



**acontis technologies GmbH**

**SOFTWARE**

**EC-Master**

**Rust Programming Interface**

**Version 3.3**

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# 1 Introduction

The Rust Wrapper provides a Rust interface to use EC-Master, EC-Simulator and RAS Client/Server.

## 1.1 Requirements

### Rust v1.90.0 and above

- Download “rustup” and install Rust

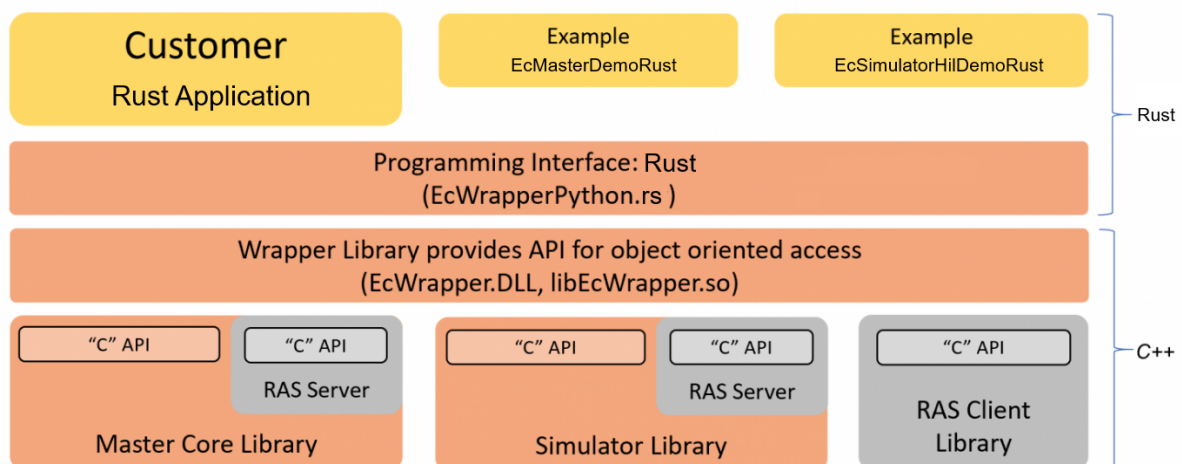
### Windows (x86/x64)

- Microsoft Windows 10 and above
- Microsoft Visual C++ 2015 Runtime

### Linux (x86/x64/ARM)

- Ubuntu 18.04 and above

## 1.2 Architecture



The architecture contains 4 basic layers:

### Customer Rust application or our examples (EcMasterDemoRust, ...)

- Demo application, written in Rust

### Programming Interface (EcWrapperRust)

- Provides an object oriented API written in Rust

### Wrapper Library (EcWrapper)

- Native wrapper library, which provides API for object oriented access

## **Native Libraries**

- Master Core Library
- Simulator Library
- RAS Client Library

## 2 Programmers Guide

### 2.1 Sample Application

There is currently 1 script available:

**EcMasterDemoRust.bat**

Starts the console demo application

### 2.2 Sample Code

The Rust demo application contains of 3 modules:

**EcDemoApp.rs:**

Console demo application

**EcLogging.rs:**

Logging module, which writes asynchronous messages to console, file, ...

**EcUtil.rs:**

Utility module, which contains some helper functions

### 2.3 Wrapper

#### 2.3.1 Modules

The Rust Wrapper contains of 5 modules:

**EcWrapperRust.rs**

**class CEcWrapperRust**

EC-Wrapper base class

**class CEcMasterRust**

EC-Master

**class CEcMasterMbxGatewayClientRust**

Mailbox Gateway Client for EC-Master

**class CEcMasterMbxGatewayServerRust**

Mailbox Gateway Server for EC-Master

**class CEcSimulatorRust**

EC-Simulator

**class CEcSimulatorRasServerRust**

RAS Server for EC-Simulator

**class CEcRasClientRust**

RAS Client for EC-Master / EC-Simulator

**EcMotionRust.rs**

**class CEcMotionRust**

EC-Motion interface

**EcWrapperRustTypes.rs**

Rust types

**EcWrapper.rs**

C Rust interface (internal)

**EcWrapperTypes.rs**

C Rust types (internal)

