COMPUTING CENTRE NEWSLETTER
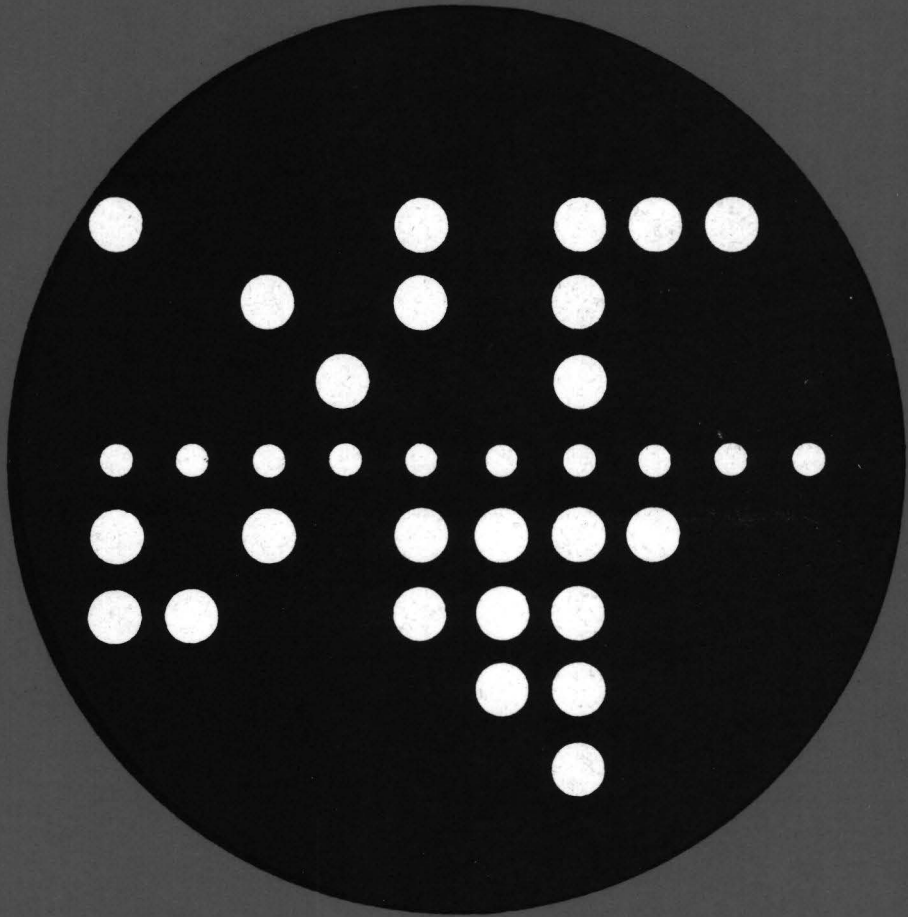
July 1979 - N° 33

Commission of the European Communities

JOINT
RESEARCH
CENTRE

Ispra Establishment

CONTENTS

EDITORIAL NOTE.

The Computing Centre Newsletter is published monthly except for August and December.

It describes developments, modifications and specific topics in relation to the use of the computing installations of the Joint Research Centre, Ispra Establishment.

The aim of the Newsletter is to provide information of importance to the users of the computing installations, in a form which is both interesting·and readable.

The Newsletter also includes articles which are of intellectual and educational value in order to keep the users informed of new advances in computer science topics.

The Editorial Board is composed as follows:

J.	Pire.	Responsible Editor.
M.	Dowell.	Technical Editor.
C.	Pigni.	Editors.
H.	de Wolde.	

Administration and contact address:

      Ms. A. Cambon (tel. 730)
      Support to Computing
      Building 36
      J.R.C. Ispra Establishment
21020-ISPRA (Varese)

