# CHAPTER 7 MISCELLANEOUS TOPICS CONTENTS

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## 7.1 Versions

### 7.1.1 General

PINE OS is available in the following three versions:

Kana V1.Ø
Kana V2.Ø } (Japan only)
Export version 1.Ø

For application programs which have to run in different modes depending on the OS version, PINE OS provides a facility which allows them to refer to the version of the OS under which they are currently running.

### 7.1.2 Version Check

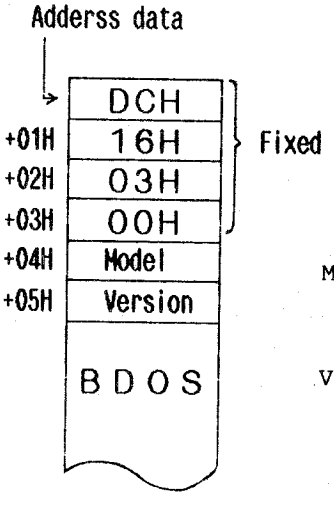
The version can be examined using one of the following methods:
1. Checking the CP/M serial number.
2. Calling ROMID on OS ROM.

This subsection shows how to test the version using the above methods.

#### 7.1.2.1 Checking the CP/M serial number

The model type and OS version number, and other information are stored in 6-byte CP/M BDOS fields, labeled Serial No., which are located at the beginning of RBDOS1 and RBDOS2.

To refer to Serial No. in RBDOS1, check the 6 bytes before the BDOS entry address which is stored in addresses ØØØ6H and ØØØ7H. To refer to Serial No. in RBDOS2, check the 6 bytes starting at ØEAØØH. These two fields contain the same information.



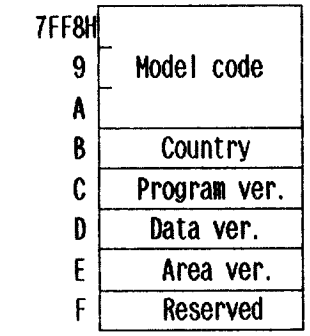

Model : ØØH : PX-8
: Ø1H : PINE

Version:
Bits 7-4 : Destination
ØØH : Export version
Ø1H : HASCI (not available for PINE)
Ø2H : ASCII (not available for PINE)
Ø3H : Kana version (Japan only)
Bits 3-Ø Version No.
Ø1H : V1.Ø
Ø2H : V2.Ø

7.1.2.2 ROMID

ROMID identifies the OS ROM installed in the PINE. It is located in an 8-byte area on OS ROM at 7FF8H. ROMID can be referenced using the LDIRX BIOS function.

The format of the ROMID field is shown below. Data in this field is all in ASCII code.




Model code : Set to 'PIN'.
Country — : 'J' : Kana version(Japan only)
'E' : Export version
'U' : USA version
(not available for PINE)
Program ver.: Identifies the OS version.
'1' : Ver.1.0
'2' : Ver.2.0
Data ver. : Identifies the version of the initial system area data.
'1' : Ver.1.0
'2' : Ver.2.0
Area ver. : Indentifies the version of the added system area.
'1' : Ver.1.0
'2' : Ver.2.0
'3' : Ver.3.0

7.1.3 Version Differences

The table on the next page summarizes the functional differences among OS Kana version V1.Ø, and V2.Ø, and Export version 1.Ø. The table below lists the OS versions and their identifications placed on the OS ROM (mask ROM).

| OS version | Version ID on ROM |
|---|---|
| Kana V1.Ø (Japan only) | EPSON POSK1 |
| Kana V2.Ø (Japan only) | EPSON POSK2 |
| Export Version 1.Ø | EPSON POSO1 |

| Difference | Kana V1.0 | Export version 1.0 | Kana V2.0 | Remarks |
|---|---|---|---|---|
| *CRS state after cartridge installation. | Depends on the cartridge type. | Programmable by rewriting CRSTPTN(0EFC1H). | Same as in Export version 1.0. | OS cartridge check routine(CHKMOD) is made available by rewriting CRSTPTN when adding a cartridge. |
| Supported cartridge I/F mode | HS mode<br>DB mode | HS mode<br>DB mode<br>IO mode | HS mode<br>DB mode<br>IO mode | IO mode is available for cartridges with device codes of 0EH and 0FH. |
| Emergency TF write at power-off time | No | Yes | Yes | |
| Provisions for modifying hook or adding hook entries | Control can be transferred to any location in the RAM area from the hook. | Control can be transferred to locations at 8000H and higher from the hook.<br>A hook entry to BIOS is added to Kana V1.0. | Control can be trasferred to locations at 8000H and higher from the hook.<br>A hook entry to ART-interrupt processing routine is added to Export version 1.0. | Control can be transferred to any locations in the RAM area through hook entries for ICF, OVF, and EXT interrupts. |
| System utility jump table. | A jump table is available for 33 utility routines. | An entry to cartridge check routine(CHKMOD) is added to the jump table for kana V1.0. | Same as in Export version 1.0. | |
| Power-off or alarm processing during RSIOX processing. | RSIOX is terminated before power-off or alarm processing is performed. | Power-off or alarm processing is performed during RSIOX processing(no data is lost). | Same as in Export version 1.0. | |

