We present a hardware trusted computing base (TCB) aimed at Direct Recording Voting Machines (T-DRE), with novel design features concerning vote privacy, device verifiability, signed-code execution and device resilience. Our proposal is largely compliant with the VVSG (Voluntary Voting System Guidelines), while also strengthening some of its rec-comendations. To the best of our knowledge, T-DRE is the first architecture to employ multi-level, certification-based, hardware-enforced privileges to the running software. T-DRE also makes a solid case for the feasibility of strong security systems: it is the basis of 165,000 voting machines, set to be used in a large upcoming national election. In short, our contribution is a viable computational trusted base for both modern and classical voting protocols.