Verix Developer Training

Operating System

Features

- § Commercial Tools
  - Microsoft Visual Studio v6.0
  - ARM Compiler
- § Native Code
  - Applications run faster as compared to interpreted code
  - Object code requires more space
- § Large Applications
  - May extend well-beyond the 64K limit
  - R-modules no longer needed
- § Shared Libraries
  - Build libraries that can be shared between applications
  - Reduces library duplication amongst applications
  - Changes to a library requires recompile & download

Features

§ Dynamic Memory Allocation

§ Downloadable OS

§ Flash File System

- Application / Shared Libraries / Static Files
- Append vs. Overwrite
- Occasionally may want to defrag or coalesce

§ Events

- No interrupts, traps/guards

Features

§ Console Interface

- Keyboard
- Display

§ Device Ownership

- Only one task can own a device at any time
- Can pass console ownership across tasks

§ Extension Areas

- Declare maximum file size (in bytes)
- Eliminates writing blank records and then overwriting

Features

§ Multiple Applications

§ Waterproofing

- Segregate applications into partitions
- Firmware and software partitioning via the MMU
- Eliminates the re-certification process

System Mode

§ A system application that comes with the OS

§ Responsible for administrative tasks, such as:
- Starting the initial application
- Receiving downloads
- Setting config.sys variables
- Setting the clock
- Setting display contrast
- Starting the debug monitor
- Device diagnostics
- Clearing memory

§ Enter System Mode by:
- Pressing [F2]/[F4]
- Entering a password (1Z66831 or 1)

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Check the OS version

Vx510

VERIFONE O5150
Q50014A0
09/22/2001 VERIX V

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F₁
F₂
F₃
F₄

ALPHA

Firmware/ OS version

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System Mode Menus

§ SYS MODE MENU 1

CONTRAST

CLOCK

RESTART

§ SYS MODE MENU 2

DOWNLOAD

RAM FILES

FLASH FILES

§ SYS MODE MENU 3

SYSTEM INFO

EDIT

PASSWORDS

VeriFone.

System Mode Menus

§ **SYS MODE MENU 4**

REMOTE DIAGS

ERROR LOG

DEBUGGER

§ **SYS MODE MENU 5**

SCREEN DIAG

KEYBOARD DIAG

MAG CARD DIAG

§ **SYS MODE MENU 6**

IPP DIAG

IPP KEY LOAD

PRINTER DIAG

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System Mode Menus

§ **SYS MODE MENU 7**

RAM DIRECTORY

FLASH DIRECTORY

§ **SYS MODE MENU 8**

ICC DIAGS

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System Mode Menu - Navigation

§ Use ↑ [purple 1] and ↓ [purple 2] to scroll through menus

§ To select a menu option, press the [Fx] key associated with the menu item

§ Generally, press [X] or CANCEL to exit a menu item or Menu and return to the Menu or Previous Menu

§ Press RESTART [F4] from SYS MODE MENU 1 to run the application or exit from System Mode

