$$B_{x^a} = \begin{cases} \mathbf{C}^q \otimes \mathbf{C}^q & \rightarrow & \mathbf{C}^q \otimes \mathbf{C}^q \\ |a\rangle \otimes |y\rangle & \mapsto & |a\rangle \otimes |y \oplus x^a \mod n\rangle \end{cases}$$