Kriegsmarine

M4-UKW = B

M4-UKW = C

BASIC PROCEDURE

Decrypting a Kriegsmarine 4-rotor message

Note: The Kriegsmarine 4-rotor Enigma machines (M4) are more complex than the 3-rotor Wehrmacht versions. This procedure takes for granted that you already know the basic Enigma operating steps that are used with the 3-rotor machines and that you are ready to advance to a more challenging level of Enigma activity. We have selected the sample message from the Basic Procedure Encrypting and Sending a Kriegsmarine 4-Rotor Message as our example in this procedure. You will, of course, use your own received message to decrypt.

1. Print-out a paper copy of all of these documents:
    . Inner Settings
    . Outer Settings
    . Bigram Tables

2. Notice the identical first two and last two 4-letter groups in the message. The Message Indicators that we need for decryption are hidden inside these identical letter groups. Write one set of these letter groups one above the other, as shown:

    K   I   B   L

    K   C   L   H

3. Re-group the letters following this pattern:

    K------I   B-----L
    K-----C   L-----H
    You get: KI   BL   KC   LH

4. Now, write-out the pairs of letters like this:
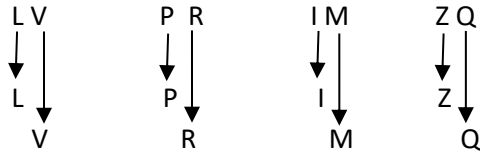
    KI =   BL =   KC =   LH =

5. Get your printed-out bigram tables. Read the instructions on how to use them.
6. Using the bigram tables, decrypt the pairs of letters you have just written, like this:

    KI=LV   BL=PR   KC=IM   LH=ZQ

7. Write-out the decrypted pairs of letters, like this:

    LV   PR   IM   ZQ

8. Add a short arrow and a long arrow to each pair of letters, as follows:

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L V        P R        I M        Z Q
↓ ↓        ↓ ↓        ↓ ↓        ↓ ↓
L          P          I          Z
  ↓          ↓          ↓          ↓
  V          R          M          Q
```

9. Write the short-arrow letters in order, from left to right:

   L P I Z

10. Drop the first letter:

    P I Z

11. Write the long-arrow letters, in order, from left to right:

    V R M Q

12. Look at the trigram from step 10: PIZ. Using the "Inner Settings" table, scan-down the "Key Ind." (Key Indicator) column and verify that the Key Indicator date matches the correct date in the header. (See the "Basic Procedure Encrypting and Sending a Kriegsmarine 4-rotor Message" for a sample header.)

13. The "UKW" column may show "B," which means that we will be using the Kriegsmarine M4-UKW = B reflector machine. If you will be using a key indicator that has a "C" in this column, select the M4-UKW = C reflector machine.

14. Open the cover of the Enigma simulator. Click on the letter "B" located at the left end of the rotor shaft until it shows either "Kriegsmarine M4-UKW = B" or "Kriegsmarine M4-UKW = C," depending on which machine reflector you are using.

15. Remove rotors I, II, and III from the rotor shaft and store them in the box, in order.

16. The "Inner Settings" column on the "Inner Settings" sheet gives you the rotor settings you will use. Click on the Beta or Gamma rotor (depending on which machine you are using) in the box, check the end of the rotor to ensure it shows the letter "A," then install the rotor on the left end of the rotor shaft.

17. Then select the next rotor, set it to the correct letter, and install it next to the Beta or Gamma rotor on the shaft.

18. Working from left to right, set and install the last two rotors onto the shaft. Close the Enigma cover.

19. Click on the Stecker plugboard. You will notice that the plugboard is numbered, not lettered.

20. Using the "Outer Settings" table, scan down the "Key. Ind." (Key Indicator) column until you have located the Key Indicator and date of the month you are using. We are using Key Indicator PIZ for our date, the 27th.

21. Set the Stecker plugs as indicated. Return to the Enigma top view.

22. The last column on the "Outer Settings" table is labeled, "Basic Start Position." Dial-in the "Basic Start Position" letters into the 4 rotors, in order, from left to right. Our example "Basic Start Position" is TCXK.

23. Using the Enigma keyboard, slowly type-in the quadgram from Step 11: VRMQ. As each letter is typed, a letter will illuminate on the Enigma light panel. Write-down the four letters as they illuminate, in order. For our practice message, they should read KKZW.

24. Set these four illuminated letters into the four rotors, from left to right.

25. Go back to your Enigma keyboard. Click on the small metal plate at the bottom of the Enigma that displays, "Show textbox."
26. The two quadgrams VRMQ and KKZW will already be in the textbox. Ignore these for now.

    Note: There are several different ways to decrypt a message from this point on. I will use my favorite, but, if you prefer a different method, that will be fine.

27. Hover over the box at the top right-hand corner of the Enigma simulator. Click on "Auto typing." A box entitled "Enigma Auto Typing" will appear.
28. Find the message that you want to decrypt. Highlight only the <u>text</u> portion of the message, <u>not</u> the two 4-letter Message Indicators at both ends of the message, and <u>not</u> any 3-letter trigrams that may be hanging around.
29. Right-click and copy the message text.
30. Right-click and paste the message text into the "Enigma Auto Typing" box.
31. Do you see the "Start" button? Click it!
32. After the message is finished printing, hover over the textbox and click when, "Click here to Copy Output to Clipboard" is displayed.
33. Your decrypted message will appear on the screen.