Let $G = \text{Gal}(K/F)$ for a Galois field extension $K/F$. The Brauer Monoid, $M^2(G, K)$ is defined by adapting the cocycle construction of the Relative Brauer Group, $Br(K/F) = H^2(G, K^*)$. We adapt the cocycles by allowing the image to be all of $K$, these cocycles, $f : G \times G \to K$, are called \textbf{weak} 2-cocycles. Let $e$ an idempotent weak 2-cocycle, define the group $M^2_e(G, K)$ to be $\{ [f] \in M^2(G, K) | ef = f \}$. For a specific ring $R_e$ associated with an idempotent $e$, we have a complex on $R_e$-modules, $M^e$, that gives us that $M^2_e(G, K) \cong H^2(Hom_{R_e}(M^e, K^*))$. The idempotents $e$ are in one-to-one correspondence with lower subtractive partial orders on the group $G$, $e \mapsto \leq e$. For $S$ and $T$ lower subtractive subsets of $G$, such that $S \cup T = (G, \leq_e)$, there exists a split short exact sequence on the complexes:

$$0 \to M^{S \cap T} \to M^S \oplus M^T \to M^e \to 0.$$ 

This gives us a long exact sequence on cohomology, which can aid with the computation of $H^2(Hom_{R_e}(M^e, K^*)) \cong M^2_e(G, K)$. (Received September 17, 2012)