

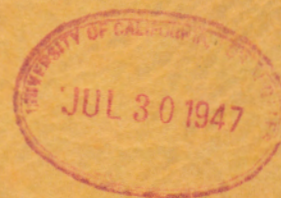
Robert D. Keys

Declassified
RESTRICTED

INSTRUCTION BOOK

Declassified

**MODEL TDB
RADIOTELEGRAPH
TRANSMITTING EQUIPMENT**



Manufactured for U. S. Navy Department, Bureau of Ships

ENGINEERING DEPARTMENT
RADIOMARINE CORPORATION OF AMERICA
75 VARICK STREET, NEW YORK, N. Y.

April 1942

MODEL TDB

RADIOTELEGRAPH TRANSMITTING EQUIPMENT

COMPONENT UNITS

Radiotelegraph Transmitter, Navy Type TDB (Radiomarine Type ET-8019-A), 110 V. DC
Motor Generator, Type ET-8010, 110 V. DC Input, GE Type BC/LY/BC/LY
Motor Starter, GE, CR-4052-Y1, Cat. #6934846 G11, 110 V. DC with thermal cut-out heater #81D254
Filter, Type 20
One Set of Vacuum Tubes consisting of 2-RCA 813 and 2-RCA 807
Telegraph Key, Type CQ
Capacitor, GE, 9CE6A14, .1 mfd., 1000 V. DC
Snubber Bracket
Control Unit, Type 8019
Antenna Transfer Switch, Type ATS-7
Five Calibration Cards, 8019-A blank form
One Set of Type R-1 Quartz Crystals in holders as specified in Contract
Spare Parts Box containing spares as in "SPARE PARTS LIST".

Disregard paragraph 9, page 10, and reference to power transfer switch PTS-1 on pages 4, 5 and 10. This switch is not furnished, since Model TDB equipment is complete with motor generator.

Paragraph 10, page 10, refers to T-1176 instead of T-902.

Disregard ENCLOSURES on page 10. The list of enclosures for TDB equipment is as follows:

T-1175 - Schematic Circuits

T-1176 - ET-8019-A with Separate Motor Generator Set and Control Panel

Typical Calibration Chart

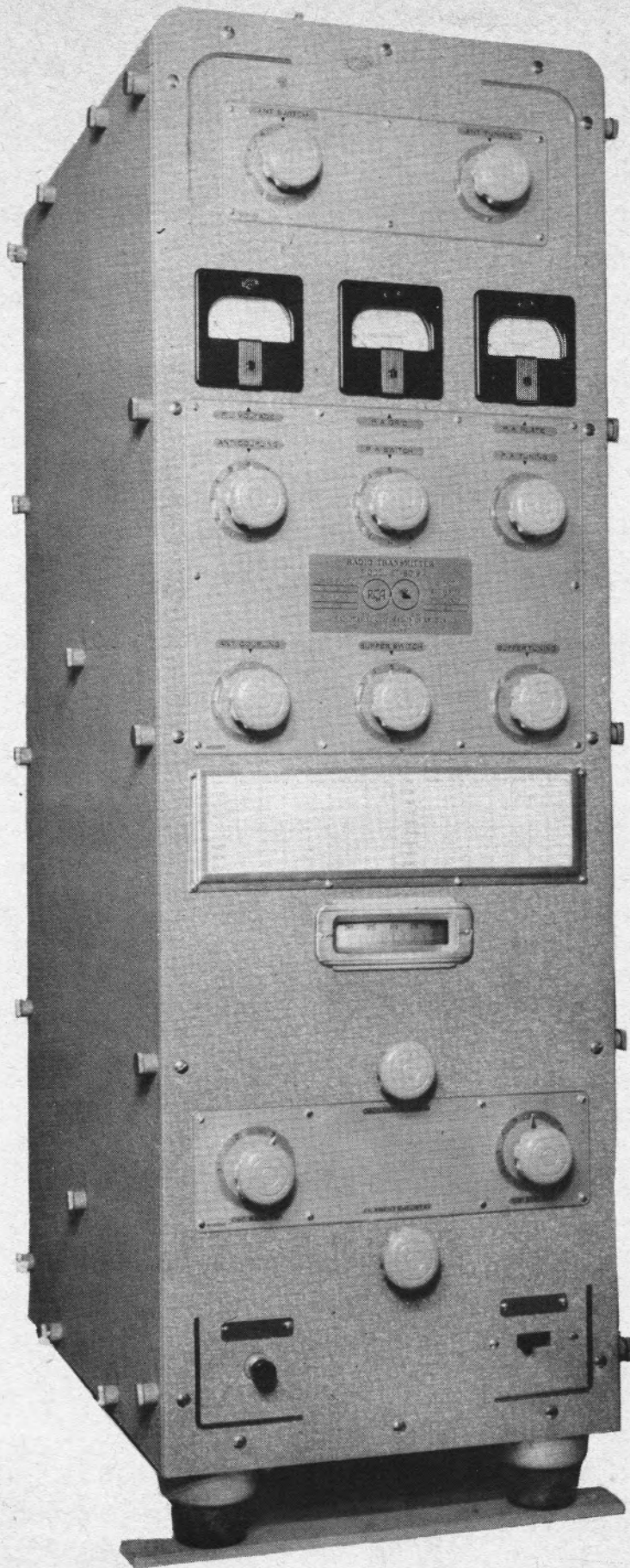
Photograph (Frontispiece)

Chart indicating how each crystal may be used to obtain output frequencies that are in harmonic relationship.

Parts List - Pages 18 to 23 inclusive

Spare Parts List - Pages 24 to 29 inclusive

Conversion Kit Parts List - Page 30



ET-8019-A RADIOTELEGRAPH TRANSMITTER

INSTRUCTION BOOK
FOR MODEL ET-8019-A

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INSTRUCTION BOOK
FOR MODEL ET-8019-A
HIGH-FREQUENCY
RADIOTELEGRAPH TRANSMITTER

GENERAL

The ET-8019-A high-frequency radiotelegraph transmitter described in this instruction book is designed primarily for marine applications, and provides a number of important operating characteristics not heretofore available. In the design of this transmitter, full advantage is taken of the efficiency of modern beam vacuum tubes, together with simplified controls, small space requirements, as well as coverage of all assigned high-frequency bands for ship radiotelegraph service.

FREQUENCY RANGE

The ET-8019-A transmitter is designed to cover, by means of front panel adjustments, a continuous frequency range of 2000 to 22140 Kc. The frequency coverage of the oscillator circuit in the transmitter is divided into four bands as follows:

- Band 1 - 2000 to 2400 Kc.
- Band 2 - 2400 to 3200 Kc.
- Band 3 - 3200 to 4200 Kc.
- Band 4 - 4200 to 5600 Kc.

The buffer and power amplifier circuits operates as fundamental frequency amplifiers for the above four frequency bands. For the higher frequency bands, use is made of frequency multiplication in the buffer stage.

ANTENNA POWER

The transmitter is designed to deliver approximately 200 watts or more A2 emission to a suitable antenna in the band between 2000 and 17000 Kc. Above 17000 Kc., the antenna power is approximately 150 watts.

TYPE OF ANTENNA

For general application to provide maximum efficiency, two separate antennas are recommended. For operation in the so-called 2 Mc. band, that is, frequencies between 2000 and 3000 Kc., a short vertical wire antenna approximately 30 to 40 feet long may be employed. The transmitter current feeds and series resonates such an antenna for this band. For operation on the higher frequencies, the ship's main antenna should be used, in which case the transmitter voltage feeds such an antenna. The necessary switching to select either type of antenna for the ET-8019-A transmitter should be accomplished by an antenna transfer switch such as Radiomarine Type ATS-7. SEE ~~W-108~~ T-1176

TYPE OF EMISSION

The transmitter is designed to provide A-1 (continuous wave) and A-2 (modulated wave) emission. For A-2 emission, the modulation frequency is 500 cycles, and the modulation percentage is approximately 70 per cent.

FREQUENCY TOLERANCE

When the transmitter is used as a master oscillator type of transmitter, a frequency tolerance of plus or minus .05 per cent is maintained. When the transmitter is used as a crystal-controlled transmitter, a frequency tolerance of plus or minus .02 per cent is maintained. A special temperature compensating capacitor is used in the oscillator circuit to correct for frequency drift due to temperature variations

MASTER OSCILLATOR OPERATION

Continuous frequency coverage within the bands specified above may be obtained when the transmitter is used for master oscillator operation. Crystal control may also be used to provide a large number of output frequencies within the specified bands as outlined below under "Crystal Oscillator Operation."

CRYSTAL OSCILLATOR OPERATION

The transmitter is designed so that a maximum of 10 quartz crystals may be installed to provide crystal control. Each crystal may be used to obtain 2, 3 or 4 output frequencies whenever the assigned output frequencies are in harmonic relationship. For example, a 4140 Kc. crystal provides output on 4140, 8280, 12420 and 16560 Kc. In order to determine the fundamental frequency of the crystal that is required for each output frequency, refer to the "Typical Calibration Data" in this book.

	<u>CRYSTAL</u> <u>FREQUENCY</u>	<u>OUTPUT</u> <u>FREQUENCY</u>	<u>OUTPUT</u> <u>FREQUENCY</u>	<u>OUTPUT</u> <u>FREQUENCY</u>	<u>OUTPUT</u> <u>FREQUENCY</u>
1 -	3105		6210		12420
2 -	3110		6220		12440
3 -	4130		8260	12390	16520
4 -	4140	4140	8280	12420	16560
5 -	4150	4150	8300	12450	16600
6 -	4160	4160	8320	12480	16640
7 -	5510	5510	11020	16530	22040
8 -	5520	5520	11040	16560	22080
9 -	5525	5525	11050	16575	22100
10 -	5530	5530	11060	16590	22120

NOTE: When crystals 1, 3, 4, 5 and 8 are supplied, a total of 17 output frequencies are obtained.

When crystals 1, 2, 3, 4, 5, 8 and 10 are supplied a total of 23 output frequencies are obtained.

When 10 crystals are supplied, a total of 35 output frequencies are obtained.

For other combinations of crystals, refer to the crystal chart in enclosure.

VACUUM TUBES

The transmitter uses a total of four vacuum tubes, as follows:

- 1 - RCA 807 as crystal or master oscillator.
- 1 - RCA 807 as buffer amplifier or frequency multiplier.
- 2 - RCA 813's as power amplifiers.

TYPE OF CIRCUIT

A schematic circuit diagram, T-957, is enclosed, showing the circuit arrangement. The RCA 807 oscillator grid circuit is connected to a 11-position switch, which is marked "Crystal Switch." Ten of these positions on this switch are used to select the desired crystal (up to ten crystals, if crystals are used). The last or eleventh position of the Crystal Switch is marked "M.O." The switch should always be left in the "M.O." position, regardless of the output frequency to be used, for master oscillator (non-crystal) operation.

