

German Field Telephone Equipment Reference

Feldfernsprecher 33 / Field Telephone 33

Description

The feldfernsprecher 33 (FF33) is the standard field telephone of the German military forces of WWII. It is a general purpose field telephone designed for wired communications. It was introduced in 1933 as a modern replacement for the previous WWI legacy field telephones the last of the series being the feldfernsprecher 26 (1926). The FF33 can also be connected to the Torn. Fu. D2 and Torn. Fu. BI, and F series radio sets to act as a remote handset.

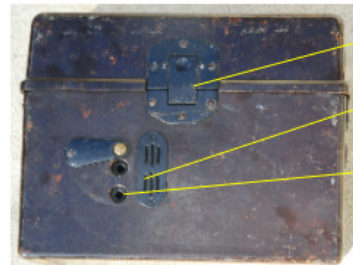
The telephone is 28 x 21 x 10 (Metric) x x (Imperial) and weighs 5.84 Kg. The complete telephone has of the following components: a press to talk (PTT) handset, switchboard patch cable, generator crank, shoulder strap, 1.5 volt battery and internal framework for the telephone components. Accessories available are: headphone (kopfhörer) and throat microphone (kehlkopf). These were used with the telephone when it was used by switchboard operators.

The set is housed in a bakelite case which consists of two parts is hinged and fastened with press to release spring latch.



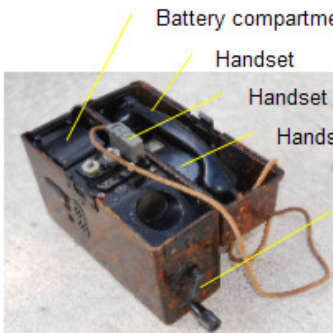
Carry strap notch
Crank port

On the top of the case are two white panels. The panel on the left is used to record temporary information such as call signs or station number while the panel on the right is inscribed with the German phonetic alphabet.



Cover latch release
Ringer vent
Jacks K1 & K2 (Common)

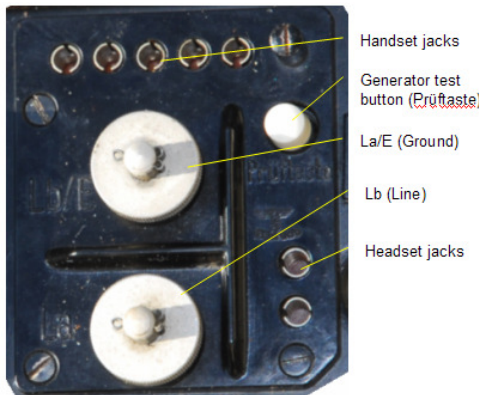
A dust cover on the front can be swung open to give access to two jacks; both jacks are common and also common to the with the incoming line terminations on the top of the phone. The jacks are used when patching two phones together or when connecting a field phone to an exchange line via an exchange line adaptor. The grill on the front of the case ports the sound of the ringer. On the right side of the case is another access plate which protects the port for installing the crank onto the generator. Sockets are located on each side of the lower case along the edge for installing a carrying strap. The leather carrying strap is usually missing from these telephones and is quite hard to find.



Battery compartment
Handset
Handset plug
Handset spring
Generator crank

Looking down into the opened telephone case from the top you'll see the following: The handset rests on top and when the phone is open it is convenient to lay the handset in the open top. Inside the top is a leaf spring that holds the handset in place when the phone is closed¹. The battery compartment is on the end, covered with a hinged lid. Beside the battery box is an open compartment where the patch cable and the handset cord are stowed.

The handset plugs into a center jack console with a unidirectional plug. Beside the plug are two screw terminals marked **Lb/E** and **La**. **La** is line and **Lb/E** is ground or in alternative mode of connection; a single conductor local earth ground. While this mode of communication allows two separate circuits using only one cable pair, it is open to



interception from local earth listening devices. It also makes quality of communications dependant upon the local grounding quality.

