ON TRACK WITH 10GE FOR AVIONICS COMMUNICATIONS NETWORKS

Avionics communications capture and analysis with 10GE

With the nature of programs in the aerospace industry, a fair amount of the investment is made during the program's development phase which need to be secured for extended periods of time.

This is reflected by long running programs with regular updates of capabilities which can also imply technology updates which need be introduced into an existing system for update. This is not uncommon for a wide range of technologies, especially implementations supporting avionics communication and networks. These drive a need for handling different domains e.g., system integration or the development area, cases where the new equipment has to work alongside or in harmony with the existing and established technology.

In addition to the demand for suitable interfaces and increased data capturing bandwidth for multiple 10G Ethernet links, there is a need for high precision data correlation of all the captured data from the multiple avionics communication interfaces. These 3 major requirements drive the design of such a test system carefully considering cost efficiency, availability and future expandability, all important non-technical requirements up to a certain extent.

PC hardware is the baseline for such a test system and needs fulfill requirements beyond that of standard desktop or industrial PC hardware capabilities. A move to PC server-based platforms appear to be a good way to cope with requirements for hosting disk space for the high volume of recording data plus hosting/handling the high bandwidth interfaces with suitable motherboard architecture (see figure 1).

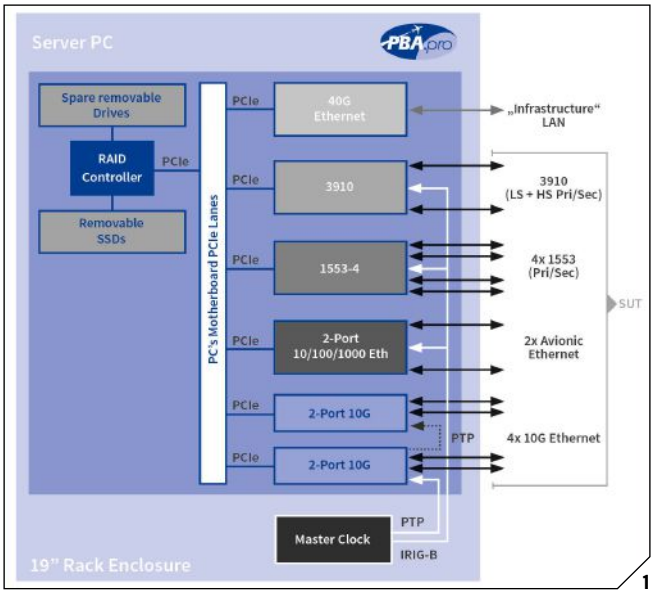
Power consumption as well as power dissipation in terms of the heat generated by the number of interface boards is a primary factor for the hosting platform. A firm requirement for such a test system includes time synchronization in respect to the correlation of all captured traffic from MIL-STD-1553, STANAG3910, 10/100Mbit Ethernet and 10G Ethernet interfaces. The choice of a suitable third party interface for 10G Ethernet links has to consider a corresponding capability for synchronization to external time sources for a smooth integration. Selected for this case was an IEEE1588 (PTP) capable COTS 10G interface synchronized by a COTS Master Clock device, offering IRIG-B as well as IEEE1588 for precise time synchronization of all interface boards of the test system (see figure 2). Worthy of a mention is the 10G board has a dedicated IEEE1588-time sync input, therefore does not need receive the time sync information via the "operational" 10G Ethernet ports.

The described test system approach offers a (10G) Ethernet capability for capturing and synchronized time stamping at the Ethernet MAC Frame level which revealed the situation that such capabilities are just the "least common multiplier" for customers when asking for "(10G) Ethernet" support.

However, with respect to analysis and post processing requirements, these capabilities build a very important foundation for anything happening at the higher levels of Ethernet, e.g. further protocols and/or Ethernet Frame payload decoding.

The data capture, as well as post-processing can be achieved using a flexible and open software solution like the AIM PBA.pro Test and Analysis software with third party interface support. It supports automated post-processing like off-line filtering with data export handled via scripting.

Finally, a unique and powerful capability of the AIM PBA.pro software is to have all common avionics buses and networks time correlated within one single framework application, solving monitoring, capturing and automated or interactive post-processing as described above. \\



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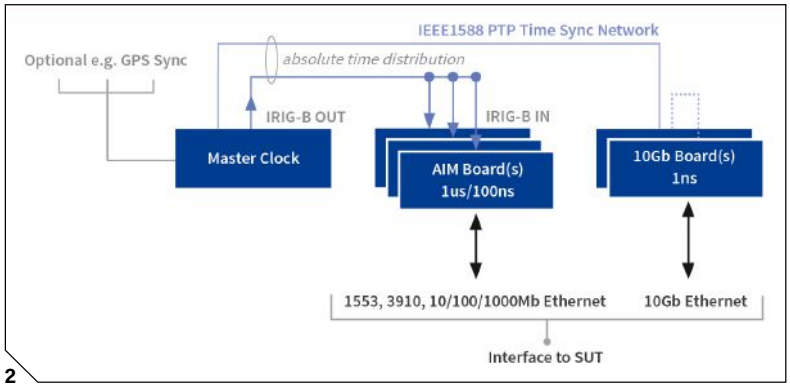
1 // A move to PC server-based platforms are a good way to cope with requirements for hosting disk space for the high volume of recording data



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2 // An IEEE1588 (PTP) capable COTS 10G interface synchronized by a COTS Master Clock device