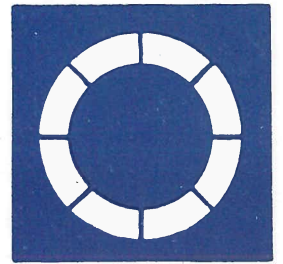


FORUM

195 COMPUTER NEWSLETTER



FORUM CENTRAL COMPUTER NEWSLETTER

Number 3 August 1977

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SECTION 1 195_GROUP_REPRESENTATIVES_MEETING_(29/6/77)

The programme was as follows:

09.30 Introduction

09.35 The Dual 195 Installation

A review of the transfer of the computing centre and the inauguration of the coupled system.

10.00 The Rutherford Laboratory Computing Advisory Committee and the SRC Facilities Committee for Computing. This includes allocation of cpu time to categories.

10.15 COFFEE

10.30 General Meeting

Updated notes issued for the meeting are given here. Formal replies to some questions of general interest are provided.

11.30 Package Support

Levels of Support for Packages and other Software.

11.45 The SRC Network - A review of progress.

12.00 Parallel Category Meetings.

LUNCH

14.00 Proposed System Enhancements including Graphics Facilities

15.00 Remote Users' Meeting

Some aspects of using the system from remote links.

ATTENDANCE

C & A Division

A. Bryden, J.W. Burren, C.S. Cooper, F. Hart, P.J. Hemmings,
H. Hurst, G.A. Lambert, A.T. Lea, T.G. Pett, D. Rowley,
D. Trew, W. Walkinshaw, J.B. Whittaker.

Attendance

Category Representatives

J. Barlow
C. Batty
N.J. Diserens
J.S. Hutton
K.G. Jeffrey

Film Analysis
Nuclear Structure
RL (Other Divisions)
HEP (deputy)
NERC

Group Representatives

D. Adams
E.M. Adams
J. Allison
D. Asbury
D. Aston
F. Atchison
R. Barrett
G.G. Baxter
C. Blamey
I. Bloodworth
D.R.S. Boyd
P.D. Bristowe
R.O. Butt
J.V. Carey
A. Chryssafis
E.F. Clayton
M. Coupland
P.D. Dacre
P. Domanski
K.P. Duffey
J.R.C. Duke
R.J. Ellison
E. Eisenhandler
W. Gibbons
Mrs.E.M. Gill
C.F. Grainger
M. Grayson
K. Guettler
A.W.N. Hames
R.J.R. Johns
Mrs.L. Jones
G.T. Laws
A.P. Lotts
D. Lowther
J. MacAllister
F. MacDonald
R.S. Mackintosh
B. Mack
R. Martin
R. Maybury
C. McArthur
D. McGregor

Southampton Chemistry
Southampton Chemistry
Manchester/PETRA -
Nuclear Physics (Structure) R.L.
RL/CERN E-Gamma
RL Instrumentation
Surrey
NERC - I.O.S
AWRE
Group B R.L.
HEP CGA - R.L.
Physics Dept. Surrey University
RL. Admin. Div.
R.G.O.
Cranfield Institute of Technology
Imperial College - Film Analysis
Q.M.C.
Sheffield Chemistry
NERC - I.O.S.
R.L. Laser
PERME, Waltham Abbey
Manchester Univ.
QMC/RL-Counter Group C
GEOS UK Users Group
NERC Central Computing Group
Salford Univ. - Vice Chancellor's Dept.
Sheffield Chemistry
UCL Counter/CERN
M.S.S.L.
Imperial Coll. Mech.Eng.
Oxford Univ. - Physical Chemistry
Salford Univ. - Mathematics Dept.
DURHAM F/A
Imperial Coll. (Elec.Eng.)
Oxford Univ. - Nuclear Physics
Birmingham F.A.
Oxford, Nuclear Structure
R.G.O.
R.O.E.
R.L.
Bristol Univ. Particle Physics
I.S.C. Newbury

Attendance

D. Meader	Bristol Univ. Biopolymers
I. Mohammed	Oxford Univ. - Theoretical Physics
S. Moore	Oxford Univ. - Physical Chemistry
D.J. Munday	Cavendish Laboratory - Cambridge
P.J. Negus	Glasgow Univ. - F.A.
M.J. O'Connell	R.L. - Instrumentation
J. Payne	ARD. Culham
T. Phillips	UCL - Physics B/C Group
D.C. Rance	RL. Admin
W.G. Richards	Oxford Univ - Physical Chemistry
S. Rose	Oxford Univ.
L.R. Scotland	Edinburgh Univ.
D.W. Scott	NERC, ITE
E. Skovfoged	U.C. Cardiff
J. Smyth	Forestry Commission
R.J. Tapper	Bristol Univ. - Particle Physics Group
S. Treadwell	Networks Group - UCL
C.J. Webb	NP (KCL)
N. West	Oxford Univ. - F.A.
C. Whittaker	Cranfield Institute of Technology
J.R. Wormald	Liverpool - Physics
J.B. Young	AWRE

NOTES FOR 195 REPRESENTATIVE'S MEETING
29 JUNE, 1977

1. INTRODUCTION

During the last 9 months the second 195 was installed in R26 and 195/1 was moved from R1 to R26.

There were problems with poor response and poor turnround. These were mainly due to the temporary configuration of the system and it is expected that these problems will disappear now the dual system is operational. They were aggravated by hardware faults.

