PROGRAM COMPLIT

VERSION 83-1 (FEBRUARY, 1983)
*MAJOR MODIFICATION.

VERSION 83-2 (MAY, 1983)
*ADDED SELECTION OF PLOTS BY MAT OR
ZA/MT/ENERGY RANGE (EV).

VERSION 83-3 (DECEMBER, 1983)
*ADDED VARIABLE AXIS UNITS (PROGRAM
CONTROLLED...X=MILLI-EV, EV, KEV,
MEV...Y=MILLI-BARN, BARN).

VERSION 84-1 (APRIL, 1984)
*ADDED SELECTION BY REACTION/ENERGY
RANGE.

VERSION 85-1 (APRIL, 1985)
*SPECIAL I/O ROUTINES TO GUARANTEE
ACCURACY OF ENERGY.

VERSION 85-2 (AUGUST, 1985)
*ADDED IDENTIFY DATA POINTS OPTION
(SMALL BOX DRAWN AROUND EACH CROSS
SECTION AND RATIO POINT).

VERSION 86-1 (JANUARY, 1986)
ENERGY DEPENDENT SCATTERING RADIUS

VERSION 86-2 (DECEMBER, 1986)
*DOUBLE PRECISION PLOT SCALING
(REQUIRED FOR NARROW ENERGY RANGES)

VERSION 88-1 (JULY 1988)
*MAJOR REVISION TO MAKE CODE EASILY
INTERFACEABLE TO ALMOST ANY PLOTTER.

VERSION 88-2 (OCTOBER 1988)
*ADDED INTERACTIVE MOUSE INPUT

VERSION 89-1 (JANUARY 1989)
*PSYCHOANALYZED BY PROGRAM FREUD TO
INSURE PROGRAM WILL NOT DO ANYTHING
CRAY.

VERSION 89-2 (MARCH 1989)
*ADDED ENDF/B-V AND VI MT
DEFINITIONS. PROGRAM WILL DETERMINE
ENDF/B FORMAT BASED ON MF=1,
MT=451 AND USE AS APPROPRIATE MT
DEFINITIONS. IF NO MF=1, MT=451
PROGRAM WILL USE ENDF/B-VI
MT DEFINITIONS.

VERSION 90-1 (AUGUST 1990)
*A NEW PROGRAM
*ADDED INTERACTIVE MOUSE INPUT
*ADDED 3 CHARACTER FONTS
*ADDED PHOTON DATA, MF=23 AND 27
*ADDED FORTRAN SAVE OPTION.
- Added maximum ratio range when plotting ratios.
- Added grid types.
- Added variable line thickness.
- Warning...input parameter format has been changed...see description below.

Version 92-1 (January 1992)
- Added incident charged particles (identified in plot titles).
- Added completely compatible I/O for reading floating point numbers.

Version 92-2 (May 1992)
- Corrected description of input parameters and example problems.
- Added variable character size input.

Version 93-1 (March 1993)
- Added completely compatible I/O for reading floating point numbers.

Version 94-1 (January 1994)
- Variable ENDF/B data filenames to allow access to file structures.
- Warning...input parameter format has been changed.
- Close all files before terminating (see, subroutine ENDIT).

Version 95-1 (March 1995)
- Corrected cross section multiplier for equivalences.
- Corrected ratio scaling, for maximum ratio less than 1.0.

Version 96-1 (January 1996)
- Improved computer independence.
- All double precision.
- Uniform treatment of ENDF/B I/O.
- Improved output precision.
- Defined scratch file names.
- Increased page size from 24000 to 48000 points.

Version 97-1 (April 1997)
- Increased page size from 48000 to 480000 points.

Version 99-1 (March 1999)
- Corrected character to floating point read for more digits.
- Updated test for ENDF/B format version based on recent format change.
- General improvements based on user feedback.

Version 2000-1 (February 2000)
- General improvements based on user feedback.

Version 2002-1 (May 2002)
- Input parameters optional.
- Control minimum ratio range by input.
- Optional black or white background.

- Added include for common.
- Increased page size from 48000 to 60000 points.
- Added new Reich-Moore to file2 to allow identification of resolved and any following unresolved resonance regions.

Version 2007-1 (Jan. 2007)
- Checked against all ENDF/B-VII.
- Increased MAXLOAD to 600,000 from 12,000.

Version 2009-1 (Jan. 2009)
- Ignored differences near resonance region boundaries (resolved and unresolved).

Version 2010-1 (July 2010)
- Allow comparison plot even if there is no difference (just see data).
- Only plot linearly interpoolable data.
- Include threshold energy points to show cross sections, but not ratios near threshold.

Version 2011-1 (Jan. 2011)
- Increased MT.DAT from 200 to 1,000 entries, to accommodate new MTs.

- Increased incident particle list to
include photon (ZA = 0).

*Added CODENAME

*32 and 64 bit Compatible

*Added ERROR stop

VERS. 2013-1 (Nov. 2013)

*ONLY use min/max ratios to decide whether or not to plot - non-positive cross sections are no longer used.

*Limited per-cent differences to fit output format = -9999 to +9999 %. OUT9 replaced NORMX

VERS. 2015-1 (Jan. 2015)

*Added MF=10 Radionuclide Production which requires longer plot titles.

*Restricted character size multiplier to 0.5 to 1.5 to accommodate longer plot titles.

*Replaced ALL 3 way if statements.

VERS. 2015-2 (Mar. 2015)

*Corrected tables for X and Y axis labels = see change search for 2015-2

VERS. 2015-3 (Oct. 2015)

*Allow multiple LRF=7 regions plus unresolved region - earlier assumed LRF=7 never used unresolved.

*For MF=2 use MT=151 to define Unresolved Resonance Region (URR). Ignore NJOY MT=152 and 153.

VERS. 2017-1 (May 2017)

*All floating input parameters changed to character input + IN9 conversion.

VERS. 2018-1 (Jan. 2018)

*Doubled in core storage to 1,200,000.

*Replaced Q MeV by MT= at top of plots (Q value in ENDF is now only defined in MF=3, making it difficult for all other MF now treated by this code)

*Initial Linear X scaling for MF=1 (nu-bar) and MF=4 (Legendre) = this can be turned OFF by ZOOM + Unless energy range is requested = allows MF=1 and 4 default Linear X scaling to be turned off by input parameters, i.e., by COMHARD

*Zoom lower energy limit restricted 1.0d-5 eV - lower zoom of linear energy plots (otherwise cannot find actual lower limit on plot).

*Added NRO = energy dependent scatter radius to reading FILE2 parameters to define unresolved energy range.

*Corrected energy dependent scatter for all resonance types (see, above remarks).

VERS. 2019-1 (June 2019)

*Additional Interpolation Law Tests

*Checked Maximum Tabulated Energy to insure it is the same for all MFs - if not, print WARNING messages.

VERS. 2020-1 (Dec. 2020)

*Corrected Treatment of Threshold cross sections, to include threshold (Previously code only used positive cross sections = skipped threshold)

*Added isomeric state (m or n) to ZA interpretation.

