



## Online professional books

Simatic S7- TIA Portal programming: [Automation!](#)

## lamaPLC Simatic know-how contents

Simatic S7-1500 / S7-1200: [Simatic S7-1500 / S7-1200](#)

Simatic TIA portal (and classic) type-definitions: [TIA Data-types](#)

Simatic TIA SCL commands: [SCL commands](#)

Simatic TIA Basic know-hows: [TIA Portal know-how](#)

Simatic (TIA and classic) Modbus error- and statuscodes: [Simatic Modbus S7 error- and statuscodes](#)

Simatic S7 PLC types: [S7 PLC types](#)

Simatic TIA lamaLibrary: [Simatic LamaLibrary](#)

Simatic TIA Diagnose generator: [TIA Diagnose generator](#)

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## lamaPLC Arduino know-how contents

[Arduino basics](#)

[Arduino display](#)

[Arduino wiring](#)

[Arduino MKR family](#)

[Espressif ESP family](#)

[STM32F10: ARM STM32 Minimum System Development Module Board](#)



### Software

[Arduino code collection](#)

[Arduino - OLED SH1106 with AHT20/BMP280 Sensor](#)

# lamaPLC Communication basic contents

1-Wire basics **AS-i basics** Bluetooth basics **CAN basics** ControlNet basics **DALI basics** DASH7 basics **deviceNet basics** DMX512 basics **EtherNet/IP basics** GPS basics **I<sup>2</sup>C basics** IE basics **Interbus IoT basics** **KNX / EIB basics** LoRa / LoRaWan / LoraMesh **Matter basics** Modbus basics **MQTT basics** NFC basics **nRF24 basics** OPC basics **PowerLink basics** ProfiBus basics **ProfiNet basics** RS-232 basics **RS-422 basics** RS-485 basics **Sinec H1 basics** SPI basics **TCP / UDP basics** Thread basics **UART basics** USB basics **Wifi basics** Wiegand basics **WS2812 basics** Z-Wave basics **Zigbee basics** IEC 61850

## LamaPLC Sensoric / Actoric / Display Content

### Display Module

#### lamaPLC: Displays

##### Display moduls

 <p><b>DM56A04 / DM36B06</b> digital tube display with Modbus Communication</p>	 <p><b>TM1650</b> 7-Segment Display with I<sup>2</sup>C like or Modbus Communication</p>
 <p><b>HT16K33</b> 7-segment display with I<sup>2</sup>C communication</p>	 <p><b>HT16K33</b> 7-segment display with I<sup>2</sup>C communication</p>
 <p><b>TM1637</b> 7-segment display with I<sup>2</sup>C-like protocol</p>	 <p><b>LCD 1602/2004</b> with I<sup>2</sup>C communication</p>
 <p><b>SSH1106/SSD1306</b> OLED Display with I<sup>2</sup>C communication</p>	 <p><b>ST7789 driver</b> TFT-LCD screen driver with SPI/I<sup>2</sup>C communication</p>



[st756x display drivers](#)

ST7565, ST7567, GM12864, GM12864-59N, GM12864-03A, GM12864-01A, GME12864-41

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[hmi](#), [display](#), [lcd](#), [oled](#)

## Actors

### lamaPLC: Actors

#### Switches / Relays / SSRs



[Multi-channel optocoupled relay module](#)

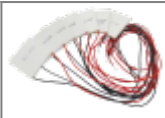
(HL-54, HW-316, KY-019, HFD4/3-S, FY-T734)



[Multi-channel Solid State Relay \(SSR\)](#)

[Module](#)  
(SSR G3MB-202P)

#### TEC / Peltier Elements



[TEC / Peltier Elements](#)

#### MPPT (Maximum Power Point Tracking)



[MPPT](#)

(SD05CRMA)

#### LED controllers / addressable LEDs



[WS28xx: addressable RGB LEDs](#)

#### Motor controllers/drivers



### NEMA units & drivers

(A4988, DRV8825, TMC2208, TMC2209, TMC2225, TMC2240, TB6600, DM556, DM542, DM860, DM860H)

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[actor](#)





## Sensors

### LamaPLC: Sensors




The page below lists sensors compatible with microcontrollers such as Arduino, Raspberry Pi Nano, ESP32, and ESP8266, as they operate at 3.3V/5V signal levels.

The search is easier in the [summarized abbreviation index](#), depending on the type designation.

