基于时序路径的FPGA时序分析技术研究

周 珊，王金波，王晓丹
（中国科学院 空间应用工程与技术中心，北京 100094）

摘 要：针对于航天高可靠FPGA测试时时序分析技术的重要性，根据多年FPGA设计测试经验对时序分析技术进行深入剖析，提炼出一套切实可行的时序分析技术，阐明了时序分析的分析对象，时序分析技术的主要方法，给出了时序分析时接口信号时序计算法则，以及时序测试结果的分析准则；并把这套分析技术成功的应用到了多个航天高可靠软件的测试中，发现了很多由时序问题引起功能失效的重大问题，对其中常见的时序问题给予归类总结.

关键词：时序分析技术；时序测试需求；延时计算准则；时序分析方法
中图分类号：TP391.9 **文献标识码**：A **文章编号**：1000－7180(2016)01－0076－05

Research of FPGA Timing Sequence Analysis Technology Based on Timing Sequence Path

ZHOU Shan, WANG Jin-bo, WANG Xiao-dan
(Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, Beijing 100094, China)

Abstract: For the significance of high reliable FPGA test timing sequence analysis technology on Spaceflight, depending on the FPGA design and test experience for several years, timing sequence analysis technology is analyzed deeply, and a set of feasible solution is extracted, and the analysis target of timing sequence analysis is clarified. The interface signal timing sequence calculation rules of timing sequence analysis and analysis rules of timing sequence test results are presented by the main method of timing sequence analysis technology; this set of technology is applied successfully on the tests of several high reliable software on Spaceflight, many significant functional disabled problems, caused by timing sequence problems, can be found, and the common timing sequence problems are classified and summarized.

Key words: timing analysis technology; timing test requirement; delay calculation rule; timing analysis means

作者简介：

周 珊 女，(1983-)，硕士，工程师. 研究方向为高可靠软件、嵌入式软件测试. E-mail: zhoushan@csu.ac.cn.

王金波 男(1978-)，博士，副研究员. 研究方向为高可靠软件.

王晓丹 女(1982-)，工程师. 研究方向为高可靠软件、嵌入式软件测试.