

MIKROE



CODEGRIP
for ARM® Cortex®-M MCUs

USER MANUAL

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Time saving embedded tools



CODEGRIP
USB / WIFI PROGRAMMER & DEBUGGER

POWER
USB-LINK
NET-LINK
ACTIVE
DATA

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CODEGRIP is a unified solution, designed to perform programming and debugging tasks on a range of different microcontroller devices (MCUs) based on the ARM® Cortex®-M architecture. By bridging differences between various MCUs, it allows a huge number of MCUs from several different MCU vendors to be programmed and debugged. Although the number of supported MCUs is absolutely huge, more MCUs might be added in the future, along with some new functionalities.

Thanks to some advanced and unique features such as wireless connectivity and USB-C connector, the task of programming of a huge number of various ARM® Cortex®-M

based microcontrollers becomes seamless and effortless, providing users with both the mobility and the complete control over the microcontroller programming and debugging process. The USB-C connector offers improved performance and reliability, compared to traditionally used USB Type A/B connectors. Wireless connectivity redefines the way the development board can be used.

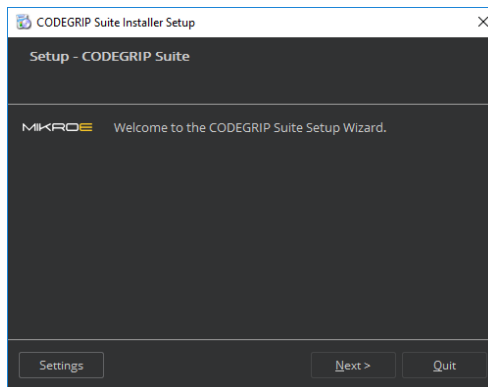
The graphical user interface (GUI) of the CODEGRIP Suite is clear, intuitive, and easy to learn, offering a very pleasant user experience. The embedded HELP system provides detailed guidelines for every aspect of the CODEGRIP Suite.

1. Installing CODEGRIP Suite

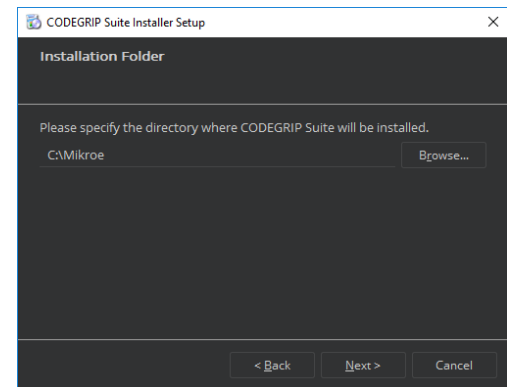
The installation process is easy and straightforward.

Download CODEGRIP Suite software application from the link www.mikroe.com/setup/codegrip and follow the steps below.

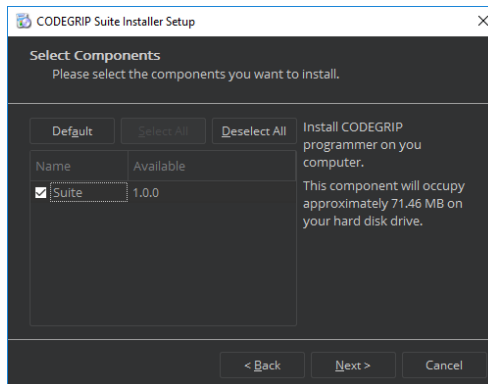
1. Start the installation



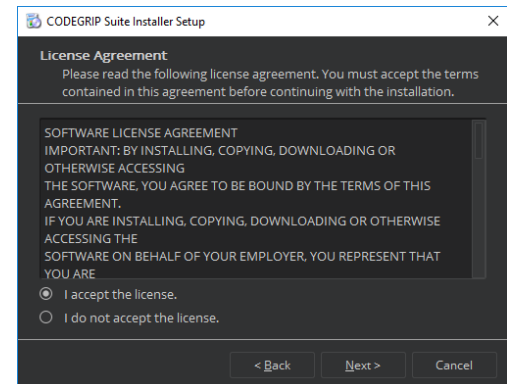
2. Select the destination folder



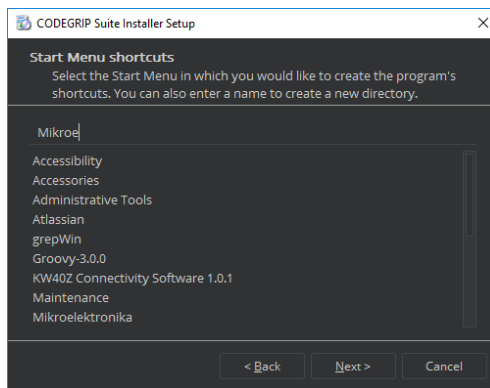
3. Select the components to install



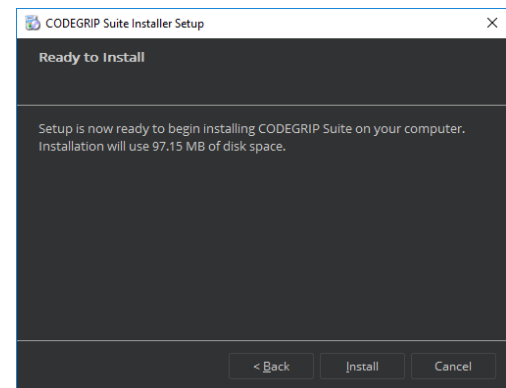
4. License agreement



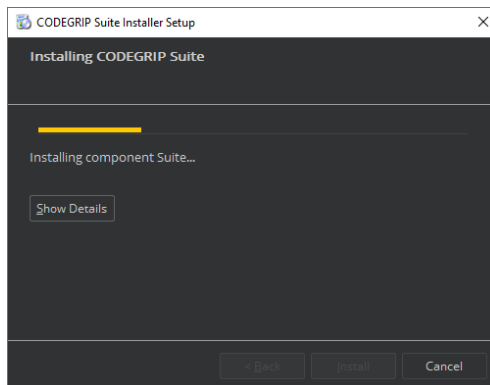
5.
Select the
start menu
shortcuts



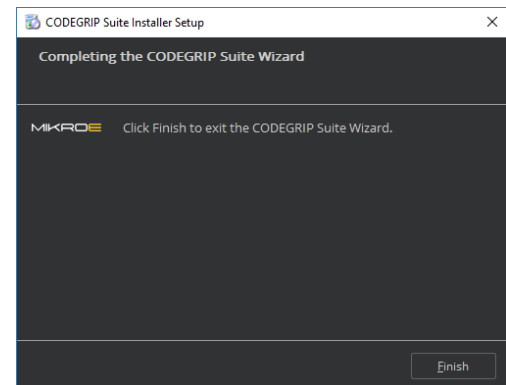
6.
Start the
installation
process



7.
Installation
progress



8.
Finish the
installation
process



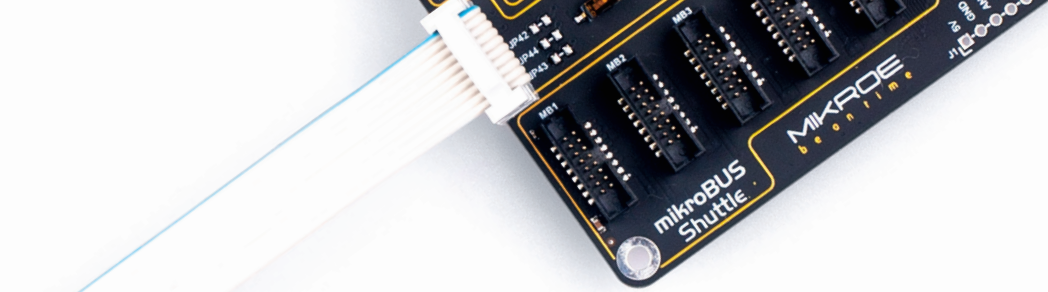
2. CODEGRIP

The CODEGRIP device offers a set of unique and innovative functionalities, some of which have never been used before on a similar device. These functionalities include wireless programming and debugging, power monitoring, advanced debugging options with the SWD support, and more.

The CODEGRIP device comes in two different types: as a stand-alone device and an integrated on-board module. This manual will be focused on the stand-alone CODEGRIP device.

In order to better understand how this device is operated, this chapter will give you a brief overview of its basic hardware functions.





2.1 USB connectivity

The USB-C connector is the latest upgrade of the conventional USB A/B type connectors, typically found on most personal computers today. The USB-C connector has many advantages over the USB type A/B connector such as the completely symmetrical design which reduces the possibility of the connector misalignment and the damage it might cause, higher current capability, and more. However, if there is not appropriate USB-C connector on the host PC, a USB-C cable adapter can be used.

2.2 WiFi connectivity

The CODEGRIP device can be linked with the CODEGRIP Suite over the WiFi network, allowing it to program and debug the target MCU wirelessly. This is a revolutionary new feature, which allows some unique usage scenarios, currently not available on any other programming/debugging solution in the world. The WiFi connectivity option offers a complete autonomy of the development system. Running a toxic gas sensor application while debugging the firmware in real time, programming it with a new firmware during exposure, having sensor responses collected and logged remotely

from several different base points, debugging drone firmware while it is in mid-air... This is just a simple example of what CODEGRIP can offer.

The WiFi module on the CODEGRIP device has an integrated chip antenna, which allows good WiFi reception. However, if a stronger WiFi signal is required, the CODEGRIP device offers an SMA connector for an external WiFi antenna.

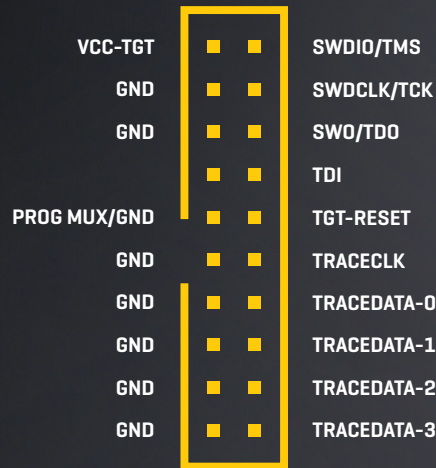
The WiFi link can be protected by a password, or by the MAC address filtering option.

To use the WiFi functionality, a separate registration code is required. It can be bought from the official Mikroë online store www.mikroe.com

NOTE

2.3 Target connector

The CODEGRIP device can be used with any hardware, equipped with the standard JTAG/SWD programming header. Packed in a sturdy casing with rubber feet, it can be used independently, bringing all the powerful features to a third-party hardware.



The CODEGRIP device is equipped with the target MCU connector, which contains JTAG/SWD and power supply pins. This connector is used to interface the CODEGRIP device with the target MCU, allowing it to perform programming and debugging operations, to provide the power supply for the target MCU, and to be used as the power input when the CODEGRIP device is powered from the connected development board.