#### Temperature, Humidity, Air-pressure, Gas, Air-quality Sensors and Module

 <p><b>AHT10 Modul</b> Temperature, Humidity + Arduino example code</p>	 <p><b>ENS160 + AHT21</b> Air Quality Sensor - CO, ECO, TVOC, Temp &amp; Humidity Module</p>
 <p><b>AHT20/BMP280 Modul</b> Temperature, Humidity, Air pressure + Arduino example code</p>	 <p><b>MAX31865</b> RTD to Digital Converter - PT100/PT1000 Platine</p>
 <p><b>PTA8C04</b> 4-channel PT100 Modbus Modul with Modbus RTU + Holding Registers Description</p>	 <p><b>NT18B07</b> 7 Kanal RS485 Temperature Sensors with Modbus RTU + Holding Registers Description</p>
 <p><b>DS18B20</b> 1-Wire Digital Thermometer</p>	 <p><b>BMP/BME</b> Bosch Temperature/Humidity/Pressure sensors with I<sup>2</sup>C communication (BME280, BME680, BMP180, BMP280, ...)</p>

 <p><b>DHT</b> Temperature / Humidity sensors with 1-wire / I<sup>2</sup>C communication (DHT11, DHT20, DHT22/AM2302, ...)</p>	 <p><b>DPS</b> Infineon Temperature/Pressure sensors with I<sup>2</sup>C communication (DPS310)</p>
 <p><b>D6T</b> Omron Non-Contact Thermal Sensors with I<sup>2</sup>C communication (D6T-32L, D6T-44L, D6T-8L, D6T-1A, ...)</p>	 <p><b>GM</b> MEMS Gas-sensors (GM-102b, GM-302b, GM-502b, GM-702b, ...)</p>
 <p><b>ENS</b> ScioSense Multi-gas sensors with I<sup>2</sup>C communication (ENS-160)</p>	 <p><b>HTU</b> TE Connectivity temperature/humidity sensors with I<sup>2</sup>C communication (HTU-21)</p>
 <p><b>MQ</b> Winsen Gas-sensors (MQ-2, MQ-3, MQ-4, MQ-5, MQ-6, MQ-7, MQ-8, MQ-9, MQ-131, MQ-135, MQ-137, ...)</p>	 <p><b>SGP</b> SGP Sensirion TVOC/VOC sensors with I<sup>2</sup>C communication (SGP30, SGP40, SGP41, ...)</p>
 <p><b>SHT</b> Sensirion Temperature/humidity sensor with I<sup>2</sup>C communication (SHT20, SHT21, SHT25, SHT30, SHT31, SHT35, SHT40, GY21, ...)</p>	 <p><b>HDC</b> Texas Instruments Temperature/humidity sensors with I<sup>2</sup>C communication (HDC-1080)</p>
 <p><b>CJMCU-6814</b> combined gas sensor module for CO, NO<sub>2</sub>, NH<sub>3</sub> (MICS-6814)</p>	 <p><b>MH-Z19</b> series of NDIR CO<sub>2</sub> sensors (MH-Z19B, MH-Z19C, MH-Z19D, MH-Z19E)</p>
 <p><b>CJMCU-811 CCS811</b> Gas Sensor (VOCs TVOC CO<sub>2</sub>)</p>	 <p><b>Sensio SCD CO<sub>2</sub> measurement module</b> (SCD30)</p>



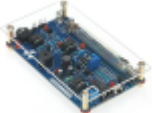
 <p><b>Senson SCD CO<sup>2</sup> measurement module</b> (SCD40, SCD41)</p>	 <p><b>MLX90614 (GY-906)</b> infrared non-contact thermometer</p>
 <p><b>XGZP68xx</b> Silicon Pressure Sensors / Module (XGZP6810D, XGZP6857D, XGZP6859D, XGZP6887D, XGZP6897D, XGZP6899A)</p>	

**Distance measurement, Gesture Recognition, Optical flow, Motion**

 <p><b>HC-SR04</b> Ultrasonic Sensor Module</p>	 <p><b>VL53Lnn</b> STMicroelectronics time-of-flight (ToF) laser-ranging sensors with I<sup>2</sup>C communication (VL53L0X, VL53L1X, VL53L0/1XV2, GY-530, ...)</p>
 <p><b>VL6180X</b> STMicroelectronics Time-of-Flight (ToF) sensor with I<sup>2</sup>C communication</p>	 <p><b>TOFnnnC</b> STMicroelectronics Time-of-Flight (ToF) sensors with I<sup>2</sup>C communication (TOF050C, TOF200C, TOF400C, ...)</p>
 <p><b>PAJ</b> Pixart gesture recognition sensors/module with I<sup>2</sup>C communication (PAJ7620U2, GY-PAJ7620)</p>	 <p><b>APDS</b> Avago ALS and proximity detection sensors with I<sup>2</sup>C communication (APDS-9900, APDS-9930, APDS-9960)</p>
 <p><b>M01</b> V0.4 Laser ranging sensor with UART communication</p>	 <p><b>A0221AU/A02YYUW</b> Waterproof Ultrasonic Distance Sensor with UART communication</p>
 <p><b>Waveshare TOF</b> Laser Range Sensor with UART / I<sup>2</sup>C communication</p>	 <p><b>RD-XX</b> Ai-Thinker Radar Module with UART communication (RD-01, RD-03, RD-03D, ...)</p>

