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Information processing systems — Computer graphics — Programmer's Hierarchical Interactive Graphics System (PHIGS) language bindings —

Part 1: FORTRAN

Systèmes de traitement de l'information — Infographie — Interfaces langage entre un programme d'application et son support graphique —

Partie 1: FORTRAN

Reference number
ISO/IEC 9593-1:1990(E)

Contents

Annexes

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 9593-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

ISO/IEC 9593 consists of the following parts, under the general title *Information processing systems — Computer graphics — Programmer's Hierarchical Interactive Graphics System (PHIGS) language bindings* :

— *Part 1: FORTRAN*

— *Part 2: Extended Pascal*

— *Part 3: ADA*

— *Part 4: C*

Annex B forms an integral part of this part of ISO/IEC 9593. Annex A is for information only.

Introduction

The Programmer's Hierarchical Interactive Graphics System (PHIGS), the functional description of which is given in ISO/IEC 9592-1, is specified in a language independent manner and needs to be embedded in language dependent layers (language bindings) for use with particular programming languages.

The purpose of this part of ISO/IEC 9593 is to define a standard binding for the FORTRAN computer programming language.

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Information processing systems — Computer graphics — Programmer's Hierarchical Interactive Graphics System (PHIGS) language bindings —

Part 1: FORTRAN

1 Scope

ISO/IEC 9592-1 specifies a language independent nucleus of a graphics system. For integration into a programming language, PHIGS is embedded in a language dependent layer obeying the particular conventions of that language. This part of ISO/IEC 9593 specifies such a language dependent layer for the FORTRAN language.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 9593. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 9593 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1539 : 1980, *Information processing systems - Programming Languages - FORTRAN.*

ISO/IEC 9592-1 : 1989, *Information processing systems - Computer graphics - Programmer's Hierarhical Interactive Graphics System (PHIGS) - Part 1 - functional description.*

ISO/IEC TR 9973 : 1988, *Information processing - Procedures for registration of graphical items.*

3 Principles

3.1 Specification

This part of ISO/IEC 9593 defines the PHIGS language binding interface for FORTRAN 77, as described in ISO 1539 : 1980. With some minor modifications, application programs can be transported between full FORTRAN 77 and FORTRAN 77 Subset PHIGS installations.

3.2 Mapping of PHIGS function names to FORTRAN subroutine names

The function names of PHIGS are all mapped to FORTRAN subroutine names that start with the letter 'P'. The mapping is generally done in a one-to-one correspondence to functions defined in ISO/IEC 9592-1. However, some functions are split into more than one subroutine in this binding, due to the number of parameters required. The remaining letters after the first one are obtained by deriving a unique acronym from the words of the function name; e.g., OPEN becomes OP, WORKSTATION becomes WK. Hence, the FORTRAN subroutine name of PHIGS function OPEN WORKSTATION is POPWK. For a list of all abbreviations, see clause 4. Names used internally that may be known outside PHIGS, e.g., during linking, start with some easily recognized and documented form such as 'PH' (subroutine, function, and common block names). Therefore, no external names starting with this construct should be chosen when using PHIGS, in order to avoid name conflicts.

3.3 Parameters

In general, the order of PHIGS function parameters is preserved. For some subroutines, however, there are additional parameters that have been inserted in the normal parameter sequence (e.g., array length for arrays).

Values of input parameters are unaltered by any PHIGS function as well as PACK DATA RECORD and UNPACK DATA RECORD.

In order that any element of a list (member of a set), such as the set of structure names, can be inquired, in this binding the inquiry functions return only a single element of a list (member of a set). In addition, the total number of elements of the list (members of the set) is always returned. The elements (members) are numbered starting from 1; each invocation of the inquiry function requires the desired element (member) number as an input parameter and returns the corresponding element (member). When the list (set) is empty, a zero is returned as the number of elements (members) and the parameter representing the single element (member) in the list is undefined.

3.4 The FORTRAN subset

The binding for FORTRAN 77 Subset is different from that for full FORTRAN 77 in order to accommodate the FORTRAN 77 Subset restrictions.

Those PHIGS subroutines in the full FORTRAN 77 binding that have arguments of type CHARACTER*(*) have alternative subroutine definitions that include fixed length character strings, CHARACTER*80, for the Subset.

In some cases an additional INTEGER parameter (the number of characters) appears in the parameter list and the Subset version is distinguished by the addition of a final 'S', so that they can coexist in the same implementation. In other cases the INTEGER is already present and the FORTRAN 77 Subset version has the same name as the full FORTRAN 77 version.

A full FORTRAN 77 implementation shall include both subroutines when the names are distinct and only the full FORTRAN 77 version when the names are the same.

The enumeration values in this binding may be redefined by replacing the PARAMETER statements with corresponding DATA statements.

3.5 Error handling

There are two error routines in every PHIGS system, named PERLOG and PERHND. The user may replace the latter with his/her own subroutine using the same name, PERHND, and calling sequence. Furthermore, this user-defined error routine may call the system-defined error logging procedure PERLOG.

4 Generating FORTRAN subroutine names

For the binding of the PHIGS functions that inquire lists (sets), the word 'element' ('member') is added to the PHIGS name.

The derivation of the abbreviation for the subroutine names is performed in several steps. First, plurals are reduced to their singular form, and then compound terms are reduced to maintain uniqueness and appropriate name length. Finally, each remaining word is replaced by the null string or by an abbreviation.

Table 1 - Reduction of plurals to singulars

DEVICES	→	DEVICE
ELEMENTS	→	ELEMENT
EVENTS	→	EVENT
FILES	→	FILE
IDENTIFIERS	→	IDENTIFIER
INDICES	→	INDEX
LABELS	→	LABEL
LENGTHS	→	LENGTH
NETWORKS	→	NETWORK
PATHS	→	PATH
PRIMITIVES	→	PRIMITIVE
PRIORITIES	→	PRIORITY
REFERENCES	→	REFERENCE
TRANSFORMATIONS	→	TRANSFORMATION
STRUCTURES	→	STRUCTURE
TYPES	→	TYPE
WORKSTATIONS	→	WORKSTATION

Generating FORTRAN subroutine names

Table 2 - Reduce compound terms for uniqueness

ANNOTATION TEXT CHARACTER HEIGHT	→	ATCH
ANNOTATION TEXT CHARACTER UP	→	ATCU
INQUIRE ANNOTATION TEXT	→	QAT
SET ANNOTATION TEXT	→	SAT
ANNOTATION TEXT RELATIVE	→	ATR
ARCHIVE ALL	→	ARA
ARCHIVE STRUCTURE IDENTIFIER	→	ASID
IDENTIFIER AND REFERENCE	→	IR
CHANGE STRUCTURE IDENTIFIER	→	CSTID
DELETE ALL STRUCTURE	→	DAS
DYNAMICS OF STRUCTURE	→	DSTR
DYNAMICS OF WORKSTATION ATTRIBUTES	→	DSWA
EDGE FLAG	→	EDFG
ELEMENT POINTER	→	EP
ELEMENT CONTENT	→	ECO
ELEMENT TYPE AND SIZE	→	ETS
ERROR HANDLING MODE	→	ERHM
EVALUATE VIEW MAPPING MATRIX	→	EVMM
EVALUATE VIEW ORIENTATION MATRIX	→	EVOM
GENERALIZED STRUCTURE ELEMENT	→	GSE
INDIVIDUAL ASF	→	IASF
LIST OF	→	E
E AVAILABLE GENERALIZED DRAWING PRIMITIVE 3	→	EGD3
MAXIMUM LENGTH	→	L
MODELLING CLIPPING VOLUME	→	MCV
MODELLING CLIPPING	→	MCL
PATTERN REFERENCE POINT AND VECTORS	→	PRPV
PATTERN REFERENCE POINT	→	PARF
RETRIEVE ALL	→	RA
RETRIEVE STRUCTURE IDENTIFIER	→	RSID
SET OF	→	element
STRUCTURE IDENTIFIER	→	SID
STRUCTURE PATH	→	STPA
STRUCTURE NETWORK	→	SN
STRUCTURE STATE	→	STRS
TEXT FONT	→	TXFN
TRANSFORM POINT	→	TP
UNPOST ALL	→	UPA
VIEW TRANSFORMATION	→	VT
WORKSTATION STATE VALUE	→	WKST
(FORTRAN 77 subset)	→	S

Table 3 - Deletions

element	ALL	AND	AT	AVAILABLE
BETWEEN	DATA	DEVICE	EVENT	FACTOR
FROM	IN	LIST	METAFILE	MORE
NAMES	NUMBER	OF	SIZE	SUPPORTED
TABLE	TO	TYPE	VALUE	VECTOR
WHICH				

Table 4 - Abbreviations

3	→	3	EMPTY	→	EM
ADD	→	AD	ERROR	→	ER
ALIGNMENT	→	AL	ESCAPE	→	ESC
ANCESTORS	→	AN	EVALUATE	→	EV
ANNOTATION	→	AN	EXECUTE	→	EX
APPLICATION	→	AP	EXPANSION	→	XP
ARCHIVE	→	AR	EXTENT	→	X
AREA	→	A	FACILITIES	→	F
ARRAY	→	A	FILE	→	F
ASF	→	ASF	FILL	→	F
AWAIT	→	WAIT	FILTER	→	FT
BUILD	→	BL	FLAG	→	F
CATEGORY	→	CA	FLUSH	→	FLUSH
CELL	→	C	FONT	→	F
CHANGE	→	C	GENERALIZED	→	G
CHARACTER	→	CH	GET	→	GT
CHOICE	→	CH	GLOBAL	→	GM
CLASSIFICATION	→	CL	HANDLING	→	HND
CLOSE	→	CL	HEIGHT	→	H
COLOUR	→	C	HIGHLIGHTING	→	HL
COMPOSE	→	CO	HLHSR	→	HR
CONFLICT	→	CN	IDENTIFIER	→	ID
CONFLICTING	→	C	INCREMENTAL	→	I
CONNECTION	→	C	INDEX	→	I
CONTENT	→	CT	INDICATOR	→	I
COPY	→	C	INDIVIDUAL	→	I
CURRENT	→	C	INITIALIZE	→	IN
DEFAULT	→	D	INPUT	→	I
DESCENDANTS	→	DE	INQUIRE	→	Q
DELETE	→	D	INTERPRET	→	I
DISPLAY	→	D	INTERIOR	→	I
DRAWING	→	D	INVISIBILITY	→	IV
EDGE	→	ED	ITEM	→	ITM
EDGETYPE	→	EDT	LABEL	→	LB
EDGEWIDTH	→	EW	LENGTH	→	L
EDIT	→	ED	LINETYPE	→	LN
ELEMENT	→	EL	LINEWIDTH	→	LW
EMERGENCY	→	E	LOCAL	→	LM

Generating FORTRAN subroutine names

Table 4 (continued) - Abbreviations

LOCATOR	→	LC	RESOLUTION	→	RS
LOGGING	→	LOG	RESTORE	→	R
LOGICAL	→	L	RETRIEVE	→	RE
MAPPING	→	MP	ROTATE	→	RO
MARKER	→	MK	SAMPLE	→	SM
MATRIX	→	M	SCALE	→	SC
MESSAGE	→	MSG	SEARCH	→	S
MODE	→	M	SET	→	S
MODEL	→	MD	SIMULTANEOUS	→	SIM
NETWORK	→	N	SPACE	→	SP
OFFSET	→	OS	SPACING	→	SP
OPEN	→	OP	SPATIAL	→	S
ORIENTATION	→	OR	STATE	→	S
OVERFLOW	→	OV	STATUS	→	ST
PACK	→	P	STRING	→	ST
PATH	→	P	STROKE	→	SK
PATTERN	→	PA	STRUCTURE	→	ST
PHIGS	→	PH	STYLE	→	S
PICK	→	PK	SYSTEM	→	SY
POINTER	→	PT	TEXT	→	TX
POLYLINE	→	PL	TRANSFORM	→	T
POLYMARKER	→	PM	TRANSFORMATION	→	T
POST	→	PO	TRANSLATE	→	TR
POSTED	→	PO	UNPACK	→	U
PRECISION	→	PR	UNPOST	→	UPO
PREDEFINED	→	P	UP	→	UP
PRIMITIVE	→	P	UPDATE	→	U
PRIORITY	→	P	VALUATOR	→	VL
QUEUE	→	Q	VIEW	→	VW
RANGE	→	RA	VIEWPORT	→	V
READ	→	RD	VOLUME	→	VOL
RECORD	→	REC	WINDOW	→	W
REDRAW	→	R	WRITE	→	W
REFERENCE	→	RF	WORKSTATION	→	WK
REMOVE	→	RE	X	→	X
REPRESENTATION	→	R	Y	→	Y
REQUEST	→	RQ	Z	→	Z

5 Data types

In ISO/IEC 9592-1 parameters of several types are used. The following shows the correspondence between the types used in ISO/IEC 9592-1 and their realization in a FORTRAN implementation.

PHIGS Data Type	**FORTRAN Data Types**
I integer	INTEGER
A(I) array of integers	This is described more at the end of this clause, where the representations of CELL ARRAY and PATTERN are described.
R real	REAL
const × *simple_type* where *simple_type* is realized as I or R	(vector of values, for example 2×R) For input argument where const ≥6 or for output argument where const ≥4, then array of constant length is used, otherwise use separate parameters.
const 1 × const 2 × R (matrix of values, for example 2×3×R)	REAL array (const 1, const 2) For example, in order to store the projection transformation defined by: $x \rightarrow x'/w'$ $y \rightarrow y'/w'$ $z \rightarrow z'/w'$ in a 4 × 4 × REAL matrix, the values shall be stored such that: $x' = p[1,1]*x + p[2,1]*y + p[3,1]*z + p[4,1]$ $y' = p[1,2]*x + p[2,2]*y + p[3,2]*z + p[4,2]$ $z' = p[1,3]*x + p[2,3]*y + p[3,3]*z + p[4,3]$ $w' = p[1,4]*x + p[2,4]*y + p[3,4]*z + p[4,4]$
S string	1) In a full FORTRAN 77 subroutine: a) INTEGER containing the number of characters returned (for output string argument only). b) CHARACTER*(*) containing the string. In addition, if a character string that is an input parameter may reasonably contain no characters, then an INTEGER (≥0) is used to give the number of characters to be passed to the subroutine. 2) In a FORTRAN 77 Subset subroutine: a) INTEGER containing the number of characters passed to the subroutine (for input string only, i.e. only one INTEGER needed for output). b) INTEGER containing the number of characters returned (for output string argument only). If the value is < 0 or > 80, error 2004 is

Data types

generated.
c) CHARACTER*80 containing the string.

P2 point — REAL, REAL containing the X- and Y-values

const × P2 (only occurs in non-inquiry functions)
Separate REAL parameters, with the X- and Y- coordinates of one point being followed by the X- and Y- coordinates of the next.

P3 point — REAL, REAL, REAL containing the X-, Y-, and Z-values

const × P3 — If const ≥2 REAL arrays xa(const), ya(const), za(const) are used, otherwise separate REAL arrays are used, with the X-, Y-, and Z-coordinates of one point being followed by the X-,Y-, and Z-coordinates of the next.

L(L(P2/3)) list of point lists (for fill area sets)
The following description applies to both 2D and 3D point lists except that the PZA array is not present for 2D point lists. The arguments that specify the list of point lists are as follows:

INTEGER NPL
INTEGER IXA(NPL)
REAL PXA(*), PYA(*), PZA(*)

where
NPL is the number of point lists
IXA is an array of end indices for the point lists
PXA, PYA, PZA are the coordinate arrays

The range of indices in PXA, PYA, and PZA of each point list is as follows:
1 to IXA(1) is the first point list
IXA(i-1)+1 to IXA(i) is the ith point list, for i=2, to NPL when NPL ≥2

Thus, for example:
a) 1 is the start index for the 1st point list,
b) IXA(i-1)+1 is the start index for the ith point list for all i=2 to NPL when NPL≥2, and
c) IXA(i) is the end index for all point lists i=1 to NPL.

In the actual arguments specifying the list of point lists (supplied by the application program), the following conditions shall hold true; otherwise error 2005 is generated, with the allowable exception:
d) NPL≥1,
e) PXA, PYA and PZA are dimensioned by at least IXA(NPL) (however it is allowable for the implementation not to generate error 2005 in this case),
f) IXA(1)≥3 (the first point list is at least 3 points),
g) IXA(i+1)-IXA(i)≥3 for i=1 to NPL-1, when NPL≥2 (the ith point list is at least 3 points).

V2 2D vector — REAL, REAL containing the X- and Y-values specifying an offset from some reference point in the coordinate system of the reference point.

V3 3D vector

REAL, REAL, REAL containing the X-, Y-, and Z-values specifying an offset from some reference point in the coordinate system of the reference point.

E enumeration

INTEGER
All values are mapped to the range zero to N-1, where N is the number of enumeration alternatives. Except for null values, the order of the enumeration alternatives is the same as in ISO/IEC 9592-1 : null values always appear in the first position. If the integer value given by the application program is not in the range 0 to N-1, there is a language binding error condition (error 2000).

const × E (only occurrence in PHIGS is const = 18)

An array of INTEGER elements of dimension const is used, each element being an enumeration alternative.

NM classification

INTEGER identifying the name of an element of a name set. The domain of the names is the set of INTEGERS from 0 to an implementation defined maximum. The minimum maximum is 63.

FR filter

A compound data type containing two name sets representing inclusion and exclusion sets. Represented as two sets. For input parameter:

INTEGER giving the number of elements in the inclusion set, an array of INTEGERs giving the elements in the inclusion set, INTEGER giving the number of elements in the exclusion set, and an array of INTEGERs giving the elements in the exclusion set.

For output parameter:

INTEGER (input) giving the dimension (ni) of the array that will contain the elements of inclusion set. INTEGER (input) giving the dimension (nc) of the array that will contain the elements of exclusion set. INTEGER (output) giving the number of elements of the inclusion set array actually used. INTEGER (output) giving the number of elements of the exclusion set array actually used. Array of INTEGERs (output) containing the elements in the inclusion set. Array of INTEGERs (output) containing the elements in the exclusion set.

If the size required to contain the inclusion or exclusion elements is greater than the size of the arrays supplied (as determined by the dimensions ni and ne), error 2001 will be generated and the value returned in the corresponding INTEGER (output) parameters will respresent the input array size required.

L(FR) list of filter

This data type is only used in the incremental search functions and applies to both the "normal" and "inverted" lists of filters. The arguments that specify the list of filters are as follows:

```
INTEGER FLN
INTEGER FLISX(FLN)
INTEGER FLIS(*)
INTEGER FLESX(FLN)
INTEGER FLES(*)
```

where

Data types

FLN is the number filters
FLISX is an array of end indices of each inclusion set in the list filters
FLIS is the array of elements of the inclusion sets
FLESX is an array of end indices of each exclusion set in the list filters
FLES is the array of elements of the exclusion sets

The range of indices in FLIS of each inclusion set is as follows:

1 to FLISX(1) is the first inclusion set,
FLISX(i-1)+1 to FLISX(i) is the ith inclusion set,
for i=2, to FLN when FLN ≥2

Correspondingly the range of indices in FLES of each exclusion set is as follows:

1 to FLESX(1) is the first exclusion set,
FLESX(i-1)+1 to FLESX(i) is the ith exclusion set,
for i=2, to FLN when FLN ≥2

Thus, for example:

a) 1 is the start index for the first inclusion set,
b) FLISX(i-1)+1 is the start index for the ith inclusion set for all i=2 to FLN when FLN≥2, and
c) FLISX(i) is the end index for all inclusion sets i=1 to FLN.

In the actual arguments specifying the list filters (supplied by the application program), the following conditions shall hold true; otherwise error 2006 is generated, with the allowable exception:

d) FLN≥1,
e) FLIS and FLES are dimensioned by at least FLESX(FLN) (however it is allowable for the implementation not to generate error 2006 in this case),

a set of *simple_type*

(for example, SET(NM) or SET(E)): INTEGER giving the number of elements in the set and an array of *simple_type* giving the elements in the set. The only direct use of the SET constructor involves either a classification, NM, or enumeration, E, as its *simple_type*; both are represented as INTEGERs.

PP pick path item

This data type is never independently accessed through the language binding interface, but is instead realized through the list of pick path items, or *pick path*, L(PP).

L(PP) pick path

INTEGER (input) giving the size of the INTEGER matrix within which the pick path will be returned, an INTEGER (output) returning the actual size of the pick path (only for output parameters) (however, if the size required is greater than the size of the input array size error 2001 will be generated and the value returned represents the input array size required), and a 3×N INTEGER matrix (output) returning the pick path, where the (1,*) components contain the structure identifiers, the (2,*) components contain the pick identifiers, and the (3,*) components contain the element sequence numbers.

ER element reference

This data type is never independently accessed through the language binding interface, but is instead realized through the list of element references, or *element reference path*, L(ER).

L(ER) element reference path

INTEGER (input) giving the size of the INTEGER matrix within which the element reference path will be returned, an INTEGER (output) returning the actual size of the element reference path (only for output parameters) (however, if the size required is greater than the size of the input array size error 2001 will be generated and the value returned represents the input array size required), and a 2×N INTEGER matrix (output) returning the element reference path, where the (1,*) components contain the structure identifiers, and the (2,*) components contain the the element sequence numbers.

L(L(ER)) list of element reference paths

For inquiry functions, a single call only returns a single element of the list. Each element of the list is a list itself as described under ELEMENT REFERENCE PATH above.

For a complete list of length n,

a) INTEGER (input parameter) containing the *sequence number* (see below) of the required list elements (in the range 0...n).

b) INTEGER (output parameter) containing the number of items in the list, n.

c) parameters of the type described under ELEMENT REFERENCE PATH.

If the sequence number given is 0, the requested element returned is undefined, but an error is not indicated thereby; the number of items in the list n is returned. If the sequence number given is <0 or >n, then error 2002 is indicated, the number of items in the list is returned, but the requested element is undefined; the exception to this occurs when the list size is 0, and in that case an error is not indicated thereby.

HS2 2D half-space

Two (2) REALs giving the X- and Y-components of a point in modelling coordinates and two (2) REALs giving the X- and Y-components of a normal vector in modelling coordinates. This data type is never independently accessed through the language binding interface, but is instead realized through the list of 2D half-spaces, L(HS2).

L(HS2) 2D half-space

2D half-spaces are only used as a component of a list, i.e., L(HS2), and are hence always specified as a component of a two dimensional array.

```
INTEGER NHALFS
REAL HALFSP(4,NHALFS)
```

where

NHALFS is the number of modelling clipping half spaces in the list,
for the ith modelling clipping half-space:
HALFSP(1,i) is the X-component of the point,
HALFSP(2,i) is the Y-component of the point,
HALFSP(3,i) is the DX-component of the normal vector,
HALFSP(4,i) is the DY-component of the normal vector.

HS3 3D half-space

Three (3) REALs giving a point in modelling coordinates and three (3) REALs giving a normal vector in modelling coordinates. This data type is never independently accessed through the language binding interface, but is

Data types

instead realized through the list of 3D half-spaces, L(HS3).

L(HS3) 3D half-spaces

3D half-spaces are only used as a component of a list, i.e., L(HS3), and are hence always specified as a component of a two dimensional array.

INTEGER NHALFS
REAL HALFSP(6,NHALFS)

where

NHALFS is the number of modelling clipping half spaces in the list,
for the ith modelling clipping half-space:
HALFSP(1,i) is the X-component of the point,
HALFSP(2,i) is the Y-component of the point,
HALFSP(3,i) is the Z-component of the point,
HALFSP(4,i) is the DX-component of the normal vector,
HALFSP(5,i) is the DY-component of the normal vector,
HALFSP(6,i) is the DZ-component of the normal vector.

FP font/precision pair

This data type is a specific case of the more general ordered pair of different types (described next).

an ordered pair of different types

(for example (I;E) or font/precision pair, FP)
The different types are represented in turn in the FORTRAN parameter list.

SE structure element

This compound data type is realized directly as the constituent parts identified in ISO/IEC 9592-1. The data type of each of the constituent parts is described in this clause.

PS posted structure

This compound data type is realized directly as the constituent parts identified in ISO/IEC 9592-1. The data type of each of the constituent parts is described in this clause.

B bounding range

REAL, REAL specifying a range with the first value less than or equal to the second value.

const × B

(for example 2×B or 3×B) For input argument where const ≥3 or for output argument where const ≥2, use array of constant length, otherwise, use separate parameters. For those cases where const = 2 for input arguments and the parameter list would have more than 9 arguments when applying this rule, use an array of constant length.

CLR colour specification

For input parameter:

INTEGER giving the length (n) of the list of colour components dictated by the colour model. REAL array of at least dimension n. If the length of the list, as described by n, is inappropriate for the colour model in effect, error 118 is indicated.

For output parameter:

INTEGER (input) giving the dimension (n) of the array that will contain the list of colour components. INTEGER (output) giving the number of elements of the array actually used. REAL array of at least dimension n.

If the size required to contain the list of colour components is greater than the size of the arrays supplied (as determined by the dimension n), error 2001 will be generated and the value returned in the INTEGER (output) parameter will respresent the input array size required.

CC chromaticity coefficient — This only occurs as 3×CC and is realized as a REAL array of nine (9) elements representing the primary colour chromaticity coefficients, (u', v') and luminance value (Y).

C connection identifier — INTEGER where the set of valid values is implementation dependent.

F file — INTEGER where the set of valid values is implementation dependent.

W workstation type — INTEGER where the set of valid values is implementation dependent.

MCV modelling clipping volume — This data type is never used through the language binding interface, but is instead used to describe internal system state in ISO/IEC 9592-1.

G2 2D generalized drawing primitive identifier — INTEGER where the set of legal values is described in ISO/IEC 9592-1.

G3 3D generalized drawing primitive identifier — INTEGER where the set of legal values is described in ISO/IEC 9592-1.

GS generalized structure element identifier — INTEGER where the set of legal values is described in ISO/IEC 9592-1.

AI archive file identifier — INTEGER where an implementation may restrict the range but shall at least provide all non-negative integers that are available at that implementation.

PI pick identifier — INTEGER where an implementation may restrict the range but shall at least provide all non-negative integers that are available at that implementation. The default value for pick identifier is zero.

EI escape identifier — INTEGER where the set of legal values is described in ISO/IEC 9592-1.

FN function name — INTEGER where the range is shown in clause 6.

WI workstation identifier — INTEGER where an implementation may restrict the range but shall at least provide all non-negative integers that are available at that implementation.

D data record — Represented as a set of scalar values and an array of type CHARACTER*80 containing the data. In addition, an INTEGER input parameter is used to dimension the array. Where the data record is an output parameter, an additional output argument 'number of array elements of data record occupied' is needed. There are no scalar values except where the data record contains

Data types

values that are compulsory in PHIGS.
Special utility functions are defined to pack INTEGER, REAL, and CHARACTER data into the data record and to unpack the data record to the individual data items (PPREC, PUREC). The content of the packed data records is implementation dependent, but PPREC should perform the inverse function of PUREC and vice versa.
For INQUIRE CURRENT ELEMENT CONTENT and INQUIRE ELEMENT CONTENT the data record is returned directly into integer, real and character arrays.

list of n values of one *underlying_type* (for example L(I))

1) For input parameter:
   a) INTEGER (input) containing length n of the list (unless the length is already present as a separate PHIGS parameter, in that case it is not duplicated)
   b) array of dimension n, whose elements are of the appropriate *underlying_type*.

When the length can actually be defined as zero within PHIGS, the binding indicates the array dimension by *. The implementation checks that the given length is ≥1.

2) For output parameter in non-inquiry functions:
   a) INTEGER (input) containing the dimension of the array
   b) INTEGER (output) containing the number of elements of the array actually used
   c) an array whose elements are of the appropriate *underlying_type*. The input dimension being too small is a language binding error condition (error 2001).

In both cases (input or output), where the *underlying_type* is a 2D point, there is a REAL array for the X-coordinates and another for the Y-coordinates, and in the case of a 3D point, an additional REAL array for the Z-coordinates.

3) For inquiry functions, a single call only returns a single element of the list. For a complete list of length n,
   a) INTEGER (input) containing the *sequence number* (see below) of required list element (in the range 0...n).
   b) INTEGER (output) containing the number of items in the list, n.
   c) a parameter of the appropriate *underlying_type* containing the requested element.

If the sequence number given is 0, the requested element returned is undefined, but an error is not indicated thereby; the number of items in the list n is returned. If the sequence number given is <0 or >n, then error 2002 is indicated, the number of items in the list is returned, but the requested element is undefined; the exception to this occurs when the list size is 0, and in that case an error is not indicated thereby.

4) A complete inquired list is returned from a single call when the maximum

size of the list is a small constant m:

a) INTEGER (output) containing the number of elements of the array actually used.

b) an array of dimension m, whose elements are of the appropriate *underlying_type*.

The representation of CELL ARRAY and PATTERN allows the user of the routines requiring a cell array parameter to pass any portion of the array as an argument. Two examples should make this clear.

Certainly the user can pass an entire two-dimensional array. In this case the number of columns of the cell array is the same as the dimensions of the FORTRAN array:

```
INTEGER DIMX, DIMY, CELLS (DIMX,DIMY)
CALL PCA (X1,Y1,X2,Y2,DIMX,DIMY,1,1,DIMX,DIMY,CELLS)
```

(1,1)	(2,1)	(3,1)	. . .	(DIMX,1)
(1,2)	(2,2)	(3,2)	. . .	(DIMX,2)
:	:	:		:
(1,DIMY)	(2,DIMY)	(3,DIMY)	. . .	(DIMX,DIMY)

To use an arbitrary portion of an array the user passes the upper left corner of the portion as starting address and the dimensions of the portion of interest of the array. The area inside the small box is the cell array being passed:

```
INTEGER STARTX, STARTY, DX, DY, DIMX, DIMY, CELLS (DIMX,DIMY)
DATA STARTX/3/, STARTY/6/, DX/2/, DY/3/
CALL PCA (X1,Y1,X2,Y2,DIMX,DIMY,STARTX,STARTY,DX,DY,CELLS)
```

(1,1)	(2,1)	(3,1)	(4,1)	. . .	(DIMX,1)
(1,2)	(2,2)	(3,2)	(4,2)	. . .	(DIMX,2)
:	:	:	:		:
:	:				:
(1,6)	(2,6)	(3,6)	(4,6)	. . .	(DIMX,6)
(1,7)	(2,7)	(3,7)	(4,7)	. . .	(DIMX,7)
(1,8)	(2,8)	(3,8)	(4,8)	. . .	(DIMX,8)
:	:				:
:	:	:	:		:
(1,DIMY)	(2,DIMY)	(3,DIMY)	(4,DIMY)	. . .	(DIMX,DIMY)

6 Enumeration types

All the enumeration types of PHIGS are mapped to FORTRAN INTEGERs. The correspondence between PHIGS scalars and FORTRAN INTEGERs is shown as follows in a list of symbolic FORTRAN constants that may be included in any application program. This clause contains a mapping PHIGS enumeration types to FORTRAN variable names. In a FORTRAN 77 Subset implementation, this mapping could be accomplished by the DATA statement.

"Line type", "marker type" and "colour model" are defined as INTEGER rather than enumeration types in PHIGS. Constant definitions for the explicitly defined and required values of these conceptually unbounded ranges are provided as a convenience.

Also, a numbering of all PHIGS functions is given for use in the error handling procedures.

