

5. Adjust Enigma Settings

To obtain secure communications, the German Heer (Army) and Luftwaffe (Air Force) used standard procedures to transmit and receive messages. For a message to be correctly encrypted and decrypted, both the sender and receiver needed to set up their Enigma machines in exactly the same way. These settings were distributed on the codesheets. For reasons of security, different parts of the armed forces had their own network, with different codesheets and with a network having its own codename.

Each codesheet contained the following key settings:

Tag: Day of the month

Walzenlage: Choice and order of wheels

Ringstellung: The setting of the alphabet rings

Steckerverbindungen: The plug connections on the plugboard

Kennguppen: Letter groups to identify the day of the month to the receiver at the beginning of a message

The codesheets were distributed beforehand, and contained the basic settings for a whole month, by day. In general, the codesheets were in the custody of an officer who was responsible for setting up the machine rotors and ringsettings. After setup, he could lock the machine front panel with a key. The operator could only select the rotor starting position.

Refer to the U571 December 1944 codesheet that you previously downloaded and printed.

To open-up the Enigma Simulator program, click on the "Start" button, "All Programs," and "Enigma icon." When the program opens, a message will appear concerning default settings. Exit out of this message.

To prepare the Enigma Simulator for use, we need to adjust the internal settings (the so-called "key") as agreed between the sender and recipient. To set the key, we must select the proper reflector, the rotors and their order, adjust the ring setting of the rotors, insert plugs on the plugboard and set the machine in its start position. You will notice that the mouse pointer changes into a little hand when you move over places where you can select or click something. To open the Enigma simulator menu, move the mouse over the little square in the top right corner of the machine [1].



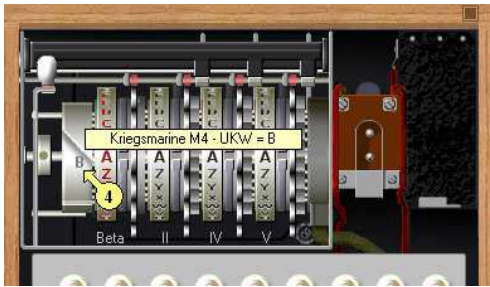
Setting the rotors (Walzenlage)

Click the power switch [2] (Wehrmacht) or one of the locks [3] (Kriegsmarine M3/M4) to open the Enigma. The interior of the machine will become visible, showing the rotor cradle compartment at the top of the machine and a rotor box, containing the unused spare rotors, at the bottom.



Selecting the Reflector (Umkehrwalze or UKW)

You can choose between the different Enigma models by left-or right clicking the letter on the reflector [4]. Choose the Wehrmacht UKW=B 3-rotor model.

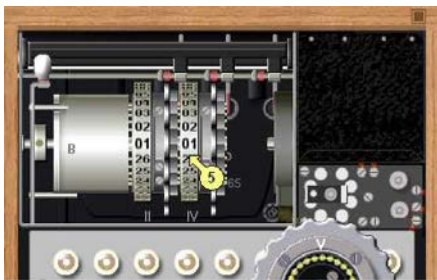


Model UKW Rotors Choice of rotors

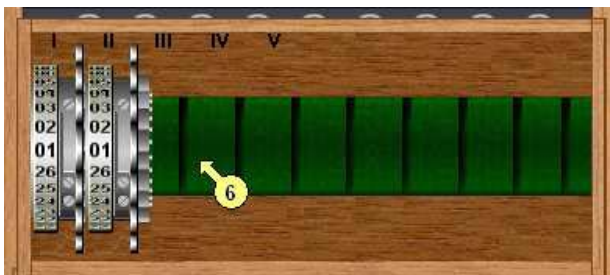
| | Model | UKW | Rotors | Choice of rotors |
|---|------------------------------|-----|--------|--|
| 1 | Wehrmacht (Heer & Luftwaffe) | B | 3 | 5 normal |
| 2 | Wehrmacht (Heer & Luftwaffe) | C | 3 | 5 normal |
| 3 | Kriegsmarine M3 | B | 3 | 5 normal + 3 double notched |
| 4 | Kriegsmarine M3 | C | 3 | 5 normal + 3 double notched |
| 5 | Kriegsmarine M4 | B | 4 | 5 normal + 3 double notched + Beta + Gamma |
| 6 | Kriegsmarine M4 | C | 4 | 5 normal + 3 double notched + Beta + Gamma |

Changing the Rotors (Walzenlage)

To change one or more rotors, click on a rotor [5] in the rotor cradle to lift it out of the Enigma machine. The rotor will then move on top of the machine. Below is a Wehrmacht 3-rotor machine. Rotor number 3 (counting from left to right) has been removed from the cradle and turned so that you can see part of it end-on. Notice that it has a Roman Numeral **V** stamped on the end.



