

**PROFIBUS COMPETENCY CENTRE, AUSTRALIA TECHNICAL SERIES**

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**SUBJECT: DIAGNOSTIC TOOLS**

Each segment in a network should have at least one “piggyback socket” to allow connection of a diagnostic tool. This allows analysis of a segment without affecting operation of the network.

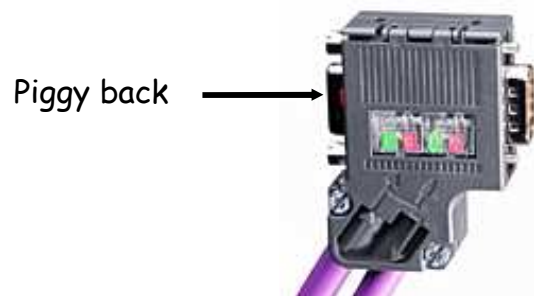


Fig. 1 Example of DP Connector with ‘Piggy-back’ Socket.<sup>1</sup>

Diagnostic bus tools are available from several manufacturers. It is mandatory to use one of these tools during installation and commissioning to minimise wiring faults.

Hand-held testers can typically perform the following checks on PROFIBUS cabling:

- Detection of breaks and short-circuits in lines or screens
- Checking termination resistor settings
- Checking the length of the installed cable
- Determining the location of faults
- Detection of reflection-generating faults

They may also perform some or all of the following checks on PROFIBUS DP slaves:

- Health of RS 485 driver
- Voltage supply for line terminations
- Checking slave addressing

When the Network is operational, there are some higher level Diagnostic Tools available. These are PC based and will normally have a number of features, most importantly:

- Message capture and display with the ability to “trigger” on particular telegrams or conditions.
- Message filtering to allow display of only wanted telegrams.

Other useful features include:

- “Live list” overview showing all devices that are taking part in communications.
- Decoding of the telegrams.
- Oscilloscope triggering facility allowing the capture of the transmitted waveform from a particular slave.
- Network performance statistics and reporting.

Ideally the analyser should be portable and not require a spur line for connection to the network.

An example of this type of analyser is ProfiTrace Ultra, which is a modern PROFIBUS analyser with the following features:

- High-speed analyser for both DP and PA.
  - × Extensive triggering and filtering capability.
  - × PA probe required for PA connection.
- Decoding of all telegrams.
- Built-in high-speed oscilloscope (currently DP only).
  - × PA ‘scope is in development.
- Rapid overview of network health
  - × live list and bar chart
- Health-checking and performance statistics.
- Report generation for documentation.

References:

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<sup>i</sup> CPIC Presentation L02 Verwer Training & Consultancy Ltd.  
The New and Rapid Way to PROFIBUS DP, Manfred Popp

<http://www.profibuscentre.com.au>  
<http://www.profibus.com/>