

**ROOT DIRECTORY DESCRIPTION TABLE Format of SINGLIX FS1, FS2 file systems**

Offset	Item	DATA	Type	Size	Description of Item
0	Directory Sign	'DDT'	Char	3 byte	TR-SINGLIX Directory Description Table
3	Reserved	XXh	Byte	1 byte	Must be 0 for Current/This DDT Version
4	Sector Size	XXh	Byte	1 byte	Bytes per Sector (FS1=512, FS2=2048) as shift count
5	Extent Allocation Type	XXh	Byte	1 byte	0 = direct, 1 = indirect
6	Root Directory Sign	'RT'	Word	2 byte	'RT' as Root Directory Identifier
8	Directory Number	XXXXXXXXh	Dword	4 byte	(This) DDT Address of Root Directory (Offset)
12	Sector Count	XXXXXXXXh	Dword	4 byte	Number of Sectors (belong to root dir, except DDT)
16	Beginning Sector	XXXXXXXXh	Dword	4 byte	Volume Beginning Sector (LBA) Address (abs)
20	Parent Dir Serial	FFFFFFFFh	Dword	4 byte	Must be FFFFFFFFh for root directory.
24	Directory Size	XXXXXXXXh	Dword	4 byte	Directory Size in bytes.
28	Sub Directory Level	XXXh	Word	2 byte	Sub directory level should be 0 for Root Directory
30	Attributes	1 byte	Byte	1 byte	(Dos type) Directory Attributes (0,0,A,D,V,S,H,R)
31	Extended Attributes	1 byte	Byte	1 byte	User, Group, Others Permission Flags
32*	Reserved	8 bytes	Byte	8 byte	Reserved for TR-MULTIX (must be 0)
40	Country	XXh	Byte	1 byte	Language, Date, Text Format (default = 0)
41	Time Zone	XXh	Byte	1 byte	-11 to +12 (GMT = 0, default = 0)
42	Creating Year	XXh	Byte	1 byte	Years since 1980 (0-255)
43	Creating Month	XXh	Byte	1 byte	Month (1-12)
44	Creating Day	XXh	Byte	1 byte	Day (1-31)
45	Creating Hour	XXh	Byte	1 byte	Hour (0-23)
46	Creating Minute	XXh	Byte	1 byte	Minute (0-59)
47	Last Access Date	XXXXXXh	Byte	3 byte	The Last Access (RDT Write) Date
50	Last Access Time	XXXXh	Byte	2 byte	The Last Access (RDT Write) Time
52	Last Modification Year	XXh	Byte	1 byte	Years since 1980 (0-255)
53	Last Modif. Month	XXh	Byte	1 byte	Month (1-12)
54	Last Modification Day	XXh	Byte	1 byte	Day (1-31)
55	Last Modification Hour	XXh	Byte	1 byte	Hour (0-23)
56	Last Modif. Minute	XXh	Byte	1 byte	Minute (0-59)
57	Last Modif. Second	XXh	Byte	1 byte	Second (0-59)
58	Volume Serial No.	XXXXXXXXh	Dword	4 byte	Volume (Root Directory) Serial No. (Tick Count)
62	Long Name Length	00h	Byte	1 byte	Length of unicode dir name = 0 (for root dir)
63	Volume Name Type	XXh	Byte	1 byte	0 = Default, 12 = Msdos, 14 = Unix, 64 = Singlix
64	Volume Name	64 chars	Char	64 byte	FS Volume Name String (Zero Padded)
128	Extents Table	16*(4+4) bytes	Dword	128 byte	Table of 16 direct or indirect extent addresses
256	Reserved	256 bytes	Byte	256 byte	Reserved/Optional data for Root Directory
512**	Reserved	?	Byte	1536 byte	Optional/Reserved Area for FS2 Directories/Files

\* Used by TR-MULTIX (Multiuser, Multitasking) Operating System, only!

\*\* 1536 byte extra description for 2048 bytes per sector File System (FS2), only ! Optional !

