

APPENDIX B

DESCRIPTION OF TRAC-M STRUCTURAL ELEMENTS

The information contained in this appendix was generated using the same script that generated the TRAC PathFinder. The PathFinder consists of HTML pages that may be accessed dynamically using a Web browser to view the information contained herein, as well as the applicable source coding.

Note: XTV/XMGR5 Graphics System. Module Xtv, which implements the XTV/XMGR5 graphics system, is to be replaced in a future version of TRAC-M/F90 by modules CXtvXFaces, XtvComps, XtvData, XtvDump, and XtvSetup.

Note: C Routines. The Fortran interface modules to C-language routines are included here, but not the C routines themselves.

B.1. PROGRAMs

PROGRAM: trac
PURPOSE: The TRAC-M main PROGRAM.
Source file: trac.f90
USEs MODULEs: DataSgnf EngUnits GlobalDat IntrType Io SysTime TracInput
CALLs: InitSysTime blkdat clean dmpit init input otrcsni sgnfetup
steady trans

B.2. MODULEs

MODULE: Alloc
PURPOSE: Generic F90 dynamic allocation, initialization, and diagnostics routine to establish memory for 1D, 2D, and 3D real arrays and 1D integer arrays.
Source file: AllocM.f90
CONTAINS: AllocIntOneD AllocRealOneD AllocRealThreeD
AllocRealTwoD
USEs MODULEs: IntrType
USEd by: AddSegment1D AddSegment3D AllBOp AllFOp
AllFillArrays AllocGen1D AllocPlenum AllocVess AllocVess3
SetSysMat allocBoundary icomp input pntrod repipe replen
repump resepd retee revlve rpipe rplen rpump rsepd retee
rvlve svset1

MODULE: Bad

PURPOSE: Initializes parameters nbd (used to dimension boundary arrays bd1 and bd2) and bdfull (used by the PLENUM and VESSEL components).

Source file: BadM.f90

USES MODULES: IntrType

USED by: StbVel1D SysService TeeArray allocBoundary bkmom chkbd constb elgr flux fwall htpipe inner input iplen ivssl j1d j3d plen1 plen2 plen3 poster preper rdcrvs repump resepd retee rpump rsepd rtee savbd set3dbd setbd stbme steady tee1x tf1d tf1ds tf1ds1 tf1ds3 trans vssl1 vssl2 vssl3

MODULE: BadInput

PURPOSE: Declares INTEGER variable jflag that is set to 1 if bad input data are encountered.

Source file: BadInputM.f90

USES MODULES: IntrType

USED by: LuMatch fbrcss hash input loadn namlst rcomp rdcomp rdrest readi readr recntl rhtstr rlevel timstp uncnvt uncnvtn unnumb unsvcb wir

MODULE: Bits

PURPOSE: Declares numerous integer parameters required for bit processing within the code.

Source file: BitsM.f90

USES MODULES: IntrType

USED by: EdgeAvg1D Plenum StbME3D StbVel1D bkstb3 break1 chkbd cif3 ecomp ff3d fill1 flux htif j3d poster preper rcomp set3dbd stbme stbme3 tee2 tee3 tf1ds tf1ds1 tf1ds3 tf3ds tf3ds1 tf3ds3 vssl2 vssl3

MODULE: Boundary

PURPOSE: Declares REAL fluid-component boundary arrays bd and vsi, declares integer variable bdOffset, and controls boundary memory allocation.

Source file: BoundaryM.f90

CONTAINS: allocBoundary

USES MODULES: IntrType

USED by: InitBDArray StbME3D TableTransComp astpln auxpln bdplen break1 break2 break3 civssl fill1 fill2 fill3 fillx ibrk icomp ifill input ipipe iplen iprizr ipump itee ivlve ivssl j3d out1d pipe1 pipe2 pipe3 plen1 plen2 plen3 prizr1 prizr2 prizr3 pump1 pump2 pump3 sepdx set3dbd stbme3 steady tbc1 tee1 tee2 tee3 tf3ds tf3ds3 tfplbk tfpln trans vlve1 vlve2 vlve3 vssl1 vssl2 vssl3 wplen

MODULE: Break

PURPOSE: Contains the BREAK component-specific routines.

Source file:	BreakM.f90
CONTAINS:	AllBOP AllBreakArrays break1 break2 break3 breakx dbrk ibrk rbreak rebrk wbreak
USES MODULES:	BreakArray Global
USED by:	dmnpit icomp out1d post prep1d rdcomp rdrest sdmpit sgnfetup wcomp

MODULE: BreakArray
PURPOSE: Defines the derived-type breakArrayT specific to BREAK-component arrays.
Source file: BreakArrayM.f90
USEs MODULES: GlobalDim IntrType
USED by: Break xtvbrak

MODULE: BreakVlt
PURPOSE: Contains routines specific to the BREAK-component VLT for initial setup and clearing, loading data from and storing data in the global VLT arrays, and reading from and writing to the restart dump.
Source file: BreakVltM.f90
CONTAINS: BreakTableDump BreakTableRst
USEs MODULES: Global IntrType
USED by: break1 break2 break3 breakx dbrk dmpVLT ibrk rbreak rebrk rstVLT wbreak xtvbrak

MODULE: CFaces
PURPOSE: Contains the interface for routines written in the C language (including xtv and C implementations for some of the Fortran 90 bit intrinsic functions) that are in file cfiles.c.
Source file: CFacesM.f90
CONTAINS: GetLocalSysInfo btestc cepsilon cxtvbw cxtvbw1 cxtvcl cxtvin cxtvoa cxtvoa1 cxtvow ibclrc ibsetc of1123c on1123c
 (These routines are within the INTERFACE.)
USED by: EdgeAvg1D Linear StbME3D StbVel1D StbVelx StbVely StbVelz Xtv auxpln bkstb3 break1 chkbd cif3 ecomp ff3d fill1 flux htif init initbc inner ivssl j3d out1d plen3 poster prep1d preper rcomp rvssl set3dbd sgnf3d stbme stbme3 tee2 tee3 tf1ds tf1ds1 tf1ds3 tf3ds tf3ds1 tf3ds3 tfplbk tfpln velbc vssl2 vssl3

MODULE: CXtvXFaces
PURPOSE: C interface for routines contained in file Cxtvxdr.c.
Source file: CXtvXFacesM.f90
CONTAINS: cxtvxarrupd cxtvxbrak cxtvxclose cxtvxcntl cxtvxdata cxtvxdatainit cxtvxfill cxtvxgd1a cxtvxgd1b cxtvxgd1c cxtvxgd1d cxtvxgnpr cxtvxhtr1 cxtvxhtr2 cxtvxhtr3 cxtvxhtr4 cxtvxhtr5 cxtvxhtr6 cxtvxhts1 cxtvxhts2 cxtvxopn cxtvxpln1 cxtvxpln2 cxtvxpln3 cxtvxsa2d cxtvxssl1d cxtvxst1d cxtvxstart cxtvxsul1d cxtvxsv1d cxtvxupdcnts cxtvxvard cxtvxvcent cxtvxvsl1 cxtvxvsl2 cxtvxvsl3
 (These routines are within the INTERFACE.)
USED by: Xtv clean

MODULE: Ccfl
 PURPOSE: Declares parameters, integer and real variables for the CCFL model.
 Source file: CcflM.f90
 USEs MODULES: IntrType
 USED by: StbVel1D StbVelz dmpit input rcomp rdrest rvssl tf1ds1 tf3ds1

MODULE: CompTyp
 PURPOSE: Initializes component-type parameters and controls the setting and return of component types.
 Source file: CompTypM.f90
 CONTAINS: gettype settype
 USEs MODULES: IntrType
 USED by: AllocGen1D Control DataSgnf InitBDArray Sepd StbVel1D SysService Xtv blkdat chkbd civssl compi constb core1 dcomp dmpVLT dmpit elgr error fltom flux fwall htcdr htif htstr1 htstrp htstrv htvsal icomp ihpss1 ihpss3 inner input iplen irod irodl jld junsol out1d out3d post post3d poster prep1d prep3d preper rbreak rdcomp rdrest rebrk refill rehtst repipe replen reprzr repump retee revlve revssl rfdbk rfill rhtstr rodht rpipe rplen rpripr rpump rstVLT rtee rvlve rvssl srlp stbme tee1 tee2 tee3 tf1ds tf1ds1 tf1ds3 wcomp whtstr wtee zpwnrm zpwrcl

MODULE: Control
 PURPOSE: Contains the control system-specific routines.
 Source file: ControlM.f90
 CONTAINS: cbedit cbset conblk delay evfxxx evltab fbrcss order rcntl rcntl svset svset1 svset3 svseth trip trips trpset
 USEs MODULES: CompTyp ControlDat EngUnits Global GlobalDat GlobalPnt IntrType Io Temp
 USED by: breakx core1 dmpit fillx input pipe1 pipe3 prep pump3 pumpsr rdrest rkin tee1x tee3 timstp vlv3 vlvex wpump

MODULE: ControlDat
 PURPOSE: Declares Control-System-derived types and controls: the allocation of Control-System memory, deallocation of Control-System memory required only to read the restart file, and reading from and writing to the dump restart file.
 Source file: ControlDatM.f90
 CONTAINS: CSDump CSFree CSRestart CSSetLuIdx
 USEs MODULES: IntrType
 USED by: Control DataSgnf Xtv break1 core3 edit init rcomp rfill rhtstr rpump rvlve sepd1 steady timchk trans unsvcb wbreak wcomp

MODULE: DataSgnf

PURPOSE: Controls data significance edits.
Source file: DataSgnfM.f90
CONTAINS: otrcsni rsgnf sdmpit sgnf1d sgnf3d sgnfetup sgnfpipe sgnfplen
sgnfprzr sgnfpump sgnftee sgnfvolve sgnfvol1d sgnfvol3d sgnhtstr
vsgnfpipes vsgnfplen vsgnfprzr vsgnfpump vsgnftee vsgnfvlve
vsgnhtstr
USEs MODULES: CompTyp ControlDat Flt Global GlobalDat GlobalDim GlobalPnt
IntrType
USED by: pstepq trac

MODULE: EngUnits
PURPOSE: Initializes variables for and controls the conversion of English/SI
units.
Source file: EngUnitsM.f90
CONTAINS: InitLabels LuMatch uncnvt uncnvtn uncnvts unnumb
USEs MODULES: IntrType
USED by: CSSetLuIdx Control WriteSim2DArray WriteStSumV1 WriteStaticV1
WriteStaticV3 WriteValAs2DArray WriteValAsArray
WriteValAsSArray Xtv core1 dmpit ecomp edit elgr error hash hout
htstr1 ihpss1 ihpss3 input irod ivssl namlst rcomp rdrest readr
reecho rehtst rerod1 rfill rhtstr rpipe rpump rrod1 rrod2 rsepd rtee
rvolve rvssl sedit steady timstp trac unsvcb warray wbreak wcomp
wfill whtstr wlevel wmxtyb wpipe wplen wpri zr wpump wsepd
wtee wvlve wvssl

MODULE: Eos
PURPOSE: Contains all equation-of-state (EOS) data and routines for fluids.
Source file: EosM.f90
USEs MODULES: EosData EosInline EosNoInline
USED by: Fprop3D Htif3D StbVelx StbVely StbVelz Therm3D bkspln bksstb
bkstb3 break1 break3 breakx chen chf choke core1 dmpit fillx gvssl2
htcor htif htvssl hvwebb ibrk ifill ihpss1 ihpss3 input iplen iprop
ivssl mgap namlst plen2 plen3 poster preper rbreak rcomp rdrest
revssl rpump rvlve rvssl tf1d tf1ds tf1ds3 tf3ds tf3ds1 tf3ds3 tfplbk
tfpln vssl2 vssl3 whtstr

MODULE: EosData
PURPOSE: Declares EOS variables.
Source file: EosDataM.f90
USEs MODULES: IntrType Io
USED by: Eos EosInline EosNoInline

MODULE: EosInline
PURPOSE: Contains fluid EOS routines that support the Cray F90 modinline and inlinefrom optimization options.
Source file: EosInlineM.f90
CONTAINS: hev h rholih satdeh satprh sattmh
USES MODULES: EosData
USED by: Eos EosNoInline

MODULE: EosNoInline
PURPOSE: Contains fluid EOS routines that do not support the Cray F90 modinline and inlinefrom optimization options.
Source file: EosNoInlineM.f90
CONTAINS: cpll cplld cpllh cpvv1 cpvv1d cpvv1h hev hevd fprop fpropd fproph
 rholid rholiq satded satder satprd satprs sattmd sattmp seteod
 seteoh seteos sigma sound thcl thcl d thclh thcv therm d thermh
 thermo therm s viscl viscl d viscl h viscv viscv d viscv h
USES MODULES: EosData EosInline
USED by: Eos

MODULE: EvalDF
PURPOSE: Contains difference evaluation routines used to calculate the TRAC timestep.
Source file: EvalDFM.f90
CONTAINS: evaldf1d evaldf2d
USES MODULES: IntrType TimeStepDat
USED by: Evaldf3D core3 pipe3 prizr3 pump3 tee3 vlve3

MODULE: FailDat
PURPOSE: Declares variables used in error processing.
Source file: FailDatM.f90
USES MODULES: IntrType
USED by: bkspln bksstb bkstb3 hout input namlst newdl t outer post tf1ds3
 tf3ds3 tfplbk timstp

MODULE: Fill
PURPOSE: Contains the FILL-component-specific routines.
Source file: FillM.f90
CONTAINS: AllFOp AllFillArrays dfill fill1 fill2 fill3 fillx ifill refill rfill wfill
USES MODULES: FillArray Global
USED by: dmpit icomp out1d post prep1d rdcomp rdrest sdmpit sgnfetup
 wcomp

MODULE: FillArray
 PURPOSE: Defines the derived-type fillArrayT specific to FILL-component arrays.
 Source file: FillArrayM.f90
 USEs MODULES: GlobalDim IntrType
 USED by: Fill xtvfill

MODULE: FillVlt
 PURPOSE: Contains routines specific to the FILL-component VLT for initial setup and clearing, loading data from and storing data in the global VLT arrays, and reading from and writing to the restart dump file.
 Source file: FillVltM.f90
 CONTAINS: FillTableDump FillTableRst
 USEs MODULES: Global IntrType
 USED by: dfill dmpVLT fill1 fill2 fill3 fillx ifill ihpss1 refill rfill rstVLT wfill xtvfill

MODULE: Flt
 PURPOSE: Contains routines for the FLT that is generic to all component types for performing initial setup, retrieving selected data, and reading from and writing to the restart dump file.
 Source file: FltM.f90
 CONTAINS: GenTableDump GenTableRst GetGenTable
 USEs MODULES: Global IntrType
 USED by: AllocGen1D CheckAcc DataSgnf EdgeAvg1D Sepd StbVel1D SysService bdplen bksp1n bksstb bkstb3 break1 break2 break3 breakx chen chkbd cihtst civssl compi constb core1 core3 dbrk dcomp dfill dhtstr dmpit dplen dprizr drod1 dtee dvssl ecomp elgr error evaldf1d evaldf2d fill1 fill2 fill3 fillx fwall htcdr htif htpipe htstr1 htstr3 htstrp htstrv htvs1l ibrk icomp ifill ihpss1 ihpss3 inner input ipipe iplen iprizr iprop ipump irod irod1 itee ivlve ivssl iwall3 jbd4 junsol lchpip out1d out3d pipe1 pipe3 plen3 pntrod post post3d poster prep1d prep3d preper prizr1 prizr3 pump1 pump3 pumpsr rbreak rcomp rdcomp rdrest rebrk refill rehtst repipe replen reprzr repump rerod1 retee revlve revssl rfill rhtstr rpipe rplen rprizr rpump rrod1 rrod2 rtee rvlve rvssl savbd setbd svset svset1 svset3 svseth tee1 tee2 tee3 tf1ds tf1ds1 tf1ds3 tf3ds tf3ds1 tf3ds3 tfplbk vlve1 vlve3 vlve3 vssl1 vssl2 vssl3 vssrod vsssr wbreak wcomp wfill whtstr wpipe wplen wprizr wpump wrcomp wtee wvlve wvssl xtv1d xtvbrak xtvdr xtvfill xtvht

MODULE: Gen1DArray
 PURPOSE: Contains routines for accessing generic 1D-component arrays, including initializing parameters for array pointers, declaring derived types for the pointers, allocating memory, loading a scalar EOS derivative, determining the pointers for 1D and 2D generic arrays, and resetting the generic 1D-component arrays for timestep update and backup.

Source file: Gen1DArrayM.f90

CONTAINS: AllocGen1D BackUpGen1D CopyGen1DArray Get1DArrayPointer Get2DArrayPointer GetEosDriv1d GetGen1D GetGen1D2D GetGen1DArray IncrementGen1D TimeUpGen1D

USEs MODULES: GlobalDim IntrType

USED by: AllocPlenum BackUpPlen CheckAcc SetJunAvgPtrs SysService TimeUpPlen astpln bdplen bkmom bkspln break1 break2 break3 breakx chkbd compi constb dbrk dcomp dfill dplen dprizr ecomp fill1 fill3 fillx htpipe ibrk ifill ihpss1 ihpss3 inner ipipe iplen iprizr iprop ipump itee ivlve j1d out1d pipe1 pipe3 piprod plen1 plen2 plen3 poster preper prizr1 prizr3 przr1x pump3 rbreak rcomp rebrk recomp refill repipe replen reprzr repump resepd retee revlve rfill rpipe rplen rprizr rpump rsepd rtee rvlve savbd sepd2 sepd3 sepdi sepdx sgnf1d sgnfpipe sgnfplen sgnfprzr sgnfpump sgnftee sgnfv1ve sgnfvoll1d stbmpl svset1 tee1 tee2 tee3 tf1d tfplbk tfpln vlve1 vlve3 vlve3 vsgnfplen vssl2 wplen wrcomp wvlve xtv1d xtvbrak xtvfill xtvpipe xtvplen xtvprzr xtvump xtvtee xtvvalv

MODULE: Gen1DCrunch

PURPOSE: Contains worker routines applicable to generic 1D-component arrays, where the access to the array database is through the argument interface.

Source file: Gen1DCrunchM.f90

CONTAINS: CellFluxes CellLogic EdgeAvg1D StbVel1D IndAob bkmmom bksstb choke cylht flux fwall level mprop powint stbme tf1ds tf1ds1 tf1ds3 volv

USEs MODULES: IntrType

USED by: bkmom constb offtke poster preper tf1d

MODULE: Gen1DInit

PURPOSE: Contains all routines for initializing and loading generic 1D-component arrays.

Source file: Gen1DInitM.f90

CONTAINS: CheckAcc chbd chkbd compi elgr iprop junsol volfa

USEs MODULES: IntrType

USED by: ipipe iprizr ipump itee ivlve

MODULE: Gen1DTask
PURPOSE: Contains task management routines applicable to generic 1D-component arrays that access the global database.
Source file: Gen1DTaskM.f90
CONTAINS: bkmom cellav constb htpipe ihpss1 inner j1d poster preper savbd setbd tf1d
USES MODULES: IntrType
USED by: break1 break2 break3 fill1 fill2 fill3 ibrk icompl ifill ipipe iprizr ipump itee ivlve jbd4 pipe1 pipe2 pipe3 prizr1 prizr2 prizr3 pump1 pump2 pump3 rpipe rprizr rpump rsepd rtee rvlve tee1 tee2 tee3 vlve1 vlve2 vlve3

MODULE: GenHeat
PURPOSE: Contains routines that calculate the interfacial heat transfer at each cell center.
Source file: GenHeatM.f90
CONTAINS: htif
USES MODULES: IntrType
USED by: Htif3D Plenum tf1d vssl2

MODULE: Global
PURPOSE: Declares global variables (i.e., those that apply to the overall calculation).
Source file: GlobalM.f90
USES MODULES: GlobalDim IntrType
USED by: AllocGen1D BackUpGen1D BackUpPlen Break BreakVlt CellFluxes CellLogic Control DataSgnf EdgeAvg1D Fill FillVlt Flt GenJunInfo Get1DArrayPointer Get2DArrayPointer GetEosDriv1d GetHS1DPtr GetHS2DPtr GetHS3DPtr GetHeatArray GetNoht JunTerms PipeVlt PlenVlt Plenum PrizeVlt Pump PumpVlt RodVlt Sepd SepdVlt SetSysMat SetSysVar SysService Tee TeeVlt TimeUpGen1D TimeUpHS TimeUpHS1 TimeUpPlen Valve ValveVlt VessVlt Xtv bfclos bfin bfinn bfout bfoutn bkmom bkmmom chkbdt cihtst civssl compi constb core1 dcomp dhtstr dmpVLT dmpit drod1 dvssl ecomp edit fltom hout htpipe htstr1 htstr3 htstrv icompl ihpss1 ihpss3 init inner input iprizr ivssl j1d lchvss numtoicompl out1d out3d outer pipe1 piprod pntrod post post3d poster prep prep3d preper prizr1 pumpd pumpsr pumpx rbreak rcomp rdcomp rdrest rebrk recomp refill rehtst rerod1 revssl rfill rhtstr rpipe rrod2 rtee rvssl sedit stbme tf1d vssl2 vssl3 vssrod wcomp whtstr wrcomp

MODULE: GlobalDat
PURPOSE: Declares and initializes global variables (i.e., those that apply to the overall calculation).
Source file: GlobalDatM.f90

USEs MODULES: IntrType
USED by: AllocGen1D AllocVess BlockSolver CellFluxes CellLogic CheckAcc
ClearFluxSums Control DataSgnf EdgeAvg1D JunTerms Plenum
PressCoef3D PrizeTableDump Sepd SetSysMat StbME3D StbVel1D
StbVelx StbVely StbVelz Xtv bkmom bksmom bksstb bkstb3 break1
break2 break3 breakx chen chkbd cif3 compi constb core1 core3
cournno cpvv1d cpvv1h dcomp dhtstr dmpit dprizr drod1 dvssl
ecompc edit elgr error ff3d fill1 fill2 fill3 fillx fltom fluxes frod gvssl2
hout htcor htif htpipe htstr1 htstr3 htstrp htstrv htvssl ibrk icomp ifill
ihpss1 ihpss3 init inner input ipipe iprizr iprop ipump irod irod1 itee
ivlve ivssl iwall3 j3d namlst newdlt out1d out3d outer pipe1 pipe2
pipe3 piprod plen1 plen2 plen3 post post3d poster prep prep1d
prep3d preper prizr1 prizr2 prizr3 pstepq pump1 pump2 pump3
pumpsr rbreak rcomp rdcomp rdrest rebrk recomp refill rehtst retee
revssl rfdbk rfill rhtstr rkin rpipe rpump rtee rvlve rvssl savbd sedit
set3dbd stbme stbme3 steady t tee1 tee1x tee2 tee3 tf1d tf1ds tf1ds1
tf1ds3 tf3ds tf3ds1 tf3ds3

MODULE: GlobalDim
PURPOSE: Declares and initializes global variables (i.e., those that apply to the overall calculation).
Source file: GlobalDimM.f90
USEs MODULES: IntrType
USED by: BlockSolver BreakArray BuildBndryTable DataSgnf Evaldf3D
FillArray Fprop3D Gen1DArray GenJunInfo Global HSArray
HeatArray Htif3D InitBDArray IntArray PipeArray PlenArray
Plenum PressCoef1D PressCoef3D PumpArray SetSysMat Solver
StbME3D StbVelx StbVely StbVelz TeeArray Therm3D ValveArray
VessArray VessArray3 bksstb break1 break3 civssl dbrk dcomp dfill
dvssl fillx fprop fpropd fproph htif htpipe ipipe iprizr ipump irod1
itee ivlve junsol lchpip matsol namlst piprod prefwd preinp prep1d
pumpsr rcomp repipe reprzr repump rerod1 resepd retee revlve
rprizr rpump rrod2 rvlve savbd sepdi srltp stbme3 steady tf1ds
tf1ds1 tf1ds3 tf3ds3 thermd thermh thermo therms trans vssl1
warray wcomp wmxtyb wvssl

MODULE: GlobalPnt
PURPOSE: Declares pointers for the global variables (i.e., those that apply to the overall calculation).
Source file: GlobalPntM.f90
USEs MODULES: IntrType
USED by: Control DataSgnf Plenum Xtv bkmom break1 cihtst civssl constb
core1 core3 dhtstr dmpit edit fillx fltom hout htstr1 htstr3 htstrv
icomp ihpss1 ihpss3 init input iprop ivssl numtoicomp out1d out3d
outer post post3d poster prep prep1d prep3d preper pumpsr rcomp
rdcomp rdrest rehtst revssl rfill rhtstr rpump rvlve rvssl sedit steady

tee1 tf1d timchk timstp trans unsvcb vlvex vssl1 vssl2 vssl3 vsssr
wbreak wcomp whtstr

MODULE:HSArray

PURPOSE: Contains routines for accessing generic HTSTR arrays, including initialization of parameters for array pointers, declaration of derived types for the pointers, determination of the pointers for 1D, 2D, and 3D heat-structure arrays, and resetting the generic heat-structure arrays for timestep update.

Source file: HSArrayM.f90

CONTAINS: GetHS GetHS1DPtr GetHS2DPtr GetHS3DPtr GetHS2d GetHS3d
GetHSSurf GetNoht TimeUpHS TimeUpHS1

USES MODULES: GlobalDim IntrType

USED by: RodTask sgnhtstr svseth vsgnhtstr xtvht

MODULE: HeatArray

PURPOSE: Contains routines for accessing variables specific to heated components, including initialization of parameters for array pointers and determination of the pointers for heated-component arrays.

Source file: HeatArrayM.f90

CONTAINS: GetHeatArray

USES MODULES: GlobalDim IntrType

USED by: AllocGen1D compi ecomp itee pipe1 poster preper prizr1 pump1
svset1 tee1 vlve1

MODULE: HeatCor

PURPOSE: Contains correlations and routines involving heat transfer.

Source file: HeatCorM.f90

CONTAINS: chen chf chf1 hlfilm htcor hvfilm hvnb tmsfb

USES MODULES: IntrType

USED by: RodCrunch htpipe

MODULE: HpssDat

PURPOSE: Declares the derived type for HPSS variables.

Source file: HpssDatM.f90

USES MODULES: IntrType

USED by: icomp ihpss1 ihpss3 input rcomp

MODULE: IntArray

PURPOSE: Declares the derived type for integer-component-specific arrays.

Source file: IntArrayM.f90

USES MODULES: GlobalDim IntrType

USED by: AllocGen1D chkbd dcomp dtee ecomp htpipe ipipe iprizr ipump itee
ivlve poster preper rcomp reomp repipe reprzr repump resepd retee
revlve rpipe rprizr rpump rsepd rtee rvlve tf1d wrcomp xtv1d
xtvpipe xtvprzr xtvump xtvtee xtvvalv

MODULE: IntrType

PURPOSE: Invokes F90 intrinsics to determine the INTEGER and REAL KINDs
(represented as integer parameters) sdk and sik, respectively,
required to declare variables with the desired precision and range.

Source file: IntrTypeM.f90

USED by: Alloc AssignGen1DPtr Bad BadInput Bits Boundary BreakArray
BreakVlt BuildBndryTable Ccfl CheckAcc CompTyp Control
ControlDat DataSgnf EngUnits EosData EvalDF FailDat FillArray
FillVlt Flt Gen1DArray Gen1DCrunch Gen1DInit Gen1DTask
GenHeat GetIntTeeFace Global GlobalDat GlobalDim GlobalPnt
HSArry HeatArray HeatCor HpssDat IntArray Io JCIndex
JunTerms Linear Matrices Network OneDDat PipeArray PipeVlt
PlenArray PlenVlt Plenum PreInput PrizeVlt Prizer PumpArray
PumpSource PumpVlt ReadEcho Restart RodCrunch RodGlobal
RodHtcref1 RodTask RodVlt SemiSolver Sepd SepdVlt SetBDJunCell
SetMat SysConfig SysService SysTime TableTransComp
TableTransJC TableTransfer TeeArray TeeVlt Temp TextIo
Thermocple TimeStep TimeStepDat TracInput Util ValveArray
ValveVlt VectDrag VessArray VessArray3 VessCon VessMat
VessStbME VessTask VessTf3dc VessTo1D VessVlt Xtv Xvol bfaloc
blkdat break1 break2 break3 breakx checksize clean cleari dbrk
dcomp dfill dmpVLT dmpit dpipe dpump dtee dvlve ecomp edit
error etee faxpos fill1

MODULE: Io

PURPOSE: Declares and initializes variables specific to data input/output.

Source file: IoM.f90

USES MODULES: IntrType

USED by: CSSetLuIdx Control EosData InitLabels LuMatch Plenum StbVel1D
TextIo Xtv bansol breakx chen chf chksr cihtst clean core1 dmpit
ecomp edit elgr error fillx hash hout htcor htstr1 htvssl hvwebb ibrk
icompile ihpss1 ihpss3 init input irod irod1 ivlve ivssl junsol lchpip
lchvss mfrod mstrct namlst newdlt nxcmp out3d outer post post3d
preinp prep1d prep3d pstepq pumpd pumpsr pumpx rbreak rcomp
rdcomp rdcrds rdrest readi readr rebrk reecho refill rerod1 resepd
reete revssl rfill rhtstr rlevel rpipe rprizr rpump rrod1 rrod2 rsepd
rtee rvlve rvssl sclmom sedit sepd1 split srtlp steady tf1ds3 tf3ds
tf3ds3 timstp trac trans uncnvt uncnvtn unnumb unsvcb volfa vssl2
wbreak wcomp wfill whtstr wir wlabi wlabin wlabr wlevel
wmxytb wpipe wprizr wpump wsepd wtee wvlve wvssl

MODULE: JunTerms
PURPOSE: Isolates subroutines and data associated with contributions to the flow equations from junctions between mesh segments (includes junctions between components). Pointers in the data structure are set by subroutine SetJunAvgPtrs and are private to this module.
Source file: JunTermsM.f90
CONTAINS: AssocJunPtrs DpJun JunCoefDp JunFluxes1D PressCoefJun1D PressCoefJun3D SetJunAvgPtrs StbME3DJun StbMEJun StbVel3DJun
USES MODULES: Global GlobalDat IntrType Matrices SysConfig Xvol
USED by: SemiSolver init post post3d prep tf1d

MODULE: Linear
PURPOSE: Contains routines that solve systems of linear equations.
Source file: LinearM.f90
CONTAINS: SAXPYT SDOTT SSCALT balanct balbakt daxpy ddot dgbfa dgbsl dscal hqr2t hqrt idamax matsol orthest ortrant sasumt scopym scopyt sfa22v sfa33v sfa44 sfa44v sfa55 sfa55v sgecot sgedit sgeev sgefap sgefst sgeslt ssl22v ssl33v ssl44 ssl44v ssl55 ssl55v
USES MODULES: CFaces IntrType
USED by: BlockSolver Solver bkspn bksstb bkstb3 choke ihpss3 out3d outer post post3d prep1d prep3d tf1ds tf3ds tfpln vssl2

MODULE: Matrices
PURPOSE: Data and subroutines in this module are associated directly with the solution of the equations for the dynamics of the fully linked physical system being modeled. As such, much of the data structure and programming is linked directly to the choice of solution method and will need to be replaced if a new solution method is chosen or the underlying set of equations is significantly altered. However, much of this data structure reflects the types of matrix sparsity typical in the physical systems modeled by this program and should be understood before being replaced.
Source file: MatricesM.f90
CONTAINS: ClearFluxSums EqnSubstitute SetCenPointers SetEdgPointers SetNetPointers Solver Trisolve
USES MODULES: IntrType
USED by: CellFluxes CellLogic EdgeAvg1D JunTerms PressCoef3D SemiSolver SetMat StbME3D StbVel1D VessStbVel bksmom bkspn bksstb bkstb3 post prep stbme stbmpl tf1ds tf1ds3 tf3ds tf3ds3 tfplbk tfpln vssl3

MODULE: Network
PURPOSE: Declares and allocates memory for variables related to the network of components.

Source file: NetworkM.f90
CONTAINS: allocNet
USEs MODULES: IntrType
USED by: bkmom constb hout icompl outer plen2 plen3 post post3d poster
prep1d prep3d preper tf1d vssl2 vssl3

MODULE: OneDDat
PURPOSE: Declares variables for 1D components and contains a routine to clear same.

