

# XTD - 2 : SK-VM SDK UserGuide

2001. 10. 29

## XTD Document Version History

Version	Date	Author	Description
1.0	2001 - 10 - 29	Kim.W.G	Created.
1.0	2001 - 12 - 20	Kim.W.G	Modified. -
1.1	2001 - 12 - 27	Kim.W.G	Modified. - Print Caught Exception 가 - UI
1.1	2001 - 01 - 23	Kim.W.G	Modified. - CP Guide 가
1.1	2001 - 02 - 25	Kim.W.G	Modified. ( / )

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SK-VM SDK UserGuide

SK-VM SDK  
SK-VM

CDMA REX가 REX OS Task  
UI UI Task UI Task SK-  
VM 가 UI Task가 Idle , VM

Memory  
PC , VM  
WAP Browser, GVM, SK-VM  
SK-VM WAP Browser ,  
WAP Browser가  
color 256~360kb 가 4-gray 170kb,  
(SK-VM 1.0 )

Graphics  
SK-VM 2가 가  
PNG( ) : MIDP  
LBM( ) : XCE  
PNG format interlaced , (data chunk 가 2 )

- 1, 2, 4, 8, 16 bit grayscale
- 8, 16bit grayscale with alpha (8, 16bit)
- 1, 2, 4, 8bit indexed RGB (max 256 color palette 가 )
- 3, 6byte RGB : RGB가 1byte

- 4, 8byte RGBT : RGBT가 1byte
- alpha value transparency

LBM PNG 가 ,  
SDK (c: \ SK - VM \ bin \ png2lbm - 256c.exe png2lbm - 4g.exe)  
가 .

LBM MIDP PNG (jar  
) PNG  
LBM .

4-gray 가  
.

4-gray phone> (included transparency bit)  
width \* height \* (2bit + 1bit) / 8  
color phone>(included transparency bit)  
width \* height \* (8bit) + 1bit) / 8

, SCH-X350(4-gray), SCH-X230(color) ,  
SCH-X350 (available LCD Size : 128 \* 112)  
128 \* 112 \* 2 / 8 = 3584bytes

SCH-X230 (available LCD Size : 120 \* 149)  
120 \* 149 \* 8 / 8 = 17880bytes

Network

HTTP, TCP/IP, Datagram protocol Connector ,  
API, .  
open 1 .  
open . network  
close close() method PPP 5 .  
close delay time IOException  
.

## Sound

### SK-VM

가 MA1, MA2, MMF, EVRC가 SCH-X350  
EVRC가 ,

pause(), resume()

가 pause() /  
resume() IOException catch

## File System

REX OS EFS(Embedded File System) SK-VM

RMS Persistant Storage

Connector, FileInputStream, FileOutputStream, XFile 가

, CLDC/MIDP Connector ,

Connector XFile

EFS 450Kb , 가  
1500msec / 10Kb, 가 150msec/10Kb가  
가

## 3D

3 3 API가  
. Graphics3D Object3D , 3  
LCD LCD

3












- 
- 
- 
- /
- Z-Buffer (Z : 0~255)
- Backface Culling
- Flat Shading

- (Lighting)
- 
- Gouraud Shaing

SDK /

Windows  
(WindowsNT4.0, Windows2000)  
\*\* MMF Yamaha MA-2 Synthesizer Win2K

SDK  
SK-VM SDK XCE developer site(<http://developer.xce.co.kr/sdk-down1.html>)  
SDK C-drive  
“C: \ SK-VM” 가 가

 SK-VM		
 bin		PhoneEmul.exe, PhoneEmul_c.exe (4gray, 256color ) png2lbm-4g.exe, png2lbm-256c.exe PNG2LBMWin.exe (png2lbm dialog ) MMFPlayer.exe, LBMViewer.exe
 classes		Classes
 device_info		Device
 docs		, SDK, API
 down		Download , wml, wmls, jar, msd
 example		HelloMIDlet.java Perf, phone, skvm
 icons		msd file MIDlet-Ani-Icon, MIDlet-Icon example lbm
 rs		SK-VM
 sf		Source Factory midlet source가
 YAMAHA		YAMAHA MA-2 driver



SDK

C: \ SK - VM

SDK

SDK가 “c:/SK - VM/bin” 2  
PhoneEmul. exe(X - 350 ), PhoneEmul\_c.exe(X - 230, 250 ) .



