Precise measurements on rovibrational transitions of the $\nu_4(3\Sigma^u)$ CCH bending mode of (X$^2\Pi$) C$_2$H have been performed using the Cologne Supersonic Jet Spectrometer for Terahertz Applications (SuJeSTA). The molecules were formed in a supersonic jet expansion when a gas mixture of C$_2$H$_2$ and CO diluted in He was introduced to an electrical discharge nozzle. Radiation of a backward wave oscillator (BWO) probes the molecular beam 40 mm downstream and spectra in the frequency range 360-600 GHz were recorded. A strong Renner-Teller coupling effect shifts the ($3\Sigma^u$) component of the $\nu_4$ bending mode towards lower energies and into the submillimeter region. Pure rotational transitions in the $2\Pi_{1/2}$ and $2\Pi_{3/2}$ ground state levels and in the $v_4 = 1 (3\Sigma^u)$ excited vibration state were recorded, extending earlier data published by Yamamoto et al. $^a$ In addition, some rovibrational transitions between the ground state and the $v_4 = 1 (3\Sigma^u)$ state have been identified. Thus the vibrational energy of the $\nu_4(3\Sigma^u)$ state was determined precisely as 609977.1(42) MHz or 20.34664(14) cm$^{-1}$. Furthermore, the Coriolis coupling constant between the ground and $\nu_4(3\Sigma^u)$ state has also been determined with greatly improved precision.