On the right side of the panel the white generator test button (**Prüftaste**). Shorting the screw terminals and pressing the Prüftaste button while cranking the generator will sound the local ringer as a test of the generator output. The



generator outputs of 84 volts AC as ringing current. Adjacent are the jacks for headphones. The generator crank is stored in a hole and notch next to the panel.

In the field, when set up for use, the top cover is usually closed and the line and handset cord run out of the unit by the end of the case near the battery box. A pair of soft rubber strips built into the case cushions the cords when the lid is closed. The handset can then be laid crosswise on the closed cover. The photo to the right shows the jäger talking in the handset of a W28 telephone while the FF33 has its handset resting on the top of the closed case. A



special accessory is available that creates a resting cradle for the handset on the closed lid. This was normally used with a switchboard setup and not in the field.



¹ If the phone is closed improperly it is possible to snap the bridge of the handset, care should be used in closing the phone with the handset in the cradle. **Always** make sure the larger microphone end of the handset is in the depression opposite the battery end.

To make a call after connecting the telephone, open the generator crank cover on the end of the phone, screw the crank onto the threaded shaft. Crank the generator a few turns, this will send ringing current to the telephone or switchboard at the other end of the line. Pick up the handset and listen for when the distant station answers. To transmit press the PTT and speak, release after speaking.

General Operation

Telephone to Telephone Connection

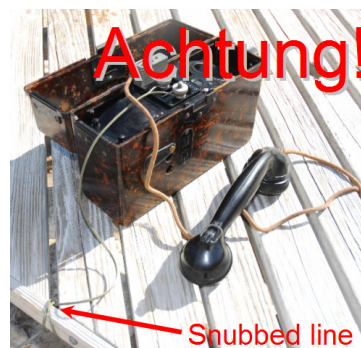
The simplest field telephone setup is a point to point operation. This can be set up quickly and is usually used to enable a forward outpost to communicate back to the front line or a command post (CP). The configuration is two FF33 telephones and a one pair line between the telephones².



The line between the points can be run using a hand cable reel or backpack wire reel for longer distances. The cable can be run from CP to the outpost or the reverse, the wire reel is left at the destination since the connection to that telephone will be made directly to the termination at the reel. The other telephone will be connected at the origination of the line run.

The line pairs will be marked to indicate which lead of the pair is earth (ground). The earth end is connected to the screw terminal marked **Lb/E** the other is connected to the **La** terminal. At the other end of the line the same connection is made.

Achtung! In the heat of action a careless jäger can very easily snag the incoming line, which will pull the telephone off the table, **you will always snub the incoming line to a solid object.** This is the first step before attaching the incoming line to the telephone. It is far better to snag the line than smash the 70 year old telephone.



Once the telephones are connected a communications test should be run. The outpost rings the CP and requests a test count. Once the outpost test is complete the CP rings the outpost and requests a test count. This tests two-way ringing and talking. This also reminds the outpost to take steps to muffle the ringer if needed. Wrapping the telephone in a blanket or a zeltbahn is an effective method of reducing the volume of the ring.

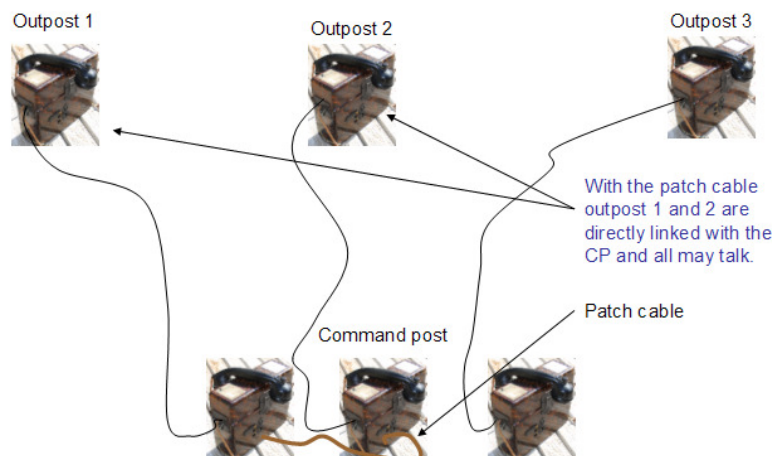
² Communications begin to degrade if the line length is over a kilometer.

