

Technical Bulletin

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..... Bulletin #9
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OS/3 TECHNICAL BULLETIN

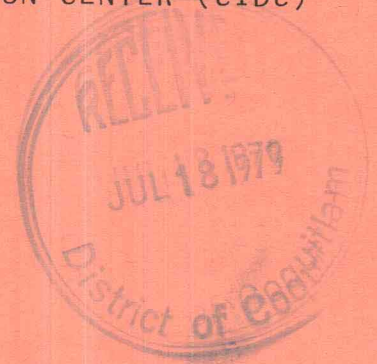
This bulletin contains information on the use of:

The IBM 3741 MEDIA COMPATIBILITY UTILITY FOR THE UTS400

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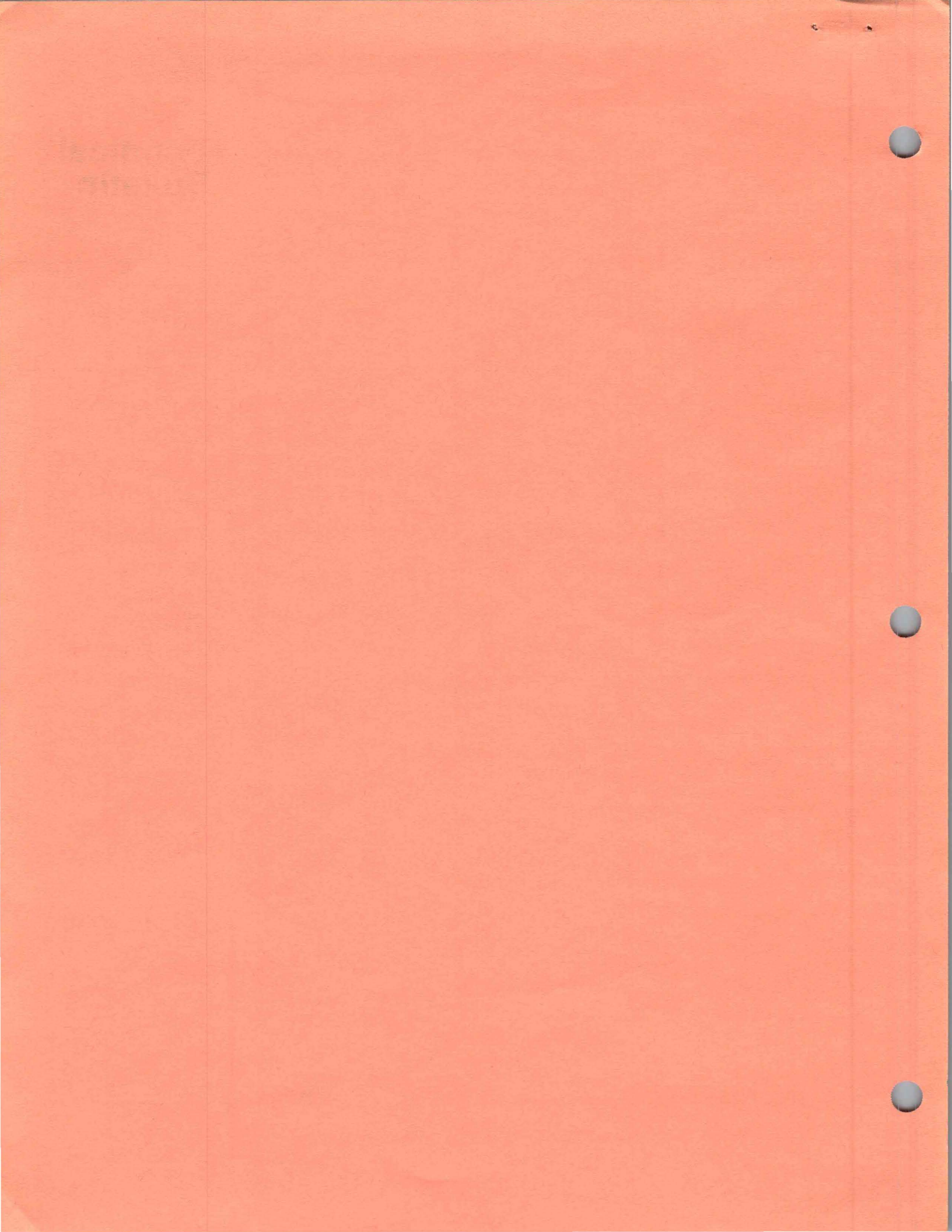


