

2003.3

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# 1.

## 1.1.

( )

( )

( )

,

,

.

## 1.2.

~~/~~

,

~~/~~

~~/~~

HAL(Handset Adaptation Layer)

~~/~~

API)

(Application Programming Interface,

C

~~/~~

API

~~/~~

## 1.3.

### 1.3.1.

(Runtime Execution Environment)

API

### 1.3.2. Clet

C

### 1.3.3. Jlet

### 1.3.4.

. HAL

### 1.3.5.

가

### 1.3.6.

( )

Clet

Jlet

가

(concurrently)

### 1.4.

~~~~~ : ~ . ( : ~ . / ~ . / ~ . )  
/ ~ . / ~ . )  
~~~~~ : ~ .



## 1.5.

가

☞ : 96x54

☞ : 4가 256가

☞ :

☞ :

☞ :

(Non-Volatile)

☞ 가 600KB

☞  
400KB

☞ 가 500KB

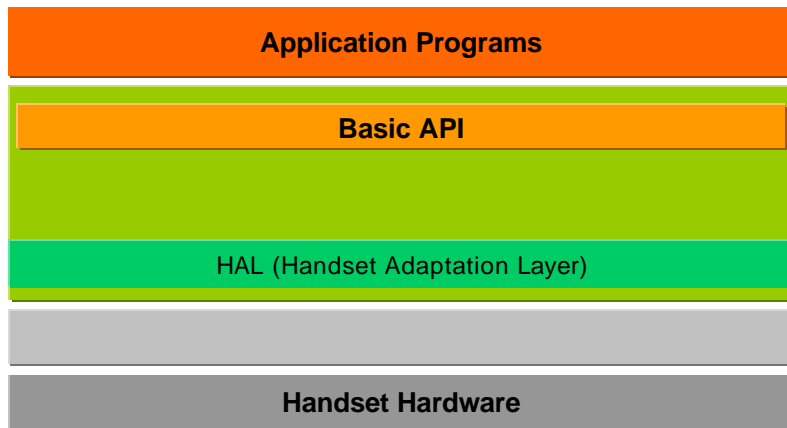
(Volatile)

☞ 가 HEAP 300KB

☞ 가 20KB

## 2.

S/W 1 가 .



1

✍ HAL (Handset Adaptation Layer)

가 , .

✍ API (BASIC API)

가

API . C

API .

### 3.

#### 3.1.

#### 3.2.

가 가

#### 3.3.

가 C API(Basic API)

##### 3.3.1. C

API C API C (Semantic)

##### 3.3.2.

API API (Semantic)

### 3.4.

가 API

☞ PUBLIC

가 , 가

☞ CP(Content Provider)

CP ,

☞ (System)

, .

#### 3.4.1. API

API API

. .

☞ NO ACCESS : .

☞ READ ONLY : .

☞ WRITE ONLY : .

☞ READ/WRITE : , .

API

.

#### 3.4.2.

가 ,

☞ (Private Directory)

.

☞

(Application Shared Directory)

☞

(System Shared Directory)

### 3.5. API 가/

API 가/ . 가/ API  
API 가/ API 가/ 7.2  
API 가/ API API

### 3.6.

HEAP

☞

☞

(Compaction)

(fragmentation)

☞

가 (Garbage Collection)

가

☞

(Stack)

(exception)

☞

, C

### 3.7.

#### 3.7.1.

☞

☞ /

☞

☞ API 가/

☞

#### 3.7.2.

가

### 3.8.

#### 3.8.1.

EUC\_KR (Character Set)

#### 3.8.2.

C

(locale)

EUC\_KR

### 3.8.3.

EUC\_KR

가

Private Use(0xE000-0xF8FFF)

7.2

## 4. HAL

### 4.1. TYPE DEFINITION

```
typedef unsigned char M_Boolean      // unsigned 8bit. TRUE    FALSE
CHECK

typedef unsigned int M_Uint32        // unsigned 32 bit type
typedef unsigned short M_Uint16     // unsigned 16bit type
typedef unsigned char M_Uint8       // unsigned 8bit type, unsigned char
type
typedef signed int M_Int32          // signed 32bit type. signed int
type
typedef signed short M_Int16        // signed 16bit type. signed short
typedef signed char M_Int8          // signed 8bit type. signed char
typedef char M_Char                 // char
typedef unsigned char M_Byte        // unsigned 8bit type. unsigned char
type
typedef signed long long M_Int64    // signed 64bit type. signed
long long type
typedef unsigned long long M_Uint64 // unsigned 64bit type. unsigned
long long type
typedef unsigned short M_Ucode      // unsigned 16bit. unicode character
typedef signed long M_Sint31        // signed 32bit. signed long type
typedef signed short M_Sint15      // signed 16bit. signed short type
typedef M_Uint32 M_Addr             // unsigned 32bit. unsigned int type
#define NULL    0                   //NULL
#define TRUE    1                   //TRUE
#define FALSE   0                   //FALSE
#define inline  __inline            //inline
```



## 4.2.

## API


API , HAL

. ,

. HAL API 가

---

\_\_\_\_\_ .

 MH\_pltEvent

| MH_KEY_PRESSEVENT<br>MH_KEY_RELEASEEVENT<br>MH_KEY_REPEATEVENT | MH_KeyCode     |
|--|----------------|
| MH_EXIT_EVENT  | NULL           |
| MH_TIMER_EVENT   | NULL           |
| MH_SMS_EVENT   | MH_SMSEvent    |
| MH_ANN_EVENT   | MH_AnnInfo     |
| MH_CALL_EVENT  | MH_CallEvent   |
| MH_NETWORK_EVENT   | MH_NetEvent    |
| MH_SERIAL_EVENT  | MH_SerialEvent |
| MH_MEDIA_EVENT   | MH_MediaEvent  |

1 HAL

|                       |         |
|-----------------------|---------|
| MH_KEY_PRESSEVENT -   | KeyCode |
| MH_KeyCode            |         |
| MH_KEY_RELEASEEVENT - | KeyCode |
| MH_KeyCode            |         |

MH\_KEY\_REPEATEVENT - ,  
 MH\_KEYREPEAT\_EVENT  
 가 MH\_KEYREPEAT\_EVENT MH\_sysGet Information  
 () key repeat ,  
 MH\_EXIT\_EVENT - .  
 MH\_TIMER\_EVENT - MH\_timerSet() 가 .  
 MH\_SMS\_EVENT - SMS 가 .  
 MH\_ANN\_EVENT - (Annunciator) 가 .  
 MH\_CALL\_EVENT - 가 .  
 MH\_NETWORK\_EVENT - .  
 MH\_SERIAL\_EVENT - .  
 MH\_MEDIA\_EVENT - .

M\_Boolean MH\_pltEvent(MH\_Event event, void \*param)

[in] event event  
 [in] param event .

TRUE

FALSE - , 가 full .

MH\_EXIT\_EVENT 가 MH\_pltStart()  
 .

## ✎ MH\_pltStart

```

HAL
    , MH_EXIT_EVENT

)
    가
    , Main class
"org.kwis.am.Main"
MH_pltStart(0, "org.kwis.am.Main", 0, 0);
)
    가
    , Main class
"org.kwis.am.Main" /test/appManager.jar
MH_pltStart(0, "org.kwis.am.Main", "/test/appManager.jar", 0);

```

```

M_Int32 MH_pltStart(M_Int32 JavaC, M_Char* programID, M_Char* path, M_Char*
args)

```

```

[in] JavaC      0      Java, 1      C
[in] programID  java      ,      main class
가      . C      ,      ID
[in] path      path      file 가
null
[in] args      (      가
0)

```

## 4.3. System

(Kernel)

(Critical Section)

(lock)



MH\_pltEvent()

```

enum _MH_Event
{
    MH_EXIT_EVENT = 1, //
    MH_KEY_PRESSEVENT, // 가
    MH_KEY_RELEASEEVENT, // 가
    MH_KEY_REPEATEVENT, //
    MH_TIMER_EVENT, // 가
    MH_SMS_EVENT, // SMS 가

    MH_CALL_EVENT, // 가
    MH_ANN_EVENT // (Annunciator) 가
};

enum _MH_Event {
    MH_SERIAL_EVENT
enum _MH_SUB_SERIAL_EVENT{
    MH_SERIAL_READ = 0, // READ 가
    MH_SERIAL_WRITE, // SERIAL write event
    MH_SERIAL_ERROR, // H/W
};

enum _MH_Event {
    MH_EXIT_EVENT = 1, //
    MH_KEY_PRESSEVENT, // 가
    MH_KEY_RELEASEEVENT, // 가
    MH_KEY_REPEATEVENT, //
    MH_TIMER_EVENT, // 가
    MH_SMS_EVENT, // SMS 가

    MH_CALL_EVENT, // 가
    MH_ANN_EVENT // (Annunciator) 가
};

```

```

MH_NETWORK_EVENT,
MH_SERIAL_EVENT,
MH_MEDIA_EVENT
};
    
```

|                     |                    | /                     |
|---------------------|--------------------|-----------------------|
| MH_EXIT_EVENT       |                    |                       |
| MH_KEY_PRESSEVENT   |                    | Key Press             |
| MH_KEY_RELEASEEVENT |                    | Key Release           |
| MH_KEY_REPEATEVENT  |                    | key press             |
| MH_TIMER_EVENT      |                    | MH_timerSet()         |
| MH_SMS_EVENT        | MH_SMS_NEW         | SMS                   |
|                     | MH_SMS_SEND_NOTIFY | MH_smsSend()          |
| MH_CALL_EVENT       | MH_CALL_INCOMING   | 가                     |
|                     | MH_CALL_NOTIFY     | MH_callPlace()        |
| MH_ANN_EVENT        |                    | Annunciator           |
| MH_NETWORK_EVENT    | MH_PPP_OPEN        | MH_netConnect()       |
|                     | MH_PPP_CLOSE       | MH_netClose()         |
|                     | MH_SOCKET_CONNECT  | MH_netSocketConnect() |
|                     | MH_SOCKET_CLOSE    | MH_netSocketClose()   |
|                     | MH_SOCKET_READ     | MH_netSocketRead()    |
|                     | MH_SOCKET_WRITE    | MH_netSocketWrite()   |
| MH_SERIAL_EVENT     | MH_SERIAL_READ     | MH_serialRead()       |
|                     | MH_SERIAL_WRITE    | MH_serialWrite()      |
|                     | MH_SERIAL_ERROR    | H/W                   |

|                |                           |                   |
|----------------|---------------------------|-------------------|
|                | MH_SERIAL_DTR             |                   |
| MH_MEDIA_EVENT | MH_MDAEV__MEDIA<br>_EMPTY | MH_mdaWriteData() |
|                | MH_MDAEV_MEDIA_FULL       | MH_mdaRecord()    |

```

enum _MH_KeyCode{
MH_KEY_0          = '0',
MH_KEY_1          = '1',
MH_KEY_2          = '2',
MH_KEY_3          = '3',
MH_KEY_4          = '4',
MH_KEY_5          = '5',
MH_KEY_6          = '6',
MH_KEY_7          = '7',
MH_KEY_8          = '8',
MH_KEY_9          = '9',
MH_KEY_ASTERISK  = '*',
MH_KEY_POUND     = '#',

MH_KEY_UP        = -1,
MH_KEY_DOWN      = -2,
MH_KEY_LEFT      = -3,
MH_KEY_RIGHT     = -4,
MH_KEY_SELECT    = -5,
MH_KEY_SOFT1     = -6,
MH_KEY_SOFT2     = -7,
MH_KEY_SOFT3     = -8,
MH_KEY_SEND      = -10,
MH_KEY_END       = -11,
MH_KEY_POWER     = -12,
MH_KEY_SIDE_UP   = -13,
MH_KEY_SIDE_DOWN = -14,
MH_KEY_SIDE_SEL  = -15,
MH_KEY_CLEAR     = -16,

```

```
MH_KEY_FLIPDOWN    = -17,
MH_KEY_FLIPUP      = -18,
MH_KEY_INVALID     = 0
};

enum MH_CallState {
MH_CS_IDLE = 0,
MH_CS_CALLING,
MH_CS_CALLED,
MH_CS_CALLREJECTED,
MH_CS_INCOMMING, // , 가 .(?)
MH_CS_OTHERCALL, //
MH_CS_TRANSFERCALL, //
MH_CS_END
}

enum _MH_Annunciator{
MH_ANN_RSSI, // RSSI
MH_ANN_BATT, //
MH_ANN_NOSERVICE, //
MH_ANN_SILENTMODE, // ,
MH_ANN_ALARM, //
}
typedef _MH_Annunciator MH_Annunciator;

struct _MH_AnnInfo{
    MH_Annunciator type; //Annunciator info type
    M_Int32 data; //
}
typedef struct _MH_AnnInfo MH_AnnInfo;
```



 MH\_sysGetHeapBlock

```
void MH_sysGetHeapBlock (M_Uint32* start, M_Uint32* size)
```

[out] start     Heap

[out] size     Heap

✎ MH\_sysGetInformation

```

        10 string
        가
command 가
    
```

)

M\_Char buf[16];

MH\_sysGetInformation("ESN", buf, sizeof(buf));

M\_Int32 MH\_sysGetInformation (M\_Char\* command, M\_Char\* buf, M\_Int32 bufSize)

[in] command String

[out] buf

[out] bufSize

| command   |                               |
|-----------|-------------------------------|
| "ESN"     | ESN                           |
| "NID"     | (Network Identification )     |
| "SID"     | (System Identification)       |
| "BASEID"  | (Base station Identification) |
| "BASELAT" | (Base station Latitude)       |

|                |  |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
|----------------|--|--|--------|----------------|--------------|--------------|------------|--------------|------------|--------------|------------|--------------|-------------|-------------|------------|--------|------------|---------|------------|---------|-------------|---------|-----------|
| “BASELONG”     | (Base station longitude)   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “CURRENTCH”    | (Current Channel number)   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “PHONENUMBER”  |  |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “RSSILEVEL”    | RSSI   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “BATTERYLEVEL” |  |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “MAXRSSILEVEL” | RSSI   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “MAXBATTLEVEL” |  |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “MAXSERIALNUM” |  |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “MAXSOCKETNUM” |  |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “MEDIADEVICES” | <p>device , device가<br/>                     “,” . device가<br/>                     M_E_NOTSUP .</p> <p>✍</p> <table border="1"> <tr> <td></td> <td>device</td> </tr> <tr> <td>“Qualcomm_CMX”</td> <td>Qualcomm CMX</td> </tr> <tr> <td>“Yamaha_MA1”</td> <td>Yamaha MA1</td> </tr> <tr> <td>“Yamaha_MA2”</td> <td>Yamaha MA2</td> </tr> <tr> <td>“Yamaha_MA3”</td> <td>Yamaha MA3</td> </tr> <tr> <td>“audio/MIDI”</td> <td>MIDI play ,</td> </tr> <tr> <td>“audio/MP3”</td> <td>MP3 play ,</td> </tr> <tr> <td>“IS96”</td> <td>QCELP - 8K</td> </tr> <tr> <td>“IS96A”</td> <td>QCELP - 8K</td> </tr> <tr> <td>“IS733”</td> <td>QCELP - 13K</td> </tr> <tr> <td>“IS127”</td> <td>EVRC - 8K</td> </tr> </table> <p>가</p> |  | device | “Qualcomm_CMX” | Qualcomm CMX | “Yamaha_MA1” | Yamaha MA1 | “Yamaha_MA2” | Yamaha MA2 | “Yamaha_MA3” | Yamaha MA3 | “audio/MIDI” | MIDI play , | “audio/MP3” | MP3 play , | “IS96” | QCELP - 8K | “IS96A” | QCELP - 8K | “IS733” | QCELP - 13K | “IS127” | EVRC - 8K |
|                | device   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “Qualcomm_CMX” | Qualcomm CMX   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “Yamaha_MA1”   | Yamaha MA1   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “Yamaha_MA2”   | Yamaha MA2   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “Yamaha_MA3”   | Yamaha MA3   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “audio/MIDI”   | MIDI play ,  |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “audio/MP3”    | MP3 play ,   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “IS96”         | QCELP - 8K   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “IS96A”        | QCELP - 8K   |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “IS733”        | QCELP - 13K  |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |
| “IS127”        | EVRC - 8K  |  |        |                |              |              |            |              |            |              |            |              |             |             |            |        |            |         |            |         |             |         |           |

|                 |   |
|-----------------|---|
|                 | <p>“audio/xxx”</p> <p>MIME</p> <p>) 가 CMX, MA1 EVRC-8K</p> <p>, “Qualcomm_CMX, Yamaha_MA1”</p>      |
| “DNS”           | <p>. IP . )</p> <p>“127.0.0.1”</p>  |
| “TIMEZONE”      | <p>“GMT+ : “, “GMT- : “</p> <p>time zone . ,</p> <p>) “GMT+09:30”, “GMT -12:00”</p>                 |
| “PHONEMODEL”    | <p>ID string</p>  |
| “KEYREPEAT”     | <p>“ : ”, ms .</p> <p>M_E_NOTSUP .</p> <p>) “600:250” 600ms</p> <p>MH_KEYREPEAT_EVENT 가 , 250ms</p> |
| “VIBRATORLEVEL” | <p>가 .</p> <p>( 0, 100)</p> <p>) “3” 3</p> <p>“1” 1</p>   |
| “VOLUMELEVEL”   | <p>가 .</p> <p>( 0, 100)</p> <p>) “10” 10</p> <p>“4” 4</p>   |

[out] buf . string

[in] bufSize buf size

0

M\_E\_INVALID - command

M\_E\_NOTSUP - command

M\_E\_SHORTBUF - 가

## ✎ MH\_sysSetInformation

가 가 . HAL

```
M_Int32 MH_sysSetInformation(M_Char* cmd, M_Char* value)
```

[in] cmd .

[in] value cmd

0

M\_E\_ACCESS - .

M\_E\_INVALID - cmd value .

## ☞ MH\_sysLock

```

        (Critical Section)
        (external context)
MH_sysUnlock
MH_pIEvent() 가
가 MH_pIEvent() ISR(interrupt service
routine) , 가
MH_pIEvent() context
(Critical Section) MH_sysLock()
MH_sysUnlock() 가 MH_pIEvent()
HAL
MH_sysLock(), MH_sysUnlock nested
MH_sysLock() lock , MH_sysUnlock
lock

```

```
void MH_sysLock (void)
```

```
MH_sysUnl ock
```

✍ MH\_sysUnlock

MH\_sysLock ..

void MH\_sysUnlock (void)

MH\_sysLock



✍ MH\_sysHallInit

Hal .  
HAL API . HAL  
API 가 API .


void MH\_sysHallInit (void)

✍ MH\_sysHalExit

. HAL

HAL

```
void MH_sysHalExit()
```

 MH\_sysWait

Binary semaphore wait .

가 blocking CPU power

. HAL

void MH\_sysWait (void)

---

## ✎ MH\_sysSignal

Binary semaphore signal .

가 MH\_sysWait() blocking .

MH\_pItEvent() . MH\_sysSignal() ISR

void MH\_sysSignal (void)

## ✍ MH\_debugPutChar

HAL API, (console) API

```
void MH_debugPutChar(M_Char ch);
```

[in] ch -

## 4.4. CALL

```

        ,          ,          가
        ,          ,          MH_pltEvent()
        MH_CALL_EVENT   MH_CallEvent


    ✎

//
typedef enum MH_SUB_CALL_EVENT {
    MH_CALLEV_INCOMING = 0,          // 가
    MH_CALLEV_NOTIFY          // MH_callPlace()          /
} MH_SUB_CALL_EVENT;

//
typedef struct MH_CallEvent{
    M_Int32 event;          //          Event, enum _MH_SUB_CALL_EVENT

    M_Int32 rtnCode;          /**0 :          MH_callPlace()가
        , -1 : MH_callPlace()가          */
} MH_CallEvent;

```

 MH\_callPlace


. 가 (MH\_CALLEV\_NOTIFY)가 . 가 .

M\_Int32 MH\_callPlace (char \* phonenum)

[in] phonenum

0

M\_E\_ERROR -

 MH\_callEnd

MH\_CALLEV\_NOTIFY

void MH\_callEnd (void)



✎ MH\_callAccept

MH\_CALLEV\_INCOMING 가 ,

void MH\_callAccept(void)

MH\_SUB\_CALL\_EVENT

✍ MH\_callReject

. MH\_CALLEV\_INCOMING 가

.

.

void MH\_callReject(void)

## 4.5. HandSet Device

```
✍  
  
//  
typedef enum MH_DevBackLight {  
    MH_LIGHT_ON = 0,        //  
    MH_LIGHT_OFF,          //  
    MH_LIGHT_ALWAYS_ON,    //  
    MH_LIGHT_DEFAULT       //  
} MH_DevBackLight;
```

## ✎ MH\_devBacklight

가 .  
 MH\_LIGHT\_DEFAULT .  
 system , 가  
 0 LCD  
 1 LCD 가 . 가  
 color color  
 0xYYRRGGBB( (network byte ordering) ) .  
 YY RR (Red), GG (Green), BB (Blue)

M\_Int32 MH\_devBacklight (M\_Int32 id, MH\_DevBackLight on\_off, M\_Int32 color,  
 M\_Int32 timeout)

[in] id  
 [in] on\_off  
 [in] color  
 [in] timeout , MH\_DEV\_LIGHT\_ON

0

M\_E\_ERROR - 가



## ✎ MH\_devVibrator

Vibrator . on .  
 level 0 timeout . level 0  
 vibrator 가 . level  
 0-100 . 100 가 가 0  
 가 . 0-100 가  
 가 .  
 가 가 MH\_sysGetInformation()  
 .  
 ) 가 => 1-100 :  
 가 , => 1-50 : , 51-100 :  
 가 , , => 1-33: , 34-66: ,  
 67-100:

```
void MH_devVibrator (M_Int32 level, M_Int32 timeout)
```

[in] level 0 off, 1-100

[in] timeout ,

 MH\_devLedControl

LED

)

LED가 4

LSB BIT 4

31 bit ...

0



MH\_devLedControl(0xF,0x6)

led 4

가

2

.

```
void MH_devLedControl (M_Int32 leds, M_Int32 mask)
```

[in] leds

LED

[in] mask

 MH\_devGetLedCount

LED

M\_Int32 MH\_devGetLedCount (void)

led



## 4.6.

TCP/IP

```

TCP/IP
MH_netConnect()
API
MH_netClose()
API
MH_netClose()
API
MH_netSocketClose()
MH_netClose()
MH_netSocketClose()
API
I/O
MH_NETWORK_EVENT
MH_NetEvent
MH_pltEvent()

```

✍

```

//
#define MH_AF_INET

//TCP/UDP
typedef enum MH_SOCKET_TYPE{
    MH_SOCKET_STREAM =1, // TCP SOCKET
    MH_SOCKET_DGRAM // UDP SOCKET
} MH_SOCKET_TYPE;

//
typedef enum MH_SUB_NETWORK_EVENT {
    MH_NETEV_NETWORK_OPEN = 0x01, //
    MH_NETEV_NETWORK_CLOSE = 0x02, //
    MH_NETEV_SOCKET_CONNECT = 0x04, // SOCKET
    MH_NETEV_SOCKET_CLOSE = 0x08, // SOCKET

```

```
        MH_NETEV_SOCKET_READ = 0x10,           // SOCKET READ
        MH_NETEV_SOCKET_WRITE = 0x20,         // SOCKET WRITE
    } MH_SUB_NETWORK_EVENT;

//
typedef struct MH_NetEvent{
    M_Int32 fd;                                //
    M_Int32 event;                             //      event, MH_SUB_NETWORK_EVENT
} MH_NetEvent;
```

## ✎ MH\_netConnect

(NonBlocking) . M\_E\_WOULDBLOCK  
 가 .  
 가 MH\_NETEV\_NETWORK\_OPEN  
 . 가 MH\_NETEV\_NETWORK\_CLOSE

M\_Int32 MH\_netConnect (void)

0

M\_E\_WOULDBLOCK - 가 가

M\_E\_INPROGRESS -

M\_E\_ISCONN - 가

M\_E\_ERROR -

## ✎ MH\_netClose

(blocking)

MH\_netClose()

API

가

MH\_netClose() 가

M\_Int32 MH\_netClose (void)

0

M\_E\_INPROGRESS -

M\_E\_ERROR -

## ✎ MH\_netSocket

. 가 가 .

M\_Int32 MH\_netSocket (M\_Int32 domain, M\_Int32 type)

```
[in] domain                MH_AF_INET
[in] type                  MH_SOCKET_STREAM(TCP    ), MH_SOCKET_DGRAM(UDP
);
```

```
M_E_NOTSUP - domain    type
M_E_NOTCONN-          가
M_E_NOSPACE-
M_E_ERROR -
```

## ✍ MH\_netSocketConnect

TCP . M\_E\_WOULDBLOCK  
 (NonBlocking) , ,  
 MH\_NETEV\_SOCKET\_CONNECT

M\_Int32 MH\_netSocketConnect (M\_Int32 fd, M\_Int32 addr, M\_int16 port)

[ in] fd  
 [ in] addr IP (network byte ordering)  
 .  
 [ in] port (network byte ordering)

0

M\_E\_INVALID - 가 0  
 M\_E\_WODULDBLOCK -  
 M\_E\_NOTCONN - 가  
 M\_E\_ISCONN - CONNECT  
 M\_E\_INPROGRESS -  
 M\_E\_ERROR -

## ✎ MH\_netSocketRead

TCP . 0 EOF(End Of File) .  
 M\_E\_WOULDBLOCK 가  
 MH\_NETEV\_SOCKET\_READ 가

M\_Int32 MH\_netSocketRead (M\_Int32 fd, M\_Byte \*buf, M\_Int32 len)

[in] fd

[out] buf

[in] len

M\_E\_WOULDBLOCK - 가  
 M\_E\_NOTCONN- 가  
 M\_E\_ERROR -

## ✎ MH\_netSocketWrite

TCP . M\_E\_WOULDBLOCK .  
MH\_NETEV\_SOCKET\_WRITE 가

M\_Int32 MH\_netSocketWrite (M\_Int32 fd, M\_Byte \*buf, M\_Int32 len)

[ in] fd  
[ in] buf  
[ in] len size

M\_E\_WODULDBLOCK -

M\_E\_NOTCONN - 가

M\_E\_ERROR -



---

## MH\_netSocketBind

local port .

M\_Int32 MH\_netSocketBind (M\_Int32 fd, M\_Int16 port)

[in] fd

[in] port

(network byte ordering)

0

M\_E\_INVALID - 가

M\_E\_ISCONN - 가

M\_E\_NOTCONN - 가

M\_E\_ERROR -





## ✎ MH\_netSocketRcvFrom

UDP . M\_E\_WOULDBLOCK  
 가 .  
 MH\_NETEV\_SOCKET\_READ 가 .

```
M_Int32 MH_netSocketRcvFrom (
    M_Int32 fd,
    M_Byte *buf,
    M_Int32 len,
    M_Int32 *addr,
    M_Int16 *port
)
```

[in] fd -

[out] buf -

[in] len - size

[out] addr IP . (network byte ordering)

[out] port . (network byte ordering)

M\_E\_WOULDBLOCK - 가

M\_E\_NOTCONN - 가

M\_E\_ERROR -



 MH\_netSocketClose

(blocking)

M\_Int32 MH\_netSocketClose (M\_Int32 fd)

[in] fd

0

M\_E\_INPROGRESS -

M\_E\_NOTCONN - 가

M\_E\_ERROR -

 MH\_netGetMaxPacketLength

UDP

M\_Int32 MH\_netGetMaxPacketLength (void)

 MH\_netSocketAccept

TCP . 가  
MH\_netSocketBind() . 가 M\_E\_WOULDBLOCK

MH\_NETEV\_SOCKET\_CONNECT .

M\_Int32 MH\_netSocketAccept (M\_Int32 fd)

fd - TCP

M\_E\_WOULDBLOCK -

M\_E\_NOTSUP -

M\_E\_NOTCONN - 가

M\_E\_ERROR -



## 4.7. Serial

```

        MH_sysGetSystemInformation()
        “          가 0,          가 1, ... (
        -1)”          가
          가

        MH_pltEvent()


        MH_SERIAL_EVENT   MH_SerialEvent

✍

//
typedef enum MH_SUB_SERIAL_EVENT{
    MH_SERIALEV_READ = 0,    //
    MH_SERIALEV_WRITE,      //
    MH_SERIALEV_ERROR,      //      H/W
} MH_SUB_SERIAL_EVENT;

//
typedef struct MH_SerialEvent{
    M_Int32 fd;              //
    M_Int32 event;          //      Event, MH_SUB_SERIAL_EVENT
} MH_SerialEvent;

```

 MH\_serialOpen

```

        param
        ::= [
        ::= " " *(, " ")
        ::=
        ::=
    
```

|          |                                      |  |        |
|----------|--------------------------------------|--|--------|
|          |                                      |  |        |
| baudrate | 9600, 19200, 38400,<br>57600, 115200 |  | 115200 |
| parity   | even, odd, no                        |  | no     |
| size     |                                      |  | 8      |
| flow     | hardware, software,<br>no            |  | no     |

가 8 ,  
, 115200

"baudrate=115200,parity=no,size=8,flow=hardware"

가

M\_Int32 MH\_serialOpen (M\_Int32 port,M\_byte \*param)

[ in] port

[ in] param

M\_E\_NOTSUP -

M\_E\_INVALID -

M\_E\_ISCONN - 가

M\_E\_ERROR -

## ✍ MH\_serialWrite

```

M_E_WOULDBLOCK
,
가 , MH_SERIALLEV_WRITE
MH_SERIALLEV_WRITE
MH_serialWrite()
DTR M_E_NOTCONN

```

```
M_Int32 MH_serialWrite (M_Int32 fd, M_Uint8* buf, M_Int32 len)
```

```

[in] fd
[in] buf
[in] len

```

```

M_E_ERROR -
M_E_WODULDBLOCK -
M_E_NOTCONN - DTR

```

## ✎ MH\_serialRead

```

        M_E_WOULDBLOCK
가 , 가 , MH_SERIAL_READ
가 MH_SERIAL_READ
MH_serialRead()
DTR M_E_NOTCONN

```

```
M_Int32 MH_serialRead (M_Int32 fd, M_Uint8 *buffer, M_Int32 len)
```


```

[in] port
[out] buf
[in] len

```

```
M_E_ERROR - M_E_WOULDBLOCK - 가
```

```
M_E_NOTCONN - DTR
```

 MH\_serialClose

```
void MH_serialClose (M_Int32 fd)
```

[in] fd

## 4.8. MEDIA

```

API
, vocoder
/

//
typedef enum MH_mdaToneType {

    MH_SND_TONE_0 = 0,           // DTMF for 0 key
    MH_SND_TONE_1,             // DTMF for 1 key
    MH_SND_TONE_2,             // DTMF for 2 key
    MH_SND_TONE_3,             // DTMF for 3 key
    MH_SND_TONE_4,             // DTMF for 4 key
    MH_SND_TONE_5,             // DTMF for 5 key
    MH_SND_TONE_6,             // DTMF for 6 key
    MH_SND_TONE_7,             // DTMF for 7 key
    MH_SND_TONE_8,             // DTMF for 8 key
    MH_SND_TONE_9,             // DTMF for 9 key
    MH_SND_TONE_A,             // DTMF for A key
    MH_SND_TONE_B,             // DTMF for B key
    MH_SND_TONE_C,             // DTMF for C key
    MH_SND_TONE_D,             // DTMF for D key
    MH_SND_TONE_POUND,         // DTMF for # key
    MH_SND_TONE_STAR,          // DTMF for * key
    MH_SND_NOTE_A4,             // 440.0 Hz -Piano Notes-
    MH_SND_NOTE_AS4,           // 466.1 Hz
    MH_SND_NOTE_B4,            // 493.8 Hz
    MH_SND_NOTE_C4,            // 523.2 Hz
    MH_SND_NOTE_CS4,           // 554.3 Hz
    MH_SND_NOTE_D4,            // 587.3 Hz
    MH_SND_NOTE_DS4,           // 622.2 Hz
    MH_SND_NOTE_E4,            // 659.2 Hz

```

---

```
MH_SND_NOTE_F4,           // 698.5 Hz
MH_SND_NOTE_FS4,         // 739.9 Hz
MH_SND_NOTE_G4,          // 784.0 Hz
MH_SND_NOTE_GS4,         // 830.6 Hz
MH_SND_NOTE_A5,          // 880.0 Hz
MH_SND_NOTE_AS5,         // 932.2 Hz
MH_SND_NOTE_B5,          // 987.7 Hz
MH_SND_NOTE_C5,          // 1046.5 Hz
MH_SND_NOTE_CS5,         // 1108.7 Hz
MH_SND_NOTE_D5,          // 1174.6 Hz
MH_SND_NOTE_DS5,         // 1244.3 Hz
MH_SND_NOTE_E5,          // 1318.5 Hz
MH_SND_NOTE_F5,          // 1397.0 Hz
MH_SND_NOTE_FS5,         // 1479.9 Hz
MH_SND_NOTE_G5,          // 1568.0 Hz
MH_SND_NOTE_GS5,         // 1661.2 Hz
MH_SND_NOTE_A6,          // 1760.0 Hz
MH_SND_NOTE_AS6,         // 1864.7 Hz
MH_SND_NOTE_B6,          // 1975.5 Hz
MH_SND_NOTE_C6,          // 2093.1 Hz
MH_SND_NOTE_CS6,         // 2217.4 Hz
MH_SND_NOTE_D6,          // 2349.3 Hz
MH_SND_NOTE_DS6,         // 2489.1 Hz
MH_SND_NOTE_E6,          // 2637.0 Hz
MH_SND_NOTE_F6,          // 2793.7 Hz
MH_SND_NOTE_FS6,         // 2959.9 Hz
MH_SND_NOTE_G6,          // 3135.9 Hz
MH_SND_NOTE_GS6,         // 3322.4 Hz
MH_SND_NOTE_A7,          // 3520.0 Hz

} MH_mdaToneType;

typedef enum MH_MdaDevInfo {
    MH_MDAINFO_STREAM_PLAY = 0x0001, // STREAM
```



---

```

MH_MDAINFO_CALL_BY_REFERENCE    = 0x0002, //

MH_MDAINFO_PAUSE_RESUME        = 0x0004, // pause/resume

MH_MDAINFO_SEEK                = 0x0008 // seek
MH_MDAINFO_STREAM_RECORD       = 0x0010, // STREAM

} MH_MdaDevInfo;

//
typedef enum MH_SUB_MEDIA_EVENT {
    MH_MDAEV_MEDIA_EMPTY = 0 // 가
    MH_MDAEV_TONE_EMPTY, // 가
    MH_MDAEV_MEDIA_FULL, // 가 full
    MH_MDAEV_MEDIA_ERROR, // 가
    MH_MDAEV_TONE_ERROR, // 가
} MH_SUB_MEDIA_EVENT;

//
typedef struct MH_MediaEvent{
    M_Int32 event; //MH_SUB_MEDIA_EVENT
    M_Int32 mdaID; /** */
    M_Int32 size; /* MH_MDAEV_MEDIA_EMPTY , MH_MDAEV_TONE_EMPTY
    ,
    MH_MDAEV_MEDIA_FULL ,
    */
} MH_MediaEvent;

```

✎ MH\_mdaTonePlay

```

    Tone
    .
    .
    가
    (MH_MDAEV_TONE_EMPTY)
    (MH_MDAEV_TONE_EMPTY)
    가 ]. 가
    MH_MDAEV_TONE_ERROR
    mdaID number 0 , (MH_MDAEV_TONE_EMPTY)
    MH_MediaEvent mdaID field 가 0 . pause/resume
    , MH_mdaTonePlay
    가 , MH_mdaResume
    pause/resume MH_mdaTonePlay
    ,
    , MH_ MH_mdaTonePlay 가
    0
    .
    
```

M\_Int32 MH\_mdaTonePlay (MH\_mdaToneType tone[], M\_Int32 duration[], M\_Int32 number)

```

[in] tones
[in] duration ( ms)
[in] number
    
```

```

M_E_INUSE -
M_E_ERROR - 가
    
```



✎ MH\_mdaFreqTonePlay

```

        Tone
            .
            .
            가
            (MH_MDAEV_TONE_EMPTY)
            (MH_MDAEV_TONE_EMPTY)
            가 ]
            MH_MDAEV_TONE_ERROR
        mdaID number 0 , (MH_MDAEV_TONE_EMPTY)
        MH_MediaEvent mdaID field 가 0 . pause/resume
            , MH_mdaTonePlay
            가 , MH_mdaResume
        pause/resume MH_mdaFreqTonePlay
            ,
            , MH_MH_mdaFreqTonePlay 가
            0
    
```

M\_Int32 MH\_mdaFreqTonePlay (M\_Int32 hiFreq[], M\_Int32 lowFreq[], M\_Int32 duration[], M\_Int32 number)

```

[in] hiFreq
[in] lowFreq
[in] duration ( ms)
[in] number
    
```

```

M_E_INUSE -
M_E_ERROR - 가
    
```



---

## MH\_mdaGetDeviceID

```
MH_sysGetInformation() . MH_sysGetInformation command
    "MEDIADVICES"
    mdaID number 0
mdaID number 0
```

```
M_Int32 MH_mdaGetDeviceID(M_Char* devName)
```

```
[ in] devName
```

```
M_E_NOTSUP -
```

```
MH_sysGetInformation
```

 MH\_mdaGetDeviceInfo

1. MH\_MDAINFO\_STREAM\_PLAY bit  
 MH\_mdaWriteData(가 0, MH\_mdaTonePlay, MH\_mdaFreqTonePlay)  
 MH\_MDAINFO\_CALL\_BY\_REFERENCE bit가
2. MH\_MDAINFO\_CALL\_BY\_REFERENCE bit MH\_mdaWriteData(가 0, MH\_mdaTonePlay, MH\_mdaFreqTonePlay)가 bit가
3. MH\_MDAINFO\_PAUSE\_RESUME bit가 pause/resume
4. MH\_MDAINFO\_SEEK bit가 seek
5. MH\_MDAINFO\_STREAM\_RECORD bit  
 MH\_mdaCopy

M\_Int32 MH\_mdaGetDeviceInfo(M\_Int32 mdaID, M\_Int32\* rtnInfo)

[in] mdaID  
 [out] rtnInfo MH\_MdaDevInfo bit OR

0

M\_E\_ERROR -



## ✎ MH\_mdaWriteData

```

        가 (MH_MDAEV_SOUND_EMPTY)
        [ (MH_MDAEV_SOUND_EMPTY)
        가 ].
MH_mdaStop()가 가
가 . 가
가
가 MH_MDAEV_SOUND_ERROR
. pause/resume ,
MH_mdaWriteData 가 ,
MH_mdaResume . pause/resume
MH_mdaWriteData ,
MH_mdaWriteData 가

```

```

M_Int32 MH_mdaWriteData (
    M_Int32 mdaID,
    void *buf,
    M_Int32 size,
)

```

```

[in] mdaID
[in] buf
[in] size

```

```

M_E_INUSE -
M_E_ERROR - 가

```

M\_E\_NOTSUP -

## ✎ MH\_mdaPause

가 . MH\_mdaResume 가  
 (state)  
 , pause/resume  
 가 가 .

M\_Int32 MH\_mdaPause(M\_Int32 mdamdID)

[in] mdaID

0

M\_E\_NOTSUP - pause/resume

## MH\_mdaResume

. 가  
, pause/resume .


M\_Int32 MH\_mdaResume(M\_Int32 mdaID)

[in] mdaID

0

M\_E\_NOTSUP - pause/resume

---

  
 MH\_mdaSeek


milli second . pause  
가 , seek

M\_Int32 MH\_mdaSeek(M\_Int32 mdaID, M\_Int32 seekTime)

[in] mdaID  
[in] seekTime (ms), 0  
,

0

M\_E\_NOTSUP - seek

 MH\_mdaStop

/ 가 . 가  
가 가 . 가 가  
가 , 가 .  
가 .

M\_Int32 MH\_mdaStop (M\_Int32 mdaID)

[in] mdaID

0

✎ MH\_mdaGetVolume

가  
 ,  
 가  
 0, 100  
 0 - 100  
 . 0-100  
 가  
 가  
 가  
 가 MH\_sysGetInformation()  
 ) 가 , => 1-50 : 51-100 :  
 가 , , => 1-33: , 34-66: ,  
 67-100:

M\_Int32 MH\_mdaGetVolume (M\_Int32 mdaID)

[in] mdaID

M\_E\_NOTSUP -

## ✎ MH\_mdaSetVolume

가 . . . 0, 100 .  
 가 ,  
 가 가 .

```
void MH_mdaSetVolume (M_Int32 mdaID, M_Int32 value)
```

[ in] mdaID

[ in] value (0-100 )

M\_E\_NOTSUP -

✎



---

## MH\_mdaControl

(control) 가  
 , HAL 가  
 . 가 ,  
 가 cmd  
 .

```
M_Int32 MH_mdaControl(M_Int32 mdaID, M_Char* cmd, M_Byte* buf1, M_Byte*
buf2);
```

[in] mdaID

[in] cmd (control)

[in] buf1 buf1

[in] buf2 buf2

0

M\_E\_ERROR- command , command

✎ MH\_mdaRecord

. MH\_mdaRecord() 가  
 (background) sampling  
 . 가 full  
 (MH\_MDAEV\_MEDIA\_FULL)  
 . 가 MH\_MDAEV\_MEDIA\_ERROR  
 가 가  
 가 full . 가 full  
 . 가 full  
 , stop .

M\_Int32 MH\_mdaRecord (M\_Int32 mdaID)

[in] mdaID (MH\_mdaGetDeviceID )

0

M\_E\_INPROGRESS - 가

M\_E\_ERROR -

M\_E\_NOTSUP -

---

## ✎ MH\_mdaCopy

, MH\_mdaCopy 가 .

```
M_Int32 MH_mdaCopy(M_Int32 mdaID, void* buf, M_Int32 size)
```

```
[in] mdaID (MH_mdaGetDeviceID )  
[in] buf 가  
[in] size
```

M\_E\_ERROR -

M\_E\_NOTSUP -

## 4.9. TIME

HAL                    1    Timer    가  
                          .            , HAL    UTC            70   1   1   0   0   0  
                          milli-second                                    .


---

## ✎ MH\_timerSet

가 HAL\_MH\_TIMER\_EVENT 가  
MH\_timerSet() ,  
가 .


```
void MH_timerSet (M_Int64 timeout)
```

[in] timeout milli-second , 64bit

 MH\_timerClear

void MH\_timerClear (void)

MH\_timerSet

 MH\_timerCurrentTime

M\_Int64 MH\_timerCurrentTime (void)

UTC            70   1   1   0   0   0            milli-second

## 4.10. UTILITY



---

✎ MH\_utilConvertLocalCodeToUnicode

Space(0x20)

M\_Int32 MH\_utilConvertLocalCodesToUnicode (M\_Char \*psz, int len, M\_Uint16 \*puni, int buflen)

[in] psz "C" ( ; EUC\_KR )

[in] len

[out] puni "Unicode"

[in] buflen

M\_E\_SHORTBUF - puni 가

## ✎ MH\_utilConvertUnicodeToLocalCode

가  
0x20 (Space)

```
M_Int32 MH_utilConvertUnicodeToLocalCode(M_Unicode *puni, M_Int32 len,
M_Unicode *plocal, M_Int32 buflen);
```

[in] unicode


[in] puni “Unicode”

[in] len

[out] puni “C” ( “C” ;  
EUC\_KR )

[in] buflen

M\_E\_SHORTBUF - plocal 가

 MH\_utilUnConvertLocalCodeToUnicodeChar

```
M_UInt16 MH_utilConvertLocalCodeToUnicodeChar(M_UInt8 *psz, M_Int32 len,  
M_Int32 *pconsumed);
```

[in] psz

[in] len

[out] pconsumed

Unicode

---

✍ MH\_utilGetLocalCodeSizeInUnicode

M\_UInt32 MH\_utilLocalCodeSizeToUnicodeChar(M\_UInt16 \*psz, M\_Int32 len);

[in] psz

[in] len ( :M\_UInt16)

( : )

---

✎ MH\_utilGetUnicodeSizeInLocalCode

M\_Uint16 .

M\_Uint32 MH\_utilGetUnicodeSizeInLocalCode (M\_Uint8 \*psz, M\_Int32 len);

[in] psz

[in] len

( :M\_Uint16)

## 4.11. FILE

```

File System      .
    API          path      path      .
blocking        .                HAL API      HAL

```



```

#define MH_FILE_OPEN_RDONLY      0x1      // (O_RDONLY)
#define MH_FILE_OPEN_WRONLY      0x2      // (O_WRONLY|O_CREAT)
#define MH_FILE_OPEN_WRTRUNC     0x4      //
(O_WRONLY|O_CREAT|O_TRUNC)
#define MH_FILE_OPEN_RDWR       0x8      // (O_RDWR|O_CREAT|O_BINARY)
#define MH_FILE_SEEK_SET         0
#define MH_FILE_SEEK_CUR         1
#define MH_FILE_SEEK_END         2
#define MH_FILE_IS_DIR           0x01

typedef struct _fileInfo MH_FileInfo {
    M_Int32 attrib                //          bit mask      (
,                                )
    M_Uint32 creationTime        //
    M_Uint32 size                //
};

```

## MH\_fileAttribute

```
M_Int32 MH_fileAttribute (M_Char* pathname, MH_FileInfo* fi)
```

[in] pathname

[out] fi

0

M\_E\_BADFILENAME -

M\_E\_LONGNAME -

M\_E\_ERROR -

 MH\_fileAvailable

M\_Int32 MH\_fileAvailable (void)

M\_E\_ERROR -



 MH\_fileClose

M\_Int32 MH\_fileClose (M\_Int32 fd)

[in] fd

0

M\_E\_ERROR

## ✎ MH\_fileList

```
buf  NULL  ('\0')  NULL
```

```
M_Int32 MH_fileList (M_Char *root, M_Char* buf, M_Int32 bufSize)
```

```
[in]  root
[out] buf
[in]  bufSize  buf
```

```
0
```

```
M_E_SHORTBUF - 가
M_E_BADFILENAME -
M_E_LONGNAME -
M_E_ERROR -
```

 MH\_fileMkDir

M\_Int32 MH\_fileMkDir (M\_Char \* dirname)

[in]     dirname

0

M\_E\_BADFILENAME -

M\_E\_LONGNAME -

M\_E\_NOENT -

M\_E\_EXIST -

M\_E\_ERROR -

가

가

## ✎ MH\_fileOpen

flag 가

| flag                 |   |
|----------------------|---|
| MH_FILE_OPEN_RDONLY  |   |
| MH_FILE_OPEN_WRONLY  |   |
| MH_FILE_OPEN_WRTRUNC | 0 |
| MH_FILE_OPEN_RDWR    | 가 |

M\_Int32 MH\_fileOpen (M\_Char\* pathname, M\_Int32 flag)

[in] pathname

[in] flag

file

M\_E\_NOENT - MH\_FILE\_OPEN\_RDONLY

M\_E\_BADFILENAME -

M\_E\_LONGNAME -

M\_E\_INVALID - open option option parameter

M\_E\_NOSPACE -

M\_E\_ERROR -



---

## MH\_fileRead

buf

```
M_Int32 MH_fileRead (M_Int32 fd, M_Char* buf, M_Int32 size)
```

|       |      |                |
|-------|------|----------------|
| [in]  | fd   |                |
| [out] | buf  | buffer pointer |
| [in]  | size | buffer size    |

Size가 0 이면 0 반환  
0 이면 EOF 반환

M\_E\_EOF -

M\_E\_ERROR -

 MH\_fileRemove

M\_Int32 MH\_fileRemove (M\_Char\* pathname)

[in] pathname

0

M\_E\_NOENT -

M\_E\_INUSE -

M\_E\_BADFILENAME -

M\_E\_LONGNAME -

M\_E\_ERROR -

---

  
 MH\_fileRename

M\_Int32 MH\_fileRename (M\_Char \*oldname, M\_Char \*newname)

[in] oldname

[in] newname

0

M\_E\_BADFILENAME -

M\_E\_LONGNAME -

M\_E\_NOSPACE -

M\_E\_ERROR -

M\_E\_NOENT -

M\_E\_EXIST

-

M\_E\_INUSE -



 MH\_fileRmdir

가

M\_Int32 MH\_fileRmdir (M\_Char \* dirname)

[in] dirname

0

M\_E\_BADFILENAME -

M\_E\_LONGNAME -

M\_E\_NOTEMPTY -

가

M\_E\_NOENT - 가

M\_E\_ERROR -

## MH\_fileSeek

```

                                .
                                pos
                                pos
pos                                ,
                                3 가

```

M\_Int32 MH\_fileSeek (M\_Int32 fd, M\_Int32 pos, M\_Int32 where)

[in] fd

[in] pos , /  
가

[in] where MH\_FILE\_SEEK\_SET, MH\_FILE\_SEEK\_CUR, MH\_FILE\_SEEK\_END

M\_E\_INVALID - MH\_FILE\_SEEK\_SET, MH\_FILE\_SEEK\_CUR,

MH\_FILE\_SEEK\_END

M\_E\_BADSEEKPOS - 가

M\_E\_ERROR -

---

✎ MH\_fileWrite

fd                    가                    buf 가 가                    size

M\_Int32 MH\_fileWrite (M\_Int32 fd, M\_Char\* buf, M\_Int32 size)

[in]    fd  
[in]    buf  
[in]    size            write

write

M\_E\_ERROR -

M\_E\_NOSPACE -

 MH\_fileTotalSpace

M\_Int32 MH\_fileTotalSpace (void)

M\_E\_ERROR -

## 4.12. InputMethod

InputMethod Automata

( ) InputMethod

InputMethod ( ) ( )

( )

( )

InputMethod

( )

MH\_IMAgetSurpportModeCount() MH\_IMAgetSupportedModes(),

MH\_IMAgetCurrentMode

MH\_IMAgetSupportedModes()

, ISO 639 , 가

"/S", "/L" 가

"EN/S"

"KO"

, "N123"

가

HAL

,



```
# #define MH_IMA_NUM_MODE "N123" //
```

```
#define MH_IMA_FLUSH -99 //
```

가 MH\_IMAhandleInput

가

MH\_pItEvent

 MH\_IMAgetSurpportModeCount

\_Int32 MH\_IMAgetSurpportModeCount()


---

✎ MH\_IMAgetSupportedModes()

가 ISO 639  
"S"/"L" 가  
"EN/S"  
"KO"

char\*\* MH\_IMAgetSupportedModes()

( )

 MH\_IMAsetCurrentMode

MH\_IMAgetSupportedModes()

M\_Int32 MH\_IMAsetCurrentMode (M\_Int32 mode)

가

"1".

