ½ 6U8A (PENTODE)
3.4 - 30.0 MC
P/O K2
) XMTR MIXER V6 12AT7
RCVR XMTR RF AMPLIFIER V7 6DC6
DRIVER V8 6CL6
POWER AMPL V9 AND V10 (2) 6146 (PAR.)
3.4-30.0 MC
J2 TO RCVR ANT. (IF USED)
P/O K3
J1 TO ANT.
AVC FROM V15A
6.555– 32.655 MC
3.4–29.7 MC
XTAL OSC CATH FOL V12B ½ 6U8A (TRIODE)
6.555- 32.655 MC
RCVR 1ST MIXER V13B ½ 6U8A (TRIODE)
ALC RECT V17A ½ 6BN8 (DIODES)
ALC VOLTAGE TO V4A
RELAY K3
ANTENNA SWITCHING
EXT CKT CONTROL
–70V DC
·OFF CONTROL
XMTR AND
CVR CKT
VOX RELAY K2
RELAY K4
METER SWITCHING
EXTERNAL POWER SWITCHING
AVC/ALC SWITCHING
B+ SWITCHING
ANTENNA
WITCHING

SECTION III
PRINCIPLES OF OPERATION

3.1 BLOCK DIAGRAM.

Refer to figure 3-1. The KWM-2/2A is an SSB or CW transceiver operating in the range between 3.4 and 30.0 mc. It consists of a double-conversion receiver and a double-conversion exciter-transmitter. The transmitter and receiver circuits use common oscillators, common mechanical filter, and common r-f amplifier. The transmitter low-frequency i-f and the receiver low-frequency i-f is 455 kc. The high-frequency i-f for both is 2.955 to 3.155 mc. This is a band-pass i-f which accommodates the full 200-kc bandwidth. Figure 7-1 is a schematic diagram of the KWM-2/2A, and figure 7-2 is a schematic diagram of the 516F-2 Power Supply.

3.2 TRANSMITTER CIRCUITS.

3.2.1 A-F CIRCUITS.

Microphone or phone-patch input is connected to the grid of the first audio amplifier, V1A, amplified, and coupled to the grid of the second audio amplifier, V11B. Output from V11B is coupled to the grid of cathode follower V3A through the MIC GAIN control, R8. Output from the cathode follower is fed to the resistive balance point of the balanced modulator. In TUNE, LOCK, and CW positions of the EMISSION switch, output from the tone oscillator, V2B, is fed to the grid of the second audio amplifier. Amplifier tone oscillator signal is taken from the plate of V11B to the grid of the vox amplifier to activate the vox circuits in CW operation. This signal is also fed to the grid of the first receiver a-f amplifier, V16A, for CW monitoring.

3.2.2 BALANCED MODULATOR AND LOW-FREQUENCY I-F CIRCUITS.

Audio output from the cathode of V3A and the bfo voltage are fed to the wiper of the carrier balance potentiometer, R15. Both upper and lower sideband outputs from the balanced modulator are coupled through i-f transformer T1 to the grid of the i-f amplifier, V4A. Output from the i-f amplifier is fed to the mechanical filter, FL1. The pass band of FL1 is centered at 455 kc. This passes either upper or lower sideband, depending upon the sideband polarity selected when the EMISSION switch connects bfo crystal Y16 or Y17. The single-sideband output of FL1 is connected to the grids of the first transmitter mixer in push pull.

3.2.3 BALANCED MIXERS.

The 455-kc single-sideband signal is fed to the first balanced mixer grids in push-pull. The plates of the mixer are connected in push-pull, and vfo signal is fed to the two grids in parallel. The mixer cancels the vfo signal energy and translates the 455-kc single-sideband signal to a 2.955- to 3.155-mc single-sideband signal. The coupling network between the first and second mixers is broadbanded to provide a uniform response. The transmit frequency is determined within the pass band by the vfo frequency. The band-pass i-f signal is fed to one of the grids of the second balanced mixer, and the high-frequency injection signal energy from crystal oscillator V13A is fed to the signal input cathode and to the other grid. This arrangement cancels the high-frequency injection signal energy within the mixer and translates the band-pass i-f signal to desired operating band.

3.2.4 R-F AND ALC CIRCUITS.

The slug-tuned circuits coupling V6 to V7, V7 to V8, and V8 to the power amplifier are ganged to the EXCITER TUNING control. The signal is amplified by the r-f amplifier, V7, and the driver, V8, to drive the power amplifier, V9 and V10. Output from the parallel power amplifiers is tuned by a pi-network and fed to the antenna through contacts of transmit-receive relay K3. Negative r-f feedback from the PA plate circuit to the driver cathode circuit reduces distortion in the output signal. Both the driver and PA stages are neutralized to ensure stability. When r-f driving voltage to the PA becomes great enough that positive peaks drive the PA grids positive, the grids begin to draw current and the signal is detected. This produces an audio envelope. The audio is rectified by the alc rectifier, V17A, which is connected to produce a negative d-c voltage. The voltage is filtered by C159, C160, R118, and R119, which also determine time constant, and used to control the gain of V4A and V7. This system allows a high average level of modulation without driving the PA tubes well into the grid current region which would result in increased distortion.

3.3 RECEIVER CIRCUITS.

3.3.1 R-F CIRCUITS.

Signal input from the antenna is connected through relay contacts to the tuned input circuit, T3. The signal is applied from T3 to the grid of the receiver-transmitter r-f amplifier, V7. Amplified signal from V7 is. applied from the tuned circuit consisting of L10 and band switch selected capacitors to the grid of the receiver first mixer, V13B.

3.3.2 RECEIVER MIXERS.

The input r-f signal is fed to the grid of V13B, and the high-frequency oscillator injection signal is fed to the cathode of V13B. The difference product of the first mixer is applied from the plate of the tube to variable i-f transformer T2. Output of T2 in the range of 2.955 to 3.155 megacycles is applied to the grid of the second receiver mixer, V17B, across parallel-tuned trap circuit Z5. This trap circuit minimizes a spurious response which would otherwise result from harmonics of the high-frequency crystal oscillator. When signal input is applied to the grid of V17B and vfo injection signal is applied to the cathode of V17B, the 455-kc difference product is fed from V17B plate to mechanical filter FL1.

3.3.3 I-F CIRCUITS.

The output from FL1 is applied to the grid of the first i-f amplifier, V1B. The i-f signal is amplified by V1B and V3B and applied through T5 to avc rectifier V15A and the grid of product detector V15B. Beat-frequency oscillator signal is applied to the cathode of V15B, and the product of mixing is the detected audio signal. Output of the avc rectifier circuit is applied to the two receiver i-f amplifiers and through contacts of relay K4 to the receiver-transmitter r-f amplifier. This avc voltage controls the gain of the receiver and prevents overloading.

3.3.4 A-F CIRCUITS.

Output from the product detector is applied through the A.F. GAIN control, R92, to the grid of the first a-f amplifier, V16A. Amplified audio output of V16A is coupled to the grid of the a-f output amplifier, V16B, which produces the power to operate speaker, headphones, or phone patch.

3.4 OSCILLATORS.

The transceiver contains five oscillators. They are the tone oscillator, the beat-frequency oscillator, the variable-frequency oscillator, the high-frequency crystal oscillator, and the crystal calibrator.

3.4.1 TONE OSCILLATOR.

The tone oscillator operates when the EMISSION switch is in LOCK, TUNE, or CW position. It is a phase-shift oscillator operating at approximately 1500 cps. Its output is fed to the transmitter audio circuits for tuneup signal and to the balanced modulator to produce a carrier frequency 1500 cps removed from the dial reading. This signal allows carrier to be applied to the power amplifier grids for CW or tuneup. Some of the output from the tone oscillator is applied to the receiver audio circuits for sidetone monitoring in CW operation.

3.4.2 BEAT-FREQUENCY OSCILLATOR.

The bfo is crystal controlled at either 453.650 or 456.350 kilocycles, depending upon whether Y16 or Y17 is selected by EMISSION switch section S9H. The unused crystal is shorted out by this switch section. These crystal frequencies are matched to the pass band of the mechanical filter, FL1, so that the carrier frequency is placed approximately 20 db down on the skirts of the filter response. This 20-db carrier attenuation is in addition to the 30-db suppression provided by the balanced modulator.

3.4.3 VARIABLE-FREQUENCY OSCILLATOR.

The vfo uses fixed capacitance and variable inductance to tune the range of 2.5 to 2.7 mc. The series combination of capacitor C308 and diode CR301 is connected in parallel with capacitor C303. The diode switches C308 into or out of the circuit, depending upon the polarity of a bias voltage impressed across the diode junction. When USB emission is selected, the bias is positive and C308 is switched into the circuit. The capacitor then is adjusted to shift the vfo frequency by an amount equal to the frequency separation of bfo crystals Y16 and Y17. This allows the selection of either sideband without upsetting tuning or dial calibration.

3.4.4 HIGH-FREQUENCY CRYSTAL OSCILLATOR.

The high-frequency crystal oscillator, V13A, is crystal controlled by one of 14 crystals selected by BAND switch S2. Output from the high-frequency crystal oscillator is fed to the transmitter second mixer and to the crystal oscillator cathode follower. The cathode follower provides isolation and impedance match between the crystal oscillator and the receiver first mixer cathode. The output frequency of this oscillator is always 3.155 mc higher than the lower edge of the desired band. This high-frequency injection signal is the crystal fundamental frequency for all desired signals below 12 megacycles, but for operating frequencies higher than 12 mc, the crystal frequency is doubled in the plate circuit of the oscillator. Instructions for calculating crystal frequencies for the desired bands are given in section II.

3.4.5 CRYSTAL CALIBRATOR.

The 100-kc crystal calibrator, V12A, is the pentode section of a type 6U8A tube. Its output is coupled to the antenna coil, T3. The calibrator may be trimmed to zero beat with WWV by adjustment of capacitor C76.

3.5 VOX AND ANTI-VOX CIRCUITS.

Audio output voltage from the second microphone amplifier, V11B, is coupled to the VOX GAIN control, R39. A portion of this voltage is amplified by vox amplifier V14B and fed to vox rectifier which is one of the diodes of V14. The positive d-c output of the vox rectifier is applied to the grid of vox relay amplifier V4B, causing it to conduct current and actuate the vox relay, K2. Contacts of K2 switch the receiver antenna lead, the other relay coils, and the -70-volt d-c muting and bias voltage. Relays K3 and K4 switch the metering circuits from receive to transmit, the low plate voltages from receive to transmit tubes, and the avc and alc leads.

The antivox circuit provides a threshold voltage to prevent loudspeaker output (picked up by the microphone circuits) from tripping the KWM-2/2A into transmit function. Some of the receiver output audio voltage is connected through C235 to the ANTI-VOX GAIN control, R45. Signal from the slider of this potentiometer is rectified by the antivox rectifier, which is the other diode of V14. Negative d-c output voltage from the antivox rectifier, connected to the grid of V4B, provides the necessary antivox threshold. ANTI-VOX GAIN control R45 adjusts the value of the antivox voltage threshold so that loudspeaker output will not produce enough positive d-c output from the vox rectifier to exceed the negative d-c output from the antivox rectifier and cause V4B to actuate K2. However, speech energy into the microphone will cause the positive vox voltage to overcome the negative antivox voltage and produce the desired action of K2.

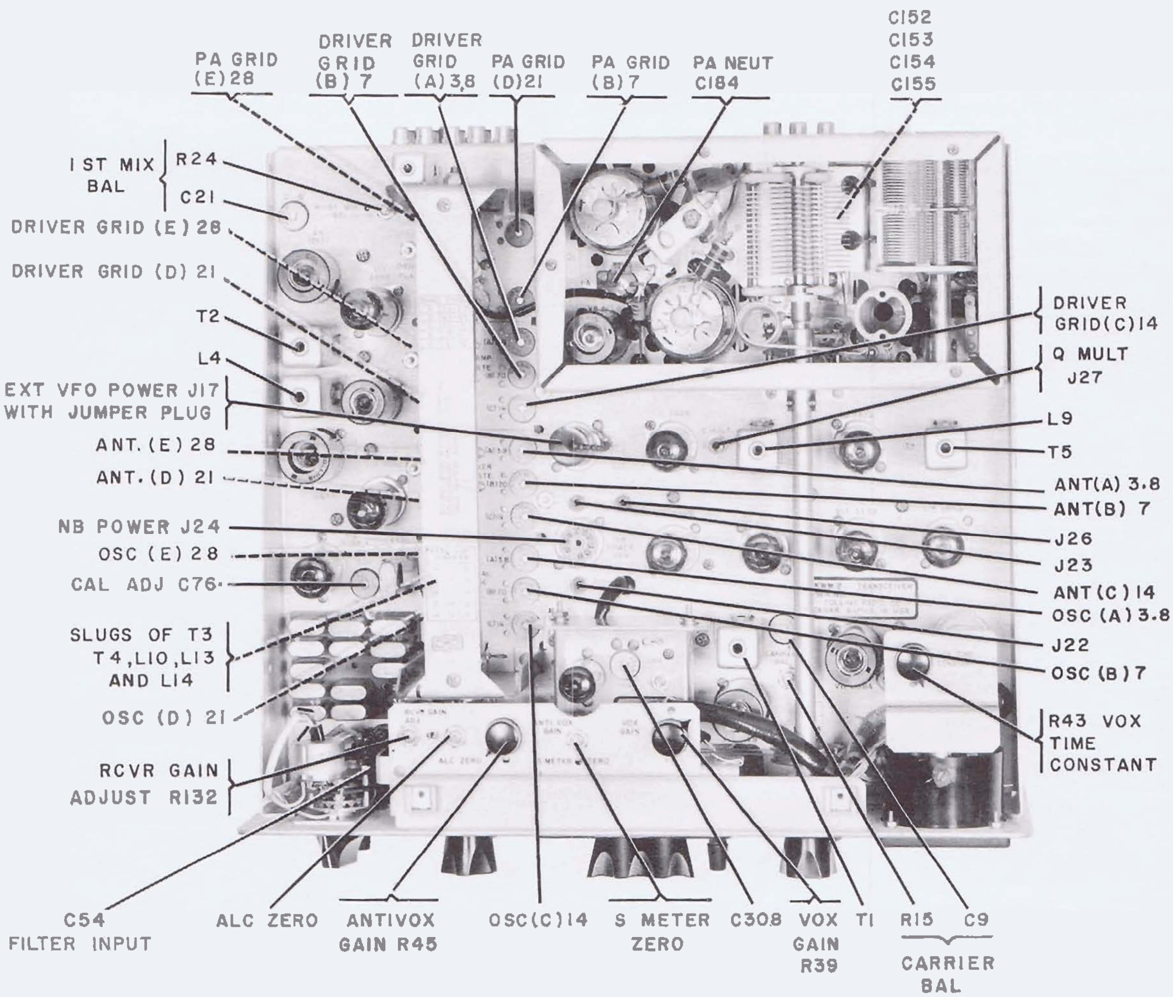


Figure 4-1. Location of Adjustments

SECTION IV
SERVICE INSTRUCTIONS

4.1 GENERAL.

Included in this section are signal tracing procedures, alignment and neutralization procedures, and voltage and resistance measurements. If any soldered parts are removed or replaced at terminals to which diodes CR1, CR2, CR3, or CR4 are connected, be sure to attach an alligator clip to the diode lead. This acts as a heat sink to protect the diode.

To remove the transceiver chassis from the cabinet, lift the lid and remove the two Phillips-head screws located between the lid fasteners. Remove the four feet and the screw located midway between the rear feet. From the rear, push the chassis forward until the front panel protrudes from the cabinet about an inch. Grasping the front panel at the edges, carefully slide the chassis out of the cabinet.

4.2 TRANSMITTER SIGNAL TRACING.

Table 4-1 lists appropriate signal generator connection points and normal signal levels. Figure 4-1 shows

TABLE 4-1. TRANSMITTER SIGNAL LEVELS

SIGNAL GENERATOR CONNECTION POINT	BAND-SWITCH POSITION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR OUTPUT VOLTAGE
V8-2 (grid)	3.8	3.9 mc	0.5 volt
	7.2	7.3 mc	0.41 volt
	14.2	14.3 mc	0.5 volt
	21.4	21.5 mc	0.2 volt
	28A	28.6 mc	0.75 volt
V7-1 (grid)	3.8	3.9 mc	40,000 microvolts
	7.2	7.3 mc	22,000 microvolts
	14.2	14.3 mc	43,000 microvolts
	21.4	21.5 mc	30,000 microvolts
	28A	28.6 mc	32,000 microvolts
	28B, 28C	According to crystal used	
V6-2 (grid)	14.2	3.055 mc	32,000 microvolts
V5-2 (grid)	14.2	3.055 mc	62,000 microvolts
V4A-6 (grid)	14.2	455 kc	12,000 microvolts
For following, disconnect signal generator, remove J16 short, set EMISSION switch to TUNE, and adjust MIC GAIN for grid current threshold. Measure with a-c vtvm or calibrated oscilloscope.			
V3A-7 (cathode)	Any	*1500 cps	0.014 volt
V3A-9 (grid)	Any	*1500 cps	0.06 volt
V11B-9 (grid)	Any	*1500 cps	2.8 volts
For following, turn EMISSION switch to USB, and connect audio oscillator to J11 through a 40-db pad. Set MIC GAIN fully clockwise, and adjust audio oscillator output for PA grid current threshold. Measure input at oscillator output with a-c vtvm.			
V1A-9 (grid) or J11 PHONE PATCH	Any	1500 cps	35 millivolts through a 40-db pad
For following, short J16 to ground; peak EXCITER TUNING for each band; and measure at test point with vtvm.			
V6-3	3.6		1.0 to 1.8 volts
	7.0		1.0 to 1.4 volts
	14.0		1.0 to 1.4 volts
	21.2		1.0 to 1.4 volts
	38.5		1.0 to 1.4 volts
V5-2 or 7	Vfo set at 100		1.0 to 1.4 volts
Wiper of R15	Any		1.0 to 1.4 volts

*Frequency of internal tone oscillator.

location of adjustments. Before making measurements, set EMISSION switch to USB, and disable the power amplifier by disconnecting the jumper between J5 and J6 and removing the high-voltage rectifier tube from its socket. Set meter switch to GRID. Peak EXCITER TUNING and turn VOX GAIN control full counterclockwise. Short PTT jack J16 to ground to key the KWM-2/2A to transmit. Connect signal generator output to points indicated in table 4-1, and adjust signal generator output attenuator until PA grid current just begins to show on the meter. Attenuator reading is signal voltage necessary at that point. Voltages given in the table are nominal and may vary ±20%. Be careful, each time, to set signal generator to frequency shown in the table. Oscillator output voltage may be measured with a vacuum-tube voltmeter.

4.3 RECEIVER SIGNAL TRACING.

Table 4-2 lists significant test points and normal signal levels. Figure 4-1 shows location of test points and adjustments. All r-f and i-f measurements were made by connecting a vacuum-tube voltmeter to the avc bus and increasing signal generator output until the avc threshold is reached. The avc threshold voltage is the point at which the d-c vtvm indication just changes with increased signal level. The receiver was tuned to 14.1 mc for these measurements and test signal injected at indicated test points. Signal voltage values are taken from signal generator output attenuator. All values are nominal and may vary ±20% without degrading performance.

4.4 VOLTAGE AND RESISTANCE MEASUREMENTS.

Table 4-3 lists voltage and resistance of all tube sockets of the KWM-2/2A except that of the vfo tube, V301. DO NOT OPEN the oscillator can. Refer to figure 7-3 for location of tube sockets. Measurements were made under the following conditions:

a. All measurements with vtvm and with all tubes in sockets. Unless otherwise noted in table, all measurements made with R.F. GAIN at maximum, A.F. GAIN at minimum, EMISSION switch in USB position, BAND switch in 14.2 position, vfo dial at 100, OFF-ON-NB-CAL switch in ON position. All voltages on transmitter tubes are taken with PTT jack J16 shorted to ground and MIC GAIN control full counterclockwise, but not far enough to close S14.

b. Resistances of less than 0.9 ohm listed as zero.

c. Voltage measurements made with the tube under test operating normally, J16 shorted to ground, no audio input to transmitter, no transmitter power output.

d. Resistance measurements made with power supply plug removed from J13.

e. All measurements made from tube sockets pin to ground.

f. When two voltages are given for same tube pin, the first is for receive condition and the second for transmit condition.

WARNING

Do not attempt any measurements of power amplifier plate voltage without special high-voltage test probe. Voltage here is 800 volts d-c. Do not make any other voltage or resistance measurements on KWM-2/2A with high voltage applied. Remove high-voltage rectifier from socket in power supply.

4.5 ALIGNMENT PROCEDURES.

4.5.1 TRANSMITTER CIRCUITS ALIGNMENT.

If only touch-up alignment is necessary, and if the transmitter develops enough drive to provide any

TABLE 4-2. RECEIVER SIGNAL LEVELS

TEST POINT	FREQUENCY	VOLTAGE	TEST POINT	FREQUENCY	VOLTAGE
V15B-8	455 kc	1.1 volts	V13B-8	High-frequency oscillator injection signal (17.155 mc)	1.8 to 3.0 volts*
V15B-9	455 kc	1.4 volts*			
V3B-6	455 kc	8000 microvolts	V13B-9	14.1 mc	55 microvolts
V1B-6	455 kc	220 microvolts	V7-1	14.1 mc	6.5 microvolts
V17B-9	2.5-2.7 mc	0.6 volt*	J2 (RCVR ANT) or J1 (OUTPUT)	14.1 mc	2.3 microvolts
V17B-8	3.055 mc	180 microvolts			

*Oscillator injection voltage, measured with r-f vacuum-tube voltmeter.