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OS/3 TECHNICAL BULLETIN SUMMARY

The following Technical Bulletins are published for the OS/3 system. Current items are identified with an "*" in column one; scheduled items are identified with an "***" in the date column:

<u>SYSTEM</u>	<u>DATE</u>	<u>ORDER#</u>	<u>ITEM and DESCRIPTION</u>
*OS/3	1/78	UP-8605.1	OS/3 Technical Bulletin #1 (This document presents an overview of the UTS400 support and gives some user guidelines.)
*OS/3	3/78	UP-8605.1-A	OS/3 Technical Bulletin #1,-A (This update contains page replacements to UP-8605.1.)
*OS/3	4/78	UP-8605.2	OS/3 Technical Bulletin #2 (This document provides a list of the options that can affect the performance of an OS/3 IMS 90 system.)
*OS/3	1/78	UP-8605.3	OS/3 Technical Bulletin #3 (This document is a User Guide for the UTS400 CHARACTER PROTECTION MODE available with release 4.3.)
*OS/3	7/78	UP-8605.3-R1	OS/3 Technical Bulletin #3-R1 (This document contains updated guidelines for the UTS400 CHARACTER PROTECTION MODE available with release 5.0.)
*OS/3	11/78	UP-8605.4	OS/3 Technical Bulletin #4 (This document contains information on the use of the 8413 DISKETTE FILE CREATION UTILITY.)
*OS/3	5/79	UP-8605.5	OS/3 Technical Bulletin #5 (This document contains information on the use of DATA UTILITIES for OS/3 Release 5.2.)
*OS/3	12/78	UP-8605.6	OS/3 Technical Bulletin #6 (This document contains information on the use of IMS 90 Multi-Thread.)

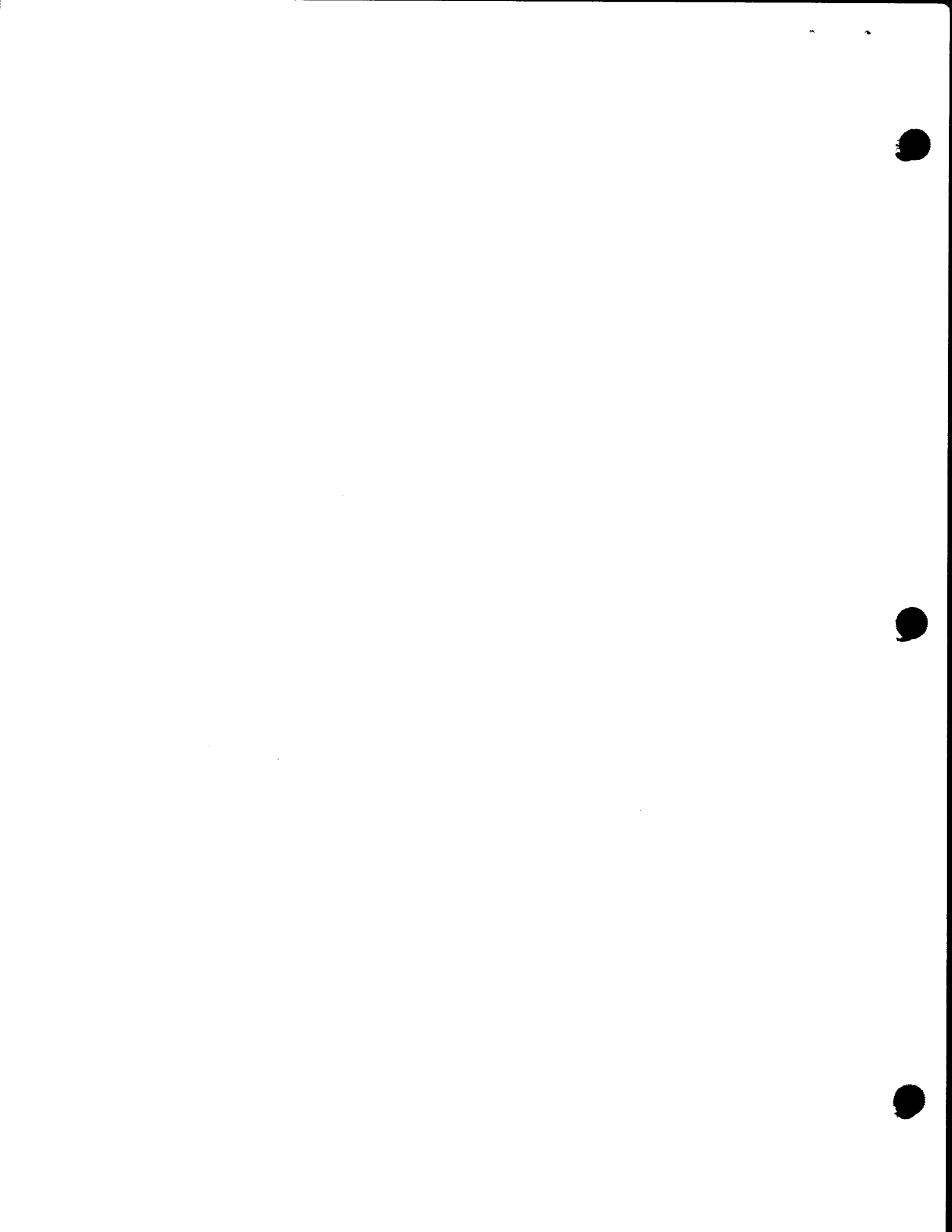
OS/3 TECHNICAL BULLETIN SUMMARY (cont'd)

