

SECTION I

GLOBAL DATA MANAGEMENT DOMAIN

1.0 General Description

The Global Data Management Domain is a centralized system shared component of GCOS66 which performs global data management functions, such as opening and closing files, which apply to all access methods.

The functions included in this component are:

1. The Create Buffer Pool function creates and initializes a buffer pool with the input size and sharability attributes. The buffer pool can be referenced by a 12 character ASCII name.
2. The Delete Buffer Pool function deletes the buffer pool with the specified name.
3. The Reserve File function is called during file allocation. A shared file structure is created and, if the file is under concurrent access control, a Resource Control Block is associated with the file and it is enqueued on behalf of the requesting process.
4. The Remove File function is performed during file deallocation. The Resource Control Block associated with the file is dequeued for the requesting process and, if this is the last user of the file, the Resource Control Block and the shared file structure are deleted.
5. The Open function creates and initializes a File Access Domain for the requested access method. Thus the file may be opened for access by any of the access methods (IDS, UFAS, Buffer Management, ...). An entry descriptor to the created File Access Domain is returned to the caller to permit access to the file through the access method domain.

6. The Close function terminates the use of a File Access Domain. The entry descriptor to the File Access Domain returned by the Open function is invalidated.
7. The Reserve Buffers function is intended for use by the access methods themselves. Buffers for a file may be reserved either when the file is opened or deferred until the caller is prepared to access the file. When the latter is desired, this function performs the reservation so that the file may be accessed.
8. The Remove Buffers function removes the reservation of buffers for a file or set of files and returns the buffers to the available list of the buffer pool.
9. The Global Flush function flushes all buffers for all the open files. This function is normally used at commitment points.
10. The Global Close function flushes the buffers and closes all the open files. This function is normally called at termination.
11. The Global Reset Currencies function flushes the buffers for all open files and insures that each access method resets (ie. deletes) its values of record currencies and buffer currencies (ie. current location in the file).
12. The Global Suspend File Usage function is called when the Command Executive unmaps a tenant from a process. The files used by that process on behalf of the tenant are suspended. This involves resetting the record and buffer currencies for each open file and also removing the buffers from the reservation list.
13. The Return File Information function returns attributes of the file and information about the usage of the file.

2.0 Interface to the Data Management Domain

The Data Management Domain is entered via a CLIMB instruction with the function code selecting the particular function to be called. The first parameter that is passed always describes a command block; other parameters may be required depending on the function executed. A detailed description of the parameters and definition of the command block is provided along with the description of the individual functions.

2.1 Buffer Pool Functions

2.1.1 Buffer Pool Command Block (BPCB)

The BPCB is input to the Create and Delete Buffer Pool functions.

