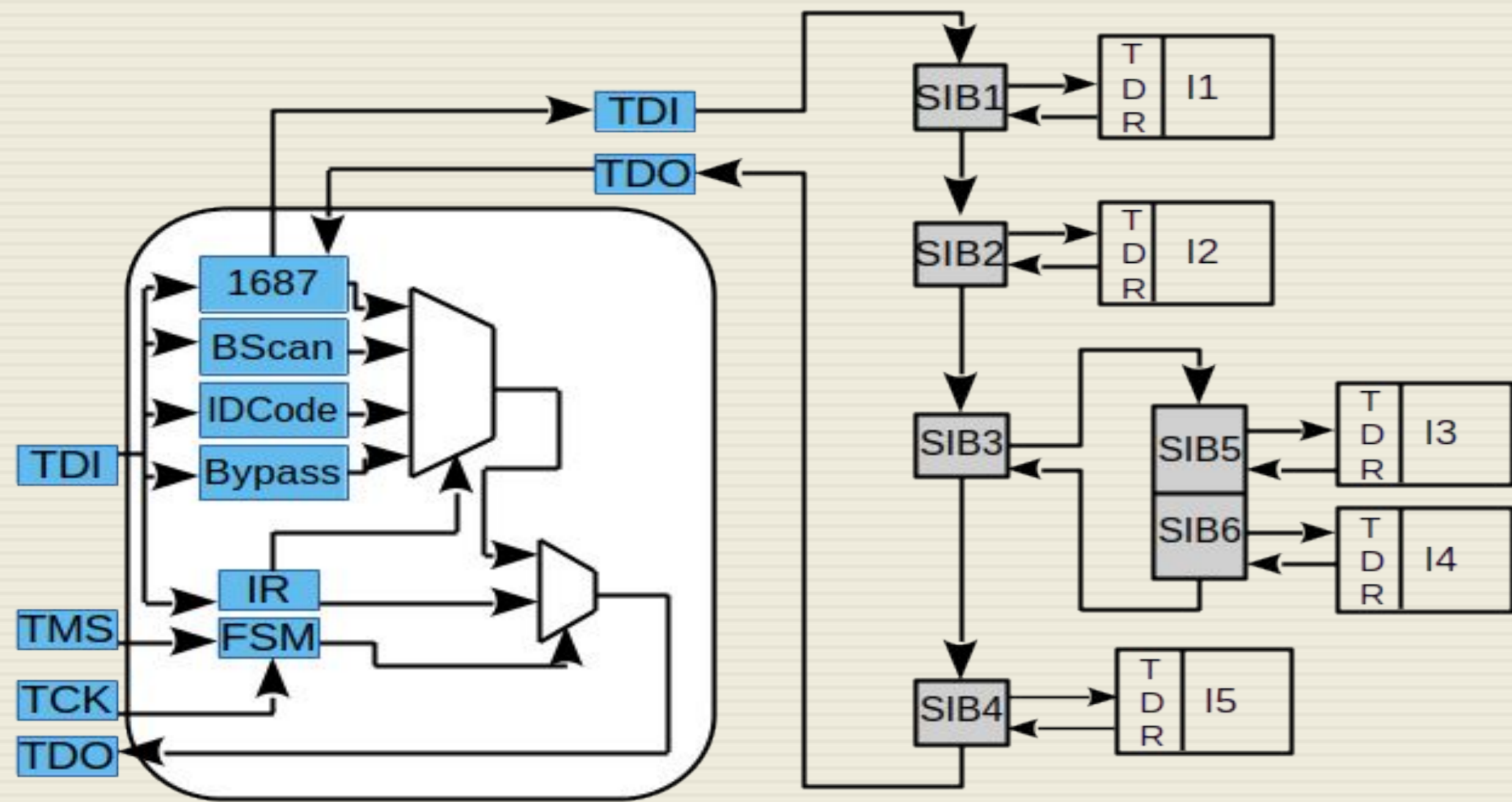