| Difference | Kana V1.0 | Export version 1.0 | Kana V2.0 | Remarks |
|---|---|---|---|---|
| Alarm screen display time. | Fixed at 50 seconds. | Programmable. Defaults to 50 seconds. Display time is loaded in ALRMTIME (0F308H). | Same as in Export version 1.0. | |
| Alarm or wake processing after power failure. | Not inhibited. | Inhibited. Original state is restored by powering on the machine after power is restored. | Controlled by flag BTRYALM (0EFC3H).<br>=00H : Inhibited.<br>=Nonzero : Not inhibited. | In Export version 1.0 and kana V2.0, alarm or wake processing routine is exited if power is shut down by a power failure when it has been inhibited. |
| Cartridge printer support. | Not supported.<br>CRT(01) in the LST : field is assigned to LCD. | Supported.<br>Assingned to CRT(01) in the LST : field. | Same as in Export version 1.0. | Supported in cartridge HS mode. |
| Initialization of printer version data. | After rewriting I/O byte LST : field.<br>By sending ESC+'R'+n immediately after a warm boot. | After rewriting I/O byte LST : field.<br>After a warm boot.<br>After rewriting character generator.<br>By sending ESC+'R'+n immediately after power-on | Not initialized. | In Export version 1.0, PRTFLG is cleared at power-on time.<br>In Export version 1.0, PRTFLG contains information pertaining to LST : and display character set. |
| I/O device serial parameter (when RS-232C is used) | Input and output devices have different serial parameters. | Only LST: devices have different serial parameters. | Same as in Export version 1.0. | |

| Difference | Kana V1.0 | Export version 1.0 | Kana V2.0 | Remarks |
|---|---|---|---|---|
| Character set specifications for display functions | ASCII, England , and Japan | ASCII, France, German, England Sweden, Denmark, Italy, Spain and Norway | Japan only | |
| Pointer to character generator table | Fixed. | Fixed. | Fonts data can be extracted from the user-supplied character generator by rewriting the area containing the starting address of the character generator table to be used.<br>Codes 20H-7FH :<br>RLCGENN(0F95EH)<br>Codes 80H-9FH :<br>RLCGENG(0F360H)<br>Codes A0H-DFH :<br>RLCGENK(0F362H) | |

## 7.2 DIP Switches

### 7.2.1 General

PINE OS uses DIP switches to define the following:
1. Keyboard type
2. BIOS LIST device interface
3. International character set for the keyboard and display functions

The keyboard type can be identified automatically by the keyboard hardware that is actually installed, irrespective of whether the corresponding DIP switch is in the ON or OFF state.

### 7.2.2 DIP Switch Bit Definitions

Figure 7.2.1 shows the definition of the DIP switches. The state of bit 8 is determined by hardware depending on the keyboard actually installed, irrespective of the position of the DIP switch.