NOTE When the connected host board provides power to the CODEGRIP device, CODEGRIP input voltage must be in range 2.5V to 10V.

On the bottom of the CODEGRIP device there is the sticker which contains additional information.

- Supported MCU family/architecture
- Unique serial number
- Unique WiFi MAC address



CODEGRIP firmware

The CODEGRIP device is based on the powerful 32-bit MCU, which utilizes a complex firmware to provide all the required functionalities. The firmware will be continuously improved so that additional optimizations, functions, and support for new MCU families might be added in the future. Therefore, the complete CODEGRIP programming environment is designed so that the firmware upgrade process is effortless and easy.

2.4 CODEGRIP adapters

JTAG/SWD programming/debugging headers may vary across different hardware applications. To ensure compatibility with various header configurations there is a set of different adapters available as an additional purchase option.





CODEGRIP Suite

Selected Device: CODEGRIP

MK64FN1M0xxx12

Vendor: NXP Flash Size: 1024 kB
Protocol: SWD Connection: Normal
Speed: 500 kHz Reset Type: Hardware Reset

Source: Led_Blinking.hex

DETECT	RESET
WRITE	VERIFY
READ	FLASH
ERASE	BLANK

Erasing MCU...
Writing MCU...
Verifying...
Write operation done and verified.



2.5 LED indicators

There are five LED indicators on the CODEGRIP device, used to indicate different states of the device, providing visual feedback to the user.



3. CODEGRIP link structure

CODEGRIP Suite can detect multiple CODEGRIP devices. In addition, a single CODEGRIP device can be operated by multiple software applications. To avoid any ambiguity, CODEGRIP utilizes the concept of links.

CODEGRIP Suite uses a link to the specific CODEGRIP device, in order to send commands and receive responses. The link can be created, opened, and destroyed by the user, employing some specific functions of CODEGRIP Suite.

Based on the link and its state, CODEGRIP Suite can always unambiguously know which CODEGRIP device to use, and if the specific CODEGRIP device is currently available. A single CODEGRIP device can have links to multiple CODEGRIP Suite applications, while CODEGRIP Suite can have a link to only a single CODEGRIP device at time. Still, it can easily switch the link to any CODEGRIP device detected during the scanning process.

3.1 Link types

Depending on what type of interface is used to establish the link, there are two types of links available: the USB link, and the WiFi link.

NOTE *USB link is the primary link and it has the highest priority. Some operations, such as the firmware update, are exclusively used with the USB link. When the USB link is active, all the WiFi links to that specific CODEGRIP device will be forced to a closed state.*

3.2 Link states

Each link has several different states recognized by the CODEGRIP Suite.

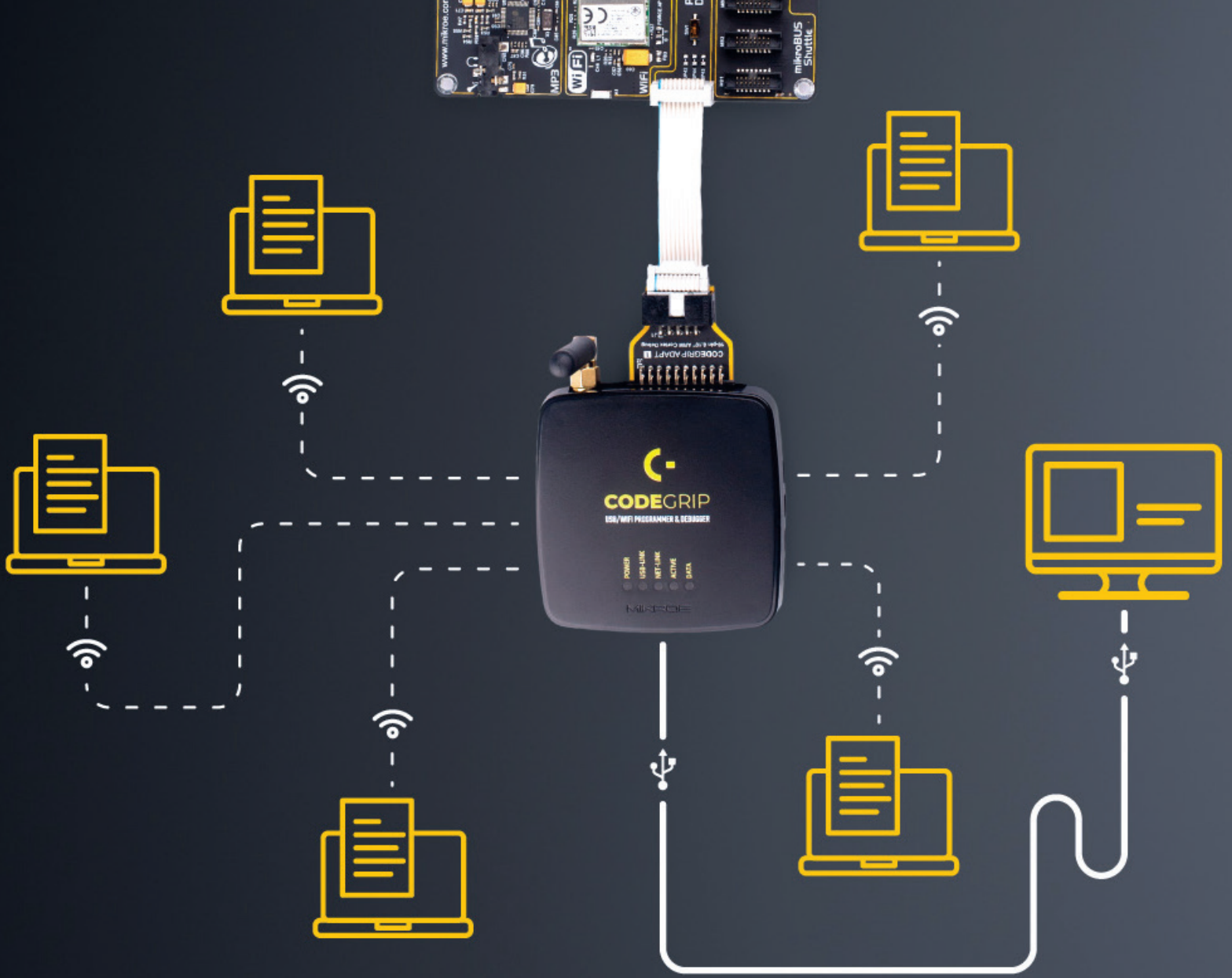
The link is **Closed**: the CODEGRIP device is not available over the communication interface [USB or WiFi]. Either it is disconnected, nonresponsive, turned OFF, or otherwise unavailable.

The link is **Available**: the CODEGRIP device is available over the communication interface [USB or WiFi]. Communication packets can reach the CODEGRIP device, and it is able to send back the response.

The link is **Blocked**: this state indicates that the link was blocked because the specific CODEGRIP device is busy servicing another link.

When CODEGRIP Suite actively uses the link for issuing commands to a linked CODEGRIP device, other applications linked to the same CODEGRIP device will have their links in a blocked state. As soon as the task is complete, those links will revert to the available state.

The indicator showing the current state is visible at the status bar at the bottom of the Suite. More detailed description about the Shortcut bar commands find in the Chapter 4.



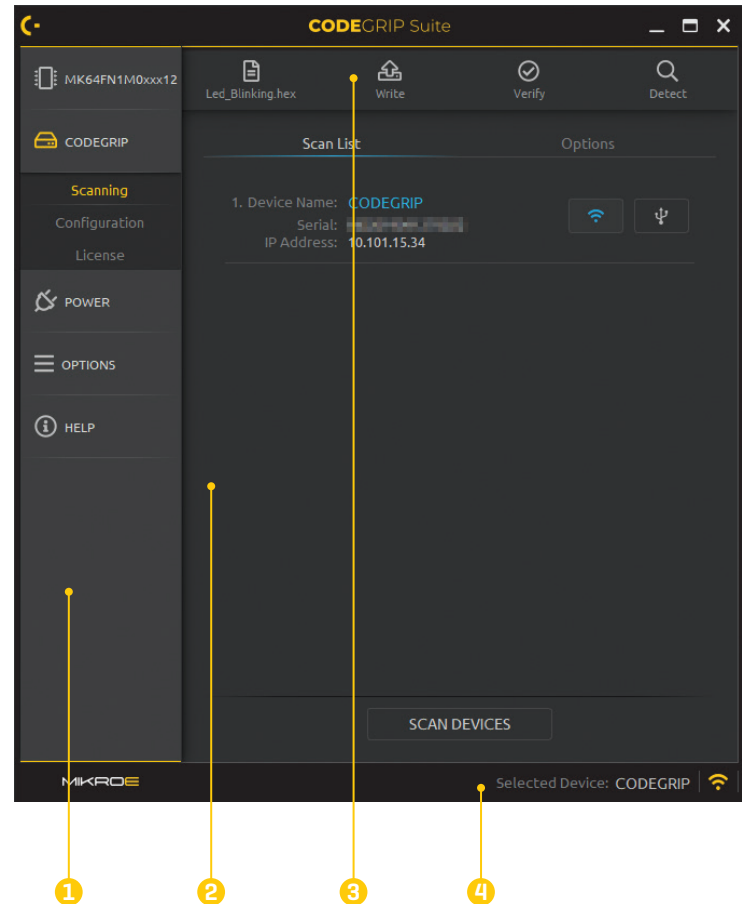
4. CODEGRIP Suite overview

The graphical user interface (GUI) of CODEGRIP Suite is clear, intuitive, and easy to use, which ensures a fluid workflow. The main window is divided into several sections, which are used to display and organize all information, tools, and options in a consistent and comprehensible manner.

Besides the very informative Help system, CODEGRIP Suite also offers a short description for the most of its functionalities in a form of a hovering tooltip. It is enough to keep the mouse hovering above the specific graphical element for a while, and a small tooltip will pop up, providing some basic info.

The following chapter explains the GUI layout and its main elements. GUI of the CODEGRIP Suite can be divided into several sections:

- 1. Menu section**
- 2. Menu Item section**
- 3. Shortcut bar**
- 4. Status bar**



4.1 Menu section

As already mentioned, all *Menu buttons* are located in the *Menu section* **[1]** of the CODEGRIP Suite GUI. By clicking a *Menu button*, one or more *Menu items* are unfolded. *Menu items* are grouped by the type of the function they are related to. For example, clicking the CODEGRIP *Menu button* will unfold *Scanning*, *Configuration*, and *License Menu items*. All these *Menu items* are related to configuring and working with CODEGRIP devices, and therefore they are grouped under the CODEGRIP *Menu button*.

