COLLINS

instruction book

KWS-1 Transmitter

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 prepaid, 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.

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
Ark Radio Supply Company
3101 4th Avenue South
Birmingham 5
Phone: 205-2-9588
Attn: E. C. Henniger

*Bedell Engineering Services
2454 Tenth Avenue South
Birmingham
Phone: 205-2-7982
Attn: Dr. C. F. Bedell
SEE ALSO: Atlanta, Georgia (Ark)

ALASKA
Yukon Radio Supply, Inc.
(P.O. Box 496)
641 3rd Street
Anchorage
Attn: A. E. Peterson

ARIZONA
Elliott Electronics, Inc.
418 N. 4th Street
Tucson
Phone: MAIN 4-2473
Attn: J. W. Friesenga

**Southwest Electronic Devices
(P.O. Box 9147)
140 S. 2nd Street
Phoenix
Phone: AL 2-7143
Attn: Herman A. Middleton

ARKANSAS
Lavender Supply Company
(P.O. Box 1168)
113-125 E. 4th Street
Texarkana
Phone: 2-4195
Attn: J. M. Lavender
Ed Moore's Radio & Appliance
12th & Jefferson
DeWitt
Phone: WHITBY 6-2820
Attn: Ed Moore

CALIFORNIA
**Amrad Supply, Inc.
999 Howard Avenue
Burlingame
Phone: DIAMOND 5-2757
Attn: Dan Rodriguez
Amrad Supply, Inc.
3415 Balboa Street
San Francisco
Phone: SKYLINE 1-4661
Attn: J. Stevens

*Communication Receiver Service
510 Maplewood
Los Angeles 4
Phone: HOLLYWOOD 3-2429
Attn: Charles C. Manahan

Elmar Electronics
140 11th Street at Madison
Oakland 7
Phone: TUE 4-3311
(TXW-OATS)
Attn: Elvis Fergo, M. L. Chrise

**Henry Radio Company, Inc.
(P.O. Box 6438)
11040 W. Olympic Blvd.
Los Angeles 4
Phone: GBALETE 9-6701
Attn: Ted Henry

Mission Ham Supplies
5474 Mission Blvd.
Riverside
Phone: GW 36523
Attn: Wm. P. Halquist

Qwest Industrial Electronics
(P.O. Box 257)
611 San Fernando
San Jose
Phone: Cypress 4-4494
Attn: Frank Quemet

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**ALSO AUTHORIZED DISTRIBUTOR
*SERVICE AGENCY ONLY

Radio Products Sales, Inc.
1501 S. Hill Street
Los Angeles 15
Phone: HRA 3-1271
Attn: Ken Reisen
Scott Radio Supply, Inc.
266 Alum Rock Avenue
Long Beach
Phone: HOB 6-1542/7-8629
Attn: E. E. Scott
Valley Electronic Supply Company
1301 W. Magnolia Blvd.
Burbank
Phone: Victoria 3-3844
Attn: Frank Eckert, Bud Road
Western Radio & TV Supply Company
(P.O. Box 1725)
1415 India Street
San Diego 1
Phone: RE 1-8086
Attn: A. W. Fruder, Art Stewart

COLORADO
Radio Products Sales Co.
16th Street
Denver 2
Phone: CHEROKEE 4-6951
Attn: Walter Netles/Willard Wright

CONNECTICUT
Haty of Hartford, Inc.
100 Bush Street
Hartford
Phone: Jackson 7-1861
Attn: Edward C. Gedrozy
Radio Shack Corp. of Connecticut
230 Crown Street
New Haven 10
Phone: 3RD 7-5971
Attn: E. G. Albano
SEE ALSO: Boston, Massachusetts

DELWARE
Willard S. Wilson, Inc.
405-405 Delaware Avenue
Wilmington 1
Phone: OLYMPIA 4-5231
Attn: Willard S. Wilson

DISTRICT OF COLUMBIA
Electronic Wholesalers, Inc.
2245 Sherman Ave.
Washington 1
Phone: HUDSON 3-2520
Attn: Ray Avery

FLORIDA
**Amateur Radio Center, Inc.
2000 E. N. E. 2nd Avenue
Miami
Phone: FRAKIN 4-4401
Attn: Willey Gilkinson

**Broad Radio
7221 Central Avenue
St. Petersburg 10
Phone: 72314
Attn: H. G. Pahn

**Electronic Wholesalers, Inc.
930 W 27th Avenue
Miami 47
Phone: OXford 6-1620
Attn: Philip Koster

Gulf Elecnic, Inc.
(P. O. Box 2121)
305 E. Wright St.
Pensacola
Phone: HOB 5-3516
Attn: F. R. Grice, Jr.

