

NOTES ON THE USE OF THE 360/44 PROGRAMMING SYSTEM MONITOR

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These notes are intended as a supplement to "Introduction to the Use of FORTRAN IV under the 360/44 Programming System Monitor".

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I. IPL (Initial Program Loading)

To start the programming system monitor (or restart after a drastic failure) the program PS/44 must be loaded from a disk into the computer. There are presently two versions to choose from: 'Release 6' and 'Release 7'. Normally 'Release 7' is preferable, but 'Release 6' must be used to produce object decks from FORTRAN source decks (unfortunately). These disks have the labels:

Release 6	Old	(Release 6)	CIT
	PS-44	'IPSD00'	033

Release 7	PS-44	'IPSD00'	CIT
			037

The IPL procedure is as follows (this can also be found in the notebook "Operating Procedures for Various 360/44 Systems" on the console of the 360/44).

1. Mount the appropriate disk on any of the 5 disk units, and place the plastic identification cylinder numbered 194 into the corresponding receptacle. (In principle, one of the 360/75 operators should do this.)

2. On the 44 console, dial the load unit switches to 194. Push 'Stop', 'System Reset', and 'Load'.

3. Load the 2-card IPL deck onto the card reader. Push 'End of File' and 'Start'. (See note on the card reader for some words about the card reader buttons.)

The IPL deck looks like:

```
// ✕ SET ✕ 70365          (Card 1)
/&                        (Card 2)
```

where 70365 is the date (70 = year, 365 = day). It appears that the correct date is not necessary. However, this data may affect disk data set with an expiration date defined.

4. The console typewriter will type:

```
IA891 M 104 IPSD00
IA841 DEF IPL UNITS
IA90A M ALL REQ DISKS
```

The third line calls for the operator to mount all required disks (Step 1 above). Then type 'EOB' -- end of block. This is done by simultaneously pressing the 'Alternate Coding' key and the '5' key. Do not type the letters 'E' - 'O' - 'B'.

5. The typewriter will then type:

```
IA821 JC INIT DØNE
```

```
FA83A INT REQ OOA
```

You may now begin processing your jobs.

An alternate procedure which avoids the IPL deck is described in the IBM Manual "System 360 Model 44 Programming System Operator's Guide".

II. 360/44 Typewriter Commands

There are several common typewriter messages which demand operator response. Conversely, there are several commands the operator can give the computer from the console.

Typewriter Messages

IA90A M ALL REQ DISKS

Mount any disks you've forgotten and type the 'End of Block' command to continue (see Note 1).

FA83A INT REQ 00A

Load a job program onto the card reader, push 'End of File' and 'Start'. The '00A' in the message refers to unit '00A' which is the card reader.

FA80A INT REQ 00A

The card reader usually wants a /* card to terminate the present job stop, or a /& card to terminate the job. This is likely to occur if the job has failed, or a deck is being punched. Sometimes, simply load a new job.

Load the appropriate cards , push 'End of File' and 'Start'. If you loaded a /& card, the typewriter will probably write FA83A

FA99A INT REQ 00A

The card reader wants a deck of blank cards to punch or wants to change from punch back to read. Since the read and punch units are combined into one, you must remove any further programs from the hopper before putting in the blank cards or vice versa. Push 'Start'.

FA99A INT REQ 00B

Unit 00B is the printer. It is probably not turned on. Push 'Start'. If this doesn't work it's sick. If in doubt, see a 360/75 operator.

The typewriter also prints out various error messages, e.g., IA01I STMNT FMT ERR. These must be looked up in one of the IBM manuals in the blue notebook on the 44 console.

Operator Commands

The operator gets the attention of the typewriter by pressing the 'Request' key. The sense light 'Procd' must come on before proceeding.

CANCEL

The most common command is CANCEL, used to terminate a job. After typing CANCEL, type the end of block command.

DUMP

Produces a dump of the current job, as well as terminating it. If you have already typed CANCEL to stop the job, it is too late to type DUMP.

Note: Dumps are time consuming.

Other commands are described on pages 14-19 of the IBM "360/44 Programming System Operator's Guide".

If you mistype, you may cancel the whole line by pressing the 'ALTERNATE C/DING' and 'CANCEL' keys simultaneously.

III. Card Reader/Punch

The 44 card reader and punch are combined into a single unit, labelled 00A. This particular unit is old, and the punch is touchy. It can be opened by lifting the two hinged top panels and unhooking the back panel. It may be operated with these panels open. The chip box is behind the front lower left (blue) panel.

