Version 1, September 2009. **CCS-L2X3**

LEO II instruction set.

Program actions on the *LEO II* computer.
Unfortunately I have no detailed information on the actions for LEO II. However the major innovation on LEO II was that, whereas 1 microsecond pulses with a 1 microsecond gap were used in the store on LEO I, on LEO II ¼ microsecond pulses with a ¼ microsecond gap were used. This allowed successive groups of four long words to be interleaved. The [delay line] tubes were therefore only a quarter of the length and the access to the store four times faster. Nanoseconds had not been 'invented' then and the oscilloscopes (Cossor MkIII) were not really fast enough!

The action set largely mirrored that of LEO I except with one, probably unique, addition for a business computer. The SQUARE ROOT action was implemented. It did in binary what you may remember was a two digit at-a-time iteration in decimal. I remember finding a design error and duly wrote the required memo to the development department detailing my temporary solution. Within a couple of hours the designer, Colin Lewry, was out on the factory floor not believing there was an error in his design at a fairly late stage in the production cycle. However when I went through the detail he went away to think about it and not long after came back to say he had put out my temporary solution as an official modification.

The other later innovation for the introduction of magnetic core storage for the last four machines was the implementation of actions 30 and 31, BULK CLEAR and BULK COPY. The Mullard matrix [core storage] had four times the capacity of the acoustic mercury [delay line] store. The actions were used to manipulate tubes of data between the main store and the three times larger backing store. The other technical innovation with the core store was the transistor control logic. The access time to all compartments in the main store was the same - [ie, *random access*]. You didn't have to wait for the data you wanted to 'ripple' through the mercury!

Tony Morgan, Eastcote, May 2009.