<u>SYSTEM</u>	<u>DATE</u>	<u>ORDER#</u>	<u>ITEM and DESCRIPTION</u>
*OS/3	3/78	UP-8605.7	OS/3 Technical Bulletin #7 (This document contains information concerning techniques for processing unordered IRAM files.)
*OS/3	5/79	UP-8605.8	OS/3 Technical Bulletin #8 (This document contains information on the use of CHARACTER PROTECTION MODE UTILITY for the UTS400; this utility is available with Releases 5.2/5.2.1 and 6.0.
*OS/3	5/79	UP-8605.9	OS/3 Technical Bulletin #9 (This document contains information on the use of the IBM 3741 MEDIA COMPATIBILITY UTILITY for the UTS400; this utility is available with Releases 5.2/5.2.1 and 6.0.

Note: Technical Bulletins are issued as they become available, and may or may not be issued in sequential order.

UTS400, 3741 DISKETTE MEDIA COMPATIBILITY

UTS400, 3741 Diskette Media Compatibility
USER GUIDE



UTS400, 3741 DISKETTE MEDIA COMPATIBILITY

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UTS400, 3741 DISKETTE MEDIA COMPATIBILITY

1. 3741 Diskette Media Compatibility

The UTS400 3741 Diskette Media Compatibility Routine provides the UTS400 MAC80 programmer with a media exchange capability. This means that on the UTS400 it is possible to generate 3741 formatted diskettes as well as to read 3741 formatted diskettes generated by any system adhering to the same standard as on the UTS400.

This document defines the routines on the UTS400 that provide *IBM 3741 Diskette media compatibility. The 3741 Diskette Media Compatibility routine is included in the UTS400 Utility Library package.

1.1. File Format on Diskette

The exact file format of the diskette is defined in 'The IBM Diskette, General Information Manual' (GA21-9182-1). Copies of this may be obtained from IBM.

1.2. I/O Packet Format

In order to access the 3741 Diskette by means of the 3741 Diskette Media Compatibility routine it is necessary to use an I/O packet. The 3741 Diskette Media Compatibility I/O packet has been incorporated into the UTS400 peripheral I/O routine packet. The latter, however, needs to be expanded for 3741 Diskette use. The format for this expanded packet is shown on the next page.

Care must be taken that two byte binary words used for the I/O Buffer Address and the Buffer size are placed in memory with the low byte first, then the high byte. This is a MAC80 standard when using such instructions as DW, SHLD, and LHLD.