Those changes which affect the user will be described in the paragraphs below.

2. HARDWARE

2.1 General

The 2314 disk drives were removed at the end of December. In November, therefore, the 2314 general disks, ATLAS1 and ATLAS2, were copied to a 3330 disk called XA3325.

The two 195's are now installed, and are coupled as a 2+2 megabyte system.

2.2 Performance

There have been further problems with the Memorex disk drives, involving damage to some privately owned packs. There were also intermittent problems with the 6250 b.p.i. tape drives; these have now been resolved.

2.3 Shutdowns

One shutdown is being planned, for air-conditioning maintenance. It is scheduled from Saturday 8th October to Tuesday 11th. Normal service resumes on Wednesday 12th October.

2.4 Routine Maintenance

Routine maintenance will be done on 195/1, once a month, on Thursdays from 15.00 to 19.00.

Maintenance on 195/2 will be also be once a month on Thursdays, but from 16.00 to 20.00.

The dates are as follows:

195/1 - 9th June, 14th July, 11th August, 15th September, 13th October, 10th November, 8th December.

195/2 - 23rd June, 28th July, 25th August, 29th September, 27th October, 24th November, 22nd December.

During these periods a restricted service will be offered on the remaining machine, with the Front End system only. MAST, HASP and ELECTRIC will be available but very little batch work will be run.

2.5 System Development

The system will be required for System Development on Tuesday and Thursday evenings from 17.30 to 19.00.

3 SYSTEM SOFTWARE

3.1 HASP_and_OS

The dual system is up and running.

Minor changes to HASP which have taken place over the last nine months are listed below.

i) HASP was altered to allow 4-digit job numbers and to extend the job queue to 1500 jobs.

ii) When a user is logged in to ELECTRIC and receives a 'JOB ENDED' message from HASP the message 'jobname ENDED NOT EXECUTED' will be output if the job had a JCL error or was cancelled before execution.

iii) The /*NEEDS card has been introduced. Jobs requiring special resources which are specific to either machine should include one of these cards. The format of the card is, for example,

```
/*NEEDS ELECTRIC  
or /*NEEDS STAIRS,MAST
```

The resources currently defined, and their association with particular hardware or software, are:

<u>NAME</u>	<u>HARDWARE</u>	<u>SOFTWARE</u>
195/1	195/1	ANY
195/2	195/2	ANY
MAST	ANY	FRONT END
ELECTRIC	ANY	FRONT END
STAIRS	ANY	FRONT END
NETWORKS	ANY	FRONT END
FRONT	ANY	FRONT END
BACK	ANY	BACK END

The /*NEEDS card may be inserted anywhere in the deck that a /*SETUP card is valid.

It is processed when a job is read into the system, and determines only which CPU the job will run on. Using, for instance, /*NEEDS ELECTRIC will run the job on the front end machine, but will not guarantee that the job is run when ELECTRIC is online.

3.2 ELECTRIC

The new ELECTRIC manual is now available. Users requiring a copy of this manual should inform Mrs. June Scholes, if they have not already done so.

Users are again requested to note that the space available in ELECTRIC is gradually running out and files not in current use should be archived. Work has continued on attempting to find ways of improving ELECTRIC response.

There have been several minor changes to ELECTRIC. A brief

mention of them is made below, but for details on how to use them users should refer to the new edition of the ELECTRIC manual.

- i) A bug in the LINENUM=NO option when typing directories containing archived files has been fixed.
- ii) .L M=Z is no longer printed unless layout has already been switched off by an earlier occurrence of this command.
- iii) Refinements have been made to the barring facility in layout so that lines of text are no longer barred unnecessarily.
- iv) A layout parameter whose value is set outside the allowed limit is now set to that limit instead of being ignored.
- v) The reserved directory names D, E, and * have been introduced.
- vi) ELECTRIC now stores the value of FL (or FL1 or JB or JB1) given with certain commands and uses this as a default value if the FL parameter is omitted from any subsequent command.
- vii) It is now possible to run a job to list the archived files in a user's own main directory or sub-directories. The job is run by executing JB=ARKFLS.
- viii) Messages are now stored in the recipient's MESSBOX (provided he has one) even if he is logged in when they are sent.
- ix) Automatic plants have been introduced for all the remaining positional parameters in the HASP accounting field of the JOB statement, for use with the EXEC, PRINT, PUNCH and TAPE commands.
- x) When in FIND mode it is no longer legal to use a comma to separate the sub-command from the parameter list; also the rules for context searching are now the same as for \$L.
- xi) It is now possible to use the PRINT command to output a file to a private dataset on disk, which can be kept for printing extra copies. This facility should be useful mainly for manuals and large documents using text layout. The main advantages are that once a dataset has been created, copies can be printed as an offline process avoiding the copy operation within ELECTRIC, and that the ELECTRIC source files can then be archived, releasing valuable file space.