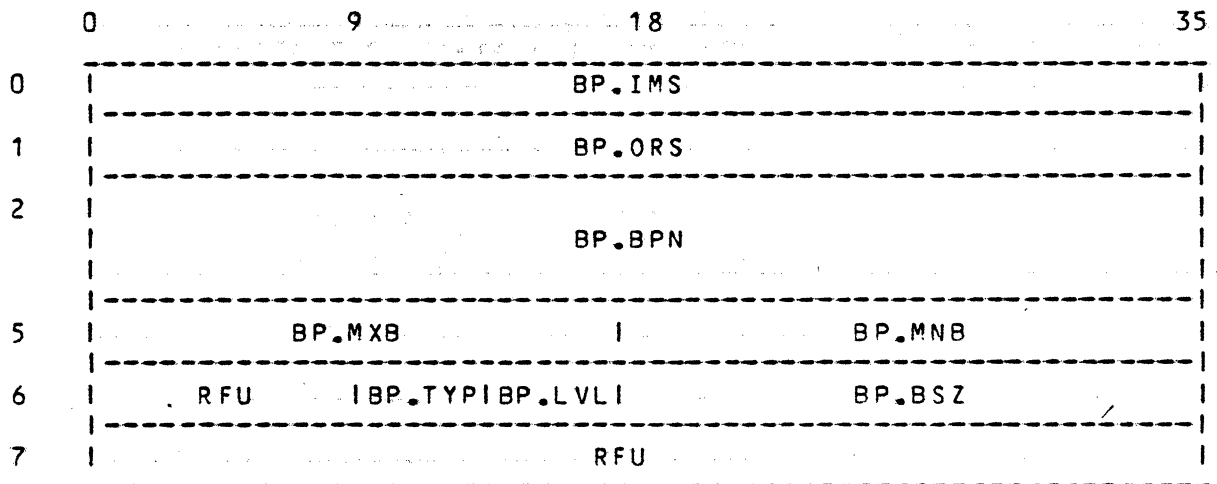


Figure 1.2-1. Buffer Pool Command Block

BP.IMS Immediate status
BP.ORS Original status
BP.BPN Buffer Pool Name (3 words)
BP.MXB Maximum number of buffers in pool
BP.MNB Minimum number of buffers in pool
BP.TYP Buffer pool type (2 bits; bits 9-10)
 =00 public buffer pool
 =01 private buffer pool
BP.LVL Buffer pool level (7 bits)
 = 0 process level
 = 1 work station level
 = 2 system level
BP.BSZ Buffer size in words

2.1.2 Create_Buffer_Pool (DCBP.F)

This function creates a buffer pool with the specified sharability and size. The buffer pool may be public (any file can be assigned to it) or private (only certain specified files can be assigned to it). The buffer pool will remain active until explicitly deleted by the Delete Buffer Pool function or until the working space in which it resides is freed.

Format

ICLIMB DM.OPC,n,DCBP.F,EAX0

where n = 1 if the buffer pool is public and
n = 2 if the buffer pool is private

Parameters

- descriptor 0 : frames the Buffer Pool Command Block (BPCB)
- descriptor 1 : frames the private file list

Buffer_Pool_Command_Block (BPCB) Parameters

Input

BP.BPN	Name of the buffer pool to be created
BP.MXB	Maximum number of buffers in pool
BP.MNB	Minimum number of buffers in pool
BP.TYP	Buffer pool type (public or private)
BP.LVL	Buffer pool level (process, workstation or system)
BP.BSZ	Buffer size in words

Output

BP.IMS	Immediate status
BP.ORS	Original status

Status Codes

- 1 Buffer pool already exists
- 2 File identifiers not input for private file
- 3 Invalid buffer size
- 4 One or more of the specified files are already assigned to a different buffer pool
- 5 Buffer space is not available

Private File List

0	18	35
0	NUMBER FILE ID'S 1	RFU
1	RFU	
2	UNIQUE FILE IDENTIFIER	1
4	UNIQUE FILE IDENTIFIER	2
	:	:
	:	:
	:	:
m	UNIQUE FILE IDENTIFIER	n

Function

If the buffer pool name is unique, the control structures which describe the buffer pool are created. Space is allowed for the pool to grow to reach the maximum number of buffers that was specified. The minimum number of buffers specified are created and initialized in the pool.

If this is a private buffer pool, file control structures for each of the input files is created and associated with the buffer pool.

2.1.3 Delete Buffer Pool (DDBP.F)

This function deletes the buffer pool with the specified name. All files must have been "removed" that were associated with the buffer pool.

Format

ICLIMB DM,OPC,1,DDBP.F,EAX0

Parameters

- descriptor 0 : frames the Buffer Pool Command Block

Buffer Pool Command Block (BPCB) Parameters

Input

BP.BPN Buffer pool name
BP.LVL Buffer pool level (process, work station, system)

Output

BP.IMS Immediate status
BP.ORS Original status

Status Codes

1 Buffer pool not found
2 One or more files still active

Function

The buffer pools are searched for a match on the input name and a check made to insure that all files associated with the buffer pool are inactive.

If the buffer pool is private, the file control structures for the files assigned to the buffer pool are deleted.

The buffers and buffer pool control structures are then deleted.