Use of Terminals on TSO
C. Daolio, M. Dowell, D. König

In this, and the next few issues of the Newsletter there will be a series of articles which will present basic information about the use of various types of terminals on the TSO system.
The articles will describe the details of the particular keyboard layout, line and character deletion methods, attention interruption. They will give very specific and practical information to the users of such terminals. The articles are not intended to be an introduction to the use of TSO. They are meant to explain and clarify the similarities and differences in the various types of terminal which are at present used with TSO at the JRC Computing Centre.
This particular article will present a general introduction to the subject as well as specific information about the IBM 2741 Communication Terminal.
As stated in a previous issue of the Newsletter, a "Green Book" describing an introduction to the use of TSO (entitled "JRC-TSO Primer"), is at present being prepared. It is hoped that this will be available in a few weeks. It will not be possible in these articles to describe every different type of TSO terminal which is used at the JRC-Ispra. Also, it will not be possible to give complete and full information for the terminals which are described. A fuller and more detailed reference of the information in these articles may be found in the IBM Manual : "TSO Terminals" (GC28-62-1).

Introduction

In all cases explanations will be given of the methods by which the programmer may use the TSO system (on a particular terminal) to send and receive information.
All TSO terminals have a typewriter-like keyboard through which the terminal user enters information into the system. The features of each keyboard vary from terminal to terminal; for example, one terminal may not have a backspace key, while another may not allow for lowercase letters.

Certain conventions, however, apply to the use of all TSO
terminals. They are:

. Any lowercase letters typed are interpreted by the system as
  uppercase letters. For example, if the following is typed:

      abcDe8-fg
  then the system interprets it as:
      ABCDE8-FG
  The only exceptions are certain text-handling applications
  which allow the user to type in text in both uppercase and
  lowercase letters and user programs which perform
  input/output operations using the PUTT and GETT routines (see
  Installation Notes - UTIL).

. All messages or other output sent to the user by the system
  come out in uppercase letters. The only exception is the
  output from the special text handling applications and use of
  the PUTT/GETT subroutines mentioned previously which come out
  in both uppercase and lowercase.

. When typing a message (a line) into a terminal there is a
  specific key/code designed to be used to signify the end of
  message. This is usually the carriage (carrier) return
  [RETURN] key.
  However, on some terminals it is not possible to obtain the
  end of message character by depressing only one key. (This
  will be described in detail for the appropriate terminals).

  To enable the protocol of transmission to be implemented
  effectively it is necessary to provide some or all of the
  following features. The features provided, and the manner in
  which they are provided, depends on the type of terminal
  being used.

Features.

1) Line deletion
2) Character deletion
3) Attention interrupt/receive interrupt special feature
4) Transmit interrupt special feature

Character deletion and line deletion

TSO provides to the terminal user a method for correcting typing
mistakes. It is possible to request the deletion of the
character which has just been typed by the user (character
deletion) and it is also possible to request that all of the
proceeding characters which have been input in a line be deleted
(line deletion).
It is possible to delete the character which has just been typed
or the whole line at any point within the "typing in" of that
line before the end of line (carriage return) is typed.
Deletion of the character just input removes that character from
the input and the new "last character input" becomes the
character which was typed before the one which has now been
deleted.

Examples of input of various lines using the symbol "%" for
character deletion.

abcd%e (CR) will be input as   abce
abcd%%%c (CR) will be input as   ac
ab%cd%%ef% (CR) will be input as ae

Attention Interruption (with or without receive interrupt
special feature)

These features enable the terminal user to perform some or all
of the following functions:

i)   Interrupt an output message or listing which is being sent
      to the terminal user from the TSO system.

ii)   Interrupt a process which is being performed by the TSO
      system

iii) Interrupt at a time when the TSO system is waiting for user
      input.

(NOTE   The attention interrupt is also used on some terminals
to produce the line deletion action).

On some terminals there is a special attention interruption key (ATTN), on other terminals another key/code is used for attention interruption. If a terminal does not have a key which can be used for attention interruption, then it is possible to use the TERMINAL command (described in a later section) to defined a string of characters which when typed by the user will simulate an attention interruption.

For terminals with the receive interrupt feature it is possible to cause attention interruption at any time (i.e. as in i),ii) and iii)above).

