

TB SIG E4

WAR DEPARTMENT TECHNICAL BULLETIN

S/Sgt H. Stabelton

Radio

RADIO OPN SEC 566th SIG

**GERMAN RADIO
RECEIVER**

Spez. 445 b Bs

RADIO OPN SEC 566th SIG

WAR DEPARTMENT

25 FEBRUARY 1944

Staff Sgt H. E. Stabelton

RESTRICTED

WAR DEPARTMENT,
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TB SIG E4, German Radio Receiver Spez. 445 b Bs is published
for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

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(For explanation of symbols see FM 21-6.)

WARNING!

THE GERMANS ARE EXPERTS
IN THE USE OF BOOBY TRAPS!
TURNING A DIAL OR SWITCH
MAY DETONATE THE EXPLO-
SIVE. DO NOT HANDLE OR
EXAMINE THEIR EQUIPMENT
UNTIL IT HAS BEEN CLEARED
BY DESIGNATED PERSONNEL!

LOOK OUT!

DESTRUCTION NOTICE

DESTROY THIS SET COMPLETELY! THIS IS VITALLY IMPORTANT!

WHY — THIS IS THE ENEMY'S OWN EQUIPMENT! HE IS ALREADY FAMILIAR WITH ITS OPERATION. HE HAS ADEQUATE SUPPLIES OF REPLACEMENT PARTS. DON'T LET THIS SET FALL INTO HIS HANDS!

WHEN — When ordered to do so by your commander.

HOW —

1. Smash — Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools, etc.
2. Cut — Use axes, handaxes, machetes, etc.
3. Burn — Use gasoline, kerosene, oil, flame throwers, incendiary grenades, etc.
4. Explosives — Use firearms, grenades, TNT, etc.
5. Disposal — Bury in slit trenches, foxholes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT.

WHAT —

1. Smash — Tubes, capacitors, coils, keys, headsets, microphones, panels, frames, antenna mast sections, and other electrical parts.
2. Cut — All cables, wiring, and cords.
3. Burn — Diagrams, charts, instruction books, wire.
4. Bury or scatter — Any or all of the above pieces after destroying them.

DESTROY EVERYTHING!

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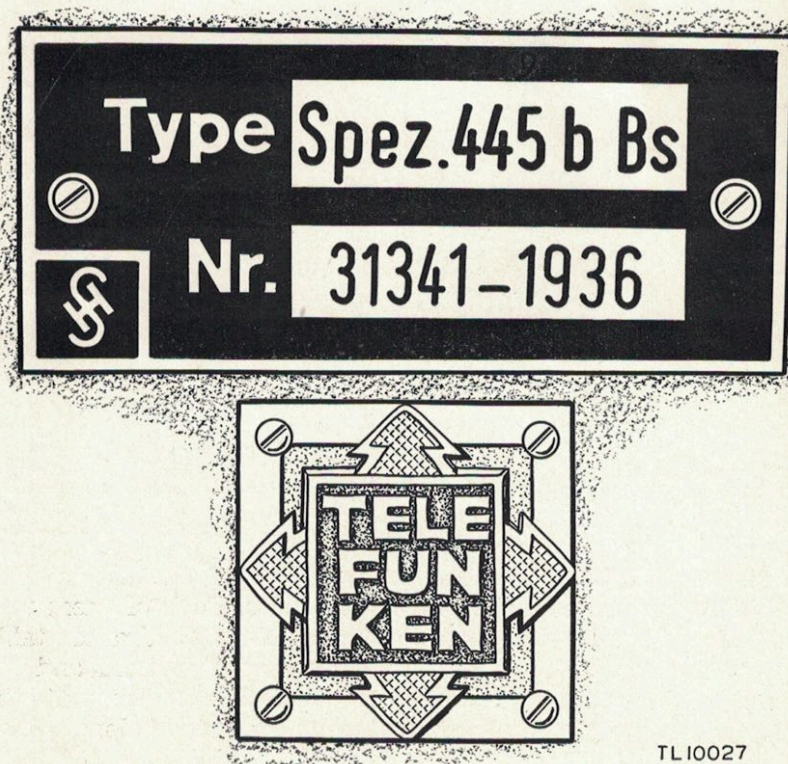
GERMAN RADIO RECEIVER