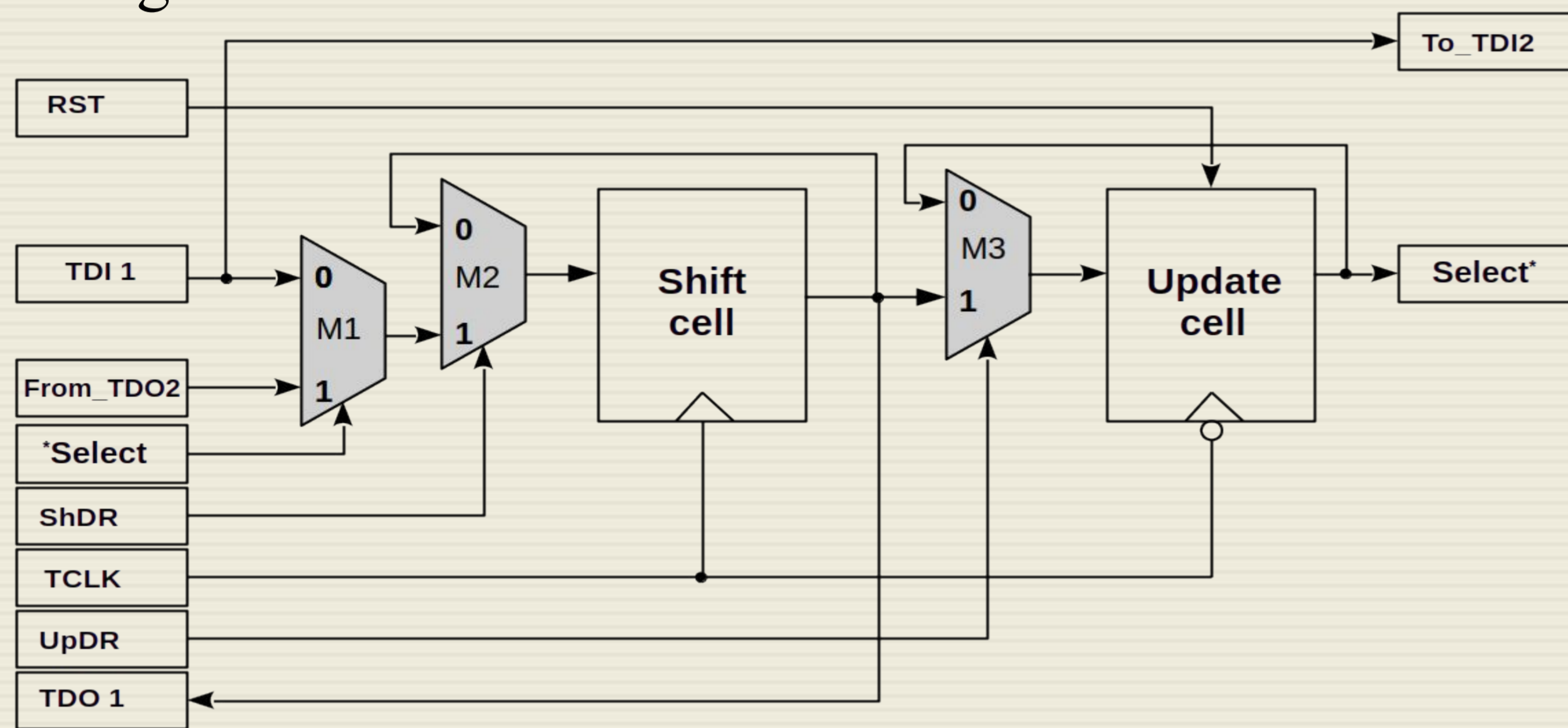