The oscillator circuit, for either crystal or master oscillator operation, covers four basic frequency bands which are selected by the "Oscillator Band Switch." The four basic oscillator bands are as follows:

<u>OSCILLATOR BAND SWITCH</u>	<u>OSCILLATOR FREQUENCY RANGE</u>
1	2000 to 2400 Kc.
2	2400 to 3200 Kc.
3	3200 to 4200 Kc.
4	4200 to 5600 Kc.

It should be noted that the four basic oscillator bands specified above provide "Output Frequencies" in these same bands. This means that the buffer and power amplifier stages in the transmitter always operate as fundamental frequency amplifiers for the four basic frequency bands. However, for the remaining higher frequency bands, namely, all frequencies from 5600 K.C. and higher, the buffer stage operates as a frequency multiplier. The circuit arrangement of the RCA-807 buffer stage is so designed that it not only functions as a fundamental amplifier, but may also be adjusted to double, triple or quadruple the basic oscillator frequency. The circuit comprises a tapped tank inductance connected to a 9-position switch, an arrangement of three fixed tank capacitors, plus a panel-controlled variable capacitor. This arrangement, therefore, enables each crystal (or a single master oscillator setting) to be used for several output frequencies whenever the output frequencies are even or odd harmonics of the oscillator frequency.

The power amplifier stage, which uses two RCA 813 tubes in parallel, comprises a tuned tank circuit consisting of a tapped inductance connected to a 9-position switch, plus a panel-controlled variable air capacitor. The power amplifier tank circuit is designed to always function as a fundamental frequency amplifier in any of the specified bands. The power amplifier tank circuit is arranged so that for the higher frequencies capacitive coupling is used to the antenna, while for the lower frequencies conductive coupling is employed. There is also provided a panel-controlled coupling switch, antenna loading inductance switch and a

panel-control which varies the movement of an iron core inside the loading inductance. The transfer of the output circuit from voltage to current feed is accomplished by means of the antenna switch which permits voltage feed to be employed.

For keying the transmitter, a high-speed keying relay is employed, which keys the oscillator, buffer, and power amplifier stages. For A-2 or modulated wave emission, the power amplifier stage is plate modulated through a suitable modulation transformer which is connected to a source of 500 cycles from the motor generator set.

PANEL CONTROLS AND INSTRUMENTS

1. Test key.
2. A1-A2 switch.
3. Filament rheostat.
4. Oscillator band switch.
5. Crystal-M.O. switch.
6. Oscillator tuning.
7. Antenna coupling (D).
8. Buffer switch (E).
9. Buffer tuning (F).
10. Antenna coupling (G).
11. P.A. switch (H).
12. P.A. tuning (I).
13. Antenna switch (J).
14. Antenna tuning (K).
15. Filament voltmeter.
16. P.A. grid milliammeter.
17. P.A. plate ammeter.
18. Calibration chart.

POWER SUPPLY

The ET-8019-A is designed so that it may use the same motor generator power supply that is normally employed with the shipboard intermediate-frequency transmitter such as the ET-8010 type. This motor generator consists of a motor for 110 or 230-volt D.C. supply, a 1200-volt, .45-ampere D.C. generator, and a 110-volt, 1.59-ampere, 500-cycle alternator. Collector rings are provided on the motor to furnish alternating current for filament supply. When the ET-8019-A is furnished for use with the ET-8010 type of intermediate-frequency transmitter, a suitable power transfer switch PTS-1, is furnished to enable the motor generator to be used with either transmitter. The motor generator requires approximately 1300 watts from the shipboard power supply.

For an independent high frequency installation where the ET-8019-A is furnished with its own motor generator set, an ET-8019 "Control Panel" is required. This panel contains a motor generator Start-Stop Switch, ganged generator and alternator field rheostat, and a plate voltmeter. The motor generator used with independent installations is the same as outlined in the above paragraph. Where the power supply is A.C., a suitable motor generator may be furnished, or a rectifier is available when A1 emission only is required.

DIMENSIONS AND WEIGHT

The overall dimensions of the ET-8019-A transmitter are approximately 12-1/4 inches wide, 19-1/4 inches deep, and 45-3/16 inches high. The unit is designed to match the ET-8010 type of transmitter in appearance and in height, so that both units will present a pleasing appearance when installed in the radio room. The weight of the ET-8019-A is approximately 150 Lbs.

INSTRUCTIONS FOR RADIO OPERATOR

1. Careful attention to the following instructions will enable the radio operator to quickly adjust the transmitter to any one of its calibrated frequencies, and to secure maximum overall performance.

2. In the case of a set installed for crystal-controlled operation, the operator should place the various switches and dials at the settings as recorded on the calibration chart. For example, to transmit on 4140 Kc., place the oscillator band switch in position 3, the oscillator dial at 260, antenna coupling (D) as indicated by front panel calibration chart, buffer switch (E) at 4, buffer tuning (F) at 21, antenna coupling (G) at 10, P.A. switch (H) in position 4, P.A. tuning (I) as determined by installation, antenna switch (J) at 9 and antenna tuning (K) at 0. As a further example, to transmit on 2600 Kc., place the oscillator band switch in position 2, the oscillator dial at 78, antenna coupling (D) at zero, buffer switch (E) at 3, buffer tuning (F) at 10, antenna coupling (G) as determined after installation, P.A. switch (H) in position 2, P.A. tuning (I) as determined by installation, antenna switch (J) as determined by installation and antenna tuning (K) as determined by installation. The antenna tuning control (K) is always to be adjusted for maximum power amplifier plate current provided the antenna coupling control (G) has been correctly set so that the maximum power amplifier plate does not exceed .35 amperes. When changing the antenna coupling, it is important to readjust the power amplifier tuning control (I) for maximum P.A. plate current, whether or not the antenna has been resonated to maximum.

3. Adjust filament voltage to 10 volts and plate voltage to 1200 volts. The plate voltage adjustment will normally be made by means of the voltmeter and rheostat on the intermediate-frequency transmitter such as an ET-8010 type, when both the ET-8019-A and ET-8010 are installed together with a common motor generator set. A power transfer switch, type PTS-1 is used to transfer the motor generator circuits and plate voltage should be adjusted for the ET-8019-A by temporarily placing the PTS-1 switch in the intermediate-frequency (ET-8010) position. When the ET-8019-A is used with a separate motor generator set, a small control panel containing a Start-Stop switch, plate voltmeter, and a ganged generator and alternator field rheostat is provided.

4. Correct adjustment procedure for current feed operation in the 2000-3000 Kc. band. Place the A1-A2 switch in the A-1 position for continuous wave transmission. Place P. A. switch (H) in position 1. Press the tuning key and adjust P.A. tuning (I) for minimum plate current. Now adjust the antenna coupling (G) antenna switch (J) and antenna tuning (K)

until the P.A. plate ammeter reads between approximately .3 to .35 amperes. After this is done, slightly readjust the P.A. tuning (I) for minimum P.A. plate current and then re-resonate the antenna with antenna tuning (K). The "short" 30 to 40-foot antenna should be used for this frequency band.

For operation above 3000 Kc., voltage feed to the main ship antenna should be used. Set antenna switch (J) at position 9 and leave it there. Place antenna coupling switch (G) in position indicated on calibration chart. Place P.A. switch (H) according to calibration chart. Close test key and adjust the P.A. tuning (I) and antenna coupling (D) for a P.A. plate current between .3 and .35 amperes. It is important to understand how to correctly adjust the antenna coupling and power amplifier tuning under these conditions. As the antenna coupling (D) is increased, that is when the pointer is moved toward higher readings, it is necessary to readjust the power amplifier tuning (I) toward higher readings in order to maintain the power amplifier tank circuit in resonance. When the correct adjustment has been obtained, a change in the setting of either the antenna coupling or the power amplifier tuning will cause an increase in plate current, the correct setting of course being the one which gives minimum plate current at the loaded out value of between .3 and .35 amperes. It will be observed that as the antenna coupling is increased (pointer moving toward higher readings on the scale), that the power amplifier tuning becomes "broader," which is an indication that the set is loading out into the antenna.

If the ET-8019-A is installed for operation on frequencies between approximately 3000 and 4000 Kc., it may sometimes be found desirable to use current rather than voltage feed to the antenna. In such cases, for current feed, the antenna coupling (D) is not used and instead coupling (G) is employed and the antenna resonated by means of the antenna inductance switch (J) and the antenna tuning control (K).

5. The P.A. grid milliammeter provided on the transmitter is to be used to enable the operator to correctly adjust the buffer switch (E) and buffer tuning (F). As the buffer tuning condenser (F) is brought into resonance, the P. A. grid current will reach a maximum. In general, the P.A. grid current will have a value between approximately 4 to 17 milliamperes for operation on the higher portions of the frequency band.

6. When crystals are furnished for crystal control, they should be plugged into the sockets provided at the top of the oscillator unit. Always install crystals so that the nameplate on the crystal faces the front panel. The crystal sockets are numbered 1 to 10 to correspond to the first 10 positions of the crystal switch. The lowest frequency crystals should be plugged into the sockets bearing the lower number. For example, when seven crystals are furnished for the usual ship frequencies, a 3105 K.C. crystal goes in socket #1, 3110 K.C. in #2, 4130 K.C. in #3, 4140 K.C. in #4, 4150 K.C. in #5, 5520 K.C. in #6 and 5530 K.C. in #7. If additional crystals are used, a similar arrangement should be followed so that higher numbers on the crystal switch conform to the higher crystal frequencies.

7. Adjustments for master oscillator operation are in all respects similar to those for crystal oscillator operation with the exception that in general a slightly higher setting of the oscillator tuning dial (1 to 2 divisions) is necessary for good keying with crystal control.

8. Correct performance with crystal control and satisfactory keying may be checked as follows. Assume all switches and antenna coupling and power amplifier tuning adjustments are properly made. As the oscillator tuning dial is turned toward lower numbers the crystal will "snap" out of oscillation and the P.A. plate current will increase. Now, if the oscillator tuning is carefully turned toward higher readings a point will be reached where the crystal oscillator "snaps" in and the P.A. plate current will decrease. This adjustment may not give clean keying. The oscillator tuning should then be turned approximately 1 or 2 divisions higher on the scale, which will give clean keying and normal operation. Obviously, when the calibration chart is properly filled in, all of the various dials and switches may be quickly set at the calibrated points.

9. If it is desired to use A-2 or modulated transmission, the panel switch should be placed in the A-2 position. This will then modulate the power amplifier tubes with 500-cycle energy from the alternator on the motor generator set and provides a distinctive note which is useful for calling purposes or for handling traffic during fading conditions.

10. Always keep the sides of the set firmly fastened by means of the thumb screws which are provided. The inside of the transmitter should be kept free from dust or dirt and switch contacts should be inspected occasionally to insure proper operation. Binding posts for meter connections inside the set, for use by the serviceman, are normally short circuited by means of small jumper connections. These binding posts should be kept tight.

SERVICE ADJUSTMENTS

1. Switch Positions. Refer to the enclosed typical calibration chart for correct switch positions for the various bands. Note that above 5.6 Mc. frequency multiplication is employed in the buffer so that no crystals higher than 5.6 Mc. are required for the highest output frequencies.

