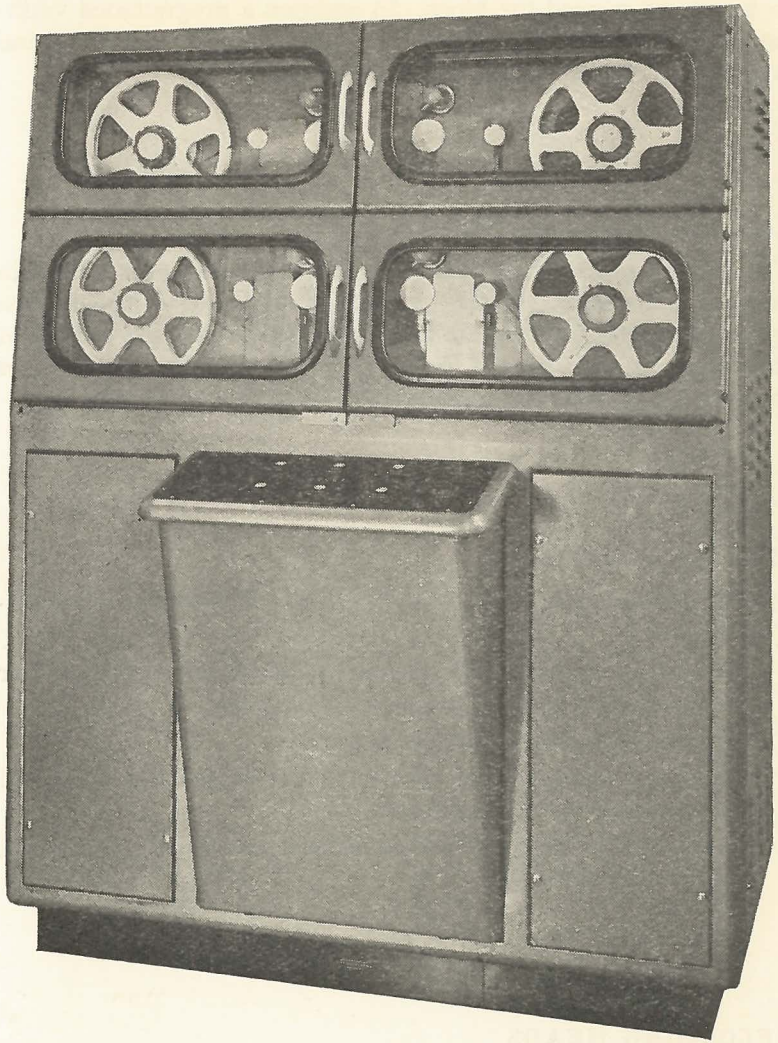

The Decca Twin Tape Unit

LEO Computers Ltd., Elms House, Brook Green, London, W.6

The LEO Automatic Office

MAGNETIC TAPE

Magnetic tape can be used with LEO for carrying forward information from one job to another, for temporary storage of information and, where necessary, for the recording of results. Up to 16 decks can be linked to the computer through two buffered channels. Transfer of information to and from the buffer store can take place concurrently with other operations of the computer.

TAPE UNITS

The unit is manufactured by Decca Radar Limited. The decks are mounted in a tape cabinet, two decks to a cabinet, each deck having its own independent drive and reading and writing system. The cabinet is 49½″ long, 36″ deep and 64½″ high. It is ventilated by an intake fan through a filter.

The two tape decks in each cabinet are independently accessible through glass-fronted doors which must remain closed during operation. If they are opened the tape is automatically stopped. The cabinets are slightly pressurized and sealed to reduce the amount of dust entering the system.

The tape is run out of contact with the reading and writing heads. This gives a wider tolerance to the performance of the tape and prevents the accumulation of dust on the heads.

CAPACITY AND SPEED

Each deck may be loaded with a spool of $\frac{1}{2}''$ wide tape up to 3,600 ft. in length. Eight channels are recorded on the tape at a character density of 100 binary digits to the inch. A complete tape has a storage capacity equivalent to 690,000 compartments, a compartment holds a short number of 18 binary digits and sign. The information is carried in blocks of 32 words, a word being equivalent to 5 decimal digits. A full-sized tape can hold up to 21,600 blocks.

Writing and reading takes place at $22\frac{1}{2}$ blocks a second. The tape-speed is 100 inches per second and the stop, start reverse times are less than 10 milli-sec. The distance moved by a tape in stop, start operation is less than .7 of an inch. A pneumatic clutch system which operates on the underside of the tape does not damage the tape during the acceleration and braking movements.

WRITING ON THE TAPE

Information is written on the tape in such a way that at the end of a job the tape on the spool is in a condition ready for reading.

As soon as a block of information has been written on the tape a check is made that it has been written correctly. This is done by comparing what has been written with the information still contained in the buffer store, if there is disagreement the computer stops for investigation or a second attempt at writing is carried out. This ensures that errors in writing are detected at the time and not later when the information is being read. In addition a check total of each block can be written with each block to provide a comprehensive check when reading.

READING OFF THE TAPE

The blocks of information on the tape may be read one at a time in the sequence in which they appear on the tape. Alternatively a computer instruction can arrange for a block with a particular code number to be read. The search can be made while the computer is carrying out other operations.

Each block is read by two separate heads and in the event of a disagreement an alarm is given and arrangements can be made to accept or re-read the block. In addition a programmed verification of the check total can be made which permits several attempts at reading before giving an alarm.

LOADING THE TAPES

The loading procedure is fully automatic. The spool is placed in position and the end of tape is clipped to the take-up spool; then by pressing two buttons the tape is brought under the control of the computer. To unload, the tape can be wound on to either of the two spools by a fast rewind action and then removed.

SPECIAL FACILITIES

Special features have been provided to aid operational efficiency. These are:—

- end marks on the tape to prevent the operator or the computer inadvertantly running the tape off the end.
- remote operation of manual controls.
- clips and labels on the spools for ease of attaching tape and identification of tape contents.
- a detachable ring on the spool which prevents the accidental overwriting of a tape.

RECORDING HEADS

The heads on different tape decks are mutually aligned. This allows the interchange of tapes between decks for the purposes of recording and reading and greatly adds to the overall flexibility.