IEEE Std. 1687 (IJTAG)

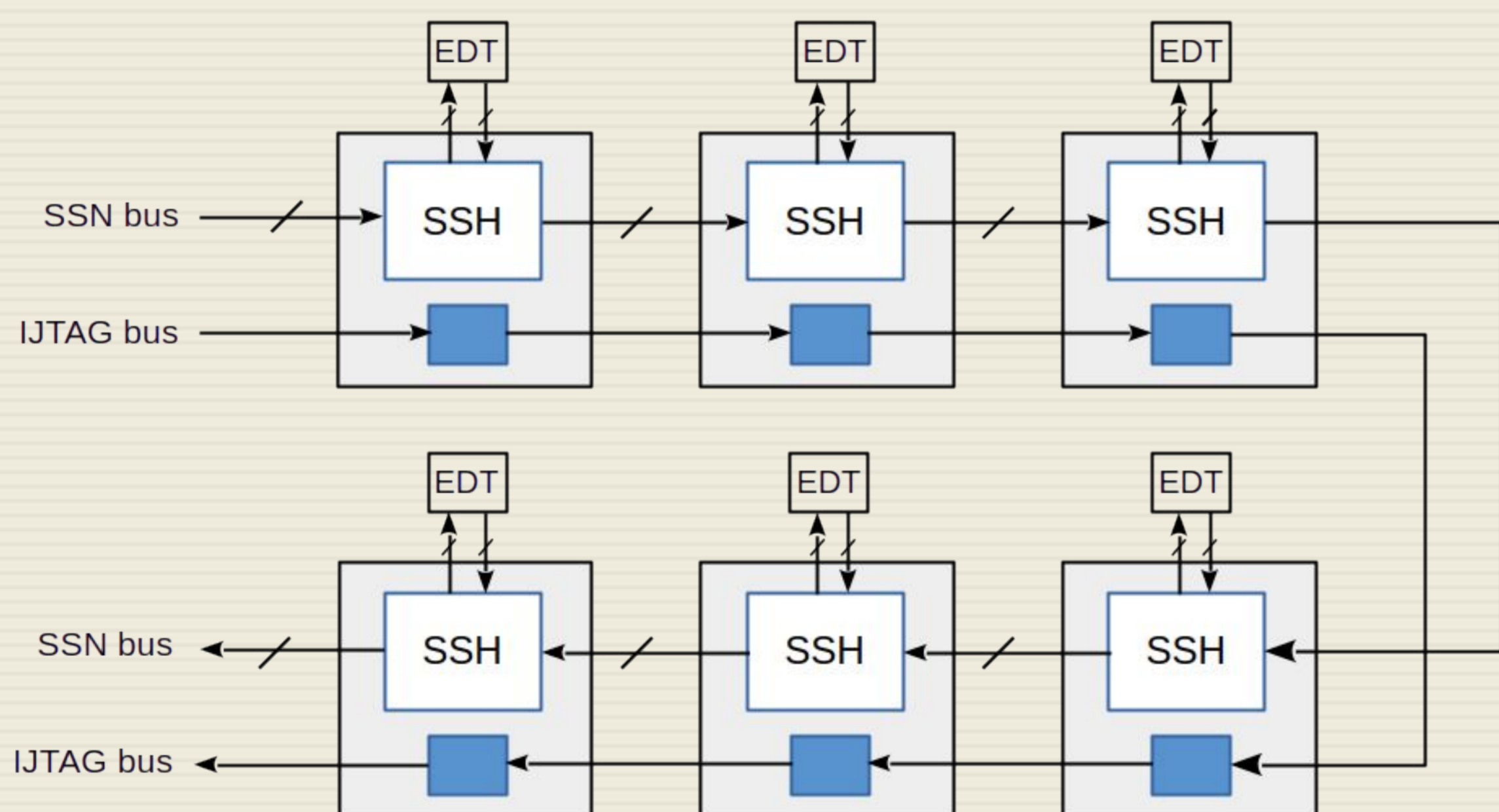
- The IJTAG provides efficient access to on-chip embedded instruments; however, it is vulnerable to scan attacks



- IJTAG uses Segment Insertion Bit (SIB) to dynamically reconfigure the scan network

