

VORTEX/VORTEX II REVISION E.2
Release Bulletin
92W9905-005 K

I. INTRODUCTION

VORTEX/VORTEX II Revision E.2 release replaces all previous releases of VORTEX. This release bulletin describes the major changes and corrections to VORTEX/VORTEX II that are included with this release. This bulletin serves as a supplement to the VORTEX Installation Manual (see supporting documentation below) and it is suggested that it be placed with that manual for future needs.

II. SUPPORTING DOCUMENTATION

A. VORTEX

1. VORTEX Reference Manual plus addendum 1 & 2 & 3
(98A9952-103)
2. VORTEX External *
- (89A0203F)
3. VORTEX Internals *
- (89A0231D, 89A0232D, 89A0233E, 89A0304B)
4. VORTEX Installation Manual
(98A9952-252)

B. VORTEX II

1. VORTEX II Reference Manual plus addendum 1 & 2
(98A9952-241)
2. VORTEX II External Supplement*
- (89A0273B)
3. VORTEX II Internal Supplement *
- (89A0289B)
4. VORTEX Installation Manual
(98A9952-252)

* Indicates documentation at level Rev. E.

- C. VTAM (See VTAM release bulletin)

III. MAJOR REVISION CHANGES

A. FORTRAN

1. An updated version of FORTRAN is included in the E.2 release. This compiler has the following additional features:
 - a. Comparable to Industry level G (see Section 5.3 of VORTEX Reference Manual for details).
 - b. Uses overlays thus allowing minimum execution of 9K (minimum symbol table).
2. Reentrant Runtime (V\$RERR) now consists of four versions:
 - a. Nucleus - no firmware calls
 - b. Nucleus - firmware calls to FPAOM WCS
 - c. OM - no firmware calls
 - d. OM - firmware calls to FPAOM WCS
3. The FPAOM WCS contents has been increased to a full five hundred and twelve word page. The additional firmware supports the new compiler and reentrant runtime. Approximately 50 ccs work, and 10 BCS entry points remain available for user firmware (see assembly listing).
4. The FPFOM OM job stream has been eliminated.

B. V75

VORTEX has been modified to fully support the V75 instruction set and hardware. (see the VORTEX Reference Manual for details).

C. BIC/BTC Support

Changes have been made to support more than 6 BIC/BTCs on a system and to "map" BIC/BTC device addresses to non standard trap locations. (See Section 5.4 of the VORTEX Installation Manual for details).

D. Four new utility routines have been added to the OM library:

1. CA2B - convert an ASCII string to binary
2. CB2A - convert a binary number to ASCII
3. CTIME - convert the RTC time to an ASCII string (hours: minutes: seconds: milliseconds).
4. MOVE - move a block of n words.

(See Table 13.1 of VORTEX Reference Manual for Details).

E. SYSGEN

1. A search capability has been added to SGEN2 for the ALT device. (see Section 15.5.5 of VORTEX Reference Manual for details.)
2. A new section, Section 5.4.10, has been added to the VORTEX Installation Manual which lists and explains all "special" SYSGEN directives required.
3. The following controller tables have been added to the SGL:

CTIP2A, CTIP3A, CTCI4A, CTCI5A, CTCI6A, CTCI7A,
CTCO4A, CTCO5A, CTCO6A, CTCO7A.

F. RTE Services (VORTEX only)

1. Low core (V\$LMEMBK) and the memory protect interrupt handler (V\$FUNC) have been modified to handle (VORTEX II vectored I/O and EXEC requests. Standard software will be converted to these type requests when other modifications are required.

G. PATCH

1. PATCH has been modified so that it blocks patches and enters the block with interrupts disabled. This allows patching of executing code. The block contains all patches entered on one PATCH directive record.
2. A header has been added to the patch image file (PTCHIM) to prevent erroneous patching by BTPTCH and problems with .HIST and .APND. (see Section 7.7 of the VORTEX Installation Manual for details.)
3. Two new PATCH directives have been added:
.BASE -- set a base value
.LIBR -- patch a load module file.
(see Section 7.7 of the VORTEX Installation Manual for details.)