Source file: OneDDatM.f90
CONTAINS: cleardf1dc
USEs MODULES: IntrType
USED by: GetIntTeeFace StbVel1D bkmom bkmmom bksp1n bksstb break1
break2 break3 constb etee fwall fwkf htif httpipe icompl inner iplen
itee jbd4 out1d out3d outer pipe1 pipe2 pipe3 plen1 plen2 plen3 post
post3d poster prep prep1d prep3d preper prizr1 prizr2 prizr3
pump1 pump2 pump3 pumpsr rttr sclmom sepd1 sepd2 sepd3
stbme stbmpl tee1 tee2 tee3 teemet teemf1 teex tf1d tf1ds tf1ds1
tf1ds3 tfplbk tfpln vlve1 vlve2 vlve3 vssl1 vssl2 vssl3

MODULE: Pipe
PURPOSE: Contains the PIPE-component-specific routines.
Source file: PipeM.f90
CONTAINS: dpipe ipipe pipe1 pipe1x pipe2 pipe3 repipe rpipe wpipe
USEs MODULES: PipeArray
USED by: dmpit icompl out1d post prep1d rdcomp rdrest sdmpit sgnfetup
wcomp

MODULE: PipeArray
PURPOSE: Defines the derived-type pipeArrayT specific to PIPE-component arrays.
Source file: PipeArrayM.f90
USEs MODULES: GlobalDim IntrType
USED by: Pipe

MODULE: PipeVlt
PURPOSE: Contains routines specific to the PIPE component VLT for initial setup and clearing, loading data from and storing data in the global VLT arrays, and reading from and writing to the restart dump file.
Source file: PipeVltM.f90
CONTAINS: PipeTableDump PipeTableRst
USEs MODULES: Global IntrType
USED by: dmpVLT dpipe ipipe pipe1 pipe1x pipe2 pipe3 repipe rpipe rstVLT
sgnfpipes vsnfpipes wpipe xtvpipe

MODULE: PlenArray
PURPOSE: Defines the derived-type plenumArrayT specific to PLENUM-component arrays.
Source file: PlenArrayM.f90
USEs MODULES: GlobalDim IntrType
USED by: Plenum SetBDJunCell SysService xtvplen

MODULE: PlenVlt
PURPOSE: Contains routines specific to the PLENUM-component VLT for initial setup and clearing, loading data from and storing data in the global VLT arrays, and reading from and writing to the restart dump file.
Source file: PlenVltM.f90
CONTAINS: PlenTableDump PlenTableRst
USEs MODULES: Global IntrType
USED by: AllocPlenum InitBDArray SetBDJunCell astpln auxpln bdplen bkspn dmpVLT dplen iplen plen1 plen2 plen3 replen rplen rstVLT stbmpl tfplbk tfpln wplen xtvplen

MODULE: Plenum
PURPOSE: Contains the PLENUM-component-specific routines.
Source file: PlenumM.f90
CONTAINS: AllocPlenum BackUpPlen TimeUpPlen astpln auxpln bdplen bkspn dplen iplen plen1 plen2 plen3 replen rplen stbmpl tfplbk tfpln wplen
USEs MODULES: Bits GenHeat Global GlobalDat GlobalDim GlobalPnt IntrType Io PlenArray
USED by: dmpit icomp out1d post prep1d rdcomp rdrest sdmpit sgnfetup wcomp

MODULE: PreInput
PURPOSE: Converts free-format TRACIN to standard TRAC format; writes same to file TRCINP. Makes initial error-detection pass for TRACIN.
Source file: PreInputM.f90
CONTAINS: allblk hunts idel indel preinp value
USEs MODULES: IntrType
USED by: input

MODULE: PrizeVlt
PURPOSE: Contains routines specific to the PRESSURIZER component VLT for initial setup and clearing, loading data from and storing data in the global VLT arrays, and reading from and writing to the restart dump file.
Source file: PrizeVltM.f90
CONTAINS: PrizeTableDump PrizeTableRst

USEs MODULES: Global IntrType
 USEd by: dmpVLT dprizr iprizr prizr1 prizr2 prizr3 prizr1x reprzr rprizr
 rstVLT sgnfprzr vsgnfprzr wprizr xtvprzr

MODULE: Prizer
 PURPOSE: Contains the PRESSURIZER-component-specific routines.
 Source file: PrizerM.f90
 CONTAINS: dprizr iprizr prizr1 prizr2 prizr3 prizr1x reprzr rprizr wprizr
 USEs MODULES: IntrType
 USEd by: dmpit icom post out1d prep1d rdcomp rdrest sdmpit sgnfetup
 wcomp

MODULE: Pump
 PURPOSE: Contains the PUMP-component-specific routines.
 Source file: PumpM.f90
 CONTAINS: dpump ipump pump1 pump2 pump3 pumpi rdcvrs rddim repump
 rpump wpump
 USEs MODULES: Global PumpArray
 USEd by: dmpit icom post out1d prep1d rdcomp rdrest sdmpit sgnfetup
 wcomp

MODULE: PumpArray
 PURPOSE: Defines the derived-type pumpArrayT specific to PUMP-component
 arrays.
 Source file: PumpArrayM.f90
 USEs MODULES: GlobalDim IntrType
 USEd by: Pump pumpd pumpsr pumpx

MODULE: PumpSource
 PURPOSE: Contains routines to calculate pump characteristics from input
 curves.
 Source file: PumpSourceM.f90
 CONTAINS: getcrrv pumpd pumpsr pumpx split
 USEs MODULES: IntrType
 USEd by: preper

MODULE: PumpVlt
 PURPOSE: Contains routines specific to the PUMP component VLT for initial
 setup and clearing, loading data from and storing data in the global
 VLT arrays, and reading from and writing to the restart dump file.
 Source file: PumpVltM.f90
 CONTAINS: GetPumpTab PumpTableDump PumpTableRst
 USEs MODULES: Global IntrType

USEd by: dmpVLT dpump ipump pump1 pump2 pump3 pumpd pumpsr
 pumpx repump rpump rstVLT sgnfpump svset1 vsgnfpump
 wpump xtvump

MODULE: ReadEcho
 PURPOSE: Contains routines to read data from the input and dump restart files
 and to echo same to the TRCOUT file.
 Source file: ReadEchoM.f90
 CONTAINS: readi readr reecho wir
 USEs MODULES: IntrType
 USEd by: input rbreak rcntl rdcrrs rddim rebrk recntl refill rehtst repipe replen
 reprzr repump resepd retee revlve revssl rfill rhtstr rpipe rplen rprizr
 rpump rrod1 rsepd rtee rvlve rvssl timstp

MODULE: Restart
 PURPOSE: Contains low-level routines specific to processing restart dump file,
 including reading data from disk, writing data to disk, emptying
 buffers, and closing the dump restart file.
 Source file: RestartM.f90
 CONTAINS: bfclos bfin bfinis bfinn bfinni bfinv bfout bfoutis bfoutn bfoutni
 bfouts enddmp
 USEs MODULES: IntrType
 USEd by: AllBOp AllFOp BreakTableDump BreakTableRst CSDump
 CSRestart FillTableDump FillTableRst GenTableDump GenTableRst
 PipeTableDump PipeTableRst PlenTableDump PlenTableRst
 PrizeTableDump PrizeTableRst PumpTableDump PumpTableRst
 RodTableDump RodTableRst SepdTableDump SepdTableRst
 TeeTableDump TeeTableRst ValveTableDump ValveTableRst
 VessTableDump VessTableRst blkdat clean dbrk dcomp dfill dhtstr
 dlevel dmpit dpipe dplen dpump drod1 dtee dvlve dvssl pstepq
 rdrest rebrk recomp refill rehtst repipe replen reprzr repump rerod1
 resepd retee revlve revssl steady timchk timstp

MODULE: RodCrunch
 PURPOSE: Contains worker routines applicable to the ROD-component arrays,
 where the access to the array database is through the argument
 interface.
 Source file: RodCrunchM.f90
 CONTAINS: bansol cdthex decays deltar expand fnmesh frod fthex gapht hlflmr
 htvsll hvwebb irod1 lchpip lchvss mbn mfrod mfuel mgap mhtr
 mwrz mzirc rfdbk rkin rodht rrod1 shrink trislz zcore zpwhci
 zpwnrm zpwrcl
 USEs MODULES: HeatCor IntrType
 USEd by: RodTask

MODULE: RodGlobal
PURPOSE: Declares and allocates memory for arrays that specify heat structure-fluid-cell interface information and material property information for the ROD component.
Source file: RodGlobalM.f90
CONTAINS: allocPrptb allocWp
USEs MODULES: IntrType
USED by: core1 input iprop irod1 ivssl preper tf1ds3 vssl3 vssssr

MODULE: RodHtcref1
PURPOSE: Declares variables used to provide ROD or SLAB information from the heat-structure solution.
Source file: RodHtcref1M.f90
USEs MODULES: IntrType VessCon
USED by: core1 hlflmr hvwebb vssrod

MODULE: RodTask
PURPOSE: Contains task management routines applicable to ROD-component arrays that access the global database.
Source file: RodTaskM.f90
CONTAINS: cihtst core1 core3 dhtstr drod1 fltom htstr1 htstr3 htstrp irod piprod pntrod rehtst rerod1 rhtstr rrod2 vssrod whtstr
USEs MODULES: HSArray IntrType RodCrunch
USED by: dmpit icomp post prep rdcomp rdrest wcomp

MODULE: RodVlt
PURPOSE: Contains routines specific to the ROD-component VLT for initial setup and clearing, loading data from and storing data in the global VLT arrays, and reading from and writing to the restart dump file.
Source file: RodVltM.f90
CONTAINS: GetRodTab RodTableDump RodTableRst SetRodTab
USEs MODULES: Global IntrType
USED by: cihtst core1 core3 dhtstr dmpVLT drod1 fltom htstr1 htstr3 htstrp irod irod1 pntrod rehtst rerod1 rhtstr rrod1 rrod2 rstVLT sdmpit sgnfetup sgnhtstr svseth vsghntstr whtstr xtvht

MODULE: SemiSolver
PURPOSE: Wrapper for subroutines specific to the creation of the pressure matrix associated with the semi-implicit equation (basic step of the SETS method).
Source file: SemiSolverM.f90
CONTAINS: BlockSolver PressCoef1D PressCoef3D
USEs MODULES: IntrType JunTerms Matrices
USED by: outer tf1d

MODULE: Sepd
PURPOSE:
Source file: SepdM.f90
CONTAINS: dsepd isepd resepd rsepd sepd1 sepd2 sepd3 sepdi sepdx ssepor tofric tokfac wsepd
USEs MODULES: CompTyp Flt Global GlobalDat IntrType SepdVlt Tee TeeArray TeeVlt
USED by: dmpit icompile out1d post prep1d rdcomp rdrest wcomp

MODULE: SepdVlt
PURPOSE:
Source file: SepdVltM.f90
CONTAINS: SepdTableDump SepdTableRst
USEs MODULES: Global IntrType
USED by: Sepd dmpVLT rstVLT

MODULE: SetMat
PURPOSE: Contains data and subroutines necessary for the setup of systemwide linear equations. Arrays used in the module *Matrices* are allocated by subroutine *SetSysMat*, contained in this module.
Source file: SetMatM.f90
CONTAINS: AreContigC AreContigE EdgJun1D EdgJunCount ExtraTrid SearchI SetAdjEdgInd SetIVolAdj SetSysMat SetTridiag
USEs MODULES: IntrType Matrices SysConfig
USED by: init

MODULE: SysConfig
PURPOSE: From the standpoint of system services such as data communication and system equation solution, the data structures are viewed from a different perspective than the standard component-based orientation. This module provides information in a readily accessible form, clearly defining the structure of data and equations and the connectivity of the system. It enables communication and translation between components and between component-based

data and systemwide data structures used in solving the dynamic equations for the coupled physical system.

Two major classes of data are defined here. First is junction data, expressing how components are connected. Second is mesh segment information. A segment is defined as a geometrically contiguous region within a component. Segments of a given type (e.g., 1D) have a natural connectivity through their end junctions with segments of the same type and may be regrouped with no impact on the internal generation and solution of equations. This data structure defines the extent and nature of such regions.

Within the 1D data class, three types are supported. The first is a general double-ended mesh, with connections to mesh segments at either end. This supports existing TRAC-M components such as PIPE, TEE, VALVE, PRIZR, and PUMP. The second type is a single-ended 1D component. In this component, the cell edge at one end of the 1D mesh is treated as having zero area and is ignored (the number of internal-edge variables equals the number of volumes). Currently, only the PLENUM operates in this mode. The first connection to the PLENUM is treated as a normal mesh edge, and the rest are side junctions (controlled by a call to addSegment1D). The final component type has no active internal mesh segment; rather, it acts simply as a terminating boundary condition (BREAKs and FILLS).

Source file: SysConfigM.f90

CONTAINS: AddSegment1D AddSegment3D Adj1DEdge Adj3DEdge
CheckOtherSeg FindMeshEnd GenJunInfo InteriorJunNum
JunCellsIndex Junctions Set3DSysVar SetSegment SetSysVar
StartBranch StartOneEnded

USES MODULES: IntrType

USED by: CellFluxes CellLogic CheckAcc EdgeAvg1D JunTerms PressCoef1D
SetMat StbVel1D SysService VessStbVel bksmom bkspIn bksstb
bkstb3 chkbd init input prep rbreak rebrk refill repipe replen reprzr
repump resepd retee revlve revssl rfill rpipe rplen rpizr rpump
rsepd rtee rvlve rvssl stbme stbmpl tf1ds tf1ds3 tf3ds3 tfplbk tfpln

MODULE: SysService

PURPOSE: Wrapper for the subroutines and special data directly associated with the communication of information between components.

Source file: SysServiceM.f90

CONTAINS: AssignGen1DPtr BuildBndryTable GetIntTeeFace InitBDArray
JCIndex SetBDJunCell SetBDVar TableTransAll TableTransComp
TableTransJC TableTransfer

USES MODULES: Bad CompTyp Flt Gen1DArray Global IntrType PlenArray
SysConfig TeeArray TeeVlt VessArray VessArray3

USED by: auxpln break1 break2 break3 civssl constb fill1 fill2 fillx hout ibrk
icomp ifill init inner ipipe iplen ipizr ipump itee ivlve ivssl outer
pipe1 pipe2 pipe3 plen1 plen2 plen3 post post3d prep3d prizr1

prizr2 prizr3 pump1 pump2 pump3 set3dbd stbme3 steady tbc1 tee1
tee2 tee3 tf3ds trans vlve1 vlve2 vlve3 vssl1 vssl2 vssl3

MODULE: SysTime
PURPOSE: Contains routines to provide system times.
Source file: SysTimeM.f90
CONTAINS: GetSysTime InitSysTime printClock startClock stopClock
USEs MODULES: IntrType
USED by: dmpit error hout pstepq sedit timchk trac xtvGnPr

MODULE: Tee
PURPOSE: Contains the TEE-component-specific routines.
Source file: TeeM.f90
CONTAINS: dtee etee itee jbd4 offtke retee rtee tbc1 tee1 tee1x tee2 tee3 teex wjcell
wtee
USEs MODULES: Global TeeArray
USED by: Sepd dmpit icomp out1d post prep1d rdcomp rdrest sdmpit
sgnfetup wcomp

MODULE: TeeArray
PURPOSE: Defines the derived-type teeArrayT specific to TEE-component
arrays.
Source file: TeeArrayM.f90
USEs MODULES: Bad GlobalDim IntrType
USED by: Sepd SysService Tee

MODULE: TeeVlt
PURPOSE: Contains routines specific to the TEE-component VLT for initial
setup and clearing, loading data from and storing data in the global
VLT arrays, and reading from and writing to the restart dump file.
Source file: TeeVltM.f90
CONTAINS: GetTeeTab TeeTableDump TeeTableRst
USEs MODULES: Global IntrType
USED by: Sepd SetBDJunCell SysService dmpVLT dtee etee icomp iplen itee
reete rstVLT rtee sepdx sgnftee svset1 tee1 tee1x tee2 tee3 vsnfttee
wtee xtvtee

MODULE: Temp
PURPOSE: Declares temporary scratch space.
Source file: TempM.f90
USEs MODULES: IntrType
USED by: Control dmpit ihpss1 ihpss3 input out3d outer post post3d prep1d
prep3d rdrest vssl2

MODULE: TextIo
PURPOSE: Contains low-level routines to process text input and output information.
Source file: TextIoM.f90
CONTAINS: dcodf loadn scltbl warray wiarn wlabi wlabin wlabr wlabrn wmxytb
USES MODULES: IntrType Io
USED by: elgr input pumpx rbreak rcntl rcomp rdcrvs rebrk recntl refill repipe
replen repump rerod1 resepd retee revlve revssl rfill rhtstr rlevel
rpipe rplen rpump rrod2 rsepd rtee rvlve rvssl wrcomp

MODULE: Thermocple
PURPOSE: Declares variables used by the ROD thermocouple model.
Source file: ThermocpleM.f90
USES MODULES: IntrType
USED by: blkdat core1 core3 expand rodht

MODULE: TimeStep
PURPOSE: Contains routines used to control the TRAC timestep.
Source file: TimeStepM.f90
CONTAINS: newdlt timstp
USES MODULES: IntrType TimeStepDat
USED by: steady trans

MODULE: TimeStepDat
PURPOSE: Declares variables used in the TRAC timestep control.
Source file: TimeStepDatM.f90
USES MODULES: IntrType
USED by: EvalDF TimeStep

MODULE: TracInput
PURPOSE:
Source file: TracInputM.f90
CONTAINS: asign hash input isort namlst nxtcmp r2ii vmcell
USES MODULES: IntrType
USED by: trac

MODULE: Util
PURPOSE: Contains utility routines generic to multiple components, such as setting arrays to a constant value, performing linear interpolation, and calculating the concentration of a solute.
Source file: UtilM.f90
CONTAINS: clear clearn concf courno jfind jvalue linint linint0 lint4d ltopp
mixprp numtoicomp rttr shiftb teemet teemf1 teemf2 teemom

USES MODULES: IntrType
USED by: StbVel1D VessCrunch VessStbVel VessTF3DS bkspln bksstb bkstb3
break1 breakx cbset cdthex core1 delay etee evfxx evltab fillx hout
htstrp ibrk ifill ihpss1 ihpss3 input ipipe iplen iprizr iprop ipump
irod itee ivlve ivssl loadn mzirc newdlt out1d out3d outer post
post3d preinp prep1d prep3d preper pumpd pumpsr pumpx rcntl
rcomp rddim rdrest rerod1 revssl rfdbk rfill rhtstr rpipe rplen rpump
rrod2 rsepd rtee rvlve rvssl sedit srltp tbc1 tf1ds1 value vlve vxssl

MODULE: Valve
PURPOSE: Contains the VALVE-component-specific routines.
Source file: ValveM.f90
CONTAINS: dvlve faxpos ivlve revlve rvlve vlve1 vlve2 vlve3 vlve vxwvlve
USES MODULES: Global ValveArray
USED by: dmpit icomp out1d post prep1d rdcomp rdrest sdmpit sgnfetup
wcomp

MODULE: ValveArray
PURPOSE: Defines the derived-type valveArrayT specific to VALVE-component arrays.
Source file: ValveArrayM.f90
USES MODULES: GlobalDim IntrType
USED by: Valve

MODULE: ValveVlt
PURPOSE: Contains routines specific to the VALVE-component VLT for initial setup and clearing, loading data from and storing data in the global VLT arrays, and reading from and writing to the restart dump file.
Source file: ValveVltM.f90
CONTAINS: GetValveTab ValveTableDump ValveTableRst
USES MODULES: Global IntrType
USED by: dmpVLT dvlve input ivlve revlve rstVLT rvlve sgnfvleve svset1 vlve1
vlve2 vlve3 vlve vxsgnfvleve vxwvlve xtvvalv

MODULE: VectDrag
PURPOSE: Contains routines required for evaluation of the 3D wall shear coefficients, including declaration of variables and pointers and setting the coefficients in vector mode.
Source file: VectDragM.f90
CONTAINS: prefwd tmpptr
USES MODULES: IntrType
USED by: vxssl

MODULE: VessArray
PURPOSE: Declares and allocates memory for VESSEL-component-specific arrays.
Source file: VessArrayM.f90
CONTAINS: AllocVess
USEs MODULES: GlobalDim IntrType
USED by: Htif3D StbVel3DJun SysService cif3 civssl dlevel dvssl htstrv ihpss3
ivssl j3d out3d post3d prefwd prep3d revssl rvssl set3dbd svset3
tf3ds3 vssl1 vssl2 vssl3 vssrod wlevel wvssl xtvvsl

MODULE: VessArray3
PURPOSE: Declares and allocates memory for VESSEL-component-generic arrays.
Source file: VessArray3M.f90
CONTAINS: AllocVess3 GetVSAR
USEs MODULES: GlobalDim IntrType
USED by: PressCoef3D SetJunAvgPtrs StbME3D StbVelx StbVely StbVelz
SysService VessTo1D backup bkstb3 cella3 cif3 dvpscl dvssl ff3d
fluxes htstrv ifset ihpss3 initbc ivssl iwall3 j3d mix3d prefwd
rdzmom revssl rvssl sclmom set3dbd setbdt sgnf3d sgnfvol3d
stbme3 svset3 tf3ds tf3ds1 tf3ds3 timupd velbc vrbv vssl1 vssl2 vssl3
vssrod vssssr wvssl xtvvsl zerov

MODULE: VessCon
PURPOSE: Declares and initializes INTEGER parameters for the 3D VESSEL component.
Source file: VessConM.f90
USEs MODULES: IntrType
USED by: AllocVess PressCoef3D RodHtcref1 StbME3D StbVelx StbVely
StbVelz VessTo1D backup bansol bkstb3 blkdat cella3 cif3 copya core1
dlevel dvpscl dvssl ff3d fluxes hlflmr htif httpipe htstr1 htstr3 htstrp
htstrv htvsll hvwebb ifset ihpss3 initbc input irodl ivssl iwall3 j3d
leveli levelr mix3d namlst prefwd rdzmom revssl rhtstr rlevel rodht
rvssl sclmom set3dbd setbdt setva sgnf3d sgnfvol3d stbme3 svset3
tf3ds tf3ds1 tf3ds3 timupd velbc vrbv vssl1 vssl2 vssl3 vssrod vssssr
wlevel wvssl zcore zerov

MODULE: VessCrunch
PURPOSE: Contains worker routines applicable to the VESSEL-component arrays, where the access to the array database is through the argument interface.
Source file: VessCrunchM.f90

CONTAINS: bakup cella3 chksr copya dvpscl ff3d fluxes gvssl1 gvssl2 ifset initbc
iwall3 leveli levelr mix3d rdzmom rlevel sclmom setbdt setva
stbme3 timupd vrbv vsssr

USEs MODULES: Util

USED by: VessTask svset3

MODULE: VessMat

PURPOSE: Declares and allocates memory for the 3D-VESSEL-component,
container-array-pointers vmap (Vessel Matrix Array Pointers).

Source file: VessMatM.f90

CONTAINS: allocVmap

USEs MODULES: IntrType

USED by: civssl input out3d post3d prep3d revssl rvssl vssl1 vssl2 vssl3

MODULE: VessStbME

PURPOSE: Wrapper for the subroutines directly associated with the 3D
stabilizer mass and energy equations.

Source file: VessStbMEM.f90

CONTAINS: StbME3D bkstb3

USEs MODULES: IntrType

USED by: vssl3

MODULE: VessStbVel

PURPOSE: Wrapper for the subroutines directly associated with the 3D
stabilizer velocity equations.

Source file: VessStbVelM.f90

CONTAINS: StbVelx StbVely StbVelz

USEs MODULES: Matrices SysConfig Util

USED by: vssl1

MODULE: VessTF3DS

PURPOSE: Contains subroutines to linearize the hydrodynamic semi-implicit
finite-difference equations for VESSEL components.

Source file: VessTF3DSM.f90

CONTAINS: tf3ds tf3ds1 tf3ds3 velbc zerov

USEs MODULES: Util

USED by: vssl2

MODULE: VessTask

PURPOSE: Contains task management routines applicable to the VESSEL-
component arrays that access the global database.

Source file: VessTaskM.f90

CONTAINS: cif3 civssl dlevel dvssl htstrv ihpss3 ivssl j3d out3d post3d prep3d
revssl rvssl set3dbd vssl1 vssl2 vssl3 wlevel wvssl
USES MODULES: IntrType VessCrunch
USED by: dmpit htstr1 icomp input outer post prep rdrest sdmpit sgnfetup
wcomp

MODULE: VessTf3dc
PURPOSE: Declares variables required to process multiple VESSELS.
Source file: VessTf3dcM.f90
USES MODULES: IntrType
USED by: PressCoef3D StbME3D StbVelx StbVely StbVelz bakup bkstb3 cella3
cif3 civssl dvpscl dvssl ff3d gvssl1 htif icomp ifset ihpss3 initbc ivssl
iwall3 j3d leveli levelr mix3d out3d post3d prefwd prep3d rdzmom
revssl rvssl sclmom set3dbd sgnfvol3d stbme3 tf3ds tf3ds1 tf3ds3
timupd vrbd vssl1 vssl2 vssl3 vsssr wvssl

MODULE: VessTo1D
PURPOSE: Contains routines that provide a copy-in, copy-out interface from
the 3D VESSEL arrays to the same 1D arrays used by the 1D
components.
Source file: VessTo1DM.f90
CONTAINS: Evaldf3D Fprop3D Htif3D Therm3D
USES MODULES: IntrType VessArray3 VessCon
USED by: ivssl tf3ds tf3ds3 vssl2 vssl3

MODULE: VessVlt
PURPOSE: Contains routines specific to the VESSEL component VLT for initial
setup and clearing, loading data from and storing data in the global
VLT arrays, and reading from and writing to the restart dump file.
Source file: VessVltM.f90
CONTAINS: GetVessTab VessTableDump VessTableRst
USES MODULES: Global IntrType
USED by: Adj3DEdge AllocVess Htif3D InitBDArray PressCoef3D SetIVolAdj
StbME3D StbVelx StbVely StbVelz bakup bkstb3 cella3 chksr cif3
civssl dmpVLT dvpscl dvssl ff3d fluxes gvssl1 gvssl2 htstrv ifset
ihpss3 initbc ivssl iwall3 j3d lchvss leveli levelr mix3d out3d post3d
prefwd prep3d rdzmom revssl rstVLT rvssl sclmom set3dbd setbdt
sgnf3d sgnfvol3d stbme3 svset3 tf3ds tf3ds1 tf3ds3 timupd velbc
vrbd vssl1 vssl2 vssl3 vsssr wvssl xtvvsl zero

MODULE: Xtv
PURPOSE: Contains routines specific to graphics processing with XTV.
Source file: XtvM.f90

CONTAINS: PrintVarDesc WriteSim2DArray WriteStSumV1 WriteStaticV1
 WriteStaticV3 WriteValAs2DArray WriteValAsArray
 WriteValAsSArray xtv1d xtvGnPr xtvbi3e xtvbrak xtvbuf1 xtvbuf1o
 xtvbuf3 xtvbufs xtvcntl xtvdr xtvfill xtvht xtvinit xtvpipe xtvplen
 xtvprzr xtvpump xtvtee xtvvalv xtvvsl
USES MODULES: CFaces CXtvXFaces CompTyp ControlDat EngUnits Global
 GlobalDat GlobalPnt IntrType Io
USED by: init pstepq steady trans
MODULE: Xvol
PURPOSE: Declares variables used to determine the sensitivity limits for the
 tf1ds subroutine.
Source file: XvolM.f90
USES MODULES: IntrType
USED by: CellFluxes EdgeAvg1D JunTerms astpln constb tf1d tf1ds tf3ds tfpln

B.3. INTERFACES

INTERFACE: TRACAllo
PURPOSE: Interface for subroutines AllocIntOneD, AllocRealOneD,
 AllocRealThreeD, and AllocRealTwoD.
Source file: AllocM.f90
CONTAINED in: Alloc
CALLED By: AddSegment1D AddSegment3D AllBOP AllFOP AllocGen1D
 AllocPlenum AllocVess AllocVess3 SetSysMat allocBoundary icomp
 input pntrod repipe replen repump resepd retee revlve rpipe rplen
 rpump rsepd rtee rvlve

INTERFACE: (UNNAMED)
PURPOSE: Interface for routines written in C Language (including xtv and C
 implementations for some of the Fortran 90-bit intrinsic functions).
Source file: CFacesM.f90
CONTAINED in: Cfaces

INTERFACE: (UNNAMED)
PURPOSE: C interface for routines contained in file Cxtvxdr.c.
Source file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces

B.4. PROCEDURES

PROCEDURE: AllocIntOneD
PURPOSE: Interface for subroutine AllocIntOneD.
Source file: AllocM.f90
CONTAINED in: Alloc

PROCEDURE: AllocRealOneD
PURPOSE: Interface for subroutine AllocRealOneD.
Source file: AllocM.f90
CONTAINED in: Alloc

PROCEDURE: AllocRealThreeD
PURPOSE: Interface for subroutine AllocRealThreeD.
Source file: AllocM.f90
CONTAINED in: Alloc

PROCEDURE: AllocRealTwoD
PURPOSE: Interface for subroutine AllocRealTwoD.
Source file: AllocM.f90
CONTAINED in: Alloc

B.5. SUBROUTINES

SUBROUTINE: AddSegment1D
PURPOSE: Adds a 1D segment to the current component's segment list. This is called by all 1D components.
Source file: SysConfigM.f90
CONTAINED in: SysConfig
USES MODULES: Alloc
CALLS: TRACAllo
CALLED by: repipe replen reprzr repump resepd retee revlve rpipe rplen rpri zr rpump rsepd rtee rvlve

SUBROUTINE: AddSegment3D
PURPOSE: Adds a 3D segment to the current component's segment list.
Source file: SysConfigM.f90
CONTAINED in: SysConfig
USES MODULES: Alloc
CALLS: TRACAllo
CALLED by: revssl rvssl

SUBROUTINE: AllBOP
PURPOSE: Performs memory allocation and reads specified data from and writes specified data to the restart dump file for the BREAK components.
SOURCE file: BreakM.f90
CONTAINED in: Break
USES MODULES: Alloc Restart
CALLs: TRACAllo bfinn bfoutn
CALLED by: AllBreakArrays

SUBROUTINE: AllBreakArrays
PURPOSE: Controls the operation of AllBOP by specifying the operation to be performed (memory allocation, either read from or write to the restart dump file) and the individual arrays to be processed for BREAK components.
SOURCE file: BreakM.f90
CONTAINED in: Break
CALLs: AllBOP
CALLED by: dbrk rbreak rebrk

SUBROUTINE: AllFOP
PURPOSE: Performs memory allocation and reads specified data from and writes specified data to the restart dump file for the FILL components.
SOURCE file: FillM.f90
CONTAINED in: Fill
USES MODULES: Alloc Restart
CALLs: TRACAllo bfinn bfoutn
CALLED by: AllFillArrays

SUBROUTINE: AllFillArrays
PURPOSE: Controls the operation of AllFOP by specifying the operation to be performed (memory allocation, either read from or write to the restart dump file) and the individual arrays to be processed for FILL components.
SOURCE file: FillM.f90
CONTAINED in: Fill
USES MODULES: Alloc
CALLs: AllFOP
CALLED by: dfill refill rfill

SUBROUTINE: AllocGen1D
PURPOSE: Performs memory allocation for generic 1D arrays.

SOURCE file: Gen1DArrayM.f90
 CONTAINED in: Gen1DArray
 USES MODULES: Alloc CompTyp Flt Global GlobalDat HeatArray IntArray
 CALLS: TRACAllo
 CALLED by: rbreak rebrk refill repipe reprzr repump resepd retee revlve rfill
 rpipe rpri zr rpump rsepd rtee rvlve

SUBROUTINE: AllocIntOneD
 PURPOSE: Fortran 90 dynamic allocation, initialization, and diagnostics routine to establish memory for 1D integer arrays.
 SOURCE file: AllocM.f90
 CONTAINED in: Alloc

SUBROUTINE: AllocPlenum
 PURPOSE: Performs memory allocation for arrays specific to the PLENUM component.
 SOURCE file: PlenumM.f90
 CONTAINED in: Plenum
 USES MODULES: Alloc Gen1DArray PlenVlt
 CALLS: TRACAllo
 CALLED by: replen rplen

SUBROUTINE: AllocRealOneD
 PURPOSE: Fortran 90 dynamic allocation, initialization, and diagnostics routine to establish memory for 1D real arrays.
 SOURCE file: AllocM.f90
 CONTAINED in: Alloc

SUBROUTINE: AllocRealThreeD
 PURPOSE: Fortran 90 dynamic allocation, initialization, and diagnostics routine to establish memory for 3D real arrays.
 SOURCE file: AllocM.f90
 CONTAINED in: Alloc

SUBROUTINE: AllocRealTwoD
 PURPOSE: Fortran 90 dynamic allocation, initialization, and diagnostics routine to establish memory for 2D real arrays.
 SOURCE file: AllocM.f90
 CONTAINED in: Alloc

SUBROUTINE: AllocVess
 PURPOSE: Allocates memory for the VESSEL-component-specific arrays.
 Source file: VessArrayM.f90

CONTAINED in: VessArray
 USEs MODULES: Alloc GlobalDat VessCon VessVlt
 CALLs: TRACAllo
 CALLED by: revssl rvssl

SUBROUTINE: AllocVess3
 PURPOSE: Allocates memory for the VESSEL-component-generic arrays.
 Source file: VessArray3M.f90
 CONTAINED in: VessArray3
 USEs MODULES: Alloc
 CALLs: TRACAllo
 CALLED by: revssl rvssl

SUBROUTINE: AssignGen1DPtr (post 3.0: name changed to AssignPtr)
 PURPOSE: Provides a pointer to the source of a specified variable. The variable name is provided as a character string.
 Source file: SysServiceM.f90
 CONTAINED in: SysService
 USEs MODULES: IntrType
 CALLED by: SetBDVar

SUBROUTINE: AssocJunPtrs
 PURPOSE: Sets junction pointers.
 Source file: JunTermsM.f90
 CONTAINED in: JunTerms
 CALLED by: SetJunAvgPtrs

SUBROUTINE: BackUpGen1D
 PURPOSE: Performs a timestep backup for the generic 1D-component arrays.
 SOURCE file: Gen1DArrayM.f90
 CONTAINED in: Gen1DArray
 USEs MODULES: Global
 CALLED by: out1d

SUBROUTINE: BackUpPlen
 PURPOSE: Performs a timestep backup for arrays specific to the PLENUM component.
 SOURCE file: PlenumM.f90
 CONTAINED in: Plenum
 USEs MODULES: Gen1DArray Global
 CALLED by: out1d

SUBROUTINE: BlockSolver
PURPOSE: Reduces the system matrix associated with the semi-implicit equations to a sparse pressure matrix that is solved by subroutine Solver.
Source file: SemiSolverM.f90
CONTAINED in: SemiSolver
USEs MODULES: GlobalDat GlobalDim Linear
CALLs: DpJun JunCoefDp PressCoef1D PressCoef3D PressCoefJun1D PressCoefJun3D Solver sfa44 sfa55 ssl44 ssl55
CALLED by: outer

SUBROUTINE: BreakTableDump
PURPOSE: Writes the VLT of the BREAK component to the dump restart file.
Source file: BreakVltM.f90
CONTAINED in: BreakVlt
USEs MODULES: Restart
CALLs: bfoutis bfouts
CALLED by: dmpVLT

SUBROUTINE: BreakTableRst
PURPOSE: Reads the VLT of the BREAK component from the dump restart file.
Source file: BreakVltM.f90
CONTAINED in: BreakVlt
USEs MODULES: Restart
CALLs: bfinis bfinis
CALLED by: rstVLT

SUBROUTINE: BuildBndryTable
PURPOSE: Builds the data-transfer table associated with communication of the component boundary.
Source file: SysServiceM.f90
CONTAINED in: SysService
USEs MODULES: GlobalDim IntrType
CALLED by: SetBDVar

SUBROUTINE: CSDump
PURPOSE: Controls writing the control system data to the dump restart file.
SOURCE file: ControlDatM.f90
CONTAINED in: ControlDat
USEs MODULES: Restart
CALLs: bfoutis bfoutn bfoutni bfouts
CALLED by: dmpit

SUBROUTINE: CSFree
PURPOSE: Deallocates only the control system memory required to read the dump restart file.
SOURCE file: ControlDatM.f90
CONTAINED in: ControlDat
CALLED by: rdrest

SUBROUTINE: CSRestart
PURPOSE: Controls reading the control system data from the dump restart file.
SOURCE file: ControlDatM.f90
CONTAINED in: ControlDat
USES MODULES: Restart
CALLs: bfinis bfinn bfinni bfin
CALLED by: rdrest

SUBROUTINE: CSSetLuIdx
PURPOSE: Initializes the control block, signal, and trip unit label indexes, alleviating the need for further lookup.
Source file: ControlDatM.f90
CONTAINED in: ControlDat
USES MODULES: EngUnits Io
CALLs: LuMatch error
CALLED by: init

SUBROUTINE: CellFluxes
PURPOSE: Sums contributions from all cell-face flows needed in the calculation of the semi-implicit mass and energy equations.
Source file: Gen1DCrunchM.f90
CONTAINED in: Gen1DCrunch
USES MODULES: Global GlobalDat Matrices SysConfig Xvol
CALLED by: tf1d

SUBROUTINE: CellLogic
PURPOSE: Sets variables giving composite information on velocities at each volume's faces. Some details of equation solution depend on knowing whether all velocities bounding a cell are effectively zero or if one of these velocities has changed sign.
Source file: Gen1DCrunchM.f90
CONTAINED in: Gen1DCrunch
USES MODULES: Global GlobalDat Matrices SysConfig
CALLED by: tf1d

SUBROUTINE: CheckAcc
PURPOSE: Determines whether the friction factors for each junction cell opposing this component are set according to the accumulator phase separation model. If so, it copies the adjacent component's jun2 g1DAr friction values to the current component's g1DAr locations.
Source file: Gen1DInitM.f90
CONTAINED in: Gen1DInit
USEs MODULES: Flt Gen1DArray GlobalDat IntrType SysConfig
CALLed by: ipipe iprizr ipump ivlve

SUBROUTINE: CheckOtherSeg
PURPOSE: Checks the other side of the last junction to see if further special processing is required before normal tracing through mesh segments may continue.
Source file: SysConfigM.f90
CONTAINED in: SysConfig
CALLs: FindMeshEnd
CALLed by: SetSysVar

SUBROUTINE: ClearFluxSums
PURPOSE: Clears variables used to sum the mass and energy fluxes needed in the calculation of the semi-implicit mass and energy equations. Also initializes logical variables describing general characteristics of the equation sets needed in the global solution.
SOURCE file: MatricesM.f90
CONTAINED in: Matrices
USEs MODULES: GlobalDat
CALLed by: outer

SUBROUTINE: CopyGen1DArray
PURPOSE: Copies a generic 1D-component array.
SOURCE file: Gen1DArrayM.f90
CONTAINED in: Gen1DArray
CALLs: Get1DArrayPointer
CALLed by: svset1

SUBROUTINE: DpJun
PURPOSE: After solution of the semi-implicit pressure equations by Solver, calculates the difference between pressure changes in the two cells adjacent to each mesh segment junction. Information is extracted directly from the system pressure change solution (pS) and placed in blocks%cDp(1, icDp).
SOURCE file: JunTermsM.f90

CONTAINED in:	JunTerms
CALLED by:	BlockSolver
SUBROUTINE:	EdgJun1D
PURPOSE:	An internal subroutine used by SetSysMat to calculate off-band coupling coefficients for cell edge <i>i</i> , where <i>i</i> is taken from the context of SetSysMat. This logic is applied to each of the two volumes adjacent to face <i>i</i> and isolated here to avoid repetition of coding within SetSysMat. Results are loaded into aIndE%aob.
SOURCE file:	SetMatM.f90
CONTAINED in:	SetMat
CALLED by:	SetSysMat
SUBROUTINE:	EdgJunCount
PURPOSE:	Internal to subroutine SetSysMat, this counts the number of faces connecting to the two volumes adjacent to cell edge <i>i</i> , which may contribute momentum to face <i>i</i> . Results are stored in the array icountE.
SOURCE file:	SetMatM.f90
CONTAINED in:	SetMat
CALLED by:	SetSysMat
SUBROUTINE:	EdgeAvg1D
PURPOSE:	Calculates quantities necessary to evaluate cell-edge fluxes and derivatives of these fluxes in a 1D mesh segment.
SOURCE file:	Gen1DCrunchM.f90
CONTAINED in:	Gen1DCrunch
USEs MODULES:	Bits CFaces Flt Global GlobalDat Matrices SysConfig Xvol
CALLED by:	tf1d
SUBROUTINE:	EqnSubstitute
PURPOSE:	Substitutes the results of solving the band matrix block in terms of network variables (call to Trisolve) into a network equation. Results are placed in the module variables net%a and rhsnet.
Source file:	MatricesM.f90
CONTAINED in:	Matrices
CALLED by:	Solver
SUBROUTINE:	Evaldf3D
PURPOSE:	Loads 3D VESSEL array data into 1D-component arrays.
Source file:	VessTo1DM.f90
CONTAINED in:	VessTo1D
USEs MODULES:	EvalDF GlobalDim

CALLs:	evaldf1d
CALLED by:	vssl3
SUBROUTINE:	ExtraTrid
PURPOSE:	Assigns extra tridiagonal submatrices, where a change in subnetwork occurs without a corresponding splitting row (entry in splitRowsC or splitRowSE)
Source file:	SetMatM.f90
CONTAINED in:	SetMat
CALLED by:	SetTridiag
SUBROUTINE:	FillTableDump
PURPOSE:	Writes the VLT of the FILL component to the dump restart file.
Source file:	FillVltM.f90
CONTAINED in:	FillVlt
USEs MODULES:	Restart
CALLs:	bfoutis bfouts
CALLED by:	dmpVLT
SUBROUTINE:	FindMeshEnd
PURPOSE:	At this point, the junction indexed jOther is at a side branch of a 1D component. We need to trace back to a starting point that will prevent loss of information in further variable indexing for this contiguous 1D mesh. This subroutine traces through 1D mesh segments until it hits a 3D segment, hits a one-ended mesh segment, hits a component with no segments (Break or Fill), or returns to the starting point of the trace (closed loop). The end of this trace is taken as the point for continuing the numbering of systemwide variables.
Source file:	SysConfigM.f90
CONTAINED in:	SysConfig
CALLs:	StartOneEnded
CALLED by:	CheckOtherSeg SetSysVar
SUBROUTINE:	FillTableRst
PURPOSE:	Reads the VLT of the FILL component from the dump restart file.
Source file:	FillVltM.f90
CONTAINED in:	FillVlt
USEs MODULES:	Restart
CALLs:	bfinis bfinis
CALLED by:	rstVLT
SUBROUTINE:	Fprop3D
PURPOSE:	Controls the evaluation of fluid property data for 3D VESSEL arrays.