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File Groups

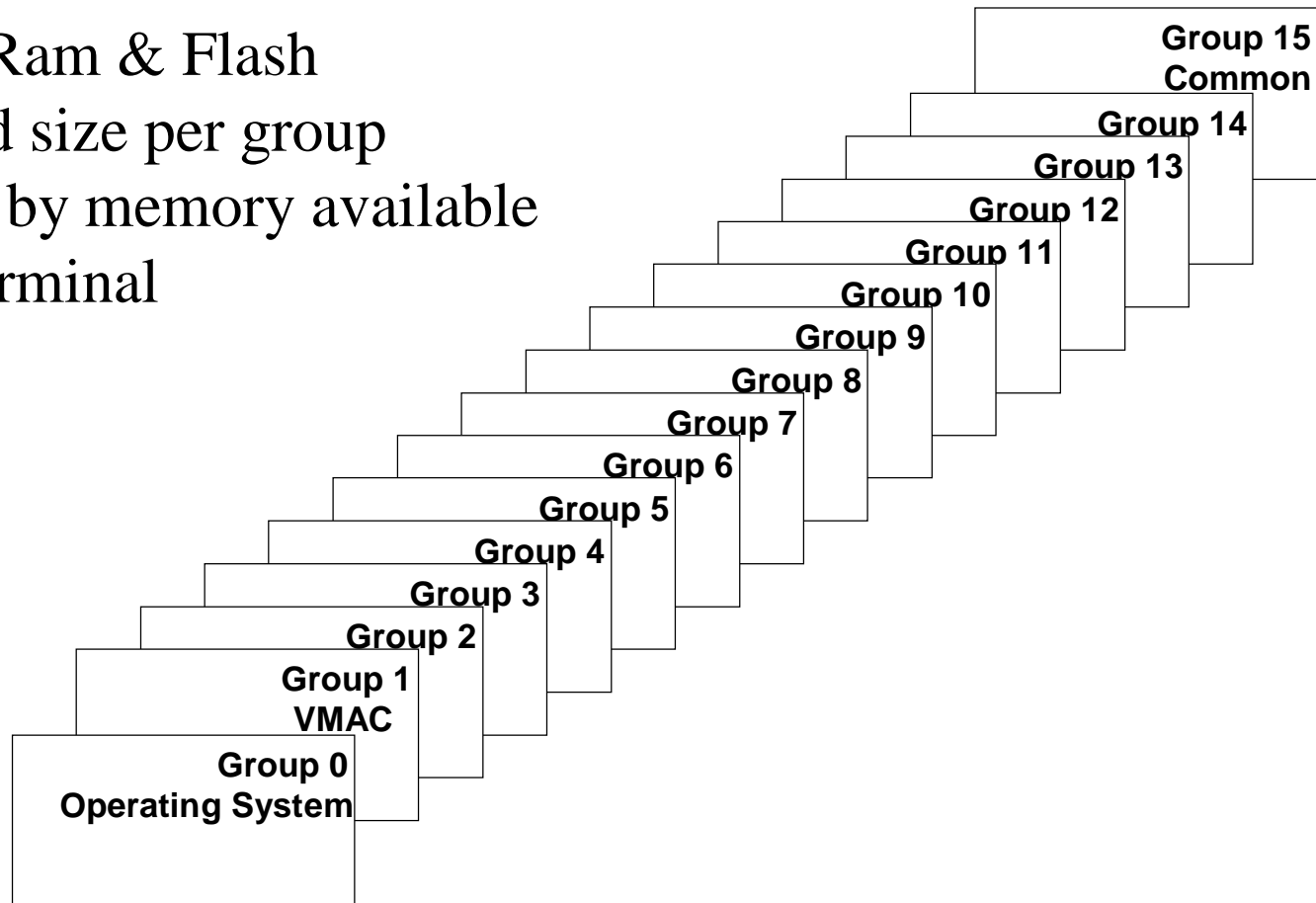§ Logical partitions of memory

§ There are 16 groups (0-15)

- GID 0　　Operating System only
- GID 1　　Supervisory Application / Sponsor Application (VMAC)
  » Can open files in GID 1-15
- GID 2-14 Can open file in their group
  » Can open files in GID 15
- GID 15　Common Area
  » Shared common data space
  » Limited to GID 15

§ Groups span both Flash & RAM

File Groups

Across Ram & Flash
No fixed size per group
Limited by memory available
in the terminal

Group 15
Common

Group 14

Group 13

Group 12

Group 11

Group 10

Group 9

Group 8

Group 7

Group 6

Group 5

Group 4

Group 3

Group 2

Group 1
VMAC

Group 0
Operating System

File Authentication and Compression

§ **File Authentication**

- Verify or prove the authenticity of a file before it can be executed in the terminal
- Uses VeriShield to generate an application signature

§ **File Compression**

- For download files
- Can be used only with VeriCentre
- Zip files do not get authenticated, however, individual files in the zip file are
- Requires config.sys variable in GID 1
  - e.g. *UNZIP=MYAPP.ZIP

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Memory Layouts

Group	Ram (I:)	Flash (F:)
GID0	For system use	For system use
GID1 (main)	Main CONFIG.SYS	
GID2	CONFIG.SYS	
. .		
GID14	CONFIG.SYS	
GID15 (shared)	CONFIG.SYS	

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System / Group Passwords

Group	Passwords	Where it is?
GID0	N/A	N/A
GID1	Group 1 password	Inside CONFIG.SYS *SMPW ← **System mode Password** *PW
GID2	Group 2 password	Inside CONFIG.SYS *PW
. .		
GID14	Group 14 password	Inside CONFIG.SYS *PW
GID15	Group 15 password	Inside CONFIG.SYS *PW

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System / Group Passwords

When you need to have a password?

- Enter into system menu (need the system mode password)
- Edit the CONFIG.SYS
- Clear the RAM/FLASH
- Download application into the GID
- Change password
- List out the files in a GID

What if the passwords are not known?