H. DASMR

1. Two new optional parameters have been added. (see Section 4.2.14 of the VORTEX Reference Manual for details.)

I. Close and Update of LO

1. DASMR and FORTRAN have been changed so that they do not close and update LO if it is assigned to an RMD.
2. JCP has been changed so that it does close and update LO if it is assigned to an RMD upon encountering a JOB, ENDJOB, or FINI.
3. JCP includes a/CFILE directive for global logical units. (see Section 4.2.26 of the VORTEX Reference Manual for details.)

J. FORTRAN/SYSGEN

Five SG43 diagnostics will be output while SYSGEN is processing the 5 Fortran overlays. These messages are expected and should be ignored.

IV SMR CORRECTIONS

The following section lists the SMRs which were officially closed with the E.2 release. Note: additional SMRs may have been corrected with this release but are not reflected in this report.

PAGE 1 VORTEX SMR'S CLOSED WITH REV. E.2

SMR NAME -----	SMR NO. -----	DESCRIPTION -----
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RAZI VORTEX	0431	THE LAST TRACK REQUESTED IN THE PRT PARAMETER OF THE 'RAZI' PROGRAM IS DELETED FROM THE ASSIGNMENT.
-------------	------	---

VSJPDUMP	0581	VSJPDUMP USES THE WRONG LUN WHEN ATTEMPTING TO DUMP FROM THE CHECKPOINT FILE.
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TOUTIL	0692	TOUTIL SENDS ONE EXTRA WORD IN MODE 3 (UNFORMATTED BINARY), MAKING IT UNUSABLE IN DATAPLOT. THE LAST WORD OF EACH RECORD OVERFLOWS ONTO THE NEXT PLOT RASTER LINE.
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VTAM-VTSIOC	0704	VTAM I/O REQUESTS ARE POPPED BY VTSIOC, CCSCRO IN SUCH A WAY THAT VTAM TASKS MAY NOT BE TERMINATED BECAUSE VORT EX THINGS FALSLY THAT THERE IS STILL ACTIVE I/O FOR THE VTAM TASK.
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VORTEX-SNAP	0718	RELATIVE LOCATION 0123 OF PROGRAM HAS AN ADDI 3 WHEN IT SHOULD BE ADDI2. IT TAKES US BACK ONE LOCATION TO MANY.
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VORTEX	0719	IN DEBUG, WHEN 3RD ARGUMENT OF SNAP CALL IS NEGATIVE, THE CONTENTS OF THE TIDB DOES NOT GET DISPLAYED
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VORTEX

SMR'S CLOSED WITH REV. E.2

SMR NAME -----	SMR NO. -----	DESCRIPTION -----
VORTEX=SAL	0723	TASK APPARENTLY NOT RESTARTED AFTER TIME DELAY AND RESCHEDULE, IF IT PREVIOUSLY SCHEDULED CORE-RESIDENT TASK. (IF IT DOES NOT SCHEDULE CORE-RESIDENT TASK IT IS RESTARTED)
VSFMAIN-E	0732	SPECIFYING AN ILLEGAL LOGICAL UNIT IN A LIST OR ADD DIRECTIVE MAY DESTROY A LOW CORE LOCATION RESULTING IN RANDOM ERRORS.
VSCGPS-E	0733	ANY FUNC 1 OR FUNC 2 REQUEST CAUSES THE SOFTWARE CHARACTER GENERATOR TO CONTINUALLY SLEW PAPER.
VTAM=VORTEX	0734	THE TOP DIRECTIVE FOR MYNA CONTAINS A BAD STATUS WORD. IS-- 074701, SHOULD BE--047401.
VSTYA=VORTEX	0735	FUNC REQUESTS TO TY OR CT GREATER THAN 2 RESULT IN RANDOM OUTPUT AND POSSIBLE SYSTEM HANG RPGRY OUTPUTS A FUNC 0300.
VSSYTASK	0736	MAP KEY CONFLICTS MAY OCCUR WHEN A MAP IS ERRONEOUSLY CHECKPOINTED. 2)MAP 0 CAN BE DESTROYED BY A USER TASK DOING A DELAY TYPE 1 IF THE USER TASK MAP IS CHECKPOINTED.

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VORTEX

SMR'S CLOSED WITH REV. E.2

SMR NAME

SMR NO.

DESCRIPTION

V3SERV-E

0737

SCHEDULING A RESIDENT TASK BY A MAP D
TASK WILL RESULT IN AN EX24 DIAGNOSTIC

VZLPDX-F

0738

MODEL D STATUS DRIVER WILL ONLY OUTPUT
A MAXIMUM OF 60 CHARACTERS INSTEAD OF
132.

