"A LARGE EUROPEAN COMPUTER INSTALLED AT CERN"

The main computer for the Omega and Split Field Magnet (SFM) projects, a CII 10070 manufactured in France by the Compagnie Internationale pour l'Informatique, was delivered to the Data Handling Division and installed in Lab. 5 during the month of December 1970.

The equipment configuration comprises 64K of 32 bit word core memory, 3 fixed head disks, 1 nine-track and 2 seven-track magnetic tape units, card reader and punch line printer and some 24 I/O channels. The software includes a multiprogramming operating system produced by CII (SIRIS 7).

After an initial check-out period the computer was submitted to an acceptance test lasting one month. A variety of programmes were run for up to 23 hours a day under varying environmental conditions to test the performance of central and peripheral units.

The computer was remarkably successful and passed all the tests with a total up-time of nearly 99%.

Subsequently, validation of SIRIS 7 took place, and finally the whole computer system was formally accepted on the 16th of March 1971. The machine will be now connected via data links to the Omega and SFM on-line computers and to a visual display system and will constitute the heart of a complex data acquisition and processing system developed for these two projects.

This CII 10070 is provisionally installed on the ground-floor of Lab. 5 before being moved to its final destination near the West Hall.

P. Villemoes

**MACHINE PERFORMANCE**

<table>
<thead>
<tr>
<th>1st February - 1st March 1971 (4 weeks)</th>
<th>6500</th>
<th>6600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Achieved (Scheduled)</td>
<td>530  (563)</td>
<td>456 (586)</td>
</tr>
<tr>
<td>Development Achieved (Scheduled)</td>
<td>33   (44)</td>
<td>13  (12)</td>
</tr>
<tr>
<td>IDLE (Scheduled)</td>
<td>30   (20)</td>
<td>25  (20)</td>
</tr>
<tr>
<td>LOST + Unscheduled Maintenance</td>
<td>41</td>
<td>122</td>
</tr>
<tr>
<td>Preventative Maintenance + Machine Development (Scheduled)</td>
<td>40 (45)</td>
<td>56 (54)</td>
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The performance of the 6500 was good throughout this period, and in particular the number of unscheduled dead starts was particularly low. Unfortunately this performance was not matched by the 6600 and is reflected in the unusually high figure for Lost and unscheduled maintenance. Much of this can be attributed to the installation of an FCO in the 6681 channel adapter on channel 12, which provoked serious timing problems between the 6681 and the Low Speed Interface. The number of memory failures was also higher than usual, resulting in a large number of dead-starts. There is however a happy ending to this story - the performance of the 6600 during March (to date) seems much improved.

A substantial effort was made during the month to identify and isolate tape units giving poor performance. As a result, Units 30/6600, 65/6600, 66/6500 were all down for substantial periods. In general the performance of tape units now seems to be satisfactory.

The rotating mass storage devices on the CDC 6500 gave some trouble at the beginning of the month on file on the 663B (SK5) was down for 51 hours following a head crash, and the drum on the 6500 (SK7) for 125 hours following the installation of the 'Lock-Out' modifications.

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**OPERATIONAL CHANGES**

1. **Job Classifications**

   On February 1st a new system was introduced with revised job classifications (see Computer Notice 570)

   In particular a 45K limit was imposed on S, M jobs and the default line limits changed to:

   - X jobs 1024 lines
   - S jobs 2048 lines
   - M, A, B, C jobs 5000 lines

2. **RIOS Facilities**

   Remote Input Output Station facilities were introduced on March 1st. The service has been steadily improved since then and the facilities currently available are as follows: (See Computer Notices 571, 572, 574).

   3 stations are currently in operation:

   - **Station 0** Card reader/Line printer on 3100 in Building 2 (FOCUS)
   - **Station 1** IBM 1130 in User area of central computing facilities
   - **Station 2** IBM 1130 at ISR (Building 376)

   All stations are normally in operation between the following hours:

   - **Mon** 13.30 - 16.00, 20.00 - 22.30
   - **Tues, Wed, Thurs** 10.00 - 13.00, 14.00 - 17.30, 19.00 - 22.30
   - **Fri** 10.00 - 16.00, 20.00 - 22.30

   X and S jobs may be read, and are run on the CDC 6600. The FOCUS teletype adjacent to the RIOS must be used to warn the computer operators of the tape numbers required by S jobs. This can be done by means of the TAPE command, parameters Reelno, Reynam, ....
Jobs run on the central RIOS are limited to approximately 750 lines of output and 2000 cards of input. These limits have been chosen to avoid unnecessary queuing at the RIOS and thereby to assure fast turnaround. Users are reminded that the printers on the RIOS have different line length, namely:

- **RIOS 0**: 156 characters/line (FOCUS)
- **RIOS 1**: 120 characters/line (User area)
- **RIOS 2**: 132 characters/line (ISR)

The line length on all printers connected to the CDC 6000 series computers is 136 characters/line.

In the event of unscheduled cold starts on the CDC 6600, all jobs submitted via the RIOS are lost and must be resubmitted by the user. The Computer Centre group cannot identify individual jobs lost in this way but will make every effort to inform users of all unscheduled cold starts by means of the status sheets and by means of the Broadcast commands.

The RIOS can accept priority codes, but they are not transmitted to the central computer.

Further enhancements to the RIOS facilities will be announced in the near future.

3. **FOCUS Changes**

As from March 15th the X and S jobs submitted via FOCUS were assigned the same priority as X and S jobs submitted via the RIOS and the central reader. The F control point was also suppressed. These actions were all taken at the request of the Computer Coordinator in order to improve machine scheduling. The suppression of the F control point resulted in some inconvenience to those FOCUS users engaged in partially interactive computing and special steps have now been taken to remedy this. For further details see FOCUS User Note 27.