**Kikade Radio Supply, Inc.
1719 Grand Central Avenue
Tampa
Phone: 2-6543
Attn: E. T. Kikade

GEORGIA
Ack Radio Supply Co.
331 Luckie Street NW
Atlanta 1
Phone: JA 4-8477
Attn: T. E. Akerhorn

Specially Distributing Co., Inc.
760 Jasper St. N. E.
Atlanta 3
Phone: TRinity 3-2521
Attn: J. E. Eaton

HAWAII
*Howsbelle Electronics
815 Kamehame Road
Honolulu 14
Phone: 695-4666
Attn: Thomas Tenya

IDAHO
Robbin's Radio & TV, Inc.
(P. O. Box 2021)
2711 State Street
Boise
Phone: 26892
Attn: W. A. Robinson, Jr.

ILLINOIS
Allied Radio Corp.
100 N. Western Avenue
Chicago 60
Phone: MARYMAR 1-6800
Attn: Jim Sommersfeld/Jason Thomas
Klaus Radio & Electric Co.
463 E. Lake Street
Peoria
Phone: BE 8-3401
Attn: Clifford Morris

Newark Electronic Corporation
223 W. Madison Street
Chicago 6
Phone: 734E 2-9244
Attn: Les Wilkins/A. L. Pouche

INDIANA
Brown Electronics, Inc.
1032 Broadway
Fort Wayne
Phone: ANTHONY 3382
Attn: A. A. Brown

Graham Electronic Supply Co., Inc.
122 S. Senate Street
Indianapolis 4
Phone: MIGHT 4-9487
Attn: G. M. Graham/D. A. Hiltis/J. F. Simpson

Radio Distributing Co., Inc.
(P.O. Box 1499)
1123 High Street
South Bend 15
Phone: ATIANTIC 8-4665
Attn: William A. Davidson

IOWA
Bob and Jack's, Inc.
4507 Forest Avenue
Des Moines 11
Phone: BLACK 5-0073
Attn: Robert M. Evans/Jack Landis

Radio Trade Supply Co.
1224 Grand Avenue
Des Moines 9
Phone: ATIANTIC 8-7217
Attn: Leo Vance Davis/Larry Woods

World Radio Laboratories, Inc.
(P.O. Box 915)
3415 W. Broadway
Council Bluffs
Phone: 32-5120
Attn: Alan McMillan/Leo Meyerow/ C. H. Williams

KANSAS
The Overton Electric Co., Inc.
322 Jackson Street
Topeka
Phone: CESTRAL 3-1397
Attn: S. D. Thacker/Frank Thafer

LOUISIANA
**Radio Parts Inc.
1123 Magazine Street
New Orleans 13
Phone: 522-0217
Attn: Irene J. Levi

MARYLAND
Tioga George and Radio Shack Division
Electronics Distributors, Inc.
11344 Fern Street
Wheaton
Phone: LOCKWOOD 5-2262
Attn: George J. Pasque

MASSACHUSETTS
DeMarbco Radio Supply, Inc.
1095 Commonwealth Avenue
Boston 15
Phone: ALGoquin 4-9000
Attn: Frank DeMarbco

Graham Radio, Inc.
505 Main Street
Reading
Phone: 944-6000
Attn: Robert T. Graham, Sr.