Mnemonic FORTRAN names and their values for PHIGS ENUMERATION type values:

```
annotation style                    unconnected,  lead line using current polyline attributes
          INTEGER       PUNCON,     PLDLN
          PARAMETER(    PUNCON=1,   PLDLN=2 )
INTEGER rather than enumeration type. Explicitly defined and required portion of
conceptually unbounded range defined here.

archive state               ARCL,               AROP
          INTEGER           PARCL,              PAROP
          PARAMETER(        PARCL=0,            PAROP=1 )

aspect identifier
          INTEGER       PLN,        PLWSC,      PPLCI,      PMK,        PMKSC,
          1             PPMCI,      PTXFN,      PTXPR,      PCHXP,      PCHSP,
          2             PTXCI,      PIS,        PISI,       PICI,       PEDFG,
          3             PEDT,       PEWSC,      PEDCI
          PARAMETER(    PLN=0,      PLWSC=1,    PPLCI=2,    PMK=3,      PMKSC=4,
          1             PPMCI=5,    PTXFN=6,    PTXPR=7,    PCHXP=8,    PCHSP=9,
          2             PTXCI=10,   PIS=11,     PISI=12,    PICI=13,    PEDFG=14,
          3             PEDT=15,    PEWSC=16,   PEDCI=17 )

aspect source               bundled,    individual
          INTEGER           PBUNDL,     PINDIV
          PARAMETER(        PBUNDL=0,   PINDIV=1 )

clipping indicator          noclip,     clip
          INTEGER           PNCLIP,     PCLIP
          PARAMETER(        PNCLIP=0,   PCLIP=1 )

colour available            monochrome, colour
          INTEGER           PMONOC,     PCOLOR
          PARAMETER(        PMONOC=0,   PCOLOR=1 )

colour model                RGB,        CIE,        HSV,        HLS
          INTEGER           PRGB,       PCIE,       PHSV,       PHLS
          PARAMETER(        PRGB=1,     PCIE=2,     PHSV=3,     PHLS=4 )
INTEGER rather than enumeration type. Explicitly defined and required portion of
conceptually unbounded range defined here.
```

Enumeration types

```
composition type        preconcatenate,     postconcatenate,    replace
        INTEGER         PCPRE,              PCPOST,             PCREPL
        PARAMETER(      PCPRE=0,            PCPOST=1,           PCREPL=2 )

conflict resolution     maintain,   abandon,    update
        INTEGER         PCRMNT,     PCRABA,     PCRUPD
        PARAMETER(      PCRMNT=0,   PCRABA=1,   PCRUPD=2 )

control flag conditionally,     always
        INTEGER         PCONDI,     PALWAY
        PARAMETER(      PCONDI=0,   PALWAY=1 )

deferral mode           ASAP,       BNIG,       BNIL,       ASTI,       WAIT
        INTEGER         PASAP,      PBNIG,      PBNIL,      PASTI,      PWAITD
        PARAMETER(      PASAP=0,    PBNIG=1,    PBNIL=2,    PASTI=3,    PWAITD=4 )

device coordinate units metres,     other
        INTEGER         PMETRE,     POTHU
        PARAMETER(      PMETRE=0,   POTHU=1 )

display surface empty   notempty,   empty
        INTEGER         PNEMPT,     PEMPTY
        PARAMETER(      PNEMPT=0,   PEMPTY=1 )

dynamic modification    IRG,        IMM,        CBS
        INTEGER         PIRG,       PIMM,       PCBS
        PARAMETER(      PIRG=0,     PIMM=1,     PCBS=2 )

echo switch             noecho,     echo
        INTEGER         PNECHO,     PECHO
        PARAMETER(      PNECHO=0,   PECHO=1 )

edit mode               insert,     replace
        INTEGER         PINSRT,     PREPLC
        PARAMETER(      PINSRT=0,   PREPLC=1 )
```

Enumeration types

element type		all,	nil,	polyline 3,	polyline,..		
	INTEGER(	PEALL,	PENIL,	PEPL3,	PEPL,		
	1	PEPM3,	PEPM,	PETX3,	PETX,		
	2	PEATR3,	PEATR,	PEFA3,	PEFA,		
	3	PEFAS3,	PEFAS,	PECA3,	PECA,		
	4	PEGDP3,	PEGDP,	PEPLI,	PEPMI,		
	5	PETXI,	PEII,	PEEDI,	PELN,		
	6	PELWSC,	PEPLCI,	PEMK,	PEMKSC,		
	7	PEPMCI,	PETXFN,	PETXPR,	PECHXP,		
	8	PECHSP,	PETXCI,	PECHH,	PECHUP,		
	9	PETXP,	PETXAL,	PEATCH,	PEATCU,		
	a	PEATP,	PEATAL,	PEANST,	PEIS,		
	b	PEISI,	PEICI,	PEEDFG,	PEEDT,		
	c	PEEWSC,	PEEDCI,	PEPA,	PEPRPV,		
	d	PEPARF,	PEADS,	PERES,	PEIASF,		
	e	PEHRID,	PELMT3,	PELMT,	PEGMT3,		
	f	PEGMT,	PEMCV3,	PEMCV,	PEMCLI,		
	g	PERMCV,	PEVWI,	PEEXST,	PELB,		
	h	PEAP,	PEGSE,	PEPKID			
	PARAMETER(	PEALL=0,	PENIL=1,	PEPL3=2,	PEPL=3,		
	1	PEPM3=4,	PEPM=5,	PETX3=6,	PETX=7,		
	2	PEATR3=8,	PEATR=9,	PEFA3=10,	PEFA=11,		
	3	PEFAS3=12,	PEFAS=13,	PECA3=14,	PECA=15,		
	4	PEGDP3=16,	PEGDP=17,	PEPLI=18,	PEPMI=19,		
	5	PETXI=20,	PEII=21,	PEEDI=22,	PELN=23,		
	6	PELWSC=24,	PEPLCI=25,	PEMK=26,	PEMKSC=27,		
	7	PEPMCI=28,	PETXFN=29,	PETXPR=30,	PECHXP=31,		
	8	PECHSP=32,	PETXCI=33,	PECHH=34,	PECHUP=35,		
	9	PETXP=36,	PETXAL=37,	PEATCH=38,	PEATCU=39,		
	a	PEATP=40,	PEATAL=41,	PEANST=42,	PEIS=43,		
	b	PEISI=44,	PEICI=45,	PEEDFG=46,	PEEDT=47,		
	c	PEEWSC=48,	PEEDCI=49,	PEPA=50,	PEPRPV=51,		
	d	PEPARF=52,	PEADS=53,	PERES=54,	PEIASF=55,		
	e	PEHRID=56,	PELMT3=57,	PELMT=58,	PEGMT3=59,		
	f	PEGMT=60,	PEMCV3=61,	PEMCV=62,	PEMCLI=63,		
	g	PERMCV=64,	PEVWI=65,	PEEXST=66,	PELB=67,		
	h	PEAP=68,	PEGSE=69,	PEPKID=70			
GDP attributes		polyline	polymarker	text	interior	edge	
	INTEGER	PPLATT,	PPMATT,	PTXATT,	PINATT,	PEDATT	
	PARAMETER(	PPLATT=0,	PPMATT=1,	PTXATT=2,	PINATT=3,	PEDATT=4)	
input class		none,	locator,	stroke,	valuator,	choice,	pick,
		string					
	INTEGER	PNCLAS,	PLOCAT,	PSTROK,	PVALUA,	PCHOIC,	PPICK,
	1	PSTRIN					
	PARAMETER(	PNCLAS=0,	PLOCAT=1,	PSTROK=2,	PVALUA=3,	PCHOIC=4,	PPICK=5,
	1	PSTRIN=6)					
input device status		none,	ok,	nopick,	nochoice		
	INTEGER	PNONE,	POK,	PNPICK,	PNCHOI		
	PARAMETER(	PNONE=0,	POK=1,	PNPICK=2,	PNCHOI=2)		
interior style		hollow,	solid,	pattern,	hatch,	empty	
	INTEGER	PHOLLO,	PSOLID,	PPATTR,	PHATCH,	PISEMP	
	PARAMETER(	PHOLLO=0,	PSOLID=1,	PPATTR=2,	PHATCH=3,	PISEMP=4)	

Enumeration types

linetype
INTEGER PARAMETER(solid, PLSOLI, PLSOLI=1, dash, PLDASH, PLDASH=2, dot, PLDOT, PLDOT=3, dash-dot, PLDASD, PLDASD=4)
INTEGER rather than enumeration type. Explicitly defined and required portion of conceptually unbounded range defined here.

marker type
INTEGER PARAMETER('.', PPOINT, PPOINT=1, '+', PPLUS, PPLUS=2, '*', PAST, PAST=3, 'o', POMARK, POMARK=4, 'x', PXMARK, PXMARK=5)
INTEGER rather than enumeration type. Explicitly defined and required portion of conceptually unbounded range defined here.

modelling clipping operator
INTEGER PARAMETER(replace, PMCREP, PMCREP=1, intersect, PMCINT, PMCINT=2)
INTEGER rather than enumeration type. Explicitly defined and required portion of conceptually unbounded range defined here.

modification mode
INTEGER PARAMETER(NIVE, PNIVE, PNIVE=0, UWOR, PUWOR, PUWOR=1, UQUM, PUQUM, PUQUM=2)

more simultaneous events
INTEGER PARAMETER(nomore, PNMORE, PNMORE=0, more, PMORE, PMORE=1)

off/on switch for edge flag and error handling mode
INTEGER PARAMETER(off, POFF, POFF=0, on, PON, PON=1)

open-structure status
INTEGER PARAMETER(none, PNONST, PNONST=0, open, POPNST, POPNST=1)

operating mode
INTEGER PARAMETER(request, PREQU, PREQU=0, sample, PSAMPL, PSAMPL=1, event, PEVENT, PEVENT=2)

path order
INTEGER PARAMETER(topfirst, PPOTOP, PPOTOP=0, bottomfirst, PPOBOT, PPOBOT=1)

polyline/fill area control flag
INTEGER PARAMETER(polyline, PPLINE, PPLINE=0, fill area, PFILLA, PFILLA=1, fill area set, PFILAS, PFILAS)

presence of invalid values
INTEGER PARAMETER(absent, PABSNT, PABSNT=0, present, PPRSNT, PPRSNT=1)

reference handling flag
INTEGER PARAMETER(delete, PDELE, PDELE=0, keep, PKEEP, PKEEP=1)

regeneration flag
INTEGER PARAMETER(postpone, PPOSTP, PPOSTP=0, perform, PPERFO, PPERFO=1)

Enumeration types

```
relative input priority     higher,      lower
        INTEGER             PHIGHR,      PLOWER
        PARAMETER(          PHIGHR=0,    PLOWER=1 )

search direction            backward,    forward
        INTEGER             PBWD,        PFWD
        PARAMETER(          PBWD=0,      PFWD=1 )

search success indicator    failure,     success
        INTEGER             PFAIL,       PSUCC
        PARAMETER(          PFAIL=0,     PSUCC=1 )

state of visual representation  correct,  deferred,    simulated
        INTEGER             PVROK,       PVRDFR,      PVRSIM
        PARAMETER(          PVROK=0,     PVRDFR=1,    PVRSIM=2 )

structure network source    CSS,         ARCHIVE
        INTEGER             PCSS,        PARCHV
        PARAMETER(          PCSS=0,      PARCHV=1 )

structure state value       STCL,        STOP
        INTEGER             PSTCL,       PSTOP
        PARAMETER(          PSTCL=0,     PSTOP=1 )

structure status indicator  non-existent, empty,      not empty
        INTEGER             PSNOEX,      PSEMPT,      PSNEMP
        PARAMETER(          PSNOEX=0,    PSEMPT=1,    PSNEMP=2 )

system state value          PHCL,        PHOP
        INTEGER             PPHCL,       PPHOP
        PARAMETER(          PPHCL=0,     PPHOP=1 )

text alignment horizontal   normal,      left,        centre,      right
        INTEGER             PAHNOR,      PALEFT,      PACENT,      PARITE
        PARAMETER(          PAHNOR=0,    PALEFT=1,    PACENT=2,    PARITE=3 )

text alignment vertical     normal,      top,         cap,         half,        base,        bottom
        INTEGER             PAVNOR,      PATOP,       PACAP,       PAHALF,      PABASE,      PABOTT
        PARAMETER(          PAVNOR=0,    PATOP=1,     PACAP=2,     PAHALF=3,    PABASE=4,    PABOTT=5 )

text path                   right,       left,        up,          down
        INTEGER             PRIGHT,      PLEFT,       PUP,         PDOWN
        PARAMETER(          PRIGHT=0,    PLEFT=1,     PUP=2,       PDOWN=3 )

text precision              string,      character,   stroke
        INTEGER             PSTRP,       PCHARP,      PSTRKP
        PARAMETER(          PSTRP=0,     PCHARP=1,    PSTRKP=2 )

type of returned values     set,         realized
        INTEGER             PSET,        PREALI
        PARAMETER(          PSET=0,      PREALI=1 )

update state                notpending,  pending
        INTEGER             PNPEND,      PPEND
        PARAMETER(          PNPEND=0,    PPEND=1 )

vector/raster/other type    vector,      raster,      other
        INTEGER             PVECTR,      PRASTR,      POTHWK
        PARAMETER(          PVECTR=0,    PRASTR=1,    POTHWK=2 )
```

```
viewtype                parallel,       perspective
        INTEGER         PPARL,          PPERS
        PARAMETER(      PPARL=0,        PPERS=1 )

workstation category    OUTPUT,         INPUT,          OUTIN,          MO,             MI
        INTEGER         POUTPT,         PINPUT,         POUTIN,         PMO,            PMI
        PARAMETER(      POUTPT=0,       PINPUT=1,       POUTIN=2,       PMO=3,          PMI=4 )

workstation dependency indicator
                        workstation independent,        workstation dependent
        INTEGER         PWKI,                           PWKD
        PARAMETER(      PWKI=0,                         PWKD=1 )

workstation state value WSCL,           WSOP
        INTEGER         PWSCL,          PWSOP
        PARAMETER(      PWSCL=0,        PWSOP=1 )
```

additional in the FORTRAN binding, to be used with PHIGS inquiry functions that return both Current and Requested values

```
                        current,        requested
        INTEGER         PCURVL,         PRQSVL
        PARAMETER(      PCURVL=0,       PRQSVL=1 )
```

PHIGS functions. These names are used for error handling. The names are the same as the PHIGS function names except that the sentinel character 'P' is replaced by 'E'. The same function identification is used for both full FORTRAN 77 and FORTRAN 77 Subset.

```
INTEGER         EOPPH,          ECLPH,          EOPWK,          ECLWK,          ERST
PARAMETER(      EOPPH=0,        ECLPH=1,        EOPWK=2,        ECLWK=3,        ERST=4 )
INTEGER         EUWK,           ESDUS,          EMSG,           EPL3,           EPL
PARAMETER(      EUWK=5,         ESDUS=6,        EMSG=7,         EPL3=8,         EPL=9 )
INTEGER         EPM3,           EPM,            ETX3,           ETX,            EATR3
PARAMETER(      EPM3=10,        EPM=11,         ETX3=12,        ETX=13,         EATR3=14 )
INTEGER         EATR,           EFA3,           EFA,            EFAS3,          EFAS
PARAMETER(      EATR=15,        EFA3=16,        EFA=17,         EFAS3=18,       EFAS=19 )
INTEGER         ECA3,           ECA,            EGDP3,          EGDP,           ESPLI
PARAMETER(      ECA3=20,        ECA=21,         EGDP3=22,       EGDP=23,        ESPLI=24 )
INTEGER         ESPMI,          ESTXI,          ESII,           ESEDI,          ESLN
PARAMETER(      ESPMI=25,       ESTXI=26,       ESII=27,        ESEDI=28,       ESLN=29 )
INTEGER         ESLWSC,         ESPLCI,         ESMK,           ESMKSC,         ESPMCI
PARAMETER(      ESLWSC=30,      ESPLCI=31,      ESMK=32,        ESMKSC=33,      ESPMCI=34 )
INTEGER         ESTXFN,         ESTXPR,         ESCHXP,         ESCHSP,         ESTXCI
PARAMETER(      ESTXFN=35,      ESTXPR=36,      ESCHXP=37,      ESCHSP=38,      ESTXCI=39 )
INTEGER         ESCHH,          ESCHUP,         ESTXP,          ESTXAL,         ESATCH
PARAMETER(      ESCHH=40,       ESCHUP=41,      ESTXP=42,       ESTXAL=43,      ESATCH=44 )
INTEGER         ESATCU,         ESATP,          ESATAL,         ESANS,          ESIS
PARAMETER(      ESATCU=45,      ESATP=46,       ESATAL=47,      ESANS=48,       ESIS=49 )
INTEGER         ESISI,          ESICI,          ESEDFG,         ESEDT,          ESEWSC
PARAMETER(      ESISI=50,       ESICI=51,       ESEDFG=52,      ESEDT=53,       ESEWSC=54 )
INTEGER         ESEDCI,         ESPA,           ESPRPV,         ESPARF,         EADS
PARAMETER(      ESEDCI=55,      ESPA=56,        ESPRPV=57,      ESPARF=58,      EADS=59 )
INTEGER         ERES,           ESIASF,         ESPLR,          ESPMR,          ESTXR
PARAMETER(      ERES=60,        ESIASF=61,      ESPLR=62,       ESPMR=63,       ESTXR=64 )
INTEGER         ESIR,           ESEDR,          ESPAR,          ESCR,           ESHLFT
PARAMETER(      ESIR=65,        ESEDR=66,       ESPAR=67,       ESCR=68,        ESHLFT=69 )
INTEGER         ESIVFT,         ESCMD,          ESHRID,         ESHRM,          ESLMT3
PARAMETER(      ESIVFT=70,      ESCMD=71,       ESHRID=72,      ESHRM=73,       ESLMT3=74 )
INTEGER         ESLMT,          ESGMT3,         ESGMT,          ESMCV3,         ESMCV
PARAMETER(      ESLMT=75,       ESGMT3=76,      ESGMT=77,       ESMCV3=78,      ESMCV=79 )
INTEGER         ESMCLI,         ERMCV,          ESVWI,          ESVWR3,         ESVWR
PARAMETER(      ESMCLI=80,      ERMCV=81,       ESVWI=82,       ESVWR3=83,      ESVWR=84 )
INTEGER         ESVTIP,         ESWKW3,         ESWKW,          ESWKV3,         ESWKV
PARAMETER(      ESVTIP=85,      ESWKW3=86,      ESWKW=87,       ESWKV3=88,      ESWKV=89 )
INTEGER         EOPST,          ECLST,          EEXST,          ELB,            EAP
PARAMETER(      EOPST=90,       ECLST=91,       EEXST=92,       ELB=93,         EAP=94 )
INTEGER         EGSE,           ESEDM,          ECELST,         ESEP,           EOSEP
PARAMETER(      EGSE=95,        ESEDM=96,       ECELST=97,      ESEP=98,        EOSEP=99 )
INTEGER         ESEPLB,         EDEL,           EDELRA,         EDELLB,         EEMST
PARAMETER(      ESEPLB=100,     EDEL=101,       EDELRA=102,     EDELLB=103,     EEMST=104 )
INTEGER         EDST,           EDSN,           EDAS,           ECSTID,         ECSTRF
PARAMETER(      EDST=105,       EDSN=106,       EDAS=107,       ECSTID=108,     ECSTRF=109 )
```

Enumeration types

```
INTEGER      ECSTIR,     EPOST,      EUPOST,     EUPAST,     EOPARF
 PARAMETER(  ECSTIR=110, EPOST=111,  EUPOST=112, EUPAST=113, EOPARF=114 )
 INTEGER     ECLARF,     EARST,      EARSN,      EARAST,     ESCNRS
 PARAMETER(  ECLARF=115, EARST=116,  EARSN=117,  EARAST=118, ESCNRS=119 )
 INTEGER     ERSID,      EREST,      ERESN,      ERAST,      EREPAN
 PARAMETER(  ERSID=120,  EREST=121,  ERESN=122,  ERAST=123,  EREPAN=124 )
 INTEGER     EREPDE,     EDSTAR,     EDSNAR,     EDASAR,     ESPKID
 PARAMETER(  EREPDE=125, EDSTAR=126, EDSNAR=127, EDASAR=128, ESPKID=129 )
 INTEGER     ESPKFT,     EINLC3,     EINLC,      EINSK3,     EINSK
 PARAMETER(  ESPKFT=130, EINLC3=131, EINLC=132,  EINSK3=133, EINSK=134 )
 INTEGER     EINVL3,     EINVL,      EINCH3,     EINCH,      EINPK3
 PARAMETER(  EINVL3=135, EINVL=136,  EINCH3=137, EINCH=138, EINPK3=139 )
 INTEGER     EINPK,      EINST3,     EINST,      ESLCM,      ESSKM
 PARAMETER(  EINPK=140,  EINST3=141, EINST=142,  ESLCM=143,  ESSKM=144 )
 INTEGER     ESVLM,      ESCHM,      ESPKM,      ESSTM,      ERQLC3
 PARAMETER(  ESVLM=145,  ESCHM=146,  ESPKM=147,  ESSTM=148,  ERQLC3=149 )
 INTEGER     ERQLC,      ERQSK3,     ERQSK,      ERQVL,      ERQCH
 PARAMETER(  ERQLC=150,  ERQSK3=151, ERQSK=152,  ERQVL=153,  ERQCH=154 )
 INTEGER     ERQPK,      ERQST,      ESMLC3,     ESMLC,      ESMSK3
 PARAMETER(  ERQPK=155,  ERQST=156,  ESMLC3=157, ESMLC=158,  ESMSK3=159 )
 INTEGER     ESMSK,      ESMVL,      ESMCH,      ESMPK,      ESMST
 PARAMETER(  ESMSK=160,  ESMVL=161,  ESMCH=162,  ESMPK=163,  ESMST=164 )
 INTEGER     EWAIT,      EFLUSH,     EGTLC3,     EGTLC,      EGTSK3
 PARAMETER(  EWAIT=165,  EFLUSH=166, EGTLC3=167, EGTLC=168,  EGTSK3=169 )
 INTEGER     EGTSK,      EGTVL,      EGTCH,      EGTPK,      EGTST
 PARAMETER(  EGTSK=170,  EGTVL=171,  EGTCH=172,  EGTPK=173,  EGTST=174 )
 INTEGER     EWITM,      EGTITM,     ERDITM,     EIITM,      ESERHM
 PARAMETER(  EWITM=175,  EGTITM=176, ERDITM=177, EIITM=178,  ESERHM=179 )
 INTEGER     EESC,       EPREC,      EUREC
 PARAMETER(  EESC=180,   EPREC=181,  EUREC=182 )
```

7 List of the PHIGS function names

The complete list of PHIGS function names follows. PACK DATA RECORD and UNPACK DATA RECORD do not appear in ISO/IEC 9592-1, but have been created for this binding

7.1 List of functions ordered alphabetically by bound name

PADS	AD-S	ADD NAMES TO SET
PAP	AP	APPLICATION DATA
PARAST	ARA-ST	ARCHIVE ALL STRUCTURES
PARSN	AR-SN	ARCHIVE STRUCTURE NETWORKS
PARST	AR-ST	ARCHIVE STRUCTURES
PATR	ATR	ANNOTATION TEXT RELATIVE
PATR3	ATR-3	ANNOTATION TEXT RELATIVE 3
PATR3S	ATR-3-S	ANNOTATION TEXT RELATIVE 3 (FORTRAN 77 subset)
PATRS	ATR-S	ANNOTATION TEXT RELATIVE (FORTRAN 77 subset)
PBLTM	BL-T-M	BUILD TRANSFORMATION MATRIX
PBLTM3	BL-T-M-3	BUILD TRANSFORMATION MATRIX 3
PCA	C-A	CELL ARRAY
PCA3	C-A-3	CELL ARRAY 3
PCELST	C-EL-ST	COPY ALL ELEMENTS FROM STRUCTURE
PCLARF	CL-AR-F	CLOSE ARCHIVE FILE
PCLPH	CL-PH	CLOSE PHIGS
PCLST	CL-ST	CLOSE STRUCTURE
PCLWK	CL-WK	CLOSE WORKSTATION
PCOM	CO-M	COMPOSE MATRIX
PCOM3	CO-M-3	COMPOSE MATRIX 3
PCOTM	CO-T-M	COMPOSE TRANSFORMATION MATRIX
PCOTM3	CO-T-M-3	COMPOSE TRANSFORMATION MATRIX 3
PCSTID	CSTID	CHANGE STRUCTURE IDENTIFIER
PCSTIR	C-ST-IR	CHANGE STRUCTURE IDENTIFIER AND REFERENCES
PCSTRF	C-ST-RF	CHANGE STRUCTURE REFERENCES
PDAS	DAS	DELETE ALL STRUCTURES
PDASAR	DAS-AR	DELETE ALL STRUCTURES FROM ARCHIVE
PDEL	D-EL	DELETE ELEMENT
PDELLB	D-EL-LB	DELETE ELEMENTS BETWEEN LABELS
PDELRA	D-EL-RA	DELETE ELEMENT RANGE
PDSN	D-SN	DELETE STRUCTURE NETWORK
PDSNAR	D-SN-AR	DELETE STRUCTURE NETWORKS FROM ARCHIVE
PDST	D-ST	DELETE STRUCTURE
PDSTAR	D-ST-AR	DELETE STRUCTURES FROM ARCHIVE
PECLPH	E-CL-PH	EMERGENCY CLOSE PHIGS
PELS	EL-S	ELEMENT SEARCH
PEMST	EM-ST	EMPTY STRUCTURE
PERHND	ER-HND	ERROR HANDLING
PERLOG	ER-LOG	ERROR LOGGING
PESC	ESC	ESCAPE
PEVMM	EVMM	EVALUATE VIEW MAPPING MATRIX
PEVMM3	EVMM-3	EVALUATE VIEW MAPPING MATRIX 3
PEVOM	EVOM	EVALUATE VIEW ORIENTATION MATRIX
PEVOM3	EVOM-3	EVALUATE VIEW ORIENTATION MATRIX 3
PEXST	EX-ST	EXECUTE STRUCTURE
PFA	F-A	FILL AREA
PFA3	F-A-3	FILL AREA 3
PFAS	F-A-S	FILL AREA SET
PFAS3	F-A-S-3	FILL AREA SET 3
PFLUSH	FLUSH	FLUSH DEVICE EVENTS
PGDP	G-D-P	GENERALIZED DRAWING PRIMITIVE
PGDP3	G-D-P-3	GENERALIZED DRAWING PRIMITIVE 3
PGSE	GSE	GENERALIZED STRUCTURE ELEMENT

List of the PHIGS function names		List of functions ordered alphabetically by bound name
PGTCH	GT-CH	GET CHOICE
PGTITM	GT-ITM	GET ITEM TYPE FROM METAFILE
PGTLC	GT-LC	GET LOCATOR
PGTLC3	GT-LC-3	GET LOCATOR 3
PGTPK	GT-PK	GET PICK
PGTSK	GT-SK	GET STROKE
PGTSK3	GT-SK-3	GET STROKE 3
PGTST	GT-ST	GET STRING
PGTVL	GT-VL	GET VALUATOR
PIITM	I-ITM	INTERPRET ITEM
PINCH	IN-CH	INITIALIZE CHOICE
PINCH3	IN-CH-3	INITIALIZE CHOICE 3
PINLC	IN-LC	INITIALIZE LOCATOR
PINLC3	IN-LC-3	INITIALIZE LOCATOR 3
PINPK	IN-PK	INITIALIZE PICK
PINPK3	IN-PK-3	INITIALIZE PICK 3
PINSK	IN-SK	INITIALIZE STROKE
PINSK3	IN-SK-3	INITIALIZE STROKE 3
PINST	IN-ST	INITIALIZE STRING
PINST3	IN-ST-3	INITIALIZE STRING 3
PINVL	IN-VL	INITIALIZE VALUATOR
PINVL3	IN-VL-3	INITIALIZE VALUATOR 3
PISS	I-S-S	INCREMENTAL SPATIAL SEARCH
PISS3	I-S-S-3	INCREMENTAL SPATIAL SEARCH 3
PLB	LB	LABEL
PMSG	MSG	MESSAGE
PMSGS	MSG-S	MESSAGE (FORTRAN 77 subset)
POPARF	OP-AR-F	OPEN ARCHIVE FILE
POPPH	OP-PH	OPEN PHIGS
POPST	OP-ST	OPEN STRUCTURE
POPWK	OP-WK	OPEN WORKSTATION
POSEP	OS-EP	OFFSET ELEMENT POINTER
PPL	PL	POLYLINE
PPL3	PL-3	POLYLINE 3
PPM	PM	POLYMARKER
PPM3	PM-3	POLYMARKER 3
PPOST	PO-ST	POST STRUCTURE
PPREC	P-REC	PACK DATA RECORD
PQANF	Q-AN-F	INQUIRE ANNOTATION FACILITIES
PQARF	Q-AR-F	INQUIRE ARCHIVE FILES
PQARS	Q-AR-S	INQUIRE ARCHIVE STATE VALUE
PQCECO	Q-C-ECO	INQUIRE CURRENT ELEMENT CONTENT
PQCETS	Q-C-ETS	INQUIRE CURRENT ELEMENT TYPE AND SIZE
PQCF	Q-C-F	INQUIRE COLOUR FACILITIES
PQCHS	Q-CH-S	INQUIRE CHOICE DEVICE STATE
PQCHS3	Q-CH-S-3	INQUIRE CHOICE DEVICE STATE 3
PQCMD	Q-C-MD	INQUIRE COLOUR MODEL
PQCMDF	Q-C-MD-F	INQUIRE COLOUR MODEL FACILITIES
PQCNRS	Q-CN-RS	INQUIRE CONFLICT RESOLUTION
PQCR	Q-C-R	INQUIRE COLOUR REPRESENTATION
PQCST	Q-C-ST	INQUIRE ALL CONFLICTING STRUCTURES
PQCSTN	Q-C-ST-N	INQUIRE CONFLICTING STRUCTURES IN NETWORK
PQDCH	Q-D-CH	INQUIRE DEFAULT CHOICE DEVICE DATA
PQDCH3	Q-D-CH-3	INQUIRE DEFAULT CHOICE DEVICE DATA 3
PQDDUS	Q-D-D-U-S	INQUIRE DEFAULT DISPLAY UPDATE STATE
PQDLC	Q-D-LC	INQUIRE DEFAULT LOCATOR DEVICE DATA
PQDLC3	Q-D-LC-3	INQUIRE DEFAULT LOCATOR DEVICE DATA 3
PQDP	Q-D-P	INQUIRE NUMBER OF DISPLAY PRIORITIES SUPPORTED
PQDPK	Q-D-PK	INQUIRE DEFAULT PICK DEVICE DATA
PQDPK3	Q-D-PK-3	INQUIRE DEFAULT PICK DEVICE DATA 3
PQDSK	Q-D-SK	INQUIRE DEFAULT STROKE DEVICE DATA
PQDSK3	Q-D-SK-3	INQUIRE DEFAULT STROKE DEVICE DATA 3

List of functions ordered alphabetically by bound name **List of the PHIGS function names**