"0".



✎ MH\_IMAGetCurrentMode()

MH\_IMAgetSupportedModes()

M\_Int32 MH\_IMAGetCurrentMode()

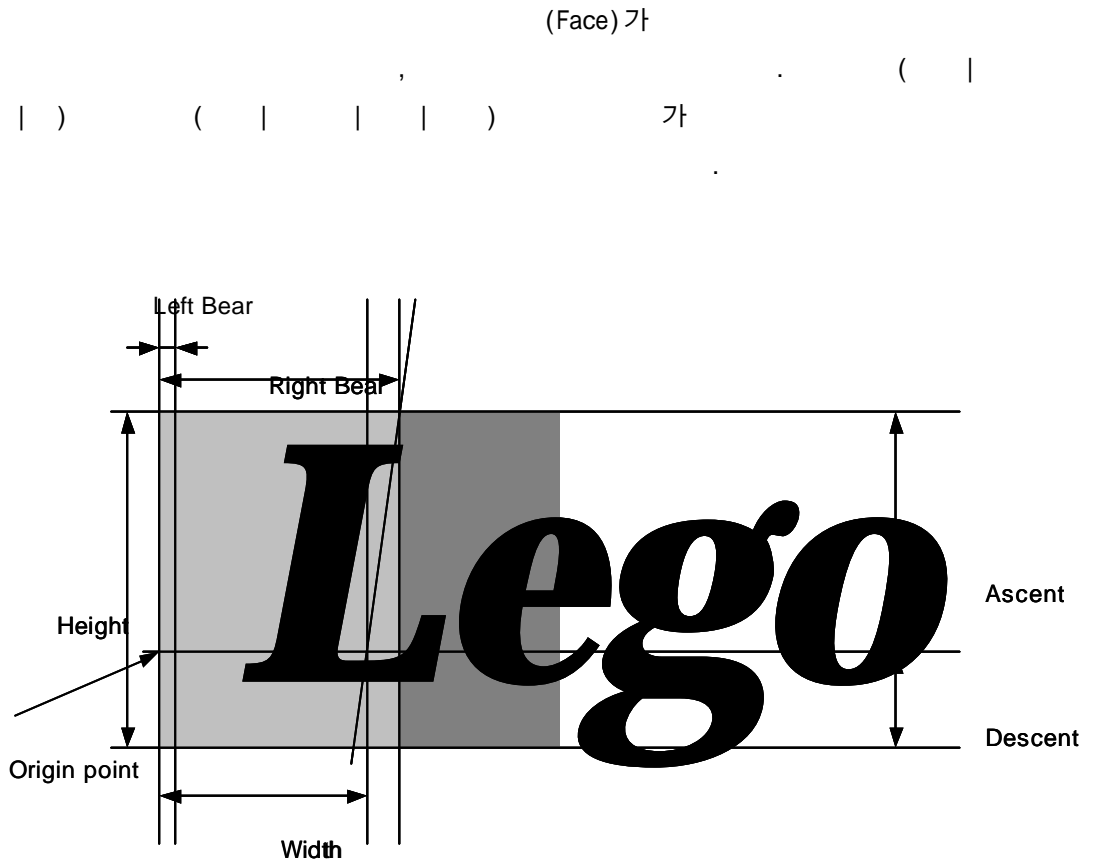
## ✎ MH\_IMAhandleInput

, ( )MH\_IMA\_FLUSH 가

```
M_Int32 MH_IMAhandleInput (
    char key,
    M_Int32 type,
    char *buf1,
    M_Int32 *size1,
    char *buf2,
    M_Int32 *size2
);
```

|            |             |                 |
|------------|-------------|-----------------|
| key [in]   | (MH_KeyCode | , MH_IMA_FLUSH) |
| type [in]  | (MH_Event   | .)              |
| buf1 [out] |             |                 |
| size1 [in] |             |                 |
| buf2 [out] |             |                 |
| size2 [in] |             |                 |

## 4.13. Font



2

(Height)

(Ascent)

(Descent)

(Bear)

(Left Bear) 0

가 . (Right Bear)가 (Width)  
 , (Width)

. (Right Bear)

✍

```
typedef struct _MH_CharGlyphInfo {
    // (bear)
    int lbear;
    // (bear)
    int rbear;
    //
    int width;
    //
    int height;
} MH_CharGlyphInfo;

#define MH_FB_FT_SIZE_SMALL 8
#define MH_FB_FT_SIZE_MEDIUM 0
#define MH_FB_FT_SIZE_LARGE 16

#define MH_FB_FT_FACE_SYSTEM 0
#define MH_FB_FT_FACE_MONOSPACE 32
#define MH_FB_FT_FACE_PROPORTIONAL 64

#define MH_FB_FT_STYLE_PLAIN 0
#define MH_FB_FT_STYLE_BOLD 1
#define MH_FB_FT_STYLE_ITALIC 2
#define MH_FB_FT_STYLE_UNDERLINE 4
```

## ✎ MH\_fnGetFont

```

face    MH_FB_FT_FACE_SYSTEM, MH_FB_FT_FACE_MONOSPACE(
        ), MH_FB_FT_FACE_PROPORTIONAL(
        ),
size    MH_FB_FT_SIZE_SMALL,    MH_FB_FT_SIZE_MEDIUM,
MH_FB_FT_SIZE_LARGE    가    style    MH_FB_FT_STYLE_ITALIC,
MH_FB_FT_STYLE_BOLD,    MH_FB_FT_STYLE_UNDERLINED    OR
MH_FB_FT_STYLE_PLAIN    .    가    가
        .
        "C"
        .

```

M\_Int32 MH\_fnGetFont (M\_Int32 face, M\_Int32 size, M\_Int32 style)

[in] face (MH\_FB\_FT\_FACE\_SYSTEM, MH\_FB\_FT\_FACE\_MONOSPACE, MH\_FB\_FT\_FACE\_PROPORTIONAL)

[in] size (MH\_FB\_FT\_SIZE\_SMALL, MH\_FB\_FT\_SIZE\_MEDIUM, MH\_FB\_FT\_SIZE\_LARGE)

[in] style (MH\_FB\_FT\_STYLE\_ITALIC, MH\_FB\_FT\_STYLE\_BOLD, MH\_FB\_FT\_STYLE\_UNDERLINED)

 MH\_fnGetFontHeight

M\_Int32 MH\_fnGetFontHeight (M\_Int32 font)

[ in] font

 MH\_fnGetFontAscent

(Ascent)

M\_Int32 MH\_fnGetFontAscent (M\_Int32 font)

[in] font

(Ascent)

 MH\_fnGetFontDescent

(Descent) .

M\_Int32 MH\_fnGetFontDescent (M\_Int32 font)

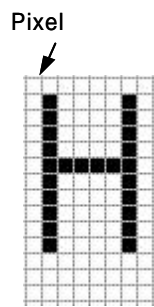
[in] font

(Descent)



## ✎ MH\_fnGetCharGlyph

LCD 가 LCD  
 가 (0,  
 0) (1, 0), (2, 0), ... (0, 1), (1, 1) ...



LCD가 16bit

```
M_UInt8 *pbuf = MH_fnGetCharGlyph(fontid, 'H', blackPixel, whitePixel, &bpl);
M_UInt16 *ppxls = (M_UInt16 *)pbuf;
가 , , ppxls[0] whitePixel ppxls[bpl*1]
whitePixel, ppxls[bpl * 1 + 1] blackPixel
```

```
const M_UInt8 *MH_fnGetCharGlyph(
    const M_Int32 fontid,
    const M_UInt16 ch,
    const M_UInt32 fgPxl,
    const M_UInt32 bgPxl,
    M_Int32 *pbpl,
)
```

[in] fontid

[in] ch ( . 가 )

[in] fgPxI

[in] bgPxI

[out] bpl

. ch 가 NULL

---

## ✎ MH\_fnGetCharInfo

(Left Bear)

(Right Bear)

M\_Int32 MH\_fnGetCharInfo(M\_Int32 font, M\_Uint16 char, MH\_CharGlyphInfo \*pcg)

[in] font

[in] char ( . 가 )

[out] pcg

0

:

M\_E\_ERROR -

가

## 4.14. Frame Buffer

```

LCD
,
LCD
, Double Buffering
. MG_fbGetScreenBuffer()
,
. MG_fbFlushLcd()
LCD
.

```



```

typedef struct _MH_DisplayInfo MH_DisplayInfo {
//
M_Int32 bpp;
//
24bit
bpp
32
, depth
24
. 2
depth
M_Int32 depth;
//
;
M_Int32 width;
//
;
M_Int32 height;
//
; PADDING
M_Int32 bpl;
// LCD
GrayScale
TRUE COLOR
M_Int32 colortype;
// TRUE
red
mask
M_Int32 redmask;
// TRUE
blue
mask
M_Int32 bluemask;
// TRUE
green
mask
M_Int32 greenmask;
};
#define MH_FB_MAIN_LCD 1

```

```
#define MH_FB_SUB_LCD      2
```

✎ MH\_GRP\_DIRECT\_COLOR\_TYPE


```
#define MH_GRP_DIRECT_COLOR_TYPE
```

```
. (1 << 0) .
```

 MH\_GRP\_GRAY\_TYPE

```
#define MH_GRP_GRAY_TYPE
```

```
    . (1 << 1)    .
```

 MH\_GRP\_COLOR\_TYPE

```
#define MH_GRP_COLOR_TYPE
```

```
    . (1 << 2)    .
```



🔗 MH\_fbGetDisplayInfo

```

screen                . screen      MH_FB_MAIN_LCD
MH_FB_SUB_LCD        가             . MH_FB_MAIN_LCD
LCD                  , MH_FB_SUB_LCD   가      LCD

```

```
void MH_fbGetDisplayInfo (M_Int32 screen, MH_DisplayInfo* displayinfo)
```

```

[in]   screen             : MH_FB_MAIN_LCD, MH_FB_SUB_LCD
      가
[out]displayinfo

```

---

## ✍ MH\_fbFlushLcd

LCD

```
void MH_fbFlushLcd (  
    M_Int32 screen,  
    M_Int32 x,  
    M_Int32 y,  
    M_Int32 w,  
    M_Int32 h  
)
```

screen - : MH\_FB\_MAIN\_LCD, MH\_FB\_SUB\_LCD 가 .  
x - x  
y - y  
w -  
h -

 MH\_fbMakePixel

0xRRGGBB

M\_Int32 MH\_fbMakePixel (M\_Int32 color)

color - 0xRRGGBB color

 MH\_fbGetPixelFromRGB

r, g, b

M\_Int32 MH\_fbGetPixelFromRGB (M\_Int32 r, M\_Int32 g, M\_Int32 b)

r - (0-255)

g - (0-255)

b - (0-255)

 **MH\_fbGetRGBFromPixel**

, , .

```
M_Int32 MH_fbGetRGBFromPixel (M_Int32 pixel, M_Int32 *r, M_Int32 *g,  
M_Int32 *b)
```

pixel –

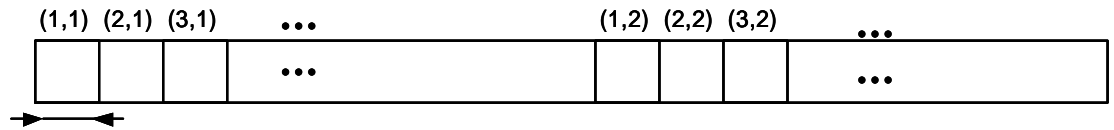
r - (0-255)

g - (0-255)

b - (0-255)

✎ MH\_fbGetScreenBuffer

LCD 가 LCD  
 LCD  
 -(bits per pixel \* width + padding) / 8 \* height- ,  
 가  
 Dual LCD LCD LCD depth( )가  
 가 , LCD 가 가  
 가 LCD , MG\_fbFlushLcd  
 (가 ) LCD  
 LCD  
 가



Pixel (LCD가 16bit 2byte가 , 8bit 1byte가 )

M\_Uint8\* MH\_fbGetScreenBuffer (M\_Int32 lcd\_num)

lcd\_num - [in] (0; 1; LCD )

## 4.15. Virtual Key

```

        가
        가
(mapping)
        ( )
        가 , 가 ,
MH_keyGetVirtualCode MH_keyGetKeyCode 가
        가
“MH_VIRGAME_A” 가 가 가 “7” “1”
“SOFT_2”
int a;
a = MH_keyGetVirtualCode(MH_KEY_7); // a == MH_VIRGAME_A

```



```

// UP
#define MH_VIRUP 1
// DOWN
#define MH_VIRDOWN 6
// LEFT
#define MH_VIRLEFT 2
// RIGHT
#define MH_VIRRIGHT 5
// FIRE(SEL)
#define MH_VIRFIRE 8
// GAME1
#define MH_VIRGAME_A 9
// GAME2
#define MH_VIRGAME_B 10
// GAME3
#define MH_VIRGAME_C 11
// GAME4
#define MH_VIRGAME_D 12
// SIDE UP

```

```
#define      MH_VIRSIDE_UP      96
// SIDE DOWN
#define      MH_VIRSIDE_DOWN    97
// SIDE SEL
#define      MH_VIRSIDE_SEL     98
// SIDE CLEAR
#define      MH_VIRSIDE_CLEAR   99
```



## ✎ MH\_keyGetVirtualCode

(mapping) 가 가

M\_Int32 MH\_keyGetVirtualCode(M\_Int32 keyCode)

keyCode KeyCode . MH\_KeyCode

[in] Virtual Keypad

---

✎ MH\_keyGetKeyCode

가 (mapping) 가

M\_Int32 MH\_keyGetKeyCode(M\_Int32 gameAction)

[in] gameAction Virtual Keypad

KeyCode . MH\_KeyCode .

## 5. API

### 5.1. C API

Clet API . Clet

#### handleCletEvent

```
void CletHandleEvent(int type, int param1, int param2)
```

type 1 가 . param1  
param2 type .

| (type)                     |   |                             |
|----------------------------|---|-----------------------------|
| MV_KEY_PRESS_EVENT         | 가 | param1 =<br>.<br>param2 = 0 |
| MV_KEY_REPEAT_EVENT        | 가 | param1 =<br>.<br>param2 = 0 |
| MV_KEY_RELEASE_EVENT       | 가 | param1 =<br>.<br>param2 = 0 |
| MV_CHILD_APP_START_EVENT   |   | param1 =<br><br>param2 = 0  |
| MV_CHILD_APP_DESTROY_EVENT |   | param1 =<br><br>param2 =    |
| MV_USER_EVENT              |   | param1 =                    |

|  |  |          |
|--|--|----------|
|  |  | param2 = |
|--|--|----------|

### startClet

```
void startClet(int argc, char *argv[]);
```

. argc 가 , argv  
. argv[0] argv[argc-1] 가 .

### pauseClet

```
void pauseClet();
```

가

### resumeClet

```
void resumeClet();
```

가

### destroyClet

```
void destroyClet();
```

### paintClet

```
void paintClet(int x, int y, int w, int h);
```

. x, y, w, h

가 .

### 5.1.1.

API  
/ , / , , ,  
API .  
(static) , (dynamic)  
(compaction)  
,  
,  
MC\_knlCalloc() API , MC\_knlFree()  
API .  
(compaction)  
가 . (ID)  
(compaction)  
(compaction)  
가 , MC\_knlGetFreeMemory() API  
API (compaction) API  
API API . API  
(indirect) API . API  
API  
( ) , DECLARE\_INDIRECTBUF()  
.DECLARE\_INDIRECTBUF()  
가 .

```

typedef struct _IndirectBuf {
    INDIRECT_BUF_HEAD;
    char buf[1024]
} IndirectBuf;

char staticBuf[256]; // (static) buffer
char imageBuf[1024];
DECLARE_INDIRECTBUF(IndirectBuf, idBuf);

void startClet() {
    M_Byte* dynamicBuf;
    M_Uint32 mBufID;
    M_Int32 freeMemorySize;

    strcpy(staticBuf, "this is testing...\n");
    MC_knlPrintk("%s", staticBuf);
    
```

```

mBufID = MC_knlCalloc(256);           // mBufID
dynamicBuf = MC_GETDPTR(mBufID);     //
strcpy(dynamicBuf, "this is testing...\n");
MC_knlPrintk("%s", dynamicBuf);

freeMemorySize = MC_knlGetFreeMemory(); //
    (compaction)

dynamicBuf = MC_GETDPTR(mBufID);     //      (compaction)
//

MC_knlPrintk("%s", dynamicBuf);

MC_knlFree(mBufID);

...

if ( (rID = MC_knlGetResourceID("test.gif", &rSize)) < 0 ) {
    MC_knlPrintk(resource not found\n");
    ...
}

mBufID = MC_knlCalloc(rSize); //
MC_knlGetResource(rID, mBufID, rSize);
dynamicBuf = MC_GETDPTR(mBufID);
memcpy(imageBuf, dynamicBuf, rSize);

...
MC_knlGetResource(rID, &idBuf, rSize); //
DECLARE_INDIRECTBUF()
memcpy(imageBuf, idBuf.buf, rSize);
...
}

```

가 / 가

(access) . event /

가 . 가 ,

(over lay) ..

heap .

가

가

(symbolic)

(symbolic)

가 API

1 가

가  
, ESN

API



(caller)가  
가

API 가  
.. API  
API

MC\_PRGTYPE\_JAVAAPP

```
#define MC_PRGTYPE_JAVAAPP
```

```
. 1 .
```



 MC\_PRGTYPE\_CAPP

```
#define MC_PRGTYPE_CAPP
```

```
C          . 2          .
```

 MC\_PRGTYPE\_CDLL

```
#define MC_PRGTYPE_CDLL
```

```
C , 3 .
```

 MC\_PRGTYPE\_JAVADLL

```
#define MC_PRGTYPE_JAVADLL
```

```
, 4 .
```

 MC\_PRGTYPE\_JAVASYDLL

```
#define MC_PRGTYPE_JAVASYDLL
```

```
, 5 .
```

✎ MC\_DIR\_SYS\_READ\_REQ\_MASK

```
#define MC_DIR_SYS_READ_REQ_MASK
```

```
system directory read가 . 0x01 .
```

✎ MC\_DIR\_SYS\_WRITE\_REQ\_MASK

```
#define MC_DIR_SYS_WRITE_REQ_MASK
```

```
system directory write가 . 0x02 .
```

✎ MC\_DIR\_SHARED\_READ\_REQ\_MASK

```
#define MC_DIR_SHARED_READ_REQ_MASK
```

```
shared directory read 가 . 0x04 .
```

✎ MC\_DIR\_SHARED\_WRITE\_REQ\_MASK

```
#define MC_DIR_SHARED_WRITE_REQ_MASK
```

```
shared directory write가 . 0x08 .
```



✎ MC\_NETWORK\_ACCESS\_REQ\_MASK

```
#define MC_NETWORK_ACCESS_REQ_MASK
```

```
network API 가 . 0x10 .
```

✎ MC\_SERIAL\_ACCESS\_REQ\_MASK

```
#define MC_SERIAL_ACCESS_REQ_MASK
```

```
serial API 가 . 0x20 .
```

✎ MC\_SYSTEM1\_ACCESS\_REQ\_MASK

```
#define MC_SYSTEM1_ACCESS_REQ_MASK
```

```
system group1      API   가 (system group1      API   가  
    ) . 0x40      .
```

✎ MC\_SYSTEM2\_ACCESS\_REQ\_MASK

```
#define MC_SYSTEM2_ACCESS_REQ_MASK
```

```
system group2      API   가 (system group2      API   가  
    ) . 0x80      .
```

 MC\_GETDPTR

```
#define MC_GETDPTR(mID)
```

```
MC_knICall loc()
```

```
mID -
```

## ✎ DECLARE\_INDIRECTBUF

```
#define DECLARE_INDIRECTBUF(typeName, var)
```

```
(          ) .
```

```
,
```

```
typedef struct type_name {
```

```
    INDIRECT_BUF_HEAD; //
```

```
    char buf[1024]; // 가
```

```
};
```

```
typeName - 가
```

```
var -
```

kernel overview

 MCTimer

```
typedef struct _MTimer MCTimer
```

```
MC_knlDefTimer, MC_knlSetTimer, MC_knlUnsetTimer
```

 **TIMERCB**

```
typedef void (*TIMERCB)(MCTimer *tm, void* parm)
```


MC\_knIDefTimer( ) . 가 .

tm -

parm -


MC\_knIDefTimer



 MC\_knlPrintk

```
int MC_knlPrintk(M_Char* format, ...)
```

```
format string    stdout    . "ISO/IEC 9899:1999(E) -- Programming  
Languages - C"  printf    .
```

 MC\_knlSprintk

```
int MC_knlSprintk(M_Char* buf, M_Char* format, ...)
```

```
format string buf .
```

```
“ISO/IEC 9899:1999(E) -- Programming Languages – C” sprintf .
```

## ✎ MC\_knlGetExecNames

```
M_Int32 MC_knlGetExecNames(M_Char* prgName, M_Char* version, M_Char* vendor,
M_Char* buf, M_Int32 bufSize)
```

```

prgName(          ), version, vendor
가 NULL
prgName, version, vendor가 NULL
null
)"/1/1.jar,3\0/2/2.jar,2\0" buf

```

```

prgName - [in]
version - [in]
vendor - [in]
buf - [out] null list
bufSize - [in] buf

```

count

M\_E\_SHORTBUF - buf 가

## ✎ MC\_knlExecute

```
M_Int32 MC_knlExecute(M_Char* execName, M_Int32 parmCnt, ...)
```

```
java/C/C++
```

```
(non-blocking)
```

```
MV_CHILD_APP_DESTROY_EVENT
```

```
, event
```

```
:
```

```
C
```

```
...
MC_knlExecute("execName", 4, "this parm1", "20", "this parm3", "40");
...
```

```
C/C++
```

```
void startClet(int argc, char* args[]) {
    args[0]; // ( )
    args[1]; // "this parm1" 가
    args[2]; // "20" 가
    args[3]; // "this parm3" 가
    args[4]; // "40" 가
}
```

```
Java
```

```
public static void main(String[] args) {
    int argLen = args.length; // 5
    args[0]; // " ( )
    args[1]; // "this parm1" 가
    args[2]; // "20" 가
    args[3]; // "this parm3" 가
    args[4]; // "40" 가
}
```

```
execName - [in]
```

```
, MC_knlGetExecNames()
```

parmCnt - [in]

ID

M\_E\_ACCESS - ,  
M\_E\_NOMEMORY - 가  
M\_E\_INVALID - 가

## ✎ MC\_knlExit

```
void MC_knlExit(M_Int32 exitCode)
```

```

    return ,
    MC_knlExit()
    MV_CHILD_APP_DESTROY_EVENT(exitCode
    A 가 B B 가 exitCode 27

```

```

program A

void handleCletEvent(int type, int parm1, int parm2)

switch(type) {
case MV_CHILD_APP_DESTROY_EVENT :
    knlPrintk("exit code %d\n", parm1); // 27
    break;

case XXX :
    ...
    execute("B", ...);
    ...
    break;

}

...
}

program B

void handleCletEvent(int type, int parm1, int parm2) {

    ...
    if ( xxx ) {
        MC_knlExit(27);
        return
    }

}

```

exitCode - [in]

 MC\_knIProgramStop

M\_Int32 MC\_knIProgramStop(M\_Int32 prgID)

prgID - [in]

0

M\_E\_ACCESS -



 MC\_knlGetCurProgramID

M\_Int32 MC\_knlGetCurProgramID()

 MC\_knlGetParentProgramID

M\_Int32 MC\_knlGetParentProgramID()

 MC\_knlGeAppManagerID

M\_Int32 MC\_knlGetAppManagerID()

ID .

## ✍ MC\_knlGetProgramInfo

```
M_Int32 MC_knlGetProgramInfo(M_Int32* buf, M_Int32 bufSize)
```

```

, index index
type . buf[2]가 MC_PRGTYPE_JAVADLL prgID가 2
java application DLL .

```

buf - [out]

bufSize - [in]

M\_E\_SHORTBUF - 가

---

✎ MC\_knlGetAccessLevel

M\_Int32 MC\_knlGetAccessLevel()

(bit)

API

(bit)

MC\_DIR\_SYS\_READ\_REQ\_MASK, MC\_DIR\_SYS\_WRITE\_REQ\_MASK,  
MC\_DIR\_SHARED\_READ\_REQ\_MASK, MC\_DIR\_SHARED\_WRITE\_REQ\_MASK,  
MC\_NETWORK\_ACCESS\_REQ\_MASK, MC\_SERIAL\_ACCESS\_REQ\_MASK,  
MC\_SYSTEM1\_ACCESS\_REQ\_MASK, MC\_SYSTEM2\_ACCESS\_REQ\_MASK

( OR )

 MC\_knlGetProgramName

M\_Int32 MC\_knlGetProgramName(M\_Char \* nameBuf, M\_Int32 bufSize)

ADF

nameBuf - [out]

bufSize - [in] namebuf size

0

M\_E\_SHORTBUF - 가

## ✎ MC\_knlCreateSharedBuf

```
void* MC_knlCreateSharedBuf(const M_Char* name, M_Int32 size)
```

name - [in]                    . Null                    .  
size - [in]

(                    )

0 -                    가                    가

가                    .

---

 MC\_knlDestroyShareBuf

M\_Int32 MC\_knlDestroySharedBuf(void\* buf)

buf - [in] ( )

0

M\_E\_INVALID -

M\_E\_ERROR -

가



 MC\_knlGetSharedBuf

```
void* MC_knlGetSharedBuf(const M_char* name)
```

name .

name - [in] . Null .

( )

0 - 가

---

✎ MC\_knlGetSharedBufSize

```
M_Int32 MC_knlGetSharedBufSize(void* buf)
```

```
buf - [in] ( ). MC_knlCreateSharedBuf()  
MC_knlGetSharedBuf()
```

-1 - 가

 MC\_knlResizeSharedBuf

```
void* MC_knlResizeSharedBuf(void* buf, M_Int32 size)
```

```
buf - [in] ( )  
size - [in]
```

```
가 ( )
```

```
0
```

```
가
```

---

## ✎ MC\_knlAlloc

M\_Uint32 MC\_knlAlloc(M\_Int32 size)

MC\_knlFree()


MC\_GETDPTR()

size - [in] (byte )

0

가

---

  
 MC\_knlCalloc


M\_Uint32 MC\_knlCalloc(M\_Int32 size)

MC\_knlFree()

MC\_GETDPTR()

size - [in] (byte )

0  
가

 MC\_kniFree

```
void MC_kniFree(M_Uint32 mID)
```

```
MC_kniCalloc()
```

```
mID - [in]
```

 MC\_knlGetTotalMemory

M\_Int32 MC\_knlGetTotalMemory()

total .

total (byte )

 MC\_knlGetFreeMemory

M\_Int32 MC\_knlGetFreeMemory()

free . free .  
,

free (byte )



---

## ✎ MC\_knlDefTimer

```
void MC_knlDefTimer(MCTimer* tm, TIMERCB cb)
```

```

    가                가
    가                MC_knlSetTimer()
    가                .

```

```

MCTimer tm;

void TimerCb(MCTimer* ptm, void* parm) {
    MC_knlPrintk("timer occur %d\n", parm);
    MC_knlSetTimer(ptm, 1000L, (int)param+1);
}

void startClet(int argc, char* argv[]) {
    MC_knlPrintk("start Clet!!!\n");
    MC_knlDefTimer(&tm, TimerCb);
    MC_knlSetTimer(&tm, 1000L, 0x1234);
}

```

tm - [in]

cb - [in]

## ✎ MC\_knlSetTimer

```
M_Int32 MC_knlSetTimer(MCTimer* tm, M_Int64 timeout, void* parm)
```

```

가      MC_knlDefTimer()      가
      가
      ,
      가
      MC_knlUnsetTimer()
      resolution
      가

```

```

tm - [in]
timeout - [in] milliseconde
parm - [in] 가

```

0

M\_E\_EXIST - 가

 MC\_knlUnsetTimer

```
void MC_knlUnsetTimer(MCTimer* tm)
```

. 가 .

tm - [in]

 MC\_knlCurrentTime

M\_Int64 MC\_knlCurrentTime()

.                    millisecond                    .

1970    1    1    0    0    0                    millisecond

## ✎ MC\_knlGetSystemProperty

```
M_Int32 MC_knlGetSystemProperty(M_Char* id, M_Char* rtnBuf, M_Int32 bufSize)
```

. API HAL

```
"ESN", "NID", "SID", "BASELAT", "BASELONG", "CURRENTCH",
"PHONENUMBER", "RSSILEVEL", "BATTERYLEVEL",
"DATASERVICEMODE", "MAXSOCKETNUM", "MAXRSSILEVEL",
"MAXSERIALNUM", "MAXBATTLELEVEL", "MEDIADVICES", "DNS",
"VIBRATORLEVEL" id .
```

id - [in]

rtnBuf - [out]

bufSize - [in]

0

M\_E\_SHORTBUF : 가

M\_E\_INVALID : 가

## ✎ MC\_knlSetSystemProperty

```
M_Int32 MC_knlSetSystemProperty(M_Char* id, M_Char* buf)
```

```
. API HAL
```

```
가 .
```

```
"ESN", "NID", "SID", "BASELAT", "BASELONG", "CURRENTCH",  
"PHONENUMBER", "RSSILEVEL", "BATTERYLEVEL",  
"DATASERVICEMODE", "MAXSOCKETNUM", "MAXRSSILEVEL",  
"MAXSERIALNUM", "MAXBATTLELEVEL", "MEDIADVICES", "DNS"  
id .
```

```
id - [in] ID
```

```
buf - [in]
```

```
0
```

```
M_E_INVALID : 가 ,
```

 MC\_knlGetResourceID

M\_Int32 MC\_knlGetResourceID(M\_Char\* resourceName, M\_Int32\* size)

ID

resourceName - [in]

size - [?]

ID

M\_E\_NOENT : 가

---

✎ MC\_knlGetResource

M\_Int32 MC\_knlGetResource(M\_Int32 resourceID, void\* buf, M\_Int32 bufSize)

ID

.

resourceID - [in] ID

buf - [in] ( )

bufSize - [in]

0

M\_E\_SHORTBUF : 가



## 5.1.2.

(Off Screen Frame Buffer)

API .

(Byte Per Line) .

MC\_GrpFramebuffer , , ,

/

MC\_grpCreateOffScreenFramebuffer

MC\_grpGetScreenFramebuffer 가 .

MC\_grpDestoryScreenFramebuffer .

가 .

Offset) 가 .

MC\_grpSetContext

API , API

(alpha ), XOR (xor )

( alpha ) 가 . , xor

alpha xor 가 .

/

BMP, PNG .

MC\_grpCreatelImage

```

        . MC_grpDrawImage
    animated          MC_grpDecodeNextImage
        .
        MC_grpDestoryImage
MC_grpEncodeImage          BMP
    .
    LCD
        .
        LCD
    , MC_grpFlushLcd          LCD
    .
    LCD 가          가 LCD LCD 가
    .          LCD          MC_grpFlushLcd
    LCD          . (          .) MC_grpFlushLcd
    가
        ,
    가          ,          가
    MC_imGetSurpportModeCount()
        ISO 639
    가          가          “/S”, “/L”          가
        .          “N123”
MC_GrpContext, MC_GrpFrameBuffer
    
```

 MC\_GrpPixelOpProc

```
typedef M_Int32 (*MC_GrpPixelOpProc)(M_Int32 srcpxl, M_Int32 orgpxl, M_Int32  
param1)
```

(Operation)

srcpxl    orgpxl    param1

srcpxl - [in]

destpxl - [in]

param1 - [in]

```
int alphaOp(int srcpxl, int orgpxl, int param1){  
    return (srcpxl * (255 - param1) + orgpxl * param1) / 255;  
}
```

 MC\_GrpContext

```
typedef struct _MC_GrpContext MC_GrpContext
```

```
    ,  
    ,  
    ,  
    ,  
    가 .
```

✎ MC\_GRP\_DIRECT\_COLOR\_TYPE


```
#define MC_GRP_DIRECT_COLOR_TYPE
```

```
. (1 << 0) .
```

✎ MC\_GRP\_GRAY\_TYPE

```
#define MC_GRP_GRAY_TYPE
```

```
    . (1 << 1)    .
```

 MC\_GRP\_COLOR\_TYPE

```
#define MC_GRP_COLOR_TYPE
```

```
    . (1 << 2)    .
```

 `_MC_GrpDisplayInfo`

```
struct _MC_GrpDisplayInfo
int m_bpp

int m_depth

int m_width

int m_height

int m_bpl

int m_colortype
    ; MC_GRP_DIRECT_COLOR_TYPE, MC_GRP_GRAY_TYPE, MC_GRP_COLOR_TYPE
int m_redmask

int m_bluemask

int m_greenmask

int m_bpp

int m_depth

int m_width

int m_height

int m_bpl

int m_colortype
```



```
; MC_GRP_DIRECT_COLOR_TYPE, MC_GRP_GRAY_TYPE, MC_GRP_COLOR_TYPE
```

```
int m_redmask
```

```
int m_bluemask
```

```
int m_greenmask
```

 MC\_GrpDisplayInfo

```
typedef struct _MC_GrpDisplayInfo MC_GrpDisplayInfo
```

가

 \*MC\_GrpFrameBuffer

```
typedef M_Int32 MC_GrpFrameBuffer
```

가 .

✎ MC\_GRP\_GET\_FRAME\_BUFFER\_POINTER

```
#define MC_GRP_GET_FRAME_BUFFER_POINTER(a)
```

a - [in] MC\_GrpFrameBuffer

 MC\_GRP\_GET\_FRAME\_BUFFER\_WIDTH

```
#define MC_GRP_GET_FRAME_BUFFER_WIDTH(a)
```

a - [in] MC\_GrpFrameBuffer

✍ MC\_GRP\_GET\_FRAME\_BUFFER\_HEIGHT

```
#define MC_GRP_GET_FRAME_BUFFER_HEIGHT(a)
```

a - [in] MC\_GrpFrameBuffer

✍ MC\_GRP\_GET\_FRAME\_BUFFER\_BPL

```
#define MC_GRP_GET_FRAME_BUFFER_BPL(a)
```

a - [in] MC\_GrpFrameBuffer

 MC\_GRP\_GET\_FRAME\_BUFFER\_BPP

```
#define MC_GRP_GET_FRAME_BUFFER_BPP(a)
```

a - [in] MC\_GrpFrameBuffer



✎ MC\_GRP\_CONTEXT\_CLIP\_IDX

```
#define MC_GRP_CONTEXT_CLIP_IDX
```

가

.

,

,

. 0

.

✎ MC\_GRP\_CONTEXT\_FG\_PIXEL\_IDX

```
#define MC_GRP_CONTEXT_FG_PIXEL_IDX
```

```
. 1 .
```

✎ MC\_GRP\_CONTEXT\_BG\_PIXEL\_IDX

```
#define MC_GRP_CONTEXT_BG_PIXEL_IDX
```

```
. 2 .
```

 MC\_GRP\_CONTEXT\_ALPHA\_IDX

```
#define MC_GRP_CONTEXT_ALPHA_IDX
```

```
0 . , 255 . 4
```

✎ MC\_GRP\_CONTEXT\_PIXELOP\_IDX

```
#define MC_GRP_CONTEXT_PIXELOP_IDX
```

```
(Operation) . 5 .
```

```
MC_GrpPixelOpFunc
```

✍ MC\_GRP\_CONTEXT\_PIXEL\_PARAM1\_IDX

```
#define MC_GRP_CONTEXT_PIXEL_PARAM1_IDX
```

가 가 . 6 .

 MC\_GRP\_CONTEXT\_FONT\_IDX

```
#define MC_GRP_CONTEXT_FONT_IDX
```

```
MC_getFont . 7 .
```

✎ MC\_GRP\_CONTEXT\_STYLE\_IDX

```
#define MC_GRP_CONTEXT_STYLE_IDX
```

```
MC_GRP_SOLID_STYLE      MC_GRP_DOTTED_STYLE      가      . 8
```



 MC\_GRP\_CONTEXT\_XOR\_MODE\_IDX

```
#define MC_GRP_CONTEXT_XOR_MODE_IDX
```


```
XOR      .          . 1 XOR      ,  
          . 9      .
```

✎ MC\_GRP\_CONTEXT\_OFFSET\_IDX

```
#define MC_GRP_CONTEXT_OFFSET_IDX
```

(Offset)

. 10 .

 MC\_GRP\_SOLID\_STYLE

```
#define MC_GRP_SOLID_STYLE
```

```
. MG_FB_SOLID_STYLE .
```

 MC\_GRP\_DOTTED\_STYLE


```
#define MC_GRP_DOTTED_STYLE
```

```
MG_FB_DOTTED_STYLE .
```

✎ MC\_GRP\_FT\_SIZE\_SMALL


```
#define MC_GRP_FT_SIZE_SMALL
```

```
. 8 .
```

 MC\_GRP\_FT\_SIZE\_MEDIUM

```
#define MC_GRP_FT_SIZE_MEDIUM
```

```
. 0 .
```

 MC\_GRP\_FT\_SIZE\_LARGE

```
#define MC_GRP_FT_SIZE_LARGE
```

```
. 16 .
```

 MC\_GRP\_FT\_FACE\_SYSTEM

```
#define MC_GRP_FT_FACE_SYSTEM
```

```
. 0 .
```



 MC\_GRP\_FT\_FACE\_MONOSPACE


```
#define MC_GRP_FT_FACE_MONOSPACE
```

. 32 .

 MC\_GRP\_FT\_FACE\_PROPORTIONAL

```
#define MC_GRP_FT_FACE_PROPORTIONAL
```

. 64 .

 MC\_GRP\_FT\_STYLE\_PLAIN


```
#define MC_GRP_FT_STYLE_PLAIN
```

```
. 0 .
```

 MC\_GRP\_FT\_STYLE\_BOLD

```
#define MC_GRP_FT_STYLE_BOLD
```

```
. 1 .
```

 MC\_GRP\_FT\_STYLE\_ITALIC

```
#define MC_GRP_FT_STYLE_ITALIC
```

```
. 2 .
```

 MC\_GRP\_FT\_STYLE\_UNDERLINE

```
#define MC_GRP_FT_STYLE_UNDERLINE
```

```
. 4 .
```

✍ MC\_GRP\_IMAGE\_DONE

```
#define MC_GRP_IMAGE_DONE
```

```
. 1 .
```

✎ MC\_GRP\_FRAME\_DONE

```
#define MC_GRP_FRAME_DONE
```


가 . 0



 MC\_Grplmage

```
typedef void * MC_Grplmage
```

. ( )가  
.

 MC\_GRP\_IS\_ANIMATED


```
#define MC_GRP_IS_ANIMATED
```

```
. 1 .
```

 MC\_GRP\_ANIMATE\_DELAY

```
#define MC_GRP_ANIMATE_DELAY
```

```
. 2 .
```

 MC\_GRP\_LOOP\_COUNT

```
#define MC_GRP_LOOP_COUNT
```

```
. 3 .
```


## ✎ MC\_grpGetImageProperty

```
int MC_grpGetImageProperty(MC_GrpImage img, int index)
```

|                      |                 |
|----------------------|-----------------|
| MC_GRP_IS_ANIMATED   | ; 1 , 0         |
| MC_GRP_ANIMATE_DELAY | ;               |
| MC_GRP_LOOP_COUNT    |                 |
| MC_GRP_IMAGE_WIDTH   |                 |
| MC_GRP_IMAGE_HEIGHT  |                 |
| MC_GRP_IMAGE_BPP     | (Bit per Pixel) |

img -

index -

 MC\_grpGetImageFrameBuffer

MC\_GrpFrameBuffer MC\_grpGetImageFrameBuffer(MC\_GrpImage img)

img -

---

## ✎ MC\_grpGetScreenFrameBuffer

```
MC_GrpFrameBuffer MC_grpGetScreenFrameBuffer(M_Int32 i)
```

```
    i  
  
    i - [in]          0          LCD          , 1  
                    LCD  
  
                    ; i          가          NULL
```

 MC\_grpDestroyOffScreenFramebuffer

```
void MC_grpDestroyOffScreenFramebuffer(MC_GrpFramebuffer fb)
```

fb - [in]



## ✎ MC\_grpCreateOffScreenFrameBuffer

```
MC_GrpFrameBuffer MC_grpCreateOffScreenFrameBuffer(M_Int32 w, M_Int32 h)
```

```

        LCD 가 .
w   h   0   .
w - [in]
h - [in]
        ; w, h 가 0   가
NULL   .

```

---

## MC\_grpInitContext

```
void MC_grpInitContext(MC_GrpContext* pgc)
```

```
    .
    .
    .
    , Alpha , XORMode,
    가 ,
    , (0, 0) .
```

pgc - [in] MC\_GrpContext

 MC\_grpSetContext

void MC\_grpSetContext(MC\_GrpContext\* pgc, M\_Int32 index, void\* pv)

. index pv 가

| idx                         | pv   |
|-----------------------------|--|
| MC_GRP_CONTEXT_CLIP_IDX     | pv 가<br>x, y 가 가 ,<br>x, y 가   |
| MC_GRP_CONTEXT_FG_PIXEL_IDX | .  |
| MC_GRP_CONTEXT_BG_PIXEL_IDX | .  |
| MC_GRP_CONTEXT_ALPHA_IDX    | 0<br>255 0 255<br>MC_GRP_CONTEXT_PIXEL_OP_IDX<br>MC_GRP_CONTEXT_PIXEL_PARAM1_IDX 가 |
| MC_GRP_CONTEXT_FONT_IDX     | .  |
| MC_GRP_CONTEXT_STYLE_IDX    | MC_GRP_SOLID_STYLE, MC_GRP_DOTTED_STYLE  |
| MC_GRP_CONTEXT_PIXEL_OP_IDX | .  |

|                                  |                                 |
|----------------------------------|---------------------------------|
| <p>MC_GRP_CONTEXT_OFFSET_IDX</p> | <p>가 . pv<br/>x ,<br/>y 가 .</p> |
|----------------------------------|---------------------------------|

index - [in] ; MC\_GRP\_CONTEXT\_CLIP\_IDX, MC\_GRP\_CONTEXT\_FG\_PIXEL\_IDX,  
 MC\_GRP\_CONTEXT\_BG\_PIXEL\_IDX, MC\_GRP\_CONTEXT\_ALPHA\_IDX,  
 MC\_GRP\_CONTEXT\_FONT\_IDX, MC\_GRP\_CONTEXT\_STYLE\_IDX,  
 MC\_GRP\_CONTEXT\_PIXEL\_OP\_IDX, MC\_GRP\_CONTEXT\_OFFSET\_IDX  
 pv - [in]

MC\_GrpContext, MC\_GrpGetContext

## ✎ MC\_grpGetContext

```
void MC_grpGetContext(MC_GrpContext* pgc, M_Int32 index, void* pv)
```

. index pv 가  
MC\_grpSetContext .

index - [in] ; MC\_GRP\_CONTEXT\_CLIP\_IDX, MC\_GRP\_CONTEXT\_FG\_PIXEL\_IDX,  
MC\_GRP\_CONTEXT\_BG\_PIXEL\_IDX, MC\_GRP\_CONTEXT\_ALPHA\_IDX,  
MC\_GRP\_CONTEXT\_FONT\_IDX, MC\_GRP\_CONTEXT\_STYLE\_IDX,  
MC\_GRP\_CONTEXT\_PIXEL\_OP\_IDX, MC\_GRP\_CONTEXT\_OFFSET\_IDX  
pv - [out]

MC\_GrpContext, MC\_grpSetContext

## ✎ MC\_grpPutPixel

```
void MC_grpPutPixel(MC_GrpFrameBuffer dst, M_Int32 x, M_Int32 y,
MC_GrpContext* pgc)
```

pgc 가 (Frame Buffer) 가 x, y 가  
가

dst - [in]

x - [in] x

y - [in] y

pgc - [in]

## ✎ MC\_grpDrawLine

```
void MC_grpDrawLine(MC_GrpFrameBuffer dst, M_Int32 x1, M_Int32 y1, M_Int32
x2, M_Int32 y2, MC_GrpContext* pgc)
```

(Frame Buffer) .  
pgc 가 가 , /  
(x1, y2), (x2, y2) .  
가

dst - [in]

x1 - [in] x

y1 - [in] y

x2 - [in] x

y2 - [in] y

pgc - [in]

## ✎ MC\_grpDrawRect

```
void MC_grpDrawRect(MC_GrpFrameBuffer dst, M_Int32 x, M_Int32 y, M_Int32 w,
M_Int32 h, MC_GrpContext* pgc)
```

pgc 가 (Frame Buffer) 가 , /  
(x,y) w, h (x+w-1,y+h-1)

w h가

dst - [in]

x - [in] x

y - [in] y

w - [in]

h - [in]

pgc - [in]



## ✎ MC\_grpFillRect

```
void MC_grpFillRect(MC_GrpFrameBuffer dst, M_Int32 x, M_Int32 y, M_Int32 w,
M_Int32 h, MC_GrpContext* pgc)
```

(Frame Buffer)

pgc 가 (x,y) 부터 (x+w,y+h) 까지 w, h 가 0

dst - [in]

x - [in] x

y - [in] y

w - [in]

h - [in]

pgc - [in]

## ✎ MC\_grpCopyFrameBuffer

```
void MC_grpCopyFrameBuffer( MC_GrpFrameBuffer dst, M_Int32 dx, M_Int32 dy,
M_Int32 w, M_Int32 h, MC_GrpFrameBuffer src, M_Int32 sx, M_Int32 sy,
MC_GrpContext* pgc)
```

(Frame Buffer)

pgc 가 (dx, dy)  
w, h img 가 가 (sx, sy)  
dst src 가 MC\_grpCopyArea  
w h 가 0 src

dst - [in]  
dx - [in] x  
dy - [in] y  
w - [in]  
h - [in]  
src - [in]  
sx - [in] x  
sy - [in] y  
pgc - [in]

MC\_grpCopyArea

## ✎ MC\_grpDrawImage

```
void MC_grpDrawImage( MC_GrpFrameBuffer dst, M_Int32 dx, M_Int32 dy, M_Int32
w, M_Int32 h, MC_GrpImage src, M_Int32 sx, M_Int32 sy, MC_GrpContext* pgc)
```

(Frame Buffer)

pgc 가 (dx, dy)  
w, h img 가 가 (sx, sy)

가

w h 가 0 src mask plane  
mask 가 1bit plane src 가 DEPTH 가

dst - [in]  
dx - [in] x  
dy - [in] y  
w - [in]  
h - [in]  
src - [in]  
sx - [in] x  
sy - [in] y  
pgc - [in]

---

## ✎ MC\_grpCopyArea

```
void MC_grpCopyArea(MC_GrpFrameBuffer dst, M_Int32 dx, M_Int32 dy, M_Int32 w,  
M_Int32 h, M_Int32 x, M_Int32 y, MC_GrpContext* pgc)
```

dst 가 가 (dx, dy) dst (x, y) w, h

dst - [in]

dx - [in] x

dy - [in] y

w - [in]

h - [in]

x - [in] x

y - [in] y

pgc - [in]

## ✎ MC\_grpDrawArc

```
void MC_grpDrawArc(MC_GrpFrameBuffer dst, M_Int32 x, M_Int32 y, M_Int32 w,
M_Int32 h, M_Int32 s, M_Int32 e, MC_GrpContext* pgc)
```

(Frame Buffer) .  
pgc 가 가 , /  
s e , 0 가 3 .  
(x,y)가 height, width  
drawRect 가 (x + width, y + height) 가  
가 0 .

dst - [in]

x - [in] x

y - [in] y

w - [in]

h - [in]

s - [in] (0-360 : )

e - [in] (0-360 : )

pgc - [in]

## ✎ MC\_grpFillArc

```
void MC_grpFillArc(MC_GrpFrameBuffer dst, M_Int32 x, M_Int32 y, M_Int32 w,
M_Int32 h, M_Int32 s, M_Int32 e, MC_GrpContext* pgc)
```

(Frame Buffer)

pgc 가 (Frame Buffer) 가 /

s e , 0 가 3 .