For terminals without the receive interrupt feature it is only possible to interrupt when the TSO system is waiting for user input (ie as described in iii)above). For such terminals it is possible to define that a simulated attention interrupt will occur in certain circumstances, by using the TERMINAL command. An example of this would be to cause a simulated attention interruption after each 20 lines of output from the TSO system.

Transmit Interrupt Feature

For a terminal which is equipped with the Transmit Interrupt feature, it is possible to either wait for the system to supply a message to indicate that is ready to accept input, or to type ahead without waiting for a message, the special feature also allows the system to interrupt the user while he is entering information. If the system has a high priority message to send to the user it will interrupt the output operation and print the message.

In general, if the user's terminal is not fitted with the Transmit Interrupt feature, he must wait for system to indicate that it is ready to accept input. This is normally done by unlocking/enabling the terminal keyboard to allow user input.

The PROFILE Command

The PROFILE command may be used to establish (for a particular user) a user profile; that is it enables the user to tell the TSO system how he wants to use his terminal. The given specifications are valid for the userid concerned for all future sessions until they are changed by another PROFILE command. It is possible to:

- Define a character-deletion and/or a line-delection control character.

- Specify whether or not the system is to prompt the user for missing information.

- Specify whether or not the user will accept messages from other terminals.

- Specify whether or not the user wants the opportunity to obtain additional information about messages from a command procedure.

- Specify whether or not the user wants message numbers for diagnostic messages which may be displayed at the terminal.

When a "userid" is set up by the TSO administrator a specific default user profile is established. Subsequently the user may make use of the PROFILE command with the appropriate operands to change the characteristics specified by these operands. Other characteristics not specified explicitly in a particular use of PROFILE will remain unaltered.
A full specification of the PROFILE command is given in the IBM manual "TSO Command Language Reference" (GC28-6732). Also, details can be obtained by using the TSO HELP system.
Here, examples of possible use of the command are given.

Example 1

Use of the PROFILE command to establish that the character 'ə' will be used as line-deletion character. All other existing user profile characteristics will remain unaltered.

PROFILE line (ə)

Example 2

Use of the PROFILE command (shortened form PROF) to establish that:
  a) the character '!' will be used for character-deletion.
  b) the user does not want to receive messages from other terminals.
All other existing user profile characteristics will remain unaltered.

PROF CHAR(!) NOINTERCOM

The TERMINAL Command

This command may be used to define the operating characteristics of the terminal being used for the duration of the user's session. This command is principally to enable the user to modify the terminal characteristics to suit the terminal which he is using for a particular session. The characteristics defined will remain until a LOGOFF command is entered.

The command enables the definition of the following characteristics and options:

.   The opportunity to request an attention interruption after a specified number of lines of continuous output.

.   The opportunity to request an attention interruption after a specified number of seconds have elapsed during which the terminal has been locked and inactive.

.   The definition of a string, which when input will cause an attention interruption.

.   Specification of whether or not the keyboard will be locked when the system is not waiting for user input.

.   Specification of the line length to be used.

.   For video devices, specification of the character string used to clear the screen.

.   Specification of the screen dimensions for video devices.

A full specification of the TERMINAL command is given in the IBM manual "TSO Command Language Reference" (GC28-6732). Also, details can be obtained by using the TSO HELP system.

In this document, some examples of the use of the TERMINAL command are given.

Example 1

To allow the user to specify that the screen to be used will have 12 lines each of 80 characters, and that '%' will be used to clear the screen

TERMINAL SCREEN(12,80) CLEAR(%)

Example 2

Using TERM (the shortened form) to define that an attention interrupt may be input after 20 lines of continuous output or after 100 seconds elapsed time (locked and inactive) or when the character @ is input.

TERM LINES(20) SECONDS(100) INPUT(@)

IBM 2741 Communication Terminal

The IBM 2741 Communication Terminal resembles a conventional IBM Selectric typewriter mounted on a terminal stand. The device has a similar keyboard to the normal typewriter except that there are two controls not found on the typewriter.

