Automatic data extraction from CBRAM and ReRAM arrays

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Conductive Bridge RAM (CBRAM) and Resistive RAM (ReRAM) devices have excellent properties for developing PUFs (Physical Unclonable Functions) in IoT (Internet of Things) applications. They operate at extremely low power, which prevents side channel attacks. We use the programming voltage of these devices, the Vset, to generate PUF Challenge Response Pairs (CRPs). The current technique involves manual programming of these devices using Source and Measurement Units (SMUs). The new prototype will avoid manual testing; which is slow, tedious, and prone to errors. We are demonstrating an automatic data extraction from these devices. For this purpose, we developed a daughter card. The setup shown below enables us to extract the programming data from the CBRAM or ReRAM array and transmit it to the PC for an in-depth analysis. The on-board DAC in SmartFusion is used to sweep the voltage with high accuracy and ADC is used to read back the analog voltage from the daughter card. PUF response generation is carried out by ARM core inside the SmartFusion. The daughter card is capable of 32x32 array.