(x,y)가 height, width

fillRect 가 (x + width - 1, y + height - 1) 가

가 0

dst - [in]

x - [in] x

y - [in] y

w - [in]

h - [in]

s - [in] (0-360 : )

e - [in] (0-360 : )

pgc - [in]

## ✎ MC\_grpDrawString

```
void MC_grpDrawString(MC_GrpFrameBuffer dst, M_Int32 x, M_Int32 y, const
M_Char* str, M_Int32 len, MC_GrpContext* pgc)
```

```

                                (Frame Buffer)
pgc 가                                가                                /

str                                "C"                                Unicode
drawUnicodeString
len -1                                가 NULL                                , len 0                                -1

```

```

pd - [in]
bpl - [in]
x - [in]                                x
y - [in]                                baseline y
str - [in] "C"
len - [in]
pgc - [in]

```

## ✎ MC\_grpDrawUnicodeString

```
void MC_grpDrawUnicodeString(MC_GrpFrameBuffer dst, M_Int32 x, M_Int32 y,
const M_UCode* str, M_Int32 len, MC_GrpContext* pgc)
```

```

                (Frame Buffer)
pgc 가                가                /

str                "C"                drawString
                "C"

len  0

dst - [in]
x - [in]      x
y - [in]      baseline  y
str - [in]
len - [in]
pgc - [in]
```



## ✎ MC\_grpGetRGBPixels

```
void MC_grpGetRGBPixels(MC_GrpFrameBuffer dst, M_Int32 x, M_Int32 y, M_Int32
w, M_Int32 h, M_Uint32* pd, M_Int32 ipl)
```

(Frame Buffer) 가 .  
 .  
 0x00RRGGBB .  
 가 가 ipl .

psrc - [in]  
 sbpl - [in]  
 x - [in] 가 x  
 y - [in] 가 y  
 w - [in] 가  
 h - [in] 가  
 pd - [out]  
 ipl - [in]

## ✎ MC\_grpSetRGBPixels

```
void MC_grpSetRGBPixels(MC_GrpFrameBuffer dst, M_Int32 x, M_Int32 y, M_Int32
w, M_Int32 h, const M_Uint32* psrc, M_Int32 ibpl, MC_GrpContext* pgc)
```

(Frame Buffer) .  
. LCD  
가 .  
0x00RRGGBB .  
가 ibpl w

pd - [in]  
x - [in] 가 x  
y - [in] 가 y  
w - [in] 가  
h - [in] 가  
pd - [in]  
ibpl - [in]  
pgc - [in]

## ✎ MC\_grpFlushLcd

```
void MC_grpFlushLcd(M_Int32 i, MC_GrpFrameBuffer frm, M_Int32 x, M_Int32 y,
M_Int32 w, M_Int32 h)
```

```
          (Frame Buffer) LCD
          LCD
          LCD
```

```
pd - [in]
i - [in]      (0;      1;      LCD )
bpl - [in]
x - [in]      x
y - [in]      y
w - [in]
h - [in]
```

 MC\_grpGetPixelFromRGB

```
M_Int32 MC_grpGetPixelFromRGB(M_Int32 r, M_Int32 g, M_Int32 b)
```

. r, g, b 가 255 가

r - [in] red (0-255)  
g - [in] green (0-255)  
b - [in] blue (0-255)

 MC\_grpGetRGBFromPixel

```
M_Int32 MC_grpGetRGBFromPixel (M_Int32 pixel, M_Int32 *r, M_Int32 *g, M_Int32 *b)
```

pixel - [in] pixel

r - [out] red (0-255)

g - [out] green (0-255)

b - [out] blue (0-255)

pixel

---

 MC\_grpGetDisplayInfo

```
M_Int32 MC_grpGetDisplayInfo(M_Int32 i, MC_GrpDisplayInfo* pi)
```

```
    i - [in]          ; 0
```

```
    pi - [out]
```

```
    가 1, 0
```

## ✎ MC\_grpRepaint

```
void MC_grpRepaint(M_Int32 lcd, M_Int32 x, M_Int32 y, M_Int32 w, M_Int32 h)
```

```

    paintClet   가   .   ,
    paintClet   , paintClet
    .

i - [in]       0       LCD       , 1
    LCD
x - [in]       x
y - [in]       y
w - [in]
h - [in]

```

## ✎ MC\_grpGetFont

```
M_Int32 MC_grpGetFont(M_Int32 face, M_Int32 size, M_Int32 style)
```

가 .  
face size, style .

face - [in] ; MC\_GRP\_FT\_FACE\_SYSTEM, MC\_GRP\_FT\_FACE\_MONOSPACE ,  
MC\_GRP\_FT\_FACE\_PROPORTIONAL

size - [in] ; MC\_GRP\_FT\_SIZE\_LARGE MC\_GRP\_FT\_SIZE\_MEDIUM ,  
MC\_GRP\_FT\_SIZE\_SMALL .

style - [in] ; MC\_GRP\_FT\_STYLE\_PLAIN MC\_GRP\_FT\_STYLE\_ITALIC ,  
MC\_GRP\_FT\_STYLE\_BOLD , MC\_GRP\_FT\_STYLE\_UNDERLINED OR .



 MC\_grpGetFontHeight

M\_Int32 MC\_grpGetFontHeight(M\_Int32 font)

가

0

font - [in]

 MC\_grpGetFontAscent

M\_Int32 MC\_grpGetFontAscent(M\_Int32 font)

(Ascent)

가

0

font - [in]

 MC\_grpGetFontDescent

M\_Int32 MC\_grpGetFontDescent(M\_Int32 font)

(Descent) .  
가 0 .

font - [in]

---

 MC\_grpGetStringWidth

```
M_Int32 MC_grpGetStringWidth(M_Int32 font, const M_Uint8* str, M_Int32 len)
```


```
len -1 (NULL 가 )
```

```
font - [in]
```

```
str - [in]
```

```
len [in]
```

---

 MC\_grpGetUnicodeStringWidth

```
M_Int32 MC_grpGetUnicodeStringWidth(M_Int32 font, const M_UCode* str,  
M_Int32 len)
```

len -1 (NULL 가 )

font - [in]

str - [in]

len [in]

## ✎ MC\_grpCreateImage

```
M_Int32 MC_grpCreateImage(MC_GrpImage *newImg, M_Uint32 bufID, M_Int32 off,
M_Int32 len)
```

(PNG, GIF, Animated-GIF, BMP ) 가

가 . 가

NULL

buf

MC\_knlCalloc

ID

가

MC\_grpDestroyImage 가

newImg - [out]

;

NULL

bufID - [in]

가

MC\_knlCalloc

ID

off - [in]

len - [in]

MC\_GRP\_IMAGE\_DONE :

가

M\_E\_NOMEMORY :

가

M\_E\_BADFORMAT :

 MC\_grpDestroyImage

```
void MC_grpDestroyImage(MC_GrpImage img)
```

img -

## ✎ MC\_grpDecodeNextImage

M\_Int32 MC\_grpDecodeNextImage(MC\_GrpImage dst)

가

dst - [out]

MC\_GRP\_FRAME\_DONE : 가

MC\_GRP\_IMAGE\_DONE : 가

가

M\_E\_NOMEMORY : 가

M\_E\_BADFORMAT :





---

✎ MC\_grpPostEvent

M\_Int32 MC\_grpPostEvent(M\_Int32 id, M\_Int32 type, M\_Int32 param1, M\_Int32 param2)

.  
가 handleCletEvent 가  
. parameter type, param1, param2가 .


id - [in]

type - [in]

param1 - [in] 1

param2 - [in] 2

1, 0

 MC\_imGetSurpportModeCount

M\_Int32 MC\_imGetSurpportModeCount()



## ✎ MC\_imSetCurrentMode

M\_Int32 MC\_imSetCurrentMode (M\_Int32 mode)

MH\_IMAgetSupportedModes()

mode[in]

가

"1".

"0".

 MC\_imGetCurrentMode()

M\_Int32 MC\_imGetCurrentMode()

MH\_IMAgetSupportedModes()

..

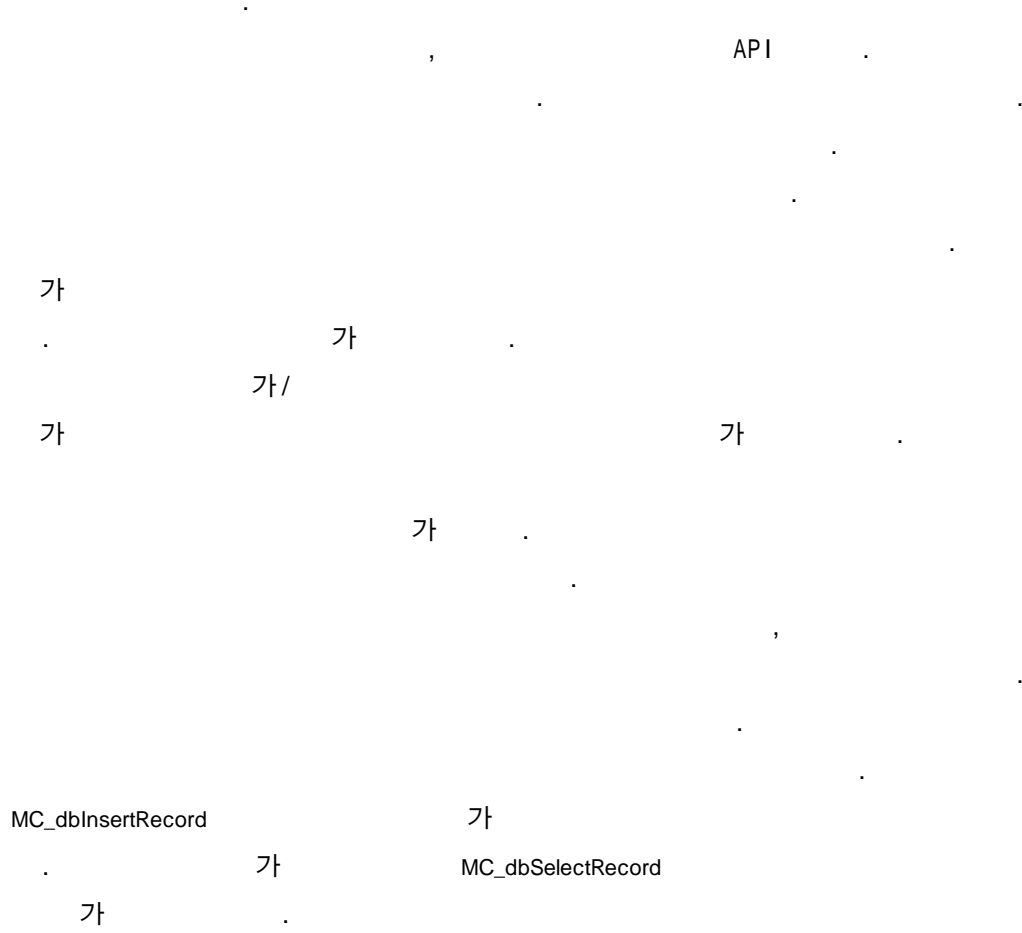
---

 MC\_imHandleInput

```
M_Int32 MC_imHandleInput (char key, M_Int32 type, char *buf1, M_Int32
*size1, char *buf2, M_Int32 *size2)
```

```
,
key [in] (MH_KeyCode , MH_IMA_FLUSH)
type [in] (MH_Event .)
buf1 [out]
size1 [in]
buf2 [out]
size2 [in]
```

### 5.1.3.





## ✎ MC\_dbOpenDataBase

가

```
M_Int32 MC_dbOpenDataBase(M_Char* dataBaseName, M_Int32 recordSize,
M_Boolean create, M_Int32 mode)
```

dataBaseName - ,

recordSize - (byte ).

가 recordSize 가

create - 가

mode - , DIR\_PRIVATE\_ACCESS,

DIR\_SHARED\_ACCESS, DIR\_SYSTEM\_ACCESS 가 가

(0 )

M\_E\_NOENT - create 가 가

M\_E\_INVALID - create 가 recordSize 가 0 ,

dataBaseName NULL , mode 가 가

M\_E\_ERROR -

MC\_dbCloseDataBase

MC\_fsOpen

## ✎ MC\_dbCloseDataBase

M\_Int32 MC\_dbCloseDataBase(M\_Int32 dbId)

dbId -

0

M\_E\_BADFD - 가

M\_E\_ERROR -

MC\_dbOpenDataBase

## ✎ MC\_dbDeleteDataBase

가 가 가 .

```
M_Int32 MC_dbDeleteDataBase(M_Char* dataBaseName, M_Int32 mode)
```

dataBaseName -

mode -

DIR\_PRIVATE\_ACCESS , DIR\_SHARED\_ACCESS, DIR\_SYSTEM\_ACCESS 가 가 ,

0

M\_E\_NOENT - 가

M\_E\_INUSE - 가

M\_E\_INVALID - dataBaseName NULL , mode 가

가

M\_E\_ACCESS -

M\_E\_ERROR -

MC\_dbCloseDataBase

MC\_fsOpen

## ✎ MC\_dbInsertRecord

가 .

가 ,

(garbage)

MC\_dbSelectRecord

(garbage)

M\_Int32 MC\_dbInsertRecord(M\_Int32 dbId, M\_Byte\* buf, M\_Int32 len)

dbId - 가

buf - 가

len -

(0 )

M\_E\_BADFD - 가

M\_E\_DATABIG -

M\_E\_INVALID - len 0 , buf 가 NULL

M\_E\_ERROR -

MC\_dbSelectRecord

MC\_dbUpdateRecord

MC\_dbDeleteRecord

---

## ✎ MC\_dbSelectRecord

MC\_dbGetRecordSize

M\_Int32 MC\_dbSelectRecord(M\_Int32 dbId, M\_Int32 recId, M\_Byte\* buf, M\_Int32 len)

dbId -

recId -

buf -

len -

0

M\_E\_BADFD - 가  
 M\_E\_BADRECID - 가  
 M\_E\_INVALID - len 0 , buf 가 NULL  
 M\_E\_SHORTBUF - 가  
 M\_E\_ERROR -

MC\_dbInsertRecord

MC\_dbUpdateRecord

MC\_dbDeleteRecord

---

## ✎ MC\_dbUpdateRecord

M\_Int32 MC\_dbUpdateRecord(M\_Int32 dbId, M\_Int32 recId, M\_Byte\* buf, M\_Int32 len)

dbId -

recId -

buf - 가

len -

0

M\_E\_BADFD 가

M\_E\_BADRECID - 가

M\_E\_DATABIG - 가

M\_E\_INVALID - len 0 , buf 가 NULL

M\_E\_ERROR -

MC\_dbInsertRecord

MC\_dbSelectRecord

MC\_dbDeleteRecord

 MC\_dbDeleteRecord

M\_Int32 MC\_dbDeleteRecord(M\_Int32 dbId, M\_Int32 recId)

dbId -

recId -

0

M\_E\_BADFD -

가

M\_E\_BADRECID -

가

M\_E\_ERROR -

MC\_dbInsertRecord

MC\_dbSelectRecord

MC\_dbUpdateRecord

## ✎ MC\_dbListRecords

M\_Int32 MC\_dbListRecords(M\_Int32 dbID, M\_Int32\* buf, M\_Int32 len)

dbID -

buf -

len -

M\_E\_BADFD - 가  
M\_E\_INVALID - len 0 , buf 가 NULL  
M\_E\_SHORTBUF - 가  
M\_E\_ERROR -

## MC\_dbSortRecords



MC\_dbSortRecords

가 2 4

가 ,

```

=====
|           |           |
=====
|   0   | 0x33 0x22 |
|   1   | 0x11 0x22 |
|   2   | 0x22 0xff |
|   3   | 0x11 0xff |
=====

```

\*  
 1, 3, 2, 0  
 가 4( )가 ( compare  
 filter NULL ).  
 가  
 compare  
 . compare 가  
 가 0 , 0 ,  
 filter 가 0 .  
 filter 가 0 .

```

M_Int32 MC_dbSortRecords(M_Int32 dbID, M_Int32* buf, M_Int32 len, M_Int32
(*compare)(const void *, const void *), M_Int32 (*filer)(const void *))

```

---

dbld -  
buf -  
len -  
compare - , NULL  
    byte  
filter - , NULL

M\_E\_BADFD - 가  
M\_E\_INVALID - len 0 , buf 가 NULL  
M\_E\_SHORTBUF - 가  
M\_E\_ERROR -

MC\_dbListRecords

---

 MC\_dbGetAccessMode

M\_Int32 MC\_dbGetAccessMode(M\_Char\* dataBaseName)

dataBaseName -

DIR\_PRIVATE\_ACCESS, DIR\_SHARED\_ACCESS, DIR\_SYSTEM\_ACCESS 가


M\_E\_NOENT - 가

M\_E\_INVALID - dataBaseName NULL

M\_E\_ERROR -

MC\_dbOpenDataBase

MC\_fsOpen

 MC\_dbGetNumberOfRecords

M\_Int32 MC\_dbGetNumberOfRecords(M\_Int32 dbId)

dbId -

M\_E\_BADFD - 가  
M\_E\_ERROR -

 MC\_dbGetRecordSize

M\_Int32 MC\_dbGetRecordSize(M\_Int32 dbId)

dbId -

(byte)

M\_E\_BADFD - 가  
M\_E\_ERROR -

MC\_dbOpenDataBase

## ✎ MC\_dbListDataBases

DIR\_PRIVATE\_ACCESS DIR\_SHARED\_ACCESS,  
DIR\_SYSTEM\_ACCESS 가

NULL(\0) NULL

M\_Int32 MC\_dbListDataBases(M\_Byte\* buf, M\_Int32 len)

buf -

len -

( 가  
)

M\_E\_SHORTBUF - 가  
M\_E\_INVALID - len 0 , buf 가 NULL  
M\_E\_ERROR -

MC\_dbOpenDataBase

MC\_fsOpen

### 5.1.4.

가 가 .  
 , , , API  
 .  
 .  
 .  
 (separator) . "/"  
 .  
 API  
 .  
 MC\_fsOpen  
 MC\_fsFileAttribute  
 MC\_fsRemove  
 MC\_fsRename  
 MC\_fsMkDir  
 MC\_fsRmdir  
 MC\_fsList  
 가 가 .  
 MC\_DIR\_PRIVATE\_ACCESS:  
 MC\_DIR\_SHARED\_ACCESS :  
 MC\_DIR\_SYSTEM\_ACCESS :  
 가 ,  
 가 .  
 Read/Write Read  
 API blocking , operation

---

✎ MC\_FILE\_OPEN\_RDONLY

```
#define MC_FILE_OPEN_RDONLY
```

```
가 . MH_FILE_OPEN_RDONLY .
```

✎ MC\_FILE\_OPEN\_WRONLY

```
#define MC_FILE_OPEN_WRONLY
```

```
가 . MH_FILE_OPEN_WRONLY .
```

✎ MC\_FILE\_OPEN\_WRTRUNC

```
#define MC_FILE_OPEN_WRTRUNC
```

```
가 0 .  
MH_FILE_OPEN_WRTRUNC .
```

✎ MC\_FILE\_OPEN\_RDWR

```
#define MC_FILE_OPEN_RDWR
```

```
가 . MH_FILE_OPEN_RDWR .
```



---

✎ MC\_FILE\_IS\_DIR

```
#define MC_FILE_IS_DIR
```

```
    attribute                bit.MH_FILE_IS_DIR    .
```

✎ MC\_MAX\_FILENAME\_LENGTH

```
#define MC_MAX_FILENAME_LENGTH
```

```
    .MH_MAX_FILENAME_LENGTH    .
```

✎ MC\_DIR\_PRIVATE\_ACCESS

```
#define MC_DIR_PRIVATE_ACCESS
```

```
    .1    .
```

✎ MC\_DIR\_SHARED\_ACCESS

```
#define MC_DIR_SHARED_ACCESS
```

```
    .2    .
```

✎ MC\_DIR\_SYSTEM\_ACCESS

---

```
#define MC_DIR_SYSTEM_ACCESS
```

```
. 3 .
```

```
✎ MC_FILE_SEEK_SET
```

```
#define MC_FILE_SEEK_SET
```

```
. MH_FILE_SEEK_SET
```

```
✎ MC_FILE_SEEK_CUR
```

```
#define MC_FILE_SEEK_CUR
```

```
current position .  
MH_FILE_SEEK_CUR .
```

```
✎ MC_FILE_SEEK_END
```

```
#define MC_FILE_SEEK_SET
```

```
. MH_FILE_SEEK_SET .
```

## ✎ MC\_fsOpen

. aMode 가 .  
30 .

M\_Int32 MC\_fsOpen(M\_Char\* name, M\_Int32 flag, M\_Int32 aMode)

name -

flag - MC\_FILE\_OPEN\_RDONLY 가  
MC\_FILE\_OPEN\_WRONLY 가  
MC\_FILE\_OPEN\_WRTRUNC 가 가 0

MC\_FILE\_OPEN\_RDWR 가 가

aMode - MC\_DIR\_PRIVATE\_ACCESS private

MC\_DIR\_SHARED\_ACCESS shared

MC\_DIR\_SYSTEM\_ACCESS system

M\_E\_ERROR -

M\_E\_NOENT - MC\_FILE\_OPEN\_RDONLY

M\_E\_BADFILENAME -

M\_E\_LONGNAME - 가

M\_E\_INVALID - flag 가

M\_E\_NOSPACE -

M\_E\_ACCESS -

:

mkdir aMode

---

  
✍ MC\_fsRead

. len            byte        buf            .

```
M_Int32 MC_fsRead(M_Int32 fd, M_Byte* buf, M_Int32 len)
```

fd -

buf -                            가

len -            byte

byte

M\_E\_ERROR -

M\_E\_BADFD -            가

M\_E\_EOF -

## ✎ MC\_fsWrite

. buf                      len                      byte                      .

M\_Int32 MC\_fsWrite(M\_Int32 fd, M\_Byte\* buf, M\_Int32 len)

fd -

buf -                      가

len -                      byte

byte

M\_E\_ERROR - fail

M\_E\_BADFD -                      가

M\_E\_NOSPACE -

 MC\_fsClose


```
M_Int32 MC_fsClose(M_Int32 fd)
```

fd -

0

M\_E\_ERROR -

M\_E\_BADFD - 가

 MC\_fsSeek

M\_Int32 MC\_fsSeek(M\_Int32 fd, M\_Int32 pos, M\_Int32 where)

fd -

pos -

where - MC\_FILE\_SEEK\_SET

MC\_FILE\_SEEK\_CUR            current position

MC\_FILE\_SEEK\_END

M\_E\_ERROR -

M\_E\_BADFD -            가

M\_E\_INVALID - where 가

M\_E\_BADSEEKPOS -            가

## ✎ MC\_fsFileAttribute

가 MC\_FileInfo

```

struct _fileInfo{
    M_Int32    attrib;           //          bit mask
    M_Uint32   creationTime;    //          1970  1  1
    M_Uint32   size;            //
};

```

bit mask

fa->attrib MC\_FILE\_IS\_DIR bit가 directory

```

program A
MC_FileInfo fi;
...
int rtn = MC_fsFileAttribute("B", &fi, MC_DIR_PRIVATE_ACCESS);
if ( fi.attrib & MC_FILE_IS_DIR ) {
    // direcorty
} else {
}
...

```

M\_Int32 MC\_fsFileAttribute(M\_Char\* name, MH\_FileInfo\* fa, M\_Int32 aMode)

name -

fa - attribute structure

aMode - MC\_DIR\_PRIVATE\_ACCESS private

MC\_DIR\_SHARED\_ACCESS shared

MC\_DIR\_SYSTEM\_ACCESS system

0

M\_E\_ERROR -


M\_E\_BADFILENAME -



M\_E\_LONGNAME - 가  
M\_E\_ACCESS -

mkdir aMode

---

  
 MC\_fsRemove

M\_Int32 MC\_fsRemove(M\_Char\* name, M\_Int32 aMode)

name -

aMode - MC\_DIR\_PRIVATE\_ACCESS private

MC\_DIR\_SHARED\_ACCESS shared

MC\_DIR\_SYSTEM\_ACCESS system

0

M\_E\_ERROR -

M\_E\_BADFILENAME :

M\_E\_LONGNAME : 가

M\_E\_NOENT:

M\_E\_ACCESS:

mkdir aMode

---

## ✎ MC\_fsRename

```
M_Int32 MC_fsRename(M_Char* oldname, M_Char* newname, M_Int32 aMode)
```

oldname -

newname -

aMode - MC\_DIR\_PRIVATE\_ACCESS private

MC\_DIR\_SHARED\_ACCESS shared

MC\_DIR\_SYSTEM\_ACCESS system

0

M\_E\_ERROR -

M\_E\_BADFILENAME -

M\_E\_LONGNAME - 가


M\_E\_EXIST -

M\_E\_NOSPACE -

M\_E\_ACCESS -

mkdir aMode

---

  
 MC\_fsMkDir

· aMode  
·

M\_Int32 MC\_fsMkDir(M\_Char\* dirName, M\_Int32 aMode)

dirName -

aMode - MC\_DIR\_PRIVATE\_ACCESS private

MC\_DIR\_SHARED\_ACCESS shared

MC\_DIR\_SYSTEM\_ACCESS system

0

M\_E\_ERROR -

M\_E\_EXIST - 가

M\_E\_NOENT - parent 가

M\_E\_BADFILENAME -

M\_E\_LONGNAME - 가

M\_E\_ACCESS -

---

## ✎ MC\_fsRmdir

가 . 가  
가 .

M\_Int32 MC\_fsRmdir(M\_Char\* dirName, M\_Int32 aMode)

dirName -

aMode - MC\_DIR\_PRIVATE\_ACCESS private

MC\_DIR\_SHARED\_ACCESS shared

MC\_DIR\_SYSTEM\_ACCESS system

0

M\_E\_ERROR -

M\_E\_NOENT - 가

M\_E\_NOTEMPTY - 가

M\_E\_BADFILENAME -

M\_E\_LONGNAME - 가

M\_E\_ACCESS -

mkdir aMode

## ✎ MC\_fsList

```

    null terminator string      buf
    null
    file1 file2
file1\0file2\0\0

```

```
M_Int32 MC_fsList(M_Char* name, M_Char* buf, M_Int32 bufSize, M_Int32 aMode)
```

name -

buf - return buf

bufSize - buf

aMode - MC\_DIR\_PRIVATE\_ACCESS private

MC\_DIR\_SHARED\_ACCESS shared

MC\_DIR\_SYSTEM\_ACCESS system

0

M\_E\_ERROR -

M\_E\_BADFILENAME -

M\_E\_LONGNAME - 가

M\_E\_SHORTBUF - buf 가

M\_E\_ACCESS -

mkdir aMode

 MC\_fsTotalSpace

M\_Int32 MC\_fsTotalSpace()

(byte)

M\_E\_ERROR -

✎ MC\_fsAvailable

M\_Int32 MC\_fsAvailable()

(byte)

M\_E\_ERROR -



## 5.1.5. NETWORK

TCP/IP . , TCP/UDP , HTTP

API .

I/O API (nonblocking) I/O

MC\_netConnect()

API 가 . MC\_netSocketClose()

API 가 M\_E\_NOTCONN ,

. MC\_netConnect()

MC\_netConnect() 가

MC\_netConnect()

TCP UDP . TCP

. TCP UDP

MC\_netSocket() M\_E\_NOSPACE .

MC\_netClose()

API

✎ MC\_AF\_INET

```
#define MC_AF_INET 2
```

가 2 .

 MC\_SOCKET\_STREAM

```
#define MC_SOCKET_STREAM 1
```

```
TCP 1
```

 MC\_SOCKET\_DGRAM

```
#define MC_SOCKET_DGRAM 2
```

```
UDP 2
```

 **NETCONNECTCB**

MC\_netConnect .

```
typedef void (*NETCONNECTCB)(M_Int32 error, void *param)
```

error - : 0, : M\_E\_ERROR

param - MC\_netConnect()

MC\_netConnect

 NETSOCKCONNECTCB

MC\_netConnect

```
typedef void (*NETSOCKCONNECTCB)(M_Int32 fd, M_Int32 error, void *param)
```

fd –

error – 0 : , : M\_E\_ERROR

param – MC\_netSocketConnect()

MC\_netSocketConnect

 **NETSOCKACCEPTCB**

MC\_netSocketAccept

```
typedef void (*NETSOCKACCEPTCB)(M_Int32 sd, M_Int32 fd, M_Int32 error, void  
*param)
```

sd -

fd -

error - 0 : , : M\_E\_ERROR

param - MC\_netSocketAccept()

MC\_netSocketAccept

 **NETSOCKREADCB**

MC\_netSetReadCB

```
typedef void (*NETSOCKREADCB)(M_Int32 fd, M_Int32 error, void *param)
```

fd –

error – 0 : , : M\_E\_ERROR

param – MC\_netSetReadCB()

MC\_netSetReadCB



 NETSOCKWRITECB

MC\_netSetWriteCB

```
typedef void (*NETSOCKWRITECB)(M_Int32 fd, M_Int32 error, void *param)
```

fd –

error – : 0, : M\_E\_ERROR

param – MC\_netSetWriteCB()

MC\_netSetWriteCB

---

  
 NETHOSTADDRCB

MC\_netGetHostAddr() . . . . . addr -1 IP  
 . . . . . (network byte ordering) .

```
typedef void (*NETHOSTADDRCB)(M_Int32 addr, void *param)
```

addr - IP

param - MC\_netGetHostAddr()

MC\_netGetHostAddr

## ☞ NETHHTTPCB

```

MC_netHttpConnect() . HTTP
가 .
HTTP (parsing)
가 . 가
.
MC_netHttpGetResponseCode(), MC_netHttpGetResponseMessage(),
MC_netHttpGetHeaderField(), MC_netHttpGetLength(),
MC_netHttpGetType(), MC_netHttpGetEncoding().
가 sd
. 가 가 -1
. 가 -1
MC_netSocketConnect() 가 . MC_netHttpClose() 가
가 I/O 가
가 . error 가 M_E_ERROR
가 M_E_ERROR .

```

```

typedef void (*NETHHTTPCB)(M_Int32 fd, M_Int32 sd, M_Int32 error, void
*param)

```

fd - HTTP

sd -

error - : 0, : M\_E\_ERROR

param - MC\_netHttpConnect()

MC\_netHttpConnect

✎ MC\_netConnect

TCP/IP 가 가  
가 0  
M\_E\_INPROGRESS  
,  
M\_E\_ISCONN 가

M\_Int32 MC\_net Connect( NETCONNECTCB cb, void \*param)

cb -

0

M\_E\_INPROGRESS -

M\_E\_ISCONN -

M\_E\_ERROR - 가

✎ MC\_netClose

,MC\_netHttpOpne()

HTTP

API

가

void MC\_netClose(void)

✍ MC\_netSocket

TCP UDP . 가  
MC\_netConnect() .

M\_Int32 MC\_netSocket(M\_Int32 domain, M\_Int32 type)

domain - AF\_INET  
type - MC\_SOCKET\_STREAM MC\_SOCKET\_DGRAM

M\_E\_NOTSUP - domain type  
M\_E\_NOTCONN -  
M\_E\_NOSPACE -  
M\_E\_ERROR -

## ✎ MC\_netSocketConnect

TCP .  
 가 IP (addr) (port)  
 (network byte ordering) . 가 NULL  
 M\_E\_INVALID . 가 0  
 가 . 가  
 MC\_netSocketClose() 가 .

M\_Int32 MC\_netSocketConnect(M\_Int32 fd, M\_Int32 addr, M\_Int16 port,  
 NETSOCKCONNECTCB cb, void \*param)

fd -

addr -

port -

cb -

param - 가

0

M\_E\_NOTSUP -

M\_E\_BADFD -

M\_E\_NOTCONN - 가

M\_E\_ISCONN -

M\_E\_INPROGRESS -

M\_E\_INVALID - 가 가 NULL

M\_E\_ERROR -

MC\_netSocketClose

## ✎ MC\_netSocketWrite

TCP

가 M\_E\_WOULDBLOCK

MC\_netSetWriteCB()

M\_E\_WOULDBLOCK

M\_Int32 MC\_netSocketWrite(M\_Int32 fd, M\_Byte\* buf, M\_Int32 len)

fd -

buf -

len -

(0 )

M\_E\_WODULDBLOCK -

M\_E\_BADFD -

M\_E\_NOTCONN -

가

M\_E\_INVALID -

가

MC\_netSocketWriteNETSOCKWRITECB



## ✍ MC\_netSocketRead

TCP

가 M\_E\_WOULDBLOCK

MC\_netSetReadCB()

M\_E\_WOULDBLOCK

M\_Int32 MC\_netSocketRead(M\_Int32 fd, M\_Byte\* buf, M\_Int32 len)

fd -

buf -

len -

(0 0)

M\_E\_WOULDBLOCK - 가

M\_E\_NOTCONN -

가

M\_E\_BADFD - 가

M\_E\_INVALID - 가

MC\_netSetReadCB

## ✎ MC\_netSocketClose

MC\_netClose()

가

M\_Int32 MC\_netSocketClose(M\_Int32 fd)

fd -

0

M\_E\_BADFD -

MC\_netClose

---

## ✎ MC\_netSocketBind

M\_Int32 MC\_netSocketBind(M\_Int32 fd, M\_Uint32 addr, M\_Uint16 port)

fd -

port - (network byte ordering)

0

M\_E\_INVALID - 가

M\_E\_NOTCONN - 가

M\_E\_BADFD -

 MC\_netGetMaxPacketLength

UDP

M\_Int32 MC\_netGetMaxPacketLength(void)

## ✎ MC\_netSocketSendTo

UDP

MC\_netGetMaxPacketLength() 가  
 가 IP (addr) (port)  
 (network byte ordering) 가 M\_E\_WOULDBLOCK

MC\_netSetWriteCB()

M\_E\_WOULDBLOCK

M\_Int32 MC\_netSocketSendTo(M\_Int32 fd, M\_Byte\* buf, M\_Int32 len, M\_Uint32  
 addr, M\_Uint16 port)

fd -

buf -

len -

addr - IP (network byte ordering)

port - (network byte ordering)

(0 )

M\_E\_NOTSUP -

M\_E\_WOULDBLOCK -

M\_E\_BADFD -

M\_E\_NOTCONN - 가

M\_E\_INVALID - 가

MC\_netGetMaxPacketLength

MC\_netSetWriteCB

 MC\_netSocketRcvFrom

UDP .  
 IP addr port .  
 IP (network byte ordering)  
 . 가 M\_E\_WOULDBLOCK  
 . MC\_netSetReadCB()

M\_E\_WOULDBLOCK .

M\_Int32 MC\_netSocketRcvFrom(M\_Int32 fd, M\_Byte\* buf, M\_Int32 len, M\_Uint32\*  
 addr, M\_Uint16\* port)

fd -

buf -

len -

addr - IP 가 . (network byte ordering)

port - 가 . (network byte ordering)

(0 )

M\_E\_WODULDBLOCK - 가

M\_E\_BADFD -

M\_E\_NOTCONN - 가

M\_E\_INVALID - IP 가  
 가

MC\_netSetReadCB

✎ MC\_netGetHostAddr

IP . 가  
 IP 가 .  
 dnsserver 가 -1 MC\_knlGetSystemProperty () 가  
 IP .

M\_Int32 MC\_netGetHostAddr(M\_Int32 dnsserver, M\_Byte \*hostname, NETHOSTADDRCB  
 cb, void \*param)

dnsserver – IP  
 hostname –  
 cb – IP  
 param – 가

0  
 M\_E\_INVALID – 가 NULL dnsserver 가  
 0 hostname NULL  
 M\_E\_ERROR –

MC\_knlGetSystemProperty

## ✎ MC\_netSocketAccept

TCP . 가  
 MC\_netSocketBind() . 가 M\_E\_WOULDBLOCK  
 가 .  
 가 M\_E\_WOULDBLOCK .

M\_Int32 MC\_netSocketAccept(M\_Int32 fd, NETSOCKACCEPTCB cb, void \*param)

fd – TCP

cb –

param – 가

M\_E\_INVALID – 가 NULL

M\_E\_WOULDBLOCK –

M\_E\_NOTSUP –

M\_E\_BADFD –

M\_E\_NOTCONN – 가

M\_E\_ERROR -



## ✎ MC\_netSetReadCB

MC\_netSocketRead()    MC\_netSocketRcvFrom()    M\_E\_WOULDBLOCK

가

가 NULL

가

가

M\_Int32 MC\_netSetReadCB(M\_Int32 fd, NETSOCKREADCB cb, void \*param)

fd -

cb -

param -        가

0

M\_E\_NOTCONN -        가

M\_E\_BADF -        가

## ✍ MC\_netSetWriteCB

MC\_netSocketWrite() MC\_netSocketSendTo() 가 M\_E\_WOULDBLOCK

가  
가  
NULL 가  
가

M\_Int32 MC\_netSetWriteCB(M\_Int32 fd, NETSOCKWRITECB cb, void \*param)

fd -

cb -

param - 가

0

M\_E\_NOTCONN - 가

M\_E\_BADF - 가

## ✎ MC\_netHttpOpen

HTTP . HTTP  
 . URL HTTP  
 IP 가 IP  
 MC\_knlGetSystemProperty()

MC\_netHttpSetRequestMethod(),  
 MC\_netHttpGetRequestMethod(),  
 MC\_netHttpSetRequestProperty(),  
 MC\_netHttpGetRequestProperty(),  
 MC\_netHttpSetProxy(),  
 MC\_netHttpGetProxy().

M\_Int32 MC\_netHttpOpen(M\_Byte\* url)

url - "http://" URL

HTTP

M\_E\_INVALID - URL

M\_E\_NOSPACE - HTTP

M\_E\_NOTCONN -

M\_E\_ERROR -

MC\_knlGetSystemProperty

MC\_netHttpSetRequestMethod

MC\_netHttpGetRequestMethod

MC\_netHttpSetRequestProperty

MC\_netHttpGetRequestProperty

MC\_netHttpSetProxy

MC\_netHttpGetProxy

## ✎ MC\_netHttpConnect

HTTP . MC\_netHttpOpen() 가  
 HTTP 가 .  
 가 . 가

M\_E\_ERROR .  
 MC\_netHttpSetRequestMethod(),  
 MC\_netHttpGetRequestMethod(),  
 MC\_netHttpSetRequestProperty(),  
 MC\_netHttpGetRequestProperty(),  
 MC\_netHttpSetProxy(),  
 MC\_netHttpGetProxy().

M\_Int32 MC\_netHttpConnect(M\_Int32 fd, NETHTTPCB cb, void \*param)

fd - HTTP

cb -

param - 가

0

M\_E\_BADFD -

M\_E\_NOTCONN - 가

M\_E\_INPROGRESS - HTTP

M\_E\_ERROR -

MC\_netHttpSetRequestMethod

MC\_netHttpGetRequestMethod

MC\_netHttpSetRequestProperty

MC\_netHttpGetRequestProperty

MC\_netHttpSetProxy

MC\_netHttpGetProxy

### MC\_netHttpSetRequestMethod

HTTP (Request Method) . "GET", "POST",  
 "HEAD" 가 . 가 "POST"  
 . 가 MC\_netHttpConnect() M\_E\_ERROR .

M\_Int32 MC\_netHttpSetRequestMethod(M\_Int32 fd, M\_Byte \*method, M\_Byte \*msg,  
 M\_Int32 msglen)

fd - HTTP

method -

msg - 가 "POST"

msglen -

0

M\_E\_BADFD -

M\_E\_INVALID -

POST

M\_E\_ERROR -

MC\_netHttpConnect

## ✎ MC\_netHttpRequestMethod

```

HTTP (Request Method)
MC_netHttpRequestMethod()
"GET" buf
NULL 가 NULL
가 MC_netHttpRequestMethod() M_E_ERROR

```

```

M_Int32 MC_netHttpRequestMethod(M_Int32 fd, M_Byte *buf, M_Int32 len)

```

fd - HTTP

buf -

len -

M\_E\_BADFD -

M\_E\_INVALID - 가

M\_E\_ERROR -

MC\_netHttpRequestMethod

---

## ✎ MC\_netHttpSetRequestProperty

HTTP (Request Property) . 가 MC\_netHttpConnect()  
M\_E\_ERROR

M\_Int32 MC\_netHttpSetRequestProperty(M\_Int32 fd, M\_Byte \*key, M\_Byte \*value)

fd - HTTP

key -

value -

0

M\_E\_BADFD -

M\_E\_ERROR -

MC\_netHttpConnect



## ✎ MC\_netHttpGetRequestProperty

HTTP (Request Property) .  
 가 MC\_netHttpConnect()  
 M\_E\_ERROR .

```
M_Int32 MC_netHttpGetRequestProperty(M_Int32 fd, M_Byte *key, M_Byte *buf,
M_Int32 len)
```

fd - HTTP  
 key -  
 buf -  
 len -

M\_E\_BADFD -  
 M\_E\_INVALID - 가  
 M\_E\_ERROR -

MC\_netHttpConnect

## ✎ MC\_netHttpSetProxy

가 MC\_netHttpConnect()  
 M\_E\_ERROR

M\_Int32 MC\_netHttpSetProxy(M\_Int32 fd, M\_Int32 proxyhost, M\_Int16 proxyport)

fd - HTTP

proxyhost - IP (network byte ordering)

proxyport - (network byte ordering)

0

M\_E\_BADFD -

M\_E\_INVALID - proxyhost 가 0 -1

M\_E\_ERROR -

MC\_netHttpConnect

## ✎ MC\_netHttpGetProxy

MC\_netHttpConnect() M\_E\_ERROR 가

M\_Int32 MC\_netHttpGetProxy(M\_Int32 fd, M\_Int32 \*proxyhost, M\_Int16 \*proxyport)

fd - HTTP

proxyhost - (network byte ordering)

proxyport -

(network byte ordering)

0

M\_E\_BADFD -

M\_E\_INVALID - proxyhost proxyport 가 NULL

M\_E\_ERROR -

MC\_netHttpConnect

## ✎ MC\_netHttpGetResponseCode

HTTP

HTTP/1.0 200 OK

HTTP/1.0 404 Not Found

200, 400

가 MC\_netHttpConnect()

가

M\_E\_ERROR

M\_Int32 MC\_netHttpGetResponseCode(M\_Int32 fd)

fd - HTTP

M\_E\_BADFD -

M\_E\_ERROR -

MC\_netHttpConnect

## ✎ MC\_netHttpGetResponseMessage

HTTP

HTTP/1.0 200 OK

HTTP/1.0 404 Not Found

"OK" "Not Found" 가 . 가 MC\_netHttpConnect()

가 M\_E\_ERROR .

M\_Int32 MC\_netHttpGetResponseMessage(M\_Int32 fd, M\_Byte \*buf, M\_Int32 len)

fd - HTTP

buf - 가

len

M\_E\_BADFD -

M\_E\_INVALID - 가

M\_E\_ERROR -

MC\_netHttpConnect

## ✍ MC\_netHttpGetHeaderField

HTTP . 가 MC\_netHttpConnect()  
 가 M\_E\_ERROR .

```
M_Int32 MC_netHttpGetHeaderField(M_Int32 fd, M_Byte *name, M_Byte *buf,
M_Int32 len)
```

fd - HTTP

name -

buf -

len -

M\_E\_BADFD -

M\_E\_INVALID - 가

M\_E\_ERROR -

MC\_netHttpConnect

## ✎ MC\_netHttpGetLength

가 . 가 MC\_netHttpConnect()  
가 M\_E\_ERROR

M\_Int32 MC\_netHttpGetLength(M\_Int32 fd)

fd - HTTP

M\_E\_BADFD -

M\_E\_ERROR -

MC\_netHttpConnect

## ✎ MC\_netHttpGetType

가 MC\_netHttpConnect()  
 M\_E\_ERROR

M\_Int32 MC\_netHttpGetType(M\_Int32 fd, M\_Byte \*buf, M\_Int32 len)

fd - HTTP

buf -

len -

M\_E\_BADFD -

M\_E\_INVALID - 가

M\_E\_ERROR -

MC\_netHttpConnect



## ✎ MC\_netHttpGetEncoding

가 MC\_netHttpConnect()  
 M\_E\_ERROR

M\_Int32 MC\_netHttpGetEncoding(M\_Int32 fd, M\_Byte \*buf, M\_Int32 len)

fd - HTTP

buf -

len -

M\_E\_BADFD -

M\_E\_INVALID - 가

M\_E\_ERROR -

MC\_netHttpConnect

## MC\_netHttpClose

HTTP . 가 MC\_netHttpConnect()  
가 .