- Change the passwords if system password is known
- Download the passwords if *SMDL=1
- Bootloading the OS

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Download

Download cable : 26264-01 (RJ45 to DB9)

Download method:

- Direct download using DDL.EXE
- Direct download using VeriCentre
- Modem download (terminal initiated) using VeriCentre
- Modem download (VC initiated, need TMA) using VeriCentre
- Terminal to terminal download

PC Requirement (for the case of using DDL.EXE)
- DOS – capable PC
- A free COM port (be careful when in a Windows environment)

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Download – DDL.EXE

DDL - Direct Download (Version 1.2, Build 45)
Usage:
 DDL -p port -b baud -t timeout -d file -e file -i file
    -c [offset] -x password -f file file... key=value...
Arguments:
 file   File to download. Equivalent to "-i" file.
 key=value Set configuration variable.
Options:
 -p port   Set host communication port. Default = 1 (COM1).
 -b baud   Set baud rate. Values: 300, 1200, 2400, 4800, 9600, 19200,
         38400, 57600, 115200. Default = 19200.
 -t time   Set communication timeout, in seconds. Default = 1.
 -d file   Download file as a data file.
 -e file   Download file as a code file.
 -i file   Download file as code if it has a .OUT or .LIB extension,
         otherwise as data.
 -c [off] Set terminal clock to host time plus optional offset of
         -23 to +23 hours.
 -x psswd Set terminal password.
 -f file   Read more arguments from file.

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Download - Example

File d.bat:

```
ddl -b115200 -p1 -fdl.lst
```

File dl.lst:

```
-isetgroup.1      // set to GID1
-isetdrive.f      // set to flash
-iapp.out         // download this file into GID1,flash
-isetdrive.I      // set to ram
-iapp.p7s         // download this file into GID1,ram
*PW=1             // set GID1 password to 1
*SMPW=1           // set system mode password to 1
*SMDL=1           // allow download when startup
*GO=f:app.out     // the starting program
*PHONE=102        // other parameters
```

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System Menu – Ram/Flash files

For RAM Files:
- Clear Group _X
- Clear all files

For Flash Files
- Clear Group_X
- Clear all files
- Defrag Y

Good practice before you do any downloading

Can help to defragment the fragmented memory blocks

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System Menu – EDIT config.sys

Keys

EDIT CONFIG.SYS

Values

*MC = 74
*GO = F:MYAPP.OUT
#HOSTIP=1.2.3.4
*ZT=1
*ZA=EPS010
*ZP=23820224
MYPARAM=234

*GO = start up program

Keys start with * or # are system parameters
Other key values are application parameters

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System parameters

Table 23   CONFIG.SYS Environment Variables (continued)

Variable	Description
*FA	When this variable is set to 1, all signature files are retained in terminal memory; default is 1.
*FILE	Maximum number of files that can be open simultaneously. Minimum is 10; maximum is 96; default is 30.
*GO	File Group 1 application filename to execute.
*MC	Modem country code setting.
*PIPE	Controls the number of pipe handles available. Minimum is 0; maximum is 256 (default).
*POW	(Omni 3600 only) Indicates the amount of time (msecs) that Verix waits before attempting to place the unit in sleep mode.
*PW	Group access system mode password; password for the current group.
*SMDL	Enables poll-for-direct download during the start-up sequence before displaying the copyright screen.
*SMPW	System mode entry password.
*TIME	Number of system timers; default 10; used with set_timer ().
*UNZIP	Group 1 CONFIG.SYS file. Automatic decompression of only one archive.
	If *UNZIP is set, the .ZIP archive automatically decompresses at startup.
*VALID	List of groups searched during file authentication using

Reference : Verix Programmer Manual (VDN:19733)

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Download – Change Password

Lab Exercise : Fix a terminal with unknown password.