Source file: VessTo1DM.f90
CONTAINED in: VessTo1D
USEs MODULES: Eos GlobalDim
CALLs: fprop
CALLED by: ivssl vssl3

SUBROUTINE: GenJunInfo
PURPOSE: Adds information about the component's position index in the order of computation (ioc), the index in component information arrays (ijcmp), and generation of information for junCells, which are not provided in the call to Junctions. This includes combining existing information in the compSeg array and junCells to build needed data on all side junctions into a given mesh segment.

Source file: SysConfigM.f90
CONTAINED in: SysConfig
USEs MODULES: Global GlobalDim
CALLED by: init

SUBROUTINE: GenTableDump
PURPOSE: Generic routine that writes the FLT that is generic to all component types to the restart dump file.

SOURCE file: FltM.f90
CONTAINED in: Flt
USEs MODULES: Restart
CALLs: bfoutis bfoutn bfouts
CALLED by: dbrk dcomp dfill dhtstr dplen dvssl

SUBROUTINE: GenTableRst
PURPOSE: Reads the FLT that is generic to all component types from the restart dump file.

SOURCE file: FltM.f90
CONTAINED in: Flt
USEs MODULES: Restart
CALLs: bfinis bfinn bfin
CALLED by: rdrest

SUBROUTINE: Get1DArrayPointer
PURPOSE: Returns the pointer for a generic 1D-component array.
SOURCE file: Gen1DArrayM.f90
CONTAINED in: Gen1DArray
USEs MODULES: Global
CALLED by: CopyGen1DArray GetGen1D GetGen1DArray IncrementGen1D

SUBROUTINE:	Get2DArrayPointer
PURPOSE:	Returns the pointer for a generic 1D-component, 2D array.
SOURCE file:	Gen1DArrayM.f90
CONTAINED in:	Gen1DArray
USEs MODULES:	Global
CALLED by:	GetGen1D2D
SUBROUTINE:	GetGen1DArray
PURPOSE:	Returns the pointer for a generic 1D-component array.
SOURCE file:	Gen1DArrayM.f90
CONTAINED in:	Gen1DArray
CALLs:	Get1DArrayPointer
CALLED by:	svset1
SUBROUTINE:	GetGenTable
PURPOSE:	Generic routine that retrieves the length of the component type, type index, or total number of cells from the FLT that is generic to all component types.
SOURCE file:	FltM.f90
CONTAINED in:	Flt
CALLs:	error
CALLED by:	ihpss1 ihpss3 irodl lchpip
SUBROUTINE:	GetHS1DPtr
PURPOSE:	Returns the pointer for a 1D HTSTR-component array.
SOURCE file:	HSArrayM.f90
CONTAINED in:	HSArray
USEs MODULES:	Global
CALLED by:	GetHS
SUBROUTINE:	GetHS2DPtr
PURPOSE:	Returns the pointer for a 2D HTSTR-component array.
SOURCE file:	HSArrayM.f90
CONTAINED in:	HSArray
USEs MODULES:	Global
CALLED by:	GetHS2d
SUBROUTINE:	GetHS3DPtr
PURPOSE:	Returns the pointer for a 3D HTSTR-component array.
SOURCE file:	HSArrayM.f90
CONTAINED in:	HSArray
USEs MODULES:	Global

CALLED by: GetHS3d GetHSSurf

SUBROUTINE: GetHeatArray

PURPOSE: Returns the pointer for a heated-component array.

SOURCE file: HeatArrayM.f90

CONTAINED in: HeatArray

USES MODULES: Global

CALLED by: svset1

SUBROUTINE: GetIntTeeFace

PURPOSE: Determines coefficients for flow coupling of velocities at the TEE junction to velocities at the other faces of the JCELL for a TEE component. Mimics behavior of subroutine TEEX but is modified for use in the System Services.

SOURCE file: SysServiceM.f90

CONTAINED in: SysService

USES MODULES: IntrType OneDDat

CALLED by: SetBDJunCell

SUBROUTINE: GetLocalSysInfo

PURPOSE: Gets computer and operating system names.

Source file: CFacesM.f90

CONTAINED in: CFaces

CALLED by: xtvinit

SUBROUTINE: GetPumpTab

PURPOSE: Returns PUMP-component common element.

Source file: PumpVltM.f90

CONTAINED in: PumpVlt

CALLS: error

CALLED by: svset1

SUBROUTINE: GetRodTab

PURPOSE: Returns ROD-component common element.

Source file: RodVltM.f90

CONTAINED in: RodVlt

CALLS: error

CALLED by: core1 svseth

SUBROUTINE: GetTeeTab

PURPOSE: Returns TEE-component common element.

Source file: TeeVltM.f90

CONTAINED in: TeeVlt

CALLs:	error
CALLed by:	icomp
SUBROUTINE:	GetValveTab
PURPOSE:	Returns VALVE-component common element.
Source file:	ValveVltM.f90
CONTAINED in:	ValveVlt
CALLs:	error
CALLed by:	input svset1
SUBROUTINE:	GetVessTab
PURPOSE:	Returns VESSEL-component common element.
Source file:	VessVltM.f90
CONTAINED in:	VessVlt
CALLs:	error
CALLed by:	lchvss
SUBROUTINE:	Htif3D
PURPOSE:	Controls the evaluation of the interfacial heat transfer at each cell center for 3D VESSEL arrays.
Source file:	VessTo1DM.f90
CONTAINED in:	VessTo1D
USEs MODULES:	Eos GenHeat GlobalDim VessArray VessVlt
CALLs:	htif
CALLed by:	vssl2
SUBROUTINE:	IncrementGen1D
PURPOSE:	Increments the pointer for a generic 1D-component array by an input value.
SOURCE file:	Gen1DArrayM.f90
CONTAINED in:	Gen1DArray
CALLs:	Get1DArrayPointer
CALLed by:	piprod
SUBROUTINE:	InitBDArray
PURPOSE:	Controls the overall initialization of the boundary data array, establishing values of variables needed to locate data to be moved between components. Most of the actual work is passed to subroutine SetBDJunCell.
SOURCE file:	SysServiceM.f90
CONTAINED in:	SysService
USEs MODULES:	Boundary CompTyp GlobalDim PlenVlt VessVlt
CALLs:	SetBDJunCell

CALLED by: init

 SUBROUTINE: InitLabels
 PURPOSE: Initializes the units and labels used for SI/English units conversion and output.

 SOURCE file: EngUnitsM.f90
 CONTAINED in: EngUnits
 USEs MODULES: Io
 CALLs: LuMatch
 CALLED by: input

 SUBROUTINE: InitSysTime
 PURPOSE: Initializes the system clock.
 SOURCE file: SysTimeM.f90
 CONTAINED in: SysTime
 CALLs: SYSTEM_CLOCK
 CALLED by: trac

 SUBROUTINE: JCIndex *** Not called, reserved for future use.***
 PURPOSE: Returns the index to the junCells array information for the given component, cell, and junction number. Also, may optionally return the index to the junCells array for the adjacent junction cell.

 SOURCE file: SysServiceM.f90
 CONTAINED in: SysService
 USEs MODULES: IntrType

 SUBROUTINE: JunCoefDp
 PURPOSE: Evaluates the coefficients of the cell-edge difference in pressure variations for the semi-implicit mass and energy equations at all junctions between mesh segments. This applies information in the derived-type array junVal to generate the appropriate coefficients stored in blocks%cDp.

 Source file: JunTermsM.f90
 CONTAINED in: JunTerms
 CALLED by: BlockSolver

 SUBROUTINE: JunFluxes1D
 PURPOSE: Sums contributions from side junctions for mass and energy fluxes needed in the calculation of the semi-implicit mass and energy equations. Convention is that a positive result results in an increase of mass or energy to the cell. Information is obtained from the junVal derived-type array and is stored in blocks%fluxSum, blocks%liqVolFluxSum, and blocks%vapVolFluxSum. Special sums are generated related to the new/old weight factor xvset

(blocks%fluxltSum, blocks%fluxvtSum, blocks%faWlInVlSum, and blocks%faWvInVvSum). In addition, a logical variable is generated, indicating whether a source of liquid is available to the cell from a side junction (blocks%sourceLiq).

Source file: JunTermsM.f90
CONTAINED in: JunTerms
CALLED by: tfld

SUBROUTINE: Junctions
PURPOSE: Loads basic information about a cell adjacent to a junction between mesh segments into junCells. Other information contained in junCells is generated by SetSysVar. This is used by all components to register connectivity information.

Source file: SysConfigM.f90
CONTAINED in: SysConfig
CALLED by: rbreak rebrk refill repipe replen reprzr repump resepd retee revlve revssl rfill rpipe rplen rpri zr rpump rsepd rtee rvlve rvssl

SUBROUTINE: LuMatch
PURPOSE: Looks up LABEL in the specified list(s) and returns the units-type index and variable index (where possible). Lookup errors are handled by the calling routine. Values not found are indicated by an index of -1.

SOURCE file: EngUnitsM.f90
CONTAINED in: EngUnits
USEs MODULES: BadInput Io
CALLED by: CSSetLuIdx InitLabels uncnvt uncnvtn unnumb xtvld xtvbrak xtvfill xtvinit xtvplen xtvssl

SUBROUTINE: PipeTableDump
PURPOSE: Writes the VLT of the PIPE component to the dump restart file.
Source file: PipeVltM.f90
CONTAINED in: PipeVlt
USEs MODULES: Restart
CALLs: bfoutis bfoutn bfouts
CALLED by: dmpVLT

SUBROUTINE: PipeTableRst
PURPOSE: Reads the VLT of the PIPE component from the dump restart file.
Source file: PipeVltM.f90
CONTAINED in: PipeVlt
USEs MODULES: Restart
CALLs: bfinis bfinn bfin

CALLED by: rstVLT

SUBROUTINE: PlenTableDump
PURPOSE: Writes the VLT of the PLENUM component to the dump restart file.
Source file: PlenVltM.f90
CONTAINED in: PlenVlt
USEs MODULES: Restart
CALLs: bfoutis bfouts
CALLED by: dmpVLT

SUBROUTINE: PlenTableRst
PURPOSE: Reads the VLT of the PLENUM component from the dump restart file.
Source file: PlenVltM.f90
CONTAINED in: PlenVlt
USEs MODULES: Restart
CALLs: bfinis bfinis
CALLED by: rstVLT

SUBROUTINE: PressCoef1D
PURPOSE: Collects terms in the pressure matrix from information interior to 1D mesh segments. Information is stored in the blocks%cDp data structure after block reduction is moved to sparse matrix a1 for final solution by subroutine Solver.
Source file: SemiSolverM.f90
CONTAINED in: SemiSolver
USEs MODULES: GlobalDim SysConfig
CALLED by: BlockSolver

SUBROUTINE: PressCoef3D
PURPOSE: Collects terms in the pressure matrix from information interior to 3D mesh segments. Information stored in the blocks%cDp data structure after block reduction is moved to sparse matrix a3D1 for final solution by subroutine Solver.
Source file: SemiSolverM.f90
CONTAINED in: SemiSolver
USEs MODULES: GlobalDat GlobalDim Matrices VessArray3 VessCon VessTf3dc VessVlt
CALLED by: BlockSolver

SUBROUTINE: PressCoefJun1D
PURPOSE: Collects terms in the pressure matrix from information at 1D mesh segment junctions. Coefficients stored in blocks%cDp after block

reduction are moved to sparse matrix storage in a1 for final solution by a call to Solver. Adjustments to the right-hand side of equations (stored in pS) are made adjacent to pressure boundary conditions.

Source file: JunTermsM.f90
CONTAINED in: JunTerms
CALLED by: BlockSolver

SUBROUTINE: PressCoefJun3D
PURPOSE: Stores pressure matrix coefficients coupling from 3D equations to 1D cells. Coefficients stored in blocks%cDp after block reduction are moved to sparse matrix storage in a3D1 for final solution by a call to Solver.

Source file: JunTermsM.f90
CONTAINED in: JunTerms
CALLED by: BlockSolver

SUBROUTINE: PrintVarDesc
PURPOSE: Generates the variable description line for graphics output.
Source file: XtvM.f90
CONTAINED in: Xtv
CALLS: cxtvxvard error
CALLED by: xtv1d xtvGnPr xtvbrak xtvcntl xtvfill xtvht xtvpipe xtvplen xtvprzr xtvump xtvtee xtvvalv xtvvsl

SUBROUTINE: PrizeTableDump
PURPOSE: Writes the VLT of the PRESSURIZER component to the dump restart file.
Source file: PrizeVltM.f90
CONTAINED in: PrizeVlt
USEs MODULES: GlobalDat Restart
CALLS: bfoutis bfoutn bfouts
CALLED by: dmpVLT

SUBROUTINE: PrizeTableRst
PURPOSE: Reads the VLT of the PRESSURIZER component from the dump restart file.
Source file: PrizeVltM.f90
CONTAINED in: PrizeVlt
USEs MODULES: Restart
CALLS: bfinis bfinn bfin
CALLED by: rstVLT

SUBROUTINE: PumpTableDump

PURPOSE: Writes the VLT of the PUMP component to the dump restart file.
Source file: PumpVltM.f90
CONTAINED in: PumpVlt
USES MODULES: Restart
CALLs: bfoutis bfoutn bfoutni bfouts
CALLED by: dmpVLT

SUBROUTINE: PumpTableRst
PURPOSE: Reads the VLT of the PUMP component from the dump restart file.
Source file: PumpVltM.f90
CONTAINED in: PumpVlt
USES MODULES: Restart
CALLs: bfinis bfinn bfinni bfin
CALLED by: rstVLT

SUBROUTINE: RodTableDump
PURPOSE: Writes the VLT of the ROD component to the dump restart file.
Source file: RodVltM.f90
CONTAINED in: RodVlt
USES MODULES: Restart
CALLs: bfoutis bfoutn bfoutni bfouts
CALLED by: dmpVLT

SUBROUTINE: RodTableRst
PURPOSE: Reads the VLT of the ROD component from the dump restart file.
Source file: RodVltM.f90
CONTAINED in: RodVlt
USES MODULES: Restart
CALLs: bfinis bfinn bfinni bfin
CALLED by: rstVLT

SUBROUTINE: SAXPYT
PURPOSE: Performs single-precision computation of $Y = A * X + Y$.
SOURCE file: LinearM.f90
CONTAINED in: Linear

SUBROUTINE: SSCALT
PURPOSE: Performs single-precision vector scale $X = A * X$.
SOURCE file: LinearM.f90
CONTAINED in: Linear

SUBROUTINE: SearchI

PURPOSE: Searches a list of integers that is already sorted in ascending order for the value contained in argument `ival`. If found, the logical argument found is set to true and the position in the array `list` is returned in the argument location. If not found, the argument found is set to false and the index of the first array element greater than `ival` is returned in location.

SOURCE file: SetMatM.f90

CONTAINED in: SetMat

CALLED by: SetSysMat

SUBROUTINE: SepdTableDump

PURPOSE: Adds edit of SEPD (Separator) VLT to dump file.

SOURCE file: SepdVltM.f90

CONTAINED in: SepdVlt

USES MODULES: Restart

CALLs: bfoutis bfouts

CALLED by: dmpVLT

SUBROUTINE: SepdTableRst

PURPOSE: Reads edit of SEPD (Separator) VLT from dump file.

SOURCE file: SepdVltM.f90

CONTAINED in: SepdVlt

USES MODULES: Restart

CALLs: bfinis bfinis

CALLED by: rstVLT

SUBROUTINE: Set3DSysVar

PURPOSE: Sets system variable indices within the data structure for 3D segments.

Source file: SysConfigM.f90

CONTAINED in: SysConfig

CALLED by: SetSysVar

SUBROUTINE: SetAdjEdgInd

PURPOSE: A system variable index for a cell edge at which an equation is evaluated (`iv`); the index of a variable known to be adjacent on a continuous 1D mesh (`ivadj`) determines if this represents an off-band connection (offband set to `.TRUE.` if it is) and determines the coefficient within `aIndE%aob` or `aIndE%a` as appropriate for storing matrix elements of cell-edge equations.

Source file: SetMatM.f90

CONTAINED in: SetMat

CALLED by: SetSysMat

SUBROUTINE: SetBDJunCell
PURPOSE: Controls the initialization of the boundary data array for a junction cell. It is given the input component number, junction identification number, and number of the cell adjacent to that junction (compNum, junNum, and cellNum). It is also provided with the location to which information is to be stored on conditions beyond that junction (bdArray and jindex). It drives a series of calls to SetBDVar to establish transfer table entries to move information from the adjacent component into the boundary information storage.

Source file: SysServiceM.f90
CONTAINED in: SysService
USEs MODULES: IntrType PlenArray PlenVlt TeeVlt
CALLs: GetIntTeeFace SetBDVar
CALLED by: InitBDArray

SUBROUTINE: SetBDVar
PURPOSE: Drives the generation of transfer table entries. It is given the name of the array data to be transferred, the offset of the data beyond the current junction, and a location to which the information will be transferred. Using this and component and junction information stored in the module data structure, it obtains values for the TO, FROM, and flipSign components of the table.

Source file: SysServiceM.f90
CONTAINED in: SysService
CALLs: AssignGen1DPtr BuildBndryTable TableTransfer
CALLED by: SetBDJunCell

SUBROUTINE: SetCenPointers
PURPOSE: Sets network matrix solution pointers specific to cell-centered variables.

Source file: MatricesM.f90
CONTAINED in: Matrices
CALLED by: SetNetPointers

SUBROUTINE: SetEdgPointers
PURPOSE: Sets network matrix solution pointers specific to cell-edge variables.

Source file: MatricesM.f90
CONTAINED in: Matrices
CALLED by: SetNetPointers

SUBROUTINE: SetIVolAdj
PURPOSE: For each edge in the system, finds and stores the system volume indices on the plus (iVol%p) and minus (iVol%m) sides of that edge.

Source file: SetMatM.f90
 CONTAINED in: SetMat
 USES MODULES: VessVlt
 CALLED by: SetSysMat

SUBROUTINE: SetJunAvgPtrs
 PURPOSE: Sets the pointers contained in the junVal derived-type array to average quantities at 1D-mesh-segment exterior junctions (including end junctions). These pointers will be used in generating system matrix coefficients involving coupling across these segment junctions.

Source file: JunTermsM.f90
 CONTAINED in: JunTerms
 USES MODULES: Gen1DArray VessArray3
 CALLS: AssocJunPtrs
 CALLED by: init

SUBROUTINE: SetNetPointers
 PURPOSE: Links generic pointers used in Solver to data objects specific to the variable varname. Use of this subroutine significantly simplifies the argument list required by subroutine Solver.

SOURCE file: MatricesM.f90
 CONTAINED in: Matrices
 CALLS: SetCenPointers SetEdgPointers
 CALLED by: Solver

SUBROUTINE: SetRodTab
 PURPOSE: Overwrites specified variable in HTSTR VLT.
 SOURCE file: RodVltM.f90
 CONTAINED in: RodVlt
 CALLS: error
 CALLED by: core1

SUBROUTINE: SetSegment
 PURPOSE: Allocates the seg1D or seg3D components in the current element of the compSeg derived-type array and stores the total number of segments. This must be called by all component input subroutines.

SOURCE file: SysConfigM.f90
 CONTAINED in: SysConfig
 CALLED by: rbreak rebrk refill repipe replen reprzr repump resepd retee revlve
 revssl rfill rpipe rplen rpri zr rpump rsepd rtee rvlve rvssl

SUBROUTINE: SetSysMat

PURPOSE: Initial setup of system matrices, including allocation of space for all arrays required for solving the systemwide equations. Also sets key indices, such as aIndc, aIndE, i3DC, i3DE, netIndC, netIndE, and adjEdg.

SOURCE file: SetMatM.f90

CONTAINED in: SetMat

USEs MODULES: Alloc Global GlobalDat GlobalDim

CALLs: EdgJun1D EdgJunCount SearchI SetAdjEdgInd SetIVolAdj SetTridiag TRACAllo

CALLED by: init

SUBROUTINE: SetSysVar

PURPOSE: Sets the unique system-variable indices for every volume and edge in the system. Ordering of variables attempts to preserve the longest pure tridiagonal submatrices possible. Ordering also is done in a way that keeps all variables associated with any physically connected 1D region grouped together (this constitutes a subnetwork). All variables from 1D regions precede those from 3D regions.

SOURCE file: SysConfigM.f90

CONTAINED in: SysConfig

USEs MODULES: Global

CALLs: CheckOtherSeg FindMeshEnd Set3DSysVar StartOneEnded

CALLED by: init

SUBROUTINE: SetTridiag

PURPOSE: Sets variables defining pure tridiagonal submatrices in the system, including related values in the network indices array.

SOURCE file: SetMatM.f90

CONTAINED in: SetMat

CALLs: ExtraTrid

CALLED by: SetSysMat

SUBROUTINE: Solver

PURPOSE: Solves sparse linear equations with coefficients stored in an array of types sparseMatrixT and vssMatrixT. The matrix structure contains banded submatrices and is solved with a network solution procedure (based on original TRAC solution procedures) that collapses banded structures, thus reducing the problem to the solution of one or more network matrices involving equations with off-band coefficients. This assumes that the right-hand side of all linear equations has been loaded into the system variable arrays (araS, ar1S, etc.) and returns the answers in these arrays. This implementation assumes that the band structure is tridiagonal with

its call to trisolver, but the remaining structure will handle a general band matrix.

SOURCE file: MatricesM.f90
CONTAINED in: Matrices
USEs MODULES: GlobalDim Linear
CALLs: EqnSubstitute SetNetPointers Trisolve matsol sgefat sgeslt
CALLED by: BlockSolver post prep

SUBROUTINE: StartBranch
PURPOSE: Searches for a side branch from currently traced segments that has itself not been traced and returns the index of the junction cell information leading to that branch.

SOURCE file: SysConfigM.f90
CONTAINED in: SysConfig

SUBROUTINE: StartOneEnded
PURPOSE: Used by SetSysVar when it starts tracing a 1D region within a component with only one end connection. This completes all necessary assignments for that component, leaving SetSysVar ready to deal with the component connected to this one.

SOURCE file: SysConfigM.f90
CONTAINED in: SysConfig
CALLED by: FindMeshEnd SetSysVar

SUBROUTINE: StbME3D
PURPOSE: Sets up 3D stabilizer equations for mass and energy. Stores velocity matrix elements.

SOURCE file: VessStbMEM.f90
CONTAINED in: VessStbME
USEs MODULES: Bits Boundary CFaces GlobalDat GlobalDim Matrices VessArray3 VessCon VessTf3dc VessVlt
CALLED by: vssl3

SUBROUTINE: StbME3DJun
PURPOSE: Evaluates contributions to the 3D stabilizer mass and energy equations from mass and energy fluxes at junctions to 1D mesh segments. Results are placed directly into the 3D system matrices (a3Dl and a3Dv) and storage for right-hand sides of the equations (ar1s, arvS, are1s, arevS, araS, and arcsS).

SOURCE file: JunTermsM.f90
CONTAINED in: JunTerms
CALLED by: post

SUBROUTINE: StbMEJun

PURPOSE: Evaluates contributions to the 1D stabilizer mass and energy equations from mass and energy fluxes at junctions between mesh segments. Results are placed directly into the system matrices (a1 and av) and storage for right-hand sides of the equations (ar1S, arvS, are1S, arevS, araS, and arcs).

SOURCE file: JunTermsM.f90

CONTAINED in: JunTerms

CALLED by: post

SUBROUTINE: StbVel1D

PURPOSE: Sets up 1D?Set up for 1D stabilizing momentum equations, that are? modified for separated equation solution.

SOURCE file: Gen1DCrunchM.f90

CONTAINED in: Gen1DCrunch

INCLUDEs files: cflow ciflim constant diddle ifcrs strtnt tst3d vdvmod vellim webnum

USEs MODULES: Bad Bits CFaces Ccfl CompTyp Flt GlobalDat Io Matrices OneDDat SysConfig Util

CALLs: error level

CALLED by: preper

SUBROUTINE: StbVel3DJun

PURPOSE: Stores coefficients coupling 3D equations stabilizer momentum to 1D stabilizer velocities. Results are placed directly into the 3D system matrices (a3D1E and a3DvE). This deals only with 3D coupling coefficients. Contributions from 1D momentum sources to the right-hand side of 3D equations currently are evaluated directly within StbVelx, StbVely, and StbVelz.

SOURCE file: JunTermsM.f90

CONTAINED in: JunTerms

USEs MODULES: VessArray

CALLED by: prep

SUBROUTINE: StbVelx

PURPOSE: Sets up the stablizer equations of motion for the radial or x direction in a VESSEL component; stores network-solution results for same into a VESSEL database.

SOURCE file: VessStbVelM.f90

CONTAINED in: VessStbVel

INCLUDEs files: diddle tst3d

USEs MODULES: CFaces Eos GlobalDat GlobalDim VessArray3 VessCon VessTf3dc VessVlt

CALLED by: vssl1

SUBROUTINE: StbVely
PURPOSE: Sets up the stablizer equations of motion for the azimuthal or y direction in a VESSEL component; stores network-solution results for same into a VESSEL database.
SOURCE file: VessStbVelM.f90
CONTAINED in: VessStbVel
INCLUDEs files: diddle tst3d
USEs MODULES: CFaces Eos GlobalDat GlobalDim VessArray3 VessCon VessTf3dc VessVlt
CALLED by: vssl1

SUBROUTINE: StbVelz
PURPOSE: Sets up the stablizer equations of motion for the axial or z direction in a VESSEL component; stores network-solution results for same into a VESSEL database.
SOURCE file: VessStbVelM.f90
CONTAINED in: VessStbVel
INCLUDEs files: constant tst3d vdvmod
USEs MODULES: CFaces Ccfl Eos GlobalDat GlobalDim VessArray3 VessCon VessTf3dc VessVlt
CALLED by: vssl1

SUBROUTINE: TableTransAll
PURPOSE: System service to transfer data for all entries in the data transfer table.
SOURCE file: SysServiceM.f90
CONTAINED in: SysService
CALLED by: hout icomp init post steady trans

SUBROUTINE: TableTransComp
PURPOSE: System service to drive the transfer of data for entries in the data transfer table associated with the current component. The index cco is used to locate information on the current component. This subroutine is being used as a temporary table driver while conflicts in information flow are resolved that prevent the use of TableTransAll. Actual transfer is performed by TableTransJC.
SOURCE file: SysServiceM.f90
CONTAINED in: SysService
USEs MODULES: Boundary IntrType
CALLs: TableTransJC
CALLED by: break1 break2 fill1 fill2 ibrk ifill inner ipipe iplen iprizr ipump itee ivlve ivssl pipe1 plen1 plen2 post3d prizr1 pump1 tee1 vlve1 vssl1 vssl2

SUBROUTINE: TableTransJC
 PURPOSE: System service to transfer the data for entries in the data transfer table associated with a specific junction cell.
 SOURCE file: SysServiceM.f90
 CONTAINED in: SysService
 USEs MODULES: IntrType
 CALLED by: TableTransComp

SUBROUTINE: TableTransfer
 PURPOSE: System service to transfer a single entry in the data transfer table to where?.
 SOURCE file: SysServiceM.f90
 CONTAINED in: SysService
 USEs MODULES: IntrType
 CALLED by: SetBDVar

SUBROUTINE: TeeTableDump
 PURPOSE: Adds edit of TEE VLT to dump file.
 SOURCE file: TeeVltM.f90
 CONTAINED in: TeeVlt
 USEs MODULES: Restart
 CALLs: bfoutis bfouts
 CALLED by: dmpVLT

SUBROUTINE: TeeTableRst
 PURPOSE: Reads edit of TEE VLT from dump file.
 SOURCE file: TeeVltM.f90
 CONTAINED in: TeeVlt
 USEs MODULES: Restart
 CALLs: bfinis bfinis
 CALLED by: rstVLT

SUBROUTINE: Therm3D
 PURPOSE: Interface to subroutine thermo for VESSEL.
 SOURCE file: VessTo1DM.f90
 CONTAINED in: VessTo1D
 USEs MODULES: Eos GlobalDim
 CALLs: thermo
 CALLED by: ivssl tf3ds tf3ds3 vssl2 vssl3

SUBROUTINE: TimeUpGen1D
 PURPOSE: Old-time/new-time array transfers for 1D components.

SOURCE file: Gen1DArrayM.f90
CONTAINED in: Gen1DArray
USEs MODULES: Global
CALLED by: break1 break3 fillx ibrk ifill ipipe iprizr ipump itee ivlve poster savbd

SUBROUTINE: TimeUpHS
PURPOSE: Old-time/new-time array transfers for HTSTRs.
SOURCE file: HSArrM.f90
CONTAINED in: HSArr
USEs MODULES: Global
CALLED by: core1 htstr3

SUBROUTINE: TimeUpHS1
PURPOSE: Old-time/new-time array transfers for HTSTRs.
SOURCE file: HSArrM.f90
CONTAINED in: HSArr
USEs MODULES: Global
CALLED by: htstr1 htstr3

SUBROUTINE: TimeUpPlen
PURPOSE: Old-time/new-time array transfers for PLENUM.
SOURCE file: PlenumM.f90
CONTAINED in: Plenum
USEs MODULES: Gen1DArray Global
CALLED by: iplen plen1 plen3

SUBROUTINE: Trisolve
PURPOSE: Solves a tridiagonal system with coefficients stored in "a", right-hand side stored in "b", and a%clow and a%chigh used to obtain the final answers as functions of the junction values. The reduction and back-substitution algorithm was extracted from an old version of TRAC-M to match the behavior of the tridiagonal solution in the old FEMOM and STBME.

