Abstract— Over the past 20+ years the DIII-D project has developed a large CAMAC-based data acquisition and control infrastructure consisting of 9 serial highways, 87 crates and 1258 CAMAC modules in service and about 420 spare modules. The cost and difficulty of maintaining these older systems is continually increasing. The use of alternative hardware for new installations and replenishing CAMAC spares from obsolete systems is underway. Onsite repair and utilization of some vendors that will still repair CAMAC modules is important in our program. Over the past five years we have been implementing new diagnostics and control systems with modern hardware. The current plan is to incrementally replace much of the existing CAMAC infrastructure with new equipment as time, machine availability and budget permit. A functions- and requirements-driven approach to the design will be outlined. Data will be presented on experience with candidate control and DAQ hardware in use at DIII-D. Some success has been realized with new waveform digitizers, thermocouple acquisition and digital I/O. Candidate control hardware will be discussed including PCI/cPCI systems, PLCs, Ethernet direct-connected server systems, and others. The functions, performance and design requirements of replacements for specific CAMAC-based modules and systems in DIII-D will be outlined. Design requirements will emphasize compatibility of interfaces to existing equipment, reliability and maintainability. Ethernet is the preferred medium of connection to the host data acquisition or machine control computer systems.