

# Device And File Considerations

This section provides information on device and system file topics.

- Supported z/OS and z/VM Device Types
  - ECKD Devices
  - Adding New Devices
  - Enhanced Backup and Restore Performance in Tape Sequential Files
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## Supported z/OS and z/VM Device Types

The standard characteristics of the device types supported by Adabas on z/OS and z/VM are summarized in the following table. Adabas block sizes and RABNs per track are provided for each Adabas component for each device type.

Device	Trks/Cyl	ASSO	DATA	WORK	PLOG/RLOG	CLOG	TEMP/SORT/DSIM	Notes
0512	16	2044:8	4092:4	8192:2	8192:2	8192:2	8192:2	
3310	11	2044:8	4092:4	4096:4	4096:4	4096:4	8192:2	
3330	19	1510:8	3140:4	4252:3	4252:3	3156:4	3140:4	
3340	12	1255:6	2678:3	3516:2	3516:2	3516:2	3500:2	
3350	30	1564:11	3008:6	4628:4	4628:4	3024:6	3008:6	
3370	12	2044:15	3068:10	5120:6	5120:6	3072:10	7680:4	
3375	12	2016:15	4092:8	4096:8	4096:8	4096:8	8608:4	
3380	15	2004:19	4820:9	5492:8	5492:8	4820:9	7476:6	3
3390	15	2544:18	5064:10	5724:9	5724:9	5064:10	8904:6	3
8345	15	4092:10	22780:2	22920:2	22920:2	22920:2	22920:2	
8350	30	3008:6	6232:3	9442:2	9442:2	9442:2	9442:2	1
8380	15	3476:12	6356:7	9076:5	9076:5	9076:5	9076:5	1
8381	15	3476:12	9076:5	11476:4	11476:4	9076:5	9076:5	1
8385	15	4092:10	23292:2	23468:2	23468:2	23468:2	23468:2	1
8390	15	3440:14	6518:8	10706:5	10706:5	8904:6	8904:6	1
8391	15	4136:12	10796:5	13682:4	13682:4	8904:6	18452:3	1
8392	15	4092:12	12796:4	18452:3	18452:3	18452:3	18452:3	1
8393	15	4092:12	27644:2	27990:2	27990:2	27990:2	27990:2	1
9332	6	2044:10	4092:5	5120:4	5120:4	10240:2	10240:2	2
9335	6	2556:14	3580:10	5120:7	5120:7	7168:5	7168:5	
9345	15	4092:10	7164:6	11148:4	11148:4	22920:2	22920:2	3

**Notes:**

1. The 8350, 838*n*, and 839*n* are pseudodevice types physically contained on a 3350, 3380, and 3390 device, respectively, but for which some or all of the standard block sizes are larger.
2. The number of tracks per cylinder listed here is artificial.
3. The IBM RAMAC 9394 emulates devices 3390 Model 3, 3380 Model K, or 9345 Model 2.

**ECKD Devices**

Adabas supports ECKD DASD devices such as the IBM 3390 with the 3990 controller and ESCON channels.

During an open operation, ADAIOR determines which DASD device types are being used for the ASSO, DATA, WORK, SORT, and TEMP data sets. At that time, Adabas issues an informational message for each Adabas database component, where *type* is the component:

ADA164 ... FILE Ddtype HAS BEEN OPENED IN ckd/eckd MODE - RABN SIZE rabn-size

**Note:**

Software AG strongly recommends that you avoid mixing ECKD and CKD extents within a file, because the file will be opened only in CKD mode. Mixing extents could degrade performance when file I/O operations are performed.

## Adding New Devices

Support for new device types that include user-defined block sizes can be implemented in ADAIOR by modifying one of the table of device-constant entries (TDCEs) reserved for this purpose.

A TDCE is X'40' bytes long and the first free TDCE can be identified by X'0000' in its first two bytes (TDCDT).

For all versions of Adabas prior to version 6.2, the address of the first TDCE is at offset ADAIOR+ X'34'.