*Increased MAXIZA to 100,000 from 10,000 to allow searching longer ENDF data files with many MATs = NOT RECOMMENDED!!!!!

VERS. 2021-1 (Jan. 2021)

*SHOW ALL = mouse click above the plotting area.

VERS. 2023-1 (Feb. 2023)

*Reduced page size from 2,400,000 to 120,000

2020-1 Acknowledgment
I thank Jean-Christophe Sublet (NDS, IAEA, Vienna, Austria) for reporting the ERROR in COMPLOT (2019-1) that led to the update in COMPLOT (2020-1) to correctly handle threshold reactions.

2015-2 Acknowledgment

I thank Chuck Whitmer (TerraPower, WA) for reporting the errors that led to the 2015-2 Improvements in this code.

I thank Jean-Christophe Sublet (UKAEA) for contributing MAC executables and Bojan Zefran (IJS, Slovenia) for contributing LINUX (32 or 63 bit) executables. And most of all I must thank Andrej Trkov (NDS, IAEA) for overseeing the entire PREPRO project at IAEA, Vienna. This was a truly International team who worked together to produce PREPRO 2015-2.

OWNED, MAINTAINED AND DISTRIBUTED BY

THE NUCLEAR DATA SECTION

INTERNATIONAL ATOMIC ENERGY AGENCY

P. O. BOX 100

A-1400, VIENNA, AUSTRIA

EUROPE

ORIGINALLY WRITTEN BY

Dermott E. Cullen

PRESENT CONTACT INFORMATION

---------------------------

Dermott E. Cullen

1466 Hudson Way

Livermore, CA 94550

U.S.A.

Telephone 925-443-1911

E. Mail RedCullen1@Comcast.net

Website RedCullen1.net/HOMEPAGE.NEW

AUTHORS MESSAGE

---------------

THE COMMENTS BELOW SHOULD BE CONSIDERED THE LATEST DOCUMENTATION ALL RECENT IMPROVEMENTS. PLEASE READ ALL OF THESE COMMENTS BEFORE PARTICULARLY THE COMMENTS CONCERNING MACHINE DEPENDENT CODING.

AT THE PRESENT TIME WE ARE ATTEMPTING TO DEVELOP A SET OF COMPUTER INDEPENDENT PROGRAMS THAT CAN EASILY BE IMPLEMENTED ON ANY ONE OF A WIDE VARIETY OF COMPUTERS. IN ORDER TO ASSIST IN THIS PROJECT IT WOULD BE APPRECIATED IF YOU WOULD NOTIFY THE AUTHOR OF ANY COMPLAINTS, OPERATING PROBLEMS OR SUGGESTIONS ON HOW TO IMPROVE THIS PROGRAM. HOPEFULLY, IN THIS WAY FUTURE VERSIONS OF THIS PROGRAM WILL BE COMPLETELY COMPATIBLE FOR USE ON YOUR COMPUTER.

PURPOSE

-----------------

COMPARE ENDF/B FORMATTED DATA FROM TWO SEPARATE INPUT TAPES. REACTIONS ARE CONSIDERED TO BE COMPARABLE IF THEY HAVE THE SAME (ZA, MF, MT). RESULTS ARE PRESENTED IN GRAPHICAL FORM.

IN THE FOLLOWING FOR SIMPLICITY THE ENDF/B TERMINOLOGY--ENDF/B TAPE--WILL BE USED. IN FACT THE ACTUAL MEDIUM MAY BE TAPE, CARDS, DISK OR ANY OTHER MEDIUM.

ON WHAT COMPUTERS WILL THE PROGRAM RUN

------------------

THE PROGRAM HAS BEEN IMPLEMENTED ON A VARIETY OF COMPUTERS FROM CRAY AND IBM MAINFRAME TO SUN WORKSTATIONS TO AN IBM-AT PC. THE PROGRAM IS SMALL ENOUGH TO RUN ON VIRTUALLY ANY COMPUTER.

THE PROGRAM USES A SIMPLE CALCOMP LIKE GRAPHICS INTERFACE
(DESCRIBED BELOW) AND ALLOWS THE USER SPECIFY THE PHYSICAL SIZE OF THE PLOTTER BEING USED, BY INPUT PARAMETERS. USING THESE CONVENTIONS THIS PROGRAM CAN BE EASILY INTERFACED TO VIRTUALLY ANY PLOTTER.

FOR SPECIAL CONSIDERATIONS SEE THE SECTIONS BELOW ON,

(1) COMPUTER DEPENDENT CODING
(2) PLOTTER/GRAPHICS TERMINAL INTERFACE

GRAPHICS INTERFACE

--------------------------------------------------------------------------------

THIS PROGRAM USES A SIMPLE CALCOMP LIKE GRAPHICS INTERFACE WHICH REQUIRE ONLY 3 SUBROUTINES...PLOTS, PLOT AND PEN (DESCRIBED IN DETAIL BELOW). ALL CHARACTERS AND SYMBOLS ARE DRAWN USING TABLES OF PEN STROKES (SUPPLIED WITH THIS PROGRAM). USING THIS METHOD THE PROGRAM SHOULD BE SIMPLE TO INTERFACE TO VIRTUALLY ANY PLOTTER OR GRAPHICS TERMINAL AND THE APPEARANCE AND LAYOUT OF THE PLOTS SHOULD BE INDEPENDENT OF WHICH PLOTTER IS USED.

2015 PLOTTER DIMENSIONS

###########################################################################

PLOTTER DIMENSIONS ARE IN INCHES - NOT CM, MM, OR CUBITS
NOT INCONVENIENCE ANYONE - IN PRACTICE I HAVE USED EXACTLY THE SAME DIMENSION = X = 0 to 12.5 and Y = 0 to 10 FOR DECADES TO PRODUCE BOTH ON-SCREEN AND HARDCOPY POSTSCRIPT PLOTS.

I STRONGLY SUGGEST THAT YOU NOT CHANGE THESE DIMENSIONS UNLESS YOU MUST = BASED ON THE PLOT SIZE YOU OBTAIN WHEN YOU FIRST RUN THIS CODE.

PROGRAM IDENTIFICATION

--------------------------------

AS DISTRIBUTED THE FIRST FRAME OF PLOTTED OUTPUT WILL DOCUMENT THE PROGRAM NAME, VERSION AND INSTALLATION. THIS INFORMATION IS STORED AS DATA IN THE ARRAY VERSES NEAR THE BEGINNING OF SUBROUTINE FRAME1. IF YOU WISH TO CUSTOMIZE THE OUTPUT TO IDENTIFY YOUR INSTALLATION CHANGE THE LAST TWO LINES OF THE ARRAY (VERSES).