2. Oscillator Band Centering. The four oscillator bands are centered in the laboratory by means of four oscillator condensers which are mounted on the left side of the oscillator unit, locked, and covered with a small plate. Under normal circumstances, these four oscillator band centering condensers should not be tampered with or readjusted, as otherwise the correct coverage may not be obtained with the band spread oscillator tuning panel control. If, however, it is ever necessary to adjust any of the band centering condensers, it is important that this adjustment be made with the oscillator tuning dial set at the correct position. For example, to center range 1 use an accurate frequency meter set at 2000 K.C., place the oscillator tuning dial at 30 and leave it there and then carefully adjust band centering condenser #1 until 2000 K.C. is obtained. These same considerations apply with respect to oscillator band coverage in the various other bands provided by the set. Band centering condenser must be locked after adjustment.

The normal band coverage of each oscillator range, based on the band setting frequency, is listed below:

<u>OSC. BAND</u>	<u>RANGE</u>	<u>BAND SETTING FREQUENCY</u>	<u>DIAL SETTING</u>
1	2000 - 2400	2000	30
2	2400 - 3200	3105	280
3	3200 - 4200	*4140	260
4	4200 - 5600	*5520	342

***Calling Frequencies**

NOTE: Oscillator tuning dial has a "Stop" at 410 divisions.

3. When the ET-8019-A is furnished with crystals, it is important for the installation man to understand the proper procedure in calibrating the oscillator tuning dial to insure stable crystal oscillator operation and clean keying. Sets shipped with crystals are, of course, calibrated and the calibration is entered on the chart so that the procedure outlined below need not be repeated. However, in the event of additional crystals being installed at a future date, carefully observe the following instructions.

A. Insert a 0-50 milliammeter across the oscillator meter links in the rear of the set.

B. Temporarily disconnect antenna from set.

C. Insert crystals in the crystal sockets, making sure the nameplate on the crystal faces the front panel. Crystal sockets are numbered to correspond to the equivalent oscillator switch positions and the crystals should be inserted with the lowest frequency crystals in the lower numbered sockets.

D. Place all switches in their correct positions and the power amplifier tuning condenser at a scale reading as shown on the typical calibration chart enclosed. This chart is based on a power amplifier tuning adjustment with no antenna for convenience of the serviceman in setting the P.A. at resonance.

E. Adjust plate voltage to normal value of 1200 volts. Now momentarily press the test button on the transmitter panel. If the oscillator tuning adjustment is such that the crystal is not oscillating, the power amplifier plate current will be high, around 350 m.a. Now as the oscillator tuning knob is turned, the crystal will snap into oscillation and the power amplifier plate current will drop to a low value of approximately 100 m.a. The P.A. tuning condenser may now be readjusted for a more accurate minimum. Next, observe the oscillator plate current and note that as the oscillator dial is turned the plate current in the oscillator will dip to approximately 20 m.a. Now turn the oscillator tuning dial toward higher readings until the oscillator plate current is approximately 3 m.a. higher than its minimum value

or about 23 m.a. Then check the note in the ship's short-wave receiver by keying the set rapidly to observe if good clean-cut keying is obtained. This final setting of the oscillator tuning dial, namely about 3 m.a. higher than minimum oscillator plate current, should be the value to record on the calibration chart. It will be observed that crystals will oscillate over a very wide range on the oscillator tuning dial as long as the dial is rotated toward higher readings. However, the calibration should not be recorded for too high a dial setting above that which gives minimum oscillator plate current, as this will reduce the drive on the buffer. If it is necessary to adjust crystals without a 0-50 milliamperere oscillator meter, it is possible to make the adjustment using the main plate meter on the panel. This is done by slowly turning the oscillator tuning dial starting at zero until a setting is reached where the power amplifier plate current suddenly drops. Then the oscillator tuning dial should be advanced to a higher reading by approximately 1 or 2 scale divisions and this new setting recorded as the correct crystal oscillator calibration. Beat note check on short-wave receiver should also be made to insure good keying.

4. Master Oscillator Calibration. Sets furnished without crystals or sets with crystals which are to be calibrated for additional master oscillator frequencies should be calibrated in the usual manner with a suitable frequency meter. All switches and the power amplifier tuning adjustments should be set as shown on the typical calibration chart. Considerable band spread is provided on the oscillator tuning dial so that the various frequencies in each band may be readily calibrated and re-set with accuracy.

5. Power Amplifier and Antenna Coupling Adjustment. Refer to "Instructions for Radio Operator" with respect to correct adjustments in the power amplifier and output circuits. The serviceman should clearly understand that this transmitter is designed for both voltage and current feed to the antenna, which results in certain controls not being used for voltage feed, while others are not used for current feed.

6. Buffer Plate Current and Power Amplifier Grid Current Metering. A pair of meter links for the buffer plate is provided on the same mounting board as those previously mentioned for the oscillator. Average buffer plate current for normal operation is approximately 60 m.a. Power amplifier grid current is indicated by the panel meter, as previously described. Normal power amplifier grid current will vary from approximately 4 to 17 m.a. depending upon the frequency band.

7. Buffer Tank Circuit Adjustments. Since in the ET-8019-A transmitter the buffer tuning condenser is panel controlled, it is unnecessary to make any internal adjustments to the buffer inductance for the frequency range covered by the set. However, in calibrating the set aboard ship, care must be exercised to record correct settings for the buffer switch and condenser, as this determines the harmonic which is selected for frequency multiplication.

8. Tuning Key. The tuning key on the front panel, when pressed, inserts resistance in the cathode of the power amplifier and buffer stages, and automatically short circuits this resistance when the button is in its "open" position. Operation of the tuning key also performs the same functions

as the contacts on the keying relay. The power output of the set is therefore lower when the tuning key is used than when the regular telegraph key is employed. All tuning should always be done on A-1 rather than A-2 emission. The purpose of the cathode resistor which is inserted by the tuning key is to protect the tubes from overload in the event that the power amplifier tuning condenser has not been properly adjusted.

9. Power Transfer Switch. Since in many installations the ET-8019-A is used with an ET-8010 type of set, a suitable power transfer switch known as Type PTS-1 is to be used. This switch transfers the A.C. collector ring circuit, the 500-cycle circuit, the telegraph key, and the negative high-voltage circuit to either type of transmitter as required.

10. ET-8019-A Control Panel. For application where the ET-8019-A is used with its own motor generator set, a suitable control panel is required. This panel contains a start-stop switch, ganged generator and alternator field rheostats and a plate voltmeter. See external connection diagram T-902.

ENCLOSURES

T-957 - Schematic Circuits.

T-902 - ET-8019-A with separate motor generator set and control panel.

T-903 - ET-8019-A with ET-8010, ET-8010-B, ET-8010-C and ET-8010-D.

T-904 - ET-8019-A with ET-8010-A, ET-8010-BA, ET-8010-CA and ET-8010-DA.

Typical Calibration Chart.

Photograph (frontispiece).

Chart indicating how each crystal may be used to obtain output frequencies that are in harmonic relationship.

The various component units referred to in this instruction book or on circuit diagrams are not to be construed as a "bill of material." Material furnished for a particular order will be in accordance with the specifications or requirements of that order.

NOTE 1 - If an ET-8019 "Rectifier Unit" is used with the ET-8019-A, for operation from a 110 volt 60 cycle line, A1 emission only is obtained, and the filament transformer in the ET-8019-A must be changed to a type S-13866 to replace either a type S-11751 or S-15568.

NOTE 2 - Radiomarine Corporation reserves the right to change specifications and designs of equipment described in this book.

ET-8019-A - TYPICAL CALIBRATION DATA

Col.	OUTPUT FREQ. (KC)	XTAL. FREQ. (KC)	XTAL SWITCH	OSC.BAND SWITCH	OSC. TUNING SCALE (With) (Xtal.)	OSC. TUNING SCALE (With) (M.O.)	ANTENNA COUPLING "D"	BUFFER SWITCH "E"	BUFFER TUNING "F"	ANTENNA COUPLING "G"	P. A. SWITCH "H"	P. A. TUNING "I"	ANTENNA SWITCH "J"	ANTENNA TUNING "K"
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	2000	2000		1	32	30	0	1	26		1	14	1	
	2100	2100		1	75	73	0	1	32		1	22	1 or 2	
	2200	2200		1	129	127	0	1 or 2	41 or 16		1	29	2	
	2300	2300		1	202	200	0	2	24		1	35	2	
	2400	2400		1	296	294	0	2	30		1	40	2 or 3	
	2400	2400		2	30	28	0	2	30		1	40	2 or 3	
	2500	2500		2	52	50	0	2	35		1 or 2	44 or 23	3	
	2600	2600		2	80	78	0	2 or 3	41 or 10		2	27	3	
	2700	2700		2	111	109	0	3	15		2	31	3 or 4	
	2800	2800		2	146	144	0	3	19		2	34	4	
	2900	2900		2	180	178	0	3	23		2	36	4	
	3000	3000		2	224	222	0	3	26		2 or 3	39 or 22	4 or 5	
*	3105	3105	1	2	284	280	0	3	29		2 or 3	41 or 25	5	
*	3110	3110	2	2	286	284	0	3	29		2 or 3	41 or 25	5	
	3200	3200		2 or 3	337 or 33	335 or 31	0	3	31		3	28	5 or 6	
	3400	3400		3	67	65	0	3	36		3	34	7	
	3600	3600		3	109	107	0	3	40		3	38	8	
	3800	3800		3	156	154	0	3 or 4	45 or 12	10	3 or 4	41 or 20	9	0
	4000	4000		3	212	210	0	4	17	10	4	25	9	0
*	4130	4130	3	3	258	256	0	4	21	10	4	29	9	0
c	4140x	4140	4	3	262	260	0	4	21	10	4	29	9	0
	4150	4150	5	3	266	264	0	4	21	10	4	29	9	0
	4165x	4165		3	272	270	0	4	22	10	4	29	9	0
	4200	4200		3 or 4	286 or 52	284 or 50	0	4	23	10	4	30	9	0
	4400	4400		4	82	80	0	4	27	10	4	34	9	0
	4600	4600		4	115	113	0	4	31	10	4	37	9	0
	4800	4800		4	154	152	0	4	34	10	4 or 5	40 or 7	9	0
	5000	5000		4	197	195	0	4	37	10	5	13	9	0
	5200	5200		4	250	248	0	4 or 5	40 or 9	10	5	17	9	0
	5400	5400		4	312	310	0	5	13	10	5	22	9	0
	5510x	5510		4	341	339	0	5	16	10	5	24	9	0
c	5520	5520	6	4	344	342	0	5	16	10	5	24	9	0
	5530	5530	7	4	347	345	0	5	16	10	5	24	9	0
	5535x	5535		4	348.5	346.5	0	5	16	10	5	24	9	0
	5600	5600 or) 2800)		4 or 2	378 or 146	376 or 144	0	5	17	10	5	25	9	0
	5800	2900		2	180	178	0	5	20	10	5	29	9	0

----- Couple to best suit antenna -----

----- Tune to suit antenna -----

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ET-8019-A - TYPICAL CALIBRATION DATA

