

## 摘要

随着数字电视技术的发展，数字电视正逐步取代传统的模拟电视。数字电视技术涵盖了从信源编码、信道复用调制、射频传输以及终端解码的各个环节。数字电视传输国际标准主要有四种：美国 ATSC 标准、欧洲 DVB 标准、日本 ISDB 标准和中国 DTMB 标准。根据传输方式的不同，数字电视又有卫星广播、有线广播、地面无线广播。然而无论采用哪种国际标准、哪种传输介质，基于 MPEG-2 系统层定义的传输流的复用器都是数字电视系统传输的核心设备。所有的节目数据和增值服务都是先通过复用器打包成传输流输出。

本论文在此背景下，主要研究探讨了一种面向 AVS 的传输流复用器的算法和软硬件协同的实现方法。文中首先介绍了数字电视的优势、发展现状和前景，介绍了数字电视系统的组成结构和相关技术，同时还介绍了数字电视系统中重要的传输标准。然后介绍了 AVS 编码标准和 MPEG-2 系统层传输流复用器的原理和系统结构。接着详细说明了如何采用新的思路，采用独特的软硬件结合的设计实现整个复用器系统的方案，并将该复用器应用于 AVS 高清编码 SOC 系统中。最后对本文进行总结，并提出了数字电视系统中复用器发展的设想。

本文中介绍的复用器设计方案，最终集成到 AVS 高清编码器 SOC 中，复用器同时也与 AVS 高清编码器等集成并运行于 Xilinx 公司的 Virtex-6 系列 FPGA 上。整个设计方案系统设计简单，稳定，灵活性强。

**关键词：**DTV、复用器、AVS

# ***AVS transport stream multiplexer design and implementation***

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## ***Abstract***

With the development of digital television, digital television is gradually replacing the traditional analog TV. The digital television technology covers all aspects of source coding, channel multiplexing modulation, RF transmission and terminal decoding. There are four major digital television transmission of international standards: American ATSC, European DVB standard, the Japanese ISDB standard and China DTMB standard. Depending on the transmission, digital television and satellite broadcasting, cable broadcasting, terrestrial radio. However, regardless of what kind of international standard, which transmission medium, the transmission of digital television system based on MPEG-2 system layer defines the transport stream multiplexer core devices. All program data and value-added services are first through the administration of the packaged into the transport stream output.

In this context, the main study of this thesis oriented AVS transport stream multiplexer algorithm and hardware and software co. First the advantages of digital TV, development status and prospects, and describes the composition of the digital television system and related technologies, and also describes the transmission standard in the digital television system. Then introduces the principles and system architecture of the AVS coding standard and MPEG-2 system layer transport stream multiplexer. Followed by a detailed description of how to adopt new ideas, unique combination of hardware and software design of the multiplexer system program, and the multiplexers used in the AVS HD encoding SOC system. Finally, to sum up this article, and put forward the idea of the development of the multiplexer in the digital

television system.

The multiplexer design described in this article, and ultimately integrated into the AVS HDTV encoder SOC, multiplexer also integrated with the AVS HDTV encoder and running on Xilinx's Virtex-6 family of FPGAs. Entire design system is designed to be simple, stable and flexible.

**Keywords:** *DTV, Multiplexer, AVS*