To use this facility the parameter LIST=DS must be

set with the PRINT command. The parameters VOLUME and TODSN must also be used, e.g.

```
PRINT FL=X,LIST=DS,VOLUME=FREEDISK,TODSN='MON.IDX'
```

the default value of VOLUME is FREEDISK. This causes ELECTRIC to submit a job which does not print the file but copies an intermediate dataset onto the specified volume. This job will fail if the dataset already exists. If the volume is not permanently mounted, you need the SETUP parameter to plant the whole of the relevant SETUP card, e.g.

```
SETUP='/*SETUP DDXXXX,DISK30'
```

The optional parameters associated with PRINT are available except for LINENUM, ENTLN, TAB, MARGIN, COPIES and LNCNT. The JOB card and ROUTE parameters apply to the modified version of the PRINT job.

Once the dataset has been created lineprinter copies may be obtained from it by submitting JOB=PRINT with the compulsory parameters VOLUME and TODSN, and the parameter SETUP if required, e.g.

```
EXEC JB=PRINT,VOLUME=DDXXXX,TODSN='MON.IDX'
```

The job submitted has the default name idOUTPUT, as with the print command. All the optional parameters associated with the PRINT command are available for use with JOB=PRINT, except for LIST. The parameters LABEL (or LB), COL, DF and LAYOUT apply to JOB=PRINT, and should not be used. The COPIES and LNCNT parameters are planted on the JOB statement, and not processed internally as with the normal PRINT job. LNCNT should not be used if the file makes use of text layout commands.

Multiple column output and output on the FR80 may be obtained by specifying the relevant edit group name for JOB=PRINT. These group names are the same as the values of LIST as described in the manual for the PRINT command, e.g.

```
EXEC JB=PRINT(MC).....
```

will give multiple column output. The parameters WIDTH, CAMERA, LPI, MODE and TITLE are available as defined in the manual.

- xii) The parameter 'NAME' can be used to plant a character string in the NAME field of the output job for PRINT, PUNCH and TAPE commands.

- xiii) ELECTRIC now uses the COPPER accounts data-set to process LOGIN commands.
- xiv) Output for jobs submitted with FORMS=555 is now automatically routed to LOCAL.
- xv) The default backup routing of output for jobs routed to ELECTRIC with HC=2 is now the default print location of the terminal from which the job is submitted.
- xvi) The rules with regard to routing have now been rationalised. There are three ways in which a ROUTE card may be inserted in a job submitted via ELECTRIC: by use of the ROUTE parameter; by including a ROUTE card in the file; automatically by ELECTRIC according to the default set for the terminal. If more than one of these is used at the same time ELECTRIC now only supplies one ROUTE card according to the hierarchy listed above. That is, use of the ROUTE parameter takes precedence over a ROUTE card, which in turn takes precedence over default routing.

When the ROUTE and BACKUP parameters are used with the EXEC, PRINT, PUNCH and TAPE commands the values 'PRINTER6' and '1130' are synonymous, as are the values 'LOCAL' and '360'.

The BACKUP parameter used with a command or a ROUTE card may have the value 'REMOTEN', 'RMn', 'Rn' or just 'n'.

- xvii) All COPPER commands are now available via ELECTRIC, but the provision of this facility necessitated a change of syntax in some cases and the introduction of a new command, 'RESET'.

Commands via COPPER

ROUTE JOB=nnnn

LISTxyz

ROUTE JOB=nnnn,ROUTE=n,ID=id,ACCT=acct

CHAN JOB=nnnn,PRI=pri,ID=id,ACCT=acct

Commands via ELECTRIC

STATUS JOB=nnnn,OPT=R

STATUS LIST=xyz

RESET JOB=nnnn,ROUTE=n,ID=id,ACCT=acct

RESET JOB=nnnn,PRI=pri,ID=id,ACCT=acct

The commands 'CANCEL' and 'RATION' have the same syntax via COPPER or ELECTRIC. For a logged in user the values of ID and ACCT will default to the login values if omitted when the command is sent via ELECTRIC.

For the sake of uniformity the ELECTRIC versions will be implemented in COPPER in due course.

xviii) The parameters DEV, NF, ROUTE and KEY can be reset with the SETD command.

xix) The value of KEY given with login is retained and used as a filekey until overwritten by a subsequent setting of KEY. Also KEY is automatically planted by ELECTRIC in the same way as ID and ACCT if there is a \$P with the name KEY and DF=NO.

xx) The edit command \$I LN=n:

can be used to insert a blank line in a file.

3.3 MAST

MAST has been changed to make use of the new RL standard character codes.

The reply to ++M JOBS was changed to differentiate between which jobs are running on the front end machine, and which on the back end.

4. DISKS

There are problems with the amount of permanently mounted disk space available; this in turn causes problems with the allocation of work space, and users should try to observe a limit of 200 tracks for temporary work datasets. Beyond this limit use should be made of the de-mountable pack, USDSK2, which is now double density. The de-mountable pack XA3328, which was used in this way by the old 'Atlas' users, is to be withdrawn on 1st August. Also, users must ensure that datasets going onto the permanently mounted packs RHELO3, RHELO4 and RHELO5 are registered with P.A.O. beforehand.

The short-term datasets on the packs referred to by VOL=REF=FREEISK and VOL=REF=ATLAS should also not be greater than 200 tracks in length. Both of these 'FREEISK' type packs are now available to all users; it is sometimes possible to get space on VOL=REF=ATLAS when it is not available on the other pack. It is hoped eventually to merge these two packs, referring to them both by, for example, UNIT=FREEISK.