PQDSP	Q-D-SP	INQUIRE DISPLAY SPACE SIZE
PQDSP3	Q-D-SP-3	INQUIRE DISPLAY SPACE SIZE 3
PQDST	Q-D-ST	INQUIRE DEFAULT STRING DEVICE DATA
PQDST3	Q-D-ST-3	INQUIRE DEFAULT STRING DEVICE DATA 3
PQDSTR	Q-DSTR	INQUIRE DYNAMICS OF STRUCTURES
PQDSWA	Q-DSWA	INQUIRE DYNAMICS OF WORKSTATION ATTRIBUTES
PQDUS	Q-D-U-S	INQUIRE DISPLAY UPDATE STATE
PQDVL	Q-D-VL	INQUIRE DEFAULT VALUATOR DEVICE DATA
PQDVL3	Q-D-VL-3	INQUIRE DEFAULT VALUATOR DEVICE DATA 3
PQECI	Q-E-C-I	INQUIRE LIST OF COLOUR INDICES
PQECO	Q-ECO	INQUIRE ELEMENT CONTENT
PQEDF	Q-ED-F	INQUIRE EDGE FACILITIES
PQEDM	Q-ED-M	INQUIRE EDIT MODE
PQEDR	Q-ED-R	INQUIRE EDGE REPRESENTATION
PQEEDI	Q-E-ED-I	INQUIRE LIST OF EDGE INDICES
PQEGD3	Q-EGD3	INQUIRE LIST OF AVAILABLE GENERALIZED DRAWING PRIMITIVES 3
PQEGDP	Q-E-G-D-P	INQUIRE LIST OF AVAILABLE GENERALIZED DRAWING PRIMITIVES
PQEGSE	Q-E-GSE	INQUIRE LIST OF AVAILABLE GENERALIZED STRUCTURE ELEMENTS
PQEII	Q-E-I-I	INQUIRE LIST OF INTERIOR INDICES
PQEP	Q-EP	INQUIRE ELEMENT POINTER
PQEPAI	Q-E-PA-I	INQUIRE LIST OF PATTERN INDICES
PQEPLI	Q-E-PL-I	INQUIRE LIST OF POLYLINE INDICES
PQEPMI	Q-E-PM-I	INQUIRE LIST OF POLYMARKER INDICES
PQERHM	Q-ERHM	INQUIRE ERROR HANDLING MODE
PQETS	Q-ETS	INQUIRE ELEMENT TYPE AND SIZE
PQETXI	Q-E-TX-I	INQUIRE LIST OF TEXT INDICES
PQEVWI	Q-E-VW-I	INQUIRE LIST OF VIEW INDICES
PQEWK	Q-E-WK	INQUIRE LIST OF AVAILABLE WORKSTATION TYPES
PQGDP	Q-G-D-P	INQUIRE GENERALIZED DRAWING PRIMITIVE
PQGDP3	Q-G-D-P-3	INQUIRE GENERALIZED DRAWING PRIMITIVE 3
PQGSEF	Q-GSE-F	INQUIRE GENERALIZED STRUCTURE ELEMENT FACILITIES
PQHLFT	Q-HL-FT	INQUIRE HIGHLIGHTING FILTER
PQHRIF	Q-HR-I-F	INQUIRE HLHSR (IDENTIFIER) FACILITIES
PQHRM	Q-HR-M	INQUIRE HLHSR MODE
PQHRMF	Q-HR-M-F	INQUIRE HLHSR (MODE) FACILITIES
PQIF	Q-I-F	INQUIRE INTERIOR FACILITIES
PQIQOV	Q-I-Q-OV	INQUIRE INPUT QUEUE OVERFLOW
PQIR	Q-I-R	INQUIRE INTERIOR REPRESENTATION
PQIVFT	Q-IV-FT	INQUIRE INVISIBILITY FILTER
PQLCS	Q-LC-S	INQUIRE LOCATOR DEVICE STATE
PQLCS3	Q-LC-S-3	INQUIRE LOCATOR DEVICE STATE 3
PQLI	Q-L-I	INQUIRE NUMBER OF AVAILABLE LOGICAL INPUT DEVICES
PQMCLF	Q-MCL-F	INQUIRE MODELLING CLIPPING FACILITIES
PQOPST	Q-OP-ST	INQUIRE OPEN STRUCTURE
PQOPWK	Q-OP-WK	INQUIRE SET OF OPEN WORKSTATIONS
PQPAF	Q-PA-F	INQUIRE PATTERN FACILITIES
PQPAN	Q-P-AN	INQUIRE PATHS TO ANCESTORS
PQPAR	Q-PA-R	INQUIRE PATTERN REPRESENTATION
PQPCR	Q-P-C-R	INQUIRE PREDEFINED COLOUR REPRESENTATION
PQPDE	Q-P-DE	INQUIRE PATHS TO DESCENDANTS
PQPEDR	Q-P-ED-R	INQUIRE PREDEFINED EDGE REPRESENTATION
PQPHF	Q-PH-F	INQUIRE PHIGS FACILITIES
PQPIR	Q-P-I-R	INQUIRE PREDEFINED INTERIOR REPRESENTATION
PQPKS	Q-PK-S	INQUIRE PICK DEVICE STATE
PQPKS3	Q-PK-S-3	INQUIRE PICK DEVICE STATE 3
PQPLF	Q-PL-F	INQUIRE POLYLINE FACILITIES
PQPLR	Q-PL-R	INQUIRE POLYLINE REPRESENTATION
PQPMF	Q-PM-F	INQUIRE POLYMARKER FACILITIES
PQPMR	Q-PM-R	INQUIRE POLYMARKER REPRESENTATION
PQPOST	Q-PO-ST	INQUIRE POSTED STRUCTURES
PQPPAR	Q-P-PA-R	INQUIRE PREDEFINED PATTERN REPRESENTATION
PQPPLR	Q-P-PL-R	INQUIRE PREDEFINED POLYLINE REPRESENTATION

List of the PHIGS function names **List of functions ordered alphabetically by bound name**

PQPPMR	Q-P-PM-R	INQUIRE PREDEFINED POLYMARKER REPRESENTATION
PQPTXR	Q-P-TX-R	INQUIRE PREDEFINED TEXT REPRESENTATION
PQPVWR	Q-P-VW-R	INQUIRE PREDEFINED VIEW REPRESENTATION
PQSID	Q-SID	INQUIRE STRUCTURE IDENTIFIERS
PQSIM	Q-SIM	INQUIRE MORE SIMULTANEOUS EVENTS
PQSKS	Q-SK-S	INQUIRE STROKE DEVICE STATE
PQSKS3	Q-SK-S-3	INQUIRE STROKE DEVICE STATE 3
PQSTRS	Q-STRS	INQUIRE STRUCTURE STATE VALUE
PQSTS	Q-ST-S	INQUIRE STRING DEVICE STATE
PQSTS3	Q-ST-S-3	INQUIRE STRING DEVICE STATE 3
PQSTST	Q-ST-ST	INQUIRE STRUCTURE STATUS
PQSYS	Q-SY-S	INQUIRE SYSTEM STATE VALUE
PQTXF	Q-TX-F	INQUIRE TEXT FACILITIES
PQTXR	Q-TX-R	INQUIRE TEXT REPRESENTATION
PQTXX	Q-TX-X	INQUIRE TEXT EXTENT
PQTXXS	Q-TX-X-S	INQUIRE TEXT EXTENT (FORTRAN 77 subset)
PQVLS	Q-VL-S	INQUIRE VALUATOR DEVICE STATE
PQVLS3	Q-VL-S-3	INQUIRE VALUATOR DEVICE STATE 3
PQVWF	Q-VW-F	INQUIRE VIEW FACILITIES
PQVWR	Q-VW-R	INQUIRE VIEW REPRESENTATION
PQWKC	Q-WK-C	INQUIRE WORKSTATION CONNECTION AND TYPE
PQWKCA	Q-WK-CA	INQUIRE WORKSTATION CATEGORY
PQWKCL	Q-WK-CL	INQUIRE WORKSTATION CLASSIFICATION
PQWKPO	Q-WK-PO	INQUIRE SET OF WORKSTATIONS TO WHICH POSTED
PQWKSL	Q-WK-S-L	INQUIRE WORKSTATION STATE TABLE LENGTHS
PQWKST	Q-WKST	INQUIRE WORKSTATION STATE VALUE
PQWKT	Q-WK-T	INQUIRE WORKSTATION TRANSFORMATION
PQWKT3	Q-WK-T-3	INQUIRE WORKSTATION TRANSFORMATION 3
PRAST	RA-ST	RETRIEVE ALL STRUCTURES
PRDITM	RD-ITM	READ ITEM FROM METAFILE
PREPAN	RE-P-AN	RETRIEVE PATHS TO ANCESTORS
PREPDE	RE-P-DE	RETRIEVE PATHS TO DESCENDANTS
PRES	RE-S	REMOVE NAMES FROM SET
PRESN	RE-SN	RETRIEVE STRUCTURE NETWORKS
PREST	RE-ST	RETRIEVE STRUCTURES
PRMCV	R-MCV	RESTORE MODELLING CLIPPING VOLUME
PRO	RO	ROTATE
PROX	RO-X	ROTATE X
PROY	RO-Y	ROTATE Y
PROZ	RO-Z	ROTATE Z
PRQCH	RQ-CH	REQUEST CHOICE
PRQLC	RQ-LC	REQUEST LOCATOR
PRQLC3	RQ-LC-3	REQUEST LOCATOR 3
PRQPK	RQ-PK	REQUEST PICK
PRQSK	RQ-SK	REQUEST STROKE
PRQSK3	RQ-SK-3	REQUEST STROKE 3
PRQST	RQ-ST	REQUEST STRING
PRQVL	RQ-VL	REQUEST VALUATOR
PRSID	RSID	RETRIEVE STRUCTURE IDENTIFIERS
PRST	R-ST	REDRAW ALL STRUCTURES
PSANS	S-AN-S	SET ANNOTATION STYLE
PSATAL	SAT-AL	SET ANNOTATION TEXT ALIGNMENT
PSATCH	S-ATCH	SET ANNOTATION TEXT CHARACTER HEIGHT
PSATCU	S-ATCU	SET ANNOTATION TEXT CHARACTER UP VECTOR
PSATP	SAT-P	SET ANNOTATION TEXT PATH
PSC	SC	SCALE
PSC3	SC-3	SCALE 3
PSCHH	S-CH-H	SET CHARACTER HEIGHT
PSCHM	S-CH-M	SET CHOICE MODE
PSCHSP	S-CH-SP	SET CHARACTER SPACING
PSCHUP	S-CH-UP	SET CHARACTER UP VECTOR
PSCHXP	S-CH-XP	SET CHARACTER EXPANSION FACTOR

List of functions ordered alphabetically by bound name **List of the PHIGS function names**

PSCMD	S-C-MD	SET COLOUR MODEL
PSCNRS	S-CN-RS	SET CONFLICT RESOLUTION
PSCR	S-C-R	SET COLOUR REPRESENTATION
PSDUS	S-D-U-S	SET DISPLAY UPDATE STATE
PSEDCI	S-EDCI	SET EDGE COLOUR INDEX
PSEDFG	S-EDFG	SET EDGE FLAG
PSEDI	S-ED-I	SET EDGE INDEX
PSEDM	S-ED-M	SET EDIT MODE
PSEDR	S-ED-R	SET EDGE REPRESENTATION
PSEDT	S-EDT	SET EDGETYPE
PSEP	S-EP	SET ELEMENT POINTER
PSEPLB	S-EP-LB	SET ELEMENT POINTER AT LABEL
PSERHM	S-ERHM	SET ERROR HANDLING MODE
PSEWSC	S-EW-SC	SET EDGEWIDTH SCALE FACTOR
PSGMT	S-GM-T	SET GLOBAL TRANSFORMATION
PSGMT3	S-GM-T-3	SET GLOBAL TRANSFORMATION 3
PSHLFT	S-HL-FT	SET HIGHLIGHTING FILTER
PSHRID	S-HR-ID	SET HLHSR IDENTIFIER
PSHRM	S-HR-M	SET HLHSR MODE
PSIASF	S-IASF	SET INDIVIDUAL ASF
PSICI	S-I-C-I	SET INTERIOR COLOUR INDEX
PSII	S-I-I	SET INTERIOR INDEX
PSIR	S-I-R	SET INTERIOR REPRESENTATION
PSIS	S-I-S	SET INTERIOR STYLE
PSISI	S-I-S-I	SET INTERIOR STYLE INDEX
PSIVFT	S-IV-FT	SET INVISIBILITY FILTER
PSLCM	S-LC-M	SET LOCATOR MODE
PSLMT	S-LM-T	SET LOCAL TRANSFORMATION
PSLMT3	S-LM-T-3	SET LOCAL TRANSFORMATION 3
PSLN	S-LN	SET LINETYPE
PSLWSC	S-LW-SC	SET LINEWIDTH SCALE FACTOR
PSMCH	SM-CH	SAMPLE CHOICE
PSMCLI	S-MCL-I	SET MODELLING CLIPPING INDICATOR
PSMCV	S-MCV	SET MODELLING CLIPPING VOLUME
PSMCV3	S-MCV-3	SET MODELLING CLIPPING VOLUME 3
PSMK	S-MK	SET MARKER TYPE
PSMKSC	S-MK-SC	SET MARKER SIZE SCALE FACTOR
PSMLC	SM-LC	SAMPLE LOCATOR
PSMLC3	SM-LC-3	SAMPLE LOCATOR 3
PSMPK	SM-PK	SAMPLE PICK
PSMSK	SM-SK	SAMPLE STROKE
PSMSK3	SM-SK-3	SAMPLE STROKE 3
PSMST	SM-ST	SAMPLE STRING
PSMVL	SM-VL	SAMPLE VALUATOR
PSPA	S-PA	SET PATTERN SIZE
PSPAR	S-PA-R	SET PATTERN REPRESENTATION
PSPARF	S-PARF	SET PATTERN REFERENCE POINT
PSPKFT	S-PK-FT	SET PICK FILTER
PSPKID	S-PK-ID	SET PICK IDENTIFIER
PSPKM	S-PK-M	SET PICK MODE
PSPLCI	S-PL-C-I	SET POLYLINE COLOUR INDEX
PSPLI	S-PL-I	SET POLYLINE INDEX
PSPLR	S-PL-R	SET POLYLINE REPRESENTATION
PSPMCI	S-PM-C-I	SET POLYMARKER COLOUR INDEX
PSPMI	S-PM-I	SET POLYMARKER INDEX
PSPMR	S-PM-R	SET POLYMARKER REPRESENTATION
PSPRPV	S-PRPV	SET PATTERN REFERENCE POINT AND VECTORS
PSSKM	S-SK-M	SET STROKE MODE
PSSTM	S-ST-M	SET STRING MODE
PSTXAL	S-TX-AL	SET TEXT ALIGNMENT
PSTXCI	S-TX-C-I	SET TEXT COLOUR INDEX
PSTXFN	S-TXFN	SET TEXT FONT

List of the PHIGS function names		List of functions ordered alphabetically by bound name
PSTXI	S-TX-I	SET TEXT INDEX
PSTXP	S-TX-P	SET TEXT PATH
PSTXPR	S-TX-PR	SET TEXT PRECISION
PSTXR	S-TX-R	SET TEXT REPRESENTATION
PSVLM	S-VL-M	SET VALUATOR MODE
PSVTIP	S-VT-I-P	SET VIEW TRANSFORMATION INPUT PRIORITY
PSVWI	S-VW-I	SET VIEW INDEX
PSVWR	S-VW-R	SET VIEW REPRESENTATION
PSVWR3	S-VW-R-3	SET VIEW REPRESENTATION 3
PSWKV	S-WK-V	SET WORKSTATION VIEWPORT
PSWKV3	S-WK-V-3	SET WORKSTATION VIEWPORT 3
PSWKW	S-WK-W	SET WORKSTATION WINDOW
PSWKW3	S-WK-W-3	SET WORKSTATION WINDOW 3
PTP	TP	TRANSFORM POINT
PTP3	TP-3	TRANSFORM POINT 3
PTR	TR	TRANSLATE
PTR3	TR-3	TRANSLATE 3
PTX	TX	TEXT
PTX3	TX-3	TEXT 3
PTX3S	TX-3-S	TEXT 3 (FORTRAN 77 subset)
PTXS	TX-S	TEXT (FORTRAN 77 subset)
PUPAST	UPA-ST	UNPOST ALL STRUCTURES
PUPOST	UPO-ST	UNPOST STRUCTURE
PUREC	U-REC	UNPACK DATA RECORD
PUWK	U-WK	UPDATE WORKSTATION
PWAIT	WAIT	AWAIT EVENT
PWITM	W-ITM	WRITE ITEM TO METAFILE

7.2 List of functions ordered alphabetically by PHIGS function name

PADS	AD-S	ADD NAMES TO SET
PATR	ATR	ANNOTATION TEXT RELATIVE
PATRS	ATR-S	ANNOTATION TEXT RELATIVE (FORTRAN 77 subset)
PATR3	ATR-3	ANNOTATION TEXT RELATIVE 3
PATR3S	ATR-3-S	ANNOTATION TEXT RELATIVE 3 (FORTRAN 77 subset)
PAP	AP	APPLICATION DATA
PARAST	ARA-ST	ARCHIVE ALL STRUCTURES
PARSN	AR-SN	ARCHIVE STRUCTURE NETWORKS
PARST	AR-ST	ARCHIVE STRUCTURES
PWAIT	WAIT	AWAIT EVENT
PBLTM	BL-T-M	BUILD TRANSFORMATION MATRIX
PBLTM3	BL-T-M-3	BUILD TRANSFORMATION MATRIX 3
PCA	C-A	CELL ARRAY
PCA3	C-A-3	CELL ARRAY 3
PCSTID	CSTID	CHANGE STRUCTURE IDENTIFIER
PCSTIR	C-ST-IR	CHANGE STRUCTURE IDENTIFIER AND REFERENCES
PCSTRF	C-ST-RF	CHANGE STRUCTURE REFERENCES
PCLARF	CLAR-F	CLOSE ARCHIVE FILE
PCLPH	CL-PH	CLOSE PHIGS
PCLST	CL-ST	CLOSE STRUCTURE
PCLWK	CL-WK	CLOSE WORKSTATION
PCOM	CO-M	COMPOSE MATRIX
PCOM3	CO-M-3	COMPOSE MATRIX 3
PCOTM	CO-T-M	COMPOSE TRANSFORMATION MATRIX
PCOTM3	CO-T-M-3	COMPOSE TRANSFORMATION MATRIX 3
PCELST	C-EL-ST	COPY ALL ELEMENTS FROM STRUCTURE
PDAS	DAS	DELETE ALL STRUCTURES
PDASAR	DAS-AR	DELETE ALL STRUCTURES FROM ARCHIVE
PDEL	D-EL	DELETE ELEMENT
PDELRA	D-EL-RA	DELETE ELEMENT RANGE
PDELLB	D-EL-LB	DELETE ELEMENTS BETWEEN LABELS
PDST	D-ST	DELETE STRUCTURE
PDSN	D-SN	DELETE STRUCTURE NETWORK

List of functions ordered alphabetically by PHIGS function name **List of the PHIGS function names**

PDSNAR	D-SN-AR	DELETE STRUCTURE NETWORKS FROM ARCHIVE
PDSTAR	D-ST-AR	DELETE STRUCTURES FROM ARCHIVE
PELS	EL-S	ELEMENT SEARCH
PECLPH	E-CL-PH	EMERGENCY CLOSE PHIGS
PEMST	EM-ST	EMPTY STRUCTURE
PERHND	ER-HND	ERROR HANDLING
PERLOG	ER-LOG	ERROR LOGGING
PESC	ESC	ESCAPE
PEVMM	EVMM	EVALUATE VIEW MAPPING MATRIX
PEVMM3	EVMM-3	EVALUATE VIEW MAPPING MATRIX 3
PEVOM	EVOM	EVALUATE VIEW ORIENTATION MATRIX
PEVOM3	EVOM-3	EVALUATE VIEW ORIENTATION MATRIX 3
PEXST	EX-ST	EXECUTE STRUCTURE
PFA	F-A	FILL AREA
PFA3	F-A-3	FILL AREA 3
PFAS	F-A-S	FILL AREA SET
PFAS3	F-A-S-3	FILL AREA SET 3
PFLUSH	FLUSH	FLUSH DEVICE EVENTS
PGDP	G-D-P	GENERALIZED DRAWING PRIMITIVE
PGDP3	G-D-P-3	GENERALIZED DRAWING PRIMITIVE 3
PGSE	GSE	GENERALIZED STRUCTURE ELEMENT
PGTCH	GT-CH	GET CHOICE
PGTITM	GT-ITM	GET ITEM TYPE FROM METAFILE
PGTLC	GT-LC	GET LOCATOR
PGTLC3	GT-LC-3	GET LOCATOR 3
PGTPK	GT-PK	GET PICK
PGTST	GT-ST	GET STRING
PGTSK	GT-SK	GET STROKE
PGTSK3	GT-SK-3	GET STROKE 3
PGTVL	GT-VL	GET VALUATOR
PISS	I-S-S	INCREMENTAL SPATIAL SEARCH
PISS3	I-S-S-3	INCREMENTAL SPATIAL SEARCH 3
PINCH	IN-CH	INITIALIZE CHOICE
PINCH3	IN-CH-3	INITIALIZE CHOICE 3
PINLC	IN-LC	INITIALIZE LOCATOR
PINLC3	IN-LC-3	INITIALIZE LOCATOR 3
PINPK	IN-PK	INITIALIZE PICK
PINPK3	IN-PK-3	INITIALIZE PICK 3
PINST	IN-ST	INITIALIZE STRING
PINST3	IN-ST-3	INITIALIZE STRING 3
PINSK	IN-SK	INITIALIZE STROKE
PINSK3	IN-SK-3	INITIALIZE STROKE 3
PINVL	IN-VL	INITIALIZE VALUATOR
PINVL3	IN-VL-3	INITIALIZE VALUATOR 3
PQCST	Q-C-ST	INQUIRE ALL CONFLICTING STRUCTURES
PQANF	Q-AN-F	INQUIRE ANNOTATION FACILITIES
PQARF	Q-AR-F	INQUIRE ARCHIVE FILES
PQARS	Q-AR-S	INQUIRE ARCHIVE STATE VALUE
PQCHS	Q-CH-S	INQUIRE CHOICE DEVICE STATE
PQCHS3	Q-CH-S-3	INQUIRE CHOICE DEVICE STATE 3
PQCF	Q-C-F	INQUIRE COLOUR FACILITIES
PQCMD	Q-C-MD	INQUIRE COLOUR MODEL
PQCMDF	Q-C-MD-F	INQUIRE COLOUR MODEL FACILITIES
PQCR	Q-C-R	INQUIRE COLOUR REPRESENTATION
PQCNRS	Q-CN-RS	INQUIRE CONFLICT RESOLUTION
PQCSTN	Q-C-ST-N	INQUIRE CONFLICTING STRUCTURES IN NETWORK
PQCECO	Q-C-ECO	INQUIRE CURRENT ELEMENT CONTENT
PQCETS	Q-C-ETS	INQUIRE CURRENT ELEMENT TYPE AND SIZE
PQDCH	Q-D-CH	INQUIRE DEFAULT CHOICE DEVICE DATA
PQDCH3	Q-D-CH-3	INQUIRE DEFAULT CHOICE DEVICE DATA 3
PQDDUS	Q-D-D-U-S	INQUIRE DEFAULT DISPLAY UPDATE STATE
PQDLC	Q-D-LC	INQUIRE DEFAULT LOCATOR DEVICE DATA

List of the PHIGS function names **List of functions ordered alphabetically by PHIGS function name**

PQDLC3	Q-D-LC-3	INQUIRE DEFAULT LOCATOR DEVICE DATA 3
PQDPK	Q-D-PK	INQUIRE DEFAULT PICK DEVICE DATA
PQDPK3	Q-D-PK-3	INQUIRE DEFAULT PICK DEVICE DATA 3
PQDST	Q-D-ST	INQUIRE DEFAULT STRING DEVICE DATA
PQDST3	Q-D-ST-3	INQUIRE DEFAULT STRING DEVICE DATA 3
PQDSK	Q-D-SK	INQUIRE DEFAULT STROKE DEVICE DATA
PQDSK3	Q-D-SK-3	INQUIRE DEFAULT STROKE DEVICE DATA 3
PQDVL	Q-D-VL	INQUIRE DEFAULT VALUATOR DEVICE DATA
PQDVL3	Q-D-VL-3	INQUIRE DEFAULT VALUATOR DEVICE DATA 3
PQDSP	Q-D-SP	INQUIRE DISPLAY SPACE SIZE
PQDSP3	Q-D-SP-3	INQUIRE DISPLAY SPACE SIZE 3
PQDUS	Q-D-U-S	INQUIRE DISPLAY UPDATE STATE
PQDSTR	Q-DSTR	INQUIRE DYNAMICS OF STRUCTURES
PQDSWA	Q-DSWA	INQUIRE DYNAMICS OF WORKSTATION ATTRIBUTES
PQEDF	Q-ED-F	INQUIRE EDGE FACILITIES
PQEDR	Q-ED-R	INQUIRE EDGE REPRESENTATION
PQEDM	Q-ED-M	INQUIRE EDIT MODE
PQECO	Q-ECO	INQUIRE ELEMENT CONTENT
PQEP	Q-EP	INQUIRE ELEMENT POINTER
PQETS	Q-ETS	INQUIRE ELEMENT TYPE AND SIZE
PQERHM	Q-ERHM	INQUIRE ERROR HANDLING MODE
PQGDP	Q-G-D-P	INQUIRE GENERALIZED DRAWING PRIMITIVE
PQGDP3	Q-G-D-P-3	INQUIRE GENERALIZED DRAWING PRIMITIVE 3
PQGSEF	Q-GSE-F	INQUIRE GENERALIZED STRUCTURE ELEMENT FACILITIES
PQHLFT	Q-HL-FT	INQUIRE HIGHLIGHTING FILTER
PQHRIF	Q-HR-I-F	INQUIRE HLHSR (IDENTIFIER) FACILITIES
PQHRMF	Q-HR-M-F	INQUIRE HLHSR (MODE) FACILITIES
PQHRM	Q-HR-M	INQUIRE HLHSR MODE
PQIQOV	Q-I-Q-OV	INQUIRE INPUT QUEUE OVERFLOW
PQIF	Q-I-F	INQUIRE INTERIOR FACILITIES
PQIR	Q-I-R	INQUIRE INTERIOR REPRESENTATION
PQIVFT	Q-IV-FT	INQUIRE INVISIBILITY FILTER
PQEGDP	Q-E-G-D-P	INQUIRE LIST OF AVAILABLE GENERALIZED DRAWING PRIMITIVES
PQEGD3	Q-EGD3	INQUIRE LIST OF AVAILABLE GENERALIZED DRAWING PRIMITIVES 3
PQEGSE	Q-E-GSE	INQUIRE LIST OF AVAILABLE GENERALIZED STRUCTURE ELEMENTS
PQEWK	Q-E-WK	INQUIRE LIST OF AVAILABLE WORKSTATION TYPES
PQECI	Q-E-C-I	INQUIRE LIST OF COLOUR INDICES
PQEEDI	Q-E-ED-I	INQUIRE LIST OF EDGE INDICES
PQEII	Q-E-I-I	INQUIRE LIST OF INTERIOR INDICES
PQEPAI	Q-E-PA-I	INQUIRE LIST OF PATTERN INDICES
PQEPLI	Q-E-PL-I	INQUIRE LIST OF POLYLINE INDICES
PQEPMI	Q-E-PM-I	INQUIRE LIST OF POLYMARKER INDICES
PQETXI	Q-E-TX-I	INQUIRE LIST OF TEXT INDICES
PQEVWI	Q-E-VW-I	INQUIRE LIST OF VIEW INDICES
PQLCS	Q-LCS	INQUIRE LOCATOR DEVICE STATE
PQLCS3	Q-LCS-3	INQUIRE LOCATOR DEVICE STATE 3
PQMCLF	Q-MCL-F	INQUIRE MODELLING CLIPPING FACILITIES
PQSIM	Q-SIM	INQUIRE MORE SIMULTANEOUS EVENTS
PQLI	Q-L-I	INQUIRE NUMBER OF AVAILABLE LOGICAL INPUT DEVICES
PQDP	Q-D-P	INQUIRE NUMBER OF DISPLAY PRIORITIES SUPPORTED
PQOPST	Q-OP-ST	INQUIRE OPEN STRUCTURE
PQPAN	Q-P-AN	INQUIRE PATHS TO ANCESTORS
PQPDE	Q-P-DE	INQUIRE PATHS TO DESCENDANTS
PQPAF	Q-PA-F	INQUIRE PATTERN FACILITIES
PQPAR	Q-PA-R	INQUIRE PATTERN REPRESENTATION
PQPHF	Q-PH-F	INQUIRE PHIGS FACILITIES
PQPKS	Q-PK-S	INQUIRE PICK DEVICE STATE
PQPKS3	Q-PK-S-3	INQUIRE PICK DEVICE STATE 3
PQPLF	Q-PL-F	INQUIRE POLYLINE FACILITIES
PQPLR	Q-PL-R	INQUIRE POLYLINE REPRESENTATION
PQPMF	Q-PM-F	INQUIRE POLYMARKER FACILITIES
PQPMR	Q-PM-R	INQUIRE POLYMARKER REPRESENTATION

List of functions ordered alphabetically by PHIGS function name **List of the PHIGS function names**

PQPOST	Q-PO-ST	INQUIRE POSTED STRUCTURES
PQPCR	Q-P-C-R	INQUIRE PREDEFINED COLOUR REPRESENTATION
PQPEDR	Q-P-ED-R	INQUIRE PREDEFINED EDGE REPRESENTATION
PQPIR	Q-P-I-R	INQUIRE PREDEFINED INTERIOR REPRESENTATION
PQPPAR	Q-P-PA-R	INQUIRE PREDEFINED PATTERN REPRESENTATION
PQPPLR	Q-P-PL-R	INQUIRE PREDEFINED POLYLINE REPRESENTATION
PQPPMR	Q-P-PM-R	INQUIRE PREDEFINED POLYMARKER REPRESENTATION
PQPTXR	Q-P-TX-R	INQUIRE PREDEFINED TEXT REPRESENTATION
PQPVWR	Q-P-VW-R	INQUIRE PREDEFINED VIEW REPRESENTATION
PQOPWK	Q-OP-WK	INQUIRE SET OF OPEN WORKSTATIONS
PQWKPO	Q-WK-PO	INQUIRE SET OF WORKSTATIONS TO WHICH POSTED
PQSTS	Q-ST-S	INQUIRE STRING DEVICE STATE
PQSTS3	Q-ST-S-3	INQUIRE STRING DEVICE STATE 3
PQSKS	Q-SK-S	INQUIRE STROKE DEVICE STATE
PQSKS3	Q-SK-S-3	INQUIRE STROKE DEVICE STATE 3
PQSID	Q-SID	INQUIRE STRUCTURE IDENTIFIERS
PQSTRS	Q-STRS	INQUIRE STRUCTURE STATE VALUE
PQSTST	Q-ST-ST	INQUIRE STRUCTURE STATUS
PQSYS	Q-SY-S	INQUIRE SYSTEM STATE VALUE
PQTXX	Q-TX-X	INQUIRE TEXT EXTENT
PQTXXS	Q-TX-X-S	INQUIRE TEXT EXTENT (FORTRAN 77 subset)
PQTXF	Q-TX-F	INQUIRE TEXT FACILITIES
PQTXR	Q-TX-R	INQUIRE TEXT REPRESENTATION
PQVLS	Q-VL-S	INQUIRE VALUATOR DEVICE STATE
PQVLS3	Q-VL-S-3	INQUIRE VALUATOR DEVICE STATE 3
PQVWF	Q-VW-F	INQUIRE VIEW FACILITIES
PQVWR	Q-VW-R	INQUIRE VIEW REPRESENTATION
PQWKCA	Q-WK-CA	INQUIRE WORKSTATION CATEGORY
PQWKCL	Q-WK-CL	INQUIRE WORKSTATION CLASSIFICATION
PQWKC	Q-WK-C	INQUIRE WORKSTATION CONNECTION AND TYPE
PQWKSL	Q-WK-S-L	INQUIRE WORKSTATION STATE TABLE LENGTHS
PQWKST	Q-WKST	INQUIRE WORKSTATION STATE VALUE
PQWKT	Q-WK-T	INQUIRE WORKSTATION TRANSFORMATION
PQWKT3	Q-WK-T-3	INQUIRE WORKSTATION TRANSFORMATION 3
PIITM	I-ITM	INTERPRET ITEM
PLB	LB	LABEL
PMSG	MSG	MESSAGE
PMSGS	MSG-S	MESSAGE (FORTRAN 77 subset)
POSEP	OS-EP	OFFSET ELEMENT POINTER
POPARF	OP-AR-F	OPEN ARCHIVE FILE
POPPH	OP-PH	OPEN PHIGS
POPST	OP-ST	OPEN STRUCTURE
POPWK	OP-WK	OPEN WORKSTATION
PPREC	P-REC	PACK DATA RECORD
PPL	PL	POLYLINE
PPL3	PL-3	POLYLINE 3
PPM	PM	POLYMARKER
PPM3	PM-3	POLYMARKER 3
PPOST	PO-ST	POST STRUCTURE
PRDITM	RD-ITM	READ ITEM FROM METAFILE
PRST	R-ST	REDRAW ALL STRUCTURES
PRES	RE-S	REMOVE NAMES FROM SET
PRQCH	RQ-CH	REQUEST CHOICE
PRQLC	RQ-LC	REQUEST LOCATOR
PRQLC3	RQ-LC-3	REQUEST LOCATOR 3
PRQPK	RQ-PK	REQUEST PICK
PRQST	RQ-ST	REQUEST STRING
PRQSK	RQ-SK	REQUEST STROKE
PRQSK3	RQ-SK-3	REQUEST STROKE 3
PRQVL	RQ-VL	REQUEST VALUATOR
PRMCV	R-MCV	RESTORE MODELLING CLIPPING VOLUME
PRAST	RA-ST	RETRIEVE ALL STRUCTURES

