U N I V A C O S / 3 W O R K I N G P A P E R 8 4 5

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COMPONENT NO: A500	DATE: 08/29/80
SUBJECT: Job Control Tables	REVISION NO: 3
Section No:	
SPECIFIC CARBONEES:	

ABSTRACT:

This paper describes the tables in YSYSTEMTABLES and YRUN used by Job Control.

Revision 3 is an update to Revision 2.

1. INTRODUCTION

1.1 SCOPE

This paper describes the contents of the various job control tables used within the Release 6.0 OS/3 Operating System; VUT, LUT, SCP, Queue Tables, Job Directory, Job Step Directory, FRB, DTR, FUR, JVT, JRT, JSCD, Query Table, and WCT.

1.2 PURPOSE

The purpose of this paper is to describe the above mentioned tables.

2. COMPONENT SUMMARY

There are various tables used by the job control programs. These tables are summarized below. All system tables are in file 'YSYSTEMTABLES' on SYSRES. All job tables are in the YRUN file for that job on SYSRUN.

2.1 VUT

The VUT (Volume Use Table) contains information on all volumes used by jobs executing or scheduled in the system.

2.2 LUT

The LUT (Logical Unit Table) contains the device type and characteristics for every Logical Unit Number.

2.3 SCP

The SCP contains the queue entries for the active jobs. There are two blocks to accomodate 14 job slots.

2.4 QUEUE TABLES

The Queue Tables contain one entry for each job awaiting scheduling. There are three Queue Tables, one for each scheduling priority. A queue table entry contains the disk address of the JD, the FRB, and the JSCD.

2.5 JD

The JD (Job Directory) contains the disk address of every JSD for a given job.

2.6 JSD

The JSD (Job Step Directory) contains disk addresses of the information needed during processing of a single job step. The JSD contains the disk addresses of the FRB, the JRT, FCB's, alters, and imbedded data.

2.7 FRB

The FRB contains various items of job related information which must be maintained on disk throughout a job. The FRB contains the disk addresses of the DRT and JVT.

2.8 DRT

The DRT (Device Requirement Table) contains information about every device used by the job.

2.9 FUR

The FUR (Facilities for Unit Record) is a compressed form of the DPT containing information about only unit record devices. The FUR is contained in the same disk record as the FRB.

2.10 JVT

The JVT (Job Volume Table) contains information about all volumes used by this job, and about all autoconnect workstations.

2.11 JRT

The JRT (Job Requirement Table) contains a condensed version of the user job stream. There is one JRT for each job step.

2.12 JSCD

The JSCD (Job Shared Code Directory) contains a list of the shared entry points and modules required by the job.

2.13 QUERY TABLE

The Query Table contains a list of every label and job step in the job control. It contains the job step number and JRT entry number for them. It is only included if the query option is specified.

2.14 WCT

The WCT (Workstation Connect Table) contains label and user-id information for use in processing workstation connects and disconnects.

3. HARDWARE REQUIREMENTS

Any hardware on which OS/3 can run.

4. INTERFACE DESCRIPTION

4.1 RELATED SOFTWARE COMPONENTS

4.1.1 RUN Processor and OCL Processor

The Run Processor (or the OCL Processor) creates the job related tables - the JD, JSD, FRB, DRT, JVT, JRT, JSCD, Query Table, and WCT. Space is reserved for the FUR. The LUT is read. The resulting job is put into a Queue Table.

4.1.2 Scheduler

The scheduler reads the Queue Tables to find a job to schedule. It reads the job related tables - FRB, DRT, JVT and JSCD. It creates the FUR. It merges the JVT into the VUT. It adds the scheduled job to the SCP and removes it from the Queue.

4.1.3 Job Step Processor

The job step processor reads the job related JD, JSD (job step), JRT, FRB, FUR and Query Table. It updates the VUT as volumes are used. At job termination it deletes VUT entries, and removes the job from the SCP.

4.1.4 Queue Manipulation Utilities

The HO, BE, CH, DE, DI JBQ console commands access the Queue Tables.

4.1.5 SYSGEN

The system table file is allocated by SYSGEN. The file is on SYSRES with label "YSYSTEMTABLES". The relative record number of the first record in each table is an EQU in JCSTDEQU.

The amount of disk space to allocate must be computed. The SCP requires 2 records. The LUT requires 4 records. The number of records for the VUT is JC$VUBLK which is an EQU in the JCSTDEQU.

The number of records for each queue can be computed from user

supplied parameters giving the maximum number of jobs per queue; the formula is:

IF number-of-jobs ≥ QU$EPB then

number-of-records = ((number-of-jobs) /QU$EPB) + 2

else

number-of-records = 1.