4.2 Menu item section

When a *Menu item* is clicked, the *Menu item section* **[2]** will display all the GUI elements available for that specific *Menu item*. For example, if the *Programming Menu item* is clicked, the *Menu item section* of the GUI will show some basic information about the target and controls for MCU programming tasks. Each *Menu item* will display its own set of GUI elements in the *Menu item section* of the GUI interface when clicked.

4.3 Shortcuts bar

The *Shortcuts bar* **[3]** is another persistent section of the CODEGRIP Suite GUI, containing controls for the most commonly used commands. It appears on the top of the *Menu item section*, just below the title bar. The only *Menu item* that does not include the *Shortcuts bar* is the *Programming Menu item* since all the shortcut commands are already included there.

Icons on the *Shortcuts bar* are used to speed up the workflow, providing easy access to a set of commands from within any *Menu item* of CODEGRIP Suite. This is basically a set of commands otherwise found under the *Programming Menu item*, including the most commonly accessed CODEGRIP commands: **WRITE** *command*, **DETECT** *command* and **VERIFY** *command*, along with the interface used to select .hex or .bin file.

More detailed description about the Shortcut bar commands find in the Chapter 5.

4.4 Status bar section

The *Status bar* [4] is located at the very bottom of the GUI and it is used to provide persistent visual feedback about the CODEGRIP link status. A set of indicators along with a related text field allowing the user to always know the status of the CODEGRIP link.



Selected Device: This text field is used to either display the name of the CODEGRIP device which is currently linked to CODEGRIP Suite. If the link has been destroyed by the user, or has not been created yet, the message “None” will be displayed instead. Hovering the mouse above the message will highlight it (yellow), indicating that it is clickable.

Two actions will be performed when clicking the message in the *Selected Device* field:

- If the message “None” is displayed, the *Scanning Menu item* will be activated if clicked.
- If there is a CODEGRIP device name displayed in this field, the *Configuration Menu item* will be activated if clicked.

Link status indicator: provides visual feedback about the status of the link. When working with multiple devices, it is sometimes useful to have visual indication of the device which is currently linked with the CODEGRIP Suite. When the *Link status* indicator is clicked, the linked device will respond by blinking its ACTIVE LED.

Color-coding scheme examples:



the link is closed



the link is available



the link is blocked

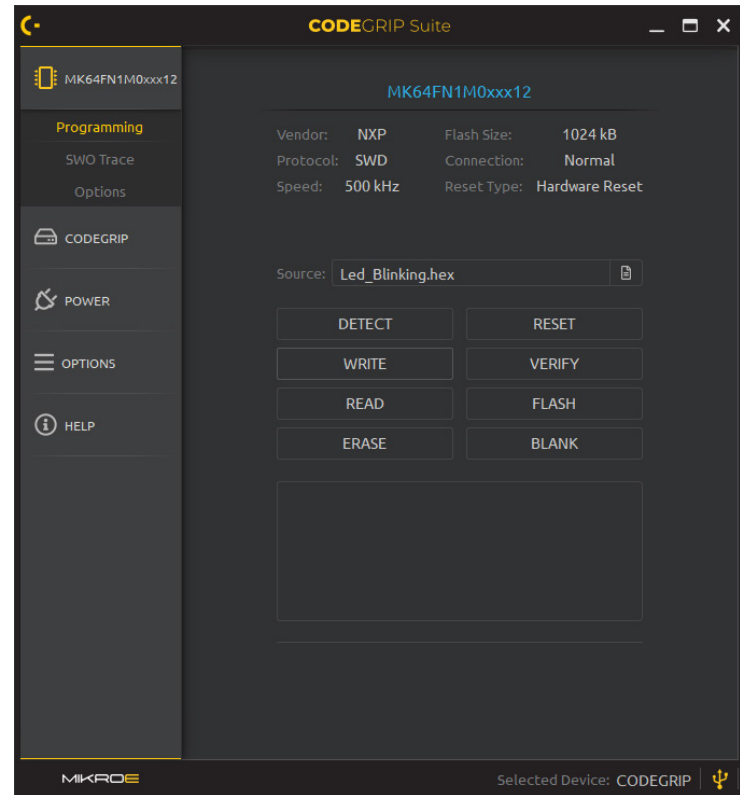
Update availability indicator: As a part of the startup procedure, CODEGRIP Suite checks if there is a software update available. If a new update is available, it will display a notification icon on the status bar, indicating that there is a new version of CODEGRIP Suite available for download. This notification icon can be suppressed by configuring the options found in the *OPTIONS/General Menu item*.

5. CODEGRIP Suite explained

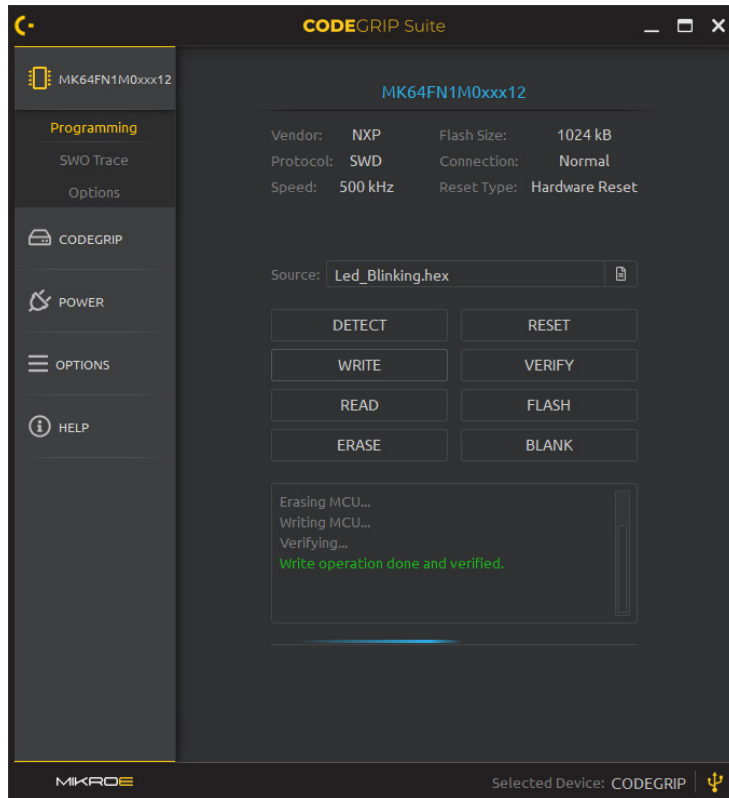
As already mentioned, each *Menu button* contains one or more related *Menu items*, and each *Menu item* contains its own set of tools and options, displayed in a form of various GUI elements on the *Menu item section*. This chapter provides detailed information on these tools and options.

5.1 Target MCU

Menu items used to interact with the target MCU (the selected MCU upon which the CODEGRIP device performs various programming/debugging tasks) are folded under this *Menu button*. The *Menu button* is labeled dynamically, according to the selected target MCU. This allows the user to always be aware of which MCU is set as the target MCU, regardless of the currently selected *Menu item*. There are three *Menu items* available, folded under this *Menu button*: *Programming*, *SWO Trace* and *Options*.



5.1.1 Programming



the selected MCU vendor, the programming protocol, connection speed, the flash size of the target MCU, the connection type, and the reset type.

Below is the interface used to select and display the program file *.bin* or *.hex* file, ready to be uploaded to the target MCU or examined by using a set of options, accessible by clicking the *FLASH* button.

There is also the programming interface, composed of a set of buttons, used to perform various programming commands. These commands will be explained in this chapter.

On the bottom of the *Menu item section*, there is a panel which displays different status messages during the programming process, along with the progress bar. Each command returns a message response and displays it on this panel. In general, messages displayed with green letters indicate a successful execution, while messages displayed with red letters indicate an error during the execution of specific command.

Troubleshooting steps required for resolving of issues reported during the execution of the programming commands are listed at the end of this manual, in the Troubleshooting section.

The *Programming Menu item* displays all the commands, parameters, and other information, related to the programming process itself.

When the *Programming Menu item* is clicked, a quick summary of the selected programming options is displayed on the top of the *Menu item section*, grouped under a label which displays the name of the target MCU:

SOURCE

The name of the currently loaded *.hex* or *.bin* file is displayed in this field. This file contains the program data that will be uploaded to the target MCU. Next to this textbox is a browse button, which opens a file selection dialog window, used to browse the *.hex* or *.bin* file.

The source file selection dialog window can also be opened by using the keyboard shortcut [Ctrl+O]. Finally, the drag & drop functionality from the host OS is also supported by CODEGRIP Suite.

The right-click menu is supported. There are *Copy File Name*, *Copy Full Path*, and *Remove File* options.

The content of the loaded source file can be viewed using the FLASH button.

DETECT button

DETECT button is used to verify the MCU.

RESET button

RESET button will perform a reset of the target MCU.

WRITE button

WRITE button performs programming of the target MCU. It will upload the program from the loaded source file to the target MCU, using the programming protocol, speed and other parameters found in the *TARGET/Options Menu item*. Before memory is written, the target MCU flash will be erased.

VERIFY button

VERIFY button is used to compare the content of the loaded source file with the content of the target MCU memory.

ERASE button

The *ERASE button* is used to erase the entire flash memory content of the target MCU.

BLANK button

The *BLANK button* is used to verify the status of the target MCU memory. If memory is blank [i.e. memory was erased by the *ERASE* command], an appropriate message will be displayed.

The functionality of these commands can be further adjusted by configuring the Verification Type settings, found in the OPTIONS/General Menu item.

NOTE

READ button

READ button performs a reading of the target MCU flash memory content. The content of the memory is then available for the FLASH button related functions.

FLASH button

FLASH button opens the *Memory View* window which displays the table view of the memory content. There are two tabs in this window: **Memory View** and **Loaded Source**. The *Memory View* tab displays the target MCU memory content. The *Loaded Source* tab displays the content of the loaded .bin or .hex source file. Note that if there is no source file loaded, the *Loaded Source* tab will reflect this condition by changing its label to “File is not loaded”.

Cell size can be configured to show 8-bit, 16-bit or 32-bit data per cell, by using the three buttons on the bottom of the *Memory View* window, labeled X1, X2, and X4.

The last column displays the data converted to ASCII characters.

