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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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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 recognised 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, INTEGER GBUNDL, PARAMETER (GBUNDL=0, GINDIV=1)	individual GINDIV		
clear control flag	conditionally, INTEGER GCONDI, PARAMETER (GCONDI=0, GALWAY=1)	always GALWAY		
clipping indicator	noclip, INTEGER GNCLIP, PARAMETER (GNCLIP=0, GCLIP=1)	clip GCLIP		
colour available	monochrome, INTEGER GMONOC, PARAMETER (GMONOC=0, GCOLOR=1)	colour GCOLOR		
coordinate switch	WC, INTEGER GWC, PARAMETER (GWC=0, GNDC=1)	NDC GNDC		
deferral mode (see ISO 7942, subclause 4.5.3)	ASAP, INTEGER GASAP, PARAMETER (GASAP=0, GBNIG=1, GBNIL=2, GASTI=3)	BNIG, GBNIG,	BNIL, GBNIL,	ASTI GASTI
detectability	undetectable, INTEGER GUNDET, PARAMETER (GUNDET=0, GDETEC=1)	detectable GDETEC		
device coordinate units	metres, INTEGER GMETRE, PARAMETER (GMETRE=0, GOTHU=1)	other GOTHU		
display surface empty	notempty, INTEGER GNEMPT, PARAMETER (GNEMPT=0, GEMPTY=1)	empty GEMPTY		
dynamic modification (see ISO 7942, subclause 4.5.3)	IRG, INTEGER GIRG, PARAMETER (GIRG=0, GIMM=1)	IMM GIMM		
echo switch	noecho, INTEGER GNECHO, PARAMETER (GNECHO=0, GECHO=1)	echo GECHO		
fill area interior style	hollow, INTEGER GHOLLO, PARAMETER (GHOLLO=0, GSOLID=1, GPATTR=2, GHATCH=3)	solid, GSOLID,	pattern, GPATTR,	hatch GHATCH
highlighting	normal, INTEGER GNORML, PARAMETER (GNORML=0, GHILIT=1)	highlighted GHILIT		

input device status	none, INTEGER PARAMETER (GNONE=0,	ok, GOK, GOK=1,	nopick, GNPICK, GNPICK=2,	nochoice GNCHOI GNCHOI=2)		
input class	none, string INTEGER PARAMETER (GNCLAS=0, GSTRIN=6)	locator, GLOCAT, GLOCAT=1,	stroke, GSTROK, GSTROK=2,	valuator, GVALUA, GVALUA=3,	choice, GCHOIC, GCHOIC=4,	pick, GPICK, GPICK=5,
implicit regeneration mode	suppressed, INTEGER PARAMETER (GSUPPD=0,	allowed GALLOW GALLOW=1)				
level of GKS	L0a, L2a, INTEGER * PARAMETER (GL0A=0, GL2A=6,	L0b, L2b, GLOB, GL2B, GLOB=1, GL2B=7,	L0c, L2c GL0C, GL2C GL0C=2, GL2C=8)	L1a, GL1A, GL1A=3,	L1b, GL1B, GL1B=4,	L1c, GL1C, GL1C=5,
new frame action necessary	no, INTEGER PARAMETER (GNO=0,	yes GYES GYES=1)				
operating mode	request, INTEGER PARAMETER (GREQU=0,	sample, GSAMPL, GSAMPL=1,	event GEVENT GEVENT=2)			
operating state value (see ISO 7942, subclause 4.11.1)	GKCL, INTEGER PARAMETER (GGKCL=0,	GKOP, GGKOP, GGKOP=1,	WSOP, GWSOP, GWSOP=2,	WSAC, GWSAC, GWSAC=3,	SGOP GSGOP GSGOP=4)	
presence of invalid values	absent, INTEGER PARAMETER (GABSNT=0,	present GPRSNT GPRSNT=1)				
regeneration flag	postpone, INTEGER PARAMETER (GPOSTP=0,	perform GPERFO GPERFO=1)				
relative input priority	higher, INTEGER PARAMETER (GHIGHR=0,	lower GLOWER GLOWER=1)				
simultaneous events flag	nomore, INTEGER PARAMETER (GNMORE=0,	more GMORE GMORE=1)				
text alignment horizontal	normal, INTEGER PARAMETER (GAHNOR=0,	left, GALEFT, GALEFT=1,	center, GACENT, GACENT=2,	right GARITE GARITE=3)		
text alignment vertical	normal, INTEGER PARAMETER (GAVNOR=0,	top, GATOP, GATOP=1,	cap, GACAP, GACAP=2,	half, GAHALF, GAHALF=3,	base, GABASE, GABASE=4,	bottom GABOTT GABOTT=5)
text path	right, INTEGER PARAMETER (GRIGHT=0,	left, GLEFT, GLEFT=1,	up, GUP, GUP=2,	down GDOWN GDOWN=3)		
text precision	string, INTEGER PARAMETER (GSTRP=0,	character, GCHARP, GCHARP=1,	stroke GSTRKP GSTRKP=2)			