Step by Step Field Setup

1. Place telephone in desired final location.
2. Open the top by releasing the front latch.
3. Remove handset, laying cord across rubber strip at end of phone.
4. Remove crank and attach by screwing it in at the crank port on the opposite end of the telephone.
5. Snub the communications wire to a solid object near the telephone.
6. Loosen the terminal screws (La and Lb/E) on the top of the phone.
7. Thread the ground wire into the **Lb/E** terminal and snug the screw down.
8. Thread the line wire into the **La** terminal and snug the screw down.
9. Make sure the handset wire and communications wire exit the phone over the rubber strip.
10. Close the cover over the wires.
11. Place the handset to your ear, when press the PTT and you should hear increased noise.
12. Turn the crank to ring the base station and wait for the base to answer.
13. Request a call back and a test count, if everything works installation is complete.

Field Setup, without Switchboard

When a switchboard is not available or is a simple telephone setup is desired multiple telephone to telephone connections can be used feeding back to the same CP. Several outposts can be connected up to individual telephones at a CP. If you wish to link multiple outposts together from a single telephone at the CP it is done using the patch cable. Each individual point to point connection can be jumpered together for a three-way or greater connection as shown by the addition of the patch cable shown in the bottom in this diagram:



Telephone Net Switchboard Operation

In a larger field situation a telephone net with a central switchboard³ (klappenschrank) is employed. Switchboards are usually the 10 line (klappenschrank zu 10 Leitungen), or the 20 line variants (feldklappenschrank zu 20 Leitungen).

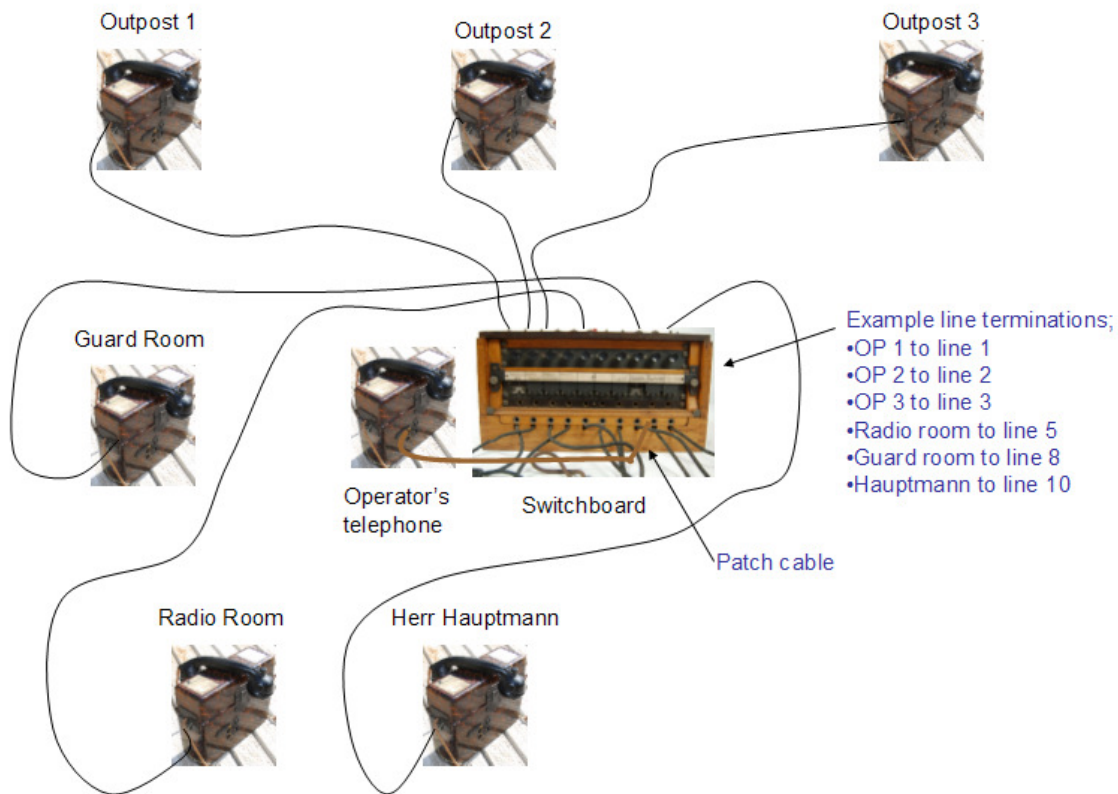
³ Detail and operation of switchboards is described in detail in the switchboard technical document.

