# MProbe integration with external software

TFCompanion is a desktop application that is included with the MProbe system. It has the control & data acquisition from the hardware and the data analysis.

Production and OEM use of MProbe system require a different interface and integration with the external software. All integration options use the same TFCompanion libraries, so the initial setup always include a desktop version of TFCompanion that used to configure spectrometers, setup and test recipes/filmstacks, etc.

There are two integration options:

1. Modbus server integration
2. PLC server integration

## I. Modbus server integration

Modbus server is a version of the TFC-Server and is a part of the TFCompanion library. TFCServer in Modbus mode is started from the command line and accepts TCP-IP commands from the external client. The Modbus client (in Java) is provided as a part of the SDK and can be interfaced directly from the User program. Alternatively, dll library provides an interface for communication with the Modbus client from C/C++/C# and other programs

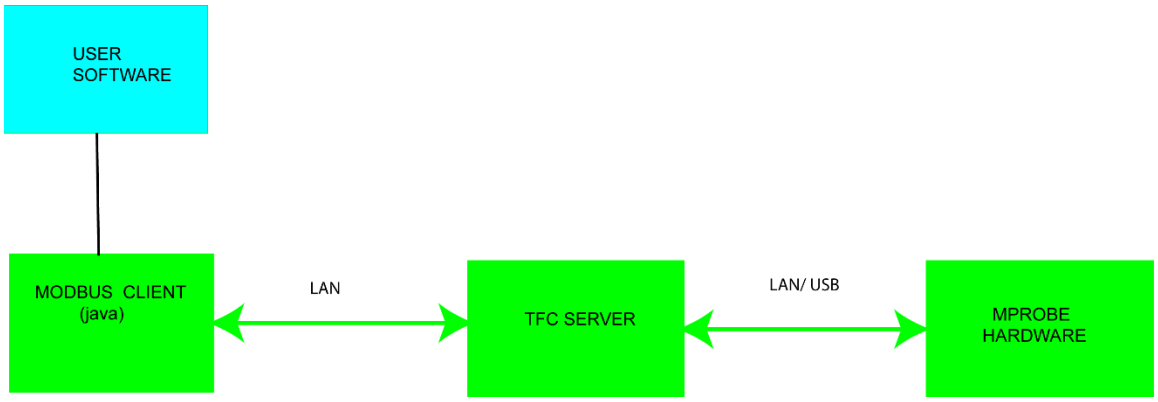


**Fig. 1 Modbus diagram using Java software**

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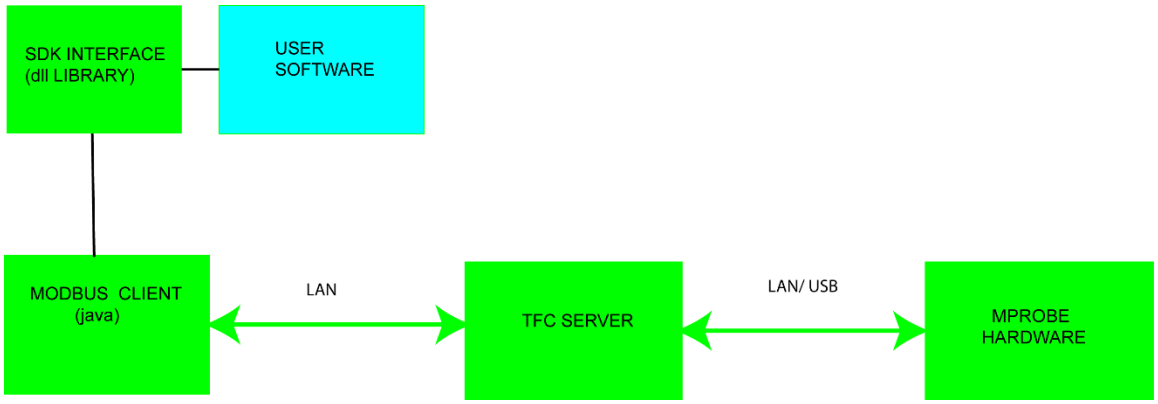


**Fig. 2 Modbus diagram using SDK (dll library)**

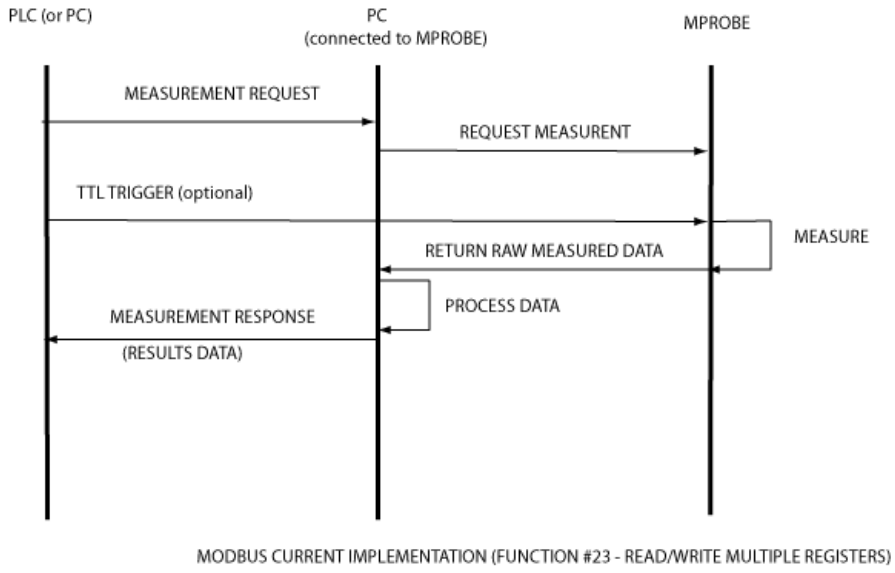


**Fig. 3 Topology of Modbus interaction.**

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This integration approach gives user detailed control of the measurement process. Modbus is a request/ response protocol, so every single measurement needs to be requested. This can an advantage or drawback depending on the application requirement.