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type of returned values	set, INTEGER PARAMETER (GSET=0,	realized GREALI GREALI=1)				
update state	notpending, INTEGER PARAMETER (GNPEND=0,	pending GPEND GPEND=1)				
vector/raster/other type	vector, INTEGER PARAMETER (GVECTR=0,	raster, GRASTR=1,	other GOTHWK=2)			
visibility	invisible, INTEGER PARAMETER (GINVIS=0,	visible GVISI=1)				
workstation category (see ISO 7942, subclause 4.5.1)	OUTPUT, INTEGER PARAMETER (GOUTPT=0,	INPUT, GINPUT=1,	OUTIN, GOUTIN=2,	WISS, GWISS=3,	MO, GMO=4,	MI GMI=5)
workstation state	inactive, INTEGER PARAMETER (GINACT=0,	active GACTIV=1)				
list of GDP attributes	polyline attribute, polymarker attribute, text attribute, fill area attribute					
	INTEGER PARAMETER (GPLATT=0,	GPMATT=1,	GTXTATT=2,	GFAATT=3)		
line type	solid, INTEGER PARAMETER (GLSOLI=1,	dash, GLDASH=2,	dot, GLDOT=3,	dash-dot GLDASD=4)		
marker type	., INTEGER PARAMETER (GPOINT=1,	+, GPLUS=2,	*, GAST=3,	o, GOMARK=4,	x 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,	ESVPI,	ESELNT,	ESCLIP,	ESWKWN
PARAMETER (ESVP=50,	ESVPI=51,	ESELNT=52,	ESCLIP=53,	ESWKWN=54)	
INTEGER	ESWKVP,	ECRS,	ECLSG,	ERENSG,	EDSG
PARAMETER (ESWKVP=55,	ECRS=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

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
GQPLR	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
GQTXS	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
GSMKSK	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
GTXT	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

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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
GQEF AI	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
GQEP AI	Q-E-PA-I	1a	INQUIRE LIST element OF PATTERN INDICES
GQEPLI	Q-E-PL-I	1a	INQUIRE LIST element OF POLYLINE INDICES
GQEP MI	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
GINS	IN-SG	2a	INSERT SEGMENT
GIITM	I-ITM	0a	INTERPRET ITEM
GMSG	MSG	1a	MESSAGE
GMSG	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
GSMK	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
GQPFR	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
GQPLR	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
GSPV	S-VP	0a	SET VIEWPORT
GSPWKVP	S-WK-VP	0a	SET WORKSTATION VIEWPORT
GSPWKWN	S-WK-WN	0a	SET WORKSTATION WINDOW
GSPWN	S-WN	0a	SET WINDOW
GTXT	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
GS LCM	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
GSPVIP	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-I-Q-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
GSM SK	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
GD SG	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
GMSG S	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
GQEF AI	Q-E-F-A-I	1a	INQUIRE LIST element OF FILL AREA INDICES
GQEP AI	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 qrs 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 qrs 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
INTEGER BUFA

error message file
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,WTYP)

Input Parameters:

INTEGER WKID

INTEGER CONID

INTEGER WTYP

workstation identifier

connection identifier

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

INTEGER COFL

workstation identifier

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
INTEGER REGFLworkstation identifier
update regeneration flag (GPOSTP,GPERFO)**SET DEFERRAL STATE**

L1a

SUBROUTINE GSDS (WKID,DEFMOD,REGMOD)

Input Parameters:INTEGER WKID
INTEGER DEFMOD
INTEGER REGMODworkstation identifier
deferral mode
(GASAP,GBNIG,GBNL,GASTI)
implicit regeneration mode
(GSUPPD,GALLOW)**MESSAGE**

L1a

Full FORTRAN 77 version

SUBROUTINE GMSG (WKID,MESS)

Input Parameters:INTEGER WKID
CHARACTER*(*) MESSworkstation identifier
message**MESSAGE**

L1a

FORTRAN 77 Subset version

SUBROUTINE GMSGS (WKID,LSTR,MESS)

Input Parameters:INTEGER WKID
INTEGER LSTR
CHARACTER*80 MESSworkstation identifier
length of string (in characters)
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

Full FORTRAN 77 version

L0a

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