SOURCE file: MatricesM.f90
CONTAINED in: Matrices
CALLED by: Solver

SUBROUTINE: ValveTableDump
PURPOSE: Adds edit of VALVE VLT to dump file.
SOURCE file: ValveVltM.f90
CONTAINED in: ValveVlt
USEs MODULES: Restart
CALLs: bfoutis bfoutn bfouts

CALLED by: dmpVLT
 SUBROUTINE: ValveTableRst
 PURPOSE: Reads edit of VALVE VLT from dump file.
 SOURCE file: ValveVltM.f90
 CONTAINED in: ValveVlt
 USES MODULES: Restart
 CALLS: bfinis bfinn bfin
 CALLED by: rstVLT

SUBROUTINE: VessTableDump
 PURPOSE: Adds edit of VESSEL VLT to dump file.
 SOURCE file: VessVltM.f90
 CONTAINED in: VessVlt
 USES MODULES: Restart
 CALLS: bfoutis bfouts
 CALLED by: dmpVLT

SUBROUTINE: VessTableRst
 PURPOSE: Reads edit of VESSEL VLT from dump file.
 SOURCE file: VessVltM.f90
 CONTAINED in: VessVlt
 USES MODULES: Restart
 CALLS: bfinis bfin
 CALLED by: rstVLT

SUBROUTINE: WriteSim2DArray
 PURPOSE: Provides XTV output routine.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 USES MODULES: EngUnits
 CALLS: cxtvxsa2d
 CALLED by: xtv1d

SUBROUTINE: WriteStSumV1
 PURPOSE: Provides XTV output routine.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 USES MODULES: EngUnits
 CALLS: cxtvxsulld
 CALLED by: xtv1d

SUBROUTINE: WriteStaticV1
 PURPOSE: Provides XTV output routine.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 USEs MODULES: EngUnits
 CALLs: cxtvxst1d
 CALLED by: xtv1d xtvbrak xtvfill xtvplen

SUBROUTINE: WriteStaticV3
 PURPOSE: Provides XTV output routine.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 USEs MODULES: EngUnits
 CALLs: cxtvxarrupd cxtvxdata cxtvxdatainit
 CALLED by: xtvvsl

SUBROUTINE: WriteValAs2DArray ***Not CALLED in Version 3.0.***
 PURPOSE: Provides XTV output routine.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 USEs MODULES: EngUnits

SUBROUTINE: WriteValAsArray
 PURPOSE: Provides XTV output routine.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 USEs MODULES: EngUnits
 CALLs: cxtvxsv1d
 CALLED by: xtv1d

SUBROUTINE: WriteValAsSArray
 PURPOSE: Provides XTV output routine.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 USEs MODULES: EngUnits
 CALLs: cxtvxss1d
 CALLED by: xtv1d

SUBROUTINE: allocBoundary
 PURPOSE: Allocates storage for the BD and VSI arrays.
 SOURCE file: BoundaryM.f90
 CONTAINED in: Boundary

USEs MODULES:	Alloc Bad
CALLs:	TRACAllo
CALLed by:	input
SUBROUTINE:	allocNet
PURPOSE:	Sets network pointers and allocates storage for the RNET array.
SOURCE file:	NetworkM.f90
CONTAINED in:	Network
CALLed by:	icomp
SUBROUTINE:	allocPrptb
PURPOSE:	Allocates storage for the PRPTB array.
SOURCE file:	RodGlobalM.f90
CONTAINED in:	RodGlobal
CALLed by:	input
SUBROUTINE:	allocVmap
PURPOSE:	Sets VESSEL matrix array pointers and allocates storage for the VMAP array.
SOURCE file:	VessMatM.f90
CONTAINED in:	VessMat
CALLed by:	input
SUBROUTINE:	allocWp
PURPOSE:	Allocates storage for the WP array.
SOURCE file:	RodGlobalM.f90
CONTAINED in:	RodGlobal
CALLed by:	input
SUBROUTINE:	assign
PURPOSE:	Assigns the component pointers according to the internal-order (IORDER) array.
SOURCE file:	TracInputM.f90
CONTAINED in:	TracInput
CALLed by:	input
SUBROUTINE:	astpln ***Not called in Version 3.0***
PURPOSE:	Evaluates mass and energy fluxes at the PLENUM junctions during postpass.
SOURCE file:	PlenumM.f90
CONTAINED in:	Plenum
USEs MODULES:	Boundary Gen1DArray PlenVlt Xvol

SUBROUTINE: auxpln
PURPOSE: Evaluates mass and energy fluxes at the PLENUM junctions during the outer iteration.
SOURCE file: PlenumM.f90
CONTAINED in: Plenum
USEs MODULES: Boundary CFaces PlenVlt SysService
CALLED by: plen2

SUBROUTINE: bakup
PURPOSE: Overwrites end-of-timestep variables with start-of-timestep values for one VESSEL level.
SOURCE file: VessCrunchM.f90
CONTAINED in: VessCrunch
USEs MODULES: VessArray3 VessCon VessTf3dc VessVlt
CALLED by: vssl2 vssl3

SUBROUTINE: balanc
PURPOSE: Supports subroutine for sgeev that balances a real matrix and isolates eigenvalues whenever possible.
SOURCE file: LinearM.f90
CONTAINED in: Linear
CALLED by: sgeev

SUBROUTINE: balbakt
PURPOSE: Support subroutine for sgeev that forms the eigenvectors of a real matrix.
SOURCE file: LinearM.f90
CONTAINED in: Linear
CALLED by: sgeev

SUBROUTINE: bansol
PURPOSE: Solves linear matrix equation.
SOURCE file: RodCrunchM.f90
CONTAINED in: RodCrunch
INCLUDEs files: cnrslv
USEs MODULES: Io VessCon
CALLED by: rodht

SUBROUTINE: bdplen
PURPOSE: Fills the PLENUM boundary array.
SOURCE file: PlenumM.f90
CONTAINED in: Plenum
USEs MODULES: Boundary Flt Gen1DArray PlenVlt

SUBROUTINE: bfaloc
PURPOSE: Allocates files and buffers for buffered I/O.
SOURCE file: bfaloc.f90
USEs MODULES: IntrType
CALLed by: dmpit rdrest

SUBROUTINE: bfclos
PURPOSE: Empties buffers and closes file.
SOURCE file: RestartM.f90
CONTAINED in: Restart
USEs MODULES: Global
CALLed by: enddmp

SUBROUTINE: bfin
PURPOSE: Initiates binary input subroutine for calls with real array arguments.
SOURCE file: RestartM.f90
CONTAINED in: Restart
USEs MODULES: Global
CALLs: error
CALLed by: bfinis bfinni bfin rdrest

SUBROUTINE: bfinis
PURPOSE: Initiates binary input subroutine for calls with integer scalar arguments.
SOURCE file: RestartM.f90
CONTAINED in: Restart
CALLs: bfin
CALLed by: BreakTableRst CSRestart FillTableRst GenTableRst PipeTableRst
 PlenTableRst PrizeTableRst PumpTableRst RodTableRst
 SepdTableRst TeeTableRst ValveTableRst VessTableRst rdrest

SUBROUTINE: bfinn
PURPOSE: Initiates binary input subroutine for calls with pointer arguments.
SOURCE file: RestartM.f90
CONTAINED in: Restart
USEs MODULES: Global
CALLs: error
CALLed by: AllBOp AllFOp CSRestart GenTableRst PipeTableRst PrizeTableRst
 PumpTableRst RodTableRst ValveTableRst rebrk recomp refill repipe
 replen repump rerod1 resepd retee revlve revssl

SUBROUTINE: bfinni

PURPOSE: Initiates binary input subroutine for calls with integer array arguments.
SOURCE file: RestartM.f90
CONTAINED in: Restart
CALLs: bfin
CALLED by: CSRestart PumpTableRst RodTableRst revssl

SUBROUTINE: bfin
PURPOSE: Initiates binary input subroutine for calls with real scalar arguments.
SOURCE file: RestartM.f90
CONTAINED in: Restart
CALLs: bfin
CALLED by: BreakTableRst CSRestart FillTableRst GenTableRst PipeTableRst PlenTableRst PrizeTableRst PumpTableRst RodTableRst SepdTableRst TeeTableRst ValveTableRst VessTableRst rdrest rehtst rerod1 revssl

SUBROUTINE: bfout
PURPOSE: Initiates binary output subroutine for calls with real array arguments.
SOURCE file: RestartM.f90
CONTAINED in: Restart
USEs MODULEs: Global
CALLs: error
CALLED by: bfoutis bfoutni bfouts dlevel dmpit

SUBROUTINE: bfoutis
PURPOSE: Initiates binary output subroutine for calls with integer scalar arguments.
SOURCE file: RestartM.f90
CONTAINED in: Restart
CALLs: bfout
CALLED by: BreakTableDump CSDump FillTableDump GenTableDump PipeTableDump PlenTableDump PrizeTableDump PumpTableDump RodTableDump SepdTableDump TeeTableDump ValveTableDump VessTableDump

SUBROUTINE: bfoutn
PURPOSE: Initiates binary output subroutine for calls with pointer arguments.
SOURCE file: RestartM.f90
CONTAINED in: Restart
USEs MODULEs: Global
CALLs: error

CALLED by: AllBOp AllFOp CSDump GenTableDump PipeTableDump
PrizeTableDump PumpTableDump RodTableDump
ValveTableDump dbrk dcomp dfill dpipe dplen dpump drod1 dtee
dvolve dvssl

SUBROUTINE: bfoutni
PURPOSE: Initiates binary output subroutine for calls with integer array
arguments.
SOURCE file: RestartM.f90
CONTAINED in: Restart
CALLS: bfout
CALLED by: CSDump PumpTableDump RodTableDump dvssl

SUBROUTINE: bfouts
PURPOSE: Initiates binary output subroutine for calls with real scalar
arguments.
SOURCE file: RestartM.f90
CONTAINED in: Restart
CALLS: bfout
CALLED by: BreakTableDump CSDump FillTableDump GenTableDump
PipeTableDump PlenTableDump PrizeTableDump
PumpTableDump RodTableDump SepdTableDump TeeTableDump
ValveTableDump VessTableDump dbrk dcomp dfill dhtstr dmpit
dplen drod1 dvssl

SUBROUTINE: bkmom
PURPOSE: Driver for bksmom; updates certain bd information (see comments in
coding).
SOURCE file: Gen1DTaskM.f90
CONTAINED in: Gen1DTask
USES MODULES: Bad Gen1DArray Gen1DCrunch Global GlobalDat GlobalPnt
Network OneDDat
CALLS: bksmom
CALLED by: pipe1 prizr1 pump1 tee1 vlve1

SUBROUTINE: bksmom
PURPOSE: Stores solution of 1D stabilizer momentum equations into 1D-
component databases.
SOURCE file: Gen1DCrunchM.f90
CONTAINED in: Gen1DCrunch
USES MODULES: Global GlobalDat Matrices OneDDat SysConfig
CALLED by: bkmom

SUBROUTINE: bkspln

PURPOSE: Copies system solution for stabilizing mass and energy equations into PLENUM-component database; generates an estimate of new-time void fraction consistent with the results of the stablizer mass and energy equations.

SOURCE file: PlenumM.f90

CONTAINED in: Plenum

USEs MODULES: Eos FailDat Flt Gen1DArray Linear Matrices OneDDat PlenVlt SysConfig Util

CALLs: sfa55 ssl55

CALLED by: plen3

SUBROUTINE: bksstb

PURPOSE: Copies the system solution for stablizer mass and energy equations into the 1D component databases; generates an estimate of new-time void fraction consistent with the results of the stablizer mass and energy equations.

SOURCE file: Gen1DCrunchM.f90

CONTAINED in: Gen1DCrunch

INCLUDEs files: syssum

USEs MODULES: Eos FailDat Flt GlobalDat GlobalDim Linear Matrices OneDDat SysConfig Util

CALLs: sfa55 ssl55

CALLED by: poster

SUBROUTINE: bkstb3

PURPOSE: Copies the system solution for stablizer mass and energy equations into the VESSEL-component databases; generates an estimate of new-time void fraction consistent with the results of the stablizer mass and energy equations.

SOURCE file: VessStbMEM.f90

CONTAINED in: VessStbME

INCLUDEs files: chgalp dtinfo syssum

USEs MODULES: Bits CFaces Eos FailDat Flt GlobalDat Linear Matrices SysConfig Util VessArray3 VessCon VessTf3dc VessVlt

CALLs: sfa55 ssl55

CALLED by: vssl3

SUBROUTINE: break1

PURPOSE: Controls BREAK prepass.

SOURCE file: BreakM.f90

CONTAINED in: Break

USEs MODULES: Bits Boundary BreakVlt CFaces ControlDat Eos Flt Gen1DArray Gen1DTask GlobalDat GlobalDim GlobalPnt IntrType OneDDat SysService Util

CALLs: TableTransComp TimeUpGen1D breakx shiftb
 CALLEd by: prep1d

SUBROUTINE: break2
 PURPOSE: Controls BREAK outer iteration.
 SOURCE file: BreakM.f90
 CONTAINED in: Break
 USEs MODULES: Boundary BreakVlt Flt Gen1DArray Gen1DTask GlobalDat IntrType OneDDat SysService

CALLs: TableTransComp
 CALLEd by: out1d

SUBROUTINE: break3
 PURPOSE: Controls BREAK postpass.
 SOURCE file: BreakM.f90
 CONTAINED in: Break
 USEs MODULES: Boundary BreakVlt Eos Flt Gen1DArray Gen1DTask GlobalDat GlobalDim IntrType OneDDat SysService

CALLs: TimeUpGen1D fprop thermo
 CALLEd by: post

SUBROUTINE: breakx
 PURPOSE: Evaluates BREAK pressure, temperature, and void fraction.
 SOURCE file: BreakM.f90
 CONTAINED in: Break
 INCLUDEs files: constant
 USEs MODULES: BreakVlt Control Eos Flt Gen1DArray GlobalDat IntrType Io Util
 CALLs: error evltab fprop linint0 mixprp shiftb thermo trip
 CALLEd by: break1

SUBROUTINE: cbedit
 PURPOSE: Edits the first 10 control-block parameter values, along with their variable-name labels and a control-block schematic diagram.
 SOURCE file: ControlM.f90
 CONTAINED in: Control
 CALLEd by: rcntl recntl

SUBROUTINE: cbset
 PURPOSE: Evaluates control-block-function output parameters.
 SOURCE file: ControlM.f90
 CONTAINED in: Control
 USEs MODULES: Util

CALLs:	conblk delay error linint0 lint4d
CALLed by:	trips
SUBROUTINE:	cella3
PURPOSE:	Evaluates cell-averaged quantities that are required for the interphasic heat-transfer calculation for the VESSEL component.
SOURCE file:	VessCrunchM.f90
CONTAINED in:	VessCrunch
INCLUDEs files:	diddle strtnt webnum
USEs MODULES:	VessArray3 VessCon VessTf3dc VessVlt
CALLed by:	vssl2
SUBROUTINE:	cellav
PURPOSE:	Evaluates cell-averaged quantities that are required for the interphasic heat-transfer calculation for 1D components.
SOURCE file:	Gen1DTaskM.f90
CONTAINED in:	Gen1DTask
INCLUDEs files:	diddle
CALLed by:	tf1d
SUBROUTINE:	chbd
PURPOSE:	Checks boundary data.
SOURCE file:	Gen1DInitM.f90
CONTAINED in:	Gen1DInit
CALLs:	error
CALLed by:	chkbd
SUBROUTINE:	checksize
PURPOSE:	Checks the size of statically allocated arrays.
SOURCE file:	checksize.f90
USEs MODULES:	IntrType
CALLs:	error
CALLed by:	icomp ihpss3 input rbreak rdrest rebrk refill repipe replen reprzr repump resepd retee revlve rfill rpipe rplen rpizr rpump rsepd retee rvlve
SUBROUTINE:	chen
PURPOSE:	Uses Chen correlation to evaluate the forced-convection, nucleate-boiling, heat-transfer coefficient.
SOURCE file:	HeatCorM.f90
CONTAINED in:	HeatCor
INCLUDEs files:	constant supres
USEs MODULES:	Eos Flt GlobalDat Io

CALLED by: htcor htvssl

 SUBROUTINE: chf
 PURPOSE: Evaluates critical heat flux (CHF) based on a local-conditions formulation.
 SOURCE file: HeatCorM.f90
 CONTAINED in: HeatCor
 USEs MODULES: Eos Io
 CALLs: chf1 error
 CALLED by: htcor htvssl

 SUBROUTINE: chf1
 PURPOSE: Applies Biasi CHF correlation.
 SOURCE file: HeatCorM.f90
 CONTAINED in: HeatCor
 INCLUDEs files: chfint constant diddlh
 CALLED by: chf htcor htvssl

 SUBROUTINE: chkbd
 PURPOSE: Checks for the consistency in the boundary-array data during initialization.
 SOURCE file: Gen1DInitM.f90
 CONTAINED in: Gen1DInit
 INCLUDEs files: elvkf
 USEs MODULES: Bad Bits CFaces CompTyp Flt Gen1DArray Global GlobalDat IntArray SysConfig
 CALLs: chbd
 CALLED by: ipipe iprizr ipump itee ivlve

 SUBROUTINE: chksr
 PURPOSE: Checks VESSEL-component SOURCE locations.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: Io VessVlt
 CALLs: error
 CALLED by: rvssl

 SUBROUTINE: choke
 PURPOSE: Evaluates the critical-flow phasic velocities and their derivatives with respect to the donor-cell total pressure.
 SOURCE file: Gen1DCrunchM.f90
 CONTAINED in: Gen1DCrunch
 INCLUDEs files: cflow constant

USEs MODULES: Eos Linear
 CALLs: error sgedit sgeev sgefap sgeslt sound therms
 CALLED by: tf1ds1

SUBROUTINE: cif3
 PURPOSE: Evaluates interfacial shear for VESSEL component.
 SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 INCLUDEs files: ciflim constant diddle diddlh film ifcrs refhti2 tst3d webnum
 USEs MODULES: Bits CFaces GlobalDat VessArray VessArray3 VessCon VessTf3dc
 VessVlt
 CALLED by: vssl1

SUBROUTINE: cihtst
 PURPOSE: Sets up arrays for HTSTR component.
 SOURCE file: RodTaskM.f90
 CONTAINED in: RodTask
 USEs MODULES: Flt Global GlobalPnt Io RodVlt
 CALLs: error irod irodl
 CALLED by: icomp

SUBROUTINE: civssl
 PURPOSE: Transfers vessel data from LCM to SCM define? so that the remaining data can be initialized.
 SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 INCLUDEs files: elvkl
 USEs MODULES: Boundary CompTyp Flt Global GlobalDim GlobalPnt SysService
 VessArray VessMat VessTf3dc VessVlt
 CALLs: error ihpss3 ivssl
 CALLED by: icomp

SUBROUTINE: clean
 PURPOSE: Closes TRAC output files.
 SOURCE file: clean.f90
 USEs MODULES: CXtvXFaces IntrType Io Restart
 CALLs: cxtvxclose enddmp
 CALLED by: error steady trac

SUBROUTINE: clear
 PURPOSE: Sets a real undimensioned array to a constant value.
 SOURCE file: UtilM.f90

CONTAINED in: Util
 CALLED by: hout ihpss3 input out3d

SUBROUTINE: cleardf1dc
 PURPOSE: Replaces a vector clear call with common marker variables in old code.
 SOURCE file: OneDDatM.f90
 CONTAINED in: OneDDat
 CALLED by: out1d prep1d

SUBROUTINE: cleari
 PURPOSE: Sets an integer array to a constant value.
 SOURCE file: cleari.f90
 USES MODULES: IntrType
 CALLED by: input loadn out3d rddim sedit srltp

SUBROUTINE: clearn
 PURPOSE: Sets a real allocated array to a constant value.
 SOURCE file: UtilM.f90
 CONTAINED in: Util
 CALLED by: ipump ivssl loadn preper rcomp revssl rplen rrod2 rvssl

SUBROUTINE: compi
 PURPOSE: Performs various A-array loading tasks common to most 1D components.
 SOURCE file: Gen1DInitM.f90
 CONTAINED in: Gen1DInit
 INCLUDES files: constant
 USES MODULES: CompTyp Flt Gen1DArray Global GlobalDat HeatArray
 CALLED by: ipipe iprizr ipump itee ivlve

SUBROUTINE: conblk
 PURPOSE: Computes all 61 types of control-block outputs that do not require tabular storage or PI/PID controllers.
 SOURCE file: ControlM.f90
 CONTAINED in: Control
 CALLS: error
 CALLED by: cbset

SUBROUTINE: constb
 PURPOSE: Drives subroutine STBME.
 SOURCE file: Gen1DTaskM.f90
 CONTAINED in: Gen1DTask

USEs MODULES: Bad CompTyp Flt Gen1DArray Gen1DCrunch Global GlobalDat
 GlobalPnt Network OneDDat SysService Xvol
 CALLs: stbme
 CALLED by: pipe3 prizr3 pump3 tee3 vlve3

SUBROUTINE: copya
 PURPOSE: Copies value of variable SRCVAL into variable SNKVAL.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: VessCon
 CALLED by: mix3d

SUBROUTINE: core1
 PURPOSE: Evaluates ROD heat-transfer coefficients and tracks quench fronts.
 SOURCE file: RodTaskM.f90
 CONTAINED in: RodTask
 INCLUDEs files: condht constant diddlh elvkf film htcref2 htcref3 ifcrs refhti refhti2
 stncom
 USEs MODULES: CompTyp Control EngUnits Eos Flt Global GlobalDat GlobalPnt Io
 RodGlobal RodHtcref1 RodVlt Thermocple Util VessCon
 CALLs: GetRodTab SetRodTab TimeUpHS error evfxxx expand fnmesh htcor
 htvsal mfrod rfdbr rkin shrink trip uncnvts zcore zpwhci zpwnrm
 zpwrcl
 CALLED by: htstr1

SUBROUTINE: core3
 PURPOSE: Evaluates ROD temperature distributions.
 SOURCE file: RodTaskM.f90
 CONTAINED in: RodTask
 USEs MODULES: ControlDat EvalDF Flt GlobalDat GlobalPnt RodVlt Thermocple
 CALLs: error evaldf2d frod
 CALLED by: htstr3

SUBROUTINE: cxtvbw
 PURPOSE: C language routine that writes binary data to the XTV datafile.
 SOURCE file: CFacesM.f90
 CONTAINED in: CFaces

SUBROUTINE: cxtvbw1
 PURPOSE: C language routine that writes binary data to the XTV datafile.
 SOURCE file: CFacesM.f90
 CONTAINED in: CFaces
 CALLED by: xtvbi3e

SUBROUTINE:	cxtvcl
PURPOSE:	C language routine that closes the XTV datafile.
SOURCE file:	CFacesM.f90
CONTAINED in:	CFaces
CALLED by:	xtvdr
SUBROUTINE:	cxtvin
PURPOSE:	C language routine that sets the maximum XTV datafile size from optional file XTVTIN.
SOURCE file:	CFacesM.f90
CONTAINED in:	CFaces
CALLED by:	xtvinit
SUBROUTINE:	cxtvoa ***Not used by Version 3.0.***
PURPOSE:	C language routine that opens the XTV datafile for appending if less than the maximum size.
SOURCE file:	CFacesM.f90
CONTAINED in:	CFaces
SUBROUTINE:	cxtvoa1
PURPOSE:	C language routine that opens the XTV datafile for appending if less than the maximum size.
SOURCE file:	CFacesM.f90
CONTAINED in:	CFaces
CALLED by:	xtvdr
SUBROUTINE:	cxtvow ***Not used by Version 3.0.***
PURPOSE:	C language routine that creates a new XTV datafile.
SOURCE file:	CFacesM.f90
CONTAINED in:	CFaces
SUBROUTINE:	cxtvxarrupd
PURPOSE:	Interface routine to output XTV data in xdr format.
SOURCE file:	CXtvXFacesM.f90
CONTAINED in:	CXtvXFaces
CALLED by:	WriteStaticV3 xtvdr
SUBROUTINE:	cxtvxbrak
PURPOSE:	Interface routine to output XTV data in xdr format.
SOURCE file:	CXtvXFacesM.f90
CONTAINED in:	CXtvXFaces
CALLED by:	xtvbrak

SUBROUTINE: cxtvxclose
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: clean

SUBROUTINE: cxtvxcntl
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvcntl

SUBROUTINE: cxtvxdata
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: WriteStaticV3 xtvbi3e

SUBROUTINE: cxtvxdatainit
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: WriteStaticV3 xtvdr

SUBROUTINE: cxtvxfill
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvfill

SUBROUTINE: cxtvxgd1a
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtv1d

SUBROUTINE: cxtvxgd1b
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtv1d

SUBROUTINE: cxtvxgd1c
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtv1d

SUBROUTINE: cxtvxgd1d
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces

SUBROUTINE: cxtvxgnpr
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvGnPr

SUBROUTINE: cxtvxhtr1
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvht

SUBROUTINE: cxtvxhtr2
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces

SUBROUTINE: cxtvxhtr3
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvht

SUBROUTINE: cxtvxhtr4
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvht

SUBROUTINE: cxtvxhtr5

PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvht

SUBROUTINE: cxtvxhtr6
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvht

SUBROUTINE: cxtvxhts1
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvht

SUBROUTINE: cxtvxhts2
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvht

SUBROUTINE: cxtvxopn
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvinit

SUBROUTINE: cxtvxpln1
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvplen

SUBROUTINE: cxtvxpln2
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvplen

SUBROUTINE: cxtvxpln3

PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvplen

SUBROUTINE: cxtvxsa2d
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: WriteSim2DArray

SUBROUTINE: cxtvxss1d
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: WriteValAsSArray

SUBROUTINE: cxtvxst1d
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: WriteStaticV1

SUBROUTINE: cxtvxstart
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: xtvinit

SUBROUTINE: cxtvxsul1d
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: WriteStSumV1

SUBROUTINE: cxtvxsv1d
PURPOSE: Interface routine to output XTV data in xdr format.
SOURCE file: CXtvXFacesM.f90
CONTAINED in: CXtvXFaces
CALLED by: WriteValAsArray

SUBROUTINE: cxtvxupdcnts

PURPOSE:	Interface routine to output XTV data in xdr format.
SOURCE file:	CXtvXFacesM.f90
CONTAINED in:	CXtvXFaces
CALLED by:	xtvdr
SUBROUTINE:	cxtvxvard
PURPOSE:	Interface routine to output XTV data in xdr format.
SOURCE file:	CXtvXFacesM.f90
CONTAINED in:	CXtvXFaces
CALLED by:	PrintVarDesc
SUBROUTINE:	cxtvxvcnt
PURPOSE:	Interface routine to output XTV data in xdr format.
SOURCE file:	CXtvXFacesM.f90
CONTAINED in:	CXtvXFaces
CALLED by:	xtv1d xtvGnPr xtvbrak xtvcntl xtvfill xtvht xtvplen xtvvsl
SUBROUTINE:	cxtvxvsl1
PURPOSE:	Interface routine to output XTV data in xdr format.
SOURCE file:	CXtvXFacesM.f90
CONTAINED in:	CXtvXFaces
CALLED by:	xtvvsl
SUBROUTINE:	cxtvxvsl2
PURPOSE:	Interface routine to output XTV data in xdr format.
SOURCE file:	CXtvXFacesM.f90
CONTAINED in:	CXtvXFaces
CALLED by:	xtvvsl
SUBROUTINE:	cxtvxvsl3
PURPOSE:	Interface routine to output XTV data in xdr format.
SOURCE file:	CXtvXFacesM.f90
CONTAINED in:	CXtvXFaces
CALLED by:	xtvvsl
SUBROUTINE:	cylht
PURPOSE:	Evaluates temperature fields in a cylinder.
SOURCE file:	Gen1DCrunchM.f90
CONTAINED in:	Gen1DCrunch
INCLUDEs files:	constant
CALLED by:	poster

SUBROUTINE: daxpy
 PURPOSE: Function that evaluates a constant times a vector plus a vector.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: dgbfa dgbsl

SUBROUTINE: dbrk
 PURPOSE: Generates BREAK data dump.
 SOURCE file: BreakM.f90
 CONTAINED in: Break
 USEs MODULES: BreakVlt Flt Gen1DArray GlobalDim IntrType Restart
 CALLs: AllBreakArrays GenTableDump bfoutn bfouts dmpVLT
 CALLED by: dmpit

SUBROUTINE: dcof
 PURPOSE: Evaluates a numeric code based on data types.
 SOURCE file: TextIoM.f90
 CONTAINED in: TextIo
 CALLED by: loadn

SUBROUTINE: dcomp
 PURPOSE: Dumps 1D component data.
 SOURCE file: dcomp.f90
 USEs MODULES: CompTyp Flt Gen1DArray Global GlobalDat GlobalDim IntArray
 IntrType Restart
 CALLs: GenTableDump bfoutn bfouts dmpVLT
 CALLED by: dpipe dprizr dpump dtee dvlve

SUBROUTINE: decays
 PURPOSE: Initializes the decay-heat constants to be consistent with the ANS5.1 1979 standard.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 INCLUDEs files: decayc
 CALLED by: rrod2

SUBROUTINE: delay
 PURPOSE: Provides a time-delay function for the input variable (XIN). The output (XOUT) is played back with the value that the input had TAU seconds previously. Linear interpolation is used for playback when TIMET minus TAU falls between two stored-time values. The user specifies the number of table storage pairs (NINT) to be saved. Both

the time and the value of the input are stored in the table array as pairs of points.

SOURCE file: ControlM.f90
CONTAINED in: Control
USES MODULES: Util
CALLS: error linint0
CALLED by: cbset

SUBROUTINE: deltar
PURPOSE: Evaluates transient fuel-cladding gap spacing (only if NFCI = 1).
SOURCE file: RodCrunchM.f90
CONTAINED in: RodCrunch
CALLED by: gapht

SUBROUTINE: dfill
PURPOSE: Generates FILL data dump.
SOURCE file: FillM.f90
CONTAINED in: Fill
USES MODULES: FillVlt Flt Gen1DArray GlobalDim IntrType Restart
CALLS: AllFillArrays GenTableDump bfoutn bfouts dmpVLT
CALLED by: dmpit

SUBROUTINE: dgbfa
PURPOSE: Factors a double-precision band matrix by elimination.
SOURCE file: LinearM.f90
CONTAINED in: Linear
CALLS: daxpy dscal
CALLED by: matsol

SUBROUTINE: dgbsl
PURPOSE: Solves double-precision band system $A * X = B$ or $TRANS(A) * X = B$ using factors computed by subroutine DGBFA.
SOURCE file: LinearM.f90
CONTAINED in: Linear
CALLS: daxpy
CALLED by: matsol

SUBROUTINE: dhtstr
PURPOSE: Determines the size of the data dump and writes the restart input data for an HTSTR component to the dump file.
SOURCE file: RodTaskM.f90
CONTAINED in: RodTask

INCLUDEs files: decayc
 USEs MODULES: Flt Global GlobalDat GlobalPnt Restart RodVlt
 CALLs: GenTableDump bfouts dmpVLT drod1
 CALLEd by: dmpit

SUBROUTINE: dlevel
 PURPOSE: Generates VESSEL level data dump.
 SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 USEs MODULES: Restart VessArray VessCon
 CALLs: bfout leveli
 CALLEd by: dvssl

SUBROUTINE: dmpVLT
 PURPOSE: Driver routine that dumps the component-specific VLT to the restart file.
 SOURCE file: dmpvlt.f90
 USEs MODULES: BreakVlt CompTyp FillVlt Global IntrType PipeVlt PlenVlt PrizeVlt PumpVlt RodVlt SepdVlt TeeVlt ValveVlt VessVlt
 CALLs: BreakTableDump FillTableDump PipeTableDump PlenTableDump PrizeTableDump PumpTableDump RodTableDump SepdTableDump TeeTableDump ValveTableDump VessTableDump error
 CALLEd by: dbrk dcomp dfill dhtstr dplen dvssl

SUBROUTINE: dmpit
 PURPOSE: Main module that generates a dump.
 SOURCE file: dmpit.f90
 INCLUDEs files: chgalp dlimit elvkf massck
 USEs MODULES: Break Ccfl CompTyp Control EngUnits Eos Fill Flt Global GlobalDat GlobalPnt IntrType Io Pipe Plenum Prizer Pump Restart RodTask Sepd SysTime Tee Temp Valve VessTask
 CALLs: CSDump bfaloc bfout bfouts dbrk dfill dhtstr dpipe dplen dprizr dpump dsepd dtee dvlve dvssl error
 CALLEd by: error pstepq timchk trac trans

SUBROUTINE: dpipe
 PURPOSE: Generates PIPE data dump.
 SOURCE file: PipeM.f90
 CONTAINED in: Pipe
 USEs MODULES: IntrType PipeVlt Restart
 CALLs: bfoutn dcomp
 CALLEd by: dmpit

SUBROUTINE: dplen
 PURPOSE: Generates PLENUM data dump.
 SOURCE file: PlenumM.f90
 CONTAINED in: Plenum
 USES MODULES: Flt Gen1DArray PlenVlt Restart
 CALLS: GenTableDump bfoutn bfouts dmpVLT
 CALLED by: dmpit

SUBROUTINE: dprizr
 PURPOSE: Generates PRIZR (Pressurizer) data dump.
 SOURCE file: PrizerM.f90
 CONTAINED in: Prizer
 USES MODULES: Flt Gen1DArray GlobalDat PrizeVlt
 CALLS: dcomp
 CALLED by: dmpit

SUBROUTINE: dpump
 PURPOSE: Generates PUMP data dump.
 SOURCE file: PumpM.f90
 CONTAINED in: Pump
 USES MODULES: IntrType PumpVlt Restart
 CALLS: bfoutn dcomp
 CALLED by: dmpit

SUBROUTINE: drod1
 PURPOSE: Writes the restart input data arrays for a subset of the HTSTR-
 component data to the TRCDMP file.
 SOURCE file: RodTaskM.f90
 CONTAINED in: RodTask
 USES MODULES: Flt Global GlobalDat Restart RodVlt
 CALLS: bfoutn bfouts
 CALLED by: dhtstr

SUBROUTINE: dscal
 PURPOSE: Scales a vector by a constant.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: dgbfa

SUBROUTINE: dsepd
 PURPOSE: Generates SEPD (Separator) data dump.

SOURCE file: SepdM.f90
 CONTAINED in: Sepd
 CALLs: dtee
 CALLED by: dmpit

SUBROUTINE: dtee
 PURPOSE: Generates TEE data dump.
 SOURCE file: TeeM.f90
 CONTAINED in: Tee
 USEs MODULES: Flt IntArray IntrType Restart TeeVlt
 CALLs: bfoutn dcomp
 CALLED by: dmpit dsepd

SUBROUTINE: dvlve
 PURPOSE: Generates VALVE data dump.
 SOURCE file: ValveM.f90
 CONTAINED in: Valve
 USEs MODULES: IntrType Restart ValveVlt
 CALLs: bfoutn dcomp
 CALLED by: dmpit

SUBROUTINE: dvpscl
 PURPOSE: Initializes scale factors on derivative of velocities with respect to pressure for one VESSEL level.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: VessArray3 VessCon VessTf3dc VessVlt
 CALLs: setva
 CALLED by: ivssl vssl1

SUBROUTINE: dvssl
 PURPOSE: Generates VESSEL data dump.
 SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 USEs MODULES: Flt Global GlobalDat GlobalDim Restart VessArray VessArray3 VessCon VessTf3dc VessVlt
 CALLs: GenTableDump bfoutn bfoutni bfouts dlevel dmpVLT
 CALLED by: dmpit

SUBROUTINE: ecomp
 PURPOSE: Writes hydrodynamic and heat-transfer information for 1D components to output file.

SOURCE file: ecomp.f90
USEs MODULES: Bits CFaces EngUnits Flt Gen1DArray Global GlobalDat HeatArray
 IntArray IntrType Io
CALLs: uncnvt uncnvts
CALLED by: wbreak wfill wpipe wprizr wpump wsepd wtee wvlve

SUBROUTINE: edit
PURPOSE: Entry routine for edit module.
SOURCE file: edit.f90
USEs MODULES: ControlDat EngUnits Global GlobalDat GlobalPnt IntrType Io
CALLs: sedit uncnvt wcomp
CALLED by: error hout pstepq steady timchk trans

SUBROUTINE: elgr
PURPOSE: Converts cell elevations to the slope between cells and converts K
 factors to additive friction-loss coefficients.
SOURCE file: Gen1DInitM.f90
CONTAINED in: Gen1DInit
INCLUDEs files: elvkf
USEs MODULES: Bad CompTyp EngUnits Flt GlobalDat Io TextIo
CALLs: error uncnvts warray
CALLED by: ipipe iprizr ipump itee ivlve

SUBROUTINE: enddmp
PURPOSE: Empties dump buffers and closes dump file.
SOURCE file: RestartM.f90
CONTAINED in: Restart
CALLs: bfclos error
CALLED by: clean

SUBROUTINE: error
PURPOSE: Processes different kinds of error conditions.
SOURCE file: error.f90
USEs MODULES: CompTyp EngUnits Flt GlobalDat IntrType Io SysTime
CALLs: clean dmpit edit
CALLED by: CSetLuIdx GetGenTable GetPumpTab GetRodTab GetTeeTab
 GetValveTab GetVessTab PrintVarDesc SetRodTab StbVel1D bfin
 bfinn bfout bfoutn breakx cbset chbd checksize chf chksr choke cihtst
 civssl conblk core1 core3 delay dmpVLT dmpit elgr enddmp
 evaldf1d evaldf2d evfxxx evltab fbrcss fillx getcrv hash hout htstr3
 htstrp hvwebb icip ihpss1 ihpss3 init input irod irodl itee ivlve
 jfind junsol loadn ltopp matsol mfrod mstret namlst nxtcmp offtke
 out1d out3d outer post post3d preinp prep1d prep3d pumpd

pumpsr rbreak rcntl rcomp rdcomp rddim rdrest readi readr recntl
 rfdbk rfill rhtstr rkin rlevel rodht rpipe rplen rpump rrod1 rrod2
 rsepd rstVLT rtee rttr rvlve rvssl sclmom sepd1 settype sgeev sgefst
 sound srlp steady svset svset1 svset3 svseth teemet teemf1 teemom
 tf3ds thermd thermh timchk timstp trans trip trips trpset uncnvt
 uncnvtn uncnvts unnumb unsvcb vssl1 wir xtvinit zpwrci

SUBROUTINE: etee
 PURPOSE: Evaluates TEE parameters on explicit pass.
 SOURCE file: TeeM.f90
 CONTAINED in: Tee
 USEs MODULES: IntrType OneDDat TeeVlt Util
 CALLED by: itee tee3

SUBROUTINE: evaldf1d
 PURPOSE: Evaluates the absolute difference between XOLD and XNEW for 1D
 allocated arrays.
 SOURCE file: EvalDFM.f90
 CONTAINED in: EvalDF
 USEs MODULES: Flt
 CALLs: error
 CALLED by: Evaldf3D pipe3 prizr3 pump3 tee3 vlve3

SUBROUTINE: evaldf2d
 PURPOSE: Evaluates the absolute difference between XOLD and XNEW for 2D
 allocated arrays.
 SOURCE file: EvalDFM.f90
 CONTAINED in: EvalDF
 USEs MODULES: Flt
 CALLs: error
 CALLED by: core3 pipe3 pump3 tee3 vlve3

SUBROUTINE: evfxxx
 PURPOSE: Evaluates the XXX component-action function using allocated
 arrays.
 SOURCE file: ControlM.f90
 CONTAINED in: Control
 USEs MODULES: Util
 CALLs: error evltab linint0 trip.
 CALLED by: core1 pipe1 pipe3 pump3 rkin tee1x tee3 vlve3

SUBROUTINE: evltab

PURPOSE: Interpolates the function value F from the tabular data based on the value of the table's independent variable function using allocated arrays: a signal variable (NVAR.GT.0), a control block (NVAR. LT.0), or a trip-signal difference DELSV (NVAR.EQ.0).

