



TECHNOLOGY NOTE

D29 REMOTE INPUT/OUTPUT STATION

What is it?

This is a small computer, equipped with a card reader and a printer, connected by a communication line to the main CDC 7600/6500 computer centre. It reads a user's cards and sends his problem to the main computer for processing. It later receives his results and prints them out for him. An independent teletype is also provided to allow the progress of a user's job to be monitored, and a TV set provides general information about the state of the central computers.

The computer system was supplied by Computer Technology Ltd. (UK), and the software was developed at CERN from an original version provided by the manufacturer.

Why was it needed?

Remote Input/Output stations allow CERN to decentralise the use of its main computers, while centralising their actual location (in a new computer centre, Building 513) to simplify their operation. There are 8 such remote user sites within CERN, including one at Lab. II, about 6 km away from the new computer centre; the other sites are about 1-2 km away. At two of the most heavily used sites, twin systems are installed to double the capacity. One more remote connection also exists, to the University of Geneva, located outside CERN in the city itself.

About 8000 jobs per week are processed via the CERN remote Input/Output stations, the vast majority of the total load on the 7600/6500.

How does it work?

To send a job for processing by the 7600/6500, a user simply places his card deck in the reader and presses the starting button. After each job is read, the central computer sends out an acknowledgement which is printed on the remote station's console. When the results are ready, they are sent out automatically to the remote station, unless the amount to be printed exceeds a limit of about 100 pages, in which case they are printed centrally and the remote station is informed accordingly. After each job is printed, another console message is issued, so the remote console keeps a complete log of all jobs sent and received.

Up to 600 cards per minute are read, translated into a form suitable for transmission, and sent down the line; about

20 pages of output per minute can be received and printed. However, the CDC system cannot send and receive data at the same time, so the station is normally set up to stop printing automatically while a user reads in his cards, then resume printing afterwards.

Some special problems
solved

The main problem encountered, when the remote stations were first installed, was that to conform to CDC requirements for connection to the central computers, each system had to simulate exactly a standard CDC remote station known as a "User Terminal 200", or "UT200". As a UT200 is a very limited device, and also requires a great deal of user or operator control, its use is very inconvenient. To achieve the desired job throughput, a development was undertaken by CERN (DD) to extend the facilities and speed of the remote stations, and fully automate their operation, by modifying the manufacturer's UT200 simulator program inside the remote computer.

The present remote station requires no user or operator control in normal use, other than loading it with cards and keeping the printer fed with paper. It accepts all jobs, and prints their results, in a form identical with centrally-submitted work (except, for the moment, that binary cards are not accepted as input). Some extra facilities are also offered remotely that are not available centrally, such as "instant listing" of cards on the printer, and the acceptance of jobs punched in a mixture of "old" and "new" IBM keypunch codes.

For further information

For further information on CERN's remote stations, please contact Ben Segal - DD, 4941, or John Ferguson - DD, 4935.