DSIGN-VORTEX 0739

DSIGN DOES NOT WORK - CHANGE:CALL \$ZN
TO CALL \$ZC.

VORTEX

0741

THE LIBRARY FUNCTION "EXP" FAILS. THE
PROBLEM IS THAT THE ARGUMENT IS NOT
ADDRESSED CORRECTLY RESULTS IN MEMORY
PROTECT.

VORTEX LMGEN 0743

WHEN ATTEMPTING TO LINK A TASK FROM A
FILE MARK ONLY LMGEN GOES INTO
A LOOP

VORTEX

0749

CONC GIVES WRONG CONCORDANCE

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VORTEX

SMR'S CLOSED WITH REV. E.2

SMR NAME

SMR NO.

DESCRIPTION

IDUTIL

0758

A PERIOD AT THE END OF AN IDUTIL
DIRECTIVE CAUSES IDUTIL TO
GIVE A IUOZ ERROR MESSAGE.

VSSERV

0759

ERROR IN MAPIN MACRO, ALLOWS MAPPING
INTO PAGE ZERO

VORTEX II

0760

FLOATING POINT FIRMWARE GIVES ERRONEOUS
RESULTS IN REV. E
OF VORTEX II.

VORTEX II

0761

IF A DISC FILE IS USED AS FORTRAN SOURCE
INPUT THE NEXT FORTRAN
COMPILE THAT TRIES TO READ FROM THE
STANDARD PI FILE (CARD
READER) GETS ERROR 0 MESSAGES FOREVER.

VORTEX

0762

SAL DISPATCHER CAUSES VORTEX II SYSTEM
TO BLOW UP WITH A HALT
AT LOCATION 57014 IN DISPATCHER.

JCP

0763

LOAD,SLCOPY, CAUSES SYSTEM TO GO INTO
STEP AT LOCATION 3.

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VORTEX

SMR'S CLOSED WITH REV. E.2

SMR NAME
-----SMR NO.
-----DESCRIPTION

FORTRAN

0764

THE FORTRAN RUN-TIME I/O PROCESSOR WILL
NOT ACCEPT I/O REQUESTS
TO LOGICAL UNIT 0.

VORTEX

0767

VORTEX D ALLOWS DESIGNATION OF THE MUX
ADDRESS AND I/O
ALGORITHM PARAMETERS IN "EQU"DIRECTIVES
AT SYSGEN TIME FOR
AD.

VORTEX

0770

A VSDPEN ON FORTRAN, CAUSES A SYSTEM
HANG. THIS OCCURS
ONLY WHEN VSRERR IS CORE RESIDENT.

VORTEX

0773

SCHEDULING RESIDENT FOREGROUND TASK
LOCKS UP SYSTEM.

VSRERR

0785

WHEN EXECUTING DIRECT ACCESS BY VSDPEN,
ERROR MESSAGE OF
EX01 APPEARS ON TTY AND PROGRAM
TERMINATES AT
ADDRESS 1000.

VORTEX

0792

RTE SERVICE MACROS ARE DEFICIENT IN THAT
PROBLEMS CAN ARISE IN
TASK SYNCHRONIZATION THROUGH THEIR USAGE

PAGE 6

VORTEX

SMR'S CLOSED WITH REV. E.2

SMR NAME

SMR NO.

DESCRIPTION

VORTEX JCP

0805

LOAD EXITS WITH JC02 WHEN A FIGURE 9 IS
OCCURRING IN THE
PROGRAM NAME

VORTEX

0824

FORTRAN PROGRAM CONTAINING DOUBLE-
PRECISION MATH OPERATES
CORRECTLY WITH SOFTWARE FLOATING-POINT,
BUT NOT WITH FPP AND
ACCELERATOR AS COMPILED WITH OR WITHOUT
F AND H OPTIONS. PROGRAM
AS RAN CORRECTLY UNDER D REVISION BUT
NOT E.

DTAN2, LTAN 0827

TRIGONOMETRY FUNCTIONS DTAN2 AND DTAN
WILL SOMETIMES PRODUCE
VALUES DIFFERENT THAN TAN2 AND DTAN.

