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Information processing systems — Computer graphics — Graphical Kernel System (GKS) language bindings —

Part 1 : FORTRAN

Systèmes de traitement de l'information — Infographie — Système graphique de base (GKS) — Interface langage —

Partie 1 : FORTRAN

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Information processing systems — Computer graphics — Graphical Kernel System (GKS) language bindings —

Part 1 : FORTRAN

0 Introduction

The Graphical Kernel System (GKS), the functional description of which is given in ISO 7942, 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 8651 is to define a standard binding for the FORTRAN computer programming language.

1 Scope and field of application

ISO 7942 (GKS) specifies a language independent nucleus of a graphics system. For integration into a programming language, GKS is embedded in a language dependent layer obeying the particular conventions of that language. This part of ISO 8651 specifies such a language dependent layer for the FORTRAN language.

2 References

ISO 7942, *Information Processing - Computer graphics - Graphical Kernel System (GKS) functional description.*

ISO 1539, *Programming Languages - FORTRAN.*

3 The FORTRAN language binding of GKS

3.1 Specification

The GKS language binding interface for ISO FORTRAN 77 (ISO 1539) shall be described as in clauses 3, 4, 5, 6, 7, 8, and 9.

3.2 Mapping of GKS function names to FORTRAN subroutine names

The function names of GKS are all mapped to FORTRAN subroutine names which start with the letter G. The mapping is generally done in a one-to-one correspondence to ISO 7942. However, some inquiry 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., ACTIVATE becomes AC, WORKSTATION becomes WK. Hence, the FORTRAN subroutine name of GKS function ACTIVATE WORKSTATION is GACWK. For a list of all abbreviations, see clause 4. Names used internally which may be known outside GKS, e.g., during linking, start with some easily recognized and documented form such as GK (subroutine, function, and common block names). Therefore, no external names starting with this construct should be chosen when using GKS, in order to avoid name conflicts. Globally used GKS names may be renamed if necessary.

3.3 Parameters

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

Values of input parameters are unaltered by any GKS function, by PACK DATA RECORD, or by UNPACK DATA RECORD.

In order that the application program may inquire any element of a list (member of a set), such as the set of segment names, 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 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 GKS 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 the two versions can coexist in the same implementation. In other cases the INTEGER parameter 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 in the case 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 for the Subset by replacing the PARAMETER statements with corresponding DATA statements.

3.5 Error handling

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

4 Generating FORTRAN subroutine names

For the binding of the GKS functions which inquire lists (sets), the word element (member) is added to the GKS function name before the subroutine name is generated from the resulting terms.

The derivation of the abbreviation for the subroutine names is performed in several steps. First, plurals are reduced to their singular form, and grammatical derivations are unified. Next, some compound terms are reduced. Finally, each remaining word is replaced by the null string or by an abbreviation.

Plurals

ATTRIBUTES	→	ATTRIBUTE	NUMBERS	→	NUMBER
DEVICES	→	DEVICE	PRIMITIVES	→	PRIMITIVE
EVENTS	→	EVENT	PRIORITIES	→	PRIORITY
FACILITIES	→	FACILITY	SEGMENTS	→	SEGMENT
FLAGS	→	FLAG	TYPES	→	TYPE
INDICES	→	INDEX	VALUES	→	VALUE
NAMES	→	NAME	WORKSTATIONS	→	WORKSTATION

Keeping Uniqueness

ACTIVE	→	ACTIVATE
DRAWING	→	DRAW
IDENTIFIER	→	IDENTIFICATION
SPACING	→	SPACE

Reduce Compound Terms:

STATE TABLES	→	TABLES
TRANSFORMATION NUMBER	→	TRANSFORMATION N
SET member	→	member
CURRENT NORMALISATION	→	CN
MAXIMUM LENGTH	→	LENGTH

Deletions

ALL	FACTOR	LIST	OF	TABLES
AND	FROM	member	ON	TO
AVAILABLE	GKSM	MODIFICATION	POINT	TYPE
CURRENT	IN	MORE	SIZE	VALUE
DATA	INDICATOR	NAME	STATES	VECTOR
DEVICE	LENGTH	NUMBER	SUPPORTED	WITH
EVENT				

Abbreviations

ACCUMULATE	→	AC	LINETYPE	→	LN
ACTIVATE	→	AC	LINEWIDTH	→	LW
ALIGNMENT	→	AL	LOCATOR	→	LC
AREA	→	A	LOGGING	→	LOG
ARRAY	→	A	LOGICAL	→	L
ASPECT	→	A	MARKER	→	MK
ASSOCIATE	→	A	MATRIX	→	M
ASSOCIATED	→	AS	MAXIMUM	→	M
ATTRIBUTE	→	A	MESSAGE	→	MSG
AWAIT	→	WAIT	MODE	→	M
BASE	→	B	NORMALIZATION	→	N
CATEGORY	→	CA	OPEN	→	OP
CELL	→	C	OPERATING	→	OP
CHARACTER	→	CH	OVERFLOW	→	OV
CHOICE	→	CH	PACK	→	P
CLASSIFICATION	→	CL	PATH	→	P
CLEAR	→	CLR	PATTERN	→	PA
CLIPPING	→	CLIP	PICK	→	PK
CLOSE	→	CL	PIXEL	→	PX
COLOUR	→	C	POLYLINE	→	PL
CONNECTION	→	C	POLYMARKER	→	PM
COPY	→	C	PRECISION	→	P
CREATE	→	CR	PREDEFINED	→	P
DEACTIVATE	→	DA	PRIMITIVE	→	P
DEFAULT	→	D	PRIORITY	→	P
DEFERRAL	→	D	QUEUE	→	Q
DELETE	→	D	READ	→	RD
DETECTABILITY	→	DTEC	RECORD	→	REC
DIMENSIONS	→	D	REDRAW	→	R
DISPLAY	→	D	REFERENCE	→	RF
DRAW	→	D	RENAME	→	REN
DYNAMIC	→	D	REPRESENTATION	→	R
element	→	E	REQUEST	→	RQ
EMERGENCY	→	E	SAMPLE	→	SM
ERROR	→	ER	SCALE	→	SC
ESCAPE	→	ESC	SEGMENT	→	SG
EVALUATE	→	EV	SELECT	→	SEL
EXPANSION	→	XP	SET	→	S
EXTENT	→	X	SIMULTANEOUS	→	SIM
FACILITY	→	F	SOURCE	→	S
FILL	→	F	SPACE	→	SP
FLAG	→	F	STATE	→	S
FONT	→	F	STRING	→	ST
GENERALISED	→	G	STROKE	→	SK
GET	→	GT	STYLE	→	S
GKS	→	KS	SURFACE	→	S
HANDLING	→	HND	TEXT	→	TX
HEIGHT	→	H	TRANSFORMATION	→	T
HIGHLIGHTING	→	HLIT	UNPACK	→	U
IDENTIFICATION	→	ID	UPDATE	→	U
INDEX	→	I	USE	→	US
INITIALISE	→	IN	VALUATOR	→	VL
INPUT	→	I	VIEWPORT	→	VP
INQUIRE	→	Q	VISIBILITY	→	VIS
INSERT	→	IN	WIDTH	→	W
INTERIOR	→	I	WINDOW	→	WN
INTERPRET	→	I	WORKSTATION	→	WK
ITEM	→	ITM	WRITE	→	W
LINE	→	LN			

5 Data types

In ISO 7942, parameters of several types are used. The following shows the correspondence between the types used in ISO 7942 and their realisation in a FORTRAN implementation.

GKS Data Type	FORTRAN Data Types
I integer	INTEGER
R real	REAL
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 which 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).
   c) CHARACTER*80 containing the string.

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

N name — INTEGER

1) Workstation Identifier, Segment Name, Pick Identifier: An implementation may restrict the range but must at least provide all non-negative integers which are available at that implementation.

   NOTE - the default value for pick identifier is zero.
2) Workstation Type, Connection Identifier, Error File: The set of valid values is implementation dependent. The Connection Identifier and Error File may be logical unit numbers.
3) GDP Identifier, Escape Identifier: The set of legal values is described in ISO 7942.
4) Identification of GKS procedure: The range is shown under 'Enumeration Types'.

E enumeration — INTEGER

NOTE - 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 7942: 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 x simple_type where simple_type is I or R (vector of values, for example 2xR)

1) In non-inquiry functions, separate simple_type parameters are used.

   NOTE - in GKS, const ≤ 4
2) In inquiry functions, if const ≤ 3, separate simple_type parameters are used; if const ≥ 4, a simple_type array of dimension const is used.

const x P (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.

const x E (only occurrence in GKS is const = 13)

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

const 1 x const 2 x R (matrix of values, for example 2x3xR)

REAL array (const 1, const 2)

list of n values of one simple_type (for example nxI)

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

   When the length could legally be zero within GKS, the binding indicates the array dimension by *. The implementation checks that the given length is ≥ 0.
2) For output parameter in non-inquiry functions:
   a) INTEGER (input parameter) containing the dimension of the array
   b) INTEGER (output parameter) containing the number of elements of the array actually used.
   c) an array whose elements are of the appropriate simple_type. The input dimension being too small is a language binding error condition (error 2001).

   In both cases (input or output), where the simple_type is a point, there is a REAL array for the X-coordinates and another for the Y-coordinates.
3) For inquiry functions, a single call returns a single element of the list. For a complete list of length n,
   a) INTEGER (input parameter) containing the sequence number of required list element (in the range 0...n).
   b) INTEGER (output parameter) containing the number of items in the list n.
   c) a parameter of the appropriate simple_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 is 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 parameter) containing the number of elements of the array actually used.

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

list of n values of a compound type (for example, nx4xR)

This only occurs in an inquiry function. A single call returns a single element of the list exactly as for the list of values of one simple_type, except that here the requested element is several FORTRAN parameters.

array of integers (for example, nxnxI)

This is described more fully below, where the representations of CELL ARRAY, PIXEL ARRAY and PATTERN ARRAY are described.

an ordered pair of different types (for example I;E)

The different types are represented in turn in the FORTRAN parameter list.

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 argument 'number of array elements of data record occupied' is needed. There are no scalar values except where the data record contains values which are compulsory in GKS.

Although data can be read from and written into the data record with the FORTRAN READ and WRITE statements, 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 (GPREC, GUREC). The content of the packed data records is implementation dependent, but GPREC must perform the inverse function to GUREC and vice versa.

The representation of CELL ARRAY, PIXEL 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.

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 first dimension of the FORTRAN array:

```
INTEGER DIMX, DIMY, CELLS (DIMX,DIMY)
CALL GCA (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 the starting address and the dimensions of the entire array for the proper treatment of addresses. 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 GCA (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 GKS are mapped to FORTRAN INTEGERs. The correspondence between GKS scalars and FORTRAN INTEGERs is shown below in a list of symbolic FORTRAN constants which may be included in any application program. The following section contains a method of mapping GKS enumeration types to FORTRAN variable names. In a FORTRAN 77 Subset implementation, this mapping could be accomplished by the DATA statement. Also, a numbering of all GKS functions is given for use in the error handling procedures.

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

```
aspect source                   bundled,        individual
        INTEGER                 GBUNDL,         GINDIV
        PARAMETER               (GBUNDL=0,      GINDIV=1 )

clear control flag              conditionally,  always
        INTEGER                 GCONDI,         GALWAY
        PARAMETER               (GCONDI=0,      GALWAY=1 )

clipping indicator              noclip,         clip
        INTEGER                 GNCLIP,         GCLIP
        PARAMETER               (GNCLIP=0,      GCLIP=1 )

colour available                monochrome,     colour
        INTEGER                 GMONOC,         GCOLOR
        PARAMETER               (GMONOC=0,      GCOLOR=1 )

coordinate switch               WC,             NDC
        INTEGER                 GWC,            GNDC
        PARAMETER               (GWC=0,         GNDC=1 )

deferral mode                   ASAP,           BNIG,           BNIL,           ASTI
(see ISO 7942, subclause 4.5.3)
        INTEGER                 GASAP,          GBNIG,          GBNIL,          GASTI
        PARAMETER               (GASAP=0,       GBNIG=1,        GBNIL=2,        GASTI=3 )

detectability                   undetectable,   detectable
        INTEGER                 GUNDET,         GDETEC
        PARAMETER               (GUNDET=0,      GDETEC=1 )

device coordinate units         metres,         other
        INTEGER                 GMETRE,         GOTHU
        PARAMETER               (GMETRE=0,      GOTHU=1 )

display surface empty           notempty,       empty
        INTEGER                 GNEMPT,         GEMPTY
        PARAMETER               (GNEMPT=0,      GEMPTY=1 )

dynamic modification            IRG,            IMM
(see ISO 7942, subclause 4.5.3)
        INTEGER                 GIRG,           GIMM
        PARAMETER               (GIRG=0,        GIMM=1 )

echo switch                     noecho,         echo
        INTEGER                 GNECHO,         GECHO
        PARAMETER               (GNECHO=0,      GECHO=1 )

fill area interior style        hollow,         solid,          pattern,        hatch
        INTEGER                 GHOLLO,         GSOLID,         GPATTR,         GHATCH
        PARAMETER               (GHOLLO=0,      GSOLID=1,       GPATTR=2,       GHATCH=3 )

highlighting                    normal,         highlighted
        INTEGER                 GNORML,         GHILIT
        PARAMETER               (GNORML=0,      GHILIT=1 )
```

```
input device status          none,          ok,            nopick,        nochoice
        INTEGER              GNONE,         GOK,           GNPICK,        GNCHOI
        PARAMETER (GNONE=0,  GOK=1,         GNPICK=2,      GNCHOI=2 )

input class                  none,          locator,       stroke,        valuator,      choice,        pick,
                             string
        INTEGER              GNCLAS,        GLOCAT,        GSTROK,        GVALUA,        GCHOIC,        GPICK,
                             GSTRIN
        PARAMETER (GNCLAS=0, GLOCAT=1,      GSTROK=2,      GVALUA=3,      GCHOIC=4,      GPICK=5,
                   GSTRIN=6 )

implicit regeneration mode   suppressed,    allowed
        INTEGER              GSUPPD,        GALLOW
        PARAMETER (GSUPPD=0, GALLOW=1 )

level of GKS                 L0a,           L0b,           L0c,           L1a,           L1b,           L1c,
                             L2a,           L2b,           L2c
        INTEGER              GL0A,          GL0B,          GL0C,          GL1A,          GL1B,          GL1C,
        *                    GL2A,          GL2B,          GL2C
        PARAMETER (GL0A=0,   GL0B=1,        GL0C=2,        GL1A=3,        GL1B=4,        GL1C=5,
        *                    GL2A=6,        GL2B=7,        GL2C=8 )

new frame action necessary   no,            yes
        INTEGER              GNO,           GYES
        PARAMETER (GNO=0,    GYES=1 )

operating mode               request,       sample,        event
        INTEGER              GREQU,         GSAMPL,        GEVENT
        PARAMETER (GREQU=0,  GSAMPL=1,      GEVENT=2 )

operating state value        GKCL,          GKOP,          WSOP,          WSAC,          SGOP
(see ISO 7942, subclause 4.11.1)
        INTEGER              GGKCL,         GGKOP,         GWSOP,         GWSAC,         GSGOP
        PARAMETER (GGKCL=0,  GGKOP=1,       GWSOP=2,       GWSAC=3,       GSGOP=4 )

presence of invalid values   absent,        present
        INTEGER              GABSNT,        GPRSNT
        PARAMETER (GABSNT=0, GPRSNT=1 )

regeneration flag            postpone,      perform
        INTEGER              GPOSTP,        GPERFO
        PARAMETER (GPOSTP=0, GPERFO=1 )

relative input priority      higher,        lower
        INTEGER              GHIGHR,        GLOWER
        PARAMETER (GHIGHR=0, GLOWER=1 )

simultaneous events flag     nomore,        more
        INTEGER              GNMORE,        GMORE
        PARAMETER (GNMORE=0, GMORE=1 )

text alignment horizontal    normal,        left,          center,        right
        INTEGER              GAHNOR,        GALEFT,        GACENT,        GARITE
        PARAMETER (GAHNOR=0, GALEFT=1,      GACENT=2,      GARITE=3 )

text alignment vertical      normal,        top,           cap,           half,          base,          bottom
        INTEGER              GAVNOR,        GATOP,         GACAP,         GAHALF,        GABASE,        GABOTT
        PARAMETER (GAVNOR=0, GATOP=1,       GACAP=2,       GAHALF=3,      GABASE=4,      GABOTT=5 )

text path                    right,         left,          up,            down
        INTEGER              GRIGHT,        GLEFT,         GUP,           GDOWN
        PARAMETER (GRIGHT=0, GLEFT=1,       GUP=2,         GDOWN=3 )

text precision               string,        character,     stroke
        INTEGER              GSTRP,         GCHARP,        GSTRKP
        PARAMETER (GSTRP=0,  GCHARP=1,      GSTRKP=2 )
```