There must be at least one record for each queue. The maximum number of jobs for each queue is stored in SIB variables SB$Q0MAX, SB$Q1MAX, and SB$Q2MAX.

These parameters should be selected so as to not waste disk space. The user must note the following facts when specifying these parameters:

- The first record of each queue table contains 7 job entries.
- Subsequent records contain 8 job entries.
- There will be one record for each queue, even if the maximum number of jobs for that queue is zero.
- The more tracks allocated to the System Table File, the greater the system initialization time.

For example, assuming an 8418 SYSRES (40 records per track):

	#records	#entries
Pre-emptive	1	7
High	6	39
Normal	11	79
Other tables	22	
	40	

If there are multiple supervisors, SYSGEN must allocate a System Table file with sufficient space to meet the largest requirements.

4.1.6 Supervisor Initialization

Supervisor initialization uses the table initialization symbiont JL$$TI to initialize YSYSTEMTABLES. Table initialization sets up the VUT, LUT, SCP, and Queue Tables. It puts the disk address of the file in SIB variable SB$SYSDA.

4.1.7 Interfaces Required

All interfaces to these tables should be via the DSECT's provided in the JCSTDEQU PROC.

4.1.8 CONNECT and FREE

The CONNECT and FREE processors read the WCT. When a match is found, the FCB is read and written, and the WCT is updated.

4.1.9 Other Users

Other users of these tables not in the job control area include the READFCB transcients, the OBTAIN transcient, the EXTEND transcient, the ALLOC transcient, ALTER, SETCS, and the REBUILD console command.

4.2 DATA BASES

These tables are the Data Base for Job Control.

4.3 OPERATOR INTERFACES

Not applicable.

4.4 USER INTERFACES

Not applicable.

5. FUNCTIONAL DESCRIPTION

The tables are contained in either a single 256 byte disk record or in many disk records linked by a physical disk address in the last four bytes of a record. The LUT and the VUT are not linked and are normally accessed by multi-sector IO.

Access to the tables is normally thru the JCAT subroutine. JCAT uses PIOCS. JCAT normally reads tables as linked records but also has provision for multi-sector read as indicated in the discussion of the JCAT keys in the JSD section below.

Most of the tables have DSECTs in the JCSTDEQU. These tables have three additional EQU's in the JCSTDEQU. The one EQU gives the number of bytes in a single table entry. Another gives the number of entries in a single disk record. Another EQU gives the number of bytes used by table entries within a disk record.

5.1 SYSTEM TABLES

The system tables are in a file on SYSRES with label 'YSYSTEMTABLES'. This file is in the VTOC and is accessed by PIOCS only. The disk address of the first record in the file is in SIB variable SB$SYSDA.

The relative record number of the first record of each system table is defined by an EQU in the JCSTDEQU.

JC$VUTRN	VUT
JC$QT0RN	Pre-emptive queue
JC$QT1RN	High priority queue
JC$QT2RN	Normal priority queue
JC$SCPRN	Scope Slots 1 thru 7
JC$SC2RN	Scope Slots 8 thru 14
JC$LUTRN	Logical Unit Table
JC$FRERN	First unused (free) record

The file is allocated by SYSGEN and initialized by supervisor initialization as described in 4.1.6 and 4.1.7 above.

5.1.1 VUT

The VUT consists of a sequence of 22 byte entries contained in a contiguous (not linked) disk area of JC$VUBLK records. The first disk address used by the VUT is at relative record number JC$VUTRN. The number of VUT records actually in use is maintained in SIB variable SB$JCVUT.

The VUT is accessed thru JCAT with key bSbVUT00. The DSECT for the VUT is in JCSTDEQU.

The VUT describes volumes and volume devices which are being used or will be used by jobs currently executing or scheduled. When a job is scheduled, its JVT is merged with the VUT. When a job terminates, a mask is set in the SIB, SB$JCMSK which indicates that VUT entries for the indicated job slots are invalid. The scheduler then clears these entries from the VUT. The last entry in the VUT, which may be a null entry, has the end bit, BJ$VEND, set.

Dynamic get device, GETDVC, also puts entries in the VUT. They are removed by dynamic free device, FREEDVC.

