The rotational spectra of six isotopomers of 1,1-difluoroethylene–HF have been collected in the 7 - 22 GHz region with a Fourier transform microwave spectrometer. These include the most abundant isotopomer, its DF counterpart, and four singly substituted $^{13}$C species in natural abundance. Both $\alpha$- and $b$-type transitions have been observed for all species. In addition, the hydrogen-fluorine spin-spin coupling interaction in the HF subunit for CH$_2$CF$_2$–HF and the deuterium nuclear quadrupole coupling interaction in CH$_2$CF$_2$–DF have been observed and analyzed. The rotational constants are consistent with a planar complex, with the two subunits interacting through a hydrogen bond formed between the H atom of HF and an F atom in 1,1-difluoroethylene and via a secondary interaction between the F atom in HF and the H atom located cis to the hydrogen-bonded F atom in 1,1-difluoroethylene. The rotational constants, hyperfine coupling constants, and results from the analogous complex, CH$_2$CF$_2$–HCCH, a are combined to determine the structural parameters of 1,1-difluoroethylene–HF and 1,1-difluoroethylene–DF, which are found to be slightly different.