|  |  |  |
| --- | --- | --- |
| **Title:** | **Software Subsystem Requirement Specification <ServicePort Subsystem>** | |
| **Distribution** |  | |
| **Author** | Ganapathi R.  Hao Wu | Date: 2012-11-30 |
| **Review** | Paul Li  Xiaojin Kuang | see Specification Review |
| **Approved** | Rock-Rendong Li | 2012-12-03 |
| **Remarks** | | |

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# Introduction

## Scope

This document is intended to detail the requirements of the 2Wire Common Topworks project’s ServicePort on Communication Board.

## Definitions

|  |  |
| --- | --- |
| **Term** | **Definition** |
| 2Wire Common Topworks | Based on 266 design, improve the re-use of previous common components to build a new platform for ABB 2Wire devices |
| CB | Communication board |
| FE | Front-end Board |

## Acronyms and Abbreviations

|  |  |
| --- | --- |
| HART | Highway Addressable Remote Transducer |
| HMI | Human Machine Interface |
| Coordinator Subsystem | 2wire subsystem providing initialization and scheduling |

## Document Conventions

Software requirements are identified using the following in-line table format:

| Ident. | Definition / Motivation | Priority | Source |
| --- | --- | --- | --- |
|  |  | **Stability** |

Each field is described in the following list:

**Ident.** a unique identifier for the Requirement

**Priority** one of: **M**andatory / **D**esirable / **F**uture

**Stability** one of: **C**ommitted (Agreed by approvers) / **N**ot yet agreed / **L**ikely to change

# Overall Description

Service port is auto-enabled when HMI is unplugged. Service port is disabled and HMI functionality is restored when HMI is plugged back to the HMI port.

ServicePort subsystem shall provide a method for coordinator to scan the HMI presence pin. Service port is enabled if the HMI presence pin is read low.

The following is use case.



Figure 1: Service Port Use Case

# Assumptions and Dependencies

## Assumptions

All service port functionalities are initiated and called by coordinator subsystem.

## Dependencies

* The ServcePort subsystem will be developed for 2Wire platform.
* Development and testing will be done regarding to the following conditions:
  + Compiler: IAR Compiler V3. 40
  + Framework: 2.3.0

# Constrain

The following requirements are related to the fact that ServicePort subsystem should base on, or the features should be developed in the subsystems.

## ABB Framework

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 4.1 | **ABB Framework**  ServicePort Subsystem shall base on ABB framework 2.3.1 [1]. | **Stability**  C |

# Non-functional Requirement

## Optimization Requirement

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 5.1 | **Optimization**  No compiler optimizations are permitted. | **Stability**  C |

## Module Test Requirement

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 5.2 | **Module test**  ServicePort Subsystem shall have module test. | **Stability**  C |

## Code Static Check Requirement

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 5.3 | **Code Static check**  ServicePort Subsystem shall pass pc-lint check (Level 3). | **Stability**  C |

## Integration Test Requirement

| Ident. | Definition / Motivation | **Priority**  D | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 5.4 | **Integration test**  2Wire platform integration test shall include ServicePort Subsystem. | **Stability**  C |

# Functional Requirements

## General

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.1 | **Purpose:** Fast serial HART for fast configuration of the transmitter.  *Note:ServicePort provides a digital HART communication for configuration. It only supports 4 commands.* | **Stability**  C |

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.2 | Uses same serial port as HMI. (UART1) | **Stability**  C |

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.3 | 1. Functionally, service port is not different from the HART subsystem. But for the fact that it supports only limited commands. 2. Protocol shall use HART “Data Link Layer Specification”[5]. | **Stability**  C |

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.4 | HMI presence pin is continuously scanned.   1. If HMI is unplugged, service port is automatically enabled. 2. If HMI is plugged, service port is automatically disabled. | **Stability**  C |

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.5 | ServicePort manage the power supply for itself and Physical HMI. | **Stability**  C |

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.6 | Speed of the service port in terms of baud rate shall up to 19200. | **Stability**  C |

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.7 | Service port shall be half duplex client-server same as HART. | **Stability**  C |

## Command Description

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.8 | The service-port shall support following HART commands.   1. Read Object 2. Write Object 3. Read Memory 4. Write Memory | **Stability**  C |

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.9 | **Command 1, Read object.**  Request:   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Pream | Delim | Add | Cmd  1 | Len | Board  Add | Fe  Add | Sub  Idx | Obj  Idx | Attr  Idx | Data | Check  Sum |   Response:  Same frame of request plus 2 bytes of response code before Board bytes. Data field will contain value read. | **Stability**  C |

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.10 | **Command 2, Write object.**  Request:   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Pream | Delim | Add | Cmd  2 | Len | Board  Add | Fe  Add | Sub  Idx | Obj  Idx | Attr  Idx | Data | Check  Sum |   Response:  Same frame of request plus 2 bytes of response code before Board bytes. Data field will contain requested data. | **Stability**  C |