Col.	OUTPUT FREQ. (KC)	XTAL. FREQ. (KC)	XTAL SWITCH	OSC. BAND SWITCH	OSC. TUNING SCALE (With) (Xtal.)	OSC. TUNING SCALE (With) (M.O.)	ANTENNA COUPLING "D"	BUFFER SWITCH "E"	BUFFER TUNING "F"	ANTENNA COUPLING "G"	P. A. SWITCH "H"	P. A. TUNING "I"	ANTENNA SWITCH "J"	ANTENNA TUNING "K"
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	6000	3000		2	224	222	0	5	24	10	5	31	9	0
	6200	3100		2	279	277	0	5	27	10	5	34	9	0
c	6210x	3105	1	2	282	280	0	5	27	10	5	34	9	0
	6220	3110	2	2	286	284	0	5	27	10	5	34	9	0
	6240x	3120		2	293	291	0	5	27	10	5	34	9	0
	6400	3200		2 or 3	337 or 33	335 or 31	0	5	30	10	5	34	9	0
	7200	3600		3	109	107	0	5	39	10	5	45	9	0
	7400	3700		3	132	130	0	5	41	10	6	12	9	0
	7600	3800		3	156	154	0	5	42	10	6	15	9	0
	7800	3900		3	182	180	0	6	9	10	6	18	9	0
	8000	4000		3	212	210	0	6	13	10	6	21	9	0
	8200	4100		3	247	245	0	6	15	10	6	24	9	0
	8240x	4120		3	254	252	0	6	16	10	6	24	9	0
	8260	4130	3	3	258	256	0	6	16	10	6	24	9	0
c	8280	4140	4	3	262	260	0	6	16	10	6	25	9	0
	8300	4150	5	3	266	264	0	6	17	10	6	25	9	0
	8330x	4165		3	272	270	0	6	17	10	6	25	9	0
	8400	4200		3	286	284	0	6	18	10	6	26	9	0
	8600	4300		4	67	65	0	6	20	10	6	28	9	0
	8800	4400		4	82	80	0	6	23	10	6	31	9	0
	9000	4500		4	99	97	0	6	25	10	6	32	9	0
	9200	4600		4	115	113	0	6	27	10	6	34	9	0
	9400	4700		4	134	132	0	6	27	10	6	36	9	0
	9600	4800		4	154	152	0	6	30	10	6	38	9	0
	9800	4900		4	174	172	0	6	32	10	6	39	9	0
	10000	5000		4	197	195	0	6	34	10	6	41	9	0
	10200	5100		4	220	218	0	6	35	10	6	42	9	0
	10400	5200		4	250	248	0	6	36	10	6	43	9	0
	10600	5300		4	281	279	0	6	38	10	7	16	9	0
	10800	5400		4	312	310	0	6	39	10	7	18	9	0
	11000	5500		4	338	336	0	6	40	10	7	20	9	0
	11020x	5510		4	341	339	0	6	40	10	7	20	9	0
e	11040	5520	6	4	344	342	0	6	40	10	7	20	9	0
	11060	5530	7	4	347	345	0	6	40	10	7	20	9	0
	11070x	5535		4	348.5	346.5	0	6	40	10	7	21	9	0
	11200	3733.33		3	140	138	0	6	41	10	7	22	9	0
	11400	3800		3	156	154	0	7	7	10	7	24	9	0
	11600	3866.66		3	173	171	0	7	9	10	7	26	9	0
	11800	3933.33		3	191	189	0	7	11	10	7	27	9	0

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ET-8019-A - TYPICAL CALIBRATION DATA

Col.	OUTPUT FREQ. (KC)	XTAL. FREQ. (KC)	XTAL SWITCH	OSC.BAND SWITCH	OSC. TUNING SCALE (With) (Xtal.)	SCALE (With) (M.O.)	ANTENNA COUPLING "D"	BUFFER SWITCH "E"	BUFFER TUNING "F"	ANTENNA COUPLING "G"	P. A. SWITCH "H"	P. A. TUNING "I"	ANTENNA SWITCH "J"	ANTENNA TUNING "K"
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	12000	4000		3	212	210	0	7	13	10	7	29	9	0
	12200	4066.66		3	233.5	231.5	0	7	14	10	7	30	9	0
	12360x	4120		3	254	252	0	7	15	10	7	31	9	0
	12390	4130	3	3	258	256	0	7	16	10	7	32	9	0
	c12420	4140	4	3	262	260	0	7	17	10	7	32	9	0
	12450	4150	5	3	266	264	0	7	17	10	7	32	9	0
	12480x	4160		3	271	269	0	7	17	10	7	32	9	0
	12600	4200		3	286	284	0	7	18	10	7	33	9	0
	12800	4266.66		4	62	59.5	0	7	19.5	10	7	35	9	0
	13000	4333.33		4	71	69	0	7	21	10	7	36	9	0
	13200	4400		4	82	80	0	7	23	10	7	37	9	0
	13400	4466.66		4	93	91	0	7	24	10	7	38	9	0
	13600	4533.33		4	104	102	0	7	25	10	8	5	9	0
	13800	4600		4	115	113	0	7	26	10	8	7	9	0
	14000	4666.66		4	127	125	0	7	27	10	7 or 8	42 or 9	9	0
	14200	4733.33		4	140	138	0	7	28	10	7 or 8	43 or 11	9	0
	14400	4800		4	154	152	0	7	30	10	7 or 8	44 or 12	9	0
	14600	4866.66		4	168	166	0	7	31	10	8	14	9	0
	14800	4933.33		4	182	180	0	7	32	10	8	16	9	0
	15000	5000		4	197	195	0	7	32.5	11	8	18	9	0
	15200	5066.66		4	214	212	0	7	33	11	8	19	9	0
	15400	5133.33		4	232	230	0	7	34	11	8	20	9	0
	15600	5200		4	250	248	0	7	35	11	8	22	9	0
	15800	5266.66		4	272	270	0	7	36	11	8	23	9	0
	16000	5333.33		4	294	292	0	7	37	11	8	25	9	0
	16200	5400		4	312	310	0	7	38	11	8	26	9	0
	16400	5466.66		4	334	332	0	7	38	11	8	27	9	0
	16480x	4120		3	254	252	0	7	39	11	8	27	9	0
	16520	4130	3	3	258	256	0	7	39	11	8	27	9	0
	c16560	5520	6	4	344	342	0	7	39	11	8	28	9	0
	16590	5530	7	4	347	345	0	7	39	11	8	28	9	0
	16600	4150	5	3	266	264	0	7	39	11	8	28	9	0
	16660x	4165		3	272	270	0	7	39	11	8	28	9	0
	16800	5600		4	378	376	0	7	40	11	8	29	9	0

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ET-8019-A - TYPICAL CALIBRATION DATA

Col.	OUTPUT FREQ. (KC)	XTAL FREQ. (KC)	XTAL SWITCH	OSC.BAND SWITCH	OSC. TUNING SCALE (With) (Xtal.) (M.O.)	ANTENNA COUPLING "D"	BUFFER SWITCH "E"	BUFFER TUNING "F"	ANTENNA COUPLING "G"	P. A. SWITCH "H"	P. A. TUNING "I"	ANTENNA SWITCH "J"	ANTENNA TUNING "K"	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	17000	4250		4	60	58	0	7	40.5	11	8	30	9	0
	17200	4300		4	67	65	0	7	41	11	8	31	9	0
	17400	4350		4	75	72.5	0	7 or 8	42 or 28	11	8	32	9	0
	17600	4400		4	82	80	0	7 or 8	43 or 29	11	8	33	9	0
	17800	4450		4	91	88.5	0	7 or 8	44 or 29	11	8	34	9	0
	18000	4500		4	99	97	0	8	30	11	8	35	9	0
	18200	4550		4	107	105	0	8	31	11	8	36	9	0
	18400	4600		4	115	113	0	8	32	11	8	37	9	0
	18600	4650		4	124	121.5	0	8	32	11	8	38	9	0
	18800	4700		4	134	132	0	8	33	11	8	38.5	9	0
	19000	4750		4	144	142	0	8	34	11	8	39	9	0
	19200	4800		4	154	152	0	8	35	11	8	40	9	0
	19400	4850		4	164	162	0	8	35.5	11	8	41	9	0
	19600	4900		4	174	172	0	8	36	11	8	41.5	9	0
	19800	4950		4	186	183.5	0	8	37	11	8	42.5	9	0
	20000	5000		4	197	195	0	8	37.5	11	8	43	9	0
	20200	5050		4	209	206.5	0	8	38	11	8	44	9	0
	20400	5100		4	220	218	0	8	38	11	8 or 9	45 or 4	9	0
	20600	5150		4	235	233	0	8	39	11	8 or 9	46 or 6	9	0
	20800	5200		4	250	248	0	8	40	11	8 or 9	47 or 7	9	0
	21000	5250		4	266	263.5	0	8	40	11	9	9	9	0
	21200	5300		4	281	279	0	8	40.5	11	9	10	9	0
	21400	5350		4	297	294.5	0	8	41	11	9	11	9	0
	21600	5400		4	312	310	0	8	42	11	9	13	9	0
	21800	5450		4	325	323	0	8	42.5	11	9	14	9	0
	22000	5500		4	338	336	0	8	42.5	11	9	15	9	0
	22025x	5506.25		4	340	338	0	8	42.5	11	9	15.3	9	0
	c22080	5520	6	4	344	342	0	8	43	11	9	15.5	9	0
	22120	5530	7	4	347	345	0	8	43	11	9	16	9	0
	22140x	5535		4	348.5	346.5	0	8	43.5	11	9	16.3	9	0
	22200	5550		4	363	360.5	0	8	44	11	9	16.5	9	0
	22400	5600		4	378	376	0	8	44	11	9	17	9	0

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- c - Primarily for calling
- x - Upper and lower frequencies allocated by F.C.C. for commercial ship telegraph service

EXPLANATION OF "TYPICAL CALIBRATION DATA"

Column 1 - In the list of output frequencies shown in column #1, the frequencies followed with an "x" are the upper and lower frequencies allocated by Federal Communications Commission for commercial ship telegraph service. The frequencies marked with a "c" are calling frequencies while the remaining frequencies listed under column 1 are for Government or other service, and are not to be used unless covered by the station license.

Column 2 - The oscillator (crystal when used) frequency listed under column #2 is the fundamental frequency required to provide the output frequency listed in column #1. Crystals should be type AVA-10 or R-1 and should be inserted in the crystal jacks of the oscillator compartment with the nameplate facing the front of the transmitter.

Column 3 - This column covers the correct position of the eleven position Crystal Switch. For master oscillator operation, the switch should always be left in the "M.O." position. For crystal oscillator operation, a record should be made on the calibration chart on the panel of the correct switch positions for the various crystals. For purposes of illustration this column has been tabulated for transmitters equipped with seven crystals. For other combinations of crystals, refer to the crystal chart.

Column 4 - This column shows the correct position of the oscillator band switch that must be used for the desired output frequencies listed under column #1.

