

Magneti Marelli MIU G4 (M4G1)

For ASW-NEXT

Short User Manual



January 2022

Note:

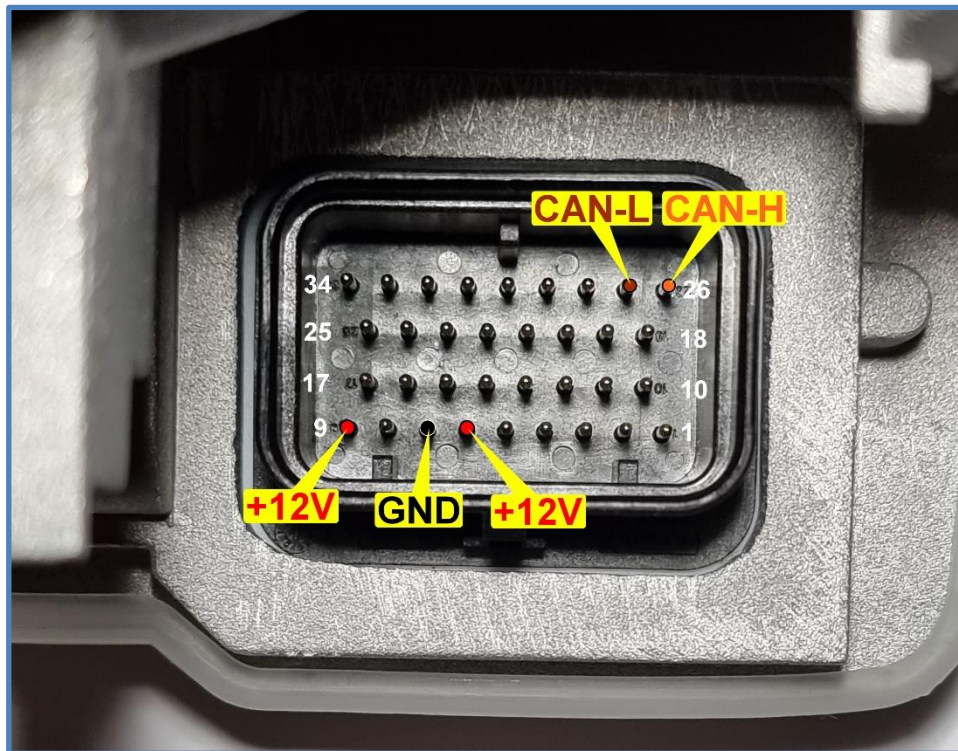
Key making procedures described in this document applies to MIUG4 used in scooters with regular key blade. Scooters with keyless immobilizer system (2021+) stores keys in the KEYLESS module, not in MIU G4 by itself. MIU G4 only holds ECU<>KEYLESS synchronization data.

Wiring diagram for MIU G4 basic connection is the same for both immobilizer types, except of missing output for LED control and missing input from transponder antenna when MIUG4 is used in KEYLESS immobilizer system. Power supply and CAN-BUS pins are at same positions.

EEPROM R/W by CAN-BUS is still possible for every type of MIU G4.

Immo-Tools.it

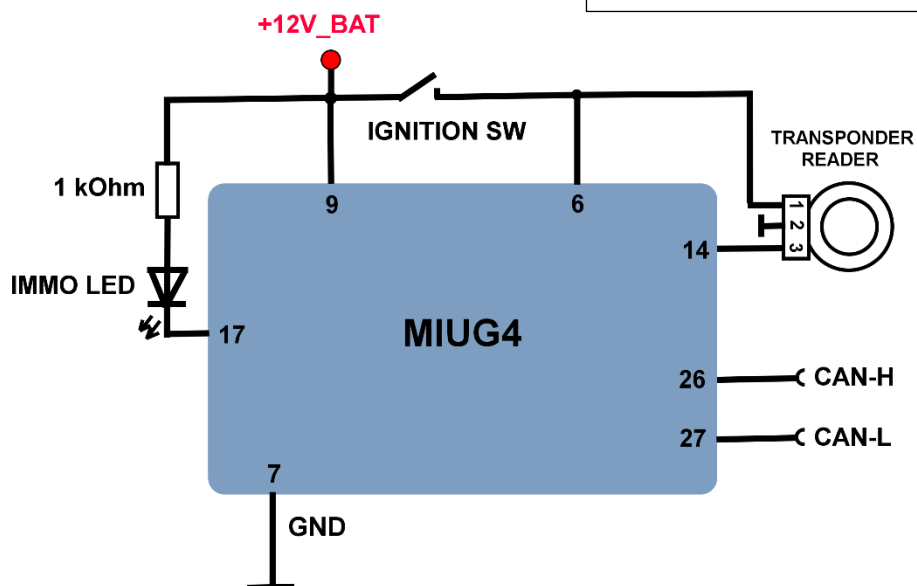
1. How to connect?