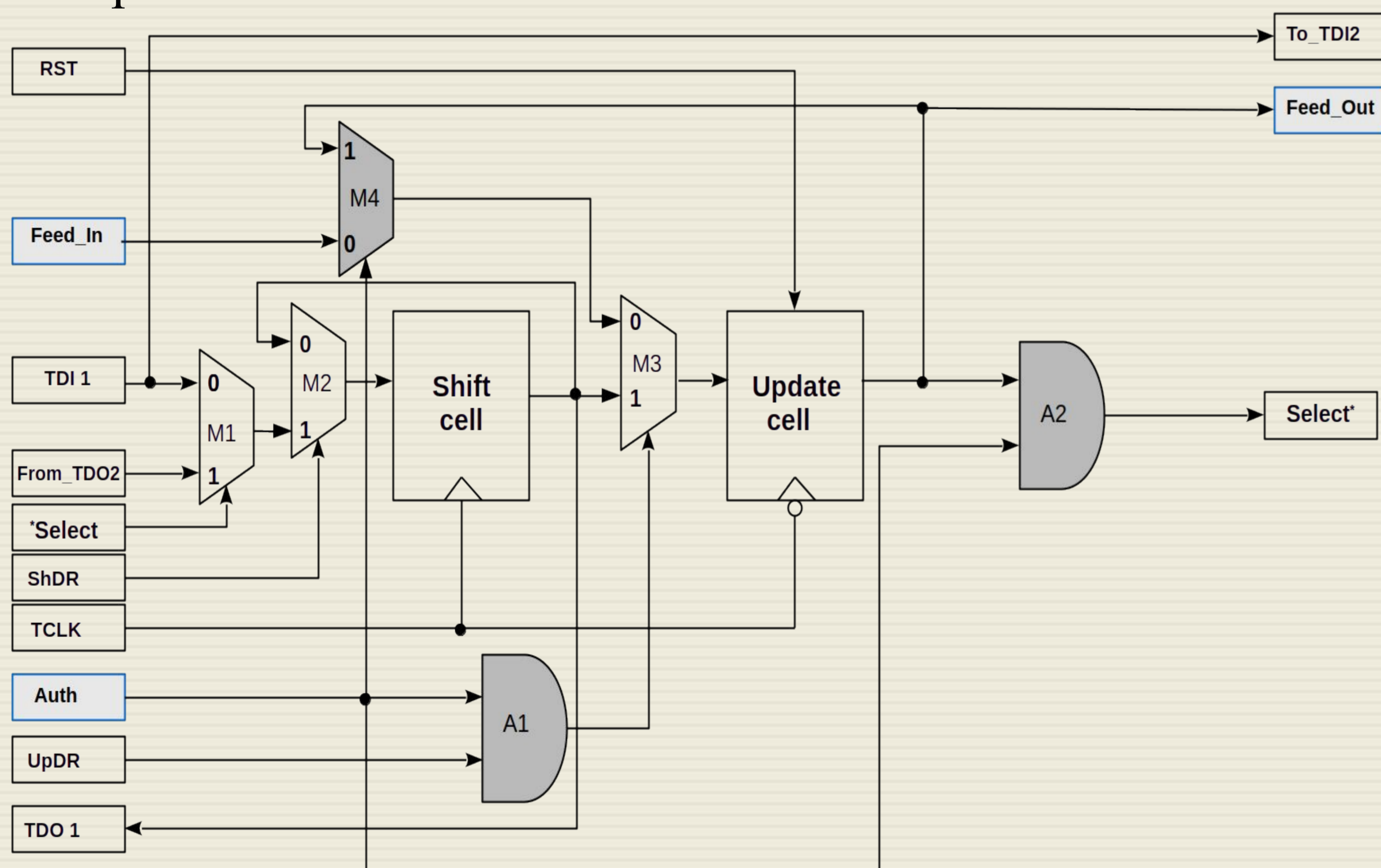


- SSN is a bus-based architecture that allows transmitting the test vectors to multiple core instances via a high-speed bus