2.2 File Reservation Functions

2.2.1 File Reservation Command Block (FRCB)

The FRCB is input to the Reserve and Remove File Functions

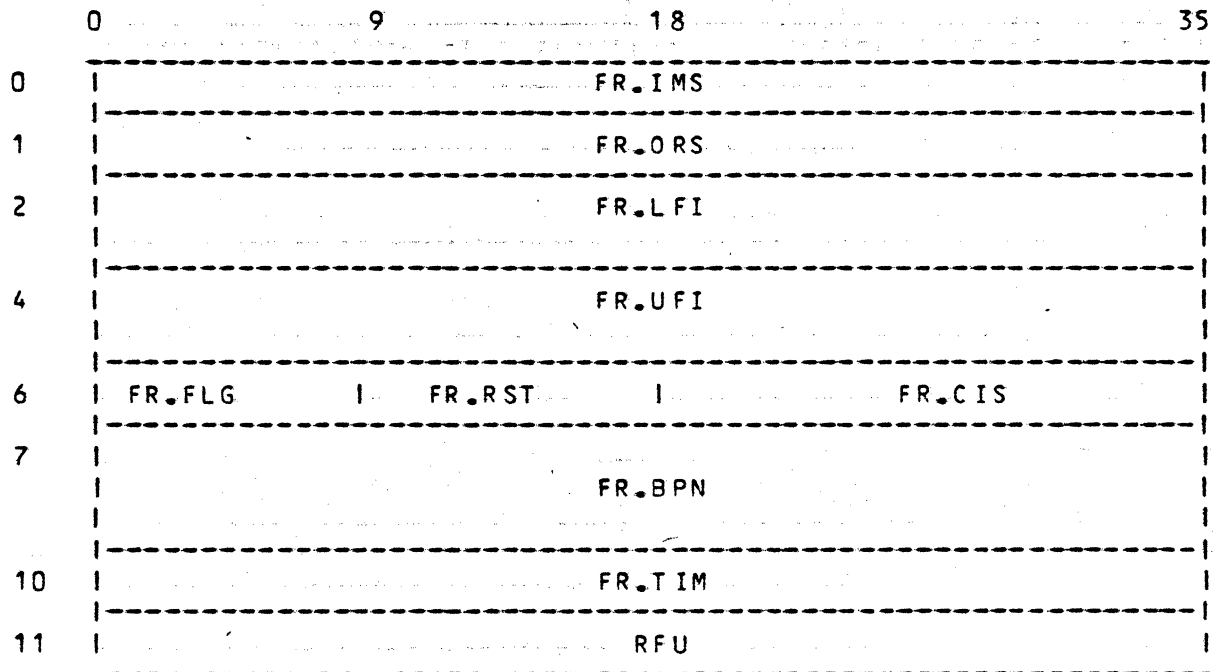


Figure 1.2-2. File Reservation Command Block

FR. IMS Immediate Status
FR. ORS Original Status
FR. LFI Local File Identifier (2 words)
SCT address (1 word)
sector number of FD (1 word)
FR. UFI Unique File Identifier (2 words)
creation date and time
FR. FLG Flags (9 bits)
F. RSHR -0 : if on, file is sharable
F. RBEF -1 : if on, file is protected by before journalization
F. RAFT -2 : if on, file is protected by after journalization
F. RDUP -3 : if on, file is protected by duplicate file
F. RPRM -4 : if on, file is a permanent file
5-6 : MBZ
F. RADF -7 : if on, copy A of duplicate file is defective
F. RBDF -8 : if on, copy B of duplicate file is defective
FR. RST Reservation type (9 bits)
=0 no concurrent access
=1 exclusive access at file level
=2 shared access at file level

=3 shared access to file, both shared and exclusive
access to CI's

=4 shared access to file, shared access to CI's

=5 shared access to file, exclusive access to CI's

FR.CIS

Control Interval size in words

FR.BPN

Buffer Pool Name (3 words)

FR.TIM

Timer value to be used when reserving the file; in units
of 1/64 milliseconds

2.2.2 Reserve_File_(DRSF.F)

This function creates a structure which describes the file, allocates a Resource Control Block for the file (if under concurrent access control), and enqueues or reserves the file for the specified process. This function must be executed for a cataloged disk file before that file can be opened. Other files will be "reserved" as part of the Open File function.

Format

ICLIMB DM.OPC,1,DRSF.F,EAXO

Parameters

- descriptor 0 : frames the File Reservation Command Block (FRCB)

File_Reservation_Command_Block_(FRCB)_Parameters

Input

FR.LFI	Local file identifier
FR.UFI	Unique file identifier
FR.FLG	Flags
	F.RSHR sharable
	F.RBEF before journal
	F.RAFT after journal
	F.RDUP duplicate file
	F.RPRM permanent file
	F.RADF copy A defective
	F.RBDF copy B defective
FR.RST	Reservation type
FR.CIS	CI size; if zero, this parameter must be supplied to the Open File function.
FR.BPN	Buffer Pool Name; if zero a buffer pool will be chosen automatically when the file is opened.
FR.TIM	Maximum length of time the process is willing to wait for the concurrent access reservation.