```
type of returned values     set,          realized
          INTEGER           GSET,         GREALI
          PARAMETER (GSET=0,              GREALI=1 )

update state                notpending,   pending
          INTEGER           GNPEND,       GPEND
          PARAMETER (GNPEND=0,            GPEND=1 )

vector/raster/other type    vector,       raster,       other
          INTEGER           GVECTR,       GRASTR,       GOTHWK
          PARAMETER (GVECTR=0,            GRASTR=1,     GOTHWK=2 )

visibility                  invisible,    visible
          INTEGER           GINVIS,       GVISI
          PARAMETER (GINVIS=0,            GVISI=1 )

workstation category        OUTPUT,       INPUT,        OUTIN,        WISS,         MO,           MI
(see ISO 7942, subclause 4.5.1)
          INTEGER           GOUTPT,       GINPUT,       GOUTIN,       GWISS,        GMO,          GMI
          PARAMETER (GOUTPT=0,            GINPUT=1,     GOUTIN=2,     GWISS=3,      GMO=4,        GMI=5 )

workstation state           inactive,     active
          INTEGER           GINACT,       GACTIV
          PARAMETER (GINACT=0,            GACTIV=1 )

list of GDP attributes      polyline attribute,polymarker attribute,text attribute,fill area attribute
          INTEGER           GPLATT,       GPMATT,       GTXATT,       GFAATT
          PARAMETER (GPLATT=0,            GPMATT=1,     GTXATT=2,     GFAATT=3 )

line type                   solid,        dash,         dot,          dash-dot
          INTEGER           GLSOLI,       GLDASH,       GLDOT,        GLDASD
          PARAMETER (GLSOLI=1,            GLDASH=2,     GLDOT=3,      GLDASD=4 )

marker type                 .,            +,            *,            o,            x
          INTEGER           GPOINT,       GPLUS,        GAST,         GOMARK,       GXMARK
          PARAMETER (GPOINT=1,            GPLUS=2,      GAST=3,       GOMARK=4,     GXMARK=5 )
```

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

```
          INTEGER       EOPKS,      ECLKS,      EOPWK,      ECLWK,      EACWK
          PARAMETER (EOPKS =0,      ECLKS=1,    EOPWK=2,    ECLWK=3,    EACWK=4 )
          INTEGER       EDAWK,      ECLRWK,     ERSGWK,     EUWK,       ESDS
          PARAMETER (EDAWK=5,       ECLRWK=6,   ERSGWK=7,   EUWK=8,     ESDS=9 )
          INTEGER       EMSG,       EESC,       EPL,        EPM,        ETX
          PARAMETER (EMSG=10,       EESC=11,    EPL=12,     EPM=13,     ETX=14 )
          INTEGER       EFA,        ECA,        EGDP,       ESPLI,      ESLN
          PARAMETER (EFA=15,        ECA=16,     EGDP=17,    ESPLI=18,   ESLN=19 )
          INTEGER       ESLWSC,     ESPLCI,     ESPMI,      ESMK,       ESMKSC
          PARAMETER (ESLWSC=20,     ESPLCI=21,  ESPMI=22,   ESMK=23,    ESMKSC=24 )
          INTEGER       ESPMCI,     ESTXI,      ESTXFP,     ESCHXP,     ESCHSP
          PARAMETER (ESPMCI=25,     ESTXI=26,   ESTXFP=27,  ESCHXP=28,  ESCHSP=29 )
          INTEGER       ESTXCI,     ESCHH,      ESCHUP,     ESTXP,      ESTXAL
          PARAMETER (ESTXCI=30,     ESCHH=31,   ESCHUP=32,  ESTXP=33,   ESTXAL=34 )
          INTEGER       ESFAI,      ESFAIS,     ESFASI,     ESFACI,     ESPA
          PARAMETER (ESFAI=35,      ESFAIS=36,  ESFASI=37,  ESFACI=38,  ESPA=39 )
          INTEGER       ESPARF,     ESASF,      ESPKID,     ESPLR,      ESPMR
          PARAMETER (ESPARF=40,     ESASF=41,   ESPKID=42,  ESPLR=43,   ESPMR=44 )
          INTEGER       ESTXR,      ESFAR,      ESPAR,      ESCR,       ESWN
          PARAMETER (ESTXR=45,      ESFAR=46,   ESPAR=47,   ESCR=48,    ESWN=49 )
          INTEGER       ESVP,       ESVPIP,     ESELNT,     ESCLIP,     ESWKWN
          PARAMETER (ESVP=50,       ESVPIP=51,  ESELNT=52,  ESCLIP=53,  ESWKWN=54 )
          INTEGER       ESWKVP,     ECRSG,      ECLSG,      ERENSG,     EDSG
          PARAMETER (ESWKVP=55,     ECRSG=56,   ECLSG=57,   ERENSG=58,  EDSG=59 )
          INTEGER       EDSGWK,     EASGWK,     ECSGWK,     EINSG,      ESSGT
          PARAMETER (EDSGWK=60,     EASGWK=61,  ECSGWK=62,  EINSG=63,   ESSGT=64 )
          INTEGER       ESVIS,      ESHLIT,     ESSGP,      ESDTEC,     EINLC
```

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PARAMETER (ESVIS=65,   ESHLIT=66,  ESSGP=67,   ESDTEC=68, EINLC=69 )
INTEGER    EINSK,      EINVL,      EINCH,      EINPK,      EINST
PARAMETER (EINSK=70,   EINVL=71,   EINCH=72,   EINPK=73,   EINST=74 )
INTEGER    ESLCM,      ESSKM,      ESVLM,      ESCHM,      ESPKM
PARAMETER (ESLCM=75,   ESSKM=76,   ESVLM=77,   ESCHM=78,   ESPKM=79 )
INTEGER    ESSTM,      ERQLC,      ERQSK,      ERQVL,      ERQCH
PARAMETER (ESSTM=80,   ERQLC=81,   ERQSK=82,   ERQVL=83,   ERQCH=84 )
INTEGER    ERQPK,      ERQST,      ESMLC,      ESMSK,      ESMVL
PARAMETER (ERQPK=85,   ERQST=86,   ESMLC=87,   ESMSK=88,   ESMVL=89 )
INTEGER    ESMCH,      ESMPK,      ESMST,      EWAIT,      EFLUSH
PARAMETER (ESMCH=90,   ESMPK=91,   ESMST=92,   EWAIT=93,   EFLUSH=94 )
INTEGER    EGTLC,      EGTSK,      EGTVL,      EGTCH,      EGTPK
PARAMETER (EGTLC=95,   EGTSK=96,   EGTVL=97,   EGTCH=98,   EGTPK=99 )
INTEGER    EGTST,      EWITM,      EGTITM,     ERDITM,     EIITM
PARAMETER (EGTST=100,  EWITM=101,  EGTITM=102, ERDITM=103, EIITM=104)
INTEGER    EEVTM,      EACTM,      EPREC,      EUREC
PARAMETER (EEVTM=105,  EACTM=106,  EPREC=107,  EUREC=108 )
```

7 Lists of the GKS function names

The complete list of GKS function names, their corresponding bound names,the abbreviations used, and their levels follows. Certain of these functions do not appear in the functional specification but have been created for the binding.

7.1 List ordered alphabetically by bound name

GACTM	AC-T-M	1a	ACCUMULATE TRANSFORMATION MATRIX
GACWK	AC-WK	0a	ACTIVATE WORKSTATION
GASGWK	A-SG-WK	2a	ASSOCIATE SEGMENT WITH WORKSTATION
GCA	C-A	0a	CELL ARRAY
GCLKS	CL-KS	0a	CLOSE GKS
GCLRWK	CLR-WK	0a	CLEAR WORKSTATION
GCLSG	CL-SG	1a	CLOSE SEGMENT
GCLWK	CL-WK	0a	CLOSE WORKSTATION
GCRSG	CR-SG	1a	CREATE SEGMENT
GCSGWK	C-SG-WK	2a	COPY SEGMENT TO WORKSTATION
GDAWK	DA-WK	0a	DEACTIVATE WORKSTATION
GDSG	D-SG	1a	DELETE SEGMENT
GDSGWK	D-SG-WK	1a	DELETE SEGMENT FROM WORKSTATION
GECLKS	E-CL-KS	0a	EMERGENCY CLOSE GKS
GERHND	ER-HND	0a	ERROR HANDLING
GERLOG	ER-LOG	0a	ERROR LOGGING
GESC	ESC	0a	ESCAPE
GEVTM	EV-T-M	1a	EVALUATE TRANSFORMATION MATRIX
GFA	F-A	0a	FILL AREA
GFLUSH	FLUSH	0c	FLUSH DEVICE EVENTS
GGDP	G-D-P	0a	GENERALIZED DRAWING PRIMITIVE
GGTCH	GT-CH	0c	GET CHOICE
GGTITM	GT-ITM	0a	GET ITEM TYPE FROM GKSM
GGTLC	GT-LC	0c	GET LOCATOR
GGTPK	GT-PK	1c	GET PICK
GGTSK	GT-SK	0c	GET STROKE
GGTST	GT-ST	0c	GET STRING
GGTVL	GT-VL	0c	GET VALUATOR
GIITM	I-ITM	0a	INTERPRET ITEM
GINCH	IN-CH	0b	INITIALISE CHOICE
GINLC	IN-LC	0b	INITIALISE LOCATOR
GINPK	IN-PK	1b	INITIALISE PICK
GINSG	IN-SG	2a	INSERT SEGMENT
GINSK	IN-SK	0b	INITIALISE STROKE
GINST	IN-ST	0b	INITIALISE STRING
GINVL	IN-VL	0b	INITIALISE VALUATOR
GMSG	MSG	1a	MESSAGE
GMSGS	MSG-S	1a	MESSAGE (FORTRAN 77 SUBSET)
GOPKS	OP-KS	0a	OPEN GKS
GOPWK	OP-WK	0a	OPEN WORKSTATION
GPL	PL	0a	POLYLINE
GPM	PM	0a	POLYMARKER
GPREC	P-REC	0a	PACK DATA RECORD
GQACWK	Q-AC-WK	1a	INQUIRE SET member OF ACTIVE WORKSTATIONS
GQASF	Q-A-S-F	0a	INQUIRE ASPECT SOURCE FLAGS (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQASWK	Q-AS-WK	1a	INQUIRE SET member OF ASSOCIATED WORKSTATIONS
GQCF	Q-C-F	0a	INQUIRE COLOUR FACILITIES
GQCHB	Q-CH-B	0a	INQUIRE CHARACTER BASE VECTOR (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHH	Q-CH-H	0a	INQUIRE CHARACTER HEIGHT (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHS	Q-CH-S	0b	INQUIRE CHOICE DEVICE STATE
GQCHSP	Q-CH-SP	0a	INQUIRE CHARACTER SPACING (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)

GQCHUP	Q-CH-UP	0a	INQUIRE CHARACTER UP VECTOR (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHW	Q-CH-W	0a	INQUIRE CHARACTER WIDTH (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHXP	Q-CH-XP	0a	INQUIRE CHARACTER EXPANSION FACTOR (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQCLIP	Q-CLIP	0a	INQUIRE CLIPPING
GQCNTN	Q-C-N-T-N	0a	INQUIRE CURRENT NORMALIZATION TRANSFORMATION NUMBER
GQCR	Q-C-R	0a	INQUIRE COLOUR REPRESENTATION
GQDCH	Q-D-CH	0b	INQUIRE DEFAULT CHOICE DEVICE DATA
GQDDS	Q-D-D-S	1a	INQUIRE DEFAULT DEFERRAL STATE VALUES
GQDLC	Q-D-LC	0b	INQUIRE DEFAULT LOCATOR DEVICE DATA
GQDPK	Q-D-PK	1b	INQUIRE DEFAULT PICK DEVICE DATA
GQDSGA	Q-D-SG-A	1a	INQUIRE DYNAMIC MODIFICATION OF SEGMENT ATTRIBUTES
GQDSK	Q-D-SK	0b	INQUIRE DEFAULT STROKE DEVICE DATA
GQDSP	Q-D-SP	0a	INQUIRE DISPLAY SPACE SIZE
GQDST	Q-D-ST	0b	INQUIRE DEFAULT STRING DEVICE DATA
GQDVL	Q-D-VL	0b	INQUIRE DEFAULT VALUATOR DEVICE DATA
GQDWKA	Q-D-WK-A	1a	INQUIRE DYNAMIC MODIFICATION OF WORKSTATION ATTRIBUTES
GQECI	Q-E-C-I	0a	INQUIRE LIST element OF COLOUR INDICES
GQEFAI	Q-E-F-A-I	1a	INQUIRE LIST element OF FILL AREA INDICES
GQEGDP	Q-E-G-D-P	0a	INQUIRE LIST element OF AVAILABLE GENERALIZED DRAWING PRIMITIVES
GQENTN	Q-E-N-T-N	0a	INQUIRE LIST element OF NORMALIZATION TRANSFORMATION NUMBERS
GQEPAI	Q-E-PA-I	1a	INQUIRE LIST element OF PATTERN INDICES
GQEPLI	Q-E-PL-I	1a	INQUIRE LIST element OF POLYLINE INDICES
GQEPMI	Q-E-PM-I	1a	INQUIRE LIST element OF POLYMARKER INDICES
GQETXI	Q-E-TX-I	1a	INQUIRE LIST element OF TEXT INDICES
GQEWK	Q-E-WK	0a	INQUIRE LIST element OF AVAILABLE WORKSTATION TYPES
GQFACI	Q-F-A-C-I	0a	INQUIRE FILL AREA COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQFAF	Q-F-A-F	0a	INQUIRE FILL AREA FACILITIES
GQFAI	Q-F-A-I	0a	INQUIRE FILL AREA INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQFAIS	Q-F-A-I-S	0a	INQUIRE FILL AREA INTERIOR STYLE (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQFAR	Q-F-A-R	1a	INQUIRE FILL AREA REPRESENTATION
GQFASI	Q-F-A-S-I	0a	INQUIRE FILL AREA STYLE INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQGDP	Q-G-D-P	0a	INQUIRE GENERALIZED DRAWING PRIMITIVE
GQIQOV	Q-I-Q-OV	0c	INQUIRE INPUT QUEUE OVERFLOW
GQLCS	Q-LC-S	0b	INQUIRE LOCATOR DEVICE STATE
GQLI	Q-L-I	0b	INQUIRE NUMBER OF AVAILABLE LOGICAL INPUT DEVICES
GQLN	Q-LN	0a	INQUIRE LINETYPE (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQLVKS	Q-LV-KS	0a	INQUIRE LEVEL OF GKS
GQLWK	Q-L-WK	0a	INQUIRE MAXIMUM LENGTH OF WORKSTATION STATE TABLES
GQLWSC	Q-LW-SC	0a	INQUIRE LINEWIDTH SCALE FACTOR (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQMK	Q-MK	0a	INQUIRE MARKER TYPE (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQMKSC	Q-MK-SC	0a	INQUIRE MARKER SIZE SCALE FACTOR (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQMNTN	Q-M-N-T-N	0a	INQUIRE MAXIMUM NORMALIZATION TRANSFORMATION NUMBER
GQNT	Q-N-T	0a	INQUIRE NORMALIZATION TRANSFORMATION
GQOPS	Q-OP-S	0a	INQUIRE OPERATING STATE VALUE
GQOPSG	Q-OP-SG	1a	INQUIRE NAME OF OPEN SEGMENT
GQOPWK	Q-OP-WK	0a	INQUIRE SET member OF OPEN WORKSTATIONS
GQPA	Q-PA	0a	INQUIRE PATTERN SIZE (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPAF	Q-PA-F	0a	INQUIRE PATTERN FACILITIES
GQPAR	Q-PA-R	1a	INQUIRE PATTERN REPRESENTATION
GQPARF	Q-PA-RF	0a	INQUIRE PATTERN REFERENCE POINT (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPCR	Q-P-C-R	0a	INQUIRE PREDEFINED COLOUR REPRESENTATION