Those fields which are type designated as ASCII or PDec (packed Decimal with no sign designation) are placed in memory with the high byte first and so on to the low byte. This is the string format.

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Type	Byte	Format	Description	
Binary	0	Low High	I/O Buffer address	
Binary	2	Low High	Buffer size	
Binary	4	Op Code 00	Op Code	
ASCII	6	High Low	Device code	
PDec	8	MM DD	Date	
	10	YY		
ASCII	12	(6 bytes)	Volume Identifier	
	14			
	16			
ASCII	18	(17 bytes)	File Identifier	
	20			
	22			
	24			
	26			
	28			
	30			
	32			
PDec	34	WRRS		Write/read relative sector
PDec	36	Ftrack Fsec		First track/First sector
PDec	38	NSEC	Number of sectors in file	
PDec	40	EOD	End-of-data relative sector	
PDec	42	RSIZ DSEC	Record size $1 \leq \text{RSIZ} \leq 128$ Directory sector	

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The various fields of this packet are explained below:

I/O Buffer Address	This is in the user program.
Buffer Size	The length of the I/O buffer in bytes.
Op Code	This is the operation code of the 3741 Diskette operation to be performed as follows: PREP - 09 hex FIND - 0A hex PDIR - 0B hex ASGF - 0C hex READ - 0D hex WRITE - 0E hex These are explained below.
Device Code	This is the physical designator for the diskette drive to be accessed such as 'D1', 'D2' etc.
Date	This is the date in packed decimal for the month, day, and year the particular file was assigned.
Volume Identifier	This is a 6-byte ASCII character string used to identify the disk volume containing the file to be accessed.
File Identifier	This is a 17-byte ASCII character string used to identify the file to be accessed.
WRRS	This is the Write/Read Relative Sector number within the file where the WRITE or READ occurs.
NSECS	This is the number of sectors encompassed by the file. It is specified by the user when the file is assigned. NSECS-1 is the relative sector number of the last sector of the file. It is the highest value that the user may place in the relative sector field of the packet for the file.
Ftrack	First track address of the file.
Fsec	First sector address of the file.
EOD	This is the relative sector number in the file of the last sector which contains meaningful data or the last relative sector from which data may be read if the file is assigned. EOD is always less than or equal to NSECS-1. EOD is updated each time a write occurs.
RSIZ	This is the record size for the file in bytes.

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It may range from 1 to 128.

DSEC This is the Directory Sector of the disk volume.

Each routine description below specifies which fields it expects to be filled before that routine is called. Bytes 34 through 43 must always be provided in the packet even though the user may not be required to put data in them.

1.2.1. Sector References

All references by means of the packet to sectors within a file are by relative sector number within that file. The UTS400 programmer must look at a file as being made up of a specified number of relative sectors, the first being numbered 0. This relative sector number is for convenience of the UTS400 programmer only. It does not appear on the disk at any time. The 3741 Diskette Media Compatibility routine uses the relative sector number to compute the actual track and sector address of the disk. All disk addresses on the disk itself appear in the standard extent format including track and sector number.

1.3. File Handling

The 3741 format allows up to 19 files to be placed on the diskette. The UTS400 3741 Diskette Media Compatibility routine recognizes the existence of these files, reads and writes them, and establishes new files on the diskette. Any one file may not encompass more than one disk volume. The following sections define the minimum operations that are supplied to accomplish the above.

1.4. User Code Generation

Since the 3741 Diskette Media Compatibility routine is part of the peripheral I/O routine, it is possible that not every user will want to use the 3741 Diskette Media Compatibility routine. In order to conserve memory the user is given the ability to selectively compile the 3741 Diskette Media Compatibility routine. This is accomplished by setting the following defined keywords to either 'TRUE' or 'FALSE' in an EQU statement which is included at the beginning of the peripheral I/O routine.

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1.4.1. D3741, Select the 3741 Section to be Compiled

If the statement:

D3741 EQU TRUE

is present, the 3741 Diskette Media Compatibility routine portion of the peripheral I/O package is compiled. If FALSE is used instead of TRUE, it is not compiled, and none of the following defined keywords apply.