List of the PHIGS function names		List of functions ordered alphabetically by PHIGS function name
PREPAN	RE-P-AN	RETRIEVE PATHS TO ANCESTORS
PREPDE	RE-P-DE	RETRIEVE PATHS TO DESCENDANTS
PRSID	RSID	RETRIEVE STRUCTURE IDENTIFIERS
PRESN	RE-SN	RETRIEVE STRUCTURE NETWORKS
PREST	RE-ST	RETRIEVE STRUCTURES
PRO	RO	ROTATE
PROX	RO-X	ROTATE X
PROY	RO-Y	ROTATE Y
PROZ	RO-Z	ROTATE Z
PSMCH	SM-CH	SAMPLE CHOICE
PSMLC	SM-LC	SAMPLE LOCATOR
PSMLC3	SM-LC-3	SAMPLE LOCATOR 3
PSMPK	SM-PK	SAMPLE PICK
PSMST	SM-ST	SAMPLE STRING
PSMSK	SM-SK	SAMPLE STROKE
PSMSK3	SM-SK-3	SAMPLE STROKE 3
PSMVL	SM-VL	SAMPLE VALUATOR
PSC	SC	SCALE
PSC3	SC-3	SCALE 3
PSANS	S-AN-S	SET ANNOTATION STYLE
PSATAL	SAT-AL	SET ANNOTATION TEXT ALIGNMENT
PSATCH	S-ATCH	SET ANNOTATION TEXT CHARACTER HEIGHT
PSATCU	S-ATCU	SET ANNOTATION TEXT CHARACTER UP VECTOR
PSATP	SAT-P	SET ANNOTATION TEXT PATH
PSCHXP	S-CH-XP	SET CHARACTER EXPANSION FACTOR
PSCHH	S-CH-H	SET CHARACTER HEIGHT
PSCHSP	S-CH-SP	SET CHARACTER SPACING
PSCHUP	S-CH-UP	SET CHARACTER UP VECTOR
PSCHM	S-CH-M	SET CHOICE MODE
PSCMD	S-C-MD	SET COLOUR MODEL
PSCR	S-C-R	SET COLOUR REPRESENTATION
PSCNRS	S-CN-RS	SET CONFLICT RESOLUTION
PSDUS	S-D-U-S	SET DISPLAY UPDATE STATE
PSEDCI	S-EDCI	SET EDGE COLOUR INDEX
PSEDFG	S-EDFG	SET EDGE FLAG
PSEDI	S-ED-I	SET EDGE INDEX
PSEDR	S-ED-R	SET EDGE REPRESENTATION
PSEDT	S-EDT	SET EDGETYPE
PSEWSC	S-EW-SC	SET EDGEWIDTH SCALE FACTOR
PSEDM	S-ED-M	SET EDIT MODE
PSEP	S-EP	SET ELEMENT POINTER
PSEPLB	S-EP-LB	SET ELEMENT POINTER AT LABEL
PSERHM	S-ERHM	SET ERROR HANDLING MODE
PSGMT	S-GM-T	SET GLOBAL TRANSFORMATION
PSGMT3	S-GM-T-3	SET GLOBAL TRANSFORMATION 3
PSHLFT	S-HL-FT	SET HIGHLIGHTING FILTER
PSHRID	S-HR-ID	SET HLHSR IDENTIFIER
PSHRM	S-HR-M	SET HLHSR MODE
PSIASF	S-IASF	SET INDIVIDUAL ASF
PSICI	S-I-C-I	SET INTERIOR COLOUR INDEX
PSII	S-I-I	SET INTERIOR INDEX
PSIR	S-I-R	SET INTERIOR REPRESENTATION
PSIS	S-I-S	SET INTERIOR STYLE
PSISI	S-I-S-I	SET INTERIOR STYLE INDEX
PSIVFT	S-IV-FT	SET INVISIBILITY FILTER
PSLN	S-LN	SET LINETYPE
PSLWSC	S-LW-SC	SET LINEWIDTH SCALE FACTOR
PSLMT	S-LM-T	SET LOCAL TRANSFORMATION
PSLMT3	S-LM-T-3	SET LOCAL TRANSFORMATION 3
PSLCM	S-LC-M	SET LOCATOR MODE
PSMKSC	S-MK-SC	SET MARKER SIZE SCALE FACTOR
PSMK	S-MK	SET MARKER TYPE

List of functions ordered alphabetically by PHIGS function name **List of the PHIGS function names**

PSMCLI	S-MCL-I	SET MODELLING CLIPPING INDICATOR
PSMCV	S-MCV	SET MODELLING CLIPPING VOLUME
PSMCV3	S-MCV-3	SET MODELLING CLIPPING VOLUME 3
PSPARF	S-PARF	SET PATTERN REFERENCE POINT
PSPRPV	S-PRPV	SET PATTERN REFERENCE POINT AND VECTORS
PSPAR	S-PA-R	SET PATTERN REPRESENTATION
PSPA	S-PA	SET PATTERN SIZE
PSPKFT	S-PK-FT	SET PICK FILTER
PSPKID	S-PK-ID	SET PICK IDENTIFIER
PSPKM	S-PK-M	SET PICK MODE
PSPLCI	S-PL-C-I	SET POLYLINE COLOUR INDEX
PSPLI	S-PL-I	SET POLYLINE INDEX
PSPLR	S-PL-R	SET POLYLINE REPRESENTATION
PSPMCI	S-PM-C-I	SET POLYMARKER COLOUR INDEX
PSPMI	S-PM-I	SET POLYMARKER INDEX
PSPMR	S-PM-R	SET POLYMARKER REPRESENTATION
PSSTM	S-ST-M	SET STRING MODE
PSSKM	S-SK-M	SET STROKE MODE
PSTXAL	S-TX-AL	SET TEXT ALIGNMENT
PSTXCI	S-TX-C-I	SET TEXT COLOUR INDEX
PSTXFN	S-TXFN	SET TEXT FONT
PSTXI	S-TX-I	SET TEXT INDEX
PSTXP	S-TX-P	SET TEXT PATH
PSTXPR	S-TX-PR	SET TEXT PRECISION
PSTXR	S-TX-R	SET TEXT REPRESENTATION
PSVLM	S-VL-M	SET VALUATOR MODE
PSVWI	S-VW-I	SET VIEW INDEX
PSVWR	S-VW-R	SET VIEW REPRESENTATION
PSVWR3	S-VW-R-3	SET VIEW REPRESENTATION 3
PSVTIP	S-VT-I-P	SET VIEW TRANSFORMATION INPUT PRIORITY
PSWKV	S-WK-V	SET WORKSTATION VIEWPORT
PSWKV3	S-WK-V-3	SET WORKSTATION VIEWPORT 3
PSWKW	S-WK-W	SET WORKSTATION WINDOW
PSWKW3	S-WK-W-3	SET WORKSTATION WINDOW 3
PTX	TX	TEXT
PTXS	TX-S	TEXT (FORTRAN 77 subset)
PTX3	TX-3	TEXT 3
PTX3S	TX-3-S	TEXT 3 (FORTRAN 77 subset)
PTP	TP	TRANSFORM POINT
PTP3	TP-3	TRANSFORM POINT 3
PTR	TR	TRANSLATE
PTR3	TR-3	TRANSLATE 3
PUREC	U-REC	UNPACK DATA RECORD
PUPAST	UPA-ST	UNPOST ALL STRUCTURES
PUPOST	UPO-ST	UNPOST STRUCTURE
PUWK	U-WK	UPDATE WORKSTATION
PWITM	W-ITM	WRITE ITEM TO METAFILE

8 PHIGS errors specific to the FORTRAN binding

Certain features of the FORTRAN language make additional errors (beyond the ones described in ISO/IEC 9592-1) possible. Specifically, these new errors are defined:

2000 Ignoring function, enumeration type out of range -- the INTEGER passed as a PHIGS enumerated type is not within the range of valid values.

2001 Ignoring function, output parameter size insufficient -- a FORTRAN array or string being passed as an output parameter is too small to contain the returned information.

2002 Ignoring function, list or set element not available -- for a non-empty list or set, a value less than zero or greater than the size of a list or set was passed as the requested list or set element in an inquiry routine.

2003 Ignoring function, invalid data record -- the data record passed to a PHIGS routine cannot be decoded, or there was a problem encountered when PHIGS was creating a data record, making the result invalid.

2004 Ignoring function, input parameter size out of range -- the INTEGER passed as an input parameter defining the size of FORTRAN array parameters is negative or greater than an absolute maximum (e.g. for FORTRAN subset functions taking strings as input parameters).

2005 Ignoring function, invalid list of point lists -- one of the conditions defining a valid list of point list has been violated:

a) NPL≥1,

b) PXA, PYA and PZA are dimensioned by at least IXA(NPL) (however that it is allowable for the implementation not to generate this error in this case),

c) IXA(1)≥3 (the first point list is at least 3 points),

d) IXA(i+1)-IXA(i)≥3 for i=1 to NPL-1, when NPL≥2 (the ith point list is at least 3 points).

2006 Ignoring function, invalid list of filters -- one of the conditions defining a valid list of filters has been violated:

e) FLN≥1,

f) FLIS and FLES are dimensioned by at least FLESX(FLN) (however that it is allowable for the implementation not to generate this error in this case).

9 The PHIGS function interface

9.1 General principles

For each PHIGS function the corresponding FORTRAN SUBROUTINE declaration is given. The name of the PHIGS function is listed, followed by its FORTRAN name and the corresponding parameters. After that, the list of parameters is described by type and a brief identifying phrase.

For the mapping of ENUMERATION types see clause 6.

For GENERALIZED DRAWING PRIMITIVE, GENERALIZED DRAWING PRIMITIVE 3, GENERALIZED STRUCTURE ELEMENT, and ESCAPE, subroutines PGDP, PGDP3, PGSE, and PESC are defined. Each GDP with an identifier less than 10,000 in the ISO International Register of Graphical Items and that is available in the implementation may, in addition, be accessed by a subroutine of the form PD*pqrs* or P3*pqrs*, where *pqrs* is a string of 4 digits representing the GDP identifier with leading zeros if necessary.[1)] The parameters are derived from those of PGDP as follows: N, PXA, PYA (and PZA for 3D) are required; PRIMID is absent; the data record is specified by parameters appropriate to the particular GDP identifier. Similarly, each ESCAPE and GSE with an identifier less than 10,000 in the ISO International Register of Graphical Items and that is available in the implementation may, in addition, be accessed by a subroutine of the form PE*pqrs* (for ESCAPE) and PS*pqrs* (for GSE). The parameters are derived from those of PESC and PGSE as follows: FCTID is absent and the data record is specified by parameters appropriate to the specific ESCAPE and GSE function. The type and order of the parameters representing the data record for the individual subroutines, and the corresponding data sent to PACK DATA RECORD if PGDP, PGDP3, PGSE or PESC is used, are defined in the ISO International Register of Graphical Items. For GDP, GDP3, GSE and ESCAPE, it is possible to define each separate subroutine using PGDP, PGDP3, PGSE and PESC.

Unregistered GDP, GDP3, GSE, and ESCAPE functions may be accessed either by the general subroutines PGDP, PGDP3, PGSE, and PESC with negative identifiers, or by subroutines named PU*lmn*, PU3*lmn*, PUS*lmn*, and PUE*lmn* where *lmn* is the absolute value of the negative identifiers. Parameter lists for these subroutines are implementation dependent.

1) For the purpose of this International Standard and according to the rules for the designation and operation of registration authorities in the ISO Directives, the ISO Council has designated the National Institute of Standards and Technology (Institute of Computer Sciences and Technology), A-266 Technology Building, Gaithersburg, MD 20899, USA to act as registration authority.

9.2 Control functions

OPEN PHIGS

SUBROUTINE POPPH (ERRFIL,BUFA)

Input Parameters:

INTEGER ERRFIL	error file
INTEGER BUFA	amount of memory units (implementation dependent; if -1, use implementation dependent default)

CLOSE PHIGS

SUBROUTINE PCLPH

OPEN WORKSTATION

SUBROUTINE POPWK (WKID,CONID,WTYPE)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER CONID	connection identifier
INTEGER WTYPE	workstation type

CLOSE WORKSTATION

SUBROUTINE PCLWK (WKID)

Input Parameters:

INTEGER WKID	workstation identifier

REDRAW ALL STRUCTURES

SUBROUTINE PRST (WKID,COFL)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER COFL	control flag (PCONDI, PALWAY)

UPDATE WORKSTATION

SUBROUTINE PUWK (WKID,REGFL)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER REGFL	regeneration flag (PPOSTP,PPERFO)

SET DISPLAY UPDATE STATE

SUBROUTINE PSDUS (WKID,DEFMOD,MODMOD)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER DEFMOD	deferral mode (PASAP,PBNIG,PBNIL,PASTI,PWAITD)
INTEGER MODMOD	modification mode (PNIVE,PUWOR,PUQUM)

MESSAGE
Full FORTRAN 77 version

SUBROUTINE PMSG (WKID,MESS)

Input Parameters:

INTEGER WKID	workstation identifier
CHARACTER*(*) MESS	message

MESSAGE
FORTRAN 77 subset version

SUBROUTINE PMSGS (WKID,LSTR,MESS)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER LSTR	length of string (in characters)
CHARACTER*80 MESS	message

9.3 Output primitive functions

POLYLINE 3

SUBROUTINE PPL3 (N,PXA,PYA,PZA)

Input Parameters:

INTEGER N	number of points
REAL PXA (N), PYA (N), PZA (N)	coordinates of points (MC)

POLYLINE

SUBROUTINE PPL (N,PXA,PYA)

Input Parameters:

INTEGER N	number of points
REAL PXA (N), PYA (N)	coordinates of points (MC)

POLYMARKER 3

SUBROUTINE PPM3 (N,PXA,PYA,PZA)

Input Parameters:

INTEGER N	number of points
REAL PXA (N), PYA (N), PZA(N)	coordinates of points (MC)

POLYMARKER

SUBROUTINE PPM (N,PXA,PYA)

Input Parameters:

INTEGER N	number of points
REAL PXA (N), PYA (N)	coordinates of points (MC)

TEXT 3

Full FORTRAN 77 version

SUBROUTINE PTX3 (PX,PY,PZ,TDX,TDY,TDZ,CHARS)

Input Parameters:

REAL PX, PY, PZ	text position (MC)
REAL TDX(2), TDY(2), TDZ(2)	text direction vectors (MC)
CHARACTER*(*) CHARS	character string

TEXT 3
FORTRAN 77 subset version

SUBROUTINE PTX3S (PX,PY,PZ,TDX,TDY,TDZ,LSTR,CHARS)

Input Parameters:

REAL PX, PY, PZ	text position (MC)
REAL TDX(2), TDY(2), TDZ(2)	text direction vectors (MC)
INTEGER LSTR	length of string (in characters)
CHARACTER*80 CHARS	character string

TEXT
Full FORTRAN 77 version

SUBROUTINE PTX (PX,PY,CHARS)

Input Parameters:

REAL PX, PY	text position (MC)
CHARACTER*(*) CHARS	character string

TEXT
FORTRAN 77 subset version

SUBROUTINE PTXS (PX,PY,LSTR,CHARS)

Input Parameters:

REAL PX, PY	text position (MC)
INTEGER LSTR	length of string (in characters)
CHARACTER*80 CHARS	character string

ANNOTATION TEXT RELATIVE 3
Full FORTRAN 77 version

SUBROUTINE PATR3 (RPX,RPY,RPZ,APX,APY,APZ,CHARS)

Input Parameters:

REAL RPX, RPY, RPZ	reference point (MC)
REAL APX, APY, APZ	annotation offset (NPC)
CHARACTER*(*) CHARS	character string

ANNOTATION TEXT RELATIVE 3
FORTRAN 77 subset version

SUBROUTINE PATR3S (RPX,RPY,RPZ,APX,APY,APZ,LSTR,CHARS)

Input Parameters:

REAL RPX, RPY, RPZ	reference point (MC)
REAL APX, APY, APZ	annotation offset (NPC)
INTEGER LSTR	length of string (in characters)
CHARACTER*80 CHARS	character string

ANNOTATION TEXT RELATIVE
Full FORTRAN 77 version

SUBROUTINE PATR (RPX,RPY,APX,APY,CHARS)

Input Parameters:

REAL RPX, RPY	reference point (MC)
REAL APX, APY	annotation offset (NPC)
CHARACTER*(*) CHARS	character string

ANNOTATION TEXT RELATIVE
FORTRAN 77 subset version

SUBROUTINE PATRS (RPX,RPY,APX,APY,LSTR,CHARS)

Input Parameters:

REAL RPX, RPY	reference point (MC)
REAL APX, APY	annotation offset (NPC)
INTEGER LSTR	length of string (in characters)
CHARACTER*80 CHARS	character string

FILL AREA 3

SUBROUTINE PFA3 (N,PXA,PYA,PZA)

Input Parameters:

INTEGER N	number of points
REAL PXA (N), PYA (N), PZA (N)	coordinates of points (MC)

FILL AREA

SUBROUTINE PFA (N,PXA,PYA)

Input Parameters:

INTEGER N	number of points
REAL PXA (N), PYA (N)	coordinates of points (MC)

FILL AREA SET 3

SUBROUTINE PFAS3 (NPL,IXA,PXA,PYA,PZA)

Input Parameters:

INTEGER NPL	number of point lists
INTEGER IXA(NPL)	array of end indices for the point lists
REAL PXA (*), PYA (*), PZA (*)	coordinates of points (MC) (see clause 5)

FILL AREA SET

SUBROUTINE PFAS (NPL,IXA,PXA,PYA)

Input Parameters:

INTEGER NPL	number of point lists
INTEGER IXA(NPL)	array of end indices for the point lists
REAL PXA (*), PYA (*)	coordinates of points (MC) (see clause 5)

CELL ARRAY 3

SUBROUTINE PCA3 (CPXA,CPYA,CPZA,DIMX,DIMY,ISC,ISR,DX,DY,COLIA)

Input Parameters:

REAL CPXA(3),CPYA(3),CPZA(3)	cell parallelogram (P,Q,R) (MC)
INTEGER DIMX, DIMY	the dimensions of COLIA which contains the cell array
INTEGER ISC, ISR	indices of start column, start row
INTEGER DX, DY	number of columns, number of rows
INTEGER COLIA (DIMX,DIMY)	colour index array

CELL ARRAY

SUBROUTINE PCA (PX,PY,QX,QY,DIMX,DIMY,ISC,ISR,DX,DY,COLIA)

Input Parameters:

REAL PX, PY, QX, QY	two points (P,Q) (MC)
INTEGER DIMX, DIMY	the dimensions of COLIA which contains the cell array
INTEGER ISC, ISR	indices of start column, start row
INTEGER DX, DY	number of columns, number of rows
INTEGER COLIA (DIMX,DIMY)	colour index array

GENERALIZED DRAWING PRIMITIVE 3

SUBROUTINE PGDP3 (N,PXA,PYA,PZA,PRIMID,LDR,DATREC)

Input Parameters:

INTEGER N	number of points (≥0)
REAL PXA (*), PYA (*), PZA (*)	coordinates of points (MC)
INTEGER PRIMID	GDP 3 identifier
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

GENERALIZED DRAWING PRIMITIVE

SUBROUTINE PGDP (N,PXA,PYA,PRIMID,LDR,DATREC)

Input Parameters:

INTEGER N	number of points (≥0)
REAL PXA (*), PYA (*)	coordinates of points (MC)
INTEGER PRIMID	GDP identifier
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

9.4 Attribute specification functions

9.4.1 Bundled attribute selection

SET POLYLINE INDEX

SUBROUTINE PSPLI (PLI)

Input Parameters:
INTEGER PLI polyline index

SET POLYMARKER INDEX

SUBROUTINE PSPMI (PMI)

Input Parameters:
INTEGER PMI polymarker index

SET TEXT INDEX

SUBROUTINE PSTXI (TXI)

Input Parameters:
INTEGER TXI text index

SET INTERIOR INDEX

SUBROUTINE PSII (II)

Input Parameters:
INTEGER II interior index

SET EDGE INDEX

SUBROUTINE PSEDI (EDI)

Input Parameters:
INTEGER EDI edge index

9.4.2 Individual attribute selection

SET LINETYPE

SUBROUTINE PSLN (LTYPE)

Input Parameters:

INTEGER LTYPE	linetype

SET LINEWIDTH SCALE FACTOR

SUBROUTINE PSLWSC (LWIDTH)

Input Parameters:

REAL LWIDTH	linewidth scale factor

SET POLYLINE COLOUR INDEX

SUBROUTINE PSPLCI (COLI)

Input Parameters:

INTEGER COLI	polyline colour index

SET MARKER TYPE

SUBROUTINE PSMK (MTYPE)

Input Parameters:

INTEGER MTYPE	marker type

SET MARKER SIZE SCALE FACTOR

SUBROUTINE PSMKSC (MSZSF)

Input Parameters:

REAL MSZSF	marker size scale factor

SET POLYMARKER COLOUR INDEX

SUBROUTINE PSPMCI (COLI)

Input Parameters:

INTEGER COLI	polymarker colour index

SET TEXT FONT

SUBROUTINE PSTXFN (FONT)

Input Parameters:
INTEGER FONT text font

SET TEXT PRECISION

SUBROUTINE PSTXPR (PREC)

Input Parameters:
INTEGER PREC text precision (PSTRP,PCHARP,PSTRKP)

SET CHARACTER EXPANSION FACTOR

SUBROUTINE PSCHXP (CHXP)

Input Parameters:
REAL CHXP character expansion factor

SET CHARACTER SPACING

SUBROUTINE PSCHSP (CHSP)

Input Parameters:
REAL CHSP character spacing

SET TEXT COLOUR INDEX

SUBROUTINE PSTXCI (COLI)

Input Parameters:
INTEGER COLI text colour index

SET CHARACTER HEIGHT

SUBROUTINE PSCHH (CHH)

Input Parameters:
REAL CHH character height

SET CHARACTER UP VECTOR

SUBROUTINE PSCHUP (CHUX,CHUY)

Input Parameters:

REAL CHUX, CHUY	character up vector

SET TEXT PATH

SUBROUTINE PSTXP (TXP)

Input Parameters:

INTEGER TXP	text path (PRIGHT,PLEFT,PUP,PDOWN)

SET TEXT ALIGNMENT

SUBROUTINE PSTXAL (TXALH,TXALV)

Input Parameters:

INTEGER TXALH	text alignment horizontal (PAHNOR,PALEFT,PACENT,PARITE)
INTEGER TXALV	text alignment vertical (PAVNOR,PATOP,PACAP,PAHALF, PABASE,PABOTT)

SET ANNOTATION TEXT CHARACTER HEIGHT

SUBROUTINE PSATCH (ATCHH)

Input Parameters:

REAL ATCHH	annotation text character height

SET ANNOTATION TEXT CHARACTER UP VECTOR

SUBROUTINE PSATCU (ATCHUX,ATCHUY)

Input Parameters:

REAL ATCHUX, ATCHUY	annotation text character up vector

SET ANNOTATION TEXT PATH

SUBROUTINE PSATP (ATP)

Input Parameters:

INTEGER ATP	annotation text path (PRIGHT,PLEFT,PUP,PDOWN)

SET ANNOTATION TEXT ALIGNMENT

SUBROUTINE PSATAL (ATALH,ATALV)

Input Parameters:

INTEGER ATALH	annotation text alignment horizontal (PAHNOR,PALEFT,PACENT,PARITE)
INTEGER ATALV	annotation text alignment vertical (PAVNOR,PATOP,PACAP,PAHALF, PABASE,PABOTT)

SET ANNOTATION STYLE

SUBROUTINE PSANS (ASTYLE)

Input Parameters:

INTEGER ASTYLE	annotation style

SET INTERIOR STYLE

SUBROUTINE PSIS (INTS)

Input Parameters:

INTEGER INTS	interior style (PHOLLO,PSOLID,PPATTR,PHATCH,PISEMP)

SET INTERIOR STYLE INDEX

SUBROUTINE PSISI (ISTYLI)

Input Parameters:

INTEGER ISTYLI	interior style index

SET INTERIOR COLOUR INDEX

SUBROUTINE PSICI (COLI)

Input Parameters:

INTEGER COLI	interior colour index

SET EDGE FLAG

SUBROUTINE PSEDFG (EDFLAG)

Input Parameters:

INTEGER EDFLAG	edge flag (POFF,PON)

SET EDGETYPE

SUBROUTINE PSEDT (EDTYPE)

Input Parameters:
INTEGER EDTYPE edgetype

SET EDGEWIDTH SCALE FACTOR

SUBROUTINE PSEWSC (EWIDTH)

Input Parameters:
REAL EWIDTH edgewidth scale factor

SET EDGE COLOUR INDEX

SUBROUTINE PSEDCI (COLI)

Input Parameters:
INTEGER COLI edge colour index

SET PATTERN SIZE

SUBROUTINE PSPA (SZX,SZY)

Input Parameters:
REAL SZX, SZY pattern size (MC)

SET PATTERN REFERENCE POINT AND VECTORS

SUBROUTINE PSPRPV (RFX,RFY,RFZ,RFVX,RFVY,RFVZ)

Input Parameters:
REAL RFX, RFY, RFZ pattern reference point (MC)
REAL RFVX(2), RFVY(2), RFVZ(2)
pattern reference vectors (MC)

SET PATTERN REFERENCE POINT

SUBROUTINE PSPARF (RFX,RFY)

Input Parameters:
REAL RFX, RFY pattern reference point (MC)

ADD NAMES TO SET

SUBROUTINE PADS (N,NAMSET)

Input Parameters:

INTEGER N	number of names in the set
INTEGER NAMSET (N)	name set

REMOVE NAMES FROM SET

SUBROUTINE PRES (N,NAMSET)

Input Parameters:

INTEGER N	number of names in the set
INTEGER NAMSET (N)	name set

9.4.3 Aspect source flag setting

SET INDIVIDUAL ASF

SUBROUTINE PSIASF (ASPCID,ASFVAL)

Input Parameters:

INTEGER ASPCID	aspect identifier (PLN, PLWSC, PPLCI, PMK, PMKSC, PPMCI, PTXFN, PTXPR, PCHXP, PCHSP, PTXCI, PIS, PISI, PICI, PEDFG, PEDT, PEWSC, PEDCI)
INTEGER ASFVAL	aspect source flag value (PBUNDL,PINDIV)

9.4.4 Workstation attribute table definition

SET POLYLINE REPRESENTATION

SUBROUTINE PSPLR (WKID,PLI,LTYPE,LWIDTH,COLI)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PLI	polyline index
INTEGER LTYPE	linetype
REAL LWIDTH	linewidth scale factor
INTEGER COLI	polyline colour index

SET POLYMARKER REPRESENTATION

SUBROUTINE PSPMR (WKID,PMI,MTYPE,MSZSF,COLI)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PMI	polymarker index
INTEGER MTYPE	marker type
REAL MSZSF	marker size scale factor
INTEGER COLI	polymarker colour index

SET TEXT REPRESENTATION

SUBROUTINE PSTXR (WKID,TXI,FONT,PREC,CHXP,CHSP,COLI)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER TXI	text index
INTEGER FONT	text font
INTEGER PREC	text precision (PSTRP,PCHARP,PSTRKP)
REAL CHXP	character expansion factor
REAL CHSP	character spacing
INTEGER COLI	text colour index

SET INTERIOR REPRESENTATION

SUBROUTINE PSIR (WKID,II,INTS,STYLI,COLI)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER II	interior index
INTEGER INTS	interior style (PHOLLO,PSOLID,PPATTR,PHATCH,PISEMP)
INTEGER STYLI	interior style index
INTEGER COLI	interior colour index

SET EDGE REPRESENTATION

SUBROUTINE PSEDR (WKID,EDI,EDFLAG,EDTYPE,EWIDTH,COLI)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER EDI	edge index
INTEGER EDFLAG	edge flag (POFF,PON)
INTEGER EDTYPE	edgetype
REAL EWIDTH	edgewidth scale factor
INTEGER COLI	edge colour index

SET PATTERN REPRESENTATION

SUBROUTINE PSPAR (WKID,PAI,DIMX,DIMY,ISC,ISR,DX,DY,COLIA)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PAI	pattern index
INTEGER DIMX, DIMY	the dimensions of COLIA which contains the pattern colour index array
INTEGER ISC, ISR	indices to start column, start row
INTEGER DX, DY	number of columns, number of rows used
INTEGER COLIA (DIMX,DIMY)	pattern colour index array

SET COLOUR REPRESENTATION

SUBROUTINE PSCR (WKID,CI,NCCS,CSPEC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER CI	colour index
INTEGER NCCS	number of components of colour specification
REAL CSPEC(*)	colour specification

9.4.5 Workstation filter definition

SET HIGHLIGHTING FILTER

SUBROUTINE PSHLFT (WKID, ISN, IS, ESN, ES)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER ISN	number of names in the inclusion set
INTEGER IS (ISN)	inclusion set
INTEGER ESN	number of names in the exclusion set
INTEGER ES (ESN)	exclusion set

SET INVISIBILITY FILTER

SUBROUTINE PSIVFT (WKID, ISN, IS, ESN, ES)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER ISN	number of names in the inclusion set
INTEGER IS (ISN)	inclusion set
INTEGER ESN	number of names in the exclusion set
INTEGER ES (ESN)	exclusion set

9.4.6 Colour model control

SET COLOUR MODEL

SUBROUTINE PSCMD (WKID, CMODEL)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER CMODEL	colour model

9.4.7 HLHSR attributes

SET HLHSR IDENTIFIER

SUBROUTINE PSHRID (HRID)

Input Parameters:

INTEGER HRID	HLHSR identifier

SET HLHSR MODE

SUBROUTINE PSHRM (WKID, HRM)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER HRM	HLHSR mode

9.5 Transformation functions

9.5.1 Modelling transformations

SET LOCAL TRANSFORMATION 3

SUBROUTINE PSLMT3 (XFRMT,CTYPE)

Input Parameters:

REAL XFRMT(4,4)	transformation matrix
INTEGER CTYPE	composition type (PCPRE, PCPOST, PCREPL)

SET LOCAL TRANSFORMATION

SUBROUTINE PSLMT (XFRMT,CTYPE)

Input Parameters:

REAL XFRMT(3,3)	transformation matrix
INTEGER CTYPE	composition type (PCPRE, PCPOST, PCREPL)

SET GLOBAL TRANSFORMATION 3

SUBROUTINE PSGMT3 (XFRMT)

Input Parameters:

REAL XFRMT(4,4)	transformation matrix

SET GLOBAL TRANSFORMATION

SUBROUTINE PSGMT (XFRMT)

Input Parameters:

REAL XFRMT(3,3)	transformation matrix

SET MODELLING CLIPPING VOLUME 3

SUBROUTINE PSMCV3 (OP,NHALFS,HALFSP)

Input Parameters:

INTEGER OP	operator
INTEGER NHALFS	number of half-spaces in list
REAL HALFSP(6,NHALFS)	list of half-spaces

SET MODELLING CLIPPING VOLUME

SUBROUTINE PSMCV (OP,NHALFS,HALFSP)

Input Parameters:

INTEGER OP	operator
INTEGER NHALFS	number of half-spaces in list
REAL HALFSP(4,NHALFS)	list of half-spaces

SET MODELLING CLIPPING INDICATOR

SUBROUTINE PSMCLI (MCLIPI)

Input Parameters:

INTEGER MCLIPI	modelling clipping indicator (PNCLIP,PCLIP)

RESTORE MODELLING CLIPPING VOLUME

SUBROUTINE PRMCV

9.5.2 View operations

SET VIEW INDEX

SUBROUTINE PSVWI (VIEWI)

Input Parameters:

INTEGER VIEWI	view index

SET VIEW REPRESENTATION 3

SUBROUTINE PSVWR3 (WKID,VIEWI,VWORMT,VWMPMT,VWCPLM,
*XYCLPI,BCLIPI,FCLIPI)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER VIEWI	view index
REAL VWORMT(4,4)	view orientation matrix
REAL VWMPMT(4,4)	view mapping matrix
REAL VWCPLM(6)	view clipping limits (NPC) XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX
INTEGER XYCLPI	x-y clipping indicator (PNCLIP,PCLIP)
INTEGER BCLIPI	back clipping indicator (PNCLIP,PCLIP)
INTEGER FCLIPI	front clipping indicator (PNCLIP,PCLIP)

SET VIEW REPRESENTATION

SUBROUTINE PSVWR (WKID,VIEWI,VWORMT,VWMPMT,VWCPLM,XYCLPI)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER VIEWI	view index
REAL VWORMT(3,3)	view orientation matrix
REAL VWMPMT(3,3)	view mapping matrix
REAL VWCPLM(4)	view clipping limits (NPC) XMIN,XMAX,YMIN,YMAX
INTEGER XYCLPI	x-y clipping indicator (PNCLIP,PCLIP)

SET VIEW TRANSFORMATION INPUT PRIORITY

SUBROUTINE PSVTIP (WKID, VIEWI, RFVWIX, RELPRI)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER VIEWI	view index
INTEGER RFVWIX	reference view index
INTEGER RELPRI	relative priority (PHIGHR,PLOWER)

9.5.3 Workstation transformation

SET WORKSTATION WINDOW 3

SUBROUTINE PSWKW3 (WKID,WKWN)

Input Parameters:

INTEGER WKID	workstation identifier
REAL WKWN(6)	workstation window limits (NPC) XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX

SET WORKSTATION WINDOW

SUBROUTINE PSWKW (WKID,XMIN,XMAX,YMIN,YMAX)

Input Parameters:

INTEGER WKID	workstation identifier
REAL XMIN,XMAX,YMIN,YMAX	workstation window limits (NPC)

SET WORKSTATION VIEWPORT 3

SUBROUTINE PSWKV3 (WKID,WKVP)

Input Parameters:

INTEGER WKID	workstation identifier
REAL WKVP(6)	workstation viewport limits (DC) XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX

SET WORKSTATION VIEWPORT

SUBROUTINE PSWKV (WKID,XMIN,XMAX,YMIN,YMAX)

Input Parameters:

INTEGER WKID	workstation identifier
REAL XMIN,XMAX,YMIN,YMAX	workstation viewport limits (DC)

9.5.4 Utility functions to support modelling

TRANSLATE 3

SUBROUTINE PTR3 (DX,DY,DZ,ERRIND,XFRMT)

Input Parameters:

REAL DX,DY,DZ	translation vector

Output Parameters:

INTEGER ERRIND	error indicator
REAL XFRMT(4,4)	transformation matrix

TRANSLATE

SUBROUTINE PTR (DX,DY,ERRIND,XFRMT)

Input Parameters:

REAL DX,DY	translation vector

Output Parameters:

INTEGER ERRIND	error indicator
REAL XFRMT(3,3)	transformation matrix

SCALE 3

SUBROUTINE PSC3 (FX,FY,FZ,ERRIND,XFRMT)

Input Parameters:
REAL FX,FY,FZ — scale factors

Output Parameters:
INTEGER ERRIND — error indicator
REAL XFRMT(4,4) — transformation matrix

SCALE

SUBROUTINE PSC (FX,FY,ERRIND,XFRMT)

Input Parameters:
REAL FX,FY — scale factors

Output Parameters:
INTEGER ERRIND — error indicator
REAL XFRMT(3,3) — transformation matrix

ROTATE X

SUBROUTINE PROX (ROTANG,ERRIND,XFRMT)

Input Parameters:
REAL ROTANG — rotation angle in radians (positive if anticlockwise)

Output Parameters:
INTEGER ERRIND — error indicator
REAL XFRMT(4,4) — transformation matrix

ROTATE Y

SUBROUTINE PROY (ROTANG,ERRIND,XFRMT)

Input Parameters:
REAL ROTANG — rotation angle in radians (positive if anticlockwise)

Output Parameters:
INTEGER ERRIND — error indicator
REAL XFRMT(4,4) — transformation matrix

ROTATE Z

SUBROUTINE PROZ (ROTANG,ERRIND,XFRMT)

Input Parameters:
REAL ROTANG — rotation angle in radians (positive if anticlockwise)

Output Parameters:
INTEGER ERRIND — error indicator
REAL XFRMT(4,4) — transformation matrix

ROTATE

SUBROUTINE PRO (ROTANG,ERRIND,XFRMT)

Input Parameters:
REAL ROTANG — rotation angle in radians (positive if anticlockwise)

Output Parameters:
INTEGER ERRIND — error indicator
REAL XFRMT(3,3) — transformation matrix

COMPOSE MATRIX 3

SUBROUTINE PCOM3 (XFRMTA,XFRMTB,ERRIND,XFRMTO)

Input Parameters:
REAL XFRMTA (4,4) — transformation matrix A
REAL XFRMTB (4,4) — transformation matrix B

Output Parameters:
INTEGER ERRIND — error indicator
REAL XFRMTO(4,4) — composed transformation matrix

COMPOSE MATRIX

SUBROUTINE PCOM (XFRMTA,XFRMTB,ERRIND,XFRMTO)

Input Parameters:
REAL XFRMTA (3,3) — transformation matrix A
REAL XFRMTB (3,3) — transformation matrix B

Output Parameters:
INTEGER ERRIND — error indicator
REAL XFRMTO(3,3) — composed transformation matrix

TRANSFORM POINT 3

SUBROUTINE PTP3 (XI,YI,ZI,XFRMT,ERRIND,XO,YO,ZO)

Input Parameters:	
REAL XI, YI, ZI	point
REAL XFRMT (4,4)	transformation matrix
Output Parameters:	
INTEGER ERRIND	error indicator
REAL XO, YO, ZO	transformed point

TRANSFORM POINT

SUBROUTINE PTP (XI,YI,XFRMT,ERRIND,XO,YO)

Input Parameters:	
REAL XI, YI	point
REAL XFRMT (3,3)	transformation matrix
Output Parameters:	
INTEGER ERRIND	error indicator
REAL XO, YO	transformed point

BUILD TRANSFORMATION MATRIX 3

SUBROUTINE PBLTM3 (X0,Y0,Z0,DX,DY,DZ,PHIX,PHIY,PHIZ,FX,FY,FZ,
*ERRIND,XFRMT)

Input Parameters:	
REAL X0, Y0, Z0	fixed point
REAL DX, DY, DZ	shift vector
REAL PHIX, PHIY, PHIZ	rotation angles in radians (positive if anticlockwise)
REAL FX, FY, FZ	scale factors
Output Parameters:	
INTEGER ERRIND	error indicator
REAL XFRMT (4,4)	transformation matrix

BUILD TRANSFORMATION MATRIX

SUBROUTINE PBLTM (X0,Y0,DX,DY,PHI,FX,FY,ERRIND,XFRMT)

Input Parameters:	
REAL X0, Y0	fixed point
REAL DX, DY	shift vector
REAL PHI	rotation angle in radians (positive if anticlockwise)
REAL FX, FY	scale factors

Output Parameters:	
INTEGER ERRIND	error indicator
REAL XFRMT (3,3)	transformation matrix

COMPOSE TRANSFORMATION MATRIX 3

SUBROUTINE PCOTM3 (XFRMTI,X0,Y0,Z0,DX,DY,DZ,PHIX,PHIY,PHIZ,
*FX,FY,FZ,ERRIND,XFRMTO)

Input Parameters:	
REAL XFRMTI (4,4)	transformation matrix
REAL X0, Y0, Z0	fixed point
REAL DX, DY, DZ	shift vector
REAL PHIX, PHIY, PHIZ	rotation angles in radians (positive if anticlockwise)
REAL FX, FY, FZ	scale factors

Output Parameters:	
INTEGER ERRIND	error indicator
REAL XFRMTO (4,4)	composed transformation matrix

COMPOSE TRANSFORMATION MATRIX

SUBROUTINE PCOTM (XFRMTI,X0,Y0,DX,DY,PHI,FX,FY,ERRIND,XFRMTO)

Input Parameters:	
REAL XFRMTI (3,3)	transformation matrix
REAL X0, Y0	fixed point
REAL DX, DY	shift vector
REAL PHI	rotation angle in radians (positive if anticlockwise)
REAL FX, FY	scale factors

Output Parameters:	
INTEGER ERRIND	error indicator
REAL XFRMTO (3,3)	composed transformation matrix

9.5.5 Utility functions to support viewing

EVALUATE VIEW ORIENTATION MATRIX 3

SUBROUTINE PEVOM3(VWRX,VWRY,VWRZ,VPNX,VPNY,VPNZ,
*VUPX,VUPY,VUPZ,ERRIND,VWORMT)

Input Parameters:

REAL VWRX, VWRY, VWRZ	view reference point (WC)
REAL VPNX, VPNY, VPNZ	view plane normal (WC)
REAL VUPX, VUPY, VUPZ	view up vector (WC)

Output Parameters:

INTEGER ERRIND	error indicator
REAL VWORMT (4,4)	view orientation matrix

EVALUATE VIEW ORIENTATION MATRIX

SUBROUTINE PEVOM(VWRX,VWRY,VUPX,VUPY,ERRIND,VWORMT)

Input Parameters:

REAL VWRX, VWRY	view reference point (WC)
REAL VUPX, VUPY	view up vector (WC)

Output Parameters:

INTEGER ERRIND	error indicator
REAL VWORMT (3,3)	view orientation matrix

EVALUATE VIEW MAPPING MATRIX 3

SUBROUTINE PEVMM3(VWWNLM,PJVPLM,PJTYPE,PJRX,PJRY,PJRZ,
*VPLD,BPLD,FPLD,ERRIND,VWMPMT)

Input Parameters:

REAL VWWNLM(4)	window limits (VRC) UMIN,UMAX,VMIN,VMAX
REAL PJVPLM(6)	projection viewport limits (NPC) XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX
INTEGER PJTYPE	projection type (PPARL,PPERS)
REAL PJRX,PJRY,PJRZ	projection reference point (VRC)
REAL VPLD	view plane distance (VRC)
REAL BPLD	back plane distance (VRC)
REAL FPLD	front plane distance (VRC)

Output Parameters:

INTEGER ERRIND	error indicator
REAL VWMPMT (4,4)	view mapping matrix

EVALUATE VIEW MAPPING MATRIX

SUBROUTINE PEVMM(VWWNLM,PJVPLM,ERRIND,VWMPMT)

Input Parameters:	
REAL VWWNLM(4)	window limits (VRC) UMIN,UMAX,VMIN,VMAX
REAL PJVPLM(4)	projection viewport limits (NPC) XMIN,XMAX,YMIN,YMAX
Output Parameters:	
INTEGER ERRIND	error indicator
REAL VWMPMT (3,3)	view mapping matrix

9.6 Structure content functions

OPEN STRUCTURE

SUBROUTINE POPST (STRID)

Input Parameters:

INTEGER STRID	structure identifier

CLOSE STRUCTURE

SUBROUTINE PCLST

EXECUTE STRUCTURE

SUBROUTINE PEXST (STRID)

Input Parameters:

INTEGER STRID	structure identifier

LABEL

SUBROUTINE PLB (LABEL)

Input Parameters:

INTEGER LABEL	label identifier

APPLICATION DATA

SUBROUTINE PAP (LDR, DATREC)

Input Parameters:

INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

GENERALIZED STRUCTURE ELEMENT

SUBROUTINE PGSE (GSEID, LDR, DATREC)

Input Parameters:

INTEGER GSEID	GSE identifier
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

SET EDIT MODE

SUBROUTINE PSEDM (EDITMO)

Input Parameters:
INTEGER EDITMO edit mode (PINSRT, PREPLC)

COPY ALL ELEMENTS FROM STRUCTURE

SUBROUTINE PCELST (STRID)

Input Parameters:
INTEGER STRID structure identifier

SET ELEMENT POINTER

SUBROUTINE PSEP (EP)

Input Parameters:
INTEGER EP element position

OFFSET ELEMENT POINTER

SUBROUTINE POSEP (EPO)

Input Parameters:
INTEGER EPO element position offset

SET ELEMENT POINTER AT LABEL

SUBROUTINE PSEPLB (LABEL)

Input Parameters:
INTEGER LABEL label identifier

DELETE ELEMENT

SUBROUTINE PDEL

DELETE ELEMENT RANGE

SUBROUTINE PDELRA (EP1,EP2)

Input Parameters:

INTEGER EP1	element position 1
INTEGER EP2	element position 2

DELETE ELEMENTS BETWEEN LABELS

SUBROUTINE PDELLB (LABEL1,LABEL2)

Input Parameters:

INTEGER LABEL1	label identifier 1
INTEGER LABEL2	label identifier 2

EMPTY STRUCTURE

SUBROUTINE PEMST (STRID)

Input Parameters:

INTEGER STRID	structure identifier

9.7 Structure manipulation functions

DELETE STRUCTURE

SUBROUTINE PDST (STRID)

Input Parameters:
INTEGER STRID structure identifier

DELETE STRUCTURE NETWORK

SUBROUTINE PDSN (STRID,REFHNF)

Input Parameters:
INTEGER STRID structure identifier
INTEGER REFHNF reference handling flag (PDELE,PKEEP)

DELETE ALL STRUCTURES

SUBROUTINE PDAS

CHANGE STRUCTURE IDENTIFIER

SUBROUTINE PCSTID (OLDSID,NEWSID)

Input Parameters:
INTEGER OLDSID original structure identifier
INTEGER NEWSID resulting structure identifier

CHANGE STRUCTURE REFERENCES

SUBROUTINE PCSTRF (OLDSID,NEWSID)

Input Parameters:
INTEGER OLDSID original structure identifier
INTEGER NEWSID resulting structure identifier

CHANGE STRUCTURE IDENTIFIER AND REFERENCES

SUBROUTINE PCSTIR (OLDSID,NEWSID)

Input Parameters:

INTEGER OLDSID	original structure identifier
INTEGER NEWSID	resulting structure identifier

9.8 Structure display functions

POST STRUCTURE

SUBROUTINE PPOST (WKID,STRID,PRIORT)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER STRID	structure identifier
REAL PRIORT	display priority

UNPOST STRUCTURE

SUBROUTINE PUPOST (WKID,STRID)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER STRID	structure identifier

UNPOST ALL STRUCTURES

SUBROUTINE PUPAST (WKID)

Input Parameters:

INTEGER WKID	workstation identifier

9.9 Structure archiving functions

OPEN ARCHIVE FILE

SUBROUTINE POPARF (AFID,ARCFIL)

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER ARCFIL	archive file name

CLOSE ARCHIVE FILE

SUBROUTINE PCLARF (AFID)

Input Parameters:

INTEGER AFID	archive file identifier

ARCHIVE STRUCTURES

SUBROUTINE PARST (AFID,N,LSTRID)

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER N	number of structure identifiers in the list
INTEGER LSTRID(N)	list of structure identifiers

ARCHIVE STRUCTURE NETWORKS

SUBROUTINE PARSN (AFID,N,LSTRID)

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER N	number of structure identifiers in the list
INTEGER LSTRID(N)	list of structure identifiers

ARCHIVE ALL STRUCTURES

SUBROUTINE PARAST (AFID)

Input Parameters:

INTEGER AFID	archive file identifier

SET CONFLICT RESOLUTION

SUBROUTINE PSCNRS (ARCCR,RETCR)

Input Parameters:

INTEGER ARCCR	archival confict resolution (PCRMNT,PCRABA,PCRUPD)
INTEGER RETCR	retrieval confict resolution (PCRMNT,PCRABA,PCRUPD)

RETRIEVE STRUCTURE IDENTIFIERS

SUBROUTINE PRSID (AFID,ILSIZE,N,LSTRID)

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER ILSIZE	size of the list (LSTRID)

Output Parameters:

INTEGER N	number of structure identifiers in the list
INTEGER LSTRID(*)	list of structure identifiers

RETRIEVE STRUCTURES

SUBROUTINE PREST (AFID,N,LSTRID)

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER N	number of structure identifiers in the list
INTEGER LSTRID(N)	list of structure identifiers

RETRIEVE STRUCTURE NETWORKS

SUBROUTINE PRESN (AFID,N,LSTRID)

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER N	number of structure identifiers in the list
INTEGER LSTRID(N)	list of structure identifiers

RETRIEVE ALL STRUCTURES

SUBROUTINE PRAST (AFID)

Input Parameters:

INTEGER AFID	archive file identifier

RETRIEVE PATHS TO ANCESTORS

```
SUBROUTINE PREPAN (AFID,STRID,PTHORD,PTHDEP,IPTHSZ,N,OL,
* APTHSZ,PATHS)
```

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER STRID	structure identifier
INTEGER PTHORD	path order (PPOTOP,PPOBOT)
INTEGER PTHDEP	path depth
INTEGER IPTHSZ	size of path buffer
INTEGER N	element of list of paths

Output Parameters:

INTEGER OL	number of paths available
INTEGER APTHSZ	actual size of the Nth structure path
INTEGER PATHS(2,IPTHSZ)	Nth structure path

RETRIEVE PATHS TO DESCENDANTS

```
SUBROUTINE PREPDE (AFID,STRID,PTHORD,PTHDEP,IPTHSZ,N,OL,
* APTHSZ,PATHS)
```

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER STRID	structure identifier
INTEGER PTHORD	path order (PPOTOP,PPOBOT)
INTEGER PTHDEP	path depth
INTEGER IPTHSZ	size of path buffer
INTEGER N	element of list of paths

Output Parameters:

INTEGER OL	number of paths available
INTEGER APTHSZ	actual size of the Nth structure path
INTEGER PATHS(2,IPTHSZ)	Nth structure path

DELETE STRUCTURES FROM ARCHIVE

```
SUBROUTINE PDSTAR (AFID,N,LSTRID)
```

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER N	number of structure identifiers in the list
INTEGER LSTRID(N)	list of structure identifiers

DELETE STRUCTURE NETWORKS FROM ARCHIVE

SUBROUTINE PDSNAR (AFID,N,LSTRID)

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER N	number of structure identifiers in the list
INTEGER LSTRID(N)	list of structure identifiers

DELETE ALL STRUCTURES FROM ARCHIVE

SUBROUTINE PDASAR (AFID)

Input Parameters:

INTEGER AFID	archive file identifier

9.10 Input functions

9.10.1 Pick related structure elements

SET PICK IDENTIFIER

SUBROUTINE PSPKID (PKID)

Input Parameters:

INTEGER PKID	pick identifier

SET PICK FILTER

SUBROUTINE PSPKFT (WKID, PKDNR, ISN, IS, ESN, ES)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number
INTEGER ISN	number of names in the inclusion set
INTEGER IS (ISN)	inclusion set
INTEGER ESN	number of names in the exclusion set
INTEGER ES (ESN)	exclusion set

9.10.2 Initialization of input devices

INITIALIZE LOCATOR 3

SUBROUTINE PINLC3 (WKID,LCDNR,IVIEWI,IPX,IPY,IPZ,PET,EVOL,LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number
INTEGER IVIEWI	initial view index
REAL IPX,IPY,IPZ	initial locator position (WC)
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

PPREC parameters to build LOCATOR INPUT DATA RECORD for PET = 4:
IL=7
IA=(*unused*, linetype ASF, linewidth scale factor ASF, polyline colour index ASF, polyline index, linetype, polyline colour index)
RL=1
RA=(linewidth scale factor)
SL=0

LSTR=()
STR=()

PPREC parameters to build LOCATOR INPUT DATA RECORD for PET = 5 and polyline/fill area control flag=PPLINE:
IL=8
IA=(polyline/fill area control flag, *unused*, linetype ASF, linewidth scale factor ASF, polyline colour index ASF, polyline index, linetype, polyline colour index)
RL=1
RA=(linewidth scale factor)
SL=0
LSTR=()
STR=()

PPREC parameters to build LOCATOR INPUT DATA RECORD for PET = 5 and polyline/fill area control flag=PFILLA:
IL=9
IA=(polyline/fill area control flag, *unused*, interior style ASF, interior style index ASF, interior colour index ASF, interior index, interior style, interior style index, interior colour index)
RL=0
RA=()
SL=0
LSTR=()
STR=()

PPREC parameters to build LOCATOR INPUT DATA RECORD for PET = 5 and polyline/fill area control flag=PFILAS:
IL=16
IA=(polyline/fill area control flag, *unused*, interior style ASF, interior style index ASF, interior colour index ASF, interior index, interior style, interior style index, interior colour index, edge flag ASF, edgetype ASF, edgewidth scale factor ASF, edge color index ASF, edge flag, edgetype, edge colour index)
RL=1
RA=(edgewidth scale factor)
SL=0
LSTR=()
STR=()

INITIALIZE LOCATOR

SUBROUTINE PINLC (WKID,LCDNR,IVIEWI,IPX,IPY,PET,XMIN,XMAX,YMIN,
*YMAX,LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number
INTEGER IVIEWI	initial view index
REAL IPX,IPY	initial locator position (WC)
INTEGER PET	prompt and echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area (DC)
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

PPREC parameters to build LOCATOR INPUT DATA RECORD for PET = 4:
IL=7
IA=(*unused*, linetype ASF, linewidth scale factor ASF, polyline colour index ASF, polyline index, linetype, polyline colour index)
RL=1
RA=(linewidth scale factor)
SL=0
LSTR=()
STR=()

PPREC parameters to build LOCATOR INPUT DATA RECORD for PET = 5 and polyline/fill area control flag=PPLINE:
IL=8
IA=(polyline/fill area control flag, *unused*, linetype ASF, linewidth scale factor ASF, polyline colour index ASF, polyline index, linetype, polyline colour index)
RL=1
RA=(linewidth scale factor)
SL=0
LSTR=()
STR=()

PPREC parameters to build LOCATOR INPUT DATA RECORD for PET = 5 and polyline/fill area control flag=PFILLA:
IL=9
IA=(polyline/fill area control flag, *unused*, interior style ASF, interior style index ASF, interior colour index ASF, interior index, interior style, interior style index, interior colour index)
RL=0
RA=()
SL=0
LSTR=()
STR=()

PPREC parameters to build LOCATOR INPUT DATA RECORD for PET = 5 and polyline/fill area control flag=PFILAS:
IL=16

IA=(polyline/fill area control flag, *unused*, interior style ASF, interior style index ASF, interior colour index ASF, interior index, interior style, interior style index, interior colour index, edge flag ASF, edgetype ASF, edgewidth scale factor ASF, edge color index ASF, edge flag, edgetype, edge colour index)
RL=1
RA=(edgewidth scale factor)
SL=0
LSTR=()
STR=()

INITIALIZE STROKE 3

SUBROUTINE PINSK3 (WKID,SKDNR,IVIEWI,N,IPX,IPY,IPZ,PET,EVOL,
*LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER SKDNR	stroke device number
INTEGER IVIEWI	initial view index
INTEGER N	number of coordinates of initial stroke
REAL IPX (*), IPY (*), IPZ (*)	coordinates of initial stroke (WC) (the actual arguments are dimensioned by at least MAX(1,N))
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

PPREC parameters to build STROKE INPUT DATA RECORD for PET = 1 or 2:
IL=2
IA=(input buffer size, editing position)
RL=4
RA=(x interval, y interval, z interval, time interval in seconds)
SL=0
LSTR=()
STR=()

PPREC parameters to build STROKE INPUT DATA RECORD for PET = 3:
IL=9
IA=(input buffer size, editing position, *unused*, marker type ASF, marker size scale factor ASF, polymarker colour index ASF, polymarker index, marker type, polymarker colour index)
RL=5
RA=(x interval, y interval, z interval, time interval in seconds, marker size scale factor)
SL=0
LSTR=()
STR=()

PPREC parameters to build STROKE INPUT DATA RECORD for PET = 4:
IL=9
IA=(input buffer size, editing position, *unused*, linetype ASF, linewidth scale factor ASF, polyline colour index ASF, polyline index, linetype, polyline colour index)
RL=5
RA=(x interval, y interval, z interval time interval in seconds, linewidth scale factor)
SL=0
LSTR=()
STR=()

INITIALIZE STROKE

SUBROUTINE PINSK (WKID,SKDNR,IVIEWI,N,IPX,IPY,PET,XMIN,XMAX,
*YMIN,YMAX,LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER SKDNR	stroke device number
INTEGER IVIEWI	initial view index
INTEGER N	number of coordinates of initial stroke
REAL IPX (*), IPY (*)	coordinates of initial stroke (WC) (the actual arguments are dimensioned by at least MAX(1,N))
INTEGER PET	prompt and echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area (DC)
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

PPREC parameters to build STROKE INPUT DATA RECORD for PET = 1 or 2:
IL=2
IA=(input buffer size, editing position)
RL=3
RA=(x interval, y interval, time interval in seconds)
SL=0
LSTR=()
STR=()

PPREC parameters to build STROKE INPUT DATA RECORD for PET = 3:
IL=9
IA=(input buffer size, editing position, *unused*, marker type ASF, marker size scale factor ASF, polymarker colour index ASF, polymarker index, marker type, polymarker colour index)
RL=4
RA=(x interval, y interval, time interval in seconds, marker size scale factor)
SL=0
LSTR=()
STR=()

PPREC parameters to build STROKE INPUT DATA RECORD for PET = 4:
IL=9
IA=(input buffer size, editing position, *unused*, linetype ASF, linewidth scale factor ASF, polyline colour index ASF, polyline index, linetype, polyline colour index)
RL=4
RA=(x interval, y interval, time interval in seconds, linewidth scale factor)
SL=0
LSTR=()
STR=()

INITIALIZE VALUATOR 3

SUBROUTINE PINVL3 (WKID,VLDNR,IVAL,PET,EVOL,LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER VLDNR	valuator device number
REAL IVAL	initial value
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

PPREC parameters to build VALUATOR INPUT DATA RECORD:
IL=0
IA=()
RL=2
RA=(low value of valuator range, high value of valuator range)
SL=0
LSTR=()
STR=()

INITIALIZE VALUATOR

SUBROUTINE PINVL (WKID,VLDNR,IVAL,PET,XMIN,XMAX,YMIN,YMAX,
*LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER VLDNR	valuator device number
REAL IVAL	initial value
INTEGER PET	prompt and echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area (DC)
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

PPREC parameters to build VALUATOR INPUT DATA RECORD:
IL=0
IA=()
RL=2
RA=(low value of valuator range, high value of valuator range)
SL=0
LSTR=()
STR=()

INITIALIZE CHOICE 3

SUBROUTINE PINCH3 (WKID,CHDNR,ISTAT,ICHNR,PET,EVOL,LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER CHDNR	choice device number
INTEGER ISTAT	initial status (POK,PNCHOI)
INTEGER ICHNR	initial choice number
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

PPREC parameters to build CHOICE INPUT DATA RECORD for PET = 2:
IL=number of choice alternatives
IA=(list of prompts)
RL=0
RA=()
SL=0
LSTR=()
STR=()

PPREC parameters to build CHOICE INPUT DATA RECORD for PET = 3 or 4:
IL=0
IA=()
RL=0
RA=()
SL=number of choice strings
LSTR=(list of lengths of choice strings)
STR=(list of strings)

PPREC parameters to build CHOICE INPUT DATA RECORD for PET = 5:
IL=1 + (number of choice alternatives (=N))
IA(1)=(structure identifier)
IA(1+I)=Ith pick identifier, I=1,...,N
RL=0
RA=()
SL=0
LSTR=()
STR=()

INITIALIZE CHOICE

```
SUBROUTINE PINCH (WKID,CHDNR,ISTAT,ICHNR,PET,XMIN,XMAX,YMIN,
*YMAX,LDR,DATREC)
```

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER CHDNR	choice device number
INTEGER ISTAT	initial status (POK,PNCHOI)
INTEGER ICHNR	initial choice number
INTEGER PET	prompt and echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area (DC)
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

PPREC parameters to build CHOICE INPUT DATA RECORD for PET = 2:
- IL=number of choice alternatives
- IA=(list of prompts)
- RL=0
- RA=()
- SL=0
- LSTR=()
- STR=()

PPREC parameters to build CHOICE INPUT DATA RECORD for PET = 3 or 4:
- IL=0
- IA=()
- RL=0
- RA=()
- SL=number of choice strings
- LSTR=(list of lengths of choice strings)
- STR=(list of strings)

PPREC parameters to build CHOICE INPUT DATA RECORD for PET = 5:
- IL=1 + (number of choice alternatives (=N))
- IA(1)=(structure identifier)
- IA(1+I)=Ith pick identifier, I=1,...,N
- RL=0
- RA=()
- SL=0
- LSTR=()
- STR=()

INITIALIZE PICK 3

SUBROUTINE PINPK3 (WKID,PKDNR,ISTAT,IPPD,PP,PET,EVOL,LDR,DATREC,PPORDR)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number
INTEGER ISTAT	initial status (POK,PNPICK)
INTEGER IPPD	depth of initial pick path
INTEGER PP(3,IPPD)	initial pick path
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record
INTEGER PPORDR	pick path order (PPOTOP, PPOBOT)

INITIALIZE PICK

SUBROUTINE PINPK (WKID,PKDNR,ISTAT,IPPD,PP,PET,XMIN,XMAX,YMIN,YMAX,
*LDR,DATREC,PPORDR)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number
INTEGER ISTAT	initial status (POK,PNPICK)
INTEGER IPPD	depth of initial pick path
INTEGER PP(3,IPPD)	initial pick path
INTEGER PET	prompt and echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area (DC)
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record
INTEGER PPORDR	pick path order (PPOTOP, PPOBOT)

INITIALIZE STRING 3
Full FORTRAN 77 version

SUBROUTINE PINST3 (WKID,STDNR,LSTR,ISTR,PET,EVOL,LDR,DATREC)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER STDNR	string device number
INTEGER LSTR	length of the initial string (≥0). The number of characters actually used is the minimum of LSTR and the length of ISTR.
CHARACTER*(*) ISTR	initial string
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

PPREC parameters to build STRING INPUT DATA RECORD:
IL=2
IA=(input buffer size, initial editing position)
RL=0
RA=()
SL=0
LSTR=()
STR=()

INITIALIZE STRING 3
FORTRAN 77 subset version

SUBROUTINE PINST3 (WKID,STDNR,LSTR,ISTR,PET,EVOL,LDR,DATREC)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER STDNR	string device number
INTEGER LSTR	length of the initial string
CHARACTER*80 ISTR	initial string
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

PPREC parameters to build STRING INPUT DATA RECORD:
IL=2
IA=(input buffer size, initial editing position)
RL=0
RA=()
SL=0
LSTR=()
STR=()

INITIALIZE STRING
Full FORTRAN 77 version

```
      SUBROUTINE PINST (WKID,STDNR,LSTR,ISTR,PET,XMIN,XMAX,YMIN,
     *YMAX,LDR,DATREC)

      Input Parameters:
      INTEGER WKID                    workstation identifier
      INTEGER STDNR                   string device number
      INTEGER LSTR                    length of the initial string (≥0). The number
                                      of characters actually used is the minimum of
                                      LSTR and the length of ISTR.
      CHARACTER*(*) ISTR              initial string
      INTEGER PET                     prompt and echo type
      REAL XMIN,XMAX,YMIN,YMAX        echo area (DC)
      INTEGER LDR                     dimension of data record array
      CHARACTER*80 DATREC(LDR)        data record
```

PPREC parameters to build STRING INPUT DATA RECORD:
IL=2
IA=(input buffer size, initial editing position)
RL=0
RA=()
SL=0
LSTR=()
STR=()

INITIALIZE STRING
FORTRAN 77 subset version

SUBROUTINE PINST (WKID,STDNR,LSTR,ISTR,PET,XMIN,XMAX,YMIN,
*YMAX,LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER STDNR	string device number
INTEGER LSTR	length of the initial string
CHARACTER*80 ISTR	initial string
INTEGER PET	prompt and echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area (DC)
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

PPREC parameters to build STRING INPUT DATA RECORD:
IL=2
IA=(input buffer size, initial editing position)
RL=0
RA=()
SL=0
LSTR=()
STR=()

9.10.3 Setting mode of input devices

SET LOCATOR MODE

SUBROUTINE PSLCM (WKID,LCDNR,MODE,ESW)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)

SET STROKE MODE

SUBROUTINE PSSKM (WKID,SKDNR,MODE,ESW)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER SKDNR	stroke device number
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)

SET VALUATOR MODE

SUBROUTINE PSVLM (WKID,VLDNR,MODE,ESW)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER VLDNR	valuator device number
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)

SET CHOICE MODE

SUBROUTINE PSCHM (WKID,CHDNR,MODE,ESW)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER CHDNR	choice device number
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)

SET PICK MODE

SUBROUTINE PSPKM (WKID,PKDNR,MODE,ESW)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)

SET STRING MODE

SUBROUTINE PSSTM (WKID,STDNR,MODE,ESW)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER STDNR	string device number
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)

9.10.4 Request input functions

REQUEST LOCATOR 3

SUBROUTINE PRQLC3 (WKID,LCDNR,STAT,VIEWI,PX,PY,PZ)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number
Output Parameters:	
INTEGER STAT	status (PNONE,POK)
INTEGER VIEWI	view index
REAL PX,PY,PZ	locator position (WC)

REQUEST LOCATOR

SUBROUTINE PRQLC (WKID,LCDNR,STAT,VIEWI,PX,PY)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number
Output Parameters:	
INTEGER STAT	status (PNONE,POK)
INTEGER VIEWI	view index
REAL PX,PY	locator position (WC)

REQUEST STROKE 3

SUBROUTINE PRQSK3 (WKID,SKDNR,N,STAT,VIEWI,NP,PXA,PYA,PZA)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER SKDNR	stroke device number
INTEGER N	dimension of arrays for stroke points
Output Parameters:	
INTEGER STAT	status (PNONE,POK)
INTEGER VIEWI	view index
INTEGER NP	number of points
REAL PXA (N), PYA (N), PZA (N)	coordinates of points in stroke (WC)

REQUEST STROKE

SUBROUTINE PRQSK (WKID,SKDNR,N,STAT,VIEWI,NP,PXA,PYA)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER SKDNR	stroke device number
INTEGER N	dimension of arrays for stroke points
Output Parameters:	
INTEGER STAT	status (PNONE,POK)
INTEGER VIEWI	view index
INTEGER NP	number of points
REAL PXA (N), PYA (N)	coordinates of points in stroke (WC)