GQPFAR	Q-P-F-A-R	0a	INQUIRE PREDEFINED FILL AREA REPRESENTATION
GQPKID	Q-PK-ID	1b	INQUIRE CURRENT PICK IDENTIFIER VALUE
GQPKS	Q-PK-S	1b	INQUIRE PICK DEVICE STATE
GQPLCI	Q-PL-C-I	0a	INQUIRE POLYLINE COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQPLF	Q-PL-F	0a	INQUIRE POLYLINE FACILITIES
GQPLI	Q-PL-I	0a	INQUIRE POLYLINE INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPLR	Q-PL-R	1a	INQUIRE POLYLINE REPRESENTATION
GQPMCI	Q-PM-C-I	0a	INQUIRE POLYMARKER COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQPMF	Q-PM-F	0a	INQUIRE POLYMARKER FACILITIES
GQPMI	Q-PM-I	0a	INQUIRE POLYMARKER INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPMR	Q-PM-R	1a	INQUIRE POLYMARKER REPRESENTATION
GQPPAR	Q-P-PA-R	0a	INQUIRE PREDEFINED PATTERN REPRESENTATION
GQPPLR	Q-P-PL-R	0a	INQUIRE PREDEFINED POLYLINE REPRESENTATION
GQPPMR	Q-P-PM-R	0a	INQUIRE PREDEFINED POLYMARKER REPRESENTATION
GQPTXR	Q-P-TX-R	0a	INQUIRE PREDEFINED TEXT REPRESENTATION
GQPX	Q-PX	0a	INQUIRE PIXEL
GQPXA	Q-PX-A	0a	INQUIRE PIXEL ARRAY
GQPXAD	Q-PX-A-D	0a	INQUIRE PIXEL ARRAY DIMENSIONS
GQSGA	Q-SG-A	1a	INQUIRE SEGMENT ATTRIBUTES
GQSGP	Q-SG-P	1a	INQUIRE NUMBER OF SEGMENT PRIORITIES SUPPORTED
GQSGUS	Q-SG-US	1a	INQUIRE SET member OF SEGMENT NAMES IN USE
GQSGWK	Q-SG-WK	1a	INQUIRE SET member OF SEGMENT NAMES ON WORKSTATION
GQSIM	Q-SIM	0c	INQUIRE MORE SIMULTANEOUS EVENTS
GQSKS	Q-SK-S	0b	INQUIRE STROKE DEVICE STATE
GQSTS	Q-ST-S	0b	INQUIRE STRING DEVICE STATE
GQTXAL	Q-TX-AL	0a	INQUIRE TEXT ALIGNMENT (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQTXCI	Q-TX-C-I	0a	INQUIRE TEXT COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQTXF	Q-TX-F	0a	INQUIRE TEXT FACILITIES
GQTXFP	Q-TX-F-P	0a	INQUIRE TEXT FONT AND PRECISION (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQTXI	Q-TX-I	0a	INQUIRE TEXT INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQTXP	Q-TX-P	0a	INQUIRE TEXT PATH (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQTXR	Q-TX-R	1a	INQUIRE TEXT REPRESENTATION
GQTXX	Q-TX-X	0a	INQUIRE TEXT EXTENT
GQTXXS	Q-TX-X-S	0a	INQUIRE TEXT EXTENT (FORTRAN 77 SUBSET)
GQVLS	Q-VL-S	0b	INQUIRE VALUATOR DEVICE STATE
GQWKC	Q-WK-C	0a	INQUIRE WORKSTATION CONNECTION AND TYPE
GQWKCA	Q-WK-CA	0a	INQUIRE WORKSTATION CATEGORY
GQWKCL	Q-WK-CL	0a	INQUIRE WORKSTATION CLASSIFICATION
GQWKDU	Q-WK-D-U	0a	INQUIRE WORKSTATION DEFERRAL AND UPDATE STATES
GQWKM	Q-WK-M	1a	INQUIRE WORKSTATION MAXIMUM NUMBERS
GQWKS	Q-WK-S	0a	INQUIRE WORKSTATION STATE
GQWKT	Q-WK-T	0a	INQUIRE WORKSTATION TRANSFORMATION
GRDITM	RD-ITM	0a	READ ITEM FROM GKSM
GRENSG	REN-SG	1a	RENAME SEGMENT
GRQCH	RQ-CH	0b	REQUEST CHOICE
GRQLC	RQ-LC	0b	REQUEST LOCATOR
GRQPK	RQ-PK	1b	REQUEST PICK
GRQSK	RQ-SK	0b	REQUEST STROKE
GRQST	RQ-ST	0b	REQUEST STRING
GRQVL	RQ-VL	0b	REQUEST VALUATOR
GRSGWK	R-SG-WK	1a	REDRAW ALL SEGMENTS ON WORKSTATION
GSASF	S-A-S-F	0a	SET ASPECT SOURCE FLAGS
GSCHH	S-CH-H	0a	SET CHARACTER HEIGHT
GSCHM	S-CH-M	0b	SET CHOICE MODE
GSCHSP	S-CH-SP	0a	SET CHARACTER SPACING
GSCHUP	S-CH-UP	0a	SET CHARACTER UP VECTOR
GSCHXP	S-CH-XP	0a	SET CHARACTER EXPANSION FACTOR
GSCLIP	S-CLIP	0a	SET CLIPPING INDICATOR
GSCR	S-C-R	0a	SET COLOUR REPRESENTATION

GSDS	S-D-S	1a	SET DEFERRAL STATE
GSDTEC	S-DTEC	1b	SET DETECTABILITY
GSELNT	SEL-N-T	0a	SELECT NORMALIZATION TRANSFORMATION
GSFACI	S-F-A-C-I	0a	SET FILL AREA COLOUR INDEX
GSFAI	S-F-A-I	0a	SET FILL AREA INDEX
GSFAIS	S-F-A-I-S	0a	SET FILL AREA INTERIOR STYLE
GSFAR	S-F-A-R	1a	SET FILL AREA REPRESENTATION
GSFASI	S-F-A-S-I	0a	SET FILL AREA STYLE INDEX
GSHLIT	S-HLIT	1a	SET HIGHLIGHTING
GSLCM	S-LC-M	0b	SET LOCATOR MODE
GSLN	S-LN	0a	SET LINETYPE
GSLWSC	S-LW-SC	0a	SET LINEWIDTH SCALE FACTOR
GSMCH	SM-CH	0c	SAMPLE CHOICE
GSMK	S-MK	0a	SET MARKER TYPE
GSMKSC	S-MK-SC	0a	SET MARKER SIZE SCALE FACTOR
GSMLC	SM-LC	0c	SAMPLE LOCATOR
GSMPK	SM-PK	1c	SAMPLE PICK
GSMSK	SM-SK	0c	SAMPLE STROKE
GSMST	SM-ST	0c	SAMPLE STRING
GSMVL	SM-VL	0c	SAMPLE VALUATOR
GSPA	S-PA	0a	SET PATTERN SIZE
GSPAR	S-PA-R	1a	SET PATTERN REPRESENTATION
GSPARF	S-PA-RF	0a	SET PATTERN REFERENCE POINT
GSPKID	S-PK-ID	1b	SET PICK IDENTIFIER
GSPKM	S-PK-M	1b	SET PICK MODE
GSPLCI	S-PL-C-I	0a	SET POLYLINE COLOUR INDEX
GSPLI	S-PL-I	0a	SET POLYLINE INDEX
GSPLR	S-PL-R	1a	SET POLYLINE REPRESENTATION
GSPMCI	S-PM-C-I	0a	SET POLYMARKER COLOUR INDEX
GSPMI	S-PM-I	0a	SET POLYMARKER INDEX
GSPMR	S-PM-R	1a	SET POLYMARKER REPRESENTATION
GSSGP	S-SG-P	1a	SET SEGMENT PRIORITY
GSSGT	S-SG-T	1a	SET SEGMENT TRANSFORMATION
GSSKM	S-SK-M	0b	SET STROKE MODE
GSSTM	S-ST-M	0b	SET STRING MODE
GSTXAL	S-TX-AL	0a	SET TEXT ALIGNMENT
GSTXCI	S-TX-C-I	0a	SET TEXT COLOUR INDEX
GSTXFP	S-TX-F-P	0a	SET TEXT FONT AND PRECISION
GSTXI	S-TX-I	0a	SET TEXT INDEX
GSTXP	S-TX-P	0a	SET TEXT PATH
GSTXR	S-TX-R	1a	SET TEXT REPRESENTATION
GSVIS	S-VIS	1a	SET VISIBILITY
GSVLM	S-VL-M	0b	SET VALUATOR MODE
GSVP	S-VP	0a	SET VIEWPORT
GSVPIP	S-VP-I-P	0b	SET VIEWPORT INPUT PRIORITY
GSWKVP	S-WK-VP	0a	SET WORKSTATION VIEWPORT
GSWKWN	S-WK-WN	0a	SET WORKSTATION WINDOW
GSWN	S-WN	0a	SET WINDOW
GTX	TX	0a	TEXT
GTXS	TX-S	0a	TEXT (FORTRAN 77 SUBSET)
GUREC	U-REC	0a	UNPACK DATA RECORD
GUWK	U-WK	0a	UPDATE WORKSTATION
GWAIT	WAIT	0c	AWAIT EVENT
GWITM	W-ITM	0a	WRITE ITEM TO GKSM

7.2 List ordered alphabetically by GKS function name

GACTM	AC-T-M	1a	ACCUMULATE TRANSFORMATION MATRIX
GACWK	AC-WK	0a	ACTIVATE WORKSTATION
GASGWK	A-SG-WK	2a	ASSOCIATE SEGMENT WITH WORKSTATION
GWAIT	WAIT	0c	AWAIT EVENT
GCA	C-A	0a	CELL ARRAY
GCLRWK	CLR-WK	0a	CLEAR WORKSTATION
GCLKS	CL-KS	0a	CLOSE GKS
GCLSG	CL-SG	1a	CLOSE SEGMENT
GCLWK	CL-WK	0a	CLOSE WORKSTATION

GCSGWK	C-SG-WK	2a	COPY SEGMENT TO WORKSTATION
GCRSG	CR-SG	1a	CREATE SEGMENT
GDAWK	DA-WK	0a	DEACTIVATE WORKSTATION
GDSG	D-SG	1a	DELETE SEGMENT
GDSGWK	D-SG-WK	1a	DELETE SEGMENT FROM WORKSTATION
GECLKS	E-CL-KS	0a	EMERGENCY CLOSE GKS
GERHND	ER-HND	0a	ERROR HANDLING
GERLOG	ER-LOG	0a	ERROR LOGGING
GESC	ESC	0a	ESCAPE
GEVTM	EV-T-M	1a	EVALUATE TRANSFORMATION MATRIX
GFA	F-A	0a	FILL AREA
GFLUSH	FLUSH	0c	FLUSH DEVICE EVENTS
GGDP	G-D-P	0a	GENERALIZED DRAWING PRIMITIVE
GGTCH	GT-CH	0c	GET CHOICE
GGTITM	GT-ITM	0a	GET ITEM TYPE FROM GKSM
GGTLC	GT-LC	0c	GET LOCATOR
GGTPK	GT-PK	1c	GET PICK
GGTST	GT-ST	0c	GET STRING
GGTSK	GT-SK	0c	GET STROKE
GGTVL	GT-VL	0c	GET VALUATOR
GINCH	IN-CH	0b	INITIALISE CHOICE
GINLC	IN-LC	0b	INITIALISE LOCATOR
GINPK	IN-PK	1b	INITIALISE PICK
GINST	IN-ST	0b	INITIALISE STRING
GINSK	IN-SK	0b	INITIALISE STROKE
GINVL	IN-VL	0b	INITIALISE VALUATOR
GQASF	Q-A-S-F	0a	INQUIRE ASPECT SOURCE FLAGS (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQCHB	Q-CH-B	0a	INQUIRE CHARACTER BASE VECTOR (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHXP	Q-CH-XP	0a	INQUIRE CHARACTER EXPANSION FACTOR (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQCHH	Q-CH-H	0a	INQUIRE CHARACTER HEIGHT (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHSP	Q-CH-SP	0a	INQUIRE CHARACTER SPACING (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQCHUP	Q-CH-UP	0a	INQUIRE CHARACTER UP VECTOR (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHW	Q-CH-W	0a	INQUIRE CHARACTER WIDTH (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHS	Q-CH-S	0b	INQUIRE CHOICE DEVICE STATE
GQCLIP	Q-CLIP	0a	INQUIRE CLIPPING
GQCF	Q-C-F	0a	INQUIRE COLOUR FACILITIES
GQCR	Q-C-R	0a	INQUIRE COLOUR REPRESENTATION
GQCNTN	Q-C-N-T-N	0a	INQUIRE CURRENT NORMALIZATION TRANSFORMATION NUMBER
GQDCH	Q-D-CH	0b	INQUIRE DEFAULT CHOICE DEVICE DATA
GQDDS	Q-D-D-S	1a	INQUIRE DEFAULT DEFERRAL STATE VALUES
GQDLC	Q-D-LC	0b	INQUIRE DEFAULT LOCATOR DEVICE DATA
GQDPK	Q-D-PK	1b	INQUIRE DEFAULT PICK DEVICE DATA
GQDST	Q-D-ST	0b	INQUIRE DEFAULT STRING DEVICE DATA
GQDSK	Q-D-SK	0b	INQUIRE DEFAULT STROKE DEVICE DATA
GQDVL	Q-D-VL	0b	INQUIRE DEFAULT VALUATOR DEVICE DATA
GQDSP	Q-D-SP	0a	INQUIRE DISPLAY SPACE SIZE
GQDSGA	Q-D-SG-A	1a	INQUIRE DYNAMIC MODIFICATION OF SEGMENT ATTRIBUTES
GQDWKA	Q-D-WK-A	1a	INQUIRE DYNAMIC MODIFICATION OF WORKSTATION ATTRIBUTES
GQFACI	Q-F-A-C-I	0a	INQUIRE FILL AREA COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQFAF	Q-F-A-F	0a	INQUIRE FILL AREA FACILITIES
GQFAI	Q-F-A-I	0a	INQUIRE FILL AREA INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQFAIS	Q-F-A-I-S	0a	INQUIRE FILL AREA INTERIOR STYLE (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQFAR	Q-F-A-R	1a	INQUIRE FILL AREA REPRESENTATION
GQFASI	Q-F-A-S-I	0a	INQUIRE FILL AREA STYLE INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQGDP	Q-G-D-P	0a	INQUIRE GENERALIZED DRAWING PRIMITIVE
GQIQOV	Q-I-Q-OV	0c	INQUIRE INPUT QUEUE OVERFLOW

GQLVKS	Q-LV-KS	0a	INQUIRE LEVEL OF GKS
GQLN	Q-LN	0a	INQUIRE LINETYPE (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQLWSC	Q-LW-SC	0a	INQUIRE LINEWIDTH SCALE FACTOR (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQEGDP	Q-E-G-D-P	0a	INQUIRE LIST element OF AVAILABLE GENERALIZED DRAWING PRIMITIVES
GQEWK	Q-E-WK	0a	INQUIRE LIST element OF AVAILABLE WORKSTATION TYPES
GQECI	Q-E-C-I	0a	INQUIRE LIST element OF COLOUR INDICES
GQEFAI	Q-E-F-A-I	1a	INQUIRE LIST element OF FILL AREA INDICES
GQENTN	Q-E-N-T-N	0a	INQUIRE LIST element OF NORMALIZATION TRANSFORMATION NUMBERS
GQEPAI	Q-E-PA-I	1a	INQUIRE LIST element OF PATTERN INDICES
GQEPLI	Q-E-PL-I	1a	INQUIRE LIST element OF POLYLINE INDICES
GQEPMI	Q-E-PM-I	1a	INQUIRE LIST element OF POLYMARKER INDICES
GQETXI	Q-E-TX-I	1a	INQUIRE LIST element OF TEXT INDICES
GQLCS	Q-LC-S	0b	INQUIRE LOCATOR DEVICE STATE
GQMKSC	Q-MK-SC	0a	INQUIRE MARKER SIZE SCALE FACTOR (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQMK	Q-MK	0a	INQUIRE MARKER TYPE (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQLWK	Q-L-WK	0a	INQUIRE MAXIMUM LENGTH OF WORKSTATION STATE TABLES
GQMNTN	Q-M-N-T-N	0a	INQUIRE MAXIMUM NORMALIZATION TRANSFORMATION NUMBER
GQSIM	Q-SIM	0c	INQUIRE MORE SIMULTANEOUS EVENTS
GQOPSG	Q-OP-SG	1a	INQUIRE NAME OF OPEN SEGMENT
GQNT	Q-N-T	0a	INQUIRE NORMALIZATION TRANSFORMATION
GQLI	Q-L-I	0b	INQUIRE NUMBER OF AVAILABLE LOGICAL INPUT DEVICES
GQSGP	Q-SG-P	1a	INQUIRE NUMBER OF SEGMENT PRIORITIES SUPPORTED
GQOPS	Q-OP-S	0a	INQUIRE OPERATING STATE VALUE
GQPAF	Q-PA-F	0a	INQUIRE PATTERN FACILITIES
GQPARF	Q-PA-RF	0a	INQUIRE PATTERN REFERENCE POINT (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPAR	Q-PA-R	1a	INQUIRE PATTERN REPRESENTATION
GQPA	Q-PA	0a	INQUIRE PATTERN SIZE (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPKS	Q-PK-S	1b	INQUIRE PICK DEVICE STATE
GQPKID	Q-PK-ID	1b	INQUIRE CURRENT PICK IDENTIFIER VALUE
GQPX	Q-PX	0a	INQUIRE PIXEL
GQPXA	Q-PX-A	0a	INQUIRE PIXEL ARRAY
GQPXAD	Q-PX-A-D	0a	INQUIRE PIXEL ARRAY DIMENSIONS
GQPLCI	Q-PL-C-I	0a	INQUIRE POLYLINE COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQPLF	Q-PL-F	0a	INQUIRE POLYLINE FACILITIES
GQPLI	Q-PL-I	0a	INQUIRE POLYLINE INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPLR	Q-PL-R	1a	INQUIRE POLYLINE REPRESENTATION
GQPMCI	Q-PM-C-I	0a	INQUIRE POLYMARKER COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQPMF	Q-PM-F	0a	INQUIRE POLYMARKER FACILITIES
GQPMI	Q-PM-I	0a	INQUIRE POLYMARKER INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPMR	Q-PM-R	1a	INQUIRE POLYMARKER REPRESENTATION
GQPCR	Q-P-C-R	0a	INQUIRE PREDEFINED COLOUR REPRESENTATION
GQPFAR	Q-P-F-A-R	0a	INQUIRE PREDEFINED FILL AREA REPRESENTATION
GQPPAR	Q-P-PA-R	0a	INQUIRE PREDEFINED PATTERN REPRESENTATION
GQPPLR	Q-P-PL-R	0a	INQUIRE PREDEFINED POLYLINE REPRESENTATION
GQPPMR	Q-P-PM-R	0a	INQUIRE PREDEFINED POLYMARKER REPRESENTATION
GQPTXR	Q-P-TX-R	0a	INQUIRE PREDEFINED TEXT REPRESENTATION
GQSGA	Q-SG-A	1a	INQUIRE SEGMENT ATTRIBUTES
GQACWK	Q-AC-WK	1a	INQUIRE SET member OF ACTIVE WORKSTATIONS
GQASWK	Q-AS-WK	1a	INQUIRE SET member OF ASSOCIATED WORKSTATIONS
GQOPWK	Q-OP-WK	0a	INQUIRE SET member OF OPEN WORKSTATIONS
GQSGUS	Q-SG-US	1a	INQUIRE SET member OF SEGMENT NAMES IN USE
GQSGWK	Q-SG-WK	1a	INQUIRE SET member OF SEGMENT NAMES ON WORKSTATION
GQSTS	Q-ST-S	0b	INQUIRE STRING DEVICE STATE
GQSKS	Q-SK-S	0b	INQUIRE STROKE DEVICE STATE