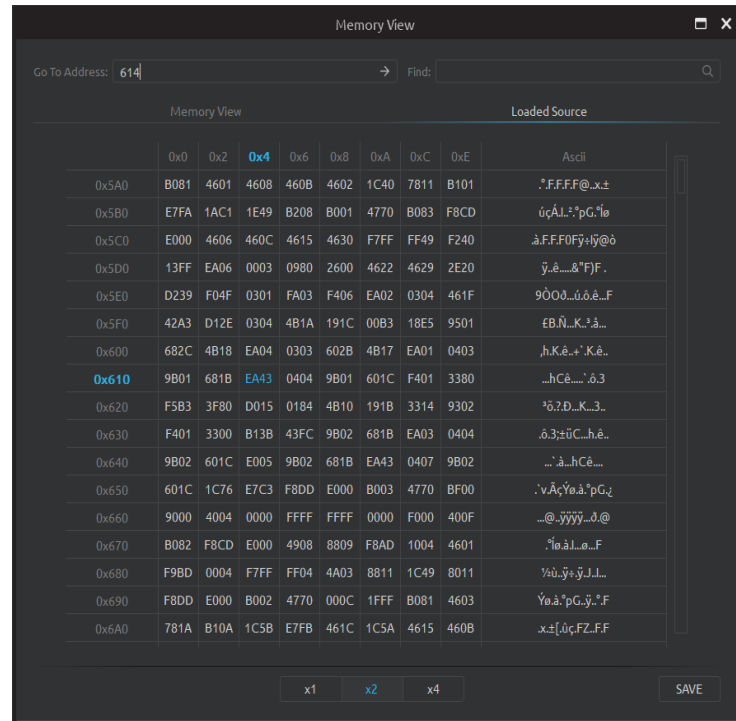
Data listed on both the **Memory View** and **Loaded Source** tabs can be exported as a .bin or .hex file. Clicking the SAVE button located on the bottom right corner of the *Memory View* window will open a new file dialog, allowing to enter the filename and the path for the exported file.

Goto Address

By using the text box, you will jump to your specify memory location. If the specified value is not a valid address, the corresponding action will be disabled.

Find

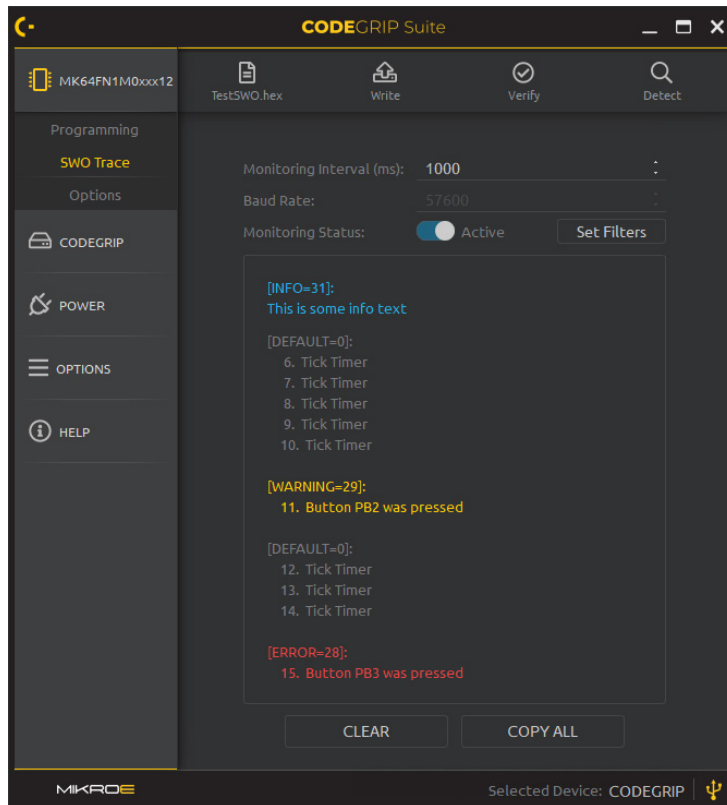
This function is used to search for an occurrence of the value specified in the textbox.



The length of the search value should match the selected cell size. If data length for the search pattern is not valid, the Find button will be disabled.

NOTE

5.1.2 SWO Trace



SWO (Serial Wire Output) trace is used to display various SWO-related messages in the Menu item section of the CODEGRIP Suite. The ARM SWO trace port uses a single pin to stream out data packets over 32 different ports, using the specified clock rate. The SWO is a part of the ARM® CoreSight Debug module which is incorporated in most of the MCUs based

on the Cortex®-M3, M4, and M7 core. It is perfectly suited to output debug and runtime information and monitor the performance of the application in real time, without using processing resources, and without the need for complex coding routines.

To simplify working with the SWO trace port, Mikroe has provided the SWO library with ready-made functions, which can drastically speed up the software development. The library is available for download from the Libstock at libstock.mikroe.com

Monitoring Interval

The monitoring interval can be specified in this text field. The collected SWO messages will be displayed on the lower part of the *Menu item* section after the specified monitoring interval expires. If the internal buffer becomes full, an overflow error message will be displayed. In that case, the monitoring interval should be decreased.

Baud Rate

The baud rate of the SWO Trace clock can be specified in this text field. It needs to be matched with the baud rate used in the SWO software, running on the target MCU. Otherwise, SWO data might get corrupted and the messages might not be displayed at all. To change the baud rate, the *Monitoring Status* needs to be paused.

Monitoring Status

Options: *Paused*, *Active*

When *Paused*, the SWO trace messages will not be collected and displayed on CODEGRIP Suite GUI. When set to *Active*, the SWO monitoring will be resumed.

Set Filters

This button opens a new window, which contains five checkboxes, used to manage the incoming SWO messages. There are three message categories, depending on the SWO port they are sent through: *Info*, *Warning*, and *Error* messages. When the specific checkbox is ticked, messages corresponding to that category will be displayed.

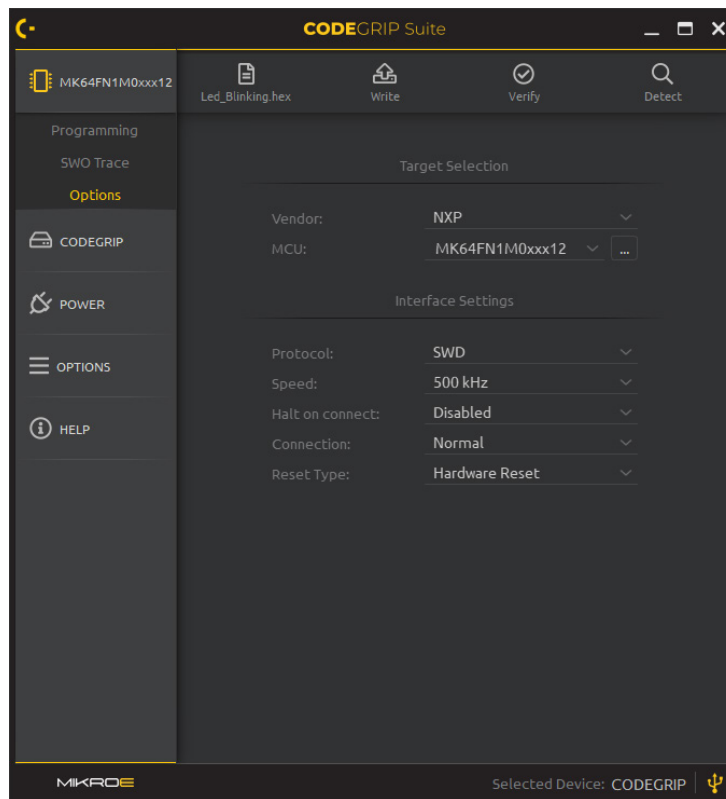
The categories are color-coded. Info messages are displayed with the light blue letters, Warning messages are displayed using the yellow color, while the Error messages are displayed in red.

The *Default* category is used to manage messages sent over any other SWO port that is not either *Info*, *Warning*, or *Error* port. These messages are displayed in grey color.

The last checkbox labeled as *Port* is used to show or hide the port number and the category of the specific incoming message. If multiple messages are received over the same port, the port number and the category message will be displayed only before the first message, respecting the previously explained color coding scheme.

NOTE To use the SWO Tracing, the programming protocol must be set to SWD. Not all ARM® MCUs support the SWO Trace. For more information about the SWO Trace capabilities, please consult the datasheet or the reference manual of the used MCU.

5.1.3 Options



The *Options Menu* item displays a set of options, which are used to select and configure the target MCU.

Vendor

Options: *a list of supported MCU vendors.*

The *Vendor* dropdown menu allows the MCU vendor to be selected. If *All* is selected the vendor filtering will not be applied.

MCU

Options: *a list of all the supported MCUs from the selected vendor.*

This dropdown menu allows the target MCU to be selected. It contains a list of MCUs available from the selected vendor.

Typing in this textbox will dynamically filter the MCU list, showing only the MCU names containing the characters typed so far.

Protocol

Options: *SWD, JTAG*

This dropdown menu is used to select the programming protocol. Note that the *SWD* programming protocol must be selected when using the SWO Trace.

Speed

Options: *500 kHz, 1 MHz, 2 MHz, 3 MHz, 4 MHz*

This dropdown menu allows the link communication clock frequency [communication speed] to be selected.

Halt on Connect

Options: *Disabled, Enabled*

This option is used to pause [halt] the execution of the program on the target MCU.

If *Enabled*, the MCU software execution will be halted after the connection

to the target MCU is established.

If *Disabled*, the program will continue running on the target MCU freely, regardless of the connection.

Connection

Options: *Normal, Under Reset*

The *Normal* option will set CODEGRIP Suite to attempt the detection of the target MCU, without modifying the state of the RESET line.

The *Under Reset* option will set CODEGRIP Suite to hold the target MCU in reset whenever the connection is attempted.

Reset Type

Options: *Hardware Reset, System Reset, Vector Reset*


There are typically three types of reset on the ARM® core-based MCUs: *Hardware Reset*, *System Reset*, and *Vector Reset*. However, there are some specific MCUs that have these options implemented differently. For a detailed explanation of the reset options, please consult the datasheet or the reference manual of the specific MCU.

Enabling the Halt on Connect option, combined with the Connection option set to Under Reset, can be useful to prevent the MCU from altering the function of the programming pins, which might interfere with communication with the CODEGRIP Suite.

NOTE


Target Browse window


By clicking the browse button next to the MCU selection dropdown menu, the *Target Browse* window will pop up. The *Target Browse* window contains a vendor drop down menu and MCU textbox. Typing in this textbox will dynamically filter the MCU list, showing only the MCU names that contain the characters typed so far.