TABLE 4-3. VOLTAGE AND RESISTANCE MEASUREMENTS

TUBE		PIN NUMBER 1	2	3	4	5	6	7	8	9	PLATE CAP
V1	D-C V	290/-4**	200/-3.8**	2.6	-	0	-1.4/-18	0.45	33/30	-0.3/-0.35	
	A-C V				6.3	0					
	Ohms	9K	34K	10 to 1K	0	0	4.7 meg	180	80K	1 meg	
V2	D-C V	290/255	0	150***	-	0	140***	4.2***	125/105	125/105	
	A-C V		6.5***		6.3	0					
	Ohms	9K	650K	110K	0	0	58K	∞	6.5K	52K	
V3	D-C V	230/-4**	120/-3.4**	0.5/0	-	0	-1.4/-18	.15/7**	-0.4/210	0	
	A-C V				6.3	0					
	Ohms	14K	39K	47	0	0	4.7 meg	1K	10K	0 to 250K	
V4	D-C V	-0.3/260	0/95	0.1/0.7	-	0	-1.0/-1.0	18/0	290/90	0/-0.7	
	A-C V				6.3	0					
	Ohms	8K	23K	130	0	0	1.5 meg	2K	21K	∞	
V5	D-C V	290/250	-55/-0.05	0/2.1	0	0	285/245	-55/-0.05	0/2.2	-	
	A-C V				0	0				6.3	
	Ohms	9K	480K	240	0	0	9K	480K	240	0	
V6	D-C V	0.3/220	-2.0/0	0/1.9	0	0	-0.3/220	-1.9/0	0/1.9	0	
	A-C V				6.3	6.3				0	
	Ohms	10K	98K	225	0	0	10K	98K	220	0	
V7	D-C V	-1.5/-1.5	0	0	0	250/230	108/100	0			
	A-C V			6.3	0						
	Ohms	3.6 meg	0	0	0	10K	27K	0			
V8	D-C V	0/4	-55/0	-0.4/145	0	0	300/285	0	-0.4/145	-55/0	
	A-C V				0	6.3					
	Ohms	150	15K	30K	0	0	8.3K	0	30K	15K	
V9	D-C V	0/0.02	0	-0.4/240	0	-55	0/0.02	0	0		
	A-C V		0					6.3			
	Ohms	2	0	7.8K	2	27K	2	0	0		∞
V10	D-C V	0/0.02	0	-0.4/240	0	-55	0/0.02	0	0		
	A-C V							6.3			
	Ohms	2	0	7.8K	2	27K	2	0	0		∞
V11	D-C V	96/86	-5.3/-4.7	70/65	0	0	195/185	0	2/1.8	0	
	A-C V				6.3	0					
	Ohms	55K	95K	230K	0	0	17K	0	1K	480K	
V12	D-C V	285/-4**	0.1/-0.4	300/-4**	0	0	300/-4**	32/0.7	110/1.2	100/-9	
	A-C V				6.3	0					
	Ohms	9K	1 meg	120K	0	0	240K	1 meg	6.8K	55K	
V13	D-C V	155/250	-10/-9	230/200	0	0	300/285	0	1.8/0	0	
	A-C V				6.3	0					
	Ohms	20K	1 meg	51K	0	0	8K	0	150	200K	
V14	D-C V	-0.5	0.9	1.8/2.2	0	0	-0.1	80/72	-0.1	0.65/0.6	
	A-C V				6.3	0					
	Ohms	∞	0 to 500K	∞	0	0	270K	120K	0 to 250K	330	
V15	D-C V	-1.8/-19	2.8/2.5	2.8/2.5	0	0	-1.8/-19	130/180	-0.4/-58	1.5/0	
	A-C V				6.3	0					
	Ohms	3.4 meg	5.6K	5.6K	0	0	3.4 meg	43K	1 meg	820	
V16	D-C V	3/2.8	1.8/1.5	92/88	0	0	2.2/2.0	0	110/105	200/180	
	A-C V				6.3	0					
	Ohms	5.6K	2.3 meg	220K	0	0	68	470K	22K	10K	
V17	D-C V	-0.8	2.65/2.4	-0.8	0	0	-1.5/-1.6	300/-4**	0/-58	3.8/0.2	
	A-C V				0	6.3					
	Ohms	∞	2300*	∞	0	0	2.3 meg	8.5K	100K	1K	

*Selected in final test.
**Receive B+ line may vary from -0.2 to -10 volts in transmit function.
***EMISSION switch in TUNE position.

grid current indication, touch-up alignment of capacitive trimmers is satisfactory. If the rear slug, L14, must be adjusted to provide adequate grid current on the 14-mc band (see paragraph 4.5.1.4, step h), it will be necessary to realign the capacitor trimmers for the 14-mc, 21-mc, and 28-mc bands as in paragraph 4.5.1.4.

4.5.1.1 TEST EQUIPMENT REQUIRED. A signal generator, a vacuum-tube voltmeter, a general coverage communications receiver, and a 100-watt, 50-ohm dummy load are required for complete alignment and neutralization.

4.5.1.2 455-KC I-F ALIGNMENT. (Refer to figure 4-1 for location of adjustments.)

a. Disconnect the high voltage (800 volts) from the transmitter by removing the high-voltage rectifier tube from the power supply.
b. Disable the screen circuit of the PA tubes by unsoldering one end of the jumper between the PA DISABLE jacks, J5 and J6.
c. Connect an r-f vtvm from pin 2 of V5 to ground.
d. Set EMISSION switch to TUNE. Turn MIC GAIN off.
e. Any voltage reading on the vtvm is due to carrier. Adjust carrier balance potentiometer R15 for minimum vtvm indication.
f. Set MIC GAIN to full on.
g. Start with the bottom slug nearly out and peak primary and secondary of T1 for peak vtvm reading.

NOTE

The bottom slug may be adjusted to produce two peaks. Set to the peak which occurs with the slug nearest the bottom of the can.

h. Adjust filter input trimmer C54 for peak vtvm reading. Disconnect vtvm.
i. Plug in high-voltage rectifier and restore PA screen voltage.

4.5.1.3 BAND-PASS I-F ALIGNMENT.

a. Turn on KWM-2/2A. Set EMISSION switch to TUNE. Tune and load KWM-2/2A into a dummy load at 14.3 mc. Switch meter to GRID position.
b. Make a swamping tool by connecting a 1000-ohm resistor and a 0.01-uf capacitor in series and connecting clips to their free pigtails. Connect the swamping tool across terminal 3 (secondary winding) of T2 to ground. This terminal is connected to the T2 end of coupling capacitor C25.
c. Keep grid current to approximately midscale or lower by adjusting MIC GAIN control, and peak the primary of T2 with tuning tool such as Walsco 2543. The primary slug for T2 is at the bottom of the can. Use grid current as peak indication.
d. Remove the swamping tool from the secondary of T2, and connect it across the primary of T2 (between pins 1 and 6 of the first mixer, V5). Peak the secondary of T2 (slug at top of shield can). Remove the swamping tool.
e. Retune and reload at 14.255 mc. Without swamping any of the tuned circuits, peak L4 for grid current indication.

4.5.1.4 R-F CIRCUITS ALIGNMENT.

a. Adjust all ceramic trimmer capacitors including the three below the chassis to 1/2-maximum capacitance, except as follows: DO NOT change the setting of CARRIER BAL capacitor, and set 3.8-mc trimmers C70, C37, C109, and C130 to 2/3-maximum capacitance. Maximum capacitance of these trimmers occurs when the large, square notch is aligned toward a point midway between the two mounting screws. One-half capacitance occurs with the notch pointed directly at the front or rear of the unit. Two-thirds capacitance occurs with the notch turned off the half-point toward the mounting screws. Refer to figure 4-2.
b. Connect the KWM-2/2A output to a 50-ohm dummy load. Set the dial to 100, BAND switch to 3.6, and EXCITER TUNING control to 2.1 on the logging (lower) scale. Set meter switch to GRID and EMISSION switch to LOCK.

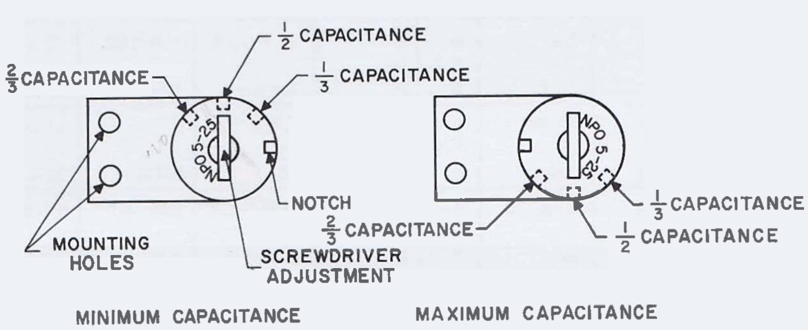


Figure 4-2. Ceramic Trimmer Capacitors

CAUTION

Keep MIC GAIN setting low to protect PA. Check frequently to be sure the PA is resonated.

c. Adjust MIC GAIN control for approximately 1/4-scale grid current. Tune and load the PA into the dummy load.

d. Adjust all slugs, except the rear one, for maximum grid current. Reduce MIC GAIN setting as necessary to keep the grid current indication below 1/4 scale. Make no adjustment to the rear slug, L14, at this time. Return MIC GAIN control to minimum setting.

NOTE

If slugs must be turned more than two turns in either direction, the unit has troubles other than alignment. Trouble-shoot the unit.

e. Set dial to 150, BAND switch to 7.0, and EXCITER TUNING to 3.6 on the logging (lower) scale.

f. Adjust MIC GAIN for 1/4-scale grid current. Tune and load the PA into the dummy load. Adjust the 7-mc trimmers for peak grid current, keeping grid current below 1/4 scale with MIC GAIN control. Return MIC GAIN to minimum position.

g. Set BAND switch to 14.0, dial to 150, and EXCITER TUNING to 6.1 on logging (lower) scale. Adjust MIC GAIN for 1/4-scale grid current. Tune and load PA into dummy load.

h. Tune the rear slug, L14, for maximum grid current, keeping the current at 1/4 scale or less with the MIC GAIN control.

i. Adjust all 14-mc trimmers for peak grid current, keeping current below 1/4 scale with MIC GAIN control. Return MIC GAIN control to minimum setting.

j. Set BAND switch to 21.2, dial to 100, and EXCITER TUNING to 7.6 on logging (lower) scale. Set grid current to 1/4 scale, and tune and load the PA into the dummy load.

k. Adjust all 21-mc trimmers for peak grid current, keeping grid current at 1/4 scale or less with the MIC GAIN control. Return the MIC GAIN control to minimum setting.

l. Set BAND switch to 28A, dial to 100, and EXCITER TUNING to 9.0 on the logging (lower) scale. Set grid current to 1/4 scale with MIC GAIN control and tune and load the PA into dummy load.

m. Adjust all 28-mc trimmers for maximum grid current, keeping grid current at 1/4 scale with the MIC GAIN control. Return MIC GAIN to minimum position.

4.5.1.5 CRYSTAL OSCILLATOR ALIGNMENT.

a. This procedure is a refinement which peaks the oscillator plate circuits in the center of the 200-kc tuning range. Turn the tuning dial to 100.

b. Set BAND switch to 28A. Adjust EXCITER TUNING control for a peak on the PA grid current meter. Set EMISSION switch to TUNE. Increase MIC GAIN setting, if necessary, to obtain grid current indication.

c. Repeak the (E)28 trimmer in the crystal oscillator plate circuit.

d. Set the BAND switch to 21.2, and adjust EXCITER TUNING control for peak in grid current.

e. Repeak the (D)21 trimmer in the oscillator plate circuit.

f. Repeat this procedure with BAND switch settings of 14.0, 7.0, and 3.6, adjusting the crystal oscillator plate circuit trimmers, (C)14, (B)7.0, and (A)3.8 respectively.

4.5.1.6 PA NEUTRALIZING.

a. Disable PA plate and screen circuits as in paragraph 4.5.1.2., steps a and b.

b. Connect a 50-ohm, noninductive, 100-watt dummy load to OUTPUT jack J1.

c. Connect vtvm probe across dummy load.

d. Set BAND switch to 28A, and meter switch to GRID. Set EMISSION switch to LOCK and dial to 100.

e. Advance MIC GAIN setting full clockwise. Adjust EXCITER TUNING and P.A. TUNING for maximum r-f voltage indication on the vtvm. This level may be less than 0.5 volt.

f. From the bottom of the chassis, adjust the PA neutralizing capacitor, C184, for a dip in the vtvm indication. This voltage is PA plate feedthrough.

g. Remove the r-f probe connection from across the load.

4.5.1.7 DRIVER NEUTRALIZING.

a. Connect the high-voltage plate supply to the PA tubes by replacing the rectifier tube. Connect the jumper between J5 and J6 (PA DISABLE) jacks to energize PA screen grids.

b. Remove the filament voltage to the driver tube, V8, by unsoldering L29 from C241. See figure 6-3. If an old 6CL6 tube, having no short circuits, is available, clip off its filament pins and substitute it for V8.

c. Connect the r-f probe of the vtvm across the dummy load at J1. Connect a piece of insulated wire to the r-f probe tip and wrap two turns around the ungrounded end of the dummy load. Ground the probe case to the common ground.

d. Set the BAND switch to 14.0, EMISSION switch to LOCK, and meter switch to PLATE.

e. Adjust the bias control in the power supply for 40-ma no-signal PA plate current. It will be necessary to have the EMISSION switch in LSB or USB position and MIC GAIN full counterclockwise for this adjustment. Reset EMISSION switch to LOCK position. Set meter switch to PLATE position.

f. Increase MIC GAIN setting, and adjust EXCITER TUNING and P.A. TUNING controls for maximum voltage across the 50-ohm dummy load. This level will be less than 0.3 volt.

g. Adjust the driver neutralizing capacitor, C117, for a voltage dip. This capacitor is located on the shield partition closest to the shield can. Refer to figure 6-3.

h. Restore V8 to normal operation.

4.5.1.8 FEEDBACK NEUTRALIZING.

a. Set BAND switch to 28A position, EMISSION switch to TUNE, and meter switch to PLATE position.

b. Adjust EXCITER TUNING control for a peak in PA plate current.

c. Dip the PA plate current with the P.A. TUNING control.

d. Switch to LOCK and repeat steps b and c.

e. Adjust the feedback neutralizing capacitor, C120 (on driver-PA shield below chassis and farthest from shield cans), until PA plate current dip and grid current dip coincide. Readjust the MIC GAIN as necessary to hold PA grid current at about half scale during this adjustment.

f. Set BAND switch to 21.2, peak EXCITER TUNING control, and dip PA plate current with P.A. TUNING control.

g. Check that PA plate current dip and grid current dip occur at same setting of P.A. TUNING control.

h. Repeat this check on bands 14.2, 7.0, and 3.6.

4.5.1.9 VFO SIDEBAND FREQUENCY-SHIFT ADJUSTMENT.

a. Set BAND switch to 3.6 position. Set EXCITER TUNING to approximately 1.9 on logging scale. Set EMISSION switch to LSB, and set OFF-ON-NB-CAL switch to CAL position. Tune dial near 100 until calibrate signal is zero beat, and do not touch for following procedure.

b. Switch to USB; adjust C308 (on vfo) to zero beat.

4.5.1.10 CARRIER BALANCE ADJUSTMENT.

a. Set BAND switch to 3.8. Set dial to 100. Connect a 50-ohm, 100-watt, dummy load to transmitter output jack J1. Tune and load the transmitter.

b. Set EMISSION switch to LSB position. Turn MIC GAIN control full counterclockwise until the switch clicks.

c. Connect an r-f vtvm across the dummy load and set it to its lowest scale.

d. Key to transmit by shorting PTT jack J16 to ground. If vtvm indication is 0.2 volt or more, adjust CARRIER BAL potentiometer R15 and trimmer C9 until the vtvm indication is less than 0.2 volt. These adjustments interact, so adjust first one and then the other until neither produces any further decrease in vtvm indication.

e. If vtvm indication is still more than 0.2 volt, check first mixer balance as in paragraph 4.5.1.11.

f. If a vtvm is not available, use a communications receiver with S-meter. Couple the receiver loosely to the dummy load. Do this by connecting a short piece of insulated hook-up wire to the receiver input terminals. Set up the KWM-2/2A as in steps a and b. Move the receiver antenna wire closer to the dummy load until the S-meter indicates near full scale. Proceed as in steps b and d, adjusting R15 and C9 for carrier null. This method will provide adequate nulling of carrier but does not allow accurate determination of actual carrier suppression below maximum signal output.

g. Switch EMISSION switch to USB and check that the carrier is at null. If USB null differs appreciably from LSB null, rebalance on USB and recheck null on LSB. Repeat until carrier null is approximately the same on both sidebands.

4.5.1.11 FIRST MIXER BALANCE ADJUSTMENT.

a. Tune and load the transmitter into dummy load at 14.1 mc. Loosely couple a general coverage communications receiver to the transmitter output. Tune the communications receiver back and forth across 14.555 mc until the signal is heard.

b. Adjust the mixer balance potentiometer, R24, and the trimmer, C21, for minimum output. These adjustments interact, so adjust first one and then the other until neither produces further decrease in output.

4.5.1.12 ALC ZERO ADJUSTMENT.

a. Turn MIC GAIN full counterclockwise until switch clicks.

b. Set meter switch to ALC position.

c. Short PTT jack to ground.

d. Check alc bias at ALC jack with d-c vtvm. If this bias exceeds -1.8 volts ±20%, replace V17 to bring this voltage into correct limits. Adjust ALC ZERO potentiometer R30 (top of chassis near R45) until meter indicates zero.

4.5.1.13 PA LOADING TRIMMER ADJUSTMENTS.

These trimmer capacitors are adjusted to provide the required total output capacity for matching 50-ohm antenna loads on the amateur bands with the INCR LOAD control set at the 50 Ω mark. Normally, they will not need readjustment, since, when the PA is properly loaded, the tuning is relatively broad. If it is determined that adjustment is necessary, proceed as follows:

a. Refer to figure 7-3 for location of the loading trimmers. The relay cover must be removed to obtain access.

b. Connect a 50-ohm nonreactive dummy load to the transceiver RF OUT jack.

c. Set INCR LOAD control to 50 Ω mark.

d. Tune up at 21.3 mc, and set EMISSION switch to lock.

e. Set MIC GAIN to the point which begins to produce PA grid current. This is grid current threshold.

f. Adjust C155 until PA draws 230-ma plate current at the dip.

g. Tune up at 28.6 mc and check plate current. If not 230 ma, readjust C155 for best compromise between 21.3 and 28.6 mc.

h. Tune up at 14.150 mc, and set MIC GAIN as in step e.

i. Adjust C152 as in step f.

j. Tune up at 7.150 mc, and set MIC GAIN as in step e.

k. Adjust C153 as in step f.
l. Tune up at 3.700 mc, and set MIC GAIN as in step e.
m. Adjust C154 as in step f.
n. Turn off equipment and replace relay cover.

4.5.2 RECEIVER CIRCUITS ALIGNMENT.

If the transmitter circuits are aligned first, the r-f amplifier tuned circuits, the high-frequency crystal oscillator tuned circuits, the vfo sideband frequency-shift adjustment, and the band-pass i-f transformer alignment will already be completed for the receiver alignment. The only alignment remaining for the receiver circuits are the i-f alignment, the r-f gain adjustment, the S-meter zero adjustment, and crystal calibrator trimmer adjustment.

4.5.2.1 455-KILOCYCLE I-F ALIGNMENT.

a. Remove vfo tube V301 from socket.
b. Set EMISSION switch to USB.
c. Connect signal generator to pin 8 of V17B, and increase signal generator output until S-meter shows slight indication (S3). Rock the signal generator frequency to center the signal at the approximate center of the filter pass band.

NOTE

If a vtvm is available, it may be connected to avc bus and used as alignment peak indicator.

d. Adjust the slugs of L9 and T5 for peak indication on the S-meter. Reduce signal generator output as necessary to keep S-meter indication low. Repeak L9 and T5 as in any standard alignment procedure.
e. Replace vfo tube.

4.5.2.2 R-F GAIN AND S-METER ZERO ADJUSTMENTS.

a. Set receiver to middle of favorite operating band, and peak EXCITER TUNING control for maximum output. Set R.F. GAIN control (front panel) to maximum clockwise position. Tune calibrated signal generator to same frequency as receiver, and set A.F. GAIN control to maximum counterclockwise position.
b. Short RCVR ANT. jack J2 to ground; adjust S-METER ZERO potentiometer R121 so S-meter reads zero.
c. Remove short from J2, and apply 2.5 microvolts from calibrated signal generator with a 47-ohm, non-inductive resistor in parallel. Adjust RCVR GAIN ADJUST R132 until S-meter just kicks off zero (1/2 S-unit or less).
d. Repeat step b.