GQTXAL	Q-TX-AL	0a	INQUIRE TEXT ALIGNMENT (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQTXCI	Q-TX-C-I	0a	INQUIRE TEXT COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQTXX	Q-TX-X	0a	INQUIRE TEXT EXTENT
GQTXXS	Q-TX-X-S	0a	INQUIRE TEXT EXTENT (FORTRAN 77 SUBSET)
GQTXF	Q-TX-F	0a	INQUIRE TEXT FACILITIES
GQTXFP	Q-TX-F-P	0a	INQUIRE TEXT FONT AND PRECISION (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQTXI	Q-TX-I	0a	INQUIRE TEXT INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQTXP	Q-TX-P	0a	INQUIRE TEXT PATH (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQTXR	Q-TX-R	1a	INQUIRE TEXT REPRESENTATION
GQVLS	Q-VL-S	0b	INQUIRE VALUATOR DEVICE STATE
GQWKCA	Q-WK-CA	0a	INQUIRE WORKSTATION CATEGORY
GQWKCL	Q-WK-CL	0a	INQUIRE WORKSTATION CLASSIFICATION
GQWKC	Q-WK-C	0a	INQUIRE WORKSTATION CONNECTION AND TYPE
GQWKDU	Q-WK-D-U	0a	INQUIRE WORKSTATION DEFERRAL AND UPDATE STATES
GQWKM	Q-WK-M	1a	INQUIRE WORKSTATION MAXIMUM NUMBERS
GQWKS	Q-WK-S	0a	INQUIRE WORKSTATION STATE
GQWKT	Q-WK-T	0a	INQUIRE WORKSTATION TRANSFORMATION
GINSG	IN-SG	2a	INSERT SEGMENT
GIITM	I-ITM	0a	INTERPRET ITEM
GMSG	MSG	1a	MESSAGE
GMSGS	MSG-S	1a	MESSAGE (FORTRAN 77 SUBSET)
GOPKS	OP-KS	0a	OPEN GKS
GOPWK	OP-WK	0a	OPEN WORKSTATION
GPREC	P-REC	0a	PACK DATA RECORD
GPL	PL	0a	POLYLINE
GPM	PM	0a	POLYMARKER
GRDITM	RD-ITM	0a	READ ITEM FROM GKSM
GRSGWK	R-SG-WK	1a	REDRAW ALL SEGMENTS ON WORKSTATION
GRENSG	REN-SG	1a	RENAME SEGMENT
GRQCH	RQ-CH	0b	REQUEST CHOICE
GRQLC	RQ-LC	0b	REQUEST LOCATOR
GRQPK	RQ-PK	1b	REQUEST PICK
GRQST	RQ-ST	0b	REQUEST STRING
GRQSK	RQ-SK	0b	REQUEST STROKE
GRQVL	RQ-VL	0b	REQUEST VALUATOR
GSMCH	SM-CH	0c	SAMPLE CHOICE
GSMLC	SM-LC	0c	SAMPLE LOCATOR
GSMPK	SM-PK	1c	SAMPLE PICK
GSMST	SM-ST	0c	SAMPLE STRING
GSMSK	SM-SK	0c	SAMPLE STROKE
GSMVL	SM-VL	0c	SAMPLE VALUATOR
GSELNT	SEL-N-T	0a	SELECT NORMALIZATION TRANSFORMATION
GSASF	S-A-S-F	0a	SET ASPECT SOURCE FLAGS
GSCHXP	S-CH-XP	0a	SET CHARACTER EXPANSION FACTOR
GSCHH	S-CH-H	0a	SET CHARACTER HEIGHT
GSCHSP	S-CH-SP	0a	SET CHARACTER SPACING
GSCHUP	S-CH-UP	0a	SET CHARACTER UP VECTOR
GSCHM	S-CH-M	0b	SET CHOICE MODE
GSCLIP	S-CLIP	0a	SET CLIPPING INDICATOR
GSCR	S-C-R	0a	SET COLOUR REPRESENTATION
GSDS	S-D-S	1a	SET DEFERRAL STATE
GSDTEC	S-DTEC	1b	SET DETECTABILITY
GSFACI	S-F-A-C-I	0a	SET FILL AREA COLOUR INDEX
GSFAI	S-F-A-I	0a	SET FILL AREA INDEX
GSFAIS	S-F-A-I-S	0a	SET FILL AREA INTERIOR STYLE
GSFAR	S-F-A-R	1a	SET FILL AREA REPRESENTATION
GSFASI	S-F-A-S-I	0a	SET FILL AREA STYLE INDEX
GSHLIT	S-HLIT	1a	SET HIGHLIGHTING
GSLN	S-LN	0a	SET LINETYPE
GSLWSC	S-LW-SC	0a	SET LINEWIDTH SCALE FACTOR
GSLCM	S-LC-M	0b	SET LOCATOR MODE
GSMKSC	S-MK-SC	0a	SET MARKER SIZE SCALE FACTOR
GSMK	S-MK	0a	SET MARKER TYPE

GSPARF	S-PA-RF	0a	SET PATTERN REFERENCE POINT
GSPAR	S-PA-R	1a	SET PATTERN REPRESENTATION
GSPA	S-PA	0a	SET PATTERN SIZE
GSPKID	S-PK-ID	1b	SET PICK IDENTIFIER
GSPKM	S-PK-M	1b	SET PICK MODE
GSPLCI	S-PL-C-I	0a	SET POLYLINE COLOUR INDEX
GSPLI	S-PL-I	0a	SET POLYLINE INDEX
GSPLR	S-PL-R	1a	SET POLYLINE REPRESENTATION
GSPMCI	S-PM-C-I	0a	SET POLYMARKER COLOUR INDEX
GSPMI	S-PM-I	0a	SET POLYMARKER INDEX
GSPMR	S-PM-R	1a	SET POLYMARKER REPRESENTATION
GSSGP	S-SG-P	1a	SET SEGMENT PRIORITY
GSSGT	S-SG-T	1a	SET SEGMENT TRANSFORMATION
GSSTM	S-ST-M	0b	SET STRING MODE
GSSKM	S-SK-M	0b	SET STROKE MODE
GSTXAL	S-TX-AL	0a	SET TEXT ALIGNMENT
GSTXCI	S-TX-C-I	0a	SET TEXT COLOUR INDEX
GSTXFP	S-TX-F-P	0a	SET TEXT FONT AND PRECISION
GSTXI	S-TX-I	0a	SET TEXT INDEX
GSTXP	S-TX-P	0a	SET TEXT PATH
GSTXR	S-TX-R	1a	SET TEXT REPRESENTATION
GSVLM	S-VL-M	0b	SET VALUATOR MODE
GSVP	S-VP	0a	SET VIEWPORT
GSVPIP	S-VP-I-P	0b	SET VIEWPORT INPUT PRIORITY
GSVIS	S-VIS	1a	SET VISIBILITY
GSWN	S-WN	0a	SET WINDOW
GSWKVP	S-WK-VP	0a	SET WORKSTATION VIEWPORT
GSWKWN	S-WK-WN	0a	SET WORKSTATION WINDOW
GTX	TX	0a	TEXT
GTXS	TX-S	0a	TEXT (FORTRAN 77 SUBSET)
GUREC	U-REC	0a	UNPACK DATA RECORD
GUWK	U-WK	0a	UPDATE WORKSTATION
GWITM	W-ITM	0a	WRITE ITEM TO GKSM

7.3 List ordered alphabetically by bound name within level

GACWK	AC-WK	0a	ACTIVATE WORKSTATION
GCA	C-A	0a	CELL ARRAY
GCLKS	CL-KS	0a	CLOSE GKS
GCLRWK	CLR-WK	0a	CLEAR WORKSTATION
GCLWK	CL-WK	0a	CLOSE WORKSTATION
GDAWK	DA-WK	0a	DEACTIVATE WORKSTATION
GECLKS	E-CL-KS	0a	EMERGENCY CLOSE GKS
GERHND	ER-HND	0a	ERROR HANDLING
GERLOG	ER-LOG	0a	ERROR LOGGING
GESC	ESC	0a	ESCAPE
GFA	F-A	0a	FILL AREA
GGDP	G-D-P	0a	GENERALIZED DRAWING PRIMITIVE
GGTITM	GT-ITM	0a	GET ITEM TYPE FROM GKSM
GIITM	I-ITM	0a	INTERPRET ITEM
GOPKS	OP-KS	0a	OPEN GKS
GOPWK	OP-WK	0a	OPEN WORKSTATION
GPL	PL	0a	POLYLINE
GPM	PM	0a	POLYMARKER
GPREC	P-REC	0a	PACK DATA RECORD
GQASF	Q-A-S-F	0a	INQUIRE ASPECT SOURCE FLAGS (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQCF	Q-C-F	0a	INQUIRE COLOUR FACILITIES
GQCHB	Q-CH-B	0a	INQUIRE CHARACTER BASE VECTOR (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHH	Q-CH-H	0a	INQUIRE CHARACTER HEIGHT (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHSP	Q-CH-SP	0a	INQUIRE CHARACTER SPACING (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQCHUP	Q-CH-UP	0a	INQUIRE CHARACTER UP VECTOR (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHW	Q-CH-W	0a	INQUIRE CHARACTER WIDTH (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQCHXP	Q-CH-XP	0a	INQUIRE CHARACTER EXPANSION FACTOR (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQCLIP	Q-CLIP	0a	INQUIRE CLIPPING
GQCNTN	Q-C-N-T-N	0a	INQUIRE CURRENT NORMALIZATION TRANSFORMATION NUMBER
GQCR	Q-C-R	0a	INQUIRE COLOUR REPRESENTATION
GQDSP	Q-D-SP	0a	INQUIRE DISPLAY SPACE SIZE
GQECI	Q-E-C-I	0a	INQUIRE LIST element OF COLOUR INDICES
GQEGDP	Q-E-G-D-P	0a	INQUIRE LIST element OF AVAILABLE GENERALIZED DRAWING PRIMITIVES
GQENTN	Q-E-N-T-N	0a	INQUIRE LIST element OF NORMALIZATION TRANSFORMATION NUMBERS
GQEWK	Q-E-WK	0a	INQUIRE LIST element OF AVAILABLE WORKSTATION TYPES
GQFACI	Q-F-A-C-I	0a	INQUIRE FILL AREA COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQFAF	Q-F-A-F	0a	INQUIRE FILL AREA FACILITIES
GQFAI	Q-F-A-I	0a	INQUIRE FILL AREA INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQFAIS	Q-F-A-I-S	0a	INQUIRE AREA INTERIOR STYLE (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQFASI	Q-F-A-S-I	0a	INQUIRE FILL AREA STYLE INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQGDP	Q-G-D-P	0a	INQUIRE GENERALIZED DRAWING PRIMITIVE
GQLN	Q-LN	0a	INQUIRE LINETYPE (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQLVKS	Q-LV-KS	0a	INQUIRE LEVEL OF GKS
GQLWK	Q-L-WK	0a	INQUIRE MAXIMUM LENGTH OF WORKSTATION STATE TABLES
GQLWSC	Q-LW-SC	0a	INQUIRE LINEWIDTH SCALE FACTOR (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQMK	Q-MK	0a	INQUIRE MARKER TYPE (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)

GQMKSC	Q-MK-SC	0a	INQUIRE MARKER SIZE SCALE FACTOR (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQMNTN	Q-M-N-T-N	0a	INQUIRE MAXIMUM NORMALIZATION TRANSFORMATION NUMBER
GQNT	Q-N-T	0a	INQUIRE NORMALIZATION TRANSFORMATION
GQOPS	Q-OP-S	0a	INQUIRE OPERATING STATE VALUE
GQOPWK	Q-OP-WK	0a	INQUIRE SET member OF OPEN WORKSTATIONS
GQPA	Q-PA	0a	INQUIRE PATTERN SIZE (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPAF	Q-PA-F	0a	INQUIRE PATTERN FACILITIES
GQPARF	Q-PA-RF	0a	INQUIRE PATTERN REFERENCE POINT (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPCR	Q-P-C-R	0a	INQUIRE PREDEFINED COLOUR REPRESENTATION
GQPFAR	Q-P-F-A-R	0a	INQUIRE PREDEFINED FILL AREA REPRESENTATION
GQPLCI	Q-PL-C-I	0a	INQUIRE POLYLINE COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQPLF	Q-PL-F	0a	INQUIRE POLYLINE FACILITIES
GQPLI	Q-PL-I	0a	INQUIRE POLYLINE INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPMCI	Q-PM-C-I	0a	INQUIRE POLYMARKER COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQPMF	Q-PM-F	0a	INQUIRE POLYMARKER FACILITIES
GQPMI	Q-PM-I	0a	INQUIRE POLYMARKER INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQPPAR	Q-P-PA-R	0a	INQUIRE PREDEFINED PATTERN REPRESENTATION
GQPPLR	Q-P-PL-R	0a	INQUIRE PREDEFINED POLYLINE REPRESENTATION
GQPPMR	Q-P-PM-R	0a	INQUIRE PREDEFINED POLYMARKER REPRESENTATION
GQPTXR	Q-P-TX-R	0a	INQUIRE PREDEFINED TEXT REPRESENTATION
GQPX	Q-PX	0a	INQUIRE PIXEL
GQPXA	Q-PX-A	0a	INQUIRE PIXEL ARRAY
GQPXAD	Q-PX-A-D	0a	INQUIRE PIXEL ARRAY DIMENSIONS
GQTXAL	Q-TX-AL	0a	INQUIRE TEXT ALIGNMENT (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQTXCI	Q-TX-C-I	0a	INQUIRE TEXT COLOUR INDEX (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQTXF	Q-TX-F	0a	INQUIRE TEXT FACILITIES
GQTXFP	Q-TX-F-P	0a	INQUIRE TEXT FONT AND PRECISION (INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
GQTXI	Q-TX-I	0a	INQUIRE TEXT INDEX (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQTXP	Q-TX-P	0a	INQUIRE TEXT PATH (INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
GQTXX	Q-TX-X	0a	INQUIRE TEXT EXTENT
GQTXXS	Q-TX-X-S	0a	INQUIRE TEXT EXTENT (FORTRAN 77 SUBSET)
GQWKC	Q-WK-C	0a	INQUIRE WORKSTATION CONNECTION AND TYPE
GQWKCA	Q-WK-CA	0a	INQUIRE WORKSTATION CATEGORY
GQWKCL	Q-WK-CL	0a	INQUIRE WORKSTATION CLASSIFICATION
GQWKDU	Q-WK-D-U	0a	INQUIRE WORKSTATION DEFERRAL AND UPDATE STATES
GQWKS	Q-WK-S	0a	INQUIRE WORKSTATION STATE
GQWKT	Q-WK-T	0a	INQUIRE WORKSTATION TRANSFORMATION
GRDITM	RD-ITM	0a	READ ITEM FROM GKSM
GSASF	S-A-S-F	0a	SET ASPECT SOURCE FLAGS
GSCHH	S-CH-H	0a	SET CHARACTER HEIGHT
GSCHSP	S-CH-SP	0a	SET CHARACTER SPACING
GSCHUP	S-CH-UP	0a	SET CHARACTER UP VECTOR
GSCHXP	S-CH-XP	0a	SET CHARACTER EXPANSION FACTOR
GSCLIP	S-CLIP	0a	SET CLIPPING INDICATOR
GSCR	S-C-R	0a	SET COLOUR REPRESENTATION
GSELNT	SEL-N-T	0a	SELECT NORMALIZATION TRANSFORMATION
GSFACI	S-F-A-C-I	0a	SET FILL AREA COLOUR INDEX
GSFAI	S-F-A-I	0a	SET FILL AREA INDEX
GSFAIS	S-F-A-I-S	0a	SET FILL AREA INTERIOR STYLE
GSFASI	S-F-A-S-I	0a	SET FILL AREA STYLE INDEX
GSLN	S-LN	0a	SET LINETYPE
GSLWSC	S-LW-SC	0a	SET LINEWIDTH SCALE FACTOR
GSMK	S-MK	0a	SET MARKER TYPE
GSMKSC	S-MK-SC	0a	SET MARKER SIZE SCALE FACTOR
GSPA	S-PA	0a	SET PATTERN SIZE

