Let $K$ be a finite real abelian extension of $\mathbb{Q}$ with ring of integers $\mathcal{O}_K$, and with $L$ a subfield of $K$ such that $[L: \mathbb{Q}]$ is odd. Suppose $G(L/\mathbb{Q})$ has exponent $n$, and that $G(K/L)$ is a cyclic 2-group. The authors prove that the groups $U_K^+$ and $U_K^2$ of totally positive units and unit squares (respectively) of $\mathcal{O}_K$ are equal, provided that (a) $h_L$ is odd, (b) $-1 \equiv 2^k \pmod{n}$ for some $k$, and (c) exactly one $L$-prime ramifies in $K$ if $L \neq K$. This is a generalization of a result of J. V. Armitage and A. Fröhlich [Mathematika 14 (1967), 94–98; MR0214566 (35 #5415)]; the latter assumed that $K/\mathbb{Q}$ is cyclic and that $G(K/\mathbb{Q})$ has order $p^a$ for an odd prime $p$. 

Ezra Brown (Blacksburg, Va.)