

Special Functions for Storage and Retrieval of Data

**PUT T31
GET T32
CLEAR S29**

DESCRIPTION

This specification is for a set of Special Functions to carry out storage/retrieval of blocks of data. These are necessary as the logging video will not be available for this task when the IMAGEM Graphics Video is fitted in a controller.

Provision is made to load from, or dump to, tape using the System Programmer.

FEATURES

- Load/dump to tape facility.
- Total memory available 1MB provided in 64K pages by 8272 modules.
- File sizes configured using P-tables.
- Contents preserved during periods when power not applied.
- Optional checksum on each file - validated on each PUT/GET.
- Clear function to initialize any number of files.

SPECIFICATION

Capacity : 4095 files maximum
 : 32000 words maximum per file.
 : Capacity of each 64K block is 32700 words. 6 words overhead on data size of each file.

Load/dump : Using System Programmer or other suitable programming device.

Control language:-

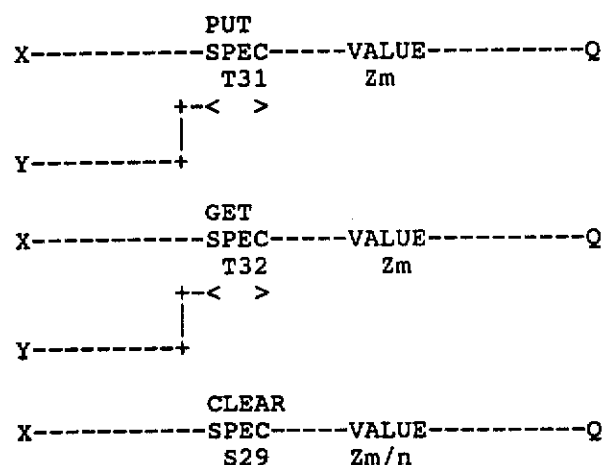


Table 1 Program Rung Data for PUT

Sym	Location	Use	Range
X	Rung Input (upper branch)	Internal GEM80 address of 1st source location	Address of location obtained by LOCATE function
Y	Rung input (lower branch)	Destination (block and file no.)	0 to 4095 (see below)
Zm	Value data	Start of parameter list (two locations)	Any table usable by special functions
Q	Rung output	Fault code	Zero; No fault: Non-zero: See Table 5

Table 2 Program Rung Data for GET

Sym	Location	Use	Range
X	Rung Input (upper branch)	Internal GEM80 address of 1st destination location	Address of write-enabled location obtained by LOCATE
Y	Rung input (lower branch)	Source (block and file no.)	0 to 4095 (see below)
Zm	Value data	Start of parameter list (two locations)	Any table usable by special functions
Q	Rung output	Fault code	Zero; No fault: Non-zero: See Table 6

Table 3 Program Rung and Value Data for CLEAR

Sym	Location	Use	Range
X	Rung Input	Block and file No. of start	0 to 4095 (see below)
Zm	Value data	Qty. of files to be cleared	Any table usable by Special Functions
N			0 to 256
Q	Rung output	Fault code	Zero; No fault: Non-zero: See Table 6

Table 4 Value Data for PUT and GET

Sym	Location	Use	Range
NW	Zm	Quantity of words to be transferred	0 to 32000
SP	Zm+1	Start pointer	0 to 31999

Table 5 Fault Codes and Flags for PUT

Condition	Rung Output	
	Numeric Value	Bits ON
Value (NW + SP) greater than file size specified in P-table	33	0 & 5
Fault detected by LOCATE (X = -1)	9	0 & 3
X + NW beyond end of data tables memory area. Or source address not in table usable by special functions	3	0 & 1
Checksum error on block header (block will be reinitialized and data lost on halt-to-run)	5	0 & 1
Inlaid SP or NW parameter specified	17	0 & 4
Illegal block numbers specified (less than 0, greater than 15) or illegal file number specified for the allowed size of file	65	0 & 6
If configured for checksum protection: Checksum error on block	129	0 & 7