1.4.2. XLATE, ASCII <-> EBCDIC Translate Control

If the statement:

XLATE EQU TRUE

is given, all data being read from the diskette is translated from EBCDIC to ASCII before control is returned to the user. All data written on the diskette is to be translated from ASCII to EBCDIC before it is written. All control codes and bit patterns not within the scope of either code type are translated to blanks.

If FLASE is used in place of TRUE, no translation code is generated by the compiler, thus reducing the size of the 3741 Diskette Media Compatibility routine. It is now the user's responsibility to do any necessary translation. Diskette files may thusly be created in ASCII rather than in EBCDIC. Diskettes generated in this mode are not IBM compatible.

1.4.3. KANA, Katakana Translate Control

If the statement:

KANA EQU TRUE

is present, the translation considers the Katakana symbol set as well as the English set. If FALSE is used instead of TRUE, all codes representing Katakana symbols are translated to blanks in both ASCII and EBCDIC. KANA is included to reduce the size of the translation tables, and thus the memory required, for the non-Katakana users.

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1.5. 3741 Diskette Operation Routines

The routines described in this section are used to produce and manage diskettes on the UTS400. The basic 3741 format is always used. The content may vary according to the translate options described above. The routines are called as follows:

```
LXI      B,PKT      ; REG B,C = I/O PACKET ADDRESS
CALL    PIO        ;
```

PIO uses the operation code in the packet to reference the correct routine.

1.5.1. PREP: Create a New Diskette in IBM 3741 Format

This operation is used to create a new diskette in 3741 format. Its first function is to format the diskette in such a manner that the hardware of the disk controller can read and write on it. This operation is handled by the disk prep routine supplied in the UTS400 firmware; see UP-8358-A, section 11.3.

The second step is to establish track 0 of the diskette in the format defined in the IBM 3741 document. This track contains the information concerning file size, location, name, date of creation, etc.

The volume name supplied in the I/O packet is used by this routine to identify the diskette, i.e. it is placed on the diskette as its volume name.

Bytes of I/O packet used:

Byte	Meaning
4	Operation code: 09 hex
11-16	Volume identifier of diskette (ASCII)

Error codes used:

Code	Meaning
00	Normal completion of routine.
01	Diskette drive status in register B.
FF	PIO request not honored. Previous request in progress.

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1.5.2. FIND: Locate a File on the Diskette

The FIND operation is used to search the diskette directory for the volume-file name specified. If found, the location and size of the file are placed in bytes 36 through 43 of the I/O packet; otherwise they are set to zero.

This routine must be used prior to the first in a series of READs or WRITEs to establish the file parameters in bytes 36 through 43 of the packet. The READ and WRITE use the information in these bytes to determine the locations on the diskette to use.

Bytes of I/O packet used:

Byte	Meaning
4	Operation code: 0A hex
6-7	Disk drive mnemonic
11-16	Volume identifier of diskette (ASCII)
17-33	File identifier of file (ASCII)

Error codes used:

Code	Meaning
00	Normal completion of routine.
01	Diskette drive status in register B.
02	Volume identifier on diskette does not match the volume identifier in the packet.
03	File identifier in packet cannot be found on the diskette.
0C	Volume or file identifier is not left justified or not specified. (Only used if XLATE is TRUE)
FF	PIO request not honored. Previous request in progress.

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1.5.3. PDIR: Print file directory contents

Copy the file's directory into the buffer specified for the diskette drive identified in the packet. Information is copied into the users buffer until it is full or the end of the diskette directory is found. Each logical line of the directory is terminated in the buffer with the hexadecimal value OD. Information is placed in the buffer in the format:

```
<Volume-name>CR<File-name>b<Creation-date>b<start trk:sec>b
<NSECS>b<EOD>b<RSIZ>CR
```

where: 'b' represents a blank, CR represents the ASCII code for the carriage return, OD hex. The string <File-name> ... CR is repeated for each file name. All bytes contain ASCII symbols.

```
<Volume-name>:    6 bytes + CR = 7 bytes
<File-name>:      17 bytes + b = 18 bytes
<Creation-date>:  6 bytes + b = 7 bytes
<Start trk:sec>:  4 bytes + b = 5 bytes
<EOF>:            4 bytes + b = 5 bytes
<EOD>:            4 bytes + b = 5 bytes
<RSIZ>:           3 bytes + b = 4 bytes
```