Type Spez.445 b Bs

(TELEFUNKEN)

1. DESCRIPTION.

a. **The Set.** The German radio receiver, **Spez.445 b Bs** (portable receiver b)*, manufactured by Telefunken, is used with many German radio sets, particularly with radio sets **5 W.S./24b 104** (5-watt transmitter) and **LS 100/108** (100-watt transmitter). The iden-



TL 10027

Figure 1. Nameplate of German radio receiver, Spez.445 b Bs.

*Whenever German words appear in this bulletin, the American military equivalent will follow in parentheses.

tification name plate, located on the front panel of the set, is shown in figure 1. Radio receiver **Spez. 445 b Bs** (portable receiver b), hereafter referred to as the "set," is a two-man pack type, four-tube, tuned radio-frequency (r-f) receiver employing a regenerative detector circuit. The set covers a frequency range of approximately 100 to 7,740 kc and is capable of receiving continuous-wave (c-w) and amplitude-modulated signals. It can be used in nets with American amplitude-modulated radio sets within the frequency and distance range. The set has low sensitivity and poor selectivity, and should only be used for the reception of strong signals. The set, accessories, and batteries are all contained in one apparatus case. Since the mechanical and electrical design is not of recent date, the set is probably obsolete and being replaced by the **Torn E. b.** (portable receiver b).

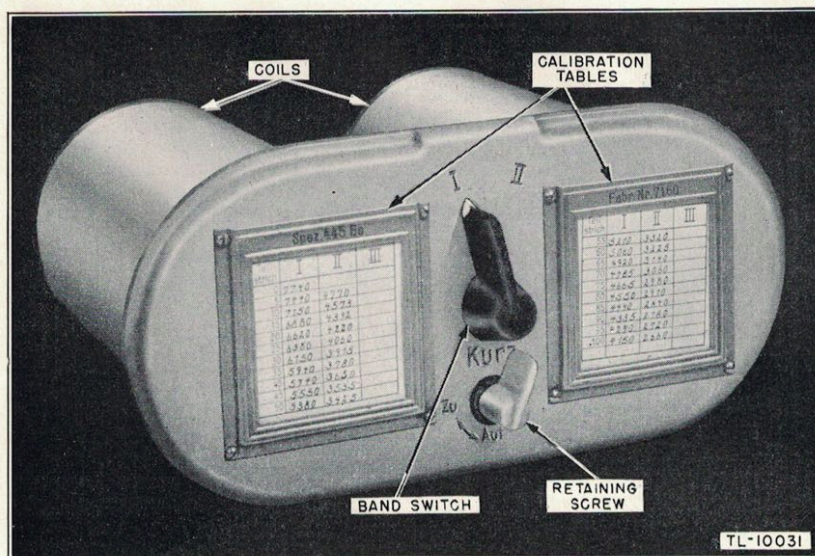


Figure 2. Typical plug-in coil unit for German radio receiver, Spez. 445 b Bs.

b. Plug-in Coil Units. The frequency range of the set is made possible by the use of three plug-in coil units. Each of these units (fig. 2), has a band switch incorporated within it. Calibration tables are provided for each of the frequency ranges covered and correspond to the readings on the tuning dial. The approximate frequency coverages of the plug-in coil units are listed below:

<u>Plug-in coil unit</u>	<u>Kilocycles</u>
Kurz (short)	2,660 to 7,740
Mittel (medium)	500 to 3,160
Lang (long)	100 to 1,000

2. PERFORMANCE DATA. The table below lists the performance data and general characteristics of the **Spez. 445 b Bs** (portable receiver b).

