Rotational spectrum of the CoCO radical generated by ultraviolet photolysis of Co(CO)$_3$NO was measured in the millimeter wave region to determine rotational and hyperfine interaction constants. Rotational transitions ranging from $J = 29.5 - 28.5$ to $34.5 - 33.5$ were assigned in the $\Omega = 3/2$ and $\Omega = 5/2$ spin substates of the $X^2\Delta_g$ ground vibronic state as well as in the vibrationally excited states $\nu_2$, $2\nu_2$, and $2\nu_2$ of the $\Omega = 5/2$ spin substate. Each rotational transition was split into 8 hyperfine components due to the $^{59}$Co nucleus. Molecular constants, including the rotational constant $B$, centrifugal distortion constant $D$, nuclear spin-orbit interaction constant $\alpha$, Fermi contact interaction constant $b_F$, magnetic dipolar interaction constant $e$, and nuclear quadrupole interaction constant $eQq$, were determined for the vibrationally ground state by least squares fitting of the observed spectrum. The equilibrium rotational constant $B_e$ was determined to be 4435.7510(18) MHz and the internuclear distance between Co and C was evaluated to be 1.688 Å. The $\alpha$ and $e$ values are consistent with the values estimated from the hyperfine constants of the $^{59}$Co atom. The $b_F$ value is nearly equal to zero.