By clicking the  button, a new set of filtering options is revealed. The following search criteria will become available:

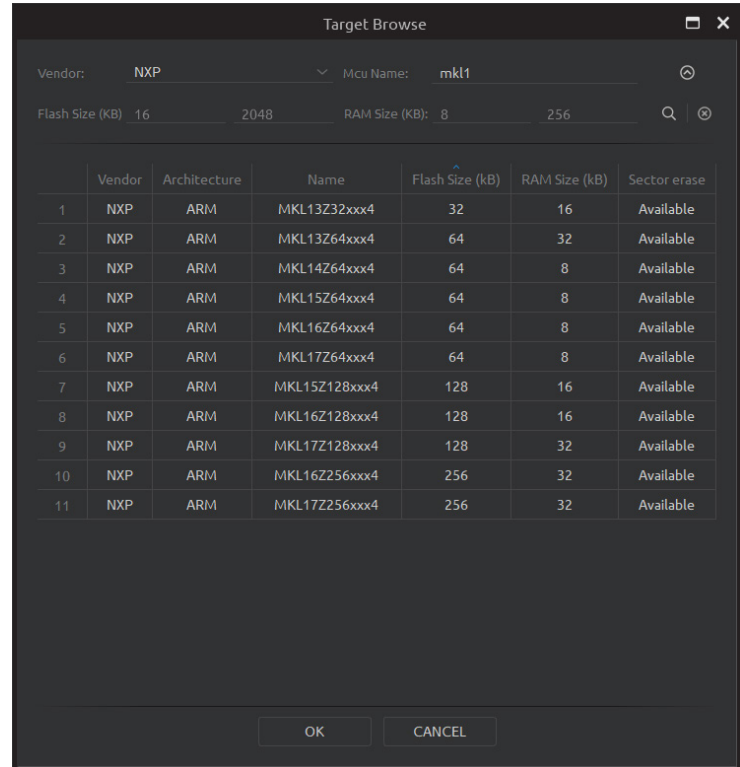
- The *Flash Size* [kB] field allows MCU filtering based on available flash memory. There are two textboxes used to define the minimum and the maximum value for the range. MCUs with the flash memory capacity outside of the *Flash Size* range will be hidden from the search list.
- The *RAM Size* [kB] field works similarly to the *Flash Size* field, but it performs filtering based on the amount of the available RAM range of the MCU. MCUs with the RAM capacity outside of the *RAM Size* range will be hidden from the search list.

The MCU list displayed in the *Target Browse* window can be sorted in ascending or descending order for each MCU parameter, by clicking on its column header.

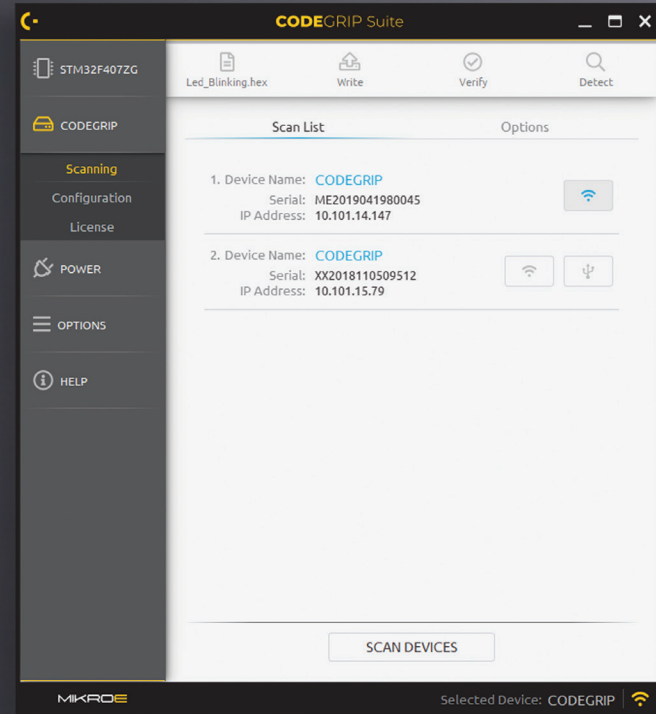
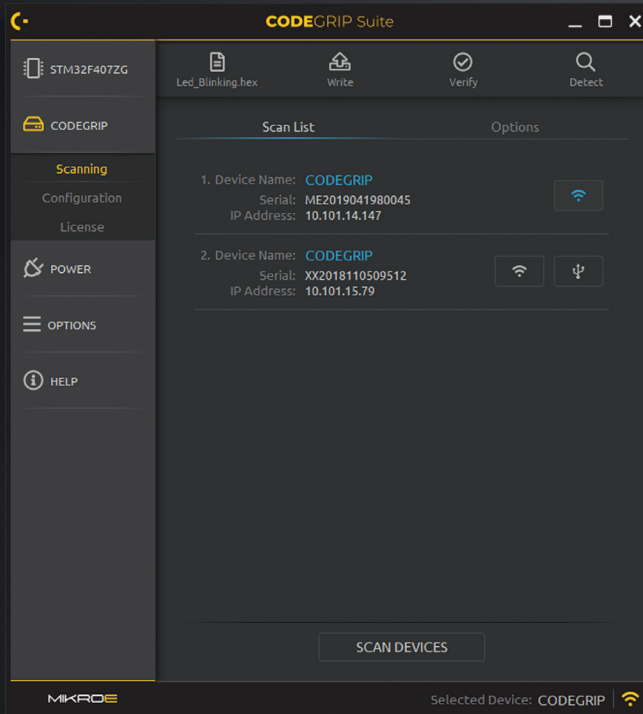
 Apply filter button will perform the search action, according to the selected filtering criteria.

 Clear filter button clears all the filtering parameters.

The target MCU can be selected by double clicking on the appropriate line.



Dark or Light...



...it's your choice!

5.2 CODEGRIP

The *CODEGRIP* Menu button contains Menu items related to the detection and setup of the CODEGRIP device.

5.2.1 Scanning

The *Scanning Menu item* contains tools for detecting CODEGRIP devices. This *Menu item* also provides controls for link management. There are two tabs displayed in the Menu item section, *Scan List tab* and *Options tab*.

Scan List tab

To start the scanning process click on the *SCAN DEVICES* button. All detected CODEGRIP devices will be visible in the *Scan List*. Every item listed, displays some general information about the device itself, such as the *Device Name*, *Serial number*, and *IP address*.

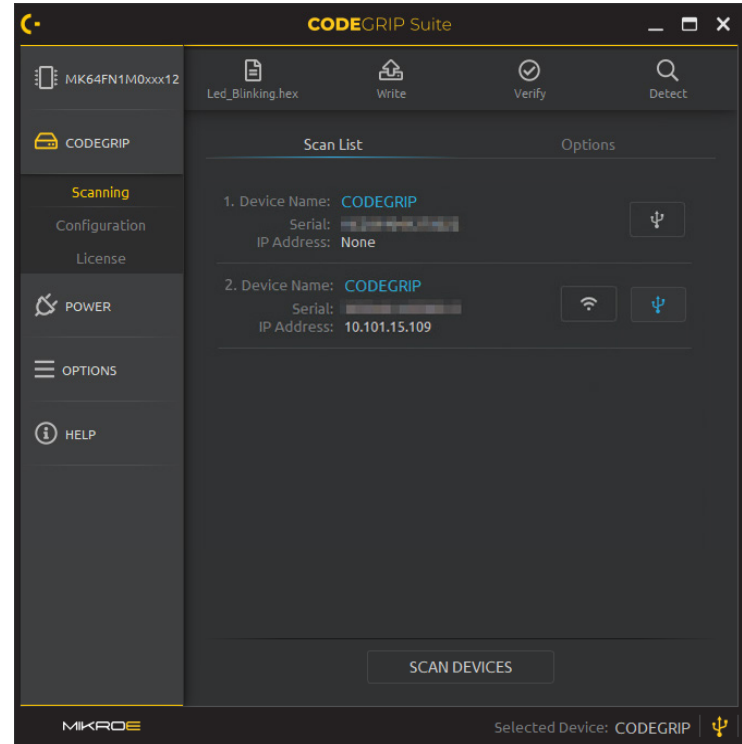
Depending on the available interface (USB or WiFi), one or two link buttons will appear on each CODEGRIP device item. These buttons are used to create or close the link between the specific device and CODEGRIP Suite.

Device Name

Every CODEGRIP device has its own device name. This allows the user to clearly identify the specific CODEGRIP device, especially when there is more than one device connected to a host PC. The user can modify the device name.

Serial number

This is a unique serial number associated with the CODEGRIP device. Every device has its own serial number, which is used for the identification. This information cannot be modified by the user.



IP address

If the CODEGRIP device is detected over the WiFi network, its IP address will be displayed. Otherwise, this field will display the message "None".

USB LINK button

This button is used to create or destroy the USB link to a specific CODEGRIP device.

WiFi LINK button

This button is used to create or destroy the WiFi link.

Note that the CODEGRIP device must be properly configured and discoverable over the WiFi network for this option to work [more information can be found in the *Configuration Menu item* description, in this chapter].

SCAN DEVICES button

This button will start the scanning process. CODEGRIP Suite will try to detect all the CODEGRIP devices visible through USB/WiFi interfaces.

Options tab

This tab is divided into two subsections, labeled as *Scan interface* and *Remote Scan*. Settings which are used to limit the scanning scope, are located in the *Scan Interface subsection*, while the *Remote Scan subsection* contains settings that can be used to expand the scanning to CODEGRIP devices located behind the gateway at a remote location. Up to five IP addresses can be specified in the corresponding fields.

Selected Interface

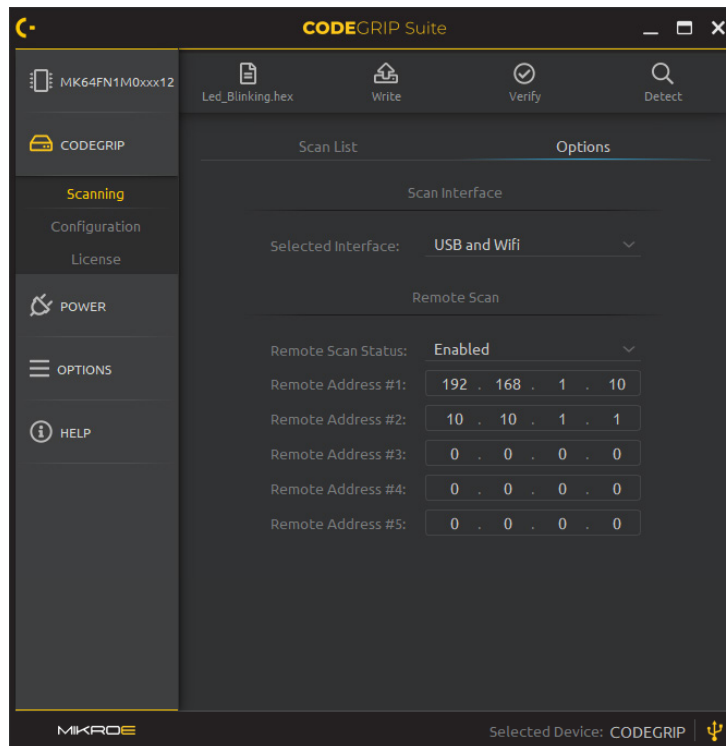
Options: *USB and WiFi, USB only, WiFi only*

This option allows limiting the scanning scope to only CODEGRIP devices which use the interface selected in this dropdown menu.

Remote Scan Status

Options: *Enabled, Disabled*

If the *Enabled* option is selected, the IP address from the *Remote Address* fields will be included in the device scan process. Otherwise, only the local network will be scanned.