1) The "Terminal mode" switch (which is labelled COM/LCL). This is located on the left-hand side of the terminal stand. To use the 2741 as a TSO terminal the switch should be set to COM.

2) The "Attention" key (which is labelled ATTN). This is located on the upper right side of the keyboard. It replaces the INDEX key which is found on the normal typewriter.

Figure 1

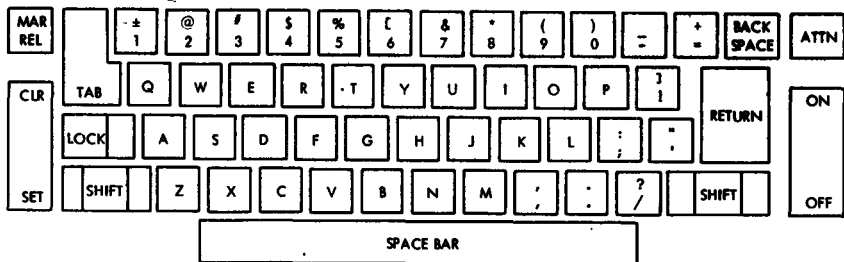**Correspondence Keyboard** (Part Number 1169703)

Figure 1 shows the keyboard used on the 2741 terminals at the JRC-Ispra. This keyboard is known as the "correspondence keyboard". There are, within the Centre one or two terminals which have another type of keyboard (the EBCDIC keyboard). Information about this keyboard may be found in the IBM manual "TSO-Terminals" (GC28-6762). In figure 1 the correspondence keyboard is shown. The uppercase (capital) letters and the characters shown in the upper half of some of the keys may be obtained by holding down the SHIFT key (or alternatively by locking down the SHIFT key by using the LOCK key). When the SHIFT key is not depressed the lowercase letters and the characters of the lower half of some kays are available.
The ON/OFF is used to switch the terminal on and off.
The RETURN kay is used to end any message typed to the system by the user.
The ATTN key is used for attention interruption and line deletion.
The BACKSPACE key is used to perform character deletion. The effect of pressing this key once is to move the print position back one place. Therefore, the next character typed will overprint the previous one.
The MAR/REL, CLR/SET and TAB key have the same effect as on normal typewriters.

A few special characters which appear on the correspondence keyboard are interpreted differently by the system. These are:

±	(plus-minus)	becomes	|	(or)
]	(right"square"bracket)	becomes	>	(greater than)
[	(left "square"bracket)	becomes	<	(less than)

All IBM 2741 terminals at JRC-Ispra are equiped with:-

i) Receive interrupt special feature.
    Therefore the system will respond to the ATTN key at any
    time.

ii) Transmit interrupt special feature.
    However, this facility is not set-up for use by default.
    The default action is that the user must wait for the system
    to unlock the keyboard to allow input. It is possible, by
    using the BREAK subcommand of the TERMINAL command, to
    change the situation and make use of the transmit interrupt
    special feature.

Attention interruption is performed by using the ATTN key. For
the 2741 no simulated attention interruption facilities are
pre-defined. It is of course possible for the user to define
his own simulated attention interruption facilities by using the
TERMINAL command. The ATTN key may also be used for line
deletion. If, during the typing of a line (before pressing the
RETURN key) the user wishes to delete the line (ie. wishes to
forget and not use any part of the line) then if the users
presses the ATTN key this will cause line deletion.

NOTE   If the user wishes to cause an attention interrupt when
the system is in the state of writing for user input he must:-

i) Press the ATTN key once if no characters have been typed on
    the line.
ii) Press the ATTN key twice if characters have already been
    typed.

The next article in this series will describe the Hazeltine
video terminal. Subsequent articles will include descriptions
of the 3270 terminal and the Olivetti terminals.

A new series of subroutines has been installed to allow for the graphic representation of 3-dimensional functions with the removal of the hidden lines.

The package is based on ; a program obtained from the Center for Atmospheric Research (U.S.A.) and has been modified for easy use and conformity with the existing 3D graphics (GINO-F). Many options are standardized. However, programmers who wish to use the more sophisticated options may contact the Advisory Service for information. (Daily, 11.30-12.30hrs., Computing Support Library).

