

ISWiFi – firmware

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Changelog

Rev	Data	Opis	Autor
1.0	05.03.17	Init draft	M.R.
1.1	04.04.17	Internacionalization	M.R.

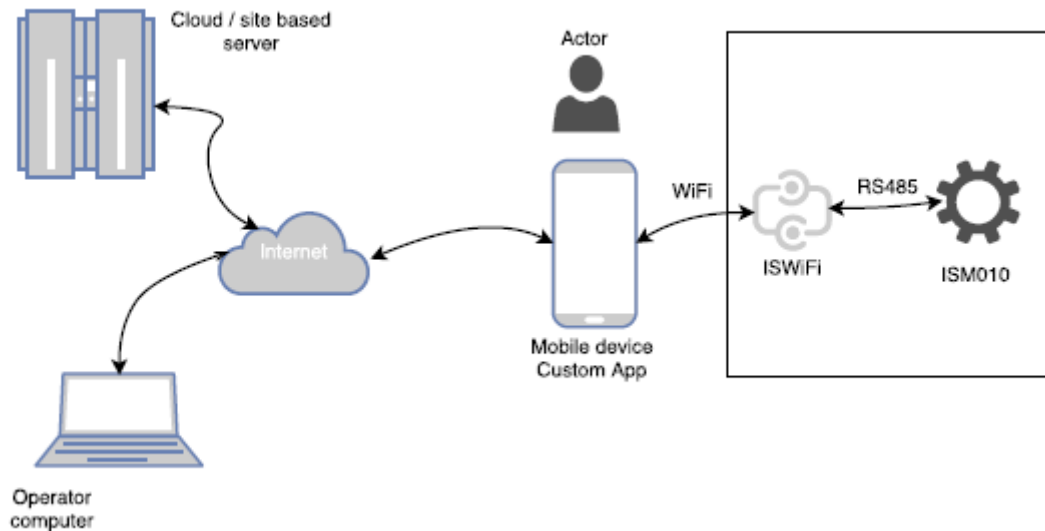
Related Documents

ID	Title	Version	Date	File	Author
[1]	Moduł komunikacji bezprzewodowej ISWiFi	3	02-03-2017	ISWiFi_moduł.pdf	R.Smaga
[2]	ISWiFi Communication	1.01	04.03.17	Komunikacja.pdf	M.Radziwon
[3]	Parametry	1.01	5.03.17	Parametry.pdf	M.Radziwon

Hardware

Firmware should run on STM32F105 microprocessor embedded in system described in [1].

System



ISWiFi is a part of bigger system aimed to enable control and supervision of ISM010 device over internet. ISWiFi is a device equipped with WiFi and Ethernet modules, which should act as a REST API server for incoming connections, and be a proxy device to poll MODBUS communication over RS485.

ISWiFi is designed to be powered by a FreeRTOS operating system.

Functionality

Reading state of ISM 0-10

ISWiFi should dump all registers (1-16 & 501-634) of ISM010 during powerup and after forcing software reset.

ISWiFi should have a low priority cyclic (with interval defined in /Properties/QueryInterval) checkup of ISM010 registers (2-16) and store it as cache for retrieval via Wifi or Ethernet and for logging.

A change in any of the parameters should be compared against parameter stored in /Query/SensRange. SensRange contains a percentage value, which multiplied by chached value defines a threshold for change detection. When change („big enough”) is detected, chached value is updated.

Some values, at their update may require to be written to one or more logs.

After each successful MODBUS poll, parameter /ISM010_available should be set to true.

Server REST API

ISWiFi should serve a REST API server with msgpack encoded payload. Details of communication is described in [2], list of parameters in [3].

Server should be available on both WiFi and Ethernet connections. In order to prevent race conditions, an ongoing communication on one interface should temporarily block connections on the other (http reply: 423 Locked).

Each request for ISM010 parameter should induce a MODBUS query, the exact reply should be sent to client. If reply is different than cached value, the cached value should be updated even if it does not satisfy SenseRange trigger.

/ISM010_restart request forces entry to event log, and permanent log.

Each parameter write should be logged in events log, and should populate fields /Properties/LastChange and /Properties/Changes

Each request for deletion of file forces entries for event and permanent log

Logger

Each logger should create csv files with \t as separators and CRLF as EOL.

Each entry should contain of textual time and date, unix time, and entry string.

Each logger file should accommodate maximum of 256 entries. Then a new file should be created with the same name and suffix _x, where x is a consecutive number. When 90% of memory is used, the oldest deletable file should be deleted before creating a new one. Deletable files are all besides permanent log files.

Writing should be brownout save – i.e. it should not corrupt SD card in case of loss of power during operation.

Pernament Log

This file should be impossible to delete via API. It includes log of the most important events:

- deletion/clear of other log files
- change of ISWiFi own parameters (write)
- change of ISM010 parameters (write)
- API induces reset,
- lockout reset
- powerup
- change of time settings (/Time/Time)

Events log

Event log should contain following entries:

- establishing a connection via WiFi or ethernet (log MAC address?)
- Brownout
- sartup
- change of ISM010 phase (parameter 10) from 00 na 01 (system start)
- change of ISM010 phase (parameter 10)
- file access (/Data/{filename}) – timestamp and file
- API restart
- API file deletion
- lockout reset
- change of ISM010 or ISWiFi parameter through API
- error occurance (error code + consecutive error number (consecutive error number non-resettable))

Error Log

Error log should contain information about errors appearing in ISM010 parameter 13 and 09; their automatic disappear (in case of error from 13) and via lockout reset (09). Error log entry should clearly indicate the origin of error.

Each error should be assigned with non-resettable consecutive error number.

Value Log

Each entry comes from update described in Reading state of ISM 0-10.

Temperature Controller

The device should have two simple hysteresis based temperature controllers.

$T < T_{0-H} \rightarrow$ out changes to HIGH

$T > T_0 \rightarrow$ out changes to LOW

Temp sensor is KTY81 sensor