Output

FR.IMS	Immediate Status
FR.ORS	Original Status

Status_Codes

1	invalid buffer pool name
2	file already assigned to different buffer pool
3	space for control structures not available
4	concurrent access conflict (after waiting for FR.TIM)
5	already reserved by this process with a different reservation type
6	file is not a cataloged disk file

Function

A search for the file structure is made based on FR.LFI and FR.UFI. If not found, the file structure

is created and, if concurrent access is desired, a Resource Control Block is allocated for the file and the file is reserved (RCB is enqueued).

If FR.BPN is specified, then the file is associated with the buffer pool with the specified name.

2.2.3 Remove_File_(DRMF.F)

This function removes the file from the reservation list for the calling process. It is called at process termination for all files reserved or allocated by the process. This function must be preceded by a Commit function.

Format:

ICLIMB DM.OPC,1,DRMF.F,EAXO

Parameters

- descriptor 0 : frames the FRCB

File_Reservation_Command_Block_(FRCB)_Parameters

Input

FR.LFI Local file identifier
FR.UFI Unique file identifier

Output

FR.IMS Immediate status
FR.ORS Original status

Status_Codes

1 File not found
2 File still open

Function

A search for the file structure is made based on FR.LFI and FR.UFI. The count of the outstanding reservations against the file is decremented and, if zero, the Resource Control Block is deallocated and the file structures deleted.

2.3 Open-Close File Functions

2.3.1 Open-Close Command Block (OPCB)

The OPCB is input to both the Open and Close File functions.

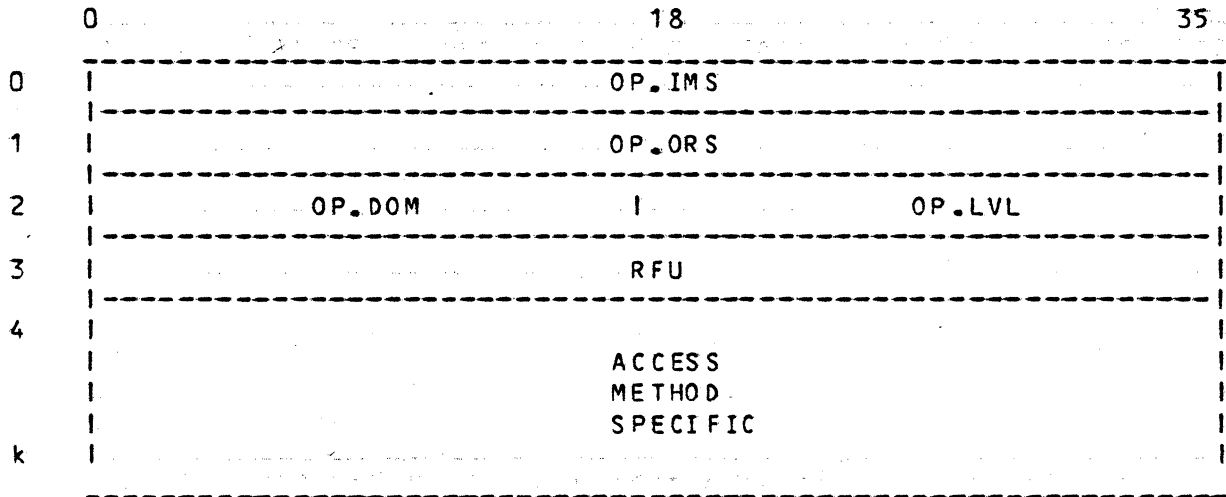


Figure 1.2-3. Open-Close Command Block

OP.IMS Immediate Status
OP.ORS Original Status
OP.DOM Desired access method domain
 =1 Buffer Management
 =2 UFAS
 =3 IDS
 =4 Before Journal
OP.LVL Level of Access
 =0 process
 =1 work station
 =2 system

Words 4 - k of the OPCB are defined based on the access method chosen by specifying OP.DOM.

2.3.2 Open_File_(DOPN.F)

The Open File function creates and initializes a file access domain through which the caller can access the file. The particular type of domain depends on the access method chosen through specification of OP.DOM.