## 2.3.2 Return code vs. exception handling

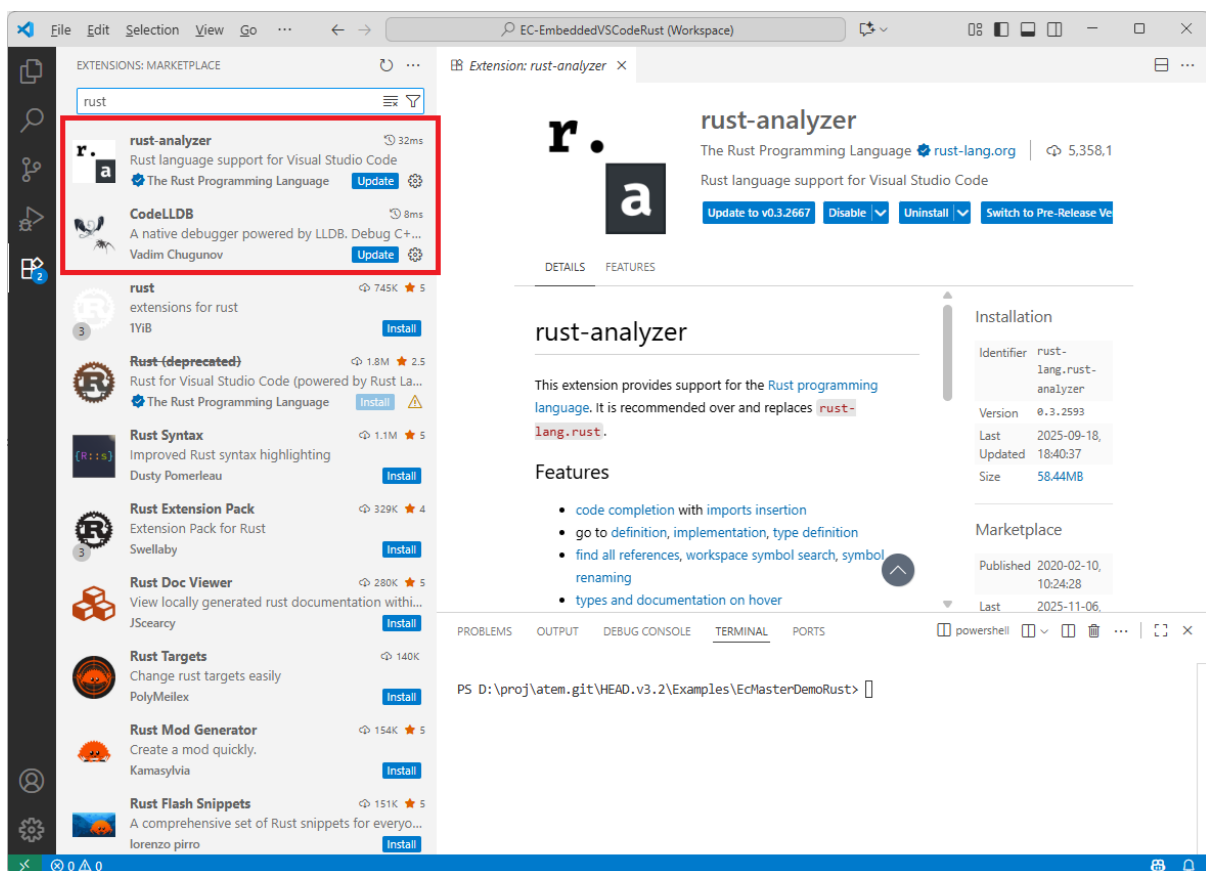
The most of all API functions returns a return code for error handling. This behaviour can be changed to throw an exception in error case by simply setting:

```
CEcWrapperRust_EnableExceptionHandling = true // default is false
```

## 2.4 Supported IDEs

### 2.4.1 Visual Studio Code

Install rust extension by open extension tab and enter *rust*:

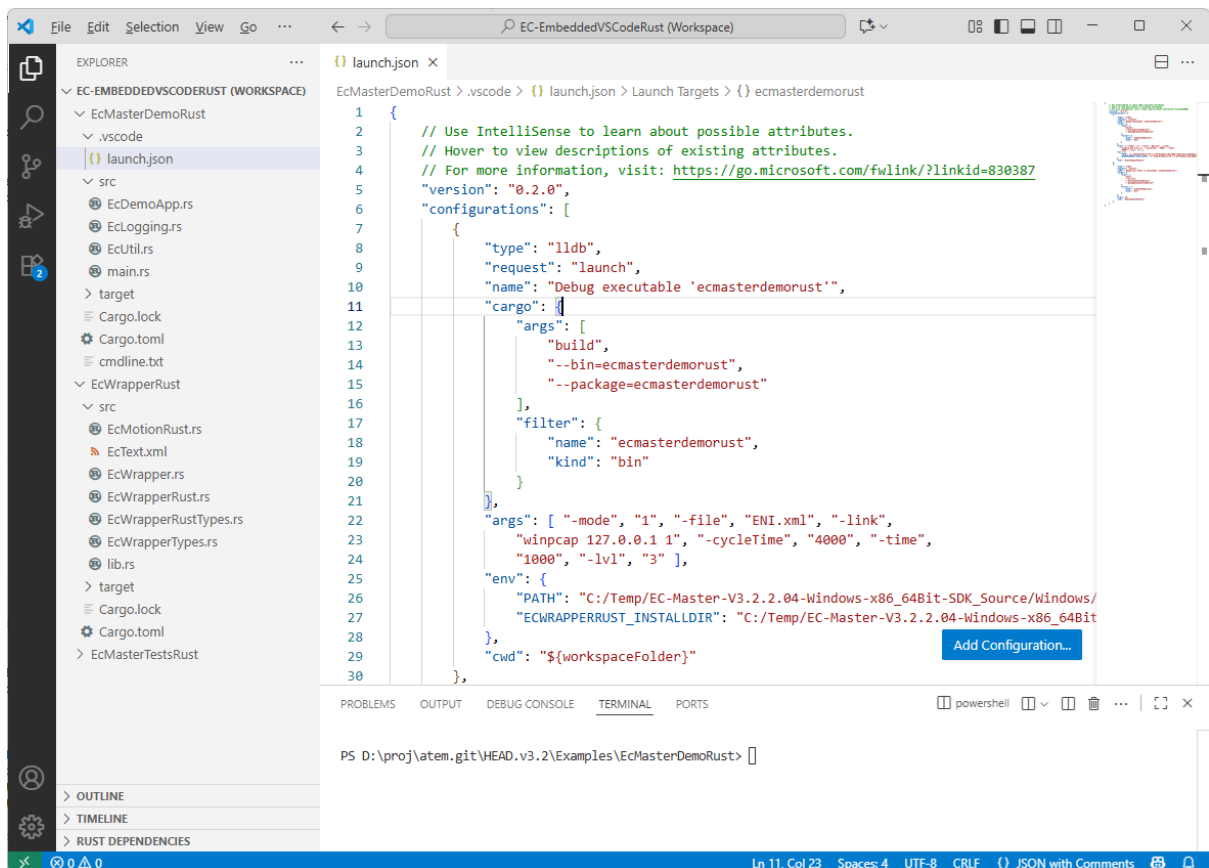


Open package folder e.g. **EC-Master-V3.2.2.04-Windows-x86\_64Bit-SDK\_Source** and configure the `launch.json`:

```

{
  "version": "0.2.0",
  "configurations": [
    {
      "type": "lldb",
      "request": "launch",
      "name": "Debug executable 'ecmasterdemorust'",
      "cargo": {
        "args": [
          "build",
          "--bin=ecmasterdemorust",
          "--package=ecmasterdemorust"
        ],
        "filter": {
          "name": "ecmasterdemorust",
          "kind": "bin"
        }
      },
      "args": [ "-mode", "1", "-file", "ENI.xml", "-link", "winpcap 127.0.0.1 1", "-cycleTime", "4000", "-time", "1000", "-lvl", "3" ],
      "env": {
        "PATH": "C:/Temp/EC-Master-V3.2.2.04-Windows-x86_64Bit-SDK_Source/Windows/x64/",
        "ECWRAPPERRUST_INSTALLDIR": "C:/Temp/EC-Master-V3.2.2.04-Windows-x86_64Bit-SDK_Source/Windows/x64/"
      },
      "cwd": "${workspaceFolder}"
    }
  ]
}

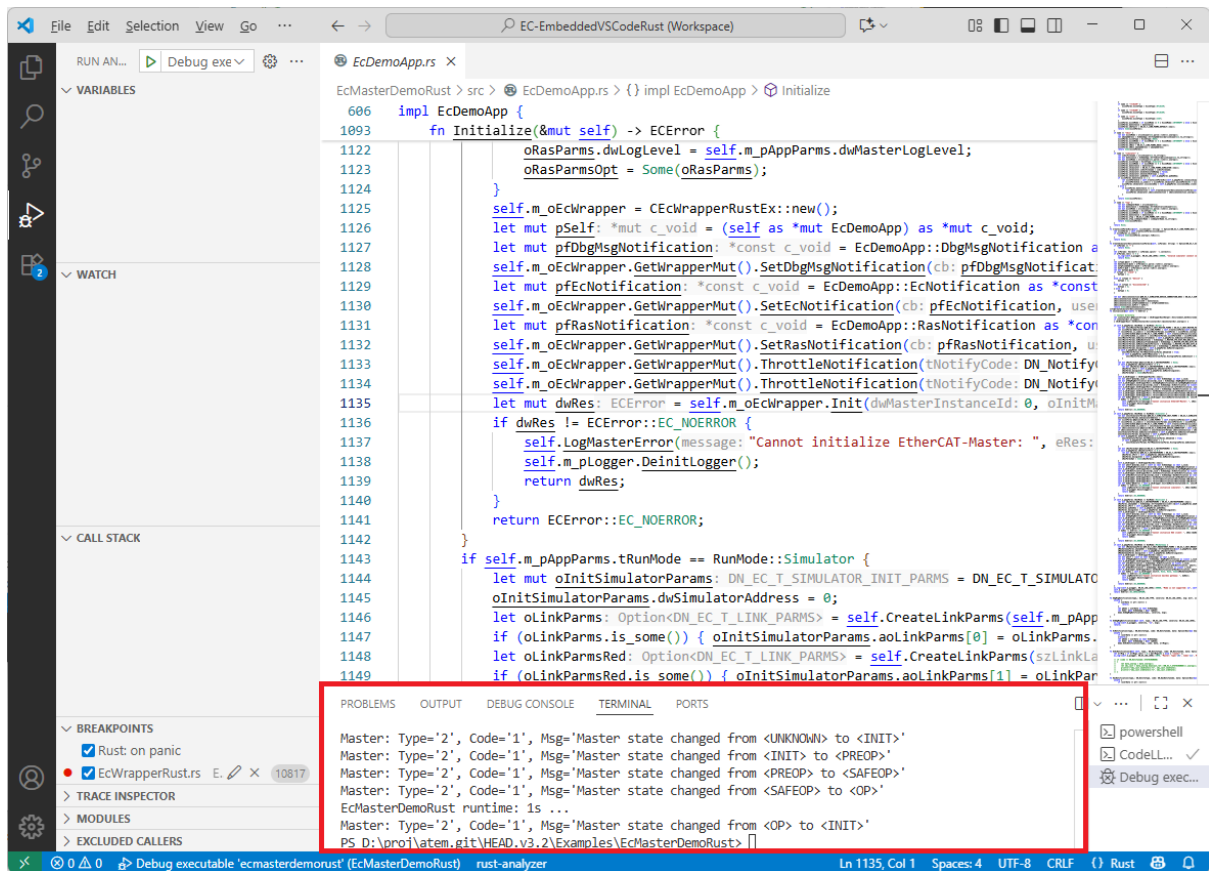
```