Column 6 - This column covers approximate settings of the oscillator tuning scale for master oscillator operation. The exact scale readings to be recorded on the transmitter calibration chart should, of course, be determined by actual calibration with a suitable frequency meter.

Column 5 - This column shows typical settings of the oscillator tuning scale for crystal oscillator operation. Individual transmitters may require slightly different scale settings for optimum crystal control, as outlined in paragraph E, page 8.

Column 7 - The correct value of antenna coupling will be determined by the actual antenna and the procedure outlined in "Instructions for Radio Operators" Section 4, pages 5-6, should be followed and recorded on calibration chart.

Column 8 - Covers the positions of the buffer switch which must be used for the desired output frequencies.

Column 9 - This column shows approximate settings of the buffer tuning scale. The exact scale readings to be recorded on the transmitter calibration chart should, of course, be determined by actual calibration. The procedure outlined in paragraph 6, page 9, should be followed.

Column 10 - The correct value of antenna coupling will be determined by the actual antenna and the procedure outlined in "Instructions for Radio Operators" Section 4, pages 5-6, should be followed and recorded on calibration chart.

Column 11 (and 12) - Covers the positions of the power amplifier switch, while column #12 covers the scale settings of the power amplifier tuning condenser. P.A. switch and P.A. tuning settings listed above are based on no antenna connection and with antenna coupling condenser set at 0. When set is loaded out on actual antenna, the P.A. tuning scale will require a different setting and the correct setting to be recorded should be determined as described under "Instructions for Radio Operators" Section 4, pages 5-6. Under certain conditions, depending on the antenna coupling used, if it is found that the P. A. tuning scale is at relatively high setting (near 50), then the P.A. switch should be set to the next higher number and a new P.A. tuning adjustment determined.

Column 13 (and 14) - Covers the switch position of the antenna load coil for low frequency operation 2000 to 3000 K.C., while column #14 covers the scale settings of the antenna tuning. The settings of both controls will depend on the low frequency antenna used. When the correct settings have been made a record of them should be made on the calibration chart.

Chart to show new (July 29, 1940) F.C.C. high-frequency ship telegraph allocations and their harmonic relationship. Also shows crystal frequencies for ET-8019 transmitters that are required to obtain the various output frequencies.

<u>XTAL FREQ.</u>	<u>OUTPUT FREQ.</u>	<u>OUTPUT FREQ.</u>	<u>OUTPUT FREQ.</u>	<u>OUTPUT FREQ.</u>
4120		8240	12360	16480
4125		8250	12375	16500
4130		8260	12390	16520
4140	4140	8280	12420	16560
4150	4150	8300	12450	16600
4160	4160	8320	12480	16640
4165	4165	8330		16660
5506.25				22025
5510	5510	11020	16530	22040
5512.5	5512.5	11025		22050
5515	5515	11030		22060
5518.75				22075
5520	5520	11040	d16560	22080
5525	5525	11050	16575	22100
5527.5	5527.5	11055		22110
5530	5530	11060	16590	22120
5531.25				22125
5535	5535	11070	16605	22140
3105	6210		d12420	
3110	6220		12440	
3115	6230		12460	
3120	6240		d12480	

November 26, 1941

PARTS LIST BY SYMBOL DESIGNATIONSMODEL TDB RADIOTELEGRAPH EQUIPMENT

<u>Symbol Desig.</u>	<u>Function - Description - Type Number - Manufacturer</u>
C-101	Oscillator grid capacitor, mica, .00005 mfd., plus or minus 10%, 5000 V. DC test, RCA Mfg. Co., model NF.
C-102	Oscillator compensating capacitor, air, bi-metallic, thermal compensating, RCA Mfg. Co., type 34895.
C-103	Oscillator tuning capacitor, air, variable, 19 mmfd. to 150 mmfd., 1000 V. DC, 39 plates, National Co., SE-150.
C-104	Oscillator plate capacitor, air, variable, 5 to 140 mmfd., plus or minus 5%, 1000 V. DC, 27 plates, Cardwell Mfg. Co., S-7039.
C-105	Oscillator plate capacitor, same as C-104.
C-106	Oscillator plate capacitor, same as C-104.
C-107	Oscillator plate capacitor, same as C-104.
C-108	Oscillator plate circuit by-pass capacitor, mica, .01 mfd., plus or minus 5%, 2500 V. DC test, RCA Mfg. Co., model NF.
C-109	Buffer grid coupling capacitor, same as C-101.
C-110	Oscillator cathode by-pass capacitor, mica, .01 mfd., plus or minus 10%, 2500 V. DC test, RCA Mfg. Co., model NF.
C-111	Oscillator screen by-pass capacitor, mica, .001 mfd., plus or minus 10%, 5000 V. DC test, RCA Mfg. Co., model NF.
C-112	Oscillator heater by-pass capacitor, mica, .01 mfd., plus or minus 10%, 2500 V. DC test, RCA Mfg. Co., model NF.
C-113	Oscillator heater by-pass capacitor, same as C-112.
C-114	Buffer cathode by-pass capacitor, same as C-112.
C-115	Buffer tuning capacitor, air, variable, 19 to 150 mmfd., 39 plates, Cardwell Mfg. Co., NP-150-DS.
C-116	Buffer plate capacitor, mica, .0001 mfd., plus or minus 10%, 5000 V. DC test, RCA Mfg. Co., model NF.
C-117	Buffer plate capacitor, same as C-116.
C-118	Buffer plate capacitor, same as C-116.
C-119	P.A. grid coupling capacitor, mica, .00005 mfd., plus or minus 10%, 5000 V. DC test, RCA Mfg. Co., model NF.
C-120	Buffer screen grid by-pass capacitor, mica, .01 mfd., plus or minus 10%, 2500 V. DC test, RCA Mfg. Co., model NF.
C-121	Buffer plate circuit by-pass capacitor, mica, .01 mfd., plus or minus 10%, 2500 V. DC test, RCA Mfg. Co., model NF.
C-122	P.A. filament by-pass capacitor, same as C-121.
C-123	P.A. filament by-pass capacitor, same as C-121.
C-124	P.A. screen by-pass capacitor, mica, .004 mfd., plus or minus 10%, 5000 V. DC test, RCA Mfg. Co., model NF.
C-125	Voltmeter by-pass capacitor, mica, .01 mfd., plus or minus 20%, 1000 V. DC test, Sangamo Co., type B-25.
C-126	P.A. plate coupling capacitor, mica, .002 mfd., plus or minus 5%, 3000 V. 60 cy. Eff. (RMS), RCA Mfg. Co., model UC 3054.

PARTS LIST BY SYMBOL DESIGNATIONSMODEL TDB RADIOTELEGRAPH EQUIPMENT

<u>Symbol</u> <u>Desig.</u>	<u>Function - Description - Type Number - Manufacturer</u>
C-127	Antenna coupling capacitor, air, 9 to 50 mmfd., variable, Cardwell Mfg. Co., type NP-50-DS.
C-128	Milliammeter, by-pass capacitor, same as C-125.
C-129	P.A. plate tuning capacitor, air, variable, 19 to 150 mmfd., plus or minus 5%, Cardwell Mfg. Co., type NP-150-DS.
C-130	P.A. plate tuning capacitor, same as C-129.
C-131	P.A. plate choke by-pass capacitor, mica, .0008 mfd., plus or minus 5%, 5000 V. 60 cy. Eff. (RMS), RCA Mfg. Co., type UC 3079.
C-132	Key relay contact capacitor, paper, .1 mfd., plus 10%, minus 2½%, 1000 V. DC test, General Electric Co., Pyranol, type 9CE6A14.
C-133	Ammeter by-pass capacitor, same as C-125.
C-134	H.V. filter capacitor, paper, 4 mfd., plus 10%, minus 2½%, 2000 V. DC test, General Electric Co., Pyranol, type 9CE5A53.
C-135	Oscillator padding capacitor, mica, 100 mmfd., plus or minus 10%, 700 V. working, DC, Sprague Co., type #SM-31.
C-136	Oscillator padding capacitor, same as C-135.
C-137	Oscillator padding capacitor, same as C-135.
C-138	Oscillator padding capacitor, same as C-135.
C-139	P.A. plate choke by-pass capacitor, same as C-126.
C-201	Voltmeter by-pass capacitor, same as C-125.
C-501	Key spark suppressor capacitor, same as C-132.
C-601	Motor filter capacitor, mica, .01 mfd., plus or minus 10%, RCA Mfg. Co., model NF.
C-602	Motor filter capacitor, same as C-601.
C-603	Motor filter capacitor, paper, .5 mfd., plus 10%, minus 2½%, General Electric Co., Pyranol, 9CE5A29.
C-604	Motor filter capacitor, same as C-603.

FUSES

F-101	Filament primary fuse, cartridge 2", 250 V. 3 amp., renewable, Chase-Shawmut Co., standard.
F-101A	Filament primary fuse link, 3 amp., 250 V.
F-102	500 cy. alternator fuse, same as F-101.
F-102A	Filament primary fuse link, same as F-101A.
F-103	High voltage fuse, 3000 V. .75 amp., 5-7/16" long, Littell-fuse, #2113.
F-201	High voltage fuse, same as F-103.

JACKS AND RECEPTACLES

J-101	Crystal jack assembly, 10 prs. of General Radio type 274-J jacks, General Radio Co., type 274-J.
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PARTS LIST BY SYMBOL DESIGNATIONSMODEL TDB RADIOTELEGRAPH EQUIPMENT

Symbol
Desig. Function - Description - Type Number - Manufacturer

RELAYS - TELEGRAPH KEYS

K-101 Keying relay, SPDT, coil 3200 ohms, 12 V. 5 m.a. DC, Struthers Dunn, Inc., type CXB-2126.

K-401 Magnetic controller, motor starter, General Electric Co., CR-4052-Y1, cat. #6934846G11, (115 V. DC Sets).

K-401 Magnetic controller, motor starter, General Electric Co., CR-4052-Y1, cat. #6934846G7, (230 V. DC Sets).

K-401A Magnetic controller coil, solenoid 1500 ohms, General Electric Co., 22D104G1, (115 V. DC Sets).

K-401A Magnetic controller coil, solenoid 6500 ohms, General Electric Co., 22D104G2, (230 V. DC Sets).

K-501 Telegraph Key, manually operated, J.H. Bunnell & Co., type CQ.

INDUCTORS R.F. and A.F.

L-101 L.F. antenna loading inductor, 26 turns, #10 AWG, 7 taps, diameter 2-3/8", length 3-5/8", Radiomarine Corp.

L-102 L.F. antenna coupling inductor, 13 turns, #10 AWG, 9 taps, diameter 2 1/2", length 3 1/2", Radiomarine Corp.

L-103 L.F. P.A. tank inductor, 32 turns, #12 AWG, 5 taps, diameter 3", length 4 1/4", Radiomarine Corp.

L-104 H.F. P.A. tank inductor, 5 turns, 3/16" copper tubing, 2 taps, diameter 1-5/8", length 1-5/8", Radiomarine Corp.

L-105 Buffer L.F. tank inductor, 26 turns, #10 AWG, 4 taps, diameter 2-3/8", length 3-5/8", Radiomarine Corp.