Reader

To clear out old cards press 'Stop' and 'NPRO'.

Load your deck in the hopper and place the card follower on top of it. You must press 'End of File' if you wish the last card of your deck to be read. The 'End of File' light will not go on if the deck is small and the card follower is not in place. Then press 'Start'.

If the 'Check' light comes on during reading, you're in trouble. Lift off the remaining cards and press 'Stop' and 'NPRO' to clear out the reader. the 'NPRO' will not work if cards remain in the hopper, or if the 'End of File' light is on. Pressing 'Stop' cures the latter. Remember to press 'End of File' before starting again.

At this time the 'Check' light is still on. Try reloading all the cards for the job step that failed. Press 'End of File' and 'Start'. The 'Check' light should now go off and the reading commence. If the 'Check' light comes on again you get an automatic ABEND. Start the whole job over. Good luck!

The card reader may be stopped at any time by pressing 'Stop'. Push 'Start' to continue.

Punch

If you plan to punch a deck, the typewriter will type FA99A INT REQ 00A when it needs blank cards. Push 'Stop' and 'NPRO' to clear out the source deck, load the blank cards, card follower, and push 'Start'. If the punch runs out of cards, it will type FA99A ... again. Load more on and push 'Start'.

If you plan to produce an object deck for a second source deck, it is best not to load the second source deck until the first object deck is completely punched.

The punched cards are not interpreted. You can interpret a deck using the IBM 557 interpreters (old style) near the 360/75 console. If you wish to interpret one (or a few) card, there is a modified IBM 029 keypunch near the 44. Slip the card into the right-most section, flip the 'Interpret' switch up, and press 'Reg'. Flip the 'Interpret' switch down to restore the usual keyboard functions.

IV. Printer

The IBM 1443 printer has a speed of 200 lines per minute and is 120 (not 132) characters wide. It operates on-line, and hence is a big cause of the slowness of the 44. You can minimize the system printout by specifying the `NØSØURCE` option in the `// EXEC FØRTRAN` statement, or `NØMAP` in the `// EXEC LNKEDT` statement.

Check that none of your FØRTRAN write statements produce more than 120 characters per line.

Carriage control commands are the same as for the 360/75 except that single spacing must be indicated by a blank in the first column.

Allowed FØRMAT (1X...)

or FØRMAT (' NAME =')

but not FØRMAT ('A NAME =')

whereas all of these would work on the 360/75.

You can advance the printer by a whole page by pressing 'Stop' and 'Carriage Restore'. If you only wish to advance a few lines, press 'Carriage Space'. Press 'Start' to continue.

If you wish to see the output a little quicker you can open the printer hood and lift up the type bar cover. You can now see the latest line printed but one.

V. FØRTRAN Programming

Notes in this section refer to "Introduction to the Use of FØRTRAN IV under the 360/44 Programming System Monitor" by Duane Edgington.

Compilation using //name EXEC FØRTRAN

The name is arbitrary but has further significance if you are using overlay (see below). To be safe, always use a name.

The option NØSOURCE is useful for reducing printer time during compilation.

The option DECK can be used only with the 'Release 6' monitor at present. In this case, each source deck must be followed by a /* card.

Linkage Editing Using //name EXEC LNKEDT

The name need not be the same as on the EXEC FØRTRAN card but it should be present.

Use the option NØMAP to reduce printer time during linkage editing.

Disk Control Cards

If for reasons of space you wish to define two data sets on two different disks, the ALLØC statement is modified as follows:

Instead of 1316 = 'IPSDØØ' write

$$\left. \begin{array}{l} 191 \\ 192 \\ 193 \end{array} \right\} = \text{'(6 character name of disk)'}$$

The 191, 192, 193 refers to the identification cylinder which plugs into the disk unit. High energy physics presently owns two SCRATCH disks 'HEP 001' and 'HEP 002'. Do not use these for permanent program storage. Use the 'IPSDØØ' disk for now.

Contrary to Edgington's write-up, if the LABEL statement contains no SCRATCH date, your datasets will last forever. Be careful to avoid duplicate datasets.

A utility program LISTIO can be used to find out the contents of a disk. SQUEEZE will eliminate spaces between datasets. Notes on these routines will appear later.