ENDF/B FORMAT

-----------


CROSS SECTION INTERPOLATION

-----------------------------

CROSS SECTIONS MUST BE IN EITHER HISTOGRAM (I.E., INTERPOLATION LAW 1) OR LINEARLY INTERPOLABLE (I.E. INTERPOLATION LAW 2) FORM. IF THEY ARE NOT A WARNING MESSAGE WILL BE PRINTED AND EXECUTION WILL BE TERMINATED. SEE INSTRUCTIONS BELOW ON HOW TO CONVERT DATA TO HISTOGRAM OR LINEARLY INTERPOLABLE FORM.

REACTION INDEX

-------------------

THIS PROGRAM DOES NOT USE THE REACTION INDEX WHICH IS GIVEN IN SECTION MF=1, MT=451 OF EACH EVALUATION.

SECTION SIZE

-------------------

SINCE THIS PROGRAM USES A LOGICAL PAGING SYSTEM THERE IS NO LIMIT
TO THE NUMBER OF POINTS IN ANY SECTION, E.G., THE TOTAL CROSS SECTION MAY BE REPRESENTED BY 200,000 DATA POINTS.

DATA SELECTION

THE USER MAY SPECIFYING THE DATA TO BE COMPARED BY INPUTTING UP TO 100 MAT/MT/ENERGY OR ZA/MF/MT/ENERGY RANGES. IF THE UPPER LIMIT OF THE MAT OR ZA RANGE IS LESS THAN THE LOWER LIMIT IT WILL BE SET TO THIS INDICATE ONLY COMPARE ONE MAT OR ZA. IF THE UPPER LIMIT IS STILL ZERO IT WILL BE SET TO 9999 (NO LIMIT). IF THE UPPER MF OR MT LIMIT IS ZERO IT WILL BE SET TO 99 OR 999, RESPECTIVELY (NO LIMIT). IF THE UPPER ENERGY LIMIT IS ZERO IT WILL BE SET TO A LARGE NUMBER (NO LIMIT).

THE LIST OF RANGES MUST BE TERMINATED BY A BLANK LINE (I.E. ZERO LOWER AND UPPER MAT/MF/MT OR ZA/MF/MT LIMITS).

IF THE FIRST RANGE LINE IS BLANK THIS LINE WILL TERMINATE THE LIST OF REQUESTS (I.E. A SECOND BLANK LINE NEED NOT BE INPUT) AND ALL PHYSICALLY COMPARABLE DATA WILL BE PLOTTED.

WHICH REACTIONS WILL BE PLOTTED

THOSE REACTIONS WITH THE SAME (ZA, MF, MT) WILL BE COMPARED, BUT ONLY THOSE DATA WHICH DIFFER BY A USER SPECIFIED ALLOWABLE DIFFERENCE WILL BE PLOTTED. IN ORDER TO FORCE ALL COMPARABLE REACTIONS TO BE PLOTTED THE USER NEED ONLY SPECIFY AN ALLOWABLE DIFFERENCE OF ZERO.

EQUIVALENT REACTIONS

IN ORDER TO COMPARE REACTIONS WHICH HAVE DIFFERENT ZA, MF OR MT THE USER IS ALLOWED TO SPECIFY AN EQUIVALENCE LIST OF UP TO 100 (ZA,MF,MT) COMBINATIONS ON THE MASTER FILE WHICH ARE TO BE USED TO COMPARE SIMILAR REACTIONS FROM DIFFERENT MATERIALS E.G., IRON AND NICKEL INELASTIC SCATTERING) OR DIFFERENT REACTIONS FROM THE SAME OR DIFFERENT MATERIALS E.G., U-235 CAPTURE AND FISSION - IN WHICH CASE THE RATIO WILL BE THE CAPTURE TO FISSION RATIO OF THE SAME REACTION IN DIFFERENT VERSIONS OF THE ENDF/B FORMAT WHICH MAY BE ASSIGNED DIFFERENT MT NUMBERS, E.G., THE PHOTONEUTRINO CROSS SECTION IN MT=602 IN ENDF/B-V AND EARLIER VERSIONS OF ENDF/B, BUT IS MT=522 IN ENDF/B-VI.

IN THESE EQUIVALENCE LISTS A ZERO FIELD IMPLIES ALL. FOR EXAMPLE, TO EQUATE MT=522 FROM ONE FILE TO MT=602 ON THE OTHER, FOR ALL MATERIALS, ONE NEED ONLY SPECIFY ZA=0, MF=23, MT=522 EQUIVALENT TO ZA=0, MF=23 AND MT=602.

PLOT FORMATS

THE TWO CROSS SECTIONS ARE CONSIDERED TO BE A STANDARD (THE FIRST CROSS SECTION) AND A CROSS SECTION TO BE COMPARED TO THE STANDARD CROSS SECTION (THE SECOND CROSS SECTION). THE OUTPUT FROM THIS PROGRAM IS A SERIES OF PLOTS. EACH PLOT WILL CONTAIN THE STANDARD CROSS SECTION AND IN ADDITION THE USER MAY SPECIFY THAT EACH PLOT ALSO CONTAIN THE SECOND CROSS SECTION AND/OR THE RATIO OF THE SECOND CROSS SECTION TO THE FIRST CROSS SECTION.


(1) THE STANDARD CROSS SECTION (I.E. FIRST EVALUATION) AND THE SECOND EVALUATION. THE DATA WILL BE PRESENTED AS TWO SUB-PLOTS...
PER PLOT WITH THE STANDARD CROSS SECTION ON THE UPPER HALF OF THE PLOT AND THE SECOND CROSS SECTION IN THE LOWER HALF OF THE PLOT.


ADDITIONAL PLOT FEATURES
------------------------

IN ADDITION TO THE CROSS SECTIONS AND/OR RATIO THE FOLLOWING INFORMATION WILL BE INCLUDED ON EACH PLOT.

(1) AN IDENTIFICATION FOR EACH SET OF CROSS SECTIONS (UP TO 30 CHARACTERS FOR EACH SET).

(2) THE MAXIMUM NEGATIVE AND POSITIVE PER-CENT DIFFERENCE BETWEEN THE TWO CROSS SECTIONS.

(3) ARROWS INDICATING THE ENERGY AT WHICH THE MAXIMUM DIFFERENCES (MINIMUM AND MAXIMUM RATIO) OCCUR.


RATIO DATA
----------

IF RATIO OUTPUT IS REQUESTED THE RATIO WILL BE DEFINED AT EACH ENERGY THAT APPEARS IN EITHER EVALUATION. BETWEEN THESE ENERGIES THE RATIO WILL BE PLOTTED ASSUMING LINEAR DEPENDENCE BETWEEN TABULATED VALUES. FOR HISTOGRAM OR LINEARLY INTERPOLABLE CROSS SECTIONS THIS REPRESENTATION WILL POINT OUT ALL EXTREMA OF THE RATIO, BUT NOT NECESSARILY THE ENERGY DEPENDENCE BETWEEN TABULATED VALUES.