PERFORMANCE DATA

Frequency range:	100 to 7,740 kc (approximately)
Types of signals which may be received: ..	cw, tone, and voice
Type of receiver:	a-m, tuned radio-frequency with regenerative detector
Number of tubes:	4
	1 r-f amplifier type RE074
	1 detector type RE074
	1 1st a-f amplifier type RE074
	1 2d a-f amplifier type RE074
Power supply:	batteries
Filament	4-volt alkaline storage battery, German type 4.8 NC10 at 0.25 amperes
Plate	90-volt dry battery, German type DIN/VDE 1600 at 10 milli-amperes
Grid	3-volts (dry battery)

NOTE: When German batteries are used, the plate and grid use a 90-volt **Anode Batterie** ("B" battery) which is tapped at 3 volts.

Antenna type:

long wire or rod antenna

3. CONTROLS. The controls on the front panel (fig. 3) are listed below with a brief statement of their function:

a. Voltmeter. The voltmeter in the upper left of the front panel of the set is used to indicate the condition of the batteries. The voltmeter normally reads the "A" battery voltage which is applied to the tube filaments. By pressing the blue button on the face of the meter marked 100V the "B" battery voltage can be measured.

b. Filament Rheostat. The **Heizregler** (filament rheostat), located on the left side of the front panel, is a variable resistance in series with the filament circuit. This rheostat enables the operator to adjust the filament voltage to the correct value as indicated on the voltmeter.

c. Tone-filter Switch. The **Tonkreis** (tone-filter) switch is used for receiving c-w signals, and in the **mit** (in) position increases the selectivity of the set and decreases interference from signals on

nearby channels. In order to prevent distortion, this switch should be in the *ohne* (out) position when receiving voice signals.

d. **Main Switch.** This switch, when set to the **3R** (3-tube) position, turns the set on, and puts into operation only one audio stage. When the switch is set on the **4R** (4-tube) position, both audio stages are operating. In the **Aus** (off) position the battery power to the set is turned off.

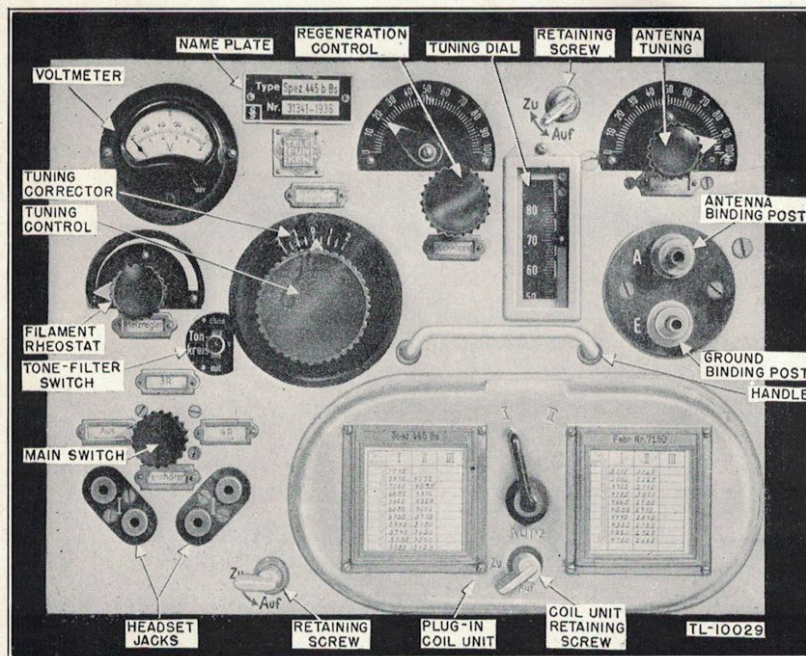


Figure 3. German radio receiver, Spez. 445 b Bs, front view.

e. **Headset Jacks.** The jacks labeled **Fernhörer** (headset) are for the use of headsets.

f. **Tuning Control.** The **Abstimmung** (tuning control) is used to tune the set.

g. **Tuning Corrector.** The **Gleichlauf** (tuning corrector) is used to compensate for misalignment of the r-f amplifier.

h. **Regeneration Control.** The **Rückkopplg.** (regeneration) control determines the amount of feedback in the detector circuit.

i. **Antenna Tuning.** The **Antennenkopplung** (antenna tuning) is a variable control used to tune the antenna circuit.