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.11 | **Command 3, Read memory**  Request:   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Pream | Delim | Add | Cmd  3 | Len | Board  Add | Fe  Add | Mem  Add | Mem  Len | Data | Check  Sum |   Response:  Same frame of request plus 2 bytes of response code before Board bytes. Data field will contain value read. | **Stability**  C |

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.12 | **Command 4, Write memory**  Request:   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Pream | Delim | Add | Cmd  4 | Len | Board  Add | Fe  Add | Mem  Addr | Mem  Len | Data | Check  Sum |   Response:  Same frame of request plus 2 bytes of response code before Board bytes. Data field will contain requested data. | **Stability**  C |

## Board and Fe Address

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.13 | All Service Port commands can operate on both CB and FE. Service Port has to differentiate on which board it has to read or write. This functionality is performed via 2 information received into request frame:   * Board: 0 is CB, 1 is FE * FE address: when Board is set to FE, FE address byte is used as communication address, otherwise it is discarded.   This solution is adapted to reduced code size and to simply factory operations. | **Stability**  C |

# Safety Requirements

| Ident. | Definition / Motivation | **Priority**  M | Source  R&D |
| --- | --- | --- | --- |
| ServicePort 6.14 | **Safety Loop**  Coordinator is not in the safety loop[[3](#Ref4)]. | **Stability**  C |

# Manufacturing

None

References

|  |  |
| --- | --- |
| **Ref.** | **Document** |
| [1] | [DD028]ABB BUI Common Framework release 2.3.1 |

Revision Chart

|  |  |  |  |
| --- | --- | --- | --- |
| **Rev.** | **Description of Version/Changes** | **Primary Authors** | **Date** |
| 00 | First Release | Ganapathi R | 2009-09-22 |
| 01 | Second Release;  ServicePort 6.6: Only one baud rate 19200  ServicePort 6.7:half duplex | Hao Wu | 2012-11-30 |

Review

**First Review**

|  |  |
| --- | --- |
| **Document Revision:** | 00 |
| **Review Date:** | 2009-09-22 |

**Second Review**

|  |  |
| --- | --- |
| **Document Revision:** | 01 |
| **Review Date:** | 2012-11-30 |

**Review-Participant:**

|  |  |  |
| --- | --- | --- |
| *Dept.* | *Name* |  |
| R&D Lenno | Roberto Colombo | 2009-09-22 rev01 |
| INCRC Bangalore | Ashwin Herur |

|  |  |  |
| --- | --- | --- |
| *Dept.* | *Name* |  |
| R&D ShangHai | Paul Li  Xiaojin Kuang | 2012-11-29 rev02 |

**Decision of the Review:**

|  |  |  |
| --- | --- | --- |
|  | *Decision* | *next steps* |
| **X** | Inspection passed ***without restrictions*** | Phase finished |
|  | Inspection passed ***with restrictions*** | some changes must be done |
|  | Inspection ***not*** passed | Inspection must be repeated |

**Changes Are Proved:**

The Reviewer confirms that all changes are done:

|  |  |  |
| --- | --- | --- |
| proved Rev: | Date: | Reviewer: |
| 00 | 2009-09-22 | Roberto Colombo  Ashwin Herur |

|  |  |  |
| --- | --- | --- |
| proved Rev: | Date: | Reviewer: |
| 01 | 2012-11-30 | Paul Li  Xiaojin Kuang |

**Check List**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Yes | No | N.A. |
| 1. | Does the specification explain the currently known requirements that the product finally has to perform? | **X** |  |  |
| 2. | Are complex subjects explained? | **X** |  |  |
| 3. | Are all used abbreviations and technical expressions explained? | **X** |  |  |
| 4. | Are all referenced documents in the reference list? | **X** |  |  |
| 5. | Contains the document a rough overview of the product’s main functionality? | **X** |  |  |
| 6. | Are all requirements referenced? | **X** |  |  |
| 7. | Are all requirements testable? | **X** |  |  |
| 8. | Is the typical environment of the product described? | **X** |  |  |
| 9. | Is defined which components already exist, will be bought or self-written? | **X** |  |  |
| 10. | Are safety requirements (e.g error-detection, error-handling) specified? |  |  | **X** |
| 11. | Are service/update requirements described? | **X** |  |  |
| 12. | Are all dependencies to other requirement documents considered? | **X** |  |  |
| 13. | Are templates used in a correct manner? | **X** |  |  |
| 14. | Are all open issues transferred to the defects table? | **X** |  |  |

**Defect**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Checkpoint | Description | Major Defect | Done date |
| 1 | ServicePort 6.6 | ServicePort only support one baud rate 19200 | Y | 2012-11-30 |
| 2 | ServicePort 6.7 | Communication is not an full duplex. It is a half duplex used as in client/server mode. | Y | 2012-11-30 |