4.5.2.3 CRYSTAL CALIBRATOR ADJUSTMENT.

a. Tune WWV to zero beat at 15.0 mc at a time when station WWV is not transmitting a tone.
b. Turn the function switch to CAL position. Adjust CAL ADJUST trimmer C76 for zero beat of calibration signal.

4.5.2.4 VFO DIAL CALIBRATION. Calibrate the dial at 100. If, after calibrating the dial at 100, zero beat with the calibrate signal does not occur at 0 and 200 ±1 kc on the dial, there is end point spread. If there is no end point spread, but the hairline is not vertical when the dial is calibrated, a mechanical adjustment only is required. Refer to step h in the following procedure. To correct for end point spread, make the following adjustments:

a. Set OFF-ON-NB-CAL switch to CAL position, and tune in the calibrate signal for zero beat near 200 on the dial (on any band).
b. With ZERO SET knob, set hairline to 200.
c. Tune calibrate signal to zero beat at the 0 end of the dial. Note the difference in kilocycles between the hairline and dial 0 (example: -1.5 kc).
d. Without moving the hairline, set the dial to the opposite side of 0 by an amount equal to the error noted above (example: +1.5 kc).
e. Adjust L302 for zero beat. The slug-tuned inductor, L302, is accessible at the top of the vfo can.
f. With ZERO SET knob, move the hairline to dial 0.
g. Tune the calibrate signal to zero beat at the 200 end of the dial. If zero beat does not occur at exactly 200, repeat steps b through e.
h. If, after adjustment of end points, the hairline is not vertical in the window, loosen the setscrews on the dial hub and move the dial with respect to the oscillator shaft so that zero beat occurs with the end points (0 and 200) set at center.
i. After these adjustments of the vfo calibration, make the vfo sideband frequency shift adjustment according to paragraph 4.5.1.9.

4.6 DIAL CORD REPLACEMENT. (Refer to figure 4-3.)

4.6.1 BAND SWITCH CORD.

a. Place BAND switch in position 2A. Remove all power from KWM-2/2A, and remove the PA compartment cover. Short the PA plates to ground with a screwdriver blade. Check to see that the movable contacts of both S7 and S8 are at positions 13 and 14. This may be determined by counting clockwise on the wafer from the X-mark, looking at the wafer on the side marked with the X, and beginning with the first position clockwise from the X-mark as 1. Count all positions, including the holes in the empty spaces where no lugs are mounted.
b. Use a knife blade or small screwdriver and pry open the tab far enough to release the old cord. This tab is located on the inner face of the pulley. Remove the broken or defective cord from the band-switch pulleys near the front panel; one is located above the chassis and the other below the chassis. Loosen the idler pulley so it will not be in the way during restringing.
c. Replace the old cord with three feet of new cord, Collins part number 432-1009-00. When ordering dial cord, be sure to state the desired length in feet.

d. String the cord according to the appropriate part of figure 4-3. Make sure the cord turns do not overlap on the pulleys. Pull the cord tight and tie to the tab. Mash the tab down to clamp the cord securely. Tighten the idler to bring the cord to tension.

e. Check again that the switch sections S7 and S8 are positioned properly according to the instructions of step a. If they are not, loosen the shaft coupler and turn the switch shaft to bring the contacts to proper position. Tighten the shaft coupler.

f. Apply a little airplane cement on the dial cord knots to help keep them tight. After the cement is dry, trim the loose end back NO CLOSER than one-half inch from the knot.

4.6.2 LOADING CAPACITOR CORD.

a. Place INCR LOAD control at 10 on the logging scale. This positions the INCR LOAD control horizontally and points it at the meter. Remove all power from the KWM-2/2A, and remove the PA compartment top cover. Short the PA plate caps to ground with a screwdriver blade. Check that the loading capacitor is fully meshed. If not, position the capacitor plates manually so they are fully meshed.

b. Use a knife or small screwdriver and pry the tab open far enough to release old cord. Remove broken or defective dial cord from loading capacitor pulleys.

c. Replace the old cord with two feet of new cord, Collins part number 432-1009-00. When ordering dial cord, be sure to state the desired length in feet.

d. String the cord according to the appropriate part of figure 4-3. Make sure the cord turns do not overlap on the pulleys. Pull the cord tight and tie to the tab. Mash the tab down to clamp the cord securely.

e. Check to see that the INCR LOAD control is at 10 on the logging scale, and that the loading capacitor is fully meshed. If not, loosen the shaft coupler, mesh capacitor plates manually, and retighten the coupler.

f. Apply a little airplane cement on the knots in the dial cords to help hold them tight. After the cement is dry, trim the loose ends back NO CLOSER than one-half inch from the knot.

4.7 RELAY MAINTENANCE.

Gradual accumulations of dust, lint, or oxidation may cause the contacts of relays to become high-resistance connections and degrade switching functions. If this happens, clean the contacts. Refer to figure 7-3 for relay contact arrangement. Clean the contacts with a contact cleaning tool which may be obtained from P.K. Neuses, Inc., Arlington Heights, Illinois, and Number 3-316. Be careful not to bend any of the contact springs. Observe the contacts in a dental mirror and press the armature down with thumb or finger. Check that all normally closed contacts have opened before any of the normally open contacts close. If this is not the case, the relay may have to be replaced. If the contact cleaning tool mentioned above cannot be obtained easily, a passable job may be done with a rough paper soaked in carbon tetrachloride. DO NOT use files, emery paper, or abrasives.

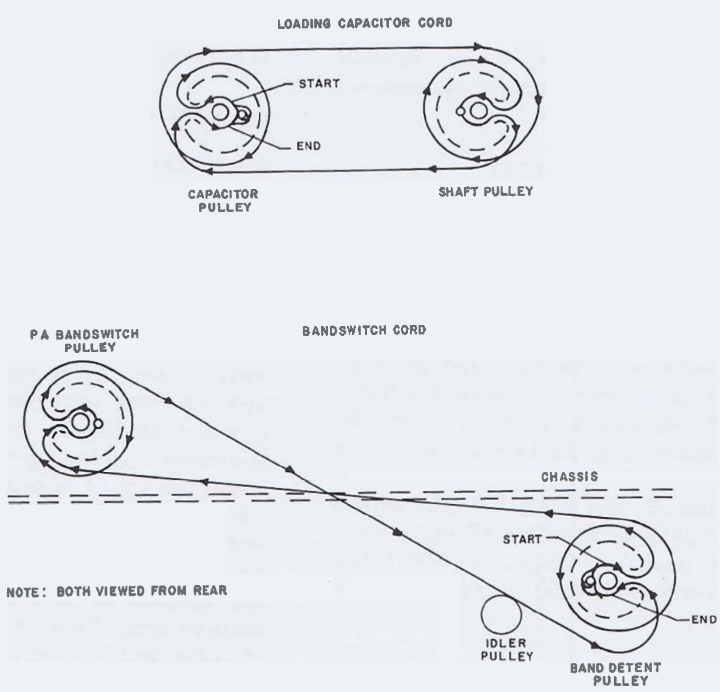


Figure 4-3. Dial Cord Stringing Diagram

SECTION V
SPECIFICATIONS

5.1 KWM-2 AND KWM-2A TRANSCEIVERS.

The KWM-2 and KWM-2A Transceivers are capable of covering any frequency within the ranges of 3.4 to 5.0 mc and 6.5 to 30.0 mc. With crystals furnished, they cover the entire amateur bands of 80, 40, 20, and 15 meters, the 28.5- to 28.7-mc portion of the ten-meter band, and WWV at 15.0 mc. The KWM-2 is equipped with 14 crystal sockets which are selectable from the front panel and provide 14 operating bands, each 200 kilocycles wide. The KWM-2A differs only in regard to the number of crystal sockets furnished, the method of switching crystals, and slight electrical and mechanical differences related to crystal switching. It is equipped with an extra crystal-mounting board which doubles the number of selectable crystal sockets. Crystals for added coverage may be plugged into spare sockets in either transceiver, or crystals for other bands may be substituted for those furnished.

5.2 REQUIREMENTS FOR OPERATION.

Either transceiver requires a 110-volt, 50- to 60-cycle-per-second, a-c power source and a power supply, such as the 516F-2, for fixed-station operation. It consumes approximately 235 watts of power from the line in receive function and approximately 475 watts in transmit function. The transceiver may be operated mobile by using a power supply, such as the MP-1 for 12-volt d-c operation or a 516E-2 for 24- to 28-volt operation. In mobile operation the transceiver requires 800 volts d-c at approximately 175 ma; a bias supply adjustable between -60 and -80 volts; and 6, 12, or 24 volts d-c filament supply at 11.0, 5.5, or 2.75 amperes respectively. Any high-impedance crystal or dynamic microphone may be used. A 4-ohm speaker is required. The antenna and feed system must present a 50-ohm load with swr not exceeding 2.0 to 1.

5.3 SPECIFICATIONS.

Frequency range	3.4 to 30.0 megacycles. With crystals furnished, bands are as follows: 80 meters -3.4 to 3.6 mc, 3.6 to 3.8 mc, and 3.8 to 4.0 mc. 40 meters - 7.0 to 7.2 mc and 7.2 to 7.4 mc. 20 meters - 14.0 to 14.2 mc, 14.2 to 14.4 mc and 14.8 to 15.0 mc (WWV). 15 meters - 21.0 to 21.2 mc, 21.2 to 21.4 mc, and 21.4 to 21.6 mc. 10 meters - 28.5 to 28.7 mc.
Mode	Single sideband (either sideband selectable) or CW.
Type of service	SSB-continuous; CW-50% duty cycle.
Power consumption from a-c line	235 watts in receive function 475 watts in transmit function.
Plate power input	175 watts PEP on SSB, 160 watts on CW.

Power output	100 watts PEP (nominal) into 50 ohms.
Microphone input impedance	High impedance.
R-f output impedance	50 ohms with not more than 2.0-to-1 swr.
R-f input impedance	50 ohms.
Matching speaker impedance	4 ohms.
Matching phone-patch impedance	500 to 600 ohms, receive output to phone patch; high impedance phone-patch input to transmitter.
Frequency stability	Total variation after warmup not more than 100 cps.
Calibration accuracy	1 kilocycle.
Keying	Break-in.
Audio-frequency response	300 to 2400 cps ±6 db.
Carrier suppression	Carrier 50 db down from output signal.
Unwanted sideband	50 db down from output signal.
Oscillator feedthrough or mixer products (undesired)	50 db down from output signal.
Second harmonic radiation	40 db down from output signal.
Third order distortion	30 db down from output signal.
Receiver sensitivity	0.5 microvolt for 10-db signal to noise ratio in amateur bands.
Receiver selectivity	2.1-kc bandwidth at 6 db down, 4.2-kc bandwidth at 60 db down.
Receiver spurious responses	Image rejection better than 50 db. Internal spurious signals below one microvolt equivalent antenna input.
Receiver output level	1.0 watt maximum.
Size	7-3/4 h, 14-3/4 w, 14 d.
Weight	18 pounds 3 ounces.

5.4 TUBE AND SEMICONDUCTOR COMPLEMENT.

TABLE 5-1. TUBES AND SEMICONDUCTORS

SYMBOL	FUNCTION	TYPE
V1A	First microphone amplifier	6AZ8
V1B	First receiver i-f amplifier	6AZ8
V2A	Vfo cathode follower	6U8A
V2B	Tone oscillator	6U8A
V3A	Microphone amplifier cathode follower	6AZ8
V3B	Receiver second i-f amplifier	6AZ8
V4A	Transmitter i-f amplifier	6AZ8
V4B	Vox relay amplifier	6AZ8
V5	First transmitter mixer	12AT7
V6	Second transmitter mixer	12AT7
V7	Receiver-transmitter r-f amplifier	6DC6
V8	Transmitter driver	6CL6
V9	Transmitter power amplifier	6146
V10	Transmitter power amplifier	6146
V11A	Beat-frequency oscillator	6U8A
V11B	Second microphone amplifier	6U8A

SYMBOL	FUNCTION	TYPE
V12A	Crystal calibrator	6U8A
V12B	Crystal oscillator cathode follower	6U8A
V13A	High-frequency crystal oscillator	6U8A
V13B	Receiver first mixer	6U8A
V14A	Vox rectifier (one diode), antivox rectifier (other diode)	6BN8
V14B	Vox amplifier	6BN8
V15A	Avc rectifier (both diodes)	6BN8
V15B	Product detector	6BN8
V16A	Receiver first a-f amplifier	6EB8
V16B	Receiver a-f output amplifier	6EB8
V17A	Alc rectifier (both diodes)	6BN8
V17B	Receiver second mixer	6BN8
V301	Variable-frequency oscillator	6AU6
CR1-CR4	Balanced modulator	1N34A
CR5	Receiver r-f trimming	HC7001
CR6	Calibrator harmonic generator	1N34A
CR7	Screen voltage gate	1N1490

5.5 AVAILABLE ACCESSORIES.

TABLE 5-2. AVAILABLE ACCESSORIES

ITEM	FUNCTION	COLLINS PART NUMBER
136B-2 Noise Blanker	Eliminates noise pulses when the noise components present on the antenna have energy distribution in the 40-mc portion of the spectrum and when the noise pulses have a repetition rate not in excess of 100,000 pulses per second.	522-1661-00
312B-3 Speaker	Station speaker.	522-1166-00
312B-4 Station Control	Speaker, phone patch, directional wattmeter, and station control switches.	522-1167-00
399C-1 External VFO	Speaker, extra 70K-2 vfo, and vfo control switches for operating transmitter and/or receiver in different portions of 200-kc band.	522-1597-00
312B-5 Station Control	Combination of features and functions of 312B-4 and 399C-1 accessories.	522-1668-00
351E-4 Mounting Plate	Mount on table or bench.	522-1482-003
351D-2 Mobile Mount	Mount for mobile operation	522-1726-00
516F-1 A-C Power Supply*	A-c power supply.	522-0847-00
516F-2 A-C Power Supply	A-c power supply.	522-1170-00
MP-1 D-C Power Supply	Mobile power supply for 12- to 14-volt source.	597-0380-00
516E-2 D-C Power Supply	Mobile power supply for 24- to 28-volt source.	522-0846-00
302C-3 Directional Wattmeter	Measure forward and reflected power.	522-1696-00
440E-1 Cable	Mobile power connections.	522-2051-00

*Use with special cable adapter, Collins part number 543-8791-00.

SECTION VI
PARTS LIST

KWM-2 and KWM-2A Transceivers

ITEM	DESCRIPTION	COLLINS PART NO.
	KWM-2 TRANSCEIVER	522-1611-00
	KWM-2A TRANSCEIVER	522-1792-00
C1, C17, C48, C56, C216, C224, C260, C269	CAPACITOR, CERAMIC: 0.02 uf, +100% -20%, 500 v dc	913-2142-00
C2	CAPACITOR, MICA: 220 uuf, ±10%, 500 v dc	912-2841-00
C3, C4, C24, C96, C100, C103, C127, C256	CAPACITOR, CERAMIC: 4700 uuf, +100% -20%, 500 v dc	913-3012-00
C5, C82, C228, C230, C241	CAPACITOR, CERAMIC: 1000 uuf, +80% -20%, 500 v dc	913-1292-00
C6, C160	CAPACITOR, CERAMIC: 0.47 uf, +80% -20%, 25 v dc	913-3804-00
C7, C8, C18, C19, C20, C28, C29, C43, C71, C75, C80, C89, C92, C104, C107, C108, C122, C126, C139, C146, C156, C158, C169, C188, C193, C195, C196, C201, C212, C222, C229, C232, C235, C252, C262, C263	CAPACITOR, CERAMIC: 10,000 uuf, +100% -20%, 500 v dc	913-3013-00
C9, C21, C36, C76, C116, C134, C136	CAPACITOR, VARIABLE, CERAMIC: 5 uuf min, 25 uuf max; 350 v dc	917-1073-00
*C10	CAPACITOR, MICA: 10 uuf ±10%, 500 v dc	912-2754-00
*C10	CAPACITOR, MICA: 12 uuf ±10%, 500 v dc	912-2757-00
*C10	CAPACITOR, MICA: 15 uuf ±10%, 500 v dc	912-2760-00
*C10	CAPACITOR, MICA: 20 uuf ±10%, 500 v dc	912-2766-00
*C10	CAPACITOR, MICA: 22 uuf ±10%, 500 v dc	912-2769-00
*C10	CAPACITOR, MICA: 27 uuf ±10%, 500 v dc	912-2775-00
*C10	CAPACITOR, MICA: 33 uuf ±10%, 500 v dc	912-2781-00
*C10	CAPACITOR, MICA: 39 uuf ±10%, 500 v dc	912-2787-00
*C10	CAPACITOR, MICA: 43 uuf ±10%, 500 v dc	912-2790-00
*C10	CAPACITOR, MICA: 47 uuf ±10%, 500 v dc	912-2793-00
*C10	CAPACITOR, MICA: 51 uuf ±10%, 500 v dc	912-2796-00
*C10	CAPACITOR, MICA: 56 uuf ±10%, 500 v dc	912-2799-00
*C10	CAPACITOR, MICA: 62 uuf ±10%, 500 v dc	912-2802-00
*C10	CAPACITOR, MICA: 68 uuf ±10%, 500 v dc	912-2804-00
*C10	CAPACITOR, MICA: 75 uuf ±10%, 500 v dc	912-2808-00
C11, C15, C23, C27, C40, C41, C44, C45, C59, C61, C62, C72, C83, C91, C124, C186, C187, C219, C220, C226, C234, C265	CAPACITOR, CERAMIC: 1000 uuf, +100% -20%, 500 v dc	913-3009-00
C12/13, C85/86, C132/147, C161/162, C163/164, C165/166, C167/190, C181/182, C191/192, C194/202, C197/200, C198/199, C203/204, C205/206, C207/208, C209/210, C236/237, C242/243, C244/245, C246/247, C250/251	CAPACITOR, CERAMIC: dual type, 0.01 uf, GMV, 500 v dc per section	913-3829-00
C14, C55	CAPACITOR, MICA: 100 uuf, ±5%, 500 v dc	912-2816-00
C16, C135	CAPACITOR, MICA: 33 uuf, ±10%, 500 v dc	912-2781-00
C22, C35	CAPACITOR, MICA: 22 uuf, ±5%, 500 v dc	912-2768-00
C25, C26	CAPACITOR, TUBULAR, CERAMIC: 6 uuf, ±1/2 uuf, 500 v dc	916-0122-00

*Selected in manufacture.