GSPARF	S-PA-RF	0a	SET PATTERN REFERENCE POINT
GSPLCI	S-PL-C-I	0a	SET POLYLINE COLOUR INDEX
GSPLI	S-PL-I	0a	SET POLYLINE INDEX
GSPMCI	S-PM-C-I	0a	SET POLYMARKER COLOUR INDEX
GSPMI	S-PM-I	0a	SET POLYMARKER INDEX
GSTXAL	S-TX-AL	0a	SET TEXT ALIGNMENT
GSTXCI	S-TX-C-I	0a	SET TEXT COLOUR INDEX
GSTXFP	S-TX-F-P	0a	SET TEXT FONT AND PRECISION
GSTXI	S-TX-I	0a	SET TEXT INDEX
GSTXP	S-TX-P	0a	SET TEXT PATH
GSVP	S-VP	0a	SET VIEWPORT
GSWKVP	S-WK-VP	0a	SET WORKSTATION VIEWPORT
GSWKWN	S-WK-WN	0a	SET WORKSTATION WINDOW
GSWN	S-WN	0a	SET WINDOW
GTX	TX	0a	TEXT
GTXS	TX-S	0a	TEXT (FORTRAN 77 SUBSET)
GUREC	U-REC	0a	UNPACK DATA RECORD
GUWK	U-WK	0a	UPDATE WORKSTATION
GWITM	W-ITM	0a	WRITE ITEM TO GKSM
GINCH	IN-CH	0b	INITIALISE CHOICE
GINLC	IN-LC	0b	INITIALISE LOCATOR
GINSK	IN-SK	0b	INITIALISE STROKE
GINST	IN-ST	0b	INITIALISE STRING
GINVL	IN-VL	0b	INITIALISE VALUATOR
GQCHS	Q-CH-S	0b	INQUIRE CHOICE DEVICE STATE
GQDCH	Q-D-CH	0b	INQUIRE DEFAULT CHOICE DEVICE DATA
GQDLC	Q-D-LC	0b	INQUIRE DEFAULT LOCATOR DEVICE DATA
GQDSK	Q-D-SK	0b	INQUIRE DEFAULT STROKE DEVICE DATA
GQDST	Q-D-ST	0b	INQUIRE DEFAULT STRING DEVICE DATA
GQDVL	Q-D-VL	0b	INQUIRE DEFAULT VALUATOR DEVICE DATA
GQLCS	Q-LC-S	0b	INQUIRE LOCATOR DEVICE STATE
GQLI	Q-L-I	0b	INQUIRE NUMBER OF AVAILABLE LOGICAL INPUT DEVICES
GQSKS	Q-SK-S	0b	INQUIRE STROKE DEVICE STATE
GQSTS	Q-ST-S	0b	INQUIRE STRING DEVICE STATE
GQVLS	Q-VL-S	0b	INQUIRE VALUATOR DEVICE STATE
GRQCH	RQ-CH	0b	REQUEST CHOICE
GRQLC	RQ-LC	0b	REQUEST LOCATOR
GRQSK	RQ-SK	0b	REQUEST STROKE
GRQST	RQ-ST	0b	REQUEST STRING
GRQVL	RQ-VL	0b	REQUEST VALUATOR
GSCHM	S-CH-M	0b	SET CHOICE MODE
GSLCM	S-LC-M	0b	SET LOCATOR MODE
GSSKM	S-SK-M	0b	SET STROKE MODE
GSSTM	S-ST-M	0b	SET STRING MODE
GSVLM	S-VL-M	0b	SET VALUATOR MODE
GSVPIP	S-VP-I-P	0b	SET VIEWPORT INPUT PRIORITY
GFLUSH	FLUSH	0c	FLUSH DEVICE EVENTS
GGTCH	GT-CH	0c	GET CHOICE
GGTLC	GT-LC	0c	GET LOCATOR
GGTSK	GT-SK	0c	GET STROKE
GGTST	GT-ST	0c	GET STRING
GGTVL	GT-VL	0c	GET VALUATOR
GQIQOV	Q-IQ-OV	0c	INQUIRE INPUT QUEUE OVERFLOW
GQSIM	Q-SIM	0c	INQUIRE MORE SIMULTANEOUS EVENTS
GSMCH	SM-CH	0c	SAMPLE CHOICE
GSMLC	SM-LC	0c	SAMPLE LOCATOR
GSMSK	SM-SK	0c	SAMPLE STROKE
GSMST	SM-ST	0c	SAMPLE STRING
GSMVL	SM-VL	0c	SAMPLE VALUATOR
GWAIT	WAIT	0c	AWAIT EVENT
GACTM	AC-T-M	1a	ACCUMULATE TRANSFORMATION MATRIX
GCLSG	CL-SG	1a	CLOSE SEGMENT
GCRSG	CR-SG	1a	CREATE SEGMENT
GDSG	D-SG	1a	DELETE SEGMENT
GDSGWK	D-SG-WK	1a	DELETE SEGMENT FROM WORKSTATION
GEVTM	EV-T-M	1a	EVALUATE TRANSFORMATION MATRIX
GMSG	MSG	1a	MESSAGE
GMSGS	MSG-S	1a	MESSAGE (FORTRAN 77 SUBSET)

GQACWK	Q-AC-WK	1a	INQUIRE SET member OF ACTIVE WORKSTATIONS
GQASWK	Q-AS-WK	1a	INQUIRE SET member OF ASSOCIATED WORKSTATIONS
GQDDS	Q-D-D-S	1a	INQUIRE DEFAULT DEFERRAL STATE VALUES
GQDSGA	Q-D-SG-A	1a	INQUIRE DYNAMIC MODIFICATION OF SEGMENT ATTRIBUTES
GQDWKA	Q-D-WK-A	1a	INQUIRE DYNAMIC MODIFICATION OF WORKSTATION ATTRIBUTES
GQEFAI	Q-E-F-A-I	1a	INQUIRE LIST element OF FILL AREA INDICES
GQEPAI	Q-E-PA-I	1a	INQUIRE LIST element OF PATTERN INDICES
GQEPLI	Q-E-PL-I	1a	INQUIRE LIST element OF POLYLINE INDICES
GQEPMI	Q-E-PM-I	1a	INQUIRE LIST element OF POLYMARKER INDICES
GQETXI	Q-E-TX-I	1a	INQUIRE LIST element OF TEXT INDICES
GQFAR	Q-F-A-R	1a	INQUIRE FILL AREA REPRESENTATION
GQOPSG	Q-OP-SG	1a	INQUIRE NAME OF OPEN SEGMENT
GQPAR	Q-PA-R	1a	INQUIRE PATTERN REPRESENTATION
GQPLR	Q-PL-R	1a	INQUIRE POLYLINE REPRESENTATION
GQPMR	Q-PM-R	1a	INQUIRE POLYMARKER REPRESENTATION
GQSGA	Q-SG-A	1a	INQUIRE SEGMENT ATTRIBUTES
GQSGP	Q-SG-P	1a	INQUIRE NUMBER OF SEGMENT PRIORITIES SUPPORTED
GQSGUS	Q-SG-US	1a	INQUIRE SET member OF SEGMENT NAMES IN USE
GQSGWK	Q-SG-WK	1a	INQUIRE SET member OF SEGMENT NAMES ON WORKSTATION
GQTXR	Q-TX-R	1a	INQUIRE TEXT REPRESENTATION
GQWKM	Q-WK-M	1a	INQUIRE WORKSTATION MAXIMUM NUMBERS
GRENSG	REN-SG	1a	RENAME SEGMENT
GRSGWK	R-SG-WK	1a	REDRAW ALL SEGMENTS ON WORKSTATION
GSDS	S-D-S	1a	SET DEFERRAL STATE
GSFAR	S-F-A-R	1a	SET FILL AREA REPRESENTATION
GSHLIT	S-HLIT	1a	SET HIGHLIGHTING
GSPAR	S-PA-R	1a	SET PATTERN REPRESENTATION
GSPLR	S-PL-R	1a	SET POLYLINE REPRESENTATION
GSPMR	S-PM-R	1a	SET POLYMARKER REPRESENTATION
GSSGP	S-SG-P	1a	SET SEGMENT PRIORITY
GSSGT	S-SG-T	1a	SET SEGMENT TRANSFORMATION
GSTXR	S-TX-R	1a	SET TEXT REPRESENTATION
GSVIS	S-VIS	1a	SET VISIBILITY
GINPK	IN-PK	1b	INITIALISE PICK
GQDPK	Q-D-PK	1b	INQUIRE DEFAULT PICK DEVICE DATA
GQPKID	Q-PK-ID	1b	INQUIRE CURRENT PICK IDENTIFIER VALUE
GQPKS	Q-PK-S	1b	INQUIRE PICK DEVICE STATE
GRQPK	RQ-PK	1b	REQUEST PICK
GSDTEC	S-DTEC	1b	SET DETECTABILITY
GSPKID	S-PK-ID	1b	SET PICK IDENTIFIER
GSPKM	S-PK-M	1b	SET PICK MODE
GGTPK	GT-PK	1c	GET PICK
GSMPK	SM-PK	1c	SAMPLE PICK
GASGWK	A-SG-WK	2a	ASSOCIATE SEGMENT WITH WORKSTATION
GCSGWK	C-SG-WK	2a	COPY SEGMENT TO WORKSTATION
GINSG	IN-SG	2a	INSERT SEGMENT

8 GKS errors specific to the FORTRAN binding

Certain features of the FORTRAN language make additional errors (beyond the ones described in ISO 7942) possible. Specifically, these new errors are defined:

2000 Enumeration type out of range -- the INTEGER passed as a GKS enumerated type is not within the range of valid values.

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

2002 List element or set member 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 element or set member in an inquiry routine.

2003 Invalid data record -- the data record cannot be decoded, or there was a problem encountered when the data record was created, making the result invalid.

9 The GKS function interface

9.1 General principles

For each GKS function the corresponding FORTRAN SUBROUTINE declaration is given. The name of the GKS 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 and ESCAPE, subroutines GGDP and GESC are defined. In this binding, the GDP and ESCAPE identifiers are bound to integers. Each GDP with an identifier less than 1000 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 GDpqrs, 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 GGDP as follows: N, PXA, PYA are required; PRIMID is absent; the data record is specified by parameters appropriate to the particular GDP identifier. Similarly each ESCAPE with an identifier less than 1000 in the ISO International Register of Graphics Items and that is available in the implementation may in addition be accessed by a subroutine of the form GEpqrs, where pqrs represents the ESCAPE identifier. The parameters are derived from those of GESC as follows: FCTID is absent and the input and output data records are specified by parameters appropriate to the specific ESCAPE 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 GGDP or GESC is used, are defined in the ISO International Register of Graphical Items. For both GDP and ESCAPE, it is possible to define each separate subroutine using GGDP and GESC.

Any unregistered GDP and ESCAPE functions that the implementation provides are accessible by the general subroutines GGDP and GESC with negative identifiers. The implementation may also allow access by subroutines named GUabc (for GDP) and GUEabc (for ESCAPE) where abc is the absolute value of the negative identifier. Parameter lists for the GUabc and GUEabc subroutines are implementation dependent.

9.2 Control functions

OPEN GKS L0a

SUBROUTINE GOPKS (ERRFIL,BUFA)

Input Parameters:

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

CLOSE GKS L0a

SUBROUTINE GCLKS

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 Bureau of Standards (Institute of Computer Sciences and Technology), A-266 Technology Building, Gaithersburg, MD 20899, USA to act as registration authority.

OPEN WORKSTATION L0a

SUBROUTINE GOPWK (WKID,CONID,WTYPE)

Input Parameters:

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

CLOSE WORKSTATION L0a

SUBROUTINE GCLWK (WKID)

Input Parameters:

INTEGER WKID	workstation identifier

ACTIVATE WORKSTATION L0a

SUBROUTINE GACWK (WKID)

Input Parameters:

INTEGER WKID	workstation identifier

DEACTIVATE WORKSTATION L0a

SUBROUTINE GDAWK (WKID)

Input Parameters:

INTEGER WKID	workstation identifier

CLEAR WORKSTATION L0a

SUBROUTINE GCLRWK (WKID,COFL)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER COFL	control flag (GCONDI,GALWAY)

REDRAW ALL SEGMENTS ON WORKSTATION L1a

SUBROUTINE GRSGWK (WKID)

Input Parameters:

INTEGER WKID	workstation identifier

UPDATE WORKSTATION L0a

SUBROUTINE GUWK (WKID,REGFL)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER REGFL	update regeneration flag (GPOSTP,GPERFO)

SET DEFERRAL STATE L1a

SUBROUTINE GSDS (WKID,DEFMOD,REGMOD)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER DEFMOD	deferral mode (GASAP,GBNIG,GBNIL,GASTI)
INTEGER REGMOD	implicit regeneration mode (GSUPPD,GALLOW)

MESSAGE L1a
Full FORTRAN 77 version

SUBROUTINE GMSG (WKID,MESS)

Input Parameters:

INTEGER WKID	workstation identifier
CHARACTER*(*) MESS	message

MESSAGE L1a
FORTRAN 77 Subset version

SUBROUTINE GMSGS (WKID,LSTR,MESS)

Input Parameters:

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

ESCAPE L0a

SUBROUTINE GESC (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

9.3 Output functions

POLYLINE L0a

SUBROUTINE GPL (N,PXA,PYA)

Input Parameters:

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

POLYMARKER L0a

SUBROUTINE GPM (N,PXA,PYA)

Input Parameters:

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

TEXT L0a
Full FORTRAN 77 version

SUBROUTINE GTX (PX,PY,CHARS)

Input Parameters:

REAL PX, PY	text position in world coordinates
CHARACTER*(*) CHARS	string of characters

TEXT L0a

FORTRAN 77 Subset version

SUBROUTINE GTXS (PX,PY,LSTR,CHARS)

Input Parameters:

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

FILL AREA L0a

SUBROUTINE GFA (N,PXA,PYA)

Input Parameters:

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

CELL ARRAY L0a

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

Input Parameters:

REAL PX, PY, QX, QY	two points (P, Q) in world coordinates
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 L0a

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

Input Parameters:

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

9.4 Output attributes

9.4.1 Workstation independent primitive attributes

SET POLYLINE INDEX **L0a**

SUBROUTINE GSPLI (PLI)

Input Parameters:
INTEGER PLI — polyline index

SET LINETYPE **L0a**

SUBROUTINE GSLN (LTYPE)

Input Parameters:
INTEGER LTYPE — linetype

SET LINEWIDTH SCALE FACTOR **L0a**

SUBROUTINE GSLWSC (LWIDTH)

Input Parameters:
REAL LWIDTH — linewidth scale factor

SET POLYLINE COLOUR INDEX **L0a**

SUBROUTINE GSPLCI (COLI)

Input Parameters:
INTEGER COLI — polyline colour index

SET POLYMARKER INDEX **L0a**

SUBROUTINE GSPMI (PMI)

Input Parameters:
INTEGER PMI — polymarker index

SET MARKER TYPE L0a

SUBROUTINE GSMK (MTYPE)

Input Parameters:
INTEGER MTYPE — marker type

SET MARKER SIZE SCALE FACTOR L0a

SUBROUTINE GSMKSC (MSZSF)

Input Parameters:
REAL MSZSF — marker size scale factor

SET POLYMARKER COLOUR INDEX L0a

SUBROUTINE GSPMCI (COLI)

Input Parameters:
INTEGER COLI — polymarker colour index

SET TEXT INDEX L0a

SUBROUTINE GSTXI (TXI)