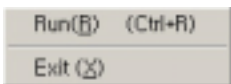
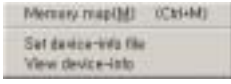


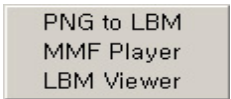

<Figure1. X350 >

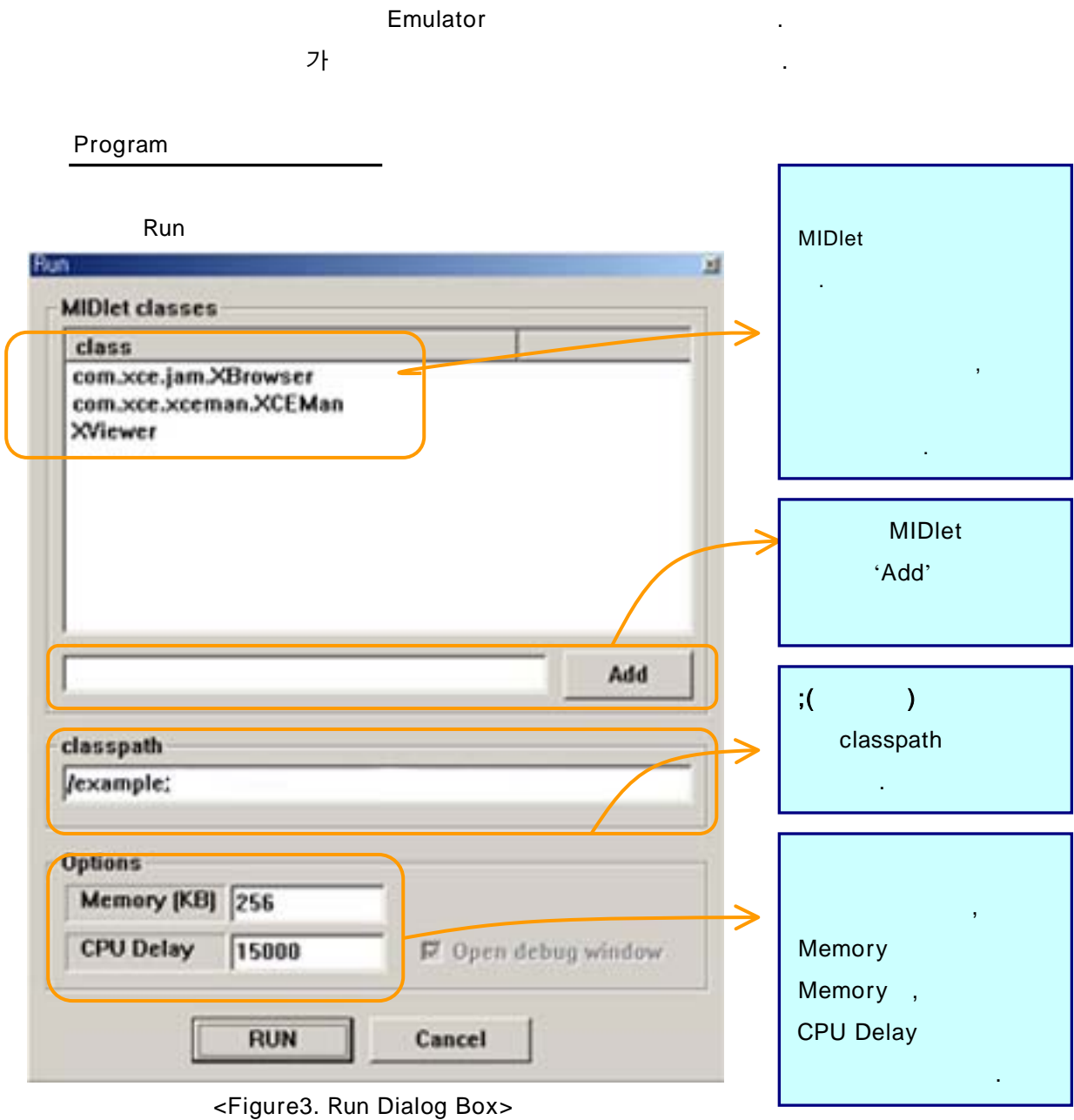


<Figure2. X230 >

<Figure1>, <Figure2>

# SCH - X400, SCH - X460, SCH - X290 X230

	Menu Image	Menu Item	Description
Program		Run	Dialog box
		Exit	
Device		Memory map	Memory Map Dialog
		Set device-info file	Device Information file
		View device-info	Device
Debug		Show debug window	
		Print LCD Refresh area	
		Print GC message	
		Print Caught Exception	Exception Trace
Special		Disconnect network	Network
		SMS	SMS Dialog
		Phone Pause	VM pause
		Phone Resume	VM pause resume
Tools		PNG to LBM	PNG -> LBM Visual Converting Tool
		MMF Player	MMF Player
		LBM Viewer	LBM Image Format Viewer
Help		About	
		API Reference	API Document
		Developer Support	<a href="http://developer.xce.co.kr/">http://developer.xce.co.kr/</a>