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**CERN COMPUTER PERFORMANCE MEETING**

The CERN COMPUTER PERFORMANCE MEETING is held every Tuesday at 14.15 in the DD conference room Building 578. Users wishing to discuss operational problems with the computer management, or to receive information concerning the performance of the computer centre, are cordially invited to attend.

J. Down

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**NINE TRACK TAPES**

It is expected that a general service for reading 9-track tapes will be available on the central computers as from Monday, 5th April (see Computer Newsletter 54). Two CDC 609 tape units are attached to Channel 11 of both the 6500 and 6600 as logical units 34 and 35. These units are slow (roughly a quarter of the speed of existing 7-track units) and it is emphasised that they are intended for handling small numbers of tapes (at 800 b.p.i. only) produced by small computers around CERN. Large volumes of data recorded on tape at CERN or other institutions must continue to use 7-track tape until a 9-track tape service is available on the CDC 7600 installation. Until full documentation is available the Programming Enquiry Office should be consulted for further information. A brief description of the service is given below. The section RECOMMENDATIONS should be studied by all (intending) 9-track users and the Programming Enquiry Office consulted if any points are unclear.
Tapes

Preference should be given to using new tapes on 9-track units. When the tapes are requested from the Computer Centre Group they must be declared for use as 9-track. These tapes will be issued with one load point only and a sticker "9". Other tapes should be returned for re-certification and for load point removal. Once tapes are used as 9-track they should not be returned to 7-track use since not all units erase full width and since re-certification and labelling are required.

Labels

9-track tapes will be unlabelled for the time being. CDC/IBM compatible labels will probably be used on the 7600 installation. Due to the small number of tapes involved and the lack of need to write 9-track tapes at the central computing system a special temporary label system has not been implemented. To assign file to 9-track tape it is necessary to punch a "9" in column 10 of the tape description card. The reel number should be checked carefully since the system performs no label checking.

Formats

If record-lengths are an even integral number of 60-bit words 9-track input/output is fully compatible with 7-track or disk input/output; standard FORTRAN I/O statements, FORTRAN Library Subprograms, and standard utility programs (COPYBR, etc.) may be used. The use of a utility like COPYBR with a record containing a non-integral number of 60-bit words will cause a rounding up of the record length on the output medium (e.g. an input record of 40 8-bit bytes will be copied as a record of 6 60-bit words with zero fill of the extra 40 bits). An attempt to write an odd number of 60-bit words to 9-track tape will cause an extra 4 zero bits to be written in order to give an integral number of 8-bit bytes. Coded 9-track tapes (ASCII or EBCDIC codes) may be read as binary tapes and conversion performed by a central subprogram.

Utilities

New library subprograms will be released shortly for
a) Unpacking to 1, 2, or 4 bytes per 60-bit word (UBYTE)
b) Conversion of IBM 360 32-bit integers/floating point numbers to CDC format (CVT360)
c) Conversion of Hewlett-Packard integers/floating point numbers to CDC format (CVT3HP)

Recommendations

1. Never use a 9-track tape more than once or with other than a small program. When in doubt copy to 7-track and use the 7-track tape for subsequent runs and tests. Program turnaround of the application and overall system efficiency will benefit. The danger of errors due to the use of unlabelled tapes will also be reduced.

2. Use physical record lengths:

   a) Greater than 18 8-bit bytes (industry noise standard)
   b) Strictly less than 3840 bytes/512 60-bit words (for CDC compatibility)
   c) Which are an integral multiple of 2880 bits (360 8-bit bytes, 48 60-bit words)
      if possible (2880 is the LCM of 6, 8, 16, 18, 24, 32, 36, 48, 60, 64).

      If recommendation c) is too restrictive then

   d) Which are an integral multiple of 120 bits (LCM of 8 and 60). Failure to comply with this convention will result in the loss of the last \( n \) bits \( (n \leq 60) \) if the tape is read with some CDC 8000 Series systems.

The suggested logical/physical record length for maximum tape and processing economy is 28,800 bits equivalent to

   480 60-bit words (4800 6-bit characters)
   and 900 32-bit words (3600 8-bit bytes).
3. Do not write at or beyond the end of tape mark (inter-system compatibility)

4. Write 2 consecutive filemarks to signify end of information (CDC convention for unlabelled tapes).

5. Use standard FORTRAN input/output statements (special library routines like RANYZM are too machine and system dependent).

R. McIntosh

6000 SERIES SCOPE
BUG LIST

System Version April 5, 1971

5203 UTILITY BACKZF goes back over two file marks if the file is positioned after and END-OF-FILE.

5285 RBAIEX RBAIEX stops with arith. error mode 2 if in the expression R1**I2 I2 is not defined.

5309 BATCHIO The card count on reading is not consistent.

5312 FUN FUN(P) creates an empty record for a routine which gave a fatal diagnostic.

5313 FUN FUN issues a diagnostic if the name of a subroutine appears also as a variable name inside the subroutine.

S. Kurjo

PROGRAMMING ENQUIRY OFFICE

The Programming Enquiry Office is currently only staffed with two members due to transfer and leaving of staff. In May we expect one new member to arrive while two further posts are still vacant. Be patient, we will try to operate the office full time, but it will be difficult to offer the same service as before.

NEXT NEWSLETTER

Closing date for the submission of articles for the next Newsletter is Monday, 26th April 1971.

Editor:
H. von Eicken