To the left is an example switchboard setup. The telephone interface⁴ (Amtszusatz 33) is attached to a 10 line switchboard (Klappenschrank zu 10 Leitungen) with two FF33s. This makes for a nice command post communications setup.



When a switchboard is employed all lines run directly to the switchboard and all call connections are controlled by the operator.

Below is an example field arrangement of field telephones, lines and switchboard. Operation of the telephones is performed in the same manner. The only difference is when in placing a call the operator will answer and you must tell him to whom you wish to be connected. The post you are calling from will be known to the operator as the line will be marked on his switchboard.

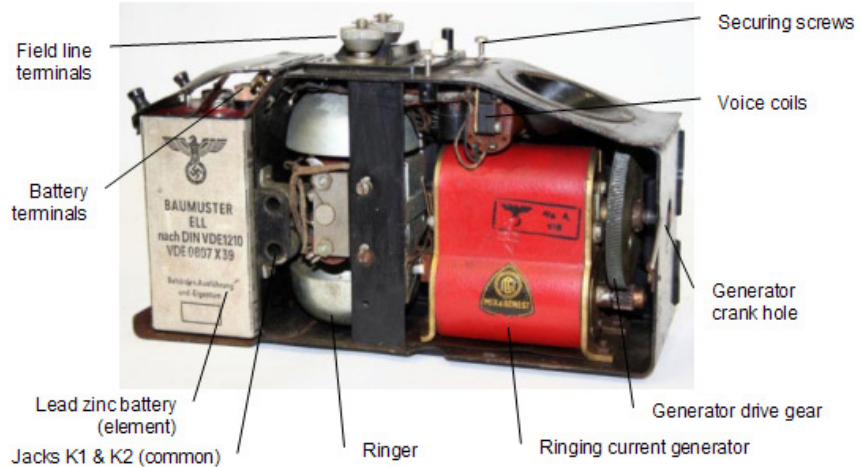


⁴ The telephone interface allowed the switchboard to connect into and dial regular German Reichspost telephones used in military offices and other locations.