The routines can only be used to prepare an Intermediate File. Thus, the use of the GRAPHIT system is obligatory.
(See the green book "GRAPHIT' for further information).

The basic coordinate system is as follows;
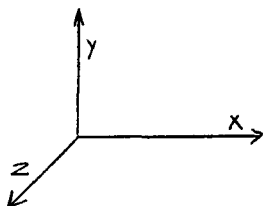
The FORTRAN calling sequence is:

    CALL CARPET(X,Z,Y,NX,NZ,S,SIZE)

Parameter Specifications.

   X is a linear array with dimension NX containing the strictly monotonic increasing X values. Equal spacing is not required.

   Z is a linear array with dimension NZ containing the values of the second independent variable.

   Y is a two-dimensional array, dimensions NX and NZ, the function values. The Y values must be of the same order of magnitude as the X and Z values.

S   is   a   linear   array, dimension   3,   containing   the
       coordinates of the viewpoint. It is assumed that   the
       line of sight is S (0,0,0). The best pictures   are
       obtained if the distance is 5-10 times the size of   the
       projected body.

SIZE   the image will be drawn approximately in a square with
       sides of "SIZE" centimetres. The position of the pen
       before drawing is the left-under corner of this square.

NX&NY are the dimensions of the arrays X,Z,Y as previously
       specified. The arrays should be dimensioned with exactly
       these sizes in the calling segment. It is not possible
       to transfer parts of larger arrays to subroutine CARPET.

Note: limitations on the size of problem for the installed
version are:

$$NX \leqslant 50$$

$$NX*NZ < 1000$$

Example.

On the following two pages an example of the use of subroutine
CARPET is given.
The example describes the use of subroutine CARPET to view data
points representing the function :

$$y = \sqrt{x + z}$$
$$y = 0 \quad \text{along the boundaries}$$

figure 1 gives a listing of the program.

Figure 2 shows a copy of the graphic output produced by the
program.

Figure 1.

```
l 10 235
00010 C      DEMONSTRATION PROGRAM FOR SUBROUTINE CARPET
00020 C      JULY 1979
00030       DIMENSION X(10),Z(20),Y(10,20),S(3)
00040       DO 100 I=1,10
00050   100 X(I)=1.3**I
00060       DO 110 J=1,20
00070   110 Z(J)=1.15**J
00080       DO 120 I=2,9
00090       DO 120 J=2,19
00100   120 Y(I,J)=(X(I)+Z(J))**0.5
00110       DO 130 I=1,10
00120       Y(I,1)=0.
00130   130 Y(I,20)=0.
00140       DO 140 J=1,20
00150       Y(1,J)=0.
00160   140 Y(10,J)=0.
00170       S(1)=40.
00180       S(2)=40.
00190       S(3)=40.
00200       CALL FINIM(2.0,2.0)
00210       CALL PICTNO(1)
00220       CALL CARPET(X,Z,Y,10,20,S,20.0)
00221       CALL FINIM(20.,20.)
00222       CALL PICTNO(2)
00223       S(1)=-40.
00224       CALL CARPET(X,Z,Y,10,20,S,20.0)
00225       CALL FINIM(20.,20.)
00226       CALL PICTNO(3)
00227       S(2)=-40.
00228       CALL CARPET(X,Z,Y,10,20,S,20.0)
00229       CALL FINIM(20.,20.)
00230       S(1)=40.
00231       CALL PICTNO(4)
00232       CALL CARPET(X,Z,Y,10,20,S,20.0)
00233       CALL FINTRA
00234       STOP
00235       END
```

Figure 2.