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

**Two-Way Radio Engineers, Inc.
109-115 Ward Street
Boston
Phone: GARRISON 3-7511
Attn: Sherman M. Wolf

MICHIGAN
*Communication Service Company
201 South Lincoln
Charlotte
Phone: 1770-W
Attn: Bart Rigotra
M. N. Duffy & Co.
2404 Grand Avenue W.
Detroit 26
Phone: Woodward 3-2270
Attn: M. N. Duffy, Bill Maise

Purchase Radio Supply
327 E. Hoover Avenue
Ann Arbor
Phone: NORMANDY 8-6966/8-6262
Attn: Roy J. Purchase

Radio Supply & Engineering
96 Selden Avenue
Detroit 1
Phone: TEMPLE 1-3175
Attn: C. N. Houser

Warren Radio Company
1710 South Westside
Kalamazoo
Phone: FRESQUE 2-5720/2-7127
Attn: Frank Smith

MINNESOTA
Low Cost Company
1211 Lakeshire Avenue
Minneapolis 3
Phone: FEDERAL 9-6351
Attn: Joe Hatch

**Electronix Center, Inc.
107 3rd Avenue North
Minneapolis 1
Phone: FEDERAL 9-6378
Attn: Ward Jensen

MISSOURI
Walter Ashe Radio Company
1125 Pine Street
St. Louis 3
Phone: CLEFSTO 1-1125
Attn: Joe Novak

Herrstein-Applebee Co.
1012-1014 McGee Street
Kansas City 6
Phone: BAYARD 1-1155
Attn: R. F. Fries/Clyde Frye

Henry Radio Company
211 North Main
Burlington
Phone: OBSERVER 9-3127
Attn: Bob Henry, Helen DeArmond

NEW HAMPSHIRE
**Evans Radio
(P.O. Box 3132)
Bow Junction, Route 3A
Concord
Phone: CAPITAL 3-3538
Attn: Roger Britton

NEW JERSEY
Federated Purchaser, Inc.
1021 U.S. Rt. 22
Mountainside
Phone: ALbany 2-6200
Attn: Hal Thorne
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1.3.2. POWER SUPPLIES.

The power supply portion of the KWS-1 includes a high and low voltage supply in the single cabinet. The high voltage Power Supply consists of two single phase, full wave rectifiers and filter networks for supplying voltages to the plates and screen grids of the Power Amplifier. Also included in the high voltage supply are suitable interlocks for safety purposes, a primary switch, overload fuses and a plate contactor. The low voltage Power Supply provides all operating voltages for the exciter portion.

On cw operation, the high voltage is ON and a grid-block system of bias is used to cut off the r-f excitation to the Power Amplifier. On phone operation, the push-to-talk switch on the microphone, or the voice operate (VOX) system, controls the application of operating voltages by the carrier control relay action. Thus, actual transmitting occurs only when the cw key is depressed on CW, when the operator is talking on SSB or when the push-to-talk switch is operated.

1.4. REFERENCE DATA.

Power Source: 115 or 230 volts ac, 50/60 cycles, single phase.

Power Input Requirements: The maximum overall input power requirement is 1500 watts.

PA Plate Power Input: The nominal rated power input is 1000 watts peak envelope power.

Distortion: Third order distortion is down more than 35 decibels with tone frequencies of 900 and 2500 cps.

Frequency Range:

<table>
<thead>
<tr>
<th>Band (Meters)</th>
<th>Range (Mc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>3.0 to 4.0</td>
</tr>
<tr>
<td>40</td>
<td>7.0 to 7.3</td>
</tr>
<tr>
<td>20</td>
<td>14.0 to 15.0</td>
</tr>
<tr>
<td>15</td>
<td>20.5 to 21.5</td>
</tr>
<tr>
<td>11</td>
<td>26.4 to 27.4</td>
</tr>
<tr>
<td>10</td>
<td>28.0 to 29.0</td>
</tr>
<tr>
<td>10</td>
<td>29.0 to 30.0</td>
</tr>
</tbody>
</table>

Calibration: Direct reading in kilocycles on linear scale.

Dial Accuracy: Within 200 cps.

Frequency Stability:

Warmup: 5 minutes, not more than 1000 cps. 10 minutes, not more than 500 cps.

Normal Operation: After 20 minutes, within 300 cps of starting frequency. After 30 minutes, within 100 cps over 10-minute period.

Audio Frequency Response: Within plus or minus three decibels from 200 to 2900 cps.

Carrier Suppression: Not less than fifty decibels.

Undesired Sideband Suppression: Not less than fifty decibels.

Spurious Radiation: At least 35 decibles down.