[Memory] ,

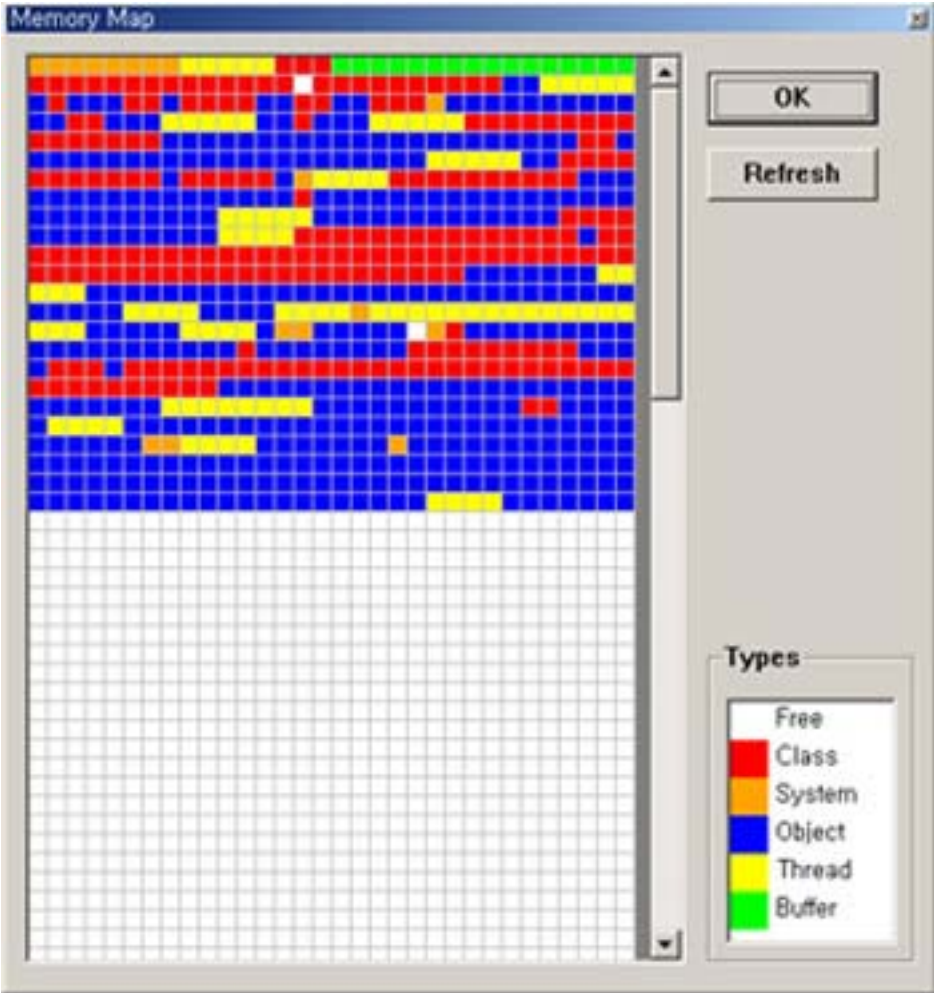
256kb 가

[CPU Delay] 가 CPU ,

10000~15000

Device

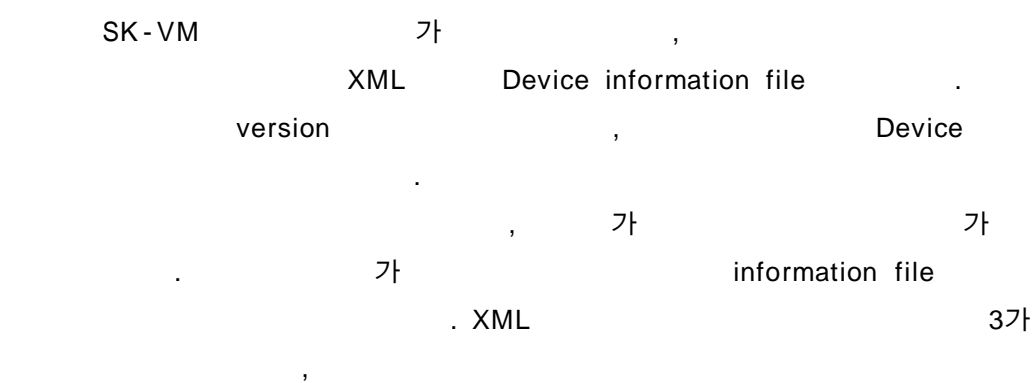
Memory map



<Figure4. Memory Map Dialog>

<Figure4> Memory Map dialog box . dialog-box VM  
type “Types”  
VM refresh  
“Refresh” .

Set Device-info file / View device info



System.getProperty(“property”) [java system property]

<Properties>  
m,CARRIER, m.TYPE, m.VENDER, m.MODEL, m.CONF\_PROFILE,  
m.SK\_VM, m.EXT\_SW, m.LCD\_PIXEL, m.LCD\_FONT, m.SOUND\_POLY,  