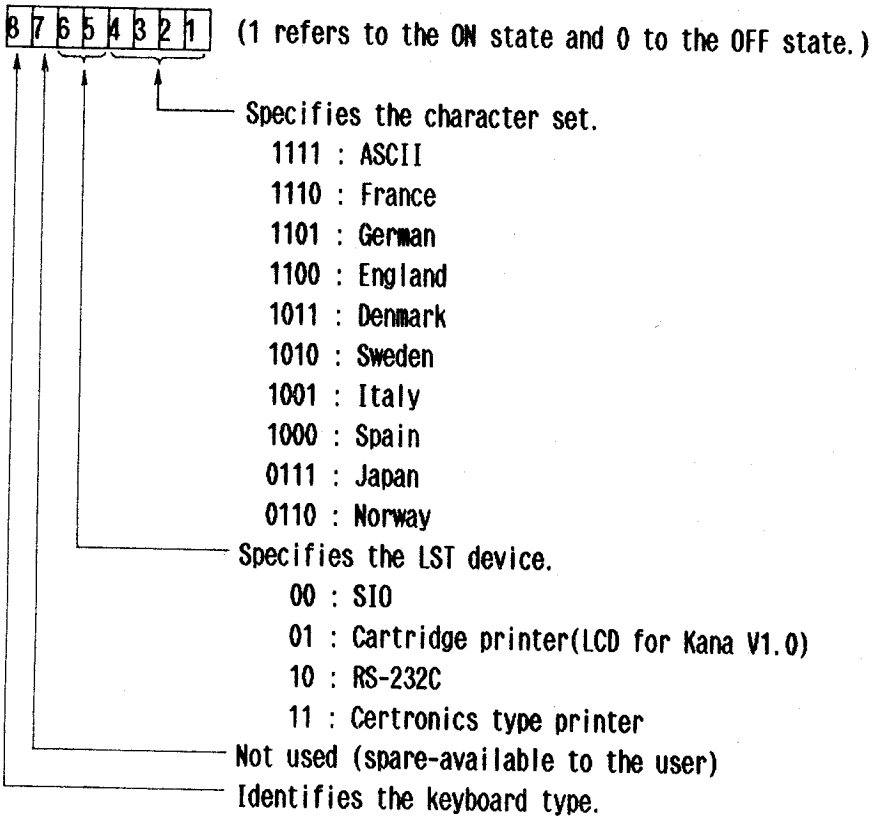



Fig. 7.2.1 DIP Switch Bit Definitions

### 7.2.3 System Processing

PINE OS reads in the DIP switch status during boot processing initiated by a system initialize or reset and stores it in YKCOUNTRY (ØF775H) for subsequent reference during key entry, display, and list processing.

#### 7.2.3.1 Key entry processing

YKCOUNTRY bit 7 is referenced during key entry processing to identify the type of the keyboard installed. When the standard keyboard is used, YKCOUNTRY bits 3-Ø are used to indicate the character set employed.

#### 7.2.3.2 Display processing

Flag areas for display processing includes YLDFLTC (ØF776H) and YLCOUNTRY (ØF777H). Bits 3-Ø of YKCOUNTRY are copied into YLDFLTC during boot processing and the contents of YLDFLTC are copied into YLCOUNTRY during a processing routine common to BOOT and WBOOT. The display function references YLCOUNTRY when converting character codes to the correct fonts of the specified character set.

#### 7.2.3.3 List processing

The IO byte at RAM address ØØØ3H is referenced during list processing. When BOOT is started, it copies bits 5 and 4 of YKCOUNTRY into bits 7 and 6 of the IO byte. When the BDOS or BIOS list function is called, it reads in the IO byte into RIOBYTE (ØF529H). The actual list processing routine references RIOBYTE to determine the actual list driver routine.

During list processing, YKCOUNTRY is also referenced to output the international character set specification to the list device.

#### 7.2.3.4 Programming notes

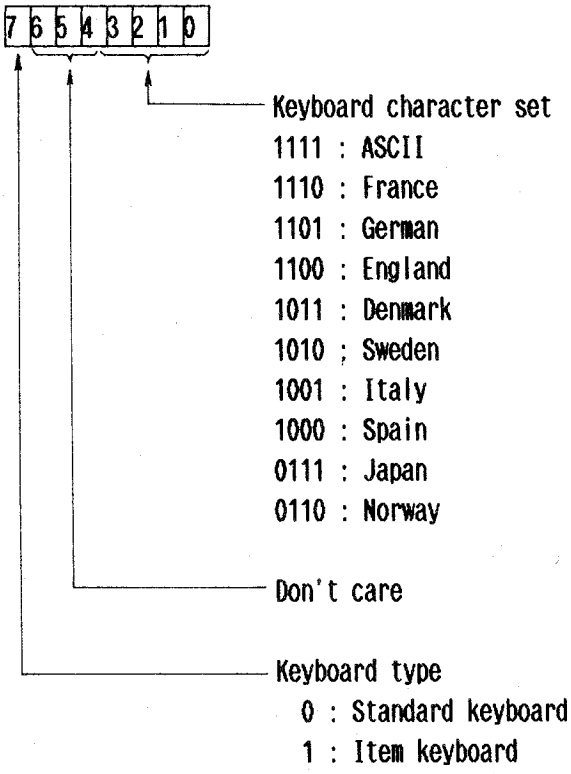
(1) The application program can check the state of the DIP switches using the READSW BIOS function.
(2) Since PINE OS reads the DIP switch status when a reset is performed, changes in the DIP switch status by the user do not take effect immediately. To make a change in the DIP switch status effective, press the RESET button.
(3) The character sets supported by the keyboard and display functions differ between OS Export and Kana versions.

| Country / OS | ASCII | France | Germany | England | Denmark | Sweden | Italy | Spain | Japan | Norway |
|---|---|---|---|---|---|---|---|---|---|---|
| Kana V1.0 | ○ | × | × | × | × | × | × | × | ○ | × |
| Kana V2.0 | × | × | × | × | × | × | × | × | × | × |
| | | | | | | | | | | |
| Export V1.0 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ |
| | | | | | | | | | | |

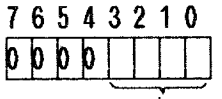
○ : Supported.
× : Not supported.

The system areas related to system processing are listed below.