4. BATTERY INSTALLATION.

a. **General.** The German type batteries, if they are available, should be installed in the apparatus case as shown in figure 4. The German type **4.8 NC10** alkaline storage battery is used to supply 4 volts for the tube filaments. The plate supply battery is a 90-volt

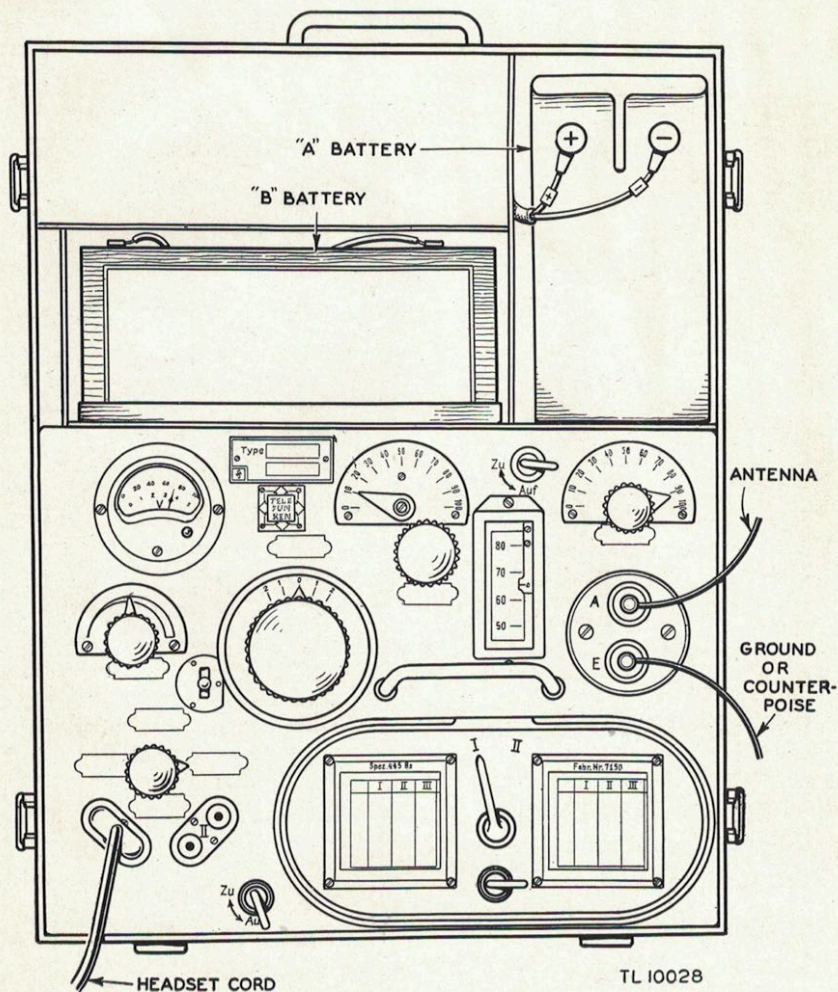
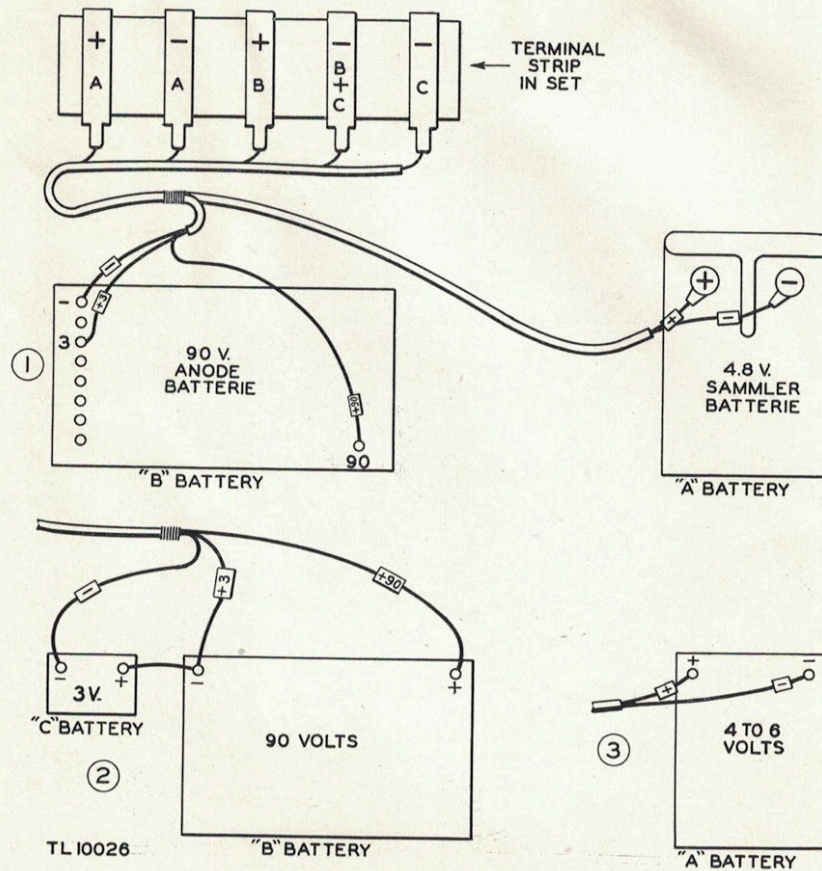