m.COLOR, m.MIN, m.SID, m.BASE\_ID, m.REG\_ZONE, m.PILOT\_PN,  
m.GVM\_VER ...

Emulator Skin [Emulator Skin Bitmap Image]

<Properties>  
Image file name, Image width, Image height ...

[Other Settings]

<Properties>  
Supported sound format, Text component handler class, Sound type,  
Concurrently available socket number, Graphics DLL name, Image folder  
name...

[Other Settings]  
DTD

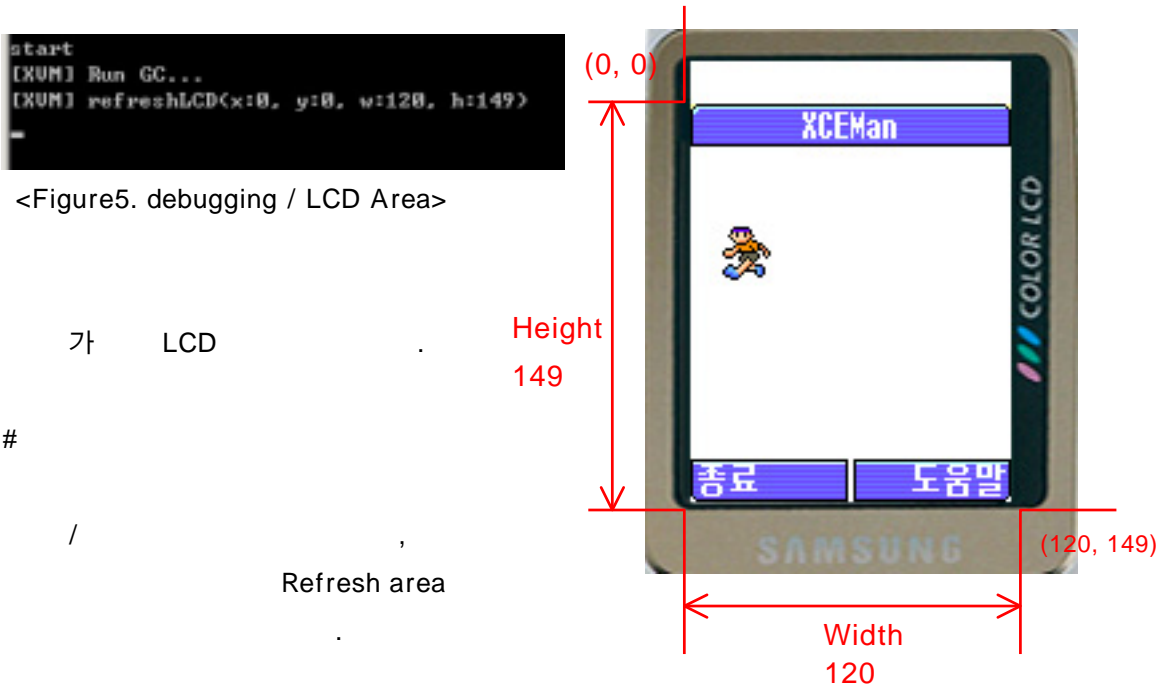
Debug

Debug                    3                    , [Show debug window]                    disable