SOURCE file: ControlM.f90
CONTAINED in: Control
USEs MODULES: Util
CALLs: error linint0
CALLED by: breakx evfxxx fillx pumpsr vlvex

SUBROUTINE: expand
PURPOSE: Adds rows of conduction nodes within the VESSEL rods during reflood.

SOURCE file: RodCrunchM.f90
CONTAINED in: RodCrunch
USEs MODULES: Thermocple
CALLED by: core1

SUBROUTINE: faxpos
PURPOSE: Evaluates the flow-area fraction, FA, or valve-stem fractional position, XPOS, for the VALVE.

SOURCE file: ValveM.f90
CONTAINED in: Valve
USEs MODULES: IntrType
CALLED by: rvlve vlvex

SUBROUTINE: fbrcss
PURPOSE: Identifies BREAK components that are coupled through a fluid-flow path to the secondary side of a steam generator.

SOURCE file: ControlM.f90
CONTAINED in: Control
USEs MODULES: BadInput
CALLs: error
CALLED by: input

SUBROUTINE: ff3d
PURPOSE: Makes final pass update for all variables in 3D VESSEL.

SOURCE file: VessCrunchM.f90
CONTAINED in: VessCrunch
USEs MODULES: Bits CFaces GlobalDat VessArray3 VessCon VessTf3dc VessVlt
CALLs: gvssl1
CALLED by: vssl3

SUBROUTINE: fill1
 PURPOSE: Controls FILL prepass.
 SOURCE file: FillM.f90
 CONTAINED in: Fill
 USEs MODULES: Bits Boundary CFaces FillVlt Flt Gen1DArray Gen1DTask GlobalDat
 IntrType SysService
 CALLs: TableTransComp fillx
 CALLED by: prep1d

SUBROUTINE: fill2
 PURPOSE: Controls FILL outer iteration.
 SOURCE file: FillM.f90
 CONTAINED in: Fill
 USEs MODULES: Boundary FillVlt Flt Gen1DTask GlobalDat IntrType SysService
 CALLs: TableTransComp
 CALLED by: out1d

SUBROUTINE: fill3
 PURPOSE: Controls FILL postpass.
 SOURCE file: FillM.f90
 CONTAINED in: Fill
 USEs MODULES: Boundary FillVlt Flt Gen1DArray Gen1DTask GlobalDat IntrType
 CALLED by: post

SUBROUTINE: fillx
 PURPOSE: Evaluates postpass FILL velocity.
 SOURCE file: FillM.f90
 CONTAINED in: Fill
 INCLUDEs files: constant
 USEs MODULES: Boundary Control Eos FillVlt Flt Gen1DArray GlobalDat GlobalDim
 GlobalPnt IntrType Io SysService Util
 CALLs: TimeUpGen1D error evltab fprop linint0 mixprp shiftb thermo trip
 CALLED by: fill1

SUBROUTINE: fltom
 PURPOSE: Controls transfer of data between hydro and HTSTR databases.
 SOURCE file: RodTaskM.f90
 CONTAINED in: RodTask
 USEs MODULES: CompTyp Global GlobalDat GlobalPnt RodVlt
 CALLs: piprod vssrod
 CALLED by: htstr1 htstr3

SUBROUTINE:	flux
PURPOSE:	Evaluates mass flow at the boundary of a 1D component for use in mass inventory.
SOURCE file:	Gen1DCrunchM.f90
CONTAINED in:	Gen1DCrunch
INCLUDEs files:	massck
USEs MODULES:	Bad Bits CFaces CompTyp
CALLED by:	preper
SUBROUTINE:	fluxes
PURPOSE:	Defines explicit portion of mass- and energy-flux terms.
SOURCE file:	VessCrunchM.f90
CONTAINED in:	VessCrunch
USEs MODULES:	GlobalDat VessArray3 VessCon VessVlt
CALLED by:	vssl2
SUBROUTINE:	fnmesh
PURPOSE:	Initializes the supplemental user-specified rows of conduction nodes within the VESSEL rods at the start of reflood.
SOURCE file:	RodCrunchM.f90
CONTAINED in:	RodCrunch
CALLED by:	core1
SUBROUTINE:	fprop
PURPOSE:	Determines the D2O or H2O fluid enthalpy, transport properties, and surface tension by calling fpropd or fproph.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
USEs MODULES:	GlobalDim
CALLs:	fpropd fproph
CALLED by:	Fprop3D break3 breakx fillx ibrk ifill iplen iprop plen3 poster
SUBROUTINE:	fpropd
PURPOSE:	Evaluates the D2O fluid enthalpy, transport properties, and surface tension using allocated arrays.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
USEs MODULES:	GlobalDim
CALLED by:	fprop
SUBROUTINE:	fproph
PURPOSE:	Evaluates the H2O fluid enthalpy, transport properties, and surface tension using allocated arrays.

SOURCE file: EosNoInlineM.f90
CONTAINED in: EosNoInline
USES MODULES: GlobalDim
CALLED by: fprop

SUBROUTINE: frod
PURPOSE: Evaluates temperature profiles in nuclear or electrically heated fuel rods.

SOURCE file: RodCrunchM.f90
CONTAINED in: RodCrunch
USES MODULES: GlobalDat
CALLs: gapht mwrx rodht
CALLED by: core3

SUBROUTINE: fwall
PURPOSE: Computes a two-phase friction factor.
SOURCE file: Gen1DCrunchM.f90
CONTAINED in: Gen1DCrunch
INCLUDEs files: constant
USES MODULES: Bad CompTyp Flt OneDDat
CALLs: fwkf
CALLED by: preper

SUBROUTINE: fwkf
PURPOSE: Evaluates form-loss K factors for an abrupt contraction or expansion.
SOURCE file: fwkf.f90
USES MODULES: IntrType OneDDat
CALLED by: fwall iwall3

SUBROUTINE: gapht
PURPOSE: Evaluates fuel-cladding gap heat-transfer coefficient.
SOURCE file: RodCrunchM.f90
CONTAINED in: RodCrunch
CALLs: deltar mgap
CALLED by: frod

SUBROUTINE: getcrv
PURPOSE: Gets appropriate pump curves from database.
SOURCE file: PumpSourceM.f90
CONTAINED in: PumpSource
USES MODULES: IntrType
CALLs: error split

CALLED by: pumpd

SUBROUTINE: gvssl1
PURPOSE: Evaluates integrated VESSEL parameters for graphics purposes.
SOURCE file: VessCrunchM.f90
CONTAINED in: VessCrunch
INCLUDEs files: syssum
USEs MODULES: VessTf3dc VessVlt
CALLED by: ff3d

SUBROUTINE: gvssl2
PURPOSE: Evaluates average values for VESSEL graphics (integrated values calculated in subroutine gvssl1).
SOURCE file: VessCrunchM.f90
CONTAINED in: VessCrunch
USEs MODULES: Eos GlobalDat VessVlt
CALLED by: vssl3

SUBROUTINE: hash
PURPOSE: Determines the first array index for each alphabet letter that is the first letter of the character-string label names.
SOURCE file: TracInputM.f90
CONTAINED in: TracInput
USEs MODULES: BadInput EngUnits Io
CALLs: error
CALLED by: input

SUBROUTINE: hlfilm
PURPOSE: Evaluates wall-to-liquid, heat-transfer coefficient in transition and film boiling.
SOURCE file: HeatCorM.f90
CONTAINED in: HeatCor
INCLUDEs files: constant diddlh
CALLED by: htcor

SUBROUTINE: hlflmr
PURPOSE: Evaluates wall-to-liquid heat-transfer coefficient in reflood transition and film boiling.
SOURCE file: RodCrunchM.f90
CONTAINED in: RodCrunch
INCLUDEs files: constant diddlh infohl refhti refhti2
USEs MODULES: RodHtcref1 VessCon
CALLED by: htvssl

SUBROUTINE: hout
 PURPOSE: Controls the outer-iteration logic for a complete timestep.
 SOURCE file: hout.f90
 INCLUDEs files: dlimit syssum
 USEs MODULES: EngUnits FailDat Global GlobalDat GlobalPnt IntrType Io Network
 SysService SysTime Util
 CALLs: TableTransAll clear edit error outer post uncnvts
 CALLED by: steady trans

SUBROUTINE: hqr2t
 PURPOSE: Supports subroutine for sgeev that finds the eigenvalues of a real upper-Hessenberg matrix by the QR quality review? method.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: sgeev

SUBROUTINE: hqrt
 PURPOSE: Support subroutine for sgeev that finds the eigenvalues and eigenvectors of a real upper-Hessenberg matrix by the QR method.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: sgeev

SUBROUTINE: htcor
 PURPOSE: Computes heat-transfer coefficients.
 SOURCE file: HeatCorM.f90
 CONTAINED in: HeatCor
 INCLUDEs files: chfint condht constant diddlh htcav htcs supres
 USEs MODULES: CompTyp Eos Flt GlobalDat Io
 CALLs: chen chf chf1 hlfilm hvfilm hvnb tmsfb
 CALLED by: core1 htpipe

SUBROUTINE: htif
 PURPOSE: Evaluates the interphasic heat-transfer for the 0D and 1D components using allocated arrays.
 SOURCE file: GenHeatM.f90
 CONTAINED in: GenHeat
 INCLUDEs files: constant diddle diddlh film htcref3 ifcrs refhti refhti2 tst3d webnum
 USEs MODULES: Bits CFaces CompTyp Eos Flt GlobalDat GlobalDim OneDDat
 VessCon VessTf3dc
 CALLED by: Htif3D plen2 tf1d

SUBROUTINE: htpipe
PURPOSE: Averages velocities and generates heat-transfer coefficients for 1D components.
SOURCE file: Gen1DTaskM.f90
CONTAINED in: Gen1DTask
INCLUDEs files: condht constant diddlh
USEs MODULES: Bad Flt Gen1DArray Global GlobalDat GlobalDim HeatCor IntArray OneDDat VessCon
CALLs: htcor
CALLED by: preper

SUBROUTINE: htstr1
PURPOSE: Controls HTSTR prepass.
SOURCE file: RodTaskM.f90
CONTAINED in: RodTask
INCLUDEs files: htcref3
USEs MODULES: CompTyp EngUnits Flt Global GlobalDat GlobalPnt Io RodVlt VessCon VessTask
CALLs: TimeUpHS1 core1 fltom htstrv uncnvts
CALLED by: prep

SUBROUTINE: htstr3
PURPOSE: Controls HTSTR postpass.
SOURCE file: RodTaskM.f90
CONTAINED in: RodTask
INCLUDEs files: cnrslv
USEs MODULES: Flt Global GlobalDat GlobalPnt RodVlt VessCon
CALLs: TimeUpHS TimeUpHS1 core3 error fltom htstrp
CALLED by: post

SUBROUTINE: htstrp
PURPOSE: Evaluates the heat-structure instantaneous power and total energy in each ROD or SLAB element of the HTSTR.
SOURCE file: RodTaskM.f90
CONTAINED in: RodTask
INCLUDEs files: constant
USEs MODULES: CompTyp Flt GlobalDat RodVlt Util VessCon
CALLs: error
CALLED by: htstr3

SUBROUTINE: htstrv
PURPOSE: Initializes to zero some VESSEL-component, hydro-cell arrays used to store HTSTR information.

SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 USEs MODULES: CompTyp Flt Global GlobalDat GlobalPnt VessArray VessArray3
 VessCon VessVlt
 CALLs: setva
 CALLED by: htstr1

SUBROUTINE: htvssl
 PURPOSE: Averages velocities and generates heat-transfer coefficients for the
 VESSEL (reflood model).
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 INCLUDEs files: chfint condht constant diddlh htcav htceref3 htcs ifcrs infohl refhti
 refhti2 supres
 USEs MODULES: CompTyp Eos Flt GlobalDat Io VessCon
 CALLs: chen chf chf1 hlflmr hvnb hvwebb
 CALLED by: core1

SUBROUTINE: hvfilm
 PURPOSE: Evaluates the vapor heat-transfer coefficient that is the maximum of
 the Bromley, natural-convection, and Dougall-Rohsenow
 coefficients.
 SOURCE file: HeatCorM.f90
 CONTAINED in: HeatCor
 INCLUDEs files: constant
 CALLED by: htcor

SUBROUTINE: hvnb
 PURPOSE: Evaluates vapor heat-transfer coefficient for nucleate boiling.
 SOURCE file: HeatCorM.f90
 CONTAINED in: HeatCor
 INCLUDEs files: constant
 CALLED by: htcor htvssl

SUBROUTINE: hvwebb
 PURPOSE: Evaluates vapor heat-transfer coefficient for dispersed vapor flow.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 USEs MODULES: Eos Io RodHtceref1 VessCon
 CALLs: error
 CALLED by: htvssl

SUBROUTINE: ibrk

PURPOSE: Initializes the BREAK data arrays that are not input.
SOURCE file: BreakM.f90
CONTAINED in: Break
INCLUDEs files: constant elvkf
USEs MODULES: Boundary BreakVlt Eos Flt Gen1DArray Gen1DTask GlobalDat
IntrType Io SysService Util
CALLs: TableTransComp TimeUpGen1D fprop mixprp thermo
CALLED by: icom

SUBROUTINE: icom
PURPOSE: Controls the routines that initialize component data.
SOURCE file: icom.f90
INCLUDEs files: elvkf junction
USEs MODULES: Alloc Boundary Break CompTyp Fill Flt Gen1DTask Global GlobalDat
GlobalPnt HpssDat IntrType Io Network OneDDat Pipe Plenum
Prizer Pump RodTask Sepd SysService Tee TeeVlt Valve VessTask
VessTf3dc
CALLs: GetTeeTab TRACAllo TableTransAll allocNet checksize cihst civssl
error ibrk ifill ihpss1 ipipe iplen iprizr ipump isepd itee ivlve setnet
CALLED by: init

SUBROUTINE: ifill
PURPOSE: Initializes the FILL data arrays that are not input from cards.
SOURCE file: FillM.f90
CONTAINED in: Fill
INCLUDEs files: constant elvkf
USEs MODULES: Boundary Eos FillVlt Flt Gen1DArray Gen1DTask GlobalDat IntrType
SysService Util
CALLs: TableTransComp TimeUpGen1D fprop mixprp thermo
CALLED by: icom

SUBROUTINE: ifset
PURPOSE: Initializes 3D interfacial shear at start of each VESSEL prepass.
SOURCE file: VessCrunchM.f90
CONTAINED in: VessCrunch
USEs MODULES: VessArray3 VessCon VessTf3dc VessVlt
CALLs: setva
CALLED by: vssl1

SUBROUTINE: ihpss1
PURPOSE: Evaluates HPSS initialization for the 1D hydraulic components.
SOURCE file: Gen1DTaskM.f90
CONTAINED in: Gen1DTask

USEs MODULES: CompTyp EngUnits Eos FillVlt Flt Gen1DArray Global GlobalDat
 GlobalPnt HpssDat Io Temp Util
 CALLs: GetGenTable error therms uncnvts
 CALled by: icomp

SUBROUTINE: ihpss3
 PURPOSE: Evaluates HPSS initializaton for the 3D VESSEL component.
 SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 USEs MODULES: CompTyp EngUnits Eos Flt Gen1DArray Global GlobalDat GlobalPnt
 HpssDat Io Linear Temp Util Util VessArray VessArray3 VessCon
 VessTf3dc VessVlt
 CALLs: GetGenTable checksize clear error matsol therms
 CALled by: civssl

SUBROUTINE: init
 PURPOSE: Entry routine for subroutine INIT.
 SOURCE file: init.f90
 USEs MODULES: CFaces ControlDat Global GlobalDat GlobalPnt IntrType Io JunTerms
 SetMat SysConfig SysService Xtv
 CALLs: CSSetLuIdx GenJunInfo InitBDArray SetJunAvgPtrs SetSysMat
 SetSysVar TableTransAll error icomp xtvdr xtvinit
 CALled by: trac

SUBROUTINE: initbc
 PURPOSE: Initializes VESSEL component phantom cells and sets some
 boundary conditions.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: CFaces VessArray3 VessCon VessTf3dc VessVlt
 CALLs: setva
 CALled by: ivssl

SUBROUTINE: inner
 PURPOSE: Performs an inner iteration for a 1D component.
 SOURCE file: Gen1DTaskM.f90
 CONTAINED in: Gen1DTask
 USEs MODULES: Bad CFaces CompTyp Flt Gen1DArray Global GlobalDat OneDDat
 SysService
 CALLs: TableTransComp on1123c tf1d
 CALled by: pipe2 prizr2 pump2 tee2 vlve2

SUBROUTINE: input

PURPOSE: Entry routine for Module TracInput.
SOURCE file: TracInputM.f90
CONTAINED in: TracInput
INCLUDEs files: bignum cflow cnrslv conceck constant defval diddlh elvkf h2fdbk htcs
junction massck nrcmp rows solcon tst3d
USEs MODULES: Alloc Bad BadInput Boundary Ccfl CompTyp Control EngUnits Eos
FailDat Flt Global GlobalDat GlobalPnt HpssDat Io PreInput
ReadEcho RodGlobal SysConfig Temp TextIo Util ValveVlt VessCon
VessMat VessTask
CALLs: DATE_AND_TIME GetValveTab InitLabels TRACAllo
allocBoundary allocPrptb allocVmap allocWp assign checksize clear
cleari error fbrcss hash isort loadn namlst nxtcmp order preinp r2ii
rcntl rdcomp rdrest readi readr reecho rvssl seteos settype srltp
uncnvt uncnvts unnumb vmcell warray wlabi
CALLed by: trac

SUBROUTINE: ipipe
PURPOSE: Initializes the PIPE data arrays that are not input.
SOURCE file: PipeM.f90
CONTAINED in: Pipe
INCLUDEs files: elvkf
USEs MODULES: Boundary Flt Gen1DArray Gen1DInit Gen1DTask GlobalDat
GlobalDim IntArray IntrType PipeVlt SysService Util
CALLs: CheckAcc TableTransComp TimeUpGen1D chkbd compi elgr iprop
junsol volfa
CALLed by: icomp

SUBROUTINE: iplen
PURPOSE: Loads the PLENUM arrays that are needed, but not input, to start a
problem.
SOURCE file: PlenumM.f90
CONTAINED in: Plenum
INCLUDEs files: constant elvkf
USEs MODULES: Bad Boundary CompTyp Eos Flt Gen1DArray OneDDat PlenVlt
SysService TeeVlt Util
CALLs: TableTransComp TimeUpPlen fprop mixprp thermo
CALLed by: icomp

SUBROUTINE: iprizr
PURPOSE: Initializes the PRIZER (Pressurizer) data arrays that are not input.
SOURCE file: PrizerM.f90
CONTAINED in: Prizer
INCLUDEs files: constant elvkf

USEs MODULES: Boundary Flt Gen1DArray Gen1DInit Gen1DTask Global GlobalDat
 GlobalDim IntArray PrizeVlt SysService Util
 CALLs: CheckAcc TableTransComp TimeUpGen1D chkbd compi elgr iprop
 junsol volfa
 CALLED by: icomp

SUBROUTINE: iprop
 PURPOSE: Calls subroutines THERMO, FPROP, and MIXPRP for most 1D
 components.

SOURCE file: Gen1DInitM.f90

CONTAINED in: Gen1DInit

USEs MODULES: Eos Flt Gen1DArray GlobalDat GlobalPnt RodGlobal Util

CALLs: fprop mixprp thermo

CALLED by: ipipe iprizr ipump itee ivlve

SUBROUTINE: ipump

PURPOSE: Initializes the PUMP data arrays that are not input.

SOURCE file: PumpM.f90

CONTAINED in: Pump

INCLUDEs files: elvkf

USEs MODULES: Boundary Flt Gen1DArray Gen1DInit Gen1DTask GlobalDat
 GlobalDim IntArray IntrType PumpVlt SysService Util

CALLs: CheckAcc TableTransComp TimeUpGen1D chkbd clearn compi elgr
 iprop junsol volfa

CALLED by: icomp

SUBROUTINE: irod

PURPOSE: Initializes rod component parameters that are not user input.

SOURCE file: RodTaskM.f90

CONTAINED in: RodTask

INCLUDEs files: constant

USEs MODULES: CompTyp EngUnits Flt GlobalDat Io RodVlt Util

CALLs: error linint0 uncnvts zpwhci zpwrcki

CALLED by: cihtst

SUBROUTINE: irodl

PURPOSE: Initializes HTSTR arrays that provide information on the location of
 hydro data.

SOURCE file: RodCrunchM.f90

CONTAINED in: RodCrunch

USEs MODULES: CompTyp Flt GlobalDat GlobalDim Io RodGlobal RodVlt VessCon

CALLs: GetGenTable error lchpip lchvss

CALLED by: cihtst

SUBROUTINE: isepd
 PURPOSE: Initializes the SEPD (Separator) data arrays that are not input.
 SOURCE file: SepdM.f90
 CONTAINED in: Sepd
 CALLED by: icode

SUBROUTINE: isort
 PURPOSE: Sorts a list of integers in ascending order.
 SOURCE file: TracInputM.f90
 CONTAINED in: TracInput
 CALLED by: input

SUBROUTINE: itee
 PURPOSE: Initializes TEE data arrays that are not input from cards.
 SOURCE file: TeeM.f90
 CONTAINED in: Tee
 INCLUDEs files: constant elvkf
 USEs MODULES: Boundary Flt Gen1DArray Gen1DInit Gen1DTask GlobalDat
 GlobalDim HeatArray IntArray IntrType OneDDat SysService
 TeeVlt Util
 CALLs: TableTransComp TimeUpGen1D chkbd compi elgr error etee iprop
 jld junsol volfa
 CALLED by: icode

SUBROUTINE: ivlve
 PURPOSE: Initializes the VALVE data arrays that are not input.
 SOURCE file: ValveM.f90
 CONTAINED in: Valve
 INCLUDEs files: elvkf
 USEs MODULES: Boundary Flt Gen1DArray Gen1DInit Gen1DTask GlobalDat
 GlobalDim IntArray IntrType Io SysService Util ValveVlt
 CALLs: CheckAcc TableTransComp TimeUpGen1D chkbd compi elgr error
 iprop junsol volfa
 CALLED by: icode

SUBROUTINE: ivssl
 PURPOSE: Initializes the VESSEL data arrays that are not input.
 SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 INCLUDEs files: bandw ifcrs

USEs MODULES: Bad Boundary CFaces EngUnits Eos Flt Global GlobalDat GlobalPnt
 Io RodGlobal SysService Util VessArray VessArray3 VessCon
 VessTf3dc VessTo1D VessVlt
CALLs: Fprop3D TableTransComp Therm3D clearn dvpscl initbc iwall3
 mix3d rdzmom sclmom set3dbd setbdt uncnvt wlevel
CALLed by: civssl

SUBROUTINE: iwall3
PURPOSE: Divides input friction factor by hydraulic diameter.
SOURCE file: VessCrunchM.f90
CONTAINED in: VessCrunch
INCLUDEs files: elvkf
USEs MODULES: Flt GlobalDat VessArray3 VessCon VessTf3dc VessVlt
CALLs: fwkf setva
CALLed by: ivssl

SUBROUTINE: j1d
PURPOSE: Fills bd array at component junctions.
SOURCE file: Gen1DTaskM.f90
CONTAINED in: Gen1DTask
USEs MODULES: Bad CompTyp Gen1DArray Global
CALLed by: itee jbd4 setbd

SUBROUTINE: j3d ***Not Called in Version 3.0***
PURPOSE: Fills bd array at VESSEL SOURCE-connection junctions.
SOURCE file: VessTaskM.f90
CONTAINED in: VessTask
USEs MODULES: Bad Bits Boundary CFaces GlobalDat VessArray VessArray3 VessCon
 VessTf3dc VessVlt
CALLs: of1123c

SUBROUTINE: jbd4
PURPOSE: Fills bd array with JCELL parameters for the TEE-component
 internal junction.
SOURCE file: TeeM.f90
CONTAINED in: Tee
USEs MODULES: Flt Gen1DTask IntrType OneDDat
CALLs: j1d
CALLed by: tee1

SUBROUTINE: junsol
PURPOSE: Determines junction parameters for connecting and sequencing
 components.

SOURCE file: Gen1DInitM.f90
 CONTAINED in: Gen1DInit
 USEs MODULES: CompTyp Flt GlobalDim Io
 CALLs: error
 CALLED by: ipipe iprizr ipump itee ivlve

SUBROUTINE: justlr
 PURPOSE: Left or right justifies the letters of a character string.
 SOURCE file: justlr.f90
 USEs MODULES: IntrType
 CALLED by: rcntl readi readr recntl reecho warray wiarn wmxtyb

SUBROUTINE: lchpip
 PURPOSE: Defines the pointer to the hydro array data for a 1D component.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 USEs MODULES: Flt GlobalDim Io
 CALLs: GetGenTable
 CALLED by: irodl

SUBROUTINE: lchvss
 PURPOSE: Defines the pointer to the hydro array data for a VESSEL component.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 USEs MODULES: Global Io VessVlt
 CALLs: GetVessTab
 CALLED by: irodl

SUBROUTINE: level
 PURPOSE: Uses a curve fit to obtain the water level in a cylindrical pipe as a function of the void fraction.
 SOURCE file: Gen1DCrunchM.f90
 CONTAINED in: Gen1DCrunch
 CALLED by: StbVel1D offtke

SUBROUTINE: leveli
 PURPOSE: Transfers data for axial level IZ from inverted form to stacked form.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: VessCon VessTf3dc VessVlt
 CALLED by: dlevel wlevel

SUBROUTINE: levelr
 PURPOSE: Transfers data for axial level IZ from stacked form to inverted form.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: VessCon VessTf3dc VessVlt
 CALLED by: revssl rlevel rvssl

SUBROUTINE: linint
 PURPOSE: Performs linear interpolation on array tabular data.
 SOURCE file: UtilM.f90
 CONTAINED in: Util
 INCLUDEs files: constant
 CALLED by: pumpd pumpx

SUBROUTINE: linint0
 PURPOSE: Performs linear interpolation on array tabular data without a derivative evaluation using allocated arrays.
 SOURCE file: UtilM.f90
 CONTAINED in: Util
 CALLED by: breakx cbset cdthex delay evfxxx evltab fillx irod mzirc rfill rpipe rpump rrod2 rsepd rtee rvlve vssl1

SUBROUTINE: lint4d
 PURPOSE: Linearly interpolates a function table with zero to four independent variables.
 SOURCE file: UtilM.f90
 CONTAINED in: Util
 CALLED by: cbset rfdbk

SUBROUTINE: loadn
 PURPOSE: Reads in specially formatted input data using allocated arrays.
 SOURCE file: TextIoM.f90
 CONTAINED in: TextIo
 INCLUDEs files: defval
 USEs MODULES: BadInput Util
 CALLs: cleari clearn dcof error
 CALLED by: input rbreak rcntl rcomp rdcvrs rfill rhtstr rpipe rplen rpump rrod2 rsepd rtee rvlve rvssl

SUBROUTINE: matsol
 PURPOSE: Solves the vessel-matrix equation $A * X = C$ using the capacitance method.

SOURCE file: LinearM.f90
 CONTAINED in: Linear
 USEs MODULES: GlobalDim
 CALLs: dgbfa dgbsl error sgefata sgeslt
 CALLED by: Solver ihpss3

SUBROUTINE: mbn
 PURPOSE: Evaluates values for electrically heated nuclear fuel-rod insulator properties.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 CALLED by: mfrod

SUBROUTINE: mfrod
 PURPOSE: Orders fuel-rod property selection and evaluates an average temperature for property evaluation.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 USEs MODULES: Io
 CALLs: error mbn mfuel mhtr mstret mzirc
 CALLED by: core1

SUBROUTINE: mfuel
 PURPOSE: Evaluates uranium dioxide and uranium-plutonium dioxide properties.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 CALLED by: mfrod

SUBROUTINE: mgap
 PURPOSE: Evaluates values for the thermal conductivity of the gap-gas mixture.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 USEs MODULES: Eos
 CALLED by: gapht

SUBROUTINE: mhtr
 PURPOSE: Evaluates values for electrically heated fuel-rod heater coil properties.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 CALLED by: mfrod

SUBROUTINE: mix3d
 PURPOSE: Initializes stabilizer quantities at start of problem and equivalences stabilizer quantities to basic values when two-step method is not being used.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: VessArray3 VessCon VessTf3dc VessVlt
 CALLs: copya
 CALLED by: ivssl vssl3

SUBROUTINE: mixprp
 PURPOSE: Evaluates mixture properties from those of separate phases.
 SOURCE file: UtilM.f90
 CONTAINED in: Util
 CALLED by: breakx fillx ibrk ifill iplen iprop

SUBROUTINE: mprop
 PURPOSE: Orders structure property selection and evaluates an average temperature for property evaluation.
 SOURCE file: Gen1DCrunchM.f90
 CONTAINED in: Gen1DCrunch
 CALLs: mstrct
 CALLED by: preper

SUBROUTINE: mstrct
 PURPOSE: Evaluates properties for certain types of steel.
 SOURCE file: mstrct.f90
 USEs MODULES: IntrType Io
 CALLs: error
 CALLED by: mfrod mprop

SUBROUTINE: mwrx
 PURPOSE: Evaluates the Zircaloy steam reaction in the cladding at high temperatures.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 INCLUDEs files: constant
 CALLED by: frod

SUBROUTINE: mzirc
 PURPOSE: Evaluates properties for Zircaloy-4.
 SOURCE file: RodCrunchM.f90

CONTAINED in: RodCrunch
 USEs MODULES: Util
 CALLs: linint0
 CALLED by: mfrod

SUBROUTINE: namlst
 PURPOSE: Performs input-data check on all namelist variables.
 SOURCE file: TracInputM.f90
 CONTAINED in: TracInput
 INCLUDEs files: cflow cnrslv defval diddlh elvkf htcs tst3d
 USEs MODULES: BadInput EngUnits Eos FailDat GlobalDat GlobalDim Io VessCon
 CALLs: error uncnvt
 CALLED by: input

SUBROUTINE: newdlt
 PURPOSE: Evaluates prospective new-time increment.
 SOURCE file: TimeStepM.f90
 CONTAINED in: TimeStep
 INCLUDEs files: chgalp dlimit dtinfo
 USEs MODULES: FailDat GlobalDat Io Util
 CALLs: sedit
 CALLED by: timstp

SUBROUTINE: nxtcmp
 PURPOSE: Finds the beginning of data for the next component.
 SOURCE file: TracInputM.f90
 CONTAINED in: TracInput
 USEs MODULES: Io
 CALLs: error
 CALLED by: input

SUBROUTINE: of1123c
 PURPOSE: Performs C implementation of TRAC-P subroutine BITS entry point of1123 (bit-flag logic).
 SOURCE file: CFacesM.f90
 CONTAINED in: CFaces
 CALLED by: j3d poster set3dbd

SUBROUTINE: offtke
 PURPOSE: Evaluates exit void fraction for TEE-component offtake model.
 SOURCE file: TeeM.f90
 CONTAINED in: Tee

INCLUDEs files:	constant
USEs MODULES:	Gen1DCrunch IntrType
CALLs:	error level
CALLed by:	tee3
SUBROUTINE:	on1123c
PURPOSE:	Performs C implementation of TRAC-P subroutine BITS entry point on1123 (bit-flag logic).
SOURCE file:	CFacesM.f90
CONTAINED in:	CFaces
CALLed by:	inner
SUBROUTINE:	order
PURPOSE:	Rearranges the signal-variable, control-block, and trip ID numbers in ascending order based on their absolute value and searches for the DO-loop index values for each control-parameter evaluation pass through the signal variables, control blocks, and trips.
SOURCE file:	ControlM.f90
CONTAINED in:	Control
CALLed by:	input
SUBROUTINE:	orthest
PURPOSE:	Supports subroutine for sgeev that does an orthogonal similarity transformation of a real matrix. That transforms an orthogonal similarity?
SOURCE file:	LinearM.f90
CONTAINED in:	Linear
CALLed by:	sgeev
SUBROUTINE:	ortrant
PURPOSE:	Support subroutine for sgeev that accumulates the orthogonal similarity transformation used in the reduction of a real matrix. That transforms an orthogonal similarity?
SOURCE file:	LinearM.f90
CONTAINED in:	Linear
CALLed by:	sgeev
SUBROUTINE:	otrcsni
PURPOSE:	
SOURCE file:	DataSgnfM.f90
CONTAINED in:	DataSgnf
CALLed by:	trac

SUBROUTINE: out1d
PURPOSE: Controls outer calculation for 1D components.
SOURCE file: out1d.f90
INCLUDEs files: vellim
USEs MODULES: Boundary Break CFaces CompTyp Fill Flt Gen1DArray Global
GlobalDat GlobalPnt IntrType OneDDat Pipe Plenum Prizer Pump
Sepd Tee Util Valve
CALLs: BackUpGen1D BackUpPlen break2 cleardf1dc error fill2 pipe2 plen2
prizr2 pump2 sepd2 tee2 vlve2
CALLED by: outer

SUBROUTINE: out3d
PURPOSE: Controls outer calculation for a VESSEL.
SOURCE file: VessTaskM.f90
CONTAINED in: VessTask
INCLUDEs files: bandw
USEs MODULES: CompTyp Flt Global GlobalDat GlobalPnt Io Linear OneDDat Temp
Util VessArray VessMat VessTf3dc VessVlt
CALLs: clear cleari error vssl2
CALLED by: outer

SUBROUTINE: outer
PURPOSE: Controls outer calculation for one timestep.
SOURCE file: outer.f90
USEs MODULES: FailDat Global GlobalDat GlobalPnt IntrType Io Linear Network
OneDDat SemiSolver SysService Temp Util VessTask
CALLs: BlockSolver ClearFluxSums error out1d out3d
CALLED by: hout

SUBROUTINE: pipe1
PURPOSE: Controls PIPE prepass.
SOURCE file: PipeM.f90
CONTAINED in: Pipe
USEs MODULES: Boundary Control Flt Gen1DArray Gen1DTask Global GlobalDat
HeatArray IntrType OneDDat PipeVlt SysService
CALLs: TableTransComp bkmom evfxxx pipe1x preper savbd
CALLED by: prep1d

SUBROUTINE: pipe1x
PURPOSE: Evaluates liquid volume discharged (q_{out}), collapsed liquid level (z),
and volumetric flow rate (v_{flow}); assumes vertical component with
low-numbered cell at top.

SOURCE file: PipeM.f90
CONTAINED in: Pipe
USES MODULES: IntrType PipeVlt
CALLED by: pipe1

SUBROUTINE: pipe2
PURPOSE: Controls PIPE outer iteration.
SOURCE file: PipeM.f90
CONTAINED in: Pipe
USES MODULES: Boundary Gen1DTask GlobalDat IntrType OneDDat PipeVlt
SysService
CALLs: inner
CALLED by: out1d

SUBROUTINE: pipe3
PURPOSE: Controls PIPE postpass.
SOURCE file: PipeM.f90
CONTAINED in: Pipe
USES MODULES: Boundary Control EvalDF Flt Gen1DArray Gen1DTask GlobalDat
IntrType OneDDat PipeVlt SysService
CALLs: constb evaldf1d evaldf2d evfxxx poster savbd
CALLED by: post

SUBROUTINE: piprod
PURPOSE: Moves hydro data for a 1D component to and from the HTSTR
database.
SOURCE file: RodTaskM.f90
CONTAINED in: RodTask
USES MODULES: Gen1DArray Global GlobalDat GlobalDim
CALLs: IncrementGen1D
CALLED by: fltom

SUBROUTINE: plen1
PURPOSE: Performs the prep stage calculation for the PLENUM timestep
initialization.
SOURCE file: PlenumM.f90
CONTAINED in: Plenum
USES MODULES: Bad Boundary Gen1DArray GlobalDat OneDDat PlenVlt SysService
CALLs: TableTransComp TimeUpPlen
CALLED by: prep1d

SUBROUTINE: plen2
PURPOSE: Controls PLENUM outer iteration.