Overlay

If you are trying to overlay a program with several FORTRAN source decks, you must observe a naming convention. The INCLUDE DECKNAME,L statement is used to indicate which decks belong in which phases of the overlay. The DECKNAME is not your FORTRAN subroutine name. The 44 gives names to a series of FORTRAN decks following a '// NAME EXEC FORTRAN' statement according to

<u># of deck</u>	<u>44 name</u>
1	NAME
2	NAME0001
3	NAME0002
.	}
.	
.	
.	Use as many zeroes as needed for a total of 8 characters.

where NAME is what appears on the EXEC FORTRAN card.

If you are overlaying with object decks, you also use the statement INCLUDE DECKNAME,L for each object deck. 'DECKNAME' need not be the name punched in cols. 73-76. It is defined in the statement MODULE DECKNAME which precedes the deck in the link editing. This feature can be used to avoid the complication that main programs and block data decks are all called 'MAIN' in cols. 73-76 of the object decks.

VI. // PAUSE statement

The PAUSE control card can be inserted in your job to allow an operator decision during execution. Upon encountering it, the computer types // PAUSE and waits for operator action. If you wish to continue, type the end of block command. If you wish to halt the job, push 'PSW Restart' on the 44 main console. You may include a message as to why you paused using

// † PAUSE † message....

VII. Module Library

To save time at the link edit step you may store programs on the relocatable module library. The library is in dataset 'SDSREL' on disk 'IPSD00'. PS44 Release 6 and Release 7 each has its own library, and you can access only the library of the system you are using. These libraries contain, among other things, the FORTRAN library functions such as CØS, EXP, ABS, etc. The directory (Table of Contents) of the module library can be printed using the job 'RELIST' shown in the examples below. The deck for this and other programs described will ultimately be kept in the card file drawers next to the 44 disk unit.

You need to produce an object deck to load into the library. The loading routine 'RELØD' is shown below. Your object deck is identified by a card preceding it with the deck name in cols. 1-... . Each deck must be followed by a /* card. Insert your deck(s) between the 'CPYMEM...' card and the /* card of 'RELØD'. Thus there are 3 /* cards in a row at the end of the job.

If someone else has already put a deck on the library using your deck name, yours won't go on. You don't need to redo your deck, only put a new name on the identification card preceding your deck in job 'RELØD'.

In a job which needs to use your new library routine, put a // Ø INCLUDE Ø NAME,R card in the link edit step. The 'R' stands for relocatable library routine.

If your routine is called by another routine which has already been link edited, the 'AUTØLINK' feature of the 44 will automatically load your routine off of the module library, just as for routines 'CØS', etc. If you are overlaying, the 'AUTØLINK' may load your subroutine into the wrong phase. This can be avoided by using the 'NØAUTØ' option in the 'PHASE' statement

Ø PHASE Ø PNAME,RØØT,NØAUTØ

However, now the 'AUTØLINK' will not put standard library routines into phase PNAME. You need to have a copy of the link editor map which tells which routines are needed, and use a Ø INCLUDE Ø RNAME,R card for each routine. Another way around this complication is given in Section VIII on the phase library.

To delete a routine from the module library, use job 'DELETE' shown below. Put your routine name(s) inside of the parentheses in place of the example 'PSAVE'. The 'CØNDENSE' statement then fills the hole left by your routine.

SOME DECKS PERTAINING TO THE MODULE LIBRARY

```
//RELIST JOB  
//SYS002 ACCESS SDSREL  
// EXEC UTILS  
PRTIME* SIZEIN=(360,15),INCL=SDSREL  
/*  
/&
```

```
//REFLID JOB  
//SYS003 ACCESS SDSREL  
// EXEC UTILS  
CPYMEM* SIZEOUT=(360,5),TRUNC=(1,72)  
/*  
/*  
/&
```

```
//DELETE JOB  
// ACCESS SDSREL(PSAVE)  
// DELETE SDSREL(PSAVE)  
// CONDENSE SDSREL  
/&
```

VIII. Phase Library

Whole programs, or overlay phases may be stored on another library, the phase library. This library is in dataset 'SDSABS' also on disk 'IPSD00'.

Its directory may be printed using job 'ABSLIST', shown below.