Buffer size = 7 + (number-of-files) * 44

Bytes of I/O packet used:

Byte	Meaning
0-1	Destination buffer address. This address must be supplied. If not, an error code of 04 is returned in register A.
2-3	Destination buffer length. Low order bits are in byte 2, high order bits in byte 3.
4	Operation code: 0B hex
6-7	Disk drive mnemonic (ASCII)

Error codes used:

Code	Meaning
00	Normal completion of routine.
01	Diskette drive status in register B.
04	The Source/Destination buffer address in the packet is zero.
FF	PIO request not honored. Previous request is in progress.

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1.5.4. ASGF: Assign a file

Assign a file name to an area on the diskette of the volume specified. The next file space on the diskette is assigned the file identifier specified if the number of sectors indicated by the NSECS field of the packet exist in a contiguous block. The file identifier specified in the packet must be unique, or the file is not allocated. Once a file is allocated, its size may not be changed, nor may it be deleted until the disk is prepped again. If a larger or smaller file is needed, a different diskette must be prepped, the new file allocated on it, and the data copied into it.

The date of the file is specified in bytes 8-10 of the packet in the format: YYMMDD, where YY, MM, and DD are two digits each contained within the byte, YY in byte 8, MM in byte 9, and DD in byte 10.

If the file is allocated, bytes 36 through 43 of the packet are filled by the ASGF routine. If the ASGF routine is used prior to a WRITE, it is not necessary to use the FIND routine.

Bytes of I/O packet used:

Byte	Meaning
4	Operation code: OC hex
6-7	Disk drive mnemonic (ASCII)
8-10	Date of allocation: MM DD YY
11-16	Volume identifier of diskette (ASCII)
17-33	File identifier of new file (ASCII)
36	NSECS, the number of sectors to be allocated
42	RSIZ, record size in bytes: 1<=RSIZ<=128

Error codes used:

Code	Meaning
00	Normal completion of routine.
01	Diskette drive status in register B.
02	Volume identifier on diskette does not match the volume identifier in the packet.
0A	File identifier already exists on the diskette.
0B	Not enough space on diskette to allocate to file identifier.
0C	Volume or file identifier is not left justified or not specified. (Only used if XLATE is TRUE)
FF	PIO request not honored. Previous request is in progress.

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1.5.5. READ: Read a block of data.

Read the diskette starting at the relative sector specified of the volume-file specified until the buffer specified is filled. Reading always begins on a sector boundary. If the user has specified translation, translate the data in the users buffer from EBCDIC to ASCII.

The relative sector number must be in the following range:

0 = relative sector number = end-of-file

If it is greater than end-of-date, the error code 05 hex is placed in register A and control returned to the calling routine. Nothing is read.

Bytes of I/O packet used:

Byte	Meaning
0-1	Source buffer address. This address must be supplied. If not, an error code of 04 is returned in register A.
2-3	Destination buffer length. Byte 2, low order bits, byte 3 high order bits.
4	Operation code: 0D hex
6-7	Disk drive mnemonic (ASCII)
34-35	Relative sector of file where reading begins
36-43	Set up by FIND routine before first READ

Error codes used:

Code	Meaning
00	Normal completion of routine
01	Diskette drive status in register B.
04	The Source/Destination buffer address in the packet is zero.
05	The relative sector in the packet is beyond the end-of-data in the file.
07	The READ routine has read past the end-of-data of the file. Data read before the EOD is in the user's buffer.
09	Bytes 36 thru 43 have not been established by the FIND routine.
FF	PIO request not honored. Previous request is in progress.

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1.5.6. WRITE: Write a block of data

If the user has specified no translation, the contents of the buffer are copied directly to the disk. Otherwise, it is assumed that the data in the buffer is in ASCII, and it is translated to EBCDIC. It is then copied to the volume-file beginning at the relative sector of the diskette specified. Data is copied to the diskette in the form of records which:

- a. Reside on sequential sectors and tracks,
- b. Are fixed length (RSIZ), at most 128 bytes long,
- c. Begin in position one of a sector and do not span sectors, and
- d. Are unblocked, only one record per sector.