JC$VVSN	CL6	Volume serial number of the volume which this entry describes. There is only one

		entry with a given VSN in the VUT at any time. For inherited volume entries (BJ$$VIV set) the VSN is 4 blanks, the job slot number, and a sequential number.
JC$VLUN	C	DRT number (JVT only)
JC$VFLG1	C	Flag bits as below:
BJ$VALC	X'80'	A pub is allocated to this entry.
BJ$VRES	X'40'	A pub is reserved for this entry.
BJ$VMTWG	X'20'	For internal job step processor use.
BJ$VTBMT	X'10'	Volume must be mounted, pub is allocated.
BJ$VDNS	X'08'	The device which this volume is mounted on is not shareable because another volume will be mounted on the same device in a later job step.
BJ$VVNS	X'04'	The volume is not shareable because it will be mounted on another device in a later job step.
BJ$VVN	X'02'	The volume is not shareable due to 'NS' specified on the // VOL card.
BJ$VSEQ	X'01'	The volume is a sequential volume in a multi-volume file or is a resolved alternate or optional device. It is not shareable.
JC$VFLG2	C	Flag bits as below:
BJ$VID	X'80'	Inherit device; this volume will be used on a device presently being used by some other volume.
BJ$VIV	X'40'	Inherit volume. This is a dummy entry for a device which will use a volume currently on some other device.
BJ$VPERM	X'10'	Permanent VUT entry. This volume is a system volume and is always allocated to all job slots.
BJ$VSHD	X'08'	This device will inherit a volume during the job step but not at the start. The mount message will be issued by Data Management.
BJ$VEND	X'04'	This is the last entry in the VUT.

BJ$VOPT	X'02'	Unresolved alternate or optional volume.
JC$VDNI	C	Device non-shareable index; index number (1 to 255) of VUT entry which will next use this device. This entry has BJ$VDNS set. The indexed entry will have BJ$VID set and indexes back to this entry with BJ$VIDI.
JC$VIDI	C	Inherit device index; index number (1 to 255) of VUT entry which is previously mounted on the device that this volume will use. This entry has BJ$VID set. The indexed entry has BJ$VDNS set and indexes this entry with BJ$VDNI.
JC$VVNI	C	Volume non-shareable index; index number (1 to 255) of dummy VUT entry for the next device to use this volume. This entry has BJ$VVNS set. The indexed entry has BJ$VIV set.
JC$VLDT	CL2	Logical device type and subtype required by this volume.
JC$VFEAT	CL2	Features required by this volume.
JC$VPUB1	H	Reserved pub address.
JC$VPUB2	H	Allocated pub address.
JC$VUCDE	CL2	User job bit mask. The bit is set if the job requires this volume. It is cleared when the job no longer requires this volume. If this mask is zero the entry is null.

5.1.2 LUT

The Logical Unit Table consists of 256 4 byte entries contained in four disk records read with a multi-sector read. The LUT is accessed thru JCAT with key bSbLUT00. Each LUT entry contains the device type and characteristics associated with that DVC number by SYSGEN.

5.1.3 SCP

The scope table consists of two block which contain the queue entries for active or rolled out jobs. One scope block is for job slots 1 thru 7 and the other is for 8 thru 14. The SCP is accessed thru JCAT with key ØSØSCP00 for the first block and with key ØSØSC2000 for the second. The DSECT for the SCP is in the

JCSTDEQU.

JC$SCNAM	7CL9	These 7 entries comprise the top console line. Each entry either contains a job name or the empty slot number.
	C	One byte filler for a 64 byte console line.
JC$SCQUE	7CL(QU$LEN-6)	These 7 entries contain the queue entries for the active jobs for that job slot. Due to space restrictions, the disk address of the JSCD is truncated from the queue entry.
JC$SCNUM	PL2	This contains the slot number times ten of the first slot in this block. It contains either 10 or 80.

5.1.4 Queue Tables

A Queue Table consists of a sequence of 30 byte entries maintained in the linked record format. The Queue Tables are accessed thru JCAT with keys bSbQTi00. There may be up to 32767 entries per queue. See Section 4.1.6 above for discussion of specification of maximum number of entries per queue. The last entry in the queue, which may be a null entry or may be the header entry, has the end bit JB$END, set.

Each queue entry contains information about a job that has been processed by the run processor. A job in a queue may be in:

schedule status	job is awaiting scheduling
hold status	job was in schedule status but now may not be scheduled
save status	job is awaiting a save to YJCS by the JL$$SV symbiont

When a job goes into execution, it is removed from the queue.

The first entry in each queue contains queue information and is Not a job entry. This first entry is called the header entry. There are 3 Queue Tables in the system:

QT2	Normal priority queue.
QT1	High priority queue. No jobs from the normal

priority queue will be scheduled if the high priority queue contains any jobs not in hold status.

