

MeinEnigma Quick Reference

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For software version 0.93

Serial port settings: 38400 bps, 8n1, no hardware handshaking or software flow control.

Commands can be in upper or lower case and abbreviated to fewer letters (shown below in bold).

Keyboard input is not echoed.

A colon followed by arguments will set the value.

Entering alphabetic characters (A-Z, a-z) will input text to encrypt/decrypt. Enter spaces for grouping.

Keyboard Keys in Model Mode

C - toggle clock mode

L - lamp test (turn on all displays and LEDs)

O - odometer, show total number of characters

T - toggle text to speech output

K - toggle the keyboard and rotor click sounds

M - toggle Morse code output

S - display serial number

V - show software version

Serial Port Commands

? Help, display list of available commands

!SETTINGS Show the current settings

!MODEL:[EN I|M3|M4] Display or set Enigma model.

!UKW:[UKWA|UKWB|UKWC|UKWBT|UKWCT] Display or set reflector.

!ROTOR:[1,2,3,4,5,6,7,8,G,B] Display or set rotor. Specify 3 or 4 rotors, depending on model.

!RING:[A,B,C,D] Display or set rotor rings. Specify 3 or 4 values, depending on model.

!PLUGBOARD:[AB CD EF GH] Display or set plugboard. Specify up to 13 letter pairs.

!START:ABC Display or set rotor start position. Specify 3 or 4 rotors, depending on model.

!GROUPSIZE:4|5|6 Display or set group size.

!SAVE:1-15 Save current settings. Settings 1-4 can be recalled by pressing the appropriate rotor button on powerup.

!LOAD:1-15 Load a saved setting.

!LOGLEVEL:0-2 Display or set log level. Higher levels display more information.

!TIME:hmmss Display or set real-time clock (hours, minutes, seconds).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

Arduino Nano Port Usage

Port	Type	Usage
D0	Digital/Serial	USB Serial Rx for programming
D1	Digital/Serial	USB Serial Tx for programming
D2	Digital/Int	Rotor 0
D3	Digital/Int/PWM	Rotor 0
D4	Digital	Rotor 1
D5	Digital/PWM	Rotor 1
D6	Digital.PWM	Rotor 2
D7	Digital	Rotor 2
D8	Digital	Sound module DO
D9	Digital/PWM	Sound module DI
D10	Digital/PWM/SPI	Rotor 3
D11	Digital/PWM/SPI	Rotor 3
D12	Digital/SPI	Sound module BUSY
D13	Digital/SPI	Buzzer (and Arduino LED)
A0	Digital/Analog	Decimal point control
A1	Digital/Analog	Decimal point control
A2	Digital/Analog	Decimal point control
A3	Digital/Analog	Decimal point control
A4	Digital/Analog/I ² C	I ² C SDA
A5	Digital/Analog/I ² C	I ² C SCL
A6	Digital/Analog	Big Red Button
A7	Digital/Analog	Mode switch

I²C Devices

Address	Device
0x00	Lamp/Keyboard HTK16K33 (U201)
0x20	Plugboard MCP23017 (U301)
0x21	Plugboard MCP23017 (U302)
0x68	DS3231 Real-Time Clock Module

Note: Addresses shown are defaults, but some can be changed using jumpers.

Example of Decrypting a Message

(taken from <http://enigmaworldcodegroup.freeforums.net/thread/75/enigma-challenge-2016>)

Encrypted message (Enigma model M3 with UKW B reflector):

[EWGC2016]

XTS WWK

YNUAL FXBLJ PVARC AUEFD IQKFE VYCXN FRBBE HJJAN JDCRI GMJZC MSTAL WFSPB
YUNFG UUDYL DZJIG XQCSK QPURI EKMVO PDWKG IXBLH RVLYQ LBAPT PWGNU UGINK
RWYYI IFCQC XZSRZ MDQBM JHUNY LVLXN OAEVZ WSVAT FTVZT YOECZ HEOTB UUAPG
UHIDK GMNGR ADTEO IISNA ZOHZC WJWNP HLCPH PBTOW

Entry from keysheet for 1 May 2016:

Tag	Walzenlage	Ringstellung	Steckerverbindungen	Kennguppen
01	I V III	24 21 05	AT BG CN EP FI HQ JS KZ OU XY	VWX YNU GUJ GGB

Set machine as follows:

Model: M3

Reflector: UKWB

Rotor: 1,5,3

Plugboard: AT BG CN EP FI HQ JS KZ OU XY

Rotor Rings: X U E (24 = X, 21 = U, 05 = E)

Set rotor positions to first key in message: XTS

Type second key of message: WWK, decrypts to JZU

Now set rotor positions to: JZU

Look at first group in message, YNUAL.

Confirm YNU is a valid keygroup for the day.

Ignore last two characters (AL).