M\_Int32 MC\_netHttpClose(M\_Int32 fd)

fd - HTTP

0

M\_E\_BADFD -

### 5.1.6.

Media

```
    , , (CLIP)
    . MC_knlSetSystemProperty()
    "MEDIADVICES" .
    , ,
    , , 가 .
```

✎ MC\_MDA\_STATUS\_ERROR

```
#define MC_MDA_STATUS_ERROR (-1)
```

```
                .           -1.
```

✎ MC\_MDA\_STATUS\_END\_OF\_DATA

```
#define MC_MDA_STATUS_END_OF_DATA 1
```

( ) - 가 ( )  
1.

✍ MC\_MDA\_STATUS\_START

```
#define MC_MDA_STATUS_STARTED 2
```

```
( ) - ( ) . 2.
```

✎ MC\_MDA\_STATUS\_STOPP

```
#define MC_MDA_STATUS_STOPP 3
```

```
( ) - ( )  
- . 3
```

✍ MC\_MDA\_STATUS\_PAUSE

```
#define MC_MDA_STATUS_PAUSED 4
```

```
( ) - ( )  
- . 4
```



✍ MC\_MDA\_STATUS\_RESUME

```
#define MC_MDA_STATUS_RESUMED 5
```

```
( ) - ( )  
- . 5
```

✍ MC\_MDA\_STATUS\_RECORD

```
#define MC_MDA_STATUS_RECORDED 6
```

- . 6

✎ MC\_MDA\_STATUS\_FULL\_OF\_DATA

```
#define MC_MDA_STATUS_FULL_OF_DATA 7
```

- 가 . 7.

✎ MC\_MDA\_VOLSEL\_CUR

```
#define MC_MDA_VOLSEL_CUR 0
```

. 0.

✎ MC\_MDA\_VOLSEL\_MIN

```
#define MC_MDA_VOLSEL_MIN 1
```

. 1.

✎ MC\_MDA\_VOLSEL\_MAX

```
#define MC_MDA_VOLSEL_MAX 2
```

. 2.

✎ (\*MEDIACB)

가

```
typedef void (*MEDIACB)(MC_MdaClip* clip, M_Int32 status)
```

clip ?

status ?

## ✎ MC\_mdaClipCreate

```

        CLIP . MC_knlSetSystemProperty()
"MEDIADEVICES" . MIME
    "audio/xxx", "video/xxx" MIME .
        MC_mdaClipPutData() ,
file MC_mdaClipPutDataByFile()

Clip .

    가 가

```

```
MC_MdaClip* MC_mdaClipCreate(M_Char* mType, M_Int32 bufSize, MEDIACB cb)
```

mType - [in]


bufSize - [in] (CLIP )

cb - [in]

MC\_MdaClip

0



 MC\_mdaClipFree

M\_Int32 MC\_mdaClipFree(MC\_MdaClip\* clip)

clip - [in]

0

M\_E\_INUSE :

M\_E\_INVALID: clip NULL

 MC\_mdaClipGetType

```
M_Int32 MC_mdaClipGetType(MC_MdaClip* clip, M_Byte* buf, M_Int32 bufSize)
```

clip – [in]

buf – [out]

bufSize – [in]

0

M\_E\_SHORTBUF - 가

---

✎ MC\_mdaClipPutData

가  
.  
가 가 가 , MC\_mdaClipPutData()  
.  
가 가 가  
.

```
M_Int32 MC_mdaClipPutData (MC_MdaClip* clip, M_Byte* buf, M_Int32 size)
```

clip – [in]

buf – [in]

size – [in]

## ✎ MC\_mdaClipPutDataByFile

```

        가
        ,
        .
        , MC_mdaClipPutData()
        .
        가   가   가
        .
    
```

```

M_Int32 MC_mdaClipPutData (MC_MdaClip* clip, M_Byte* filename, M_Int32 size,
M_Int32 aMode)
    
```

clip - [in]

filename - [in]

size - [in]

aMode - MC\_DIR\_PRIVATE\_ACCESS private  
 MC\_DIR\_SHARED\_ACCESS shared  
 MC\_DIR\_SYSTEM\_ACCESS system

---

 MC\_mdaClipGetData

, MC\_mdaClipGetData() 가

"MEDIADVICES"

M\_Int32 MC\_mdaClipGetData(MC\_MdaClip\* clip, M\_Byte\* buf, M\_Int32 size)

clip – [in]

buf – [in]

size – [in]

 MC\_mdaClipAvailableDataSize

가 ( 가 )

M\_Int32 MC\_mdaClipAvailableDataSize(MC\_MdaClip\* clip)

clip - [in]

가

 MC\_mdaClipClearData

가 .

M\_Int32 MC\_mdaClipClearData (MC\_MdaClip\* clip)

clip - [in]

0 -

M\_E\_ERROR - 가 .

---

## ✎ MC\_mdaClipSetPosition

, M\_E\_NOTSUP 가 .

```
M_Int32 MC_mdaClipSetPosition(MC_MdaClip* clip, M_Int32 ms)
```

clip – [in]

ms – [in] (milli second)

0

M\_E\_NOTSUP ? 가

M\_E\_ERROR –



---

## ✎ MC\_mdaClipGetVolume

가  
0, 100 .

M\_Int32 MC\_mdaClipGetVolume(MC\_MdaClip\* clip)

clip - [in]

M\_E\_NOTSUP -

---

## ✎ MC\_mdaClipSetVolume

가 0, 100

```
void MC_mdaClipSetVolume(MC_MdaClip* clip, M_Int32 level)
```

clip – [in]

level – [in] (0-100 )

M\_E\_NOTSUP –

## ✎ MC\_mdaPlay

가  
 MC\_MDA\_STATUS\_STARTED 가 . 가  
 . 가  
 MC\_MDA\_STATUS\_END\_OF\_DATA 가 .  
 가 ,  
 MC\_mdaClipPutData() .

M\_Int32 MC\_mdaPlay(MC\_MdaClip\* clip, M\_Boolean repeat)

clip - [in]

repeat - [in] 0 , 1

0

M\_E\_INUSE - 가

M\_E\_ERROR -

---

## ✎ MC\_mdaPause

( / )

가

MC\_MDA\_STATUS\_PAUSED

가

M\_Int32 MC\_mdaPause(MC\_MdaClip\* clip)

clip - [in]

0

M\_E\_NOTSUP - paue

M\_E\_ERROR -

---

## ✎ MC\_mdaResume

( / )  
가  
MC\_MDA\_STATUS\_RESUMED 가  
,

M\_Int32 MC\_mdaResume(MC\_MdaClip\* clip)

clip - [in]

0

M\_E\_NOTSUP - resume

M\_E\_ERROR -

---

## ✎ MC\_mdaStop

( / )  
가  
MC\_MDA\_STATUS\_STOPPED 가  
,

M\_Int32 MC\_mdaStop(MC\_MdaClip\* clip)

clip - [in]

0

M\_E\_ERROR -

## ✎ MC\_mdaRecord

가  
 MC\_MDA\_STATUS\_RECORDED 가 , 가 ,  
 MC\_MDA\_STATUS\_FULL 가 . 가 ,  
 MC\_mdaClipGetData() 가 ,

M\_Int32 MC\_mdaRecord(MC\_MdaClip\* clip)

clip - [in]

0

M\_E\_INUSE -

M\_E\_ERROR -

✎

## MC\_mdaGetVolume

MC\_mdaClipGetVolume ( ) 0 - 100  
가 0-100  
가  
가  
MC\_knlGetSystemProperty()  
) 가 , => 1-50 : 51-100 :  
가 , , => 1-33: , 34-66: ,  
67-100:  
  
M\_int32 MC\_mdaGetVolume()



---

## ✎ MC\_mdaSetVolume

MC\_mdaSetVolume(M\_Int32 value, Clip API)

void MC\_mdaSetVolume(M\_Int32 value)

value – [in] (0-100)

✎ MC\_mdaVibrator

```

Vibrator . on .
    level 0 timeout . level 0 vibrator
가 . level 0-100
    . 100 가 가 0 가
    . 0-100 가
가 . 가
    가 MC_knlGetSystemProperty("VIBRATORLEVEL") .
) 가 => 1-100 :
    가 , => 1-50 : , 51-100 :
    가 , , => 1-33: , 34-66: , 67-100:
    
```

```
void MC_mdaVibrator(M_Int32 level, M_Int32 timeout)
```

```
[in] level 0 off, 1-100
```

```
[in] timeout ,
```

## 5.1.7. SERIAL

API . 가  
 0, 1, 2.. .  
 MC\_knlGetSystemProperty() “MAXSERIALNUM” .  
 I/O API MC\_srIclose() .  
 I/O 가 I/O M\_E\_WOULDBLOCK  
 I/O 가 HAL  
 가 가 .

---

## ✎ SRLWRITECB

MC\_srISetWriteCB

HAL

가

```
typedef void (*SRLWRITECB)(M_Int32 fd, M_Int32 error, void *param)
```

fd -

error - : 0, : M\_E\_ERROR

param -

MC\_srISetWriteCB

---

  
 SRLREADCB

MC\_srISetReadCB

HAL

가

```
typedef void (*SRLREADCB)(M_Int32 fd, M_Int32 error, void *param)
```

fd -

error - : 0, : M\_E\_ERROR

param -

MC\_srISetReadCB

✎ MC\_srlOpen

```

        param
        ::= [
        ::= " " *(, " " )
        ::=
        ::=
    
```

| baudrate | 9600, 19200, 38400,<br>57600, 115200 |  | 115200 |
|----------|--------------------------------------|--|--------|
| parity   | even, odd, no                        |  | no     |
| Size     |                                      |  | 8      |
| Flow     | hardware, software,<br>no            |  | no     |

가 , 8 ,  
, 115200

”baudrate=115200,parity=no,size=8,flow=hardware”  
가

M\_Int32 MC\_srlOpen(M\_Int32 port, M\_Byte\* param)

port - (0 ~ ( - 1) );  
param -

M\_E\_NOTSUP - 가

M\_E\_INVALID -

M\_E\_ISCONN - 가

## ✍ MC\_srlWrite

M\_E\_WOULDBLOCK

MC\_srlSetWriteCB

M\_E\_WOULDBLOCK

```
M_Int32 MC_srlWrite(M_Int32 fd, M_Uint8* buf, M_Int32 size)
```

fd -

buf -

size -

write size

M\_E\_WOULDBLOCK -

M\_E\_BADFD -

M\_E\_INVALID - 가

MC\_srlSetWriteCB



## ✎ MC\_srlRead

M\_E\_WOULDBLOCK . MC\_srlSetReadCB 가

M\_E\_WOULDBLOCK .

M\_Int32 MC\_srlRead(M\_Int32 fd, M\_Uint8\* buf, M\_Int32 size)

fd -

buf -

size -

size

M\_E\_WOULDBLOCK - 가

M\_E\_BADFD - fd

M\_E\_INVALID - 가

### MC\_srlSetReadCB

|   |        |       |     |   |
|---|--------|-------|-----|---|
| . | 가      | param | API | . |
|   | 가 NULL |       |     | 가 |
|   |        | .     | 가   |   |
|   |        | 가     | .   |   |

```
M_Int32 MC_srlSetReadCB(M_Int32 fd, SRLREADCB cb, void *param)
```

fd -

cb -

param - 가

0

M\_E\_BADFD ?

M\_E\_ERROR ?

## ✎ MC\_srlSetWriteCB

. 가 param API .  
 가 NULL .  
 가 . 가  
 .

```
M_Int32 MC_srlSetWriteCB(M_Int32 fd, SRLWRITECB cb, void *param)
```

fd -


cb -

param - 가

0

M\_E\_BADFD -

M\_E\_ERROR -

 MC\_srlClose

M\_Int32 MC\_srlClose(M\_Int32 fd)

fd -


0

M\_E\_BADFD -

## 5.1.8. PHONE

API

MC\_phnCallPlace()

 MC\_phnCallPlace

M\_Int32 MC\_phnCallPlace(M\_Byte\* phonenumber)

phonenumber - ( NULL)


0

M\_E\_ERROR( )

## 5.1.9. MISC

가

HAL

 MC\_BackLight

```
typedef enum _MC_BackLight MC_BackLight {  
    MC_LIGHT_ON = 0          //  
    MC_LIGHT_OFF,           //  
    MC_LIGHT_ALWAYS_ON,    //  
    MC_LIGHT_DEFAULT,      //      가  
} MC_BackLight;
```



## ✎ MC\_miscBackLight

가

MC\_LIGHT\_DEFAULT

Backlight 0 LCD  
 1 LCD 가 가  
 color color  
 0xYYRRGGBB( (network byte ordering) )  
 YY RR (Red), GG (Green), BB (Blue)

M\_Int32 MC\_miscBackLight(M\_Int32 id, MC\_BackLight on\_off, M\_Int32 color,  
 M\_Int32 timeout)

id -


on\_off -

color -

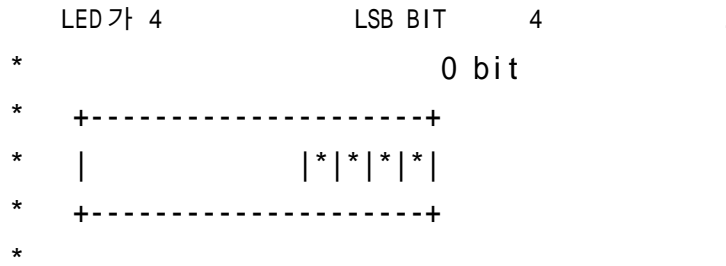
timeout - . on\_off 가 MC\_DEV\_LIGHT\_ON

0

M\_E\_ERROR ? 가

 MC\_miscSetLed


LED on/off . bit가 1 on, 0 off .  
 )



MC\_miscSetLed(0x3) led2 , .

void MC\_miscSetLed(M\_Int32 leds)

leds - 가 1 LED 가 on 0 off

 MC\_miscGetLed

LED on/off .

M\_Int32 MC\_miscGetLed()

led on/off bit OR


 MC\_miscGetLedCount

LED .

M\_Int32 MC\_miscGetLedCount (void)


led

## **5.1.10. UTILITY**

 MC\_utilHtonl


M\_Int32                    Host Byte Odering    Network Byte Odering                    .

M\_Int32 MC\_utilHtonl(M\_Int32 val)

 MC\_utilHtons

M\_Int16                    Host Byte Odering    Network Byte Odering                    .


M\_Int16 MC\_utilHtons(M\_Int16 val)

 MC\_utilNtohI

M\_Int32                      Network Byte Oding      Host Byte Oding                      .

M\_Int32 MC\_utilNtohI(M\_Int32 val)



 MC\_utilNtohs

M\_Int16                      Network Byte Oding      Host Byte Oding                      .

M\_Int16 MC\_utilNtohs(M\_Int16 val)

---

 MC\_utilInetAddrInt

IP IP .  
IP Network Byte Ordering .

M\_int32 MC\_utilInetAddrInt(M\_Byte\* addr)

-1

-1

 MC\_utilInetAddrStr

IP IP .  
Network Byte Odering .

```
void MC_utilInetAddrStr(M_Int32 ip, M_Byte* addr)
```

ip - IP  
addr - IP

### 5.1.11.

```

, / ,
, 가 .
/
가
MC_uicGetClass
가
MC_uicCreate
,
MC_uicDestroy .
(0, 0) ,
가
"C"
가
Clet handleCletEvent
MC_uicHandleEvent . MC_uicHandleEvent
,
Clet paintClet MC_uicPaint
.
MC_uicHandleEvent 가 MC_uicSetEventHandler
가
, MC_uicHandleEvent
, MC_uicHandleEvent
MC_uicCallbackProc .

```

---

```

        MC_UicComponent
    ,
    ,
        MC_uicGetTextSize 가
    256 , MC_uicSetTextSize 가
    가
    MC_uicInsertText
    MC_uicDeleteText
    MC_uicGetMaxTextSize
    MC_uicSetMaxTextSize
    MC_uicGetTextSize
    MC_uicGetText

    가
    MC_UIC_CHANGE_CALLBACK :
    MC_UIC_KEY_CALLBACK : 가

    /
    / MC_UicComponent , /
    , / . MC_uicSetTime
    / , /
    . / ,
    , MC_uicSetTimeMask 가
    가
    MC_uicSetTimeMask
    MC_uicSetTime
    MC_uicGetTime
    MC_uicSetTimeLong

    가
    MC_UIC_CHANGE_CALLBACK :

    MC_UicComponent ,

```

가

MC\_uicAddMenuItem  
MC\_uicGetMenuItem  
MC\_uicRemoveMenuItem  
MC\_uicSetActiveMenuItem  
MC\_uicGetActiveMenuItem

가

MC\_UIC\_CHANGE\_CALLBACK :

MC\_UicComponent

가

MC\_uicSetLabel

MC\_UicComponent

가

MC\_uicAddListItem  
MC\_uicGetListItem  
MC\_uicRemoveListItem  
MC\_uicSetActiveListItem  
MC\_uicGetActiveListItem

가

MC\_UIC\_CHANGE\_CALLBACK :

---

가 , .

가 .

MC\_uicDestory  
MC\_uicRepaint  
MC\_uicPaint  
MC\_uicGetClassName  
MC\_uicIsInstance  
MC\_uicHandleEvent  
MC\_uicConfigure  
MC\_uicGetGeometry  
MC\_uicSetEnable  
MC\_uicSetExtData  
MC\_uicGetExtData  
MC\_uicSetCallback  
MC\_uicSetEventHandler  
MC\_uicSetFont  
MC\_uicGetFont

가 .

MC\_UIC\_SELECT\_CALLBACK : 가 "SELECT" 가  
MC\_UIC\_PAINT\_CALLBACK : 가 MC\_UIC\_DESTORY\_CALLBACK :  
가

✂ MC\_UicComponent

```
typedef M_Int32 MC_UicComponent
```



✎ MC\_UicClass

```
typedef M_Int32 MC_UicClass
```

✎ MC\_UicApplicationContext

```
typedef M_Int32 MC_UicApplicationContext
```

## ✂ MC\_UicCallbackProc

```
typedef void (*MC_UicCallbackProc)(MC_UicComponent cc, void* serverData,  
M_Int32 clientData)
```

cc -

serverData -

;

.

clientData -

---

## ✂ MC\_UicEventHandlerProc

```
typedef M_Int32 (*MC_UicEventHandlerProc)(MC_UicComponent cc, M_Int32 type,  
M_Int32 param1, M_Int32 param2)
```

cc -

type -

param1 - 1

param2 - 2

1 , 0

✂ MC\_UIC\_MENU\_COMPONENT

```
#define MC_UIC_MENU_COMPONENT "MenuComponent"
```

```
, "MenuComponent" .
```

✂ MC\_UIC\_DATE\_TIME\_COMPONENT

```
#define MC_UIC_DATE_TIME_COMPONENT    "DateTimeComponent"
```

```
,                                     , "DateTimeComponent" .
```

✂ MC\_UIC\_TEXT\_COMPONENT

```
#define MC_UIC_TEXT_COMPONENT "TextComponent"
```

```
, "TextComponent" .
```

✂ MC\_UIC\_LABEL\_COMPONENT

```
#define MC_UIC_LABEL_COMPONENT "LabelComponent"
```

```
, "LabelComponent" .
```



✂ MC\_UIC\_LIST\_COMPONENT

```
#define MC_UIC_LIST_COMPONENT "ListComponent"
```

```
, "ListComponent" .
```

✂ MC\_UIC\_DESTROY\_CALLBACK

```
#define MC_UIC_DESTROY_CALLBACK 1
```

가

1

✎ MC\_UIC\_PAINT\_CALLBACK

```
#define MC_UIC_PAINT_CALLBACK 2
```

가 , 2 .

✂ MC\_UIC\_SELECT\_CALLBACK

```
#define MC_UIC_SELECT_CALLBACK      3
```

```
,      3
```

✂ MC\_UIC\_CHANGE\_CALLBACK

```
#define MC_UIC_CHANGE_CALLBACK 4
```

```
, 4
```

```
.
```

✎ MC\_UIC\_KEY\_CALLBACK

```
#define MC_UIC_KEY_CALLBACK 5
```

가 , 5

✂ MC\_GRP\_GRAY\_TYPE

```
#define MC_GRP_GRAY_TYPE(1 << 1)
```

```
.          (1 << 1).
```

✂ MC\_GRP\_COLOR\_TYPE

```
#define MC_GRP_COLOR_TYPE(1 << 2)
```

```
.      (1 << 2).
```



✂ MC\_ALIGN\_LEFT

```
#define MC_ALIGN_LEFT 0
```

```
. 0.
```

✂ MC\_ALIGN\_RIGHT

```
#define MC_ALIGN_RIGHT 1
```

```
. 1.
```

✂ MC\_ALIGN\_CENTER

```
#define MC_ALIGN_CENTER      2  
  
                                .      2.
```

✎ MC\_uicCreateApplicationContext

MC\_UicApplicationContext MC\_uicCreateApplicationContext()

---

## ✎ MC\_uicGetClass

MC\_UicClass MC\_uicGetClass(M\_Uint8\* psz)

가 .

가 .

MC\_UIC\_MENU\_COMPONENT, MC\_UIC\_DATE\_TIME\_COMPONENT,  
MC\_UIC\_TEXT\_COMPONENT, MC\_UIC\_LABEL\_COMPONENT, MC\_UIC\_LIST\_COMPONENT 가 .

psz - [in]

(psz)

M\_E\_ERROR

---

## ✎ MC\_uicCreate

MC\_UicComponent MC\_uicCreate(MC\_UicApplicationContext\* pac, MC\_UicClass cls)

·  
· MC\_uicCreateApplicationContext  
(Application Context)  
·  
MC\_uicGetClass 가

pac - [in]

cls - [in]

M\_E\_ERROR :

MC\_UIC\_E\_OUT\_OF\_MEM :

MC\_uicCreateApplicationContext

✂ MC\_uicDestroy

```
void MC_uicDestroy(MC_UicComponent cc)
```

```
    cc
```

```
cc - [in]
```

## ✂ MC\_uicRepaint

```
void MC_uicRepaint(MC_UicComponent cc, M_Int32 x, M_Int32 y, M_Int32 w,
M_Int32 h)
```

```

      .
      paintClet 가
      .
      w, h가 -1 , (x, y)
      가 가 .

```

cc - [in]

x - [in] x ( )

y - [in] y ( )

w - [in]

h - [in]

MC\_grpRepaint

MC\_uicPaint



## ✍ MC\_uicPaint

```
void MC_uicPaint(MC_UicComponent cc, MC_GrpContext *pgc)
```

```
    paintClet                . pgc 가  
                                pgc
```

```
cc - [in]
```

```
pgc - [in]
```

---

✎ MC\_uicGetClassName

M\_Uint8\* MC\_uicGetClassName(MC\_UicComponent cc)

cc 가 가

"C"

cc - [in]

NULL

## ✎ MC\_uiclsInstance

```
M_Uint32 MC_uiclsInstance(MC_UicComponent cc, M_Uint8* pcls)
```

가

cc - [in]

pcls - [in]

가

1,

0

---

  
✎ MC\_uicHandleEvent

```
M_Int32 MC_uicHandleEvent(MC_UicCompeont cc, M_Int32 type, M_Int32 param1,  
M_Int32 param2)
```

```
0  
가 1  
type param1, param2 handleCletEvent
```

cc - [in]

type - [in]

param1 - [in] 1

param2 - [in] 2

## ✂ MC\_uicConfigure

```
void MC_uicConfigure(MC_UicComponent cc, M_Int32 x, M_Int32 y, M_Int32 w,
M_Int32 h, M_Int32 mask)
```

```

    (x, y)가 가 , w, h
    .mask & MC_UIC_POS_MASK가 0 (x, y) 가
    , mask & MC_UIC_SIZE_MASK 가 0 (w, h)
w h가 0

```

```
cc - [in]
```

```
x - [in] x
```

```
y - [in] y
```

```
w - [in]
```

```
h - [in]
```

```
mask - [in] ;
```

```
MC_UIC_SIZE_MASK MC_UIC_POS_MASK OR
```

---

## ✎ MC\_uicGetGeometry

```
void MC_uicGetGeometry(MC_UicComponent cc, M_Int32* px, M_Int32* py,  
M_Int32* pw, M_Int32* ph)
```

가 .  
px, py 가 가 , pw, ph  
가 NULL , .

cc - [in]

px - [out] x

py - [out] y

pw - [out]

ph - [out]

## ✂ MC\_uicSetEnable

```
void MC_uicSetEnable(MC_UicComponent cc, M_Int32 enable)
```

```

enable          가 / 가          .
                가
                가          (Enable FALSE )

```

```
cc - [in]
```

```
enable - [in] 1 가 , 0 가
```

## ✎ MC\_uicSetCallback

```
MC_UicCallbackProc MC_uicSetCallback( MC_UicComponent cc, M_Int32 idx,
MC_UicCallbackProc proc, M_Int32 clientData)
```

```

        가 ,
.
clientData 가 가
.
MC_UIC_DESTROY_CALLBACK
MC_UIC_PAINT_CALLBACK
MC_UIC_SELECT_CALLBACK
MC_UIC_CHANGE_CALLBACK
MC_UIC_KEY_CALLBACK

cc - [in]
idx - [in] 가 MC_UIC_PAINT_CALLBACK,
MC_UIC_SELECT_CALLBACK
proc - [in]
clientData - [in]
.
, NULL
.

```



---

## ✂ MC\_uicSetEventHandler

```
MC_UicEventHandlerProc MC_uicSetEventHandler( MC_UicComponent cc,  
MC_UicEventHandlerProc handler)
```

가 ,

cc - [in]

handler - [in]

NULL

✎ MC\_uicSetFont

```
M_Int32 MC_uicSetFont(MC_UicComponent cc, M_Int32 fontid)
```

fontid 가


cc - [in]

fontid - [in] MC\_grpGetFont

✎ MC\_uicGetFont

```
M_Int32 MC_uicGetFont(MC_UicComponent cc)
```

cc - [in]


 **MC\_uicSetFgColor**

```
void MC_uicSetFgColor(MC_UicComponent cc, M_Int32 nColor);
```

Foreground .

cc - [in]

nColor - (0xRRGGBB)

 MC\_uicSetBgColor

```
void MC_uicSetBgColor(MC_UicComponent cc, M_Int32 nColor);
```

Background .

cc - [in]

nColor - (0xRRGGBB)

✎ MC\_uicSetLabel

```
void MC_uicSetLabel(MC_UicComponent cc, M_Uint8 *psz)
```

가 가

cc - [in]

psz - [in]

✎ MC\_uicGetLabel

M\_Uint8\* MC\_uicGetLabel(MC\_UicComponent cc)

가 가

cc - [in]

---

## ✎ MC\_uicSetlabelAlignment

```
M_Int32 MC_uicSetlabelAlignment(MC_UicComponent cc, M_Int32 align)
```

```
MC_ALIGN_LEFT, MC_ALIGN_RIGHT, MC_ALIGN_CENTER
```

```
,  
가            가
```

```
cc - [in]
```

```
align - [in]
```

```
MC_ALIGN_LEFT, MC_ALIGN_RIGHT,
```

```
MC_ALIGN_CENTER
```



## ✎ MC\_uicSetTimeMask

```
M_Int32 MC_uicSetTimeMask(MC_UicComponent cc, M_Int32 mask)
```

```
(mask & MC_UIC_TIME_MASK) 0 , (mask &
MC_UIC_DATE_MASK) 0 가 .
가 가 .
```

```
cc - [in]
```

```
mask - [in] , MC_UIC_TIME_MASK MC_UIC_DATE_MASK
OR .
```

## ✎ MC\_uicSetTime

```
void MC_uicSetTime(MC_UicComponent cc, struct tm* pd)
```

|    |   |        |    |
|----|---|--------|----|
|    | 가 | 가      |    |
| pd | C | time.h | tm |

cc - [in]

pd - [in] . time.h

---

## ✂ MC\_uicSetTimeLong

```
void MC_uicSetTimeLong(MC_UicComponent cc, time_t time)
```

|        |   |        |        |   |
|--------|---|--------|--------|---|
|        |   | .      |        |   |
|        | 가 |        | 가      | . |
| time   | C | time.h | time() |   |
| time_t | . |        |        |   |

cc - [in]

time - [in] . time.h

---

## ✂ MC\_uicGetTime

```
void MC_uicGetTime(MC_UicComponet cc, struct tm* pd)
```

/ .  
 . 가 NULL 가  
 .  
 가 가  
 C time.h tm .

cc - [in]

pd - [out]

---

## ✎ MC\_uicAddMenuItem

```
M_Int32 MC_uicAddMenuItem(MC_Component cc, M_Uint8* psz, MC_GrpImage img)
```

가 .  
가 가 .

cc - [in]

psz - [in]

img - [in]

(0 .)

---

## ✂ MC\_uicGetMenuItem

```
M_Int32 MC_uicGetMenuItem(MC_Component cc, M_Uint32 idx, M_Uint8* psz,  
M_Int32 buflen, MC_GrpImage* img)
```

가 .

가 가 .

cc - [in]

idx - [in] 가

psz - [out]

buflen - [in]

img - [out]

1 0 M\_E\_SHOFTBUF: psz 가

✎ MC\_uicRemoveMenuItem

M\_Int32 MC\_uicRemoveMenuItem(MC\_Component cc, M\_Uint32 idx)

idx 가 가

가 가

cc - [in]

idx - [in]

1 0

---

## ✎ MC\_uicSetActiveMenuItem

```
M_Int32 MC_uicSetActiveMenuItem(MC_Component cc, M_Int32 idx)
```

```
가      가  
idx      ,  
idx -1
```

cc - [in]

idx - [in]



✎ MC\_uicGetActiveMenuItem

M\_Int32 MC\_uicGetActiveMenuItem(MC\_Component cc)

가 가

cc - [in]

-1 : 가

## ✎ MC\_uicInsertText

```
M_Int32 MC_uicInsertText(MC_Component cc, M_Int32 idx, M_Uint8* psz, M_Int32 len)
```

```

가 .
cc 가 가          idx          psz          len
          . idx 가 0          가          , M_CuicGetMaxTextSize()
가가          .
          가          psz 가 가
          .
          가          가
          .

```

```
cc - [in]
```

```
idx - [in]
```

```
psz - [in]
```

```
len - [in]
```

```
가
```

```
len
```

```
.
```

## ✎ MC\_uicDeleteText

```
void MC_uicDeleteText(MC_Component cc, M_Int32 idx, M_Int32 len)
```

```

cc 가 가
      .
      .
      len -1   idx   가
idx 가          len  0
      .
      가   가
      .

```

cc - [in]

idx - [in]

len - [in]

✎ MC\_uicGetMaxTextSize

M\_Int32 MC\_uicGetMaxTextSize(MC\_Component cc)

가 가

cc - [in]

### ✎ MC\_uicSetMaxTextSize

M\_Int32 MC\_uicSetMaxTextSize(MC\_Component cc, M\_Int32 max)

가 가  
 256  
 max  
 ,  
 max  
 cc - [in]  
 max - [in] ( )  
 ; 가 M\_E\_NOMEMORY 가

✎ MC\_uicGetTextSize

```
M_Int32 MC_uicGetTextSize(MC_Component cc)
```

가 가

cc - [in]

## ✎ MC\_uicGetText

```
M_Int32 MC_uicGetText(MC_Component cc, M_Int32 idx, M_Uint8* pszBuf, M_Int32 len)
```

```

cc 가 가
idx
pszBuf len
idx , idx가 0 0
, idx가 0
가 가


```

```

cc - [in]
idx - [in]
psz - [out]
len - [in]

```

---

 MC\_uicAddListItem

```
M_Int32 MC_uicAddListItem(MC_Component cc, M_Uint8* psz, MC_GrpImage img)
```

가 .

가 가

cc - [in]

psz - [in]

img - [in]

(0 .)



## ✂ MC\_uicGetListItem

```
M_Int32 MC_uicGetListItem(MC_Component cc, M_Uint32 idx, M_Uint8* psz,
M_Int32 buflen, MC_GrplImage* img)
```

가 .  
가 가

cc - [in]  
idx - [in] 가  
psz - [out]  
buflen - [in]  
img - [out]

1 0 M\_E\_SHOFTBUF: psz 가

---

## ✎ MC\_uicRemoveListItem

M\_Int32 MC\_uicRemoveListItem(MC\_Component cc, M\_Uint32 idx)

idx 가 가

가

가

cc - [in]

idx - [in]

1

0

---

  
✎ MC\_uicSetActiveListItem

```
M_Int32 MC_uicSetActiveListItem(MC_Component cc, M_Int32 idx)
```

```
    .
    .   가   .
    .   가   .
    .   idx   ,
    .   .   idx -1   .
```

```
cc - [in]
```

```
idx - [in]
```

✎ MC\_uicGetActiveListItem

M\_Int32 MC\_uicGetActiveListItem(MC\_Component cc)

가 가

cc - [in]

-1 : 가

---

## 5.1.12. C

C

C

ANSI-C

☞ (string.h)

strcpy, strncpy, strcat, strncat, strcmp, strncmp, strchr, strrchr, strspn, strcspn, strpbrk, strstr, strlen, strtok, memcpy, memmove, memcmp, memchr, memset

☞ (stdlib.h)

atof, atoi, atoll, strtod, strtol, strtoul

☞ 가 (stdarg.h)

va\_list, va\_start, va\_arg, va\_end

☞ (time.h)

clock, time, difftime, mktime, localtime, gmtime

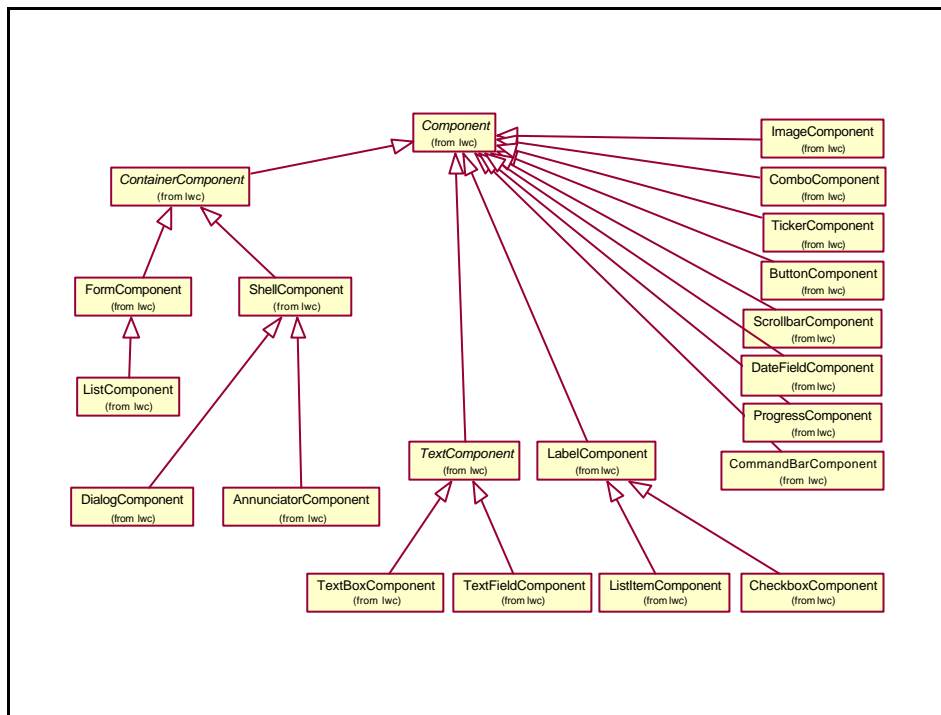
## 5.2. API

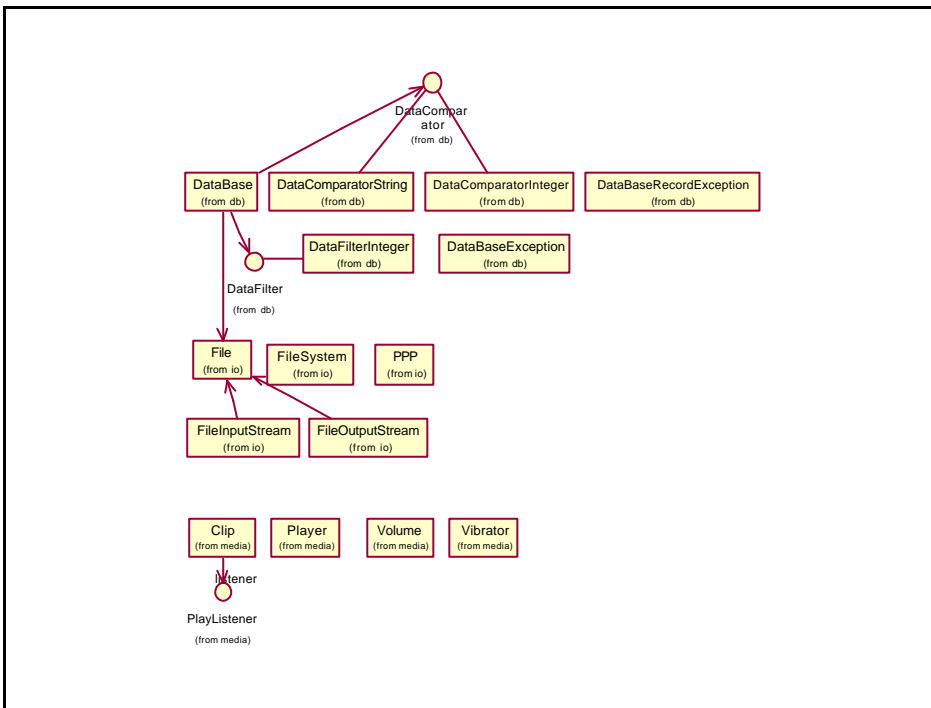
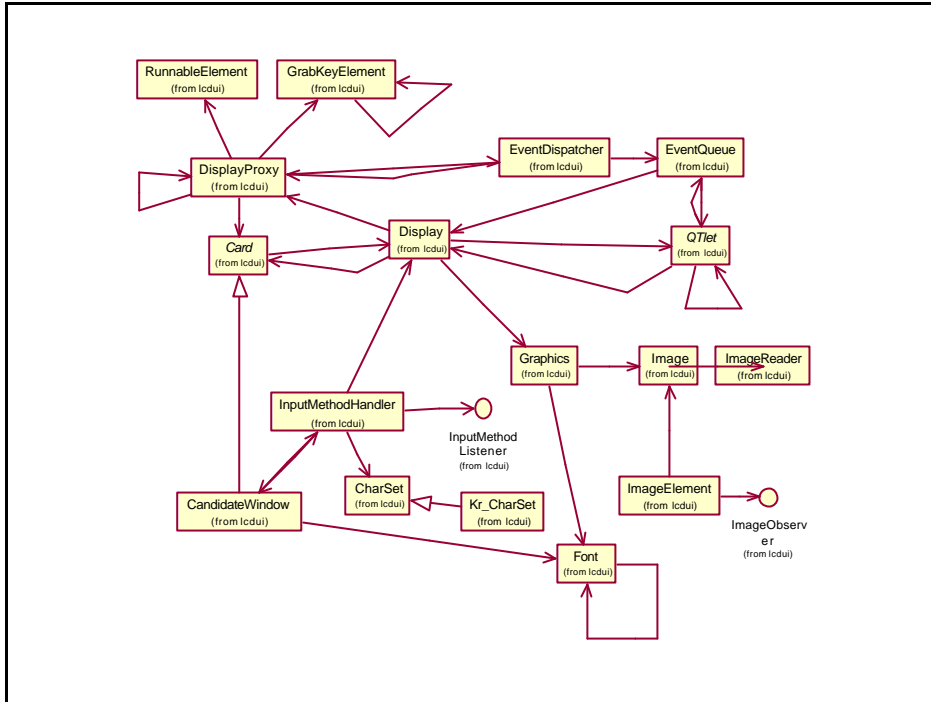
java.lang,

java.io, java.util GNU classpath

CPU

### MSP/MSF API





## 5.2.1. Core System (java.lang)

/ GNU classpath java.lang

| Class or Interface             | Member Variable or Method                        |
|--------------------------------|--|
| ArithmeticException            | ArithmeticException()                            |
|                                | ArithmeticException(java.lang.String)            |
| ArrayIndexOutOfBoundsException | ArrayIndexOutOfBoundsException()                 |
|                                | ArrayIndexOutOfBoundsException(int)              |
|                                | ArrayIndexOutOfBoundsException(java.lang.String) |
| ArrayStoreException            | ArrayStoreException()                            |
|                                | ArrayStoreException(java.lang.String)            |
| Boolean                        | Boolean(boolean)                                 |
|                                | booleanValue()                                   |
|                                | equals(java.lang.Object)                         |
|                                | hashCode()                                       |
|                                | toString()                                       |
| Byte                           | MAX_VALUE  |
|                                | MIN_VALUE  |
|                                | Byte(byte)                                       |
|                                | byteValue()                                      |
|                                | equals(java.lang.Object)                         |
|                                | hashCode()                                       |
|                                | parseByte(java.lang.String)                      |
|                                | parseByte(java.lang.String, int)                 |
|                                | toString()                                       |
| Character                      | MAX_RADIX  |
|                                | MAX_VALUE  |
|                                | MIN_RADIX  |
|                                | MIN_VALUE  |
|                                | Character(char)                                  |
|                                | charValue()                                      |
|                                | digit(char, int)                                 |
|                                | equals(java.lang.Object)                         |
|                                | hashCode()                                       |



|                        |  |
|------------------------|--|
|                        | isDigit(char)                            |
|                        | isLowerCase(char)                        |
|                        | isUpperCase(char)                        |
|                        | toLowerCase(char)                        |
|                        | toString()                               |
|                        | toUpperCase(char)                        |
| Class                  | forName(java.lang.String)                |
|                        | getName()                                |
|                        | getResourceAsStream(java.lang.String)    |
|                        | isArray()                                |
|                        | isAssignableFrom(java.lang.Class)        |
|                        | isInstance(java.lang.Object)             |
|                        | isInterface()                            |
|                        | newInstance()                            |
|                        | toString()                               |
| ClassCastException     | ClassCastException()                     |
|                        | ClassCastException(java.lang.String)     |
| ClassNotFoundException | ClassNotFoundException()                 |
|                        | ClassNotFoundException(java.lang.String) |
| Double                 | MAX_VALUE                                |
|                        | MIN_VALUE                                |
|                        | NaN                                      |
|                        | NEGATIVE_INFINITY                        |
|                        | POSITIVE_INFINITY                        |
|                        | Double(double)                           |
|                        | byteValue()                              |
|                        | doubleToLongBits(double)                 |
|                        | doubleValue()                            |
|                        | equals(java.lang.Object)                 |
|                        | floatValue()                             |
|                        | hashCode()                               |
|                        | intValue()                               |
|                        | isInfinite()                             |
|                        | isInfinite(double)                       |
|                        | isNaN()                                  |
|                        | isNaN(double)                            |

|           |                               |
|-----------|-------------------------------|
|           | longBitsToDouble(long)        |
|           | longValue()                   |
|           | parseDouble(java.lang.String) |
|           | shortValue()                  |
|           | toString()                    |
|           | toString(double)              |
|           | valueOf(java.lang.String)     |
| Error     | Error()                       |
|           | Error(java.lang.String)       |
| Exception | Exception()                   |
|           | Exception(java.lang.String)   |
| Float     | MAX_VALUE                     |
|           | MIN_VALUE                     |
|           | NaN                           |
|           | NEGATIVE_INFINITY             |
|           | POSITIVE_INFINITY             |
|           | Float(double)                 |
|           | Float(float)                  |
|           | byteValue()                   |
|           | doubleValue()                 |
|           | equals(java.lang.Object)      |
|           | floatToIntBits(float)         |
|           | floatValue()                  |
|           | hashCode()                    |
|           | intBitsToFloat(int)           |
|           | intValue()                    |
|           | isInfinite()                  |
|           | isInfinite(float)             |
|           | isNaN()                       |
|           | isNaN(float)                  |
|           | longValue()                   |
|           | parseFloat(java.lang.String)  |
|           | shortValue()                  |
|           | toString()                    |
|           | toString(float)               |
|           | valueOf(java.lang.String)     |

|                              |  |
|------------------------------|--|
| IllegalAccessException       | IllegalAccessException()                       |
|                              | IllegalAccessException(java.lang.String)       |
| IllegalArgumentException     | IllegalArgumentException()                     |
|                              | IllegalArgumentException(java.lang.String)     |
| IllegalMonitorStateException | IllegalMonitorStateException()                 |
|                              | IllegalMonitorStateException(java.lang.String) |
| IllegalStateException        | IllegalStateException()                        |
|                              | IllegalStateException(java.lang.String)        |
| IllegalThreadStateException  | IllegalThreadStateException()                  |
|                              | IllegalThreadStateException(java.lang.String)  |
| IndexOutOfBoundsException    | IndexOutOfBoundsException()                    |
|                              | IndexOutOfBoundsException(java.lang.String)    |
| InstantiationException       | InstantiationException()                       |
|                              | InstantiationException(java.lang.String)       |
| Integer                      | MAX_VALUE                                      |
|                              | MIN_VALUE                                      |
|                              | Integer(int)                                   |
|                              | byteValue()                                    |
|                              | doubleValue()                                  |
|                              | equals(java.lang.Object)                       |
|                              | floatValue()                                   |
|                              | hashCode()                                     |
|                              | intValue()                                     |
|                              | longValue()                                    |
|                              | parseInt(java.lang.String)                     |
|                              | parseInt(java.lang.String, int)                |
|                              | shortValue()                                   |
|                              | toBinaryString(int)                            |
|                              | toHexString(int)                               |
|                              | toOctalString(int)                             |
|                              | toString()                                     |
|                              | toString(int)                                  |
|                              | toString(int, int)                             |
|                              | valueOf(java.lang.String)                      |
|                              | valueOf(java.lang.String, int)                 |
| InterruptedException         | InterruptedException()                         |

|                            |  |
|----------------------------|--|
|                            | InterruptedException(java.lang.String)       |
| Long                       | MAX_VALUE                                    |
|                            | MIN_VALUE                                    |
|                            | Long(long)                                   |
|                            | doubleValue()                                |
|                            | equals(java.lang.Object)                     |
|                            | floatValue()                                 |
|                            | hashCode()                                   |
|                            | longValue()                                  |
|                            | parseLong(java.lang.String)                  |
|                            | parseLong(java.lang.String, int)             |
|                            | toString()                                   |
|                            | toString(long)                               |
|                            | toString(long, int)                          |
| Math                       | E  |
|                            | PI   |
|                            | abs(double)                                  |
|                            | abs(float)                                   |
|                            | abs(int)                                     |
|                            | abs(long)                                    |
|                            | ceil(double)                                 |
|                            | floor(double)                                |
|                            | max(double, double)                          |
|                            | max(float, float)                            |
|                            | max(int, int)                                |
|                            | max(long, long)                              |
|                            | min(double, double)                          |
|                            | min(float, float)                            |
|                            | min(int, int)                                |
|                            | min(long, long)                              |
|                            | toDegrees(double)                            |
|                            | toRadians(double)                            |
| NegativeArraySizeException | NegativeArraySizeException()                 |
|                            | NegativeArraySizeException(java.lang.String) |
| NullPointerException       | NullPointerException()                       |
|                            | NullPointerException(java.lang.String)       |

|                       |   |
|-----------------------|---|
| NumberFormatException | NumberFormatException()                 |
|                       | NumberFormatException(java.lang.String) |
| Object                | Object()                                |
|                       | equals(java.lang.Object)                |
|                       | getClass()                              |
|                       | hashCode()                              |
|                       | notify()                                |
|                       | notifyAll()                             |
|                       | toString()                              |
|                       | wait()                                  |
|                       | wait(long)                              |
|                       | wait(long, int)                         |
| OutOfMemoryError      | OutOfMemoryError()                      |
|                       | OutOfMemoryError(java.lang.String)      |
| Runnable              | run()                                   |
| Runtime               | exit(int)                               |
|                       | freeMemory()                            |
|                       | gc()                                    |
|                       | getRuntime()                            |
|                       | totalMemory()                           |
| RuntimeException      | RuntimeException()                      |
|                       | RuntimeException(java.lang.String)      |
| SecurityException     | SecurityException()                     |
|                       | SecurityException(java.lang.String)     |
| Short                 | MAX_VALUE                               |
|                       | MIN_VALUE                               |
|                       | Short(short)                            |
|                       | equals(java.lang.Object)                |
|                       | hashCode()                              |
|                       | parseShort(java.lang.String)            |
|                       | parseShort(java.lang.String, int)       |
|                       | shortValue()                            |
|                       | toString()                              |
| String                | String()                                |
|                       | String(byte[])                          |
|                       | String(byte[], int, int)                |

|  |   |
|--|---|
|  | String(byte[] , int, int, java.lang.String)             |
|  | String(byte[] , java.lang.String)                       |
|  | String(char[] )   |
|  | String(char[] , int, int)                               |
|  | String(java.lang.String)                                |
|  | String(java.lang.StringBuffer)                          |
|  | charAt(int)   |
|  | compareTo(java.lang.String)                             |
|  | concat(java.lang.String)                                |
|  | endsWith(java.lang.String)                              |
|  | equals(java.lang.Object)                                |
|  | equalsIgnoreCase(java.lang.String)                      |
|  | getBytes()  |
|  | getBytes(java.lang.String)                              |
|  | getChars(int, int, char[] , int)                        |
|  | hashCode()  |
|  | indexOf(int)  |
|  | indexOf(int, int)                                       |
|  | indexOf(java.lang.String)                               |
|  | indexOf(java.lang.String, int)                          |
|  | lastIndexOf(int)  |
|  | lastIndexOf(int, int)                                   |
|  | length()  |
|  | regionMatches(boolean, int, java.lang.String, int, int) |
|  | replace(char, char)                                     |
|  | startsWith(java.lang.String)                            |
|  | startsWith(java.lang.String, int)                       |
|  | substring(int)  |
|  | substring(int, int)                                     |
|  | toCharArray()   |
|  | toLowerCase()   |
|  | toString()  |
|  | toUpperCase()   |
|  | trim()  |
|  | valueOf(boolean)  |
|  | valueOf(char)   |

|              |                                 |
|--------------|---------------------------------|
|              | valueOf(char[])                 |
|              | valueOf(char[], int, int)       |
|              | valueOf(double)                 |
|              | valueOf(float)                  |
|              | valueOf(int)                    |
|              | valueOf(long)                   |
|              | valueOf(java.lang.Object)       |
| StringBuffer | StringBuffer()                  |
|              | StringBuffer(int)               |
|              | StringBuffer(java.lang.String)  |
|              | append(boolean)                 |
|              | append(char)                    |
|              | append(char[])                  |
|              | append(char[], int, int)        |
|              | append(double)                  |
|              | append(float)                   |
|              | append(int)                     |
|              | append(long)                    |
|              | append(java.lang.Object)        |
|              | append(java.lang.String)        |
|              | capacity()                      |
|              | charAt(int)                     |
|              | delete(int, int)                |
|              | deleteCharAt(int)               |
|              | ensureCapacity(int)             |
|              | getChars(int, int, char[], int) |
|              | insert(int, boolean)            |
|              | insert(int, char)               |
|              | insert(int, char[])             |
|              | insert(int, double)             |
|              | insert(int, float)              |
|              | insert(int, int)                |
|              | insert(int, long)               |
|              | insert(int, java.lang.Object)   |
|              | insert(int, java.lang.String)   |
|              | length()                        |

|                                 |  |
|---------------------------------|--|
|                                 | reverse()  |
|                                 | setCharAt(int, char)   |
|                                 | setLength(int)   |
|                                 | toString()   |
| StringIndexOutOfBoundsException | StringIndexOutOfBoundsException()                            |
|                                 | StringIndexOutOfBoundsException(int)                         |
|                                 | StringIndexOutOfBoundsException(java.lang.String)            |
| System                          | err  |
|                                 | out  |
|                                 | arraycopy(java.lang.Object, int, java.lang.Object, int, int) |
|                                 | currentTimeMillis()  |
|                                 | exit(int)  |
|                                 | gc()   |
|                                 | getProperty(java.lang.String)                                |
|                                 | identityHashCode(java.lang.Object)                           |
| Thread                          | MAX_PRIORITY   |
|                                 | MIN_PRIORITY   |
|                                 | NORM_PRIORITY  |
|                                 | Thread()   |
|                                 | Thread(java.lang.Runnable)                                   |
|                                 | activeCount()  |
|                                 | currentThread()  |
|                                 | getPriority()  |
|                                 | isAlive()  |
|                                 | join()   |
|                                 | run()  |
|                                 | setPriority(int)   |
|                                 | sleep(long)  |
|                                 | start()  |
|                                 | toString()   |
|                                 | yield()  |
| Throwable                       | Throwable()  |
|                                 | Throwable(java.lang.String)                                  |
|                                 | getMessage()   |
|                                 | printStackTrace()  |
|                                 | toString()   |