QTO — Pre-emptive priority queue. No jobs from the normal or high priority queues will be scheduled if the pre-emptive priority queue contains any jobs not in hold status. If all necessary resources, except memory, are available, a pre-emptive job will cause normal and high priority jobs to be rolled out of memory so as to make memory available, if rollout is configured.

The DSECT for the QUEUE Tables is in the JCSTDEQU.

Queue First Entry

QU$SPFLG	XL2	Queue Flags.
JB$HNEWR	X'20'	When putting jobs into this queue, put jobs from a remote source into hold status.
JB$HNEWL	X'10'	When putting jobs into this queue, put jobs from a local spurce into hold status.
JE$HNEWW	X'08'	When putting jobs into this queue, put jobs from a workstation into hold status.
JE$END	X'02'	This is the last queue entry.
JE$FIRST	X'01'	This is the queue first entry.
QU$SPFLG+1		Contains queue number - 0, 1, or 2, in low 4 bits.
QU$MAX	H	Maximum possible number of jobs in this queue.
QU$NOENT	H	Current number of entries in this queue.
QU$NOACT	H	Number of entries in this queue available to be scheduled - not in hold status.
QU$NOCLR	H	Number of cleared entries in the queue. When QU$NOCLR becomes equal to QU$EPB the queue is compressed.
QU$RLVSN	CL6	Volume serial number of the run

		Library.
QU$EOQDA	CL4	Disk address of record containing the last entry in this queue.

Queue Job Entries

QU$JBLFG	XL2	Queue Job flags
JB$REM	X'80'	Job is from a remote source.
JB$SAVE	X'40'	Job is to be saved by SAVE symbiont.
JB$HLDJB	X'20'	Job is in hold status.
JB$NOSCD	X'10'	After job is saved, remove it from queue. If this bit is clear, then leave in queue with JB$SAVE bit cleared. If set the job is not included in QU$NOACT count. If not set the JB$HLDJB bit determines if it is included in QU$NOACT.
JB$SHARE	X'08'	Job uses shared code.
JB$ROLL	X'04'	Job is rolled out.
JB$END	X'02'	Last queue entry (may be set in null entry).
QU$JBFLG+1		Contains flags in high 4 bits and queue number - 0, 1, or 2 in low 4 bits.
JB$WKSTN	X'80'	Job is from a workstation.
QU$JBNAM	CL8	Job name; if first byte is X'00' this entry is null.
QU$MSTID	CL6	Master user-id. First byte of X'00', implies the system console.
QU$MEMSZ	H	Minimum memory size in 256 byte increments.
QU$DIF	H	Difference between maximum and minimum memory sizes from job card in 256 byte increments.
QU$FRB	CL4	Disk address of job's FRB.

QU$SHARE	CL4	Disk address of job's JSCD. Zero if job does not used shared code.
QU$STAT	H	reason code for why the job did not schedule.

5.2 RUN LIBRARY

Each job has a run library file on SYSRUN with label '$YSRUN job name'. This file has two parts: a job control part and a librarian part. The job control part is accessed by PIOCS, normally by the JCAT subroutine. The disk address of the first record in the run library is in preamble variable JP$RLD.

A job consists of up to 255 job steps. The job directory (JD) contains the disk address of the job step directory (JSD) for each job step. The JSD points to tables containing both job and job step information. To minimize disk access by the scheduler the queue table also contains the FRB disk address.

5.2.1 JD

The JD contains 28 bytes of disk file relevant information followed by 255 4 byte disk addresses of the JSDs. The JD is maintained in 5 disk records. The first JD record is the first record in the run library.

The format of the first JD block:

	bytes		
JDO(1)	0-3	CL4	Disk address second JD block.
JDO(2)	4-7	CL4	Disk address third JD block.
JDO(3)	8-11	CL4	Disk address fourth JD block.
JDO(4)	12-15	CL4	Disk address fifth JD block.
JH$RPT	18	C	Run library records per track.
JH$TPC	19	C	Run library tracks per cylinder.
JH$NXTCC	20-23	CL4	Disk address of next available record in the run library. Set to greater than JH$LSTCC if an extend is necessary.
JH$LSTCC	24-27	CL4	Disk address of last record currently allocated the run

		Library.
28-255	57CL4	Disk addresses of JSD(1) thru JSD(57).

The format of the second thru fifth JD blocks:

bytes		
0-227	57CL4	Disk address of a JSD. (Only the first 108 bytes 27 entries are used in the fifth JD.)
228-255	CL28	Not used.

