

# Modification of the Traverse Encoder on an Ohio-Nuclear Series 84 Scanner

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The Ohio-Nuclear Series 84 scanner translates the probe movement to the photo-plotter by light emitting diode (LED) encoders and logic circuitry. At the heart of the encoders lie 4-in.-diam disks coupled to the traverse and longitudinal probe drives by toothed belts. The direction and speed coding is achieved by clear and opaque segments on a photographic film sandwiched between two sheets of 1/16-in. Lucite to form an encoder disk.

The scanner at Canberra Hospital had been plagued with increasingly frequent but intermittent mistracking of the plotter during traverse. It usually presented as a steady oblique drift across the screen, but occasionally showed a single transverse displacement of the image. The immediate cause proved to be a rapid buildup of dust on the Lucite disk as a result of electrostatic attraction; the short-term cure was to clean the disk.

However, the coding pattern for the traverse disk is supposed to be 200 evenly spaced segments

alternately clear and opaque around the rim of the disk. Somehow the production quality disk has been produced with up to 20% variation in segment width which causes a corresponding chatter on the pulse trains into the logic circuitry. On a clean disk in good condition this variation is within circuit tolerance. But add a worn drive shaft, a thick layer of dust, and a scratched disk, and the plotter mistracks.

We replaced the Lucite disks with one of blackened brass 1.5 mm thick, into the rim of which had been milled 100 slots 1.595 mm wide to give the same coding pattern as the original. The milling machine tolerance, better than 1 sec of arc, has resulted in almost chatter-free pulse trains to the encoder, and the unit now functions completely free of tracking error.

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