Enter rest of message on keyboard:

FXBLJ PVARC AUEFD IQKFE VYCXN FRBBE HJJAN JDCRI GMJZC MSTAL WFSPB
YUNFG UUDYL DZJIG XQCSK QPURI EKMVO PDWKG IXBLH RVLYQ LBAPT PWGNU UGINK
RWYYI IFCQC XZSRZ MDQBM JHUNY LVLXN OAEVZ WSVAT FTVZT YOECZ HEOTB UUAPG
UHIDK GMNGR ADTEO IISNA ZOHZC WJWNP HLCPH PBTOW

Decrypts to:

WITHS OMEME SSAGE SCAPT UREDI NMAYO FNINE TEENF ORTYA SWEDI SHMAT
HPROF ESSOR SPENT TWOWE EKSTO DECIP HERED ANDRE VERSE ENGIN EERED ANEAR
LYVER SIONO FTHES IEMEN SANDH ALSKE TFIFT YTWOA LSOKN OWNAS THEGE HEIMF
ERNSC HREIB ERXWH ATWAS HISNA MEQUE STION MARKX

Adding spaces and punctuation:

WITH SOME MESSAGES CAPTURED IN MAY OF NINETEEN FORTY A SWEDISH MATH PROFESSOR
SPENT TWO WEEKS TO DECIPHERED AND REVERSE ENGINEERED AN EARLY VERSION OF THE
SIEMENS AND HALSKE T FIFTY TWO ALSO KNOWN AS THE GEHEIMFERNSCHREIBER. WHAT WAS HIS
NAME?

Serial port session for above:

!MODEL:M3

%MODEL:M3

!GROUPSIZE:5

%GROUP:5

!UKW:UKWB

%UKW: UKWB

!ROTOR:1,5,3

%ROTOR: I - V - III

!RING:X,U,E

%RING: - X U E

!PLUGBOARD:AT BG CN EP FI HQ JS KZ OU XY

%PLUGBOARD: AT BG CN EP FI HQ JS KZ OU XY

!START:XTS

%START: - X T S

WWK

>JZU

!START:JZU

%START: - J Z U

FXBLJ PVARC AUEFD IQKFE VYCXN FRBBE HJJAN JDCRI GMJZC MSTAL WFSPB

>WITHS OMEME SSAGE SCAPT UREDI NMAYO FNINE TEENF ORTYA SWEDI SHMAT

YUNFG UUDYL DZJIG XQCSK QPURI EKMVO PDWKG IXBLH RVLYQ LBAPT PWGNU UGINK

>HPROF ESSOR SPENT TWOWE EKSTO DECIP HERED ANDRE VERSE ENGIN EERED ANEAR

RWYYI IFCQC XZSRZ MDQBM JHUNY LVLXN OAEVZ WSVAT FTVZT YOECZ HEOTB UUAPG

>LYVER SIONO FTHES IEMEN SANDH ALSKE TFIPT YTHWA LSOKN OWNAS THEGE HEIMF

UHIDK GMNGR ADTEO IISNA ZOHZC WJWNP HLCPH PBTOW

>ERNSC HREIB ERXWH ATWAS HISNA MEQUE STION MARKX

Example of Encrypting a Message

Choose the daily keysheet to use. We'll use this one: http://meinenigma.com/EWCG_2017.html
This is for an Enigma M3. The current date is April 13, 2017 and the entry for today is:

Day	UKW	Rotors	Rings	Plugboard	Keygroup
13	B	V VIII I	11 05 15	BO CW DV EI GP HJ KX MR QU YZ	STL TEM MDJ RLQ

Model: M3

Reflector: UKWB

Rotor: 5,8,1

Plugboard: BO CW DV EI GP HJ KX MR QU YZ

Rotor Rings: K E O (11=K, 05=E, 15=O)

This is our plain text message to encrypt:

WHO PLAYED ALAN TURING IN THE 2014 FILM THE IMITATION GAME?

Split the plain text into five letter groups. Spell out numbers as characters and use the Enigma abbreviations for punctuation (X for period, ZZ for comma, and FRAGE or FRAQ for a question mark). Pad the end of the message with extra characters to fill out the last group.

WHOPL AYEDA LANTU RINGI NTHET WENTY FORT EENFI LMTHE IMITA TIONG AMEFR AQXXX

Choose two random three letter trigrams: JJT and VER.

The first trigram is the rotor start position, set them to JJT.

Type in the second trigram, VER, and note the result: GBG. This is the encrypted message key.

Set the rotor start positions to the second trigram, VER.

Type in the plain text message and note down the encrypted result:

CSJTO WFAFF EEQYX TQCED PFQOR ATBGC JFKSP CAAQV PUCVZ SDRAM LLBGL YQNXO EZTPW

Create the message header as follows:

- Start with [EWCG2017] if this is for the Enigma World Code Group
- The current time as 24 hour UTC, e.g. 2117
- How many parts in the message followed by tle, e.g. 1tle
- Which part this is, followed by tl, e.g. 1tl
- How many characters are in this part of the message: 65
- The randomly selected rotor start position: JJT
- The encrypted message key: GBG

Look at the daily keysheet key groups and pick one of the three letter trigrams: STL. Add two random letters: ZZ. This becomes the first group of the encoded message. This is the full encrypted message:

[EWCG2017]

2117 1tle 1tl 65 JJT GBG

STLZZ CSJTO WFAFF EEQYX TQCED PFQOR ATBGC JFKSP CAAQV PUCVZ SDRAM LLBGL YQNXO
EZTPW