---

|                     |                                       |
|---------------------|---------------------------------------|
| VirtualMachineError | VirtualMachineError()                 |
|                     | VirtualMachineError(java.lang.String) |

## 5.2.2. High Level IO (java.io)

/ GNU classpath java.io

| Class or Interface         | Member Variable or Method              |               |
|----------------------------|--|---------------|
| ByteArrayInputStream       | buf                                    |               |
|                            | count                                  |               |
|                            | mark                                   |               |
|                            | pos                                    |               |
|                            | ByteArrayInputStream(byte[])           |               |
|                            | ByteArrayInputStream(byte[], int, int) |               |
|                            | available()                            |               |
|                            | close()                                |               |
|                            | mark(int)                              |               |
|                            | markSupported()                        |               |
|                            | read()                                 |               |
|                            | read(byte[], int, int)                 |               |
|                            | reset()                                |               |
|                            | skip(long)                             |               |
|                            | ByteArrayOutputStream                  | buf           |
| count                      |  |               |
| ByteArrayOutputStream()    |  |               |
| ByteArrayOutputStream(int) |  |               |
| reset()                    |  |               |
| size()                     |  |               |
| toArray()                  |  |               |
| toString()                 |  |               |
| write(byte[], int, int)    |  |               |
| write(int)                 |  |               |
| DataInput                  |  | readBoolean() |
|                            |  | readByte()    |
|                            | readChar()                             |               |
|                            | readDouble()                           |               |
|                            | readFloat()                            |               |

|                 |                                      |
|-----------------|--------------------------------------|
|                 | readFully(byte[])                    |
|                 | readFully(byte[], int, int)          |
|                 | readInt()                            |
|                 | readLong()                           |
|                 | readShort()                          |
|                 | readUnsignedByte()                   |
|                 | readUnsignedShort()                  |
|                 | readUTF()                            |
|                 | skipBytes(int)                       |
| DataInputStream | in                                   |
|                 | DataInputStream(java.io.InputStream) |
|                 | available()                          |
|                 | close()                              |
|                 | mark(int)                            |
|                 | markSupported()                      |
|                 | read()                               |
|                 | read(byte[])                         |
|                 | read(byte[], int, int)               |
|                 | readBoolean()                        |
|                 | readByte()                           |
|                 | readChar()                           |
|                 | readDouble()                         |
|                 | readFloat()                          |
|                 | readFully(byte[])                    |
|                 | readFully(byte[], int, int)          |
|                 | readInt()                            |
|                 | readLong()                           |
|                 | readShort()                          |
|                 | readUnsignedByte()                   |
|                 | readUnsignedShort()                  |
|                 | readUTF()                            |
|                 | readUTF(java.io.DataInput)           |
|                 | reset()                              |
|                 | skip(long)                           |
|                 | skipBytes(int)                       |
| DataOutput      | write(byte[])                        |

|                  |  |
|------------------|--|
|                  | write(byte[], int, int)                |
|                  | write(int)                             |
|                  | writeBoolean(boolean)                  |
|                  | writeByte(int)                         |
|                  | writeChar(int)                         |
|                  | writeChars(java.lang.String)           |
|                  | writeDouble(double)                    |
|                  | writeFloat(float)                      |
|                  | writeInt(int)                          |
|                  | writeLong(long)                        |
|                  | writeShort(int)                        |
|                  | writeUTF(java.lang.String)             |
| DataOutputStream | out                                    |
|                  | written                                |
|                  | DataOutputStream(java.io.OutputStream) |
|                  | close()                                |
|                  | flush()                                |
|                  | write(byte[], int, int)                |
|                  | write(int)                             |
|                  | writeBoolean(boolean)                  |
|                  | writeByte(int)                         |
|                  | writeChar(int)                         |
|                  | writeChars(java.lang.String)           |
|                  | writeDouble(double)                    |
|                  | writeFloat(float)                      |
|                  | writeInt(int)                          |
|                  | writeLong(long)                        |
|                  | writeShort(int)                        |
|                  | writeUTF(java.lang.String)             |
| EOFException     | EOFException()                         |
|                  | EOFException(java.lang.String)         |
| InputStream      | InputStream()                          |
|                  | available()                            |
|                  | close()                                |
|                  | mark(int)                              |
|                  | markSupported()                        |

|                        |  |
|------------------------|--|
|                        | read()   |
|                        | read(byte[])   |
|                        | read(byte[], int, int)                                     |
|                        | reset()  |
|                        | skip(long)   |
| InputStreamReader      | InputStreamReader(java.io.InputStream)                     |
|                        | InputStreamReader(java.io.InputStream, java.lang.String)   |
|                        | close()  |
|                        | mark(int)  |
|                        | markSupported()  |
|                        | read()   |
|                        | read(char[], int, int)                                     |
|                        | ready()  |
|                        | reset()  |
|                        | skip(long)   |
| InterruptedIOException | bytesTransferred   |
|                        | InterruptedIOException()                                   |
|                        | InterruptedIOException(java.lang.String)                   |
| IOException            | IOException()  |
|                        | IOException(java.lang.String)                              |
| OutputStream           | OutputStream()   |
|                        | close()  |
|                        | flush()  |
|                        | write(byte[])  |
|                        | write(byte[], int, int)                                    |
|                        | write(int)   |
| OutputStreamWriter     | OutputStreamWriter(java.io.OutputStream)                   |
|                        | OutputStreamWriter(java.io.OutputStream, java.lang.String) |
|                        | close()  |
|                        | flush()  |
|                        | write(char)  |
|                        | write(char[], int, int)                                    |
|                        | write(int)   |
|                        | write(java.lang.String, int, int)                          |
| PrintStream            | PrintStream(java.io.OutputStream)                          |
|                        | checkError()   |

|                              |  |
|------------------------------|--|
|                              | close()  |
|                              | flush()  |
|                              | print(boolean)                                 |
|                              | print(char)                                    |
|                              | print(char[])                                  |
|                              | print(int)                                     |
|                              | print(long)                                    |
|                              | print(java.lang.Object)                        |
|                              | print(java.lang.String)                        |
|                              | println()                                      |
|                              | println(boolean)                               |
|                              | println(char)                                  |
|                              | println(char[])                                |
|                              | println(int)                                   |
|                              | println(long)                                  |
|                              | println(java.lang.Object)                      |
|                              | println(java.lang.String)                      |
|                              | setError()                                     |
|                              | write(byte[], int, int)                        |
|                              | write(int)                                     |
| Reader                       | lock   |
|                              | Reader()                                       |
|                              | Reader(java.lang.Object)                       |
|                              | close()  |
|                              | mark(int)                                      |
|                              | markSupported()                                |
|                              | read()   |
|                              | read(char[])                                   |
|                              | read(char[], int, int)                         |
|                              | ready()  |
|                              | reset()  |
|                              | skip(long)                                     |
| UnsupportedEncodingException | UnsupportedEncodingException()                 |
|                              | UnsupportedEncodingException(java.lang.String) |
| UTFDataFormatException       | UTFDataFormatException()                       |
|                              | UTFDataFormatException(java.lang.String)       |

---

| Writer | lock                              |
|--------|-----------------------------------|
|        | Writer()                          |
|        | Writer(java.lang.Object)          |
|        | close()                           |
|        | flush()                           |
|        | write(char[])                     |
|        | write(char[], int, int)           |
|        | write(int)                        |
|        | write(java.lang.String)           |
|        | write(java.lang.String, int, int) |

### 5.2.3. Utilities (java.util)

/ GNU classpath java.util

| Class or Interface | Member Variable or Method |
|--------------------|---------------------------|
| Calendar           | AM                        |
|                    | AM_PM                     |
|                    | APRIL                     |
|                    | areFieldsSet              |
|                    | AUGUST                    |
|                    | DATE                      |
|                    | DAY_OF_MONTH              |
|                    | DAY_OF_WEEK               |
|                    | DAY_OF_WEEK_IN_MONTH      |
|                    | DAY_OF_YEAR               |
|                    | DECEMBER                  |
|                    | DST_OFFSET                |
|                    | ERA                       |
|                    | FEBRUARY                  |
|                    | FIELD_COUNT               |
|                    | fields                    |
|                    | FRIDAY                    |
|                    | HOUR                      |
|                    | HOUR_OF_DAY               |
|                    | isSet                     |
|                    | isTimeSet                 |
|                    | JANUARY                   |
|                    | JULY                      |
|                    | JUNE                      |
|                    | MARCH                     |
|                    | MAY                       |
|                    | MILLISECOND               |
|                    | MINUTE                    |
|                    | MONDAY                    |



|  |                                 |
|--|---------------------------------|
|  | MONTH                           |
|  | NOVEMBER                        |
|  | OCTOBER                         |
|  | PM                              |
|  | SATURDAY                        |
|  | SECOND                          |
|  | SEPTEMBER                       |
|  | SUNDAY                          |
|  | THURSDAY                        |
|  | time                            |
|  | TUESDAY                         |
|  | UNDECIMBER                      |
|  | WEDNESDAY                       |
|  | WEEK_OF_MONTH                   |
|  | WEEK_OF_YEAR                    |
|  | YEAR                            |
|  | ZONE_OFFSET                     |
|  | Calendar()                      |
|  | Calendar(java.util.TimeZone)    |
|  | after(java.lang.Object)         |
|  | before(java.lang.Object)        |
|  | complete()                      |
|  | computeFields()                 |
|  | computeTime()                   |
|  | equals(java.lang.Object)        |
|  | get(int)                        |
|  | getFirstDayOfWeek()             |
|  | getGreatestMinimum(int)         |
|  | getInstance()                   |
|  | getInstance(java.util.TimeZone) |
|  | getLeastMaximum(int)            |
|  | getMaximum(int)                 |
|  | getMinimalDaysInFirstWeek()     |
|  | getMinimum(int)                 |
|  | getTime()                       |
|  | getTimeInMillis()               |

|                     |                                       |
|---------------------|---------------------------------------|
|                     | getTimeZone()                         |
|                     | initialize()                          |
|                     | internalGet(int)                      |
|                     | isLenient()                           |
|                     | isSet(int)                            |
|                     | set(int, int)                         |
|                     | set(int, int, int)                    |
|                     | setTime(java.util.Date)               |
|                     | setTimeInMillis(long)                 |
|                     | setTimeZone(java.util.TimeZone)       |
| Date                | Date()                                |
|                     | Date(long)                            |
|                     | equals(java.lang.Object)              |
|                     | getTime()                             |
|                     | hashCode()                            |
|                     | setTime(long)                         |
| EmptyStackException | EmptyStackException()                 |
| Enumeration         | hasMoreElements()                     |
|                     | nextElement()                         |
| GregorianCalendar   | AD                                    |
|                     | BC                                    |
|                     | GregorianCalendar()                   |
|                     | GregorianCalendar(int, int, int)      |
|                     | GregorianCalendar(java.util.TimeZone) |
|                     | after(java.lang.Object)               |
|                     | before(java.lang.Object)              |
|                     | computeFields()                       |
|                     | computeTime()                         |
|                     | equals(java.lang.Object)              |
|                     | getGreatestMinimum(int)               |
|                     | getLeastMaximum(int)                  |
|                     | getMaximum(int)                       |
|                     | getMinimum(int)                       |
|                     | hashCode()                            |
|                     | isLeapYear(int)                       |
| Hashtable           | Hashtable()                           |

|                        |   |
|------------------------|---|
|                        | Hashtable(int)  |
|                        | clear()   |
|                        | contains(java.lang.Object)  |
|                        | containsKey(java.lang.Object)   |
|                        | elements()  |
|                        | get(java.lang.Object)   |
|                        | isEmpty()   |
|                        | keys()  |
|                        | put(java.lang.Object, java.lang.Object)                                       |
|                        | rehash()  |
|                        | remove(java.lang.Object)  |
|                        | size()  |
|                        | toString()  |
| NoSuchElementException | NoSuchElementException()  |
|                        | NoSuchElementException(java.lang.String)                                      |
| Random                 | Random()  |
|                        | Random(long)  |
|                        | next(int)   |
|                        | nextInt()   |
|                        | nextLong()  |
|                        | setSeed(long)   |
| SimpleTimeZone         | SimpleTimeZone(int, java.lang.String)   |
|                        | SimpleTimeZone(int, java.lang.String, int, int, int, int, int, int, int, int) |
|                        | equals(java.lang.Object)  |
|                        | getOffset(int, int, int, int, int, int)                                       |
|                        | getRawOffset()  |
|                        | hashCode()  |
|                        | inDaylightTime(java.util.Date)  |
|                        | setRawOffset(int)   |
|                        | setStartYear(int)   |
|                        | useDaylightTime()   |
| Stack                  | Stack()   |
|                        | empty()   |
|                        | peek()  |
|                        | pop()   |
|                        | push(java.lang.Object)  |

|           |  |
|-----------|--|
|           | search(java.lang.Object)                                       |
| Timer     | Timer()  |
|           | cancel()   |
|           | schedule(java.util.TimerTask, java.util.Date)                  |
|           | schedule(java.util.TimerTask, java.util.Date, long)            |
|           | schedule(java.util.TimerTask, long)                            |
|           | schedule(java.util.TimerTask, long, long)                      |
|           | scheduleAtFixedRate(java.util.TimerTask, java.util.Date, long) |
|           | scheduleAtFixedRate(java.util.TimerTask, long, long)           |
| TimerTask | TimerTask()  |
|           | cancel()   |
|           | run()  |
|           | scheduledExecutionTime()                                       |
| TimeZone  | TimeZone()   |
|           | getAvailableIDs()  |
|           | getAvailableIDs(int)   |
|           | getDefault()   |
|           | getID()  |
|           | getOffset(int, int, int, int, int, int)                        |
|           | getRawOffset()   |
|           | getTimeZone(java.lang.String)                                  |
|           | initialize()   |
|           | setID(java.lang.String)  |
|           | toString()   |
|           | useDaylightTime()  |
| Vector    | capacityIncrement  |
|           | elementCount   |
|           | elementData  |
|           | Vector()   |
|           | Vector(int)  |
|           | Vector(int, int)   |
|           | addElement(java.lang.Object)                                   |
|           | capacity()   |
|           | contains(java.lang.Object)                                     |
|           | copyInto(java.lang.Object[ ])                                  |
|           | elementAt(int)   |

---

|  |  |
|--|--|
|  | elements()                             |
|  | ensureCapacity(int)                    |
|  | firstElement()                         |
|  | indexOf(java.lang.Object)              |
|  | indexOf(java.lang.Object, int)         |
|  | insertElementAt(java.lang.Object, int) |
|  | isEmpty()                              |
|  | lastElement()                          |
|  | lastIndexOf(java.lang.Object)          |
|  | lastIndexOf(java.lang.Object, int)     |
|  | removeAllElements()                    |
|  | removeElement(java.lang.Object)        |
|  | removeElementAt(int)                   |
|  | setElementAt(java.lang.Object, int)    |
|  | setSize(int)                           |
|  | size()                                 |
|  | toString()                             |
|  | trimToSize()                           |

## 5.2.4. Low Level IO (org.kwis.msf.io)

### Interface HttpSocket

```
public interface HttpSocket
```

```
HTTP
```

#### HEAD

```
public static final java.lang.String HEAD
```

```
HTTP Head . "HEAD" .
```

#### GET

```
public static final java.lang.String GET
```

```
HTTP Get . "GET" .
```

#### POST

```
public static final java.lang.String POST
```

```
HTTP Post . "POST" .
```

#### TRACE

```
public static final java.lang.String TRACE
```

```
HTTP Trace . "TRACE" .
```

#### PUT

```
public static final java.lang.String PUT
```

```
HTTP Put . "PUT" .
```

 DELETE

```
public static final java.lang.String DELETE
HTTP Delete . "DELETE" .
```

 OPTIONS


```
public static final java.lang.String OPTIONS
HTTP Options . "OPTIONS" .
```

 CONNECT


```
public static final java.lang.String CONNECT
HTTP Connect . "CONNECT" .
```

 HTTP\_OK

```
public static final int HTTP_OK
OK . 200 .
```

 HTTP\_CREATED

```
public static final int HTTP_CREATED
CREATED . 201 .
```

 HTTP\_ACCEPTED

```
public static final int HTTP_ACCEPTED
ACCEPTED . 202 .
```

 HTTP\_NON\_AUTHORITATIVE

```
public static final int HTTP_NON_AUTHORITATIVE
NOT AUTHORITATIVE . 203 .
```

✍ HTTP\_NO\_CONTENT

```
public static final int HTTP_NO_CONTENT
    NO_CONTENT . 204 .
```

✍ HTTP\_RESET\_CONTENT

```
public static final int HTTP_RESET_CONTENT
    RESET_CONTENT . 205 .
```

✍ HTTP\_PARTIAL\_CONTENT

```
public static final int HTTP_PARTIAL_CONTENT
    PARTIAL_CONTENT . 206 .
```

✍ HTTP\_MULTIPLE\_CHOICE

```
public static final int HTTP_MULTIPLE_CHOICE
    MULTIPLE_CHOICE . 300 .
```

✍ HTTP\_MOVED\_PERMANENTLY

```
public static final int HTTP_MOVED_PERMANENTLY
    MOVED PERMANENTLY . 301 .
```

✍ HTTP\_MOVED\_TEMPORARILY

```
public static final int HTTP_MOVED_TEMPORARILY
    MOVED TEMPORARILY . 302 .
```

✍ HTTP\_SEE\_OTHER

```
public static final int HTTP_SEE_OTHER
    SEE_OTHER . 303 .
```



 HTTP\_NOT\_MODIFIED

```
public static final int HTTP_NOT_MODIFIED
    NOT_MODIFIED . 304 .
```

 HTTP\_USE\_PROXY

```
public static final int HTTP_USE_PROXY
    USE_PROXY . 305 .
```

 HTTP\_BAD\_REQ

```
public static final int HTTP_BAD_REQ
    BAD_REQUEST . 400 .
```

 HTTP\_UNAUTHORIZED

```
public static final int HTTP_UNAUTHORIZED
    UNAUTHORIZED . 401 .
```

 HTTP\_PAYMENT\_REQUIRED

```
public static final int HTTP_PAYMENT_REQUIRED
    PAYMENT_REQUIRED . 402 .
```

 HTTP\_FORBIDDEN

```
public static final int HTTP_FORBIDDEN
    FORBIDDEN . 403 .
```

 HTTP\_NOT\_FOUND

```
public static final int HTTP_NOT_FOUND
    NOT_FOUND . 404 .
```

✎ HTTP\_METHOD\_NOT\_ALLOWED

```
public static final int HTTP_METHOD_NOT_ALLOWED
    METHOD NOT ALLOWED . 405 .
```

✎ HTTP\_NOT\_ACCEPTABLE

```
public static final int HTTP_NOT_ACCEPTABLE
    NOT ACCEPTABLE . 406 .
```

✎ HTTP\_PROXY\_AUTHENTICATION\_REQUIRED

```
public static final int HTTP_PROXY_AUTHENTICATION_REQUIRED
    PROXY AUTHENTICATION REQUITRED . 407 .
```

✎ HTTP\_REQ\_TIMEOUT

```
public static final int HTTP_REQ_TIMEOUT
    REQUEST TIMEOUT . 408 .
```

✎ HTTP\_CONFLICT

```
public static final int HTTP_CONFLICT
    CONFLICT . 409 .
```

✎ HTTP\_GONE

```
public static final int HTTP_GONE
    GONE . 410 .
```

✎ HTTP\_LENGTH\_REQUIRED

```
public static final int HTTP_LENGTH_REQUIRED
    LENGTH REQUIRED . 411 .
```

 HTTP\_PRECONDITION\_FAILED

```
public static final int HTTP_PRECONDITION_FAILED
    PRECONDITION_FAILED . 412 .
```

 HTTP\_ENTITY\_TOO\_LARGE

```
public static final int HTTP_ENTITY_TOO_LARGE
    TOO_LARGE . 413 .
```

 HTTP\_REQ\_TOO\_LONG

```
public static final int HTTP_REQ_TOO_LONG
    REQUEST_TOO_LONG . 414 .
```

 HTTP\_UNSUPPORTED\_TYPE

```
public static final int HTTP_UNSUPPORTED_TYPE
    UNSUPPORTED_TYPE . 415 .
```

 HTTP\_REQ\_RANGE

```
public static final int HTTP_REQ_RANGE
    REQUEST_RANGE_NOT_SATISFIABLE . 416 .
```

 HTTP\_EXPECT\_FAIL

```
public static final int HTTP_EXPECT_FAIL
    EXPECTATION_FAILED . 417 .
```

 HTTP\_SERVER\_ERR

```
public static final int HTTP_SERVER_ERR
    INTERNAL_SERVER_ERROR . 500 .
```

 HTTP\_NOT\_IMPL

```
public static final int HTTP_NOT_IMPL
    NOT IMPLEMENTED . 501 .
```

 HTTP\_BAD\_GATEWAY

```
public static final int HTTP_BAD_GATEWAY
    BAD GATEWAY . 502 .
```

 HTTP\_UNAVAILABLE


```
public static final int HTTP_UNAVAILABLE
    UNAVAILABLE . 503 .
```

 HTTP\_GATEWAY\_TIMEOUT

```
public static final int HTTP_GATEWAY_TIMEOUT
    GATEWAY TIMEOUT . 504 .
```

 HTTP\_VERSION

```
public static final int HTTP_VERSION
    VERSION NOT SUPPORTED . 505 .
```

 close

```
public void close()
    throws java.io.IOException
```

```
HTTP .
```

 getInputStream

```
public java.io.InputStream getInputStream()
```

---

throws java.io.IOException

InputStream .

Returns:

InputStream

 `getOutputStream`

```
public java.io.OutputStream getOutputStream()
```

throws java.io.IOException

OutputStream .

Returns:

OutputStream

 `getURL`

```
public java.lang.String getURL()
```

URL .

Returns:

URL

 `getProtocol`

```
public java.lang.String getProtocol()
```

URL .


Returns:

 `getHost`

```
public java.lang.String getHost()
```

URL .


Returns:

 `getFile`

```
public java.lang.String getFile()
```

URL .

Returns:

 `getRef`

```
public java.lang.String getRef()
```

URL anchor .

Returns:

anchor

 `getQuery`

```
public java.lang.String getQuery()
```

URL query .

Returns:


query

 `getPort`

```
public int getPort()
```


URL .

Returns:

 `getRequestMethod`

```
public java.lang.String getRequestMethod()
```


Returns:

 `setRequestMethod`

```
public void setRequestMethod(java.lang.String method)
                        throws java.io.IOException
```

Parameters:

`method` -

 `getRequestProperty`

```
public java.lang.String getRequestProperty(java.lang.String key)
                        key          request property
```

Parameters:

`key` - request header

Returns:

request property

 `setRequestProperty`

```
public void setRequestProperty(java.lang.String key,
                               java.lang.String value)
```

`key` - request header

Parameters:

`key` - request header

`value` - request property

 `getResponseCode`

```
public int getResponseCode()
```

throws java.io.IOException

Returns:

Throws:

java.io.IOException -

 `getResponseMessage`

```
public java.lang.String getResponseMessage()  
                        throws java.io.IOException
```

? HTTP/1.0 200 OK

? HTTP/1.0 404 Not Found

"OK"      "Not Found"

Returns:

Throws:

java.io.IOException -

 `getLength`

```
public long getLength()
```


Returns:

 `getType`

```
public java.lang.String getType()
```



Returns:

 `getEncoding`

```
public java.lang.String getEncoding()
```

"content-encoding"

Returns:

 `getExpiration`

```
public long getExpiration()
```

Returns:

1970 1 1 GMT ( )

 `getDate`

```
public long getDate()
```

Returns:

1970 1 1 GMT ( )

 `getLastModified`

```
public long getLastModified()
```

Returns:

1970 1 1 GMT ( )

 `getHeaderField`

```
public java.lang.String getHeaderField(java.lang.String name)
```

Parameters:

`name` -

Returns:

 `setProxy`

```
public void setProxy(java.lang.String host,  
                    int port)  
    throws java.io.IOException
```

HTTP

Parameters:

`host` -

`port` -

Throws:

`java.io.IOException` -


 `isRelocatable`

```
public boolean isRelocatable()
```

가 가

Returns:

가 301, 302, 303 true

 `relocation`

```
public HttpSocket relocation()
```

throws java.io.IOException

가 가  
HTTP .

Returns:

HTTP

Throws:

java.io.IOException -



## Class Message

java.lang.Object

|

+--org.kwis.msf.io.Message

```
public class Message
```

```
extends java.lang.Object
```

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

### Message

```
public Message(java.lang.String addr,
               byte[] data)
```

Parameters:

addr -

data -

### Message

```
public Message(java.lang.String addr,
               byte[] data,
               int off,
               int len)
```

Parameters:

---

addr -

data -

off -

len -



#### getData

```
public byte[] getData()
```

Returns:

#### getLength

```
public int getLength()
```

Returns:

#### setLength

```
public int setLength(int val)
```

|   |                          |                        |
|---|--------------------------|------------------------|
|   | <code>getOffset()</code> | <code>getData()</code> |
| 가 | 가 0                      | -1                     |

Parameters:

val-

Returns:

 `getOffset`

```
public int getOffset()
```

Returns:

 `setOffset`

```
public int setOffset(int val)
```

`getData()` 가  
`getData()` 가

`getLength()`

0

-1

Parameters:

val-

Returns:

 `getAddress`

```
public java.lang.String getAddress()
```

Returns:

 `getAddressInt`

```
public int getAddressInt()
```

Returns:

## ✍ getDate

```
public java.util.Date getDate()
```

```
가 .
```

Returns:

```
: 가 .
```

```
: null .
```

## ✍ setDate

```
public void getDate(java.util.Date date)
```

```
가 .
```

Parameters:

```
date - 가 .
```

## ✍ setAddressInt

```
public void getAddressInt(int addr)
```

```
. UDP
```

```
IP :
```

```
) 111.111.111.111:80
```

Parameters:

```
addr -
```

Class Network

java.lang.Object

|

+-org.kwis.msf.io.Network

public class Network

extends java.lang.Object

TCP/IP

API

API

가

TCP/IP

. TCP/IP

URL.find()

 connect

public static int connect()

TCP/IP

Returns:

가 0 ,

1 . -1 .

 disconnect

public static void disconnect()

TCP/IP

가

TCP/IP

I/O

가



## Class SchemeNotFoundException

java.lang.Object

|

+- java.lang.Throwable

|

+- java.lang.Exception

|

+- java.io.IOException

|

+- org.kwis.msf.io.SchemeNotFoundException


```
public class SchemeNotFoundException
extends java.io.IOException
```

Methods inherited from class java.lang.Throwable

fillInStackTrace, getLocalizedMessage, getMessage, printStackTrace,  
printStackTrace, printStackTrace, toString

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, wait, wait, wait

 SchemeNotFoundException

```
public SchemeNotFoundException()
```

 SchemeNotFoundException

```
public SchemeNotFoundException(java.lang.String s)
```

## Interface Socket

public interface Socket

가

(stream)

java.io.InputStream    java.io.OutputStream

(Message)

가 TCP

가 UDP

### getInputStream

```
public java.io.InputStream getInputStream()
    throws java.io.IOException
```

InputStream

Returns:

InputStream

Throws:

java.io.IOException -                    InputStream

### getOutputStream

```
public java.io.OutputStream getOutputStream()
    throws java.io.IOException
```

OutputStream

Returns:

OutputStream

Throws:


java.io.IOException -                    OutputStream

 isStream

```
public boolean isStream()
```

Returns:

true, false

 getMessageCount

```
public int getMessageCount()  
    throws java.io.IOException
```

Returns:

-1

Throws:

java.io.IOException - stream


 getMessageMaxLength

```
public int getMessageMaxLength()  
    throws java.io.IOException
```

Returns:

Throws:

java.io.IOException -

 send


```
public void send(Message m)  
    throws java.io.IOException
```

Parameters:

m – 가

Throws:

java.io.IOException -

 recv

```
public void recv(Message msg)
           throws java.io.IOException
```


Parameters:

m –

Returns:

Throws:

java.io.IOException -


 close

```
public void close()
           throws java.io.IOException
```

|             |              |                  |                   |
|-------------|--------------|------------------|-------------------|
|             |              | getInputStream() | getOutputStream() |
| InputStream | OutputStream |                  |                   |
|             | InputStream  | OutputStream     | close()    가      |

Throws:

java.io.IOException -

 accept

```
public Socket accept()
           throws java.io.IOException
```

Returns:

Throws:

java.io.IOException -

I/O 가



**Class URL**

java.lang.Object

|

+-org.kwis.msf.io.URL

public class URL

extends java.lang.Object

URL.find( )      URL(RFC1738      )      . URL

(scheme)

(stream)

URL

TCP

URL(serversocket://      )

(Socket)

|     | URL  |  |  |
|-----|--|--|--|
| TCP | socket://<IP      >:<<br>>[/<      >/<      >]<br>serversocket://:<      ><br>[/<      >/<      >] | socket://111.11<br>1.111.111:80<br>socket://111.11<br>1.111.111:80/rw<br>/3000 | .      :r(      ),<br>w(      ),<br>rw(      가 )<br>.      :<br>. 0<br>.<br>.<br>.<br>"rw",<br>"0 "<br>(serversocket<br>://      ) |

|        |                       |   |                            |
|--------|-----------------------|---|----------------------------|
| UDP    | datagram://:< >[/< >] | datagram://:80<br>datagram://:80/r<br>w/3000                  | TCP 가                      |
| serial | comm://< >:< >        | comm://0:baudr<br>ate=115200,parit<br>y=no,size=8,flow<br>=no | HAL<br>API MH_serialOpen() |
| HTTP   | HTTP URL              | http://somehost:<br>80  |                            |

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 URL

public URL()

 find

public static Socket find(java.lang.String url)  
throws SchemeNotFoundException

url

Throws:

SchemeNotFoundException -





## 5.2.5. System (org.kwis.msf.core)

### Class Kernel

java.lang.Object

|

+--org.kwis.msf.core.Kernel

```
public class Kernel
```

```
extends java.lang.Object
```

```
System Kernel
```

```
, , shared library load
```

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

```
PRGTYPE_SYSDLL
```

```
public static final int PRGTYPE_CAPP
```

C

```
PRGTYPE_APPDLL
```

```
public static final int PRGTYPE_CDLL
```

C

```
PRGTYPE_NORMAL
```

```
public static final int PRGTYPE_JAVAAPP
```

Java

 PRGTYPE\_NORMAL


```
public static final int PRGTYPE_JAVADLL
```

Java

 PRGTYPE\_NORMAL


```
public static final int PRGTYPE_JAVASYSDLL
```

Java

 DIR\_SYS\_READ\_REQ

```
public static final int DIR_SYS_READ_REQ_MASK
```

system directory read가

 DIR\_SYS\_WRITE\_REQ

```
public static final int DIR_SYS_WRITE_REQ_MASK
```

system directory write가

 DIR\_SHARED\_READ\_REQ

```
public static final int DIR_SHARED_READ_REQ_MASK
```

shared directory read가

 DIR\_SHARED\_WRITE\_REQ

```
public static final int DIR_SHARED_WRITE_REQ_MASK
```

shared directory write가

 NETWORK\_ACCESS\_REQ

```
public static final int NETWORK_ACCESS_REQ_MASK
```

network API 가

✎ SERIAL\_ACCESS\_REQ

```
public static final int SERIAL_ACCESS_REQ_MASK
```

serial API 가

✎ SYSTEM1\_ACCESS\_REQ

```
public static final int SYSTEM1_ACCESS_REQ_MASK
```

system group1 API 가 (system group1 API 가 )

✎ SYSTEM2\_ACCESS\_REQ

```
public static final int SYSTEM2_ACCESS_REQ_MASK
```

system group2 API 가 (system group2 API 가 )

✎ Kernel

```
public Kernel ()
```

✎ execute

```
public static int execute(String execName,
                          String[] args)
```

(non-blocking)

, MV\_CHILDSTOP\_EVENT

parent

---

execName - , getExecNames()  
 args - Main method() Returns:  
 ID, error value return

See Also:

getExecNames(String prgName, String version, String vendor)

 getPrgID

public static int getPrgID()

ID .

Returns:

ID

 getAMID

public static int getAMID()

ID .

Returns:

ID


 getParentPrgID

public static int getParentPrgID()

parent ID .

Returns:

ID

 getExecNames

public static String[] getExecNames(String prgName,  
 String version,

String vendor)

```

        prgName(        ), version,
vendor        .        가
NULL        .        prgName,
version, vendor 가    NULL    ,
        .        null
    .

```

Parameters:

prgName -

version -

vendor -

Returns:

string array

✍ getPrgInfo

public static int[] getPrgInfo()

```

        . int array    length
        ,    index        index
type        .    int[2]가 PRGTYPE_JAVADLL        prgID가 2
java application DLL    .

```

Returns:

type integer array

✍ stop

public static void stop(int prgID)

```

        . DLL        , DLL
APP가        .

```

Parameters:

prgID - ID

## ✍ letThrowExceptionWhenProgramExit

```
public static int letThrowExceptionWhenProgramExit()
```

```
Program thread ProgramExitException exception
API library , library
resource free .
```

Returns:

0 가 ID

## ✍ getAccessLevel

```
public static int getAccessLevel()
```

```
access level . return value bit access
API . bit XXX_REQ define
```

Returns:

access level

## ✍ getPrgName

```
public static java.lang.String getPrgName()
```

```
. ADF file .
```

Returns:

## Class ProgramExitException

java.lang.Object

|

+-- java.lang.Throwable

|

+-- java.lang.Exception

|

+-- java.lang.RuntimeException

|

+-- org.kwis.msf.core.ProgramExitException

All Implemented Interfaces:

java.io.Serializable

```
public class ProgramExitException
```

```
extends java.lang.RuntimeException
```

thread

exception

Methods inherited from class java.lang.Throwable

fillInStackTrace, getLocalizedMessage, getMessage, printStackTrace,  
printStackTrace, printStackTrace, toString

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, wait, wait, wait

 ProgramExitException


```
public ProgramExitException()
```

ProgramExitException object

 ProgramExitException

```
public ProgramExitException(java.lang.String s)
```

message 가 ProgramExitException object





**Class Shared**

```
java.lang.Object
|
+--org.kwis.msf.core.Shared
```

```
public class Shared
extends java.lang.Object

    memory shared . share
buffer 1 가 . shared buffer size create , shared
buffer free .
```

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait



 Shared

```
public Shared()
```



 createBuf

```
public static byte[] createBuf(int size)
```

```
    create . byte array 1 create . create
buf buf .
    MIME type
```

Parameters:

size - byte array

Returns:

buf, 가 null .

### getBuf

```
public static byte[] getBuf()
```

shared .

Returns:

, shared buffer가 null

### resizeBuf

```
public static byte[] resizeBuf(int size)
```

. 가  
가 0 .  
가 .  
가 object가 ,  
object 가 가

Parameters:

size -

Returns:

가

## 5.2.6. Database(org.kwis.msp.db)

### Interface DataComparator

All Known Implementing Classes:

DataComparatorInteger, DataComparatorString

```
public interface DataComparator
```

```
    sortRecord(Record r1, Record r2)
    compare(Record r1, Record r2)
```

가

See Also:

[DataFilter](#), [DataComparatorInteger](#)

 EQUIVALENT

```
public static final int EQUIVALENT
```

가

 FOLLOWS

```
public static final int FOLLOWS
```

가

 PRECEDES

```
public static final int PRECEDES
```

가

 compare

```
public int compare(byte[] data1,
                  byte[] data2)
    (    , comparator) .
```

Parameters:

data1 -

data2 -

Returns:

가 DataComparator.EQUIVALENT, data2 data1  
 ( data1 data2 )  
 DataComparator.FOLLOWS, data1 data2가  
 DataComparator.PRECEDES

## Interface DataFilter

All Known Implementing Classes:

DataFilterInteger

```
public interface DataFilter
```

```
    . sortRecord
        가
        DataFilter 가 .
```

See Also:

[DataComparator](#), [DataFilterInteger](#)

 filter

```
public boolean filter(byte[] data)
```

Parameters:

data -

Returns:

가 true, false

**Class DataBase**

java.lang.Object

|

+- - org.kwis.msp.db.DataBase

public class DataBase

extends Object

Jlet

( )

Jlet

( )

ID 0 가 ID Integer ID  
 1 가 . 가  
 ID .  
 가/  
 가 . MSP 가  
 (compaction)

Jlet

가

Jlet

Jlet

Jlet

Jlet

Jlet

( )

DataFilter

DataComparator

|  |
|--|
| java.lang.Object   |
| equals , getClass, hashCode, notify, notifyAll, toString, wait, wait, wait |

### openDataBase

```
public static DataBase openDataBase(String dataBaseName,
                                   int recordSize,
                                   boolean create)
    throws DataBaseException,
           IllegalArgumentException
```

Jlet

FileSystem.PRIVATE\_ACCESS

Parameters:

dataBaseName -

recordSize - (byte ). 가

recordSize 가

create - 가

Returns:

Throws:

DataBaseException - create가 false 가

가

IllegalArgumentException - create가 true , recordSize가 0

### openDataBase

```
public static DataBase openDataBase(String dataBaseName,
```

```

        int recordSize,
        boolean create,
        int flag)
    throws DataBaseException,
        IllegalArgumentException

```

```

        Jlet
        ,
        Jlet
        flag

```

Parameters:

dataBaseName -

recordSize - (byte ). 가  
recordSize 가

create - 가

flag - , FileSystem.PRIVATE\_ACCESS,  
FileSystem.SHARED\_ACCESS, FileSystem.SYSTEM\_ACCESS 가

Returns:

Throws:

DataBaseException - create가 false 가  
가

IllegalArgumentException - create가 true , recordSize가 0

 closeDataBase

```

public void closeDataBase()
    throws DataBaseException

```

Throws:

DataBaseException -

 deleteDataBase



```

public static void deleteDataBase(String dataBaseName)
    throws DataBaseException
    {
        Jlet FileSystem.PRIVATE_ACCESS
    }

```

Parameters:

dataBaseName -

Throws:

DataBaseException - 가

### deleteDataBase

```

public static void deleteDataBase(String dataBaseName,
    int flag)
    throws DataBaseException
    {
        Jlet flag 가 가
    }

```

Parameters:

dataBaseName -

flag -

FileSystem.PRIVATE\_ACCESS, FileSystem.SHARED\_ACCESS,  
 FileSystem.SYSTEM\_ACCESS 가

Throws:

DataBaseException - 가

### insertRecord

```

public int insertRecord(byte[] data,
    int offset,
    int numBytes)
    throws DataBaseRecordException,
    DataBaseException,
    IllegalArgumentException

```

가 .  
 . 가  
 , (garbage) .  
 selectRecord ,  
 (garbage) .

Parameters:

data - 가

offset - 가

numBytes -

Returns:

ID

Throws:

DataBaseRecordException - 가

DataBaseException -

IllegalArgumentException - data offset numBytes

 insertRecord

```
public int insertRecord(byte[] data)
    throws DataBaseRecordException,
           DataBaseException
```

가 .  
 . 가  
 , (garbage) .  
 selectRecord ,  
 (garbage) .

Parameters:

data - 가

Returns:

ID

Throws:

DataBaseRecordException - 가

DataBaseException -

 deleteRecord

```
public void deleteRecord(int recordId)
    throws DataBaseException,
           DataBaseRecordException
    {
        .
    }
    ID
```


Parameters:

recordId - ID

Throws:

DataBaseException -

DataBaseRecordException - ID가

 selectRecord

```
public byte[] selectRecord(int recordId)
    throws DataBaseException,
           DataBaseRecordException
    {
        .
    }
    ID
```

Parameters:

recordId - ID

Returns:

ID

Throws:

DataBaseException -

DataBaseRecordException - ID가

## ✍ selectRecord

```
public void selectRecord(int recordId,
                        byte[] buffer,
                        int offset)
    throws DataBaseException,
           DataBaseRecordException,
           IllegalArgumentException
```

ID

가

getRecordSize

Parameters:

recordId - ID

buffer -

offset -

Throws:

IllegalArgumentException - 가

DataBaseException -

DataBaseRecordException - ID가

## ✍ updateRecord

```
public void updateRecord(int recordId,
                        byte[] newData,
                        int offset,
                        int numBytes)
    throws DataBaseRecordException,
           DataBaseException,
           IllegalArgumentException
```

ID

Parameters:

recordId - ID

newData - 가

offset - 가

numBytes -

Throws:

DataBaseException -

DataBaseRecordException - 가  
ID가

IllegalArgumentException -

### updateRecord

```
public void updateRecord(int recordId,
                        byte[] newData)
    throws DataBaseException,
           DataBaseRecordException
    {
        ID
    }
    .
```

Parameters:

recordId - ID

newData - 가

Throws:

DataBaseException -

DataBaseRecordException - 가  
ID가

### sortRecord

```
public int[] sortRecord(DataFilter filter,
                       DataComparator comparator)
    throws DataBaseException
    {
        .
    }
    .
```

[DataComparator](#)

DataComparator comparator가 null

ID

[DataFilter](#)

filter가 null

filter null comparator  
 ID comparator null filter 가  
 ID filter comparator null  
 ID

([DataFilterInteger](#), [DataComparatorInteger](#).)

ID 가  
 ID selectRecord

Parameters:

filter - null

comparator - null

Returns:

ID 가 null

Throws:

DataBaseException -

 listDataBases

public static String[] listDataBases()

Jlet

FileSystem.PRIVATE\_ACCESS

FileSystem.SHARED\_ACCESS, FileSystem.SYSTEM\_ACCESS

가

Returns:

null

✍ `getAccessMode`

```
public static int getAccessMode(String dbName)
    throws DataBaseException
```

Parameters:

dbName -

Returns:

FileSystem.PRIVATE\_ACCESS, FileSystem.SHARED\_ACCESS,  
 FileSystem.SYSTEM\_ACCESS 가

Throws:

DataBaseException - 가 dbName null

✍ `getDataBaseName`

```
public String getDataBaseName()
```

Returns:

✍ `getDataBaseSize`

```
public int getDataBaseSize()
```

( .)