Antenna on the ignition lock



Transponder Reader (Antenna) pinout



NOTE: Transponder reader (antenna) must be mounted on the ignition lock when testing on-the-bench or in the scooter. Transponder cannot be read by without ignition lock being inside the antenna! IMMO LED will blink fault code 2 (KEY NOT DETECTED).

2. Transponder PCF7936

NOTE: Use PCF7936 transponder only! HITAG2 emulating transponders (TPX3/TPX4/CN2 or similar) are not accepted here as they do not support Read Only Modes!

NOTE: Transponder is ready to start engine. No EEPROM modification in MIUG4 is required.

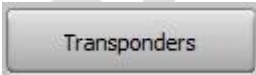
Genuine key for scooter with **MIU G4** has **PCF7936** configured to **Read Only Mode ISO 11784/5**. To select this mode use **Hitag2 programmer** and set transponder configuration bits in TMCF as follows:

MS1 = 0
MS0 = 0

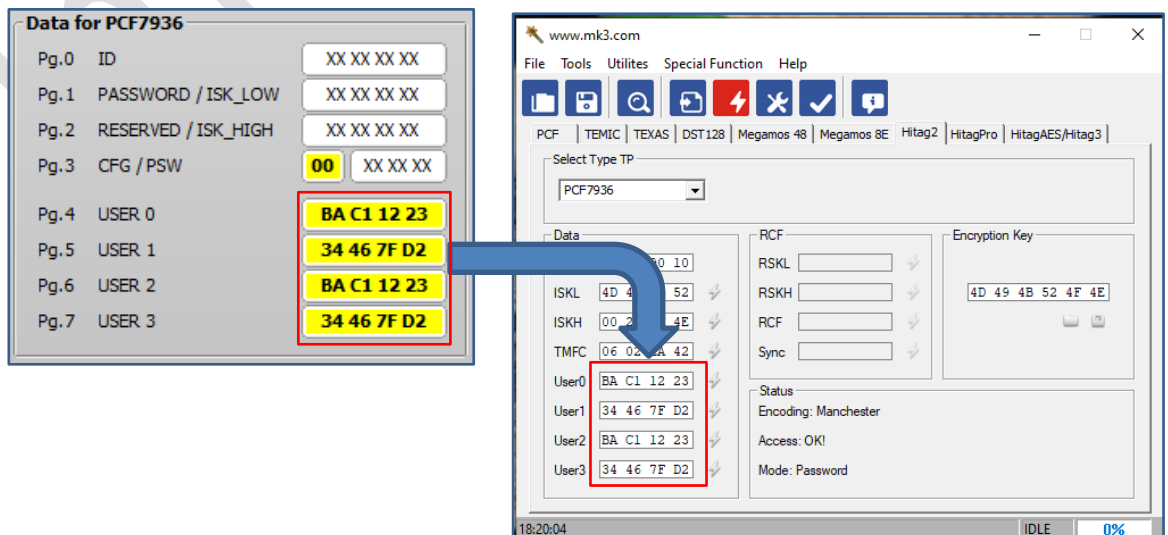
NOTE: Older or cheap Hitag2 programmer does not accept modification of MS0 / MS1. For example Zed-Bull is not suitable for MIU G4 key making to PCF7936!