function y=sqrt(x+z)

y=0 on boundaries
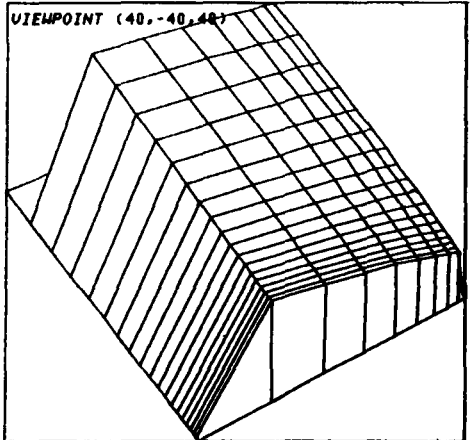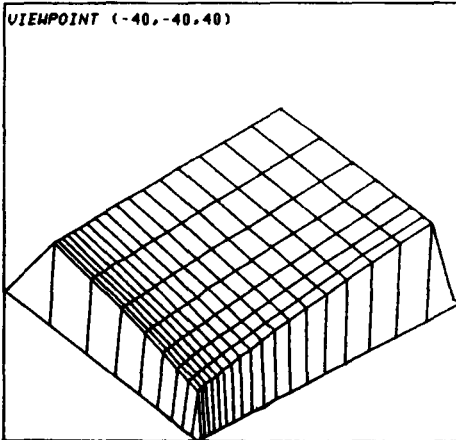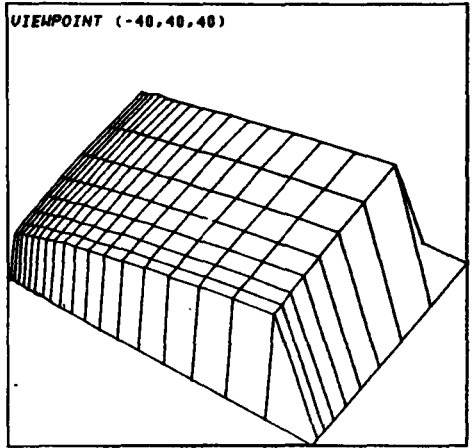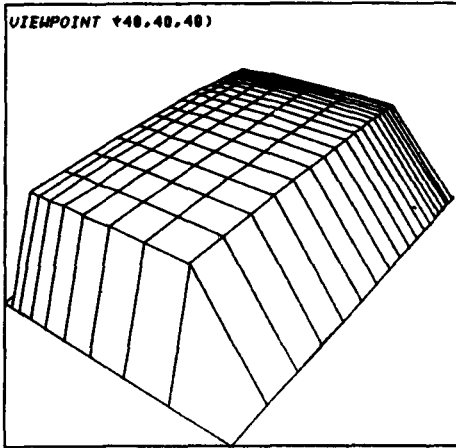
Statistics of computing installation utilization.
Report of computing installation exploitation
for the month of   July   1979.

	YEAR 1978	YEAR 1979
General		
Number of working days	21 d	20 d
Work hours from 8.00 to 24.00 for	16.00h	16.00h
Duration of scheduled maintenance	24.24h	22.67h
Duration of unexpected maintenance	12.41h	20.17h
Total maintenance time	36.65h	42.84h
Total exploitation time	299.35h	261.16h
CPU time in problem mode	130.02h	147.80h
Batch Processing		
Number of jobs	6818	6637
Number of cards input	1394000	1572558
Number of lines printed	22025000	22882000
Number of cards punched	124000	120100
CPU time	125.73h	131.31h
Number of I/O (Disk)	14975000	17617000
Number of I/O (Magnetic tape)	3334000	3824000
T.S.O.		
Number of LOGON's	804	2637
Number of messages sent by terminals	41783	153603
Number of messages received by terminals	238337	864813
CPU time	3.28h	14.72h
Number of I/O (Disk)	539826	1977000
Connect time	492.37h	1662.89h
IMS		
Total time service is available	358.40h	221.54h
CPU time	1.00h	1.77h
Number of I/O (Disk)	410500	544300

Utilisation of computer centre by objectives and appropriation
accounts for the month of July   1979.