IF THE EVALUATED DATA IS NOT IN EITHER HISTOGRAM OR LINEARLY INTERPOLABLE FORM THE RATIO MAY NOT EVEN FIND ALL EXTREMA. FOR EXAMPLE, IF ONE EVALUATION IS LINEARLY INTERPOLABLE AND THE OTHER NON-LINEAR, BUT BOTH AGREE AT ALL TABULATED ENERGIES THE RATIO WILL APPEAR TO BE EQUAL TO UNITY AT ALL ENERGIES, BUT IN FACT THE CROSS SECTION BETWEEN TABULATED ENERGIES MAY BE QUITE DIFFERENT USING LINEAR VS. NON-LINEAR INTERPOLATION. FOR THIS REASON ONLY LINEARLY INTERPOLABLE OR HISTOGRAM DATA IS ALLOWED AS INPUT TO THIS PROGRAM.

LINEAR INTERPOLABLE
---------------------

ALL CROSS SECTIONS MAY BE CONVERTED TO LINEARLY INTERPOLABLE FORM BE USING PROGRAM LINEAR (UCRL-50400, VOL. 17, PART A).

HISTOGRAM
--------

ALL LINEARLY INTERPOLABLE CROSS SECTION MAY BE CONVERTED TO
HISTOGRAM (I.E. MULTIGROUP) FORM BY USING PROGRAM GROUPIE

(UCRL-50400, VOL. 17, PART D).

INPUT UNITS

----------

UNIT DESCRIPTION

----

1  INPUT LINE

2  MT DEFINITIONS.

10  FIRST ENDF/B FORMATTED EVALUATION (STANDARD).

11  SECOND ENDF/B FORMATTED EVALUATION.

17  SOFTWARE CHARACTERS.

18  SOFTWARE SYMBOLS AND LINE TYPES

OUTPUT UNITS

----------

UNIT DESCRIPTION

----

3  NORMAL OUTPUT REPORT.

16  PLOTTER UNIT

SCRATCH UNITS

--------

UNIT DESCRIPTION

----

12  SCRATCH UNIT FOR FIRST EVALUATION

13  SCRATCH UNIT FOR SECOND EVALUATION

14  SCRATCH UNIT FOR RATIO (ONLY USED IF RATIOS REQUESTED).

OPTIONAL STANDARD FILE NAMES (SEE SUBROUTINE FILIO1 AND FILIO2)

UNIT  FILE NAME

----  ---------

2  COMPLOT.INP

3  COMPLOT.LST

9  MT.DAT

10  ENDFB.IN1 (OR AS READ FROM INPUT)

11  ENDFB.IN2 (OR AS READ FROM INPUT)

12-14  (SCRATCH)

15  PLOT.CHR

16  (PLOTTER UNIT...USUALLY A DUMMY)

INPUT PARAMETERS

------------------------------------------------------------------

LINE  COLUMNS  FORMAT  DESCRIPTION

---- -------  ------  -----------

1  1-11  E11.4  LOWER X LIMIT OF PLOTTER

12-22  E11.4  UPPER X LIMIT OF PLOTTER

23-33  E11.4  LOWER Y LIMIT OF PLOTTER

34-44  E11.4  UPPER Y LIMIT OF PLOTTER

45-55  I11  NUMBER OF PLOTS PER FRAME IN X DIRECTION

56-66  I11  NUMBER OF PLOTS PER FRAME IN Y DIRECTION

67-70  F4.1  CHARACTER SIZE MULTIPLIER

= 0 TO 1 - NORMAL CHARACTER SIZE

= OTHERWISE - CHARACTERS SCALED BY THIS FACTOR

PLOT ORIENTATION IS BASED ON THE UPPER X LIMIT

= .GT.0 - X HORIZONTAL/Y VERTICAL

= .LT.0 - Y HORIZONTAL/X VERTICAL

AFTER TESTING THE UPPER X LIMIT WILL BE SET TO ITS ABSOLUTE VALUE.

2  1-72  A72  FILENAME FOR FIRST ENDF/B DATA FILE

(LEAVE BLANK FOR ENDFB.IN1)

3  1-72  A72  FILENAME FOR SECOND ENDF/B DATA FILE

(LEAVE BLANK FOR ENDFB.IN2)

4  1-11  I11  RETRIEVAL MODE (0=MAT, 1=EA)

12-22  I11  GRID (SPEED) OPTION.

= 0 - TICK MARKS ON BORDER

= 1 - SOLID AT COARSE INTERVALS
= 2 - DASHED AT COARSE INTERVALS
= 3 - SOLID AT COARSE AND FINE INTERVALS
= 4 - DASHED AT COARSE AND FINE INTERVALS
= 5 - SOLID COARSE/DASHED FINE INTERVALS

23-33  I11  SHOULD BORDER BE PLOTTED AROUND EACH PLOT
         = 0 - NO
         = 1 - YES

34-44  I11  LINE THICKNESS
         = 0 TO 5 - LINES AND CHARACTERS
         = -1 TO -5 - ONLY LINES

45-55  I11  OUTPUT MODE
         = -1 - ONLY COMPARISON LISTING. NO PLOTS.
         = 0 - CROSS SECTION OVER RATIO.
         = 1 - CROSS SECTION OVER CROSS SECTION.
         = 2 - TWO CROSS SECTIONS ON SAME PLOT.
         = 3 - CROSS SECTION OVER CROSS SECTION OVER COMPLETED RATIO.
         = 4 - TWO CROSS SECTIONS ON SAME PLOT OVER COMPLETED RATIO.

56-66  I11  STARTING PLOT NUMBER
         = 0 - DO NOT NUMBER PLOTS
         = .GT.0 - NUMBER PLOTS IN LOWER LEFT HAND CORNER STARTING WITH INPUT NUMBER

67-70  I41  BACKGROUND COLOR
         = 0 - = BLACK
         = OTHERWISE = WHITE

5  1-11  E11.4  ALLOWABLE FRACTIONAL DIFFERENCE. USED WHEN PLOTTING RATIOS. ANY REACTION WHERE THE TWO EVALUATIONS DIFFER BY MORE THAN THE ALLOWABLE DIFFERENCE WILL BE PLOTTED. IF ZERO IS INPUT THE STANDARD ALLOWABLE DIffERENCE OF 0.001 (0.1 PER-CENT) WILL BE USED.

12-22  E11.4  MAXIMUM ALLOWABLE RATIO. IF RATIOS ARE PLOTTED THEY WILL BE IN THE RANGE RATMAX TO 1/RATMAX. IF 0.0 IS INPUT THERE WILL BE NO LIMIT ON THE RANGE OF THE RATIOS. THIS OPTION MAY BE USED TO IGNORE LARGE DIFFERENCES OVER VERY NARROW ENERGY RANGES (WHICH MAY BE UNIMPORTANT) AND ALLOW ONE TO SEE IMPORTANT, BUT SMALLER DIFFERENCES, OVER EXTENDED ENERGY RANGES.