The use-case of the Modbus integration approach is OEM integration with the production system that needs control of the measurement process/ timing of the measurement in coordination with other processes.

**Example 1** LCD or memory chip repair system.

System moves the stage to a specified location, MProbe is used to measure the thickness of oxide/resist layer, laser power is adjusted based on measured thickness and connecting resist is burned. System moves to the next point

**Example 2.** Measuring coating on bottles

Glass bottles (e.g. beer bottle) have a thin tin oxide ($Sn_2O_3$) "anti-scratch" coating. This coating thickness need to be tested in production.
Testing machine picks a bottle from production line, rotate and move it to measure the thickness of the coating at different locations. The movement is synchronized with the MProbe measurement.

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## II. PLC server integration

PLC server is a version of the TFC-Server and is a part of the TFCompanion library. TFCServer in Modbus mode is started from the command line and accepts TCP-IP commands from the external client.
The external software (client) communicates with the server over TCP-IP using a set of the specified command (API). In contrast to the Modbus integration, it has a “looser” integration. For example, client starts the measurement and results are send continuously to a specified location (PLC) or another server until client sends a stop command

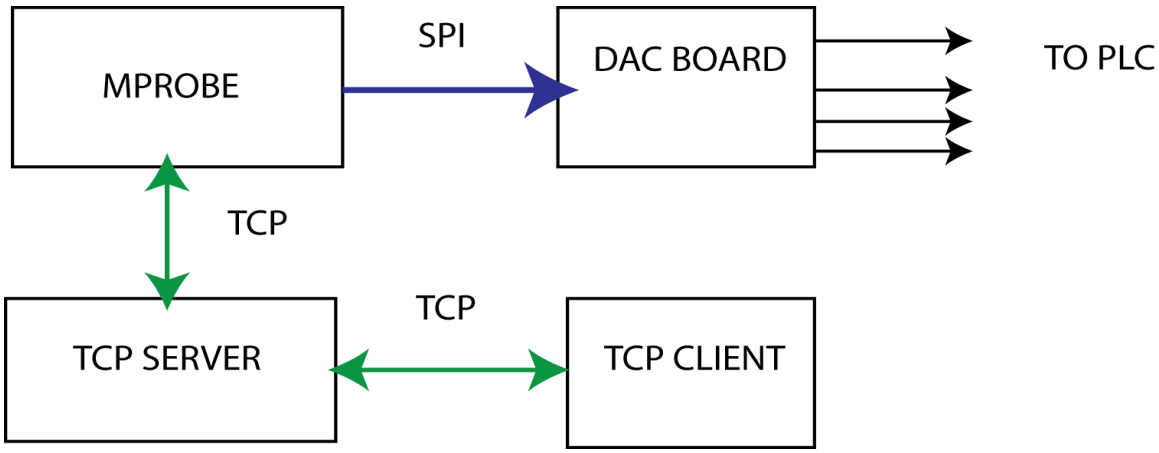


**Fig.4 TCP (PLC) server integration with analog output to the PLC**

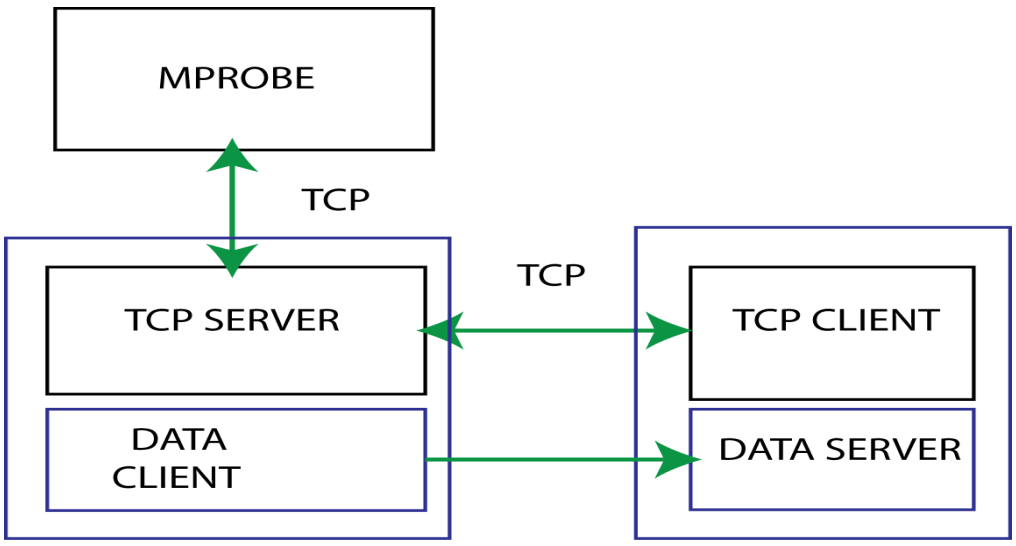


**Fig.5 TCP (PLC) server integration with result sent over TCP-IP**

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This integration options geared toward continuous measurement, where control and timing of individual measurements is not required.

The use-case scenario - roll-to-roll production.

Example 1. Roll-to-roll production PET

PET is coated with adhesive and dried. MProbe is mounted on the scanner that is moving across the tape width and continuously measure the thickness of the adhesive coating. The measurement results are sent to the PLC in the analog form and synchronized with the position of the PET tape. The measurement performed continuously (24/7) during the line run

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