'Quick Start Guide' for the MTL 931x-FB Fieldbus Barrier Calculator

1. Introduction

The design of fieldbus networks incorporating MTL's 931x-FB Fieldbus Barriers is easy using this calculator tool. The tool checks for the correct electrical operation of fieldbus segments, taking into account the following parameters*:

- DC characteristics of the Power Supply, Fieldbus Barriers and Field Devices
- DC losses due to cable loop resistance
- Ambient temperature of the cables (based on the cable temperature coefficient)
- Permitted Spur cable lengths
- Permitted Segment cable lengths
- Fieldbus terminators

*In accordance with:
IEC 61158-2: 2003; Foundation Fieldbus: Document AG-140s - Wiring and Installation 31.25 kbits/s, voltage mode, wire medium
Profibus PA: Technical Guideline - Profibus PA - User and Installation Guideline Version 2.2

2. Installing and launching the 931x-FB Fieldbus Barrier Calculator

- System Requirements: Microsoft Win 98, NT, 2000, XP, XP64 with .NET Framework 1.1
- Outdated program versions should be de-installed.
- *If installing from CD:*
  Insert the installation CD into your CD-ROM drive. If the installation routine does not start automatically, run file *Setup.msi*. Follow the on-screen prompts
- *If installing from a Zip file:*
  Unzip and save the *Setup.msi* file to a suitable drive. Double click the *Setup.msi* file to begin installation and follow the on-screen prompts.
- After installation is complete, launch the 931x-FB Fieldbus Barrier Calculator.

3. Creating a Fieldbus segment

File ➔ New ➔ Foundation Fieldbus (FF) - for Foundation Fieldbus segment calculations
File ➔ New ➔ Profibus (PA) - for Profibus PA segment calculations

a) Default selections can be made in the Segment Properties box, to be applied to the whole segment:

- Trunk and Spur cable type (loop resistance)
- Ambient cable temperature (cable losses increase with temperature)
- Field Device load current
- Default Spur cable length
- Field Device minimum voltage: (Field Devices require 9 V)
- Short circuit check option: This should normally be enabled; one spur short circuit is assumed within a segment

A text string of up to 40 characters may be entered in the 'Segment name' field.

b) Select a suitable Fieldbus Power Supply type. If the desired type is not shown, select 'Generic Type' and set the appropriate parameters for output voltage and current. The operating current of the Host may also be set; if unknown, assume 20mA.

For Profibus (PA) segments, set the Coupling Device parameters voltage and nominal current.

c) Activate the 931x-FB modules in turn by selecting from the pull-down menu in the Fieldbus Barrier boxes, beginning with Fieldbus Barrier 1. Up to 4 Fieldbus Barrier modules can be set up on one trunk.

d) Set the corresponding value for Trunk cable length and cable loop resistance for each Trunk Section used.

e) To activate the near-end terminator, check the box in the fieldbus power supply. The far end terminator should be enabled by checking the box in the in the last Fieldbus Barrier.

f) Spur connections are enabled by checking the spur boxes at each Fieldbus Barrier. The spur parameters assume the default values set up in the Segment Properties box, but may be changed individually by entering values in the relevant fields at each Fieldbus Barrier.
For documentation reasons, each spur can be provided with an appropriate name by entering text in the 'Field Device' box. A tag name can also be entered for each Fieldbus Barrier in the 'Name' text field. The maximum text length for the spur and Fieldbus Barrier tags is 40 characters.

4. Interpreting Segment Errors

The 'Fieldbus' box in the Segment Properties box indicates the status of the segment. Detected errors are displayed in the window at the bottom of the screen.

- *Trunk undervoltage ERROR*: indicates insufficient voltage at the trunk connections of one or more Fieldbus Barrier
  - o Use a Fieldbus Power Supply with higher output voltage
  - o Select a trunk cable with lower resistance
  - o Reduce the trunk cable length
- *Trunk overload ERROR:* indicates insufficient output current available from Fieldbus Power Supply
  - o Use a Fieldbus Power Supply with higher output current
  - o Select a trunk cable with lower resistance
- *Short circuit check error: Trunk undervoltage/overload ERROR*: indicates insufficient voltage or current is when a single spur short-circuit is applied.
  - o Use a Fieldbus Power Supply with higher output voltage/current
  - o Select a trunk cable with lower resistance

5. Report screen

The Report screen is selected by clicking on the tab at the foot of the Segment Screen. It displays all relevant segment parameters in a structured text form. The contents can be printed or copied and pasted into other applications.