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The PHENIX experiment at RHIC has embarked on a broad range of upgrades to enhance its physics reach. One of the upgrades consists of a set of Silicon vertex trackers that combine to cover the pseudorapidity range -2.4 to 2.4 . The primary physics goals of the vertex detectors are to study the properties of the QGP using heavy quarks, and to better understand the spin structure of the proton. This is accomplished by providing precision tracking and reconstruction of the primary vertex, and the recognition of secondary decay vertices, in all collision systems. This capability will enhance the heavy-quark signal and greatly reduce backgrounds. The vertex devices will consist of a 4-layer barrel section matching the acceptance of the PHENIX central rapidity detectors, and two 4-disk endcap sections matching the PHENIX muon arms. A description of the vertex detectors and some of their physics capabilities will be given, as well as technology choices and results from prototype components.