Create download files to change the
- System password = Z66831
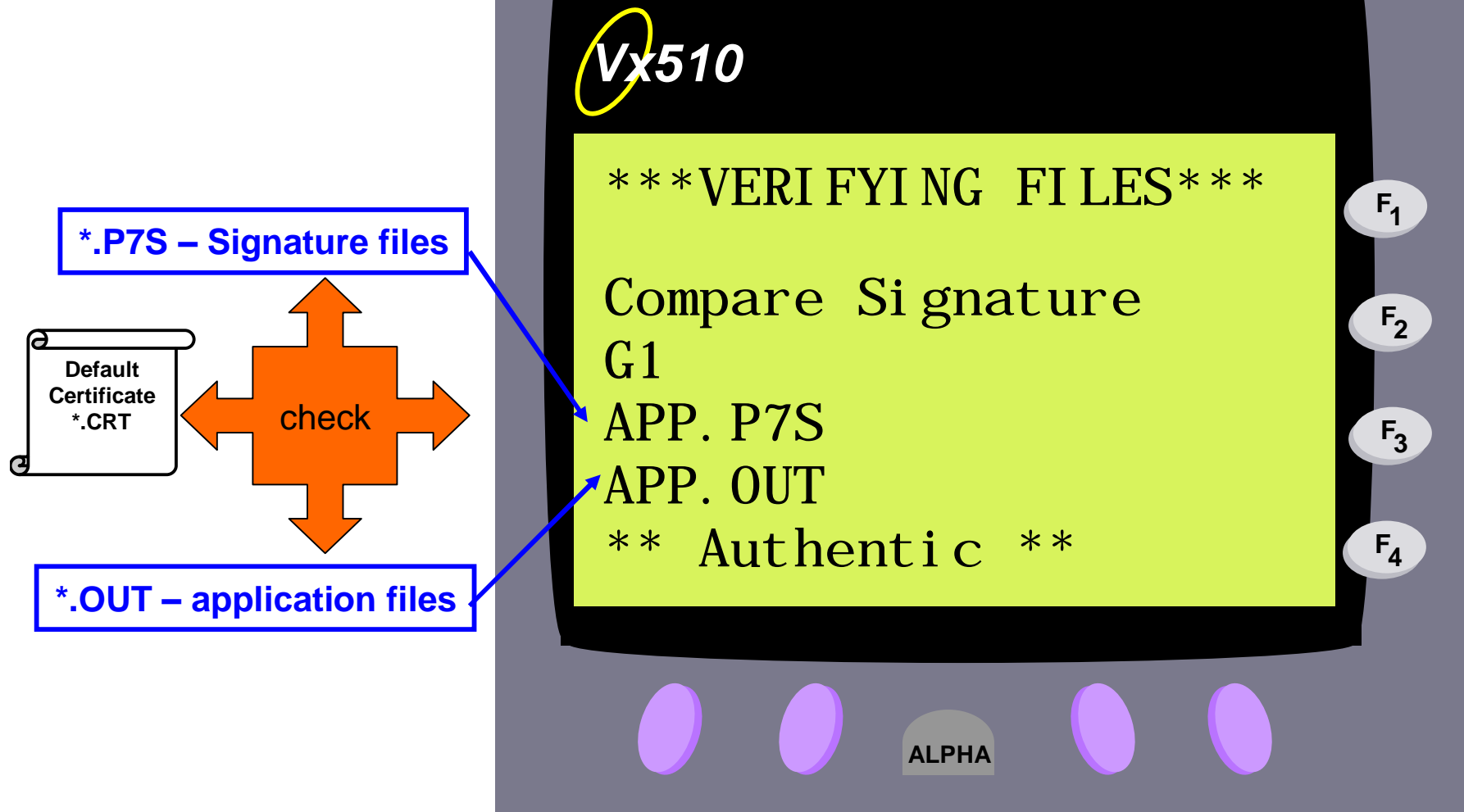- GID1 password = PASS1
- GID2 password = PASS2
- ..
- GID15 password = PASS15

!!! Remember don't set anything on *SMDL !!!