REQUEST VALUATOR

SUBROUTINE PRQVL (WKID,VLDNR,STAT,VAL)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER VLDNR	valuator device number
Output Parameters:	
INTEGER STAT	status (PNONE,POK)
REAL VAL	value

REQUEST CHOICE

SUBROUTINE PRQCH (WKID,CHDNR,STAT,CHNR)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER CHDNR	choice device number
Output Parameters:	
INTEGER STAT	status (PNONE,POK,PNCHOI)
INTEGER CHNR	choice number

REQUEST PICK

SUBROUTINE PRQPK (WKID,PKDNR,IPPD,STAT,PPD,PP)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number
INTEGER IPPD	depth of pick path to return
Output Parameters:	
INTEGER STAT	status (PNONE,POK,PNPICK)
INTEGER PPD	depth of actual pick path
INTEGER PP (3,IPPD)	pick path

REQUEST STRING
Full FORTRAN 77 version

SUBROUTINE PRQST (WKID,STDNR,STAT,LOSTR,STR)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER STDNR	string device number
Output Parameters:	
INTEGER STAT	status (PNONE,POK)
INTEGER LOSTR	number of characters returned
CHARACTER*(*) STR	character string

REQUEST STRING
FORTRAN 77 subset version

SUBROUTINE PRQST (WKID,STDNR,STAT,LOSTR,STR)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER STDNR	string device number
Output Parameters:	
INTEGER STAT	status (PNONE,POK)
INTEGER LOSTR	number of characters returned
CHARACTER*80 STR	character string

9.10.5 Sample input functions

SAMPLE LOCATOR 3

```
SUBROUTINE PSMLC3 (WKID,LCDNR,VIEWI,LPX,LPY,LPZ)

Input Parameters:
INTEGER WKID          workstation identifier
INTEGER LCDNR         locator device number

Output Parameters:
INTEGER VIEWI         view index
REAL LPX,LPY,LPZ      locator position (WC)
```

SAMPLE LOCATOR

```
SUBROUTINE PSMLC (WKID,LCDNR,VIEWI,LPX,LPY)

Input Parameters:
INTEGER WKID          workstation identifier
INTEGER LCDNR         locator device number

Output Parameters:
INTEGER VIEWI         view index
REAL LPX,LPY          locator position (WC)
```

SAMPLE STROKE 3

```
SUBROUTINE PSMSK3 (WKID,SKDNR,N,VIEWI,NP,PXA,PYA,PZA)

Input Parameters:
INTEGER WKID          workstation identifier
INTEGER SKDNR         stroke device number
INTEGER N             dimension of arrays for stroke points

Output Parameters:
INTEGER VIEWI         view index
INTEGER NP            number of points
REAL PXA (N), PYA (N), PZA (N)  coordinates of points in stroke (WC)
```

SAMPLE STROKE

SUBROUTINE PSMSK (WKID,SKDNR,N,VIEWI,NP,PXA,PYA)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER SKDNR	stroke device number
INTEGER N	dimension of arrays for stroke points
Output Parameters:	
INTEGER VIEWI	view index
INTEGER NP	number of points
REAL PXA (N), PYA (N)	coordinates of points in stroke (WC)

SAMPLE VALUATOR

SUBROUTINE PSMVL (WKID,VLDNR,VAL)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER VLDNR	valuator device number
Output Parameters:	
REAL VAL	value

SAMPLE CHOICE

SUBROUTINE PSMCH (WKID,CHDNR,STAT,CHNR)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER CHDNR	choice device number
Output Parameters:	
INTEGER STAT	status (POK,PNCHOI)
INTEGER CHNR	choice number

SAMPLE PICK

SUBROUTINE PSMPK (WKID,PKDNR,IPPD,STAT,PPD,PP)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number
INTEGER IPPD	depth of pick path to return
Output Parameters:	
INTEGER STAT	status (POK,PNPICK)
INTEGER PPD	depth of actual pick path
INTEGER PP (3,IPPD)	pick path

SAMPLE STRING
Full FORTRAN 77 version

SUBROUTINE PSMST (WKID,STDNR,LOSTR,STR)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER STDNR	string device number
Output Parameters:	
INTEGER LOSTR	number of characters returned
CHARACTER*(*) STR	string

SAMPLE STRING
FORTRAN 77 subset version

SUBROUTINE PSMST (WKID,STDNR,LOSTR,STR)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER STDNR	string device number
Output Parameters:	
INTEGER LOSTR	number of characters returned
CHARACTER*80 STR	string

9.10.6 Event input functions

AWAIT EVENT

SUBROUTINE PWAIT (TOUT,WKID,ICL,IDNR)

Input Parameters:	
REAL TOUT	time out (seconds)
Output Parameters:	
INTEGER WKID	workstation identifier
INTEGER ICL	input class (PNCLAS,PLOCAT,PSTROK, PVALUA,PCHOIC,PPICK,PSTRIN)
INTEGER IDNR	logical input device number

FLUSH DEVICE EVENTS

SUBROUTINE PFLUSH (WKID,ICL,IDNR)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER ICL	input class (PLOCAT,PSTROK,PVALUA, PCHOIC,PPICK,PSTRIN)
INTEGER IDNR	logical input device number

GET LOCATOR 3

SUBROUTINE PGTLC3 (VIEWI,LPX,LPY,LPZ)

Output Parameters:	
INTEGER VIEWI	view index
REAL LPX,LPY,LPZ	locator position (WC)

GET LOCATOR

SUBROUTINE PGTLC (VIEWI,LPX,LPY)

Output Parameters:	
INTEGER VIEWI	view index
REAL LPX,LPY	locator position (WC)

GET STROKE 3

SUBROUTINE PGTSK3 (N,VIEWI,NP,PXA,PYA,PZA)

Input Parameters:
INTEGER N dimension of arrays for stroke points

Output Parameters:
INTEGER VIEWI view index
INTEGER NP number of points
REAL PXA (N), PYA (N), PZA (N) coordinates of points in stroke (WC)

GET STROKE

SUBROUTINE PGTSK (N,VIEWI,NP,PXA,PYA)

Input Parameters:
INTEGER N dimension of arrays for stroke points

Output Parameters:
INTEGER VIEWI view index
INTEGER NP number of points
REAL PXA (N), PYA (N) coordinates of points in stroke (WC)

GET VALUATOR

SUBROUTINE PGTVL (VAL)

Output Parameters:
REAL VAL value

GET CHOICE

SUBROUTINE PGTCH (STAT,CHNR)

Output Parameters:
INTEGER STAT status (POK,PNCHOI)
INTEGER CHNR choice number

GET PICK

SUBROUTINE PGTPK (IPPD,STAT,PPD,PP)

Input Parameters:
INTEGER IPPD depth of pick path to return

Output Parameters:
INTEGER STAT status (POK,PNPICK)

INTEGER PPD	depth of actual pick path
INTEGER PP (3,IPPD)	pick path

GET STRING
Full FORTRAN 77 version

SUBROUTINE PGTST (LOSTR,STR)

Output Parameters:

INTEGER LOSTR	number of characters returned
CHARACTER*(*) STR	string

GET STRING
FORTRAN 77 subset version

SUBROUTINE PGTST (LOSTR,STR)

Output Parameters:

INTEGER LOSTR	number of characters returned
CHARACTER*80 STR	string

9.11 Metafile functions

WRITE ITEM TO METAFILE

SUBROUTINE PWITM (WKID,TYPE,IDRL,LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER TYPE	item type
INTEGER IDRL	item data record length (number characters in data record array)
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

GET ITEM TYPE FROM METAFILE

SUBROUTINE PGTITM (WKID,TYPE,IDRL)

Input Parameters:

INTEGER WKID	workstation identifier

Output Parameters:

INTEGER TYPE	item type
INTEGER IDRL	item data record length (this may be passed to PRDITM as MIDRL)

READ ITEM FROM METAFILE

SUBROUTINE PRDITM (WKID,MIDRL,MLDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER MIDRL	maximum item data record length (number of characters in the data record array). Range is 0...IDRL. If MIDRL=0, then skip the record; if MIDRL<IDRL, the excess is lost; if MIDRL≥IDRL, a full record is read (IDRL is returned by PGTITM).
INTEGER MLDR	dimension of item data record

Output Parameters:

CHARACTER*80 DATREC(MLDR)	data record

INTERPRET ITEM

SUBROUTINE PIITM (TYPE,IDRL,LDR,DATREC)

Input Parameters:

INTEGER TYPE	item type
INTEGER IDRL	item data record length (number characters in data record array)
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

9.12 Inquiry functions

9.12.1 Inquiry functions for operating state value

INQUIRE SYSTEM STATE VALUE

SUBROUTINE PQSYS (SYSSTA)

Output Parameters:
INTEGER SYSSTA system state value (PPHCL,PPHOP)

INQUIRE WORKSTATION STATE VALUE

SUBROUTINE PQWKST (WKSTA)

Output Parameters:
INTEGER WKSTA workstation state value (PWSCL,PWSOP)

INQUIRE STRUCTURE STATE VALUE

SUBROUTINE PQSTRS (STRSTA)

Output Parameters:
INTEGER STRSTA structure state value (PSTCL,PSTOP)

INQUIRE ARCHIVE STATE VALUE

SUBROUTINE PQARS (ARSTA)

Output Parameters:
INTEGER ARSTA archive state value (PARCL,PAROP)

9.12.2 Inquiry functions for PHIGS description table

INQUIRE LIST element OF AVAILABLE WORKSTATION TYPES

SUBROUTINE PQEWK (N,ERRIND,NUMBER,WKTYP)

Input Parameters:	
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NUMBER	number of workstation types
INTEGER WKTYP	Nth element of list of available workstation types

INQUIRE PHIGS FACILITIES

SUBROUTINE PQPHF (NCS,ERRIND,SIMOPW,SIMOPA,NAMESN,OLCS,CS,NFLN,IFLN)

Input Parameters:	
INTEGER NCS	character set requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER SIMOPW	maximum number of simultaneously open workstations
INTEGER SIMOPA	maximum number of simultaneously open archive files
INTEGER NAMESN	maximum number of available names for name sets
INTEGER OLCS	number of available character sets
INTEGER CS	NCSth available character set
INTEGER NFLN	maximum length of normal filter list for ISS
INTEGER IFLN	maximum length of inverted filter list for ISS

INQUIRE GENERALIZED STRUCTURE ELEMENT FACILITIES

SUBROUTINE PQGSEF (N,ERRIND,OL,GSEID,WSDIND)

Input Parameters:	
INTEGER N	element of the list of available GSEs
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of available GSEs
INTEGER GSEID	GSE identifier of Nth element of the list of available GSEs
INTEGER WSDIND	workstation dependency indicator of Nth element of the list of available GSEs (PWKI,PWKD)

INQUIRE MODELLING CLIPPING FACILITIES

SUBROUTINE PQMCLF (N,ERRIND,NDPMCV,OL,MCLPOP)

Input Parameters:

INTEGER N	list element requested

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER NDPMCV	number of distinct planes in modelling clipping volume
INTEGER OL	number of modelling clipping operators
INTEGER MCLPOP	Nth element of list of modelling clipping operators

9.12.3 Inquiry functions for PHIGS state list

INQUIRE EDIT MODE

SUBROUTINE PQEDM (ERRIND,EDITMO)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER EDITMO	edit mode (PINSRT, PREPLC)

INQUIRE SET member OF OPEN WORKSTATIONS

SUBROUTINE PQOPWK (N,ERRIND,OL,WKID)

Input Parameters:

INTEGER N	set member requested

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER OL	number of open workstations
INTEGER WKID	Nth member of set of open workstations

INQUIRE STRUCTURE IDENTIFIERS

SUBROUTINE PQSID (N,ERRIND,NUMBER,STRID)

Input Parameters:

INTEGER N	list element requested

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER NUMBER	number of structure identifiers
INTEGER STRID	Nth structure identifier

INQUIRE ARCHIVE FILES

SUBROUTINE PQARF (N,ERRIND,NUMBER,AFID,ARCFIL)

Input Parameters:

INTEGER N	list element requested

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER NUMBER	number of archive files open
INTEGER AFID	Nth open archive file identifier
INTEGER ARCFIL	Nth open archive file name

INQUIRE CONFLICT RESOLUTION

SUBROUTINE PQCNRS (ERRIND,ARCCR,RETCR)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER ARCCR	archival conflict resolution (PCRMNT, PCRABA, PCRUPD)
INTEGER RETCR	retrieval conflict resolution (PCRMNT, PCRABA, PCRUPD)

INQUIRE ALL CONFLICTING STRUCTURES

SUBROUTINE PQCST (AFID,N,ERRIND,OL,OSTRID)

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER N	element of the structure identifier list to return

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER OL	number of structure identifiers in list
INTEGER OSTRID	Nth structure identifier in list

INQUIRE CONFLICTING STRUCTURES IN NETWORK

SUBROUTINE PQCSTN (AFID,STRID,SNSRC,N,ERRIND,OL,OSTRID)

Input Parameters:

INTEGER AFID	archive file identifier
INTEGER STRID	structure identifier
INTEGER SNSRC	structure network source (PCSS,PARCHV)
INTEGER N	element of the structure identifier list to return

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER OL	number of structure identifiers in list
INTEGER OSTRID	Nth structure identifier in list

INQUIRE MORE SIMULTANEOUS EVENTS

SUBROUTINE PQSIM (ERRIND,FLAG)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER FLAG	more simultaneous events (PNMORE,PMORE)

9.12.4 Inquiry functions for workstation state list

INQUIRE WORKSTATION CONNECTION AND TYPE

SUBROUTINE PQWKC (WKID,ERRIND,CONID,WTYPE)

Input Parameters:

INTEGER WKID	workstation identifier

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER CONID	connection identifier
INTEGER WTYPE	workstation type

INQUIRE LIST element OF VIEW INDICES

SUBROUTINE PQEVWI (WKID,N,ERRIND,NVWIX,VIEWI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NVWIX	number of view bundle table entries
INTEGER VIEWI	Nth element of list of defined view indices

INQUIRE VIEW REPRESENTATION

SUBROUTINE PQVWR (WKID, VIEWI, CURQ, ERRIND,
*VWUPD, VWORMT, VWMPMT, VWCPLM, XYCLPI, BCLIPI, FCLIPI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER VIEWI	view index requested
INTEGER CURQ	whether current or requested values are to be returned (PCURVL,PRQSVL)
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER VWUPD	viewing transformation update state (PNPEND,PPEND)
REAL VWORMT(4,4)	view orientation matrix
REAL VWMPMT(4,4)	view mapping matrix
REAL VWCPLM(6)	view clipping limits (NPC) xmin,xmax,ymin,ymax,zmin,zmax
INTEGER XYCLPI	x-y clipping indicator (PNCLIP,PCLIP)
INTEGER BCLIPI	back clipping indicator (PNCLIP,PCLIP)
INTEGER FCLIPI	front clipping indicator (PNCLIP,PCLIP)

INQUIRE HLHSR MODE

SUBROUTINE PQHRM (WKID, ERRIND, HUPD, CHRM, RHRM)

Input Parameters:	
INTEGER WKID	workstation identifier
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER HUPD	HLHSR mode update state (PNPEND,PPEND)
INTEGER CHRM	current HLHSR mode
INTEGER RHRM	requested HLHSR mode

INQUIRE POSTED STRUCTURES

SUBROUTINE PQPOST (WKID,N,ERRIND,NUMBER,STRID,PRIORT)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NUMBER	number of structures posted to that workstation
INTEGER STRID	identifier of the Nth structure posted to that workstation
REAL PRIORT	input priority of the Nth structure posted to that workstation

INQUIRE DISPLAY UPDATE STATE

SUBROUTINE PQDUS (WKID,ERRIND,DEFMOD,MODMOD,DEMPTY,STOFVR)

Input Parameters:	
INTEGER WKID	workstation identifier
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER DEFMOD	deferral mode (PASAP,PBNIG,PBNIL,PASTI,PWAITD)
INTEGER MODMOD	modification mode (PNIVE,PUWOR,PUQUM)
INTEGER DEMPTY	display surface empty (PNEMPT,PEMPTY)
INTEGER STOFVR	state of visual representation (PVROK,PVRDRF,PVRSIM)

INQUIRE LIST element OF POLYLINE INDICES

SUBROUTINE PQEPLI (WKID,N,ERRIND,OL,PLI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of polyline bundle table entries
INTEGER PLI	Nth element of list of defined polyline indices

INQUIRE POLYLINE REPRESENTATION

SUBROUTINE PQPLR (WKID,PLI,TYPE,ERRIND,LTYPE,LWIDTH,COLI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER PLI	polyline index
INTEGER TYPE	type of returned values (PSET,PREALI)
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER LTYPE	linetype
REAL LWIDTH	linewidth scale factor
INTEGER COLI	polyline colour index

INQUIRE LIST element OF POLYMARKER INDICES

SUBROUTINE PQEPMI (WKID,N,ERRIND,OL,PMI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of polymarker bundle table entries
INTEGER PMI	Nth element of list of defined polymarker indices

INQUIRE POLYMARKER REPRESENTATION

SUBROUTINE PQPMR (WKID,PMI,TYPE,ERRIND,MTYPE,MSZSF,COLI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER PMI	polymarker index
INTEGER TYPE	type of returned values (PSET,PREALI)
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MTYPE	marker type
REAL MSZSF	marker size scale factor
INTEGER COLI	polymarker colour index

INQUIRE LIST element OF TEXT INDICES

SUBROUTINE PQETXI (WKID,N,ERRIND,OL,TXI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of text bundle table entries
INTEGER TXI	Nth element of list of defined text indices

INQUIRE TEXT REPRESENTATION

SUBROUTINE PQTXR (WKID,TXI,TYPE,ERRIND,FONT,PREC,CHXP,CHSP, *COLI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER TXI	text index
INTEGER TYPE	type of returned values (PSET,PREALI)
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER FONT	text font
INTEGER PREC	text precision (PSTRP,PCHARP,PSTRKP)
REAL CHXP	character expansion factor
REAL CHSP	character spacing
INTEGER COLI	text colour index

INQUIRE LIST element OF INTERIOR INDICES

SUBROUTINE PQEII (WKID,N,ERRIND,OL,II)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of interior bundle table entries
INTEGER II	Nth element of list of defined interior indices

INQUIRE INTERIOR REPRESENTATION

SUBROUTINE PQIR (WKID,II,TYPE,ERRIND,INTS,ISTYLI,COLI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER II	interior index
INTEGER TYPE	type of returned values (PSET,PREALI)
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER INTS	interior style (PHOLLO,PSOLID,PPATTR,PHATCH,PISEMP)
INTEGER ISTYLI	interior style index
INTEGER COLI	interior colour index

INQUIRE LIST element OF EDGE INDICES

SUBROUTINE PQEEDI (WKID,N,ERRIND,OL,EDI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of edge bundle table entries
INTEGER EDI	Nth element of list of defined edge indices

INQUIRE EDGE REPRESENTATION

SUBROUTINE PQEDR (WKID,EDI,TYPE,ERRIND,EDFLAG,EDTYPE,EWIDTH,COLI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER EDI	edge index
INTEGER TYPE	type of returned values (PSET,PREALI)
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER EDFLAG	edge flag (POFF, PON)
INTEGER EDTYPE	edgetype
REAL EWIDTH	edgewidth scale factor
INTEGER COLI	edge colour index

INQUIRE LIST element OF PATTERN INDICES

SUBROUTINE PQEPAI (WKID,N,ERRIND,OL,PAI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of pattern table entries
INTEGER PAI	Nth element of list of pattern indices

INQUIRE PATTERN REPRESENTATION

SUBROUTINE PQPAR (WKID,PAI,TYPE,DIMX,DIMY,ERRIND,DX,DY,COLIA)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER PAI	pattern index
INTEGER TYPE	type of returned values (PSET,PREALI)
INTEGER DIMX,DIMY	maximum pattern array dimensions
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER DX,DY	pattern colour index array dimensions
INTEGER COLIA (DIMX,DIMY)	pattern colour index array

INQUIRE COLOUR MODEL

SUBROUTINE PQCMD (WKID,ERRIND,CMODEL)

Input Parameters:	
INTEGER WKID	workstation identifier
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER CMODEL	current colour model

INQUIRE LIST element OF COLOUR INDICES

SUBROUTINE PQECI (WKID,N,ERRIND,OL,COLI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of colour table entries
INTEGER COLI	Nth element of list of colour indices

INQUIRE COLOUR REPRESENTATION

SUBROUTINE PQCR (WKID,COLI,CCSBSZ,TYPE,ERRIND,OL,CSPEC)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER COLI	colour index
INTEGER CCSBSZ	colour component specification buffer size
INTEGER TYPE	type of returned values (PSET,PREALI)
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of colour components in the colour specification
REAL CSPEC(CCSBSZ)	colour specification

INQUIRE HIGHLIGHTING FILTER

SUBROUTINE PQHLFT (WKID,ISBSZ,ESBSZ,ERRIND,ISN,IS,ESN,ES)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER ISBSZ	inclusion set buffer size
INTEGER ESBSZ	exclusion set buffer size

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER ISN	number of names in the inclusion set
INTEGER IS (ISBSZ)	inclusion set
INTEGER ESN	number of names in the exclusion set
INTEGER ES (ESBSZ)	exclusion set

INQUIRE INVISIBILITY FILTER

SUBROUTINE PQIVFT (WKID,ISBSZ,ESBSZ,ERRIND,ISN,IS,ESN,ES)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER ISBSZ	inclusion set buffer size
INTEGER ESBSZ	exclusion set buffer size

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER ISN	number of names in the inclusion set
INTEGER IS (ISBSZ)	inclusion set
INTEGER ESN	number of names in the exclusion set
INTEGER ES (ESBSZ)	exclusion set

INQUIRE WORKSTATION TRANSFORMATION 3

SUBROUTINE PQWKT3 (WKID,ERRIND,TUS,RWINDO,CWINDO,
*RVIEWP,CVIEWP)

Input Parameters:	
INTEGER WKID	workstation identifier
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER TUS	workstation transformation update state (PNPEND,PPEND)
REAL RWINDO(6)	requested workstation window in NPC RWXMIN,RWXMAX,RWYMIN RWYMAX,RWZMIN,RWZMAX
REAL CWINDO(6)	current workstation window in NPC CWXMIN,CWXMAX,CWYMIN CWYMAX,CWZMIN,CWZMAX
REAL RVIEWP(6)	requested workstation viewport in DC RVXMIN,RVXMAX,RVYMIN RVYMAX,RVZMIN,RVZMAX
REAL CVIEWP(6)	current workstation viewport in DC CVXMIN,CVXMAX,CVYMIN CVYMAX,CVZMIN,CVZMAX

INQUIRE WORKSTATION TRANSFORMATION

SUBROUTINE PQWKT (WKID,ERRIND,TUS,RWINDO,CWINDO,
*RVIEWP,CVIEWP)

Input Parameters:	
INTEGER WKID	workstation identifier
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER TUS	workstation transformation update state (PNPEND,PPEND)
REAL RWINDO(4)	requested workstation window in NPC RWXMIN, RWXMAX, RWYMIN, RWYMAX
REAL CWINDO(4)	current workstation window in NPC CWXMIN, CWXMAX, CWYMIN, CWYMAX
REAL RVIEWP(4)	requested workstation viewport in DC RVXMIN, RVXMAX, RVYMIN, RVYMAX
REAL CVIEWP(4)	current workstation viewport in DC CVXMIN, CVXMAX, CVYMIN, CVYMAX

INQUIRE LOCATOR DEVICE STATE 3

SUBROUTINE PQLCS3 (WKID,LCDNR,TYPE,MLDR,ERRIND,MODE,ESW,IVIEWI, *IPX,IPY,IPZ,PET,EVOL,LDR,DATREC)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number
INTEGER TYPE	type of returned values (PSET,PREALI)
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)
INTEGER IVIEWI	initial view index
REAL IPX, IPY, IPZ	initial locator position (WC)
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE LOCATOR DEVICE STATE

SUBROUTINE PQLCS (WKID,LCDNR,TYPE,MLDR,ERRIND,MODE,ESW,IVIEWI, *IPX,IPY,PET,EAREA,LDR,DATREC)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number
INTEGER TYPE	type of returned values (PSET,PREALI)
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)
INTEGER IVIEWI	initial view index
REAL IPX, IPY	initial locator position (WC)
INTEGER PET	prompt and echo type
REAL EAREA(4)	echo area (DC) XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE STROKE DEVICE STATE 3

SUBROUTINE PQSKS3 (WKID,SKDNR,TYPE,N,MLDR,ERRIND,MODE,ESW,IVIEWI, *NP,IPXA,IPYA,IPZA,PET,EVOL,LDR,DATREC)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER SKDNR	stroke device number
INTEGER TYPE	type of returned values (PSET,PREALI)
INTEGER N	maximum number of points
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)
INTEGER IVIEWI	initial view index
INTEGER NP	number of points
REAL IPXA(N), IPYA(N), IPZA(N)	coordinates of initial stroke (WC)
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE STROKE DEVICE STATE

SUBROUTINE PQSKS (WKID,SKDNR,TYPE,N,MLDR,ERRIND,MODE,ESW,IVIEWI, *NP,IPXA,IPYA,PET,EAREA,LDR,DATREC)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER SKDNR	stroke device number
INTEGER TYPE	type of returned values (PSET,PREALI)
INTEGER N	maximum number of points
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)
INTEGER IVIEWI	initial view index
INTEGER NP	number of points
REAL IPXA(N), IPYA(N)	coordinates of initial stroke (WC)
INTEGER PET	prompt and echo type
REAL EAREA(4)	echo area (DC) XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE VALUATOR DEVICE STATE 3

SUBROUTINE PQVLS3 (WKID,VLDNR,MLDR,ERRIND,MODE,ESW,IVAL,PET, *EVOL,LDR,DATREC)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER VLDNR	valuator device number
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)
REAL IVAL	initial value
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE VALUATOR DEVICE STATE

SUBROUTINE PQVLS (WKID,VLDNR,MLDR,ERRIND,MODE,ESW,IVAL,PET,
*EAREA,LDR,DATREC)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER VLDNR	valuator device number
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)
REAL IVAL	initial value
INTEGER PET	prompt and echo type
REAL EAREA(4)	echo area (DC) XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE CHOICE DEVICE STATE 3

SUBROUTINE PQCHS3 (WKID,CHDNR,MLDR,ERRIND,MODE,ESW,ISTAT,
*ICHNR,PET,EVOL,LDR,DATREC)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER CHDNR	choice device number
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)
INTEGER ISTAT	initial status (POK,PNCHOI)
INTEGER ICHNR	initial choice number
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE CHOICE DEVICE STATE

```
SUBROUTINE PQCHS (WKID,CHDNR,MLDR,ERRIND,MODE,ESW,ISTAT,
*ICHNR,PET,EAREA,LDR,DATREC)

Input Parameters:
INTEGER WKID                    workstation identifier
INTEGER CHDNR                   choice device number
INTEGER MLDR                    dimension of data record array

Output Parameters:
INTEGER ERRIND                  error indicator
INTEGER MODE                    operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW                     echo switch (PNECHO,PECHO)
INTEGER ISTAT                   initial status (POK,PNCHOI)
INTEGER ICHNR                   initial choice number
INTEGER PET                     prompt and echo type
REAL EAREA(4)                   echo area (DC)
                                XMIN, XMAX, YMIN, YMAX
INTEGER LDR                     number of array elements used in data record
CHARACTER*80 DATREC(MLDR)
                                data record
```

INQUIRE PICK DEVICE STATE 3

```
SUBROUTINE PQPKS3 (WKID,PKDNR,TYPE,MLDR,IPISSZ,IPESSZ,IPPSZ,
*                  ERRIND,MODE,ESW,PISSZ,PINS,PESSZ,PES,ISTAT,PPD,PP,
*                  PET,EVOL,LDR,DATREC,PPORDR)
```

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number
INTEGER TYPE	type of returned values (PSET,PREALI)
INTEGER MLDR	dimension of data record array
INTEGER IPISSZ	pick inclusion set buffer size
INTEGER IPESSZ	pick exclusion set buffer size
INTEGER IPPSZ	pick path buffer size
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)
INTEGER PISSZ	pick inclusion set size
INTEGER PINS(IPISSZ)	pick inclusion set
INTEGER PESSZ	pick exclusion set size
INTEGER PES(IPESSZ)	pick exclusion set
INTEGER ISTAT	initial status (POK,PNPICK)
INTEGER PPD	initial pick path depth
INTEGER PP(3,IPPSZ)	initial pick path
INTEGER PET	prompt and echo type
REAL EVOL(6)	echo volume (DC) XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record
INTEGER PPORDR	pick path order (PPOTOP, PPOBOT)

INQUIRE PICK DEVICE STATE

```
SUBROUTINE PQPKS (WKID,PKDNR,TYPE,MLDR,IPISSZ,IPESSZ,IPPSZ,
*                 ERRIND,MODE,ESW,PISSZ,PINS,PESSZ,PES,ISTAT,PPD,PP,
*                 PET,EAREA,LDR,DATREC,PPORDR)
```

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number
INTEGER TYPE	type of returned values (PSET,PREALI)
INTEGER MLDR	dimension of data record array
INTEGER IPISSZ	pick inclusion set buffer size
INTEGER IPESSZ	pick exclusion set buffer size
INTEGER IPPSZ	pick path buffer size

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW	echo switch (PNECHO,PECHO)
INTEGER PISSZ	pick inclusion set size
INTEGER PINS(IPISSZ)	pick inclusion set
INTEGER PESSZ	pick exclusion set size
INTEGER PES(IPESSZ)	pick exclusion set
INTEGER ISTAT	initial status (POK,PNPICK)
INTEGER PPD	initial pick path depth
INTEGER PP(3,IPPSZ)	initial pick path
INTEGER PET	prompt and echo type
REAL EAREA(4)	echo area (DC) XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record
INTEGER PPORDR	pick path order (PPOTOP, PPOBOT)

INQUIRE STRING DEVICE STATE 3
Full FORTRAN 77 version

```
SUBROUTINE PQSTS3 (WKID,STDNR,MLDR,ERRIND,MODE,ESW,LOSTR,ISTR,
*PET,EVOL,LDR,DATREC)

Input Parameters:
INTEGER WKID                    workstation identifier
INTEGER STDNR                   string device number
INTEGER MLDR                    dimension of data record array

Output Parameters:
INTEGER ERRIND                  error indicator
INTEGER MODE                    operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW                     echo switch (PNECHO,PECHO)
INTEGER LOSTR                   number of characters returned
CHARACTER*(*) ISTR              initial string
INTEGER PET                     prompt and echo type
REAL EVOL(6)                    echo volume (DC)
                                XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR                     number of array elements used in data record
CHARACTER*80 DATREC(MLDR)
                                data record
```

INQUIRE STRING DEVICE STATE 3
FORTRAN 77 subset version

```
SUBROUTINE PQSTS3 (WKID,STDNR,MLDR,ERRIND,MODE,ESW,
*LOSTR,ISTR,PET,EVOL,LDR,DATREC)

Input Parameters:
INTEGER WKID                    workstation identifier
INTEGER STDNR                   string device number
INTEGER MLDR                    dimension of data record array

Output Parameters:
INTEGER ERRIND                  error indicator
INTEGER MODE                    operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW                     echo switch (PNECHO,PECHO)
INTEGER LOSTR                   number of characters returned
CHARACTER*80 ISTR               initial string
INTEGER PET                     prompt and echo type
REAL EVOL(6)                    echo area (DC)
                                XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR                     number of array elements used in data record
CHARACTER*80 DATREC(MLDR)
                                data record
```

INQUIRE STRING DEVICE STATE
Full FORTRAN 77 version

```
SUBROUTINE PQSTS (WKID,STDNR,MLDR,ERRIND,MODE,ESW,LOSTR,ISTR,
*PET,EAREA,LDR,DATREC)

Input Parameters:
INTEGER WKID                    workstation identifier
INTEGER STDNR                   string device number
INTEGER MLDR                    dimension of data record array

Output Parameters:
INTEGER ERRIND                  error indicator
INTEGER MODE                    operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW                     echo switch (PNECHO,PECHO)
INTEGER LOSTR                   number of characters returned
CHARACTER*(*) ISTR              initial string
INTEGER PET                     prompt and echo type
REAL EAREA(4)                   echo area (DC)
                                XMIN, XMAX, YMIN, YMAX
INTEGER LDR                     number of array elements used in data record
CHARACTER*80 DATREC(MLDR)
                                data record
```