YKCOUNTRY (ØF775H) 1 byte
Contains the DIP switch status read during BOOT. This flag is referenced by the key entry processing routine to identify the keyboard installed.



YLDFLTC (ØF776H) 1 byte
Contains the default display character set. This flag is loaded with the status of the DIP switches during BOOT processing.




Display character set
- 1111 : ASCII
- 1110 : France
- 1101 : Germany
- 1100 : England
- 1011 : Denmark
- 1010 : Sweden
- 1001 : Italy
- 1000 : Spain
- 0111 : Japan
- 0110 : Norway

YLCOUNTRY (ØF777H) 1 byte
Flag indicating the display character set. This area is loaded with a copy of YLDFLTC during BOOT or WBOOT processing.
The format of YLDFLTC is identical to that of YDFLTC.

RIOBYTE (ØF529H) 1 byte
Loaded with the value of IOBYTE (at ØØØ3H) when BDOS or BIOS is called.
The format of RIOBYTE is identical to that of IOBYTE. See Section 3.9, "I/O Byte" for details.

## 7.3 Guide for Programming ROMs

This section gives a guide for programming ROM devices for ROM capsules and cartridges.

### 7.3.1 Formats

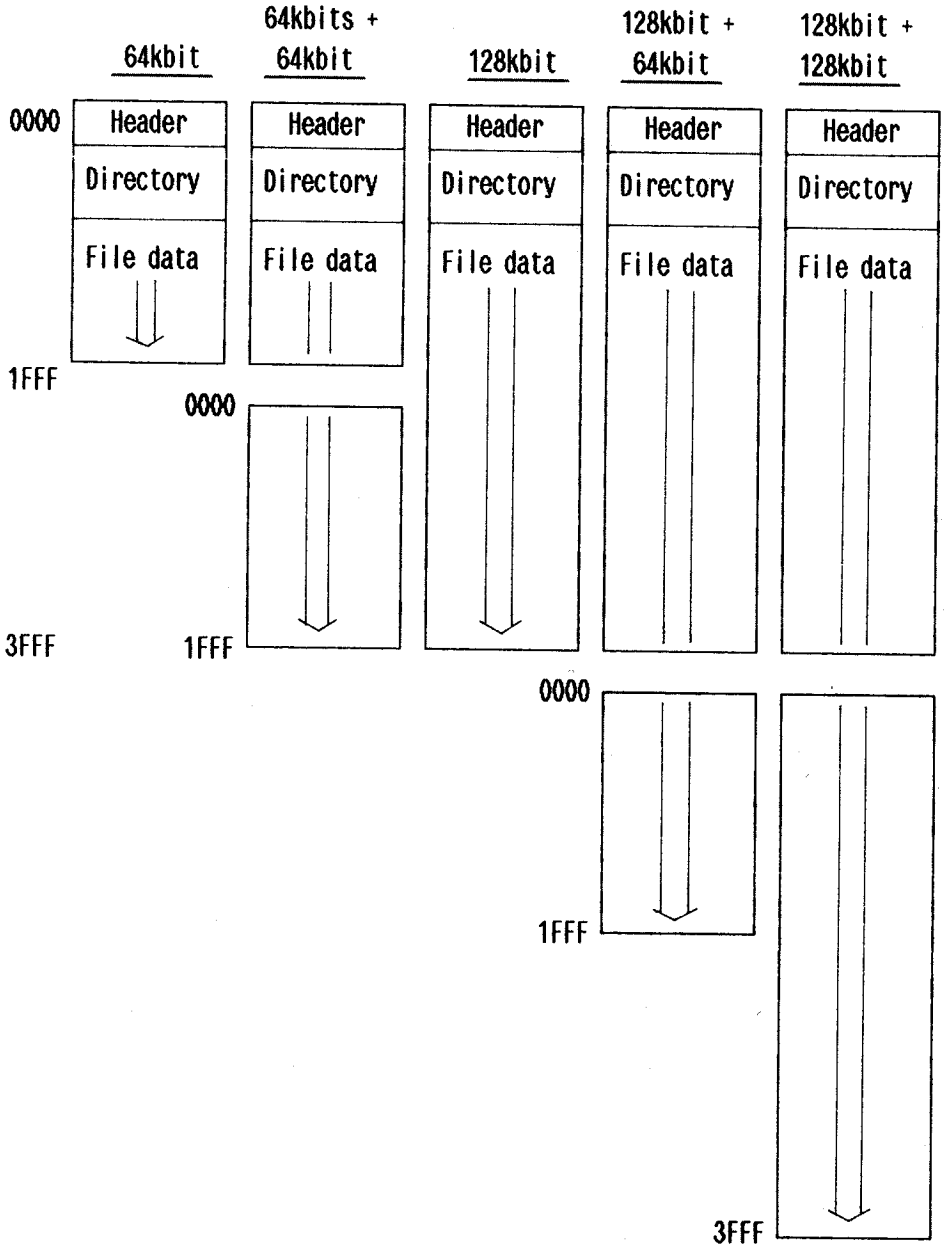
In PINE CP/M, ROMs can be programmed in two formats: M- and P-formats. The M-format is used for MAPLE and PINE ROM capsules and PINE ROM cartridges. Load-and-go programs and data files are created in this format. The P-format is dedicated to PINE ROM capsules and used to construct ROM-based programs.

