Advances in active matrix flat-panel technology have allowed the production of large area arrays with fewer defects and significantly improved signal properties. This creates the possibility of employing these devices for measuring dose distributions and quality assurance parameters as well as performing exit dosimetry. In order to explore this possibility, a system based on a device that was specifically designed for use in external beam radiotherapy imaging is being evaluated. The system is based on a 512x512 array of amorphous silicon pixels with 508 µm pixel pitch, giving a total area of 26x26 cm^2. In its imaging configuration, the array is used in conjunction with an ~1mm Cu plate and a phosphor screen. Alternatively, for the purpose of exploring the dosimetry application, other configurations using various converters such as plastic scintillators as well as a configuration with no converter have been examined. The array readout and data collection were performed using a dedicated electronic acquisition system allowing real time data transfer. In this presentation, a variety of considerations pertaining to the application of this technology to dosimetry will be addressed, including: two modes of operation (radiographic and fluoroscopic); response to dose and dose rate variations; spatial response uniformity for field profiles and symmetry measurements; short and long term response stability; and signal response for the various configurations discussed above. Finally, limitations in the current system will be reported and possible improvements discussed.

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