To put a phase (or phases) on the phase library simply use the 'KEEP' option:

```
//name 6 EXEC 6 LNKEDT (KEEP)
```

If you do this it is advisable to name the phase using b PHASE b PNAME preceding the 'INCLUDE' cards. Once a phase name is on the phase library you cannot use that name in another program as the linkage editor always checks the phase library directory before allowing a phase name. This holds whether or not your later job uses the 'KEEP' option.

To use a program on the phase library, simply submit a job with a card

```
// 6 EXEC 6 PNAME
```

followed by data, if any and a /* card. Note that the routines 'FORTRAN', 'LNKEDT' and 'ASSEMBLE' are stored on the phase library.

To delete a program from the phase library use job 'DEL PHASE' shown below. The phases listed in parentheses will be deleted. There is no protection against your wiping out somebody else's phases, or vice versa.

SOME DECKS PERTAINING TO THE PHASE LIBRARY

```
//ARSLIST JOB  
//SYS002 ACCESS SDSARS  
// CONDENSE SDSARS  
// EXEC UTILS  
PRIME= SIZIM=(720,30),INCL=SDSARS  
/*  
/E
```

```
//DELPHASE JOB  
//SYS002 ACCESS SDSARS  
// DELETE SDSARS(ONE,EVENT,BINNING)  
// CONDENSE SDSARS  
/*  
/E
```


IX. MAP and SQUEEZE Utilities

These utilities are fairly well described on p. 26 of the IBM System/360 Model 44 Programming System Operator's Guide.

The MAP utility allows you to find what data sets are stored on a disk, their size, and how full they are. Job MAP shown below will map out the main FORTRAN disk, IPSD00. For other disks, change 194 to whatever number is on the plastic identification cylinder mounted in the disk unit; also change IPSD00 to the appropriate disk name, e.g. HEPO01.

The SQUEEZE utility rearranges the data sets on a disk to fill any gaps, and deletes any data sets whose expiration date has passed. Recall that the date may be set to anything in this century during the IPL procedure. Sample job SQUEEZE will squeeze IPSD00, HEPO01 and HEPO02. The parameters on the SQUEEZE card are exactly as those for the MAP card discussed above. Copies of these decks are kept in the drawers next to the disk units.

The SQUEEZE utility also tidies up a presumably clean disk. Sometimes after deleting a disk data set, you will be unable to allocate another data set in its place. Submit a SQUEEZE job for the appropriate disk and try again.

SAMPLE JOBS PERTAINING TO THE MAP AND SQUEEZE UTILITIES

```
//MAP JOB
// EXEC UTILS
MAP DVADR=194,VOLID='IPSD00'
/*
/ &
```

```
//SQUEZ JOB
// EXEC UTILS
SQUEEZE DVADR=192,VOLID='HEP002'
SQUEEZE DVADR=193,VOLID='HEP001'
SQUEEZE DVADR=194,VOLID='IPSD00'
/*
/ &
```

X. Tape Handling

They say the Lord giveth and the Lord taketh away. In any case the 360/44 no longer has any tape units. Something called a channel-to-channel adapter has been conjured up by the Computing Center so that the 360/75 tape drives may be used instead. Tapes are read by the 75 onto one of its disks, the channel-to-channel adapter sends the contents to a 44 disk. The disk may be read using a FORTRAN unformatted READ exactly as if it were a tape. Recall that only units 1, 2 or 3 may be used for this:

e.g., READ (1) but not READ (11).

The procedure may be reversed to write a tape, again using a FORTRAN unformatted write. The only restriction is the block length must be less than 3625 bytes, the track length on the 44 disks. Recall that if there is one record per block (as there will if you write on the 44), bytes per block = $8 + 4 \times$ (words in record).

Reading a Tape

Before reading a tape you need to allocate a data set on the 44 for it to be read into. Allocate at least as many blocks as are on your tape. The blocksize parameter on the LABEL card must be at least as big as the maximum blocksize (in bytes) on your tape. The sample job ALLØC, shown below, allocates data set TEMP with 8000 blocks of 588 bytes.

To read the tape, special jobs must be in the 44 and 75 simultaneously. It is safer if the 44 job is a separate job, rather than a job step of a larger program. Load the 44 job first. An example below is called T75TØ44. In the data set which will hold the contents of the tape must be accessed on SYS004. In addition, the system data set, DATA, must be accessed on SYS003 as shown. You need not allocate this data set. The PAUSE halts the 44 to allow you to submit the companion job to the 75. When the tape has been mounted and the READY light of the tape drive is on, type end of block on the 44 typewriter. The program TRANS then 'GETS' the data from the 75.