6  1-40  40A1  IDENTIFICATION FOR UPPER EVALUATIONS

7  1-40  40A1  IDENTIFICATION FOR LOWER EVALUATIONS (IDENTIFICATIONS SHOULD BE LEFT ADJUSTED TO START IN COLUMN 1).

8-N  1- 6  I6  LOWER MAT OR ZA LIMIT (SEE SELECTION MODE, INPUT LINE 1, COLUMNS 1-11).

9-11  I2  LOWER MF LIMIT

12-22  I11.4  LOWER ENERGY LIMIT

23-28  I6  UPPER MAT OR ZA LIMIT (SEE SELECTION MODE, INPUT LINE 1, COLUMNS 1-11).

29-30  I2  UPPER MF LIMIT

31-33  I3  UPPER MT LIMIT

34-44  I11.4  UPPER ENERGY LIMIT

45-55  I11  IDENTIFY EVALUATED DATA POINTS OPTION.
         = 0 - DO NOT IDENTIFY DATA POINTS.
         = 1 - IDENTIFY DATA POINTS (BY DRAWING A SMALL BOX AROUND EACH POINT).

56-66  I11  INTERACTIVE INPUT FLAG
         = 0 - NO INTERACTIVE INPUT ALLOWED
         = 1 - INTERACTIVE INPUT ALLOWED

*SETTING THIS OPTION =1 WILL TURN ON THE MOUSE AFTER EACH PLOT AND ALLOW YOU TO INTERACTIVELY SPECIFY PLOT LIMITS.

*IF YOU DO NOT WANT TO INTERACT WITH A PLOT OR IF YOU HAVE NO INTERACTIVE CAPABILITY THIS OPTION SHOULD BE SET = 0.

*WARNING...DATA POINTS IDENTIFIED OPTION IS
NOT RECOMMENDED FOR PLOTS CONTAINING MANY (I.E. THOUSANDS) OF DATA POINTS SINCE IT WILL MERELY INCREASE THE RUNNING TIME OF THE PROGRAM AND STILL NOT ALLOW ONE TO ACCURATELY SEE DATA POINTS.

*UP TO 100 MAT OR ZA RANGES ARE ALLOWED. THE LIST IS TERMINATED BY A BLANK LINE.

IF THE UPPER LIMIT IS LESS THAN THE LOWER LIMIT IT WILL BE SET EQUAL TO THE LOWER LIMIT.

*NOTE, IN ALL CASES THE TITLE AT TOP OF PLOT WILL ONLY IDENTIFY MASTER (ZA,MF,MT). THE USER INPUT TITLES MUST BE USED TO IDENTIFY THE SECOND REACTION (SEE, EXAMPLE INPUT 4 BELOW).

EXAMPLE DEFINITION OF PLOTTER

----------------------------

2015 - WARNING - THE FOLLOWING DESCRIPTION IS OUT-OF-DATE.

TODAY THE DIMENSIONS OF THE PLOTTER ARE IN INCHES.


N+1-M EQUIVALENCE EQUATIONS

1- 6 I6 MASTER ZA.
7- 8 I2 MASTER MF.
9-11 I3 MASTER MT.
12-17 I6 EQUIVALENT ZA FROM SECOND FILE.
18-19 I2 EQUIVALENT MF FROM SECOND FILE.
20-22 I3 EQUIVALENT MT FROM SECOND FILE.
23-33 E11.4 MULTIPLICATION FACTOR. ANY EQUATED ZA,MF,MT DATA WILL BE MULTIPLIED BY THIS FACTOR.

*This option may be used to re-normalize the second cross section or if comparing one constituent of a mixture to the mixed cross section this may be used to convert the second cross section to barns per atom of the mixture. The convention is equal to the number of atoms of the one constituent per atom of the mixture. On input will be interpreted as 1.0 (with this convention the user need only input multiplication factors if they are not 1).

*Up to 100 MAT OR ZA EQUIVALENCES ARE ALLOWED.

*The list is terminated by a blank line.

*A zero input field implies all to equate a given MT number to another MT number you need merely specify ZA=0 on input.

*NOTE, IN ALL CASES THE TITLE AT TOP OF PLOTTER WILL ONLY IDENTIFY MASTER (ZA,MF,MT). THE USER INPUT TITLES MUST BE USED TO IDENTIFY THE SECOND REACTION (SEE, EXAMPLE INPUT 4 BELOW).

---

COMPUTER PROGRAM NAME: PLOTTER

COMPUTER PROGRAM VERSION: 2015

COMPUTER PROGRAM AUTHOR: [REPLACE WITH AUTHOR NAME]

COMPUTER PROGRAM DATE: [REPLACE WITH DATE]

COMPUTER PROGRAM DESCRIPTION: [REPLACE WITH DESCRIPTION]

COMPUTER PROGRAM DOCUMENTATION: [REPLACE WITH DOCUMENTATION]

COMPUTER PROGRAM LICENSE: [REPLACE WITH LICENSE]

COMPUTER PROGRAM COPYRIGHT: [REPLACE WITH COPYRIGHT]

COMPUTER PROGRAM DISTRIBUTION: [REPLACE WITH DISTRIBUTION]

COMPUTER PROGRAM SUPPORT: [REPLACE WITH SUPPORT]

COMPUTER PROGRAM Bug REPORT: [REPLACE WITH BUG REPORT]

COMPUTER PROGRAM Source CODE: [REPLACE WITH SOURCE CODE]
IF THE LOCAL PLOTTER USES DIMENSIONS OF INCHES IN ORDER TO OBTAIN COM-PLOT
10 X 10 INCH FRAMES WITH 3 X 2 PLOTS PER FRAME THE FIRST INPUT  COM-PLOT
LINE SHOULD BE,

<table>
<thead>
<tr>
<th>0.0</th>
<th>10.0</th>
<th>0.0</th>
<th>10.0</th>
<th>3</th>
<th>2</th>
</tr>
</thead>
</table>

IF THE LOCAL PLOTTER USES DIMENSION OF MILLIMETERS THE SAME  COM-PLOT
PHYSICAL SIZE PLOT MAY BE OBTAINED IF THE FIRST INPUT LINE IS,

<table>
<thead>
<tr>
<th>0.0</th>
<th>254.0</th>
<th>0.0</th>
<th>254.0</th>
<th>3</th>
<th>2</th>
</tr>
</thead>
</table>

FOR SIMPLICITY THE FOLLOWING EXAMPLE INPUTS WILL NOT DISCUSS THE COM-PLOT
PHYSICAL DIMENSIONS OF THE PLOTTER AND THE FIRST INPUT LINE WILL COM-PLOT
IN ALL CASES INDICATE 10 X 10 INCH PLOTS WITH ONLY 1 PLOT PER COM-PLOT
FRAME.