5.2.2 JSD

There is one JSD for each job step. There is always one more JSD than there are job steps specified in a user program. The last JSD is used to close files at the end of a job.

The JSD consists of a sequence 14 byte entries maintained in the linked record format. Each JSD entry consists of an 8 byte key name, a 4 byte disk address and 2 flag bytes. The last JSD entry is all binary zeros. The JSD is normally accessed by JCAT which scans the JSD for a given key name in order to obtain the necessary disk address.

The DSECT for the JSD entries, also called JCAT keys, is in JCSTDEQU.

JC$KNAME	CL8	The keyname.
JC$KFLG	C	Flag bytes.
BJ$KDEL	X'80'	Delete this key, it will not be used in the next job step.
BJ$KALTR	X'40'	An alter phase name.
BJ$KMSR	X'20'	A multi-sector disk access is used for the data pointed to by this key. The number at sectors is in JC$KLNG.
BJ$KDUP	X'10'	This is the key for an FCB which is also in the previous JSD.
BJ$KSFCB	X'08'	This is the key for a system supplied FCB.
BJ$KSRUN	X'04'	Only used if BJ$KSFCB is set.

System file is on RUN device.

JC$KLNG	C	Number of sectors for multi-sector. Otherwise for user use.
JC$KDISK	CL4	Disk address of data.

The key names in the JSD are of the following types:

bJbXXXXX	Job related tables.
bJbJRTCO	JRT always in each JSD.
bJbFRBOO	FRB always in each JSD.

File LFD Names

The following LFD's are automatically in each JSD:

YRUN

YLOD

YSRC

YMAC

YOBJ

YJCS

bCbDTAnn	Imbedded data, NN is the binary data set number within job step.
Phase name	Alter statement.

5.2.3 FRB

The FRB contains 88 bytes of information about the job. The remaining 168 bytes in the FRB's disk record contain the FUR. The FRB is accessed thru the JSD with key bJbFRBOO or directly from the disk address in the queue entry. The DSECT for the FRB is in JCSTDEQU. The comments in this DSECT are self-explanatory.

5.2.4 DRT

The DRT contains up to 255 8-byte entries maintained in linked records. The DRT is accessed from the JC$FDRT disk address in the FRB. The number of DRT entries for a given job is in FRB entry JC$FDRTN. There is one DRT entry for every device used by the job. The DSECT for the DRT is in JCSTDEQU.

JC$DRLUN	C	In run processor: Logical

		unit number from DVC statement. In run library: DRT entry number on creation. The DRT is sorted so these numbers are a key for access of the DRT. They are used in the JVT, FUR, and JRT-DVC entry.
JC$DRFLG	C	Flag byte.
BJ$DRALT	X'80'	ALT specified on DVC statement.
BJ$DROPT	X'40'	OPT specified on DVC statement.
BJ$DRPD	X'20'	Physical device in JC$DRPD, specified on DVC statement.
BJ$DREQU	X'10'	EQU statement for this LUN.
BJ$DRRES	X'08'	This device is SYSRES.
BJ$DRFRE	X'04'	Used by run processor.
BJ$DRRUN	X'02'	This device is SYSRUN.
BJ$DRSD	X'01'	Device is shareable-used by run processor.
JC$DRPD	CL2	Physical device id if BJ$DRPD is set. If BJ$DRPD is not set for a workstaion type entry, this field contains the pub address of a connected workstation or zero.
JC$DRTYP	CL4	Device type and characteristics from LUT (JC$DRLUN).

5.2.5 FUR

The FUR is maintained in the remaining bytes in the FRBs disk record. The FUR contains one entry for each unit record (printer, reader, punch) device. The FUR consists of a maximum of 56 3 byte entries. The DSECT for the FUR is in JCSTDEQU.

JC$FRPUB	CL2	Pub address assigned by scheduler.
JC$FRDRT	C	The DRT number for linking from the JRT DVC entry to the FUR.

5.2.6 JVT

The JVT contains up to 255 12-byte entries maintained in linked records. The JVT is accessed from the JC$FJVT disk address in the FRB. The JVT contains information on all volume devices used by the job. The JVT is merged into the VUT by the scheduler. The DSECT for the JVT is in JCSTDEQU.

The JVT entry's fields have the same uses as those in the first 12 bytes of the VUT; except:

JC$VLUN	C	DRT number for DRT access.

5.2.7 JRT

The JRT consists of a sequence of 16 byte entries maintained in linked records. The JRT is accessed thru the JSD with key ␣J␣bJRT0C. The JRT contains a condensed version of the users job stream for each job step. The JRT DSECT's are in JCSTDEQU.