Remote Address

The IP address of CODEGRIP devices located outside of local network can be specified here. CODEGRIP Suite will include this address to send scan packets, looking for available CODEGRIP devices. Note that when the *Remote Scan* is disabled, these fields will become unavailable.

The CODEGRIP device uses the UDP port 49001 and TCP port 49002 for the communication.

NOTE

5.2.2 Configuration

When *Configuration Menu* item is clicked, a set of four tabs will be displayed in the *Menu item section* **Device General**, **WiFi General**, **WiFi Mode**, and **Licenses**, each with its own set of options. On the bottom of the Menu item section, there are two buttons:

RELOAD CONFIGURATION button will read back the configuration values from the CODEGRIP device, refreshing the content of CODEGRIP Suite.

STORE CONFIGURATION button will upload the current configuration to the linked CODEGRIP device and perform the reset, applying new configuration settings to the CODEGRIP device.

Device General tab

This tab contains some general information about the linked CODEGRIP device.

Device Name

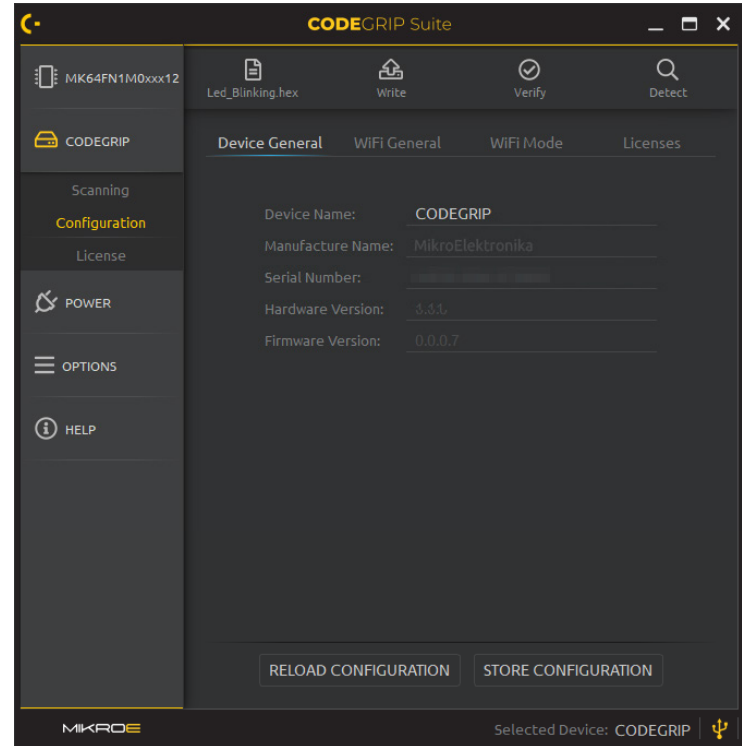
The name of the currently linked CODEGRIP device can be set here, allowing it to be easily identified by the user. It can consist of up to 32 printable ASCII characters.

Manufacturer Name

This field displays the name of the manufacturer (MikroElektronika). This field is programmed during the production phase and cannot be changed.

Serial Number

This field contains a unique serial number, associated with the specific CODEGRIP device. This field is programmed during the production phase and cannot be changed.



Hardware version

Hardware version number represents the hardware revision of the CODEGRIP device. This field is programmed during the production phase and cannot be changed.

Firmware version

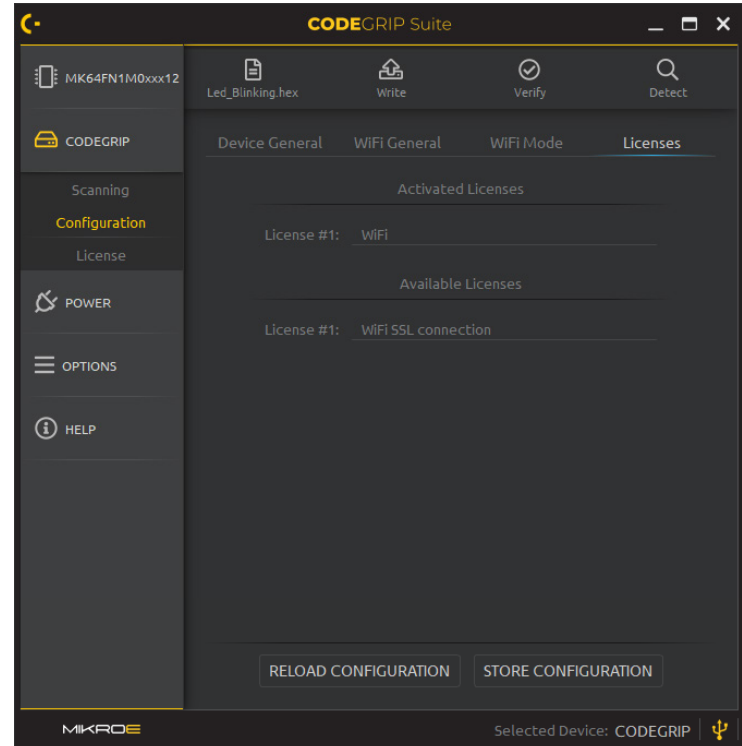
Firmware version number represents the current firmware revision of the linked CODEGRIP device.

Licenses tab

The *Licenses* tab displays a summary of CODEGRIP licenses. The *Activated Licenses* subsection contains licenses that have been activated and are in use. The *Available Licenses* subsection displays all licenses currently available for purchase. The license activation process itself is explained in the in the chapter 5.2.3. Licenses can be purchased at the Mikroe store in the same way as any other item:

For WiFi license, please visit
www.mikroe.com/codegrip-wifi-license

For SSL security license, please visit
www.mikroe.com/codegrip-ssl-license



WiFi General tab

This tab contains general WiFi information about the linked CODEGRIP device.

Interface State

Options: *Enabled, Disabled*

The integrated WiFi module can be enabled or disabled by selecting an option from this dropdown menu.

The *Enabled* option will enable the integrated WiFi module, allowing it to be used.

The *Disabled* option will disable the integrated WiFi module, by shutting it down completely. This option is useful when reduced power consumption is required.

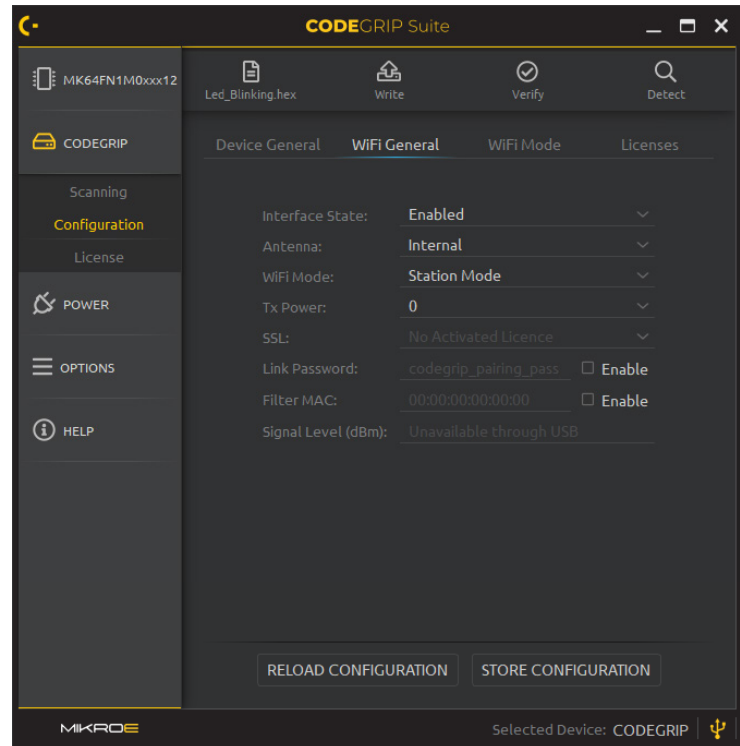
Antenna

Options: *External, Internal*

The type of WiFi antenna can be selected from this dropdown menu. An external antenna might provide better connection quality, while the internal multilayer chip antenna can be superior in terms of simplified setup when operated over a short distance.

The external antenna can be attached at the provided SMA connector.

NOTE If selected Antenna option does not match hardware setup (i.e. the Antenna option is set to "External", but no external antenna is actually attached) signal strength might be significantly degraded.



WiFi Mode

Options: *Station Mode, AP Mode*

This dropdown menu allows selection of the operating mode for the integrated WiFi module.

Station mode will configure the WiFi module to work as a wireless station. The station mode is used to wirelessly connect to an existing access point.

AP Mode will configure the WiFi module to work as an access point. The *AP Mode* allows the host PC to establish a direct WiFi connection with the CODEGRIP device.

TX Power

Options: *0 to 15*

This dropdown menu allows the strength of WiFi signal transmission power to be adjusted. Note that the selected value represents the signal attenuation, meaning that the value *0* will result with no signal attenuation while selecting the value *15* will result with the maximum signal attenuation.

SSL

Options: *Disabled, Enabled*

This dropdown menu allows to set up the encryption method for the WiFi network traffic.

NOTE *WiFi and SSL licenses are bought separately, from the Mikroe online store.*

Link Password

This field is used to specify the WiFi link password, which is stored on the CODEGRIP device. CODEGRIP Suite will have to provide this password in order to access the WiFi link to this specific CODEGRIP device. Next to this field, there is a checkbox used to enable or disable this option.

NOTE *Once entered, the password for the specific CODEGRIP device is stored by the CODEGRIP Suite, so that the user does not have to enter the password each time the CODEGRIP device is used.*

Filter MAC Address

The CODEGRIP device allows the connection to be established only with the host PC whose MAC address corresponds to the MAC address entered in this field.

The MAC filtering option can be completely disabled by unchecking the checkbox next to the Filter MAC Address field.

Signal Level (dBm)

This field displays the strength of the WiFi network signal in dBm. Values around -60dBm are considered as good and reliable signal reception, while values less than -80dBm will probably result in lost packets.

WiFi Mode tab

This tab contains some specific WiFi settings for each of the two available modes of operation. There are two subsections labeled as *Access Point Mode* and *Station Mode*. WiFi settings are grouped into these subsections, according to the mode they are used for.

Access Point Mode subsection

SSID

This is the wireless network identifier, up to 32 characters long.

Password

The network password can be set in this field. If the security protocol is not set to *Open*, the WiFi client is required to provide a password that matches the string in this field.