IN THE FOLLOWING EXAMPLES IN ALL CASES THESE OPTIONS WILL BE USED, COM-PLOT
1) DASHED GRID  - COLUMNS 12-22 OF SECOND INPUT LINE = 1 COM-PLOT
2) NO BORDER  - COLUMNS 23-33 OF SECOND INPUT LINE = 0 COM-PLOT
3) LINE THICKNESS  - COLUMNS 34-44 OF SECOND INPUT LINE = -2 COM-PLOT
4) OUTPUT MODE  - COLUMNS 45-55 OF SECOND INPUT LINE = 3 COM-PLOT
5) FIRST PLOT NUMBER  - COLUMNS 56-66 OF SECOND INPUT LINE = 1 COM-PLOT

EXAMPLE INPUT 1

RETRIEVE MTS 1023, 1056 AND 1065 THROUGH 1072, MT = 1 AND 2 COM-PLOT
(TOTAL AND ELASTIC) FROM THE FIRST INPUT FILE AND COMPARE TO COM-PLOT
ANY SECTION FROM THE SECOND FILE THAT HAS THE SAME ETA/MF/MT. ONLY COM-PLOT
COMPARE DATA OVER THE ENERGY RANGE 0.1 EV TO 1 KEV. IDENTIFY COM-PLOT
THE TWO SETS OF DATA AS ENDF/B-V AND ENDF/B-IV, RESPECTIVELY. COM-PLOT
ONLY PLOT THOSE REACTIONS WHICH DIFFER AT ONE OR MORE ENERGIES COM-PLOT
BY MORE THAN 1 PER-CENT (NOTE, 1 PER-CENT = 0.01 AS INPUT COM-PLOT
FRACTION). NO EQUIVALENT REACTIONS ARE SPECIFIED. FILERNAMES COM-PLOT
ARE STANDARD (THESE CAN EITHER BE EXPLICITLY INCLUDED, OR SIMPLY COM-PLOT
LEFT BLANK).

THE FOLLOWING 12 INPUT LINES ARE REQUIRED.

<table>
<thead>
<tr>
<th>0.0</th>
<th>10.0</th>
<th>0.0</th>
<th>10.0</th>
<th>3</th>
<th>2</th>
</tr>
</thead>
</table>

ENDFB.IN1
ENDFB.IN2

<table>
<thead>
<tr>
<th>0.01</th>
<th>0.0</th>
</tr>
</thead>
</table>

ENDF/B-V DATA (STANDARD)

<table>
<thead>
<tr>
<th>1023</th>
<th>3</th>
<th>1</th>
<th>0.1</th>
<th>3</th>
<th>2</th>
<th>1000.0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1056</td>
<td>3</td>
<td>1</td>
<td>0.1</td>
<td>3</td>
<td>2</td>
<td>1000.0</td>
<td>0</td>
</tr>
<tr>
<td>1065</td>
<td>3</td>
<td>1</td>
<td>0.1</td>
<td>1072</td>
<td>3</td>
<td>2</td>
<td>1000.0</td>
</tr>
</tbody>
</table>

(TERMINATES REQUEST LIST)
(TERMINATES EQUIVALENCE LIST)

EXAMPLE INPUT 2

TO USE ALL OF THE SAME OPTIONS AS SPECIFIED IN EXAMPLE INPUT 1, COM-PLOT
EXCEPT TO RETRIEVE U-235, U-238 AND PU-239 THROUGH PU-242 THE COM-PLOT
FOLLOWING 12 INPUT LINES ARE REQUIRED.

<table>
<thead>
<tr>
<th>0.0</th>
<th>10.0</th>
<th>0.0</th>
<th>10.0</th>
<th>3</th>
<th>2</th>
</tr>
</thead>
</table>

ENDFB.IN1
ENDFB.IN2

<table>
<thead>
<tr>
<th>0.01</th>
<th>0.0</th>
</tr>
</thead>
</table>

ENDF/B-V DATA (STANDARD)

<table>
<thead>
<tr>
<th>92235</th>
<th>3</th>
<th>1</th>
<th>0.1</th>
<th>3</th>
<th>2</th>
<th>1000.0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>92238</td>
<td>3</td>
<td>1</td>
<td>0.1</td>
<td>3</td>
<td>2</td>
<td>1000.0</td>
<td>0</td>
</tr>
<tr>
<td>94239</td>
<td>3</td>
<td>1</td>
<td>0.1</td>
<td>94242</td>
<td>3</td>
<td>2</td>
<td>1000.0</td>
</tr>
</tbody>
</table>

(TERMINATES REQUEST LIST)
(TERMINATES EQUIVALENCE LIST)

EXAMPLE INPUT 3

---------
TO USE ALL OF THE SAME OPTIONS AS SPECIFIED IN EXAMPLE INPUT 1, except to retrieve and compare all mats the following 10 input lines are required.

```
0.0 10.0 0.0 10.0 3 2
ENDFB.IN1
ENDFB.IN2
0 1 0 -2 3 1
0.01 0.0
ENDF/B-V DATA (STANDARD)
ENDF/B-IV DATA
```

```
1 1 1.0 999999999 0.0
```

(TERMINATES REQUEST LIST)

(TERMINATES EQUIVALENCE LIST)

NOTE, ZERO LOWER AND UPPER MAT LIMITS INDICATES NO LIMIT.

```
EXAMPLE INPUT 4
---------------
```

RETRIEVE U-235 AND EQUATE THE FISSION CROSS SECTION (MT=18) ON THE MASTER FILE TO CAPTURE (MT=102) ON THE SECOND FILE. PLOT THE CAPTURE, FISSION AND CAPTURE TO FISSION RATIO OVER THE ENERGY RANGE 0.0253 EV TO 1 KEV. THE FOLLOWING 11 INPUT LINES ARE REQUIRED.

```
0.0 10.0 0.0 10.0 3 2
ENDFB.IN1
ENDFB.IN2
1 1 0 -2 3 1
0.01 0.0
FISSION CAPTURE
92235 3 18 0.0253
92235 3 18 1000.0
```

(TERMINATES REQUEST LIST)

(TERMINATES EQUIVALENCE LIST)

```
EXAMPLE INPUT 5
---------------
```

IN DIFFERENT VERSIONS OF THE ENDF/B FORMAT DIFFERENT MT NUMBERS ARE ASSIGNED TO THE SAME REACTION. FOR EXAMPLE, IN ENDF/B-V AND EARLIER VERSIONS OF ENDF/B THE PHOTOELECTRIC CROSS SECTION IS MT=602, WHILE IN ENDF/B-VI IT IS MT=522. IN ORDER TO COMPARE ASSUMING THAT THE MASTER IS ENDF/B-VI AND THE OTHER ENDF/B FILE IS ENDF/B-V (OR EARLIER) YOU MAY EQUATE MT=522 TO 602.