The M- and P-formats differ in the location of the ROM header and directory areas. They also use different addressing schemes.

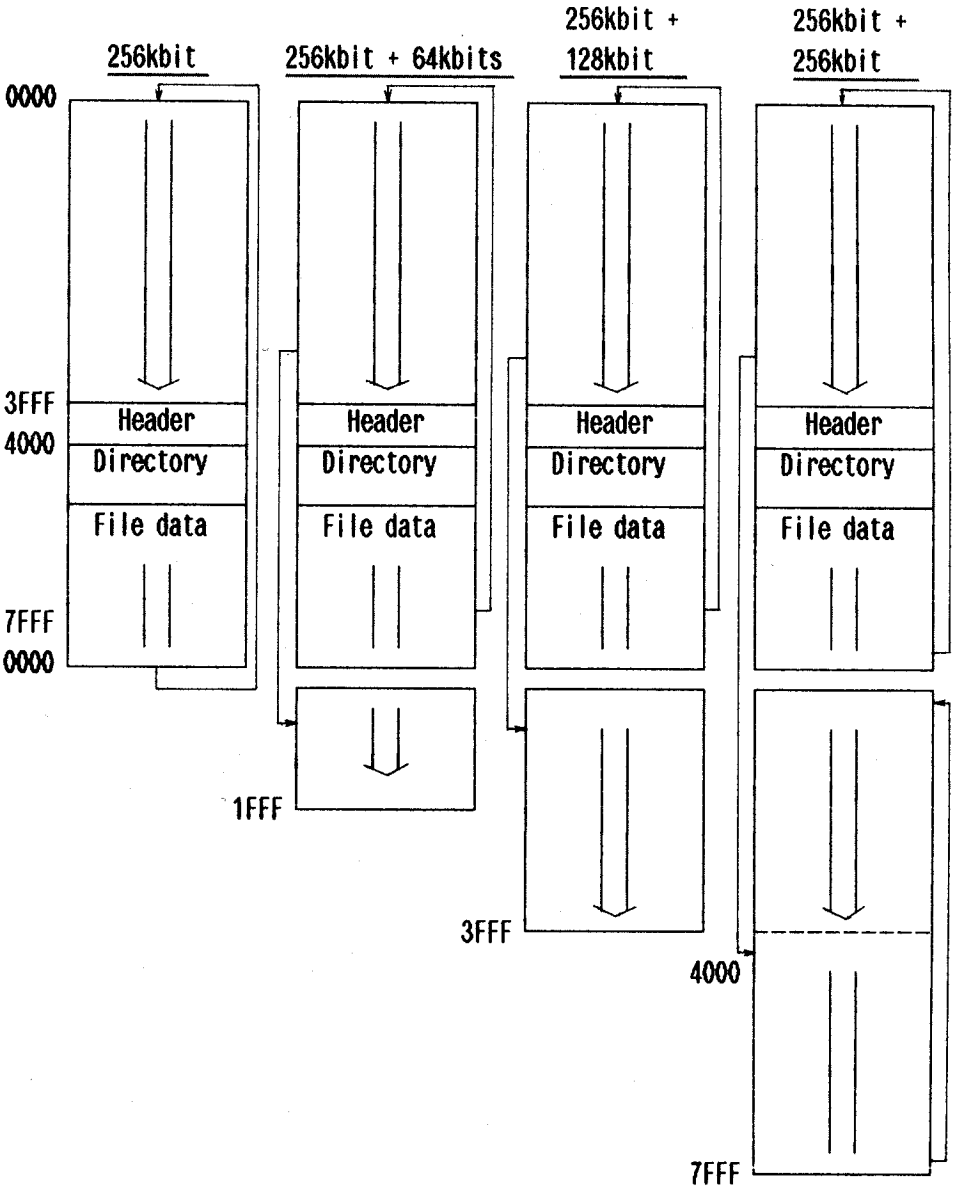
Supported ROM devices include 64K-, 128K-, and 256K-bit ROMs. Two ROM devices of the same capacity may be combined to form a single ROM cartridge or capsule.

(1) M-format ROM structure

The location of the directory for M-format PROMs differs depending on the type of the PROM device.