Format

ICLIMB DM.OPC,n,DOPN.F,EAX0

where n = the number of descriptors passed on the Argument/Parameter stack :

Parameters

- descriptor 0 : frames the OPCB
- descriptor 1 : frames the identifier of the calling domain
- descriptor 2 : frames an area of the caller's domain where the Open File function will store an entry descriptor (T=11) to the created file access domain
- descriptors 3-n : Access Method Specific

3.2.1 Buffer Management Open

The Buffer Management Open is selected by setting OP.DOM = 1.

Parameters

No additional descriptors on the Argument/Parameter Stack are required by Buffer Management.

Buffer Management Specific OPCB for Open

In addition to the four words defined for the OPCB in the general Open File function, Buffer Management requires the following:

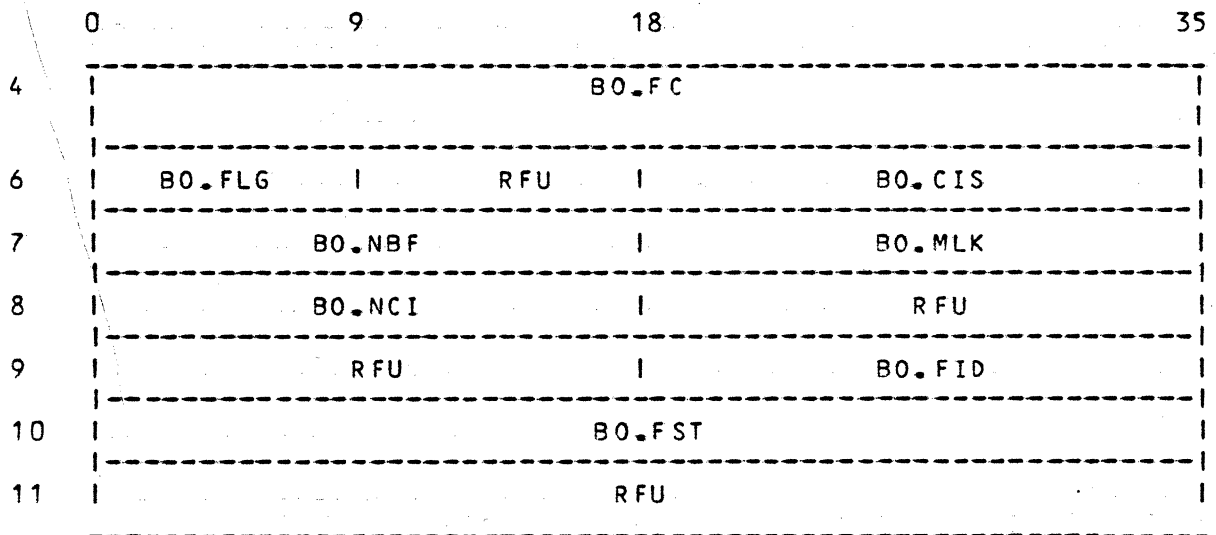


Figure 1.2-4. Buffer Management Specific Section of OPCB for Open

Open-Close Command Block (OPCB) Parameters

Input

BO.FC File code; 8 ASCII characters, left justified, blank f
BO.FLG Flags
 B.OSEQ -0 if on, file is sequential
 B.OSET -1 if on, file is member of file set
 B.ODBR -2 if on, buffer reservation is to be deferred
BO.CIS Control Interval size in words;
have been input via the Reserve File function
BO.NBF Number of buffers desired for this file set
BO.MLK Maximum number of buffers that can be locked at any
one point in time for this file set
BO.NCI Number of CI's per buffer
BO.FST File set identifier; input only if this file is a

member of a file set (B.OSET=1). When opening the first file of a file set, this parameter should be zero. It will be returned as an output parameter.

Output

B0.FID File identifier; this parameter is required input to other Buffer Management functions when the file is a member of a file set.

B0.FST File set identifier; this parameter is required input to some other global Data Management functions

B0.CIS Control Interval size; if zero on input, the correct value for CI size will be returned.

Function

1. If the file has already been opened by this user, increment the count of the number of opens for this user and return the entry descriptor to the existing Buffer Management domain.
2. Search for the Peripheral Allocation Table (PAT) based on the input file code. Construct a local file identifier from the SCT address and sector number of the FD from the PAT. Find the file structure created by the File Reserve function, if cataloged disk file. If temporary file or tape, create file structure by executing Reserve File function.
3. If the file has not yet been assigned to a buffer pool, then find a pool with buffers of the correct size. If one cannot be found, create a new buffer pool.
4. If deferred buffer reservation is not desired (B.0DBR=0), then reserve the desired number of buffers for the file.
5. Return and entry descriptor to the Buffer Management domain for this file.

