**Enigma Machine Wiring**

<https://www.cryptomuseum.com/crypto/enigma/wiring.htm>

**Entry Wheel (ETW)**

Entry = ABCDEFGHIJKLMNOPQRSTUVWXYZ

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 ABCDEFGHIJKLMNOPQRSTUVWXYZ

**Enigma Rotors 1-5 Default rotors, used by the Wehrmacht and Kriegsmarine.**

Entry = ABCDEFGHIJKLMNOPQRSTUVWXYZ

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**I = EKMFLGDQVZNTOWYHXUSPAIBRCJ Notch Y, Turnover Q**

II = AJDKSIRUXBLHWTMCQGZNPYFVOE Notch M, Turnover E

**III = BDFHJLCPRTXVZNYEIWGAKMUSQO Notch D, Turnover V**

**IV = ESOVPZJAYQUIRHXLNFTGKDCMWB Notch R, Turnover J**

V = VZBRGITYUPSDNHLXAWMJQOFECK Notch H, Turnover Z

**Enigma Rotors (6-8) Additional rotors used by Kriegsmarine M3 and M4 only.**

Entry = ABCDEFGHIJKLMNOPQRSTUVWXYZ

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VI = JPGVOUMFYQBENHZRDKASXLICTW Notch H & U, Turnover Z & M

VII = NZJHGRCXMYSWBOUFAIVLPEKQDT Notch H & U, Turnover Z & M

VIII = FKQHTLXOCBJSPDZRAMEWNIUYGV Notch H & U, Turnover Z & M

**The special fourth rotors, also called Zusatzwalzen or Greek rotors. Used on the**

**Kriegsmarine M4 with Thin Reflectors only.**

Entry = ABCDEFGHIJKLMNOPQRSTUVWXYZ

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Beta = LEYJVCNIXWPBQMDRTAKZGFUHOS

Gamma = FSOKANUERHMBTIYCWLQPZXVGJD

**The Reflector (UKW)**

The reflector (Umkehrwalze or UKW in German) is a unique feature of the Enigma machine. On the normal rotors, each letter can be wired with any other letter. An 'A' could be wired to 'F', while the 'F' is wired to 'K'. In the reflector, the connections are made in loop pairs. In the case of the wide B reflector, the 'A' is wired to the 'Y' which means that the 'Y' is also wired to the 'A', resulting in a reciprocal encryption. The advantage of this design is that encryption and decryption are possible with the same machine setting and wiring. Unfortunately, a letter can never be encrypted into itself, a property that opened the door to cryptanalysis, making the job easier to the codebreakers.

**Default wide reflectors used by the Wehrmacht and Luftwaffe M3**

Contacts = ABCDEFGHIJKLMNOPQRSTUVWXYZ

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Reflector A = EJMZALYXVBWFCRQUONTSPIKHGD

**Reflector B = YRUHQSLDPXNGOKMIEBFZCWVJAT**

Reflector C = FVPJIAOYEDRZXWGCTKUQSBNMHL

**Thin reflectors, Kriegsmarine M4 only.**

Contacts = ABCDEFGHIJKLMNOPQRSTUVWXYZ

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Reflector B Thin = ENKQAUYWJICOPBLMDXZVFTHRGS

Reflector C Thin = RDOBJNTKVEHMLFCWZAXGYIPSUQ