SOURCE file: PlenumM.f90
 CONTAINED in: Plenum
 INCLUDEs files: diddle
 USEs MODULES: Bad Boundary Eos Gen1DArray GlobalDat Network OneDDat
 PlenVlt SysService
 CALLs: TableTransComp auxpln htif tfplbk tfpln thermo
 CALLED by: out1d

SUBROUTINE: plen3
 PURPOSE: Controls PLENUM postpass.
 SOURCE file: PlenumM.f90
 CONTAINED in: Plenum
 INCLUDEs files: chgalp dtinfo
 USEs MODULES: Bad Boundary CFaces Eos Flt Gen1DArray GlobalDat Network
 OneDDat PlenVlt SysService
 CALLs: TimeUpPlen bkspn fprop stbmpl thermo
 CALLED by: post

SUBROUTINE: pntrod
 PURPOSE: Initializes HTSTR pointers.
 SOURCE file: RodTaskM.f90
 CONTAINED in: RodTask
 USEs MODULES: Alloc Flt Global RodVlt
 CALLs: TRACAllo
 CALLED by: rehtst rhtstr

SUBROUTINE: post
 PURPOSE: Controls postpass calculation for one timestep.
 SOURCE file: post.f90
 INCLUDEs files: chgalp syssum
 USEs MODULES: Break CompTyp FailDat Fill Flt Global GlobalDat GlobalPnt IntrType
 Io JunTerms Linear Matrices Network OneDDat Pipe Plenum Prizer
 Pump RodTask Sepd SysService Tee Temp Util Valve VessTask
 CALLs: Solver StbME3DJun StbMEJun TableTransAll break3 error fill3 htstr3
 pipe3 plen3 post3d prizr3 pump3 sepd3 tee3 vlve3
 CALLED by: hout steady trans

SUBROUTINE: post3d
 PURPOSE: Controls postpass calculation for the VESSEL.
 SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 INCLUDEs files: bandw

USEs MODULES: CompTyp Flt Global GlobalDat GlobalPnt Io JunTerms Linear
 Network OneDDat SysService Temp Util VessArray VessMat
 VessTf3dc VessVlt
 CALLs: TableTransComp error set3dbd vssl3
 CALLED by: post

 SUBROUTINE: poster
 PURPOSE: Performs postpass calculation for 1D components.
 SOURCE file: Gen1DTaskM.f90
 CONTAINED in: Gen1DTask
 INCLUDEs files: chgalp constant dtinfo
 USEs MODULES: Bad Bits CFaces CompTyp Eos Flt Gen1DArray Gen1DCrunch Global
 GlobalDat GlobalPnt HeatArray IntArray Network OneDDat
 CALLs: TimeUpGen1D bksstb cylht fprop of1123c powint thermo
 CALLED by: pipe3 prizr3 pump3 tee3 vlv3

 SUBROUTINE: powint
 PURPOSE: Evaluates the integral power (energy) into the PIPE wall.
 SOURCE file: Gen1DCrunchM.f90
 CONTAINED in: Gen1DCrunch
 INCLUDEs files: constant
 CALLED by: poster

 SUBROUTINE: prefwd
 PURPOSE: Prepares for evaluation of the 3D wall shear coefficients.
 SOURCE file: VectDragM.f90
 CONTAINED in: VectDrag
 INCLUDEs files: constant diddle film refhti2
 USEs MODULES: GlobalDim VessArray VessArray3 VessCon VessTf3dc VessVlt
 CALLs: tmpptr vfwall3
 CALLED by: vssl1

 SUBROUTINE: preinp
 PURPOSE: Converts free-format TRACIN deck to format used by TRAC input
 subroutine.
 SOURCE file: PreInputM.f90
 CONTAINED in: PreInput
 USEs MODULES: GlobalDim Io Util
 CALLs: error value
 CALLED by: input

 SUBROUTINE: prep
 PURPOSE: Controls prepass calculation for one timestep.

SOURCE file: prep.f90
 USEs MODULES: Control Global GlobalDat GlobalPnt IntrType JunTerms Matrices
 OneDDat RodTask SysConfig VessTask
 CALLs: Solver StbVel3DJun htstr1 prep1d prep3d trips
 CALLED by: steady trans

SUBROUTINE: prep1d
 PURPOSE: Controls the prepass calculation for 1D components.
 SOURCE file: prep1d.f90
 INCLUDEs files: dlimit
 USEs MODULES: Break CFaces CompTyp Fill Flt GlobalDat GlobalDim GlobalPnt
 IntrType Io Linear Network OneDDat Pipe Plenum Prizer Pump
 Sepd Tee Temp Util Valve
 CALLs: break1 clearfd1dc error fill1 pipe1 plen1 prizr1 pump1 tee1 vlvel
 CALLED by: prep

SUBROUTINE: prep3d
 PURPOSE: Controls prepass calculation for 3D components.
 SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 INCLUDEs files: bandw
 USEs MODULES: CompTyp Flt Global GlobalDat GlobalPnt Io Linear Network
 OneDDat SysService Temp Util VessArray VessMat VessTf3dc
 VessVlt
 CALLs: error vssl1
 CALLED by: prep

SUBROUTINE: preper
 PURPOSE: Performs prepass calculation for 1D components.
 SOURCE file: Gen1DTaskM.f90
 CONTAINED in: Gen1DTask
 USEs MODULES: Bad Bits CFaces CompTyp Eos Flt Gen1DArray Gen1DCrunch Global
 GlobalDat GlobalPnt HeatArray IntArray Network OneDDat
 PumpSource RodGlobal Util
 CALLs: StbVel1D clearn flux fwall htpipe mprop pumpsr volv
 CALLED by: pipe1 prizr1 pump1 tee1 vlvel

SUBROUTINE: printClock
 PURPOSE: Calculates and outputs the elapsed system time.
 SOURCE file: SysTimeM.f90
 CONTAINED in: SysTime

SUBROUTINE: prizr1

PURPOSE: Controls PRIZER (Pressurizer) prepass.
 SOURCE file: PrizerM.f90
 CONTAINED in: Prizer
 USEs MODULES: Boundary Flt Gen1DArray Gen1DTask Global GlobalDat HeatArray
 OneDDat PrizeVlt SysService
 CALLs: TableTransComp bkmom preper przr1x savbd
 CALLED by: prep1d

SUBROUTINE: prizr2
 PURPOSE: Controls PRIZER (Pressurizer) outer iteration.
 SOURCE file: PrizerM.f90
 CONTAINED in: Prizer
 USEs MODULES: Boundary Gen1DTask GlobalDat OneDDat PrizeVlt SysService
 CALLs: inner
 CALLED by: out1d

SUBROUTINE: prizr3
 PURPOSE: Controls PRIZER (Pressurizer) postpass.
 SOURCE file: PrizerM.f90
 CONTAINED in: Prizer
 INCLUDEs files: syssum
 USEs MODULES: Boundary EvalDF Flt Gen1DArray Gen1DTask GlobalDat OneDDat
 PrizeVlt SysService
 CALLs: constb evaldf1d poster savbd
 CALLED by: post

SUBROUTINE: przr1x
 PURPOSE: Evaluates pressurizer mass change during steady-state calculation.
 SOURCE file: PrizerM.f90
 CONTAINED in: Prizer
 USEs MODULES: Gen1DArray PrizeVlt
 CALLED by: prizr1

SUBROUTINE: pstepq
 PURPOSE: Controls printing, dumping, and graphing of data at the completion
 of a timestep.
 SOURCE file: pstepq.f90
 USEs MODULES: DataSgnf GlobalDat IntrType Io Restart SysTime Xtv
 CALLs: dmpit edit sdmpit sedit xtvdr
 CALLED by: steady trans

SUBROUTINE: pump1

PURPOSE: Controls PUMP prepass.
SOURCE file: PumpM.f90
CONTAINED in: Pump
USEs MODULES: Boundary Flt Gen1DTask GlobalDat HeatArray IntrType OneDDat PumpVlt SysService
CALLs: TableTransComp bkmom preper savbd
CALLED by: prep1d

SUBROUTINE: pump2
PURPOSE: Controls PUMP outer iteration.
SOURCE file: PumpM.f90
CONTAINED in: Pump
INCLUDEs files: vellim
USEs MODULES: Boundary Gen1DTask GlobalDat IntrType OneDDat PumpVlt SysService
CALLs: inner
CALLED by: out1d

SUBROUTINE: pump3
PURPOSE: Controls PUMP postpass.
SOURCE file: PumpM.f90
CONTAINED in: Pump
USEs MODULES: Boundary Control EvalDF Flt Gen1DArray Gen1DTask GlobalDat IntrType OneDDat PumpVlt SysService
CALLs: constb evaldf1d evaldf2d evfxxx poster savbd
CALLED by: post

SUBROUTINE: pumpd
PURPOSE: Evaluates head and torque from PUMP curves.
SOURCE file: PumpSourceM.f90
CONTAINED in: PumpSource
INCLUDEs files: constant
USEs MODULES: Global IntrType Io PumpArray PumpVlt Util
CALLs: error getcrv linint
CALLED by: pumpx

SUBROUTINE: pumpi
PURPOSE: Supplies built-in PUMP characteristics.
SOURCE file: PumpM.f90
CONTAINED in: Pump
USEs MODULES: IntrType
CALLED by: rdcrvs

SUBROUTINE: pumpsr
PURPOSE: Evaluates PUMP momentum and energy source.
SOURCE file: PumpSourceM.f90
CONTAINED in: PumpSource
INCLUDEs files: constant vellim
USEs MODULES: Control Flt Global GlobalDat GlobalDim GlobalPnt IntrType Io
OneDDat PumpArray PumpVlt Util
CALLs: error evltab pumpx shiftb trip
CALLED by: preper

SUBROUTINE: pumpx
PURPOSE: Evaluates PUMP head and torque.
SOURCE file: PumpSourceM.f90
CONTAINED in: PumpSource
INCLUDEs files: constant
USEs MODULES: Global IntrType Io PumpArray PumpVlt TextIo Util
CALLs: linint pumpd warray
CALLED by: pumpsr

SUBROUTINE: r2ii
PURPOSE: Converts a real value to an integer value.
SOURCE file: TracInputM.f90
CONTAINED in: TracInput
CALLED by: input

SUBROUTINE: rbreak
PURPOSE: Reads BREAK data from input file and creates a pointer table for
these data.
SOURCE file: BreakM.f90
CONTAINED in: Break
INCLUDEs files: elvkf junction
USEs MODULES: BreakVlt CompTyp Eos Flt Gen1DArray Global GlobalDat IntrType
Io ReadEcho SysConfig TextIo
CALLs: AllBreakArrays AllocGen1D Junctions SetSegment checksize error
loadn readi readr scltbl warray
CALLED by: rdcomp

SUBROUTINE: rcntl
PURPOSE: Reads in signal-variable, trip, and controller input data.
SOURCE file: ControlM.f90
CONTAINED in: Control
USEs MODULES: ReadEcho TextIo Util

CALLs: ccredit error justlr loadn readi readr uncnvts unnumb unsvcb warray
 wlabin wmxytb
CALLeD by: input

SUBROUTINE: rcomp
PURPOSE: Reads data common to most 1D components from input files and
 writes these data to output file.
SOURCE file: rcomp.f90
INCLUDEs files: cflow concck defval elvkf totals
USEs MODULES: BadInput Bits CFaces Ccfl ControlDat EngUnits Eos Flt Gen1DArray
 Global GlobalDat GlobalDim GlobalPnt HpssDat IntArray IntrType
 Io TextIo Util
CALLs: clearn error loadn therms uncnvt warray wiarn
CALLeD by: rpipe rprizr rpump rsepd rtee rvlve

SUBROUTINE: rdcomp
PURPOSE: Controls reading of component data from input file.
SOURCE file: rdcomp.f90
USEs MODULES: BadInput Break CompTyp Fill Flt Global GlobalDat GlobalPnt
 IntrType Io Pipe Plenum Prizer Pump RodTask Sepd Tee Valve
CALLs: error rbreak rfill rhtstr rpipe rplen rprizr rpump rsepd rtee rvlve
CALLeD by: input

SUBROUTINE: rdcrds
PURPOSE: Reads timestep cards until DTMIN < 0 is encountered.
SOURCE file: rdcrds.f90
USEs MODULES: IntrType Io ReadEcho
CALLs: readr
CALLeD by: steady

SUBROUTINE: rdcrvs
PURPOSE: Reads PUMP curves from input file.
SOURCE file: PumpM.f90
CONTAINED in: Pump
USEs MODULES: Bad IntrType TextIo
CALLs: loadn pumpi warray
CALLeD by: rpump

SUBROUTINE: rddim
PURPOSE: Reads number of points on PUMP curves from input file.
SOURCE file: PumpM.f90
CONTAINED in: Pump
USEs MODULES: ReadEcho Util

CALLs: cleari error readi
 CALLED by: rpump

SUBROUTINE: rdrest
 PURPOSE: Controls reading of component data from a restart dump file.
 SOURCE file: rdrest.f90
 INCLUDEs files: bignum chgalp dlimit elvkf massck nrcmp
 USEs MODULES: BadInput Break Ccfl CompTyp Control EngUnits Eos Fill Flt Global
 GlobalDat GlobalPnt IntrType Io Pipe Plenum Prizer Pump Restart
 RodTask Sepd Tee Temp Util Valve VessTask

CALLs: CSFree CSRestart GenTableRst bfaloc bfin bfinis bfinis checksize error
 rebrk recntl refill rehtst repipe replen reprzr repump resepd retee
 revlve revssl

CALLED by: input

SUBROUTINE: rdzmom
 PURPOSE: Defines momentum cell reciprocal lengths and weighting factors.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: VessArray3 VessCon VessTf3dc VessVlt

CALLs: setva
 CALLED by: ivssl

SUBROUTINE: readi
 PURPOSE: Reads integer data in I14 format.
 SOURCE file: ReadEchoM.f90
 CONTAINED in: ReadEcho
 USEs MODULES: BadInput Io
 CALLs: error justlr
 CALLED by: input rbreak rcntl rddim rfill rhtstr rpipe rplen rprizr rpump rrod1
 rsepd rtee rvlve rvssl

SUBROUTINE: readr
 PURPOSE: Reads real data in E14.6 format.
 SOURCE file: ReadEchoM.f90
 CONTAINED in: ReadEcho
 USEs MODULES: BadInput EngUnits Io
 CALLs: error justlr uncnvts wir
 CALLED by: input rbreak rcntl rdcrds rfill rhtstr rpipe rprizr rpump rrod1 rsepd
 rtee rvlve rvssl timstp

SUBROUTINE: rebrk
 PURPOSE: Reads BREAK data from a restart dump.

SOURCE file: BreakM.f90
 CONTAINED in: Break
 INCLUDEs files: junction
 USEs MODULES: BreakVlt CompTyp Flt Gen1DArray Global GlobalDat IntrType Io
 ReadEcho Restart SysConfig TextIo
 CALLs: AllBreakArrays AllocGen1D Junctions SetSegment bfinn checksize
 reecho rstVLT warray
 CALLED by: rdrest

SUBROUTINE: recntl
 PURPOSE: Reads the signal-variable, trip, and controller data from the restart
 file.
 SOURCE file: ControlM.f90
 CONTAINED in: Control
 USEs MODULES: BadInput ReadEcho TextIo
 CALLs: ccredit error justlr reecho unnumb unsvcb warray wmxytb
 CALLED by: rdrest

SUBROUTINE: recomp
 PURPOSE: Reads data from a restart dump common to most 1D components.
 SOURCE file: recomp.f90
 USEs MODULES: Gen1DArray Global GlobalDat IntArray IntrType Restart
 CALLs: bfinn
 CALLED by: repipe reprzr repump resepd retee revlve

SUBROUTINE: reecho
 PURPOSE: Outputs real-valued scalar input data read from the TRCRST file to
 the TRCOUT file.
 SOURCE file: ReadEchoM.f90
 CONTAINED in: ReadEcho
 USEs MODULES: EngUnits Io
 CALLs: justlr uncnvts wir
 CALLED by: input rebrk recntl refill rehtst repipe replen reprzr repump resepd
 retee revlve revssl

SUBROUTINE: refill
 PURPOSE: Reads FILL data from a restart dump.
 SOURCE file: FillM.f90
 CONTAINED in: Fill
 INCLUDEs files: junction
 USEs MODULES: CompTyp FillVlt Flt Gen1DArray Global GlobalDat IntrType Io
 ReadEcho Restart SysConfig TextIo

CALLs: AllFillArrays AllocGen1D Junctions SetSegment bfinn checksize
reecho rstVLT warray

CALLed by: rdrest

SUBROUTINE: rehtst

PURPOSE: Reads HTSTR scalar input data from a restart dump.

SOURCE file: RodTaskM.f90

CONTAINED in: RodTask

INCLUDEs files: decayc

USEs MODULES: CompTyp EngUnits Flt Global GlobalDat GlobalPnt ReadEcho
Restart RodVlt

CALLs: bfinn pntrod reecho rerod1 rstVLT unnumb unsvcb

CALLed by: rdrest

SUBROUTINE: repipe

PURPOSE: Reads PIPE data from a restart dump.

SOURCE file: PipeM.f90

CONTAINED in: Pipe

INCLUDEs files: junction

USEs MODULES: Alloc CompTyp Flt Gen1DArray GlobalDim IntArray IntrType
PipeVlt ReadEcho Restart SysConfig TextIo

CALLs: AddSegment1D AllocGen1D Junctions SetSegment TRACAllo bfinn
checksize recomp reecho rstVLT unsvcb warray wmxytb wrcomp

CALLed by: rdrest

SUBROUTINE: replen

PURPOSE: Reads PLENUM data from a restart dump.

SOURCE file: PlenumM.f90

CONTAINED in: Plenum

INCLUDEs files: junction

USEs MODULES: Alloc CompTyp Flt Gen1DArray PlenVlt ReadEcho Restart SysConfig
TextIo

CALLs: AddSegment1D AllocPlenum Junctions SetSegment TRACAllo
bfinn checksize reecho rstVLT warray wiarn

CALLed by: rdrest

SUBROUTINE: reprzr

PURPOSE: Reads PRIZER (pressurizer) data from a restart dump.

SOURCE file: PrizerM.f90

CONTAINED in: Prizer

INCLUDEs files: junction

USEs MODULES: CompTyp Flt Gen1DArray GlobalDim IntArray PrizeVlt ReadEcho
Restart SysConfig

CALLs: AddSegment1D AllocGen1D Junctions SetSegment checksize
recomp reecho rstVLT wrcomp
CALLED by: rdrest

SUBROUTINE: repump
PURPOSE: Reads PUMP data from a restart dump.
SOURCE file: PumpM.f90
CONTAINED in: Pump
INCLUDEs files: junction
USEs MODULES: Alloc Bad CompTyp Flt Gen1DArray GlobalDim IntArray IntrType
PumpVlt ReadEcho Restart SysConfig TextIo
CALLs: AddSegment1D AllocGen1D Junctions SetSegment TRACAllo bfinn
checksize recomp reecho rstVLT unsvcb warray wmxytb wrcomp
CALLED by: rdrest

SUBROUTINE: rerod1
PURPOSE: Reads HTSTR input-data arrays from a restart dump.
SOURCE file: RodTaskM.f90
CONTAINED in: RodTask
USEs MODULES: EngUnits Flt Global GlobalDim Io Restart RodVlt TextIo Util
CALLs: bfinn bfin uncnvt unnumb unsvcb warray wiarn wmxytb
CALLED by: rehtst

SUBROUTINE: resepd
PURPOSE: Reads SEPD (Separator) data from a restart dump.
SOURCE file: SepdM.f90
CONTAINED in: Sepd
INCLUDEs files: constant junction
USEs MODULES: Alloc Bad Gen1DArray GlobalDim IntArray Io ReadEcho Restart
SysConfig TextIo
CALLs: AddSegment1D AllocGen1D Junctions SetSegment TRACAllo bfinn
checksize recomp reecho rstVLT unsvcb warray wmxytb wrcomp
CALLED by: rdrest

SUBROUTINE: retee
PURPOSE: Reads TEE data from a restart dump.
SOURCE file: TeeM.f90
CONTAINED in: Tee
INCLUDEs files: constant junction
USEs MODULES: Alloc Bad CompTyp Flt Gen1DArray GlobalDat GlobalDim IntArray
IntrType Io ReadEcho Restart SysConfig TeeVlt TextIo
CALLs: AddSegment1D AllocGen1D Junctions SetSegment TRACAllo bfinn
checksize recomp reecho rstVLT unsvcb warray wmxytb wrcomp

CALLED by: rdrest

SUBROUTINE: revlve
PURPOSE: Reads VALVE data from a restart dump.
SOURCE file: ValveM.f90
CONTAINED in: Valve
INCLUDEs files: junction
USEs MODULES: Alloc CompTyp Flt Gen1DArray GlobalDim IntArray IntrType
 ReadEcho Restart SysConfig TextIo ValveVlt
CALLs: AddSegment1D AllocGen1D Junctions SetSegment TRACAllo bfinn
 checksize recomp reecho rstVLT unsvcb warray wmxymb wrcomp
CALLED by: rdrest

SUBROUTINE: revssl
PURPOSE: Reads VESSEL data from a restart dump.
SOURCE file: VessTaskM.f90
CONTAINED in: VessTask
INCLUDEs files: constant junction
USEs MODULES: CompTyp Eos Flt Global GlobalDat GlobalPnt Io ReadEcho Restart
 SysConfig TextIo Util VessArray VessArray3 VessCon VessMat
 VessTf3dc VessVlt
CALLs: AddSegment3D AllocVess AllocVess3 Junctions SetSegment bfinn
 bfinni bfin clearn levelr reecho rstVLT warray wiarn
CALLED by: rdrest

SUBROUTINE: rfdbk
PURPOSE: Evaluates the reactor core reactivity feedback caused by changes in
 the fuel temperature, coolant temperature, and coolant void from the
 beginning of the previous timestep.
SOURCE file: RodCrunchM.f90
CONTAINED in: RodCrunch
USEs MODULES: CompTyp GlobalDat Util
CALLs: error lint4d
CALLED by: core1

SUBROUTINE: rfill
PURPOSE: Reads FILL data from input file.
SOURCE file: FillM.f90
CONTAINED in: Fill
INCLUDEs files: junction
USEs MODULES: CompTyp ControlDat EngUnits FillVlt Flt Gen1DArray Global
 GlobalDat GlobalPnt IntrType Io ReadEcho SysConfig TextIo Util

CALLs: AllFillArrays AllocGen1D Junctions SetSegment checksize error
linint0 loadn readi readr scltbl warray

CALLed by: rdcomp

SUBROUTINE: rholid
PURPOSE: Evaluates the D2O liquid density and its derivatives.
SOURCE file: EosNoInlineM.f90
CONTAINED in: EosNoInline
CALLed by: rholiq

SUBROUTINE: rholih
PURPOSE: Evaluates the H2O liquid density and its derivatives.
SOURCE file: EosInlineM.f90
CONTAINED in: EosInline
CALLed by: rholiq thermh

SUBROUTINE: rholiq
PURPOSE: Determines the D2O or H2O liquid density and its derivatives by
calling RHOLID or RHOLIH.
SOURCE file: EosNoInlineM.f90
CONTAINED in: EosNoInline
CALLs: rholid rholih
CALLed by: thermd

SUBROUTINE: rhtstr
PURPOSE: Reads ROD or SLAB HTSTR data from the input file.
SOURCE file: RodTaskM.f90
CONTAINED in: RodTask
INCLUDEs files: constant decayc elvkf htcs ifcrs
USEs MODULES: BadInput CompTyp ControlDat EngUnits Flt Global GlobalDat
GlobalPnt Io ReadEcho RodVlt TextIo Util VessCon
CALLs: error loadn pntrod readi readr rrod1 rrod2 uncnvt uncnvtn warray
wiarn
CALLed by: rdcomp

SUBROUTINE: rkin
PURPOSE: Solves the neutron point-reactor kinetics differential equations.
SOURCE file: RodCrunchM.f90
CONTAINED in: RodCrunch
INCLUDEs files: decayc dlimit
USEs MODULES: Control GlobalDat
CALLs: error evfxxx trip
CALLed by: core1

SUBROUTINE: rlevel
 PURPOSE: Writes real VESSEL level array to output file TRCOUT (input echo).
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: BadInput Io TextIo VessCon
 CALLs: error levelr warray
 CALLED by: rvssl

SUBROUTINE: rodht
 PURPOSE: Evaluates the fuel-rod temperature field.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 INCLUDEs files: cnrslv constant ifcrs
 USEs MODULES: CompTyp Thermocple VessCon
 CALLs: bansol error trislv
 CALLED by: frod

SUBROUTINE: rpipe
 PURPOSE: Reads PIPE data from the input file.
 SOURCE file: PipeM.f90
 CONTAINED in: Pipe
 INCLUDEs files: junction totals
 USEs MODULES: Alloc CompTyp EngUnits Flt Gen1DArray Gen1DTask Global
 GlobalDat IntArray IntrType Io PipeVlt ReadEcho SysConfig TextIo
 Util
 CALLs: AddSegment1D AllocGen1D Junctions SetSegment TRACAllo
 checksize error linint0 loadn rcomp readi readr scltbl uncnvt unsvcb
 warray wmxymb
 CALLED by: rdcomp

SUBROUTINE: rplen
 PURPOSE: Reads PLENUM data from the input file.
 SOURCE file: PlenumM.f90
 CONTAINED in: Plenum
 INCLUDEs files: defval junction
 USEs MODULES: Alloc CompTyp Flt Gen1DArray PlenVlt ReadEcho SysConfig TextIo
 Util
 CALLs: AddSegment1D AllocPlenum Junctions SetSegment TRACAllo
 checksize clearn error loadn readi warray wiarn
 CALLED by: rdcomp

SUBROUTINE: rprizr

PURPOSE: Reads PRIZER (Pressurizer) data from input file.
 SOURCE file: PrizerM.f90
 CONTAINED in: Prizer
 INCLUDEs files: junction
 USEs MODULES: CompTyp Flt Gen1DArray Gen1DTask GlobalDim IntArray Io
 PrizeVlt ReadEcho SysConfig
 CALLs: AddSegment1D AllocGen1D Junctions SetSegment checksize rcomp
 readi readr
 CALLED by: rdcomp

SUBROUTINE: rpump
 PURPOSE: Reads PUMP data from input file.
 SOURCE file: PumpM.f90
 CONTAINED in: Pump
 INCLUDEs files: elvkv junction
 USEs MODULES: Alloc Bad CompTyp ControlDat EngUnits Eos Flt Gen1DArray
 Gen1DTask GlobalDat GlobalDim GlobalPnt IntArray IntrType Io
 PumpVlt ReadEcho SysConfig TextIo Util
 CALLs: AddSegment1D AllocGen1D Junctions SetSegment TRACAllo
 checksize error linint0 loadn rcomp rdcvrs rddim readi readr scltbl
 thermo uncnvt unsvcb warray wmxytb
 CALLED by: rdcomp

SUBROUTINE: rrod1
 PURPOSE: Reads basic ROD input parameters.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 INCLUDEs files: decayc
 USEs MODULES: EngUnits Flt Io ReadEcho RodVlt
 CALLs: error readi readr unnumb unsvcb
 CALLED by: rhtstr

SUBROUTINE: rrod2
 PURPOSE: Reads and checks array data for powered heat structures.
 SOURCE file: RodTaskM.f90
 CONTAINED in: RodTask
 INCLUDEs files: decayc
 USEs MODULES: EngUnits Flt Global GlobalDim Io RodVlt TextIo Util
 CALLs: clearn decays error linint0 loadn scltbl uncnvt uncnvtn unnumb
 unsvcb warray wlabrn wmxytb zpwnrm
 CALLED by: rhtstr

SUBROUTINE: rsepd

PURPOSE: Reads SEPD (Separator) data from input file.
SOURCE file: SepdM.f90
CONTAINED in: Sepd
INCLUDEs files: cflow constant junction totals
USEs MODULES: Alloc Bad EngUnits Gen1DArray Gen1DTask IntArray Io ReadEcho SysConfig TextIo Util
CALLs: AddSegment1D AllocGen1D Junctions SetSegment TRACAllo
checksize error linint0 loadn rcomp readi readr scltbl uncnvt unsvcb
warray wmxytb
CALLed by: rdcomp

SUBROUTINE: rsgnf
PURPOSE:
SOURCE file: DataSgnfM.f90
CONTAINED in: DataSgnf

SUBROUTINE: rstVLT
PURPOSE: Driver routine that reads the component-specific VLTs from the restart file.
SOURCE file: rstvlt.f90
USEs MODULES: BreakVlt CompTyp FillVlt IntrType PipeVlt PlenVlt PrizeVlt PumpVlt RodVlt SepdVlt TeeVlt ValveVlt VessVlt
CALLs: BreakTableRst FillTableRst PipeTableRst PlenTableRst PrizeTableRst PumpTableRst RodTableRst SepdTableRst TeeTableRst ValveTableRst VessTableRst error
CALLed by: rebrk refill rehtst repipe replen reprzr repump resepd retee revlve revssl

SUBROUTINE: rtee
PURPOSE: Reads TEE data from input file.
SOURCE file: TeeM.f90
CONTAINED in: Tee
INCLUDEs files: cflow constant junction totals
USEs MODULES: Alloc Bad CompTyp EngUnits Flt Gen1DArray Gen1DTask Global GlobalDat IntArray IntrType Io ReadEcho SysConfig TeeVlt TextIo Util
CALLs: AddSegment1D AllocGen1D Junctions SetSegment TRACAllo
checksize error linint0 loadn rcomp readi readr scltbl uncnvt unsvcb
warray wmxytb
CALLed by: rdcomp

SUBROUTINE: rvlve
PURPOSE: Reads VALVE data from input file.

SOURCE file: ValveM.f90
 CONTAINED in: Valve
 INCLUDEs files: junction
 USEs MODULES: Alloc CompTyp ControlDat EngUnits Eos Flt Gen1DArray
 Gen1DTask GlobalDat GlobalDim GlobalPnt IntArray IntrType Io
 ReadEcho SysConfig TextIo Util ValveVlt
 CALLs: AddSegment1D AllocGen1D Junctions SetSegment TRACAllo
 checksize error faxpos linint0 loadn rcomp readi readr scltbl thermo
 uncnvts unsvcb warray wmxtyb
 CALLED by: rdcomp

 SUBROUTINE: rvssl
 PURPOSE: Reads VESSEL data from input file.
 SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 INCLUDEs files: constant defval elvkf junction
 USEs MODULES: CFaces Ccfl CompTyp EngUnits Eos Flt Global GlobalDat GlobalPnt
 Io ReadEcho SysConfig TextIo Util VessArray VessArray3 VessCon
 VessMat VessTf3dc VessVlt
 CALLs: AddSegment3D AllocVess AllocVess3 Junctions SetSegment chksr
 clearn error levelr loadn readi readr rlevel uncnvts warray wiarn
 CALLED by: input

 SUBROUTINE: savbd
 PURPOSE: Moves boundary information into component arrays.
 SOURCE file: Gen1DTaskM.f90
 CONTAINED in: Gen1DTask
 USEs MODULES: Bad Flt Gen1DArray GlobalDat GlobalDim
 CALLs: TimeUpGen1D
 CALLED by: pipe1 pipe3 prizr1 prizr3 pump1 pump3 tee1 tee3 vlve1 vlve3

 SUBROUTINE: sclmom
 PURPOSE: Sets up geometric scale factors for velocities to improve momentum
 conservation.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: Io OneDDat VessArray3 VessCon VessTf3dc VessVlt
 CALLs: error
 CALLED by: ivssl

 SUBROUTINE: scltbl
 PURPOSE: Scales input table according to scale factor passed by input routine
 using allocated arrays.

SOURCE file: TextIoM.f90
 CONTAINED in: TextIo
 CALLs: unsvcb warray wmxtyb
 CALLED by: rbreak rfill rpipe rpump rrod2 rsepd rtee rvlve

SUBROUTINE: scopym
 PURPOSE: Support subroutine for sgeev that copies one vector into another.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: sgeev

SUBROUTINE: scopyt
 PURPOSE: Support subroutine for sgeev that copies the negative of one vector into another.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: sgeev

SUBROUTINE: sdmpit
 PURPOSE: Calculates the TRAC data significance parameters and writes them to the trcsno file.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USEs MODULES: Break Fill Pipe Plenum Prizer Pump RodVlt Tee Valve VessTask
 CALLs: sgnf3d sgnfpipe sgnfplen sgnfprzr sgnfpump sgnftee sgnfvlve sgnhtstr
 CALLED by: pstepq

SUBROUTINE: sedit
 PURPOSE: Writes short edit to TRCOUT file.
 SOURCE file: sedit.f90
 INCLUDEs files: dlimit
 USEs MODULES: EngUnits Global GlobalDat GlobalPnt IntrType Io SysTime Util
 CALLs: cleari uncnvts
 CALLED by: edit newdlt pstepq

SUBROUTINE: sepd1 ***Not CALLED in Version 3.0.***
 PURPOSE: Controls SEPD (Separator) prep stage.
 SOURCE file: SepdM.f90
 CONTAINED in: Sepd
 USEs MODULES: ControlDat Io OneDDat
 CALLs: error sepdx tee1

SUBROUTINE: sepd2
 PURPOSE: Controls SEPD (Separator) outer stage stage.
 SOURCE file: SepdM.f90
 CONTAINED in: Sepd
 USEs MODULES: Gen1DArray OneDDat
 CALLs: sepd1 tee2
 CALLED by: out1d

SUBROUTINE: sepd3
 PURPOSE: Controls SEPD (Separator) post stage.
 SOURCE file: SepdM.f90
 CONTAINED in: Sepd
 USEs MODULES: Gen1DArray OneDDat
 CALLs: tee3
 CALLED by: post

SUBROUTINE: sepd1
 PURPOSE: Computes separator side-arm void fraction and mixture velocity.
 SOURCE file: SepdM.f90
 CONTAINED in: Sepd
 INCLUDEs files: constant
 USEs MODULES: Gen1DArray GlobalDim IntrType
 CALLED by: sepd2

SUBROUTINE: sepdx
 PURPOSE: Computes mechanistic separator carryover and carry-under quantities.
 SOURCE file: SepdM.f90
 CONTAINED in: Sepd
 INCLUDEs files: constant
 USEs MODULES: Boundary Gen1DArray IntrType TeeVlt
 CALLs: ssepor
 CALLED by: sepd1

SUBROUTINE: set3dbd
 PURPOSE:
 SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 USEs MODULES: Bad Bits Boundary CFaces GlobalDat SysService VessArray
 VessArray3 VessCon VessTf3dc VessVlt
 CALLs: of1123c

CALLED by: ivssl post3d vssl1 vssl2 vssl3

SUBROUTINE: setbd

PURPOSE: Stores component information in bd arrays.

SOURCE file: Gen1DTaskM.f90

CONTAINED in: Gen1DTask

USEs MODULES: Bad Flt

CALLs: jld

SUBROUTINE: setbdt

PURPOSE: Sets values for boundary to first theta cell equal to values for last theta cell and sets values for boundary to last theta cell equal to values for first theta cell.

SOURCE file: VessCrunchM.f90

CONTAINED in: VessCrunch

USEs MODULES: VessArray3 VessCon VessVlt

CALLED by: ivssl vssl1 vssl2

SUBROUTINE: seteod

PURPOSE: Defines the EOS constants for D2O fluid.

SOURCE file: EosNoInlineM.f90

CONTAINED in: EosNoInline

CALLED by: seteos

SUBROUTINE: seteoh

PURPOSE: Defines the EOS constants for H2O fluid.

SOURCE file: EosNoInlineM.f90

CONTAINED in: EosNoInline

CALLED by: seteos

SUBROUTINE: seteos

PURPOSE: Defines the EOS constants for D2O or H2O fluid by calling seteod or seteoh.

SOURCE file: EosNoInlineM.f90

CONTAINED in: EosNoInline

CALLs: seteod seteoh

CALLED by: input

SUBROUTINE: setnet

PURPOSE: Provides the information needed to set up the network solution matrices.