3.2.2 UEAS_Specific_Open

To be defined.

3.2.3 IDS_Specific_Open

To be defined

3.2.4 Before_Journal_Specific_Open

To be defined.

3.3 Close_File (DCLS.F)

The Close File function terminates the usage of a file access domain. The domain is deleted so that the file is no longer accessible through it.

Format

```
ICLIMB DM.OPC,n,DCLS.F,EAXO
```

where n is the number of descriptors passed on the Argument/Parameter stack:

Parameters

- descriptor 0 : frames the OPCB
- descriptor 1 : frames the domain identifier of the caller
- descriptor 2: frames the entry descriptor of the file access domain returned by the Open File function
- descriptor 3 - n : access method specific

3.3.1 Buffer Management Specific Close

The Buffer Management Close is selected by setting
OP.DOM = 1.

Parameters

No additional descriptors are required by Buffer Management other than the three passed on the Argument/Parameter stack described in the general Close File function.

Buffer Management Specific OPCB for Close

The following access method specific portion of the Open-Close Command Block is required by Buffer Management.

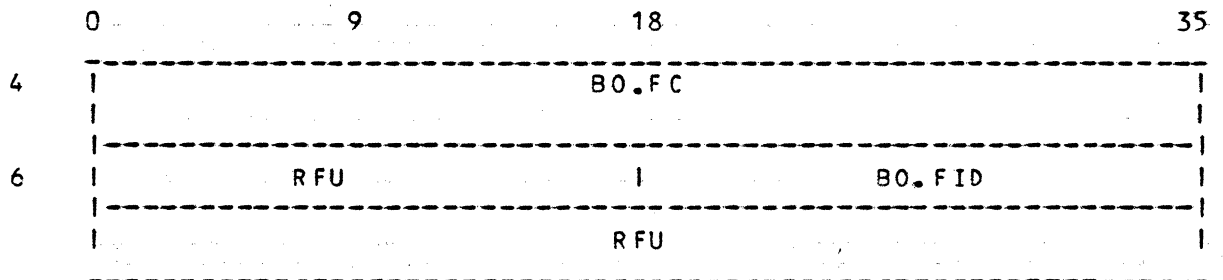


Figure 1.2-5. Buffer Management Specific OPCB for Close

OPCB Parameters

Input

BO.FC File code; 8 ASCII characters; left justified, blank filled
BO.FID File identifier; returned by the Open File function

Function

1. Search for Buffer Management file access domain based on input file code (BO.FC). Check the input entry descriptor for validity.
2. Decrement the number of times this domain has been opened. If zero, then flush the buffers and delete the local user-related structures.
3. If all files of the file set have been closed, release the buffers and delete the Buffer Management domain.

4 Buffer Reservation Functions

4.1 Reserve-Remove Buffers Command Block (RBCB)

This block is input to both the Reserve and Remove Buffers functions

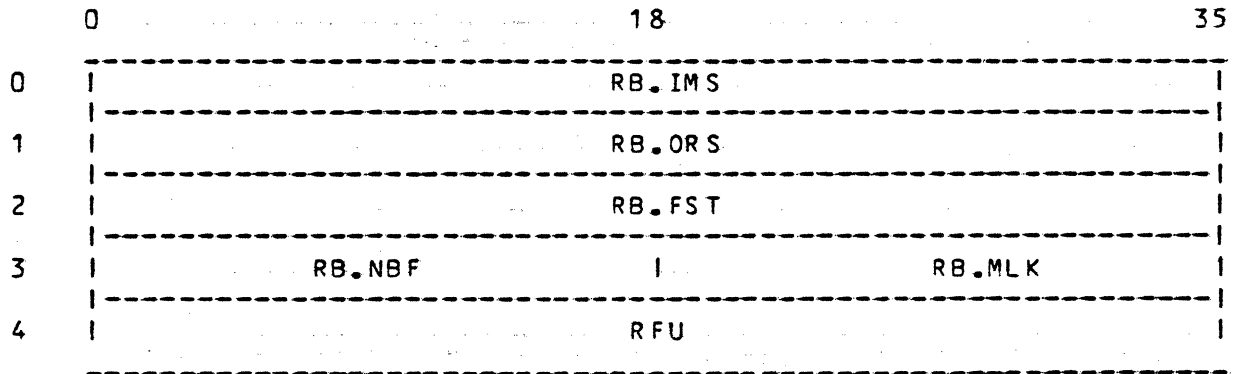


Figure 1.2-6. Reserve-Remove Buffers Command Block

RB.IMS Immediate status
RB.ORS Original status
RB.FST File set identifier
RB.NBF Number of buffers desired for the file set
RB.MLK Maximum number of buffers that can be locked
 at any one time for the file set