INQUIRE STRING DEVICE STATE
FORTRAN 77 subset version

```
SUBROUTINE PQSTS (WKID,STDNR,MLDR,ERRIND,MODE,ESW,
*LOSTR,ISTR,PET,EAREA,LDR,DATREC)

Input Parameters:
INTEGER WKID                    workstation identifier
INTEGER STDNR                   string device number
INTEGER MLDR                    dimension of data record array

Output Parameters:
INTEGER ERRIND                  error indicator
INTEGER MODE                    operating mode (PREQU,PSAMPL,PEVENT)
INTEGER ESW                     echo switch (PNECHO,PECHO)
INTEGER LOSTR                   number of characters returned
CHARACTER*80 ISTR               initial string
INTEGER PET                     prompt and echo type
REAL EAREA(4)                   echo area (DC)
                                XMIN, XMAX, YMIN, YMAX
INTEGER LDR                     number of array elements used in data record
CHARACTER*80 DATREC(MLDR)
                                data record
```

9.12.5 Inquiry functions for workstation description table

INQUIRE WORKSTATION CATEGORY

SUBROUTINE PQWKCA (WTYPE,ERRIND,WKCAT)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER WKCAT	workstation category (POUTPT,PINPUT, POUTIN,PMO,PMI)

INQUIRE DISPLAY SPACE SIZE 3

SUBROUTINE PQDSP3 (WTYPE,ERRIND,DCUNIT,DX,DY,DZ,RX,RY,RZ)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER DCUNIT	device coordinate units (PMETRE,POTHU)
REAL DX,DY,DZ	maximum display volume size (DC)
INTEGER RX,RY,RZ	maximum display volume size (raster units)

INQUIRE DISPLAY SPACE SIZE

SUBROUTINE PQDSP (WTYPE,ERRIND,DCUNIT,DX,DY,RX,RY)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER DCUNIT	device coordinate units (PMETRE,POTHU)
REAL DX,DY	maximum display space size (DC)
INTEGER RX,RY	maximum display space size (raster units)

INQUIRE HLHSR (IDENTIFIER) FACILITIES

SUBROUTINE PQHRIF (WTYPE, NI, ERRIND, NHRID, HRID)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER NI	sequence number of HLHSR identifier list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NHRID	number of available HLHSR identifiers
INTEGER HRID	NIth element of list of available HLHSR identifiers

INQUIRE HLHSR (MODE) FACILITIES

SUBROUTINE PQHRMF (WTYPE, NM, ERRIND, NHRMD, HRMD)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER NM	sequence number of HLHSR mode list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NHRMD	number of available HLHSR modes
INTEGER HRMD	NMth element of list of available HLHSR modes

INQUIRE VIEW FACILITIES

SUBROUTINE PQVWF (WTYPE, ERRIND, NPVWI)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NPVWI	number of predefined view indices

INQUIRE PREDEFINED VIEW REPRESENTATION

SUBROUTINE PQPVWR (WTYPE,PVWI,ERRIND,VWORMT,VWMPMT,VWCPLM, *XYCLPI,BCLIPI,FCLIPI)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER PVWI	predefined view index
Output Parameters:	
INTEGER ERRIND	error indicator
REAL VWORMT(4,4)	view orientation matrix
REAL VWMPMT(4,4)	view mapping matrix
REAL VWCPLM(6)	view clipping limits (NPC) xmin,xmax,ymin,ymax,zmin,zmax
INTEGER XYCLPI	x-y clipping indicator (PNCLIP,PCLIP)
INTEGER BCLIPI	back clipping indicator (PNCLIP,PCLIP)
INTEGER FCLIPI	front clipping indicator (PNCLIP,PCLIP)

INQUIRE WORKSTATION CLASSIFICATION

SUBROUTINE PQWKCL (WTYPE,ERRIND,VRTYPE)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER VRTYPE	workstation classification - vector/raster/other type (PVECTR,PRASTR,POTHWK)

INQUIRE DYNAMICS OF WORKSTATION ATTRIBUTES

SUBROUTINE PQDSWA (WTYPE,ERRIND,PLBUN,PMBUN,TXBUN,INBUN,
*EDBUN,PAREP,COLREP,VWREP,WKTR,HLFLTR,INFLTR,HLHSR)

Input Parameters:

INTEGER WTYPE	workstation type

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER PLBUN	polyline representation changeable (PIRG,PIMM,PCBS)
INTEGER PMBUN	polymarker representation changeable (PIRG,PIMM,PCBS)
INTEGER TXBUN	text representation changeable (PIRG,PIMM,PCBS)
INTEGER INBUN	interior representation changeable (PIRG,PIMM,PCBS)
INTEGER EDBUN	edge representation changeable (PIRG,PIMM,PCBS)
INTEGER PAREP	pattern representation changeable (PIRG,PIMM,PCBS)
INTEGER COLREP	colour representation changeable (PIRG,PIMM,PCBS)
INTEGER VWREP	view representation changeable (PIRG,PIMM,PCBS)
INTEGER WKTR	workstation transformation changeable (PIRG,PIMM,PCBS)
INTEGER HIFLTR	highlighting filter changeable (PIRG,PIMM,PCBS)
INTEGER INFLTR	invisibility filter changeable (PIRG,PIMM,PCBS)
INTEGER HLHSR	HLHSR mode changeable (PIRG,PIMM,PCBS)

INQUIRE DEFAULT DISPLAY UPDATE STATE

SUBROUTINE PQDDUS (WTYPE,ERRIND,DEFMOD,MODMOD)

Input Parameters:

INTEGER WTYPE	workstation type

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER DEFMOD	default value for deferral mode (PASAP,PBNIG,PBNIL,PASTI,PWAITD)
INTEGER MODMOD	default value for modification mode (PNIVE,PUWOR,PUQUM)

INQUIRE POLYLINE FACILITIES

SUBROUTINE PQPLF (WTYPE,N,ERRIND,NLT,LT,NLW,NOMLW,
*RLWMIN,RLWMAX,NPPLI)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NLT	number of available linetypes
INTEGER LT	Nth element of list of available linetypes
INTEGER NLW	number of available linewidths
REAL NOMLW	nominal linewidth (DC)
REAL RLWMIN, RLWMAX	range of linewidths (DC)
INTEGER NPPLI	number of predefined polyline indices

INQUIRE PREDEFINED POLYLINE REPRESENTATION

SUBROUTINE PQPPLR (WTYPE,PLI,ERRIND,LTYPE,LWIDTH,COLI)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER PLI	predefined polyline index
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER LTYPE	linetype
REAL LWIDTH	linewidth scale factor
INTEGER COLI	polyline colour index

INQUIRE POLYMARKER FACILITIES

SUBROUTINE PQPMF (WTYPE,N,ERRIND,NMT,MT,NMS,NOMMS,
*RMSMIN,RMSMAX,NPPMI)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER N	list element requested

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NMT	number of available marker types
INTEGER MT	Nth element of list of available marker types
INTEGER NMS	number of available marker sizes
REAL NOMMS	nominal marker size (DC)
REAL RMSMIN, RMSMAX	range of marker sizes (DC)
INTEGER NPPMI	number of predefined polymarker indices

INQUIRE PREDEFINED POLYMARKER REPRESENTATION

SUBROUTINE PQPPMR (WTYPE,PMI,ERRIND,MTYPE,MSZSF,COLI)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER PMI	predefined polymarker index

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MTYPE	marker type
REAL MSZSF	marker size scale factor
INTEGER COLI	polymarker colour index

INQUIRE TEXT FACILITIES

SUBROUTINE PQTXF (WTYPE,N,ERRIND,NFPP,FONT,PREC,NCHH,MINCHH, *MAXCHH,NCHX,MINCHX,MAXCHX,NPTXI)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NFPP	number of text font and precision pairs
INTEGER FONT	Nth element of list of text fonts
INTEGER PREC	Nth element of list of text precisions (PSTRP,PCHARP,PSTRKP)
INTEGER NCHH	number of available character heights
REAL MINCHH	minimum character height (DC)
REAL MAXCHH	maximum character height (DC)
INTEGER NCHX	number of available character expansion factors
REAL MINCHX	minimum character expansion factor
REAL MAXCHX	maximum character expansion factor
INTEGER NPTXI	number of predefined text indices

INQUIRE PREDEFINED TEXT REPRESENTATION

SUBROUTINE PQPTXR (WTYPE,PTXI,ERRIND,FONT,PREC,CHXP,CHSP, *COLI)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER PTXI	predefined text index
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER FONT	text font
INTEGER PREC	text precision (PSTRP,PCHARP,PSTRKP)
REAL CHXP	character expansion factor
REAL CHSP	character spacing
INTEGER COLI	text colour index

INQUIRE ANNOTATION FACILITIES

SUBROUTINE PQANF (WTYPE,N,ERRIND,NAS,AS,NCHH,MINCHH,MAXCHH)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER N	list element of annotation styles requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NAS	number of available annotation styles
INTEGER AS	Nth element of list of available annotation styles
INTEGER NCHH	number of available annotation text character heights
REAL MINCHH	minimum annotation text character height (DC)
REAL MAXCHH	maximum annotation text character height (DC)

INQUIRE TEXT EXTENT
Full FORTRAN 77 version

SUBROUTINE PQTXX (WKTYPE,FONT,CHXP,CHSP,CHH,TXP,TXALH,TXALV,STR,
*ERRIND,TXEXRX,TXEXRY,COPX,COPY)

Input Parameters:	
INTEGER WKTYPE	workstation type
INTEGER FONT	text font
REAL CHXP	character expansion factor
REAL CHSP	character spacing
REAL CHH	character height
INTEGER TXP	text path (PRIGHT,PLEFT,PUP,PDOWN)
INTEGER TXALH	text alignment horizontal (PAHNOR,PALEFT,PACENT,PARITE)
INTEGER TXALV	text alignment vertical (PAVNOR,PATOP,PACAP,PAHALF,PABASE,PABOTT)
CHARACTER*(*) STR	character string
Output Parameters:	
INTEGER ERRIND	error indicator
REAL TXEXRX(2), TXEXRY(2)	text extent rectangle
REAL COPX,COPY	concatenation offset

INQUIRE TEXT EXTENT
FORTRAN 77 subset version

```
SUBROUTINE PQTXXS (WKTYPE,FONT,CHXP,CHSP,CHH,TXP,TXALH,TXALV,LSTR,STR,
*ERRIND,TXEXRX,TXEXRY,COPX,COPY)
```

Input Parameters:	
INTEGER WKTYPE	workstation type
INTEGER FONT	text font
REAL CHXP	character expansion factor
REAL CHSP	character spacing
REAL CHH	character height
INTEGER TXP	text path (PRIGHT,PLEFT,PUP,PDOWN)
INTEGER TXALH	text alignment horizontal (PAHNOR,PALEFT,PACENT,PARITE)
INTEGER TXALV	text alignment vertical (PAVNOR,PATOP,PACAP,PAHALF,PABASE,PABOTT)
INTEGER LSTR	length of string (in characters)
CHARACTER*80 STR	character string

Output Parameters:	
INTEGER ERRIND	error indicator
REAL TXEXRX(2), TXEXRY(2)	text extent rectangle
REAL COPX,COPY	concatenation offset

INQUIRE INTERIOR FACILITIES

```
SUBROUTINE PQIF (WTYPE,NI,NH,ERRIND,NIS,IS,NHS,HS,NPFAI)
```

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER NI	list element of interior styles requested
INTEGER NH	list element of hatch styles requested

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NIS	number of available interior styles
INTEGER IS	NIth element of list of available interior styles (PHOLLO,PSOLID,PPATTR,PHATCH,PISEMP)
INTEGER NHS	number of available hatch styles
INTEGER HS	NHth element of list of available hatch style indices
INTEGER NPFAI	number of predefined interior indices

INQUIRE PREDEFINED INTERIOR REPRESENTATION

SUBROUTINE PQPIR (WTYPE,PII,ERRIND,STYLE,STYLID,COLI)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER PII	predefined interior index
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER STYLE	interior style (PHOLLO,PSOLID,PPATTR,PHATCH,PISEMP)
INTEGER STYLID	interior style index
INTEGER COLI	interior colour index

INQUIRE EDGE FACILITIES

SUBROUTINE PQEDF (WTYPE,N,ERRIND,NEDT,EDT,NEDW,NOMEDW, *REDWMN,REDWMX,NPEDI)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NEDT	number of available edgetypes
INTEGER EDT	Nth element of list of available edgetypes
INTEGER NEDW	number of available edgewidths
REAL NOMEDW	nominal edgewidth
REAL REDWMN, REDWMX	range of edgewidths
INTEGER NPEDI	number of predefined edge indices

INQUIRE PREDEFINED EDGE REPRESENTATION

SUBROUTINE PQPEDR (WTYPE,PEDI,ERRIND,EDFLAG,EDTYPE,EWIDTH,COLI)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER PEDI	predefined edge index
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER EDFLAG	edge flag (POFF,PON)
INTEGER EDTYPE	edgetype
REAL EWIDTH	edgewidth scale factor
INTEGER COLI	edge colour index

INQUIRE PATTERN FACILITIES

SUBROUTINE PQPAF (WTYPE,ERRIND,NPPAI)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NPPAI	number of predefined pattern indices

INQUIRE PREDEFINED PATTERN REPRESENTATION

SUBROUTINE PQPPAR (WTYPE,PPAI,DIMX,DIMY,ERRIND,DX,DY,COLIA)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER PPAI	predefined pattern index
INTEGER DIMX,DIMY	maximum pattern array dimensions
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER DX,DY	pattern colour index array dimensions
INTEGER COLIA (DIMX,DIMY)	pattern colour index array

INQUIRE COLOUR MODEL FACILITIES

SUBROUTINE PQCMDF (WTYPE,N,ERRIND,OL,CMOD,DFCMOD)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER N	element of list of available colour models
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of available colour models
INTEGER CMOD	Nth available colour model
INTEGER DFCMOD	default colour model

INQUIRE COLOUR FACILITIES

SUBROUTINE PQCF (WTYPE,ERRIND,NCOLI,COLA,NPCI,CC)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NCOLI	number of colour indices
INTEGER COLA	colour available (PMONOC,PCOLOR)
INTEGER NPCI	number of predefined colour indices
REAL CC(9)	primary colours - chromaticity coefficients and luminance value for the primaries for the display device $R_{u'}$, $R_{v'}$, R_Y, $G_{u'}$, $G_{v'}$, G_Y, $B_{u'}$, $B_{v'}$, B_Y

INQUIRE PREDEFINED COLOUR REPRESENTATION

SUBROUTINE PQPCR (WTYPE,PCI,CCSBSZ,ERRIND,OL,CSPEC)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER PCI	predefined colour index
INTEGER CCSBSZ	colour component specification buffer size
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of colour components in the colour specification
REAL CSPEC(CCSBSZ)	colour specification

INQUIRE LIST element OF AVAILABLE GENERALIZED DRAWING PRIMITIVES 3

SUBROUTINE PQEGD3 (WTYPE,N,ERRIND,NGDP,GDPL)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NGDP	number of available 3D generalized drawing primitives
INTEGER GDPL	Nth element of list of 3D GDP identifiers

INQUIRE LIST element OF AVAILABLE GENERALIZED DRAWING PRIMITIVES

SUBROUTINE PQEGDP (WTYPE,N,ERRIND,NGDP,GDPL)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NGDP	number of available generalized drawing primitives
INTEGER GDPL	Nth element of list of GDP identifiers

INQUIRE GENERALIZED DRAWING PRIMITIVE 3

SUBROUTINE PQGDP3 (WTYPE,GDP,ERRIND,NBND,BNDL)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER GDP	3D GDP identifier
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NBND	number of sets of attributes used
INTEGER BNDL(5)	list of sets of attributes used (PPLATT,PPMATT,PTXATT,PINATT,PEDATT)

INQUIRE GENERALIZED DRAWING PRIMITIVE

SUBROUTINE PQGDP (WTYPE,GDP,ERRIND,NBND,BNDL)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER GDP	GDP identifier
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NBND	number of sets of attributes used
INTEGER BNDL(5)	list of sets of attributes used (PPLATT,PPMATT,PTXATT,PINATT,PEDATT)

INQUIRE LIST element OF AVAILABLE GENERALIZED STRUCTURE ELEMENTS

SUBROUTINE PQEGSE (WTYPE,N,ERRIND,NGSE,GSEL)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER N	list element requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NGSE	number of available generalized structure elements
INTEGER GSEL	Nth element of list of GSE identifiers

INQUIRE NUMBER OF DISPLAY PRIORITIES SUPPORTED

SUBROUTINE PQDP (WTYPE,ERRIND,NSPSUP)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NSPSUP	number of display priorities supported

INQUIRE WORKSTATION STATE TABLE LENGTHS

SUBROUTINE PQWKSL (WTYPE,ERRIND,MPLBTE,MPMBTE,MTXBTE,MINBTE,
*MEDBTE,MPAI,MCOLI,VWTBI)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MPLBTE	maximum number of polyline bundle table entries
INTEGER MPMBTE	maximum number of polymarker bundle table entries
INTEGER MTXBTE	maximum number of text bundle table entries
INTEGER MINBTE	maximum number of interior bundle table entries
INTEGER MEDBTE	maximum number of edge bundle table entries
INTEGER MPAI	maximum number of pattern indices
INTEGER MCOLI	maximum number of colour indices
INTEGER VWTBI	maximum number of view table indices

INQUIRE DYNAMICS OF STRUCTURES

SUBROUTINE PQDSTR (WTYPE,ERRIND,STRCON,POST,UNPOST,
*DELETE,REFMOD)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER STRCON	structure content modification (PIRG,PIMM,PCBS)
INTEGER POST	post structure (PIRG,PIMM,PCBS)
INTEGER UNPOST	unpost structure (PIRG,PIMM,PCBS)
INTEGER DELETE	delete structure (PIRG,PIMM,PCBS)
INTEGER REFMOD	reference modification (PIRG,PIMM,PCBS)

INQUIRE NUMBER OF AVAILABLE LOGICAL INPUT DEVICES

SUBROUTINE PQLI (WTYPE,ERRIND,NLCD,NSKD,NVLD,NCHD,NPKD,NSTD)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NLCD	number of locator devices
INTEGER NSKD	number of stroke devices
INTEGER NVLD	number of valuator devices
INTEGER NCHD	number of choice devices
INTEGER NPKD	number of pick devices
INTEGER NSTD	number of string devices

INQUIRE DEFAULT LOCATOR DEVICE DATA 3

SUBROUTINE PQDLC3 (WTYPE,DEVNO,N,MLDR,ERRIND,DPX,DPY,DPZ,
*OL,PET,EVOL,LDR,DATREC)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER DEVNO	logical input device number
INTEGER N	list element requested
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
REAL DPX,DPY,DPZ	default initial locator position (WC)
INTEGER OL	number of available prompt and echo types
INTEGER PET	Nth element of list of available prompt and echo types
REAL EVOL(6)	default echo volume (DC) XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE DEFAULT LOCATOR DEVICE DATA

SUBROUTINE PQDLC (WTYPE,DEVNO,N,MLDR,ERRIND,DPX,DPY,
*OL,PET,EAREA,LDR,DATREC)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER DEVNO	logical input device number
INTEGER N	list element requested
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
REAL DPX,DPY	default initial locator position (WC)
INTEGER OL	number of available prompt and echo types
INTEGER PET	Nth element of list of available prompt and echo types
REAL EAREA(4)	default echo area (DC) XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE DEFAULT STROKE DEVICE DATA 3

```
SUBROUTINE PQDSK3 (WTYPE,DEVNO,N,MLDR,ERRIND,MBUFF,
*OL,PET,EVOL,LDR,DATREC)

Input Parameters:
INTEGER WTYPE                   workstation type
INTEGER DEVNO                   logical input device number
INTEGER N                       list element requested
INTEGER MLDR                    dimension of data record array

Output Parameters:
INTEGER ERRIND                  error indicator
INTEGER MBUFF                   available input buffer size
INTEGER OL                      number of available prompt and echo types
INTEGER PET                     Nth element of list of available prompt and echo
                                types
REAL EVOL(6)                    default echo volume (DC)
                                XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR                     number of array elements used in data record
CHARACTER*80 DATREC(MLDR)
                                data record
```

INQUIRE DEFAULT STROKE DEVICE DATA

```
SUBROUTINE PQDSK (WTYPE,DEVNO,N,MLDR,ERRIND,MBUFF,
*OL,PET,EAREA,LDR,DATREC)

Input Parameters:
INTEGER WTYPE                   workstation type
INTEGER DEVNO                   logical input device number
INTEGER N                       list element requested
INTEGER MLDR                    dimension of data record array

Output Parameters:
INTEGER ERRIND                  error indicator
INTEGER MBUFF                   available input buffer size
INTEGER OL                      number of available prompt and echo types
INTEGER PET                     Nth element of list of available prompt and echo
                                types
REAL EAREA(4)                   default echo area (DC)
                                XMIN, XMAX, YMIN, YMAX
INTEGER LDR                     number of array elements used in data record
CHARACTER*80 DATREC(MLDR)
                                data record
```

INQUIRE DEFAULT VALUATOR DEVICE DATA 3

SUBROUTINE PQDVL3 (WTYPE,DEVNO,N,MLDR,ERRIND,DVAL,
*OL,PET,EVOL,LDR,DATREC)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER DEVNO	logical input device number
INTEGER N	list element requested
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
REAL DVAL	default initial value
INTEGER OL	number of available prompt and echo types
INTEGER PET	Nth element of list of available prompt and echo types
REAL EVOL(6)	default echo volume (DC) XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE DEFAULT VALUATOR DEVICE DATA

SUBROUTINE PQDVL (WTYPE,DEVNO,N,MLDR,ERRIND,DVAL,
*OL,PET,EAREA,LDR,DATREC)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER DEVNO	logical input device number
INTEGER N	list element requested
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
REAL DVAL	default initial value
INTEGER OL	number of available prompt and echo types
INTEGER PET	Nth element of list of available prompt and echo types
REAL EAREA(4)	default echo area (DC) XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE DEFAULT CHOICE DEVICE DATA 3

SUBROUTINE PQDCH3 (WTYPE,DEVNO,N,MLDR,ERRIND,MALT,
*OL,PET,EVOL,LDR,DATREC)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER DEVNO	logical input device number
INTEGER N	list element requested
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MALT	maximum number of choice alternatives
INTEGER OL	number of available prompt and echo types
INTEGER PET	Nth element of list of available prompt and echo types
REAL EVOL(6)	default echo volume (DC) XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE DEFAULT CHOICE DEVICE DATA

SUBROUTINE PQDCH (WTYPE,DEVNO,N,MLDR,ERRIND,MALT,
*OL,PET,EAREA,LDR,DATREC)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER DEVNO	logical input device number
INTEGER N	list element requested
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MALT	maximum number of choice alternatives
INTEGER OL	number of available prompt and echo types
INTEGER PET	Nth element of list of available prompt and echo types
REAL EAREA(4)	default echo area (DC) XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE DEFAULT PICK DEVICE DATA 3

SUBROUTINE PQDPK3 (WTYPE,DEVNO,N,MLDR,ERRIND,
*OL,PET,EVOL,LDR,DATREC)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER DEVNO	logical input device number
INTEGER N	list element requested
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of available prompt and echo types
INTEGER PET	Nth element of list of available prompt and echo types
REAL EVOL(6)	default echo volume (DC) XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE DEFAULT PICK DEVICE DATA

SUBROUTINE PQDPK (WTYPE,DEVNO,N,MLDR,ERRIND,
*OL,PET,EAREA,LDR,DATREC)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER DEVNO	logical input device number
INTEGER N	list element requested
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of available prompt and echo types
INTEGER PET	Nth element of list of available prompt and echo types
REAL EAREA(4)	default echo area (DC) XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE DEFAULT STRING DEVICE DATA 3

```
SUBROUTINE PQDS13 (WTYPE,DEVNO,N,MLDR,ERRIND,MBUFF,
*OL,PET,EVOL,LDR,DATREC)
```

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER DEVNO	logical input device number
INTEGER N	list element requested
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MBUFF	available string buffer size
INTEGER OL	number of available prompt and echo types
INTEGER PET	Nth element of list of available prompt and echo types
REAL EVOL(6)	default echo volume (DC) XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE DEFAULT STRING DEVICE DATA

```
SUBROUTINE PQDST (WTYPE,DEVNO,N,MLDR,ERRIND,MBUFF,
*OL,PET,EAREA,LDR,DATREC)
```

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER DEVNO	logical input device number
INTEGER N	list element requested
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MBUFF	available string buffer size
INTEGER OL	number of available prompt and echo types
INTEGER PET	Nth element of list of available prompt and echo types
REAL EAREA(4)	default echo area (DC) XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

9.12.6 Inquiry functions for structure state list

INQUIRE SET member OF WORKSTATIONS TO WHICH POSTED

SUBROUTINE PQWKPO (STRID,N,ERRIND,OL,WKID)

Input Parameters:	
INTEGER STRID	structure identifier
INTEGER N	set member requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of workstations to which the structure is posted
INTEGER WKID	Nth member of set of workstations to which the structure is posted

9.12.7 Inquiry functions for structure content

INQUIRE OPEN STRUCTURE

SUBROUTINE PQOPST (ERRIND,STYPE,STRID)

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER STYPE	open structure status (PNONST,POPNST)
INTEGER STRID	structure identifer

INQUIRE ELEMENT POINTER

SUBROUTINE PQEP (ERRIND,EP)

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER EP	element position value

INQUIRE CURRENT ELEMENT TYPE AND SIZE

SUBROUTINE PQCETS (ERRIND,ELTYPE,IL,RL,SL)

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER ELTYPE	element type (PENIL, PEPL3, PEPL, PEPM3, PEPM, PETX3, PETX, PEATR3, PEATR, PEFA3, PEFA, PEFAS3, PEFAS, PECA3, PECA, PEGDP3, PEGDP, PEPLI, PEPMI, PETXI, PEII, PEEDI, PELN, PELWSC, PEPLCI, PEMK, PEMKSC, PEPMCI, PETXFN, PETXPR, PECHXP, PECHSP, PETXCI, PECHH, PECHUP, PETXP, PETXAL, PEATCH, PEATCU, PEATP, PEATAL, PEANST, PEIS, PEISI, PEICI, PEEDFG, PEEDT, PEEWSC, PEEDCI, PEPA, PEPRPV, PEPARF, PEADS, PERES, PEIASF, PEHRID, PELMT3, PELMT, PEGMT3, PEGMT, PEMCV3, PEMCV, PEMCLI, PERMCV, PEVWI, PEEXST, PELB, PEAP, PEGSE, PEPKID)
INTEGER IL	dimension of integer array
INTEGER RL	dimension of real array
INTEGER SL	dimension of character array

INQUIRE CURRENT ELEMENT CONTENT
Full FORTRAN 77 version

SUBROUTINE PQCECO (IIL,IRL,ISL,ERRIND,IL,IA,RL,RA,SL,LSTR,STR)

Input Parameters:	
INTEGER IIL	dimension of integer array
INTEGER IRL	dimension of real array
INTEGER ISL	dimension of character array

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER IL	number of integer entries
INTEGER IA (IIL)	array containing integer entries
INTEGER RL	number of real entries
REAL RA (IRL)	array containing real entries
INTEGER SL	number of character string entries
INTEGER LSTR(ISL)	length of each character string entry
CHARACTER*(*) STR(ISL)	character string entries

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PENIL:
IL=0
IA=()
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPL3:
IL=1
IA(1)=number of points in the polyline 3
RL=3*IA(1)
RA=elements 1 through IA(1) contain the X components of the polyline 3
elements IA(1)+1 through 2*IA(1) contain the Y components of the polyline 3
elements 2*IA(1)+1 through 3*IA(1) contain the Z components of the polyline 3
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPL:
IL=1
IA(1)=number of points in the polyline
RL=2*IA(1)
RA=elements 1 through IA(1) contain the X components of the polyline
elements IA(1)+1 through 2*IA(1) contain the Y components of the polyline
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPM3:
IL=1
IA(1)=number of points in the polymarker 3
RL=3*IA(1)
RA=elements 1 through IA(1) contain the X components of the polymarker 3
elements IA(1)+1 through 2*IA(1) contain the Y components of the polymarker 3
elements 2*IA(1)+1 through 3*IA(1) contain the Z components of the polymarker 3
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPM:
IL=1
IA(1)=number of points in the polymarker
RL=2*IA(1)
RA=elements 1 through IA(1) contain the X components of the polymarker
elements IA(1)+1 through 2*IA(1) contain the Y components of the polymarker
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PETX3:
IL=0
IA=()
RL=9
RA(1)=x-coordinate of text point (MC)
RA(2)=y-coordinate of text point (MC)
RA(3)=z-coordinate of text point (MC)
RA(4)=x-coordinate of first text direction vector (MC)
RA(5)=y-coordinate of first text direction vector (MC)
RA(6)=z-coordinate of first text direction vector (MC)
RA(7)=x-coordinate of second text direction vector (MC)
RA(8)=y-coordinate of second text direction vector (MC)
RA(9)=z-coordinate of second text direction vector (MC)
SL=1
LSTR(1)=length of string
STR(1)=string

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PETX:
IL=0
IA=()
RL=2
RA(1)=x-coordinate of text point (MC)
RA(2)=y-coordinate of text point (MC)
SL=1
LSTR(1)=length of string
STR(1)=string

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEATR3:
IL=0
IA=()
RL=6
RA(1)=x-coordinate of reference point (MC)
RA(2)=y-coordinate of reference point (MC)
RA(3)=z-coordinate of reference point (MC)
RA(4)=x-coordinate of annotation point (NPC)
RA(5)=y-coordinate of annotation point (NPC)
RA(6)=z-coordinate of annotation point (NPC)
SL=1
LSTR(1)=length of string
STR(1)=string

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEATR:
IL=0
IA=()
RL=4
RA(1)=x-coordinate of reference point (MC)
RA(2)=y-coordinate of reference point (MC)
RA(3)=x-coordinate of annotation point (NPC)
RA(4)=y-coordinate of annotation point (NPC)
SL=1
LSTR(1)=length of string
STR(1)=string

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEFA3:
IL=1
IA(1)=number of points in the fill area 3
RL=3*IA(1)
RA=elements 1 through IA(1) contain the X components of the fill area 3
elements IA(1)+1 through 2*IA(1) contain the Y components of the fill area 3
elements 2*IA(1)+1 through 3*IA(1) contain the Z components of the fill area 3
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEFA:
IL=1
IA(1)=number of points in the fill area
RL=2*IA(1)
RA=elements 1 through IA(1) contain the X components of the fill area
elements IA(1)+1 through 2*IA(1) contain the Y components of the fill area
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEFAS3:
IL=number of point lists in fill area set 3
IA()=array of end indices for point lists in fill area set 3
RL=3*(IA(IL))
RA=elements 1 through (IA(IL)) contain the X components of the fill area set 3
elements IA(IL)+1 through 2*(IA(IL)) contain the Y components of the fill area set 3
elements 2*IA(IL)+1 through 3*(IA(IL)) contain the Z components of the fill area set 3
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEFAS:
IL=number of point lists in fill area set
IA()=array of end indices for point lists in fill area set
RL=2*(IA(IL))
RA=elements 1 through (IA(IL)) contain the X components of the fill area set
elements IA(IL)+1 through 2*(IA(IL)) contain the Y components of the fill area set
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PECA3:
IL=2+(IA(1)*IA(2))
IA(1)=x dimension of cell index array
IA(2)=y dimension of cell index array
IA(3) to IA(IA(1)*IA(2)+2)=cell index array in column major order
e.g. IA(3)=COLIA(1,1), IA(4)=COLIA(2,1), ...
RL=9
RA(1)=x-coordinate of P (MC)
RA(2)=y-coordinate of P (MC)
RA(3)=z-coordinate of P (MC)
RA(4)=x-coordinate of Q (MC)
RA(5)=y-coordinate of Q (MC)
RA(6)=z-coordinate of Q (MC)
RA(7)=x-coordinate of R (MC)
RA(8)=y-coordinate of R (MC)
RA(9)=z-coordinate of R (MC)
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PECA:
IL=2+(IA(1)*IA(2))
IA(1)=x dimension of cell index array
IA(2)=y dimension of cell index array
IA(3) to IA((IA(1)*IA(2))+2)=cell index array in column major order
e.g. IA(3)=COLIA(1,1), IA(4)=COLIA(2,1), ...
RL=4
RA(1)=x-coordinate of P (MC)
RA(2)=y-coordinate of P (MC)
RA(3)=x-coordinate of Q (MC)
RA(4)=y-coordinate of Q (MC)
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEGDP3:
IL=2
IA(1)=number of points in the generalized drawing primitive 3
IA(2)=generalized drawing primitive 3 identifier
RL=3*IA(1)
RA=elements 1 through IA(1) contain the X components of the GDP 3 point list
elements IA(1)+1 through 2*IA(1) contain the Y components of the GDP 3 point list
elements 2*IA(1)+1 through 3*IA(1) contain the Z components of the GDP 3 point list
SL=number of 80 character data records (LDR for PGDP3 subroutine)
LSTR(1) to LSTR(SL) = 80
STR(1) to STR(SL) = GDP data records (DATREC(1) to DATREC(SL) for PGDP3 subroutine)