Lab exercise : reset password

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Download - Authentication

*.P7S – Signature files

Default Certificate *.CRT

check

*.OUT – application files

Vx510

```
***VERIFYING FILES***

Compare Signature
G1
APP.P7S
APP.OUT
** Authentic **
```
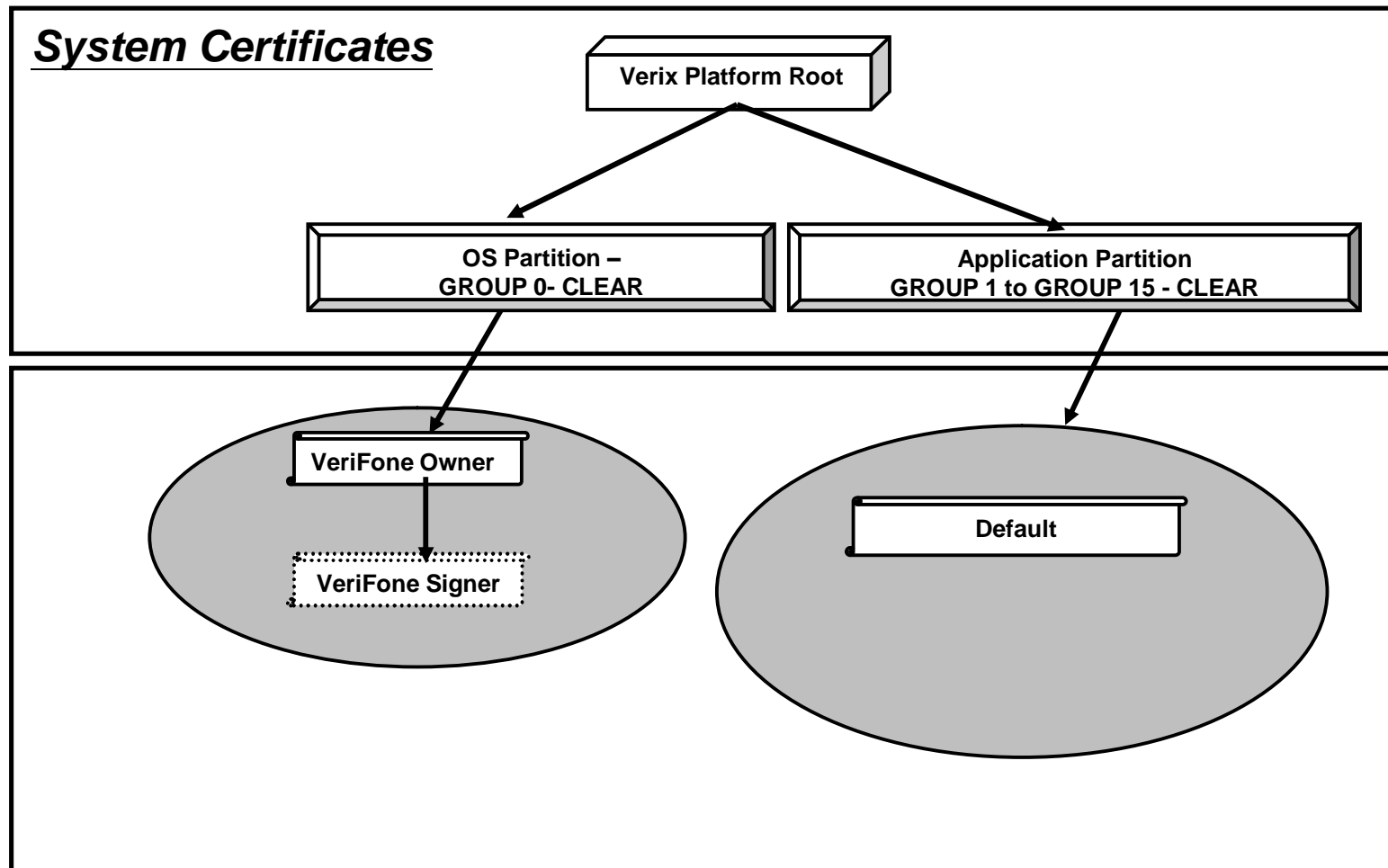
F₁
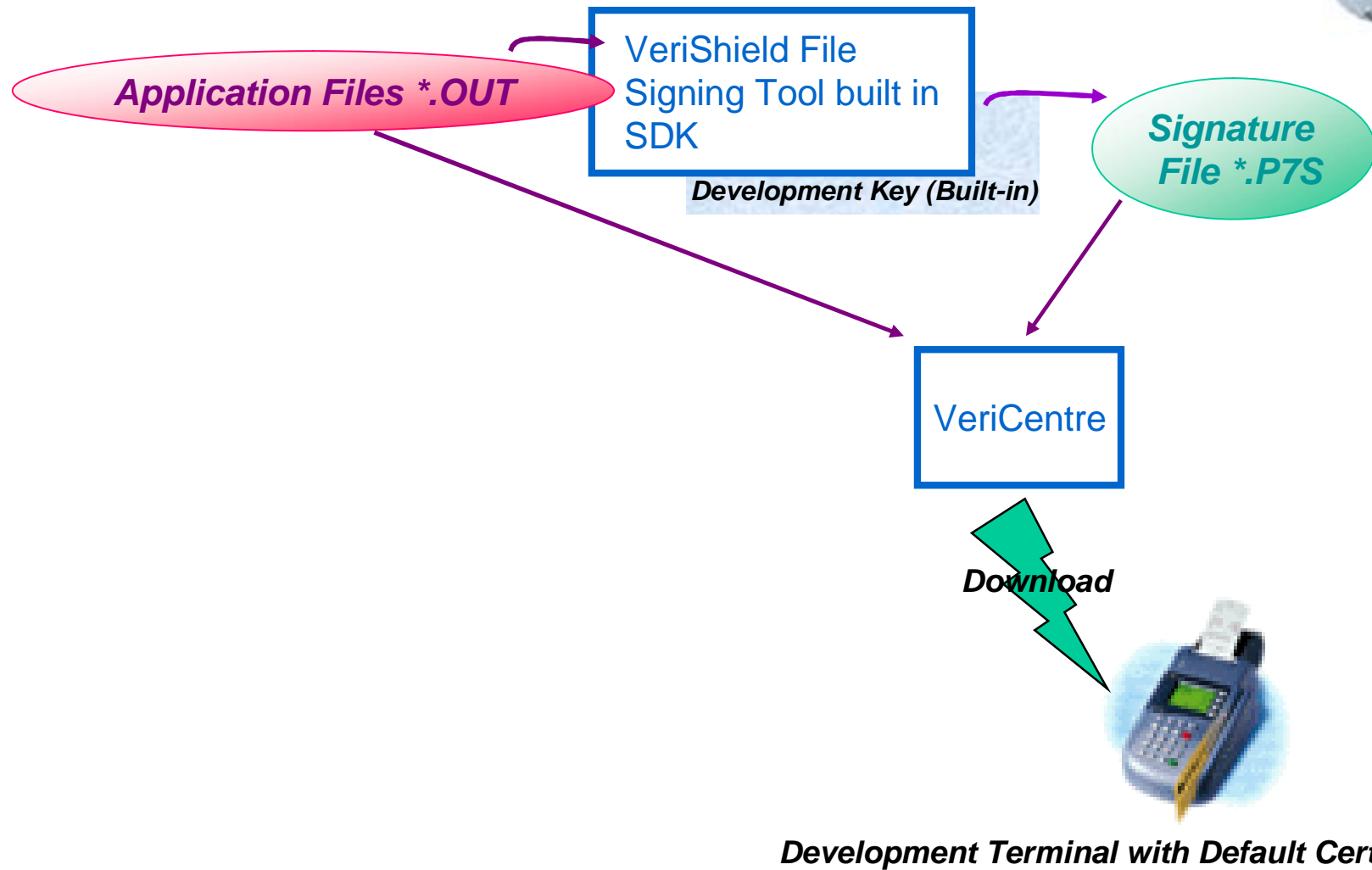
F₂

