

Title:	Fast and Efficient Totally Self-Checking Checkers for m -out-of- $(2m \pm 1)$ Codes
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Abstract:	This note is concerned with the design of fast totally self-checking checkers for m-out-of-$(2m \pm 1)$ codes. The new method uses only three levels of gates, and is based on the partitioning of the input lines into m blocks of two lines per block except for the last block. A first level of two-input AND and OR gates realizes the majority functions $T(k_i \geq 1)$ and $T(k_i \geq 2)$. These are combined through AND gates of a second level into the so-called product functions $P_{j_1 j_2 \dots j_m}$, one for each class of input codewords that have $j_1, j_2, \dots, j_m$ 1's in the corresponding blocks of the input lines. Finally, two OR gates (third level) partition the product functions into two. The property of totally self-checking operation is achieved through the proper partitioning of the product functions into two classes. This note presents a systematic method of such partitioning. Also, the note determines the cost of these checkers and compares them to previous designs. <i>Fast and Efficient Totally Self-Checking Checkers for m-out-of-$(2m \pm 1)$ Codes.</i>