JR$JSN	C	Job step number.
JR$CDE	C	Code for type of SRT entry:
		1 DVC statement
		2 LFD statement
		3 EXEC statement
		4 OPTION statement
		5 SET statement
		6 OPR statement
		7 MTC statement
		8 SKIP statement
		9 FREE statement
		10 PAUSE statement
		11 SCR statement
		12 Alternate LFD for EXEC
		13 RUN,CC statement
		14 RENAME Statement
		15 SFT statement

JR$SPAR	CL14	JRT entry information.

5.2.7.1 DVC statement

DVCDRT	C	DRT entry number.
DVCVSN	CL6	VSN from VOL statement.
DVCMOD	C	Mode characteristics of tape from VOL statement.
DVCFLG	C	Flags.
BJ$DRES	X'80'	SYSRES device.
BJ$DIGN	X'40'	Ignore specified on DVC statement.
BJ$DVOL	X'20'	Is a volume device.
BJ$DNOV	X'10'	NOVOL on VOL statement.
BJ$DRUN	X'08'	SYSRUN device.
BJ$DRPP	X'04'	Unit record device - FUR entry will be created.
BJ$DUVSN	X'02'	Duplicate VSN.
BJ$DNIVT	X'01'	Volume device which is in JVT and SVT (not RES or RUN).
DVCFLG2	C	Flag byte.
BJ$DCNT	X'80'	Block number feature on VOL statement.
BJ$DNCNT	X'40'	Block number features not on VOL statement.
BJ$SPLIT	X'20'	8415 disk.
BJ$DALT	X'10'	ALT specified on DVC statement.
BJ$DOPT	X'08'	OPT specified on DVC statement.

5.2.7.2 LFD Statement

LFDNAM	CL8	File's LFD name.
LFDFLG	C	Flag byte.

BJ$LSYS	X'80'	Job step temporary file.
BJ$LEXT	X'20'	Do allocation there is an ERB for this file.
BJ$LSYSJ	X'08'	Job temporary file.
BJ$LWSTN	X'04'	workstation device.
BJ$LREPL	X'02'	On ec36 from allocation, give user RIC option. User always is given this option if SIB bit BB$LREPL is set.
LFDADR	CL4	Disk address of FCB.

5.2.7.3 EXEC Statement

EXPRG	CL8	Program name - load module to execute.
EXFLG	C	Flag byte.
BJ$ERUN	X'80'	Load module is in YRUN.
BJ$ERBP	X'40'	EXRBP is valid.
BJ$ALT	X'20'	Program is in alternate library; following JRT entry (code 12) gives LFD name.
BJ$ALSFT	X'10'	SFT follows. (same as BJ$SHSFT bit)
BJ$EXCAB	X'08'	Skip on abnormal termination. Skip information is in the JRT for the next step.
EXPRI	C	Execution time priority.
EXRBP	XL3	Relative block number in library for loader to start searching for program.
EXEMB	X	Number of imbedded data sets.

5.2.7.4 OPTION

OPTMON	CL2	Option flags (bit 8000 indicates an alter is

present).

OPTQNAME	CL8	Label name of query option.
OPTQUERY	C	Query option flags, not used.

5.2.7.5 SET

SETCDE	C	Type of set to perform.

01	SETCUPSI	set UPSI byte
02	SETCCOM	set communications region
03	SETDDTE	set packed decimal date
04	SETEDTE	set EBCDIC date
05	SETBDTE	set binary date

If SETCUPSI

SETPAR1	C	UPSI byte "AND" mask to reset selected bits.
SETPAR2	C	UPSI byte "OR" mask to set selected bits.

If SETCCOM

SETPAR1	C	Number of bytes to move into communications region.
SETPAR2	C	Bytes to move into the communications region.

If SETDDTE

SETPAR1	PL4	Packed decimal date to move into JPSDAT for system date.

If SETEDTE

SETPAR1	CL6	EBCDIC date to move into JPSDMDE for tape file dates.

If SETBDTE

SETPARL	XL4	Discontinuous binary data to move into JP$DMDB for disk file dates.

5.2.7.6 OPR

OPRLGTH	C	Message length.
OPRFLG	C	Flags.
OPRFUID	X'80'	First 6 characters in 12 byte pause (JRT) entry contain workstation userid.
OPRLUID	X'40'	Second 6 characters in 12 byte pause (JRT) entry contain workstation user-id.
OPRUIDND	X'20'	End of pause (JRT) entries
OPRMAS	X'80'	'YMAS' was specified on the // PAUSE statement.
OPRCON	X'04'	'YCON' was specified on the //PAUSE statement.
OPRMSG	CL12	12 bytes of message. If the message length is greater than 12 bytes, the OPRMSG field is successive OPR JRT entries contains the remaining bytes of the message.

