Measurement of flatness, symmetry, and output of linear accelerators is an important part of a comprehensive quality assurance program. AAPM Task Group 40 recommends at least bi-weekly checks of output and monthly checks of flatness and symmetry constancy. With the use of multi-chamber dosemeters, flatness, symmetry, and output can be checked simultaneously, thus improving efficiency. In this presentation, the design and performance features of a custom matrix dosemeter that is both easy to manufacture with readily available materials, and easy to use with a menu driven software interface, are described.

The ionization chambers in the dosemeter are defined by two circuit boards sandwiched together with portions of the copper conducting surface removed to isolate electrically individual collecting electrodes. A total of 17 chambers oriented in a "plus sign" shape are incorporated and these allow a field size of $30x30 \text{ cm}^2$ to be analysed. Details of the chamber geometry and materials used in manufacturing will be presented.

The electrometer portion of the dosimeter consists of custom built current integrators multiplexed to a 10 bit A/D converter, all under microprocessor control. The circuit design together with the list of components used will also be presented.

The basic procedure for calibrating and operating the dosemeter will be described. The results of performance tests and the requirement for a single set of relative sensitivity factors are illustrated. The utility of the dosemeter to track the behavior of an accelerator over a period of time is demonstrated with a yearly summary of dosemeter measurements.