Transponder will be rejected by MIU G4 without configuration of MS0 = 0 / MS1 = 0

PCF7936 programming steps:

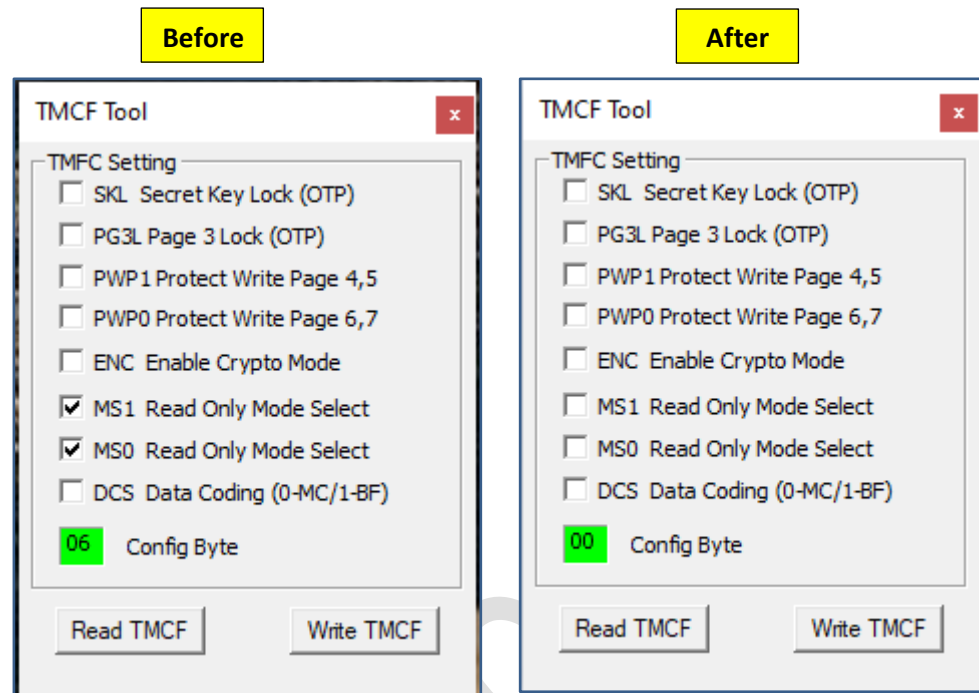
- Make sure **PCF7936** is blank. Set factory default password / encryption key in the Hitag2 programmer (4D 49 4B 52 4F 4E).
- Read EEPROM from **MIUG4** by CAN-BUS or open EEPROM dump
- Press button  to decode transponder data
- Write data from four yellow fields **USER0-USER3** in the transponder dialog
- to the fields **USER0, USER1, USER2, USER3** of Hitag2 programmer.

Program these fields one by one to PCF7936.



The image shows two screenshots from the Hitag2 programmer software. The left screenshot, titled "Data for PCF7936", displays a list of fields for programming. Fields Pg.4 (USER 0), Pg.5 (USER 1), Pg.6 (USER 2), and Pg.7 (USER 3) are highlighted in yellow and contain the hexadecimal values BA C1 12 23 and 34 46 7F D2 respectively. The right screenshot shows the main programming interface with the "Select Type TP" dropdown set to "PCF7936". The "Data" section shows the same four user fields (User0 to User3) with the same hexadecimal values. A blue arrow points from the yellow fields in the left screenshot to the corresponding fields in the right screenshot. The "Encryption Key" field is set to 4D 49 4B 52 4F 4E. The "Status" section shows "Encoding: Manchester" and "Access: OK!".

- Go to transponder configuration menu in Hitag2 programmer and **clear all bits**. It may look different for various Hitag2 programmers but main idea is the same. Example illustrates configuration menu in MK3, please find out by yourself how it looks in your particular Hitag2 programmer.



- Write configuration **00** to transponder. From this point **PCF7936**, configured in such way, will be recognized by universal transponder programmer as **TEMIC11**.


NOTE: Proceed with transponder configuration change to Read Only Mode only after user pages USER0-USER3 have been programmed with key data, extracted from MIUG4 EEPROM.

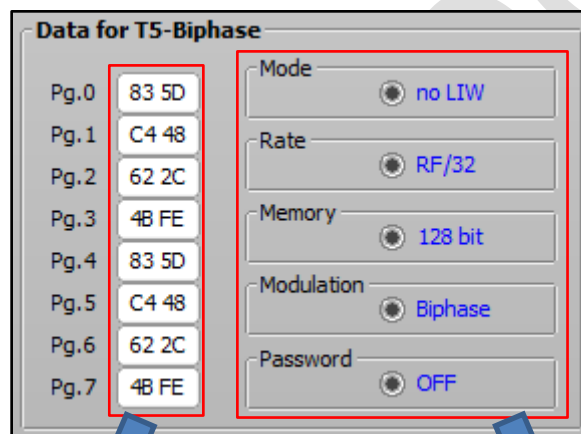
In other words, program USER0-USER3 right before setting transponder configuration to "00".

