Digital Encoding of Co-ordinates on a German Equatorial Telescope Mount

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A digital system has been designed to replace mechanical setting circles for RA and declination on a German equatorial mount. The system comprises two modules: a Digital Encoding Unit (DEU) and a Display Unit (DU). Angular position and direction of movement of the slow motion controls are sensed by means of two separate shaft encoders with a resolution of 500 pulses per revolution. These signals are processed in the DEU and transmitted to the DU in serial form together with sidereal time information. The DU features a simple key-pad for operator interface and RA and declination are displayed on a 16- digit dot-matrix LCD. Modes of operation of the DU include locating objects in offset and absolute modes, as well as a manual tracking mode for imaging applications. Both modules have been designed around 8-bit microcontrollers, and the DU provides 48 Kbytes of non-volatile memory (Serial EEPROM) for storing co-ordinates of frequently viewed objects.