4.2 Reserve Buffers (DRSB.F)

This function reserves or allocates the required number of buffers from the buffer pool for a given file set. This function is designed to be used when the "deferred buffer reservation" option of the Open File function is specified at Buffer Management level.

Format

ICLIMB DM.OPC,1,DRSB.F,EAXO

Parameters

- descriptor 0 : frames the RBCB

RBCB Parameters

Input

RB.FST File set identifier for which the buffers are to be reserved; returned by the Open File function
RB.NBF Desired number of buffers for the file set.
RB.MLK Maximum number of buffers that can be locked for the file set.

Output

RB.IMS Immediate status
RB.ORS Original status

Status Codes

1 invalid file set identifier
2 buffers not available

Function

1. If the input values for RB.NBF and RB.MLK are greater than those previously specified (via an Open File function or another Reserve Buffers function), then use the input values.

2. If the required number of buffers has not yet been reserved, then decrement the "available number of buffers" count for the buffer pool, if necessary creating new buffers up to the maximum number of buffers for the buffer pool.

3. If the required number of buffers are not available, wait the process on a semaphore associated with the buffer pool. If the buffers are still not available after a pre-determined elapsed time, then return an error to the caller.

4. When the file is accessed via the Get Control Interval (GETCI) function of Buffer Management and the buffers have not yet been reserved, Buffer Management will call this

function to reserve the number of buffers specified when
the file was opened.

2.4.3 Remove_Buffers_(DRMB.F)

This function removes buffers from the reservation list and returns them to the buffer pool as available buffers.

Format

ICLIMB DM.OPC,1,DRMB.F,EAXO

Parameters

-descriptor 0 : frames the RBCB

RBCB_Parameters

Input

RB.FST File set identifier

Output

RB.IMS Immediate status

RB.ORS Original status

Status_Codes

1 invalid file set identifier

2 buffers have not been flushed

Function

The buffers that have been reserved for the specified file set are returned to the buffer pool as available buffers.

2.5 Global File Functions

2.5.1 Global Functions Command Block (GFCB)

	0	18	35
0		GF. IMS	
1		GF. ORS	
2		GF. FLG	GF. LVL

Figure 1.2-7. Global Functions Command Block

GF.IMS Immediate Status
GF.ORS Original Status
GF.FLG Flags
 G.FDLC -0 Delete Buffer Currencies
 G.FPJR -1 Physically journalize after images
GF.LVL Access level
 =0 process
 =1 work station
 =2 system

2.5.1.1 Global Flush (DGFL.F)

This function flushes all buffers of all open files at the specified access level. If the "delete buffer currencies" flag is set, each access method will be called to destroy its copy of the buffer currency.

Format

ICLIMB DM.OPC,1,DGFL.F,EAX0

Parameters

-descriptor 0 : frames the GFCB

GFCB Parameters

Input

GF.FLG Flags
 G.FDLC delete currencies
 G.FPJR physically journalize after images
GF.LVL Access level

Output

GF.IMS Immediate status
GF.ORS Original status

Function

For each open file at the specified level the following functions are performed:

- a. the access method domain is called to destroy its copy of the buffer currencies
- b. the buffer management domain is called to flush the buffers, specifying the two input flags G.FDLC and G.FPJR.

c. if the currencies are to be deleted (G.FDCL=1), then the Reservation Entry associated with this file is released, thus allowing use of the file by a different process.

2.5.2 Global_Close_(DGCL.F)

This function flushes the buffers and closes all files that are open at the specified access level.

Format

ICLIMB DM.OPC,1,DGCL.F,EAXO

Parameters

-descriptor 0 : frames the GFCB

GFCB_Parameters

Input

GF.LVL Access level

Output

GF.IMS Immediate status
GF.ORS Original status

Function

For each file that is open at the specified access level, the corresponding access method domain is called to close the file.