VORTEX T+IT 0852

WHEN CREATING THE PATCH IMAGES ON THE
FILE PTCMIM, THE FIRST
PATCH WORD IS TO BE STORED ON ALL
RECORDS FOLLOWING RECORD ONE
OF THE FILE IS LOST.

SMR NAME -----	SMR NO. -----	DESCRIPTION -----
FORTRAN	0715	THE NAME "AC" IS BEING TREATED AS RESERVED IN E RELEASE FORTRAN CAUSING A COMPILER ERROR
DEXP, VORTEX	0724	CALCULATES INACCURATE DOUBLE PRECISION EXPONENTIALS. THIS OCCURS WHEN ASSEMBLED FOR USE WITH THE FLOATING POINT PROCESSOR.
OSIN COS	0725	CALCULATES INACCURATE DOUBLE PRECISION SINES AND COSINES.
FORTRAN	0742	EXTRA CODE IS GENERATED AFTER A "CALL" STATEMENT.
VORTEX	0774	A FORTRAN FOREGROUND PROGRAM WILL GO INTO STEP WHEN A CALL TO VSOPEN IS MADE.

VORTEX SGL FORMAT

The format of the E.2 VORTEX/VORTEX II SGL has changed from previous release. Carefully note the formats below before attempting to use the E.2 SGL.

MT and CARD SGL's:

<u>File Number</u>	<u>Contents</u>
1	SGL
2 and 3	Basic OM library job stream
4 and 5	V\$RERR without WCS calls OM job stream
6 and 7	V\$RERR with WCS calls OM job stream
8 and 9	Software OM library job stream
10 and 11	Floating Point Firmware and Accelerator OM library job stream
12 and 13	Floating-Point Processor (FPP) OM library job stream
14 and 15	FPP with FORTRAN enhancement firmware OM library job stream
16 through 30	VTAM job streams
31 and 32	Basic Dataplot II OM job stream
33 and 34	VORTEX compatible Dataplot II OM job stream
35 and 36	MOS compatible Dataplot II OM job stream

<u>Parition</u>	<u>Tracks</u>	<u>File Name</u>	<u>Sectors</u>	<u>Contents</u>
A	100	-----	-----	SGL
B	100	BSCOM	100	Basic OM
		V\$RERS	100	V\$RERR without firmware calls
		V\$RERF	100	V\$RERR with firmware calls
		SFTOM	240	Software Math OM
		ACLOM	240	Floating Point Firmware and Accelerator OM
		FPPOM	240	Floating-Point Processor OM
		FPAOM	240	FPP with FORTRAN enhancement firmware OM
		BDPOM	75	Basic Dataplot II OM
		VDPOM	75	VORTEX Compatible Dataplot II OM
		MDPOM	75	MOS Compatible Dataplot II OM
		NDM	75	VTAM Modules
		CLEAR	25	
		PARSE	50	
		REPORT	25	
		VT\$LTT	10	
		NCM	30	
		VT\$OCL	20	
		OPEN	20	
		CLOSE	20	
		VT\$OPN	20	
		VT\$OCT	20	
		TTYTCM	10	
		DUMMY	5	
		ACLFRM	30	Accelerator Firmware
		FPAFRM	30	Floating-Point Processor Firmware

MT and Card SGL Usage

1. System Generation

The SGL is the first file of the SGL media. Execution of the system generation programs is initiated by loading the appropriate system generation bootstrap.

2. OM Library Job Streams

There exist 11 object module library job streams with the SGL. These job streams are executed depending upon the options desired. Each job stream is executed by positioning to the appropriate file and assigning SI to the SGL media (note: 1, all job streams terminate just prior to their final EOF mark; 2, the card reader driver now has the capability to handle SFILE and SREC commands). Refer to the following table for the selection of job streams.

