$$
\begin{aligned}
\Psi_{116} &= C_1\left(|0d2u\rangle - |0u2d\rangle - |2d0u\rangle + |2u0d\rangle + i\,|d0u2\rangle - i\,|d2u0\rangle - i\,|u0d2\rangle + i\,|u2d0\rangle\right) \\
&\quad + C_2\left(-|02du\rangle + |02ud\rangle + i\,|0du2\rangle - i\,|0ud2\rangle - |20du\rangle + |20ud\rangle + i\,|2du0\rangle - i\,|2ud0\rangle - i\,|d02u\rangle + |d20u\rangle + |du02\rangle + |du20\rangle + i\,|u02d\rangle + i\,|u20d\rangle - |ud02\rangle - |ud20\rangle\right)
\end{aligned}
$$

$$
C_1 = \frac{-\left(\frac{1}{4}\right) - \frac{i}{4}}{\sqrt{2}}
$$

$$
C_2 = \frac{-1}{4\sqrt{2}}
$$