Click on the corresponding Roman Numeral **V** in its empty place in the spare rotors box. [6] NOTE: The arrow in this picture should be pointing to the space for Roman Numeral **V**, not the space for Roman Numeral **IV**. The picture is a little bit wrong. Remove each rotor from the cradle and place it in its corresponding Roman Numeral space in the spare rotors box.



Adjusting the Ring Setting (Ringstellung)

Put all of the rotors into the spare rotors box. Then select, adjust, and insert them one by one into the machine.

You can adjust the ring setting (Ringstellung) of a rotor when it is extracted from the machine. Once it is placed on top of the machine, you can adjust the ring setting by clicking the upper [7] or lower [8] half of the displayed rotor.

Refer to the U571 December, 1944 codesheet, day (Tag) 16. According to the codesheet rotor settings (Walzenlage), you will need to use rotors **III**, **V**, and **II**.

1. Click on rotor **III** in the spare rotors box and set the ringsetting (Ringstellung) to **H-08**. Then click on the first space on the left side of the cradle to place the rotor into the cradle.
2. Click on rotor **V** in the spare rotors box and set the ringsetting (Ringstellung) to **F-06**. Then click on the second space in the cradle to place this rotor into the cradle.
3. Click on rotor **II** in the spare rotors box and set the ringsetting (Ringstellung) to **W-23**. Then click on the third space in the cradle to place this rotor into the cradle.



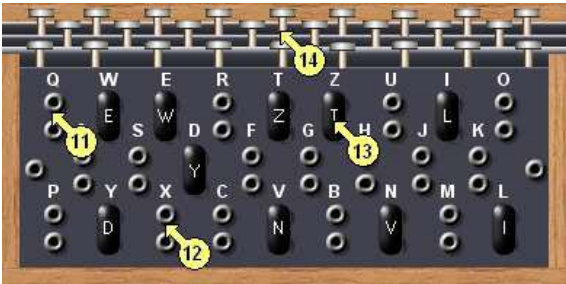
Once all rotors are placed in the rotor cradle, you can close the lid by clicking the little handle [9] at the top left, above the reflector. It will be impossible to close the lid if not all required rotors are placed inside the machine. Once all settings are finished and the machine is closed, the proper machine (Enigma I, M3 or M4) will appear.

Connecting the Plugs (Stecker) on the Plugboard (Steckerbrett)

To connect plugs from one socket to another (to switch the letter connections) you must click in the area of the plugs [10], at the bottom of the Enigma.



The plugboard or 'Steckerbrett' will appear. Simply click the desired socket [11] and then click the socket that you want to connect it to [12]. To clear a connection, just click one of the plugs [13] of a pair and both plugs will disappear. (**NOTE:** Most of the mistakes that occur using Enigma happen during this step. Please note that each letter has 2 holes **underneath** it. It is these 2 holes **underneath** the letter that go with the letter. Do not get confused by accidentally looking at a letter or a hole to the side of the one you really want!)



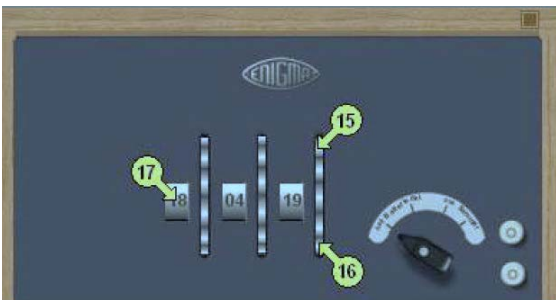
Refer to the U571 December 1944, day 16 (Tag). According to the codesheet plugboard settings (Steckerverbindungen), you will need to connect your plug settings as follows:

B to J, C to Y, D to X, E to Z, F to H, G to O, L to N, M to W, Q to V, T to U

After finishing the plug settings, you can return to the Enigma top view by clicking the keys [14] above the plugboard.

Setting the Rotor Start Position (Spruchschlussel)

On the Enigma Simulator main screen, you can change the start position of the rotors by clicking the upper [15] or lower [16] half of the rotor thumb wheels.



The Wehrmacht Enigma has rotors with numbers. Therefore, to set a message key in the next step, Step 6, the simulator has a help sheet to convert letters to numbers. This sheet appears when you click on the number inside the little rotor window [17]. Do this now! The real Enigma has this table fixed inside the wooden cover of the machine.