Figure 4. German radio receiver, Spez. 445 b Bs, set up for operation.

Anode Batterie ("B" battery), German type **DIN/VDE 1600**. When batteries are installed, be sure that the battery terminals are clean before making the connections shown in figure 5. Strap the batteries securely in place with the straps provided.

b. Filament Battery Substitutes. When German batteries are not available, the tube filaments may be supplied from a 4- to 6-volt storage battery of any manufacture. Dry batteries delivering from 4 to 6 volts may also be used. The **Heizregler** (filament rheostat) has enough resistance to drop an input of 6 volts to the correct value for the tube filaments.

NOTE: Do not let the filament voltage rise higher than the red line on the meter. The application of excessive voltage to the tube filaments will decrease the life of the tubes.



- ① German batteries.
- ② American substitute "B" and "C" batteries.
- ③ American substitute "A" battery.

Figure 5. Battery connections for German radio receiver, Spez. 445 b Bs.

c. Plate and Grid Substitutes. When German **Anode Batteries** ("B" batteries) are not available, batteries of American manufacture may be substituted (fig. 5). A separate "C" battery must be con-

nected for grid bias supply when American "B" batteries are used for the plate supply.

d. Battery Life. The expected life of substitute American batteries is given in the table below. Other batteries which will supply the necessary filament, plate, and grid voltages may also be used. The batteries listed, however, will give reasonable life for a continuous filament drain of .25 ampere and a continuous plate drain of 10 milliamperes. Intermittent use of the set will, of course, greatly increase the life of the batteries. Since the drain on the "C" battery is very small, the expected life of those batteries is not given.

FILAMENT SUPPLY ("A" Battery)

Battery type	Number used	Connection	Delivered voltage	Life
BB-54	2	Series	4 volts	Recharge
BA-23	3	Series	4.5 volts	40 hours
	6	Series-parallel	4.5 volts	100 hours
BA-35	3	Series	4.5 volts	35 hours
	6	Series-parallel	4.5 volts	85 hours
BA-65	3	Series	4.5 volts	25 hours
	6	Series-parallel	4.5 volts	75 hours
BA-15A	3	Series	4.5 volts	10 hours
	9	Series-parallel	4.5 volts	50 hours

PLATE SUPPLY ("B" Battery)