ITEM	DESCRIPTION	COLLINS PART NO.
C30, C31, C94	CAPACITOR, MICA: 10 uuf, ±10%, 500 v dc	912-2754-00
C32, C34, C37, C63, C65, C67, C68, C70, C109, C113, C115, C120, C129, C130, C184	CAPACITOR, VARIABLE, CERAMIC: 8 to 50 uuf, 350 v dc	917-1075-00
C33, C133	CAPACITOR, MICA: 130 uuf, ±5%, 500 v dc	912-2825-00
C38	CAPACITOR, MICA: 360 uuf, ±2%, 500 v dc	912-2854-00
C39, C117	CAPACITOR, VARIABLE, CERAMIC: 1.5 to 7 uuf, 350 v dc	917-1071-00
C42	NOT USED	
C46, C49, C90, C157, C211, C221, C227, C238	CAPACITOR, CERAMIC: 0.1 uf, +80% -20%, 500 v dc	913-3152-00
C47	CAPACITOR, PAPER: 0.047 uf, ±10%, 400 vdcw	931-0295-00
C50, C51, C52, C105	CAPACITOR, MICA: 470 uuf, ±5%, 500 v dc	912-2864-00
C53	CAPACITOR, MICA: 15 uuf, ±10%, 500 v dc	912-2760-00
C54, C57	NOT USED	
C58	CAPACITOR, MICA: 27 uuf, p/o Z5	
C60	CAPACITOR, MICA: 20 uuf, ±10%, 500 v dc	912-2766-00
C64	CAPACITOR, MICA: 120 uuf, ±5%, 500 vdcw	912-2823-00
C69, C121, C131, C217, C218	CAPACITOR, MICA: 220 uuf, ±5%, 500 v dc	912-2840-00
C73, C81	NOT USED	
C74	CAPACITOR, MICA: 47 uuf, ±5%, 500 v dc	912-2792-00
C76, C111	CAPACITOR, VARIABLE, CERAMIC: 3 uuf min, 12 uuf max, 350 v dc	917-1072-00
C77, C88	CAPACITOR, MICA: 510 uuf, ±5%, 500 v dc	912-2867-00
C79	CAPACITOR, CERAMIC: 3 uuf, ±1/2, 500 v dc	916-0145-00
C84, C101, C159, C225, C231, C253, C268, C273	CAPACITOR, CERAMIC: 0.1 uf, -30% +80%, 75 v dc	913-3794-00
C87, C261	CAPACITOR, MICA: 100 uuf, ±10%, 500 v dc	912-2817-00
C93	CAPACITOR, CERAMIC: 0.05 uf, GMV, 100 v dc	913-3679-00
C95	NOT USED	
C97, C266	CAPACITOR, MICA: 27 uuf, ±10%, 500 v dc (C266 used in KWM-2 only)	912-2775-00
C98, C99, C214, C215, C223	CAPACITOR, CERAMIC: 470 uuf, +100% -20%, 500 v dc	913-3007-00
C102	CAPACITOR, ELECTROLYTIC: 100 uf, -10% +75%, 6 v dc	183-1782-00
C106	CAPACITOR, ELECTROLYTIC: 30 uf, 20 uf, 15 uf; each -10% +40%, 350 v dc	183-1702-00
C110	CAPACITOR, MICA: 360 uuf, ±5%, 500 v dc	912-2855-00
C112	CAPACITOR, MICA: 240 uuf, ±2%, 500 v dc	912-2842-00
C114	CAPACITOR, MICA: 56 uuf, ±10%, 500 v dc	912-2799-00
C118, C138	CAPACITOR, CERAMIC: 1.0 uuf, ±1/4 uuf, 500 v dc	916-0070-00
C119	CAPACITOR, CERAMIC: 2 uuf, ±1/2, 500 v dc	916-0076-00
C123, C137	CAPACITOR, CERAMIC: Feedthrough type, 1000 uuf, ±10%, 500 v dc	913-4061-00
C125	CAPACITOR, MICA: 330 uuf, ±2%, 500 v dc	912-2851-00
C128	CAPACITOR, MICA: 51 uuf, ±10%, 500 v dc	912-2796-00
C140 thru C145, C248, C249	CAPACITOR, CERAMIC: 500 uuf, ±10%, 500 v dc	913-0998-00
C148, C149, C168	CAPACITOR, CERAMIC: 0.001 uf, +100% -20%, 2000 v dc	913-3537-00
C150	CAPACITOR, VARIABLE, AIR: plate meshing type, 12.0 uuf min. to 250.0 uuf max, 1000 v rms	920-0136-00
C151	CAPACITOR, VARIABLE, AIR: dual section, 13.5 uuf min to 452.3 uuf max ea section, 360 v ac, 60 cps min breakdown	920-0138-00
C152, C153, C154	CAPACITOR, VARIABLE, MICA: 100 uuf to 500 uuf, 1000 v dc	918-0006-00
C155	CAPACITOR, VARIABLE, MICA: 15 uuf to 120 uuf, 1000 v dc	918-0005-00
C171	CAPACITOR, MICA: 510 uuf (p/o T1)	
C172	CAPACITOR, MICA: 240 uuf (p/o T2)	
C173	CAPACITOR, MICA: 240 uuf (p/o T2)	
C174	CAPACITOR, MICA: 130 uuf (p/o T2)	
C175	CAPACITOR, MICA: 180 uuf (p/o L4)	
C176	CAPACITOR, MICA: 510 uuf (p/o L4)	

ITEM	DESCRIPTION	COLLINS PART NO.
C177	CAPACITOR, MICA: 180 uuf (p/o L9)	
C178	CAPACITOR, MICA: 510 uuf (p/o T5)	
C179	CAPACITOR, MICA: 510 uuf (p/o T5)	
C180, C183	CAPACITOR, CERAMIC: 10 uuf, ±10%, 5000 v dc	913-0972-00
C185, C189, C213, C233, C239, C240	NOT USED	
C254, C264	CAPACITOR, ELECTROLYTIC: 4 uf, -10%, +100%, 350 v dc	183-1783-00
C255	NOT USED	
C257	CAPACITOR, MICA: 12 uuf ±10%, 500 v dc	912-2757-00
C259	CAPACITOR, ELECTROLYTIC: 8 uf, -15% +100%, 25 v dc	183-1167-00
C267	CAPACITOR, MICA: 5 uuf, ±10%, 500 vdcw	912-2751-00
C272	CAPACITOR, MICA: 10 uuf, ±5%, 500 vdcw	912-2753-00
CR1, CR2, CR3, CR4, CR6	SEMICONDUCTOR DEVICE, DIODE: type 1N34A	353-0103-00
CR5	SILICON CAPACITOR: 8-88 uuf, +130 volts max, Hughes type HC7001	922-6002-00
CR7	SILICON RECTIFIER: type 1N1490	353-1659-00
DS1, DS2	LAMP, INCANDESCENT: 6.3 v, 0.15 amp; type 47	262-3240-00
E1 thru E5	CORE, ADJUSTABLE TUNING: ceramic; 0.5 to 32 mc; 1-1/4 in. lg core body, threaded stud type; 1/2 in. lg	288-2509-00
E6, E7	SHELL, ELECTRICAL CONNECTOR: below surface mtg; steel, cadmium pl, 2-1/16 in. by 1.172 in. by 0.781 in. overall	372-1761-00
E8	CLIP, CRYSTAL: beryllium copper; 0.009 in. thk; 3/8 in. w by 0.393 in. lg by 15/64 in. h; 0.120 in. dia mtg hole	504-8229-001
E9, E10, E13	SHIELD, ELECTRON TUBE: 9 pin medium cylindrical with flared end; open top; brass; 0.95 in. by 1.065 in.; incl beryllium copper insert	541-6554-003
E11	SHIELD, ELECTRON TUBE: 7 pin medium; brass; incl copper insert and hold-down spring	541-6551-003
E12	SHIELD, ELECTRON TUBE: 9 pin large, brass, incl copper insert and hold-down spring	541-6555-003
E14, E15, E16, E17, E18	RF COIL SLUG ASSEMBLY, FERRITE: 1/4 in. dia by 2-3/4 in. overall, incl screw, support wire and slug, for tuning T3, T4, L10, L13, and L14	288-2509-00
FL1	FILTER, BAND PASS: mechanical, 455.0 kc center frequency; 2.125 kc at 6 db, 5.3 kc at 60 db, terminal impedance, 17,000 ohms, resonating capacity 130 uuf nominal	526-9337-00
J1, J28	JACK: phono-type, ceramic insulation	360-0088-00
J2 thru J12, J16, J18 thru J23, J26, J27	JACK: phono-type, plastic insulation	360-0148-00
J13	POWER CONNECTOR: 11 pin male, chassis mounting	372-1950-00
J14	JACK, HEADPHONE: auxiliary contacts, 1 make, 1 break	360-0169-00
J15	JACK, MICROPHONE: 3 circuit, accepts PJ-068 plug	358-1050-00
J17, J24	SOCKET: 9 pin miniature, tube-type	220-1054-00
J25	CONNECTOR: 9 pin male, chassis mounting	372-1951-00
K1	NOT USED	
K2	RELAY, ARMATURE: 4 p dt, 14,000 ohm coil	970-1940-00
K3	RELAY, ARMATURE: antenna switching, dpdt, 10,000 ohm coil	970-1914-00
K4	RELAY, ARMATURE: 4 p dt and dpdt contacts, 10,000 ohm coil	970-1941-00
L1, L3, L7, L31, L33	COIL, RADIO FREQUENCY: 3 pi universal wound; unshielded; 2.0 mh ±10%	240-0084-00
L2	COIL, RADIO FREQUENCY: universal pi wound; 6 pies; 10 uh nom inductance	240-0199-00
L4	COIL, ASSEMBLY INTERMEDIATE FREQUENCY: 3.055 mc center freq; 220 kc band pass at 3 db, attenuation 35 db min from 2.5 mc to 2.7	278-0293-00
L5, L6, L11, L22, L24, L25	COIL, RADIO FREQUENCY: 3 universal wound pi sections, 75 turns ea; no. 36 AWG copper wire; powdered iron coil form; 220 uh inductance, 1 amp	240-0037-00
L8	COIL: 4 turns of #26 wire (p/o Z4)	
L10	COIL, RADIO FREQUENCY: single layer wound; 13 turns no. 28 AWG wire	546-7833-00
L12	COIL, RADIO FREQUENCY: universal wound; 4 pi, 2.0 mh inductance	240-0134-00

ITEM	DESCRIPTION	COLLINS PART NO.
L13	COIL, RADIO FREQUENCY: single layer wound, 22 turns #28 AWG wire	543-8123-002
L14	COIL, RADIO FREQUENCY: single layer wound, 12 turns, #28 AWG wire	543-8028-002
L15	COIL: 2 turns of #18 wire (p/o Z1)	
L16	COIL: 2 turns of #18 wire (p/o Z2)	
L17	COIL, RADIO FREQUENCY: single layer wound, 220 turns of no. 32 AWG wire	543-8024-00
L18	COIL, RADIO FREQUENCY: 6-1/2 turns single layer wound, #14 AWG copper wire	544-9701-00
L19	COIL, RADIO FREQUENCY: 32 turns no. 18 AWG wire, each turn tapped	506-7848-002
L20	COIL, RADIO FREQUENCY: single layer wound, 33 uh inductance, 2 ohms dc	240-0170-00
L21	COIL, RADIO FREQUENCY: 4 sections; 2.5 mh, 35 to 50 ohms, 0.125 amps	240-2100-00
L23	COIL, RADIO FREQUENCY: single layer wound, 22 uh, 0.30 ohm, 1800 ma	240-0186-00
L24, L28, L32	NOT USED	
L26, L35	COIL, RADIO FREQUENCY: single layer wound; 10.0 uh, 0.60 ohm, 740 ma current rating	240-0149-00
L27	COIL, RADIO FREQUENCY: single layer wound; tinned no. 21 or 22 AWG; 2.70 uh, 1.20 ohms resistance, 500 ma	240-0069-00
L29	COIL, RADIO FREQUENCY: 20 turns #26 AWG copper wire, single layer wound; powdered iron core; 0.200 in. dia by 1/2 in. lg wire lead terminals	544-9700-00
L30, L34	COIL, RADIO FREQUENCY: 20 turns #18 wire, powdered iron core	544-9699-00
L36, L37	COIL: 4 turns #20 (p/o Z6, Z7)	
M1	VOLTMETER: panel type, dc type, calibrated 0-400 ma and 0-60 db	458-0491-00
O1 thru O6	KNOB ASSEMBLY: pointer, push-on type, black phenolic, approx 1-1/8 in. dia, 3/4 in. h incl spring	543-8039-00
O7	KNOB ASSEMBLY: fluted, 8 flutes push-on type, pin mtg, black phenolic, 2.078 in. dia by 0.859 in. h; incl disc, spring and skirt	543-8041-00
O8	KNOB ASSEMBLY: fluted, 5 flutes push-on type, pin mtg, black phenolic, spring, pointer and disc incl	543-8044-00
O9	KNOB ASSEMBLY: fluted, 5 flutes push-on type, pin mtg, black phenolic, spring, pointer and disc incl	543-8044-00
P1 thru P12, P16 P18 thru P23, P26, P27	PLUG: phono-type (not furnished)	361-0062-00
P13	POWER CONNECTOR: 11 female contacts, cable mounting (p/o power supply)	372-1952-00
P14	PLUG, HEADPHONE: not furnished	361-0018-00
P15	PLUG, MICROPHONE: 3 circuit, equivalent to type PJ-068 (not furnished)	361-0001-00
P17	JUMPER PLUG: molded, 9 pin miniature, male contacts	372-1819-00
P24	CONNECTOR, NB POWER: 9 pin miniature, male contacts (not furnished)	372-1822-00
P25	CONNECTOR: 9 female contacts (not furnished)	372-1953-00
R1, R91, R138, R139, R145	RESISTOR, COMPOSITION: 47,000 ohms, ±10%, 1/4 w	745-0809-00
R2, R11, R13, R63, R74, R78, R93, R171, R181, R183	RESISTOR, COMPOSITION: 1 megohm, ±10%, 1/4 w	745-0857-00
R3	RESISTOR, COMPOSITION: 180 ohms, ±10%, 1/2 w	745-1321-00
R4, R37	RESISTOR, COMPOSITION: 68,000 ohms, ±10%, 1/2 w	745-1429-00
R5, R26, R98, R136	RESISTOR, COMPOSITION: 0.47 megohm, ±10%, 1/4 w	745-0845-00
R6, R12, R57, R58, R64, R77, R102, R117, R129, R135, R149, R159, R169	RESISTOR, COMPOSITION: 1000 ohms, ±10%, 1/2 w	745-1352-00
R7, R50, R76, R80, R123, R125, R145	RESISTOR, COMPOSITION: 47,000 ohms, ±10%, 1/2 w	745-1422-00
R8, S14	RESISTOR, VARIABLE, COMPOSITION: 500,000 ohms, ±30%, 1/4 w	376-7404-00
R9, R28, R168	RESISTOR, COMPOSITION: 56 ohms, ±10%, 1/4 w	745-0704-00
R14, R16	RESISTOR, COMPOSITION: 270 ohms, ±10%, 1/4 w	745-0728-00

ITEM	DESCRIPTION	COLLINS PART NO.
R15, R24, R30	RESISTOR, VARIABLE, COMPOSITION: 250 ohms, ±20%, 0.2 w	376-4621-00
R17, R27, R31, R34, R59, R60, R62, R170	RESISTOR, COMPOSITION: 100,000 ohms, ±10%, 1/4 w	745-0821-00
R18	RESISTOR, COMPOSITION: 47,000 ohms, ±10%, 1 w	745-3422-00
R19, R21, R101, R162, R175	RESISTOR, COMPOSITION: 47 ohms, ±10%, 1/2 w	745-1296-00
R20, R47	RESISTOR, COMPOSITION: 68,000 ohms, ±10%, 2 w	745-5729-00
R22, R174	RESISTOR, COMPOSITION: 56 ohms, ±10%, 1/2 w	745-1300-00
R23, R25	RESISTOR, COMPOSITION: 120 ohms, ±10%, 1/2 w	745-1314-00
R29, R36, R38, R158	RESISTOR, COMPOSITION: 220 ohms, ±10%, 1/2 w	745-1324-00
R32, R104, R167	RESISTOR, COMPOSITION: 100 ohms, ±10%, 1/2 w	745-1310-00
R33	RESISTOR, COMPOSITION: 33,000 ohms, ±10%, 1 w	745-3415-00
R35, R49, R67, R71, R127, R130, R154	RESISTOR, COMPOSITION: 0.10 megohm, ±10%, 1/2 w	745-1436-00
R39, R45	RESISTOR, VARIABLE, COMPOSITION: 500,000 ohms, ±30%, 1/4 w	376-7202-00
R40	RESISTOR, COMPOSITION: 100,000 ohms, ±10%, 1 w	745-3436-00
R41	RESISTOR, COMPOSITION: 330 ohms, ±10%, 1/2 w	745-1331-00
R42, R48	RESISTOR, COMPOSITION: 8.2 megohms, ±10%, 1/4 w	745-0890-00
R43	RESISTOR, VARIABLE, COMPOSITION: 10 megohms, ±40%, 1/4 w	376-7206-00
R44	RESISTOR, COMPOSITION: 0.27 megohm, ±10%, 1/2 w	745-1454-00
R46, R115	RESISTOR, COMPOSITION: 2200 ohms, ±10%, 1/2 w	745-1366-00
R51, R52	RESISTOR, COMPOSITION: 0.39 megohm, ±10%, 1/4 w	745-0842-00
R53	RESISTOR, COMPOSITION: 27,000 ohms, ±10%, 1/4 w	745-0800-00
R54, R65	RESISTOR, COMPOSITION: 1 megohm, ±10%, 1/2 w	745-1478-00
R55, R66, R96	RESISTOR, COMPOSITION: 0.22 megohm, ±10%, 1/2 w	745-1450-00
R56, R95	RESISTOR, COMPOSITION: 5600 ohms, ±10%, 1/2 w	745-1384-00
R61, R106	RESISTOR, COMPOSITION: 150 ohms, ±10%, 1/2 w	745-1317-00
R68	RESISTOR, COMPOSITION: 15,000 ohms, ±10%, 1 w	745-1401-00
R69	RESISTOR, COMPOSITION: 15,000 ohms, ±10%, 1/2 w	745-3401-00
R70, R105	RESISTOR, COMPOSITION: 22,000 ohms, ±10%, 2 w	745-5708-00
R72	RESISTOR, COMPOSITION: 6800 ohms, ±10%, 4 w	745-9732-00
R73	RESISTOR, COMPOSITION: 15,000 ohms, ±10%, 2 w	745-5701-00
R75	RESISTOR, COMPOSITION: 10 ohms, ±10%, 1/2 w	745-1268-00
R79, R120, R141	RESISTOR, COMPOSITION: 39,000 ohms, ±10%, 1/2 w	745-1419-00
R81	RESISTOR, COMPOSITION: 5600 ohms, ±10%, 1 w	745-3384-00
R82	RESISTOR, COMPOSITION: 4700 ohms, ±10%, 1/4 w	745-0773-00
R83, R128	RESISTOR, COMPOSITION: 3.3 megohms, ±10%, 1/4 w	745-0875-00
R84	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms, ±30%, 1/4 w	376-7402-00
R85, R179	RESISTOR, COMPOSITION: 12,000 ohms, ±10%, 1/2 w	745-1398-00
R86	RESISTOR, WIRE WOUND: 2500 ohms, ±10%, 7 w	710-9000-00
R87	RESISTOR, COMPOSITION: 6800 ohms, ±10%, 1/2 w	745-1387-00
R88, R126	RESISTOR, COMPOSITION: 820 ohms, ±10%, 1/2 w	745-1349-00
R89	RESISTOR, COMPOSITION: 180K ohms, ±10%, 1/2 w	745-1447-00
R90	RESISTOR, COMPOSITION: 27,000 ohms, ±10%, 1/2 w	745-1412-00
R92	RESISTOR, VARIABLE, COMPOSITION: 500,000 ohms, ±30%, 1/4 w	376-7405-00
R94	RESISTOR, COMPOSITION: 2.2 megohms, ±10%, 1/4 w	745-0869-00

ITEM	DESCRIPTION	COLLINS PART NO.
R97, R182	RESISTOR, COMPOSITION: 68 ohms, ±10%, 1/2 w	745-1303-00
R99	RESISTOR, COMPOSITION: 12,000 ohms, ±10%, 2 w	745-5698-00
R100	RESISTOR, COMPOSITION: 10 ohms, ±10%, 1 w	745-3268-00
R103	RESISTOR, COMPOSITION: 10,000 ohms, ±10%, 1/4 w	745-0785-00
R107	RESISTOR: 47 ohms, ±10%, 2 w (p/o Z1)	
R108	RESISTOR: 47 ohms, ±10%, 2 w (p/o Z2)	
R109 thru R114	RESISTOR, COMPOSITION: 12 ohms, ±10%, 1/2 w	745-1272-00
R116, R133, R178	RESISTOR, COMPOSITION: 18,000 ohms, ±10%, 1/2 w	745-1405-00
R118, R184	RESISTOR, COMPOSITION: 0.68 megohm, ±10%, 1/4 w	745-0851-00
R119	RESISTOR, COMPOSITION: 1.5 megohms, 1/4 w	745-0863-00
R121	RESISTOR, VARIABLE, COMPOSITION: 100,000 ohms, ±20%, 0.2 w	376-4622-00
R122	RESISTOR, COMPOSITION: 47K ohms, ±10%, 2 w	745-5722-00
R124, R151	RESISTOR, COMPOSITION: 3900 ohms, ±10%, 1/4 w	745-0070-00
R131	RESISTOR, COMPOSITION: 33,000 ohms, ±10%, 2 w	745-5715-00
R132	RESISTOR, VARIABLE, COMPOSITION: 1000 ohms, ±29%, 0.2 w	376-4623-00
R134, R160	RESISTOR, COMPOSITION: 0.12 megohm, ±10%, 1/2 w	745-1440-00
R137	RESISTOR, COMPOSITION: 82,000 ohms, ±10%, 1/2 w	745-1433-00
*R140	RESISTOR, COMPOSITION: 2700 ohms, ±10%, 1/4 w	745-0764-00
*R140	RESISTOR, COMPOSITION: 12K ohms, ±10%, 1/4 w	745-0788-00
*R140	RESISTOR, COMPOSITION: 15K ohms, ±10%, 1/4 w	745-0791-00
*R140	RESISTOR, COMPOSITION: 18K ohms, ±10%, 1/4 w	745-0794-00
*R140	RESISTOR, COMPOSITION: 22K ohms, ±10%, 1/4 w	745-0797-00
*R140	RESISTOR, COMPOSITION: 27K ohms, ±10%, 1/4 w	745-0800-00
R142	RESISTOR, COMPOSITION: 10,000 ohms, ±10%, 2 w	745-5694-00
R143	RESISTOR, COMPOSITION: 2200 ohms, ±10%, 1 w	745-3366-00
R144	RESISTOR, COMPOSITION: 3300 ohms, ±10%, 1 w	745-3373-00
R146	RESISTOR, WIRE WOUND: 15,000 ohms, ±10%, 7 w	710-9001-00
R148	RESISTOR, COMPOSITION: 820 ohms, ±10%, 2 w	745-5649-00
R150	RESISTOR, COMPOSITION: 180 ohms, ±10%, 1/4 w	745-0722-00
R152	RESISTOR, COMPOSITION: 5600 ohms, ±10%, 1/4 w	745-0776-00
R153	RESISTOR, COMPOSITION: 6800 ohms, ±10%, 2 w	745-5687-00
R155, R156	RESISTOR, COMPOSITION: 1.5 megohms, ±10%, 1/2 w	745-1485-00
R157	RESISTOR, COMPOSITION: 68 ohms, ±10%, 1 w	745-3303-00
*R161	RESISTOR, COMPOSITION: 5600 ±10%, 1/2 w	745-1384-00
*R161	RESISTOR, COMPOSITION: 6800 ohms, ±10%,1/2 w	745-1387-00
*R161	RESISTOR, COMPOSITION: 8200 ohms, ±10%, 1/2 w	745-1391-00
*R161	RESISTOR, COMPOSITION: 10K ohms, ±10%, 1/2 w	745-1394-00
*R161	RESISTOR, COMPOSITION: 12K ohms, ±10%, 1/2 w	745-1398-00
R163	RESISTOR, WIRE WOUND: 6000 ohms, ±10%, 5 w	710-9118-00
R164, R165	RESISTOR, COMPOSITION: 470K, ±10%, 1/2 w	745-1464-00
R166	RESISTOR, COMPOSITION: 680 ohms, ±10%, 1/2 w	745-1345-00
R167	NOT USED	
R172	RESISTOR, COMPOSITION: 82 ohms, ±10%, 1/4 w	745-0710-00
R173	RESISTOR, COMPOSITION: 22 ohms, ±10%, 2 w	745-5582-00
R176	RESISTOR,COMPOSITION: 4700 ohms, ±10%, 1 w	745-3380-00
R177	RESISTOR, COMPOSITION: 27,000 ohms, ±10%, 2 w	745-5712-00

*Chosen per operational requirement.