Impedance of Microphone Input: High impedance.

Impedance of Antenna Connection: 52 ohms.
(See section VIII of this book for suggested antennas.)

Impedance of Phone Patch Connection: 600 ohms

Signal Level of Phone Patch: 0.1 volt.

Finish: St James grey wrinkle.

1.5. MODIFICATION FOR CANADA.

 Equipments sold in Canada are modified to meet Canadian Department of Transport Power Regulations as follows: Final plate voltage reduced to 1500-V; Final screen voltage reduced to 300-V. This allows the transmitter to be operated at 700 watts input. This modification must not be changed.
1-6. TUBE COMPLEMENT.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Tube Type</th>
<th>Reference</th>
<th>Function</th>
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<tbody>
<tr>
<td>1</td>
<td>5749</td>
<td>V001</td>
<td>VFO</td>
</tr>
<tr>
<td>1</td>
<td>12AX7</td>
<td>V101</td>
<td>Audio Amplifier</td>
</tr>
<tr>
<td>1</td>
<td>12AT7</td>
<td>V102</td>
<td>Audio Output/Squelch Amplifier</td>
</tr>
<tr>
<td>1</td>
<td>12AT7</td>
<td>V103</td>
<td>VOX Amplifier/Relay Amplifier</td>
</tr>
<tr>
<td>1</td>
<td>12AT7</td>
<td>V104</td>
<td>Low Freq. (250 kc) Oscillator/Amplifier</td>
</tr>
<tr>
<td>2</td>
<td>OB2</td>
<td>V105, 106</td>
<td>Voltage Regulators</td>
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<tr>
<td>1</td>
<td>6AL5</td>
<td>V107</td>
<td>VOX and Squelch Rectifiers</td>
</tr>
<tr>
<td>1</td>
<td>3TF4A</td>
<td>RT101</td>
<td>Filament Regulator</td>
</tr>
<tr>
<td>1</td>
<td>12AT7</td>
<td>V201</td>
<td>First Mixer</td>
</tr>
<tr>
<td>4</td>
<td>6BA6</td>
<td>V202, 203, 209</td>
<td>1st, 2nd and 3rd Amplifiers</td>
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<tr>
<td>1</td>
<td>12AT7</td>
<td>V204</td>
<td>Second Mixer</td>
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<tr>
<td>2</td>
<td>6CL6</td>
<td>V206, 207</td>
<td>Drivers</td>
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<tr>
<td>1</td>
<td>6AU6</td>
<td>V208</td>
<td>Crystal Oscillator</td>
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<tr>
<td>2</td>
<td>4X250B</td>
<td>V401, 402</td>
<td>Final Amplifiers</td>
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<tr>
<td>1</td>
<td>6AL5</td>
<td>V403</td>
<td>Automatic Load Control Rectifier</td>
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<tr>
<td>1</td>
<td>6AN5</td>
<td>V205</td>
<td>4th Amplifier</td>
</tr>
<tr>
<td>2</td>
<td>866A</td>
<td>V501, 502</td>
<td>Rectifiers, PA plate voltage</td>
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<td>5Y3-GT</td>
<td>V503</td>
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<tr>
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<td>6AS7-G</td>
<td>V504</td>
<td>Voltage Regulator, PA screen voltage</td>
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<tr>
<td>1</td>
<td>12AX7</td>
<td>V505</td>
<td>Voltage Regulator, PA screen voltage</td>
</tr>
<tr>
<td>1</td>
<td>OB2</td>
<td>V506</td>
<td>Voltage Regulator, PA screen voltage</td>
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<tr>
<td>1</td>
<td>5U4-GB</td>
<td>V508</td>
<td>Voltage Rectifier, low voltage</td>
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<td>V509</td>
<td>Bias Rectifier</td>
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<tr>
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1-7. ACCESSORIES (Not Supplied).

312A-1 Speaker Control. Provides space for mounting beam direction indicator, clock, etc., and includes a 10-inch speaker for receiver output.

020 0186 00 Microphone assembly with push-to-talk stand.

020 0187 00 Microphone assembly with plain stand.

522 0649 00 Model 302C-1 Directional Wattmeter

522 0475 00 Model SC-101 Station Control System

Telegraph Key