Battery type	Number used	Connection	Delivered voltage	Life
BA-36	2	Series	90 volts	60 hours
BA-2	8	Series-parallel	90 volts	18 hours
BA-33	2	Parallel	90 volts	17 hours
BA-8	4	Series	90 volts	43 hours

GRID SUPPLY ("C" Battery)

Battery type	Number used	Connection	Delivered voltage
BA-27	1	Tapped at 3 volts	3 volts
BA-34	1	Tapped at 3 volts	3 volts

5. SET INSTALLATION AND OPERATION.

a. Installation. Set up the equipment according to figure 4. A rod antenna which has a suitable mounting may be used. If a rod antenna is not available, attach one end of a wire about 45 feet long to a tree, being sure to keep it insulated from the tree and free from contact with surrounding objects. Be sure that the set is securely strapped down if it is used in a vehicle. To prepare the set for operation, proceed as follows:

- (1) Remove the set from the apparatus case by first loosening the two retaining screws labeled **Zu** (tighten) and **Auf** (loosen).
- (2) Check the tubes, making sure that they are firmly seated in their sockets and that the hold-down covers are securely in place.
- (3) Replace the set in the apparatus case and tighten the retaining screws.
- (4) Install the batteries as described in paragraph 4.
- (5) Connect antenna to binding post marked **A** (antenna).
- (6) Connect ground to binding post marked **E** (ground). If used in a vehicle this binding post should be connected to the vehicle chassis.
- (7) Insert plug-in coil covering the desired frequency range.
- (8) Plug headset into one of the **Fernhörer** (headset) jacks. The set is now ready for operation.

b. Operation. Operation of the **Spez. 445 b Bs** (portable receiver b) is simple once the operator has familiarized himself with the controls. Figure 3 shows the location of the various controls as they appear on the front panel of the set. Paragraph **5a** above gives the installation procedure prior to operation. General operating instructions are given below:

- (1) Turn the main switch to **4R** (4-tube). This places all four tubes in operation and turns on the battery power to the set.
- (2) Adjust the **Heizregler** (filament rheostat) so that the voltmeter reads 3.8 (the red mark on the meter dial). Turn control clockwise to increase the filament voltage.

NOTE: When using more than 4 volts for the filament battery, turn the **Heizregler** (filament rheostat) all the way counterclockwise before turning on the battery power. This is to prevent the tube filaments from burning out, and to permit adjustment of the filament voltage after the set is turned on.

- (3) Depress the blue button on meter. The meter will indicate the **Anode Batterie** ("B" battery) voltage, which should be between 80 and 100 on the meter dial (the blue portion on the meter dial).

- (4) Set band switch on plug-in coil unit to desired frequency range.
- (5) Refer to calibration tables on plug-in coil unit for approximate dial settings.
- (6) Switch the **Tonkreis** (tone filter) to the **ohne** (out) position.

NOTE: When receiving c-w signals, and if signals on adjacent channels are causing interference, switch the **Tonkreis** (tone filter) to the **mit** (in) position.

- (7) When receiving c-w signals, set the **Rückkopplg.** (regeneration) control just past the point at which the set begins to oscillate. Oscillation is usually indicated by a rushing noise in the headset. For the reception of tone-modulated signals, set the **Rückkopplg.** just before the point at which the set begins to oscillate.