ITEM	DESCRIPTION	COLLINS PART NO.
R180	RESISTOR, COMPOSITION: 150K ±10%, 1/2 w	745-1443-00
R185	RESISTOR, COMPOSITION: 56 ohms, ±10%, 1/4 w (p/o Z4)	
R186, R187	RESISTOR, COMPOSITION: 47 ohms, ±10%, 1/2 w (p/o Z6, Z7)	
R188	RESISTOR, COMPOSITION: 470 ohms, ±10%, 1/2 w	745-1338-00
S1	NOT USED	
S2	SWITCH, ROTARY: 1 circuit, 14 positions	269-2023-00
S3, S4, S5	SWITCH, ROTARY: 1 pole, 14 positions	269-2048-00
S6	SWITCH SECTION, ROTARY: 2 circuits, 14 positions	269-1983-00
S7	SWITCH SECTION, ROTARY: 1 circuit, 14 positions	269-1981-00
S8	SWITCH SECTION, ROTARY: 1 circuit, 14 positions	269-1982-00
S9	SWITCH, ROTARY: 4 sections, 8 pole, 5 positions	259-1076-00
S10	NOT USED	
S11	SWITCH, ROTARY: 1 section, 1 pole, 4 positions	259-1075-00
S12	SWITCH, ROTARY: 1 section, 2 pole, 3 positions	259-1014-00
S13	SWITCH, ROTARY: 1 section, 1 pole, 14 positions	259-1081-00
S14	SWITCH, ROTARY: 1 circuit, 14 positions (Used in KWM-2A only)	269-2023-00
S15	SWITCH, ROTARY: 1 circuit, 2 positions (Used in KWM-2A only)	259-0980-00
T1	TRANSFORMER, INTERMEDIATE FREQUENCY: 440 to 470 kc frequency range	278-0696-00
T2	TRANSFORMER, INTERMEDIATE FREQUENCY: 3.055 mc center frequency; 220 kc band pass at 3 db	278-0293-00
T3	TRANSFORMER, RADIO FREQUENCY: 3 turns #28 AWG wire, single layer wound, 18 turns #26 AWG wire, single layer wound	544-9715-002
T4	TRANSFORMER, RADIO FREQUENCY: 12 turns #28 AWG wire	546-7945-003
T5	TRANSFORMER, INTERMEDIATE FREQUENCY: 440 kc to 470 kc frequency range	278-0281-00
T6	TRANSFORMER, AUDIO FREQUENCY: 8000 ohms primary; 500 ohms secondary w/4 ohm tap; primary 35 ma dc, secondary 0 dc	677-0368-00
V1, V3, V4	ELECTRON TUBE: type 6AZ8	255-0333-00
V2, V11, V12, V13	ELECTRON TUBE: type 6U8A	255-0328-00
V5, V6	ELECTRON TUBE: type 12AT7	255-0205-00
V7	ELECTRON TUBE: type 6DC6	255-0226-00
V8	ELECTRON TUBE: type 6CL6	255-0216-00
V9, V10	ELECTRON TUBE: type 6146	255-0101-00
V14, V15, V17	ELECTRON TUBE: type 6BN8	255-0335-00
V16	ELECTRON TUBE: type 6EB8	255-0336-00
XDS1	LAMP HOLDER: miniature; bayonet; clip mounting	262-1210-00
XV1 thru XV4 XV12 thru XV17	SOCKET, ELECTRON TUBE: noval type; molded construction; low loss composition	220-1054-00
XV5, XV6, XV8, XV11	SOCKET, ELECTRON TUBE: 9 pin miniature; brass and copper w/plastic insulation	220-1103-00
XV7	SOCKET, ELECTRON TUBE: 7 pin miniature; tube socket; molded construction, plastic	220-1111-00
XV9, XV10	SOCKET, ELECTRON TUBE: 8 female contacts	220-1155-00
XY1	SOCKET, CRYSTAL: accommodates 14 crystals; silver plated copper contacts; phenolic body, 21/32 in. by 2-15/32 in. by 2-1/16 in.	544-2825-002
XY2	SOCKET, CRYSTAL: 2 contact positions, 0.486 in. c to c	292-0082-00
Y1	CRYSTAL: 6.555 mc frequency	290-9009-00
Y2	CRYSTAL: 6.755 mc frequency	290-9010-00
Y3	CRYSTAL: 6.955 mc frequency	290-9011-00
Y4	CRYSTAL: 10.155 mc frequency	290-9027-00
Y5	CRYSTAL: 10.355 mc frequency	290-9028-00
Y6	CRYSTAL: 8.5775 mc frequency	290-9062-00
Y7	CRYSTAL: 8.6775 mc frequency	290-9063-00
Y8	CRYSTAL: 8.9775 mc frequency	290-9066-00
Y9	CRYSTAL: 12.0775 mc frequency	290-9097-00
Y10	CRYSTAL: 12.1775 mc frequency	290-9098-00
Y11	CRYSTAL: 12.2775 mc frequency	290-9099-00
Y12	CRYSTAL: 15.8275 mc frequency	290-9201-00
Y13	NOT SUPPLIED	
Y14	NOT SUPPLIED	

ITEM	DESCRIPTION	COLLINS PART NO.
Y15	CRYSTAL: 100.000 kc	289-1424-00
Y16	CRYSTAL: 453.650 kc	290-8705-00
Y17	CRYSTAL: 456.350 kc	290-8706-00
Y18	NOT USED	
Y19 thru Y31	NOT SUPPLIED	
Z1, Z2	SUPPRESSOR, PARASITIC: 2 turns #18 AWG copper wire, 47 ohms, 2 w resistor	540-5641-00
Z3	NOT USED	
Z4	SUPPRESSOR, PARASITIC: 4 turns #26 AWG copper wire; 56 ohms, 10 w resistor	544-9698-00
Z5	TRAP, RADIO FREQUENCY: 9 to 11.5 mc tuning range; incl 27 uuf capacitor	278-0538-00
Z6, Z7	SUPPRESSOR, PARASITIC: 4 turns #20 wire; 47 ohms, 1/2 w resistor	548-8217-00
	70K-2 OSCILLATOR	522-1093-00
	70K-2 Oscillator consists of the following. This equipment should be returned to Collins Radio Company for repair.	
*C301	CAPACITOR, CERAMIC: 20 uuf, ±5%, 500 vdcw	913-0053-00
*C301	CAPACITOR, CERAMIC: 20 uuf, ±5%, 500 vdcw	913-0054-00
*C301	CAPACITOR, CERAMIC: 20 uuf, ±5%, 500 vdcw	913-0055-00
*C301	CAPACITOR, CERAMIC: 20 uuf, ±5%, 500 vdcw	913-0056-00
*C301	CAPACITOR, CERAMIC: 20 uuf, ±5%, 500 vdcw	913-0057-00
*C301	CAPACITOR, CERAMIC: 20 uuf, ±5%, 500 vdcw	913-0058-00
*C301	CAPACITOR, CERAMIC: 20 uuf, ±5%, 500 vdcw	913-0232-00
*C301	CAPACITOR, CERAMIC: 20 uuf, ±5%, 500 vdcw	913-0233-00
*C301	CAPACITOR, CERAMIC: 20 uuf, ±5%, 500 vdcw	913-0234-00
C302	CAPACITOR, MICA: 1000 uuf, ±2%, 500 vdcw	912-1737-00
C303	CAPACITOR, MICA: 3000 uuf, ±1%, 500 vdcw	912-1748-00
C304	CAPACITOR, MICA: 200 uuf, ±2%, 500 vdcw	912-0514-00
‡C305	CAPACITOR, CERAMIC: 100 uuf, ±2%, 500 vdcw	913-0074-00
‡C305	CAPACITOR, CERAMIC: 100 uuf, ±2%, 500 vdcw	913-0246-00
C306, C307, C309, 310	CAPACITOR, CERAMIC: 0.02 uf, +60% -40%, 250 vdcw	913-2097-00
C308	CAPACITOR, VARIABLE, CERAMIC: 5 uuf min to ~~37.5~~ 25 uuf max, 350 vdcw	917-1073-00
CR301	SEMICONDUCTOR DEVICE, DIODE: germanium; 1N34A	353-0103-00
L301	COIL, RADIO FREQUENCY: special	240-0652-00
L302	TRIMMER ASSEMBLY: special	543-7323-00
L303	INDUCTOR, TUNING: special	543-7333-003
L304	COIL, RADIO FREQUENCY: single layer wound, magnet wire, 3.30 uh	240-0695-00
R301, R303	RESISTOR, COMPOSITION: 0.10 megohm, ±10%, 1/2 w	745-1436-00
R302	RESISTOR, COMPOSITION: 82,000 ohms, ±5%, 1/2 w	745-1432-00
T301	TRANSFORMER, RADIO FREQUENCY: special	240-0665-00
V301	ELECTRON TUBE: type 6AU6	255-0202-00
	516F-2 POWER SUPPLY	522-1170-00
C1	CAPACITOR, PAPER: 0.05 uf, ±10%, 1000 vdcw	961-4646-00
C2, C3, C4	CAPACITOR, ELECTROLYTIC: 30 uf, -10% +40%, 400 vdcw	183-1771-00
C5A, C5B	CAPACITOR, ELECTROLYTIC: dual section, 15 uf, -10% +40%, 400 v; 30 uf, -10% +40%, 400 v	183-1781-00
C6	CAPACITOR, ELECTROLYTIC: 10 uf, -15% +50%, 250 vdcw	183-1046-00
C7	CAPACITOR, ELECTROLYTIC: 10 uf, -10% +100%, 150 vdcw	183-1040-00
CR1	RECTIFIER: type 1N1490	353-1659-00
F1	FUSE, CARTRIDGE: 4 amps, 125 v, glass enclosed, 4 spares furnished	264-0217-00
L1, L2	REACTOR: 2 coils, 8.0 henrys, 150 ma dc, 200 ohms resistance, ea reactor	668-0300-00

*Chosen per operational requirement.
‡Selected in final test.

ITEM	DESCRIPTION	COLLINS PART NO.
L3	REACTOR: 1 coil, 0.92 henry, 180 ma dc, 25 ohms resistance	668-0322-00
P1	CONNECTOR, RECEPTACLE, ELECTRICAL: 11 female socket contacts, Amphenol 78-S11T or Cinch 13786; mates w/ Amphenol p/n 86CP11T Collins Radio p/n 372-1757-00 Shell for mating connector	372-1952-00
P2	ADAPTER, CONNECTOR: adapts 3 contact male plug to a 2 contact female receptacle	368-0110-00
R1, R2, R3	RESISTOR, COMPOSITION: 270K ohms, ±10%, 2 w	745-5754-00
R4, R5	RESISTOR, WIREWOUND: 25K ohms, ±5%, 11 w	710-0080-00
R6	RESISTOR, WIREWOUND: 24K ohms, ±5%, 25 w	710-0374-00
R7	NOT USED	745-1310-00

ITEM	DESCRIPTION	COLLINS PART NO.
R8	RESISTOR, COMPOSITION: 4700 ohms, ±10%, 2 w	745-5680-00
R9	RESISTOR, VARIABLE, WIREWOUND: 2500 ohms, ±10%, 2 w	750-0522-00
R10	RESISTOR, COMPOSITION: 5600 ohms, ±10%, 2 w	745-5684-00
T1	TRANSFORMER, POWER: pri 115 v 50/60 cps, sec. 6.3 5.0 v, 5.0 v, 275 v ct and tapped at 115V, 800 v ct	662-0434-00
V1	ELECTRON TUBE: type 5R4GYA	257-0142-00
V2	ELECTRON TUBE: type 5U4GB	257-0109-00
XF1	FUSEHOLDER: extractor post type, 125 v, 5 amp, accommodates 3AG cartridge fuse	265-1002-00
XV1, XV2	SOCKET, ELECTRON TUBE: 8 contact, octal, phenolic insulation	220-1155-00

GENERAL COVERAGE CRYSTALS AVAILABLE											
CRYSTAL FREQUENCY (kc)	FOR	OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR	OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR	OPERATING FREQUENCY (mc)	PART NUMBER
6555.000		3.4-3.6	290-9009-00	8577.500		14.0-14.2	290-9062-00	12977.500		22.8-23.0	290-9106-00
6755.000		3.6-3.8	290-9010-00	8652.500		14.15-14.35	290-9180-00	13077.500		23.0-23.2	290-9107-00
6955.000		3.8-4.0	290-9011-00	8677.500		14.2-14.4	290-9063-00	13177.500		23.2-23.4	290-9108-00
7155.000		4.0-4.2	290-9012-00	8777.500		14.4-14.6	290-9064-00	13277.500		23.4-23.6	290-9109-00
7355.000		4.2-4.4	290-9013-00	8877.500		14.6-14.8	290-9065-00	13377.500		23.6-23.8	290-9110-00
7555.000		4.4-4.6	290-9014-00	8977.500		14.8-15.0	290-9066-00	13477.500		23.8-24.0	290-9111-00
7755.000		4.6-4.8	290-9015-00	9077.500		15.0-15.2	290-9067-00	13577.500		24.0-24.2	290-9112-00
7955.000		4.8-5.0	290-9016-00	9177.500		15.2-15.4	290-9068-00	13677.500		24.2-24.4	290-9113-00
9755.000		6.6-6.8	290-9025-00	9277.500		15.4-15.6	290-9069-00	13777.500		24.4-24.6	290-9114-00
9955.000		6.8-7.0	290-9026-00	9377.500		15.6-15.8	290-9070-00	13877.500		24.6-24.8	290-9115-00
10155.000		7.0-7.2	290-9027-00	9477.500		15.8-16.0	290-9071-00	13977.500		24.8-25.0	290-9116-00
10355.000		7.2-7.4	290-9028-00	9577.500		16.0-16.2	290-9072-00	14077.500		25.0-25.2	290-9117-00
10555.000		7.4-7.6	290-9029-00	9677.500		16.2-16.4	290-9073-00	14177.500		25.2-25.4	290-9118-00
10755.000		7.6-7.8	290-9030-00	9777.500		16.4-16.6	290-9074-00	14277.500		25.4-25.6	290-9119-00
10955.000		7.8-8.0	290-9031-00	9877.500		16.6-16.8	290-9075-00	14377.500		25.6-25.8	290-9120-00
11155.000		8.0-8.2	290-9032-00	9977.500		16.8-17.0	290-9076-00	14477.500		25.8-26.0	290-9121-00
11355.000		8.2-8.4	290-9033-00	10077.500		17.0-17.2	290-9077-00	14577.500		26.0-26.2	290-9122-00
11555.000		8.4-8.6	290-9034-00	10177.500		17.2-17.4	290-9078-00	14677.500		26.2-26.4	290-9123-00
11755.000		8.6-8.8	290-9035-00	10277.500		17.4-17.6	290-9079-00	14777.500		26.4-26.6	290-9124-00
11955.000		8.8-9.0	290-9036-00	10377.500		17.6-17.8	290-9080-00	14877.500		26.6-26.8	290-9125-00
12155.000		9.0-9.2	290-9037-00	10477.500		17.8-18.0	290-9081-00	14977.500		26.8-27.0	290-9126-00
12355.000		9.2-9.4	290-9038-00	10577.500		18.0-18.2	290-9082-00	15077.500		27.0-27.2	290-9127-00
12555.000		9.4-9.6	290-9039-00	10677.500		18.2-18.4	290-9083-00	15177.500		27.2-27.4	290-9128-00
12755.000		9.6-9.8	290-9040-00	10777.500		18.4-18.6	290-9084-00	15277.500		27.4-27.6	290-9129-00
12955.000		9.8-10.0	290-9041-00	10877.500		18.6-18.8	290-9085-00	15377.500		27.6-27.8	290-9130-00
13155.000		10.0-10.2	290-9042-00	10977.500		18.8-19.0	290-9086-00	15477.500		27.8-28.0	290-9131-00
13355.000		10.2-10.4	290-9043-00	11077.500		19.0-19.2	290-9087-00	15527.500		27.9-28.1	290-9142-00
13555.000		10.4-10.6	290-9044-00	11177.500		19.2-19.4	290-9088-00	15577.500		28.0-28.2	290-9132-00
13755.000		10.6-10.8	290-9045-00	11277.500		19.4-19.6	290-9089-00	15627.500		28.1-28.3	290-9143-00
13955.000		10.8-11.0	290-9046-00	11377.500		19.6-19.8	290-9090-00	15677.500		28.2-28.4	290-9133-00
14155.000		11.0-11.2	290-9047-00	11477.500		19.8-20.0	290-9091-00	15727.500		28.3-28.5	290-9144-00
14355.000		11.2-11.4	290-9048-00	11577.500		20.0-20.2	290-9092-00	15777.500		28.4-28.6	290-9134-00
14555.000		11.4-11.6	290-9049-00	11677.500		20.2-20.4	290-9093-00	15827.500		28.5-28.7	290-9201-00
14755.000		11.6-11.8	290-9050-00	11777.500		20.4-20.6	290-9094-00	15877.500		28.6-28.8	290-9135-00
14955.000		11.8-12.0	290-9051-00	11877.500		20.6-20.8	290-9095-00	15927.500		28.7-28.9	290-9145-00
7577.500		12.0-12.2	290-9052-00	11977.500		20.8-21.0	290-9096-00	15977.500		28.8-29.0	290-9136-00
7677.500		12.2-12.4	290-9053-00	12077.500		21.0-21.2	290-9097-00	16027.500		28.9-29.1	290-9146-00
7777.500		12.4-12.6	290-9054-00	12177.500		21.2-21.4	290-9098-00	16077.500		29.0-29.2	290-9137-00
7877.500		12.6-12.8	290-9055-00	12277.500		21.4-21.6	290-9099-00	16127.500		29.1-29.3	290-9147-00
7977.500		12.8-13.0	290-9056-00	12377.500		21.6-21.8	290-9100-00	16177.500		29.2-29.4	290-9138-00
8077.500		13.0-13.2	290-9057-00	12477.500		21.8-22.0	290-9101-00	16227.500		29.3-29.5	290-9148-00
8177.500		13.2-13.4	290-9058-00	12577.500		22.0-22.2	290-9102-00	16277.500		29.4-29.6	290-9139-00
8277.500		13.4-13.6	290-9059-00	12677.500		22.2-22.4	290-9103-00	16327.500		29.5-29.7	290-9149-00
8377.500		13.6-13.8	290-9060-00	12777.500		22.4-22.6	290-9104-00	16377.500		29.6-29.8	290-9140-00
8477.500		13.8-14.0	290-9061-00	12877.500		22.6-22.8	290-9105-00	16477.500		29.8-30.0	290-9141-00

