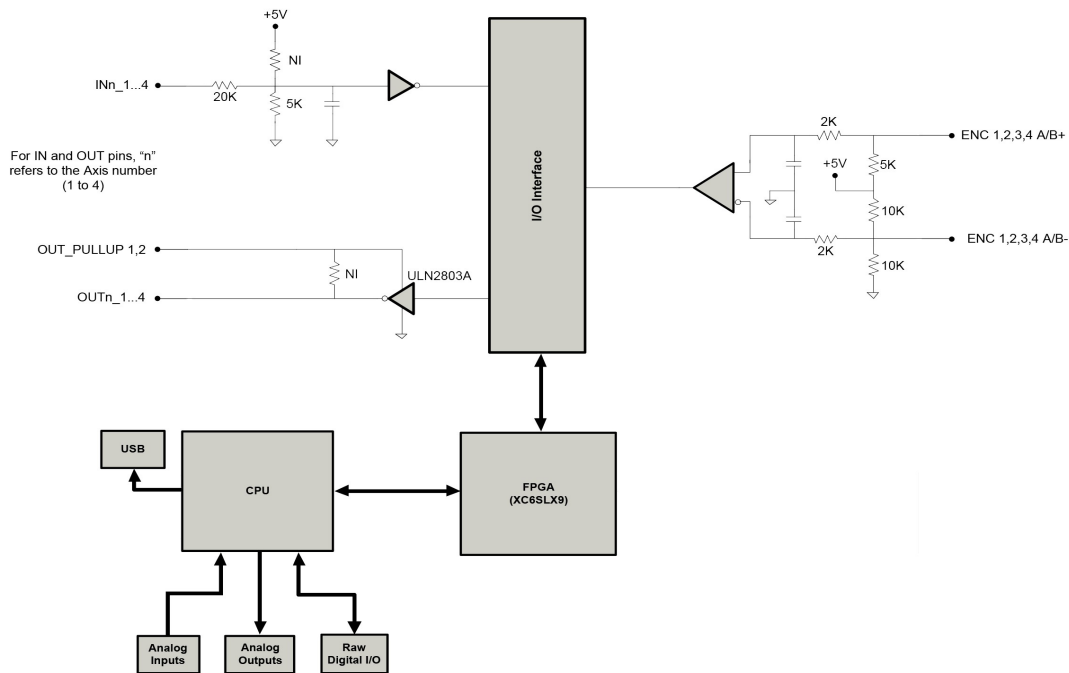


# Stepper interface card for Raspberry PI and other SBCs

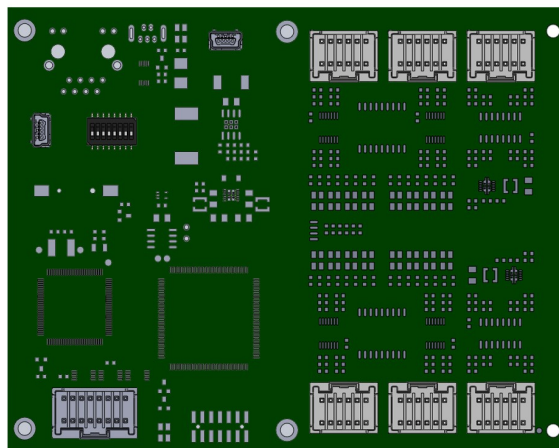
The **SBC-MI** (Single Board Computer-Motion Interface) is a low-cost motion controller interface card for servo or stepper drives with step/dir (pulse/dir) commands.

It enables the user to create professional quality motion control applications on a SBC (like Raspberry PI 3 or others), PC or tablet.



## Features

- Accel, decel, jerk, transition modes etc. settings. S curve velocity profile generation.
- Multi axes coordinated motion. CNC (G code) support also available as an option.
- High frequency stepper pulse outputs (up to 1MHz)
- Precise FPGA timing of step pulses for smooth motion at any speed
- Comprehensive move types including: linear, circular and helical interpolation; software cams; 3D shape cutting; flying shears; splines; synchronization with positional offsets

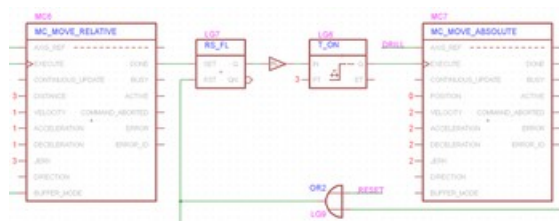


## The development system

Included is the powerful integrated **CM-MI IDE** (Click and Move Motion Interface Integrated Development Environment) for Motion, Logic, Math etc. programming  
CM-MI IDE features high level Function Block programming, based on IEC-61131-3 standard for logic and [www.PLCopen.org](http://www.PLCopen.org) compliant function block library for motion control.  
User derived function blocks (also with C++ programming e.g. for math algorithms) are supported.  
The CM-MI IDE chm help file and some tutorial videos are free to download from the manufacturer's website:

<http://www.amce.hu/en/content/download-sbc-mi>

Function block diagram:



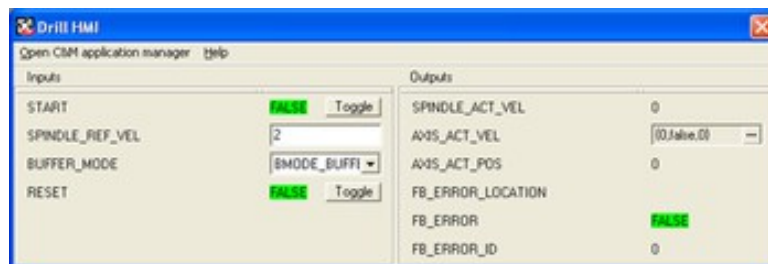
Function Block programming, based on IEC-61131-3 and PLCopen standards

Graphical debugger:



Graphical debugging with breakpoints, live labels and highlighting active Nets and Function Blocks

HMI:



Automatically generated HMI screen

## **How it all works**

The user application is developed and debugged on a Win7,8,10 PC in a drag and drop, point and click environment using Function Block diagrams.

The SBC-MI card is connected to the PC via USB.

An HMI screen is automatically generated from the MAIN I/O ports of the Function Block diagram.

The HMI screen can be customized based on the opensource Qt application framework.

The application can be run on targets like a PC, tablet or SBC (like Raspberry PI 3).

Executable code is generated for the selected platform at the push of button.

The application's executable code is downloaded to the target computer via Ethernet.

The target computer is connected to the SBC-MI card via USB.

The target computer OS is either MS Windows or Linux.

The app running in the target computer can also be remotely debugged by the development PC via an ethernet port.

## **Communication between an SBC and the SBC-MI card**

The running application calculates Position and Velocity points in Time (PVT) of the commanded motion, then these commands are transferred to the SBC-MI card via USB. Here the PVT points are interpolated and converted into coordinated multi-axis step/dir signals.

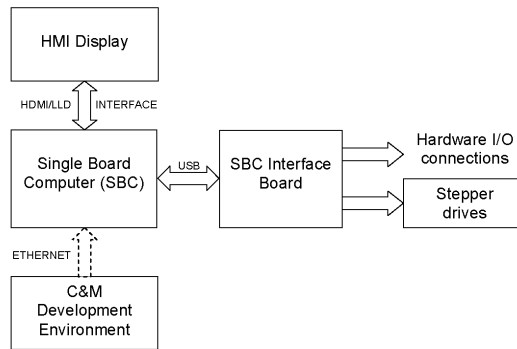
The SBC-MI card generates the fast and precisely timed stepper pulses thereby freeing up all the resources of the SBC for the application program.

The on-board GPI/Os can be further expanded with external USB I/O devices.

### **Specifications:**

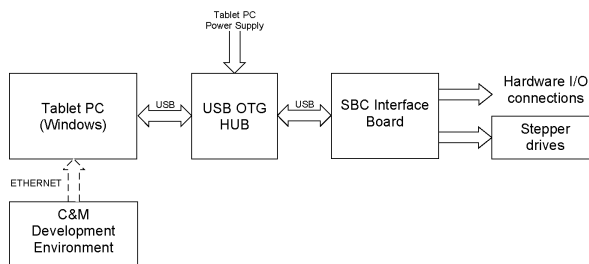
- Supports 4 axes of stepper, or 4 axes of servo in step and direction mode
- 16 uncommitted non-isolated digital inputs programmable for hardware limits, home input, stop input and error input. 1/axis of the inputs can be programmed for high-speed capture of position within 2 microseconds.
- 8 uncommitted digital outputs. 5V open collector Darlington Programmable for drive enable and high-speed position compare output. 1/axis of the outputs can be programmed for trigger at position
- 2x2 simultaneously sampled 12-bit uncommitted analog inputs
- 4 12-bit uncommitted analog outputs
- 2 quadrature encoder inputs for handwheels
- Size (H x W) mm (in) 99.9 x 130 (3.93 x 5.1)
- The 5V input power is supplied either by the Mini USB data interface or can be switched to a dedicated micro USB power input (if more power is needed e.g. for GPO pins).
- I/O Connectors: 12-pin, 2.00 mm spaced dual-row vertical or right-angled headers

Standard Configurations:



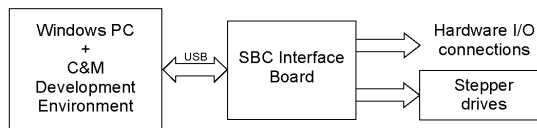
Application is developed on a Win PC and then downloaded into a Linux SBC.  
(Instead of the HMI display Start, Stop etc. pushbuttons can be used with the GPIOs.)

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Application is developed on a Win PC and then downloaded into a Win tablet.

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The same Win PC is used both for development and run time target.

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