A further difficulty lies in the fact that there are 8 de-mountable double density drives and only 3 single density, but there are about 50 single density private packs and only about 30 double density ones, causing an imbalance in the competition for the two types of drive. Users are therefore advised to use one double density private pack rather than two

single density packs, where this would not be detrimental to their jobs. Sharing of double density packs with other users could also help to ease the situation.

5. WORKLOAD

Due to the problems with the hardware in the transitional period from January onwards turnround was adversely affected and an attempt was made to relieve the situation by halving the priority 12 allocation. The amount of priority 12 time allocated will always depend on how much work the system can cope with during the day without degrading turnround at other priority levels.

When the dual system is producing an acceptable level of CPU time it is hoped to increase the priority allocations, most of the extra time being at priority 4 initially.

Users are reminded that it may well be possible to improve the efficiency of production programs after analysis by the PPE package. Details of how to use this are available in section C5 of CIGAR.

It is worth noting at this point that during the re-organisation the second 195 was used for the running of production jobs independently of the normal batch processing on 195/1. The extra CPU time obtained in this way amounted to about 450 hours.

6. FACILITIES in R1 and R26

6.1 Data Preparation Area, R1

The R1 Data Preparation Area has now been re-organised. Users with problems concerning the equipment, or their output, should contact Joe Roberts (extension 360 or 6233).

6.2 Routing of Output from Local Terminals

Jobs submitted from any of the terminals in the R1 Data Preparation Area or from the Terminal Room in R1 (room 1.75) automatically have their output routed to Remote 24 (the 1130). During the night and at weekends, when the 1130 is not manned, the output will be re-routed by the operators to the printers in R26.

Jobs submitted from the terminals in the Data Preparation Area in R26, attached either directly to the 195 or via the

2050 workstation, have their output routed to the 195 printers by default. See section 3.2, paragraph xvi for further details on routing.

6.3 Workstations_in_R1

Since the 360/195 move the majority of main site users have become workstation users. An IBM 1130 under operator control through 2 shifts provides the main service, with output distributed to the usual pigeon-holes. Most terminal users in the R1 area have their jobs automatically routed to this workstation (Remote 24) for output purposes. The user operated workstation in R1 (GEC 2050, Remote 23) has been modified to support 3 printers, 2 giving a capacity of 900 lpm in R1 and a Tally printer giving 200 lpm in Hall 3. This station no longer supports any RJE terminals. The fast card-reader from the IBM 1130 has also been installed in the user area, particularly for users to submit card jobs which are too large to be convenient for the smaller reader on the GEC 2050 or where automatic routing to Remote 24 is required.

6.4 Continuous Printing on IBM 1130 (Remote 24)

Notice CCR6 asked users to specify the HASP linecount parameter to be zero in order to get continuous printing on the 1130 printer in R1. However, when using the ELECTRIC PRINT command this causes it to print one line per page. The use of LNCNT=86 was temporarily recommended, but the LNCNT parameter should not now be used from ELECTRIC when routing to the 1130 printer in R1.

6.5 Lower Case Characters on 1130 Printer

The software for the IBM 1130 workstation printer has now been changed so that any lower case characters sent to it are translated into upper case.

6.6 Distribution of Output Printed at Rutherford

i) Output destined for a pigeon hole in R1 or R26 -
Begin the jobname with your 2-character personal identifier. Precede this with 'XA' if your personal identifier begins with a number, or with your site identifier if you are submitting jobs from a remote site but collecting the output at Rutherford.

ii) Output to be collected from R26 by a visitor -
Begin the jobname with the 2 characters 'XZ' and follow this by your personal identifier. The output will be placed in the visitors' pigeon hole, XZ.

6.7 P.A.O.

The Program Advisory Office has moved to a new office in the R1 Data Preparation Area, next to the receptionist's office. This is still the main office for 195 queries and all telephone enquiries should be directed here on extension 6111 only. The Program Advisory Office in R27 is open in the mornings for personal visits only. Both of these offices now open at 09.30 rather 09.00, to allow the advisor to attend Operations Group's early morning meeting.

7. WORKSTATIONS and TELECOMMUNICATIONS

7.1 Lines from R1 to R26

Those remote lines which at present terminate in R1 and are then linked across to R26 are gradually being moved so that they terminate in R26. Users are being informed when their workstations are affected. This work should be completed by July 18th.

7.2 GEC 4080 Nodal Processor

There has been a change of connection to the 360/195 for some workstations during the last few months. A Nodal Processor (GEC 4080), working under packet switching protocols, provides simultaneous access to the ICL 1906A and the 360/195. Currently 5 workstations are using this system, including the GEC 2050 workstation in R26. The 360/195 entry point for these stations is through a program interface known as the Network Control Program (DKNCP) which also supports a further nodal computer (Daresbury Laboratory) to which are attached 4 workstations.

7.3 New Workstations

The GEC 4070 and Prime Interactive Graphics machines and the Laser Facility's 4080 have all been brought onto the 195 as new workstations. Also, a line has been ordered for I.G.S. at Nottingham.

8. SHORT ITEMS

8.1 Joint Seminar Series

Atlas Computing Division, C and A Division and H.E.P. Data Handling Group are organising a joint seminar series on computing topics to replace the separate series currently being run by each division. The seminars will be held weekly.

8.2 STAIRS

The schedule for STAIRS is being revised as follows. The system will be available, on request to the Shift Leader, between 09.30 and 10.00, and after 19.00 each weekday.