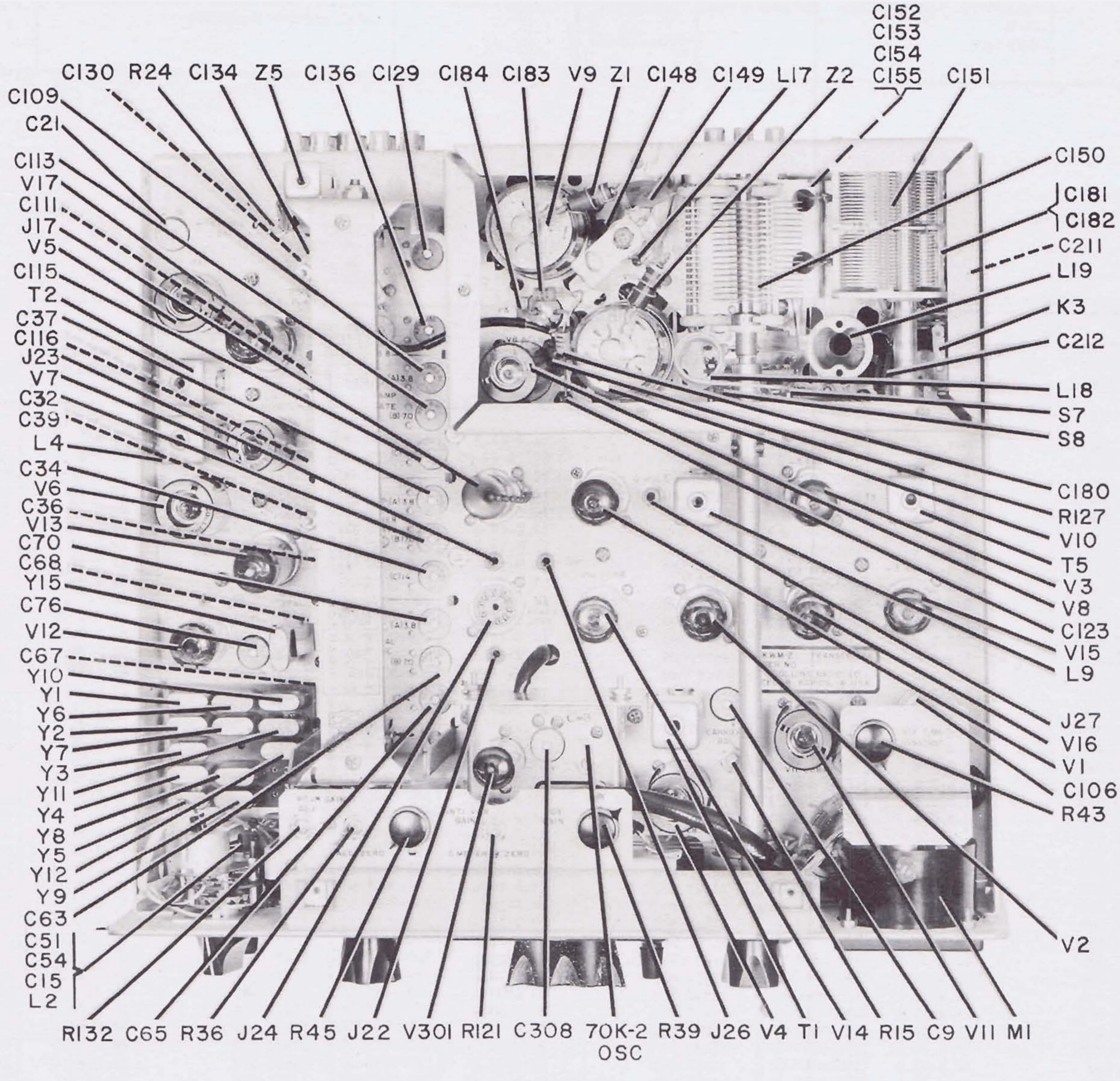


Figure 6-1. Top View, Parts Identification

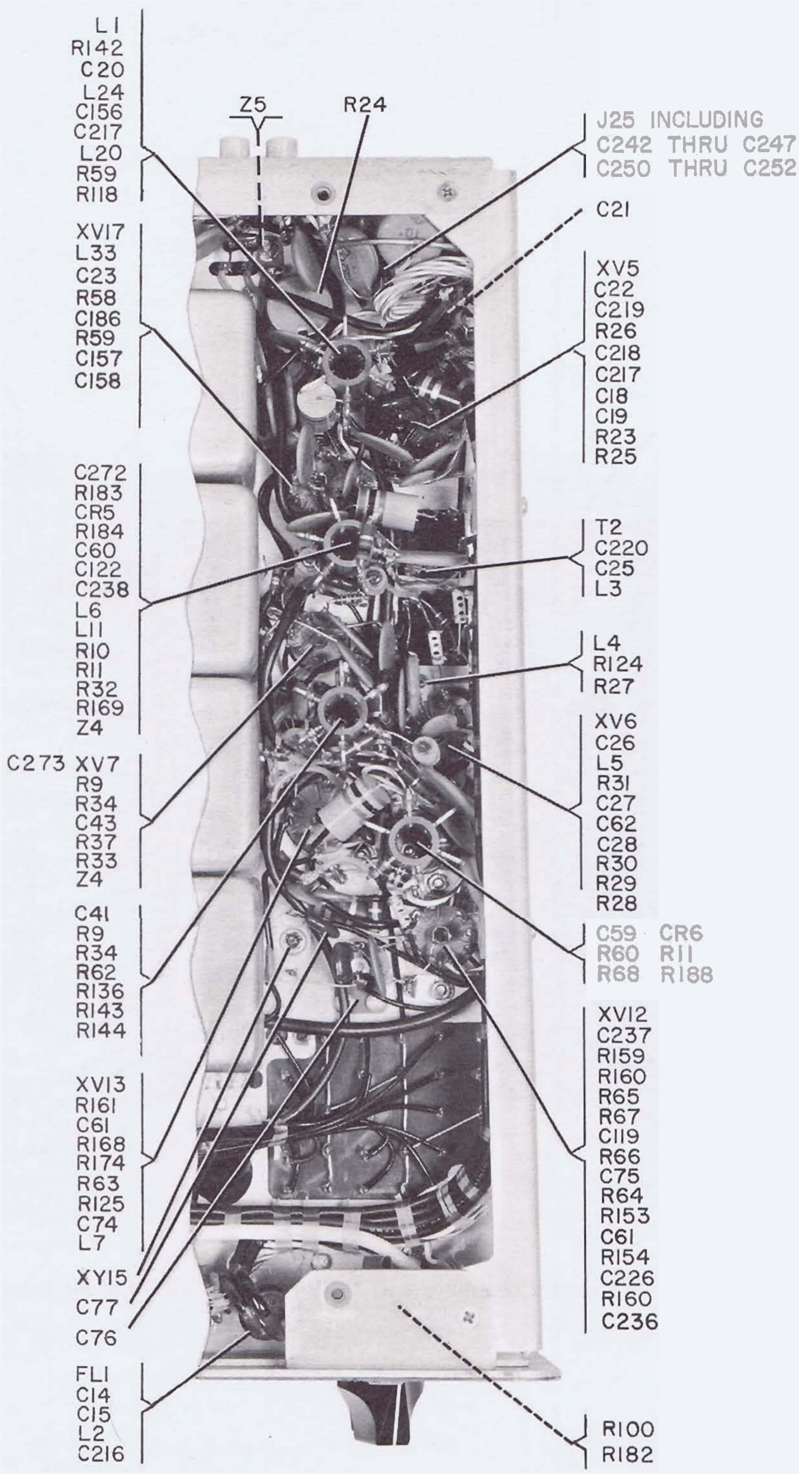


Figure 6-2. Bottom Right View, Parts Identification

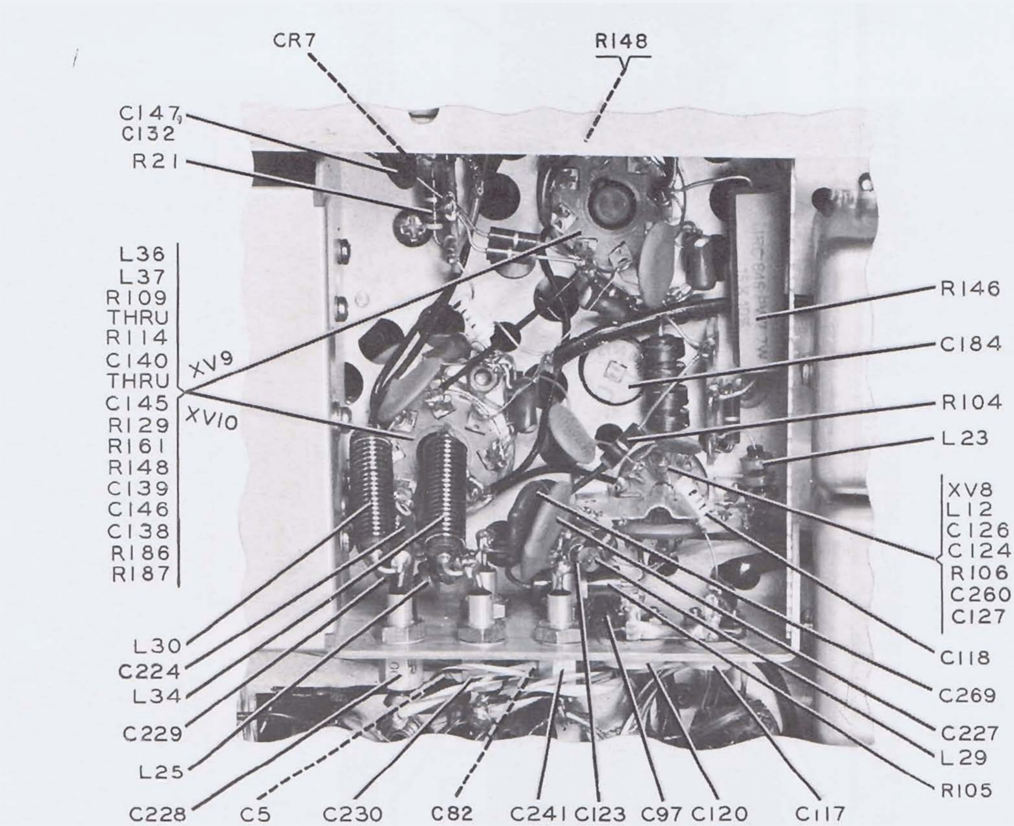


Figure 6-3. PA Grid Compartment, Bottom View, Parts Identification

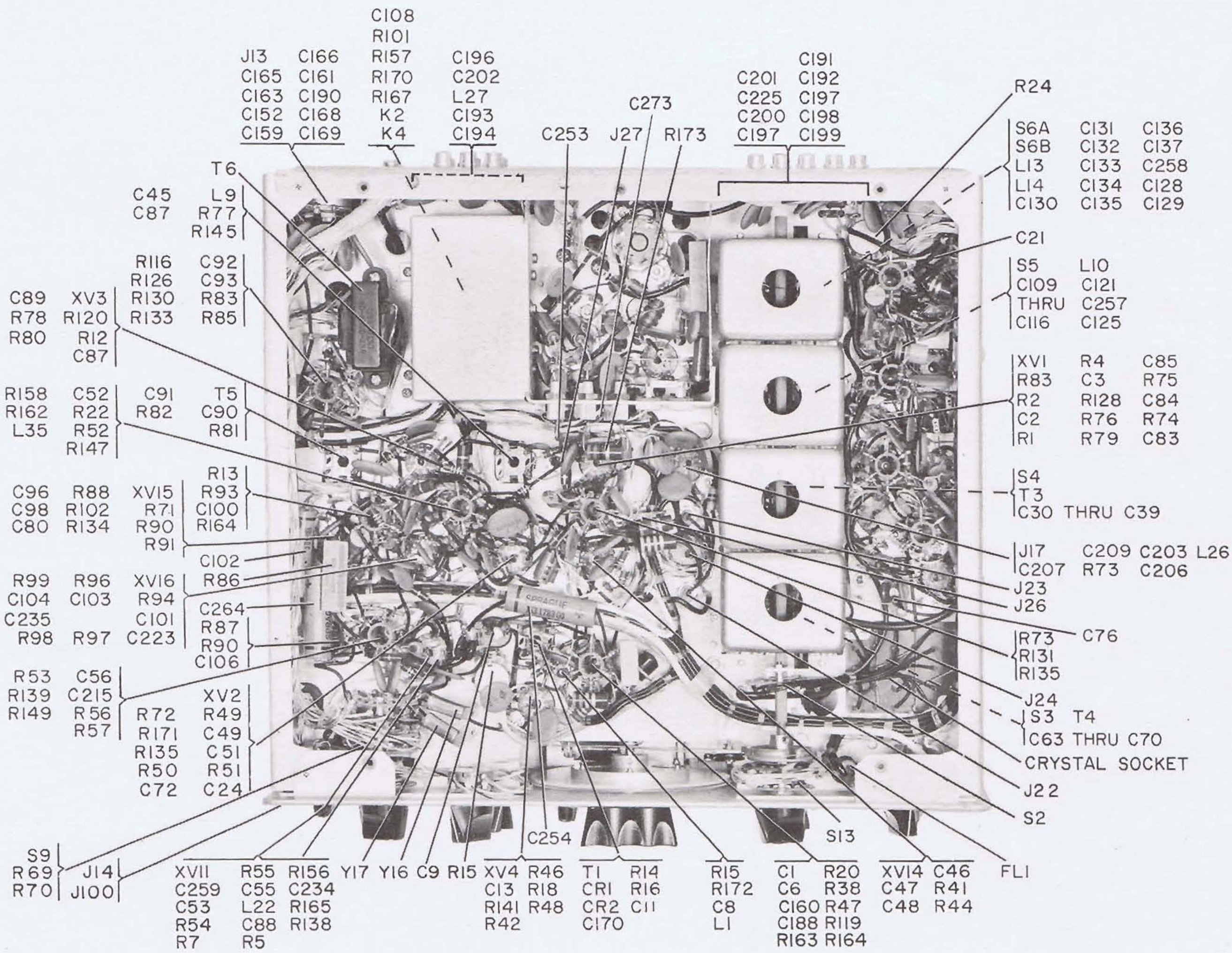
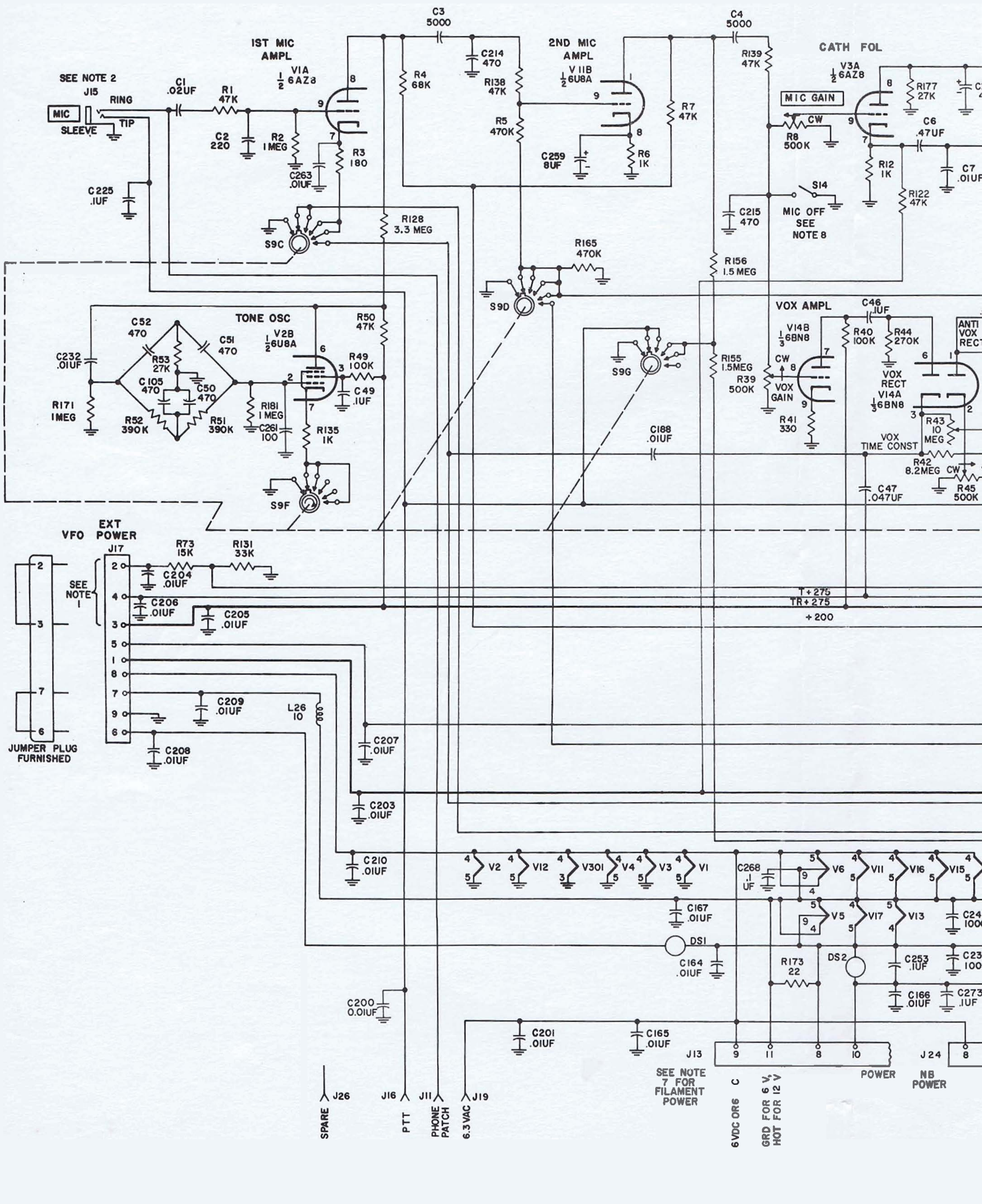
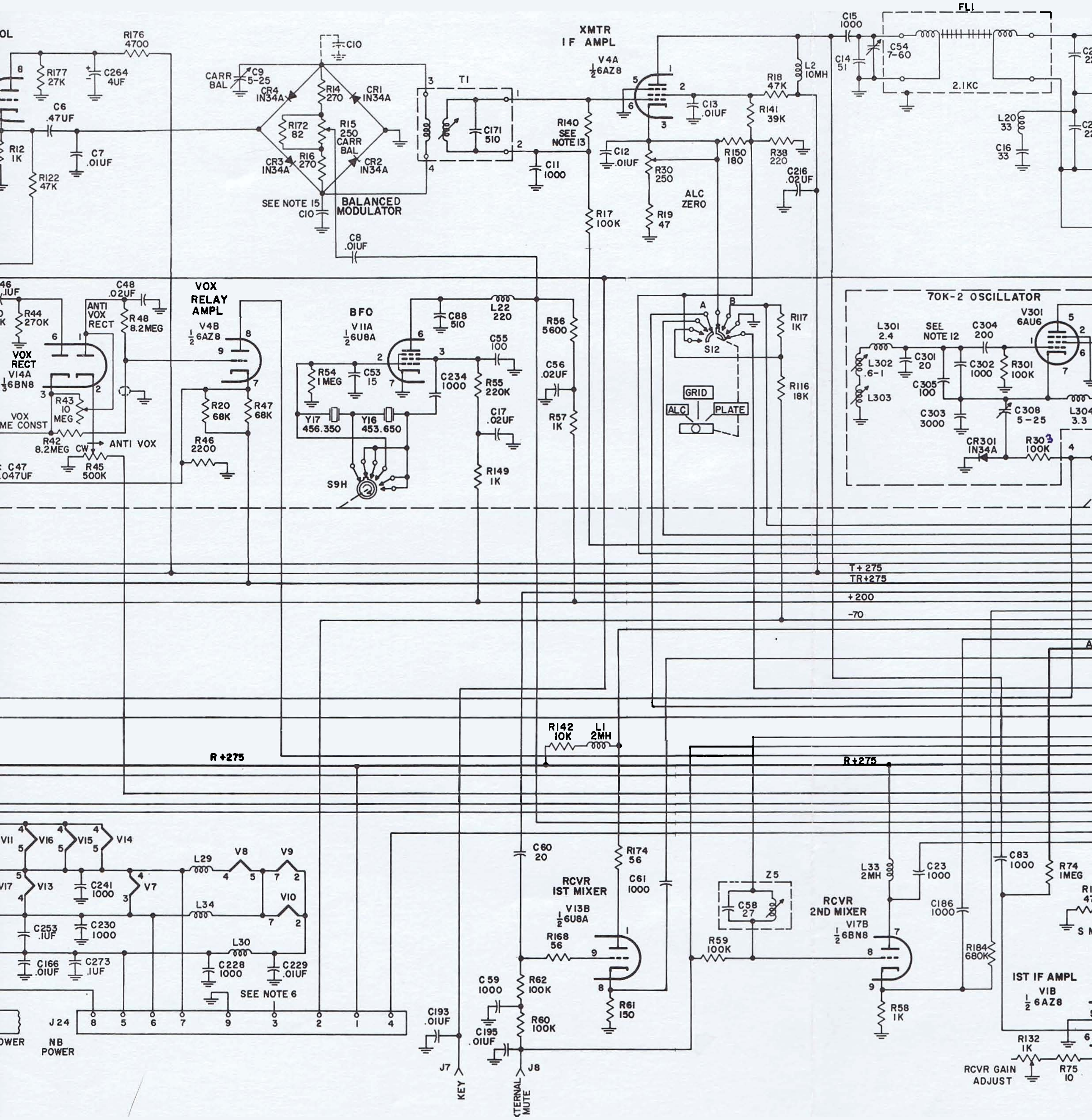
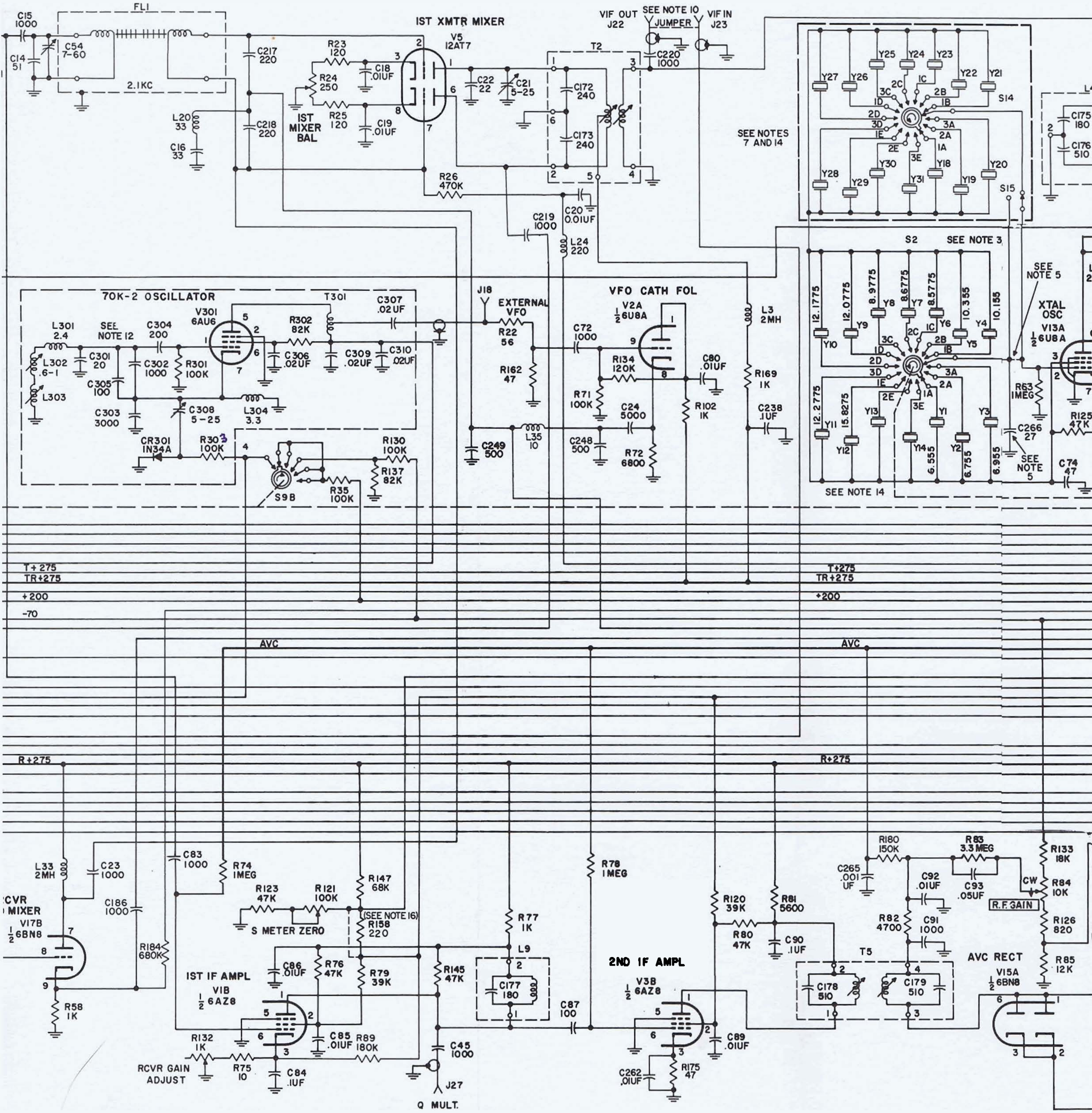