Table 6 Fault Codes and Flags for GET

Condition	Rung Output	
	Numeric Value	Bits ON
Value (NW + SP) greater than file size specified in P-table	33	0 & 5
Fault detected by LOCATE (X = -1)	9	0 & 3
Illegal block number (less than 0, greater than 15 or illegal file number specified for the allowed size of files)	65	0 & 6
X + NW beyond end of data tables memory area, or source address not in table usable by special function	3	0 & 1
If configured for checksum protection: Checksum error on block	129	0 & 7
If configured for checksum protection: GET attempted on file on which no PUT has been executed	257	0 & 8
Checksum error on block header	5	0 & 4
Invalid SP or NW parameter specified	17	0 & 4

No data transfer takes place if any of the above conditions occur.

Table 7 Fault Codes and Flags for CLEAR

Condition	Rung Output	
	Numeric Value	Bits ON
Illegal block number (less than 0, greater than 15) or illegal file number specified for the allowed size of files)	65	0 & 6
N greater than the number of files remaining in the block	33	0 & 5
Checksum error on block header block	5	0 & 2

No files are cleared if either of the above conditions occur.

APPLICATION NOTES

1. CONFIGURATION OF FILE SIZE

All files within one 64K block have the same size, the P-table being used to configure the size of files within each block i.e.

P100	Size of files for block 0
P101	Size of files for block 1
P102	Size of files for block 2
P103	Size of files for block 3
P104	Size of files for block 4
P105	Size of files for block 5
P106	Size of files for block 6
P107	Size of files for block 7
P108	Size of files for block 8
P109	Size of files for block 9
P110	Size of files for block 10
P111	Size of files for block 11
P112	Size of files for block 12
P113	Size of files for block 13
P114	Size of files for block 14
P115	Size of files for block 15

Files size is within the range 0 to 32000. A size of 0 indicates block not in use and the memory is therefore not required to be present.

2. CHECKSUM PROTECTION

If the file size figure in the P-table is negative, there is checksum protection for all files in that block. If the figure is positive, then there is no checksum protection.

3. INITIALIZATION

The storage memory is initialized:

- Whenever a new RAM board is detected at power-up;
- On Halt to Run, when a change to one of P_n to P_{n+15} is detected only changed block is initialized);
- By using the special function CLEAR.

After a block is initialized, any GET from one of its files will fail if it has checksum protection until a PUT or Load to that file has been completed.

4. TRANSFER OF DATA

The time taken to transfer data will be greater than that for the MOVE special function because of the checksum calculation and so would be greater than 4ms per 1000 locations. If no checksum protection has been specified, the transfer time will be of the same order as that for the MOVE special function.

5. LOAD/DUMP DATA (USING SYSTEM PROGRAMMER)

To load or dump off-line data to digital tape, select Option 2 from the main menu, 'Edit Program in GEM80'. Then either:

- a) To dump to tape select Option 6, 'Copy Data from GEM80 to Tape'. If you are connected to a GEM80 with off-line data capability, the message 'Enter first address, or block number, terminated 'space', Z to finish, should appear. To dump off-line data, simply enter the block number, followed by the first and last file number as prompted. When transfer is complete, you will be prompted to select more blocks to be dumped or to finish.
- B) To load from tape, select Option 7, 'Copy Data from Tape to GEM80'. If the GEM80 is not halted, you will be prompted to HALT before the transfer may continue. The blocks in the GEM80 must be configured to have the same file size as the blocks on tape.
- c) To compare data on tape with data in the GEM80, select Option 8, 'Compare Data on Tape with GEM80'. Any differences are rejected.

6. DISPLAY OF DATA BY GRAPHIC VIDEO

The IMAGEM Graphic Video can access the stored data, although checksum calculations will not be preformed even when specified for the controller.



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