A STAIRS reference card is now available from the Computer Receptionist in R1.

8.3 CIGAR

Part C8 - a brief description of utilities - is now being published, and part C6 - disk and tape JCL. Both these sections are distributed with this FORUM..

There is a new publication (RL-77-008/A), 'A First Introduction to the 195', which is intended to tell the new user what facilities are available before he starts using CIGAR.

8.4 New Character Codes and Translation Tables

These came into use on 16th November 1976. Full details are available in RL Report RL-76-121/C, 'Standard Character Codes for the RL Central Computer System'.

8.5 GINO-F

Those users who are interested should note that GINO-F is now running on the 195. The GINO-F library is supplied in the link-edit step either by using SYSLIB='SYS1.GINO' on the EXEC statement or by overriding the SYSLIB DD statement in the link-edit step. Full details on how to use the package are contained in the ELECTRIC file M.DOCUMENT.PACKAGES.LONG.GINODOC. The MUGWUMP system can be used to store and display pictures created by the use of GINO-F; details will be contained in part III of the new ELECTRIC manual and are already available in the ELECTRIC file M.DOCUMENT.ELECTRIC.PART3.SECT12.

8.6 Large Core Jobs

Users are reminded that under the 2+2 system it is impossible to run jobs requiring more than 1.4 megabytes of core. Jobs requiring more than 1 megabyte present some operational difficulties, and will only be run at the convenience of operations.

8.7 Dialin Lines

It is believed that some users have had problems using dialin with acoustic couplers. We require more information

about this, and any users who are experiencing difficulties should contact the telecommunications operator as outlined in section 7 of this issue of FORUM.

ANSWERS TO SOME QUESTIONS

Workload and Charging

Q1. Which committee is concerned with charging algorithms?

A1. Currently we "charge" on a very simple basis, namely CPU time only. When the bulk of the workload was highly CPU bound with only a medium I/O content this was fine. It is simple and easily understood. The changing pattern evident in the workload (towards more I/O bound, more large core usage, etc) means that a study is needed to find a more realistic charging algorithm. This is to be undertaken and I am sure will be discussed at the RL Computer Advisory Committee.

Independently, the Computer Board is suggesting that charging is a topic that should be discussed generally. Once networks give users access to potentially many different sites, there will be a need to quantify how much resource at each site is being used. To calculate bills, common charging practices are needed. Because the Computer Board and SRC are surveying the need for a common network, the question is arising of the SRC discussing charging generally. This is a topic for the SRC Facilities Committee for Computing.
(A.T.Lea).

Q2. Have you taken account of the additional workload from Northern HEP groups?

A2. Yes. It is always valuable to let User Support Group know as far in advance as possible of upsurges in work. We ask all groups to keep us in touch with their plans. We will pursue this particular question with groups concerned to try to quantify the likely load. (A.T.Lea).

Q3. Has the transfer of users of the 1906A at RL been taken into account?

A3. Yes, we are contacting those groups who need to move to the 195s. Also a simple document is being prepared listing areas of difference most likely to present problems.
(A.T.Lea).

System_Functions

Q4. Is there a way to hold a job with a /*NEEDS ELECTRIC card until ELECTRIC is available?

A4. Not yet. This requires further study. (A.R.Mayhook).

Q5. Could jobs cancelled because of /*NORESTART give some information?

A5. No information about the progress of the first attempt to run is available to the system after a restart. However we intend to write into the message log that the job was cancelled due to a system break. (G.H.Adamson).

Q6. Is multiple routing of output possible?

A6. Only via MUGWUMP(ELECTRIC) currently. Studies continue of improving output control. (C.D.Osland)

Q7. Is it possible to have a job's history (submission and changes of destination or priority) recorded in the message log?

A7. No, but it is hoped to enable the Hasp status reply to state where a job was printed. (M.M.Curtis).

Q9. Can a user enquire the Forms parameter of a job?

A9. No, but this can be added to the list of work. Note that any reply would refer to job-wide forms. (G.H.Adamson).

Q11. Can ELECTRIC backup prints be cancelled after the job has printed to ELECTRIC?

A11. Yes, just cancel the job. Do not worry about the reply about Messages. That merely postpones the cancellation until the job reaches the head of the print queue.

ELECTRIC_Performance

Q19. Is the 195 suitable for ELECTRIC?

Q20. When will ELECTRIC response improve?

Q23. What improvements could be made?

Composite Answer. In terms of facilities supplied against resources used, ELECTRIC on the 195 is reasonably economic. The main problem is growth. It is not usually possible to increment resources on the 195 in small amounts and hence growth in usage of ELECTRIC runs us into problems that can only be solved by major expenditure which has to be justified in terms of total 195 usage. We would certainly like to put data editing onto smaller machines but this is a long way off. We would also like the support of the user community for improving the I/O capability of the 195s (ie extra disk control unit and extra channel).

ELECTRIC will certainly improve and stabilise as the

coupled system continues to settle. However the I/O on the coupled system is the same as that on the single system but with more work going through. Thus it is difficult to see any general improvement unless more resources are made available to ELECTRIC. (J.W.Burren).

Q21. Can the maximum number of simultaneous users be limited to ensure good response?