For Adabas Version 6.2, TDCE entries are in the ADAIOR CSECT TDCON: the first TDCE entry is at offset 0; the first free TDCE entry is at offset X'400'.

For Adabas Version 7.1, TDCE entries are in the ADAIOS CSECT TDCON: the first TDCE entry is at offset 0; the first free TDCE entry is at offset X'580'.

This information is valuable when adding an additional TDCE entry.

- Information to be Zapped into the First Free ADAIOR TDCE
- General Rules for Defining Device Block Sizes
- Maximum Sequential Block Size
- Rules for Associator and Data Storage Block Sizes
- Rule for Work Data Set Block Size
- Rules for TEMP/SORT Data Set Block Sizes
- Rules for PLOG or SIBA Block Sizes
- Sequential Protection Log Block Size in I\_PTT

### Information to be Zapped into the First Free ADAIOR TDCE

The information in the following tables must be zapped into the first free TDCE. The rules described in the section *General Rules for Defining Device Block Sizes* must be followed when changing the TDCE.

Label	Offset	Contents
TDCDT	00	Device type in unsigned decimal (X'3385'), must be numeric, and unique among all TDCEs.
TDCKSN	02	Constant set number: must be uniquely chosen from the values X'2B' or X'2E'.

Label	Offset	Contents
TDCF	03	The flag bit must be set—TDCFCKD (X'40') for CKD devices, TDCFCKD (X'60') for ECKD devices or TDCFCKD (X'61') for ECKD, not user defined devices.
TDCDT1	04	(see note 1)
TDCDT2	05	(see note 1)
TDCDT3	06	(see note 1)
TDCDT4	07	(see note 1)
TDCMSBS	08	Refer to the section <i>Maximum Sequential Block Size</i> .
TDCTPC	0A	Number of tracks per cylinder.
TDCCIPT	0C	(see note 2)
TDCBPCI	0E	(see note 2)
TDCABPT	10	Number of Associator blocks per track.
TDCABS	12	Associator block size.
TDCACPB	14	(see note 2)
TDCDBPT	16	Number of Data Storage blocks per track.
TDCDBS	18	Data Storage block size.
TDCDCPB	1A	(see note 2)
TDCWBPT	1C	Number of Work blocks per track.
TDCWBS	1E	Work block size.
TDCWCPB	20	(see note 2)
TDCTSBPT	22	Number of TEMP or SORT blocks per track
TDCTSBS	24	TEMP or SORT block size.
TDCTSCP	26	(see note 2)
TDCPBPT	28	Number of PLOG blocks per track.
TDCPBS	2A	PLOG block size.
TDCPCPB	2C	(see note 2)
TDCCBPT	2E	Number of CLOG blocks per track.
TDCCBS	30	CLOG block size.
TDCCCPB	32	(see note 2)

**Notes:**

1. One or more operating-system-dependent codes for identifying the device type: z/OS, the UCB unit type from UCBTBYT4.
2. Not used for z/OS operating systems.

## General Rules for Defining Device Block Sizes

The following general rules must be followed when defining Adabas device block sizes:

- All block sizes must be multiples of 4.
- A single block cannot be split between tracks (that is, the block size must be less than or equal to the track size).

## Maximum Sequential Block Size

When adding new devices, the maximum sequential block size must also be specified. The value to be set to the maximum sequential block size is TDCMSBS, located at offset X'08' from the beginning of the ADAIOR TDCE table.

Depending on the device type, the TDCMSBS value should be as follows:

Device Type	Maximum Block Size
0512	32760
3310	32760
3330	13030
3340	8368
3350 (8350)	19069
3370	32760
3375	17600
3380 (8380/81)	23476
339 <sub>n</sub>	27998
8380/1/5	23476
839 <sub>n</sub>	27998
9332	32760
9335	32760

### Note:

On some devices, it may be most efficient to use smaller block sizes (for example, to specify 23476 for the 3380, but with two blocks per track).