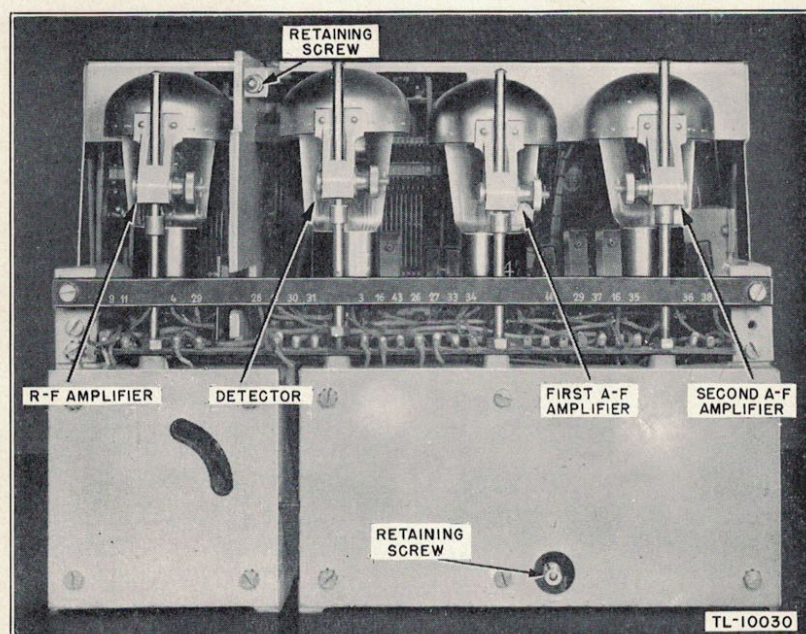


Figure 6. German radio receiver, Spez. 445 b Bs, removed from case, rear view.

- (8) Vary the **Abstimmung** (tuning control) slowly across the dial until the desired signal is tuned in. Adjust for maximum volume.
- (9) Vary the **Gleichlauf** (tuning corrector) for maximum signal strength or volume in the headset.
- (10) Adjust the **Antennenkopplung** (antenna tuning) for maximum headset volume.

(11) If volume is too great for the headset, turn the main switch to **3R** (3-tube), thereby using only one audio stage, or reduce the filament voltage slightly by means of the **Heizregler** (filament rheostat).

(12) After reception has been completed, turn the main switch to the **Aus** (off) position.

6. MAINTENANCE. Detailed maintenance instructions are not given in this bulletin. However, the following simple operating precautions should be observed when the set fails to operate:

a. Check the condition of the batteries with the voltmeter on the panel.

b. Check all plugs, cording, and connections. Much of the trouble normally encountered is usually traceable to defective cording and connections.

c. If the set is inoperative when the main switch is in the **4R** (4-tube) position, turn the switch to the **3R** (3-tube) position. If the set now operates, it indicates that the last audio-amplifier tube is defective. Replace the tube.

d. If the set is still inoperative, start with the first audio frequency tube and work back towards the r-f amplifier tube, replacing the tubes in order. To change the tubes the set must be removed from the apparatus case. Do this by loosening the two retaining screws on the front panel (fig. 3). Figure 6 shows the location of the tubes when the set is removed from the apparatus case.

e. If the simple procedures given above do not make the set operate, send it back to a signal depot. The components may be used to repair other sets. WE CAN USE THE GERMAN PARTS TO FIX OUR OWN AS WELL AS GERMAN SETS.

7. GLOSSARY OF TERMS. The German terms on the set and their American military equivalents are as follows:

<u>German</u>	<u>American</u>
A. (Antenne)	antenna
Abstimmung	tuning control
Antennenkopplung	antenna tuning
Auf	loosen
Aus	off
E. (Erde)	ground
Fabr. Nr.	serial number
Fernhörer	headset
Gleichlauf	tuning corrector
Heizregler	filament rheostat
Kurz	short
Lang	long
Mit	in
Mittel	medium
Ohne	out
3R	3 radio tubes
4R	4 radio tubes
Rückkopplg.	regeneration control
Teilstrich	graduations
Tonkreis	tone filter
u	and
Zu	tighten

WANTED:

UNCOMMON RADIOS WITH A GOOD STORY

Brian Harrison KN4R

briankn4r@gmail.com
704 657-8910 cell

9625 Island Point Road
Sherrills Ford NC 28673
kn4r.com or qrz.com/db/kn4r

WANTED:

WWII German or Japanese radios and parts
Pre-WWII civilian aviation radios - air or ground
National HROs and earlier radios
Any radio with an interesting data plate
Suitcase and clandestine radios
Rack-mount speakers (single or dual)