5.2.7.7 MTC

MTCCDE	C	Numeric code of MTC operation.
		27 BB space backward blocks
		2f BM space backward tape marks
		37 FB space forward blocks
		3F FM space forward tape marks
		1F WM write tape marks

		07 RL rewind to load point
		0F RU rewind and unload
MTCFCB	CL4	disk address of FCB.
MTCNUM	CL4	Number of blocks or tape marks to be spaced or written.

5.2.7.8 SKIP

SKPSTEP	H	Job step number to skip to.
SKPJRT	H	JRT entry number within job step to SKIP to.
SKPMSK	X	Bit mask.
		If bit mask is all zero, then skip unconditionally; or
		if for any bit in the bit mask which is set, there is a corresponding bit in the UPSI byte which is set; then skip; or
		otherwise use the next JRT entry.
SKPLFG	C	Flags
BJ$SKPAB	X'80'	Skip if abnormal termination of previous job step.
SKPQTNUM	H	Number of query table entries to skip over.
SKPADDR	CL4	disk address of query table.

5.2.7.9 FREE

FREFLGS	X	Flag byte.
BJ$FVSN	X'80'	Free a VSN device.
BJ$FLUN	X'40'	Free a device, not just a file on that device.
BJ$FUR	X'20'	Free unit record device.

BJ$FFIL	X'10'	Free a file, not a device.
BJ$FALT	X'08'	Free just the alternate devices.
BJ$FWSTN	X'04'	workstation device.
FREPTR	CL4	Disk address of FCB.
FREVSN	CL6	VSN of device to free if BJ$FVSN is set.
FRELUN	X	Run processor internal use.

5.2.7.10 PAUSE

PAUSELNG	X	Lengths of message.
OPRFLG	C	Flags as shown in Section 5.2.7.6 (OPR).
PAUSEMSG	CL12	12 bytes of message. If the message length is greater than 12 bytes, the PAUSEMSG field in successive PAUSE JRT entries contains the remaining bytes of the message.

5.2.7.11 SCR

SCRADDR	CL4	Disk address of FCB to scratch.
SCRFLG	C	Flag byte.
BJ$SCRWF	80	Scratch of all step temporary files.
BJ$SCRWJ	40	Scratch of all job temporary files.
SCRFUN	H	Type of scratch. X'00' scratch specific file X'82' scratch by date X'83' scratch by prefix X'84' scratch by extent (not implemented).
SCRDAT	XL3	Discontinues binary date for scratch by date.

SCRPRE	CL4	EBCDIC prefix for scratch by prefix.

5.2.7.12 Alternate Library LFD

LFDNAM	CL8	Alternate library LFD from EXEC card.
LFDFLG	C	Flag byte.
BJSSHSFT	X'10'	SFT entry follows.
LFDADR	CLR	Disk address of FCB.

5.2.7.13 RUN, CC

RUNENLN	X	length of CALLSYM string
RUNFLG	X	flags
RUNJBNB	CL12	CALLSYM string. If the string is greater than 12 bytes, the RUNJBNB field in successive RUNJRT entries contains the remaining bytes of the string.

5.2.7.14 RENAME

RENADR	CL4	Disk address of FCB to rename.
RENFILE	CL9	First 9 bytes of new file name. Remaining bytes for 44 character file name are always on the following three JRT entries.

5.2.7.15 SFT

SFTNAME	CL8	Entry point name of a shared module which could not be extracted from the load module by the run processor. (Load module may not exist.)

5.2.8 JSCD

The JSCD consists of a sequence of 13 byte entries maintained in linked records. The disk address of the JSCD is in QU$SHARE in the jobs queue table entry. The JSCD contains a list of the shared modules required by the job. Following each module entry is a list of all the entry points in that module.

The JSCD DSECT is in the JCSTDEQU.

JC$MDID	C	Entry type indicator.
BJ$MDBLK	X'01'	Module.
BJ$EPBLK	X'02'	Entry point.

If module:

JC$MDNAM	CL8	Name of module.
JC$MDLEV	C	Level.
JC$MDLNG	CL2	Module length.
JC$MDCNT	C	Number of entry pp ints for this module.

If entry point:

JC$EPNAM	CL8	Name of entry point.
JC$EPADR	CL4	Relative address of entry point within module.