Print LCD Refresh area / Print GC message

LCD Refresh area

LCD



Debugging message      Garbage Collection

GC가                    3가

- 1)
- 2)
- 3) System.gc()

3가                    GC                    [Print GC message]

가 , 가

## GC

	Element	Description
Free	GCT_UNKNOWN	가
Class	GCT_CLASS_CONSTANT GCT_CLASS_FIELD GCT_CLASS_INTERFACE GCT_CLASS_METHOD GCT_CLASS_METHOD_CODE GCT_CLASS_METHOD_EXCEPTION GCT_CLASS_METHOD_NATIVEINFO GCT_CLASS_STATICFIELD GCT_CLASS_HASHENTRY GCT_CLASS_UTF8	가 Garbage Collection
System	GCT_HASHTABLE GCT_STRING_HASHENTRY GCT_MONITOR	
Object	GCT_OBJECT GCT_OBJECTARRAY GCT_PRIMITIVEARRAY	GC null
Thread	GCT_VMTHREAD GCT_VMTHREAD_STACKBLK	Thread
Buffer	GCT_BUF GCT_GIFBUF GCT_JARBUF GCT_PNGBUF GCT_ZBUF GCT_MAX	JARBUF JAR GC

## Special

## Disconnect network

가

가 . Disconnect network

SMS

<Figure7>

SMS



<Figure7. SMS Dialog>

Dialog Box	3	(Service option, Class, Message)
------------	---	----------------------------------

- ```
- Service option : 0 ( , '0' )
- Class : Fully-qualified name
- Message :
```

XBrowser      MIDlet

<Figure7> SMS Dialog

Send

## DialogBox가

SMS

Phone Pause / Phone Resume



SK - VM (MIDlet ) Call VM suspend 가  
Phone Pause /  
Phone Resume .

Help

---

API Reference  
SK - VM OEM API Document가 .

Developer Support  
XCE (<http://developer.xce.co.kr>) .

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...

Information Icon



<Figure8> 3 Icon .  
, BackLight, Connection,  
Vibration .  
3  
, BackLight, Network  
Connection, Vibration .

<Figure8. Icons>

YAMAHA MA - 2 Synthesizer  
MIDlet MMF YAMAHA MA - 2  
Synthesizer 가 .  
“c:/SK - VM/YAMAHA” “driver” 가 .

[ ]→[ ]→[ 가/ ]  
.  
[ 가 / ] →  
가 ( / )  
[ ] 가 , “ ” .  
“c:/SK - VM/YAMAHA/driver” inf .  
( 가 )  
MMF YAMAHA가 SMAF Play API가  
mobile phone version Windows version  
CPU\_DELAY 가 .

UI (XBrowser)  
ver 1.1 Xbrowser( )  
UI GUI UI /  
( GUI <http://developer.xce.co.kr>  
.)



<Figure9. Xbrowser>

Figure.9 Xbrowser . Xbrowser UI  
, [ \* ], [ 0 ], [ # ] 가 .

: , , , ,  
- : ,  
- :

- : , , , 가

- : ,

- : 가 , , , ,

: URL

: [ ] ,

.

SDK setup / menu , MIDlet

.

## SDK

“c:/SK - VM/example/skvm” HelloMIDlet.java,  
 , SDK , .

### MIDlet

SK - VM CLDC / MIDP, SKT OEM-Specific API . API “c:/SK -  
 VM/classes” , JDK1.3 boot class path  
 . MIDlet .

```
C:\SK-VM\example>javac -bootclasspath /SK-VM/classes/classes.jar *.java
```

bootclasspath 가

HelloMIDlet.java .

// Compile

C: \ SK - VM \ example>javac -bootclasspath /SK - VM/classes/classes.jar HelloMIDlet.java

, “c: \ SK - VM \ example” HelloMIDlet.class가 .

### MIDlet

<Figure3> <Run Dialog Box> . dialog box MIDlet / /  
 가 .