2.5.3 Global_Reset_Currencies_(DGRC.F)

This function calls each access method domain for each file that is open at the specified level to reset the record and buffer currencies. The buffers for each file are also flushed.

Format

ICLIMB DM.OPC,1,DGRC.F,EAXD

Parameters

- descriptor 0 : frames the GFCB

GFCB_Parameters

Input

GF.LVL Access level

Output

GF.IMS Immediate status

GF.ORS Original status

Function

For each file at the specified access level that is open, the following functions are performed:

- a. the access method domain for the file is called to reset the record and buffer currencies
- b. the buffer management domain is called to flush the buffers, specifying that currencies are to be deleted.

2.5.4 Global_Suspend_File_Usage

To be defined

2.6 File Information Function

2.6.1 File Information Control Block (FICB)

	0	9	18	35
0	FI. IMS			
1	FI. ORS			
2	FI. TYP	I	RFU	
3	RFU			
4	FI. FC			
6	FI. LFI			
8	FI. UFI			
10	RFU	I	FI. RST	I
11	FI. FUS		I	FI. FID
12	FI. NBF		I	FI. MLK
13	FI. FST			
14	RFU			
20	FI. RCB		I	FI. CIS
21	FI. ATR		I	FI. NCI
22	FI. BPN			
25	FI. CFZ		I	RFU
26	RFU			
29				

Figure 1.2-8. File Information Control Block (FICB)

2.6.2 Return_file_Information_(DRFI.F)

This function returns information about the file that is maintained in the Global Data Management domain. Five versions of the function govern the specific information returned as well as the manner of identifying the file on input.

Format

ICLIMB DM.OPC,1,DRFI.F,EAXO

Parameters

- descriptor 0 : frames the FICB

FICB_Parameters

Input

FI.TYP Function type; this parameter determines which version of the function is executed:
=1 FI.FC is input
 Groups I,II,III,IV are output
=2 FI.LFI is input
 Groups II,III are output
=3 FI.LFI is input
 Groups I,II,III,V are output
=4 FI.UFI is input
 Groups II,IV are output
=5 FI.UFI is input
 Groups I,II,IV,V are output
FI.FC File code; eight ASCII characters, left justified, blank filled
FI.LFI Local file identifier;
 SCT address (1 word)
 sector number of FD (1 word)
FI.UFI Unique file identifier (2 words)

Output

FI.IMS Immediate status
FI.ORS Original status

Group I (File Usage Information)

FI.RST Reservation type (9 bits)
FI.RE Reservation Entry for file
FI.FUS File Usage State
 F.IRSF -0 if on, file has been reserved
 F.IOPN -1 if on, file has been opened
 F.IFST -2 if on, file is a member of a file set
 F.IEOF -3 if on, the file is a sequential file and the current position is at the end of file
 F.IEOV -4 if on, the file is a tape file and the current position is at the end of volume

F.IURE -5 if on, an unrecoverable error has been encountered
FI.FID Buffer Management file identifier
FI.NBF Number of buffers desired for file set
FI.MLK Maximum number of buffers that can be locked
at any one time
FI.FST Buffer Management file set identifier

Group II (File Information)

FI.RCB Resource Control Block associated with file
FI.CIS Control Interval size
FI.ATR File attributes
F.ISHR -0 if on, file is sharable
F.IBEF -1 if on, file is protected by before journalization
F.IAFT -2 if on, file is protected by after journalization
F.IDUP -3 if on, file is protected by duplicate file
F.IPRM -4 if on, file is permanent
F.ITAP-5 if on, file is assigned to tape
6-8 RFU
F.IADF -9 if on, copy A of duplicate file is defective
F.IBDF -10 if on, copy B of duplicate file is defective
FI.NCI Number of Control Intervals per buffer
FI.BPN Buffer pool name assigned to file
FI.CFZ Current file size (in number of CI's)

Group III

FI.UFI Unique file identifier (2 words)

Group IV

FI.LFI Local file identifier (2 words)

Group V

FI.FC File code

Function

Depending on the type of request (FI.TYP), the caller identifies the file by inputting either the file code (FI.FC), the local file identifier (FI.LFI), or the unique file identifier (FI.UFI). Information about the file and about the usage of the file by the current process is returned in the FICB.