equivalent time in hours

1.20.2	General Services - Administration - Ispra	34.35
1.20.3	General Services - Technical - Ispra	0.70
1.30.3	Central Workshop	3.49
1.30.4	L.M.A.	-
1.90.0	ESSOR	15.01
1.92.0	Support to the Commission	0.92
2.10.1	Reactor Safety	179.96
2.10.2	Plutonium Fuel and Actinide Research	3.04
2.10.3	Nuclear Materials	6.68
2.20.1	Solar Energy	0.01
2.20.2	Hydrogen	0.56
2.20.4	Design Studies on Thermonuclear Fusion	5.72
2.30.0	Environment and Resources	13.96
2.40.0	METRE	1.91
2.50.1	Informatics	33.69
2.50.2	Training	-
2 50.3	Safeguards	9.32
	TOTAL	309.32
1.94.0	Services to External Users	5.94
	TOTAL	315.26

BATCH PROCESSING DISTRIBUTED BY REQUESTED CORE MEMORY SIZE

	100	200	300	400	600	800	1000	1200	1400	>1400
No. of jobs	1720	2121	1340	725	273	35	7	77	30	-
Elapsed time	70	140	188	143	75	10	1	40	7	-
CPU time	2.7	18.5	47.0	19.4	21.9	2.6	0.5	16.2	2.2	-
"Equiv" time	23	40	76	58	29	5	1	23	4	-
"Turn" time	0.5	1.3	2.6	3.2	4.6	8.4	8.3	7.2	6.1	-
I/O (disk)	2082	2892	4033	5085	1062	317	9	944	207	-
I/O (tape)	1960	360	240	1162	44	9	-	12	3	-

NOTE.
All times are in hours.
"Equiv" means equivalent.
"Turn" means turn around.
All I/O transfers are measured in 1000's.

PERCENTAGE OF JOBS FINISHED IN LESS THAN

TIME	15mn	30mn	1hr	2hrs	4hrs	8hrs	1day	2day	3day	6day
%year 1978	27	43	62	80	94	99	100	100	100	100
%year 1979	31	47	62	76	88	93	99	100	100	100

Histogram not available this month.

REFERENCES TO THE PERSONNEL/FUNCTIONS OF THE COMPUTING CENTRE.

Manager of The Computing Centre   J.Pire

  Responsible for User Registration   **Ms**. G.Rambs

Operations Sector
  Responsible for the Computer Room   P.Tomba
  Substituted in case of abscence by: A.Binda-Rossetti

  Responsible for Peripherals   G.Nocera

Systems Group
  Responsible for the group   D.Konig
  Substituted in case of abscence by: P.A.Moinil

  Responsible for TSO Registration   C.Daolio

		Room	Tele.
Informatics Support Sector			
Responsible for the Sector	G.Gaggero	1874	787
Secretary	Mrs. G.Hudry	1873	787
Responsible for User Support	H.de Wolde	1883	1259
General Inf./Support Library	Mrs. A.Cambon (See Note 2)	1871	730
Advisory Service/List of Consultants (See Note 1)		1870	730

A.Inzaghi   A.A.Pollicini
           H.I. de Wolde
R.Meelhuysen   M.Dowell

NOTE 1. The advisory service is available in the same room as the Computing Support Library(room 1870). Exact details of the advisory service times for a specific week can be found at the head of any output listing(for that week).
Any informatics problem may be raised. However, the service is not designed to help users with problems which are their sole responsibility. For example, debugging of the logic of programs and requests for information which can easily be retrieved from available documentation.
If necessary, other competent personnel from the informatics division may be contacted by the consultant but not directly by the users.
The users should only contact the person who is the consultant for that specific day and only during the specified hours.
Outside the specified hours general information may be requested from Mrs. A. Cambon(see note 2) in the Computing Support Library.

NOTE 2. Mrs. Cambon is at present replaced by Mrs. C La Cognata.

HCW TO BECOME A REGULAR READER OF THE NEWSLETTER.

Persons interested in receiving regularly the "Computing Centre
Newsletter" are requested to fill in the following form and
send it to :-

        Ms. A.   Cambon

        Support To Computing

        Building 36

        Tel. 730.

        NAME   ....

        ADDRESS   ....

        ....

        ....

        TELEPHONE   ....

.