 <p><b>RCWL</b> Microwave radar sensor (RCWL-0516)</p>	 <p><b>CJMCU-3901/PMW-3901</b> compact optical flow sensor module/IC by PixArt with SPI communication</p>
 <p><b>PIR sensors</b> (HC-SR501, HC-SR505, AM-312, EKMB/EKMC)</p>	 <p><b>LM393 sensor</b> (FC-03, HC-89) Infrared Speed Sensor Module</p>



**Light, Ambient light, Proximity, Radiation**






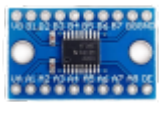
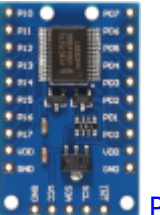
 <p><b>CJMCU-3216 / AP-3216</b> integrated digital ambient light and proximity sensor module/IC with I<sup>2</sup>C communication</p>	 <p><b>LM393</b> (KY-026) Flame Sensor (IR) Module</p>
 <p><b>RadiationD</b> Geiger counter module with tubes (J305, J321, M4011, SBM-20, STS-5, LND-712)</p>	

**Motion detection, Magnetometer, Magnetic angle sensors, 6DOF, Vibration**



 <p><b>MPU-9250/6500</b> 9-axis motion detection module</p>	 <p><b>MPU-6050 (HW-123, GY-521)</b> 6-axis MotionTracking device</p>
 <p><b>Magnetic angle sensors</b> (AS5047P, AS5600, MT6701, MT6816, MT6835, TLE5012B)</p>	 <p><b>GY-511</b> 6DOF sensor module</p>
 <p><b>Vibration sensors</b> (GXFM0459, LDTM-028K)</p>	

**Signal Converters, Shift Registers, I/O\_Expanders**



 <p><b>PCA9306</b> I<sup>2</sup>C Voltage Level Translator</p>	 <p><b>CJMCU-164</b> SN74HC164D 8-bit Shift Register Module</p>
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 <p><b>TTL to RS485 Module</b> MAX485</p>	 <p><b>TCA9548A</b> (HW617); Low-Voltage 8-Channel I<sup>2</sup>C Switch Module</p>
 <p><b>MCP23017 / MCP23S17</b> (CJMCU-2317) 16-Bit I/O Expander with Serial Interface I<sup>2</sup>C / SPI</p>	 <p><b>SC16IS750 / SC16IS752</b> One or two serial (UART) ports from microcontroller via I<sup>2</sup>C or SPI communication (CJMCU-750, CJMCU-752)</p>
 <p><b>Texas Instruments ADCs</b> Delta-sigma multi-channel Analog Converters with SPI communication (ADS111x, ADS12xx)</p>	 <p><b>TXS0108E (HW-0108)</b> 8-channel, bidirectional 5V-3.3V logic level converter</p>
 <p><b>PCF857x</b> I/O Expander chip/modul with I<sup>2</sup>C communication (PCF8574, PCF8574A, PCF8575)</p>	



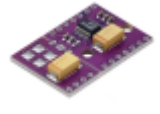
**Amplifiers, DC-DC converters, PWM signal converters**

 <p><b>XY_MOS</b> MOS FET Drive Module 400W Support PWM Controller</p>	 <p><b>CJMCU-8221</b> Analog Devices Precision instrumentation amplifier module</p>
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**Weight sensors**

 <p><b>YR-3180</b> YR-3180 - Weight sensor module with UART or Modbus communication + Modbus map</p>	 <p><b>HX711</b> 24-bit analog-to-digital converter (ADC)</p>
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**Energy harvesting (EH)**

 <p><b>LTC-3588</b> Nanopower energy harvesting power supply IC</p>	 <p><b>BQ25570 / CJMCU-2557</b> Texas Instruments nano-power management IC and module</p>
 <p><b>LTC-3108-1</b> Ultra Low Voltage Boost Converter Power Manager Breakout Board</p>	


**Energy, power, current, voltage, XDCP**

 <p><b>INA-Moduls</b> current/voltage/power monitor with I<sup>2</sup>C communication INA219 INA226 INA228 INA237 INA238 INA260 INA3221</p>	 <p><b>CJMCU-219/INA-219</b> breakout board/IC with I<sup>2</sup>C communication</p>
 <p><b>Allegro ACS758</b> Hall-effect linear current sensors (CJMCU-758)</p>	 <p><b>Digitales Potentiometer Board Moduls</b> Renesas X9C series (X9C102, X9C103, X9C104, X9C503)</p>

**Magnetic, Induction, Angle**

 <p><b>AS5600</b> Magnetic Induction Angle Measurement Sensor Module</p>
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**Healthcare sensoric**

 <p><b>MAX30100/MAX30102</b> Heart Rate Click Sensor Module</p>	 <p><b>CJMCU-6701</b> Biosensor for measuring Galvanic Skin Response (GSR) with SPI communication</p>
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**Audio, Microphone**

 <p><b>MAX4466/MAX9814</b> Low-noise Microphone Preamplifiers</p>	 <p><b>LM393</b> (HW-484, KY-037, KY-038) High-Sensitivity Sound Detection Module</p>
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[sensor](#)

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