Electrochemical gating at the single molecule level of viologen molecular bridges in ionic liquids is examined. Contrary to previous data recorded in aqueous electrolytes, a clear and sharp peak in the single molecule conductance versus electrochemical potential data is obtained in ionic liquids. These data are rationalized in terms of a two-step electrochemical model for charge transport across the redox bridge. In this model the gate coupling in the ionic liquid is found to be fully effective with a modeled gate coupling parameter, $\xi$, of unity. This compares to a much lower gate coupling parameter of 0.2 for the equivalent aqueous gating system. This study shows that ionic liquids are far more effective media for gating the conductance of single molecules than either solid-state three-terminal platforms created using nanolithography, or aqueous media.