OM JOB STREAM USAGE TABLE

Options		Job Streams	Files
OM V\$RERR without firmware calls	-----	V\$RERS plus Math OM	4-5
OM V\$RERR with firmware calls	-----	V\$RERF plus Math OM	6-7
Software Math Only	-----	BSCOM	2-3
Accelerator Math ¹	-----	SFTOM	8-9
(no FPP)	-----	BSCOM	2-3
FPP Math	-----	ACLOM	10-11
(no Accelerator)	-----	BSCOM	2-3
FPP with FORTRAN enhancement Math ¹	-----	FPPOM	12-13
	-----	BSCOM	2-3
	-----	FPAOM	14-15
Dataplot, VORTEX Compatible	-----	Math OM's of choice	see above
	-----	BDPOM	31-32
	-----	VDPOM	33-34
Dataplot, MOS Compatible	-----	Math OM's of choice	see above
	-----	BDPOM	31-32
	-----	MDPOM	35-36
VTAM	-----	VTM OM	11-30

1. for full page WCS (152 words)

Disc SGL Usage

1. System Generation

The SGL is located on the first partition of the disc SGL pack. Execution of the system generation programs is initiated by loading the appropriate system generation bootstrap.

2. OM Library Job Streams

The second partition of the disc SGL contains 25 files. These files are used in conjunction with the job directives supplied in this document depending upon the options desired. Refer to the OM Job Stream Usage Table in the MT/card usage section of this document for the selection of files and job streams.

Note: SYSGEN will disregard the PRT directives for the disc unit containing the SGL pack. However, one of the following must be performed so that the OM files can be accessed:

1. Partition the subject RMD at SYSGEN time to match the SGL pack, i.e. partition A - 100 tracks, B - 100 tracks; or
2. Upon getting VORTEX SYSTEM READY and prior to executing the OM job streams use RAZI to initialize the pack, i.e.

```
; SCHED,RAZI,10,FL,F
INL,xx,203
```

where xx is the logical unit
assigned to the first partition

```
EXIT
```

The following are the JCP directives necessary to utilize the OM files. Only execute those streams which apply to the options desired.

```
/C,    LOAD THE BASIC OM MODULES
/C,    EXECUTE--ALWAYS
```

```
/ASSIGN,BI,D(CU)B      WHERE C=CONTROLLER, U=UNIT (IE, D01B)
/PFILE,BI,,BSCUM
/FMAIN
INIT,UM,D
INPLT,BI
ADD,UM,D
```



```

/C,    LOAD THE OM VERSION OF VSRERR, NO FIRMWARE CALLS
/C,    EXECUTE--ONLY IF VSRERR IS NOT IN THE NUCLEUS AND VSRERR IS
/C,    NOT TO MAKE FIRMWARE CALLS (NOT USING FPAOM).

```

```

/PFILE,BI,,VSRERS
/FMAIN
INPUT,BI
ADD,OM,D

```

```

/C,    LOAD THE OM VERSION OF VSRERR, WITH FIRMWARE CALLS
/C,    EXECUTE--ONLY IF VSRERR IS NOT IN THE NUCLEUS AND VSRERR IS
/C,    TO MAKE FIRMWARE CALLS (FPAOM OM VERSION ONLY)

```

```

/PFILE,BI,,VSRERF
/FMAIN
INPUT,BI
ADD,OM,D

```

```

/C,    LOAD THE SOFTWARE MATH OM MODULES
/C,    EXECUTE--ONLY IF NOT USING FPP OR WCS OM VERSIONS

```

```

/PFILE,BI,,SFTOM
/FMAIN
INPUT,BI
ADD,OM,D

```

```

/C,    LOAD THE FLOATING POINT FIRMWARE AND ACCELERATOR MATH OM
/C,    EXECUTE--ONLY IF 512 WORD WCS AND NO FPP

```

```

/PFILE,BI,,ACLOM
/FMAIN
INPUT,BI
ADD,OM,D
CREATE,OM,D,WCSING,120,20
/PFILE,BI,,ACLFRM
;ABORT,JCP
C/R
;SCHED,MIUTIL,10,FL,F
N
LC
R

```

```

/C,    LOAD THE FLOATING POINT PROCESSOR MATH OM MODULES
/C,    EXECUTE--ONLY IF USING FPP AND NOT USING WCS

```

```

/PFILE,BI,,FPPOM
/FMAIN
INPUT,BI
ADD,OM,D

```



```

/C,      LOAD THE FLOATING POINT PROCESSOR WITH FORTRAN ENHANCEMENTS
/C,      MATH OM
/C,      EXECUTE--ONLY IF USING FPP AND 512 WORD WCS

```

```

/PFILE,BI,,FPAIRF
/FMAIN
INPUT,BI
ADD,OM,D
CREATE,OF,D,WCSIMG,120,20
/PFILE,BI,,FPAFRF
;ABORT,JCF
C/R
;SCHED,MUTIL,10,FL,F
N
LC
R