Secure type

Options: *Open*, *WEP*, *WPA/WPA2*

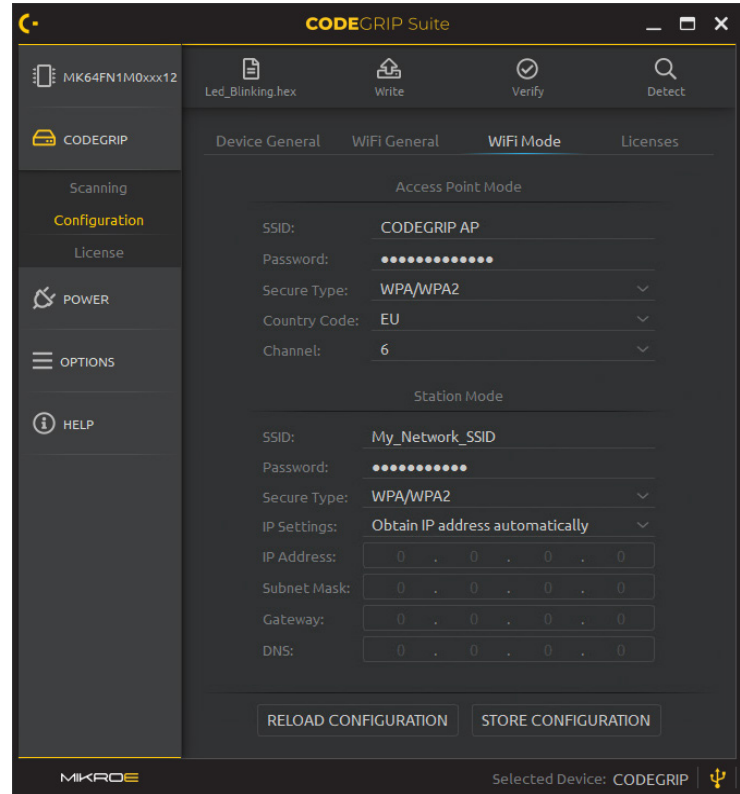
The Security protocol of the wireless network can be selected from this dropdown menu.

Country Code

Options: *EU*, *USA*

This option is used to set Tx signal levels and available frequency channels for the selected region [*EU*: 1 - 13, *USA*: 1 - 11].

If used outside of these regions, please set up the WiFi signal parameters manually (Channel and Tx level), according to your local radio-frequency regulations.



Channel

Options: *1 to 13*

This option is used to select the WiFi radio-frequency band, in relation with the *Country Code* settings.

When used in the Access Point (AP) mode, the CODEGRIP device will have a fixed IP address [192.168.1.1], with the DHCP protocol enabled.

NOTE

Station Mode subsection

All configuration settings related to the *Station Mode* are shown in this subsection. When operated in the Station mode, the CODEGRIP device becomes the WiFi client.

SSID

This is the network identifier. The string in this field must match the SSID string of the network to which the connection is attempted.

Password

If the WiFi network to which the connection is attempted requires a password, it can be specified in this field.

Secure type

Options: *Open, WEP, WPA/WPA2*

The security protocol selected here must match the security protocol used on a WiFi network to which the connection is attempted.

IP Settings

Options: *Use following static IP addresses, Obtain IP address automatically*
Use following static IP addresses allows the user to manually enter static IP address settings for the WiFi network.

Obtain IP address automatically provides the network settings, assuming that the DHCP server is running on the local network. The next four settings will not be editable if this option is selected.

IP Address

The IP address of the CODEGRIP device can be set here. Care should be taken not to have two devices with the same IP on the same WiFi network.

Subnet mask

Network subnet mask can be set in this field.

Gateway

This field is used to set the IP address of the default gateway device.

DNS

This field is used to set the IP address of the network DNS server.

5.2.3 License

License Menu item offers a set of options that are used to activate a license and enter user information, allowing personalization of the CODEGRIP device.

NOTE To successfully complete activation process, you have to create USB link with CODEGRIP device. Please have in mind that for successful license activation internet connection is required.

When the License Menu item is clicked, the Menu item section displays two subsections. The subsection labeled as User information contains text boxes which allow some general user information to be entered, including a user name, email, company, and so on. The subsection labeled as Registration codes offers some tools used to add a new license key and activate it.

User Information subsection

Name

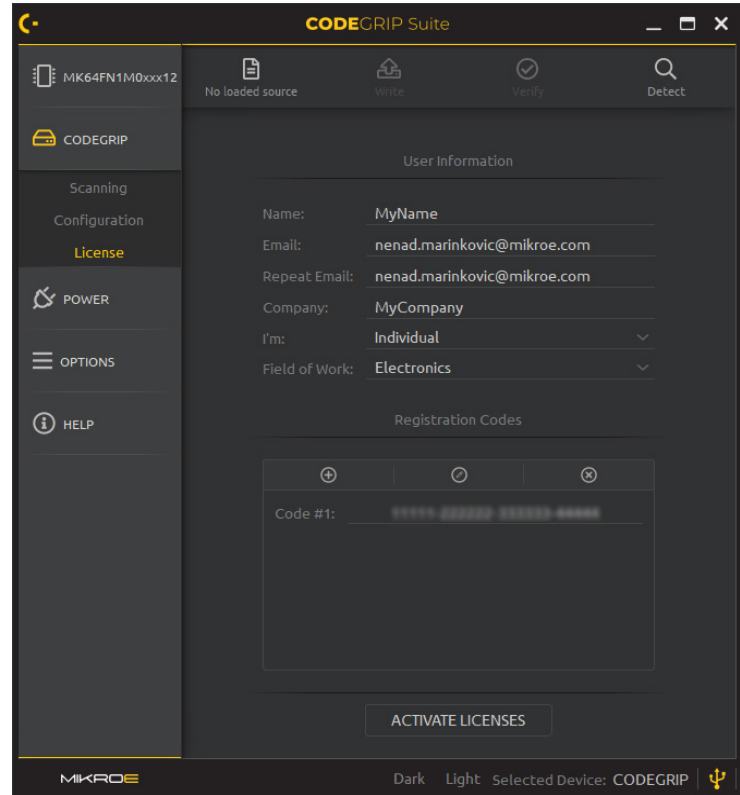
A user name can be entered in this field.

Email

An email address can be entered in this field. Only a valid email address format is accepted.

Repeat Email

This field is used to confirm that the email address was entered correctly. The content of this field should match the content of the *Email* field.



Company

The name of the company can be entered in this field. This may be the name of the company that owns the license or the name of the company that hired the person to whom the license was issued.

I'm

Options: *None, Company, Individual*

This dropdown menu is used to select one of three offered user categories.

Field of Work


Options: *a list that contains various fields of work*


The user can choose a field of work that best suits his profile. A list of various fields of work is contained within this dropdown menu, covering a wide range of different occupations.

NOTE *If any of these fields contain invalid characters or uses a wrongly formatted input [such as in the case of email address] the ACTIVATE LICENSES button will be disabled. The text field containing an invalid value will display the invalid option/string in red letters.*

Registration Codes subsection

In this subsection, there are buttons used to facilitate the licensing process. The three buttons in the top row are used to enter and manipulate the registration codes, while the last button is used to activate the specified registration codes.

 button is used to add a new registration code. Clicking this button opens a new dialog window that allows the registration code to be entered. When a valid code is entered, it can be confirmed and stored by clicking the *OK button*. CODEGRIP Suite offers multiple codes to be added, allowing simultaneous activation of all available features. All stored codes are displayed on the panel below the buttons.

 button is used to edit the selected registration code. To select a specific code, it is enough to click on it.

 button in the top row is used to delete the selected registration code.

Finally, after the registration codes are successfully stored, clicking on the *ACTIVATE LICENSES* button will perform their verification. If successful, the respective CODEGRIP Suite feature will be activated. Otherwise, an error message will be displayed in a popup window.

Once the licensing process is successfully completed, the licenses will be permanently stored within the CODEGRIP device.

For WiFi license, please visit

www.mikroe.com/codegrip-wifi-license

For SSL security license, please visit

www.mikroe.com/codegrip-ssl-license

Each registration code is used to permanently unlock a feature within the CODEGRIP device, after which it expires. Repeated attempts to use the same registration code will result with an error message.

NOTE

5.3 POWER

5.3.1 Outputs

When the *Outputs Menu item* is clicked, the Menu item section will be divided into two subsections: Controls and Measurements. The Controls subsection offers a set of options used to control power-related parameters, while the Measurements subsection offers visual feedback of the power-related parameters.

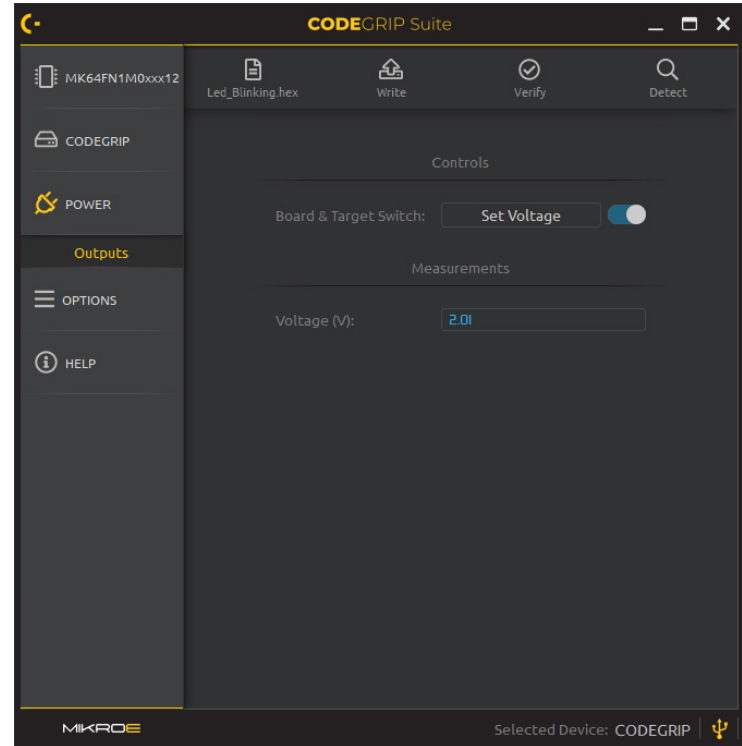
Board & Target Switch

Options: 0V to 3.3V with output current up to 700mA

The *SET VOLTAGE* button opens a dialog window which allows to set up the voltage that will be applied to the target MCU. The voltage can be set from 0 to 3.3V in 0.1V steps. Once set, the voltage can be applied by switching the button next to the *SET VOLTAGE* textbox.

Voltage [V]

This text field is used to display the actual voltage value on the target MCU connector. The CODEGRIP device is not only able to power up the target MCU, but it can also be powered by the target MCU. This field will display the actual value of the voltage on the connector in both cases: when the CODEGRIP device is used to power the target MCU, and when connected host board provides power to the CODEGRIP device.



5.4 OPTIONS

5.4.1 General

The Menu item section is divided into two subsections, labeled as *Target* and *Suite*.

