A molecular beam Fourier transform microwave spectrometer was used to characterize the axial and equatorial hydrogen bond dimers formed between tetrahydroxyiran and hydrogen chloride. Rotational, centrifugal distortion and Cl-nuclear quadrupole coupling constants have been determined for several isotopic species of both hydrogen bond conformers. The rotational parameters are consistent with a $C_4$ symmetry in both forms. The rotational spectra of oxetane-HCl has been observed in the frequency range from 5 to 18.5 GHz. Since oxetane reacts with HCl in the gas phase, mixtures of oxetane in argon and HCl in argon were independently flowed employing a modified pulsed valve. The structural properties of the hydrogen bond have been obtained from the rotational and quadrupole coupling constants.