A21. The problem is that it would be necessary to ration logged-in time. The situation is complicated further by the fact that there are periods of poor response even with 40 users logged in, but an hour later 50 users were getting good response. We do have this step in mind but it would be very much as a last resort. (J.W.Burren)

Q22. Could ELECTRIC be given more core?

A22. Studies are being made of performance against core usage. (J.W.Burren).

ELECTRIC Facilities

Q25. Copy queues are lengthened by the need to see the effect of an edit. Could a facility be provided to show the effect while editing?

A25. This is difficult to implement and the amount of work necessary does not seem to justify it. Work is in hand to allow simultaneous processing of Copy commands (including the completion of Modify, but excluding Exec) which should reduce the impact of large Copies. (T.G.Pett)

Q26. Can we delete data sets created by ELECTRIC Copies?

A26. The problem is one of security. It will be studied further. (T.G.Pett, P.J.Hemmings)

Q27. Where is the index of the new ELECTRIC Manual?

A27. Still being prepared. It will be circulated as soon as possible. (T.G.Pett).

Q28. A new user to ELECTRIC needs a limited introduction.

A28. Stick to Part I of the Manual. (T.G.Pett).

Q29. Can ELECTRIC have a HELP command?

A29. At the users' meeting last September a list of 50 improvements to ELECTRIC including the HELP command were discussed and users indicated which of these were high priority. 26 items were placed in this category and the HELP command was not among them. So far 12 items have been implemented. (T.G.Pett).

Q30. Is it better to stay logged in or to keep logging in and out?

Question/Answers

Q30. If you are idle for more than 10 minutes and ELECTRIC needs the slot for another user you will be logged out. The login/logout overhead is small unless multiple attempts are being made using the repeat last message facility that is available at some terminals.

Telecommunications

Q32. What is the availability of the nodal 4080?

A32. The GEC 4080 Node is available full time since August except when System Development is required. Users will be individually notified when this pertains. (C.Balderson).

Q33. Can lines not be lost when interrupting output?

A33. This will be amended in a future version of MAST. (P.J.Hemmings).

Q34. What is the number of the Telecommunications Operator's terminal?

A34. Address you messages to ++187. At some time this will become symbolic (like ++t and ++u) (C.Balderson).

Turnround

Q45. What are the projected turnround times?

A45. See article in previous Forum Newsletter. (P.J.Hemmings).

Q46. How much P13 time is allocated and what is it used for?

A46. Priority 13 is only issued on special request to cover such occasions as the semi-real time analysis of data to ensure that an experiment is behaving correctly. It is also used by specialist jobs on behalf of users such as library cleanup, RJE bootstrap loading, file transfer etc. Certain urgent operationally required jobs are also run at this priority.

The use of P13 is under constant review. In particular it is possible that library cleanups will be postponed to the evening or night shifts. (A.T.Lea)

Q47. What are the problems with priority 12?

Q48. Will more P12 time become available?

A47/48. Before we change the priority 12 allocations we have to be sure we can sustain the guideline turnround limits. This is not only for P12 but we must also ensure that the quantity of P12 work does not affect turnround at lower priorities. This has been observed in the past. Although we have two CPUs we do not have twice the I/O capacity. Thus we

will not be able to run much of an increased load of priority 12 over and above that run before. The problem is one we are currently studying hard. (A.T.Lea).

Q49. Why has Priority 10 turnround not improved as much as other priorities recently?

A49. Up until around early June the system suffered from a high frequency of machine breaks. Most priority 10 work consists of Setup jobs and many of the breaks involved the loss of a tape or disk drive. Queues can build up of jobs requiring drives because jobs cannot begin until all the setup requirements are met. This particularly affects the half hour target of p10, slightly affects p8, and hardly affects p6 at all. (P.J.Hemmings).

Graphics

Q51. The use of VIEW\$ to MUGWUMP produces characters of fixed size. Could software allow a variable character size?

A51. A variety of solutions are being considered and the user will be allowed to select the solution most appropriate to his problem. The most expensive is full software character generation. (C.D.Osland).

Q52. What changes are envisaged for LPGVIEW\$ (line printer simulation of graphics pictures)?

A52. Our main commitment is to provide a good graphics system for terminals and the FR80. If any spare manpower becomes available at later stages in the project we will try to cure bugs in LPGVIEW\$. (C.D.Osland).

Miscellaneous

Q53. How often is FREEDISK cleaned up?

A53. Normally once a week, but at busy periods as it was in June it is cleaned up daily. (P.J.Hemmings).

Q56. How are people advised to make efficient use of the priority system?

A56. From the Group Representative. User Support Group will visit sites needing general instruction. (P.J.Hemmings)

SECTION 2 SOFTWARE_SUPPORT

1. Introduction

In the past the level of support given by C and A Division to packages and other software on the RL central computers has been undefined with no publicised list of supported software. The support for any software is subject to change and the tables given here describe the situation at 1 September 1977.

2. Levels_of_Support

Table I defines four levels of support - each with three components - documentation, support and maintenance. Where different components of the package appear to fit into different levels the package is placed in the lower level.

3. Packages_Supported

Lists of packages in the top three levels are given in tables II, III and IV.

