

# Building EPICS drivers for Siemens PLC Communication

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The Instrumentation and Controls (I&C) for the Moller magnets is currently being developed and components are being evaluated, one of the main aspects is the Programmable Logic Controller (PLC) that will interface between the sensors and magnet power supplies. Currently this is planned to be a Siemens S7-1500 series controller. Previous PLCs used tended to be one of the Allen-Bradley series (ControlLogix or CompactLogix) which use an EtherIP driver, which only interfaces with those specific model PLCs. Fortunately an EPICS driver to interface with Siemens PLCs, s7nodave, was previously developed.

This driver was originally based on the library libnodave, however due to bugs with this library specifically with newer controllers the driver changed to use the Snap7 library. In order for EPICS to properly utilize this driver it needs to be compiled, which in turn requires the Asyn driver (which provides asynchronous driver support), which itself needs EPICS base. The controller currently being evaluated is directly connected to a Windows computer (for the Siemens software which only runs under Windows) which means that EPICS would need to be run on Windows. As no binary releases are available for Windows this meant all the EPICS related software would need to be compiled on/for Windows.

- **Several software development environments were attempted in order to build EPICS base and needed drivers under Windows**
- **WSL 2 ended up being the chosen solution**
- **All needed drivers were successfully built**
- **softIOC and application development is ongoing**

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While support for compiling EPICS under Windows does exist it isn't the most straight forward process. Initially it was attempted to use Microsoft's Visual Studio as the compiler, but some of the provided build software (namely the make command to process the Makefiles) caused errors when run. This was replaced with the MSYS2 software development environment which is based on MinGW however this turned out to be missing some libraries that the asyn driver needed. The next solution tried was to use the Windows Subsystem for Linux 2 (WSL 2) which allows a Linux environment to be run under Windows without a Virtual Machine or dual booting. The only issue encountered with this was changing some build options to point at locations/libraries specific to the Ubuntu distribution used, e.g. the RPC library (remote procedure call) being called libtirpc instead of librpc.

With all the needed EPICS software compiled and running under Windows the next tasks are to develop the softIOC and application to interface with the PLC itself.