SOURCE file: setnet.f90

USEs MODULES: IntrType

CALLED by: icomp

 SUBROUTINE: settype
 PURPOSE: Sets the component type number (e.g., 1) based on the component name (e.g., PIPE).
 SOURCE file: CompTypM.f90
 CONTAINED in: CompTyp
 CALLs: error
 CALLED by: input

 SUBROUTINE: setva
 PURPOSE: Sets value of variable var to val for one level of VESSEL data.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: VessCon
 CALLED by: dvpscl htstrv ifset initbc iwall3 rdzmom vssl1

 SUBROUTINE: sfa22v
 PURPOSE: Hardwired version of sgefat for 2 x 2 matrices evaluated as an nmat-element vector.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear

 SUBROUTINE: sfa33v
 PURPOSE: Hardwired version of sgefat for 3 x 3 matrices evaluated as an nmat-element vector.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear

 SUBROUTINE: sfa44
 PURPOSE: Hardwired version of sgefat for a 4 x 4 matrix.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: BlockSolver tf1ds tfpln

 SUBROUTINE: sfa44v
 PURPOSE: Hardwired version of sgefat for 4 x 4 matrices evaluated as an nmat-element vector.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear

 SUBROUTINE: sfa55
 PURPOSE: Hardwired version of sgefat for a 5 x 5 matrix.

SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: BlockSolver bkspln bksstb bkstb3 tf1ds tf3ds tfpln

SUBROUTINE: sfa55v
 PURPOSE: Hardwired version of sgefat for 5 x 5 matrices evaluated as an nmat-element vector.

SOURCE file: LinearM.f90
 CONTAINED in: Linear

SUBROUTINE: sgecot
 PURPOSE: Factors a real matrix by Gaussian elimination and estimates the condition of the matrix.

SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLs: saxpyt sgefat sscalt
 CALLED by: sgefst

SUBROUTINE: sgedit
 PURPOSE: Computes the determinant of a matrix using the factors computed by sgefat.

SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: choke

SUBROUTINE: sgcev
 PURPOSE: Computes the eigenvalues and eigenvectors of a general real matrix. sgefat factors a real matrix by Gaussian elimination.

SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLs: balanct balbakt error hqr2t hqrt orthest ortrant scopym scopyt
 CALLED by: choke

SUBROUTINE: sgefat
 PURPOSE: Factors a real matrix by Gaussian elimination.

SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: Solver choke matsol sgecot

SUBROUTINE: sgefst
 PURPOSE: Solves an N x N system of linear equations by calling sgecot and sgeslt.

SOURCE file: LinearM.f90

CONTAINED in: Linear
 CALLS: error sgecot sgeslt

SUBROUTINE: sgeslt
 PURPOSE: Solves the real system $A * X = B$ or $TRANS(A) * X = B$ using the factors computed by sgefat.

SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: Solver choke matsol sgefst

SUBROUTINE: sgnf1d
 PURPOSE: Calculates for 1D-components' significance data parameters.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USES MODULES: Gen1DArray
 CALLED by: sgnfpipe sgnfprzr sgnfpump sgnftee sgnfvlve

SUBROUTINE: sgnf3d
 PURPOSE: Calculates for 3D-components' significance data parameters.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USES MODULES: CFaces VessArray3 VessCon VessVlt
 CALLED by: sdmpit

SUBROUTINE: sgnfetup
 PURPOSE: Allocates the significance data arrays by the number of components in a model, calculates the total volume for each component, sets the volume factor flag for the pressurizer component for steady-state calculations, and writes to the significance data output file the number of components, component type, and number.

SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USES MODULES: Break Fill Pipe Plenum Prizer Pump RodVlt Tee Valve VessTask
 CALLS: sgnfvol3d vsgnfpipes vsgnfppln vsgnfpzr vsgnfpump vsgnftee vsgnfvleve vsgnhtstr
 CALLED by: trac

SUBROUTINE: sgnfpipe
 PURPOSE: Calculates the significance data parameters for a PIPE.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USES MODULES: Gen1DArray PipeVlt
 CALLS: sgnf1d

CALLED by: sdmpit

SUBROUTINE: sgnfplen

PURPOSE: Calculates the significance data parameters for a PLENUM.

SOURCE file: DataSgnfM.f90

CONTAINED in: DataSgnf

USEs MODULES: Gen1DArray

CALLED by: sdmpit

SUBROUTINE: sgnfprzr

PURPOSE: Calculates the significance data parameters for a PRIZER
(Pressurizer).

SOURCE file: DataSgnfM.f90

CONTAINED in: DataSgnf

USEs MODULES: Gen1DArray PrizeVlt

CALLs: sgnf1d

CALLED by: sdmpit

SUBROUTINE: sgnfpump

PURPOSE: Calculates the significance data parameters for a PUMP.

SOURCE file: DataSgnfM.f90

CONTAINED in: DataSgnf

USEs MODULES: Gen1DArray PumpVlt

CALLs: sgnf1d

CALLED by: sdmpit

SUBROUTINE: sgnftee

PURPOSE: Calculates the significance data parameters for a TEE.

SOURCE file: DataSgnfM.f90

CONTAINED in: DataSgnf

USEs MODULES: Gen1DArray TeeVlt

CALLs: sgnf1d

CALLED by: sdmpit

SUBROUTINE: sgnfvlve

PURPOSE: Calculates the significance data parameters for a VALVE.

SOURCE file: DataSgnfM.f90

CONTAINED in: DataSgnf

USEs MODULES: Gen1DArray ValveVlt

CALLs: sgnf1d

CALLED by: sdmpit

SUBROUTINE: sgnfvol1d
 PURPOSE: Calculates the total volume of all 1D real cells.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USEs MODULES: Gen1DArray
 CALLED by: vsgnfpipe vsgnfprzr vsgnfpump vsgnftee vsgnfv1ve

SUBROUTINE: sgnfvol3d
 PURPOSE: Calculates the total volume of all 3D real cells.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USEs MODULES: VessArray3 VessCon VessTf3dc VessVlt
 CALLED by: sgnfetup

SUBROUTINE: sgnhtstr
 PURPOSE: calculates significance data parameters for heat structures.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 INCLUDEs files: constant
 USEs MODULES: HSArray RodVlt
 CALLED by: sdmpit

SUBROUTINE: shiftb
 PURPOSE: Translates the table's abscissa-coordinate values so that the function value F in the table corresponds to an abscissa-coordinate value of 0.0.
 SOURCE file: UtilM.f90
 CONTAINED in: Util
 CALLED by: break1 breakx fillx pumpsr vlvex

SUBROUTINE: shrink
 PURPOSE: Removes rows of conduction nodes within the HTSTR RODs or SLABs during reflood.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 CALLED by: core1

SUBROUTINE: sound
 PURPOSE: Performs a homogeneous-equilibrium, sound-speed calculation.
 SOURCE file: EosNoInlineM.f90
 CONTAINED in: EosNoInline
 CALLs: error therms

CALLED by:	choke
SUBROUTINE:	split
PURPOSE:	Reads appropriate data from PUMP curves.
SOURCE file:	PumpSourceM.f90
CONTAINED in:	PumpSource
USEs MODULES:	IntrType Io
CALLED by:	getcrv
SUBROUTINE:	srtlp
PURPOSE:	Sorts components into loops and reorders them for the network solution.
SOURCE file:	srtlp.f90
INCLUDEs files:	junction
USEs MODULES:	CompTyp GlobalDim IntrType Io Util
CALLs:	cleari error
CALLED by:	input
SUBROUTINE:	ssepor
PURPOSE:	Performs detailed calculation of a steam-water separator.
SOURCE file:	SepdM.f90
CONTAINED in:	Sepd
USEs MODULES:	IntrType
CALLED by:	seidx
SUBROUTINE:	ssl22v
PURPOSE:	Hardwired version of sgeslt for 2 x 2 matrices evaluated as an nmat-element vector.
SOURCE file:	LinearM.f90
CONTAINED in:	Linear
SUBROUTINE:	ssl33v
PURPOSE:	Hardwired version of sgeslt for 3 x 3 matrices evaluated as an nmat-element vector.
SOURCE file:	LinearM.f90
CONTAINED in:	Linear
SUBROUTINE:	ssl44
PURPOSE:	Hardwired version of sgeslt for a 4 x 4 matrix.
SOURCE file:	LinearM.f90
CONTAINED in:	Linear
CALLED by:	BlockSolver tflds tfpln

SUBROUTINE: ssl44v
 PURPOSE: Hardwired version of sges1t for 4 x 4 matrices evaluated as an nmat-element vector.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear

SUBROUTINE: ssl55
 PURPOSE: Hardwired version of sges1t for a 5 x 5 matrix.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear
 CALLED by: BlockSolver bkspln bksstb bkstb3 tf1ds tf3ds tfpln

SUBROUTINE: ssl55v
 PURPOSE: Hardwired version of sges1t for 5 x 5 matrices evaluated as an nmat-element vector.
 SOURCE file: LinearM.f90
 CONTAINED in: Linear

SUBROUTINE: startClock
 PURPOSE: Starts the system clock.
 SOURCE file: SysTimeM.f90
 CONTAINED in: SysTime
 CALLS: SYSTEM_CLOCK

SUBROUTINE: stbme
 PURPOSE: Sets up the 1D stabilizing mass and energy equations.
 SOURCE file: Gen1DCrunchM.f90
 CONTAINED in: Gen1DCrunch
 USES MODULES: Bad Bits CFaces CompTyp Global GlobalDat Matrices OneDDat SysConfig
 CALLED by: constb

SUBROUTINE: stbme3 ***Not CALLED in Version 3.0.***
 PURPOSE: Sets up stabilizer mass and energy equations for the VESSEL component.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USES MODULES: Bits Boundary CFaces GlobalDat GlobalDim SysService VessArray3 VessCon VessTf3dc VessVlt

SUBROUTINE: stbmpl
 PURPOSE: Sets up the stabilizing mass and energy equations for the PLENUM component.

SOURCE file: PlenumM.f90
 CONTAINED in: Plenum
 USEs MODULES: Gen1DArray Matrices OneDDat PlenVlt SysConfig
 CALLED by: plen3

SUBROUTINE: steady
 PURPOSE: Generates a steady-state solution.
 SOURCE file: steady.f90
 INCLUDEs files: diddlh massck
 USEs MODULES: Bad Boundary ControlDat EngUnits GlobalDat GlobalDim GlobalPnt
 IntrType Io Restart SysService TimeStep Xtv
 CALLs: TableTransAll clean edit error hout post prep pstepq rdcdrs timchk
 timestp xtvdv
 CALLED by: trac

SUBROUTINE: stopClock
 PURPOSE: Stops the system clock.
 SOURCE file: SysTimeM.f90
 CONTAINED in: SysTime
 CALLs: SYSTEM_CLOCK

SUBROUTINE: svset
 PURPOSE: Calls svset1, svset3, and svseth to determine location-
 dependent signal-variable parameters.
 SOURCE file: ControlM.f90
 CONTAINED in: Control
 USEs MODULES: Flt
 CALLs: error svset1 svset3 svseth
 CALLED by: trips

SUBROUTINE: svset1
 PURPOSE: Evaluates signal-variable parameters with locations defined in 1D
 hydraulic components.
 SOURCE file: ControlM.f90
 CONTAINED in: Control
 INCLUDEs files: constant
 USEs MODULES: Alloc Flt Gen1DArray HeatArray PumpVlt TeeVlt ValveVlt
 CALLs: CopyGen1DArray GetGen1DArray GetHeatArray GetPumpTab
 GetValveTab error
 CALLED by: svset

SUBROUTINE: svset3

PURPOSE: Evaluates signal-variable parameters with locations defined in a 3D VESSEL component.
SOURCE file: ControlM.f90
CONTAINED in: Control
USEs MODULES: Flt VessArray VessArray3 VessCon VessCrunch VessVlt
CALLs: error
CALLED by: svset

SUBROUTINE: svseth
PURPOSE: Evaluates signal-variable parameters defined in an HTSTR component.
SOURCE file: ControlM.f90
CONTAINED in: Control
USEs MODULES: Flt HsArray RodVlt
CALLs: GetRodTab error
CALLED by: svset

SUBROUTINE: tbc1
PURPOSE: Stores the TEE internal-junction momentum term and set flag when a JCELL main-channel interface is a TEE external junction.
SOURCE file: TeeM.f90
CONTAINED in: Tee
USEs MODULES: Boundary IntrType SysService Util
CALLED by: tee1

SUBROUTINE: tee1
PURPOSE: Controls TEE prepass.
SOURCE file: TeeM.f90
CONTAINED in: Tee
USEs MODULES: Boundary CompTyp Flt Gen1DArray Gen1DTask GlobalDat GlobalPnt HeatArray IntrType OneDDat SysService TeeVlt
CALLs: TableTransComp bkmom jbd4 preper savbd tbc1 tee1x teex
CALLED by: prep1d sepd1

SUBROUTINE: tee1x
PURPOSE: Evaluates SOURCE for TEE side-leg hydrodynamics.
SOURCE file: TeeM.f90
CONTAINED in: Tee
USEs MODULES: Bad Control GlobalDat IntrType TeeVlt
CALLs: evfxxx
CALLED by: tee1

SUBROUTINE: tee2

PURPOSE: Controls TEE outer iteration.
SOURCE file: TeeM.f90
CONTAINED in: Tee
USES MODULES: Bits Boundary CFaces CompTyp Flt Gen1DArray Gen1DTask
GlobalDat IntrType OneDDat SysService TeeVlt
CALLs: inner
CALLED by: out1d sepd2

SUBROUTINE: tee3
PURPOSE: Controls TEE postpass.
SOURCE file: TeeM.f90
CONTAINED in: Tee
INCLUDEs files: constant
USES MODULES: Bits Boundary CFaces CompTyp Control EvalDF Flt Gen1DArray
Gen1DTask GlobalDat IntrType OneDDat SysService TeeVlt
CALLs: constb etee evaldf1d evaldf2d evfxxx offtke poster savbd
CALLED by: post sepd3

SUBROUTINE: teex
PURPOSE: Evaluates coefficients for flow-coupling at the TEE internal junction.
SOURCE file: TeeM.f90
CONTAINED in: Tee
USES MODULES: IntrType OneDDat
CALLED by: tee1

SUBROUTINE: tf1d
PURPOSE: Controls 1D hydrodynamics routines in outer stage.
SOURCE file: Gen1DTaskM.f90
CONTAINED in: Gen1DTask
USES MODULES: Bad Eos Gen1DArray Gen1DCrunch GenHeat Global GlobalDat
GlobalPnt IntArray IntrType JunTerms Network OneDDat
SemiSolver Xvol
CALLs: CellFluxes CellLogic EdgeAvg1D JunFluxes1D cellav htif tf1ds
tf1ds1 tf1ds3 thermo
CALLED by: inner

SUBROUTINE: tf1ds
PURPOSE: Solves the hydrodynamic equations for the 1D, two-fluid pipe model
(outer stage).
SOURCE file: Gen1DCrunchM.f90
CONTAINED in: Gen1DCrunch
INCLUDEs files: diddle diddlh diddli rows

USEs MODULES: Bad Bits CFaces CompTyp Eos Flt GlobalDat GlobalDim Linear
 Matrices OneDDat SysConfig Xvol
 CALLs: sfa44 sfa55 ssl44 ssl55
 CALled by: tf1d

SUBROUTINE: tf1ds1
 PURPOSE: Sets up initial velocity approximations and their pressure derivatives
 for the 1D, two-fluid pipe model (outer stage).
 SOURCE file: Gen1DCrunchM.f90
 CONTAINED in: Gen1DCrunch
 INCLUDEs files: cflow constant dtinfo tst3d vdvmod vellim
 USEs MODULES: Bad Bits CFaces Ccfl CompTyp Flt GlobalDat GlobalDim OneDDat
 Util
 CALLs: choke
 CALled by: tf1d

SUBROUTINE: tf1ds3
 PURPOSE: Performs final generation of new time pressures, temperatures, and
 void fractions for 1D components in subroutine outer's second
 pass.
 SOURCE file: Gen1DCrunchM.f90
 CONTAINED in: Gen1DCrunch
 USEs MODULES: Bad Bits CFaces CompTyp Eos FailDat Flt GlobalDat GlobalDim Io
 Matrices OneDDat RodGlobal SysConfig
 CALLs: thermo
 CALled by: tf1d

SUBROUTINE: tf3ds
 PURPOSE: Sets up basic mass and energy equations for 3D VESSEL component
 (outer stage).
 SOURCE file: VessTF3DSM.f90
 CONTAINED in: VessTF3DS
 INCLUDEs files: diddle diddli tst3d
 USEs MODULES: Bits Boundary CFaces Eos Flt GlobalDat Io Linear Matrices SysService
 VessArray3 VessCon VessTf3dc VessTo1D VessVlt Xvol
 CALLs: Therm3D error sfa55 ssl55
 CALled by: vssl2

SUBROUTINE: tf3ds1
 PURPOSE: Estimates new-time velocities from motion equation and evaluates
 variation of velocities with respect to pressure for 3D VESSEL
 component (outer stage).
 SOURCE file: VessTF3DSM.f90

CONTAINED in: VessTF3DS
 INCLUDEs files: constant tst3d vdvmod
 USEs MODULES: Bits CFaces Ccfl Eos Flt GlobalDat VessArray3 VessCon VessTf3dc
 VessVlt
 CALLs: velbc zerov
 CALLED by: vssl2

SUBROUTINE: tf3ds3
 PURPOSE: Performs final generation of new time pressures, temperatures, and
 void fractions for VESSEL components in subroutine outer's second
 pass.
 SOURCE file: VessTF3DSM.f90
 CONTAINED in: VessTF3DS
 USEs MODULES: Bits Boundary CFaces Eos FailDat Flt GlobalDat GlobalDim Io
 Matrices SysConfig VessArray VessArray3 VessCon VessTf3dc
 VessTo1D VessVlt
 CALLs: Therm3D
 CALLED by: vssl2

SUBROUTINE: tfplbk
 PURPOSE: Does final generation of new time pressures, temperatures, and void
 fractions for PLENUM components in subroutine outer's second
 pass.
 SOURCE file: PlenumM.f90
 CONTAINED in: Plenum
 USEs MODULES: Boundary CFaces Eos FailDat Flt Gen1DArray Matrices OneDDat
 PlenVlt SysConfig
 CALLs: thermo
 CALLED by: plen2

SUBROUTINE: tfpln
 PURPOSE: Solves the basic hydrodynamic equations for the PLENUM (similar
 to tf1ds for the other 1D components).
 SOURCE file: PlenumM.f90
 CONTAINED in: Plenum
 INCLUDEs files: diddle rows
 USEs MODULES: Boundary CFaces Eos Gen1DArray Linear Matrices OneDDat PlenVlt
 SysConfig Xvol
 CALLs: sfa44 sfa55 ssl44 ssl55
 CALLED by: plen2

SUBROUTINE: thermd

PURPOSE: Evaluates the thermodynamic properties of D2O using allocated arrays.
SOURCE file: EosNoInlineM.f90
CONTAINED in: EosNoInline
USEs MODULES: GlobalDat GlobalDim
CALLs: error error rho_{liq}
CALLED by: thermo therms

SUBROUTINE: thermh
PURPOSE: Evaluates the thermodynamic properties of H2O using allocated arrays.
SOURCE file: EosNoInlineM.f90
CONTAINED in: EosNoInline
USEs MODULES: GlobalDat GlobalDim
CALLs: error rho_{lih}
CALLED by: thermo therms

SUBROUTINE: thermo
PURPOSE: Determines the thermodynamic properties of D2O or H2O by calling thermd or thermh.
SOURCE file: EosNoInlineM.f90
CONTAINED in: EosNoInline
USEs MODULES: GlobalDim
CALLs: thermd thermh
CALLED by: Therm3D break3 breakx fillx ibrk ifill iplen iprop plen2 plen3 poster rpump rvlve tfld tflds3 tfplbk

SUBROUTINE: therms
PURPOSE: Determines the thermodynamic properties of D2O or H2O by calling thermdo or thermho with scalar arguments.
SOURCE file: EosNoInlineM.f90
CONTAINED in: EosNoInline
USEs MODULES: GlobalDim
CALLs: thermd thermh
CALLED by: choke ihpss1 ihpss3 rcomp sound

SUBROUTINE: timchk
PURPOSE: Checks elapsed time to see whether certain functions should be performed.
SOURCE file: timchk.f90
USEs MODULES: ControlDat GlobalDat GlobalPnt IntrType Restart SysTime
CALLs: dmpit edit error
CALLED by: steady trans

SUBROUTINE: timestp
 PURPOSE: Sets up timestep and time-edit interval times.
 SOURCE file: TimeStepM.f90
 CONTAINED in: TimeStep
 INCLUDEs files: constant dlimit
 USEs MODULES: BadInput Control EngUnits FailDat GlobalDat GlobalPnt Io
 ReadEcho Restart
 CALLs: error newdlt readr trip uncnvt
 CALLED by: steady trans

SUBROUTINE: timupd
 PURPOSE: Updates start-of-timestep values with end-of-timestep values for
 one VESSEL level.
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: GlobalDat VessArray3 VessCon VessTf3dc VessVlt
 CALLED by: vssl1

SUBROUTINE: tmpptr
 PURPOSE: Sets up temporary pointers for subroutines preifd and prefwd.
 SOURCE file: VectDragM.f90
 CONTAINED in: VectDrag
 CALLED by: prefwd

SUBROUTINE: tmsfb
 PURPOSE: Evaluates the minimum stable film-boiling temperature (T_{min}).
 SOURCE file: HeatCorM.f90
 CONTAINED in: HeatCor
 CALLED by: htcor

SUBROUTINE: trans
 PURPOSE: Controls the overall transient-mode calculation for each timestep.
 SOURCE file: trans.f90
 INCLUDEs files: diddlh massck
 USEs MODULES: Bad Boundary ControlDat GlobalDat GlobalDim GlobalPnt IntrType
 Io SysService TimeStep Xtv
 CALLs: TableTransAll dmpit edit error hout post prep pstepq timchk timestp
 xtvdr
 CALLED by: trac

SUBROUTINE: trip
 PURPOSE: Returns the status of a trip.

SOURCE file: ControlM.f90
 CONTAINED in: Control
 CALLs: error
 CALLED by: breakx core1 evfxxx fillx pumpsr rkin timestp vlvex wpump

SUBROUTINE: trips
 PURPOSE: Evaluates the control parameters for the beginning of the timestep system state.

SOURCE file: ControlM.f90
 CONTAINED in: Control
 CALLs: cbset error svset trpset
 CALLED by: prep

SUBROUTINE: trisl
 PURPOSE: Solves linear system of the form $A * X = B$, where A is tridiagonal.

SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 CALLED by: rodht

SUBROUTINE: trpset
 PURPOSE: Sets up trip status flags.

SOURCE file: ControlM.f90
 CONTAINED in: Control
 INCLUDEs files: dtinfo
 CALLs: error uncnvts unnumb
 CALLED by: trips

SUBROUTINE: uncnvt
 PURPOSE: Converts a parameter's value from SI to English units or from English to SI units using undimensioned arrays.

SOURCE file: EngUnitsM.f90
 CONTAINED in: EngUnits
 USEs MODULES: BadInput Io
 CALLs: LuMatch error
 CALLED by: ecomp edit input ivssl namlst rcomp rerod1 rhtstr rpipe rpump rrod2 rsepd rtee timestp uncnvts warray wbreak wcomp wfill whtstr wlevel wmxtyb wpipe wplen wprizr wpump wsepd wtee wvlve wvssl

SUBROUTINE: uncnvtn
 PURPOSE: Converts a parameter's value from SI to English units or from English to SI units using allocated arrays.

SOURCE file: EngUnitsM.f90
 CONTAINED in: EngUnits

USEs MODULES: BadInput Io
 CALLs: LuMatch error
 CALLED by: rhtstr rrod2

SUBROUTINE: uncnvts
 PURPOSE: Provides scalar interface to uncnvt.
 SOURCE file: EngUnitsM.f90
 CONTAINED in: EngUnits
 CALLs: error uncnvt
 CALLED by: core1 ecomp elgr hout htstr1 ihpss1 input irod rcntl readr reecho
 rvlve rvssl sedit trpset whtstr

SUBROUTINE: unnumb
 PURPOSE: Assigns the units-label number to a parameter name in array
 LABELS for English/SI conversions.
 SOURCE file: EngUnitsM.f90
 CONTAINED in: EngUnits
 USEs MODULES: BadInput Io
 CALLs: LuMatch error
 CALLED by: input rcntl recntl rehtst rerod1 rrod1 rrod2 trpset

SUBROUTINE: unsvcb
 PURPOSE: Determines the units label and units-label number of a signal
 variable or control block.
 SOURCE file: unsvcb.f90
 USEs MODULES: BadInput ControlDat EngUnits GlobalPnt IntrType Io
 CALLs: error
 CALLED by: rcntl recntl rehtst repipe repump rerod1 resepd retee revlve rpipe
 rpump rrod1 rrod2 rsepd rtee rvlve scltbl warray

SUBROUTINE: value
 PURPOSE: Converts an ASCII string to its binary value.
 SOURCE file: PreInputM.f90
 CONTAINED in: PreInput
 USEs MODULES: Util
 CALLED by: preinp

SUBROUTINE: velbc
 PURPOSE: Sets velocities at internal FILL boundaries for a VESSEL.
 SOURCE file: VessTF3DSM.f90
 CONTAINED in: VessTF3DS
 USEs MODULES: CFaces VessArray3 VessCon VessVlt
 CALLED by: tf3ds1

SUBROUTINE: vfwall3
 PURPOSE: Evaluates 3D wall shear coefficients.
 SOURCE file: vfwall3.f90
 USEs MODULES: IntrType
 CALLs: wdrag
 CALLED by: prefwd

SUBROUTINE: vlve1
 PURPOSE: Controls VALVE prepass.
 SOURCE file: ValveM.f90
 CONTAINED in: Valve
 USEs MODULES: Boundary Flt Gen1DArray Gen1DTask GlobalDat HeatArray
 IntrType OneDDat SysService ValveVlt
 CALLs: TableTransComp bkmom preper savbd vlvev
 CALLED by: prep1d

SUBROUTINE: vlve2
 PURPOSE: Controls VALVE outer iteration.
 SOURCE file: ValveM.f90
 CONTAINED in: Valve
 USEs MODULES: Boundary Gen1DTask GlobalDat IntrType OneDDat SysService
 ValveVlt
 CALLs: inner
 CALLED by: out1d

SUBROUTINE: vlve3
 PURPOSE: Controls VALVE postpass.
 SOURCE file: ValveM.f90
 CONTAINED in: Valve
 USEs MODULES: Boundary Control EvalDF Flt Gen1DArray Gen1DTask GlobalDat
 IntrType OneDDat SysService ValveVlt
 CALLs: constb evaldf1d evaldf2d evfxxx poster savbd
 CALLED by: post

SUBROUTINE: vlvev
 PURPOSE: Evaluates the value of the flow-area change action for a VALVE.
 SOURCE file: ValveM.f90
 CONTAINED in: Valve
 INCLUDEs files: dlimit
 USEs MODULES: Control Flt Gen1DArray GlobalDat GlobalPnt IntrType Util ValveVlt
 CALLs: evltab faxpos shiftb trip

CALLED by: vlv1

 SUBROUTINE: vmcell
 PURPOSE: Converts a VESSEL cell number to a VESSEL-matrix cell number.
 SOURCE file: TracInputM.f90
 CONTAINED in: TracInput
 USEs MODULES: IntrType
 CALLED by: input

 SUBROUTINE: volfa
 PURPOSE: Evaluates cell volume flow areas.
 SOURCE file: Gen1DInitM.f90
 CONTAINED in: Gen1DInit
 USEs MODULES: GlobalDat Io
 CALLED by: ipipe iprizr ipump itee ivlve

 SUBROUTINE: volv
 PURPOSE: Evaluates cell-averaged phase velocities for 1D components.
 SOURCE file: Gen1DCrunchM.f90
 CONTAINED in: Gen1DCrunch
 CALLED by: preper

 SUBROUTINE: vrbd
 PURPOSE: Defines VESSEL velocities in the upstream radial direction for the inner ring (not currently used).
 SOURCE file: VessCrunchM.f90
 CONTAINED in: VessCrunch
 USEs MODULES: VessArray3 VessCon VessTf3dc VessVlt
 CALLED by: vssl1

 SUBROUTINE: vsgnfpipe
 PURPOSE: Calculates the volume for a PIPE.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USEs MODULES: PipeVlt
 CALLs: sgnfvolld
 CALLED by: sgnfetup

 SUBROUTINE: vsgnfplen
 PURPOSE: Calculates the volume for a PLENUM.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf

USEs MODULES: Gen1DArray
 CALLEd by: sgnfetup

SUBROUTINE: vsgnfprzr
 PURPOSE: Calculates the volume for a PRIZER (Pressurizer).
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USEs MODULES: PrizeVlt
 CALLs: sgnfvolld
 CALLEd by: sgnfetup

SUBROUTINE: vsgnfpump
 PURPOSE: Calculates the volume for a PUMP.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USEs MODULES: PumpVlt
 CALLs: sgnfvolld
 CALLEd by: sgnfetup

SUBROUTINE: vsgnftee
 PURPOSE: Calculates the volume for a TEE.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USEs MODULES: TeeVlt
 CALLs: sgnfvolld
 CALLEd by: sgnfetup

SUBROUTINE: vsgnfvleve
 PURPOSE: Calculates the volume for a VALVE.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 USEs MODULES: ValveVlt
 CALLs: sgnfvolld
 CALLEd by: sgnfetup

SUBROUTINE: vsgnhtstr
 PURPOSE: Calculates the volume for an HTSTR.
 SOURCE file: DataSgnfM.f90
 CONTAINED in: DataSgnf
 INCLUDEs files: constant
 USEs MODULES: HSArray RodVlt
 CALLEd by: sgnfetup

SUBROUTINE: vssl1
PURPOSE: Performs prepass calculations for VESSEL dynamics.
SOURCE file: VessTaskM.f90
CONTAINED in: VessTask
INCLUDEs files: massck
USEs MODULES: Bad Boundary Flt GlobalDat GlobalDim GlobalPnt OneDDat
SysService Util VectDrag VessArray VessArray3 VessCon VessMat
VessStbVel VessTf3dc VessVlt
CALLs: StbVelx StbVely StbVelz TableTransComp cif3 dvpscl error ifset
linint0 prefwd set3dbd setbdt setva timupd vrbd
CALLed by: prep3d

SUBROUTINE: vssl2
PURPOSE: Performs inner iterations for VESSEL dynamics.
SOURCE file: VessTaskM.f90
CONTAINED in: VessTask
USEs MODULES: Bad Bits Boundary CFaces Eos Flt Gen1DArray GenHeat Global
GlobalDat GlobalPnt Io Linear Network OneDDat SysService Temp
VessArray VessArray3 VessCon VessMat VessTF3DS VessTf3dc
VessTo1D VessVlt
CALLs: Htif3D TableTransComp Therm3D bakup cella3 fluxes set3dbd
setbdt tf3ds tf3ds1 tf3ds3 vssssr
CALLed by: out3d

SUBROUTINE: vssl3
PURPOSE: Performs postpass calculations for VESSEL dynamics.
SOURCE file: VessTaskM.f90
CONTAINED in: VessTask
INCLUDEs files: syssum
USEs MODULES: Bad Bits Boundary CFaces Eos Flt Global GlobalDat GlobalPnt
Matrices Network OneDDat RodGlobal SysService VessArray
VessArray3 VessCon VessMat VessStbME VessTf3dc VessTo1D
VessVlt
CALLs: Evaldf3D Fprop3D StbME3D Therm3D bakup bkstb3 ff3d gvssl2
mix3d set3dbd
CALLed by: post3d

SUBROUTINE: vssrod
PURPOSE: Transfers data between hydro and HTSTR databases.
SOURCE file: RodTaskM.f90
CONTAINED in: RodTask
INCLUDEs files: htcref3

USEs MODULES: Flt Global GlobalDat RodHtcref1 VessArray VessArray3 VessCon
CALLED by: fltom

SUBROUTINE: vssssr
PURPOSE: Performs steady-state change ratio calculations for the VESSEL.
SOURCE file: VessCrunchM.f90
CONTAINED in: VessCrunch
USEs MODULES: Flt GlobalDat GlobalPnt RodGlobal VessArray3 VessCon VessTf3dc VessVlt
CALLED by: vssl2

SUBROUTINE: warray
PURPOSE: Writes a real allocated array to output file TRCOUT.
SOURCE file: TextIoM.f90
CONTAINED in: TextIo
USEs MODULES: EngUnits GlobalDim
CALLs: justlr uncnvt unsvcb wlabr
CALLED by: elgr input pumpx rbreak rcntl rcomp rdcrvs rebrk rcntl refill repipe
 replen repump rerod1 resepd retee revlve revssl rfill rhtstr rlevel
 rpipe rplen rpump rrod2 rsepd rtee rvlve rvssl scltbl wrcomp

SUBROUTINE: wbreak
PURPOSE: Writes selected BREAK data to output file TRCOUT.
SOURCE file: BreakM.f90
CONTAINED in: Break
USEs MODULES: BreakVlt ControlDat EngUnits Flt GlobalDat GlobalPnt IntrType Io
CALLs: ecomp uncnvt
CALLED by: wcomp

SUBROUTINE: wcomp
PURPOSE: Controls the writing of selected component data to output file TRCOUT.
SOURCE file: wcomp.f90
INCLUDEs files: bignum stncom
USEs MODULES: Break CompTyp ControlDat EngUnits Fill Flt Global GlobalDat
 GlobalDim GlobalPnt IntrType Io Pipe Plenum Prizer Pump
 RodTask Sepd Tee Valve VessTask
CALLs: uncnvt wbreak wfill whtstr wpipe wplen wprizr wpump wsepd
 wtee wvlve wvssl
CALLED by: edit

SUBROUTINE: wdrag
PURPOSE: Evaluates coefficient of friction for liquid and vapor at the wall.