WHEN COMPARING PHOTOELECTRIC CROSS SECTIONS WE EXPECT THERE TO BE LARGE DIFFERENCES NEAR EDGES, SINCE IT IS UNLIKELY THAT TWO INDEPENDENT EVALUATIONS USE EXACTLY THE SAME EDGE ENERGIES. FROM A PRACTICAL VIEWPOINT THESE DIFFERENCES ARE NOT IMPORTANT IF THEY ONLY OCCUR OVER NARROW ENERGY RANGES NEAR ENERGIES. HOWEVER THESE LARGE DIFFERENCES MAY MAKE IT DIFFICULT TO SEE DIFFERENCES OVER OTHER ENERGY RANGES, WHICH MAY BE IMPORTANT. IN ORDER TO BE ABLE TO SEE IMPORTANT DIFFERENCES IN THE FOLLOWING COMPARISON WE WILL CONSTRRAIN THE PLOTTED RATIO TO THE RANGE ABOUT 0.9 TO 1.1 IN ORDER TO BE ABLE TO SEE DIFFERENCES OF UP TO 10 PER-CENT. WE WILL DO THIS BY SPECIFYING A MAXIMUM RATIO OF 1.1, WHICH WILL IN TURN DEFINE A MINIMUM RATIO OF 1/1.1, OR ABOUT 0.9.

```
0.0 10.0 0.0 10.0 3 2
ENDFB.IN1
ENDFB.IN2
0 1 0 -2 3 1
0.01 1.1
ENDF/B-VI
ENDF/B-V
023522 999923522
```

(TERMINATES REQUEST LIST)
EXAMPLE INPUT 6
---------------
THE SAME EXAMPLE AS ABOVE, EXCEPT THAT DIFFERENT FILENAMES WILL
BE USED TO READ THE DATA FROM A FILE TREE STRUCTURE. THE FOLLOWING
11 INPUT LINES ARE REQUIRED.

```
0.0       10.0      0.0     10.0              3          2
/Evaluated/ENDFB6/PHOTON.IN
/Evaluated/ENDFB5/PHOTON.IN
0.01      1.1
ENDF/B-V
ENDF/B-V
023522     999923522                       0               
(TERMINATES REQUEST LIST)
023522     023602                  (MULTIPLICATION OF 1.0 INFERRED)
(TERMINATES EQUIVALENCE LIST)
```

EXAMPLE INPUT 7
-------
THE OUTPUT FOR ALL OF THE ABOVE EXAMPLES ARE ORIENTED WITH X
HORIZONTAL AND Y VERTICAL. TO CHANGE THE ORIENTATION OF THE PLOTS
YOU NEED MERELY SPECIFY A NEGATIVE UPPER X LIMIT OF THE SIZE OF
THE PLOTS ON THE FIRST INPUT LINE.

THE FOLLOWING EXAMPLE IS EXACTLY THE SAME AS THE ABOVE EXAMPLE,
EXCEPT THAT THE ORIENTATION OF THE PLOTS HAS BEEN CHANGED. THE
FOLLOWING 11 INPUT LINES ARE REQUIRED.

```
0.0 -10.0      0.0     10.0              3          2
/Evaluated/ENDFB6/PHOTON.IN
/Evaluated/ENDFB5/PHOTON.IN
0.01      1.1
ENDF/B-V
ENDF/B-V
023522     999923522                       0               
(TERMINATES REQUEST LIST)
023522     023602                  (MULTIPLICATION OF 1.0 INFERRED)
(TERMINATES EQUIVALENCE LIST)
```

====== PLOTTER/GRAPHICS TERMINAL INTERFACE =============================

NON-INTERACTIVE
------------------------------------------------------------------
THIS PROGRAM USES A SIMPLE CALCOMP LIKE INTERFACE INVOLVING
ONLY 5 SUBROUTINES,

```
STARPLOT   - INITIALIZE PLOTTER
NEXTPLOT   - CLEAR SCREEN FOR NEXT PLOT
ENDPLOTS   - TERMINATE PLOTTING
```

```
PLOT(X,Y,IPEN) - DRAW OR MOVE FROM LAST LOCATION TO (X,Y), END OF CURRENT PLOT OR END OF PLOTTING.
IPEN =   2 - DRAW
       =   3 - MOVE
```

```
PEN(IPEN)    - SELECT COLOR.
IPEN- COLOR = 1 TO N (N = ANY POSITIVE INTEGER)
```

```
BOXCOLOR(X,Y,IFILL,IBORDER) - FILL A RECTANGLE WITH COLOR
X,Y = DEFINE THE CORNERS OF THE BOX
IFILL = COLOR TO FILL BOX WITH
IBORDER = COLOR OF BORDER OF BOX
```

INTERACTIVE
------------------------------------------------------------------
THIS PROGRAM INCLUDES AN INTERACTIVE INTERFACE FOR USE WITH A
MOUSE. THE INTERFACE INVOLVES 2 SUBROUTINE,

INTERACT(MYACTION) - WHETHER OR NOT INTERACTION
MYACTION = 0 - NO (RETURNED BY INTERACT)
           = 1 - YES (RETURNED BY INTERACT)

MOUSEY(IWAY,XI,YI,IWAY1,IWAY2) - READ POSITION OF MOUSE
IWAY = 0 - NO INPUT
      = 1 - LEFT BUTTON
      = 2 - MIDDLE BUTTON
      = 3 - RIGHT BUTTON
      = 4 - KEYBOARD INPUT
XI = real*4 X POSITION IN LOCAL UNITS
YI = real*4 Y POSITION IN LOCAL UNITS
IWAY1 = MINIMUM ALLOWABLE IWAY
IWAY2 = MAXIMUM ALLOWABLE IWAY

AS USED BY THIS PROGRAM IWAY1 = 1
IWAY2 = 4

KEYBOARD INPUT (IWAY=4) MEANS NO ZOOMED PLOT REQUESTED.
MOUSE INPUT (IWAY=1 TO 3) MEANS A ZOOMED PLOT IS REQUESTED.
IF IT IS XI WILL BE USED TO DEFINE ONE X (E.G., ENERGY) LIMIT OF
THE ZOOMED PLOT. MOUSEY WILL THEN BE CALLED A SECOND TIME TO
DEFINE A SECOND XI TO DEFINE THE OTHER X LIMIT OF THE ZOOMED
PLOT.

