Introduction

1 Incomprehensibility

A long story of incomprehensibility has followed (and often also preceded) the ISA Fieldbus Data Link Layer (DLL) documents. That is due to several reasons: some real ones, others only imagined but repetitively suggested and spread around by some of the people who did not agree with the proposal.

1.1 Standard style

First of all, the fear of compelling something relevant only to the implementation domain always pushes standard documents not to describe "why" or "how" but just "what" to do.

That, in this particular case of fieldbus, made things even worse than usual because of the existing experiences and approaches of many experts being radically different; it led to real problems (and it eased many imagined ones) in mutual understanding.

1.2 Features variety

Due to the differences between the existing fieldbus approaches, the technical and diplomatic need of merging them has always been the key issue of all the ISA DLL efforts and has so increased the variety of features and the complexity of the structure within such a document that tries to harmonize them all.

1.3 Many updates

Then, the long path followed in order to chisel a proposal that could be really agreed by all the different existing approaches has caused the need to frequently update, partially re-write, or delete, or add many parts of the ISA Fieldbus DLL drafts along several years.

And this, of course, did not give the documents the same clear structure as an immediate paper would have had.

1.4 Effort to understand

Finally, we have to remind how only "if" and "when" we really want to implement something, then we make the effort to understand it. When we already have an existing, even if not universal, alternative why should we make such an effort?

2 Tutorial target

Well, as done in previous editions, this tutorial aims to fill such need of explaining the "why" and "how" relevant to "what" has been included in the ISA Fieldbus DLL documents.

Differently from the past, when the addressed audience was mainly made of the members themselves of the ISA committees (see last part of 1.1 above), this edition would also like to address the people who, so far, have not had any contact with the ISA Fieldbus DLL documents. At the same time, we would like to save all the detailed tutorial material prepared in the past. In the foreword below we'll see how this kind of compromise has been reached.

Foreword

We have chosen to split the tutorial in two parts:

<u>Part A</u> - to ease the first approach to the ISA Fieldbus DLL documents by means of the following goals:

- Presenting the peculiar reasons why some of the features have been included
- Giving the flavor of its main features
- Making simple examples or graphic representation of such features

<u>Part B</u> - to ease the eventual consequent study of the ISA Fieldbus DLL documents by means of the following goals:

- Linking separate parts of this standard relevant either to the same subject or to correlated items
- Making detailed examples of this DLL mechanism

Some of the clauses of Part B are not yet available; that is also because Part B is a collection of already existing works done during the ISA committee activity. Still we decided to publish this tutorial even if Part B is incomplete, both for the reasons listed in its Introduction, which seem to urge its Part A and as an invitation too for some other committee members to work on it in some future joint efforts.

Whenever possible, all parts and subparts of the tutorial refer to the relevant ISA Fieldbus DLL documents clauses and subclauses to help in tracing each subject all along the standard documents.

The **following planning table**, for each one of the above parts and relevant goals, relates the DLL main features, which are described in this tutorial, to the relevant clauses/subclauses of this document.

NOTE — By using such a table, the reader, only interested to an external viewpoint over this DLL, could go rapidly through the "reasons why features exist," "examples/graphic representations" and the "flavor" of just those corner-stone features marked by "*".

As a general rule, we will use prefixes "A" and "B" to indicate a clause/subclause contained in the two parts of this document while PIII and PIV will refer to clauses/subclauses of, respectively, Part III (DLL Services) and Part IV (DLL Protocol) of the ISA Fieldbus Document (to be more precise, of ISA-S50.02, Part 3-1997 and ISA-S50.02, Part 4-1997).