3. Transponder T5

NOTE: Transponder is ready to start engine. No EEPROM modification in MIUG4 is required.

MIUG4 uses transponder data encoded in **BiPhase**. The fact that regular **T5-11** is encoded in **Manchester** does not allow us to use a basic **T5** programmer. Solution is to program data into **T5** in extended configuration mode where **BiPhase** encoding can be selected. Most of modern transponder programmers have extended configuration for **T5**.

- Read EEPROM from **MIUG4** by CAN-BUS or open EEPROM dump
- Press  button to decode transponder data
- Select „**T5 Configuration**“ in your transponder programmer
- Write data from <**Data for T5-Biphase**> to **T5** programmer and set configuration bits in every configuration category as specified.



Data for T5-Biphase

| | |
|------|-------|
| Pg.0 | 83 5D |
| Pg.1 | C4 48 |
| Pg.2 | 62 2C |
| Pg.3 | 4B FE |
| Pg.4 | 83 5D |
| Pg.5 | C4 48 |
| Pg.6 | 62 2C |
| Pg.7 | 4B FE |

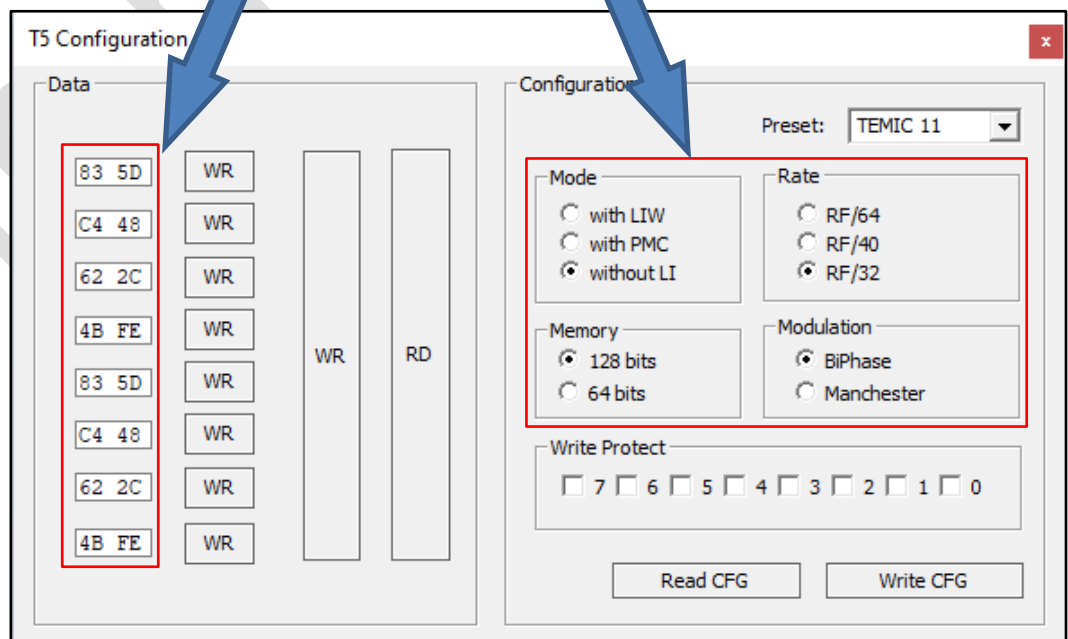
Mode: no LIW

Rate: RF/32

Memory: 128 bit

Modulation: BiPhase

Password: OFF



T5 Configuration

Preset: TEMIC 11

| | | | |
|-------|----|----|----|
| 83 5D | WR | WR | RD |
| C4 48 | WR | | |
| 62 2C | WR | | |
| 4B FE | WR | | |
| 83 5D | WR | | |
| C4 48 | WR | | |
| 62 2C | WR | | |
| 4B FE | WR | | |