Returns:

✍ `getNumberOfRecords`

```
public int getNumberOfRecords()
```

Returns:

✍ `getRecordSize`

```
public int getRecordSize()
```

(overhead)

Returns:

(byte)

✍ `getSizeAvailable`

```
public int getSizeAvailable()
```

(overhead)가

가

Returns:

(byte )

✍ `getLastModified`

```
public long getLastModified()
```

가 가

. `System.currentTimeMillis()`가

Returns:





Class DataComparatorInteger

java.lang.Object

|

+- org.kwis.msp.db.DataComparatorInteger

All Implemented Interfaces:

DataComparator

public class DataComparatorInteger

extends Object

implements DataComparator

sortRecord

|  |
|--|
| Fields inherited from interface org.kwis.msp.db.DataComparator |
| EQUIVALENT, FOLLOWS, PRECEDES                                  |

|   |
|---|
| Methods inherited from class java.lang.Object                             |
| equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait |



DataComparatorInteger

public DataComparatorInteger(int offset)

|            |            |                       |
|------------|------------|-----------------------|
|            | sortRecord | DataComparator        |
|            | ,          | DataComparatorInteger |
| sortRecord |            | 4                     |
|            |            | (big -endian)         |
| sortRecord |            |                       |

Parameters:

offset - 가



 compare

```
public int compare(byte[] data1,
                  byte[] data2)
```

Description copied from interface: DataComparator

```
( , comparator) .
```

Specified by:

compare in interface DataComparator

Following copied from interface: org.kwis.msp.db.DataComparator

Parameters:

data1 -

data2 -

Returns:

```
가 DataComparator.EQUIVALENT, data2 data1
( data1 data2 )
```

DataComparator.FOLLOWS, data1 data2가

DataComparator.PRECEDES



## Class DataComparatorString

java.lang.Object

|

+- org.kwis.msp.db.DataComparatorString

All Implemented Interfaces:

DataComparator

public class DataComparatorString

extends Object

implements DataComparator


sortRecord

Fields inherited from interface org.kwis.msp.db.DataComparator

EQUIVALENT, FOLLOWS, PRECEDES

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 DataComparatorString

public DataComparatorString(int offset)

sortRecord

DataComparator

DataComparatorString

sortRecord

String

sortRecord

Parameters:

offset -



 compare

```
public int compare(byte[] data1,
                  byte[] data2)
```

Description copied from interface: DataComparator

```
(      , comparator) .
```

Specified by:

compare in interface DataComparator

Following copied from interface: org.kwis.msp.db.DataComparator

Parameters:

data1 -

data2 -

Returns:

```
가      DataComparator.EQUIVALENT, data2      data1
      (      data1      data2      )
```

DataComparator.FOLLOWS, data1 data2가

DataComparator.PRECEDES



## Class DataFilterInteger

java.lang.Object

|

+- -org.kwis.msp.db.DataFilterInteger

All Implemented Interfaces:

DataFilter

public class DataFilterInteger

extends Object


implements DataFilter

가 (int) 가 , (min, max )


sortRecord

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 offset

protected int offset

 min

protected int min

✎ max

protected int max

✎ DataFilterInteger

```
public DataFilterInteger(int offset,
                        int min,
                        int max)
    throws IllegalArgumentException
```

offset (offset)가 (max), (min) (big-endian) , sortRecord가

Parameters:

offset -

min - Integer.MIN\_VALUE max

max - Integer.MAX\_VALUE min

Throws:

IllegalArgumentException - offset min, max가

✎ filter

```
public boolean filter(byte[] data)
```

Description copied from interface: DataFilter

Specified by:

`filter` in interface `DataFilter`

Following copied from interface: `org.kwis.msp.db.DataFilter`

Parameters:

`data` -

Returns:

가 `true`, `false`



## Class DataBaseException

```

java.lang.Object
|
+-- java.lang.Throwable
    |
    +-- java.lang.Exception
        |
        +-- org.kwis.msp.db.DataBaseException
  
```

```


public class DataBaseException
extends Exception
  
```

Methods inherited from class java.lang.Throwable

getMessage, printStackTrace, toString

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

 DataBaseException

```

public DataBaseException(String message)
  
```

DataBaseException

Parameters:

message -



✍ DataBaseException

```
public DataBaseException()
```

```
DataBaseException .
```



## Class DataBaseRecordException

```

java.lang.Object
|
+-- java.lang.Throwable
    |
    +-- java.lang.Exception
        |
        +-- org.kwis.msp.db.DataBaseRecordException
  
```

```

public class DataBaseRecordException
extends Exception
  
```

Methods inherited from class java.lang.Throwable

getMessage, printStackTrace, toString

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

 DataBaseRecordException

```

public DataBaseRecordException(String message)
  
```

```

    DataBaseRecordException
  
```

Parameters:

message -

 DataBaseRecordException

```
public DataBaseRecordException()  
    DataBaseRecord .
```

## 5.2.7. Additional IO(org.kwis.msp.io)

Class File

java.lang.Object

|

+-org.kwis.msp.io.File

All Implemented Interfaces:

Connection, InputConnection, OutputConnection, StreamConnection

public class File

extends Object

implements StreamConnection

/

Stream

(separator)

"/"

FileSystem

가

3가 가

[FileSystem.PRIVATE\\_ACCESS](#),

[FileSystem.SHARED\\_ACCESS](#),

[FileSystem.SYSTEM\\_ACCESS](#)

open(String, int, int)

open

stream

가

Read Only

open

input stream

output stream

Write Only

open

output stream

, input stream

Read/Write

open

output stream

File low level 가 API가 .

[read\(byte\[\]\)](#)

[read\(byte\[\], int, int\)](#)

[write\(byte\[\]\)](#)

[write\(byte\[\], int, int\)](#)

[write\(int\)](#)

[seek\(int\)](#)

[sizeOf\(\)](#)

API .

openInputStream(), openOutputStream(), openDataInputStream(),  
openDataOutputStream()

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

✍ maxInputStream

protected int maxInputStream

InputStream

✍ maxOutputStream

protected int maxOutputStream


OutputStream

✍ READ\_ONLY

public static final int READ\_ONLY

 WRITE

```
public static final int WRITE
```

 WRITE\_TRUNC

```
public static final int WRITE_TRUNC
```

```
0
```

 READ\_WRITE

```
public static final int READ_WRITE
```

 File

```
public File(String filename,
            int mode)
    throws IOException
```

```
    ("/")
```

```
    가 .
```

READ\_ONLY read only

exception

WRITE

가

WRITE\_TRUNC

truncation

0

READ\_WRITE read write

IllegalArgumentException

Parameters:

filename -

mode - READ\_ONLY, WRITE,WRITE\_TRUNC, READ\_WRITE

Throws:

IOException -

See Also:

[FileSystem](#)

 File

```
public File(String filename,
            int mode,
            int flag)
    throws IOException,
           SecurityException
    {
        ...
    }
    가
```

READ\_ONLY read only exception

WRITE 가

WRITE\_TRUNC truncation , 0

READ\_WRITE read write

IllegalArgumentException

Parameters:

filename -

mode - READ\_ONLY, WRITE,WRITE\_TRUNC, READ\_WRITE

flag - [FileSystem.PRIVATE\\_ACCESS](#), [FileSystem.SHARED\\_ACCESS](#),  
[FileSystem.SYSTEM\\_ACCESS](#)

Throws:


IOException -

SecurityException -

See Also:

[FileSystem](#)



 `openInputStream`

```
public InputStream openInputStream()
                    throws IOException
```

`InputStream` 가 `InputStream` `DataInputStream`

Specified by:

`openInputStream` in interface `InputConnection`

Returns:

`InputStream`

Throws:

`IOException` - `InputStream`

See Also:

[InputStream](#)

 `openDataInputStream`

```
public DataInputStream openDataInputStream()
                    throws IOException
```

`DataInputStream` 가 `DataInputStream` `InputStream`

Specified by:

`openDataInputStream` in interface `InputConnection`

Returns:

`DataInputStream`

Throws:

`IOException` - `InputStream`

See Also:



[DataInputStream](#)✍️ `openOutputStream`

```
public OutputStream openOutputStream()
                        throws IOException
```

`OutputStream` 가 . `OutputStream` `DataOutputStream`

Specified by:

`openOutputStream` in interface `OutputConnection`

Returns:

`OutputStream`

Throws:

`IOException` - `OutputStream`

See Also:

[OutputStream](#)✍️ `openDataOutputStream`

```
public DataOutputStream openDataOutputStream()
                        throws IOException
```

`DataOutputStream` 가 . `DataOutputStream`  
`OutputStream` .

Specified by:

`openDataOutputStream` in interface `OutputConnection`

Returns:

`DataOutputStream`

Throws:

`IOException` - `OutputStream`

See Also:

DataOutputStream

✍ close

```
public void close()
    throws IOException
```

Specified by:

close in interface `Connection`

Throws:

IOException -

✍ write

```
public int write(int b)
    throws IOException
```

Parameters:

b -

Throws:

IOException - close, File write, ,

✍ write

```
public int write(byte[] buf)
    throws IOException,
    NullPointerException
```

buf buf . buf가 null  
NullPointerException

Parameters:

buf - 가 byte array

Throws:

IOException - close File write ,

NullPointerException - buf가 null

 write

```
public int write(byte[] buf,
                int off,
                int len)
    throws IOException,
           NullPointerException
```

buf                      off                      len                      . buf가 null  
NullPointerException .

Parameters:

buf -                      가                      byte array

off -                      가

len -

Throws:

IOException - close File write ,

IOException - buf가 null

 read

```
public int read(byte[] buf)
    throws IOException,
           NullPointerException
```

input stream                      . buf size                      .  
buf                      ,                      .  
read -1 .

Parameters:

buf -


Returns:

EOF -1

Throws:

IOException - close File write ,

NullPointerException - buf가 null

 read

```
public int read(byte[] buf,
               int off,
               int len)
    throws IOException,
           NullPointerException
```

input stream                      len                      . len  
 EOF                                      buf                      .

Parameters:

buf -

off - buf                                      offset

len -                      가                      .


Returns:

EOF -1

Throws:

IOException - close File write ,

NullPointerException - buf가 null

 seek


```
public void seek(int pos)
    throws IOException
```

Parameters:

pos -

Throws:

IOException - handle  
가


 sizeOf

```
public int sizeOf()  
    throws IOException
```

Returns:

Throws:

IOException - handle  
가



## Class FileSystem

java.lang.Object

|

+--org.kwis.msp.io.FileSystem

```
public final class FileSystem
```

```
extends Object
```

```
FileSystem / /
```

```
가
```

```
3가
```

```
3가 가
```

[PRIVATE ACCESS](#)

[SHARED ACCESS](#)

[SYSTEM ACCESS](#)

```
exists(java.lang.String, int)
```

```
isDirectory(java.lang.String, int)
```

```
isFile(java.lang.String, int)
```

```
list(java.lang.String, int)
```

```
mkdir(java.lang.String, int)
```

```
rmdir(java.lang.String, int)
```

```
remove(java.lang.String, int)
```

```
rename(java.lang.String, int)
```

test

```
if (exists("test", PRIVATE_ACCESS)){
    System.err.println("test exists");
};
```

```
if (exists("test")){
    System.err.println("test exists");
};
```

test

test

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 PRIVATE\_ACCESS

```
public static final int PRIVATE_ACCESS
```

. 1

 SHARED\_ACCESS

```
public static final int SHARED_ACCESS
```

(Jlet Descriptor)

, 가

. 2

### ✎ SYSTEM\_ACCESS

```
public static final int SYSTEM_ACCESS
```

Descriptor) 가 (Jlet  
3

### ✎ MAX\_FILENAME\_LENGTH

```
public static final int MAX_FILENAME_LENGTH
```

filename

가 API

MAX\_FILENAME\_LENGTH

IOException

### ✎ FileSystem

```
public FileSystem()
```

### ✎ getMaxFilenameLength

```
public static int getMaxFilenameLength()
```

Returns:

### ✎ list

```
public static Vector list(String dirname)
    throws IOException
```

dirname

null

NullPointerException

dirname



MAX\_FILENAME\_LENGTH                      IOException                      .

Parameters:

dirname -

Returns:

dirname

Throws:

IOException - 가

 list

```
public static Vector list(String dirname,
                          int flag)
    throws IOException,
           SecurityException
```

. dirname null

NullPointerException                      . dirname MAX\_FILENAME\_LENGTH  
IOException

Parameters:

dirname -

flag -

Returns:

dirname

Throws:

SecurityException - 가 .

IOException - dirname

 exists

```
public static boolean exists(String name)
    throws IOException
```

가

name null                      NullPointerException                      . name

MAX\_FILENAME\_LENGTH                      IOException                      .

Parameters:

name -

Returns:

                    true,                      false

 exists

```
public static boolean exists(String name,
                             int flag)
    throws IOException,
           SecurityException
```

가                      . name      null  
 NullPointerException                      . name      MAX\_FILENAME\_LENGTH  
 IOException                      .

Parameters:

name -

flag -

Returns:

                    true,                      false

Throws:

SecurityException -

 remove

```
public static void remove(String filename)
    throws IOException
```

                    . filename      null  
 NullPointerException                      . filename      MAX\_FILENAME\_LENGTH  
 IOException                      .

Parameters:

filename -

Throws:

IOException -

 remove

```
public static void remove(String filename,
                          int flag)
    throws IOException,
           SecurityException
```

filename null NullPointerException  
 exception filename MAX\_FILENAME\_LENGTH  
 IOException

Parameters:

filename -

flag -

Throws:

SecurityException -

IOException -

 mkdir

```
public static void mkdir(String dirname)
    throws IOException
```

dirname null  
 NullPointerException dirname MAX\_FILENAME\_LENGTH  
 IOException

Parameters:

dirname -

Throws:

IOException -

가

## ✍ mkdir

```
public static void mkdir(String dirname,
                        int flag)
    throws IOException,
           SecurityException
```

```
    . dirname null NullPointerException .
dirname MAX_FILENAME_LENGTH IOException .
```

Parameters:

dirname -

flag -

Throws:

SecurityException -

IOException - 가 ,  
가

## ✍ rmdir

```
public static void rmdir(String dirname)
    throws IOException
```

```
    . dirname null
NullPointerException . dirname MAX_FILENAME_LENGTH
IOException .
```

Parameters:

dirname -

Throws:

IOException - 가 ,  
가

## ✍ rmdir

```
public static void rmdir(String dirname,
                        int flag)
    throws IOException,
```

## SecurityException

dirname null NullPointerException  
 dirname MAX\_FILENAME\_LENGTH IOException

Parameters:

dirname -

flag -

Throws:

SecurityException -

IOException - 가 ,  
 가

 toCString

```
public static byte[] toCString(String jStr)
```

Java String C String . Encoding ISO8859( )  
 KSC5601( ) .


Parameters:

jStr - java String

 available

```
public static int available()
```

Returns:

 isFile

```
public static boolean isFile(String name)
    throws IOException
```


name null NullPointerException . name  
 MAX\_FILENAME\_LENGTH IOException .

Parameters:

name -

Returns:

name true, false

 isFile

```
public static boolean isFile(String name,
                             int flag)
    throws IOException,
           SecurityException
```

name null  
 NullPointerException . name MAX\_FILENAME\_LENGTH  
 IOException .

Parameters:

name -

flag -

Returns:

name true, false

Throws:

SecurityException -

 isDirectory

```
public static boolean isDirectory(String name)
    throws IOException
```

name null  
 NullPointerException . name MAX\_FILENAME\_LENGTH  
 IOException .

Parameters:

name -

Returns:

name true, false

### isDirectory

```
public static boolean isDirectory(String name,
                                int flag)
    throws IOException,
           SecurityException
```

name null NullPointerException name  
MAX\_FILENAME\_LENGTH IOException

Parameters:

name -

flag -

Returns:

name true, false

Throws:

SecurityException -

### getCreationTime

```
public static int getCreationTime(String name)
    throws IOException
```

name null  
NullPointerException name MAX\_FILENAME\_LENGTH  
IOException name -1 return

Parameters:

name -

Returns:

-1, file

✍️ `getCreationTime`

```

public static int getCreationTime(String name,
                                  int flag)
    throws IOException,
           SecurityException
    {
        . name null NullPointerException .
name MAX_FILENAME_LENGTH IOException . name
        -1 return .
    }

```

Parameters:

`name` -

Returns:

`-1`, file✍️ `rename`

```

public static void rename(String oldName,
                          String newName)
    throws IOException
    {
        가 .
        가 . oldName newName null
        NullPointerException . oldName newName
        MAX_FILENAME_LENGTH IOException .
    }

```

Parameters:

`oldName` -`newName` -

Throws:

`IOException` - 가✍️ `rename`

```

public static void rename(String oldName,
                          String newName,

```



---

```

        int flag)
    throws IOException,
        SecurityException

```

```

        가 . 가 . oldName
    newName null NullPointerException . oldName
newName MAX_FILENAME_LENGTH IOException .

```

Parameters:

oldName -

newName -

flag -

Throws:

SecurityException -

IOException - 가

## 5.2.8. Graphics(org.kwis.msp.lcdui)

Interface ImageObserver

```
public interface ImageObserver
```

```
.   가  
.
```

```
    ✎ FRAME_END
```

```
public static final int FRAME_END
```

```
    가
```

```
    ✎ IMAGE_END
```

```
public static final int IMAGE_END
```

```
    가
```

```
    ✎ NOT_EXIST
```

```
public static final int NOT_EXIST
```

```
    가
```

```
    ✎ DECODE_ERROR
```


```
public static final int DECODE_ERROR
```

```
    가
```

```
    ✎ OUT_OF_MEMORY
```

---

```
public static final int OUT_OF_MEMORY
```

 notify

```
public void notify(Image img,
                  int status)
```

status . status  
 FRAME\_END ,  
 IMAGE\_END 가 status가 NOT\_EXIST  
 DECODE\_ERROR OUT\_OF\_MEMORY .

See Also:

[Image.loadImage\(java.lang.String, org.kwis.msp.lcd.ui.ImageObserver\)](#),  
[Image.play\(org.kwis.msp.lcd.ui.ImageObserver\)](#)

## Interface InputMethodListener

```
public interface InputMethodListener
```

```
InputMethodHandler - /
```

```
 / - . InputMethodListener
```

```
InputMethodHandler
```

```
InputMethodHandler.setInputMethodListener\(org.kwis.msp.lcd.ui.InputMethodL  
istener\) . InputMethodHandler InputMethodListener
```

```
notifyTextChanged ,
```

 notifyTextChanged

```
public void notifyTextChanged(char[] chText,  
                             int len,  
                             int pMode)
```

InputMethod .

Parameters:

chText -

len -

pMode - - Insert(-1) / replace(0) / delete(1)

---

**Interface JletEventListener**

```
public interface JletEventListener
```

```
    (Jlet)
```

```
    . postEvent
```

```
Listener
```

```
    ✎ notifyEvent
```

```
    public void notifyEvent(int type,
                           int param1,
                           int param2)
```

```
        가
```

Parameters:

type -

param1 -

param2 -

See Also:

[Display.addJletEventListener\(org.kwis.msp.lcdui.JletEventListener\)](#)

## Class Card

```
java.lang.Object
```

```
|
```

```
+- -org.kwis.msp.lcdui.Card
```

Direct Known Subclasses:

ProxyCard

```
public abstract class Card
```

```
extends Object
```

```

        .
        가
        가
        (Display)
        가
        . move resize
        .
        repaint
        paint 가
        . keyNotify, pointerNotify,
        가
        Card
        가 true
        Card false
        , true, false
        Card
        가 ITU-Key '0' '9' '#' '*' 가
        가
        EventQueue.UP, EventQueue.DOWN, EventQueue.LEFT,
        EventQueue.RIGHT, EventQueue.FIRE , EventQueue.SOFT1,
        EventQueue.SOFT2 , 가
        Display.getGameAction\(int\)
        Display.getKeyCode\(int\) 가
        .
        가 pushCard, popCard
    
```

showNotify 가 .  
 , 가 y 가 ,  
 가 x 가 .

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 x

protected int x

card x .

 y

protected int y

Card y .

 w

protected int w

Card .

 h

protected int h

Card .

 bTrans

protected boolean bTrans

Card가  
가



 Card

```
public Card()
```

```
Display.getDefaultDisplay 가 Display
```

 Card

```
public Card(boolean bTrans)
```

```
. BTrans 가  
Display.getDefaultDisplay 가
```

```
Display
```

Parameters:

bTrans –

 Card

```
public Card(Display d)
```

Parameters:

d - display

 Card

```
public Card(int x,  
            int y,  
            int w,  
            int h)
```

```
. Display.getDefaultDisplay
```



Display

Display

Card

Parameters:

x - Card display x

y - Card display y

w - Card

h - Card

Throws:

IllegalArgumentException - w h가 0

✍ Card

```
public Card(Display d,
            int x,
            int y,
            int w,
            int h)
```

display

Card

Display

Parameters:

d - display.

x - Card display x

y - Card display y

w - Card

h - Card

Throws:

IllegalArgumentException - w h가 0

✍ Card

```
public Card(Display d,
            int x,
```

```

        int y,
        int w,
        int h,
        boolean bTrans)

```

display . Display  
 Card .

Parameters:

d - display.  
 x - Card display x  
 y - Card display y  
 w - Card  
 h - Card  
 bTrans -

Throws:

IllegalArgumentException - w h가 0

 move

```

public void move(int x,
                 int y)

```

. x, y .

Parameters:

x - Card display x  
 y - Card display y

 resize

```

public void resize(int w,
                  int h)

```

. w, h 가 0

IllegalArgumentException .

Parameters:

w -

h -

Throws:

IllegalArgumentException - w h가 0

 getWidth


```
public int getWidth()
```

Returns:

 getHeight

```
public int getHeight()
```

Returns:


 getX

```
public int getX()
```

x . x

Returns:

x


 getY

```
public int getY()
```

y . y

Returns:

y

 showNotify

protected void showNotify(boolean bShow)

가 , 가 .  
 bShow 가 true가 , 가  
 bShow가 false가 .

Parameters:

bShow -

 keyNotifyprotected boolean keyNotify(int type,  
int key)

가 . 가  
 가 .  
 param1 , type KEY\_PRESSED  
 KEY\_RELEASED .  
 false 가 true

Parameters:

type - KEY\_PRESSED KEY\_RELEASED, KEY\_TYPED, KEY\_REPEATED

key - keyCode ;

[EventQueue](#)

Returns:

true, false

 pointerNotifyprotected boolean pointerNotify(int type,  
int x,  
int y)

```

        . 가
        ,
        .
        .
        type POINT_PRESSED, POINT_RELEASED, POINT_DRAGGED 가 ,
            x, y Card
        가 false true
        .
        .
        ITU ASCII ,
        .
        .

```

### [Display.getAction\(int\)](#)

Parameters:

type - POINT\_PRESSED POINT\_RELEASED, POINT\_DRAGGED

key -

Returns:

Card true, false

### paint

protected abstract void paint(Graphics g)

```

Card
    g Card . translate, setClip
    , Card가
    Graphics

```

Parameters:

g - graphics

### repaint

```

public void repaint(int x,
                   int y,
                   int w,
                   int h)

```

```

    . x, y w, h
    paint
    ,

```

paint 가  
 paint Graphics repaint

### Card

Parameters:

x - 가 Card x

y - 가 Card y

w -

h -

✍ repaint

public void repaint()

Card . repaint(0, 0, getWidth(), getHeight())

가

✍ serviceRepaints

public void serviceRepaints()

repaint , repaint

paint

✍ isShown

public boolean isShown()

Card가 . Card가 Display pushCard

Returns:


✍ getDisplay

```
public Display getDisplay()
```

```
    display .
```

Returns:

```
    display
```



**Class Display**

```

java.lang.Object
|
+- - org.kwis.msp.lcdui.Display
    
```

```

public class Display
extends Object

    Display Card, pushCard
    Display Card paint

    (LCD) Display LCD가 Jlet
    Display 가
    Display 가
    Card Card Card
    Card가
    Card Card
    Card Card
    Card Card
    Card Card
    Card Card
    Card Card
    Card Card
    Card Card

    LCD Display ( , )
    가
    
```

See Also:

[Card](#)

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait





### getDefaultDisplay

```
public static Display getDefaultDisplay()
```

```
Display . Display .
```

Returns:

display

Throws:

### getDisplay

```
public static final Display getDisplay(String str)
```

```
Display . null Display
, "dual" lcd Display
Display가 null .
```

Parameters:

str - display 가

Returns:

display

Throws:

### pushCard

```
public final void pushCard(Card c)
```

```
가
.
가
c null .
가 , showNotify
repaint가 paint가 .
```

`isShown()``true``pushCard()`


Parameters:

`c` -

Throws:

NullPointerException - `c`가 null `popCard``public final Card popCard()``가``Card``null``Jlet``가``showNotify()``isShown()``false`

Returns:

 `removeCard``public final boolean removeCard(Card c)``가` . `popCard``c`가 null`false`

Parameters:

`c` -

Returns:

 `removeAllCards`

```
public void removeAllCards()
```

```
    . Jlet Display
    . showNotify()가 ,
    .
```

✍ countCard

```
public final int countCard()
```

```
Display 가 . Jlet Display
가 .
```

Returns:

✍ callSerially

```
public final void callSerially(Runnable r)
```

```
가 Runnable run
'Runnable' , 가
가 Runnable run
. r.run() 가
,
,
```

Parameters:

r - runnable

Throws:

NullPointerException - r null

✍ callSerially

```
public final void callSerially(Runnable r,
                               int timeout)
```

```
가 Runnable run
'Runnable' , 가
thread가 Runnable run
```

---

```

        .
            r.run()
                가
        .
    ,
        ,
        r run
            .
            timeout 0
                0
    .

```

Parameters:


r - runnable

timeout - Runnable ( )

Throws:

NullPointerException - r null

IllegalArgumentException - timeout

 getDockedCard

```
public Card getDockedCard()
```

 setDockedCard

```
public void setDockedCard(Card cd,
                           int where)
```

가  
가

Parameters:


cd -

where - Graphics.TOP BOTTOM, LEFT, RIGHT 가

 isColor

```
public final boolean isColor()
```

Returns:

 numColors

```
public final int numColors()
```

Returns:

 hasPointerEvents

```
public final boolean hasPointerEvents()
```

가

Returns:

 hasPointerMotionEvents

```
public final boolean hasPointerMotionEvents()
```

가

Returns:

 hasRepeatEvents

```
public final boolean hasRepeatEvents()
```


가

Returns:

 getWidth


```
public final int getWidth()
```

Returns:

 getHeight

```
public final int getHeight()
```

Returns:

 isDoubleBuffered

```
public boolean isDoubleBuffered()
```

(double buffering)

Graphics

(flush)

Returns:

double buffer

 getKeyCode

```
public static int getKeyCode(int gameKey)
```

gameKey EventQueue.UP,  
EventQueue.DOWN, EventQueue.LEFT, EventQueue.RIGHT, EventQueue.FIRE,  
EventQueue.GAME\_A, EventQueue.GAME\_B, EventQueue.GAME\_C,  
EventQueue.GAME\_D, 가 ,

가 0

Returns:

See Also:

[EventQueue](#)

 getKeyName

```
public static String getKeyName(int key)
```

[EventQueue](#)

가 null  
"UP", "DOWN"

Returns:

See Also:

[EventQueue](#) getGameAction

```
public static int getGameAction(int key)
```

ITU-Key '0' - '9', '\*', '#"

getGameAction

[EventQueue](#)

가 0

Returns:


See Also:

[EventQueue](#) getBitsPerPixel

```
public int getBitsPerPixel()
```

(bit)

Returns:

 flush

```
public void flush()
```

Graphics

```
serviceRepaints() flush()
isDoubleBuffer 가 true
```

 addJletEventListener

```
public void addJletEventListener(JletEventListener qel)
```

```
JletEvent Listener . key, repaint, point
가 Listener
Listener ,
```

Parameters:

qel - Listener

 removeJletEventListener

```
public void removeJletEventListener(JletEventListener qel)
```

```
JletEvent Listener .
```

Parameters:

qel - Listener

 grabKey

```
public void grabKey(int key,
                    JletEventListener qel)
```

```
grab grab grab
grab grab grab
```


```
가 , AccessLevel SYSTEM
. AccessLevel SYSTEM
```



---

Parameters:

key -

 ungrabKey

```
public void ungrabKey(int key)
```

grabKey


AccessLevel SYSTEM

. AccessLevel

SYSTEM

Parameters:

key - ungrab



Class EventQueue

```
java.lang.Object
|
+--org.kwis.msp.lcdui.EventQueue
```

```
public class EventQueue
extends Object
```

```

        (Jlet)
        EventQueue 가
        가
        가
        가
        EVENT_SIZE가
        가
        , POINTER_EVENT
        가

```

| event[0]      | Event[1]   | event[2]           | event[3] |
|---------------|--|--------------------|----------|
| KEY_EVENT     | KEY_PRESSED  <br>KEY_RELEASED  <br>KEY_REPEATED  <br>KEY_TYPED | (ITU<br>ascii<br>) | 0        |
| POINTER_EVENT | POINTER_PRESSED  <br>POINTER_RELEASED  <br>POINTER_DRAGGED     | x                  | y        |
| TIMER_EVENT   |  |                    |          |

```
Jlet getNextEvent dispatchEvent
```

```
int event[] = new int[EventQueue.EVENT_SIZE];

while(true){
```

```

eq.getNextEvent(event);
eq.dispatchEvent(event);
}

```

```

, ITU- '0' '9', '*',
'#'가 , 가
,
getGameAction getKeyCode 가
가
getGameAction
가
getGameAction getKeyCode 가

```

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait



✍ EVENT\_SIZE

```

public static final int EVENT_SIZE

```

```

가 . 4 , getNextEvent

```

✍ UP

```

public static final int UP

```

```

UP . 1

```

✍ DOWN

```

public static final int DOWN

```

```

DOWN . 6

```

✍ LEFT

```
public static final int LEFT
LEFT                . 2 .

    ✎ RIGHT

public static final int RIGHT
RIGHT               . 5 .

    ✎ FIRE

public static final int FIRE
FIRE               . 8 .

    ✎ GAME_A

public static final int GAME_A
GAME_A            . 9 .

    ✎ GAME_B

public static final int GAME_B
GAME_B           . 10 .

    ✎ GAME_C

public static final int GAME_C
GAME_C          . 11 .

    ✎ GAME_D

public static final int GAME_D
GAME_D         . 12 .

    ✎ KEY_NUM0
```

```
public static final int KEY_NUM0
ITU-T '0' . 48('0') .
```

✎ KEY\_NUM1

```
public static final int KEY_NUM1
ITU-T '1' . 49('1') .
```

✎ KEY\_NUM2

```
public static final int KEY_NUM2
ITU-T '2' . 50('2') .
```

✎ KEY\_NUM3

```
public static final int KEY_NUM3
ITU-T '3' . 51('3') .
```

✎ KEY\_NUM4

```
public static final int KEY_NUM4
ITU-T '4' . 52('4') .
```

✎ KEY\_NUM5

```
public static final int KEY_NUM5
ITU-T '5' . 53('5') .
```

✎ KEY\_NUM6

```
public static final int KEY_NUM6
ITU-T '6' . 54('6') .
```

✎ KEY\_NUM7

```
public static final int KEY_NUM7
ITU-T '7' . 55('7') .
```

✍ KEY\_NUM8

```
public static final int KEY_NUM8
ITU-T '8' . 56('8') .
```

✍ KEY\_NUM9

```
public static final int KEY_NUM9
ITU-T '9' . 57('9') .
```

✍ KEY\_STAR

```
public static final int KEY_STAR
ITU-T '*' . 42('*') .
```

✍ KEY\_POUND

```
public static final int KEY_POUND
ITU-T '#' . 35('#') .
```

✍ SOFT1

```
public static final int SOFT1
SOFT1 . 90 .
```

✍ SOFT2

```
public static final int SOFT2
SOFT2 . 91 .
```

✍ SOFT3

```
public static final int SOFT3
SOFT3 . 92 .
```

✎ SIDE\_UP

```
public static final int SIDE_UP
SIDE_UP . 96 .
```

✎ SIDE\_DOWN

```
public static final int SIDE_DOWN
SIDE_DOWN . 97 .
```

✎ SIDE\_SEL

```
public static final int SIDE_SEL
SIDE_SEL . 98 .
```

✎ CLEAR

```
public static final int CLEAR
CLEAR . 99 .
```

✎ KEY\_PRESSED

```
public static final int KEY_PRESSED
. 1 .
```

✎ KEY\_RELEASED

```
public static final int KEY_RELEASED
. 2 .
```

✎ KEY\_REPEATED

```
public static final int KEY_REPEATED
```

```
        . 3 .
```

```
✎ KEY_TYPED
```

```
public static final int KEY_TYPED
```

```
        . 4 .
```

```
✎ POINT_PRESSED
```

```
public static final int POINT_PRESSED
```

```
        . 1 .
```

```
✎ POINT_RELEASED
```

```
public static final int POINT_RELEASED
```

```
        . 2 .
```

```
✎ POINT_DRAGGED
```

```
public static final int POINT_DRAGGED
```

```
        . 5 .
```

```
✎ KEY_EVENT
```

```
public static final int KEY_EVENT
```

```
        . 1 .
```

```
✎ POINTER_EVENT
```

```
public static final int POINTER_EVENT
```

```
        . 2 .
```

```
✎ SMS_EVENT
```



---

```
public static final int SMS_EVENT
SMS . 4 .
```

```
✍ RSSI_EVENT
```

```
public static final int RSSI_EVENT
RSSI LEVEL . 5 .
```

```
✍ BATT_EVENT
```

```
public static final int BATT_EVENT
LEVEL . 6 .
```

```
✍ CALL_EVENT
```

```
public static final int CALL_EVENT
Call Notify . 7 .
```

```
✍ REPAINT_EVENT
```

```
public static final int REPAINT_EVENT
```

```
✍ TIMER_EVENT
```

```
public static final int TIMER_EVENT
. 42 .
```

```
✍ CALL_SERIALLY_EVENT
```

```
public static final int CALL_SERIALLY_EVENT
call serially . 43 .
```

```
✍ APP_EVENT
```

```
public static final int APP_EVENT
```

---

. 100 .

✎ CHILDSTART\_EVENT

public static final int CHILDSTART\_EVENT

. 101 .

✎ CHILDSTOP\_EVENT

public static final int CHILDSTOP\_EVENT

. 102 .

✎ ANNUNCIATOR\_CHANGE\_EVENT

public static final int ANNUNCIATOR\_CHANGE\_EVENT

가 . 103 .

✎ USER\_EVENT

public static final int USER\_EVENT

. 0x5000 .

✎ APP\_STOP

public static final int APP\_STOP

; APP\_EVENT . 1 .

✎ APP\_RESUME

public static final int APP\_RESUME

; APP\_EVENT . 2 .

✎ APP\_DESTROY

public static final int APP\_DESTROY

---

```

; APP_EVENT . 3

```

```

✎ APP_ACTIVE

```

```

public static final int APP_ACTIVE

```

```

Active . .4

```

```

✎ getNextEvent

```

```

public void getNextEvent(int[] event)

```

```

가

```

```

가 EVENT_SIZE

```

```

ArrayIndexOutOfBoundsException

```

```

가

```

```

IllegalThreadStateException

```

```

Card keyNotify, paint

```

```

가

```

```

가

```

```

Parameters:

```

```

event - 가 EVENT_SIZE

```

```

Throws:

```

```

ArrayIndexOutOfBoundsException - 가 'EVENT_SIZE'

```

```

IllegalThreadStateException - 가

```

```

NullPointerException - event가 null

```

```

✎ postEvent

```

```

public boolean postEvent(int[] event)

```

```

가

```

가 .  
 EVENT\_SIZE  
 가 false , true

Parameters:

event -

Returns:

true, false.

Throws:

ArrayIndexOutOfBoundsException - 가 EVENT\_SIZE

NullPointerException - event가 null

✍ postEvent

```
public static void postEvent(int id,
                             int[] event)
```

. id가 가 가

id가 -1 active parameter가 . 가

Parameters:

id -

event - event

✍ dispatchEvent

```
public void dispatchEvent(int[] event)
```

Parameters:

event -

Throws:

ArrayIndexOutOfBoundsException -

가 EVENT\_SIZE



## Class Font

```
java.lang.Object
|
+--org.kwis.msp.lcdui.Font
```

```
public class Font
```

```
extends Object
```

```

        . getFont
        가 . getFont 가
        .
        getFont 가 Graphics.setFont\(org.kwis.msp.lcdui.Font\)
        .
        getFont , 가
        .
        stringWidth substringWidth
        .
        가 . STYLE_PLAIN
        STYLE_UNDERLINED
        STYLE_BOLD
        STYLE_BOLD | STYLE_UNDERLINED
        STYLE_ITALIC
        STYLE_ITALIC | STYLE_UNDERLINED
        STYLE_BOLD | STYLE_ITALIC
        STYLE_BOLD | STYLE_ITALIC | STYLE_UNDERLINED

```

Methods inherited from class java.lang.Object


equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 FACE\_MONOSPACE


```
public static int FACE_MONOSPACE
Monospace      .    32      ,      .
```

 FACE\_PROPORTIONAL

```
public static int FACE_PROPORTIONAL
Proportional   .    64      ,
```

 FACE\_SYSTEM


```
public static int FACE_SYSTEM
System         .    0      ,
. MONOSPACE   PROPORTIONAL .
```

 SIZE\_LARGE

```
public static int SIZE_LARGE
                .    16      ,      .
```

 SIZE\_MEDIUM

```
public static int SIZE_MEDIUM
                .    0      ,      .
```

 SIZE\_SMALL

```
public static int SIZE_SMALL
                .    8      ,      .
```

 STYLE\_BOLD

```
public static int STYLE_BOLD
```

1

 STYLE\_ITALIC

```
public static int STYLE_ITALIC
```

2

 STYLE\_PLAIN


```
public static int STYLE_PLAIN
```

0

 STYLE\_UNDERLINED

```
public static int STYLE_UNDERLINED
```

4

 style

```
protected int style
```

 size

```
protected int size
```

 face

```
protected int face
```



✍ `getFont`

```
public static Font getFont(int face,
                          int style,
                          int size)
```

가  
가

## Parameters:

`face` - face; `FACE_MONOSPACE`, `FACE_PROPORTIONAL`, `FACE_SYSTEM`

`style` - ; `STYLE_PLAIN` `STYLE_ITALIC`, `STYLE_BOLD`, `STYLE_UNDERLINED`

`size` - ; `SIZE_LARGE`, `SIZE_MEDIUM`, `SIZE_SMALL` 가

## Throws:

`IllegalArgumentException` - `face`, `style`, `size` 가

✍ `charsWidth`

```
public int charsWidth(char[] ch,
                      int offset,
                      int length)
```

ch가 가 offset length

가

## Parameters:

`ch` -

`offset` -


`length` -

## Returns:

## Throws:

ArrayIndexOutOfBoundsException - offset length가

NullPointerException - ch가 null

 charWidth

```
public int charWidth(char ch)
```

. ch가

' '(0x20)

' '가

Parameters:

ch -

Returns:

 getBaselinePosition

```
public int getBaselinePosition()
```

(base line)

Returns:

baseline

 getDefaultFont

```
public static Font getDefaultFont()
```

Returns:


 getFace

```
public int getFace()
```

FACE\_MONOSPACE,

FACE\_PROPORTIONAL, FACE\_SYSTEM 가 .

Returns:

 getHeight

```
public int getHeight()
```

Returns:

 getSize

```
public int getSize()
```


Returns:

 getStyle

```
public int getStyle()
```

STYLE\_UNDERLINE, STYLE\_PLAIN OR STYLE\_BOLD, STYLE\_ITALIC, .

Returns:

 isBold

```
public boolean isBold()
```

STYLE\_BOLD .

Returns:

STYLE\_BOLD true false

 `isItalic`

```
public boolean isItalic()
```

```
STYLE_ITALIC
```

Returns:

```
STYLE_ITALIC    true    false
```


 `isPlain`

```
public boolean isPlain()
```

```
STYLE_PLAIN
```

Returns:

```
STYLE_PLAIN    true    false
```

 `isUnderlined`

```
public boolean isUnderlined()
```

```
STYLE_UNDERLINED
```

Returns:

```
STYLE_UNDERLINED    true    false
```

 `stringWidth`

```
public int stringWidth(String str)
```

```
. str가
```

Parameters:

`str` -

Returns:

Throws:

`NullPointerException` - `str` `null`

---

✍ `substringWidth`

```
public int substringWidth(String str,  
                           int offset,  
                           int len)
```

. str가                      offset    len

Parameters:

`str` -

`offset` -


`len` -

Returns:

Throws:

`StringIndexOutOfBoundsException` - `offset`    `len`

`NullPointerException` - `str`    `null`    .



## Class Graphics

```
java.lang.Object
```

```
|
```

```
+- -org.kwis.msp.lcdui.Graphics
```

```
public class Graphics
```

```
extends Object
```

```
2
```

```
,
```

```
가
```

```
가 (0, 0)
```

```
,
```

```
y
```

```
가
```

```
,
```

```
x
```

```
가
```

```
translate
```

```
가
```

```
가
```

```
LEFT, HCENTER, RIGHT
```

```
가
```

```
TOP, BASELINE, BOTTOM
```

```
/
```

```
OR
```

```
BASELINE
```

```
VCENTER
```

```
OR
```

```
DOTTED SOLID
```

```
drawLine,
```

```
drawArc
```

```
fillRect
```

```
Graphics
```

```
가
```

```
XOR
```

```
setXORMode\(boolean\)
```

```
XOR
```

```
setAlpha\(int\)
```

```
. g.setAlpha(255)
```

```
g.setAlpha(0)
```

. XOR Alpha 가 .  
 Graphics 가  
 가 .

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

#### ✍ BASELINE

```
public static final int BASELINE
```

baseline

64

#### ✍ BOTTOM

```
public static final int BOTTOM
```

32

#### ✍ DOTTED

```
public static final int DOTTED
```

1

#### ✍ HCENTER

```
public static final int HCENTER
```

가

1

✍ LEFT

```
public static final int LEFT
```

4

✍ RIGHT

```
public static final int RIGHT
```

8

✍ SOLID

```
public static final int SOLID
```

0

✍ TOP

```
public static final int TOP
```

0

✍ VCENTER

```
public static final int VCENTER
```

가

2



✍ clipRect

```
public void clipRect(int x,
```



```
int y,
int width,
int height)
```

(x, y) , 가 height width  
가

Parameters:

x - graphics x

y - graphics y

width -

height -

See Also:

[setClip\(int, int, int, int\)](#)

 drawChar

```
public void drawChar(char character,
int x,
int y,
int anchor)
```

가 가 character가

Parameters:

character -

x - x

y - y

anchor - ;

Throws:

IllegalArgumentException - anchor가 가

See Also:

[drawChars\(char\[\], int, int, int, int\)](#) drawChars

```
public void drawChars(char[] data,
                    int offset,
                    int length,
                    int x,
                    int y,
                    int anchor)
```

data가 가

가 가

## Parameters:

data -

offset -

length -

x - x

y - y

anchor - ;

## Throws:

ArrayIndexOutOfBoundsException - offset length가

IllegalArgumentException - anchor

NullPointerException - data null

## See Also:

[drawString\(java.lang.String, int, int, int\)](#) drawImage

```
public void drawImage(Image img,
                    int x,
                    int y,
                    int anchor)
```

img가 가

Parameters:

img -

x - x

y - y

anchor - ;

Throws:

IllegalArgumentException - anchor

NullPointerException - img가 null

See Also:

[Image](#)

 drawLine

```
public void drawLine(int x1,
                    int y1,
                    int x2,
                    int y2)
```

가

가

Parameters:

x1 - x

y1 - y

x2 - x

y2 - y

 drawRect

```
public void drawRect(int x,
                    int y,
                    int width,
                    int height)
```

height가 0  
 (width + 1) (height + 1) 가 . width  
 fillRect

Parameters:

x - x

y - y

width -

height -

See Also:

[fillRect\(int, int, int, int\)](#)

 drawRoundRect

```
public void drawRoundRect (int x,
                           int y,
                           int width,
                           int height,
                           int arcWidth,
                           int arcHeight)
                           가
                           .
                           (width + 1) (height + 1) 가 . width
                           fillRoundRect
                           .
                           arcWidth가 width / 2 width
                           / 2 . arcHeight가 height / 2 height / 2 .
```

Parameters:

x - x

y - y

width -

height -

arcWidth -

arcHeight -

See Also:

[fillRoundRect\(int, int, int, int, int, int\)](#)

 drawString

```
public void drawString(String str,
                       int x,
                       int y,
                       int anchor)
```

가 (space) 가

Parameters:

str -

x - x

y - y

anchor - ;

Throws:

IllegalArgumentException - anchor가

NullPointerException - str null

See Also:

[drawChars\(char\[\], int, int, int, int, int\)](#), [drawSubstring\(String, int, int, int, int, int\)](#)

 drawSubstring

```
public void drawSubstring(String str,
                          int offset,
                          int len,
                          int x,
                          int y,
                          int anchor)
```

가 (space) 가

Parameters:

str -

offset - '0'

len -

x - x

y - y

anchor - ;

Throws:

IllegalArgumentException - anchor가

NullPointerException - str null

StringIndexOutOfBoundsException - offset len str 가

See Also:

[drawString\(String, int, int, int\)](#)

 drawArc

```
public void drawArc(int x,
                   int y,
                   int width,
                   int height,
                   int startAngle,
                   int arcAngle)
```

startAngle 가 arcAngle . 0 가 x 가  
Y 가 , 3 .

,  
(x, y) width , height가 가  
, drawRect 가 width + 1 height + 1

가 . 가 0

Parameters:

x - x

y - y

width - 가

height - 가

startAngle -

arcAngle -

See Also:

[fillArc\(int, int, int, int, int, int\)](#)

 fillArc

```
public void fillArc(int x,
                   int y,
                   int width,
                   int height,
                   int startAngle,
                   int arcAngle)
```

startAngle, arcAngle

drawArc

fillRect 가 width height 가

pie 가 . 가 0

Parameters:

x - x

y - y

width - 가

height - 가

startAngle -

arcAngle -

See Also:

[fillArc\(int, int, int, int, int, int\)](#)

 fillRect

```
public void fillRect(int x,
                    int y,
                    int width,
                    int height)
```

width height 가 . width height가  
0

Parameters:

x - x

y - y

width -

height -

See Also:

[drawRect\(int, int, int, int\)](#)

 fillRoundRect

```
public void fillRoundRect(int x,
                        int y,
                        int width,
                        int height,
                        int arcWidth,
                        int arcHeight)
```

가 .  
width height 가 . 가 0  
arcWidth



가 width / 2                      width / 2                      .                      arcHeight가 height / 2  
    height / 2                      .

Parameters:

x -                      x

y -                      y

width -

height -

arcWidth -

arcHeight -

See Also:

[drawRoundRect\(int, int, int, int, int, int\)](#)

 `getBlueComponent`

```
public int getBlueComponent ()
```

Returns:

0 - 255

See Also:

[setColor\(int, int, int\)](#)

 `getClipHeight`

```
public int getClipHeight ()
```

Returns:

See Also:

[clipRect\(int, int, int, int\)](#), [setClip\(int, int, int, int\)](#)

 `getWidth`

```
public int getWidth()
```

Returns:

See Also:

[clipRect\(int, int, int, int\)](#), [setClip\(int, int, int, int\)](#)

 `getX`

```
public int getX()
```

x

Returns:

x

See Also:

[clipRect\(int, int, int, int\)](#), [setClip\(int, int, int, int\)](#)

 `getY`

```
public int getY()
```

y

Returns:

y

See Also:

[clipRect\(int, int, int, int\)](#), [setClip\(int, int, int, int\)](#)

 `getColor`

```
public int getColor()
```

Returns:

0x00RRGGBB 가

See Also:

[setColor\(int, int, int\)](#), [setColor\(int\)](#)

 `getFont`

```
public Font getFont()
```

Returns:

See Also:

[Font](#), [setFont\(org.kwis.msp.lcd.ui.Font\)](#)

 `getGrayScale`

```
public int getGrayScale()
```

`setGrayScale`

, 가

Returns:

0 - 255

See Also:

[setGrayScale\(int\)](#)

 `getGreenComponent`

```
public int getGreenComponent()
```

Returns:

0 - 255

See Also:

[setColor\(int, int, int\)](#)

 `getRedComponent`


```
public int getRedComponent()
```

Returns:

0 - 255

See Also:

[setColor\(int, int, int\)](#)

 `getStrokeStyle`

```
public int getStrokeStyle()
```

Returns:

`SOLID` `DOTTED`

 `getTranslateX`

```
public int getTranslateX()
```

x

Returns:

x

See Also:

[getTranslateX\(\)](#), [translate\(int, int\)](#)

 `getTranslateY`

```
public int getTranslateY()
```


y

Returns:

y

See Also:

[getTranslateX\(\)](#), [translate\(int, int\)](#)

 `setClip`

```
public void setClip(int x,
                   int y,
                   int width,
                   int height)
```

이 메서드는 지정된 (x, y) 좌표에서 지정된 width와 height가 있는 클립 영역을 설정합니다.