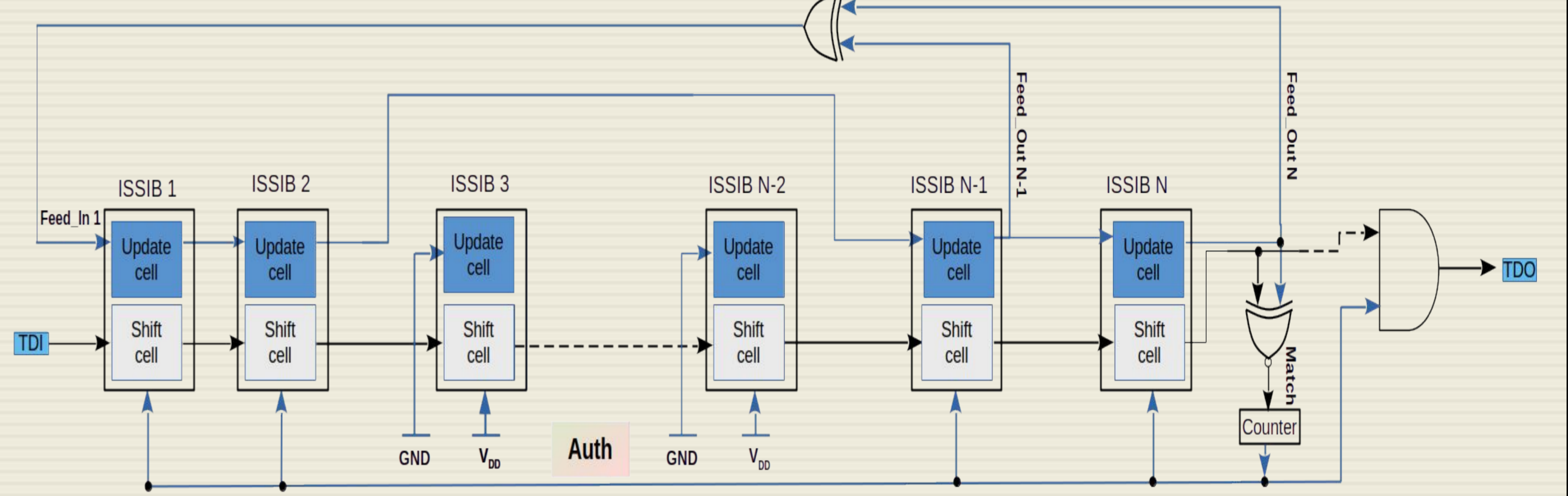


Proposed ISSIB

- The proposed ISSIB brings functionality and security together and operates in two modes: Standard and Authorization mode



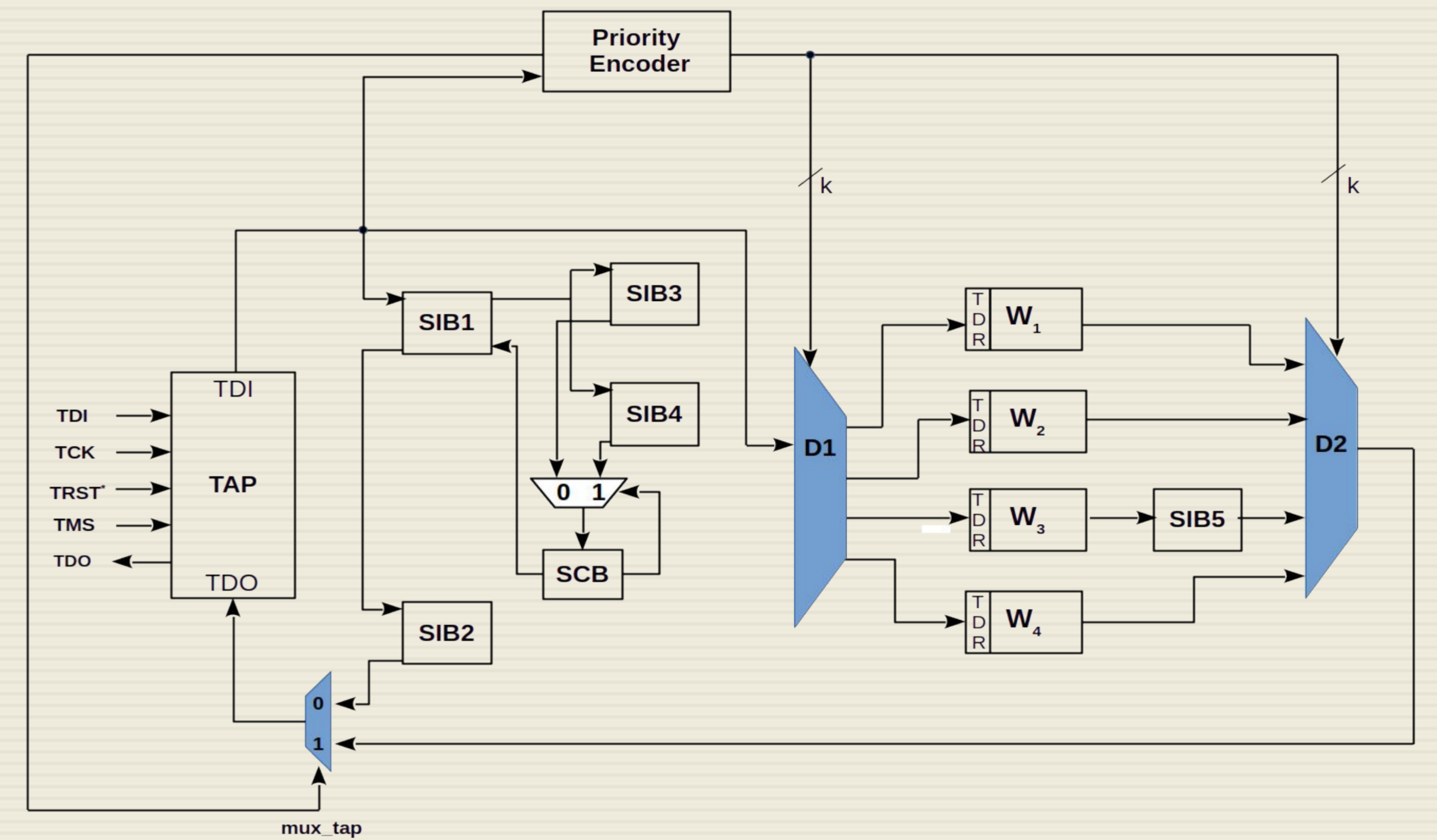
Secure IJTAG with Proposed ISSIB



- The proposed ISSIB incurs minimal area overhead compared to the existing SIB designs
- The scope of ISSIB has been extended for securing the SSN
- By integrating ISSIB, security within the SSN is significantly improved, incurring only a 1.91% area overhead