The companion job example is also labelled T75TØ44. It is preceded by a /* PRIØRITY 14 card. This is the card you've always dreamed of which gets your job run next! The //JØBLIB, // EXEC, and //ADAPTER cards are mandatory. The IOC count will be higher than if you simply read your tape in a usual 75 program because of the channel-to-channel adapter.

Figure $IOC_{new} = IOC_{old} \cdot \left(1 + \frac{Blocksize}{360}\right)$

The tape DD card is mostly notable for the lack of parameters pertaining to blocksize or record format. They are taken care of automatically as long as blocksize < 3625. In the example, the third file of a 7-track tape is read at low density. Only one file may be read per job.

To use the newly transferred data in a FORTRAN program, access your data set on SYS001, 2, or 3 and use a FORTRAN unformatted read.

SAMPLE JOBS PERTAINING TO READING A TAPE

```
//ALLOD JOB  
// ALLOC TEMP,193='HEP001',8000  
// LABEL 588  
// ALLOD OUT,192='HEP002',14000  
// LABEL 360  
/*  
/E
```

Submit this job to the 360/44 first.

```
//T75T044 JOB  
//SYS004 ACCESS TEMP,193='HEP001'  
//SYS003 ACCESS DATA,1A1='DATA'  
// PAUSE SUBMIT JOB T75T044 TO THE 360/75  
// EXEC TRANS(GET)  
/*  
/E
```

Submit this job to the 360/75

```
/*PRIORITY 14  
//T75T044 JOB (60142,KTM,SY),MCDONALD,MSGLEVEL=1  
// SET IDC=400  
//JOBLIB DD DSN=SYS2.JOBLIB,DISP=SHR  
// EXEC PGM=CHADPT  
//ADAPTER DD UNIT=270  
//TAPE DD UNIT=TAPE7,VOL=SER=XXX305,LABEL=(3,BLP),  
// DISP=OLD,DCB=DEN=0  
//
```

Writing a Tape

First allocate an output data set. The blocksize must be 360 bytes. you can fit 15000+ such blocks on a single disk--which is all you can write on a single unit. In the sample job ALLØC, data set ØUT is the one.

You can write on this data set using a FØRTRAN unformatted write.

To transfer the contents of the output data set to a tape, special jobs must be submitted to the 75 and 44 simultaneously. The 44 job should be a separate job, not a job step of a larger program. The sample 44 job is called T44TØ75. Your output data set must be accessed on SYS004. The SYS003... card is mandatory. At the PAUSE, the 44 halts while you submit the companion job to the 75. When the tape is mounted and the READY light comes on the tape unit, type end-of-block on the 44 typewriter. Program TRANS sends your data to the 75 where it is written on tape at once.

The sample companion job is also called T44TØ75. It is preceded by a /* PRIØRITY 14 card. This puts your job at the head of the 75 job queue. The //JØBLIB, // EXEC, and //ADAPTER cards are mandatory. You can estimate IOC count by

IOC = number of records x record length in words/45 + fudge factor.
If in doubt set the IOC high. The PRIORITY 14 card will still avoid delays. On the tape DD card note that the parameters for blocksize and record length are absent. Only one file may be written per job.

To read a tape generated by the above procedure, use an unformatted read. The tape DD card for this job must include

DCB=(BLKSIZE=360,RECFM=V)

If any questions or conflicts arise regarding the logistics of running channel-to-channel jobs, you may want to see Joe Dailey.

SAMPLE JOBS PERTAINING TO WRITING A TAPE =

Submit this job to the 360/44 first

```
//T44T075      JOB
//SYS003 ACCESS DATA,1A1='DATA'
//SYS004 ACCESS OUT,192='HEP002'
/*
// PAUSE      SUBMIT JOB T44T075 TO THE 360/75
// EXEC TRANS(PUT)
/*
/8
```

Submit this job to the 360/75

```
/*PRIORITY 14
//T44T075 JOB (60142,KTM,SY),MCDONALD,MSGLEVEL=1
// SET      IOC=200
//JOB LIB DD      DSN=SYS2.JOBLIB,DISP=SHR
// EXEC      PGM=CHADPT
//ADAPTER DD UNIT=270
//TAPE DD      UNIT=TAPE,VOL=SER=HE3125,LABEL=(2,BLP),
// DISP=OLD
//
```