L-106 Oscillator tank inductor, 7 turns, #18 AWG, 1 tap, diameter 7/8", length 1-1/8", Radiomarine Corp.

L-107 Oscillator tank assembly, 31 turns, #18 AWG, 1 tap, diameter 1 1/2", length 5 1/4", Radiomarine Corp.

L-108 Oscillator tank assembly, 26 turns, #18 AWG, 1 tap, diameter 1 1/2", length 1-7/8", Radiomarine Corp.

L-109 Oscillator tank assembly, 23 turns, #18 AWG, 1 tap, diameter 1 1/4", length 1-5/16", Radiomarine Corp.

L-110 Oscillator tank assembly, 16 turns, #18 AWG, 1 tap, diameter 1 1/4", length 1-3/16", Radiomarine Corp.

L-111 Choke, P.A. plate, 160 turns, #26 AWG, DSE, close winding, diameter 3/4", length 3-5/16", Radiomarine Corp.

L-112 Choke, P.A. plate, 135 turns, #26 AWG, DSE, close winding, diameter 3/4", length 2-3/4", Radiomarine Corp.

L-113 Choke, P.A. grid, 140 turns, #26 AWG, DSE, close winding, diameter 3/4", length 4", Radiomarine Corp.

L-601 Motor filter choke, 2 sections, Ohmite Mfg. Co., type Z-22.

L-602 Motor filter choke, same as L-601.

PARTS LIST BY SYMBOL DESIGNATIONSMODEL TDB RADIOTELEGRAPH EQUIPMENT

Symbol
Desig. Function - Description - Type Number - Manufacturer

METERS

M-101 P.A. plate/screen ammeter, 0-1 amp., DC, square case, black,
 Weston Electrical Instrument Corp., model 301.

M-102 P.A. grid milliammeter, 0-50 m.a. DC, square case, black,
 Weston Electrical Instrument Corp., model 301.

M-103 P.A. filament voltage, voltmeter, 0-15 V. AC, square case,
 black, Weston Electrical Instrument Corp., model 476.

M-201 H.V. voltmeter, 0-1.5 KV, DC, square case, black,
 Weston Electrical Instrument Corp., model 301.

MOTOR GENERATOR AND ROTARY CONVERTER

MG-301 Transmitter motor generator, see page 4 of instruction book
 for complete rating, General Electric Co.

RESISTORS

R-101 Oscillator grid resistor, 50M ohms, $\frac{1}{2}$ watt, plus or minus 10%,
 carbon, Erie Resistor Co., standard.

R-102 Oscillator plate resistor, 1M ohms, 2 watt, plus or minus 10%,
 carbon, International Resistance Co., type BT-2.

R-103 Oscillator plate parasitic resistor, 50 ohm, 5 watt, plus or
 minus 10%, carbon, Continental Carbon Co., type D5ST2.

R-104 P.A. grid parasitic resistor, same as R-103.

R-105 P.A. grid parasitic resistor, same as R-103.

R-106 Transient limiting resistor, 75 ohms, 20 watt, plus or minus
 5%, International Resistance Co., type DG.

R-107 Dropping resistor, tuning key, 200 ohms, 100 watt, plus or
 minus 5%, International Resistance Co., type HA.

R-108 Relay arc suppressor resistor, 500 ohms, $\frac{1}{2}$ watt, plus or
 minus 10%, Erie Resistor Co., standard.

R-109 Keying resistor, 40M ohms, 5 watt, plus or minus 10%,
 Continental Carbon Co., type D5ST2.

R-110 Oscillator cathode resistor, 500 ohm, 2 watt, plus or minus
 5%, International Resistance Co., type BT-2.

R-111 Keying relay resistor, 1M ohms, 5 watt, plus or minus 10%,
 Continental Carbon Co., type D5ST2.

R-111 Keying relay resistor, 5M ohms, 5 watt, plus or minus 10%,
 Continental Carbon Co., type D5ST2.

R-112 Oscillator/buffer voltage dividing resistor, 1500 ohms, 5 watt,
 plus or minus 10%, Continental Carbon Co., type D5ST2.

R-113 Oscillator/buffer voltage dividing resistor, same as R-112.

R-114 Oscillator/buffer voltage dividing resistor, same as R-112.

R-115 Oscillator/buffer voltage dividing resistor, same as R-112.

R-116 Oscillator/buffer voltage dividing resistor, same as R-112.

R-117 Oscillator/buffer voltage dividing resistor, same as R-112.

R-118 Oscillator/buffer voltage dividing resistor, same as R-112.

R-119 Oscillator/buffer voltage dividing resistor, same as R-112.

PARTS LIST BY SYMBOL DESIGNATIONSMODEL TDB RADIOTELEGRAPH EQUIPMENT

<u>Symbol Desig.</u>	<u>Function - Description - Type Number - Manufacturer</u>
R-120	P.A. screen dropping resistor, 2M ohms, 5 watt, plus or minus 10%, Continental Carbon Co., type D5ST2.
R-121	P.A. screen dropping resistor, same as R-120.
R-122	P.A. screen dropping resistor, same as R-120.
R-123	P.A. screen dropping resistor, same as R-120.
R-124	P.A. screen dropping resistor, same as R-120.
R-125	P.A. screen dropping resistor, same as R-120.
R-126	P.A. screen dropping resistor, same as R-120.
R-127	P.A. screen dropping resistor, same as R-120.
R-128	P.A. screen dropping resistor, same as R-120.
R-129	P.A. screen dropping resistor, same as R-120.
R-130	Buffer cathode resistor, 3M ohms, 50 watt, plus or minus 5%, International Resistance Co., type HX.
R-131	Oscillator and buffer screen and plate dropping resistor, 3M ohms, 100 watt, plus or minus 5%, International Resistance Co., type HA.
R-132	Buffer screen dividing resistor, 25M ohms, 5 watt, plus or minus 5%, Continental Carbon Co., type D5ST2.
R-133	Buffer screen dividing resistor, same as R-132.
R-134	Buffer screen dividing resistor, same as R-132.
R-135	Buffer screen dividing resistor, same as R-132.
R-136	P.A. grid resistor, 30M, 5 watts, plus or minus 5%, Continental Carbon Co., type D5ST2.
R-137	P.A. grid resistor, same as R-136.
R-138	Oscillator voltage dividing resistor, 40M ohms, 2 watt, plus or minus 5%, International Resistance Co., type BT-2.
R-139	Oscillator voltage dividing resistor, same as R-138.
R-140	Oscillator voltage dividing resistor, 40M ohms, 5 watt, plus or minus 5%, Continental Carbon Co., type D5ST2.
R-141	Buffer grid resistor, same as R-140.
R-142	Filament rheostat, 25 ohms, 150 watt, Ohmite Mfg. Co., type L, (115 V. DC Sets).
R-142	Filament rheostat, 75 ohms, 150 watt, Ohmite Mfg. Co., type L, (230 V. DC Sets).
R-201	External multiplier, voltmeter, .5 megohms, 1 watt, matched for 1.5 megohm in series, plus or minus 1%, International Resistance Co., type BT-1.
R-202	External multiplier, voltmeter, same as R-201.
R-203	External multiplier, voltmeter, same as R-201.
R-204	Alternator field resistor, 150 watt, 378 ohms, plus or minus 10%, Ohmite Mfg. Co., type L, (115 V. DC Sets).
R-204	Alternator field resistor, 150 watt, 1500 ohms, plus or minus 10%, Ohmite Mfg. Co., type L, (230 V. DC Sets).
R-205	Generator field resistor, 150 watt, 585 ohms, plus or minus 10%, Ohmite Mfg. Co., type L, (115 V. DC Sets).
R-205	Generator field resistor, 150 watt, 2510 ohms, plus or minus 10%, Ohmite Mfg. Co., type L, (230 V. DC Sets).

PARTS LIST BY SYMBOL DESIGNATIONSMODEL TDB RADIOTELEGRAPH EQUIPMENT

<u>Symbol Desig.</u>	<u>Function - Description - Type Number - Manufacturer</u>
R-401	Motor starting resistor, PTC 2½ ohms and PTC 3 ohms, General Electric Co., #2229471G16, (115 V. DC Sets).
R-401	Motor starting resistor, PTC 10 ohms and PTC 12½ ohms, General Electric Co., #2229471G7, (230 V. DC Sets).
R-402	Thermal heater cut-out resistor, 11.1-11.8 amp., General Electric Co., #81D254, (115 V. DC Sets).
R-402	Thermal heater cut-out resistor, 5.4-6.1 amp., General Electric Co., #81D249, (230 V. DC Sets).

SWITCHES

S-101	Crystal oscillator switch, S.P., 11 positions, 1 section, Centralab, type BHC-5091.
S-102	Crystal oscillator tuning switch, 2 pole, 4 positions, 2 sections, Centralab, type 4112-A.
S-103	Buffer tuning switch, 2 gang, 11 positions, Communications Products Co., type 8019-F-5.
S-104	P.A. band switch, 1 gang, 9 positions, Communications Products Co., type 10-C-5.
S-105	A ₁ -A ₂ switch, SPDT, Bryant Electric Co., type #3983.
S-106	Antenna loading switch, same as S-104.
S-107	Antenna coupling switch, 1 gang, 11 positions, Communications Products Co., type 8019-F-4.
S-108	Tuning key, SPDT, Bryant Electric Co., type 3392-A.
S-201	Start-Stop switch, DPST, Bryant Electric Co., type #3982.

TRANSFORMERS - A.F. AND POWER

T-101	Filament transformer, primary 70/160 V. 83 cy., sec. 1, 11 V. 10 amp; sec. 2, 7 V. 1 amp; sec. 3, 7 V. 1 amp., Kenyon Transformer Co., S-11751.
T-102	Modulation transformer, primary 0/100/110/120 V. sec. 660 V. 500 cy., VA 175, case no. 6A, Kenyon Transformer Co., S-7730.

VACUUM TUBES

V-101	Crystal oscillator tube, transmitting beam power tube, RCA type 807.
V-102	Buffer tube, same as V-101.
V-103	Power amplifier tube, transmitting beam power tube, RCA type 813.
V-104	Power amplifier tube, same as V-103.

SOCKETS

X-101	Oscillator socket, 5 prong, E.F. Johnson Co., #225.
X-102	Buffer socket, same as X-101.
X-103	P.A. socket, 7 prong, E.F. Johnson Co., #237.
X-104	P.A. socket, same as X-103.