F₃

F₄

ALPHA

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Download - Authentication

*.P7S – Signature file (download to RAM initially, after successful check, it will move to FLASH area. If you want to enable terminal to terminal download, these files not should not be deleted. *FA=0)

*.OUT – Application file (can be downloaded but it allow execute only after authentication OK. The authentication status can be checked in system menu)

*.CRT – Certification file (use default certificate most of the case. If you have VeriShield purchased, you can restrict the application allowed in your terminals)

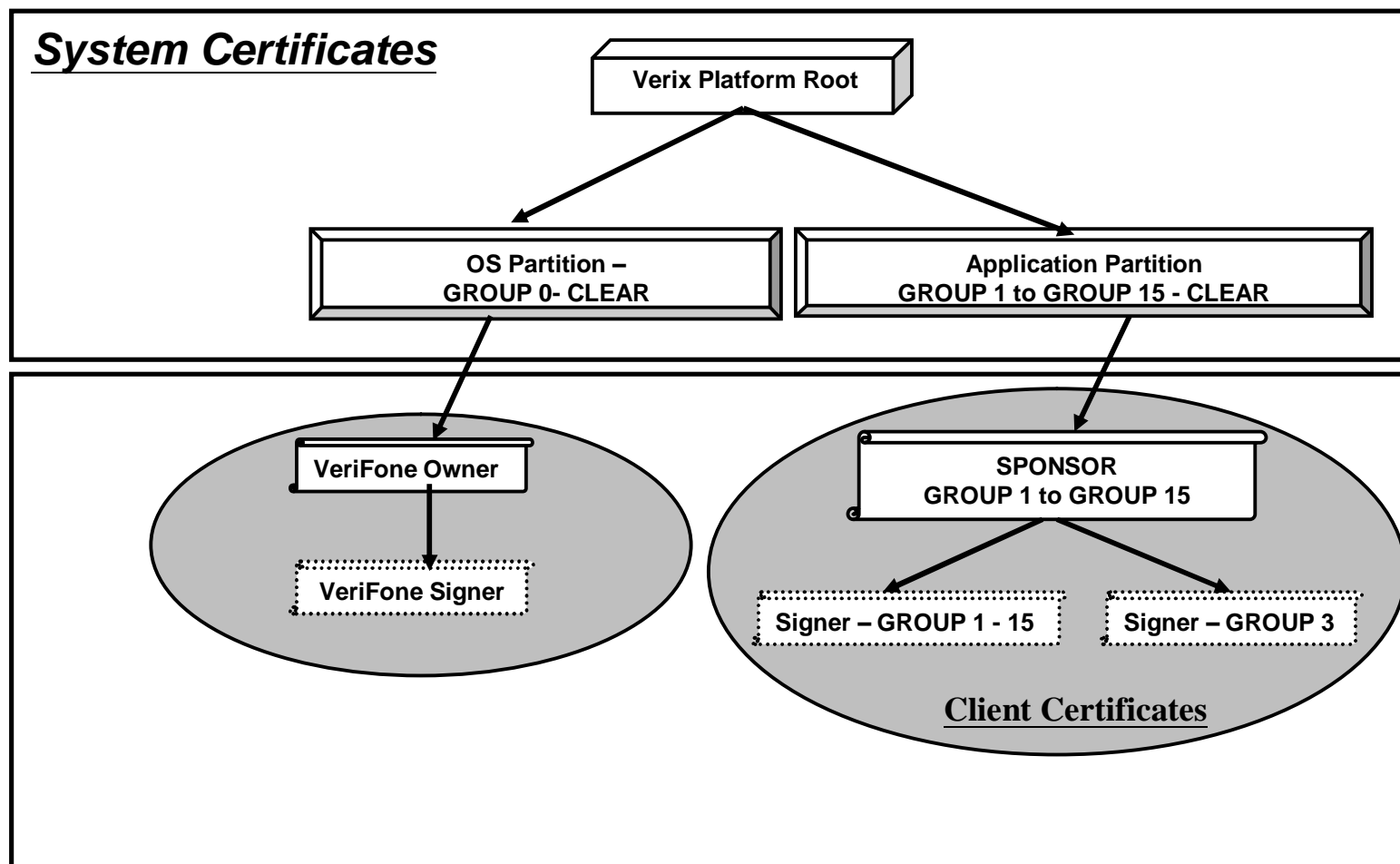*Lab exercise : download*

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System Certificates

```
                          Verix Platform Root
```

| OS Partition –
GROUP 0- CLEAR | Application Partition
GROUP 1 to GROUP 15 - CLEAR |

VeriFone Owner

VeriFone Signer

Default

Authentication – Default Signing Process

Application Files *.OUT

VeriShield File Signing Tool built in SDK

Development Key (Built-in)

*Signature File *.P7S*

VeriCentre

Download

Development Terminal with Default Certificates

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System Certificates

- Verix Platform Root
  - OS Partition –
    GROUP 0- CLEAR
    - VeriFone Owner
      - VeriFone Signer
  - Application Partition
    GROUP 1 to GROUP 15 - CLEAR
    - SPONSOR
      GROUP 1 to GROUP 15
      - Signer – GROUP 1 - 15
      - Signer – GROUP 3