Mode: with LIW with PMC without LI

Rate: RF/64 RF/40 RF/32

Memory: 128 bits 64 bits

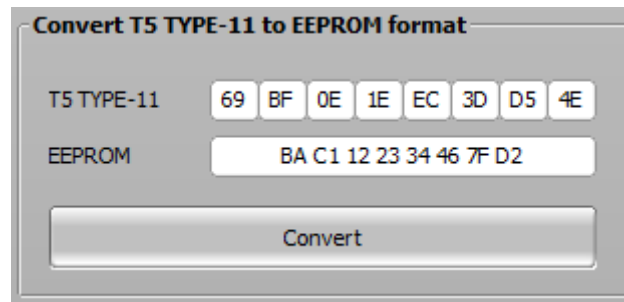
Modulation: BiPhase Manchester

Write Protect: 7 6 5 4 3 2 1 0

Read CFG Write CFG

4. Convert T5 TYPE-11 to EEPROM format

Because of differences in encoding (Manchester / BiPhase), data is represented in the wrong way when key with **PCF7936** was read as **T5-11** using universal transponder programmer. Readout from ZedBull, Tango, TagKeyTool or any other universal programmer can be converted to EEPROM format with a header „**BA C1**“. **Please note, that under certain specific circumstances conversion may be inaccurate.**



Convert T5 TYPE-11 to EEPROM format

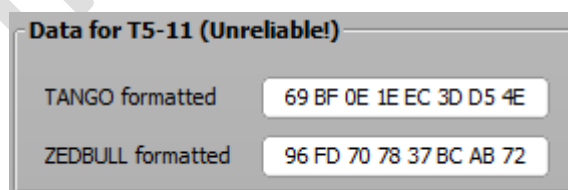
T5 TYPE-11: 69 BF 0E 1E EC 3D D5 4E

EEPROM: BA C1 12 23 34 46 7F D2

Convert

5. Data for T5-11 (Avoid of using if possible – inaccurate)

It is absolutely recommended to program key data from **EEPROM** of **MIUG4** to **PCF7936** or **T5-BiPhase** transponder, **not to the T5-11**. But if the only programmer you got is a basic **T5** programmer, you can **try** to make regular **T5-11** from data, previously converted to **pseudo-BiPhase**. Software of MIUG4 programmer provides two representations of **pseudo-BiPhase** – for Tango (or compatible) and for ZedBull (or compatible).



Data for T5-11 (Unreliable!)

TANGO formatted: 69 BF 0E 1E EC 3D D5 4E

ZEDBULL formatted: 96 FD 70 78 37 BC AB 72

NOTE: Depending on binary combination in the input data, sometimes it is impossible to calculate data for T5-11. Message “Can’t encode” is displayed in that case. Please use PCF7936 or T5-BiPhase then.

6. Modify key value in EEPROM

- Select key position to modify
- Change key value to desired. Please note, that only key value with header „BA C1 XX XX XX XX XX“ or all FF’s is accepted here. Transponder data of old type with header „BE FA“ is rejected by MIUG4.
- Press <Transfer selected key to EEPROM Dump>. Key value is transferred to EEPROM dump and CRC is re-calculated.
- Close transponder dialog window and press <Write EEPROM 95640>.

Keys in EEPROM

Master Key BA C1 12 23 34 45 B8 2E

Slave #1 FF FF FF FF FF FF FF FF

Slave #2 FF FF FF FF FF FF FF FF

Slave #3 FF FF FF FF FF FF FF FF

Slave #4 FF FF FF FF FF FF FF FF

Slave #5 FF FF FF FF FF FF FF FF

Slave #6 FF FF FF FF FF FF FF FF

Slave #7 FF FF FF FF FF FF FF FF

Only [BA C1] in header

Re-Calculate Transponder from Selected Key

Transfer Selected Key to EEPROM Dump

7. Reset MIUG4 to VIRGIN

- One by one set value of every key to FF’s to reset MIUG4 to VIRGIN: Write FF FF FF FF FF FF FF FF to selected key field and press <Transfer Selected Key to EEPROM Dump>. Repeat for all keys. CRC is re-calculated on every transfer.
- Close transponder dialog window and press <Write EEPROM 95640>.