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEGDP:
IL=2
IA(1)=number of points in the generalized drawing primitive
IA(2)=generalized drawing primitive identifier
RL=2*IA(1)
RA=elements 1 through IA(1) contain the X components of the GDP point list
elements IA(1)+1 through 2*IA(1) contain the Y components of the GDP point list
SL=number of 80 character data records (LDR for PGDP subroutine)
LSTR(1) to LSTR(SL) = 80
STR(1) to STR(SL) = GDP data records (DATREC(1) to DATREC(SL) for PGDP subroutine)

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPLI:
IL=1
IA(1)=polyline index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPMI:
IL=1
IA(1)=polymarker index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PETXI:
IL=1
IA(1)=text index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEII:
IL=1
IA(1)=interior index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEEDI:
IL=1
IA(1)=edge index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PELN:
IL=1
IA(1)=linetype
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PELWSC:
IL=0
IA=()
RL=1
RA(1)=linewidth scale factor
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPLCI:
IL=1
IA(1)=polyline colour index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEMK:
IL=1
IA(1)=marker type
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEMKSC:
IL=0
IA=()
RL=1
RA(1)=marker size scale factor
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPMCI:
IL=1
IA(1)=polymarker colour index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PETXFN:
IL=1
IA(1)=text font
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PETXPR:
IL=1
IA(1)=text precision (PSTRP,PCHARP,PSTRKP)
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PECHXP:
IL=0
IA=()
RL=1
RA(1)=character expansion factor
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PECHSP:
IL=0
IA=()
RL=1
RA(1)=character spacing
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PETXCI:
IL=1
IA(1)=text colour index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PECHH:
IL=0
IA=()
RL=1
RA(1)=character height
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PECHUP:
IL=0
IA=()
RL=2
RA(1)=x component of character up vector
RA(2)=y component of character up vector
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PETXP:
IL=1
IA(1)=text path (PRIGHT,PLEFT,PUP,PDOWN)
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PETXAL:
IL=2
IA(1)=horizontal text alignment (PAHNOR,PALEFT,PACENT,PARITE)
IA(2)=vertical text alignment (PAVNOR,PATOP,PACAP,PAHALF,PABASE,PABOTT)
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEATCH:
IL=0
IA=()
RL=1
RA(1)=annotation text character height
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEATCU:
IL=0
IA=()
RL=2
RA(1)=x component of annotation text character up vector
RA(2)=y component of annotation text character up vector
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEATP:
IL=1
IA(1)=annotation text path (PRIGHT,PLEFT,PUP,PDOWN)
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEATAL:
IL=2
IA(1)=horizontal text alignment (PAHNOR,PALEFT,PACENT,PARITE)
IA(2)=vertical text alignment (PAVNOR,PATOP,PACAP,PAHALF,PABASE,PABOTT)
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEANST:
IL=1
IA(1)=annotation style
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEIS:
IL=1
IA(1)=interior style (PHOLLO,PSOLID,PPATTR,PHATCH,PISEMP)
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEISI:
IL=1
IA(1)=interior style index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEICI:
IL=1
IA(1)=interior colour index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEEDFG:
IL=1
IA(1)=edge flag (POFF, PON)
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEEDT:
IL=1
IA(1)=edgetype
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEEWSC:
IL=0
IA=()
RL=1
RA(1)=edgewidth scale factor
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEEDCI:
IL=1
IA(1)=edge colour index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPA:
IL=0
IA=()
RL=2
RA(1)=x-component of pattern size (MC)
RA(2)=y-component of pattern size (MC)
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPRPV:
IL=0
IA=()
RL=9
RA(1)=x-coordinate of pattern reference point (MC)
RA(2)=y-coordinate of pattern reference point (MC)
RA(3)=z-coordinate of pattern reference point (MC)
RA(4)=x-component of pattern reference vector 1 (MC) (i.e. DVX(1))
RA(5)=y-component of pattern reference vector 1 (MC) (i.e. DVY(1))
RA(6)=z-component of pattern reference vector 1 (MC) (i.e. DVZ(1))
RA(7)=x-component of pattern reference vector 2 (MC) (i.e. DVX(2))
RA(8)=y-component of pattern reference vector 2 (MC) (i.e. DVY(2))
RA(9)=z-component of pattern reference vector 2 (MC) (i.e. DVZ(2))
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPARF:
IL=0
IA=()
RL=2
RA(1)=x-coordinate of pattern reference point (MC) (i.e. RFX)
RA(2)=y-coordinate of pattern reference point (MC) (i.e. RFY)
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEADS:
IL=number of names in the set
IA=array of name set elements
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PERES:
IL=number of names in the set
IA=array of name set elements
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEIASF:
IL=2
IA(1)=attribute identifier (PLN,PLWSC,PPLCI,PMK,PMKSC,PPMCI,PTXFN,PTXPR,
PCHXP,PCHSP,PTXCI,PIS,PISI,PICI,PEDFG,PEDT,PEWSC,PEDCI)
IA(2)=aspect source flag value (PBUNDL,PINDIV)
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEHRID:
IL=1
IA(1)=HLHSR identifier
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PELMT3:
IL=1
IA(1)=composition type (PCPRE,PCPOST,PCREPL)
RL=16
RA(1)=(1,1) component of local transformation matrix
RA(2)=(2,1) component of local transformation matrix
RA(3)=(3,1) component of local transformation matrix
RA(4)=(4,1) component of local transformation matrix
RA(5)=(1,2) component of local transformation matrix
RA(6)=(2,2) component of local transformation matrix
RA(7)=(3,2) component of local transformation matrix
RA(8)=(4,2) component of local transformation matrix
RA(9)=(1,3) component of local transformation matrix
RA(10)=(2,3) component of local transformation matrix
RA(11)=(3,3) component of local transformation matrix
RA(12)=(4,3) component of local transformation matrix
RA(13)=(1,4) component of local transformation matrix
RA(14)=(2,4) component of local transformation matrix
RA(15)=(3,4) component of local transformation matrix
RA(16)=(4,4) component of local transformation matrix
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PELMT:
IL=1
IA(1)=composition type (PCPRE,PCPOST,PCREPL)
RL=9
RA(1)=(1,1) component of local transformation matrix
RA(2)=(2,1) component of local transformation matrix
RA(3)=(3,1) component of local transformation matrix
RA(4)=(1,2) component of local transformation matrix
RA(5)=(2,2) component of local transformation matrix
RA(6)=(3,2) component of local transformation matrix
RA(7)=(1,3) component of local transformation matrix
RA(8)=(2,3) component of local transformation matrix
RA(9)=(3,3) component of local transformation matrix
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEGMT3:
IL=0
IA=()
RL=16
RA(1)=(1,1) component of global transformation matrix
RA(2)=(2,1) component of global transformation matrix
RA(3)=(3,1) component of global transformation matrix
RA(4)=(4,1) component of global transformation matrix
RA(5)=(1,2) component of global transformation matrix
RA(6)=(2,2) component of global transformation matrix
RA(7)=(3,2) component of global transformation matrix
RA(8)=(4,2) component of global transformation matrix
RA(9)=(1,3) component of global transformation matrix
RA(10)=(2,3) component of global transformation matrix
RA(11)=(3,3) component of global transformation matrix
RA(12)=(4,3) component of global transformation matrix
RA(13)=(1,4) component of global transformation matrix
RA(14)=(2,4) component of global transformation matrix
RA(15)=(3,4) component of global transformation matrix
RA(16)=(4,4) component of global transformation matrix
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEGMT:
IL=0
IA=()
RL=9
RA(1)=(1,1) component of global transformation matrix
RA(2)=(2,1) component of global transformation matrix
RA(3)=(3,1) component of global transformation matrix
RA(4)=(1,2) component of global transformation matrix
RA(5)=(2,2) component of global transformation matrix
RA(6)=(3,2) component of global transformation matrix
RA(7)=(1,3) component of global transformation matrix
RA(8)=(2,3) component of global transformation matrix
RA(9)=(3,3) component of global transformation matrix
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEMCV3:
IL=2
IA(1)=modelling clipping operator
IA(2)=number of modelling clipping half-spaces in list
RL=6*IA(2)
FOR i=0 TO IA(2)-1
RA((6*i)+1)=x-coordinate of point defining plane of half-space (MC)
RA((6*i)+2)=y-coordinate of point defining plane of half-space (MC)
RA((6*i)+3)=z-coordinate of point defining plane of half-space (MC)
RA((6*i)+4)=dx component of normal vector defining the plane of half-space (MC)
RA((6*i)+5)=dy component of normal vector defining the plane of half-space (MC)
RA((6*i)+6)=dz component of normal vector defining the plane of half-space (MC)
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEMCV:
IL=2
IA(1)=modelling clipping operator
IA(2)=number of modelling clipping half-spaces in list
RL=4*IA(2)
FOR i=0 TO IA(2)-1
RA((4*i)+1)=x-coordinate of point defining plane of half-space (MC)
RA((4*i)+2)=y-coordinate of point defining plane of half-space (MC)
RA((4*i)+3)=dx component of normal vector defining the plane of half-space (MC)
RA((4*i)+4)=dy component of normal vector defining the plane of half-space (MC)
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEMCLI:
IL=1
IA(1)=modelling clipping indicator (PNCLIP,PCLIP)
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PERMCV:
IL=0
IA()
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEVWI:
IL=1
IA(1)=view index
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEEXST:
IL=1
IA(1)=structure identifier
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PELB:
IL=1
IA(1)=label identifier
RL=0
RA=()
SL=0
LSTR=()
STR=()

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEAP:
IL=0
IA=()
RL=0
RA=()
SL=number of application data records (LDR for PAP subroutine)
LSTR(1) to LSTR(SL) = 80
STR(1) to STR(SL) = application data records (DATREC(1) to DATREC(SL) for PAP subroutine)

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEGSE:
IL=1
IA(1)=generalized structure element identifier
RL=0
RA=()
SL=number of GSE data records (LDR for PGSE subroutine)
LSTR(1) to LSTR(SL) = 80
STR(1) to STR(SL) = GSE data records (DATREC(1) to DATREC(SL) for PGSE subroutine)

Output parameters for STRUCTURE CONTENT DATA RECORD for ELTYPE = PEPKID:
IL=1
IA(1)=pick identifier
RL=0
RA=()
SL=0
LSTR=()
STR=()

INQUIRE CURRENT ELEMENT CONTENT
FORTRAN 77 subset version

```
SUBROUTINE PQCECO (IIL,IRL,ISL,ERRIND,IL,IA,RL,RA,SL,LSTR,STR)
```

Input Parameters:	
INTEGER IIL	dimension of integer array
INTEGER IRL	dimension of real array
INTEGER ISL	dimension of character array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER IL	number of integer entries
INTEGER IA (IIL)	array containing integer entries
INTEGER RL	number of real entries
REAL RA (IRL)	array containing real entries
INTEGER SL	number of character string entries
INTEGER LSTR(ISL)	length of each character string entry
CHARACTER*80 STR(ISL)	character string entries

See INQUIRE CURRENT ELEMENT CONTENT (PQCECO) for details on interpreting the information returned in the integer, real, and character arrays.

INQUIRE ELEMENT TYPE AND SIZE

SUBROUTINE PQETS (STRID,ELENUM,ERRIND,ELTYPE,IL,RL,SL)

Input Parameters:

INTEGER STRID	structure identifier
INTEGER ELENUM	element position

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER ELTYPE	element type (PENIL, PEPL3, PEPL, PEPM3, PEPM, PETX3, PETX, PEATR3, PEATR, PEFA3, PEFA, PEFAS3, PEFAS, PECA3, PECA, PEGDP3, PEGDP, PEPLI, PEPMI, PETXI, PEII, PEEDI, PELN, PELWSC, PEPLCI, PEMK, PEMKSC, PEPMCI, PETXFN, PETXPR, PECHXP, PECHSP, PETXCI, PECHH, PECHUP, PETXP, PETXAL, PEATCH, PEATCU, PEATP, PEATAL, PEANST, PEIS, PEISI, PEICI, PEEDFG, PEEDT, PEEWSC, PEEDCI, PEPA, PEPRPV, PEPARF, PEADS, PERES, PEIASF, PEHRID, PELMT3, PELMT, PEGMT3, PEGMT, PEMCV3, PEMCV, PEMCLI, PERMCV, PEVWI, PEEXST, PELB, PEAP, PEGSE, PEPKID)
INTEGER IL	dimension of integer array
INTEGER RL	dimension of real array
INTEGER SL	dimension of character array

INQUIRE ELEMENT CONTENT
Full FORTRAN 77 version

```
SUBROUTINE PQECO (STRID,ELENUM,IIL,IRL,ISL,ERRIND,
*IL,IA,RL,RA,SL,LSTR,STR)
```

Input Parameters:	
INTEGER STRID	structure identifier
INTEGER ELENUM	element position
INTEGER IIL	dimension of integer array
INTEGER IRL	dimension of real array
INTEGER ISL	dimension of character array

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER IL	number of integer entries
INTEGER IA (IIL)	array containing integer entries
INTEGER RL	number of real entries
REAL RA (IRL)	array containing real entries
INTEGER SL	number of character string entries
INTEGER LSTR(ISL)	length of each character string entry
CHARACTER*(*) STR(ISL)	character string entries

See INQUIRE CURRENT ELEMENT CONTENT (PQCECO) for details on interpreting the information returned in the integer, real and character arrays.

INQUIRE ELEMENT CONTENT
FORTRAN 77 subset version

```
SUBROUTINE PQECO (STRID,ELENUM,IIL,IRL,ISL,ERRIND,
*IL,IA,RL,RA,SL,LSTR,STR)
```

Input Parameters:	
INTEGER STRID	structure identifier
INTEGER ELENUM	element position
INTEGER IIL	dimension of integer array
INTEGER IRL	dimension of real array
INTEGER ISL	dimension of character array

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER IL	number of integer entries
INTEGER IA (IIL)	array containing integer entries
INTEGER RL	number of real entries
REAL RA (IRL)	array containing real entries
INTEGER SL	number of character string entries
INTEGER LSTR(ISL)	length of each character string entry
CHARACTER*80 STR(ISL)	character string entries

See INQUIRE CURRENT ELEMENT CONTENT (PQCECO) for details on interpreting the information returned in the integer, real and character arrays.

INQUIRE STRUCTURE STATUS

SUBROUTINE PQSTST (STRID,ERRIND,STRSTI)

Input Parameters:	
INTEGER STRID	structure identifier
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER STRSTI	structure status indicator (PNOEXS,PEMPTY,PNOEMP)

INQUIRE PATHS TO ANCESTORS

SUBROUTINE PQPAN (STRID,PTHORD,PTHDEP,IPTHSZ,N,ERRIND,OL,APTHSZ,PATHS)

Input Parameters:	
INTEGER STRID	structure identifier
INTEGER PTHORD	path order (PPOTOP,PPOBOT)
INTEGER PTHDEP	path depth
INTEGER IPTHSZ	size of path buffer
INTEGER N	element of the list of paths
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of paths available
INTEGER APTHSZ	actual size of the Nth structure path
INTEGER PATHS(2,IPTHSZ)	Nth structure path

INQUIRE PATHS TO DESCENDANTS

SUBROUTINE PQPDE (STRID,PTHORD,PTHDEP,IPTHSZ,N,ERRIND,OL,APTHSZ,PATHS)

Input Parameters:	
INTEGER STRID	structure identifier
INTEGER PTHORD	path order (PPOTOP,PPOBOT)
INTEGER PTHDEP	path depth
INTEGER IPTHSZ	size of path buffer
INTEGER N	element of the list of paths
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of paths available
INTEGER APTHSZ	actual size of the Nth structure path
INTEGER PATHS(2,IPTHSZ)	Nth structure path

ELEMENT SEARCH

SUBROUTINE PELS (STRID,STRTEP,SRCDIR,EISN,EIS,EESN,EES,ERRIND,STATUS,FNDEP)

Input Parameters:

INTEGER STRID	structure identifier
INTEGER STRTEP	start element position
INTEGER SRCDIR	search direction (PBWD, PFWD)
INTEGER EISN	number of elements in element inclusion set
INTEGER EIS(EISN)	element inclusion set (PEALL, PENIL, PEPL3, PEPL, PEPM3, PEPM, PETX3, PETX, PEATR3, PEATR, PEFA3, PEFA, PEFAS3, PEFAS, PECA3, PECA, PEGDP3, PEGDP, PEPLI, PEPMI, PETXI, PEII, PEEDI, PELN, PELWSC, PEPLCI, PEMK, PEMKSC, PEPMCI, PETXFN, PETXPR, PECHXP, PECHSP, PETXCI, PECHH, PECHUP, PETXP, PETXAL, PEATCH, PEATCU, PEATP, PEATAL, PEANST, PEIS, PEISI, PEICI, PEEDFG, PEEDT, PEEWSC, PEEDCI, PEPA, PEPRPV, PEPARF, PEADS, PERES, PEIASF, PEHRID, PELMT3, PELMT, PEGMT3, PEGMT, PEMCV3, PEMCV, PEMCLI, PERMCV, PEVWI, PEEXST, PELB, PEAP, PEGSE, PEPKID)
INTEGER EESN	number of elements in element exclusion set
INTEGER EES(EESN)	element exclusion set (*enumerated type the same as that of element inclusion set*)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER STATUS	status indicator (PFAIL, PSUCC)
INTEGER FNDEP	found element position

INCREMENTAL SPATIAL SEARCH 3

```
SUBROUTINE PISS3 (SRPX,SRPY,SRPZ,SDIST,SPTHSZ,SPATH,MCLIPF,SRCHCI,
* NFLN,NFLISX,NFLIS,NFLESX,NFLES,IFLN,IFLISX,IFLIS,IFLESX,IFLES,
* IPTHSZ,ERRIND,FPTHSZ,FPATH)
```

Input Parameters:

REAL SRPX,SRPY,SRPZ	search reference point (WC)
REAL SDIST	search distance
INTEGER SPTHSZ	number of elements in starting path
INTEGER SPATH(2,SPTHSZ)	starting path
INTEGER MCLIPF	modelling clip flag (PNCLIP,PCLIP)
INTEGER SRCHCI	search ceiling index
INTEGER NFLN	number of "normal" filters
INTEGER NFLISX(NFLN)	array of end indices of "normal" filter inclusion sets
INTEGER NFLIS(*)	"normal" filter inclusion sets
INTEGER NFLESX(NFLN)	array of end indices of "normal" filter exclusion sets
INTEGER NFLES(*)	"normal" filter exclusion sets
INTEGER IFLN	number of "inverted" filters
INTEGER IFLISX(IFLN)	array of end indices of "inverted" filter inclusion sets
INTEGER IFLIS(*)	"inverted" filter inclusion sets
INTEGER IFLESX(IFLN)	array of end indices of "inverted" filter exclusion sets
INTEGER IFLES(*)	"inverted" filter exclusion sets
INTEGER IPTHSZ	size of found path array

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER FPTHSZ	found path size
INTEGER FPATH(2,IPTHSZ)	found path

INCREMENTAL SPATIAL SEARCH

```
SUBROUTINE PISS (SRPX,SRPY,SDIST,SPTHSZ,SPATH,MCLIPF,SRCHCI,
* NFLN,NFLISX,NFLIS,NFLESX,NFLES,IFLN,IFLISX,IFLIS,IFLESX,IFLES,
* IPTHSZ,ERRIND,FPTHSZ,FPATH)
```

Input Parameters:

REAL SRPX,SRPY	search reference point (WC)
REAL SDIST	search distance
INTEGER SPTHSZ	number of elements in starting path
INTEGER SPATH(2,SPTHSZ)	starting path
INTEGER MCLIPF	modelling clip flag (PNCLIP,PCLIP)
INTEGER SRCHCI	search ceiling index
INTEGER NFLN	number of "normal" filters
INTEGER NFLISX(NFLN)	array of end indices of "normal" filter inclusion sets
INTEGER NFLIS(*)	"normal" filter inclusion sets
INTEGER NFLESX(NFLN)	array of end indices of "normal" filter exclusion sets
INTEGER NFLES(*)	"normal" filter exclusion sets
INTEGER IFLN	number of "inverted" filters
INTEGER IFLISX(IFLN)	array of end indices of "inverted" filter inclusion sets
INTEGER IFLIS(*)	"inverted" filter inclusion sets
INTEGER IFLESX(IFLN)	array of end indices of "inverted" filter exclusion sets
INTEGER IFLES(*)	"inverted" filter exclusion sets
INTEGER IPTHSZ	size of found path array

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER FPTHSZ	found path size
INTEGER FPATH(2,IPTHSZ)	found path

9.12.8 Inquiry function for PHIGS error state list

INQUIRE INPUT QUEUE OVERFLOW

```
SUBROUTINE PQIQOV (ERRIND,WKID,ICL,IDN)
```

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER WKID	workstation identifier
INTEGER ICL	input class (PLOCAT,PSTROK,PVALUA,PCHOIC, PPICK,PSTRIN)
INTEGER IDN	input device number

INQUIRE ERROR HANDLING MODE

SUBROUTINE PQERHM (ERRIND,ERHM)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER ERHM	error handling mode (POFF,PON)

9.13 Error control

EMERGENCY CLOSE PHIGS

SUBROUTINE PECLPH

ERROR HANDLING

SUBROUTINE PERHND (ERRNR,FCTID,ERRFIL)

Input Parameters:

INTEGER ERRNR	error number
INTEGER FCTID	function identification
INTEGER ERRFIL	error file

ERROR LOGGING

SUBROUTINE PERLOG (ERRNR,FCTID,ERRFIL)

Input Parameters:

INTEGER ERRNR	error number
INTEGER FCTID	function identification
INTEGER ERRFIL	error file

SET ERROR HANDLING MODE

SUBROUTINE PSERHM (ERHM)

Input Parameters:

INTEGER ERHM	error handling mode (POFF, PON)

9.14 Special interfaces

ESCAPE

SUBROUTINE PESC (FCTID,LIDR,IDR,MLODR,LODR,ODR)

Input Parameters:	
INTEGER FCTID	function identification
INTEGER LIDR	dimension of input data record array
CHARACTER*80 IDR (LIDR)	input data record
INTEGER MLODR	maximum length of output data record
Output Parameters:	
INTEGER LODR	number of array elements occupied in ODR
CHARACTER*80 ODR(MLODR)	output data record

10 Utility functions not defined in PHIGS

The mechanism used for providing the error indicator of these utilities is the same as that used by the inquiry functions. The following language binding dependent errors may occur: 2001 and 2003. However, implementation dependent errors may also occur.

PACK DATA RECORD
Full FORTRAN 77 version

```
SUBROUTINE PPREC(IL,IA,RL,RA,SL,LSTR,STR,MLDR,ERRIND,LDR,DATREC)

Input Parameters:
INTEGER IL                      number of integer entries (≥0)
INTEGER IA (*)                  array containing integer entries
INTEGER RL                      number of real entries (≥0)
REAL RA (*)                     array containing real entries
INTEGER SL                      number of character string entries (≥0)
INTEGER LSTR(*)                 lengths of each character string entry (≥0)
CHARACTER*(*) STR(*)            character string entries
INTEGER MLDR                    dimension of data record array

Output Parameters:
INTEGER ERRIND                  error indicator (zero if no error)
INTEGER LDR                     number of array elements used in DATREC
CHARACTER*80 DATREC(MLDR)       data record
```

PACK DATA RECORD
FORTRAN 77 subset version

```
SUBROUTINE PPREC(IL,IA,RL,RA,SL,LSTR,STR,MLDR,ERRIND,LDR,DATREC)

Input Parameters:
INTEGER IL                      number of integer entries (≥0)
INTEGER IA (IL)                 array containing integer entries
INTEGER RL                      number of real entries (≥0)
REAL RA (RL)                    array containing real entries
INTEGER SL                      number of character string entries (≥0)
INTEGER LSTR(SL)                lengths of each character string entry (≥0)
CHARACTER*80 STR(*)             character string entries
INTEGER MLDR                    dimension of data record array

Output Parameters:
INTEGER ERRIND                  error indicator (zero if no error)
INTEGER LDR                     number of array elements used in DATREC
CHARACTER*80 DATREC(MLDR)       data record
```

UNPACK DATA RECORD
Full FORTRAN 77 version

```
SUBROUTINE PUREC (LDR,DATREC,IIL,IRL,ISL,ERRIND,IL,IA,RL,RA,
*SL,LSTR,STR)
```

Input Parameters:

INTEGER LDR	number of array elements used in DATREC
CHARACTER*80 DATREC(LDR)	data record
INTEGER IIL	dimension of integer array
INTEGER IRL	dimension of real array
INTEGER ISL	dimension of character array

Output Parameters:

INTEGER ERRIND	error indicator (zero if no error)
INTEGER IL	number of integer entries
INTEGER IA (IIL)	array containing integer entries
INTEGER RL	number of real entries
REAL RA (IRL)	array containing real entries
INTEGER SL	number of character string entries
INTEGER LSTR(ISL)	length of each character string entry
CHARACTER*(*) STR(ISL)	character string entries

UNPACK DATA RECORD
FORTRAN 77 subset version

```
SUBROUTINE PUREC (LDR,DATREC,IIL,IRL,ISL,ERRIND,IL,IA,RL,RA,
*SL,LSTR,STR)
```

Input Parameters:

INTEGER LDR	number of array elements used in DATREC
CHARACTER*80 DATREC(LDR)	data record
INTEGER IIL	dimension of integer array
INTEGER IRL	dimension of real array
INTEGER ISL	dimension of character array

Output Parameters:

INTEGER ERRIND	error indicator (zero if no error)
INTEGER IL	number of integer entries
INTEGER IA (IIL)	array containing integer entries
INTEGER RL	number of real entries
REAL RA (IRL)	array containing real entries
INTEGER SL	number of character string entries
INTEGER LSTR(ISL)	length of each character string entry
CHARACTER*80 STR(ISL)	character string entries

Annex A

FORTRAN Examples

(informative)

The following sample programs, using the PHIGS FORTRAN binding, illustrate the use of PHIGS functions.

Example 1:

```
C     PROGRAM STAR
C
C     DESCRIPTION:
C       This program draws a yellow star on a blue background and writes
C       the title 'Star' in green under the star.
C     CONFORMANCE:
C       FORTRAN-77 binding with FORTRAN-77 subset comments.
C       At least one OUTPUT or OUTIN workstation.
C
C     Define PHIGS constants.
C
      INTEGER PSOLID, PRGB, PCLIP
      PARAMETER ( PSOLID = 1, PRGB = 1, PCLIP = 1 )
      INTEGER PACENT, PAHALF
      PARAMETER ( PACENT = 2, PAHALF = 3 )
C
C     Implementation dependent constants.
C
      INTEGER ERROUT,TTOUT,WSPYPE,NBYTES
      PARAMETER ( ERROUT = 1, TTOUT = 5, WSTYPE = 0, NBYTES = 0 )
C
C     Define coordinates for drawing the star.
C
      REAL STARX( 5 ),STARY( 5 )
      DATA STARX / 0.951057, -0.951057, 0.587785, 0.0, -0.587785 /
      DATA STARY / 0.309017, 0.309017, -0.951057, 1.0, -0.951057 /
C
C     Define an identity transformation.
C
      REAL IDENTX (3, 3)
      DATA IDENTX(1,1), IDENTX(1,2), IDENTX(1,3) / 1.0, 0.0, 0.0 /
      DATA IDENTX(2,1), IDENTX(2,2), IDENTX(2,3) / 0.0, 1.0, 0.0 /
      DATA IDENTX(3,1), IDENTX(3,2), IDENTX(3,3) / 0.0, 0.0, 1.0 /
C
C     Local variables
C
      REAL VWWNLM(4), PJVPLM(4), VWMPMT(3,3)
      INTEGER ERRIND
      REAL COLSPC(3)
C
C     Perform implementation dependent initialization.
```

```
C
      OPEN ( TTOUT,STATUS='NEW' )
C
C     Open PHIGS and a workstation.
C
      CALL POPPH ( ERROUT,NBYTES )
      CALL POPWK ( 1,TTOUT,WSTYPE )
C
C     Post the structure to the workstation.
C
      CALL PPOST ( 1, 1, 1.0 )
C
C     Center the window around the origin.
C
      VWWNLM(1) = -1.25
      VWWNLM(2) =  1.25
      VWWNLM(3) = -1.25
      VWWNLM(4) =  1.25
      PJVPLM(1) =  0.0
      PJVPLM(2) =  1.0
      PJVPLM(3) =  0.0
      PJVPLM(4) =  1.0
      CALL PEVMM ( VWWNLM, PJVPLM, ERRIND, VWMPMT )
      CALL PSVWR ( 1, 1, IDENTX, VWMPMT, PJVPLM, PCLIP )
C
C     Define the colours we'll be using.
C
      CALL PSCMD ( 1, PRGB )
      COLSPC(1) = 0.0
      COLSPC(2) = 0.0
      COLSPC(3) = 1.0
      CALL PSCR ( 1,0,3,COLSPC)
      COLSPC(1) = 1.0
      COLSPC(2) = 1.0
      COLSPC(3) = 0.0
      CALL PSCR ( 1,1,3,COLSPC)
      COLSPC(1) = 1.0
      COLSPC(2) = 1.0
      COLSPC(3) = 1.0
      CALL PSCR ( 1,2,3,COLSPC)
C
C     Open the structure.
C
      CALL POPST ( 1 )
C
C     Select the view index for the star.
C
      CALL PSVWI ( 1 )
C
C     Fill the star with solid yellow.
C
      CALL PSIS ( PSOLID )
```

```
      CALL PSICI ( 1 )
C
C     Draw the star.
C
      CALL PFA ( 5, STARX, STARY )
C
C     Select large characters centred under the star.
C
      CALL PSCHH ( 0.15 )
      CALL PSTXAL ( PACENT, PAHALF )
      CALL PSTXCI ( 2 )
C
C     Draw the title.
C
      CALL PTX ( 0.0,-1.1,'Star' )
C
C     FORTRAN 77 subset version.
C     CALL PTXS ( 0.0,-1.1,4,'Star' )
C
C     Close the structure, unpost it and close the workstation and PHIGS.
C
      CALL PCLST
      CALL PUPOST ( 1,1 )
      CALL PCLWK ( 1 )
      CALL PCLPH
      STOP
      END
```

FORTRAN Examples **Annex A**

Example 2:

```
C     PROGRAM IRON
C
C     DESCRIPTION:
C       This program draws a horizontal bar chart illustrating costs within
C       the iron industry. The user can select the data to be displayed using
C       a PHIGS choice device. The plot is adapted from 'Scientific American'
C       May 1984 page 39.
C     CONFORMANCE:
C       Choice device must support prompt and echo type 3
C
C     PHIGS constants:
C
      INTEGER PBUNDL,PINDIV
      PARAMETER ( PBUNDL = 0, PINDIV = 1 )
      INTEGER POK,PNCHOI
      PARAMETER ( POK = 0, PNCHOI = 1 )
      INTEGER PIS, PISI, PRGB, PCLIP
      PARAMETER ( PIS=12, PISI=13, PRGB=1, PCLIP=1 )
C
C     Implementation dependent constants:
C
      INTEGER ERROUT,TTOUT,WSTYPE,NBYTES
      PARAMETER ( ERROUT = 5,TTOUT = 5, WSTYPE = 0, NBYTES = 0 )
C
C     Returned data from inquire choice device state:
C
      INTEGER ERRIND,MODE,ESW,ISTAT,ICHNR,PET,LDR
      REAL EAREA( 4 )
      CHARACTER*80 DATREC( 10 )
C
C     Data for initialising choice device state:
C
      CHARACTER*12 CHSTRS( 4 )
      INTEGER CHLENS( 4 )
      INTEGER IDUMMY(1)
      REAL RDUMMY(1)
      INTEGER STATUS,CHOICE
C
C     Window Aspect ratio
C
     REAL EXPAN
     COMMON EXPAN
C
C     Arrays for plot data:
C
      REAL USDAT1( 6 ),USDAT2( 6 ),GDAT1( 6 ),GDAT2( 6 ),JDAT1( 6 ),
     *     JDAT2( 6 )
C
C     Define an identity transformation.
C
```