Input Parameters:
INTEGER TXI — text index

SET TEXT FONT AND PRECISION L0a

SUBROUTINE GSTXFP (FONT,PREC)

Input Parameters:
INTEGER FONT — text font
INTEGER PREC — text precision (GSTRP,GCHARP,GSTRKP)

SET CHARACTER EXPANSION FACTOR L0a

SUBROUTINE GSCHXP (CHXP)

Input Parameters:
REAL CHXP — character expansion factor

SET CHARACTER SPACING L0a

SUBROUTINE GSCHSP (CHSP)

Input Parameters:

REAL CHSP	character spacing

SET TEXT COLOUR INDEX L0a

SUBROUTINE GSTXCI (COLI)

Input Parameters:

INTEGER COLI	text colour index

SET CHARACTER HEIGHT L0a

SUBROUTINE GSCHH (CHH)

Input Parameters:

REAL CHH	character height

SET CHARACTER UP VECTOR L0a

SUBROUTINE GSCHUP (CHUX,CHUY)

Input Parameters:

REAL CHUX, CHUY	character up vector (WC)

SET TEXT PATH L0a

SUBROUTINE GSTXP (TXP)

Input Parameters:

INTEGER TXP	text path (GRIGHT,GLEFT,GUP,GDOWN)

SET TEXT ALIGNMENT L0a

SUBROUTINE GSTXAL (TXALH,TXALV)

Input Parameters:

INTEGER TXALH	text alignment horizontal (GAHNOR,GALEFT,GACENT,GARITE)
INTEGER TXALV	text alignment vertical (GAVNOR,GATOP,GACAP,GAHALF, GABASE,GABOTT)

SET FILL AREA INDEX L0a

SUBROUTINE GSFAI (FAI)

Input Parameters:

INTEGER FAI	fill area index

SET FILL AREA INTERIOR STYLE L0a

SUBROUTINE GSFAIS (INTS)

Input Parameters:

INTEGER INTS	fill area interior style (GHOLLO,GSOLID,GPATTR,GHATCH)

SET FILL AREA STYLE INDEX L0a

SUBROUTINE GSFASI (STYLI)

Input Parameters:

INTEGER STYLI	fill area style index

SET FILL AREA COLOUR INDEX L0a

SUBROUTINE GSFACI (COLI)

Input Parameters:

INTEGER COLI	fill area colour index

SET PATTERN SIZE L0a

SUBROUTINE GSPA (SZX,SZY)

Input Parameters:

REAL SZX, SZY	pattern size

SET PATTERN REFERENCE POINT L0a

SUBROUTINE GSPARF (RFX,RFY)

Input Parameters:

REAL RFX, RFY	pattern reference point

SET ASPECT SOURCE FLAGS L0a

SUBROUTINE GSASF (LASF)

Input Parameters:

INTEGER LASF (13)	list of aspect source flags (GBUNDL,GINDIV)
	1 linetype ASF
	2 linewidth scale factor ASF
	3 polyline colour index ASF
	4 marker type ASF
	5 marker size scale factor ASF
	6 polymarker colour index ASF
	7 text font and precision ASF
	8 character expansion factor ASF
	9 character spacing ASF
	10 text colour index ASF
	11 fill area interior style ASF
	12 fill area style index ASF
	13 fill area colour index ASF

SET PICK IDENTIFIER L1b

SUBROUTINE GSPKID (PKID)

Input Parameters:

INTEGER PKID	pick identifier

9.4.2 Workstation attributes (representations)

SET POLYLINE REPRESENTATION L1a

SUBROUTINE GSPLR (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	colour index

SET POLYMARKER REPRESENTATION L1a

SUBROUTINE GSPMR (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	colour index

SET TEXT REPRESENTATION L1a

SUBROUTINE GSTXR (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 (GSTRP,GCHARP,GSTRKP)
REAL CHXP	character expansion factor
REAL CHSP	character spacing
INTEGER COLI	colour index

SET FILL AREA REPRESENTATION L1a

SUBROUTINE GSFAR (WKID,FAI,INTS,STYLI,COLI)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER FAI	fill area index
INTEGER INTS	interior style (GHOLLO,GSOLID,GPATTR,GHATCH)
INTEGER STYLI	style index
INTEGER COLI	colour index

SET PATTERN REPRESENTATION L1a

SUBROUTINE GSPAR (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 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 array

SET COLOUR REPRESENTATION L0a

SUBROUTINE GSCR (WKID,CI,CR,CG,CB)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER CI	colour index
REAL CR, CG, CB	colour intensities (red/green/blue)

9.5 Transformation functions

9.5.1 Normalization transformation

SET WINDOW L0a

SUBROUTINE GSWN (TNR,XMIN,XMAX,YMIN,YMAX)

Input Parameters:

INTEGER TNR	transformation number
REAL XMIN,XMAX,YMIN,YMAX	window limits in world coordinates

SET VIEWPORT L0a

SUBROUTINE GSVP (TNR,XMIN,XMAX,YMIN,YMAX)

Input Parameters:

INTEGER TNR	transformation number
REAL XMIN,XMAX,YMIN,YMAX	viewport limits in normalized device coordinates

SET VIEWPORT INPUT PRIORITY L0b

SUBROUTINE GSVPIP (TNR,RTNR,RELPRI)

Input Parameters:

INTEGER TNR	transformation number
INTEGER RTNR	reference transformation number
INTEGER RELPRI	relative priority (GHIGHR,GLOWER)

SELECT NORMALIZATION TRANSFORMATION L0a

SUBROUTINE GSELNT (TNR)

Input Parameters:

INTEGER TNR	transformation number

SET CLIPPING INDICATOR L0a

SUBROUTINE GSCLIP (CLSW)

Input Parameters:

INTEGER CLSW	clipping indicator (GNCLIP,GCLIP)

9.5.2 Workstation transformation

SET WORKSTATION WINDOW L0a

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

Input Parameters:

INTEGER WKID	workstation identifier
REAL XMIN,XMAX,YMIN,YMAX	workstation window limits in normalized device coordinates

SET WORKSTATION VIEWPORT L0a

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

Input Parameters:

INTEGER WKID	workstation identifier
REAL XMIN,XMAX,YMIN,YMAX	workstation viewport limits in device coordinates

9.6 Segment functions

9.6.1 Segment manipulation functions

CREATE SEGMENT L1a

SUBROUTINE GCRSG (SGNA)

Input Parameters:

INTEGER SGNA	segment name

CLOSE SEGMENT L1a

SUBROUTINE GCLSG

RENAME SEGMENT L1a

SUBROUTINE GRENSG (OLD,NEW)

Input Parameters:

INTEGER OLD	old segment name
INTEGER NEW	new segment name

DELETE SEGMENT L1a

SUBROUTINE GDSG (SGNA)

Input Parameters:

INTEGER SGNA	segment name

DELETE SEGMENT FROM WORKSTATION L1a

SUBROUTINE GDSGWK (WKID,SGNA)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER SGNA	segment name

ASSOCIATE SEGMENT WITH WORKSTATION L2a

SUBROUTINE GASGWK (WKID,SGNA)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER SGNA	segment name

COPY SEGMENT TO WORKSTATION L2a

SUBROUTINE GCSGWK (WKID,SGNA)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER SGNA	segment name

INSERT SEGMENT L2a

SUBROUTINE GINSG (SGNA,M)

Input Parameters:

INTEGER SGNA	segment name
REAL M(2,3)	transformation matrix (M(1,1) M(1,2) M(1,3)) (M(2,1) M(2,2) M(2,3))

9.6.2 Segment attributes

SET SEGMENT TRANSFORMATION L1a

SUBROUTINE GSSGT (SGNA,M)

Input Parameters:

INTEGER SGNA	segment name
REAL M(2,3)	transformation matrix (M(1,1) M(1,2) M(1,3)) (M(2,1) M(2,2) M(2,3))

SET VISIBILITY L1a

SUBROUTINE GSVIS (SGNA,VIS)

Input Parameters:

INTEGER SGNA	segment name
INTEGER VIS	visiblity (GINVIS,GVISI)

SET HIGHLIGHTING L1a

SUBROUTINE GSHLIT (SGNA,HIL)

Input Parameters:

INTEGER SGNA	segment name
INTEGER HIL	highlighting (GNORML,GHILIT)

SET SEGMENT PRIORITY L1a

SUBROUTINE GSSGP (SGNA,PRIOR)

Input Parameters:

INTEGER SGNA	segment name
REAL PRIOR	segment priority

SET DETECTABILITY L1b

SUBROUTINE GSDTEC (SGNA,DET)

Input Parameters:

INTEGER SGNA	segment name
INTEGER DET	detectability (GUNDET,GDETEC)

9.7 Input functions

9.7.1 Initialisation of input devices

INITIALISE LOCATOR L0b

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

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number
INTEGER ITNR	initial normalization transformation number
REAL IPX,IPY	initial locator position (WC)
INTEGER PET	prompt/echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area in device coordinates
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

INITIALISE STROKE L0b

SUBROUTINE GINSK (WKID,SKDNR,TNR,N,IPXA,IPYA,PET,XMIN,XMAX,
*YMIN,YMAX,BUFLEN,LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER SKDNR	stroke device number
INTEGER TNR	initial normalization transformation number
INTEGER N	number of points in initial stroke
REAL IPXA (*), IPYA (*)	points in initial stroke (WC) (the actual arguments are dimensioned by at least MAX(1,N))
INTEGER PET	prompt/echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area in device coordinates
INTEGER BUFLEN	input buffer size
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

INITIALISE VALUATOR L0b

SUBROUTINE GINVL (WKID,VLDNR,IVAL,PET,XMIN,XMAX,YMIN,YMAX,
*LOVAL,HIVAL,LDR,DATREC)

Input Parameters:

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

INITIALISE CHOICE L0b

SUBROUTINE GINCH (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 (GOK,GNCHOI)
INTEGER ICHNR	initial choice number
INTEGER PET	prompt/echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area in device coordinates
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

INITIALISE PICK L1b

SUBROUTINE GINPK (WKID,PKDNR,ISTAT,ISGNA,IPKID,PET,XMIN,XMAX,
*YMIN,YMAX,LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number
INTEGER ISTAT	initial status (GOK,GNPICK)
INTEGER ISGNA	initial segment name
INTEGER IPKID	initial pick identifier
INTEGER PET	prompt/echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area in device coordinates
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

INITIALISE STRING L0b
Full FORTRAN 77 version

SUBROUTINE GINST (WKID,STDNR,LSTR,ISTR,PET,XMIN,XMAX,YMIN,
*YMAX,BUFLEN,INIPOS,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/echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area in device coordinates
INTEGER BUFLEN	input buffer size
INTEGER INIPOS	initial cursor position
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

INITIALISE STRING L0b

FORTRAN 77 Subset version

```
SUBROUTINE GINST (WKID,STDNR,LSTR,ISTR,PET,XMIN,XMAX,YMIN,
*YMAX,BUFLEN,INIPOS,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/echo type
REAL XMIN,XMAX,YMIN,YMAX	echo area in device coordinates
INTEGER BUFLEN	buffer length of string
INTEGER INIPOS	initial cursor position
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

9.7.2 Setting mode of input devices

SET LOCATOR MODE L0b

```
SUBROUTINE GSLCM (WKID,LCDNR,MODE,ESW)
```

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number
INTEGER MODE	operating mode (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)

SET STROKE MODE L0b