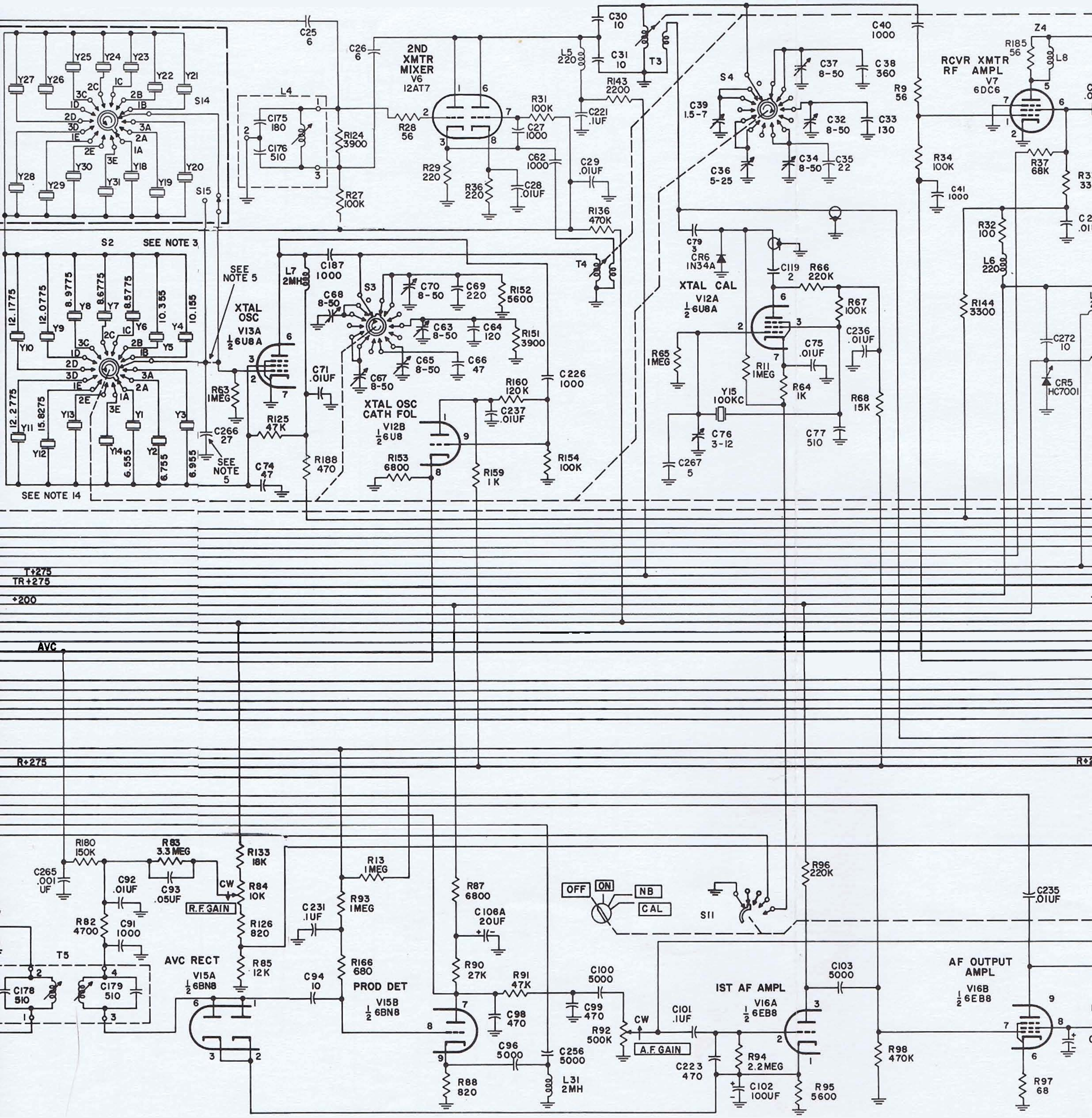
Figure 6-4. Bottom View, Parts Identification

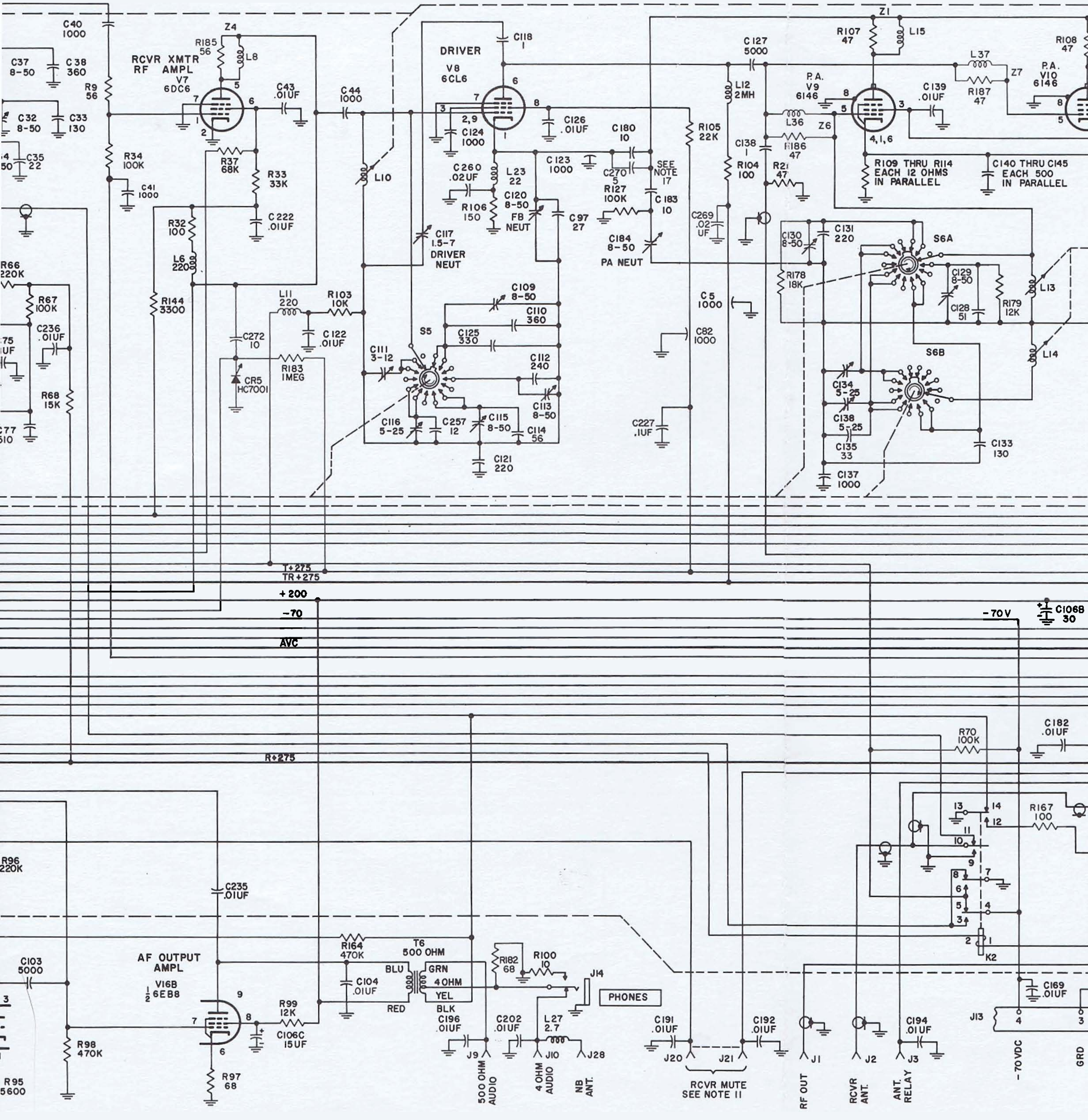

C3
5000
C4
5000
1ST MIC
AMPL
V1A
½ 6AZ8
C214
470
2ND MIC
AMPL
V11B
½ 6U8A
R139
47K
CATH FOL
V3A
½ 6AZ8
SEE NOTE 2
J15
RING
MIC
SLEEVE
TIP
C1
.02UF
R1
47K
C2
220
R2
1 MEG
R3
180
C263
.01UF
R4
68K
R138
47K
R5
470K
C259
8UF
R6
1K
R7
47K
MIC GAIN
R8
500K
CW
R177
27K
C6
.47UF
R12
1K
C7
.01UF
R122
47K
S14
MIC OFF
SEE
NOTE 8
C215
470
C225
.1UF
R128
3.3 MEG
S9C
R165
470K
S9D
R156
1.5 MEG
VOX AMPL
C46
.1UF
V14B
⅓ 6BN8
R40
100K
R44
270K
ANTI
VOX
RECT
VOX
RECT
V14A
⅓ 6BN8
R39
500K
VOX
GAIN
R41
330
R155
1.5MEG
S9G
R43
10
MEG
VOX
TIME CONST
R42
8.2MEG
R45
500K
C47
.047UF
C188
.01UF
TONE OSC
C52
470
C51
470
V2B
½ 6U8A
R50
47K
C232
.01UF
R53
27K
C105
470
C50
470
R49
100K
C49
.1UF
R171
1MEG
R52
390K
R51
390K
R181
1 MEG
C261
100
R135
1K
S9F
EXT
VFO POWER
J17
R73
15K
R131
33K
C204
.01UF
SEE
NOTE
1
C206
.01UF
C205
.01UF
T+275
TR+275
+200
C209
.01UF
L26
10
C207
.01UF
C208
.01UF
JUMPER PLUG
FURNISHED
C203
.01UF
C210
.01UF
V2
V12
V301
V4
V3
V1
C268
.1
UF
V6
V11
V16
V15
V5
V17
V13
C167
.01UF
DS1
C164
.01UF
R173
22
DS2
C253
.1UF
C166
.01UF
C273
.1UF
C200
0.01UF
C201
.01UF
C165
.01UF
J13
SEE NOTE
7 FOR
FILAMENT
POWER
POWER
J24
NB
POWER
J26
SPARE
J16
PTT
J11
PHONE
PATCH
J19
6.3 VAC
6VDC OR6 C
GRD FOR 6 V
HOT FOR 12 V



XMTR IF AMPL
V4A 1/2 6AZ8
FL1
2.1KC
C15 1000
C14 51
C54 7-60
L2 10MH
R18 47K
R141 39K
C13 .01UF
R140 SEE NOTE 13
C12 .01UF
R30 250
ALC ZERO
R19 47
R150 180
R38 220
C216 .02UF
C11 1000
R17 100K
L20 33
C16 33
R176 4700
R177 27K
C264 4UF
C6 .47UF
R12 1K
C7 .01UF
R122 47K
C10
CARR BAL
C9 5-25
CR4 IN34A
R14 270
CR1 IN34A
T1
R172 82
R15 250 CARR BAL
C171 510
CR3 IN34A
R16 270
CR2 IN34A
SEE NOTE 15
BALANCED MODULATOR
C8 .01UF
C48 .02UF
R44 270K
ANTI VOX RECT
R48 8.2MEG
VOX RECT
V14A 1/3 6BN8
R43 10 MEG
VOX TIME CONST
R42 8.2MEG
CW
ANTI VOX
R45 500K
C47 .047UF
VOX RELAY AMPL
V4B 1/2 6AZ8
R20 68K
R47 68K
R46 2200
BFO
V11A 1/2 6U8A
C88 510
L22 220
C55 100
R54 1MEG
C53 15
C234 1000
R55 220K
C17 .02UF
Y17 456.350
Y16 453.650
S9H
R149 1K
R56 5600
C56 .02UF
R57 1K
S12
GRID
ALC
PLATE
R117 1K
R116 18K
70K-2 OSCILLATOR
L301 2.4
SEE NOTE 12
C304 200
V301 6AU6
L302 .6-1
C301 20
C302 1000
R301 100K
L303
C305 100
C303 3000
C308 5-25
CR301 IN34A
R303 100K
T+275
TR+275
+200
-70
R142 10K
L1 2MH
R+275
V11
V16
V15
V14
V17
V13
V7
L29
V8
V9
L34
V10
C241 1000
C253 .1UF
C230 1000
L30
C166 .01UF
C273 .1UF
C228 1000
C229 .01UF
SEE NOTE 6
J24
NB POWER
C60 20
RCVR IST MIXER
V13B 1/2 6U8A
R174 56
C61 1000
R168 56
C59 1000
R62 100K
R60 100K
R61 150
C193 .01UF
C195 .01UF
J7
KEY
J8
EXTERNAL MUTE
Z5
C58 27
R59 100K
RCVR 2ND MIXER
V17B 1/3 6BN8
L33 2MH
C23 1000
C186 1000
R58 1K
C83 1000
R74 1MEG
R184 680K
IST IF AMPL
V1B 1/2 6AZ8
R132 1K
RCVR GAIN ADJUST
R75 10


IST XMTR MIXER
V5 12AT7
FL1
2.1KC
IST MIXER BAL
VIF OUT J22
SEE NOTE 10 JUMPER
VIF IN J23
T2
SEE NOTES 7 AND 14
S14
S15
S2
SEE NOTE 3
SEE NOTE 5
XTAL OSC V13A 1/2 6U8A
70K-2 OSCILLATOR
V301 6AU6
T301
SEE NOTE 12
J18
EXTERNAL VFO
VFO CATH FOL
V2A 1/2 6U8A
CR301 1N34A
S9B
SEE NOTE 14
T+275
TR+275
+200
-70
AVC
R+275
RCVR MIXER
V17B 1/2 6BN8
S METER ZERO
(SEE NOTE 16)
IST IF AMPL
V1B 1/2 6AZ8
RCVR GAIN ADJUST
Q MULT.
J27
2ND IF AMPL
V3B 1/2 6AZ8
T5
R.F. GAIN
AVC RECT
V15A 1/2 6BN8


2ND XMTR MIXER V6 12AT7
XTAL OSC V13A 1/2 6U8A
XTAL OSC CATH FOL V12B 1/2 6U8
XTAL CAL V12A 1/2 6U8A
RCVR XMTR RF AMPL V7 6DC6
AVC RECT V15A 1/2 6BN8
PROD DET V15B 1/2 6BN8
1ST AF AMPL V16A 1/2 6EB8
AF OUTPUT AMPL V16B 1/2 6EB8
SEE NOTE 3
SEE NOTE 5
SEE NOTE 14
R.F. GAIN
A.F. GAIN
OFF ON NB CAL
T+275
TR+275
+200
AVC
R+275



RCVR XMTR RF AMPL V7 6DC6
DRIVER V8 6CL6
P.A. V9 6146
P.A. V10 6146
AF OUTPUT AMPL V16B 1/2 6EB8
R109 THRU R114 EACH 12 OHMS IN PARALLEL
C140 THRU C145 EACH 500 IN PARALLEL
C117 1.5-7 DRIVER NEUT
C120 8-50 FB NEUT
C184 8-50 PA NEUT
SEE NOTE 17
T+275
TR+275
+200
-70
AVC
R+275
-70V
PHONES
500 OHM AUDIO
4 OHM AUDIO
NB ANT.
RCVR MUTE SEE NOTE 11
RF OUT
RCVR ANT.
ANT. RELAY
-70VDC
GRD