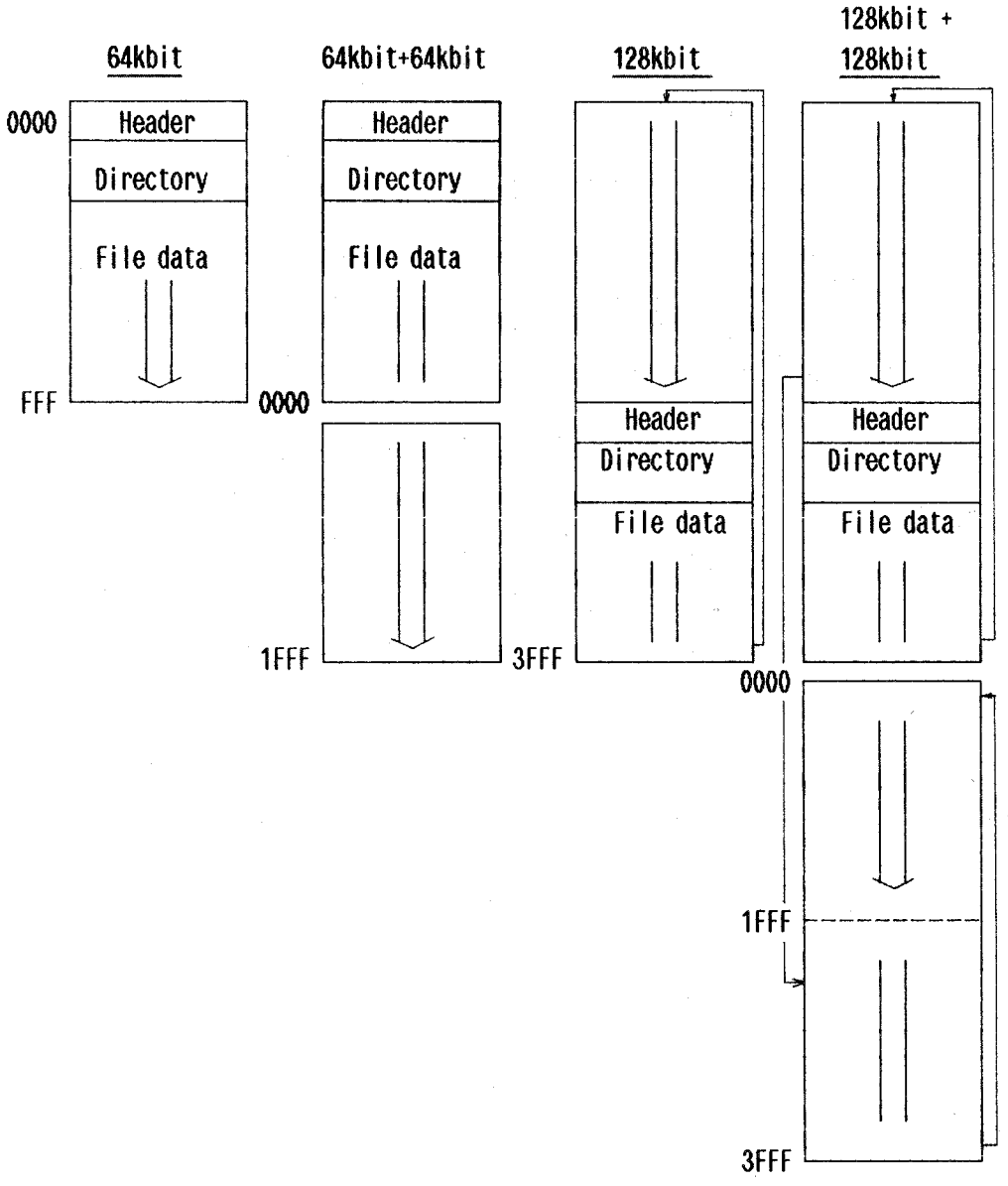


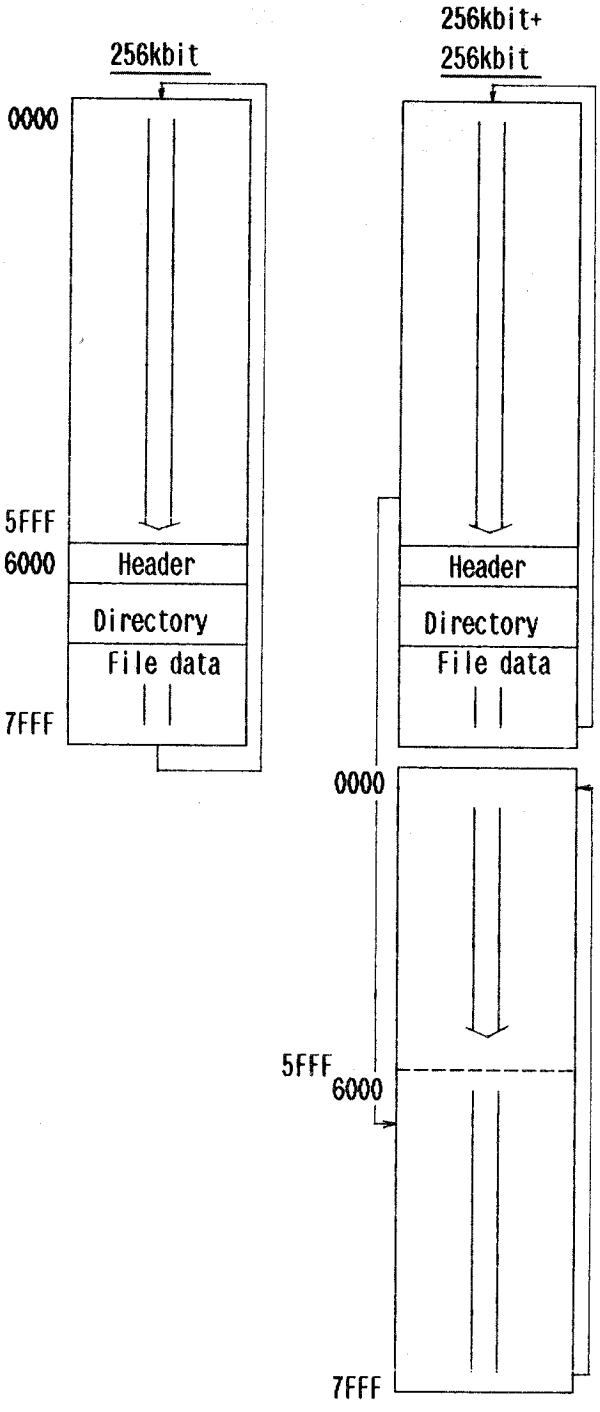

Arrows in the figure show the sequence in which ROM data is written.



(2) P-format ROM structure

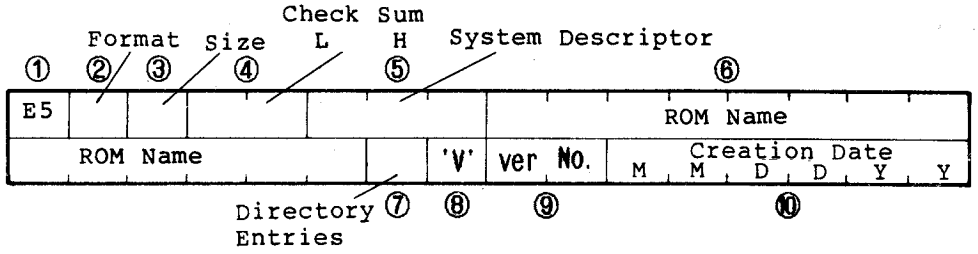
The location of the directory of P-format PROMs differs depending on the type of the PROM device.





7.3.2 Header Structure

The size of the header for a PROM file is fixed at 32 bytes. The structure of the PROM header is shown below.

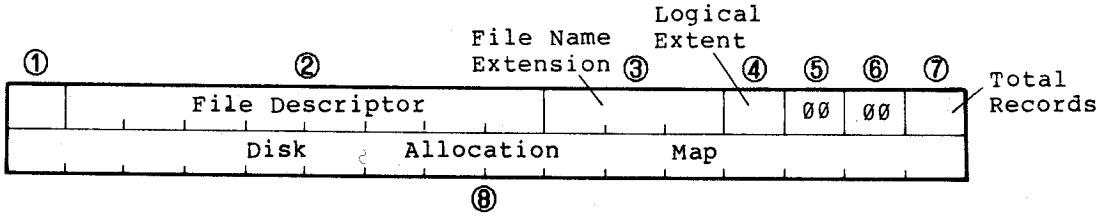



| No. | Item | Size | Description |
|---|---|---|---|
| 1 | E5H | 1 | * Set to 0E5H<br>* The system locates the beginnig of the ROM by checking this and the subsequent format fields. |
| 2 | Format | 1 | * Indentifies the format.<br>37H ···M Format<br>50H ···P Format |
| 3 | Capacity | 1 | * Indicates the capacity of the ROM in 1k bytes (binary format). The MSB is set to 1 for a dual-part PROM.<br>08H ··· 64k bits, single-part PROM<br>88H ··· 64k bits, 2-part PROM<br>10H ···128k bits, single-part PROM<br>90H ···2-part PROM with one part consisting of 128k bits.<br>20H ···256k bits, single-part PROM<br>A0H ···2-part PROM with one part consisting of 256k bits |
| 4 | Check Sum | 2 | * 2-byte field containing the checksum of the data calculated by adding together the values of the data bytes from beginning to end of the data aera and taking the lowest order two bytes. The r lower order byte is placed in the first byteposi tion of the field.<br>* This field is not used by the system. |