5.2.9 Query Table

The query table consists of a sequence of 12 byte entries maintained in linked records. The disk address of the query table is in the JRT skip statement entry. The query table contains the job step number and JRT entry number for every label in the job control.

The query table also contains the job step number for every job step referenced by the program name on the EXEC statement. The query table DSECT is in the JCSTDEQU.

QUERYNAM	CL8	Label name or program name.
QUERYFLG	C	Flags.
BJ$QLABL	X'80'	Label entry.

BJ$QPROG	X'40'	Program entry.
QUERYSTP	C	Job step number.
QUERYJRT	CL2	JRT entry number within job step.

5.2.10 WCT

The WCT consists of a sequence of variable length entries maintained in linked records. The WCT is accessed directly from the disk address put in the preamble at the start of job by GETJOB or from the disk address in FRB field JC$FWCT. The WCT consists of a 28-byte section containing file information followed by a sequence of 12-byte records containing user connect information. The WCT contains workstation data file external labels and other information to aid the CONNECT and FREE processors, which use the WCT to quickly find the desired FCB.

The WCT DSECT is in the JCSTDEQU. The WCT file information is as follows:

WCT$FLG	CL1	Flags; see WCT$FLGU below for detail
WCT$LBL	CL17	Label name or LFD name examined by connect.
WCT$FCB	CL4	FCB disk address (CCRH)
WCT$TYP	CL4	Acceptable type and characteristics from logical unit number on DVC statement.
WCTSSTEP	CL1	Step number of a FREE statement for this file. Connect and FREE commands ignore this WCT entry if the actual step number is greater than or equal to this field.
WCT#NEXT	CL1	displacement from start of disk block to next WCT entry in the block. Zero if no more entries in this block.

The WCT user id information is as follows:

WCT$FLGU	CL1	Flags.
WCB$UID	X'80'	This is a user id appendage.
WCB$WCT	X'40'	This is a WCT preamble.
WCB$LAST	X'20'	This is the last entry in the WCT.
WCB$OPT	X'10'	Optional correct.
WCB$PDC	X'08'	A physical device connect.
WCB$UIDC	X'04'	A user id connect.
WCB$REQ	X'02'	Required to be connected for job to go into execution.
WCB$MSTR	X'01'	Auto-connect to the master.
WCT$UID	CL6	The user id of the connected user. If not a user id connect entry, this field is zeroed if no user is connected. If a user id connect entry, this is the user id that may connect.
WCT$PUB	CL2	Pub address connected to zero is not connected.
WCT$PD	CL2	Physical device id for physical device connect
WCT$DRT	CL1	DRT entry number. So CONNECT can put connected pub address in DRT for scheduler.

6. PERFORMANCE

The new table format will have different processing requirements.

The run processors performance should not noticeably change. For small size jobs the scheduler and job step processor should be faster due to reduced disk access and improved algorithm. For medium size jobs the scheduler and job step processor performance should be unchanged or slightly faster.

For large jobs the scheduler and job step processor performance should be unchanged or slightly slower. However, these tables offer a new capability to accept very large jobs which previously would cause table overflow.

7. COMPATIBILITY

These new table formats require extensive changes to the scheduler and to JCAT. Some changes to the run processor, OCL processor, job step processor, SYSGEN, system initialization, and SETREL are required. Minor changes to all code which searches the job step directory is also required.

The user interface is completely compatible.

8. CONVERSION

Already covered.

9. DOCUMENTATION AND SUPPORT

9.1 INTERNAL DOCUMENTATION

142 Initialization, interface, and use of Run Library

124E Job Control Access Technique (JCAT)

178 Job Scheduler

192 Run Processor

231 Interstep Processor

9.2 USER DOCUMENTATION

The following manuals will have minor additions:

UP-8217 Job Control Programmer Reference

UP-8065 Job Control User Guide

Include upper limits in Section 10 below.

10. RESTRICTIONS

The new table formats will permit the following upper limits:

151 volumes per user job

151 volumes for all jobs active (or rolled out) in the system

48 unit record devices per job

up to 32767 jobs per queue depending on SYSGEN option

On warm start with a different supervisor, the maximum number jobs per queue of the previous supervisor is used.

A full track must be allocated for the system table file and run library even though less may be needed. This is an OS/3 not a job control restriction.

11. MAINTAINABILITY AND RELIABILITY

These tables have no redundancy or cross checking. A failure could cause the run processor, scheduler, or job step processor to abnormally terminate; or could cause the user job to execute erroneously. This is no change from the previous versions.

12. RELATED DOCUMENTS

See Section 9.1.

13. STANDARD DEVIATIONS

None known.

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