Parameters:

x - 클립 영역의 x 좌표

y - 클립 영역의 y 좌표

width - 클립 영역의 너비

height - 클립 영역의 높이

See Also:

[clipRect\(int, int, int, int\)](#)

 `setColor`

```
public void setColor(int rgb)
```

이 메서드는 지정된 rgb 값으로 클립 영역의 색상을 설정합니다. rgb 값은 0x00RRGGBB 형식의 8bit RGB 값을 나타냅니다.

Parameters:

rgb - 클립 영역의 색상

 `setColor`

```
public void setColor(int r,
                   int g,
                   int b)
```

가 RGB . 가 RGB

Parameters:


r - 0-255

g - 0-255

b - 0-255

Throws:

IllegalArgumentException - r, g, b

 **setFont**

public void setFont(Font font)

가

가

가 null setFont(Font.getDefaultFont())

Parameters:

font -

 **setGrayScale**

public void setGrayScale(int val)

가

가

가 0-255

Parameters:

val - 0-255

Throws:

IllegalArgumentException - 가

 **setStrokeStyle**

```
public void setStrokeStyle(int style)
```

Parameters:

style - SOLID      DOTTED

Throws:

IllegalArgumentException - style 가

 translate

```
public void translate(int x,
                    int y)
```

Parameters:

x - x ( )

y - y ( )

See Also:

[getTranslateX\(\)](#), [getTranslateY\(\)](#)

 getPixel

```
public int getPixel(int x,
                  int y)
```

가      RGB      가      (x, y)  
가      . 가      0x00RRGGBB      가

Parameters:

x - 가 pixel x

y - 가 pixel y

Returns:

pixel .

### setPixel

```
public void setPixel(int x,
                    int y)
```

(x, y)

Parameters:

x - 가 pixel x

y - 가 pixel y

### getPixels

```
public void getPixels(int x,
                     int y,
                     int w,
                     int h,
                     byte[] pixels,
                     int offset,
                     int bpl)
```

가 . Graphics

가 .

, setPixel .

Parameters:

x - 가 x

y - 가 y

w - 가

h - 가

pixels -

offset -



bpl - 가

Throws:

`ArrayIndexOutOfBoundsException` - pixels 가.  $(h * bpl + (w * bit \text{ per pixel} + 7) / 8)$

`NullPointerException` - pixels가 null

### getRGBPixels

```
public void getRGBPixels(int x,
                        int y,
                        int w,
                        int h,
                        int[] pixels,
                        int offset,
                        int bpl)
```

가 . Graphics

가 . data

0x00RRGGBB .

Parameters:

x - 가 x

y - 가 y

w - 가

h - 가

pixels -

offset -

bpl - 가

Throws:

`ArrayIndexOutOfBoundsException` - pixels 가.  $(h * bpl + (w * bit \text{ per pixel} + 7) / 8)$

`NullPointerException` - pixels가 null

## ✍ setPixels

```
public void setPixels(int x,
                    int y,
                    int w,
                    int h,
                    byte[] pixels,
                    int offset,
                    int bpl)
```

. Graphic

. data

, getPixel

## Parameters:

x - 가 x

y - 가 y

w - 가

h - 가

pixels -

offset -

bpl - 가

## Throws:

ArrayIndexOutOfBoundsException - pixels 가.  $(h * bpl + (w * bit \text{ per pixel} + 7) / 8)$

NullPointerException - pixels가 null

## ✍ setRGBPixels

```
public void setRGBPixels(int x,
                        int y,
                        int w,
                        int h,
                        int[] pixels,
```

```
int offset,
int bpl)
```

. Graphic  
data

0x00RRGGBB integer .

Parameters:

x - 가 x

y - 가 y

w - 가

h - 가

pixels -

offset -

bpl - 가

Throws:

ArrayIndexOutOfBoundsException - pixels 가.  $(h * bpl + (w * bit$   
per pixel + 7) / 8)

NullPointerException - pixels가 null

 copyArea

```
public void copyArea(int dx,
                    int dy,
                    int sx,
                    int sy,
                    int w,
                    int h)
```

. Graphics

Parameters:

dx - x

dy - y

SX - x

SY - y

w -

h -

### drawPolygon

```
public void drawPolygon(int[] x,
                       int[] y)
```

(x, y)

Parameters:

x - x array

y - y array

Throws:

IllegalArgumentException - x y 가

NullPointerException - x y가 null

### reset

```
public void reset()
```

가

### setAlpha

```
public void setAlpha(int alpha)
```

. alpha 0

, 255

255

XOR

Parameters:

alpha -

## ✍ getAlpha

```
public int getAlpha()
```

alpha 가 .

Returns:

alpha

## ✍ setXORMode

```
public void setXORMode(boolean b)
```

XOR . drawLine, drawPolygon XOR  
XOR (alpha) .

Parameters:

b - true XOR . false .

## ✍ isXORMode

```
public boolean isXORMode()
```

XOR

Returns :

XOR 가 true.

## ✍ encodeImage

```
public byte[] encodeImage(int x,  
                           int y,  
                           int w,  
                           int h)
```

BMP .

BMP .

Parameters:

x - x

y - y

w -

h -

Returns:

BMP

,

null



Class Image

```
java.lang.Object
|
+--org.kwis.msp.lcdui.Image
```

```
public class Image
extends Object
```

```
    . . . gif png 가
    ,
    . . . getGraphics 가 .
    가 가 가 가
    ,
    가 .
    가 , mask
    mask , mask
    가 .
    gif(animated), png, bmp(RLE ) .
```

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

✎ Image

protected Image()

✎ createlImage

```
public static Image createImage(byte[] imagedata,
                                int imageoffset,
                                int imagelength)
```

data  
imageoffset  
imagelength  
가  
가  
IllegalArgumentException  
가

Parameters:

imagedata - 가

imageoffset -

imagelength -


Returns:

Throws:

IllegalArgumentException - 가

NullPointerException - imagedata가 null

ArrayIndexOutOfBoundsException - imageoffset imagelength가

 loadImage

```
public static Image loadImage(String str,
                               ImageObserver io)
```

URL  
URL

ImageObserver notify

0 , 가 (ImageObserver.notify가 )

ImageObserver 가



가 .

Parameters:

str -

io - ImageObserver

Returns:

;

Throws:

NullPointerException - str null .

See Also:

[ImageObserver.notify\(org.kwis.msp.lcdui.Image, int\)](#) createlImage

public static Image createlImage(Image image)

가 .

가 .

[getGraphics\(\)](#)

Graphics 가 .

Animation

IllegalArgumentException .

가 .

Parameters:

image -

Returns:

Throws:

IllegalArgumentException - 가 animation

NullPointerException - image가 null .

 createlImage

public static Image createlImage(int width,

int height)

가

[getGraphics\(\)](#)

Graphics

가

가

Parameters:

width -

height -

Throws:

IllegalArgumentException - width height가 0

 createImage

```
public static Image createImage(String name)
    throws IOException
```

가

Parameters:

name -

Returns:

Throws:

IllegalArgumentException - 가

NullPointerException - name null

See Also:

[Class.getResourceAsStream\(java.lang.String\)](#)

 getGraphics

```
public Graphics getGraphics()
```

이 메서드는 Graphics 객체를 반환합니다. 이 객체는 null이 아닌 경우에만 유효하며, 그렇지 않으면 null을 반환합니다.

Returns:

Graphics

 getHeight

```
public int getHeight()
```

Returns:

 getWidth

```
public int getWidth()
```

Returns:

 isMutable

```
public boolean isMutable()
```

이 메서드는 이 Graphics 객체가 수정 가능한지 여부를 반환합니다.

Returns:

boolean


 isAnimated

```
public boolean isAnimated()
```

이 메서드는 이 Graphics 객체가 애니메이션을 지원하는지 여부를 반환합니다.

Returns:

Animation 가

 play

```
public void play(ImageObserver ob)
```

```

        . Animation 가 Animation 가
        . Animation ImageObserver animation
ImageObserver notify() . Animation 가
        .
        computing . , gif
        decode . animation

```


stop

Parameters:

ob - Observer

See Also:

[ImageObserver](#)

 stop

```
public void stop()
```

```

        . Animation Gif
        가 Animation 가
        .
        , 가 ,

```

 stopImage

```
public static void stopImage(ImageObserver io)
```

```

ImageObserver . loadImage play "
" . ImageObserver.notify
        . play
        , stop
        .
        CPU

```

io가 null

Parameters:

io - ImageObserver



## Class InputMethodHandler

java.lang.Object

|

+- org.kwis.msp.lcdui.InputMethodHandler

```
public class InputMethodHandler
```

```
extends Object
```

```
InputMethodHandler
```

```
notifyKeyInput(int keyCode)
```

```
InputMethodListener
```

```
InputMethodListener가
```

```
notifyKeyInput(int) false
```

```
InputMethodListener
```

```
setInputMethodListener(org.kwis.msp.lcdui.InputMethodListener)
```

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 InputMethodHandler

```
public InputMethodHandler(int constraint)
```

```
InputMethodHandler
```

```
TextComponent
```

```
가 가
```

```
IllegalArgumentException -
```

## ✎ getCurrentModeCode

```
public String getCurrentModeCode()
```

가 ISO 639  
 "/S" "/L" 가  
 "EN" , "EN/S"  
 가

Returns:

## ✎ notifyKeyInput

```
public final boolean notifyKeyInput(int keyCode,
                                     int type)
```

InputMethodHandler

```
setInputMethodListener(org.kwis.msp.lcdui.InputMethodListener)
    InputMethodListener notifyTextChanged
```

Parameters:

keyCode -

Returns:

가 true, false

## ✎ setInputMethodListener

```
public void
setInputMethodListener(InputMethodListener imListener)
```

InputMethodHandler

InputMethodListener

notifyTextChanged

InputMethodListener

InputMethodListener


null

InputMethodListener

Parameters:

---

imListener - InputMethodListener      null

 **changeCurrentModeToNext**

```
public void changeCurrentModeToNext ()  
    constraint
```

 **getCurrentMode**

```
public int getCurrentMode ()
```

Returns:

 **setCurrentMode**

```
public boolean setCurrentMode(int mode)
```


IllegalArgumentException

Parameters:

Mode –

 **hideSymbolCard**

```
public void hideSymbolCard()  
    CandidateWindow
```

 **setSymbolPosition**

```
public void setSymbolPosition(int x,  
                               int y,  
                               int w,  
                               int h)
```



---

InputMethodHandler 가 IM\_SYMBOL  
, x,y,w,h '0' , '0'  
IllegalArgumentException .

Parameters:

x - x .

y - y .

w - width

h - height .

Throws:

IllegalArgumentException - w,h '0'



Class Jlet

```
java.lang.Object
|
+--org.kwis.msp.lcdui.Jlet
```

```
public abstract class Jlet
extends Object
MSP
MSP
Thread Card
Jlet
pause
active
Jlet destroyed
startApp(), destroyApp()
pauseApp() resumeApp(),
```



startApp 가 . System.execute  
가 .

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

✎ ACTIVE

public static final int ACTIVE

✎ DESTROYED

public static final int DESTROYED

✎ PAUSED

public static final int PAUSED

✎ Jlet

protected Jlet()

Jlet .

✎ setActiveJlet

public static void setActiveJlet(Jlet ql)

Jlet .

Jlet .

✎ getActiveJlet

```
public static Jlet getActiveJlet()
```

```
    Jlet . Jlet null .
```

Returns:

```
Jlet
```


 getJletFromPID

```
public static Jlet getJletFromPID(int id)
```

```
    id      Jlet . Jlet      ID
    null    .
```

Returns:

```
ID      Jlet
```

 getCurrentJlet

```
public static Jlet getCurrentJlet()
```

```
    Jlet .
```

Returns:

```
Jlet
```

 getCurrentProgramID

```
public int getCurrentProgramID()
```

```
Jlet      id      .      id
가      .
```

Parameters:

```
id - Jlet      id
```

 startApp


```
protected abstract void startApp(String[] args)
```

```
    . Jlet      가      .
```

args[0] Jlet, args[1] 가 args 가

Parameters:

args - 가

 pauseApp

protected void pauseApp()

( , )

 resumeApp

protected void resumeApp()

pauseApp Jlet  
pauseApp ( , )

 destroyApp

protected abstract void destroyApp(boolean unconditional)

throws

org.kwis.msp.lcd.ui.JletStateChangeException

unconditaional true ,  
false JletStateChangeException  
가

가

Parameters:

unconditional - true 가 , false Jlet  
 JletStateChangeException

Throws:

org.kwis.msp.lcdui.JletStateChangeException -  
 unconditional true ,

 notifyDestroyed

public final void notifyDestroyed()

. Jlet  
 Destroyed 가 , destroyApp

Jlet.destroyApp() 가 .

 getAppProperty

public final String getAppProperty(String key)

. key  
 가 null .

Parameters:

key -

Returns:

 getEventQueue

public final EventQueue getEventQueue()

Jlet .

Returns:

## 5.2.9. UI Component(org.kwis.msp.lwc)


Interface ActionListener

public interface ActionListener

Listener . 가

See Also:

ButtonComponent

 action

```
public void action(Component cmp,
                  Object o)
```

action .

Parameters:


cmp - action

o - setActionListener Object

## Interface ChangeListener

```
public interface ChangeListener
```

```
SelectionListener {
    void stateChanged(ChangeEvent e);
}
```

 **changed**

```
public void changed(Component cmp,
                    Object o)
```

ChangeListener Component CHANGE 가  
 . CheckboxComponent ListComponent 가  
 Listener changed 가

Parameters:

cmp - 가 Component

o - setChangeListener Object( )

See Also:

CheckboxComponent.setChangeListener(org.kwis.msp.lwc.ChangeListener,  
 java.lang.Object),

CheckboxGroup.setChangeListener(org.kwis.msp.lwc.ChangeListener,  
 java.lang.Object),

ListComponent.setChangeListener(org.kwis.msp.lwc.ChangeListener,  
 java.lang.Object),

ListComponent.setChangeListener(org.kwis.msp.lwc.ChangeListener,  
 java.lang.Object),

ProgressComponent.setChangeListener(org.kwis.msp.lwc.ChangeListener,  
 java.lang.Object)



---

**Interface CommandListener**

```
public interface CommandListener
```

```
    /
```

```
    ✎ FOCUS_CHANGE
```

```
public static final int FOCUS_CHANGE
```

```
    가
```

```
    ✎ SELECT
```

```
public static final int SELECT
```

```
    ✎ commandAction
```

```
public void commandAction(Command c,
                           int type,
                           Object obj)
```

```
    가
```

Parameters:

c -

type - SELECT, FOCUS\_CHANGE

## Interface EventListener

```
public interface EventListener
```

```
Component . . . . . key,  
show, focus, pointer . . . . .
```

 eventNotify

```
public boolean eventNotify(int type,  
                           int arg1,  
                           int arg2,  
                           int arg3,  
                           Object obj)
```

Key, Show, Focus, Pointer 가

Parameters:

c -

type - (Component.KEY\_NOTIFY,  
Component.SHOW\_NOTIFY,  
Component.POINTER\_NOTIFY)

arg1 - type

arg2 - type

arg3 - type

obj - setEventListner Object

---

**Interface GrabKeyListener**

```
public interface GrabKeyListener
```

```
Key Grab
```

```
    ✎ grabKeyNotify
```

```
public boolean grabKeyNotify(int type,  
                             int chr,  
                             Object obj)
```

```
Key, Show, Focus, Pointer 가
```

```
Parameters:
```

```
c -
```

```
type -
```

```
(EventQueue.KEY_RELEASED,EventQueue.KEY_RELEASED,  
EventQueue.KEY_REPEATED, EventQueue.KEY_TYPED)
```

```
chr -
```

```
obj - setEventListner Object
```

## Class AnnunciatorComponent

```
java.lang.Object
```

```
|
```

```
+-org.kwis.msp.lwc.Component
```

```
|
```

```
+-org.kwis.msp.lwc.ContainerComponent
```

```
|
```

```
+-org.kwis.msp.lwc.ShellComponent
```

```
|
```

```
+-org.kwis.msp.lwc.AnnunciatorComponent
```

```
public class AnnunciatorComponent
```

```
extends ShellComponent
```

Fields inherited from class org.kwis.msp.lwc.ShellComponent

cd, cmpCommand, cmpTitle, cmpWork, RESIZE\_MASK

Fields inherited from class org.kwis.msp.lwc.ContainerComponent

cmpFocus, cmps, insetBottom, insetLeft, insetRight, insetTop, ncomp, offsetX, offsetY, useFrame

Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK,

VALID\_MASK, w, x, y

Methods inherited from class org.kwis.msp.lwc.ShellComponent

addComponent, configure, controllInset, getCard, getCommand,  
 getNextTraversalComponent, getPrevTraversalComponent, getTitle,  
 getWorkComponent, getX, getY, grabKey, isShown, keyNotify, processEvent,  
 removeAllComponents, repaint, serviceRepaints, setCommand, setGrabKeyListener,  
 setTitle, setTitle, setWorkComponent, showNotify, ungrabKey

Methods inherited from class org.kwis.msp.lwc.ContainerComponent

getComponent, getIndexOf, getNumberOfComponent, paintFrame ,  
 removeComponent, repaint, scrollTo, setComponent, useFrame , validate

Methods inherited from class org.kwis.msp.lwc.Component

calcPreferredSize, canHandleInput, focusNotify, getBackground, getForeground,  
 getHeight, getPreferredHeight, getPreferredHeight, getPreferredWidth, getWidth,  
 getXOnScreen, getYOnScreen, hasFocus, invalidate, isValid, paintContent,  
 pointerNotify, setBackground, setEventListener, setFocus, setForeground, toString

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

 AnnunciatorComponent

```
public AnnunciatorComponent(boolean bTrans)
```

```
. bTrans false
```

. true 가

Parameters:

bTrans - 가



 addComponent

```
public void addComponent(int idx,
                          Component cmp)
```

Description copied from class: ContainerComponent

가 . cmp가 가 가

AnnunciatorComponent  
IllegalStateException

Overrides:

addComponent in class ShellComponent

Parameters:

index -

cmp -

Throws:

IllegalStateException -

 removeComponent

```
public void removeComponent(Component cmp)
```

Description copied from class: ContainerComponent

## AnnunciatorComponent

IllegalStateException

.Overrides:


removeComponent in class ShellComponent

Parameters:

cmp -

Throws:

IllegalStateException -


 layout

public void layout()

Description copied from class: Component

Overrides:

layout in class ShellComponent

 show

public void show()

Description copied from class: ShellComponent

validate

Show

가


Show

Display

가

Overrides:

show in class ShellComponent

 hide

public void hide()

Description copied from class: ShellComponent

AnnunciatorComponent

AnnunciatorComponent가 show hide ,


IllegalStateException .

Overrides:

hide in class ShellComponent

Throws:

IllegalStateException -

 paint

protected void paint(Graphics g)

Overrides:

paint in class ContainerComponent

g 가 .

paintContent .

Parameters:

g-



## Class ButtonComponent

java.lang.Object

|

+--org.kwis.msp.lwc.Component

|

+--org.kwis.msp.lwc.ButtonComponent

```
public class ButtonComponent
```

```
extends Component
```

```
    . "select" 가
```

```
    ActionListener
```

### Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

### Methods inherited from class org.kwis.msp.lwc.Component

canHandleInput, configure, focusNotify, getBackground, getCard, getForeground, getHeight, getPreferredHeight, getPreferredHeight, getPreferredWidth, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, pointerNotify, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, showNotify, toString, validate

### Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait



 ButtonComponent

```
public ButtonComponent ()
```

 ButtonComponent

```
public ButtonComponent (String str,  
                        Image img)
```

```
Image  
    . img str null
```

Parameters:

str -

img -



 setFont

```
public void setFont (Font ft)
```

Parameters:

ft -

 getFont

```
public Font getFont ()
```

Returns:

### ✎ setActionListener

```
public void setActionListener(ActionListener l,
                              Object o)
```

```
ActionListener . . . . . o
ActionListener action . . . . . ActionListener
ActionListener . . . . .
```

Parameters:

l - ActionListener

o -

See Also:

ActionListener.action(org.kwis.msp.lwc.Component, java.lang.Object)

### ✎ keyNotify

```
public boolean keyNotify(int type,
                          int chr)
```

Description copied from class: Component

```
가 . . . . . , setFocus
가 . . . . . type KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED, KEY_TYPED , chr .
```

Overrides:

keyNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

```
type - . . . . . ; . . . . . KEY_PRESSED,
KEY_RELEASED, . . . . . KEY_REPEATED,
KEY_TYPED
```

```
chr - . . . . . ; '0' - '9' '*' , '#' .
```

Returns:

```
가 . . . . . 가 . . . . . , true .
false . . . . .
```

 `setString`

```
public void setString(String str)
```

Parameters:

`str` -

 `getString`

```
public String getString()
```

Returns:

 `getImage`

```
public Image getImage()
```

Returns:

 `setImage`

```
public void setImage(Image img)
```

Parameters:

`img` -

 `paintContent`

```
public void paintContent(Graphics g)
```

Description copied from class: Component

`validate`

(

---

) . -1 ,

Overrides:

paintContent in class Component


Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

Graphics

 layout

protected void layout()

Description copied from class: Component

Overrides:

layout in class Component


 calcPreferredSize

protected void calcPreferredSize(int w)

Description copied from class: Component

Overrides:

calcPreferredSize in class Component



## Class CheckboxComponent

java.lang.Object

|

+--org.kwis.msp.lwc.Component

|

+--org.kwis.msp.lwc.LabelComponent

|

+--org.kwis.msp.lwc.CheckboxComponent

```
public class CheckboxComponent
```

```
extends LabelComponent
```

```
CheckboxComponent      가
```

```
.
```

```
CheckboxGroup
```

```
CheckboxComponent
```

```
, CheckboxGroup
```

```
CheckboxGroup
```

```
CheckboxComponent
```

```
.
```

```
CheckboxGroup
```

```
CheckBox
```

```
, 가
```

```
setState
```

```
.
```

See Also:

[CheckboxGroup](#)

Fields inherited from class org.kwis.msp.lwc.LabelComponent

layout, m\_ft, m\_image, m\_str

Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent,

POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

Methods inherited from class org.kwis.msp.lwc.LabelComponent

calcPreferredSize, getFont, getImage, getLabel, invalidate, setFont, setImage, setLabel, setLayout

Methods inherited from class org.kwis.msp.lwc.Component

canHandleInput, configure, focusNotify, getBackground, getCard, getForeground, getHeight, getPreferredSize, getPreferredSize, getPreferredSize, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, isShown, isValid, layout, pointerNotify, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, showNotify, toString, validate

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

### CheckboxComponent

```
public CheckboxComponent(String str,
                          Image img)
```

```
    CheckboxComponent .
CheckboxComponent false가 .
```


Parameters:

str - .

img - .

See Also:

[CheckboxComponent\(String, Image, CheckboxGroup\)](#),  
[CheckboxComponent\(String, Image, boolean\)](#), #CheckboxComponent(String,  
Image, CheckboxGroup, boolean), [CheckboxGroup](#)

 `CheckboxComponent`

```
public CheckboxComponent(String str,
                          Image img,
                          CheckboxGroup cb)
```

`CheckboxComponent` . `CheckboxComponent` 가  
`CheckboxGroup` . `CheckboxGroup` null  
`Checkbox`가 .

See Also:

[CheckboxComponent\(String, Image\)](#), [CheckboxComponent\(String, Image, boolean\)](#), #CheckboxComponent(String, Image, CheckboxGroup, boolean),  
[CheckboxGroup](#)

 `CheckboxComponent`

```
public CheckboxComponent(String str,
                          Image img,
                          boolean bSet)
```

`CheckboxComponent` . `CheckboxComponent` 가 `bSet`  
가 .

See Also:

[CheckboxComponent\(String, Image\)](#), [CheckboxComponent\(String, Image, CheckboxGroup\)](#), #CheckboxComponent(String, Image, CheckboxGroup,  
boolean), [setState\(boolean\)](#), [CheckboxGroup](#)



 `setState`



```

public void setState(boolean bState)
CheckboxComponent . CheckboxComponent
                    CheckboxGroup      setState
false      CheckboxGroup      CheckboxComponent
                    가      ChangeListener가

```

See Also:

[getState\(\)](#)

 getState

```

public boolean getState()
CheckboxComponent

```

See Also:

[setState\(boolean\)](#)

 paintContent

```

public void paintContent (Graphics g)

```

Description copied from class: Component

```

        validate
    )
        (
        -1
    ,

```

Overrides:

paintContent in class LabelComponent

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

[Graphics](#)

### ✎ keyNotify

```
public boolean keyNotify(int type,
                        int key)
```

Description copied from class: Component

```
        가 , setFocus
        가 . type KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED, KEY_TYPED , chr .
```

Overrides:

keyNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

```
type - ; KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED,
KEY_TYPED
```

```
chr - ; '0' - '9' '*', '#' .
```

Returns:

```
        가 가 , true .
        false .
```

### ✎ setChangeListener

```
public void setChangeListener(ChangeListener listener,
                             Object obj)
```

```
CheckboxComponent ChangeListener . CheckboxComponent
        가 Listener changed 가
```

Parameters:

listener - Listener

obj - Listener가 Object ( )

See Also:

[CheckboxGroup.setChangeListener\(org.kwis.msp.lwc.ChangeListener, java.lang.Object\)](#)

Class CheckboxGroup

java.lang.Object

|

+- org.kwis.msp.lwc.CheckboxGroup

public class CheckboxGroup

extends Object

CheckboxGroup

CheckboxComponent

|    |               |                       |              |
|----|---------------|-----------------------|--------------|
|    | CheckboxGroup | CheckBoxComponent     | 가            |
| ON | 가             | CheckboxComponent     | ON           |
|    | Checkbox가 ON  | Group                 | Checkbox OFF |
| 가  | .             | CheckboxComponent가 ON | .            |


See Also:

[CheckboxComponent](#)

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait



 CheckboxGroup


public CheckboxGroup()

CheckboxGroup

See Also:

[CheckboxComponent](#)



 select

```

public void select(CheckboxComponent cb)
CheckboxGroup      CheckboxComponent      ON
.                  OFF   가   .


```

Parameters:

cb - select CheckboxComponent.

See Also:

[getSelectedCheckbox\(\)](#)

 getSelectedCheckbox

```

public CheckboxComponent getSelectedCheckbox()
CheckboxGroup      Checkbox      ON      CheckboxComponent


```

Returns:

ON CheckboxComponent

See Also:

[select\(org.kwis.msp.lwc.CheckboxComponent\)](#)

 setChangeListener

```

public void setChangeListener(ChangeListener listener,
                              Object obj)
CheckboxGroup  ChangeListener      .  CheckboxGroup
CheckboxComponent   가      Listener   changed   가

```

Parameters:

listener - Listener

obj - Listener가 Object ( )

See Also:

CheckboxComponent#CheckboxComponent(String, Image, CheckboxGroup, boolean), [CheckboxComponent.CheckboxComponent\(String, Image, CheckboxGroup\)](#),

[CheckboxComponent.setChangeListener\(org.kwis.msp.lwc.ChangeListener,  
java.lang.Object\)](#)



## Class ComboComponent

java.lang.Object

|

+--org.kwis.msp.lwc.Component

|

+--org.kwis.msp.lwc.ComboComponent

```
public class ComboComponent
```

```
extends Component
```

```
ComboComponent
```

```
ComboComponent
```

SELECT

가

```
ComboComponent
```

ChangeListener

ChangeListener

```
changed
```

### Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

### Methods inherited from class org.kwis.msp.lwc.Component

calcPreferredSize, canHandleInput, configure, focusNotify, getBackground, getCard, getForeground, getHeight, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, layout, pointerNotify, processEvent, repaint,

repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, showNotify, toString, validate

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

### ✎ ComboComponent

```
public ComboComponent ()
```

ComboComponent .

### ✎ append

```
public int append(String str)
```

가 .

Parameters:

str - 가

Returns:

가

Throws:

IllegalArgumentException - str null .

### ✎ insert

```
public int insert(int index,
                  String str)
```

index

· '0' ListItemComponent 가  
IndexOutOfBoundsException .

Parameters:

index -


Returns:

Throws:

IndexOutOfBoundsException -

See Also:

[ListComponent.insert\(int, java.lang.String, org.kwis.msp.lcdui.Image\)](#)

 set

```
public void set(int index,
                String str)
```

index  
'0' ListItemComponent 가  
IndexOutOfBoundsException .

Parameters:

index -

Throws:

IndexOutOfBoundsException -

 delete

```
public void delete(int index)
```

index  
· '0'  
ListItemComponent 가  
IndexOutOfBoundsException .

Parameters:

index -



Throws:

IndexOutOfBoundsException -

 getString

```
public String getString()
```

Returns:

, null .

 getSize

```
public int getSize()
```

ComboComponent .

Returns:


가

 getSelectedIndex

```
public int getSelectedIndex()
```

Returns:

. -1 .

 getPreferredSize

```
public int getPreferredSize()
```

Description copied from class: Component


. ContainerComponent  
가 .

Overrides:

getPreferredSize in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 getPreferredHeight

```
public int getPreferredHeight(int w)
```

Description copied from class: Component

가  
 .  
 LabelComponent  
 TextFieldComponent,  
 TextAreaComponent  
 가  
 가  
 가  
 , 가  
 .  
 , w가 -1

Overrides:


getPreferredHeight in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

w - 가 .

Returns:

 getPreferredWidth

```
public int getPreferredWidth()
```

Description copied from class: Component

. Container  
 가 .

Overrides:

getPreferredWidth in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 paintContent

```
public void paintContent(Graphics g)
```

Description copied from class: Component

```
        . validate                ,                (
        )                .                -1                ,
```

Overrides:

paintContent in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

[Graphics](#)

 keyNotify

```
protected boolean keyNotify(int type,
                             int key)
```

Description copied from class: Component

```
        . 가                , setFocus
        가                가                . type KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED, KEY_TYPED , chr                .
```

Overrides:

keyNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

```
type -                ;                KEY_PRESSED,
KEY_RELEASED,                KEY_REPEATED,
                KEY_TYPED
```

chr - ; '0' - '9' '\*', '#' .

Returns:

가 가 , true .  
false .

### setChangeListener

```
public void setChangeListener(ChangeListener listener,
                              Object obj)
```

ComboComponent ,

ChangeListener .

Parameters:

listener - ChangeListener, null Listener가 .

obj - Object , null . Object Change 가  
ChangeListener changed 가 .

### select

```
public void select(int index)
                  index .
```

Parameters:

index -

Throws:

IndexOutOfBoundsException -

## Class Command

java.lang.Object

|

+-org.kwis.msp.lwc.Command

```
public class Command
```

```
extends Object
```

```
    가          가          .          가 UI
```


```
CommandBarComponent          .          20x20pixel
```

See Also:

[CommandBarComponent](#)

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 Command

```
public Command(String str,
                Object obj)
```

```
    . obj          가          Object          가          null
    . obj          가          Object          가          getExtObject
```

Parameters:

str -

obj - Object

 Command

```
public Command(String str,
                Image img,
                Object obj)
```

```
가 . 가 . obj
가 Object 가 getExtObject
.
```

Parameters:

str -

img -

obj - Object

#### Command

```
public Command(String str,
                Image img,
                Image imgActive,
                Object obj)
```

```
. obj 가 Object 가
가 getExtObject
.
```

Parameters:

str -

img -

imgActive -

obj - Object

#### Command

```
public Command(String str,
                String imgString,
                Object obj)
```

```

        getNormallImage   가   Image.loadImage
        .
        가   Object   가   getExtObject
        .


```

Parameters:

str -

imgString -

obj - Object

 Command

```

public Command(String str,
                String imgString1,
                String imgString2,
                Object obj)

```

```

        getNormallImage   가   Image.loadImage
        . imgString1   , imgString2
        . obj   가   Object
        가   getExtObject
        .

```

Parameters:

str -

imgString1 -

imgString2 -

obj - Object

 getString

```

public String getString()

```

Returns:

✎ getExtObject

```
public Object getExtObject()
    Object
```

Returns:

Object

✎ getNormalImage

```
public Image getNormalImage()
```

가 , , 가 , Image.loadImage .

Returns:

See Also:

[Image.loadImage\(java.lang.String, org.kwis.msp.lcdui.ImageObserver\)](#)

✎ getActiveImage

```
public Image getActiveImage()
```

가 , , 가 , Image.loadImage .

Returns:





## Class CommandBarComponent

java.lang.Object

|

+--org.kwis.msp.lwc.Component

|

+--org.kwis.msp.lwc.CommandBarComponent

```
public class CommandBarComponent
```

```
extends Component
```

```
Command
```

```
가
```

```
Active Index -1
```

### Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

### Methods inherited from class org.kwis.msp.lwc.Component

calcPreferredSize, canHandleInput, configure, focusNotify, getBackground, getCard, getForeground, getHeight, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, layout, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, showNotify, toString, validate

### Methods inherited from class java.lang.Object

---

```
equals, getClass, hashCode, notify, notifyAll, wait, wait, wait
```

```
✎ CommandBarComponent
```

```
public CommandBarComponent ()
```

```
✎ getPreferredSize
```

```
public int getPreferredSize (int w)
```

Description copied from class: Component

가  
 .  
 LabelComponent  
 TextFieldComponent,  
 TextAreaComponent  
 가  
 가 . 가 가 , 가  
 . , w가 -1

Overrides:

getPreferredSize in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

w - 가 .

Returns:

```
✎ getPreferredSize
```

```
public int getPreferredSize ()
```

Description copied from class: Component


ContainerComponent  
가

Overrides:

getPreferredHeight in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 getPreferredWidth

```
public int getPreferredWidth()
```

Description copied from class: Component

Container  
가

Overrides:

getPreferredWidth in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 getSize

```
public int getSize()
```

Returns:

Command

 addCommand

```
public int addCommand(Command cmd)
```

가 . 가 가 Active Index -1

`. setActiveIndex`

Command Active

Parameters:

`cmd` - 가

Returns:

가 Command Index , -1

See Also:

[Command](#), [setActiveIndex\(int\)](#)

 `removeCommand`


```
public void removeCommand(Command cmd)
```

Parameters:

`cmd` -

See Also:

[Command](#)

 `removeAll`

```
public void removeAll()
```

Parameters:

`cmd` -

See Also:

[Command](#)

 `setActiveIndex`

```
public void setActiveIndex(int index)
```

Parameters:

index -

 `getActiveIndex`

```
public int getActiveIndex()
```

가 -1

Returns:

 `getCommand`

```
public Command getCommand(int index)
```

가 null

Parameters:

index - 가

Returns:

 `setCommandListener`

```
public void setCommandListener(CommandListener cl,
                                Object obj)
```

Listener . 가 가

Parameters:

cl - Listener

obj - commandAction 가 Object

 `keyNotify`

```
protected boolean keyNotify(int type,
```

```
int chr)
```

Description copied from class: Component

```

        가 , setFocus
        가 . type KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED, KEY_TYPED , chr

```

Overrides:

keyNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

```

type - ; KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED,
KEY_TYPED

```

```
chr - ; '0' - '9' '*', '#'

```

Returns:

```

        가 , true
        false

```

 pointerNotify

```

protected boolean pointerNotify(int type,
                                int x,
                                int y)

```

Description copied from class: Component

가

Overrides:

pointerNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

type -

x - 'x'

y - 'y'

Returns:

가 가 , false

 paintContent

```
public void paintContent(Graphics g)
```

Description copied from class: Component

```

        . validate
        )
        . -1
    .

```

Overrides:

paintContent in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

[Graphics](#)

## Class Component

java.lang.Object

|

+- -org.kwis.msp.lwc.Component

Direct Known Subclasses:

ButtonComponent, ComboComponent, CommandBarComponent,  
ContainerComponent, DateFieldComponent, ImageComponent, LabelComponent,  
ProgressComponent, ScrollbarComponent, TextComponent, TickerComponent

```
public abstract class Component
```

```
extends Object
```

```
가
```

```
가 ,
```

```
UI
```

```
Component
```

```
가 ,
```

```
( 가 ,
```

```
)
```

```
가 .
```

```
Component
```

```
가 ,
```

```
가
```

```
Component
```

```
ShellComponent가 . ,
```

```
ShellComponent 가 ,
```

```
Component가
```

```
addComponent
```

```
addComponent
```

```
가 .
```

```
, FormComponent
```

```
LabelComponent
```

```
Component
```

```
가 .
```

```
가
```

```
,
```

```
가
```

```
가 , invalidate
```

```
, Component가
```

```
, paintContent 가
```

```
validate()
```

```
가 .
```

```
가 .
```

```
ContainerComponent
```

```
layout
```



(Label, TextField, TextArea)

가 .  
 가 . UI  
 ShellComponent가 .  
 가 .  
 CanHandleInput 가 true , ContainerComponent  
 setFocus 가 , 가  
 keyNotify 가 . showNotify focusNotify ,  
 pointerNotify 가 ,  
 paintContent 가 .  
 keyNotify pointerNotify , true  
 , 가 . false ,  
 가 .  
 setEventListener Listener  
 Listener가 true  
 가 false  
 .  
 paintContent Graphics  
 .  
 setClip , reset  
 가 .

Component [LAYOUT\\_LEFT](#)  
[LAYOUT\\_RIGHT](#),[LAYOUT\\_HCENTER](#),[LAYOUT\\_TOP](#),  
[LAYOUT\\_BOTTOM](#),[LAYOUT\\_VCENTER](#) .  
 IllegalArgumentException .  
 LAYOUT\_LEFT|LAYOUT\_RIGHT  
 LAYOUT\_TOP|LAYOUT\_BOTTOM

|   |
|---|
| Methods inherited from class java.lang.Object                   |
| equals, getClass, hashCode, notify, notifyAll, wait, wait, wait |



☞ LAYOUT\_LEFT

```
public static final int LAYOUT_LEFT
```

Component

```
. '1'
```

☞ LAYOUT\_RIGHT

```
public static final int LAYOUT_RIGHT
```

Component

```
. '2'
```

☞ LAYOUT\_HCENTER

```
public static final int LAYOUT_HCENTER
```

Component 가

```
. '4'
```

☞ LAYOUT\_TOP

```
public static final int LAYOUT_TOP
```

Component

```
. '8'
```

☞ LAYOUT\_BOTTOM

```
public static final int LAYOUT_BOTTOM
```

Component

```
. '16'
```

☞ LAYOUT\_VCENTER

---

```
public static final int LAYOUT_VCENTER
```

```
Component 가  
        .  
        . '32' .
```

```
✍ x
```

```
protected int x
```

```
        Component x .
```

```
✍ y
```

```
protected int y
```

```
        Component y .
```

```
✍ w
```

```
protected int w
```

```
✍ h
```

```
protected int h
```

```
✍ parent
```

```
protected ContainerComponent parent
```

```
✍ bg
```

```
protected int bg
```

```
        . -1 .
```

✍ fg

protected int fg

✍ evtListener

protected EventListener evtListener

✍ evtListenerObj

protected Object evtListenerObj

✍ prefW

protected int prefW

✍ prefH

protected int prefH

✍ POS\_MASK

public static final int POS\_MASK

See Also:

[configure\(int, int, int, int, int\)](#)

✍ SIZE\_MASK

public static final int SIZE\_MASK

See Also:

[configure\(int, int, int, int, int\)](#)

✍ mask

protected int mask

✍ VALID\_MASK

protected static final int VALID\_MASK

✍ HAS\_FOCUS\_MASK

protected static final int HAS\_FOCUS\_MASK

✍ INPUT\_MASK

protected static final int INPUT\_MASK

✍ PREFER\_SIZE\_MASK

protected static final int PREFER\_SIZE\_MASK

✍ FOCUS\_NOTIFY

public static final int FOCUS\_NOTIFY

가 . 1 .

See Also:

[setEventListener\(org.kwis.msp.lwc.EventListener, java.lang.Object\)](#)

✍ SHOW\_NOTIFY

public static final int SHOW\_NOTIFY

가 . 2 .

See Also:

[setEventListener\(org.kwis.msp.lwc.EventListener, java.lang.Object\)](#)

✍ KEY\_NOTIFY

```
public static final int KEY_NOTIFY
```

```
가 . 3 .
```

See Also:

[setEventListener\(org.kwis.msp.lwc.EventListener, java.lang.Object\)](#)

 POINTER\_NOTIFY

```
public static final int POINTER_NOTIFY
```

```
가 . 4 .
```

See Also:

[setEventListener\(org.kwis.msp.lwc.EventListener, java.lang.Object\)](#)

 KEY\_PRESSED

```
public static final int KEY_PRESSED
```

```
가 .
```

See Also:

[setEventListener\(org.kwis.msp.lwc.EventListener, java.lang.Object\)](#)

 KEY\_RELEASED

```
public static final int KEY_RELEASED
```

```
가 .
```

See Also:

[setEventListener\(org.kwis.msp.lwc.EventListener, java.lang.Object\)](#)


 KEY\_REPEATED

```
public static final int KEY_REPEATED
```

```
가 .
```

See Also:

[setEventListener\(org.kwis.msp.lwc.EventListener, java.lang.Object\)](#)

 KEY\_TYPED

```
public static final int KEY_TYPED
```

가

See Also:

[setEventListener\(org.kwis.msp.lwc.EventListener, java.lang.Object\)](#)

 POINT\_PRESSED

```
public static final int POINT_PRESSED
```

가

See Also:

[setEventListener\(org.kwis.msp.lwc.EventListener, java.lang.Object\)](#)

 POINT\_RELEASED

```
public static final int POINT_RELEASED
```

가

See Also:

[setEventListener\(org.kwis.msp.lwc.EventListener, java.lang.Object\)](#)

 POINT\_DRAGGED

```
public static final int POINT_DRAGGED
```

가

See Also:

[setEventListener\(org.kwis.msp.lwc.EventListener, java.lang.Object\)](#)

 Component

```
protected Component ()
```



🔗 getWidth

```
public int getWidth()
```

Returns:

🔗 getHeight

```
public int getHeight()
```

Returns:

🔗 canHandleInput

```
public boolean canHandleInput()
```

가 ( true

ContainerComponent setFocus , 가

mask .

Returns:

🔗 hasFocus

```
public boolean hasFocus()
```


가 가 가 , 가 , keyNotify 가 ,



가

Returns:

가

 configure

```
public void configure(int x,
                    int y,
                    int w,
                    int h,
                    int mask)
{
    . mask = POS_MASK AND POS_MASK ,
    . mask = SIZE_MASK (w, h)
    repaint , paintContent
    layout 가
}
```

Parameters:


x - 'x'

y - 'y'

w -

h -

mask - POS\_MASK | SIZE\_MASK가 , POS\_MASK가 x,  
y , SIZE\_MASK가 w, h .

 getX

```
public int getX()
{
    x
}
```

Returns:

x

✎ getY

public int getY()

y

y

Returns:

y

✎ calcPreferredSize

protected void calcPreferredSize(int w)

✎ getPreferredSize

public int getPreferredSize()

. ContainerComponent

가

Returns:

✎ getPreferredSize

public int getPreferredSize(int w)

가

. LabelComponent

TextFieldComponent,

TextAreaComponent

가

가

가

가 . 가 가


, 가

. , w가 -1

Parameters:

w - 가 .

Returns:


 `getWidth()`

```
public int getWidth()
```

`Container`

가

Returns:

 `setBackground()`

```
public void setBackground(int bg)
```

`-1`

`0x00RRGGBB`

Parameters:

`bg` -

See Also:

[getBackground\(\)](#)

 `setForeground()`

```
public void setForeground(int fg)
```

Parameters:

`fg` -

See Also:

[setBackground\(int bg\)](#),


 `getBackground()`

```
public int getBackground()
```

Returns:

See Also:

[setBackground\(int\)](#)

 getForeground

```
public int getForeground()
```

Returns:

See Also:

[setForeground\(int\)](#)

 paintContent

```
public void paintContent(Graphics g)
```


```
        validate() , (
    ) -1 ,
```

Parameters:

g - Graphics.

See Also:

[Graphics](#)

 isValid

```
protected boolean isValid()
```

```
    가 가 가
    가
```

가 false ,  
true .

Returns:

가 .

✍ invalidate

public void invalidate()

가 가 .

✍ validate

public void validate()

가 . paintContent showNotify  
, 가 가 layout . layout  
,

✍ layout

protected void layout()

✍ setFocus

public void setFocus()

가 .

See Also:

[focusNotify\(boolean\)](#)

✍ focusNotify

public void focusNotify(boolean b)

가 가 가  
repaint , .

Parameters:

b - 가 true가 , 가 false

### ✎ keyNotify

protected boolean keyNotify(int type,  
int chr)  
가 , setFocus  
가 가 . type KEY\_PRESSED,  
KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED , chr .

Parameters:

type - ; KEY\_PRESSED,  
KEY\_RELEASED, KEY\_REPEATED,  
KEY\_TYPED

chr - ; '0' - '9' '\*', '#' .

Returns:

가 가 , true .  
false .

### ✎ pointerNotify

protected boolean pointerNotify(int type,  
int x,  
int y)  
가

Parameters:

type -

x - 'x'

y - 'y'

Returns:

---

가 가 , false

### showNotify

```
protected void showNotify(boolean bShow)
    . addComponent removeComponent
    (ShellComponent)가 show
```

Parameters:

bShow - 가

### repaint

```
public void repaint()
    가
    Card repaint , repaint
    paintContent
```

### isShown

```
public boolean isShown()
    가 가
    true, false . 가
```

Returns:

### processEvent

```
protected boolean processEvent(int type,
    int subtype,
    int param1,
    int param2)
```

Parameters:

type -

subtype -

param1 - 가

param2 - 가

 repaint

```
public void repaint(int x,
                   int y,
                   int w,
                   int h)
```

가

, repaint

Card repaint

paint()


Parameters:

x - x

y - y

w -

h -

 serviceRepaints

```
public void serviceRepaints()
```

. repaint paint

, paint

 toString

```
public String toString()
```

Object string

Overrides:

toString in class Object

Returns:



## ✍ getXOnScreen

```
public int getXOnScreen()
```

. Component X

Returns:

X

## ✍ getYOnScreen

```
public int getYOnScreen()
```

. Component Y

Returns:

Y

## ✍ getCard

```
public Card getCard()
```

. ShellComponent

Card 가 . Card  
가 가 null

Returns:

Card

See Also:

[Card](#)

## ✍ setEventListener

```
public void setEventListener(EventListener listener,  
                             Object obj)
```

```
Listener . Listener .  
Listener가 true , false
```

Parameters:

listener - Listener

obj - Listener

See Also:

[EventListener](#)



## Class ContainerComponent

java.lang.Object

|

+--org.kwis.msp.lwc.Component

|

+--org.kwis.msp.lwc.ContainerComponent

Direct Known Subclasses:

FormComponent, ShellComponent

```
public abstract class ContainerComponent
```

```
extends Component
```

```

        가
        ,
        , removeComponent
        가
        ,
        가 ShellComponent
show
        layout
        (Inset)
        ,
        가
        setFocus

```

See Also:

[ShellComponent](#), [Component](#)

Fields inherited from class org.kwis.msp.lwc.Component


bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

Methods inherited from class org.kwis.msp.lwc.Component


calcPreferredSize, canHandleInput, configure, focusNotify, getBackground, getCard, getForeground, getHeight, getPreferredSize, getPreferredHeight, getPreferredWidth, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, layout, paintContent, pointerNotify, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, showNotify, toString

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

 cmps

protected Component[] cmps


 ncomp

protected int ncomp

 cmpFocus

protected Component cmpFocus


가

 offsetX

protected int offsetX

 offsetY


protected int offsetY

 insetTop


protected short insetTop

 insetBottom

protected short insetBottom

 insetLeft

protected short insetLeft

 insetRight

protected short insetRight

 useFrame

protected boolean useFrame



 ContainerComponent

protected ContainerComponent ()



### ✍ addComponent

```
public void addComponent(int index,
                        Component cmp)
```

가 . cmp가 가 가

cmp가 null NullPointerException . cmp가  
가 IllegalArgumentException .

index '0' 가  
IndexOutOfBoundsException .