## Rules for Associator and Data Storage Block Sizes

The following rules apply for Associator and Data Storage block sizes:

- Associator block size must be greater than one-fourth the size of the largest FDT, and should be large enough to accept definitions in the various administrative blocks (RABN 1 - 30) and in the FCB;

- The block sizes for Associator and Data Storage should be a multiple of 256, less four bytes (for example, 1020) to save Adabas buffer pool space.
- The Associator and Data Storage block sizes must be at least 32 less than the sequential block size.
- Data Storage block size must be greater than: (maximum compressed record length + 10 + padding bytes).

## Rule for Work Data Set Block Size

The Work block size must be greater than either (maximum compressed record length + 110) or (Associator block size + 110), whichever is greater.

## Rules for TEMP/SORT Data Set Block Sizes

If ADAM direct addressing is used:

```
size > (maximum compressed record length + ADAM record length + 24);
size > 277 (maximum descriptor length + 24)
```

However, TEMP and SORT are generally read and written sequentially; therefore, the larger the TEMP/SORT block size, the better.

Block sizes for TEMP and SORT must be greater than the block sizes for Data Storage.

## Rules for PLOG or SIBA Block Sizes

### Note:

The use of 3480/3490 tape cartridge compression (IDRC) is not recommended for protection log files. The ADARES BACKOUT function will run at least twice as long under z/OS when processing compressed data.

The following rules apply for PLOG or SIBA block sizes:

- The PLOG or SIBA block size must be greater than either (maximum compressed record length + 110) or (Associator block size + 110), whichever is greater.
- It is also recommended that PLOG/SIBA be defined larger than the largest Data Storage block size. This avoids increased I/O caused by splitting Data Storage blocks during online ADASAV operations.

The block size (BLKSIZE) of a sequential file is determined as follows:

```
if PTF(JCL) then BLKSIZE is taken from file assignment statement or label;
if PTMBS > 0 then BLKSIZE = PTMBS;
if PTMBS = 0 then
if tape then BLKSIZE = 32760;
else BLKSIZE = TDCMSBS;
else if BLKSIZE in file assignment statement or label then use it;
if PTF(OUT) then
if QBLKSIZE > 0 then BLKSIZE = QBLKSIZE;
if tape then BLKSIZE = 32760;
else BLKSIZE = TDCMSBS;
else error.
```

**Note:**

QBLKSIZE is an ADARUN parameter.

**Sequential Protection Log Block Size in I\_PTT**

In addition, the sequential protection log block size may have to be increased in the corresponding PTT entry in CSECT I\_PTT of the load module ADAIOS.

PTT entries begin at offset 0 into CSECT I\_PTT.

Each PTT entry is X'10' bytes long and has the structure given below:

Label	Offset	Contents
PTTPN	00	Program number
PTTFT	01	File type
PTTN	02	DD name characters 2 - 8
PTTF	08	Flags: OUT (X'80') output BSAM (X'40') BSAM BACK (X'20') read backwards JCL (X'10') BLKSIZE/LRECL/RECFM taken from DATADEF statement or label UNDEF (X'04') undefined record format VAR (X'02') variable record format
-	09	Reserved
PTTMBSZ	0C	Maximum block size

The PTT entry for the sequential protection log can be identified by X'12F1' in its first two bytes.

**Enhanced Backup and Restore Performance in Tape Sequential Files**

Adabas exploits IBM's large block (more than 32,760 bytes) support for sequential access methods BSAM and QSAM under z/OS version 2 release 10 and above. ADAIOR supports tape drives with a block size of up to 256K for 3590 devices and 64K for 3490/3490E devices.

This support can provide performance benefits for any utility writing to tape (for example, ADASAV). Users must ensure that they have applied the PTF for their environment that fixes IBM APAR OW55220. Without this fix, ADARES BACKOUT from a tape file written with large block support will fail.

**Warning:**

**If you choose to write tape files with large block sizes ( for example, for database backups), these files will not be transportable to systems where support for large blocks is not available. This might include a site being used as a backup facility for disaster recovery.**