The pure rotational spectra of 2-chloro-3-fluoropyridine and 2-chloro-6-fluoropyridine were measured on a chirped-pulsed Fourier transform microwave (CP-FTMW) spectrometer in the 8 – 18.5 GHz frequency range. The spectra were analyzed to find the rotational constants of the molecules for both the $^{35}\text{Cl}$ and the $^{37}\text{Cl}$ isotopologues. The measured rotational transitions exhibit hyperfine splitting, from which the nuclear quadrupole coupling constants have been assigned. The rotational constants and the nuclear quadrupole coupling constants have been compared to \textit{ab initio} calculations performed using the Gaussian 03W software package.