- a) Maximum: Very little appears here as manpower restricts us to essential software.
- b) High: Again very little appears on this list which consists mainly of locally written or modified software, which is locally supported.
- c) Standard: This list contains the bulk of the 'supported' software, and covers packages from IBM, CERN, SHARE (IBM users association) and other sources. Also appearing here are the languages supported at a lower level than FORTRAN. Note that ALGOL is not included.
- d) Minimum: This covers everything else. However a distinction should be made between packages for which there is some documentation and those which no one has ever heard of.

The position of IBM utilities is that IBM no longer offer support for them. However, fixups are available for some known bugs and the utilities are on the whole very reliable.

4. Additional Packages

If you feel you know of a package that might usefully be added to the list of centrally supported software, you should first discuss it with a member of User Support Group. A case can then be put to the appropriate C & A committee who will make the decision. The criteria you should consider are :-

- 1) Will existing software do what is required?
- 2) Is the package subject to licensing conditions which need to be under a central control?
- 3) Is the package useful for applications beside your own?
- 4) Is the package one that you cannot mount yourself?

Table I Levels of Support

- 1) Maximum
 - Complete documentation.
 - Support always available in office hours.
 - Immediate maintenance.
- 2) High
 - Good documentation.
 - Support usually available in office hours.
 - High priority maintenance.
- 3) Standard
 - Basic documentation.
 - Limited support - List of local experts available.
 - Maintenance referred to issuing body.
- 4) Minimum
 - Some documentation.
 - Support not usually available.
 - No maintenance.

Table_II Maximum_Support

FORTRAN H EXTENDED
FORTRAN G1
ASSEMBLER
ELECTRIC

Table_III High_Support

RUTHERFORD LIBRARY (RHELIB)
GRAPHICS
- SMOG
- MUGWUMP
SOME IBM UTILITIES

Table_IV Standard_Support

OSFLOW	OSDITTO
CSMP I	ECAP I
FOWL	SUMX
FAMULUS	ENPLOT
GCARADOC	GCNEAT
ERTREE	CCOPY
XTAPE	TPCOPY
CLIST	RLDISK
LVTOC	LPDS
GINO-F	BCPL
PL/I	COBOL
NAG LIBRARY	PPE
HARWELL LIBRARY	CPC LIBRARY
CERN LIBRARY	

F.Hart (User Support Group)

SECTION 3 SOFTWARE COOPERATION

(Condensed from a paper by M J Newman,
Technology Division, RL)

1. INTRODUCTION

The purpose of this note is to highlight several problem areas in the cooperative development and use of software and some solutions.

2. PROBLEMS IDENTIFIED

The following problems are clearly not independent, and their causes and possible solutions are naturally inter-related. However, as far as is possible, we shall treat each in turn.

- a) Software Survival
- b) Software Duplication
- c) Software Reliability
- d) Software Portability

3. SOFTWARE SURVIVAL

It is accepted that many programs are difficult even to use once the original programmer has left, and even more difficult to modify or extend. It has usually been found easier to start again. One of the prime causes of the collapse of software in the absence of its author is bad design and bad documentation.

3.1 Software Design

It is recommended that more time is spent planning the structure of a program. The earlier in the life of a program a design error is incorporated, the more far reaching will be the consequences and the more difficult it will be to correct the error.

Apart from some exceptional situations, the increase in speed and memory size in computers has resulted in a shift away from programming techniques aimed at efficiency and compactness towards those aimed at clarity and reliability.

Modularity should be introduced at subroutine, package, and program level. Frequently, with little extra effort, code required for a specific task can be made more general so that it will be useful in many similar situations.

3.2 Software Documentation

The NCC has published (Ref.1) some recommendations on software documentation which might provide a useful focus when attempting to discuss standards. We can highlight two sorts of valuable documentation; User Documentation, and System Documentation.

3.2.1 User Documentation

This should contain the following information:

- a) What the program does.
- b) How to prepare data.
- c) How to run the program.
- d) How to interpret the output.

In the case of subroutines, or packages of subroutines, information on parameter lists, and common block inter-faces will be required.

3.2.2 System Documentation

This should contain information on how the program fulfils its function, how it is structured, what data structure it uses, and how it should be changed to accommodate larger problems etc. At the lowest level, this documentation will be interspersed with the lines of code to explain the coding details.

3.2.3 Useful Programs

Several programs are known to the author which can assist a programmer in producing documentation. CARADOC (Ref.2) is a program which will take as input a set of Fortran routines, and produce valuable information such as where a routine may be called from, and where named common blocks occur. ADOC (Ref.3) is an interactive program which prompts the programmer for information on the specification of a subroutine, and which outputs a document specifying the interface to the subroutine in a standard format. There are also several programs which will produce flow charts from source code.

4. DUPLICATION OF EFFORT

Most universities and government research laboratories already have organised collections of subroutines and program libraries for internal use. The scope of these is normally limited to general mathematical routines and commonly required system facilities. Beyond that, however, there are a number of groups collaborating on software. The following topics should be highlighted:

Software Cooperation

4.1 Standards

With potential authorship spread over a wide range of centres, it is essential for some minimum guide lines to be recommended. These cover aspects of modularity, documentation, reliability and portability.

4.2 Coordination

It is necessary that someone should be responsible for the coordination of work.

4.3 Communication

Efficient communication is essential. Programmers should be able to ascertain easily whether software to meet their requirements already exists in the central pool.

4.4 Motivation

Doubt is expressed whether programmers can be motivated to contribute to and benefit from such software cooperation. In the similar situation in numerical analysis, many graduate students see a contribution to an existing library as a valuable project in its own right.

