Rotational transitions of the CoCO radical were observed by millimeter wave spectroscopy. The CoCO radical was produced in a supersonic expansion by the ultraviolet photolysis of Co(CO)$_3$NO. The $J = 8.5 - 7.5, 9.5 - 8.5, 10.5 - 9.5,$ and $11.5 - 10.5$ rotational transitions in the $\Omega = 5/2$ spin state of the $X^2\Delta_i$ electronic ground state were assigned in the 75-130 GHz region. Each rotational transition was split into 8 hyperfine components due to the electron orbital-nuclear spin interaction, electron spin-nuclear spin interaction, and nuclear quadrupole interaction of the Co atom. The $\Delta$-type doublet was not resolved in the $\Omega = 5/2$ spin state. Effective molecular constants for the $\Omega = 5/2$ spin state, including rotational constant, $B$, centrifugal distortion constant, $D$, nuclear quadrupole interaction constant, $eQq$, and the linear combination, $\alpha + (1/4)b + (1/6)c$, of the electron orbital-nuclear spin interaction $\alpha$, Fermi contact interaction $b$, and magnetic dipole interaction of the electron spin and nuclear spin $c$, were determined by the least squares fitting of the observed spectrum.