SPARE PARTS LISTMODEL TDB RADIOTELEGRAPH EQUIPMENT

<u>Quantity</u>	<u>Symbol Designation</u>	<u>Description</u>
<u>CAPACITORS</u>		
5	C-110	Mica, .01 mfd., plus or minus 10%, 2500 V. DC test, RCA Mfg. Co., Faradon, model NF.
1	C-111	Mica, .001 mfd., plus or minus 10%, 5000 V. DC test, RCA Mfg. Co., Faradon, model NF.
2	C-116	Mica, .0001 mfd., plus or minus 10%, 5000 V. DC test, RCA Mfg. Co., Faradon, model NF.
2	C-119	Mica, .00005 mfd., plus or minus 10%, 5000 V. DC test, RCA Mfg. Co., Faradon, model NF.
1	C-124	Mica, .004 mfd., plus or minus 10%, 5000 V. DC test, RCA Mfg. Co., Faradon, model NF.
4	C-125	Mica, .01 mfd., plus or minus 20%, 1000 V. DC test, Sangamo, type B-25.
1	C-126	Mica, .002 mfd., plus or minus 5%, 5000 V. DC test, RCA Mfg. Co., Faradon, type UC-3054.
1	C-131	Mica, .0008 mfd., plus or minus 5%, 5000 V. DC test, RCA Mfg. Co., Faradon, type UC-3079.
1	C-132	Paper, .1 mfd., plus 10%, minus 2½%, 1000 V. DC test, General Electric Co., Pyranol, type 9CE6A14.
1	C-134	Paper, 4 mfd., plus 10%, minus 2½%, 2000 V. DC test, General Electric Co., Pyranol, type 9CE5A53.
2	C-135	Mica, .0001 mfd., plus or minus 10%, 1000 V. DC test, Sprague, cat. #SM-31.
<u>FUSES</u>		
4	F-101	Cartridge, Shawmut, 2", 250 V. 3 amp., renewable.
20	F-101A	Link, 3 amp., 250 V.
10	F-103	.75 amp., 3000 V. Littelfuse. #2113.

SPARE PARTS LISTMODEL TDB RADIOTELEGRAPH EQUIPMENT

<u>Quantity</u>	<u>Symbol Designation</u>	<u>Description</u>
<u>RELAYS</u>		
2	K-101	Struthers-Dunn, type CXB-2126, SPDT, 12 V, 5 m.a. DC, 3200 ohms.
<u>INDUCTORS R.F. AND A.F.</u>		
1	L-111 (Choke)	Radiomarine type, Coil form Alsimag 1017, 4" long, 3/4" dia., close wound with 160 turns of #26 AWG double silk enameled copper wire.
1	L-112 (Choke)	Radiomarine type, Coil form Alsimag 1017, 4" long, 3/4" dia., close wound with 135 turns of #26 AWG double silk enameled copper wire.
1	L-113	Radiomarine type, Coil form Isolantite T-322-96, 4" long, 3/4" dia., close wound with 140 turns of #26 AWG double silk enameled copper wire.
<u>METERS</u>		
1	M-101	P.A. plate/screen ammeter, Weston, model 301, 0-1 amp., DC square case, black.
1	M-102	P.A. grid milliammeter, Weston, model 301, 0-50 m.a. DC, square case, black.
1	M-103	P.A. filament voltage, Weston, model 476, 0-15 V. AC, square case, black.
1	M-201	High voltage voltmeter, 0-1.5 KV, DC, Weston, model 301, square case, black, (less external multiplier).
*1	---	Buffer cathode milliammeter, Weston, model 301, 0-150 m.a. DC, square case, black.

* Used for tuning, buffer cathode meter link.

SPARE PARTS LISTMODEL TDB RADIOTELEGRAPH EQUIPMENT

<u>Quantity</u>	<u>Symbol Designation</u>	<u>Description</u>
<u>RESISTORS</u>		
1	R-101	Erie, $\frac{1}{2}$ watt, 50M ohms, plus or minus 10%.
1	R-102	International Resistance Co., type BT-2, wire wound, 2 watt, 1M ohms, plus or minus 10%.
2	R-103	Continental Carbon Co., type D5ST2, carbon, 5 watt, 50 ohms, plus or minus 10%.
1	R-106	International Resistance Co., type DC, wire wound, 20 watt, 75 ohms, plus or minus 5%.
1	R-107	International Resistance Co., type HA, wire wound, 100 watt, 200 ohms, plus or minus 5%.
2	R-108	Erie, $\frac{1}{2}$ watt, carbon, 500 ohms, plus or minus 10%.
2	R-109	Continental Carbon Co., type D5ST2, carbon, 5 watt, 40M ohms, plus or minus 10%.
1	R-110	International Resistance Co., type BT-2, 2 watt, wire wound, 500 ohms, plus or minus 10%.
1	R-111	Continental Carbon Co., type D5ST2, carbon, 5 watt, 1M ohms, plus or minus 10%.
4	R-112	Continental Carbon Co., type D5ST2, carbon, 5 watt, 1500 ohms, plus or minus 10%.
5	R-120	Continental Carbon Co., type D5ST2, carbon, 5 watt, 2M ohms, plus or minus 10%.
1	R-130	International Resistance Co., type HX, wire wound, 50 watt, 3M ohms, plus or minus 5%.

SPARE PARTS LISTMODEL TDB RADIOTELEGRAPH EQUIPMENT

<u>Quantity</u>	<u>Symbol Designation</u>	<u>Description</u>
1	R-131	International Resistance Co., type HA, wire wound, 100 watt, 3M ohms, plus or minus 5%.
2	R-132	Continental Carbon Co., type D5ST2, carbon, 5 watt, 25M ohms, plus or minus 10%.
1	R-136	Continental Carbon Co., type D5ST2, carbon, 5 watt, 30M ohms, plus or minus 10%.
1	R-138	Continental Carbon Co., type D5ST2, carbon, 2 watt, 40M ohms, plus or minus 10%.
1	R-201	International Resistance Co., type BT-1, metallized, 1 watt, $\frac{1}{2}$ megohm, plus or minus 1%.
1	R-202	Same as and matched with R-201.
1	R-203	Same as and matched with R-201.
*1	R-401	General Electric Co., cat.#2229471-G16, starting resistance.
1	R-402	General Electric Co., cat.#81D254, thermal heater cut-out.

SWITCHES

1	S-105	Bryant, type 3983, SPDT.
1	S-108	Hart & Hageman, type 3392-A, SPDT.
1	S-201	Bryant, type 3982, DPST.

* Consists of one resistor PTC 2.25 and one resistor PTC 3.

SPARE PARTS LISTMODEL TDB RADIOTELEGRAPH EQUIPMENT

<u>Quantity</u>	<u>Symbol Designation</u>	<u>Description</u>
<u>VACUUM TUBES</u>		
1	V-101	RCA type 807.
1	V-102	Same as V-101
1	V-103	RCA type 813.
1	V-104	Same as V-103.
<u>STARTER SPARES</u>		
1	K-401A	Starter coil, General Electric, cat. #22D104 G1.
1		Set of starter contacts, consisting of the following: 1-cat.#1477525, stationary line tip. 2-cat.#5344048-G1, stationary cut-out switch contact. 1-cat.#5344049-G1, movable contact for cut-out switch. 3-cat.#5344050-P1, movable line and accelerating tip. 1-cat.#5344052-G1, stationary holding cut-out switch. 2 cat.#5381796, stationary accelerating tip.
1		Set of starter springs, consisting of the following: 3-cat.#246116, spring for line and accelerating tips. 1-cat.#2411353, spring for cut-out switch. 1-cat.#2415676, spring for clutch.
1		Set of starter flexible leads, cat. #5344070-G1.
<u>MOTOR GENERATOR SPARES</u>		
10		Sets brushes complete with springs.
2		Sets brush holders and insulation.

SPARE PARTS LISTMODEL TDB RADIOTELEGRAPH EQUIPMENT

<u>Quantity</u>	<u>Symbol Designation</u>	<u>Description</u>
<u>MISCELLANEOUS SPARES</u>		
1		Set of flexible leads for vacuum tubes and R.F. strap for oscillator compartment.
1		Set of set screws (2 of each type used).
15 feet		Flexible cable for oscillator dial.

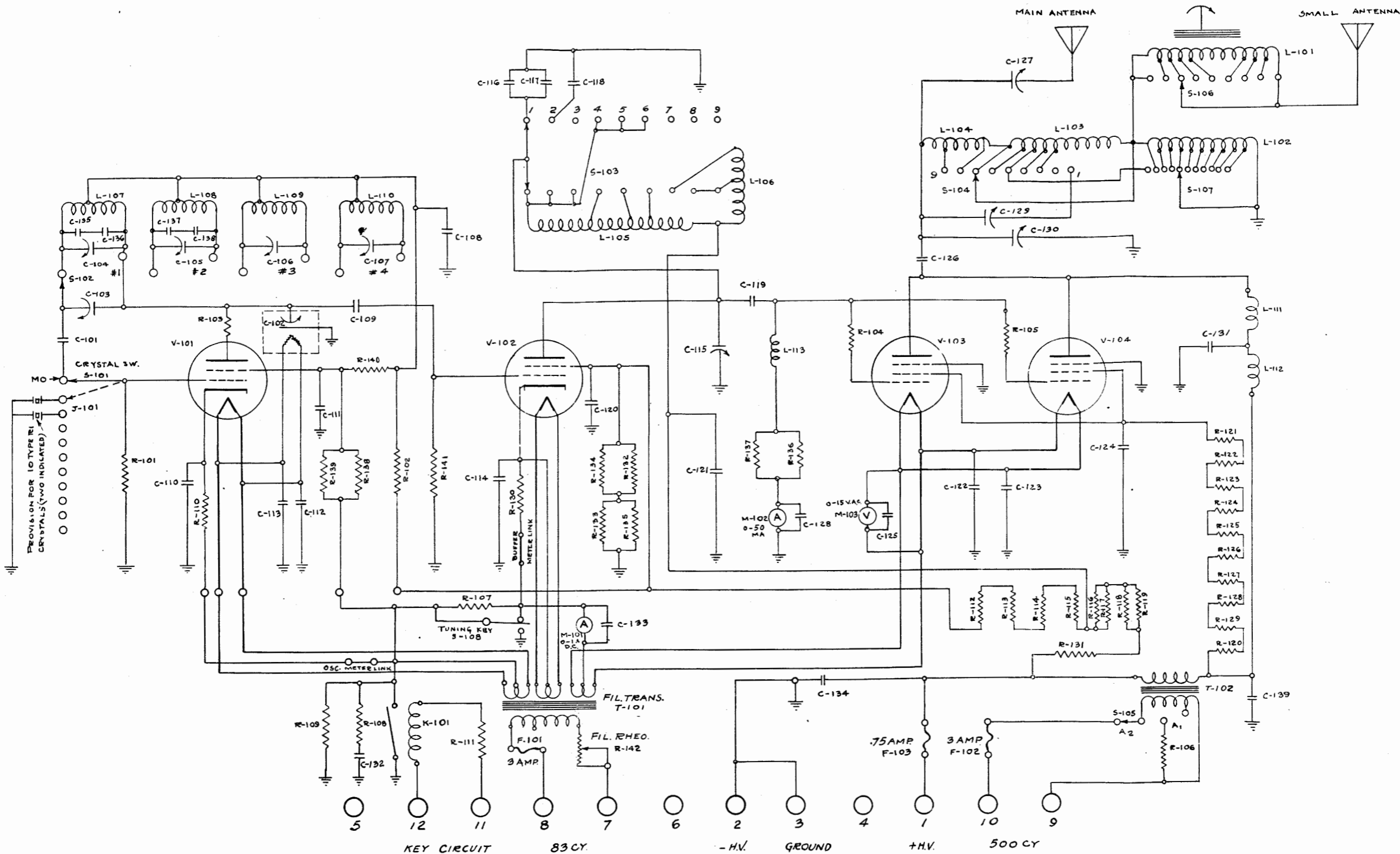
CONVERSION KIT PARTS LIST

FOR CONVERTING MODEL TDB RADIOTELEGRAPH TRANSMITTING EQUIPMENT TO OPERATE FROM 230 VOLTS DC.