IF YOU DO NOT WANT INTERACTION YOU SHOULD INCLUDE THE FOLLOWING
SUBROUTINES IN YOUR GRAPHIC INTERFACE,

SUBROUTINE INTERACT(MYACTION)
MYACTION=0
RETURN
END
SUBROUTINE MOUSEY(IWAY,XI,YI,IWAY1,IWAY2)
IWAY=4
XI=0.0
YI=0.0
RETURN
END

ALTERNATIVE INTERACTIVE
------------------------------------------------------------------
IF YOU DO NOT HAVE A MOUSE BUT WOULD STILL LIKE TO INTERACTIVE
INPUT YOU CAN REPLACE SUBROUTINE ACTION IN THIS PROGRAM.
AS DISTRIBUTED SUBROUTINE ACTION USES A MOUSE TO DEFINE LOWER
AND UPPER ENERGY (OR X) LIMITS WHICH ARE USED TO PRODUCE THE
NEXT PLOT. A CALL TO ACTION IS OF THE FORM,

CALL ACTION(KACTV,XACT1,XACT2)

KACTV   = 0 - NO INTERACTIVE INPUT
         = 1 - INTERACTIVE INPUT
XACT1   = LOWER ENERGY LIMIT
XACT2   = UPPER ENERGY LIMIT

IF THERE IS NO INTERACTIVE INPUT THE PROGRAM WILL PROCEED TO THE
NEXT PLOT REQUESTED BY NON-INTERACTIVE INPUT.
IF THERE IS INTERACTIVE INPUT THE PROGRAM WILL USE XACT1 AND
XACT2 TO DEFINE THE ENERGY LIMITS OF THE NEXT PLOT USING THE
SAME DATA AS APPEARED ON THE LAST PLOT. AS WITH NON-INTERACTIVE
INPUT, IF YOU SELECT AN ENERGY RANGE WHERE THE MAXIMUM DIFFERENCE
IS LESS THAN THAT SPECIFIED BY INPUT NO PLOT WILL BE PRODUCED
AND THE CODE WILL PROCEED TO THE NEXT PLOT REQUESTED BY
NON-INTERACTIVE INPUT.

YOU CAN REPLACE SUBROUTINE ACTION FOLLOWING THE ABOVE CONVENTIONS
TO ALLOW INTERACTION VIA DIRECT READ OF X LIMITS, LIGHTPEN OR
WHATEVER FACILITIES YOU HAVE AVAILABLE.
To select plotting colors subroutine PEN (described above) is used to select one of the available colors. When running on a mainframe using an IBM graphics terminal or on an IBM-PC using a Hewlett-Packard plotter the graphics interface (described above) will produce color plots.

When producing black and white hardcopy on a mainframe the user should add a dummy subroutine PEN to the end of the program to ignore attempts to change color. Add the following subroutine, subroutine PEN(IPEN)

When producing black and white hardcopy on a mainframe the user should add a dummy subroutine PEN to the end of the program to ignore attempts to change color. Add the following subroutine, subroutine PEN(IPEN)

RETURN
END

CHARACTER SET

This program uses computer and plotter device independent software characters. This program comes with a file that defines the pen strokes required to draw all characters on an IBM keyboard (upper and lower case characters, numbers, etc.) plus an alternate set of all upper and lower case Greek characters and additional special symbols.

The software character table contains X and Y and pen positions to draw each character. If you wish to draw any additional characters or to modify the font of the existing characters you need only modify this table.

CONTROL CHARACTERS

In the software character table all characters to be plotted will have pen position = 2 (DRAW) or = 3 (MOVE). In addition the table currently contains 4 control characters,

PEN POSITION = 0

---------------
SHIFT the next printed character by X and Y. 3 control characters are presently included in the software character table to allow shifting.

{ = shift up (for superscripts..............X= 0.0, Y= 0.5) }
\ = shift down (for subscripts..............X= 0.0, Y=-0.5) \ = shift left 1 character (for backspace...X=-1.0, Y= 0.0)

PEN POSITION = -1

---------------
Select the next printed character from the alternate character set. At present this control character is,

} = switch to alternate character set

These 4 control characters are only defined by the value of the pen position in the software character table (i.e., they are not hard wired into this program). As such by modifying the software character table the user has the option of defining any control characters to meet specific needs.

These characters may be used in character strings to produce special effects. For example, to plot subscript 5, b, superscript
10 USE THE STRING,

}5{10

TO PLOT B, SUBSCRIPT 5 AND SUPERSCRIPT 10 WITH THE 5 DIRECTLY

BELOW THE 1 OF THE 10 WE CAN USE THE BACKSPACE CHARACTER TO

POSITION THE 1 DIRECTLY ABOVE THE 5 USING THE STRING,

B}5\1{0

TO PLOT UPPER CASE GREEK GAMMA FOLLOWED BY THE WORD TOTAL (I.E.,

RESONANCE TOTAL WIDTH) USE THE STRING.

]}G TOTAL

NOTE, WHEN THESE CONTROL CHARACTERS ARE USED THEY ONLY EFFECT THE

NEXT 1 PRINTED CHARACTER (SEE, ABOVE EXAMPLE OF PLOTTING SUPER-

SCRIPT 10 WHERE THE SHIFT UP CONTROL CHARACTER WAS USED BEFORE THE

CONTROL CHARACTERS WERE USED IN COMBINATION).

IF THESE 4 CONTROL CHARACTERS ARE NOT AVAILABLE ON YOUR COMPUTER

YOU CAN MODIFY THE SOFTWARE CHARACTER TABLE TO USE ANY OTHER 4

CHARACTERS THAT YOU DO NOT NORMALLY USE IN CHARACTER STRINGS (FOR

DETAILS SEE THE SOFTWARE CHARACTER TABLE).

STANDARD/ALTERNATE CHARACTER SETS

THE SOFTWARE CHARACTER TABLE CONTAINS 2 SETS OF CHARACTERS WHICH

ARE A STANDARD SET (ALL CHARACTERS ON AN IBM KEYBOARD) AND AN

ALTERNATE SET (UPPER AND LOWER CASE GREEK CHARACTERS AND SPECIAL

CHARACTERS). TO DRAW A CHARACTER FROM THE ALTERNATE CHARACTER SET

PUT A RIGHT BRACKET CHARACTER (]) BEFORE A CHARACTER (SEE THE

ABOVE EXAMPLE AND THE SOFTWARE CHARACTER TABLE FOR DETAILS). THIS

CONTROL CHARACTER WILL ONLY EFFECT THE NEXT 1 PLOTTED CHARACTER.

SUB AND SUPER SCRIPTS

TO DRAW SUBSCRIPT PRECEED A CHARACTER BY }. TO DRAW SUPERSCRIPT

PRECEED A CHARACTER BY { (SEE THE ABOVE EXAMPLE AND THE SOFTWARE

CHARACTER TABLE FOR DETAILS). THESE CONTROL CHARACTER WILL ONLY

EFFECT THE NEXT 1 PLOTTED CHARACTER.

BACKSPACING

TO BACKSPACE ONE CHARACTER PRECEED A CHARACTER BY \ (SEE, THE

ABOVE EXAMPLE AND THE SOFTWARE CHARACTER TABLE FOR DETAILS). THIS

CONTROL CHARACTER WILL PERFORM A TRUE BACKSPACE AND WILL EFFECT

ALL FOLLOWING CHARACTERS IN THE SAME CHARACTER STRING.

PLOT DIMENSIONS

ARE DEFINED BY USER INPUT. INTERNALLY THE PROGRAM WILL CREATE A

PLOT IN APPROXIMATELY A4 OR 8-1/2 BY 11 INCH FORMAT. DURING

OUTPUT THE PLOT IS TRANSFORMED TO THE UNITS (INCHES, CENTIMETERS,

MILLIMETERS, WHATEVER) OF THE PLOTTING BEING USED AND OUTPUT.

====== PLOTTER/GRAPHICS TERMINAL INTERFACE =============================