```
SUBROUTINE GSSKM (WKID,SKDNR,MODE,ESW)
```

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER SKDNR	stroke device number
INTEGER MODE	operating mode (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)

SET VALUATOR MODE L0b

SUBROUTINE GSVLM (WKID,VLDNR,MODE,ESW)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER VLDNR	valuator device number
INTEGER MODE	operating mode (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)

SET CHOICE MODE L0b

SUBROUTINE GSCHM (WKID,CHDNR,MODE,ESW)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER CHDNR	choice device number
INTEGER MODE	operating mode (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)

SET PICK MODE L1b

SUBROUTINE GSPKM (WKID,PKDNR,MODE,ESW)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number
INTEGER MODE	operating mode (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)

SET STRING MODE L0b

SUBROUTINE GSSTM (WKID,STDNR,MODE,ESW)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER STDNR	string device number
INTEGER MODE	operating mode (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)

9.7.3 Request input functions

REQUEST LOCATOR L0b

SUBROUTINE GRQLC (WKID,LCDNR,STAT,TNR,PX,PY)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number
Output Parameters:	
INTEGER STAT	status (GNONE,GOK)
INTEGER TNR	normalization transformation number
REAL PX,PY	locator position

REQUEST STROKE L0b

SUBROUTINE GRQSK (WKID,SKDNR,N,STAT,TNR,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 (GNONE,GOK)
INTEGER TNR	normalization transformation number
INTEGER NP	number of points
REAL PXA (N), PYA (N)	points in stroke (WC)

REQUEST VALUATOR L0b

SUBROUTINE GRQVL (WKID,VLDNR,STAT,VAL)

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

REQUEST CHOICE L0b

SUBROUTINE GRQCH (WKID,CHDNR,STAT,CHNR)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER CHDNR	choice device number

Output Parameters:

INTEGER STAT	status (GNONE,GOK,GNCHOI)
INTEGER CHNR	choice number

REQUEST PICK L1b

SUBROUTINE GRQPK (WKID,PKDNR,STAT,SGNA,PKID)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number

Output Parameters:

INTEGER STAT	status (GNONE,GOK,GNPICK)
INTEGER SGNA	segment name
INTEGER PKID	pick identifier

REQUEST STRING L0b
Full FORTRAN 77 version

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

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER STDNR	string device number

Output Parameters:

INTEGER STAT	status (GNONE,GOK)
INTEGER LOSTR	number of characters returned
CHARACTER*(*) STR	character string

REQUEST STRING L0b
FORTRAN 77 Subset version

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

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER STDNR	string device number

Output Parameters:

INTEGER STAT	status (GNONE,GOK)
INTEGER LOSTR	number of characters returned
CHARACTER*80 STR	character string

9.7.4 Sample input functions

SAMPLE LOCATOR L0c

SUBROUTINE GSMLC (WKID,LCDNR,TNR,LPX,LPY)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number

Output Parameters:

INTEGER TNR	normalization transformation number
REAL LPX,LPY	locator position in WC

SAMPLE STROKE L0c

SUBROUTINE GSMSK (WKID,SKDNR,N,TNR,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 TNR	normalization transformation number
INTEGER NP	number of points
REAL PXA (N), PYA (N)	points in stroke (WC)

SAMPLE VALUATOR L0c

SUBROUTINE GSMVL (WKID,VLDNR,VAL)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER VLDNR	valuator device number

Output Parameters:

REAL VAL	value

SAMPLE CHOICE L0c

SUBROUTINE GSMCH (WKID,CHDNR,STAT,CHNR)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER CHDNR	choice device number

Output Parameters:

INTEGER STAT	status (GOK,GNCHOI)
INTEGER CHNR	choice number

SAMPLE PICK L1c

SUBROUTINE GSMPK (WKID,PKDNR,STAT,SGNA,PKID)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number

Output Parameters:

INTEGER STAT	status (GOK,GNPICK)
INTEGER SGNA	segment name
INTEGER PKID	pick identifier

SAMPLE STRING L0c
Full FORTRAN 77 version

SUBROUTINE GSMST (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 L0c
FORTRAN 77 Subset version

SUBROUTINE GSMST (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

9.7.5 Event input functions

AWAIT EVENT L0c

SUBROUTINE GWAIT (TOUT,WKID,ICL,IDNR)

Input Parameters:

REAL TOUT	time out (seconds)

Output Parameters:

INTEGER WKID	workstation identifier
INTEGER ICL	input class (GNCLAS,GLOCAT,GSTROK, GVALUA,GCHOIC,GPICK,GSTRIN)
INTEGER IDNR	logical input device number

FLUSH DEVICE EVENTS L0c

SUBROUTINE GFLUSH (WKID,ICL,IDNR)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER ICL	input class (GLOCAT,GSTROK,GVALUA, GCHOIC,GPICK,GSTRIN)
INTEGER IDNR	logical input device number

GET LOCATOR L0c

SUBROUTINE GGTLC (TNR,LPX,LPY)

Output Parameters:

INTEGER TNR	normalization transformation number
REAL LPX,LPY	locator position in world coordinates

GET STROKE L0c

SUBROUTINE GGTSK (N,TNR,NP,PXA,PYA)

Input Parameters:

INTEGER N	dimension of arrays for stroke points

Output Parameters:

INTEGER TNR	normalization transformation number
INTEGER NP	number of points
REAL PXA (N), PYA (N)	points in stroke in world coordinates

GET VALUATOR L0c

SUBROUTINE GGTVL (VAL)

Output Parameters:

REAL VAL	value

GET CHOICE L0c

SUBROUTINE GGTCH (STAT,CHNR)

Output Parameters:

INTEGER STAT	status (GOK,GNCHOI)
INTEGER CHNR	choice number

GET PICK L1c

SUBROUTINE GGTPK (STAT,SGNA,PKID)

Output Parameters:

INTEGER STAT	status (GOK,GNPICK)
INTEGER SGNA	segment name
INTEGER PKID	pick identifier

GET STRING L0c
Full FORTRAN 77 version

SUBROUTINE GGTST (LOSTR,STR)

Output Parameters:

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

GET STRING L0c
FORTRAN 77 Subset version

SUBROUTINE GGTST (LOSTR,STR)

Output Parameters:

INTEGER LOSTR	number of characters returned
CHARACTER*80 STR	string

9.8 Metafile functions

WRITE ITEM TO GKSM L0a

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

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER TYPE	item type (a possible set of values (of this parameter is described in Annex B)
INTEGER IDRL	item data record length (number of characters in the data record array)
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

GET ITEM TYPE FROM GKSM L0a

SUBROUTINE GGTITM (WKID,TYPE,IDRL)

Input Parameters:

INTEGER WKID	workstation identifier

Output Parameters:

INTEGER TYPE	item type (a possible set of values (of this parameter is described in Annex B)
INTEGER IDRL	item data record length (this may be passed to GRDITM (MIDRL))

READ ITEM FROM GKSM L0a

SUBROUTINE GRDITM (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 =0, then skip the record; if < IDRL, the excess is lost; if = IDRL, a full record is read. (IDRL is returned by GGTITM.)
INTEGER MLDR	dimension of item data record

Output Parameters:

CHARACTER*80 DATREC(MLDR)	data record

INTERPRET ITEM L0a

SUBROUTINE GIITM (TYPE,IDRL,LDR,DATREC)

Input Parameters:

INTEGER TYPE	item type(a possible set of values (of this parameter is described in Annex B)
INTEGER IDRL	item data record length (number of characters in the data record array)
INTEGER LDR	dimension of data record array
CHARACTER*80 DATREC(LDR)	data record

9.9 Inquiry functions

9.9.1 Inquiry function for operating state value

INQUIRE OPERATING STATE VALUE L0a

SUBROUTINE GQOPS (OPSTA)

Output Parameters:

INTEGER OPSTA	operating state value (GGKCL,GGKOP,GWSOP,GWSAC,GSGOP)

9.9.2 Inquiry functions for GKS description table

INQUIRE LEVEL OF GKS L0a

SUBROUTINE GQLVKS (ERRIND,LEVEL)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER LEVEL	level of GKS (GL0A,GL0B,GL0C,GL1A,GL1B,GL1C,GL2A,GL2B,GL2C)

INQUIRE LIST element OF AVAILABLE WORKSTATION TYPES L0a

SUBROUTINE GQEWK (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 av. workstation types

INQUIRE WORKSTATION MAXIMUM NUMBERS L1a

SUBROUTINE GQWKM (ERRIND,MXOPWK,MXACWK,MXWKAS)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER MXOPWK	maximum number of simultaneously open workstations
INTEGER MXACWK	maximum number of simultaneously active workstaions
INTEGER MXWKAS	maximum number of workstations associated with segment

INQUIRE MAXIMUM NORMALIZATION TRANSFORMATION NUMBER L0a

SUBROUTINE GQMNTN (ERRIND,MAXTNR)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER MAXTNR	maximum normalization transformation number

9.9.3 Inquiry functions for GKS state list

INQUIRE SET member OF OPEN WORKSTATIONS L0a

SUBROUTINE GQOPWK (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 SET member OF ACTIVE WORKSTATIONS L1a

SUBROUTINE GQACWK (N,ERRIND,OL,WKID)

Input Parameters:

INTEGER N	set member requested

Output Parameters:

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

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE POLYLINE INDEX L0a

SUBROUTINE GQPLI (ERRIND,PLI)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER PLI	polyline index

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE POLYMARKER INDEX L0a

SUBROUTINE GQPMI (ERRIND,PMI)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER PMI	polymarker index

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE TEXT INDEX L0a

SUBROUTINE GQTXI (ERRIND,TXI)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER TXI	text index

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE CHARACTER HEIGHT L0a

SUBROUTINE GQCHH (ERRIND,CHH)

Output Parameters:

INTEGER ERRIND	error indicator
REAL CHH	character height

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE CHARACTER UP VECTOR L0a

SUBROUTINE GQCHUP (ERRIND,CHUX,CHUY)

Output Parameters:

INTEGER ERRIND	error indicator
REAL CHUX, CHUY	character up vector (WC)

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE CHARACTER WIDTH L0a

SUBROUTINE GQCHW (ERRIND,CHW)

Output Parameters:

INTEGER ERRIND	error indicator
REAL CHW	character width

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE CHARACTER BASE VECTOR L0a

SUBROUTINE GQCHB (ERRIND,CHBX,CHBY)

Output Parameters:

INTEGER ERRIND	error indicator
REAL CHBX,CHBY	character base vector

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE TEXT PATH L0a

SUBROUTINE GQTXP (ERRIND,TXP)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER TXP	text path (GRIGHT,GLEFT,GUP,GDOWN)

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE TEXT ALIGNMENT L0a

SUBROUTINE GQTXAL (ERRIND,TXALH,TXALV)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER TXALH	text alignment horizontal (GAHNOR,GALEFT,GACENT,GARITE)
INTEGER TXALV	text alignment vertical (GAVNOR,GATOP,GACAP,GAHALF, GABASE,GABOTT)

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE FILL AREA INDEX L0a

SUBROUTINE GQFAI (ERRIND,FAI)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER FAI	fill area index

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE PATTERN SIZE L0a

SUBROUTINE GQPA (ERRIND,PWX,PWY,PHX,PHY)

Output Parameters:

INTEGER ERRIND	error indicator
REAL PWX, PWY	pattern width vector
REAL PHX, PHY	pattern height vector

(INQUIRE CURRENT PRIMITIVE ATTRIBUTE VALUES)
INQUIRE PATTERN REFERENCE POINT L0a

SUBROUTINE GQPARF (ERRIND,RFX,RFY)

Output Parameters:

INTEGER ERRIND	error indicator
REAL RFX, RFY	pattern reference point

INQUIRE CURRENT PICK IDENTIFIER VALUE L1b

SUBROUTINE GQPKID (ERRIND,PKID)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER PKID	pick identifier

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE LINETYPE L0a

SUBROUTINE GQLN (ERRIND,LTYPE)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER LTYPE	linetype

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE LINEWIDTH SCALE FACTOR L0a

SUBROUTINE GQLWSC (ERRIND,LWIDTH)

Output Parameters:

INTEGER ERRIND	error indicator
REAL LWIDTH	linewidth scale factor

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE POLYLINE COLOUR INDEX L0a

SUBROUTINE GQPLCI (ERRIND,COLI)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER COLI	polyline colour index

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE MARKER TYPE L0a

SUBROUTINE GQMK (ERRIND,MTYPE)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER MTYPE	marker type

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE MARKER SIZE SCALE FACTOR L0a

SUBROUTINE GQMKSC (ERRIND,MSZSF)

Output Parameters:

INTEGER ERRIND	error indicator
REAL MSZSF	marker size scale factor

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE POLYMARKER COLOUR INDEX L0a

SUBROUTINE GQPMCI (ERRIND,COLI)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER COLI	polymarker colour index

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE TEXT FONT AND PRECISION L0a

SUBROUTINE GQTXFP (ERRIND,FONT,PREC)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER FONT	text font
INTEGER PREC	text precision (GSTRP,GCHARP,GSTRKP)

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE CHARACTER EXPANSION FACTOR L0a

SUBROUTINE GQCHXP (ERRIND,CHXP)

Output Parameters:

INTEGER ERRIND	error indicator
REAL CHXP	character expansion factor

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE CHARACTER SPACING L0a

SUBROUTINE GQCHSP (ERRIND,CHSP)

Output Parameters:

INTEGER ERRIND	error indicator
REAL CHSP	character spacing

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE TEXT COLOUR INDEX L0a

SUBROUTINE GQTXCI (ERRIND,COLI)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER COLI	text colour index

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE FILL AREA INTERIOR STYLE L0a

SUBROUTINE GQFAIS (ERRIND,INTS)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER INTS	fill area interior style (GHOLLO,GSOLID,GPATTR,GHATCH)

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE FILL AREA STYLE INDEX L0a

SUBROUTINE GQFASI (ERRIND,STYLI)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER STYLI	fill area style index

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE FILL AREA COLOUR INDEX L0a

SUBROUTINE GQFACI (ERRIND,COLI)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER COLI	fill area colour index

(INQUIRE CURRENT INDIVIDUAL ATTRIBUTE VALUES)
INQUIRE ASPECT SOURCE FLAGS L0a

SUBROUTINE GQASF (ERRIND,LASF)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER LASF (13)	list of aspect source flags (GBUNDL,GINDIV) 1 linetype ASF 2 linewidth scale factor ASF 3 polyline colour index ASF 4 marker type ASF 5 marker size scale factor ASF 6 polymarker colour index ASF 7 text font and precision ASF 8 character expansion factor ASF 9 character spacing ASF 10 text colour index ASF 11 fill area interior style ASF 12 fill area style index ASF 13 fill area colour index ASF

INQUIRE CURRENT NORMALIZATION TRANSFORMATION NUMBER L0a

SUBROUTINE GQCNTN (ERRIND,CTNR)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER CTNR	current transformation number

INQUIRE LIST element OF NORMALIZATION TRANSFORMATION NUMBERS L0a

SUBROUTINE GQENTN (N,ERRIND,OL,TNR)

Input Parameters:

INTEGER N	list element requested

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER OL	length of list
INTEGER TNR	Nth element of list of transformation numbers, ordered by decreasing viewport input priority

INQUIRE NORMALIZATION TRANSFORMATION — L0a

SUBROUTINE GQNT (NTNR,ERRIND,WINDOW,VIEWPT)

Input Parameters:

INTEGER NTNR	normalization transformation number

Output Parameters:

INTEGER ERRIND	error indicator
REAL WINDOW(4)	window limits in world coordinates WXMIN, WXMAX, WYMIN, WYMAX
REAL VIEWPT(4)	viewport limits in normalized device coordinates VXMIN, VXMAX, VYMIN, VYMAX

INQUIRE CLIPPING — L0a

SUBROUTINE GQCLIP (ERRIND,CLSW,CLRECT)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER CLSW	clipping indicator (GNCLIP,GCLIP)
REAL CLRECT(4)	clipping rectangle in normalized device coordinates CXMIN, CXMAX, CYMIN, CYMAX

INQUIRE NAME OF OPEN SEGMENT — L1a

SUBROUTINE GQOPSG (ERRIND,SGNA)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER SGNA	name of open segment

INQUIRE SET member OF SEGMENT NAMES IN USE — L1a

SUBROUTINE GQSGUS (N,ERRIND,OL,SGNA)

Input Parameters:

INTEGER N	set member requested

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER OL	number of segment names
INTEGER SGNA	Nth member of set of segment names in use

INQUIRE MORE SIMULTANEOUS EVENTS L0c

SUBROUTINE GQSIM (ERRIND,FLAG)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER FLAG	more simultaneous events (GNMORE,GMORE)

9.9.4 Inquiry functions for workstation state list

INQUIRE WORKSTATION CONNECTION AND TYPE L0a

SUBROUTINE GQWKC (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 WORKSTATION STATE L0a

SUBROUTINE GQWKS (WKID,ERRIND,STATE)

Input Parameters:

INTEGER WKID	workstation identifier

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER STATE	workstation state (GINACT,GACTIV)

INQUIRE WORKSTATION DEFERRAL AND UPDATE STATES — L0a

SUBROUTINE GQWKDU (WKID,ERRIND,DEFMOD,REGMOD,DEMPTY, *NFRAME)

Input Parameters:

INTEGER WKID	workstation identifier

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER DEFMOD	deferral mode (GASAP,GBNIG,GBNIL,GASTI)
INTEGER REGMOD	implicit regeneration mode (GSUPPD,GALLOW)
INTEGER DEMPTY	display surface empty (GNEMPT,GEMPTY)
INTEGER NFRAME	new frame action necessary at update (GNO,GYES)

INQUIRE LIST element OF POLYLINE INDICES — L1a

SUBROUTINE GQEPLI (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 — L1a

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

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PLI	polyline index
INTEGER TYPE	type of returned values (GSET,GREALI)

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 L1a

SUBROUTINE GQEPMI (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 L1a

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

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER PMI	polymarker index
INTEGER TYPE	type of returned values (GSET,GREALI)
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 L1a

SUBROUTINE GQETXI (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 L1a

SUBROUTINE GQTXR (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 (GSET,GREALI)

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER FONT	text font
INTEGER PREC	text precision (GSTRP,GCHARP,GSTRKP)
REAL CHXP	character expansion factor
REAL CHSP	character spacing
INTEGER COLI	text colour index

INQUIRE TEXT EXTENT L0a
Full FORTRAN 77 version

SUBROUTINE GQTXX (WKID,PX,PY,CHARS,ERRIND,CPX,CPY, *TXEXPX,TXEXPY)

Input Parameters:

INTEGER WKID	workstation identifier
REAL PX,PY	text position in world coordinates
CHARACTER*(*) CHARS	character string

Output Parameters:

INTEGER ERRIND	error indicator
REAL CPX,CPY	concatenation point in world coordinates
REAL TXEXPX (4), TXEXPY (4)	text extent parallelogram

INQUIRE TEXT EXTENT L0a
FORTRAN 77 Subset version

SUBROUTINE GQTXXS (WKID,PX,PY,LSTR,CHARS,ERRIND,CPX,CPY, *TXEXPX,TXEXPY)

Input Parameters:

INTEGER WKID	workstation identifier
REAL PX,PY	text position in world coordinates
INTEGER LSTR	length of string (in characters)
CHARACTER*80 CHARS	character string

Output Parameters:

INTEGER ERRIND	error indicator
REAL CPX,CPY	concatenation point in world coordinates
REAL TXEXPX (4), TXEXPY (4)	text extent parallelogram

INQUIRE LIST element OF FILL AREA INDICES L1a

SUBROUTINE GQEFAI (WKID,N,ERRIND,OL,FAI)

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

INQUIRE FILL AREA REPRESENTATION L1a

SUBROUTINE GQFAR (WKID,FAI,TYPE,ERRIND,INTS,STYLI,COLI)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER FAI	fill area index
INTEGER TYPE	type of returned values (GSET,GREALI)
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER INTS	fill area interior style (GHOLLO,GSOLID,GPATTR,GHATCH)
INTEGER STYLI	fill area style index
INTEGER COLI	fill area colour index

INQUIRE LIST element OF PATTERN INDICES L1a

SUBROUTINE GQEPAI (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

L1a

SUBROUTINE GQPAR (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 (GSET,GREALI)
INTEGER DIMX,DIMY	maximum pattern array dimensions

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER DX,DY	pattern array dimensions
INTEGER COLIA (DIMX,DIMY)	pattern array

INQUIRE LIST element OF COLOUR INDICES

L0a

SUBROUTINE GQECI (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

L0a

SUBROUTINE GQCR(WKID,COLI,TYPE,ERRIND,CR,CG,CB)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER COLI	colour index
INTEGER TYPE	type of returned values (GSET,GREALI)

Output Parameters:	
INTEGER ERRIND	error indicator
REAL CR,CG,CB	colour (red/green/blue intensities)

INQUIRE WORKSTATION TRANSFORMATION L0a

SUBROUTINE GQWKT (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 (GNPEND,GPEND)
REAL RWINDO(4)	requested workstation window in NDC RWXMIN, RWXMAX, RWYMIN, RWYMAX
REAL CWINDO(4)	current workstation window in NDC 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 SET member OF SEGMENT NAMES ON WORKSTATION L1a

SUBROUTINE GQSGWK (WKID,N,ERRIND,OL,SGNA)

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER N	set member requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of segment names
INTEGER SGNA	Nth set member of set of stored segments for workstation

INQUIRE LOCATOR DEVICE STATE L0b

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

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER LCDNR	locator device number
INTEGER TYPE	type of returned values (GSET,GREALI)
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)
INTEGER TNR	initial normalization transformation number
REAL IPX, IPY	initial locator position in world coordinates
INTEGER PET	prompt/echo type
REAL EAREA(4)	echo area in device coordinates XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE STROKE DEVICE STATE L0b

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

Input Parameters:	
INTEGER WKID	workstation identifier
INTEGER SKDNR	stroke device number
INTEGER TYPE	type of returned values (GSET,GREALI)
INTEGER N	maximum number of points
INTEGER MLDR	dimension of data record array
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)
INTEGER ITNR	initial normalization transformation number
INTEGER NP	number of points
REAL IPXA(N), IPYA(N)	initial points in stroke in world coordinates
INTEGER PET	prompt/echo type
REAL EAREA(4)	echo area in device coordinates XMIN, XMAX, YMIN, YMAX
INTEGER BUFLEN	input buffer size
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE VALUATOR DEVICE STATE

L0b

SUBROUTINE GQVLS (WKID,VLDNR,MLDR,ERRIND,MODE,ESW,IVAL,PET,
*EAREA,LOVAL,HIVAL,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 (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)
REAL IVAL	initial value
INTEGER PET	prompt/echo type
REAL EAREA(4)	echo area in device coordinates XMIN, XMAX, YMIN, YMAX
REAL LOVAL, HIVAL	minimal and maximal value
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE CHOICE DEVICE STATE

L0b

SUBROUTINE GQCHS (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 (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)
INTEGER ISTAT	initial status (GOK,GNCHOI)
INTEGER ICHNR	initial choice number
INTEGER PET	prompt/echo type
REAL EAREA(4)	echo area in device coordinates XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE PICK DEVICE STATE L1b

SUBROUTINE GQPKS (WKID,PKDNR,TYPE,MLDR,ERRIND,MODE,ESW,ISTAT, *ISGNA,IPKID,PET,EAREA,LDR,DATREC)

Input Parameters:

INTEGER WKID	workstation identifier
INTEGER PKDNR	pick device number
INTEGER TYPE	type of returned values (GSET,GREALI)
INTEGER MLDR	dimension of data record array

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER MODE	operating mode (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)
INTEGER ISTAT	initial status (GOK,GNPICK)
INTEGER ISGNA	initial segment
INTEGER IPKID	initial pick identifier
INTEGER PET	prompt/echo type
REAL EAREA(4)	echo area in device coordinates XMIN, XMAX, YMIN, YMAX
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE STRING DEVICE STATE L0b

Full FORTRAN 77 version

SUBROUTINE GQSTS (WKID,STDNR,MLDR,ERRIND,MODE,ESW,LOSTR,ISTR, *PET,EAREA,BUFLEN,INIPOS,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 (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)
INTEGER LOSTR	number of characters returned
CHARACTER*(*) ISTR	initial string
INTEGER PET	prompt/echo type
REAL EAREA(4)	echo area in device coordinates XMIN, XMAX, YMIN, YMAX
INTEGER BUFLEN	input buffer size
INTEGER INIPOS	initial cursor position
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE STRING DEVICE STATE L0b
FORTRAN 77 Subset version