Erase Type

Options: *Erase Chip*, *Erase only Necessary Sectors*, *Unlock and Erase Chip*
Erase Chip will erase the content of the target MCU flash memory.

Erase only Necessary Sectors will only erase those sectors to which the data from the loaded .hex or .bin source file will be written.

Unlock and Erase Chip will clear the Read/Write protection bits (if any) before erasing the contents of the target MCU. Note that these options are considered only when *WRITE* command is executed.

Verify after Write

Options: *Enabled*, *Disabled*

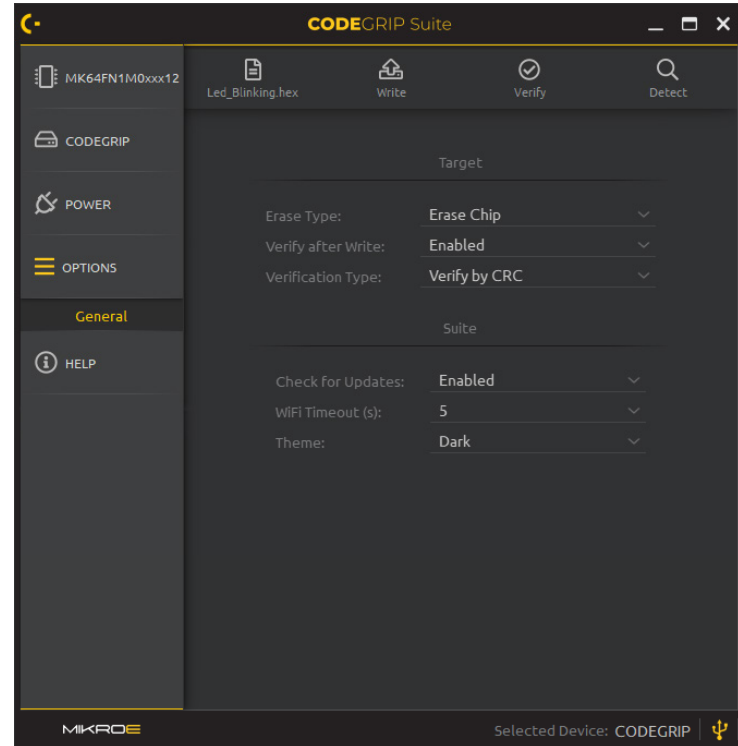
If *Enabled*, the MCU program memory will be verified after the programming process is complete.

Verification Type

Options: *Verify by CRC*, *Verify by Readback*

If the *Verify after Write* option is *Enabled*, the verification method can be selected from the dropdown menu. There are two possible options:

Verify by CRC uses the Cyclic Redundancy Check [CRC] calculations to verify written data. The algorithm is executed on the target MCU, but not all MCUs support this method. *Verify by CRC* method is usually faster than the *Verify by Readback* method, which compares the content of the program memory with the source .hex or .bin file content.



Check for Updates

Options: *Disabled*, *Enabled*

If *Enabled*, CODEGRIP Suite will check if there is a new version available for download each time it starts.

WiFi Timeout [s]

Options: *1*, *3*, *5*, *10*, *20*, *30*, *60*

When using the WiFi interface, CODEGRIP Suite will test the link to the CODEGRIP device before each command. If there is no response from the linked CODEGRIP device within the selected timeout interval, the operation will be canceled, and an error message will be displayed.

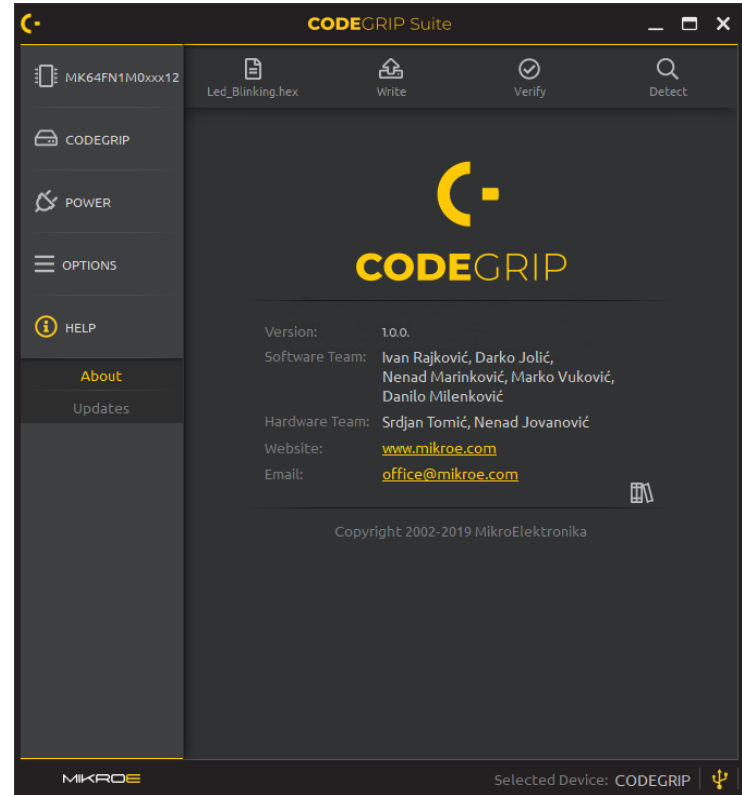
5.5 HELP

HELP Menu button reveals two *Menu items* when clicked: *About* and *Updates*. These *Menu items* contain some general information about the CODEGRIP, along with the CODEGRIP Suite update and firmware update tools.

5.5.1 About

By clicking on *About Menu item*, some general information that covers the current version of the release, the development team, and links to the site and email address will be displayed in the *Menu item section*.

Besides the general information, there is also a small book icon that opens the HELP within the application.



5.5.2 Updates

This *Menu item* contains tools used to update the Suite itself, as well as the firmware of the CODEGRIP device. There are three tabs on the *Menu item* section when this *Menu item* is clicked: the *Suite tab*, the *CODEGRIP tab*, and the *Power Module tab*.

Suite tab

When this tab is selected, a short message is displayed on the Menu item section, describing how to check for CODEGRIP Suite updates. If the *CHECK FOR UPDATES* button on the bottom is clicked, CODEGRIP Suite will check if there is a more recent version available. A new window will pop up, displaying whether the CODEGRIP Suite is up to date, or there is a new version available.

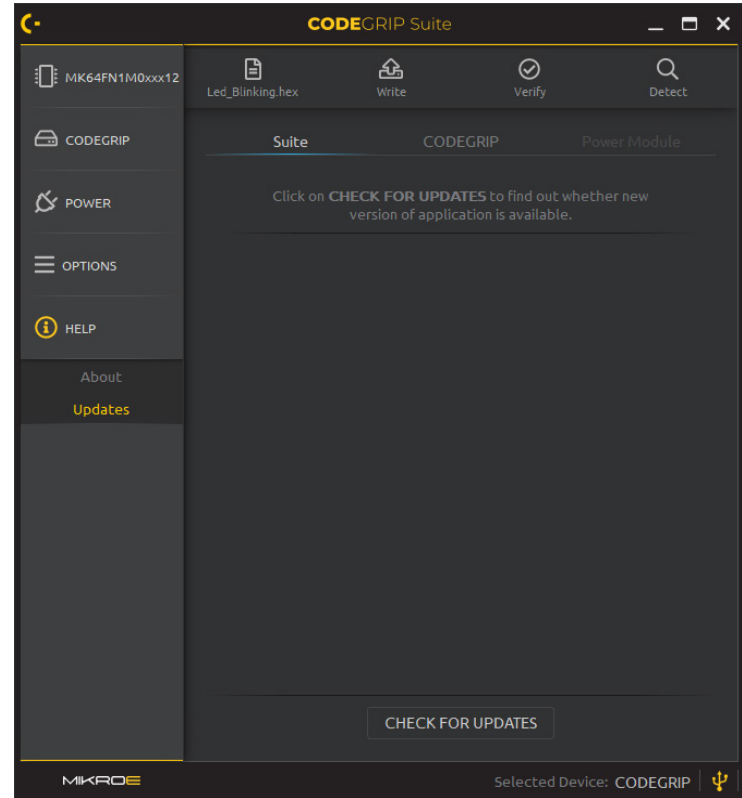
In the case when there is a new version available, a question message will be displayed on the window, asking the user to confirm or cancel the update procedure.

CODEGRIP tab

This tab contains a message panel which offers information about the currently available firmware version, followed by a short instruction on how to detect the CODEGRIP device in a bootloader mode.

Power Module tab

There are some options in this tab, currently not supported by CODEGRIP Suite. This option is reserved for future updates.



6. Troubleshooting

6.1 Target programming errors

Error Messages	Troubleshooting
Target is not detected [DETECT]	Make sure that the selected MCU matches the MCU connected to the CODEGRIP device.
Connecting to target failed	Check that the selected interface [SWD / JTAG] is supported on the target MCU. Make sure that the program lines are correctly configured. Try to connect with the "Under reset" and "Halt on connect" options enabled. Special cases: 1) The "Under reset" option is not available for MSP and TIVA MCU families. 2) The "System reset" option is not available for STM32 MCU families.
Selected chip not recognized [All buttons except DETECT]	Make sure that the selected MCU matches the MCU connected to the CODEGRIP device.
File not verified	The content in the MCU flash differs from the contents of the source file. Make sure the MCU is not read-protected.WW
Operation failed [VERIFY, READ]	Check the communication with the CODEGRIP device and the connection between the CODEGRIP device and the MCU.
Disconnect from target failed	CODEGRIP Suite lost the connection to the CODEGRIP device before the operation was completed.
Interface to target currently being used	Make sure there is no Debug or SWD process in progress.
Your board doesn't support selected vendor	Make sure your MCU card is compatible with the development board.

<i>Firmware erase error</i>	<i>The firmware erase operation failed. Check the connection to the development board and try again.</i>
<i>Firmware write error</i>	<i>Firmware update failed. Check connection with the development board try again.</i>
<i>File not verified</i>	<i>Firmware is not programmed properly. Try the firmware update process again.</i>
<i>WiFi link authentication failed</i>	<i>Link is protected by password in Link Password field. Please enter correct password.</i>

6.2 Licensing errors

Error Messages	Troubleshooting
<i>Unknown registration code</i>	<i>Make sure you have entered correct Registration Code.</i>
<i>Registration code already approved</i>	<i>Registration code previously used for activation. Please make sure you haven't already activated CODEGRIP device with this Registration Code. Check Licenses tab in Configuration Menu Item [make sure you reloaded configuration]. You can use it to license only one device.</i>
<i>License exists</i>	<i>CODEGRIP device has already been licensed for feature corresponding to Registration Code.</i>
<i>Device doesn't support license</i>	<i>You may have purchased the Registration Code that is not suitable for your device. Please contact our support.</i>

Time-saving embedded tools

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