5. RELIABILITY

That software is not infallible needs to be stressed to those not involved in its production. Several problem areas can be identified.

5.1 Programming Errors (Bugs)

Bugs can be reduced in number by more rigorous testing of programs. All software should have associated with it at least one set of test data with sample output. Modularity allows smaller and simpler units to be tested more thoroughly and therefore to provide greater reliability in programs in which these are incorporated. Programs are available which assist the programmer in detecting errors in coding. For example, the XREF (Ref.4) program detects inconsistency in a set of routines between the numbers of parameters in a routine and the number used when that routine is called. Similar inconsistencies in use of named common blocks are detected. CARADOC may also help to draw attention to programming errors.

5.2 Insufficient Program Checks

There is a natural tendency for programmers to skimp on logical checks which they feel are unlikely to be violated. Experience shows that the effort involved in coding such

Software Cooperation

checks is amply repaid in time saved when such an inconsistency in the system occurs. This is especially true when software is adapted to a purpose for which it may not have been originally intended.

5.3 Faulty Data

Some errors in data cannot be detected by any program however sophisticated. The minimum requirement should be that all input data is echoed in the output data for visual checking by the person who created the data. If the data is voluminous (eg finite element mesh coordinates) then some extra aid such as graphical output is necessary.

5.4 Interpretation of Results

Wherever possible, a program should publish error bounds on any result which it produces. Occasionally, this would require a disproportionate amount of either programming effort or processing time or both. In those cases, it is vital that the user documentation stresses this fact and warns the user to be careful in interpreting his results.

At a practical level, much help can be given by producing output in a graphical form to supplement the numerical output.

6. PORTABILITY

In a user environment with a range of machines from different manufacturers, portability of software will be of increasing importance. Establishment of networks may avoid the necessity of transporting some programs, but as traffic grows it will become desirable to decentralise the software.

The first step towards portability should be to code in a language which is available on the widest range of machines. At present, this means ANSI FORTRAN (Ref.5). This restriction should be adhered to even if local enhancements are available.

When machine dependent code is essential (eg when the word length is of importance), this should be implemented by FORTRAN callable subroutines with a well defined interface which can be implemented with minimum effort on different machines.

There is much to be said for doing input and output by means of subroutine calls rather than by in-line 'read' and 'write' statements. This allows greater flexibility in adapting to different operating systems. Subroutines are available for performing radix conversion in either direction (formatting or un-formatting) but clearly some determination is needed to use these in preference to formatted input and

output statements. However, if all input and output is done in A1 format through a single routine many implementation problems are greatly eased.

Programs are available (Ref.6) which test code for departures from the ANSI standard.

7. RECOMMENDATIONS

1. Discuss with Rutherford Laboratory staff whether some of these matters should be handled centrally and indeed whether some already are being attacked.
2. Consider what, if any, special interest groups should be set up to examine these problems and propose solutions.
3. Consider how efficient communication can be established in both directions between any central coordinating body and the dispersed community which this body is to serve.
4. Collect and disperse information on what programs are available to aid programmers such as those mentioned in this paper.
5. Consider whether software cooperation is a practical proposition.

8. REFERENCES

1. "The Documentation of Software Products : Recommendations for Producers and Users" Publ. by NCC March 1977.
2. CARADOC: Author A S Dunn, C&A Division, RL.
3. ADOC : Author M J Newman, Tech. Division, RL.
4. XREF : Author M J Newman, Tech. Division, RL.
5. American National Standard Fortran ANSI X3.9-1966
6. "P FORT, A Standard Fortran Verifier" K Robinson, 1906A Internal User Notice 129.

Editor's Note The ballot on the acceptance of the ANSI Fortran 77 Standard is due to complete in September 1977.

SECTION 4 PASCAL USER NOTE 1

Introductory note on the University of Manitoba PASCAL Compiler

Preamble

This compiler has been written by W Bruce Foulkes under the supervision of Professor James M Wells at the Department of Computer Science, University of Manitoba. Development of the compiler is continuing at Manitoba and it is released on an "as is" basis, without guaranteed support. The compiler has been made available on the RL 195 system to enable anyone interested to gain experience of the language but users should bear in mind that local support is only on an informal basis. Any comments or queries about the implementation of the language or use of the compiler should be directed to the author of this note. Similarly if you wish to receive further PASCAL User Notes.

Documentation

The language manual for PASCAL generally is the book "PASCAL: User Manual and Report" by Kathleen Jensen & Nicklaus Wirth (Springer-Verlag). The Manitoba compiler implements a subset of this language: the principal restrictions are listed below. There are available upon request two manuals: "Manitoba Pascal User Guide" and "Manitoba Pascal Code Generation"; the latter is really only of interest to prospective compiler writers; either of these manuals is available in either hard copy or fiche form.

Language Restrictions

1. Only the standard input and output files SYSIN and SYSPRINT are supported. All I/O is done through the use of READ, READLN, WRITE, WRITELN, EOLN and EOF. The I/O is not quite standard: in particular, formatted input is allowed.
2. The program header is optional; at present it serves no useful purpose since file names may not be used with the I/O routines mentioned in 1.
3. PACKED is a reserved word but is ignored and so has no effect upon the storage allocation associated with arrays and records.