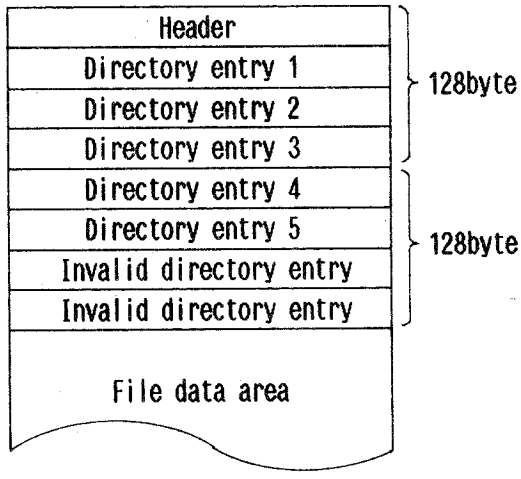
| No. | Item | Size | Description |
|---|---|---|---|
| 5 | System Name | 3 | * User-supplied system name.<br>* This field is not used by the system. |
| 6 | ROM Name | 14 | * User-supplied system name.<br>* This field is not used by the system. |
| 7 | Number of directories | 1 | * Indicates the size of the directory area in the number of directory entries. The header area is counted as one directory entry. The number of directory entries is rounded up to a multiple of 4 and stored in binary form.<br>* This field can take values of 04H, 08H, 0CH, 10H, 14H, 18H, 1CH, and 20H.<br>* The value of this field is calculated using the following formula :<br>[{(Directory Entries)/4} + 1] * 4<br>↑ ↑<br>Number of directory entries used Entry for header |
| 8 | 'V' | 1 | * Set to 'V'. |
| 9 | Ver.No. | 2 | * User-defined ROM version number. |
| 10 | Date | 6 | * User-supplied date of ROM production in MMDDYY format.<br>* This field is not used by the system. |

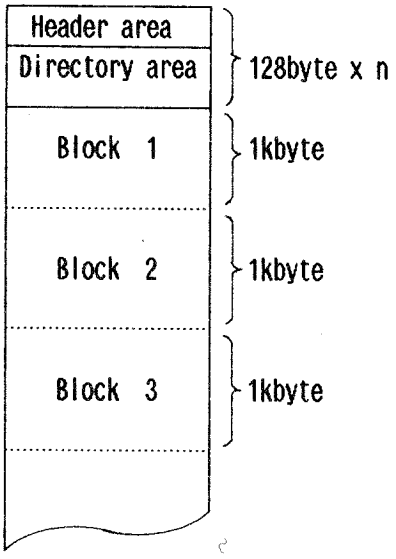
7.3.3 Directory Structure

The system can manage a file of up to 16K bytes with each directory entry. For files larger than 16K bytes, the system uses two or more entries. The format of the directory entry is identical to the FCB of standard CP/M and is depicted in the figure below. The maximum number of directory entries is 31.



| No. | Item | Size | Description |
|---|---|---|---|
| 1 | | | * Indicates the validity of the directory entry.<br>00H ··· Vaild directory entry<br>E5H ··· Invalid directory entry<br>* Invalid directory entries are created to ensure that the directory area ends on a 128-byte boundary. If, for example, five valid directory entries are created, counting the header as a single entry, two odd entries (64 bytes) will , dresult. Such entries are referred to as invalid directory entries(see the example below, ) |
| 2 | File name | 8 | * Contains a file name of up to 8 ASCII characters |
| 3 | File type | 3 | * Contains a file type of 3 ASCII characters. |
| 4 | Logical extent | 1 | * Contains the logical extent number(00H to 1FH) of this directory entry.<br>* One directory entry can handle a file area of up to 16k bytes. Two or more entries are used for a file larger than 16h bytes. These entries are identified by numbers, called logical extent numbers, assigned to them sequentially starting at 00H. |



| No. | Item | Size | Description |
|---|---|---|---|
| 5 | | 1 | * Set to 00H. |
| 6 | | 1 | * Set to 00H. |
| 7 | Total records | 1 | * Contains the total number of records (00H to 80H)managed in this directory entry.<br>* A record is the unit of data accessed by CP/M. Its size is 128 bytes. Since a single directory entry can handle a maximum of 16k bytes of file data, the greatest total number value for a single entry is 128(80H). |
| 8 | Disk allocation map | | * Contains the disk allocation map of the ROM as a a ROM capsule or cartridge. The disk allocation map is made up of block numbers which identify the blocks allocated for the file(files are managed in 1K-byte units). The block number begins (with 1 which identifies the first 1k byte of the file. Since the disk allocation map is 16 bytes long, it can manage a maximum of 16 blocks(16k bytes) of file data.<br>  |