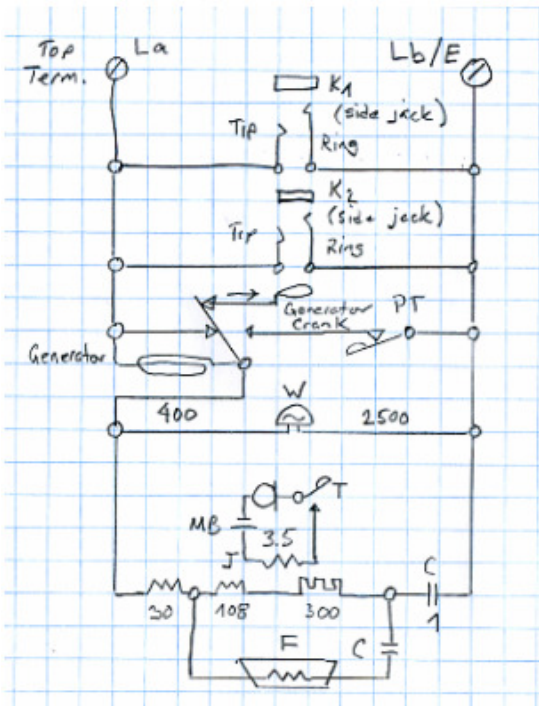
Telephone Technical Details

The internal telephone unit can be removed from the bakelite housing by unscrewing the two capture screws on the top sides of the faceplate. The generator crank must be unscrewed and then the internals can be lifted out of the case. In earlier war models there are two side plates that are held with a rotating clip at the receiver end of the case. In the later war more and more shortcuts to manufacture were undertaken. Late war telephone models used a much lighter framework with many lightening holes to save metal and omitted the use of the side covers. The wiring is uniformly well done with precise wire runs secured with linen wire lace thread throughout. The wiring and overall unit quality stayed high throughout the war.

Side View – Feldfensprecher 33 Internals



Feldfensprecher 33 Schematic



The FF33 telephone has two circuits; one is the ringing circuit which temporarily connects the generator with the ringer via the telephone line with ringing current.

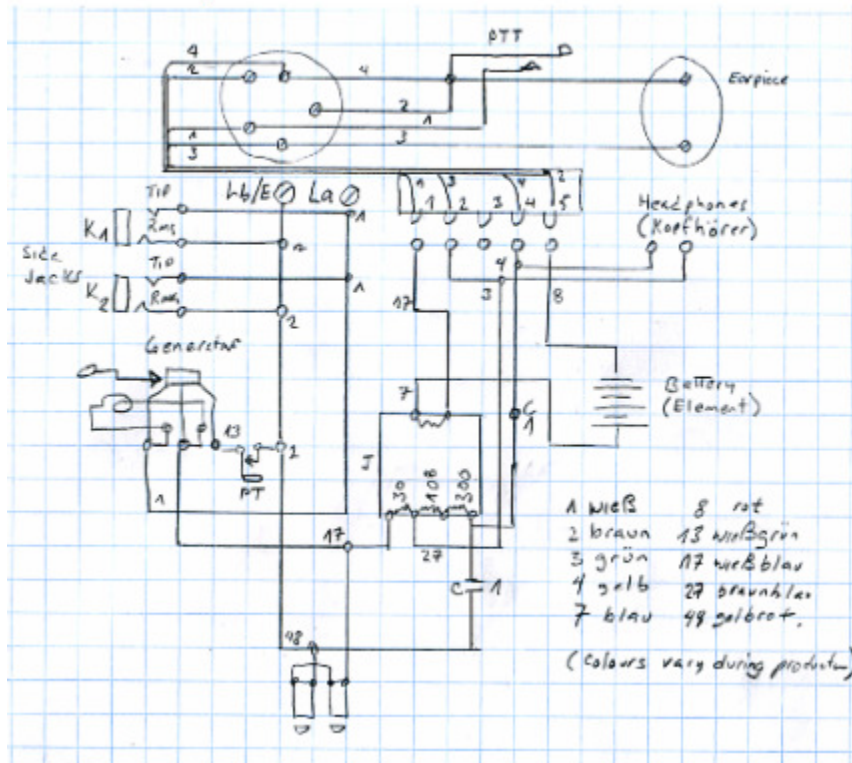
The other circuit is the talking circuit and is powered by the local battery when the PTT in the handset is pressed. When each station transmits, that only station's battery is used, this minimizes battery drain and maximizes battery life. The original battery is a 2 ¼ x 2 ¼ x 4 ½ lead-zinc cell⁵. Battery boxes are available from reenactors supply houses that use one D cell inside. However a better substitute is to solder two D cells with leads to power the



⁵ The battery is shown in the internals picture above, however it is normally enclosed in a bakelite battery housing that protects the internals of the telephone from acid leaks.

telephone. The battery is connected to the telephone inside the battery box by means of two screw terminals. The terminals are not marked for polarity but the positive terminal is to the outside of the telephone, negative is in the center.