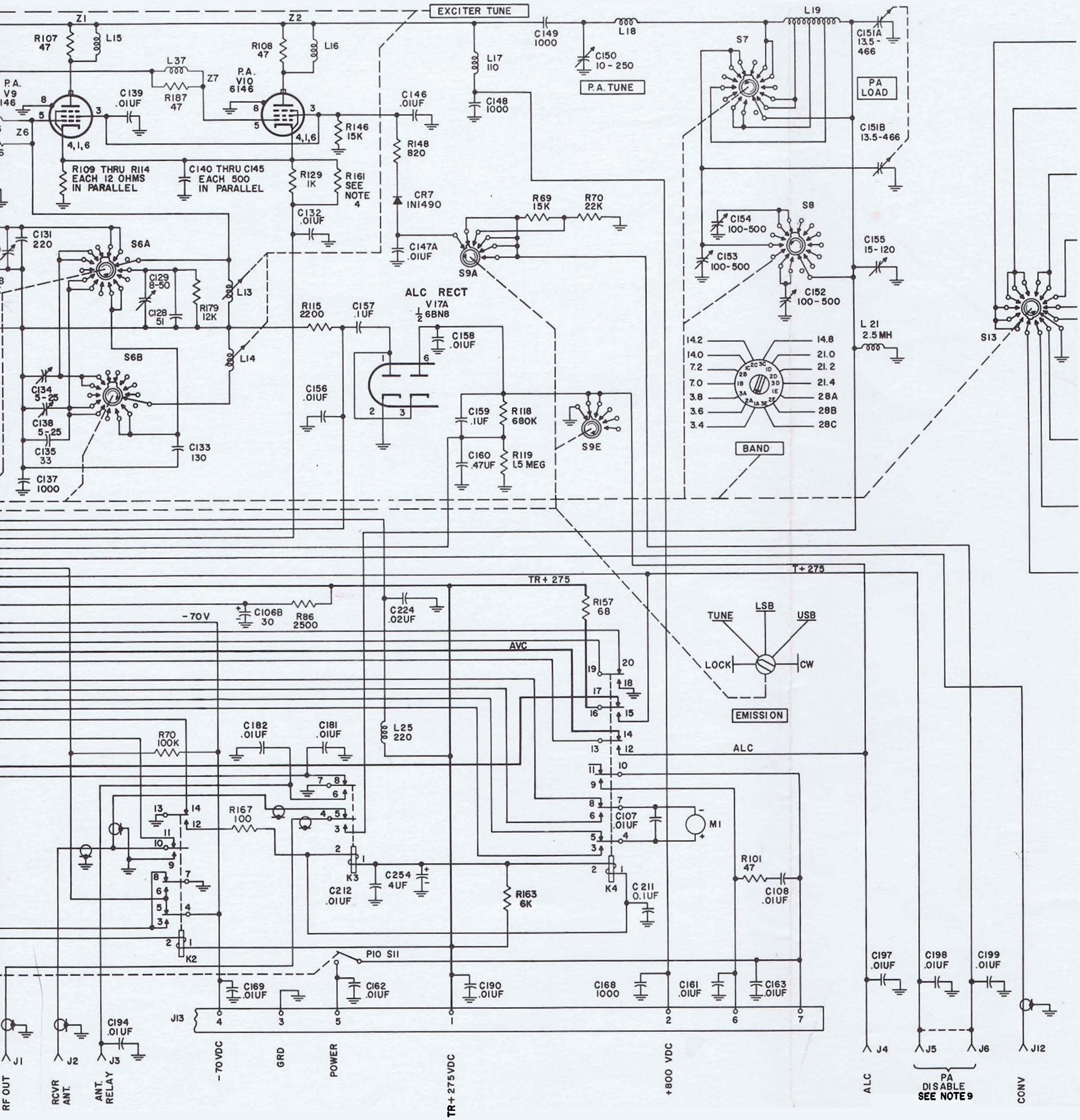


Figure 7-1. KWM

SECTION VII
ILLUSTRATIONS

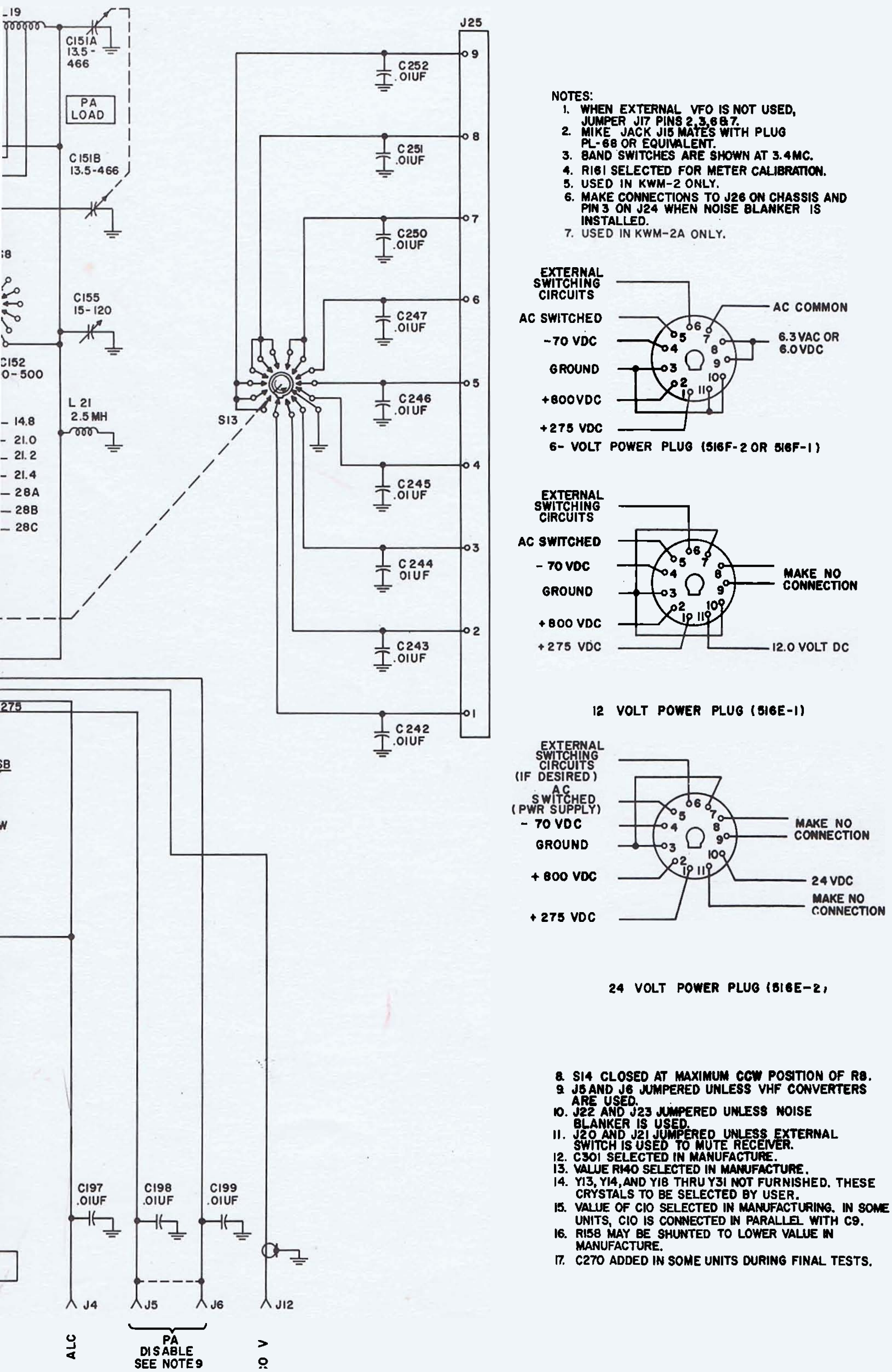
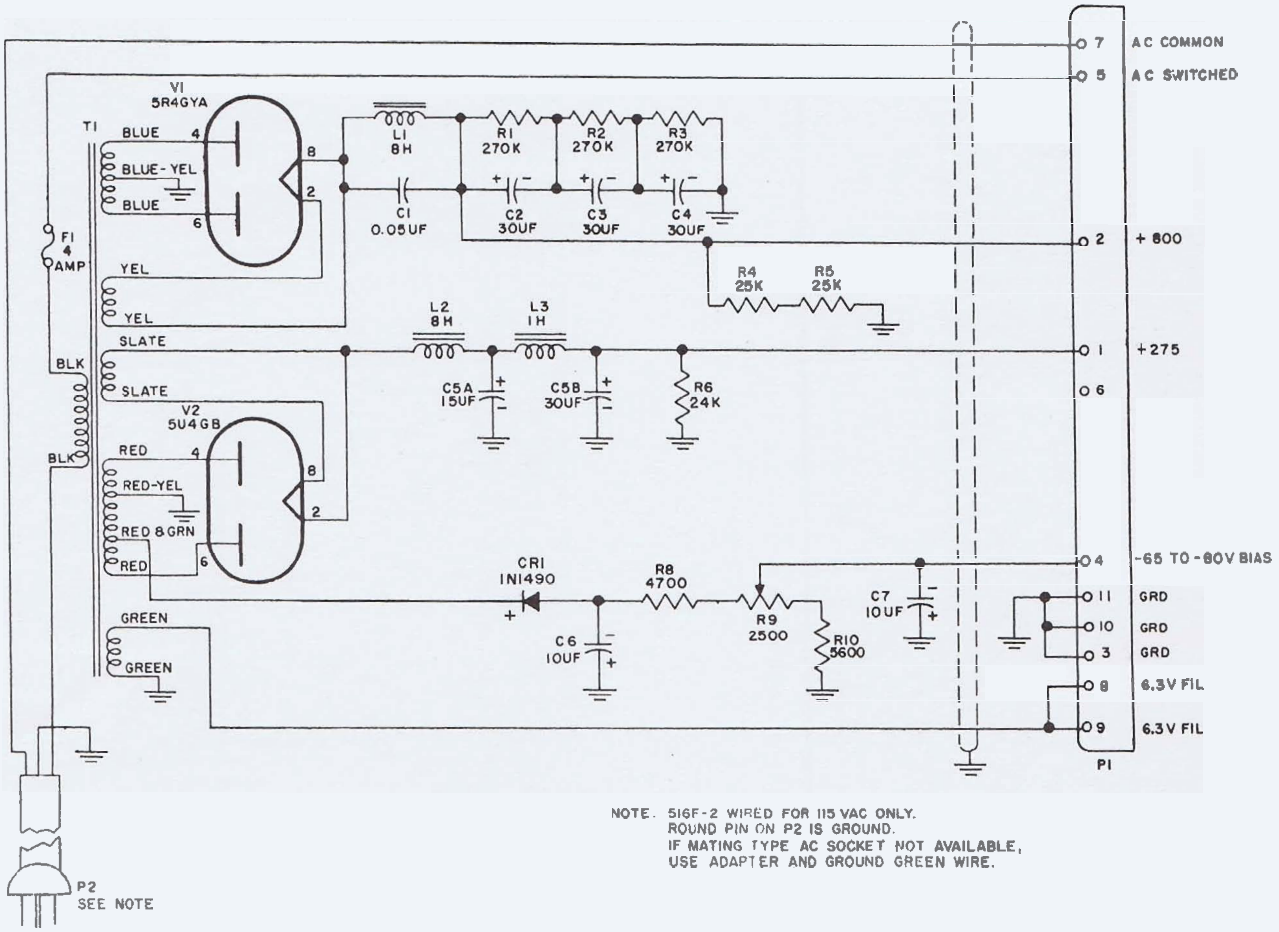
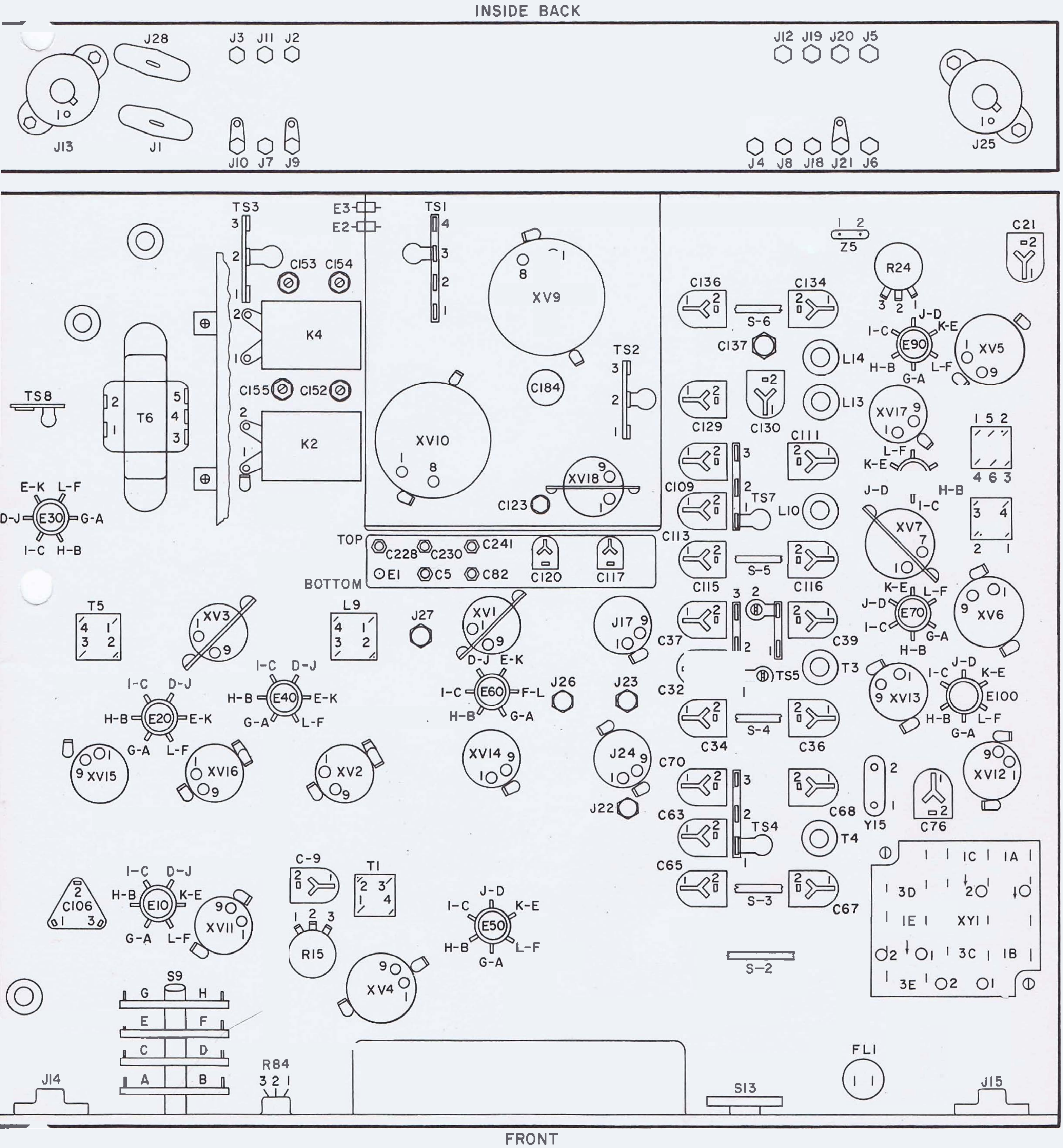


Figure 7-1. KWM-2 and KWM-2A Transceivers, Schematic Diagram



NOTE. 516F-2 WIRED FOR 115 VAC ONLY.
ROUND PIN ON P2 IS GROUND.
IF MATING TYPE AC SOCKET NOT AVAILABLE,
USE ADAPTER AND GROUND GREEN WIRE.

Figure 7-2. 516F-2 Power Supply, Schematic Diagram


INSIDE BACK
J28
J3 J11 J2
J12 J19 J20 J5
J13
J1
J10 J7 J9
J4 J8 J18 J21 J6
J25
TS3
E3
E2
TS1
C21
Z5
R24
C153 C154
K4
XV9
C136
C134
S-6
C137
L14
E90
XV5
T6
TS8
C155 C152
C184
TS2
K2
XV10
C129
C130
L13
XV17
C111
XV18
C109
TS7
L10
C123
C113
XV7
E30
TOP
C228 C230 C241
C120 C117
E1 C5 C82
BOTTOM
C115
S-5
C116
E70
XV6
T5
XV3
L9
J27
XV1
J17
C37
C39
T3
TS5
C32
XV13
E100
E20
E40
E60
J26
J23
S-4
C34
C36
XV15
XV16
XV2
XV14
J24
C70
XV12
J22
C63
TS4
C68
Y15
C76
T4
C65
C67
S-3
C-9
T1
R15
E50
C106
E10
XV11
XV4
S-2
S9
R84
J14
FL1
S13
J15
FRONT

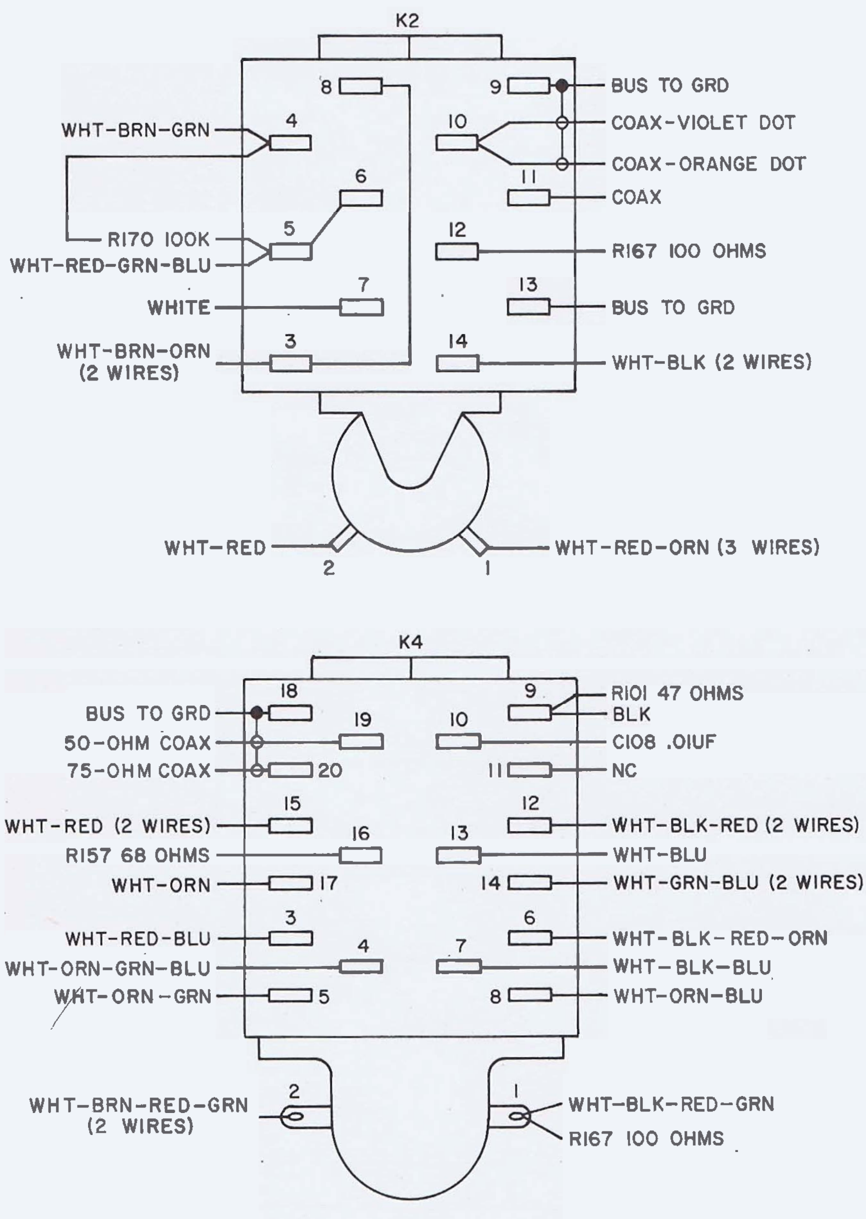


Figure 7-3. KWM-2 and KWM-2A, Location of Chassis-Mounted Components, Bottom View

Electrical Wire Code

EXAMPLES:

DA 92 — UNSHIELDED WIRE, POLYVINYL, NO. 22 AWG, WHITE WITH A RED TRACER

D	A	9	2
Type of Wire	Size of Wire	Color of Body	Color of Tracers

DAS 9123 — SHIELDED WIRE (SINGLE) POLYVINYL, NO. 22 AWG, WHITE BODY WITH BROWN, RED AND ORANGE TRACERS

D	A	S	9	123
Type of Wire	Size of Wire	Shielded	Color of Body	Color of Tracers

DASJ (9) (92) — SHIELDED AND JACKETED WIRE (MULTIPLE), POLYVINYL, NO. 22 AWG, WHITE AND WHITE WITH RED TRACER

D	A	SJ	(9)	(92)
Type of Wire	Size of Wire	Shielded and Jacketed	First Conductor	Second Conductor

A2A 91 — UNSHIELDED WIRE, IRRADIATED POLYOLEFIN, NO. 22 AWG, WHITE WITH BLACK TRACER

A2	A	9	1
Type of Wire	Size of Wire	Color of Body	Color of Tracer

TYPE OF WIRE CODE

CODE	DESCRIPTION
A	Cotton Braid Over Plastic
A2	Irradiated Modified Polyolefin, (300 Volts)
A3	Irradiated Modified Polyolefin, (600 Volts)
A4	Irradiated Modified Polyolefin, (1000 Volts)
A5	Irradiated Modified Polyolefin, (3000 Volts)
B	Busswire, Round Tinned
C	Polyvinyl Chloride, MIL-W-16878, Type B (600 Volts) (No. 20-18-16)
D	Polyvinyl Chloride, MIL-W-16878, Type B (600 Volts) (No. 22-26-28)
E	Vinyl, MIL-W-5086, Type I (600 Volts)
E2	Vinyl, MIL-W-5086, Type II (600 Volts) (No. 22-12) Note 1
E3	Vinyl, MIL-W-5086, Type II (600 Volts) (No. 0000-10) Note 2
E4	Vinyl, MIL-W-5086, Type III (600 Volts) (No. 12-22) Note 3
E5	Vinyl, MIL-W-5086, Type III (600 Volts) (No. 0000-10) Note 4
G	
H	Kel-F (Monochlorotrifluoroethylene)
I	Not Available
J	
K	Neon Sign Cable (15,000 Volts)
L	Silicone, MIL-W-16878, Type FF (600 Volts)
L2	Silicone, MIL-W-16878, Type FFW (1000 Volts)
L3	Silicone, Non-MIL (5000 Volts)
L4	Silicone, Non-MIL (10,000 Volts)
L5	Silicone, Non-MIL (15,000 Volts)
M	
N	Single Conductor Stranded (Non-Rubber)
O	Not Available
P	Single Conductor Stranded (Rubber Covered)
Q	
R	Polyvinyl Chloride, MIL-W-16878, Type C (1000 Volts)
S	Not Available
T	Teflon (TFE), MIL-W-16878, Type E (600 Volts) Stranded
U	Not Available
V	Polyvinyl Chloride, MIL-W-16878, Type D (3000 Volts)
W	Teflon (TFE), MIL-W-16878, Type EE (1000 Volts)
X	Teflon (TFE), MIL-W-16878, Type ET (250 Volts)
X2	Teflon (FEP), MIL-W-16878, Type K (600 Volts)
X3	Teflon (FEP), MIL-W-16878, Type KT (250 Volts)
X4	Teflon (TFE), Non-MIL (3000 Volts)
Y	Telephone Type, Polyvinyl
Y1	Teflon (TFE), Non-MIL; Solid Conductor
Z	Telephone Type, Braided Yarn

SIZE OF WIRE

CODE	SIZE
A	No. 22 AWG
B	No. 20
C	No. 18
D	No. 16
E	No. 14
F	No. 12
G	No. 10
H	No. 8
J	No. 6
K	No. 4
L	No. 2
M	No. 1
N	No. 0
P	No. 00
Q	No. 000
R	No. 0000
T	No. 28
V	No. 26
W	No. 24
X	No. 19
Y	No. 30
Z	

COVERING OF WIRE

S	Shielded
SJ	Shielded & Jacketed

COLOR CODE

CODE	TYPE
0	Black
1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Violet
8	Gray (Slate)
9	White
a	Clear
b	Tan
c	Pink
d	Maroon
e	Light Green
f	Light Blue

Note 1 - Extruded nylon over fiber glass braid.
Note 2 - Braided, lacquered nylon over fiber glass braid.
Note 3 - Extruded nylon over secondary vinyl over fiber glass over primary vinyl.
Note 4 - Lacquered extruded nylon over secondary vinyl over fiber glass over primary vinyl.

COLLINS