```

```

/C,      LOAD THE BASIC DATA PLOT OM MODULES
/C,      EXECUTE--ALWAYS IF DATA PLOT IS DESIRED

```

```

/PFILE,BI,,BDPDM
/FMAIN
INPUT,BI
ADD,OM,D

```

```

/C,      LOAD THE VORTEX DATA PLOT OM MODULES
/C,      EXECUTE--FOR VORTEX COMPATABLE DATA PLOT

```

```

/PFILE,BI,,VDPDM
/FMAIN
INPUT,BI
ADD,OM,D

```

```

/C,      LOAD THE MOS DATA PLOT OM MODULES
/C,      EXECUTE--FOR MOS COMPATABLE DATA PLOT, DO NOT EXECUTE
/C,      IF VDPDM HAS BEEN EXECUTED

```

```

/PFILE,BI,,MOPDM
/FMAIN
INPUT,BI
ADD,OM,D

```



```

/C,    LOAD THE SOFTWARE MATH OM MODULES
/C,    EXECUTE--ONLY IF NO FPP OR ACCELERATOR DESIRED.

```

```

/PFILE,BI,,SFTOM
/FMAIN
INPUT,BI
ADD,OM,D

```

```

/C,    LOAD THE ACCELERATOR MATH OM MODULES
/C,    EXECUTE--ONLY IF 512 WORD WCS AND NO FPP

```

```

/PFILE,BI,,ACLUM
/FMAIN
INPUT,BI
ADD,OM,D
CREATE,OM,D,WCSIMG,120,20
/PFILE,BI,,ACLFRM
;ABORT,JCP
C/R
;SCHED,MIUTIL,10,FL,F
N
LC
R

```

```

/C,    LOAD THE FLOATING POINT PROCESSOR MATH OM MODULES
/C,    EXECUTE--ONLY IF FPP AND NO ACCELERATOR

```

```

/PFILE,BI,,FPPOM
/FMAIN
INPUT,BI
ADD,OM,D

```

```

/C,    LOAD THE FLOATING POINT PROCESSOR WITH ACCELERATOR MATH OM
/C,    EXECUTE--ONLY IF FPP AND WCS

```

```

/PFILE,BI,,FPAOM
/FMAIN
INPUT,BI
ADD,OM,D
CREATE,OM,D,WCSIMG,120,20
/PFILE,BI,,FPAFRM
;ABORT,JCP
C/R
;SCHED,MIUTIL,10,FL,F
N
LC
R

```



```

/C,      LOAD THE FLOATING POINT FIRMWARE MATH MODULES
/C,      EXECUTE--ONLY IF WCS AND NO FPP OR ACCELERATOR

```

```

/PFILE,BI,,FPPOM
/FMAIN
RENAME,OM,D,SQK,SV1
RENAME,OM,D,SQL,SV2
RENAME,OM,D,SQM,SV3
RENAME,OM,D,SGN,SV4
RENAME,OM,D,XDAD,SV5
RENAME,OM,D,XDSU,SV6
RENAME,OM,D,XDMU,SV7
RENAME,OM,D,XDDI,SV8
INPUT,BI
ADD,OM,D
CREATE,OM,D,WCSIMG,120,20
/PFILE,BI,,FPPFRM
;ABORT,JCP
C/R
;SCHED,MUTIL,10,FL,F
N
LC
R

```

```

/C,      LOAD THE BASIC DATA PLOT OM MODULES
/C,      EXECUTE--ALWAYS IF DATA PLOT IS DESIRED

```

```

/PFILE,BI,,BDPOM
/FMAIN
INPUT,BI
ADD,OM,D

```

```

/C,      LOAD THE VORTEX DATA PLOT OM MODULES
/C,      EXECUTE--FOR VORTEX COMPATABLE DATA PLOT

```

```

/PFILE,BI,,VDPOM
/FMAIN
INPUT,BI
ADD,OM,D

```

```

/C,      LOAD THE MOS DATA PLOT OM MODULES
/C,      EXECUTE--FOR MOS COMPATABLE DATA PLOT.  DO NOT EXECUTE
/C,      IF VDPOM HAS BEEN EXECUTED

```

```

/PFILE,BI,,MDPOM
/FMAIN
INPUT,BI
ADD,OM,D

```