The screenshot shows the Visual Studio Code interface with the following details:

- File Explorer (Left):** Shows the project structure for 'EC-EMBEDDEDVSCODERUST (WORKSPACE)', including folders like 'src', 'target', and 'Cargo.lock', and files like 'EcDemoApp.rs', 'EcLogging.rs', 'EcUtil.rs', 'main.rs', 'Cargo.toml', 'cmdline.txt', 'EcWrapperRust', 'EcMotionRust.rs', 'EcText.xml', 'EcWrapper.rs', 'EcWrapperRust.rs', 'EcWrapperRustTypes.rs', 'EcWrapperTypes.rs', 'lib.rs', 'Cargo.lock', 'Cargo.toml', and 'EcMasterTestsRust'.
- Main Editor (Center):** Displays the 'launch.json' file for the 'ecmasterdemorust' target. The content is identical to the JSON code block above. A tooltip is visible over the 'version' field, providing information about IntelliSense and a link to Microsoft's documentation.
- Terminal (Bottom):** Shows the current directory path: 'PS D:\proj\atem.git\HEAD.v3.2\Examples\EcMasterDemoRust>'. The terminal title is 'powershell'.
- Status Bar (Bottom):** Displays 'Ln 11, Col 23', 'Spaces: 4', 'UTF-8', 'CRLF', and 'JSON with Comments'.

Start debugging and the demo output will be written into the terminal:



The screenshot displays the Visual Studio Code interface with a Rust project open. The main editor shows the `Initialize` function in `EcDemoApp.rs`. The code includes initialization of parameters, logging, and state management for the master component. A red box highlights the terminal window at the bottom, which shows the following output:

```
Master: Type='2', Code='1', Msg='Master state changed from <UNKNOWN> to <INIT>'
Master: Type='2', Code='1', Msg='Master state changed from <INIT> to <PREOP>'
Master: Type='2', Code='1', Msg='Master state changed from <PREOP> to <SAFEOP>'
Master: Type='2', Code='1', Msg='Master state changed from <SAFEOP> to <OP>'
EcMasterDemoRust runtime: 1s ...
Master: Type='2', Code='1', Msg='Master state changed from <OP> to <INIT>'
PS D:\proj\atem.git\HEAD.v3.2\Examples\EcMasterDemoRust> |
```

### 3 FAQ

I installed Rust and the demo crashes with strange errors. What can I do?

This might be a problem of mixing x86 with x64 binaries. Verify that if you have installed the Rust runtime for x64 bit, please install also EC-Master for x64 bit.