The jet cooled spectrum of pentfluoroethane ($C_2HF_5$) has been recorded between 1100 and 1325 cm$^{-1}$ at a resolution of 0.0022 cm$^{-1}$. A rotational temperature of approximately 10 K was achieved by expanding 50 Torr of $C_2HF_5$ in 500 Torr of helium. Transitions belonging to five different vibrations have been assigned and fit to a Watson Hamiltonian: the $\nu_3$ at 1309.88 cm$^{-1}$, the $\nu_4$ at 1200.74 cm$^{-1}$, the $\nu_5$ at 1142.78 cm$^{-1}$, the $\nu_13$ at 1223.33 cm$^{-1}$, and the $\nu_{14}$ at 1147.39 cm$^{-1}$. The rms deviations of the fits of the $\nu_4$ band (0.0004 cm$^{-1}$) as well as the overlapping $\nu_5$ (0.0006 cm$^{-1}$) and $\nu_{14}$ (0.0004 cm$^{-1}$) bands are in satisfactory agreement with the experimental uncertainty. The perturbations observed by McNaughton et al$^a$ are still apparent in the $\nu_3$ and $\nu_{13}$ at the rotational temperature of this study but satisfactory fits have been achieved.