SOURCE file: wdrag.f90
USEs MODULES: IntrType
CALLED by: vfwall3

SUBROUTINE: wfill
PURPOSE: Writes selected FILL data to output file TRCOUT.
SOURCE file: FillM.f90
CONTAINED in: Fill
USEs MODULES: EngUnits FillVlt Flt IntrType Io
CALLs: ecomp uncnvt
CALLED by: wcomp

SUBROUTINE: whtstr
PURPOSE: Writes selected HTSTR data to output file TRCOUT.
SOURCE file: RodTaskM.f90
CONTAINED in: RodTask
INCLUDEs files: bignum
USEs MODULES: CompTyp EngUnits Eos Flt Global GlobalDat GlobalPnt Io RodVlt
CALLs: uncnvt uncnvts
CALLED by: wcomp

SUBROUTINE: wiarn
PURPOSE: Writes an allocated integer array to output file TRCOUT.
SOURCE file: TextIoM.f90
CONTAINED in: TextIo
CALLs: justlr wlabin
CALLED by: rcomp replen rerod1 revssl rhtstr rplen rvssl wrcomp

SUBROUTINE: wir
PURPOSE: Writes one to five real or integer variable values to a character string.
SOURCE file: ReadEchoM.f90
CONTAINED in: ReadEcho
USEs MODULES: BadInput Io
CALLs: error
CALLED by: readr reecho

SUBROUTINE: wlabi
PURPOSE: Edits labeled integer-valued input data that are to be read by the load subroutine using undimensioned arrays.
SOURCE file: TextIoM.f90
CONTAINED in: TextIo
USEs MODULES: Io

CALLED by:	input
SUBROUTINE:	wlabin
PURPOSE:	Edits labeled integer-valued input data that are to be read by the load subroutine using allocated arrays.
SOURCE file:	TextIoM.f90
CONTAINED in:	TextIo
USEs MODULES:	IntrType Io
CALLED by:	rcntl wiarn
SUBROUTINE:	wlabr
PURPOSE:	Edits labeled real-valued input data that are to be read by the load subroutine using undimensioned arrays.
SOURCE file:	TextIoM.f90
CONTAINED in:	TextIo
USEs MODULES:	IntrType Io
CALLED by:	warray wmxtyb
SUBROUTINE:	wlabrn
PURPOSE:	Edits labeled real-valued input data that are to be read by the load subroutine using allocated arrays.
SOURCE file:	TextIoM.f90
CONTAINED in:	TextIo
USEs MODULES:	IntrType Io
CALLED by:	rrod2
SUBROUTINE:	wlevel
PURPOSE:	Writes real VESSEL level array to output file TRCOUT.
SOURCE file:	VessTaskM.f90
CONTAINED in:	VessTask
USEs MODULES:	EngUnits Io VessArray VessCon
CALLs:	leveli uncvt
CALLED by:	ivssl wvssl
SUBROUTINE:	wmxtyb
PURPOSE:	Converts the units of input-array tabular data with one to four independent variable parameters for output to the INLAB or TRCOUT files and to SI units for the TRAC calculation using allocated arrays.
SOURCE file:	TextIoM.f90
CONTAINED in:	TextIo
USEs MODULES:	EngUnits GlobalDim Io
CALLs:	justlr uncvt wlabr

CALLED by: rcntl recntl repipe repump rerod1 resepd retee revlve rpipe rpump
 rrod2 rsepd rtee rvlve scltbl

SUBROUTINE: wpipe
 PURPOSE: Writes selected PIPE data to output file TRCOUT.
 SOURCE file: PipeM.f90
 CONTAINED in: Pipe
 USEs MODULES: EngUnits Flt GlobalDat IntrType Io PipeVlt
 CALLs: ecomp uncvt
 CALLED by: wcomp

SUBROUTINE: wplen
 PURPOSE: Writes selected PLENUM quantities to the output file TRCOUT.
 SOURCE file: PlenumM.f90
 CONTAINED in: Plenum
 USEs MODULES: Boundary EngUnits Flt Gen1DArray PlenVlt
 CALLs: uncvt
 CALLED by: wcomp

SUBROUTINE: wprizr
 PURPOSE: Writes selected PRIZER (Pressurizer) data to output file TRCOUT.
 SOURCE file: PrizerM.f90
 CONTAINED in: Prizer
 USEs MODULES: EngUnits Flt GlobalDat Io PrizeVlt
 CALLs: ecomp uncvt
 CALLED by: wcomp

SUBROUTINE: wpump
 PURPOSE: Writes selected PUMP data to output file TRCOUT.
 SOURCE file: PumpM.f90
 CONTAINED in: Pump
 USEs MODULES: Control EngUnits Flt GlobalDat IntrType Io PumpVlt
 CALLs: ecomp trip uncvt
 CALLED by: wcomp

SUBROUTINE: wrcomp
 PURPOSE: Writes data common to 1D components to output files.
 SOURCE file: wrcomp.f90
 USEs MODULES: Flt Gen1DArray Global GlobalDat IntArray IntrType TextIo
 CALLs: warray wiarn
 CALLED by: repipe reprzr repump resepd retee revlve

SUBROUTINE: wsepd
 PURPOSE: Writes selected SEPD (Separator) data to output file TRCOUT.
 SOURCE file: SepdM.f90
 CONTAINED in: Sepd
 USEs MODULES: EngUnits Io
 CALLs: ecomp uncnvt
 CALLED by: wcomp

SUBROUTINE: wtee
 PURPOSE: Writes selected TEE data to output file TRCOUT.
 SOURCE file: TeeM.f90
 CONTAINED in: Tee
 USEs MODULES: CompTyp EngUnits Flt GlobalDat IntrType Io TeeVlt
 CALLs: ecomp uncnvt
 CALLED by: wcomp

SUBROUTINE: wvlve
 PURPOSE: Writes selected VALVE data to output file TRCOUT.
 SOURCE file: ValveM.f90
 CONTAINED in: Valve
 USEs MODULES: EngUnits Flt Gen1DArray GlobalDat IntrType Io ValveVlt
 CALLs: ecomp uncnvt
 CALLED by: wcomp

SUBROUTINE: wvssl
 PURPOSE: Writes selected VESSEL data to output file TRCOUT.
 SOURCE file: VessTaskM.f90
 CONTAINED in: VessTask
 USEs MODULES: EngUnits Flt GlobalDat GlobalDim Io VessArray VessArray3 VessCon
 VessTf3dc VessVlt
 CALLs: uncnvt wlevel
 CALLED by: wcomp

SUBROUTINE: xtv1d
 PURPOSE: Writes index and data for generic variables of 1D components for XTV graphics.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 USEs MODULES: Flt Gen1DArray IntArray
 CALLs: LuMatch PrintVarDesc WriteSim2DArray WriteStSumV1
 WriteStaticV1 WriteValAsArray WriteValAsSArray cxtvxgd1a
 cxtvxgd1b cxtvxgd1c cxtvxvnt xtvbuf1 xtvbufs

CALLED by: xtvpipe xtvprzr xtvump xtvtee xtvvalv
 SUBROUTINE: xtvGnPr
 PURPOSE: Loads and dumps general pointer information to the graphics files.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 USEs MODULES: GlobalDat SysTime
 CALLs: PrintVarDesc cxtvxgnpr cxtvxvnt xtvbufs

SUBROUTINE: xtvbi3e
 PURPOSE: Converts values to IEEE format under UNICOS for XTV graphics.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 CALLs: cxtvbw1 cxtvxdata
 CALLED by: xtvbuf1 xtvbuf1o xtvbuf3

SUBROUTINE: xtvbrak
 PURPOSE: Writes BREAK graphics files.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 USEs MODULES: BreakArray BreakVlt Flt Gen1DArray
 CALLs: LuMatch PrintVarDesc WriteStaticV1 cxtvxbrak cxtvxvnt xtvbuf1
 xtvbufs
 CALLED by: xtvdr

SUBROUTINE: xtvbuf1
 PURPOSE: Buffers data to be sent to a C binary write routine and converts to IEEE format under UNICOS for XTV graphics using 1D allocated arrays.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 CALLs: xtvbi3e
 CALLED by: xtv1d xtvbrak xtvfill xtvht xtvplen

SUBROUTINE: xtvbuf1o
 PURPOSE: Buffers data to be sent to a C binary write routine and converts to IEEE format under UNICOS for XTV graphics using 1D undimensioned arrays.
 SOURCE file: XtvM.f90
 CONTAINED in: Xtv
 CALLs: xtvbi3e
 CALLED by: xtvbufs

SUBROUTINE: xtvbuf3
PURPOSE: Buffers data to be sent to a C binary write routine and converts to IEEE format under UNICOS for XTV graphics using 3D allocated arrays.
SOURCE file: XtvM.f90
CONTAINED in: Xtv
CALLs: xtvbi3e
CALLED by: xtvvsl

SUBROUTINE: xtvbufs
PURPOSE: Buffers data to be sent to a C binary write routine and converts to IEEE format under UNICOS for XTV graphics for scalar data.
SOURCE file: XtvM.f90
CONTAINED in: Xtv
CALLs: xtvbuflo
CALLED by: xtvld xtvGnPr xtvbrak xtvcntl xtvdr xtvfill xtvht xtvpipe xtvprzr xtvump xtvtee xtvvalv xtvvsl

SUBROUTINE: xtvcntl
PURPOSE: Writes index and data for control-block output-parameter values for XTV graphics.
SOURCE file: XtvM.f90
CONTAINED in: Xtv
CALLs: PrintVarDesc cxtvxcntl cxtvxvent xtvbufs
CALLED by: xtvdr

SUBROUTINE: xtvdr
PURPOSE: Main xtv driver routine that calls appropriate component-specific routine to perform a function.
SOURCE file: XtvM.f90
CONTAINED in: Xtv
USEs MODULES: Flt
CALLs: cxtvcl cxtvoal cxtvxarrupd cxtvxdatainit cxtvxupdcnts xtvbrak xtvbufs xtvcntl xtvfill xtvgnpr xtvht xtvpipe xtvplen xtvprzr xtvump xtvtee xtvvalv xtvvsl
CALLED by: init pstepq steady trans

SUBROUTINE: xtvfill
PURPOSE: Writes FILL graphics files.
SOURCE file: XtvM.f90
CONTAINED in: Xtv
USEs MODULES: FillArray FillVlt Flt Gen1DArray

CALLs: LuMatch PrintVarDesc WriteStaticV1 cxtvxfill cxtvxvcent xtvbuf1
xtvbufs

CALLED by: xtvdrr

SUBROUTINE: xtvdrr

PURPOSE: Writes index and data for HTSTR-component variables for XTV
graphics.

SOURCE file: XtvM.f90

CONTAINED in: Xtv

INCLUDEs files: bignum

USEs MODULES: Flt HSAArray RodVlt

CALLs: PrintVarDesc cxtvxhtr1 cxtvxhtr3 cxtvxhtr4 cxtvxhtr5 cxtvxhtr6
cxtvxhts1 cxtvxhts2 cxtvxvcent xtvbuf1 xtvbufs

CALLED by: xtvdrr

SUBROUTINE: xtvintr

PURPOSE: Defines names for all output variables, opens header file, and calls
cxtvtin to set the maximum datafile size for XTV graphics.

SOURCE file: XtvM.f90

CONTAINED in: Xtv

CALLs: GetLocalSysInfo LuMatch cxtvin cxtvxopn cxtvxstart error

CALLED by: init

SUBROUTINE: xtvpipr

PURPOSE: Writes index and data for PIPE variables and calls xtv1d for generic
1D variables for XTV graphics.

SOURCE file: XtvM.f90

CONTAINED in: Xtv

USEs MODULES: Flt Gen1DArray IntArray PipeVlt

CALLs: PrintVarDesc xtv1d xtvbufs

CALLED by: xtvdrr

SUBROUTINE: xtvpplr

PURPOSE: Writes index and data for PLENUM variables for XTV graphics.

SOURCE file: XtvM.f90

CONTAINED in: Xtv

USEs MODULES: Flt Gen1DArray PlenArray PlenVlt

CALLs: LuMatch PrintVarDesc WriteStaticV1 cxtvxpln1 cxtvxpln2 cxtvxpln3
cxtvxvcent xtvbuf1

CALLED by: xtvdrr

SUBROUTINE: xtvprrr

PURPOSE: Writes index and data for PRESSURIZER variables and calls xtv1d for generic 1D variables for XTV graphics.
SOURCE file: XtvM.f90
CONTAINED in: Xtv
USEs MODULES: Flt Gen1DArray IntArray PrizeVlt
CALLs: PrintVarDesc xtv1d xtvbufs
CALLED by: xtvdr

SUBROUTINE: xtvpump
PURPOSE: Writes index and data for PUMP variables and calls xtv1d for generic 1D variables for XTV graphics.
SOURCE file: XtvM.f90
CONTAINED in: Xtv
USEs MODULES: Flt Gen1DArray IntArray PumpVlt
CALLs: PrintVarDesc xtv1d xtvbufs
CALLED by: xtvdr

SUBROUTINE: xtvtee
PURPOSE: Writes index and data for TEE variables and calls xtv1d for generic 1D variables for XTV graphics.
SOURCE file: XtvM.f90
CONTAINED in: Xtv
USEs MODULES: Flt Gen1DArray IntArray TeeVlt
CALLs: PrintVarDesc xtv1d xtvbufs
CALLED by: xtvdr

SUBROUTINE: xtvvalv
PURPOSE: Writes index and data for VALVE variables and calls xtv1d for generic 1D variables for XTV graphics.
SOURCE file: XtvM.f90
CONTAINED in: Xtv
USEs MODULES: Flt Gen1DArray IntArray ValveVlt
CALLs: PrintVarDesc xtv1d xtvbufs
CALLED by: xtvdr

SUBROUTINE: xtvvsl
PURPOSE: Writes index and data for VESSEL variables for XTV graphics.
SOURCE file: XtvM.f90
CONTAINED in: Xtv
USEs MODULES: Flt VessArray VessArray3 VessVlt
CALLs: LuMatch PrintVarDesc WriteStaticV3 cxtvxvnt cxtvxvsl1 cxtvxvsl2 cxtvxvsl3 xtvbuf3 xtvbufs
CALLED by: xtvdr

SUBROUTINE: zcore
 PURPOSE: Evaluates axial locations for CHF and transition boiling within the core and computes associated void fractions.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 INCLUDEs files: diddlh htcres2 refhti refhti2
 USEs MODULES: VessCon
 CALLED by: core1

SUBROUTINE: zeroV
 PURPOSE: Zeroes velocities at zero flow areas.
 SOURCE file: VessTF3DSM.f90
 CONTAINED in: VessTF3DS
 USEs MODULES: VessArray3 VessCon VessVlt
 CALLED by: tf3ds1

SUBROUTINE: zpwhci
 PURPOSE: Evaluates axial power shape based on user input.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 CALLED by: core1 irod

SUBROUTINE: zpwnrm
 PURPOSE: Normalizes the 1D or 2D axial-power distribution to a spatially averaged value of unity.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 USEs MODULES: CompTyp
 CALLED by: core1 rrod2

SUBROUTINE: zpwrcl
 PURPOSE: Interpolates the r- or x-direction power shapes from zpwf at the axial locations of the node rows.
 SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 USEs MODULES: CompTyp
 CALLs: error
 CALLED by: core1 irod

B.6. FUNCTIONS

FUNCTION: Adj1DEdge
PURPOSE: Given an input integer index to a `junCells` element, returns the system variable index corresponding to the face on the opposite side of that junction cell (one face into the same 1D mesh segment).
Source file: SysConfigM.f90
CONTAINED in: SysConfig

FUNCTION: Adj3DEdge
PURPOSE: Given an input integer index to a `junCells` element, returns the system variable index corresponding to the face opposite the connection within the 3D mesh segment for `junCells(i)%compnum`. This function assumes a logically rectangular structure to the 3D mesh.
SOURCE file: SysConfigM.f90
CONTAINED in: SysConfig
USES MODULES: VessVlt

FUNCTION: AreContigC
PURPOSE: Checks to see if volumes indexed `iv1` and `iv2` are immediately contiguous on the 1D mesh. This requires that the connection from at least one cell is via a mesh face within or at one of the two ends of a 1D mesh.
Source file: SetMatM.f90
CONTAINED in: SetMat

FUNCTION: AreContigE
PURPOSE: Checks to see if cell edges indexed `ie1` and `ie2` are immediately contiguous on the 1D mesh.
Source file: SetMatM.f90
CONTAINED in: SetMat

FUNCTION: GetEosDriv1d
PURPOSE: Returns a scalar equation of state derivative from the inverted container array `driv`.
SOURCE file: Gen1DArrayM.f90
CONTAINED in: Gen1DArray
USES MODULES: Global

FUNCTION: GetGen1D
PURPOSE: Returns the pointer for a generic 1D-component array.
SOURCE file: Gen1DArrayM.f90
CONTAINED in: Gen1DArray

CALLs:	Get1DArrayPointer
FUNCTION:	GetGen1D2D
PURPOSE:	Returns the pointer for a generic 1D-component, 2D array.
SOURCE file:	Gen1DArrayM.f90
CONTAINED in:	Gen1DArray
CALLs:	Get2DArrayPointer
FUNCTION:	GetHS
PURPOSE:	Returns the pointer for a 1D HTSTR-component array.
SOURCE file:	HSArrayM.f90
CONTAINED in:	HSArray
CALLs:	GetHS1DPtr
FUNCTION:	GetHS2d
PURPOSE:	Returns the pointer for a 2D HTSTR-component array.
SOURCE file:	HSArrayM.f90
CONTAINED in:	HSArray
CALLs:	GetHS2DPtr
FUNCTION:	GetHS3d
PURPOSE:	Returns the pointer for a 3D HTSTR-component array.
SOURCE file:	HSArrayM.f90
CONTAINED in:	HSArray
CALLs:	GetHS3DPtr
FUNCTION:	GetHSSurf
PURPOSE:	Returns the pointer for a 3D HTSTR surface.
SOURCE file:	HSArrayM.f90
CONTAINED in:	HSArray
CALLs:	GetHS3DPtr
FUNCTION:	GetNoht
PURPOSE:	Returns the pointer for an unheated ROD array.
SOURCE file:	HSArrayM.f90
CONTAINED in:	HSArray
USEs MODULEs:	Global
FUNCTION:	GetSysTime
PURPOSE:	Returns the current system time.
SOURCE file:	SysTimeM.f90
CONTAINED in:	SysTime

CALLs:	SYSTEM_CLOCK
FUNCTION:	GetVSAR
PURPOSE:	Returns pointer values for the 3D VESSEL component.
SOURCE file:	VessArray3M.f90
CONTAINED in:	VessArray3
FUNCTION:	IndAob
PURPOSE:	Given a sparse matrix row index and a system variable index, returns the index in aIndE(irow)%aob containing the value ivar. (This function should be removed once a general junction treatment for momentum transfer is installed.)
SOURCE file:	Gen1DCrunchM.f90
CONTAINED in:	Gen1DCrunch
FUNCTION:	InteriorJunNum
PURPOSE:	Creates a unique negative integer for use as a junction number for interior (e.g., TEE primary to secondary) component junctions. This relies on the module variable intJunNum to act as source of unique (and sequential) negative numbers.
SOURCE file:	SysConfigM.f90
CONTAINED in:	SysConfig
FUNCTION:	JunCellsIndex
PURPOSE:	Given an input junction number jun and adjacent cell number icell, searches the component with index ijcmp to find the index in junCells giving information on the cell adjacent to that junction. (Returns an INTEGER value.)
Source file:	SysConfigM.f90
CONTAINED in:	SysConfig
FUNCTION:	SDOTT
PURPOSE:	Computes single-precision inner product of single-precision vectors.
SOURCE file:	LinearM.f90
CONTAINED in:	Linear
FUNCTION:	allblk
PURPOSE:	Tests for all blanks in specified substring of string.
SOURCE file:	PreInputM.f90
CONTAINED in:	PreInput
FUNCTION:	btestc
PURPOSE:	C implementation of the Fortran 90 btest bit intrinsic function.

SOURCE file: CFacesM.f90
 CONTAINED in: CFaces

FUNCTION: cdthex
 PURPOSE: Evaluates the diametral thermal expansion of Zircaloy as a function of temperature.

SOURCE file: RodCrunchM.f90
 CONTAINED in: RodCrunch
 USEs MODULES: Util
 CALLs: linint0

FUNCTION: cepsilon
 PURPOSE: C implementation of the Fortran 90 epsilon intrinsic function.

SOURCE file: CFacesM.f90
 CONTAINED in: CFaces

FUNCTION: concf
 PURPOSE: Returns maximum solubility (kg solute/kg water) for species *i* spec at pressure *p* and water temperature *tl*.

SOURCE file: UtilM.f90
 CONTAINED in: Util
 INCLUDEs files: solcon

FUNCTION: courno
 PURPOSE: Defines the maximum material Courant number for the VESSEL component.

SOURCE file: UtilM.f90
 CONTAINED in: Util
 USEs MODULES: GlobalDat

FUNCTION: cpll
 PURPOSE: Determines the specific heat of D2O or H2O liquid as a function of enthalpy and pressure by calling *cp11d* or *cp11h*.

SOURCE file: EosNoInlineM.f90
 CONTAINED in: EosNoInline

FUNCTION: cp11d
 PURPOSE: Evaluates the specific heat of D2O liquid as a function of enthalpy and pressure.

SOURCE file: EosNoInlineM.f90
 CONTAINED in: EosNoInline

FUNCTION: cp11h

PURPOSE:	Evaluates the specific heat of H ₂ O liquid as a function of enthalpy and pressure.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	cpvv1
PURPOSE:	Determines the specific heat of D ₂ O or H ₂ O vapor as a function of temperature and pressure by calling cpvv1d or cpvv1h.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	cpvv1d
PURPOSE:	Evaluates the specific heat of D ₂ O vapor as a function of temperature and pressure.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
USEs MODULES:	GlobalDat
FUNCTION:	cpvv1h
PURPOSE:	Evaluates the specific heat of H ₂ O vapor as a function of temperature and pressure.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
USEs MODULES:	GlobalDat
FUNCTION:	ddot
PURPOSE:	Forms the dot product of two vectors.
SOURCE file:	LinearM.f90
CONTAINED in:	Linear
FUNCTION:	fthex
PURPOSE:	Evaluates the fuel linear thermal-expansion coefficient for uranium dioxide and MOX fuels.
SOURCE file:	RodCrunchM.f90
CONTAINED in:	RodCrunch
FUNCTION:	gettype
PURPOSE:	Returns component name (e.g., PIPE) from component-type number (e.g., 1.0).
SOURCE file:	CompTypM.f90
CONTAINED in:	CompTyp
FUNCTION:	hev

PURPOSE:	Determines the heat of evaporation of D2O or H2O liquid corresponding to a given temperature at low pressure.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	hevd
PURPOSE:	Evaluates the heat of evaporation of D2O liquid corresponding to a given temperature at low pressure.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	hevh
PURPOSE:	Evaluates the heat of evaporation of H2O liquid corresponding to a given temperature at low pressure.
SOURCE file:	EosInlineM.f90
CONTAINED in:	EosInline
FUNCTION:	hunts
PURPOSE:	Searches character string for specified search string.
SOURCE file:	PreInputM.f90
CONTAINED in:	PreInput
FUNCTION:	ibclrc
PURPOSE:	C implementation of the Fortran 90 ibclr bit intrinsic function.
SOURCE file:	CFacesM.f90
CONTAINED in:	CFaces
FUNCTION:	ibsetc
PURPOSE:	C implementation of the Fortran 90 ibset bit intrinsic function.
SOURCE file:	CFacesM.f90
CONTAINED in:	CFaces
FUNCTION:	idamax
PURPOSE:	Finds the index of the element having the maximum absolute value.
SOURCE file:	LinearM.f90
CONTAINED in:	Linear
FUNCTION:	idel
PURPOSE:	Searches specified substring of string for any one character in a set of specified characters.
SOURCE file:	PreInputM.f90
CONTAINED in:	PreInput

FUNCTION:	indel
PURPOSE:	Searches specified substring of string for first nonoccurrence of any one character in a set of specified characters.
SOURCE file:	PreInputM.f90
CONTAINED in:	PreInput
FUNCTION:	jfind
PURPOSE:	Locates junctions in junction sequence array.
SOURCE file:	UtilM.f90
CONTAINED in:	Util
USES MODULES:	IntrType
CALLs:	error
FUNCTION:	jvalue
PURPOSE:	Converts one character of a string to a binary number: 0–9 returned as binary mode; blank, as binary 0; all others, as less than 0.
SOURCE file:	UtilM.f90
CONTAINED in:	Util
FUNCTION:	ltopp
PURPOSE:	Determines if velocities at opposite faces of a TEE-component JCELL are both directed into the JCELL.
SOURCE file:	UtilM.f90
CONTAINED in:	Util
CALLs:	error
FUNCTION:	numtoicomp
PURPOSE:	Returns the ordered component index of the input component number.
SOURCE file:	UtilM.f90
CONTAINED in:	Util
USES MODULES:	Global GlobalPnt
FUNCTION:	rttr
PURPOSE:	Determines coefficient for momentum convection across the TEE internal junction.
SOURCE file:	UtilM.f90
CONTAINED in:	Util
USES MODULES:	OneDDat
CALLs:	error
FUNCTION:	sasumt
PURPOSE:	Evaluates the sum of the magnitudes of vector elements.

SOURCE file:	LinearM.f90
CONTAINED in:	Linear
FUNCTION:	satded
PURPOSE:	Evaluates the derivative of the saturation temperature with respect to pressure for D2O vapor.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	satdeh
PURPOSE:	Evaluates the derivative of the saturation temperature with respect to pressure for H2O vapor.
SOURCE file:	EosInlineM.f90
CONTAINED in:	EosInline
FUNCTION:	satder
PURPOSE:	Determines the derivative of the saturation temperature with respect to pressure for D2O or H2O vapor by calling satded or satdeh.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	satprd
PURPOSE:	Evaluates the saturation pressure of D2O vapor at a given vapor temperature.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	satprh
PURPOSE:	Evaluates the saturation pressure of H2O vapor at a given vapor temperature.
SOURCE file:	EosInlineM.f90
CONTAINED in:	EosInline
FUNCTION:	satprs
PURPOSE:	Determines the saturation pressure of D2O or H2O vapor at a given temperature by calling satprd or satprh.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	sattmd
PURPOSE:	Evaluates the saturation temperature of D2O vapor at a given pressure.
SOURCE file:	EosNoInlineM.f90

CONTAINED in:	EosNoInline
FUNCTION:	sattmh
PURPOSE:	Evaluates the saturation temperature of H2O vapor at a given pressure.
SOURCE file:	EosInlineM.f90
CONTAINED in:	EosInline
FUNCTION:	sattmp
PURPOSE:	Determines the saturation temperature of D2O or H2O vapor at a given pressure by calling sattmd or sattmh.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	sigma
PURPOSE:	Returns surface tension of water as a function of pressure.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	teemet
PURPOSE:	Evaluates the explicit third term of TEE internal-junction momentum convection.
SOURCE file:	UtilM.f90
CONTAINED in:	Util
USES MODULES:	OneDDat
CALLs:	error
FUNCTION:	teemf1
PURPOSE:	Evaluates the coefficient of the implicit first term of TEE internal-junction momentum convection.
SOURCE file:	UtilM.f90
CONTAINED in:	Util
USES MODULES:	OneDDat
CALLs:	error
FUNCTION:	teemf2
PURPOSE:	Evaluates the coefficient of the implicit second term of TEE internal-junction momentum convection.
SOURCE file:	UtilM.f90
CONTAINED in:	Util
FUNCTION:	teemom

PURPOSE:	Evaluates the TEE internal-junction three momentum-convection terms by calling teemet, teemf1, and teemf2.
SOURCE file:	UtilM.f90
CONTAINED in:	Util
CALLs:	error
FUNCTION:	thcl
PURPOSE:	Determines the thermal conductivity of D2O or H2O as a function of pressure and enthalpy by calling thcl d or thcl h.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	thcl d
PURPOSE:	Evaluates the thermal conductivity of D2O as a function of pressure and enthalpy.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	thcl h
PURPOSE:	Evaluates the thermal conductivity of H2O as a function of pressure and enthalpy.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	thcv
PURPOSE:	Evaluates thermal conductivity of steam as a function of pressure and enthalpy.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
USEs MODULEs:	GlobalDat
FUNCTION:	tofric
PURPOSE:	Returns the value of tofric for the SEPARATOR component.
SOURCE file:	SepdM.f90
CONTAINED in:	Sepd
FUNCTION:	tokfac
PURPOSE:	Returns the value of tokfac for the SEPARATOR component.
SOURCE file:	SepdM.f90
CONTAINED in:	Sepd
FUNCTION:	viscl

PURPOSE:	Determines the viscosity of D2O or H2O liquid as a function of pressure and enthalpy by calling viscl _d or viscl _h .
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	viscl _d
PURPOSE:	Evaluates the viscosity of D2O liquid as a function of pressure and enthalpy.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	viscl _h
PURPOSE:	Evaluates the viscosity of H2O liquid as a function of pressure and enthalpy.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	viscv
PURPOSE:	Determines the viscosity of D2O or H2O vapor as a function of pressure and enthalpy by calling viscv _d or viscv _h .
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
FUNCTION:	viscv _d
PURPOSE:	Evaluates the viscosity of D2O vapor as a function of pressure and enthalpy.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
USEs MODULES:	GlobalDat
FUNCTION:	viscv _h
PURPOSE:	Evaluates the viscosity of H2O vapor as a function of pressure and enthalpy.
SOURCE file:	EosNoInlineM.f90
CONTAINED in:	EosNoInline
USEs MODULES:	GlobalDat
FUNCTION:	wjcell
PURPOSE:	Evaluates the j _{cell} width seen by the adjacent side-channel cell from which the pressure gradient across the internal junction is defined.
SOURCE file:	TeeM.f90
CONTAINED in:	Tee

B.7. BLOCK DATAs

BLOCK DATA: blkdat
PURPOSE: Defines block data.
Source file: blkdat.f90
INCLUDEs files: bandw cflow chfint chgalp ciflim cnrslv constant decayc defval
diddle diddlh diddli dlimit dtinfo elvkf film h2fdbk htcav htcref3
htcs ifcrs junction refhti refhti2 rows solcon stncom strtnt tst3d
vckdat vdvmod webnum
CALLED by: trac

B.8. INCLUDE files

INCLUDE: bandw
PURPOSE: Defines common block bandw.
Source file: bandw.h
INCLUDEd by: blkdat ivssl out3d post3d prep3d

INCLUDE: bignum
PURPOSE: Contains data statements to initialize the arrays used to display the
TRAC-M big numbers.
Source file: bignum.h
INCLUDEd by: input rdrest wcomp whtstr xtvht

INCLUDE: boil
PURPOSE: Defines common block boil.
Source file: boil.h
INCLUDEd by: tf3ds

INCLUDE: cflow
PURPOSE: Defines common block cflow.
Source file: cflow.h
INCLUDEd by: StbVel1D blkdat choke input namlst rcomp rsepd rtee tf1ds1

INCLUDE: chfint
PURPOSE: Defines common block chfint.
Source file: chfint.h
INCLUDEd by: blkdat chf1 htcor htvssl

INCLUDE: chgalp
PURPOSE: Defines common block chgalp.

Source file: chgalp.h
INCLUDED by: bkstb3 blkdat dmpit newdlt plen3 post poster rdrest

INCLUDE: ciflim
PURPOSE: Defines common block ciflim.
Source file: ciflim.h
INCLUDED by: StbVel1D blkdat cif3

INCLUDE: cnrslv
PURPOSE: Defines common block cnrslv.
Source file: cnrslv.h
INCLUDED by: bansol blkdat htstr3 input namlst rodht

INCLUDE: concck
PURPOSE: Defines common block concck.
Source file: concck.h
INCLUDED by: input rcomp

INCLUDE: condht
PURPOSE: Defines common block condht.
Source file: condht.h
INCLUDED by: core1 htcor httpipe htvssl

INCLUDE: constant
PURPOSE: Defines common block constant.
Source file: constant.h
INCLUDED by: StbVel1D StbVelz blkdat breakx chen chf1 choke cif3 compi core1
cylht fillx fwall hlfilm hlflmr htcor htif httpipe htstrp htvssl hvfilm
hvnb ibrk ifill input iplen iprizr irod itee linint mwrp offtke poster
powint prefwd pumpd pumpsr pumpx resepd retee revssl rhtstr
rodht rsepd rtee rvssl sepdi sepdx sgnhtstr svset1 tee3 tf1ds1 tf3ds1
timstp vsghntstr

INCLUDE: decayc
PURPOSE: Defines common block decayc.
Source file: decayc.h
INCLUDED by: blkdat decays dhtstr rehtst rhtstr rkin rrod1 rrod2

INCLUDE: defval
PURPOSE: Defines common block defval.
Source file: defval.h
INCLUDED by: blkdat input loadn loado namlst rcomp rplen rvssl

INCLUDE: diddle
 PURPOSE: Defines common block diddle.
 Source file: diddle.h
 INCLUDED by: StbVel1D StbVelx StbVely blkdat cella3 cellav cif3 htif plen2 prefwd
 tf1ds tf3ds tfpln

INCLUDE: diddlh
 PURPOSE: Defines common block diddlh.
 Source file: diddlh.h
 INCLUDED by: blkdat chf1 cif3 core1 hlflm hlflmr htcor htif htpipe htvssl input
 namlst steady tf1ds trans zcore

INCLUDE: diddli
 PURPOSE: Defines common block diddli.
 Source file: diddli.h
 INCLUDED by: blkdat tf1ds tf3ds

INCLUDE: dlimit
 PURPOSE: Defines common block dlimit.
 Source file: dlimit.h
 INCLUDED by: blkdat dmpit hout newdlt prep1d rdrest rkin sedit timestp vlvox

INCLUDE: dtinfo
 PURPOSE: Defines common block dtinfo.
 Source file: dtinfo.h
 INCLUDED by: bkstb3 blkdat newdlt plen3 poster tf1ds1 trpset

INCLUDE: elvkf
 PURPOSE: Defines common block elvkf.
 Source file: elvkf.h
 INCLUDED by: blkdat chkbd civssl core1 dmpit elgr ibrk icomp ifill input ipipe iplen
 iprizr ipump itee ivlve iwall3 namlst rbreak rcomp rdrest rhtstr
 rpump rvssl

INCLUDE: film
 PURPOSE: Defines common block film.
 Source file: film.h
 INCLUDED by: blkdat cif3 core1 htif prefwd

INCLUDE: h2fdbk
 PURPOSE: Defines common block h2fdbk.
 Source file: h2fdbk.h
 INCLUDED by: blkdat input

INCLUDE: htcav
PURPOSE: Defines common block htcav.
Source file: htcav.h
INCLUDEd by: blkdat htcor htvssl

INCLUDE: htcref2
PURPOSE: Defines common block htcref2.
Source file: htcref2.h
INCLUDEd by: core1 zcore

INCLUDE: htcref3
PURPOSE: Defines common block htcref3.
Source file: htcref3.h
INCLUDEd by: blkdat core1 htif htstr1 htvssl vssrod

INCLUDE: htcs
PURPOSE: Defines common block htcs.
Source file: htcs.h
INCLUDEd by: blkdat htcor htvssl input namlst rhtstr

INCLUDE: ifcrs
PURPOSE: Defines common block ifcrs.
Source file: ifcrs.h
INCLUDEd by: StbVel1D blkdat cif3 core1 htif htvssl ivssl rhtstr rodht

INCLUDE: infohl
PURPOSE: Defines common block infohl.
Source file: infohl.h
INCLUDEd by: hlflmr htvssl

INCLUDE: junction
PURPOSE: Defines common block junction.
Source file: junction.h
INCLUDEd by: blkdat icomp input rbreak rebrk refill repipe replen reprzr repump
 resepdt retee revlve revssl rfill rpipe rplen rprizr rpump rsepdt retee
 rvlve rvssl srltp

INCLUDE: massck
PURPOSE: Defines common block massck.
Source file: massck.h
INCLUDEd by: dmpit flux input rdrest steady trans vssl1

INCLUDE:	nrcmp
PURPOSE:	Defines common block nrcmp.
Source file:	nrcmp.h
INCLUDEd by:	input rdrest
INCLUDE:	refhti
PURPOSE:	Defines common block refhti.
Source file:	refhti.h
INCLUDEd by:	blkdat core1 hlflmr htif htvssl zcore
INCLUDE:	refhti2
PURPOSE:	Defines common block refhti2.
Source file:	refhti2.h
INCLUDEd by:	blkdat cif3 core1 hlflmr htif htvssl prefwd zcore
INCLUDE:	rows
PURPOSE:	Defines common block rows.
Source file:	rows.h
INCLUDEd by:	blkdat input tflds tfpln
INCLUDE:	solcon
PURPOSE:	Defines common block solcon.
Source file:	solcon.h
INCLUDEd by:	blkdat concf input
INCLUDE:	stncom
PURPOSE:	Defines common block stncom.
Source file:	stncom.h
INCLUDEd by:	blkdat core1 wcomp
INCLUDE:	strtnt
PURPOSE:	Defines common block strtnt.
Source file:	strtnt.h
INCLUDEd by:	StbVel1D blkdat cella3
INCLUDE:	supres
PURPOSE:	Defines common block supres.
Source file:	supres.h
INCLUDEd by:	chen htcor htvssl
INCLUDE:	syssum
PURPOSE:	Defines common block syssum.

Source file: syssum.h
INCLUDED by: bksstb bkstb3 gvssl1 hout post prizr3 vssl3

INCLUDE: totals
PURPOSE: Defines common block totals.
Source file: totals.h
INCLUDED by: rcomp rpipe rsepd rtee

INCLUDE: tst3d
PURPOSE: Defines common block tst3d.
Source file: tst3d.h
INCLUDED by: StbVel1D StbVelx StbVely StbVelz blkdat cif3 htif input namlst tf1ds1 tf3ds tf3ds1

INCLUDE: vckdat
PURPOSE: Defines common-block vckdat.
Source file: vckdat.h
INCLUDED by: blkdat

INCLUDE: vdvmod
PURPOSE: Defines common block vdvmod.
Source file: vdvmod.h
INCLUDED by: StbVel1D StbVelz blkdat tf1ds1 tf3ds1

INCLUDE: vellim
PURPOSE: Defines common block vellim.
Source file: vellim.h
INCLUDED by: StbVel1D out1d pump2 pumpsr tf1ds1

INCLUDE: webnum
PURPOSE: Defines common block webnum.
Source file: webnum.h
INCLUDED by: StbVel1D blkdat cella3 cif3 htif