```
SUBROUTINE GQSTS (WKID,STDNR,MLDR,ERRIND,MODE,ESW,
*LOSTR,ISTR,PET,EAREA,BUFLEN,INIPOS,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 (GREQU,GSAMPL,GEVENT)
INTEGER ESW	echo switch (GNECHO,GECHO)
INTEGER LOSTR	number of characters returned
CHARACTER*80 ISTR	initial string
INTEGER PET	prompt/echo type
REAL EAREA(4)	echo area in device coordinates XMIN, XMAX, YMIN, YMAX
INTEGER BUFLEN	input buffer size
INTEGER INIPOS	initial cursor position
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

9.9.5 Inquiry functions for workstation description table

INQUIRE WORKSTATION CATEGORY L0a

```
SUBROUTINE GQWKCA (WTYPE,ERRIND,WKCAT)
```

Input Parameters:	
INTEGER WTYPE	workstation type

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER WKCAT	workstation category (GOUTPT,GINPUT, GOUTIN,GWISS,GMO,GMI)

INQUIRE WORKSTATION CLASSIFICATION L0a

SUBROUTINE GQWKCL (WTYPE,ERRIND,VRTYPE)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER VRTYPE	vector/raster/other type (GVECTR,GRASTR,GOTHWK)

INQUIRE DISPLAY SPACE SIZE L0a

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

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

INQUIRE DYNAMIC MODIFICATION OF WORKSTATION ATTRIBUTES L1a

SUBROUTINE GQDWKA (WTYPE,ERRIND,PLBUN,PMBUN,TXBUN,FABUN,
*PAREP,COLREP,WKTR)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER PLBUN	polyline representation changeable (GIRG,GIMM)
INTEGER PMBUN	polymarker representation changeable (GIRG,GIMM)
INTEGER TXBUN	text representation changeable (GIRG,GIMM)
INTEGER FABUN	fill area representation changeable (GIRG,GIMM)
INTEGER PAREP	pattern representation changeable (GIRG,GIMM)
INTEGER COLREP	colour representation changeable (GIRG,GIMM)
INTEGER WKTR	workstation transformation changeable (GIRG,GIMM)

INQUIRE DEFAULT DEFERRAL STATE VALUES L1a

SUBROUTINE GQDDS (WTYPE,ERRIND,DEFMOD,REGMOD)

Input Parameters:	
INTEGER WTYPE	workstation type
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER DEFMOD	default value for deferral mode (GASAP,GBNIG,GBNIL,GASTI)
INTEGER REGMOD	default value for implicit regeneration mode (GSUPPD,GALLOW)

INQUIRE POLYLINE FACILITIES L0a

SUBROUTINE GQPLF (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
REAL RLWMIN, RLWMAX	range of linewidths
INTEGER NPPLI	number of predefined polyline indices

INQUIRE PREDEFINED POLYLINE REPRESENTATION L0a

SUBROUTINE GQPPLR (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 L0a

SUBROUTINE GQPMF (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
REAL RMSMIN, RMSMAX	range of marker sizes
INTEGER NPPMI	number of predefined polymarker indices

INQUIRE PREDEFINED POLYMARKER REPRESENTATION L0a

SUBROUTINE GQPPMR (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 L0a

SUBROUTINE GQTXF (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 (GSTRP,GCHARP,GSTRKP)
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 L0a

SUBROUTINE GQPTXR (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 (GSTRP,GCHARP,GSTRKP)
REAL CHXP	character expansion factor
REAL CHSP	character spacing
INTEGER COLI	text colour index

INQUIRE FILL AREA FACILITIES

L0a

SUBROUTINE GQFAF (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 fill area interior styles
INTEGER IS	NIth element of list of available fill area interior styles (GHOLLO,GSOLID,GPATTR,GHATCH)
INTEGER NHS	number of available fill area hatch styles
INTEGER HS	NHth element of list of available fill area hatch style indices
INTEGER NPFAI	number of predefined fill area indices

INQUIRE PREDEFINED FILL AREA REPRESENTATION

L0a

SUBROUTINE GQPFAR (WTYPE,PFAI,ERRIND,INTS,STYLI,COLI)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER PFAI	predefined fill area index
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER INTS	fill area interior style (GHOLLO,GSOLID,GPATTR,GHATCH)
INTEGER STYLI	fill area style index
INTEGER COLI	fill area colour index

INQUIRE PATTERN FACILITIES

L0a

SUBROUTINE GQPAF (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 L0a

SUBROUTINE GQPPAR (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 array dimensions
INTEGER COLIA (DIMX,DIMY)	pattern array

INQUIRE COLOUR FACILITIES L0a

SUBROUTINE GQCF (WTYPE,ERRIND,NCOLI,COLA,NPCI)

Input Parameters:	
INTEGER WTYPE	workstation type

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER NCOLI	number of colours
INTEGER COLA	colour available (GMONOC,GCOLOR)
INTEGER NPCI	number of predefined colour indices

INQUIRE PREDEFINED COLOUR REPRESENTATION L0a

SUBROUTINE GQPCR (WTYPE,PCI,ERRIND,CR,CG,CB)

Input Parameters:	
INTEGER WTYPE	workstation type
INTEGER PCI	predefined colour index

Output Parameters:	
INTEGER ERRIND	error indicator
REAL CR, CG, CB	colour intensities (red/green/blue)

INQUIRE LIST element OF AVAILABLE GENERALIZED DRAWING PRIMITIVES L0a

SUBROUTINE GQEGDP (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 L0a

SUBROUTINE GQGDP (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(4)	list of sets of attributes used (GPLATT,GPMATT,GTXATT,GFAATT)

INQUIRE MAXIMUM LENGTH OF WORKSTATION STATE TABLES L0a

SUBROUTINE GQLWK (WTYPE,ERRIND,MPLBTE,MPMBTE,MTXBTE,MFABTE, *MPAI,MCOLI)

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 MFABTE	maximum number of fill area bundle table entries
INTEGER MPAI	maximum number of pattern indices
INTEGER MCOLI	maximum number of colour indices

INQUIRE NUMBER OF SEGMENT PRIORITIES SUPPORTED L1a

SUBROUTINE GQSGP (WTYPE,ERRIND,NSG)

Input Parameters:

INTEGER WTYPE	workstation type

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER NSG	number of segment priorities supported

INQUIRE DYNAMIC MODIFICATION OF SEGMENT ATTRIBUTES L1a

SUBROUTINE GQDSGA (WTYPE,ERRIND,SGTR,VONOFF,VOFFON,HIGH,
*SGPR,ADD,SGDEL)

Input Parameters:

INTEGER WTYPE	workstation type

Output Parameters:

INTEGER ERRIND	error indicator
INTEGER SGTR	segment transformation changeable (GIRG,GIMM)
INTEGER VONOFF	visibility changeable from on to off (GIRG,GIMM)
INTEGER VOFFON	visibility changeable from off to on (GIRG,GIMM)
INTEGER HIGH	highlighting changeable (GIRG,GIMM)
INTEGER SGPR	segment priority changeable (GIRG,GIMM)
INTEGER ADD	adding primitives to the open segment (GIRG,GIMM)
INTEGER SGDEL	segment deletion immediately visible (GIRG,GIMM)

INQUIRE NUMBER OF AVAILABLE LOGICAL INPUT DEVICES L0b

SUBROUTINE GQLI (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 L0b

SUBROUTINE GQDLC (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
INTEGER OL	number of available prompt/echo types
INTEGER PET	Nth element of list of available prompt/echo types
REAL EAREA(4)	default echo area in device coordinates 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 L0b

SUBROUTINE GQDSK (WTYPE,DEVNO,N,MLDR,ERRIND,MBUFF,
*OL,PET,EAREA,BUFLEN,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	maximum input buffer size
INTEGER OL	number of available prompt/echo types
INTEGER PET	Nth element of list of available prompt/echo types
REAL EAREA(4)	default echo area in device coordinates XMIN, XMAX, YMIN, YMAX
INTEGER BUFLEN	buffer length for stroke
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE DEFAULT VALUATOR DEVICE DATA L0b

SUBROUTINE GQDVL (WTYPE,DEVNO,N,MLDR,ERRIND,DVAL,
*OL,PET,EAREA,LOVAL,HIVAL,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/echo types
INTEGER PET	Nth element of list of available prompt/echo types
REAL EAREA(4)	default echo area in device coordinates XMIN, XMAX, YMIN, YMAX
REAL LOVAL, HIVAL	minimal and maximal value
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

INQUIRE DEFAULT CHOICE DEVICE DATA L0b

SUBROUTINE GQDCH (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/echo types
INTEGER PET	Nth element of list of available prompt/echo types
REAL EAREA(4)	default echo area in device coordinates 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 L1b

SUBROUTINE GQDPK (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 rquested
INTEGER MLDR	dimension of data record array

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of available prompt/echo types
INTEGER PET	Nth element of list of available prompt/echo types
REAL EAREA(4)	default echo area in device coordinates 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 L0b

SUBROUTINE GQDST (WTYPE,DEVNO,N,MLDR,ERRIND,MBUFF,
*OL,PET,EAREA,BUFLEN,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	maximum string buffer size
INTEGER OL	number of available prompt/echo types
INTEGER PET	Nth element of list of available prompt/echo types
REAL EAREA(4)	default echo area in device coordinates XMIN, XMAX, YMIN, YMAX
INTEGER BUFLEN	buffer length of string
INTEGER LDR	number of array elements used in data record
CHARACTER*80 DATREC(MLDR)	data record

9.9.6 Inquiry functions for segment state list

INQUIRE SET member OF ASSOCIATED WORKSTATIONS L1a

SUBROUTINE GQASWK (SGNA,N,ERRIND,OL,WKID)

Input Parameters:	
INTEGER SGNA	segment name
INTEGER N	set member requested
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER OL	number of associated workstations
INTEGER WKID	Nth member of set of associated workstations

INQUIRE SEGMENT ATTRIBUTES L1a

SUBROUTINE GQSGA (SGNA,ERRIND,SEGTM,VIS,HIGH,SGPR,DET)

Input Parameters:	
INTEGER SGNA	segment name
Output Parameters:	
INTEGER ERRIND	error indicator
REAL SEGTM(2,3)	segment transformation matrix (SEGTM(1,1) SEGTM(1,2) SEGTM(1,3)) (SEGTM(2,1) SEGTM(2,2) SEGTM(2,3))
INTEGER VIS	visibility (GINVIS,GVISI)
INTEGER HIGH	highlighting (GNORML,GHILIT)
REAL SGPR	segment priority
INTEGER DET	detectability (GUNDET,GDETEC)

9.9.7 Pixel inquiries

INQUIRE PIXEL ARRAY DIMENSIONS L0a

SUBROUTINE GQPXAD (WKID,PX,PY,QX,QY,ERRIND,DX,DY)

Input Parameters:	
INTEGER WKID	workstation identifier
REAL PX, PY, QX, QY	upper left, lower right corners in world coordinates
Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER DX,DY	dimensions of pixel array

INQUIRE PIXEL ARRAY L0a

SUBROUTINE GQPXA (WKID,PX,PY,DIMX,DIMY,ISC,ISR,DX,DY,
*ERRIND,INVVAL,COLIA)

Input Parameters:	
INTEGER WKID	workstation identifier
REAL PX, PY	upper left corner (WC)
INTEGER DIMX, DIMY	the dimensions of colour index array
INTEGER ISC, ISR	start column, start row
INTEGER DX, DY	size of requested pixel array

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER INVVAL	presence of invalid values (GABSNT,GPRSNT)
INTEGER COLIA (DIMX,DIMY)	colour index array

INQUIRE PIXEL L0a

SUBROUTINE GQPX (WKID,PX,PY,ERRIND,COLI)

Input Parameters:	
INTEGER WKID	workstation identifier
REAL PX,PY	point in world coordinates

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER COLI	colour index

9.9.8 Inquiry function for GKS error state list

INQUIRE INPUT QUEUE OVERFLOW L0c

SUBROUTINE GQIQOV(ERRIND,WKID,ICL,IDN)

Output Parameters:	
INTEGER ERRIND	error indicator
INTEGER WKID	workstation identifier
INTEGER ICL	input class (GLOCAT,GSTROK,GVALUA,GCHOIC, GPICK,GSTRIN)
INTEGER IDN	input device number

9.10 Utility functions

EVALUATE TRANSFORMATION MATRIX L1a

SUBROUTINE GEVTM (X0,Y0,DX,DY,PHI,FX,FY,SW,MOUT)

Input Parameters:

REAL X0, Y0	fixed point
REAL DX, DY	shift vector
REAL PHI	rotation angle in radians
REAL FX, FY	scale factors
INTEGER SW	coordinate switch (GWC,GNDC)

Output Parameters:

REAL MOUT(2,3)	segment transformation matrix (MOUT(1,1) MOUT(1,2) MOUT(1,3)) (MOUT(2,1) MOUT(2,2) MOUT(2,3))

ACCUMULATE TRANSFORMATION MATRIX L1a

SUBROUTINE GACTM (MINP,X0,Y0,DX,DY,PHI,FX,FY,SW,MOUT)

Input Parameters:

REAL MINP(2,3)	segment transformation matrix (MINP(1,1) MINP(1,2) MINP(1,3)) (MINP(2,1) MINP(2,2) MINP(2,3))
REAL X0, Y0	fixed point
REAL DX, DY	shift vector
REAL PHI	rotation angle in radians
REAL FX, FY	scale factors
INTEGER SW	coordinate switch (GWC,GNDC)

Output Parameters:

REAL MOUT(2,3)	segment transformation matrix (MOUT(1,1) MOUT(1,2) MOUT(1,3)) (MOUT(2,1) MOUT(2,2) MOUT(2,3))

9.11 Error handling

EMERGENCY CLOSE GKS L0a

SUBROUTINE GECLKS

ERROR HANDLING L0a

SUBROUTINE GERHND (ERRNR,FCTID,ERRFIL)

Input Parameters:

INTEGER ERRNR	error number
INTEGER FCTID	function identification (see Section 6)
INTEGER ERRFIL	error file

ERROR LOGGING L0a

SUBROUTINE GERLOG (ERRNR,FCTID,ERRFIL)

Input Parameters:

INTEGER ERRNR	error number
INTEGER FCTID	function identification (see Section 6)
INTEGER ERRFIL	error file

9.12 Utility functions not defined in GKS

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. Note: implementation dependent errors may occur also.

PACK DATA RECORD L0a
Full FORTRAN 77 version

SUBROUTINE GPREC(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 L0a
FORTRAN 77 Subset version

```
SUBROUTINE GPREC (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*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 L0a
Full FORTRAN 77 version

```
SUBROUTINE GUREC (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