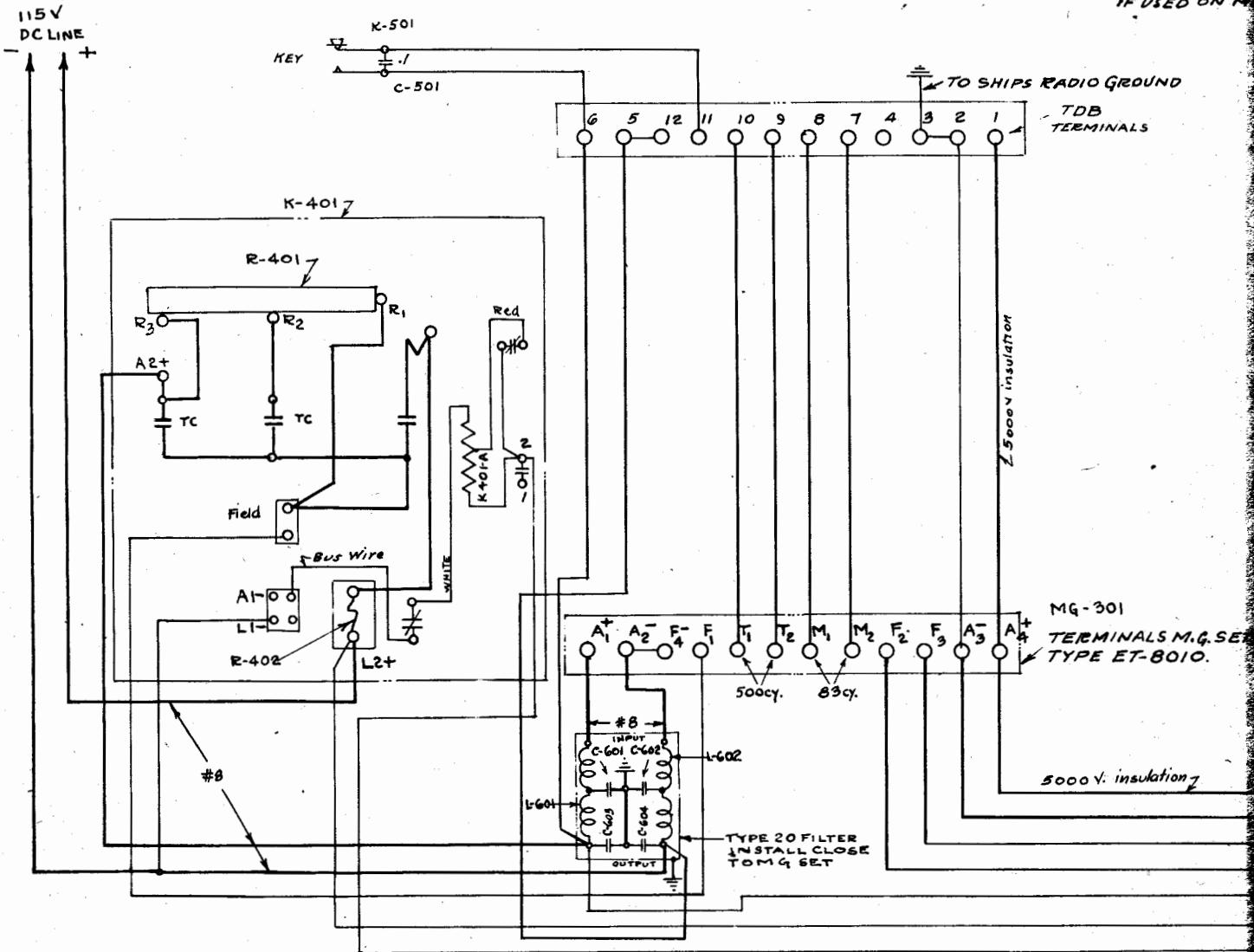
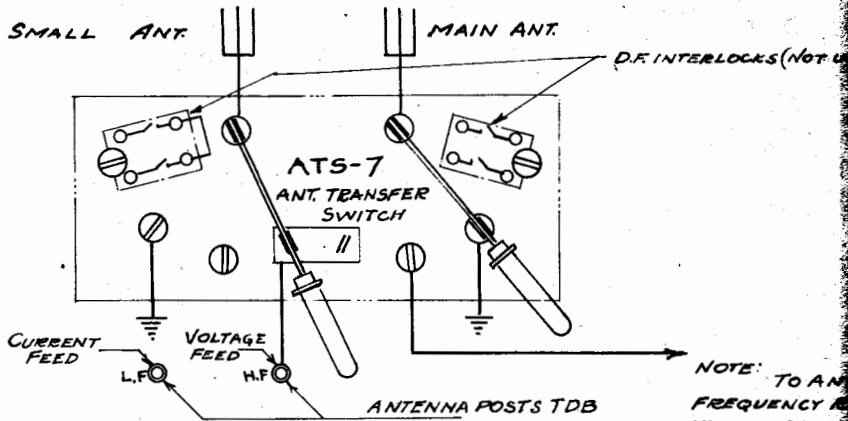
CONVERSION KIT is not a component of MODEL TDB. Supplied only when ordered.

<u>Quantity</u>	<u>Symbol Designation</u>	<u>Description</u>
<u>RELAYS</u>		
1	K-401	Motor starter, General Electric, CR-4052-Y1, cat.#6934846 G7, 230 V. DC, equipped with thermal cut-out heater #81D249.
1	K-401A	Starter coil, cat.#22D104G2, (to be added to spare parts box).
<u>MOTOR GENERATOR AND ROTARY CONVERTER</u>		
1	MG-301	Motor generator, General Electric, type ET-8010, 230 V. DC.
<u>RESISTORS</u>		
2	R-111	Keying relay resistor, Continental Carbon Co., type D5ST2, 5 watt, 5M ohms, plus or minus 10% (one to be added to spare parts box).
1	R-142	Filament rheostat, Ohmite, type L, 150 watt, 75 ohms, plus or minus 10%.
*1	R-204	Alternator field resistor, Ohmite, type L, 150 watt, 1500 ohms, plus or minus 10%.
*1	R-205	High voltage generator field resistor, Ohmite, type L, 150 watt, 2510 ohms, plus or minus 10%.
1	R-401	One set of starter resistors, General Electric, cat.#2229471-G7, consisting of one PTC-10 and one PTC-12.5 (to be added to spare parts box).
1	R-402	Thermal cut-out heater, General Electric, cat.#81D249 (to be added to spare parts box).

* Ganged



MODEL TDB (ET-8019-A)
 RADIOTELEGRAPH TRANSMITTER EQUIPMENT
 SCHEMATIC DIAGRAM
 RADIOMARINE CORP. OF AMERICA
 ENGINEERING DEPT. *ll*
 NEW YORK *ll*
 Sub. 0
 T-1175
 Date 4/4/42

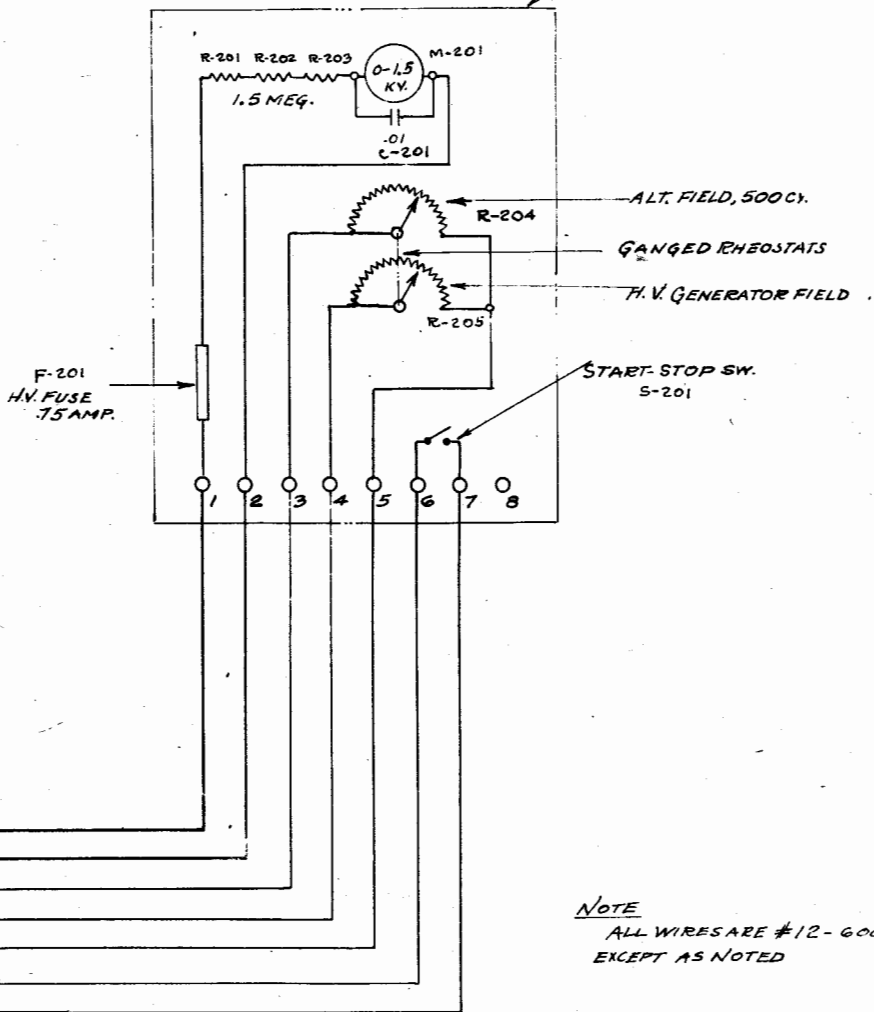


F INTERLOCKS (NOT USED)

NOTE: TO ANTENNA POST OF INTERMEDIATE FREQUENCY RADIO TRANSMITTER, FOR EXAMPLE MODEL TDA, IF USED ON MAIN ANTENNA.

RADIO GROUND
TDB
TERMINALS

TDB CONTROL UNIT



Q-301
TERMINALS M.G. SET
TYPE ET-8010.

00 V. insulation

NOTE
ALL WIRES ARE #12-600VOLT INSULATION
EXCEPT AS NOTED

MODEL TDB (ET-8019-A) RADIO TELEGRAPH TRANSMITTER EQUIPMENT EXTERNAL CONNECTIONS		
RADIOMARINE CORP. OF AMERICA		
ENGINEERING DEPT.	SS	T-1176
NEW YORK	Sub. 0	
		Date 4/1/42