

SpaceWire IP Tunnel and Protocol Analyser Software

The SpaceWire IP Tunnel software provides a means by which "Virtual Satellite Integration" can be performed. This virtual integration provides the ability to test components of a satellite together, despite those components potentially being a great distance apart. The SpaceWire IP Tunnel software can achieve this through use of the Internet (or some other network). Traffic which would normally be exchanged between components over a SpaceWire link is instead tunnelled through the Internet.

The SpaceWire Protocol Analyser extends the functionality of the IP Tunnel, allowing tunnelled traffic to be monitored and recorded.

SpaceWire IP Tunnel

An example scenario where the Tunnel may be used is shown in Figure 1.

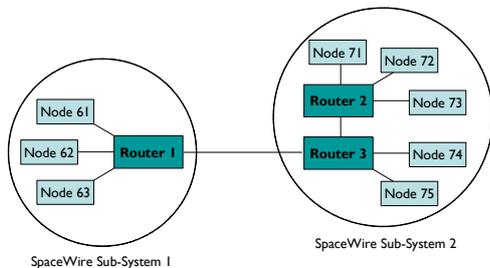


Figure 1: SpaceWire Subsystem Integration

A satellite may consist of two sub-systems, for example one built in Europe and another in the US. These two sub-systems will be tested independently and might not be integrated together until late in the development stage, by which time correcting any problems is likely to be costly.

The SpaceWire IP Tunnel can be used to integrate the two sub-systems virtually, as shown in Figure 2. To establish a tunnel, two PCs running the SpaceWire IP Tunnel software are each connected to SpaceWire IP-Tunnel devices. The first of these devices is connected to the SpaceWire network of one of the sub-systems, while the second device is connected to the other sub-system. Traffic leaving one sub-system will be tunnelled to the other without modification. The only noticeable difference may be in the data rates and latency of the link over the Tunnel.

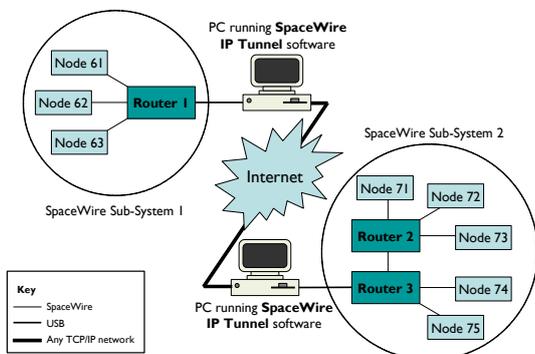


Figure 2: SpaceWire Subsystem Integration with IP Tunnel

In addition to ensuring that all data packets and time-codes pass between the two sub-systems in the correct sequence, the Tunnel also reflects the link status at each end. So if the link is disconnected at one end of the Tunnel, the other end of the Tunnel will also disconnect.

SpaceWire Protocol Analyser

The SpaceWire Protocol Analyser is an extension to the SpaceWire IP Tunnel which analyses the traffic crossing each Tunnel. A Tunnel can be created for each of the two links on the SpaceWire IP Tunnel device. Statistics of the Tunnel can be viewed while the Tunnel is running as shown in Figure 3.

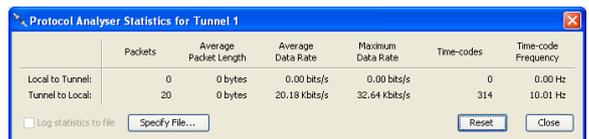


Figure 3: IP Tunnel Software

Traffic can also be recorded and displayed. The properties of the traffic to be recorded can be specified (for example packets with specific addresses can be recorded), and recording of data packets and time-codes can be enabled or disabled. The amount of traffic to be recorded can be specified along with a trigger condition. This condition may be a specific address, data pattern or time-code value, or a manual trigger may be used.

Once traffic is recorded it is presented in a window with each field of the traffic identified, as shown in Figure 4.

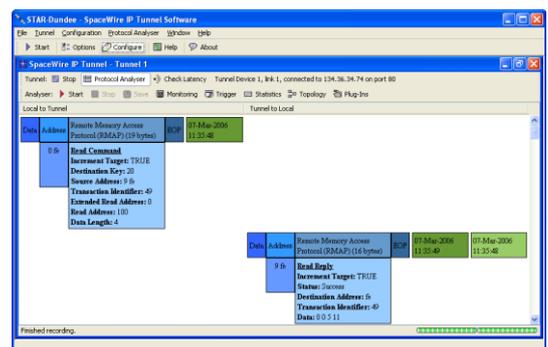


Figure 4: Protocol Traffic Analysis

Higher Level Protocol Plug-Ins for the Protocol Analyser

The SpaceWire Protocol Analyser can be extended to support the use of protocols that are carried within SpaceWire packets using Higher Level Protocol plug-ins. These do not need to be provided with the Protocol Analyser software, and can be added at a later date. A Remote Memory Access Protocol (RMAP) plug-in is provided. Information is provided with the software to allow plug-ins to be written, to support any protocol you may be using. Source code for an example plug-in is also provided.

With a higher level plug-in loaded, the Protocol Analyser can be set to trigger on packets containing that protocol. If the plug-in provides it, further conditions specific to that protocol may also be specified for the trigger. Any packets recorded containing that protocol are identified as such, and the plug-in may also provide support for displaying the individual fields within the packet.

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