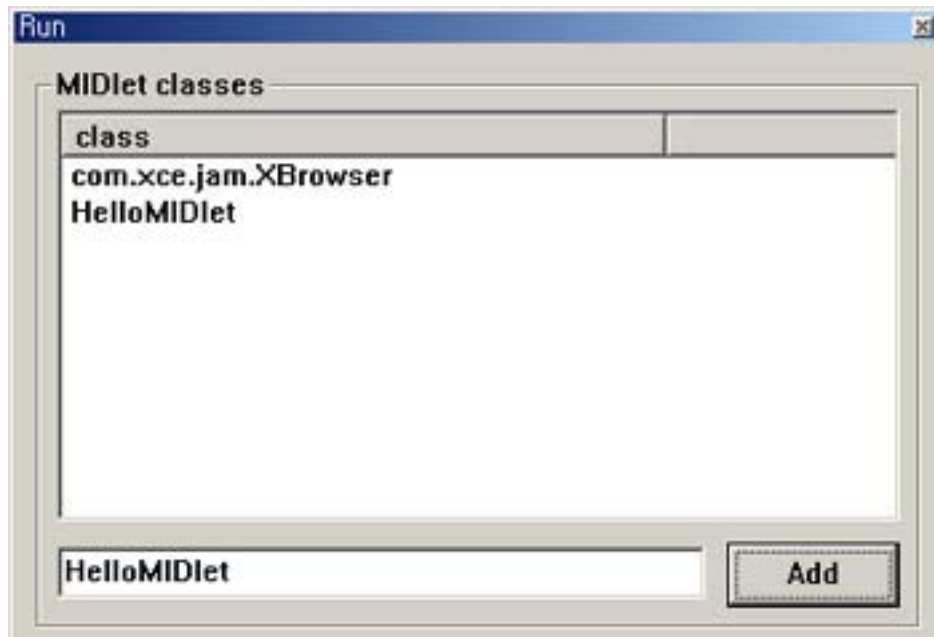
### MIDlet

1. classpath
2. MIDlet ( 가)
3. Option
- 4.

1. SK - VM SDK `/example;`



2. MIDlet , “Add” Button



3. Memory / CPU Delay .



- 4.

## SDK

1. SDK c: \ SK - VM
2. YAMAHA MA - 2 Synthesizer Win2K
3. MMF MA - 2 driver , MMF Player MMF Application
4. X - 350 System.getProperty() 가 Release X - 350 PhoneEmul X - 350

## # SK-VM Error Code

Exception

/ Error

-

Exception / Error

| class format<br>malformed sig<br>not constant<br>bytecode err<br>out of memory<br>no such method<br>no such field<br>member acces<br>throw except<br>uncaught err<br>log buf err<br>filemap err | CONSTANT_UTF8<br><br><br><br><br><br><br><br><br>Uncaught Exception<br>Error |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|

-

Error

| xvm abort<br>memory consist<br>heap alloc err<br>memory mark<br>gc mark err<br>thread resume<br>thread switch<br>monitor err<br>assert err | SK-VM<br>가<br><br><br>가<br><br><br><br>assertion fail |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|

\*

Exception / error가

[bugreport@xce.co.kr](mailto:bugreport@xce.co.kr)

