Hydrogen cluster ions are of interest as reactants in astrophysical processes and as simple models for theoretical calculations. In this work, H$_4^+$ and its deuterated isotopomers were isolated in a neon matrix and investigated by electron spin resonance spectroscopy. The various isotopomers were formed by mixing H$_2$, D$_2$, and HD gases with neon and depositing the mixtures onto a copper rod cooled to 2.6 K. The matrices were then x-irradiated at 60 keV for 30 minutes. Electron spin resonance spectra were recorded for H$_4^+$, H$_3$D$^+$, H$_2$D$_2^+$, HD$_3^+$, and D$_4^+$ at temperatures ranging from 2.6 K to 9 K. These isotopomers could only be formed at 2.6 K, and were very sensitive to changes in temperature. Diatomic hydrogen ions (H$_2^+$ and HD$^+$) were also observed at 2.6 K at low sample gas concentrations. Experimental values for the hyperfine interactions were determined by fitting the observed hyperfine structure lines with those obtained from an exact diagonalization of the spin Hamiltonian.