Data is copied from the user's buffer forming records as each RSIZ number of bytes is copied. Copying continues until the user's buffer is emptied, or the end-of-file is encountered. If there are not enough bytes in the user's buffer to form a record of RSIZ bytes, the bytes there are copied, and the rest of the record padded with binary zeros to form a record of RSIZ bytes.

The relative sector number must be in the following range:

0 = relative sector number = end-of-file

If it is greater than the end-of-file, the error code 06 hex is placed in register A, and control returned to the calling routine. Nothing is copied to the diskette in this case. The end-of-data is always set after a write and indicates the last sector written.

Bytes of I/O packet used:

Byte	Meaning
0-1	Destination buffer address. This address must be supplied. If not, an error code of 04 is returned in register A.
2-3	Destination buffer length. Low order bits are in byte 2, high order bits in byte 1.
4	Operation code: 0E hex.
6-7	Disk drive mnemonic (ASCII)
34-35	Relative sector of file where writing begins
36-43	Set up by FIND or ASGF routine before first WRITE

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Error codes used:

Code	Meaning
00	Normal completion of routine.
01	Diskette drive status in register B.
04	The Source/Destination buffer address in the packet is zero.
06	The relative sector in the packet is beyond the end-of-file for the file.
08	The Write routine has passed the end-of-file. Data written before the EOF is on the diskette. Nothing is written past the EOF.
09	Bytes 36 thru 43 have not been established by the FIND routine.
FF	PIO request not honored. Previous request is in progress.

1.6. Error Codes

The following hexadecimal codes are placed in register A before control is returned to the user.

Code	Meaning
00	Normal completion of routine.
01	Diskette drive status in register B.
02	Volume identifier on diskette does not match the volume identifier in the packet.
03	File identifier in packet cannot be found on the diskette.
04	The Source/Destination buffer address in the packet is zero.
05	The relative sector in the packet is beyond the end-of-data in the file.
06	The relative sector in the packet is beyond the end-of-file for the file.
07	The READ routine has read past the end-of-data of the file. Data read before the EOD is in the user's buffer.
08	The Write routine has passed the end-of-file. Data written before the EOF is on the diskette, nothing is written past the EOF.
09	Bytes 36 thru 43 have not been established by the FIND routine.
0B	Not enough space on diskette for allocation.
0C	Volume or file identifier is not left justified or not specified. (Only used if XLATE is TRUE)
FF	PIO request not honored. Previous request is in progress.

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1.7. Status Codes

If a 01 code is presented in register A, register B contains one of, or a combination of, the following status codes. These codes are placed in the control page by the UTS400 to indicate the status of a peripheral operation. The 3741 Diskette Media Compatibility routine extracts them from the control page and places the result in register B if it is other than zero.

The code as presented in the control page is in the form of three octal digits. The 3741 Diskette Media Compatibility routine converts it to a two digit hex number. Since the three octal digits represent eight status bits, no information is lost in the hex presentation. And, since several errors may occur, the system may OR the status codes of each error into one status code.

Octal	Hex	Meaning
000	00	Device ready
001	01	Data error
002	02	End of diskette
003	03	Data error and end of diskette
004	04	CRC error
005	05	CRC error and data error
006	06	CRC error and end of diskette
007	07	CRC error, end of diskette, and data error
010	08	Disk address error
020	10	Control indication (not an error condition but a user-program dependent condition)
030	18	Control indication and disk address error
040	20	Write protected diskette
050	28	Disk address error and write protected diskette
060	30	Write protected diskette and control indication
070	38	Write protected diskette, control indication and disk address error
100	40	Device not ready
200	80	File security*
300	C0	File security and device not ready

* This term means that something happened (such as disk drive door opened) which requires reinitiation of your device control command. This status may occur when the UTS400 is initialized.



USER COMMENT SHEET

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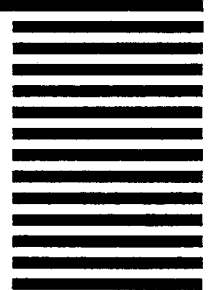
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