

PROFIBUS COMPETENCY CENTRE, AUSTRALIA TECHNICAL SERIES		
DATE: Feb, 09	ORIGINATOR: GRANT WEYMAN	DOCUMENT REF: 09/020
SUBJECT: DP SPUR LINES		

Spur-lines can cause reflections to occur. This is due to the additional capacitance introduced by the spur-line cable.

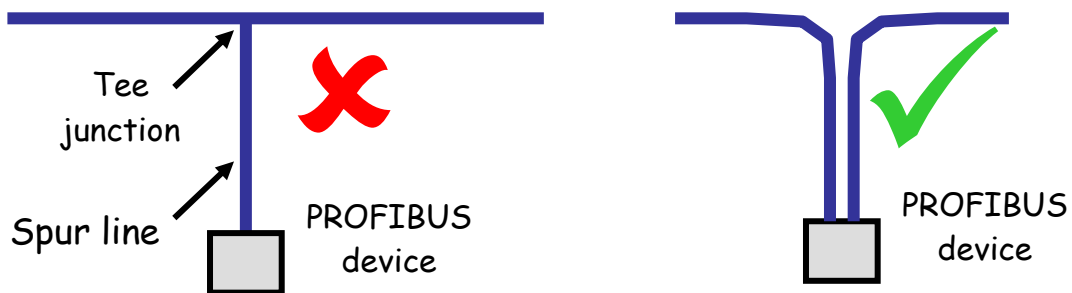


Fig. 1 DP Spur line diagram

The effect of reflections at low bit rates is less significant than at high bit rates, where they become a higher proportion of the signal:

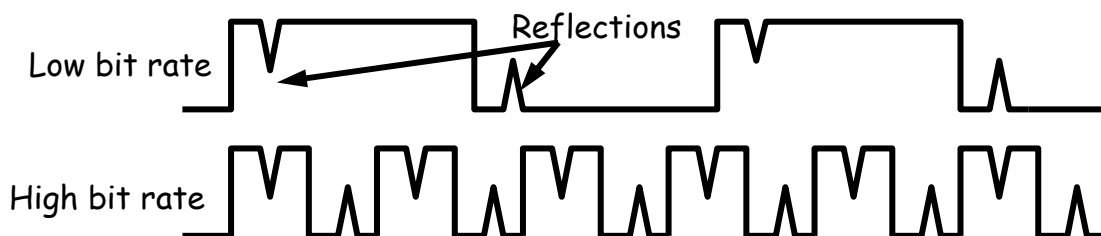


Fig. 2 Reflection Wave Form

Spur-lines are not allowed when using higher baud rates (>1.5Mbit/s). At baud rates lower than 1.5Mbit/s, spur-lines are allowed up to the maximum capacitance for the baud rate. Note that when spur lines are installed, additional termination at the end of a spur-line should not be used! The rule that we must never exceed two terminations per segment, still applies even if using spurs.

Baud rate	Total allowable spur capacitance	Total Spur cable length*
>1.5Mbit/s	None	None
1.5Mbit/s	0.2 nF	6.7m
500kbit/s	0.6 nF	20m
187.5kbit/s	1.0 nF	33m
93.75kbit/s	3.0 nF	100m
19.2kbit/s	15 nF	500m
* Calculated for PROFIBUS cable type A at 30pF/m		

Table 1 Allowable Spur lengths<sup>i</sup>

Points of note:

- The total Spur line length of a segment represents the sum of all Spurs attached to that segment.
- Spurs on DP segments should be avoided where possible.
- Each PROFIBUS device will have a short Spur line carrying the bus signals between the external bus connector and it's RS 485 driver chip.
- Devices are tested for reflections as part of the certification process.
- Uncertified devices can cause reflections.

References:

<sup>i</sup> CPIC Presentation L03 Verwer Training & Consultancy Ltd.  
The New and Rapid Way to PROFIBUS DP, Manfred Popp

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