NOTE: Root Dir. Entry: FFFFFFFFh is erased entry, 0 is end of root dir. entries. Root dir. entries are the FDT or DDT addresses of files or sub directories. (32 bit sector offset number which is > 0 and < FFFFFFFFh)

Root directory is the parent directory of all sub directory level 1 directories (of course if they are recorded in root directory entries.) Directory Description Table Offset 28 is for Sub Directory Level. The ZERO value at RDT Offset 28 indicates it is ROOT directory (also Parent Dir Serial Number FFFFFFFFh and 'RT' identifier in root directory signature field indicates that). The Operating System Software/Kernel or a program which uses this SINGLIX FS, must check the letter "DDT" letters at the beginning of directory descriptor table and then FFFFFFFFh in Parent Dir Serial Number field and 0 in Sub Directory Level field and 'RT' in Root Directory Identifier field. (At Offset 0, "D" is for directories, "F" is for files. "DE" shows that directory/files is actually deleted, cannot be undeleted because of it is removed from UNDELETE directory. And corresponding Disk Allocation Table/Bitmap bits are set to 1 and indicates to the sectors of that directory/file as DELETED/FreeForUse.)

Root/Parent Dir. Serial number is used for that purpose: When a dir or file is deleted, it will be removed from root/parent dir entries by replacing child directory or file number to FFFFFFFFh = deleted entry sign. And, it will be located in UNDELETE Directory as a new deleted file entry. When user want to undelete this file, if the directory (volume) serial number in the parent/root directory descriptor table is same with the number declared as parent dir serial number in child dir/file descriptor table, the deleted directory or file will be restored in the root directory. Directory serial number is just a tick count which always different by the computer's timer ticks. (as like as volume serial number.)

Directory serial number checkup is performed for preventing accidental/wrong restore operations. Because, a directory can be deleted, then, a new directory description table can be created on same disk sector, only serial number check (because of serial number is the timer tick count) will provide determining of that DDT is actually the parent directory's description table or a new directory description table. Also, Root Directory Serial Number is (same with) Volume (File System) Serial Number; Root Directory Serial Number is not needed for undelete procedure. (There is only one root directory in a FS and it cannot be deleted.)

Singlix FS file system uses extents which are contiguous/sequential sectors (like as variable size clusters) for file allocation on disk volume (partition). Length (sector count) of an extent may be 1 to File Size / Sector Size sectors. At the beginning, 16 direct extent fields/rows are used in FDT (in Extent Table space). Every direct extent field/row is 2 dwords. The 1st one is for file offset (as sector) and the 2nd is disk sector address (offset). When file grows beyond 16 extents. Indirect extents table is used. And 16 direct extent entries are changed to 16 indirect table entries. Each indirect table contains entries for 64 direct extents (if sector size is 512 bytes).

#### EXTENDED ATTRIBUTES byte:

Bit 0 = Owner's Read Only Flag [ 0 = Writable file, 1 = Read only file ]  
Bit 1 = Owner's Executable File Flag (1 = executable file -in multitasking mode-)  
Bit 2 = Group User's Invisible Flag (0=No, 1=Yes) [ 1 = This file is not visible except the owner ]  
Bit 3 = Group User's Read Only Flag (0=No, 1=Yes) [ The result can be 'Writable' if Bit 0 is 0 ]  
Bit 4 = Group User's Executable File Flag (1= executable by group user if also Bit 1 is 1)  
Bit 5 = Other User's Invisible Flag (0=No, 1=Yes) [ 1 = This file is not visible except the group ]  
Bit 6 = Other User's Read Only Flag (0=No, 1=Yes) [ The result can be 'Writable' if Bit 0 & Bit 3 is 0 ]  
Bit 7 = Other User's Executable File Flag (1= executable by other users if also Bit 1 & Bit 4 is 1)

#### (DOS) BASIC ATTRIBUTES byte:

Bit 0 = Read Only Flag (R)  
Bit 1 = Hidden (Invisible) Flag (H)  
Bit 2 = System File Flag (S)  
Bit 3 = Volume Flag (V)  
Bit 4 = Directory Flag (D)  
Bit 5 = Archive Flag (A)  
Bit 6 = Reserved (0)  
Bit 7 = Reserved (0)

#### DIRECTORY DATA (ENTRY) FORMAT:

Each directory entry is 1 dword (4 bytes) that points to the description table address of a file or directory.

If a directory entry contains the value 0FFFFFFFh, it is a deleted entry and should be skipped during the directory search.

If a directory entry contains a 0 (zero), it is the end of the directory entries and the directory search should be stopped there.