## # SK-VM Image Map

|           |            |            |             |             |             |             |             |
|-----------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| 0/0/0     | 36/0/0     | 73/0/0     | 108/0/0     | 146/0/0     | 182/0/0     | 218/0/0     | 255/0/0     |
| 0/36/0    | 36/36/0    | 73/36/0    | 108/36/0    | 146/36/0    | 182/36/0    | 218/36/0    | 255/36/0    |
| 0/73/0    | 36/73/0    | 73/73/0    | 108/73/0    | 146/73/0    | 182/73/0    | 218/73/0    | 255/73/0    |
| 0/108/0   | 36/108/0   | 73/108/0   | 108/108/0   | 146/108/0   | 182/108/0   | 218/108/0   | 255/108/0   |
| 0/146/0   | 36/146/0   | 73/146/0   | 108/146/0   | 146/146/0   | 182/146/0   | 218/146/0   | 255/146/0   |
| 0/182/0   | 36/182/0   | 73/182/0   | 108/182/0   | 146/182/0   | 182/182/0   | 218/182/0   | 255/182/0   |
| 0/218/0   | 36/218/0   | 73/218/0   | 108/218/0   | 146/218/0   | 182/218/0   | 218/218/0   | 255/218/0   |
| 0/255/0   | 36/255/0   | 73/255/0   | 108/255/0   | 146/255/0   | 182/255/0   | 218/255/0   | 255/255/0   |
| 0/0/85    | 36/0/85    | 73/0/85    | 108/0/85    | 146/0/85    | 182/0/85    | 218/0/85    | 255/0/85    |
| 0/36/85   | 36/36/85   | 73/36/85   | 108/36/85   | 146/36/85   | 182/36/85   | 218/36/85   | 255/36/85   |
| 0/73/85   | 36/73/85   | 73/73/85   | 108/73/85   | 146/73/85   | 182/73/85   | 218/73/85   | 255/73/85   |
| 0/108/85  | 36/108/85  | 73/108/85  | 108/108/85  | 146/108/85  | 182/108/85  | 218/108/85  | 255/108/85  |
| 0/146/85  | 36/146/85  | 73/146/85  | 108/146/85  | 146/146/85  | 182/146/85  | 218/146/85  | 255/146/85  |
| 0/182/85  | 36/182/85  | 73/182/85  | 108/182/85  | 146/182/85  | 182/182/85  | 218/182/85  | 255/182/85  |
| 0/218/85  | 36/218/85  | 73/218/85  | 108/218/85  | 146/218/85  | 182/218/85  | 218/218/85  | 255/218/85  |
| 0/255/85  | 36/255/85  | 73/255/85  | 108/255/85  | 146/255/85  | 182/255/85  | 218/255/85  | 255/255/85  |
| 0/0/170   | 36/0/170   | 73/0/170   | 108/0/170   | 146/0/170   | 182/0/170   | 218/0/170   | 255/0/170   |
| 0/36/170  | 36/36/170  | 73/36/170  | 108/36/170  | 146/36/170  | 182/36/170  | 218/36/170  | 255/36/170  |
| 0/73/170  | 36/73/170  | 73/73/170  | 108/73/170  | 146/73/170  | 182/73/170  | 218/73/170  | 255/73/170  |
| 0/108/170 | 36/108/170 | 73/108/170 | 108/108/170 | 146/108/170 | 182/108/170 | 218/108/170 | 255/108/170 |
| 0/146/170 | 36/146/170 | 73/146/170 | 108/146/170 | 146/146/170 | 182/146/170 | 218/146/170 | 255/146/170 |
| 0/182/170 | 36/182/170 | 73/182/170 | 108/182/170 | 146/182/170 | 182/182/170 | 218/182/170 | 255/182/170 |
| 0/218/170 | 36/218/170 | 73/218/170 | 108/218/170 | 146/218/170 | 182/218/170 | 218/218/170 | 255/218/170 |
| 0/255/170 | 36/255/170 | 73/255/170 | 108/255/170 | 146/255/170 | 182/255/170 | 218/255/170 | 255/255/170 |
| 0/0/255   | 36/0/255   | 73/0/255   | 108/0/255   | 146/0/255   | 182/0/255   | 218/0/255   | 255/0/255   |
| 0/36/255  | 36/36/255  | 73/36/255  | 108/36/255  | 146/36/255  | 182/36/255  | 218/36/255  | 255/36/255  |
| 0/73/255  | 36/73/255  | 73/73/255  | 108/73/255  | 146/73/255  | 182/73/255  | 218/73/255  | 255/73/255  |
| 0/108/255 | 36/108/255 | 73/108/255 | 108/108/255 | 146/108/255 | 182/108/255 | 218/108/255 | 255/108/255 |
| 0/146/255 | 36/146/255 | 73/146/255 | 108/146/255 | 146/146/255 | 182/146/255 | 218/146/255 | 255/146/255 |
| 0/182/255 | 36/182/255 | 73/182/255 | 108/182/255 | 146/182/255 | 182/182/255 | 218/182/255 | 255/182/255 |
| 0/218/255 | 36/218/255 | 73/218/255 | 108/218/255 | 146/218/255 | 182/218/255 | 218/218/255 | 255/218/255 |
| 0/255/255 | 36/255/255 | 73/255/255 | 108/255/255 | 146/255/255 | 182/255/255 | 218/255/255 | 255/255/255 |