Feldfensprecher 33 Functional Schematic w/Handset



Purchasing a FF 33

FF33 are still relatively plentiful, having been used by quite a few European countries including Switzerland, Norway and Sweden well into the 1970's.

Current prices range from \$60 to \$125 with some being offered for the ridiculous prices of \$200 and up. Check the telephone or the photos of the telephone well. Almost always the telephone will be missing the carry strap and the patch cord. Many will be missing the hand crank, look for it either attached to the end of the telephone on the generator shaft or stowed in its pocket on the top of the telephone under the handset.

Check the handset; sometimes it will be missing the carbon speaker and receiver cartridges. And in instances the microphone side will be replaced with a receiver end as the microphone cover with its elongated cup is more easily damaged. The other regular handset problem is the bridge of the handset being cracked. The

cabling to the handset is often frayed or damaged at the exit due to the rubber cable grommet being deteriorated. The handset PTT button should function freely. The plug on the cable will have 4 or 5 pins, the middle pin was unconnected. Later in the production the middle pin was omitted to save materials and production time. The same is true of the socket on the telephone.

The battery case is another piece that is often missing. This is easily discovered by lifting the battery compartment cover. The battery case is designed to protect the telephone internals from any leakage by the corrosive battery. A missing battery case isn't fatal to operation of the telephone and isn't a piece that isn't on view when the telephone is on display.

Test the battery connector nuts, sometimes these will be corroded in place. Depending on the amount of the corrosion damage it may be possible to free them. However do not use heavy force as these terminals are mounted on a bakelite insulator plate that will not stand stressing.

If you have the opportunity to remove the telephone internals, do so. This is done by loosening the two capture screws on the top of the body. Depending on the production date of the telephone it may have metal side panels. Most telephones will not have too much dirt or dust inside due to being well shielded. However if the telephone was stored in a moist environment or immersed in water the internals may be ruined. Rusting or bubbling or evidence of repainting on the top panel of the telephone is a good sign to walk away from a purchase, except for scrap or spares.

The only other butchery I've seen in telephone internals is where someone attempted to disassemble the components. The wiring harness is soldered and well run such that all of the parts must either be unsoldered or removed in a very specific order. Watch for cut wires between components, a sign of the some amateur disassembly.

Remedies

If the generator crank is missing it is easy to make a replacement, it may not be as pretty but workable. The generator shaft is 8mm x 1.5mm thread. The quickest is to tap one end of a piece of aluminum tube and bend it into a crank shape. More time consuming is to machine a substitute.

For fixing a cracked handset bridge, epoxy resin⁶ is best. Disassemble and clean the handset thoroughly. Then fasten the two pieces together in a jig to hold them properly.



⁶ Good source for West epoxy resin <http://www.aircraftspruce.com/catalog/cmpages/westepoxy.php>

Use peel ply⁷ on the exterior to keep the finish clean. Case cracks in the bakelite can be handled similarly. Use a reverse mould of an undamaged section and fiber cloth to help in forming the case if the damage is extensive. Dye may be added to the resin help disguise the repair.

Repairing a frayed handset cable end can be accomplished by shortening the cable. Repairing wiring in the telephone requires care in stripping and soldering to make sure of a good connection. The wire is cloth insulated. So stripping is best done with a razor cutter, straggling threads can be burned back with the soldering iron. Use muriatic acid to clean the wires and terminals, neutralize the acid with soda after. All terminals must be soldered for a good connection, do not use crimp terminals, the electrical connection will not be good and introduce noise. Also most crimp connectors are too large for the small gauge of the wiring in the FF33.

⁷ Peel ply <http://www.aircraftspruce.com/catalog/cmpages/peelply.php>