



1.3 The Electronic Enigma

Now that we had a reliable simulator, we could actually start working on our initial goal: the electronic Enigma variant. As we were already playing with the thought to make it available as a DIY kit later, we wanted to keep the cost at an absolute minimum. A circuit diagram was designed and every effort was made to keep the circuit as simple as possible. We decided to keep the look and feel of the original Enigma: our device would need to have 26 keys and 26 lamps, otherwise it wouldn't be a real Enigma.

Next, we needed to find a replacement for the -mechanical- wheels. Alpha-numerical LED displays were found and the latest generation of these, produces much more light at much lower power consumption, which was very welcome as we wanted the device to be battery powered. At the heart of the unit came a low-cost micro controller from the well known manufacturer Microchip. A range of processors with built-in memory is available from this brand, and we picked a model that would be large enough to simulate both the M3 and M4 Enigma machines.

Once the circuit diagram was complete, a professional PCB (Printed Circuit Board) had to be designed. We decided to create the PCB in two parts: the main Enigma PCB and a separate Steckerbrett. This would greatly enhance the possibilities when building the PCB in a case. Some people may want to use the Enigma 'as is', whilst others may want to build it in, say, a wooden box.

When the first prototype boards arrived from the PCB manufacturer, we were very nervous. First we had to check if all components would fit -mechanically- on the PCB, which they did. We then built the first board and tested it electrically and, believe it or not, it passed the initial test. But that was only part of the story as the real pain had yet to come: programming the Microchip controller. To cut a long story short, after weeks of programming, testing and modifying, we finally managed to decode our first real message. The many hours that went into the project had payed off and we were finally looking at a more or less finished product.

If you are interested in electronics and circuit diagrams, you'll find the complete story in chapter 4. The full circuit diagram is printed in Appendix A (separate sheet).

1.4 What's in a name?

We now needed a name for our new Enigma variant, especially if we were going to sell it. Many names were invented and scrapped and we finally adopted the simplest of them all. Most real Enigma machines have a serial number starting with a letter. 'A' for the Heeres Enigma (Armee) and 'M' for the naval machines (Marine). Other letters were used for special Enigma variants, such as 'G', 'K', 'D', 'C', etc. As our machine is completely driven by electronics, we will be using the letter 'E' which is not used for any other Enigma variant. Thus, the **Enigma-E** was born.

1.5 Terminology used in this manual

Many articles on the Enigma subject have been written over the years. Depending on the country of origin, different expressions are used for the same thing. Take for example the *wheels* of the Enigma: in UK English they are often called **Wheels** or **Drums**, whilst in American literature they are commonly called **Rotors**. And to make it even more complex, the original German expression for a wheel is **Walze**. In this manual, we will be using the German expressions wherever possible. After all, it is a German device.

1.6 Registering your device

Each **Enigma-E** comes with a unique serial number and a certificate to prove that it's a genuine item. The serial number is printed on the box, the PCB and on the certificate. We would like you to register yourself and your serial number through the on-line registration form on the website. This way, we can keep you informed of future developments. To register, visit:

<http://www.xat.nl/enigma-e/>