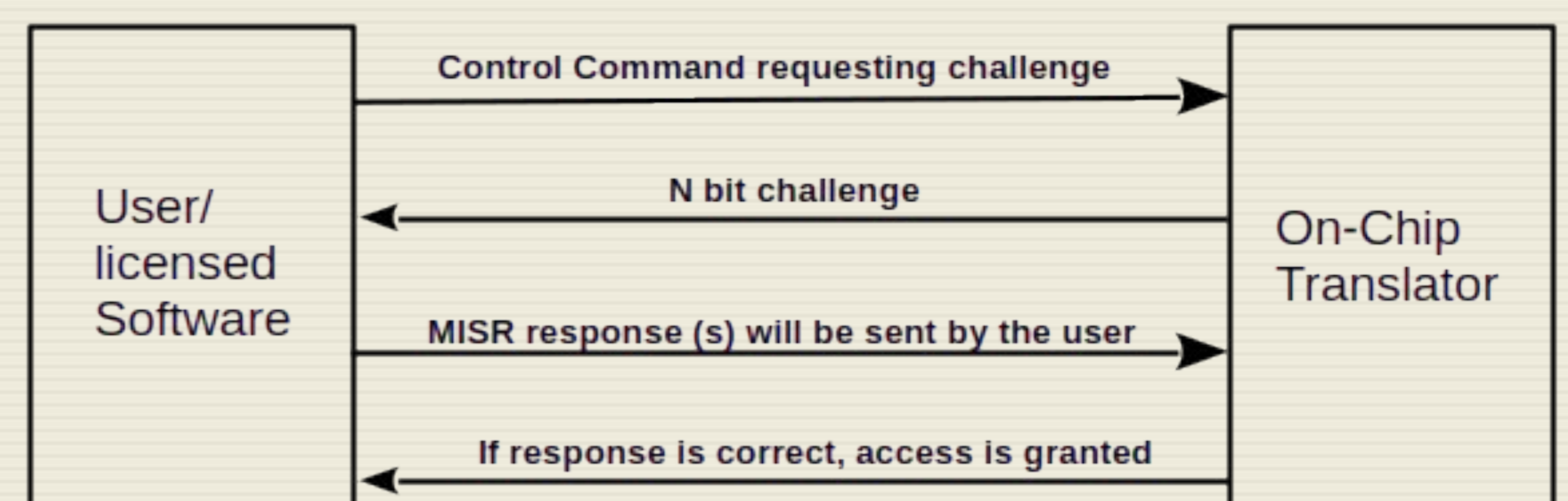
Security Against Data Alteration/Sniffing Attack

- The proposed scheme protects the data of an instrument by bypassing the shifting of data through other instruments



Exploring Non-TAP Interfaces for Efficient and Secure Access to IJTAG Network

- IJTAG enables efficient access to on-chip instruments through TAP controller of IEEE Std. 1149.1 (JTAG)
- IEEE Std. P1687.1 explores alternative means of utilizing the functional ports, such as I2C, UART, and SPI, as non-TAP device interfaces for resource constraint ICs
- A new protocol that utilizes UART as a device interface to access on-chip instruments has been proposed



- The proposed protocol is able to reduce the access time and data overhead by a maximum of 45.51% and 69.66% respectively, and it incurs a minimal area overhead
- The protocol integrates robust security measures based on data encryption, thwarting intruders from stealing useful information over the IJTAG network

References

- Anjum Riaz et al., "On protecting IJTAG using an inherently secure SIB," in 2023 IFIP/IEEE VLSI-SoC, 2023
- Anjum Riaz et al., "Enhancing the security of IJTAG network using inherently secure SIB," in Innovations for Trustworthy AI, 2024
- Anjum Riaz et al., "On protecting IJTAG from data sniffing and alteration attacks," in 2022 IEEE Computer Society ISVLSI, 2022
- Anjum Riaz et al., "Exploring Non-TAP interfaces for efficient and secure access to IJTAG network," IEEE TDMR, 2024