Client Certificates

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Authentication – Sponsor File Signing
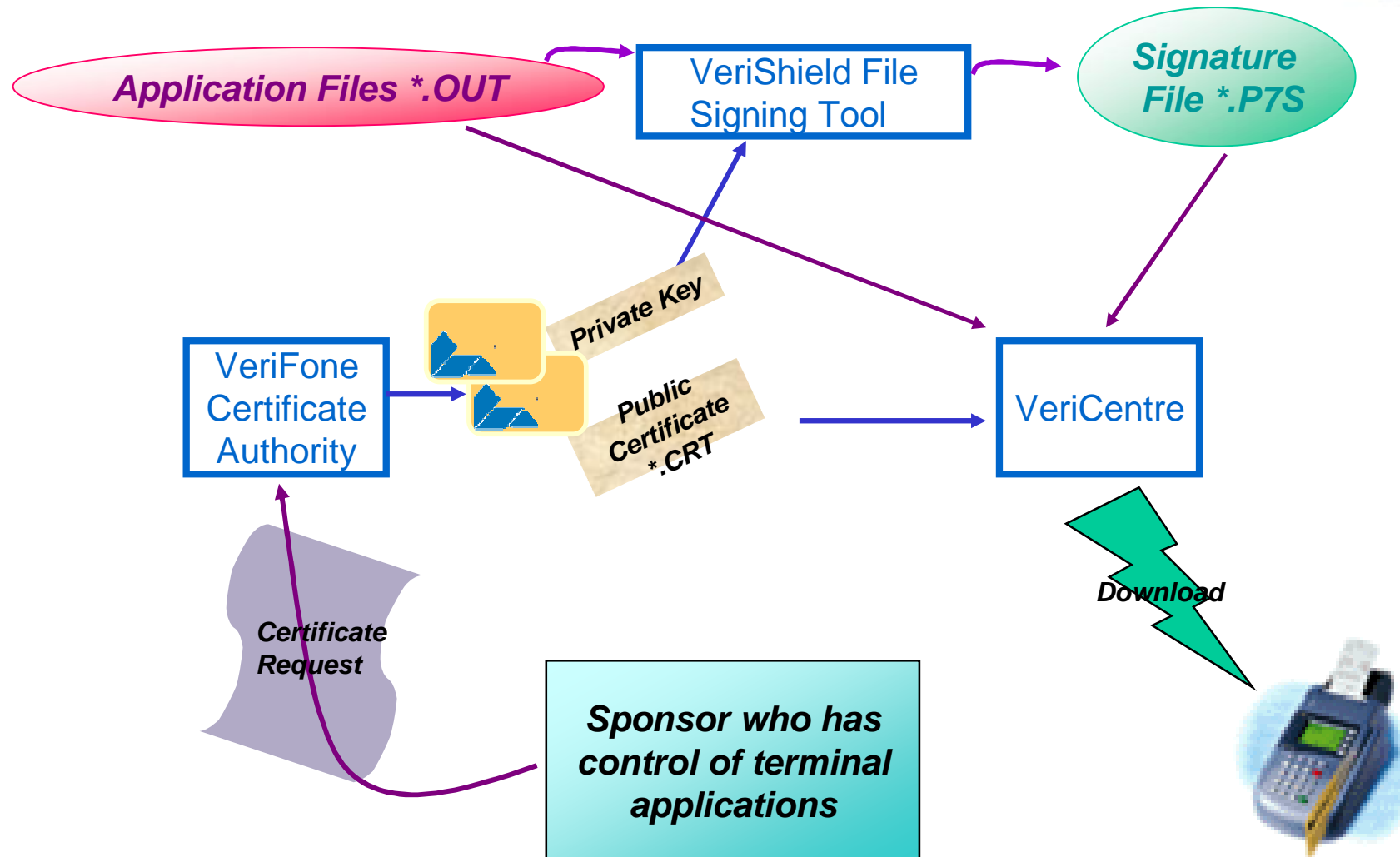
Download – Terminal to terminal

Need cable 05651-02

Two terminals - one as copy source and the other as copy destination
Source terminal should have the *.P7S file retained. (I.e. *FA cannot be equal to 0)

Steps:

1. Enter system mode
2. Press * for sender, press # for receiver
3. Enter password.
4. Download initiated…
5. File authentication

Lab exercise : Back to Back download

OS reload – By Download

- Required when
  - OS upgrade/downgrade
  - Unexpected corruption of OS

<div style="border: 2px solid red;">

!!!! Warning !!!!

1. Please don't interrupt during downloading/updating
2. Please don't inject the incorrect type of OS
   QA00XXX – Vx510/Vx610
   Q500XXXX – Omni37xx

</div>

Lab exercise : OS download

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OS reload – Bootloading

- Required when
    - Unable to access the system menu
    - OS failed to start up correctly
    - Incorrect manufacture program block are programmed
    - Any other unexpected errors / lockup

<div style="border: 2px solid red; color: red;">

!!!! Security Warning !!!!

Due to the secure nature of the terminal. Bootloading should be restricted for use by the authorized personnel only. Strict security policy should be used to safeguard the process from being misuse.

</div>

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LAB Exercise

LAB1：

1. Set system mode download enable
2. Chang system password and all group's password as "1"

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