Parameters:

index -

cmp -

Throws:

IllegalArgumentException - cmp가 가

IndexOutOfBoundsException - index가

NullPointerException - cmp null

### ✍ addComponent

```
public int addComponent(Component cmp)
```

가 . 가 .

Parameters:

cmp - 가

Throws:

IllegalArgumentException - cmp가 가

NullPointerException - cmp null

## ✍️ setComponent

```
public void setComponent(int index,
                        Component cmp)
```

· cmp가 null  
가 NullPointerException  
· cmp가  
IllegalArgumentExcepion  
·  
index '0'  
가  
IndexOutOfBoundsException

Parameters:

index -

cmp -

Throws:

IllegalArgumentExcepion - cmp가 가

NullPointerException - cmp가 null

IndexOutOfBoundsException - index가

## ✍️ removeComponent

```
public void removeComponent(int index)
```

· index  
·  
index '0'  
가  
IndexOutOfBoundsException

Parameters:

index -

Throws:

IndexOutOfBoundsException - index가

## ✍️ removeComponent

```
public void removeComponent(Component cmp)
```

가


false .

Parameters:

cmp -

 removeAllComponents

```
public void removeAllComponents()
```

 getComponent


```
public Component getComponent(int i)
```

stack 가 . 가  
null .

Parameters:

i - 가

Returns:

 getIndexOf

```
public int getIndexOf(Component cmp)
```

stack 가 .

Parameters:

cmp - 가

Returns:

 validate

```
public void validate()
```

Description copied from class: Component



```
, 가 . paintContent showNotify  
가 가 layout . layout  
,
```

Overrides:

validate in class Component

 getNextTraversalComponent

```
protected Component getNextTraversalComponent()
```

```
가 . 가  
가 가 null .
```

Returns:

가

 getPrevTraversalComponent

```
protected Component getPrevTraversalComponent()
```

```
가 . 가  
가 가 null .
```

Returns:

가

 keyNotify

```
protected boolean keyNotify(int type,  
int key)
```

Description copied from class: Component

```
가 , setFocus  
가 가 . type KEY_PRESSED,  
KEY_RELEASED, KEY_REPEATED, KEY_TYPED , chr .
```

Overrides:

keyNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component


Parameters:

```
type - ; KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED,
KEY_TYPED
```

```
chr - ; '0' - '9' '*', '#' .
```

Returns:

```
가 가 , true .
false .
```

 processEvent

```
protected boolean processEvent(int type,
                                int subtype,
                                int param1,
                                int param2)
```

Description copied from class: Component

Overrides:

processEvent in class Component

Following copied from class: org.kwis.msp.lwc.Component


Parameters:

type -

subtype -

param1 - 가

param2 - 가

 paint

```
protected void paint(Graphics g)
```

```
g 가 .
```

## paintContent

Parameters:

g -

 scrollTo

```
protected boolean scrollTo(int dx,
                           int dy)
```

. dx, dy가 가 (offset) 가  
scrollTo

Parameters:

dx - x

dy - y

Returns:

true, false

 repaint

```
public void repaint(int x,
                   int y,
                   int w,
                   int h)
```

Description copied from class: Component

가 Card repaint  
, repaint paint()

Overrides:

repaint in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

x - x

y - y

w -

h -

### repaint

```
public void repaint()
```

Description copied from class: Component

```
가
Card repaint , repaint
paintContent
```

Overrides:

repaint in class Component

### useFrame

```
public void useFrame(boolean useFrame)
```

```
ContainterComponent . True
setInset()
False initInset() '0'
```

### controllInset

```
protected void controllInset(boolean flag)
```

```
ContainerComponent . True
ContainerComponent , False
'0'
```

### paintFrame

```
protected void paintFrame(Graphics g)
```

```
useFrame true
```

Parameters:

g -


✍ `getNumberOfComponent`

```
public int getNumberOfComponent ()
```

Component

Returns:

Component



## Class DateFieldComponent

java.lang.Object

|

+- org.kwis.msp.lwc.Component

|

+- org.kwis.msp.lwc.DateFieldComponent

public class DateFieldComponent

extends Component

DateFieldComponent

DateFieldComponent

[TimeZone](#) [Date](#)

가

getDate, setDate

DateFieldComponent

DateFieldComponent

3가

[MODE\\_TIME](#)

[MODE\\_DATE](#)

[MODE\\_TIME\\_DATE](#)

See Also:

[Date](#), [Calendar](#), [TimeZone](#)

Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK,

VALID\_MASK, w, x, y

Methods inherited from class org.kwis.msp.lwc.Component

calcPreferredSize, canHandleInput, configure, focusNotify, getBackground, getCard, getForeground, getHeight, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, layout, pointerNotify, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, toString, validate

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

 MODE\_TIME

```
public static final int MODE_TIME
```

```
        DateFieldComponent
```

```
MODE_TIME      '0'
```

 MODE\_DATE

```
public static final int MODE_DATE
```

```
        DateFieldComponent
```

```
MODE_DATE      '1'
```

 MODE\_TIME\_DATE

```
public static final int MODE_TIME_DATE
```

## DateFieldComponent

MODE\_TIME\_DATE '2'

 DateFieldComponent

public DateFieldComponent(int mode)

[TimeZone](#) [Date](#)

DateFieldComponent

가

[MODE\\_TIME](#)

[MODE\\_DATE](#)

[MODE\\_TIME\\_DATE](#)

## IllegalArgumentException

Parameters:

mode - DateFieldComponent

Throws:

IllegalArgumentException - 3가

MODE\_TIME, MODE\_DATE, MODE\_DATE -

See Also:

[MODE\\_TIME](#), [MODE\\_DATE](#), [MODE\\_TIME\\_DATE](#), [TimeZone](#), [Date](#)

 getDate

public Date getDate()

DateFieldComponent

가

Date

Date

DateFieldComponent

[Date](#)

1970/1/00:00:00 GMT

milliseconds

가



See Also:

[setDate\(Date dt\)](#), [Date](#)

 `getMode`

```
public int getMode()
```

DateFieldComponent

See Also:

[setMode\(int mode\)](#)

 `getTimeZone`

```
public TimeZone getTimeZone()
```

DateFieldComponent

TimeZone

TimeZone


TimeZone, TimeZone.[TimeZone.getDefault\(\)](#)

Returns:

DateFieldComponent      TimeZone

See Also:

[setTimeZone\(TimeZone tz\)](#), [TimeZone](#)

 `showNotify`

```
protected void showNotify(boolean bShow)
```

Description copied from class: Component

. `addComponent`    `removeComponent`  
,  
(ShellComponent)가 show

Overrides:

`showNotify` in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

bShow - 가

### setDate

```
public void setDate(Date dt)
```

DateFieldComponent Date . null  
 NullPointerException . Date 1970/1/00:00:00 GMT  
 milliseconds 가 .

Parameters:

dt - DateFieldComponent Date

Throws:

NullPointerException - Date가 null

See Also:

[getDate\(\)](#), [Date](#)

### setMode

```
public void setMode(int mode)
```

DateFieldComponent . 가 MODE\_TIME,  
 MODE\_DATE, MODE\_TIME\_DATE ,  
 IllegalArgumentException .

Parameters:

mode - DateFieldComponent

Throws:

IllegalArgumentException -

See Also:

[getMode\(\)](#), [MODE\\_TIME](#), [MODE\\_DATE](#), [MODE\\_TIME\\_DATE](#)

### setTimeZone

```
public void setTimeZone(TimeZone tz)
```

DateFieldComponent TimeZone . TimeZone

TimeZone , TimeZone.[TimeZone.getDefault\(\)](#)

Parameters:


tz - DateFieldComponent TimeZone

Throws:

NullPointerException - TimeZone null

See Also:

[getTimeZone\(\)](#), [TimeZone](#)

 [getPreferredHeight](#)

```
public int getPreferredHeight(int w)
```

Description copied from class: Component

가  
 .  
 LabelComponent TextFieldComponent,  
 TextAreaComponent 가 가 가  
 가 . 가 가 , 가 .  
 . , w가 -1

Overrides:

getPreferredHeight in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

w - 가 .

Returns:

 [getPreferredHeight](#)

```
public int getPreferredHeight()
```

Description copied from class: Component

. ContainerComponent

가

Overrides:

getPreferredHeight in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 getPreferredWidth

public int getPreferredWidth()

Description copied from class: Component

. Container

가

Overrides:

getPreferredWidth in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 paintContent

public void paintContent (Graphics g)

Description copied from class: Component

```

        validate
    )
    -1

```

Overrides:

paintContent in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

[Graphics](#)

### keyNotify

```
public boolean keyNotify(int type,
                        int key)
```

Description copied from class: Component

```
가 , setFocus
가 type KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED, KEY_TYPED , chr
```

Overrides:

keyNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

```
type - ; KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED,
KEY_TYPED
```

```
chr - ; '0' - '9' '*', '#'
```

Returns:

```
가 가 , true
false
```

### getStringValue

```
public String getStringValue(int mode)
```

MODE\_DATE Mon, 10 Dec 2001

MODE\_TIME 03 : 28 ( am )

MODE\_TINE\_DATE Mon, 10 Dec 2001 03 : 28 ( am )

Parameters:

mode - DateFieldComponent

Returns:

/ .

Throws:

IllegalArgumentException -



## Class DialogComponent

```
java.lang.Object
```

```
|
```

```
+-org.kwis.msp.lwc.Component
```

```
|
```

```
+-org.kwis.msp.lwc.ContainerComponent
```

```
|
```

```
+-org.kwis.msp.lwc.ShellComponent
```

```
|
```

```
+-org.kwis.msp.lwc.DialogComponent
```

```
public class DialogComponent
```

```
extends ShellComponent
```

```
DialogComponent
```

```
DialogComponent
```

```
가
```

```
DialogComponent
```

```
Component
```

```
Component
```

```
가
```

```
ContainerComponent
```

```
가
```

```
DialogComponent
```

```
3가
```

```
TYPE_OK
```

```
TYPE_OK_CANCEL
```

```
TYPE_NONE
```

```
TYPE_NONE
```

```
3
```

```
setTimeout\(int\)
```

```
가
```

```
TYPE_NONE
```

```
TIMEOUT_INFINITE
```

```
timeout
```

```
TYPE_OK
```

```
, TYPE_NONE,TYPE_OK,TYPE_OK_CANCEL
```

```
, IllegalArgumentException
```

Fields inherited from class org.kwis.msp.lwc.ShellComponent

cd, cmpCommand, cmpTitle, cmpWork, RESIZE\_MASK

Fields inherited from class org.kwis.msp.lwc.ContainerComponent

cmpFocus, cmps, insetBottom, insetLeft, insetRight, insetTop, ncomp, offsetX, offsetY, useFrame

Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

Methods inherited from class org.kwis.msp.lwc.ShellComponent

addComponent, addComponent, configure, controllInset, getCard, getCommand, getNextTraversalComponent, getPrevTraversalComponent, getTitle, getWorkComponent, getX, getY, grabKey, hide, isShown, keyNotify, processEvent, removeAllComponents, removeComponent, repaint, serviceRepaints, setCommand, setGrabKeyListener, setTitle, setTitle, setWorkComponent, showNotify, ungrabKey

Methods inherited from class org.kwis.msp.lwc.ContainerComponent

getComponent, getIndexOf, getNumberOfComponent, paint, removeComponent, repaint, scrollTo, setComponent, useFrame, validate

Methods inherited from class org.kwis.msp.lwc.Component



calcPreferredSize, canHandleInput, focusNotify, getBackground, getForeground, getHeight, getPreferredSize, getPreferredHeight, getPreferredWidth, getWidth, getXOnScreen, getYOnScreen, hasFocus, invalidate, isValid, paintContent, pointerNotify, setBackground, setEventListener, setFocus, setForeground, toString

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

 TYPE\_NONE

public static final int TYPE\_NONE

3, '0'

 TYPE\_OK

public static final int TYPE\_OK

OK, '1'

 TYPE\_OK\_CANCEL

public static final int TYPE\_OK\_CANCEL

OK, CANCEL, '2'

 DLG\_TIMEOUT

public static final int DLG\_TIMEOUT

doModal, TIMEOUT, '10'

DLG\_OK

```
public static final int DLG_OK
doModal          OK          . '11'
```

DLG\_CANCEL

```
public static final int DLG_CANCEL
doModal          CANCEL      . '12'
```

OK\_BUTTON

```
public static final int OK_BUTTON
OK               . '20'
```

CANCEL\_BUTTON

```
public static final int CANCEL_BUTTON
CANCEL          . '21'
```

TIMEOUT\_INFINITE

```
public static final int TIMEOUT_INFINITE
timeout         . '-1'
```

actionState

```
protected int actionState
```

```
( )
```

-2

DialogComponent [doModal\(\)](#)

DialogComponent가



## ✍ DialogComponent

```
public DialogComponent(int type)
```

가 DialogComponent

DialogComponent DialogComponent 가

```
, TYPE_NONE, TYPE_OK, TYPE_OK_CANCEL
, IllegalArgumentException
```

Parameters:

type -

Throws:

IllegalArgumentException - type TYPE\_NONE, TYPE\_OK, TYPE\_OK\_CANCEL

IllegalArgumentException - cmp가 가

See Also:

[TYPE\\_NONE](#), [TYPE\\_OK](#), [TYPE\\_OK\\_CANCEL](#)

## ✍ DialogComponent

```
public DialogComponent(Component cmp,
                        String title,
                        int type)
```

DialogComponent

DialogComponent DialogComponent 가

```
, TYPE_NONE, TYPE_OK, TYPE_OK_CANCEL
, IllegalArgumentException
```

null

Parameters:

cmp - null

title - null

type -

Throws:

IllegalArgumentException - type TYPE\_NONE, TYPE\_OK, TYPE\_OK\_CANCEL

IllegalArgumentException - cmp가 가

See Also:

[TYPE\\_NONE](#), [TYPE\\_OK](#), [TYPE\\_OK\\_CANCEL](#)

 DialogComponent

```
public DialogComponent(Component cmp,
                        String ttl,
                        int type,
                        int x,
                        int y,
                        int w,
                        int h)
```

DialogComponent

DialogComponent

```
'0' '0' IllegalArgumentException
, TYPE_NONE,TYPE_OK,TYPE_OK_CANCEL
, IllegalArgumentException
```

null

Parameters:

cmp - null

title - null

type - . TYPE\_NONE,TYPE\_OK ,TYPE\_OK\_CANCEL

x - x

Y - y

w -

h -

Throws:

IllegalArgumentException - type TYPE\_NONE, TYPE\_OK, TYPE\_OK\_CANCEL

IllegalArgumentException - x,y '0' w,h '0'

IllegalArgumentException - cmp가 가

See Also:

[TYPE\\_NONE](#), [TYPE\\_OK](#), [TYPE\\_OK\\_CANCEL](#)

 `setButtonString`

```
public void setButtonString(int buttonType,
                             String buttonStr)
```

DialogComponent TYPE\_NONE

[OK\\_BUTTON](#)

[CANCEL\\_BUTTON](#)

IllegalArgumentException

TYPE\_NONE

Parameters:

buttonType - .OK\_BUTTON CANCEL\_BUTTON

buttonStr -

Throws:

IllegalArgumentException -

See Also:

OK\_BUTTON, CANCEL\_BUTTON✍ `setType``public void setType(int type)`

DialogComponent

`. TYPE_NONE 3 ,`[TIMEOUT\\_INFINITE](#)`, TYPE_NONE,TYPE_OK,TYPE_OK_CANCEL``, IllegalArgumentException``TYPE_OK TYPE_OK_CANCEL`[setTimeout\(int\)](#)

Parameters:

tp - DialogComponent

Throws:

IllegalArgumentException -

See Also:

[setTimeout\(int timeout\)](#), [TYPE\\_NONE](#), [TYPE\\_OK](#), [TYPE\\_OK\\_CANCEL](#)✍ `setTimeout``public void setTimeout(int timeout)`

DialogComponent

`. setType\(int\)``milliseconds``TYPE_NONE`[TIMEOUT\\_INFINITE](#)`TYPE_OK``timeout`

Parameters:

timeout -

See Also:

[getTimeout\(\)](#), [setType\(int type\)](#)

 `getTimeout`

```
public int getTimeout()
```

milliseconds

Returns:

See Also:

[setTimeout\(int timeout\)](#)

 `doModal`

```
public int doModal()
```


DialogComponent

Timeout

가

Returns:

- DLG\_OK,DLG\_CANCEL, DLG\_TIMEOUT

 `show`

```
public void show()
```

Description copied from class: ShellComponent

`validate`

Overrides:


`show` in class `ShellComponent`

 `getActionState`

```
public int getActionState()
```

DialogComponent

Returns:

 layout

```
public void layout()
```

Description copied from class: Component

Overrides:

layout in class ShellComponent

 paintFrame

```
protected void paintFrame(Graphics g)
```

Description copied from class: ContainerComponent

useFrame            true

Overrides:

paintFrame in class ContainerComponent

Following copied from class: org.kwis.msp.lwc.ContainerComponent

Parameters:

g -





## Class FormComponent

java.lang.Object

|

+--org.kwis.msp.lwc.Component

|

+--org.kwis.msp.lwc.ContainerComponent

|

+--org.kwis.msp.lwc.FormComponent

Direct Known Subclasses:

ListComponent

```
public class FormComponent
```

```
extends ContainerComponent
```

```
ContainerComponent
```

```
. FormComponent
```

```
. UP/DOWN
```

```
가
```

```
scrollbar가
```

Fields inherited from class org.kwis.msp.lwc.ContainerComponent

cmpFocus, cmps, insetBottom, insetLeft, insetRight, insetTop, ncomp, offsetX, offsetY, useFrame

Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK,

VALID\_MASK, w, x, y

Methods inherited from class org.kwis.msp.lwc.ContainerComponent

addComponent, addComponent, controllInset, getComponent, getIndexOf,  
getNumberOfComponent, paintFrame, processEvent, removeAllComponents,  
removeComponent, removeComponent, repaint, repaint, setComponent, useFrame,  
validate

Methods inherited from class org.kwis.msp.lwc.Component

canHandleInput, configure, getBackground, getCard, getForeground, getHeight,  
getPreferredHeight, getPreferredHeight, getPreferredWidth, getWidth, getX,  
getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid,  
paintContent, pointerNotify, serviceRepaints, setBackground, setEventListener,  
setFocus, setForeground, showNotify, toString

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

✍ FormComponent

```
public FormComponent ()
```

✍ FormComponent

```
public FormComponent (boolean bVertical)
```

```
        . bVertical    true
        ,      false    .
```

Parameters:

bVertical –



 setPacked

```
public void setPacked(boolean b)
```

Parameters:

b - true, false

 getPacked

```
public boolean getPacked()
```

Returns:

 setGab

```
public void setGab(int gab)
```

Parameters:

gab -

 getGab

```
public int getGab()
```

Returns:

### focusNotify

```
public void focusNotify(boolean b)
```

Description copied from class: Component

```
        .        가        가        가
        repaint        ,        .
```

Overrides:

focusNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

b - 가 true가 , 가 false

### keyNotify

```
protected boolean keyNotify(int type,
                             int key)
```

Description copied from class: Component

```
        .        가        , setFocus
        가        가        . type    KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED, KEY_TYPED    , chr        .
```

Overrides:

keyNotify in class ContainerComponent

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

type - ; KEY\_PRESSED,  
KEY\_RELEASED, KEY\_REPEATED,  
 KEY\_TYPED

chr - ; '0' -'9' '\*', '#'

Returns:

```
        가        가        , true        .
```

false


 calcPreferredSize

protected void calcPreferredSize(int cw)

Description copied from class: Component

Overrides:

calcPreferredSize in class Component


 layout

public void layout()

Description copied from class: Component

Overrides:

layout in class Component

 paint

public void paint(Graphics g)

Overrides:

paint in class ContainerComponent

g 가  
paintContent

Parameters:

g-

 getNextTraversalComponent

protected Component getNextTraversalComponent()

Description copied from class: ContainerComponent

가 . 가  
가 . 가  
가 가 null .

Overrides:

getNextTraversalComponent in class ContainerComponent

Following copied from class: org.kwis.msp.lwc.ContainerComponent

Returns:

가

 `getPrevTraversalComponent`

`protected Component getPrevTraversalComponent()`

Description copied from class: ContainerComponent

가 . 가  
가 . 가  
가 가 null .

Overrides:

getPrevTraversalComponent in class ContainerComponent

Following copied from class: org.kwis.msp.lwc.ContainerComponent

Returns:

가

 `scrollTo`

`protected boolean scrollTo(int dx,  
int dy)`

Description copied from class: ContainerComponent

. dx, dy가 가 (offset) 가  
. , scrollTo .

Overrides:

scrollTo in class ContainerComponent

Following copied from class: `org.kwis.msp.lwc.ContainerComponent`

Parameters:

`dx` - x

`dy` - y

Returns:

`true`, `false`



## Class ImageComponent

java.lang.Object

|

+-org.kwis.msp.lwc.Component

|

+-org.kwis.msp.lwc.ImageComponent

```
public class ImageComponent
```

```
extends Component
```

```
ImageComponent
```

```
ImageComponent setLayout\(int\)
```

```
ImageComponent Component.LAYOUT\_LEFT
```

```
Component.LAYOUT\_RIGHT,
```

```
Component.LAYOUT\_HCENTER,Component.LAYOUT\_TOP,
```

```
Component.LAYOUT\_BOTTOM,Component.LAYOUT\_HCENTER
```

```
. ImageComponent
```

```
LAYOUT_LEFT|LAYOUT_TOP
```

See Also:

[Image](#)

### Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y


### Methods inherited from class org.kwis.msp.lwc.Component




calcPreferredSize, canHandleInput, configure, focusNotify, getBackground, getCard, getForeground, getHeight, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, keyNotify, layout, pointerNotify, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, toString, validate

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

 imgStr

protected String imgStr

 img

protected Image img

 ImageComponent

public ImageComponent()

ImageComponent . null

 ImageComponent

public ImageComponent(Image img)

ImageComponent . img null .

Parameters:

img - null

 setImage


```
public ImageComponent(String str)
```

ImageComponent

str 가

Parameters:

str - null

 setImage

```
public void setImage(Image img)
```

ImageComponent

가

repaint가 . img가 null

가

Parameters:

img -

 getImage

```
public Image getImage()
```

ImageComponent

Returns:

 setImage

```
public void setImage(String str)
```

ImageComponent

가

null

, IllegalArgumentException

Parameters:

str-

Throws:

IllegalArgumentException - null

 `setLayout`

```
public void setLayout(int layout)
```


[Component.LAYOUT\\_LEFT](#), ImageComponent  
[Component.LAYOUT\\_LEFT](#), [Component.LAYOUT\\_RIGHT](#),  
[Component.LAYOUT\\_TOP](#), [Component.LAYOUT\\_BOTTOM](#)  
[Component.LAYOUT\\_HCENTER](#), [Component.LAYOUT\\_VCENTER](#)  
[Component](#)

Parameters:

type - Layout Type

See Also:

[Component.LAYOUT\\_LEFT](#), [Component.LAYOUT\\_RIGHT](#),  
[Component.LAYOUT\\_HCENTER](#), [Component.LAYOUT\\_TOP](#),  
[Component.LAYOUT\\_BOTTOM](#), [Component.LAYOUT\\_VCENTER](#)

 `getPreferredHeight`

```
public int getPreferredHeight(int w)
```

Description copied from class: Component

가  
LabelComponent TextFieldComponent,  
TextAreaComponent 가 가 가  
가 . 가 가 , 가  
. , w가 -1

Overrides:


getPreferredHeight in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

w - 가 .

Returns:

 getPreferredHeight

```
public int getPreferredHeight()
```

Description copied from class: Component

. ContainerComponent  
가 .

Overrides:

getPreferredHeight in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 getPreferredWidth

```
public int getPreferredWidth()
```

Description copied from class: Component

. Container  
가 .

Overrides:

getPreferredWidth in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 paintContent

```
public void paintContent(Graphics g)
```

Description copied from class: Component

```

        . validate
        )
        . -1

```

Overrides:

paintContent in class Component


Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

[Graphics](#)

 showNotify

```
protected void showNotify(boolean bShow)
```

Description copied from class: Component

```

        . addComponent removeComponent
        (ShellComponent)가 show

```


Overrides:

showNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

bShow - 가

 play

```
public void play()
```

가

✍ stop

```
public void stop()
```

가



## Class LabelComponent

```
java.lang.Object
```

```
|
```

```
+- -org.kwis.msp.lwc.Component
```

```
|
```

```
+- -org.kwis.msp.lwc.LabelComponent
```

Direct Known Subclasses:

CheckboxComponent, ListItemComponent

```
public class LabelComponent
```

```
extends Component
```

```
    . LabelComponent setLayout\(int\)
```

```
    . LabelComponent Component
```

```
    . LabelComponent
```

```
LAYOUT_LEFT
```

```
    null
```

Fields inherited from class org.kwis.msp.lwc.Component

```
bg, evtListener, evtListenerObj, fg, FOCUS_NOTIFY, h, HAS_FOCUS_MASK,
INPUT_MASK, KEY_NOTIFY, KEY_PRESSED, KEY_RELEASED, KEY_REPEATED,
KEY_TYPED, LAYOUT_BOTTOM, LAYOUT_HCENTER, LAYOUT_LEFT,
LAYOUT_RIGHT, LAYOUT_TOP, LAYOUT_VCENTER, mask, parent,
POINT_DRAGGED, POINT_PRESSED, POINT_RELEASED, POINTER_NOTIFY,
POS_MASK, PREFER_SIZE_MASK, prefH, prefW, SHOW_NOTIFY, SIZE_MASK,
VALID_MASK, w, x, y
```

Methods inherited from class org.kwis.msp.lwc.Component

```
canHandleInput, configure, focusNotify, getBackground, getCard, getForeground,
getHeight, getPreferredHeight, getPreferredHeight, getPreferredWidth, getWidth,
getX, getXOnScreen, getY, getYOnScreen, hasFocus, isShown, isValid, keyNotify,
layout, pointerNotify, processEvent, repaint, repaint, serviceRepaints,
setBackground, setEventListener, setFocus, setForeground, showNotify, toString,
```

---

validate

Methods inherited from class java.lang.Object

equals , getClass , hashCode , notify , notifyAll , wait , wait , wait

✎ layout

protected int layout

LabelComponent . [Component.LAYOUT\\_LEFT](#) .

✎ m\_ft

protected Font m\_ft

✎ m\_str

protected String m\_str

✎ m\_image

protected Image m\_image

✎ LabelComponent

public LabelComponent ( )

· null ·



LAYOUT\_LEFT .

✍ LabelComponent

public LabelComponent(String str)

· null  
· LAYOUT\_LEFT .

Parameters:

str - 가 null

✍ LabelComponent

public LabelComponent(String str,  
Image img)

· null , LAYOUT\_LEFT .

Parameters:

str - 가 null

img - null

✍ LabelComponent

public LabelComponent(String str,  
String imgString)

· null ,

LAYOUT\_LEFT .

Parameters:

str - 가 null

imgString - null



 invalidate

```
public void invalidate()
```

Description copied from class: Component

가 가 .

Overrides:

invalidate in class Component


 setLabel

```
public void setLabel(String str)
```

null

Parameters:

str - null

 setImage

```
public void setImage(Image img)
```

null

Parameters:

img - null

 getLabel

```
public String getLabel()
```

가 .

Returns:

 getImage

```
public Image getImage()
```

가 .

Returns:

 **setFont**

```
public void setFont(Font font)
```

Font.getDefaultFont()

Parameters:

font -

 **getFont**

```
public Font getFont()
```

Font.getDefaultFont()

Returns:

 **calcPreferredSize**

```
protected void calcPreferredSize(int cw)
```

Description copied from class: Component

Overrides:

calcPreferredSize in class Component

 **paintContent**

```
public void paintContent(Graphics g)
```

Description copied from class: Component

validate

(

) . -1 ,

Overrides:

paintContent in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

[Graphics](#)

 setLayout

```
public void setLayout(int layout)
```

. LabelComponent

[Component](#)

IllegalArgumentException

Parameters:

type -

Throws:

IllegalArgumentException -

See Also:

[Component.LAYOUT\\_LEFT](#),

[Component.LAYOUT\\_RIGHT](#),

[Component.LAYOUT\\_HCENTER](#),

[Component.LAYOUT\\_TOP](#),

[Component#LYAOUT\\_VCENTER](#), [Component.LAYOUT\\_BOTTOM](#)

## Class ListComponent

```

java.lang.Object
|
+--org.kwis.msp.lwc.Component
    |
    +--org.kwis.msp.lwc.ContainerComponent
        |
        +--org.kwis.msp.lwc.FormComponent
            |
            +--org.kwis.msp.lwc.ListComponent
  
```

```
public class ListComponent
```

```
extends FormComponent
```

```
ListComponent FormComponent
```

```
ContainerComponent ListItemComponent 가 ,
```

```
ListItemComponent 3가 . *
SELECT\_IMPLICIT,
SELECT\_MULTIPLE, SELECT\_EXCLUSIVE
SELECT_MULTIPLE,SELECT_EXCLUSIVE 가
```

```
가 ListItemComponent SELECT
ActionListener
```

```
ChangeListener
```

```
ListComponent 가
#controlNumberImage(boolean showImage)
true 가 , false
가
```

See Also:

[ListItemComponent](#), [ActionListener](#), [ChangeListener](#)

Fields inherited from class org.kwis.msp.lwc.ContainerComponent

cmpFocus, cmps, insetBottom, insetLeft, insetRight, insetTop, ncomp, offsetX, offsetY, useFrame

Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

Methods inherited from class org.kwis.msp.lwc.FormComponent

calcPreferredSize, focusNotify, getGab, getPacked, layout, scrollTo, setGab, setPacked

Methods inherited from class org.kwis.msp.lwc.ContainerComponent

controlInset, getComponent, getIndexOf, getNumberOfComponent, paintFrame, processEvent, removeAllComponents, removeComponent, removeComponent, repaint, repaint, useFrame, validate

Methods inherited from class org.kwis.msp.lwc.Component

canHandleInput, configure, getBackground, getCard, getForeground, getHeight, getPreferredSize, getPreferredSize, getPreferredSize, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, paintContent, pointerNotify, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, showNotify, toString

Methods inherited from class java.lang.Object

---

```
equals, getClass, hashCode, notify, notifyAll, wait, wait, wait
```

### ✎ SELECT\_IMPLICIT

```
public static final int SELECT_IMPLICIT
ListComponent 가
```

### ✎ SELECT\_EXCLUSIVE

```
public static final int SELECT_EXCLUSIVE
```

### ✎ SELECT\_MULTIPLE

```
public static final int SELECT_MULTIPLE
```

### ✎ ListComponent

```
public ListComponent(int type)
                가 '0' ListComponent
                ListComponent
SELECT_IMPLICIT ,SELECT_EXCLUSIVE,SELECT_MULTIPLE
                IllegalArgumentException
```

Parameters:

type - ListComponent

Throws:

`IllegalArgumentException` -

See Also:

`#ListComponent()`



 `append`

```
public int append(String str,
                  Image img)
```

`ListComponent`

[ListItemComponent](#)

가 .

null .

Parameters:

`str` - `ListItemComponent` null

`img` - `ListItemComponent` null

Returns:

가 .

 `addComponent`

```
public void addComponent(int index,
                          Component cmp)
```

`index` 가 .

가 가 [ListItemComponent](#)

`IllegalArgumentException` . `cmp`가 null `NullPointerException`  
 . `cmp`가 가

`IllegalArgumentException` .

`index` '0' `ListComponent` 가

`IndexOutOfBoundsException` .

Overrides:

`addComponent` in class `ContainerComponent`

Parameters:



index - 가 .

cmp - 가 .

Throws:

IllegalArgumentException - 가 가 [ListItemComponent](#)

IllegalArgumentException - cmp가 가

IndexOutOfBoundsException - index가

NullPointerException - cmp null

See Also:

[addComponent\(Component cmp\)](#), [setComponent\(int index, Component cmp\)](#)

 **addComponent**

public int addComponent(Component cmp)

가 . 가 .

가 가 [ListItemComponent](#)

IllegalArgumentException . cmp가 null NullPointerException

. cmp가 가

IllegalArgumentException .

Overrides:

addComponent in class ContainerComponent

Parameters:

cmp - 가 .

Returns:

Throws:


IllegalArgumentException - 가 가 [ListItemComponent](#)

IllegalArgumentException - cmp가 가

NullPointerException - cmp null

See Also:

[addComponent\(int index, Component cmp\)](#), [setComponent\(int index, Component cmp\)](#)

 setComponent

```
public void setComponent(int index,
                        Component cmp)
```

index '0' ListComponent 가

IndexOutOfBoundsException

가 [ListItemComponent](#)

IllegalArgumentException . cmp가 null NullPointerException

cmp가

가

IllegalArgumentException

Overrides:

setComponent in class ContainerComponent

Parameters:

index -

cmp -

Throws:

IllegalArgumentException - 가 [ListItemComponent](#)

IllegalArgumentException - cmp가


가

IndexOutOfBoundsException - index

NullPointerException - cmp null

See Also:

[addComponent\(int index, Component cmp\)](#), [addComponent\(Component cmp\)](#)

 insert

```
public int insert(int index,
                 String str,
                 Image img)
```

ListItemComponent

가 .

'0' ListComponent 가

IndexOutOfBoundsException .

가

[ListItemComponent](#)

IllegalArgumentException .

cmp가

가

IllegalArgumentException

Parameters:

index - 가 .

str - 가 .

img -

가 .

Returns:

가 .

Throws:

IndexOutOfBoundsException -

IllegalArgumentException -


가 [ListItemComponent](#)

IllegalArgumentException - cmp가

가

IndexOutOfBoundsException - index가 '0'

, 가

 set

```
public void set(int index,
               String str,
               Image img)
```

ListItemComponent

null

'0'

ListItemComponent 가  
IndexOutOfBoundsException .

Parameters:

index - .

src - .

img - 가 .

Throws:

IndexOutOfBoundsException -

 getString

public String getString(int index)

ListItemComponent .  
'0' ListItemComponent 가  
IndexOutOfBoundsException .

Parameters:

index -

Returns:

index

Throws:

IndexOutOfBoundsException -

 getImage

public Image getImage(int index)

ListItemComponent .  
가 null .  
'0' ListItemComponent 가  
IndexOutOfBoundsException .

Parameters:

index -

Returns:

index

Throws:

IndexOutOfBoundsException -

 getSize

```
public int getSize()
```

ListComponent 가

Returns:

ListComponent가 가

 isSelected

```
public boolean isSelected(int index)
```

가

. index가

ListComponent

ListItemComponent

- '0'

'

-1'

-

IndexOutOfBoundsException

Returns:

true/

false.

Throws:

IndexOutOfBoundsException - index가

- '0'

'

-1'

-

 getSelectedIndexes

```
public int[] getSelectedIndexes()
```

ListComponent

가

null

Returns:

.. null

..

✍ `getSelectedIndex`

```
public int getSelectedIndex()
```

ListComponent

가 '-1'

Returns:

-1

✍ `setActionListener`

```
public void setActionListener(ActionListener l,
                              Object o)
```

ListComponent [ActionListener](#) ListComponent 가

ListItemComponent [EventQueue.FIRE](#)

ActionListener [ActionListener.action\(Component cmp, Object o\)](#)

Parameters:

l - ListComponent ActionListener.

o - ListComponent ActionListener

✍ `setChangeListener`

```
public void setChangeListener(ChangeListener l,
                              Object o)
```

ListComponent [ChangeListener](#) ListComponent 가

ListItemComponent 가 ChangeListener

[ChangeListener.changed\(Component cmp, Object o\)](#)

Parameters:

l - ListComponent ChangeListener.

o - ListComponent ChangeListener

✍ `keyNotify`

```
protected boolean keyNotify(int type,
```

```
int key)
```

Description copied from class: Component

```

        가 , setFocus
        가 type KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED, KEY_TYPED , chr

```

Overrides:

keyNotify in class FormComponent

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

```

type - ; KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED,
KEY_TYPED
chr - ; '0' - '9' '*', '#'


```

Returns:

```

        가 가 , true
        false

```

 select

```
public void select(int index)
```

```

index '-1' ,
IndexOutOfBoundsException
'-1' 가 , ListComponent
SELEC_EXCLUSIVE

```

Parameters:


```
index -
```

Throws:

```

IndexOutOfBoundsException - index가 (index<-1 ||
index>(
))

```

 select

```
public void select(ListItemComponent cmpp)
```

```
ListComponent          SELECT_IMPLICIT, SELECT_MULTIPLE
                        , SELECT_MULTIPLE
가                      ,
```

Parameters:

cmpp -

 controlNumber

```
public void controlNumber(boolean showImage)
```

```
                        . true          가          (1~9,0
),                      가          . false
                        ,              Disable      . true ,
가                      . false          Disable
```

Parameters:

useImage - . true / false

See Also:

[isControlNumber\(\)](#)

 isControlNumber

```
public boolean isControlNumber()
```

Returns:

See Also:

[controlNumber\(boolean\)](#)



## ✍ paint

```
public void paint(Graphics g)
```

Overrides:

paint in class FormComponent

```
g 가
paintContent
```

Parameters:

g –

## ✍ getNextTraversalComponent

```
protected Component getNextTraversalComponent()
```

Description copied from class: ContainerComponent

```
가 . 가
. 가
가 가 null .
```

Overrides:

getNextTraversalComponent in class FormComponent

Following copied from class: org.kwis.msp.lwc.ContainerComponent

Returns:

```
가
```

## ✍ getPrevTraversalComponent

```
protected Component getPrevTraversalComponent()
```

Description copied from class: ContainerComponent

```
가 . 가
. 가
가 가 null .
```

Overrides:

getPrevTraversalComponent in class FormComponent

Following copied from class: org.kwis.msp.lwc.ContainerComponent

Returns:

가



## Class ListItemComponent

```

java.lang.Object
|
+--org.kwis.msp.lwc.Component
    |
    +--org.kwis.msp.lwc.LabelComponent
        |
        +--org.kwis.msp.lwc.ListItemComponent
  
```

```
public class ListItemComponent
```

```
extends LabelComponent
```

```

ListItemComponent 가 LabelComponent
LabelComponent INPUT_MASK 가
  
```

See Also:

[LabelComponent](#)

### Fields inherited from class org.kwis.msp.lwc.LabelComponent

layout, m\_ft, m\_image, m\_str

### Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

### Methods inherited from class org.kwis.msp.lwc.LabelComponent

calcPreferredSize, getFont, getImage, getLabel, paintContent, setFont, setImage, setLabel, setLayout

Methods inherited from class org.kwis.msp.lwc.Component

canHandleInput, configure, focusNotify, getBackground, getCard, getForeground, getHeight, getPreferredSize, getPreferredHeight, getPreferredWidth, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, keyNotify, layout, pointerNotify, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, showNotify, toString, validate

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

 ListItemComponent

```
public ListItemComponent(String str)
```

```
    ListItemComponent
```

```
    null
```

```
    null
```

```
    LAYOUT_LEFT
```

Parameters:

str - ListItemComponent가

null

 ListItemComponent

```
public ListItemComponent(String str,
                          Image img)
```

```
ListItemComponent
```

## ListItemComponent

Parameters:

str - ListItem null

img - ListItem null

✍ ListItemComponent

```
public ListItemComponent(String str,
                          String imgString)
```

ListItemComponent

null

LAYOUT\_LEFT

null

Parameters:

str - 가 null

imgString - null

✍ setState

```
public void setState(boolean bState)
```

ListItemComponent

Parameters:

bState - true, false

✍ getState

```
public boolean getState()
```

Returns:

true, false

## Class ProgressComponent

```

java.lang.Object
|
+--org.kwis.msp.lwc.Component
|
+--org.kwis.msp.lwc.ProgressComponent

```

```
public class ProgressComponent
```

```
extends Component
```

```

Interactive NoneInteractive 가 가 . Interactive
setStep 가
NoneInteractive setValue
step 1 setStep 가
ProgressComponent 0 가

```

### Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

### Methods inherited from class org.kwis.msp.lwc.Component

calcPreferredSize, canHandleInput, configure, focusNotify, getBackground, getCard, getForeground, getHeight, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, layout, pointerNotify, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, showNotify, toString, validate

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

### ProgressComponent

```
public ProgressComponent(boolean bInteractive,
                          int max)
```

0

Parameters:

bInteractive - Progress

max -

### setStep

```
public void setStep(int step)
```

Interactive

가

, setValue

. step

step

1

Parameters:

nStep - 가

Throws:

IllegalArgumentException - step 0

See Also:

[getStep\(\)](#)

### getStep

```
public int getStep()
```

Returns:

가 .

See Also:

#setStep()

 setMargin

```
public void setMargin(int top,
                    int bottom)
                    ( )
```

See Also:

#setStep()

 setMaxValue

```
public void setMaxValue(int maxValue)
```

Progress .

Parameters:

maxValue -

Throws:

IllegalArgumentException - maxValue 0

 setValue

```
public int setValue(int value)
```

Progress . setStep step

. = value - value % step . value 가 0  
0 MAX MAX .


Parameters:





w - 가 .

Returns:

 `getPreferredHeight`

```
public int getPreferredHeight()
```

Description copied from class: Component

`ContainerComponent`  
가 .

Overrides:

`getPreferredHeight` in class Component

Following copied from class: `org.kwis.msp.lwc.Component`

Returns:

 `getPreferredWidth`

```
public int getPreferredWidth()
```

Description copied from class: Component

`Container`  
가 .

Overrides:

`getPreferredWidth` in class Component

Following copied from class: `org.kwis.msp.lwc.Component`

Returns:

 `paintContent`

```
public void paintContent(Graphics g)
```

Description copied from class: Component

```

        validate
    )
    -1

```

Overrides:

paintContent in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

[Graphics](#)

 keyNotify

```

public boolean keyNotify(int type,
                        int key)

```

Description copied from class: Component

```

        가 , setFocus
        가 type KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED, KEY_TYPED , chr

```

Overrides:

keyNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

```

type - ; KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED,
KEY_TYPED

```

```

chr - ; '0' - '9' '*', '#'

```

Returns:

```

        가 가 , true
        false

```

---

✍️ setChangeListener


```
public void setChangeListener(ChangeListener listener,  
Object obj)
```

```
ProgressComponent ChangeListener . ProgressComponent  
ChangeListener  
ChangeListener.changed\(Component cmp, Object o\) .
```

Parameters:

l - ListComponent ChangeListener.

o - ListComponent ChangeListener .



## Class ScrollbarComponent

```

java.lang.Object
|
+--org.kwis.msp.lwc.Component
    |
    +--org.kwis.msp.lwc.ScrollbarComponent
  
```

```
public class ScrollbarComponent
```

```
extends Component
```

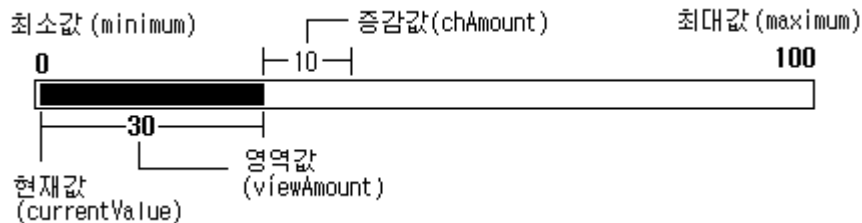
```
ScrollbarComponent(int direction, int currentValue, int viewAmount, int minimum, int maximum, int chAmount)
```

```
ScrollbarComponent(int direction, int currentValue, int viewAmount, int minimum, int maximum, int chAmount)
    throws IllegalArgumentException
```

```
ScrollbarComponent(int direction, int currentValue, int viewAmount, int minimum, int maximum, int chAmount)
    throws IllegalArgumentException
```

```
ScrollbarComponent(int direction, int currentValue, int viewAmount, int minimum, int maximum, int chAmount)
    throws IllegalArgumentException
```

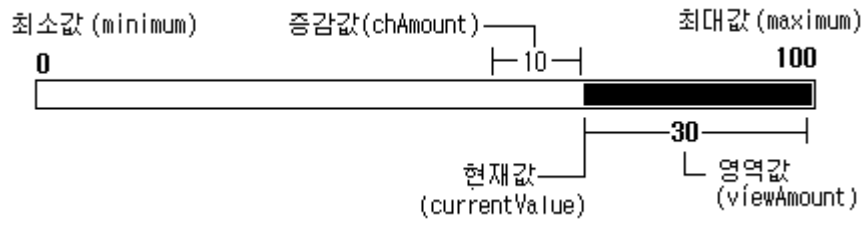
```
ScrollbarComponent(int direction, int currentValue, int viewAmount, int minimum, int maximum, int chAmount)
    throws IllegalArgumentException
```



```
ScrollbarComponent
```

```
ScrollbarComponent\(int direction, int currentValue, int viewAmount, int minimum, int maximum, int chAmount\)
```

```
scrollBar = new ScrollbarComponent(HORIZONTAL, 0, 30, 0, 100, 10);
```



|                |   |          |   |
|----------------|---|----------|---|
|                |   |          |   |
| (direction)    | VERTICAL HORIZONTAL<br><br>IllegalArgumentException | VERTICAL | VERTICAL<br>HORIZONTAL                                  |
| (currentValue) | ScrollbarComponent<br><br>가                         | 0        | (minimum) <= (currentValue) <= (maximum) - (viewAmount) |
| (viewAmount)   | ScrollbarComponent                                  | 1        | 0 < (viewAmount) <= (maximum) - (minimum)               |
| (minimum)      | ScrollbarComponent                                  | 0        | (minimum) < (maximum)                                   |

|                 |                         |    |                                      |
|-----------------|-------------------------|----|--------------------------------------|
| )               |                         |    |                                      |
| (maximum<br>)   | ScrollbarComponent      | 10 | (minimum) <<br>(maximum)             |
| (chAmount<br>t) | ScrollbarComponent<br>가 | 1  | 0 <<br>(chAmount) <=<br>(viewAmount) |

|   |
|---|
| Fields inherited from class org.kwis.msp.lwc.Component  |
| bg, evtListener, evtListenerObj, fg, FOCUS_NOTIFY, h, HAS_FOCUS_MASK, INPUT_MASK, KEY_NOTIFY, KEY_PRESSED, KEY_RELEASED, KEY_REPEATED, KEY_TYPED, LAYOUT_BOTTOM, LAYOUT_HCENTER, LAYOUT_LEFT, LAYOUT_RIGHT, LAYOUT_TOP, LAYOUT_VCENTER, mask, parent, POINT_DRAGGED, POINT_PRESSED, POINT_RELEASED, POINTER_NOTIFY, POS_MASK, PREFER_SIZE_MASK, prefH, prefW, SHOW_NOTIFY, SIZE_MASK, VALID_MASK, w, x, y |

|  |
|--|
| Methods inherited from class org.kwis.msp.lwc.Component  |
| calcPreferredSize, canHandleInput, configure, getBackground, getCard, getForeground, getHeight, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, layout, pointerNotify, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, showNotify, toString, validate |

|   |
|---|
| Methods inherited from class java.lang.Object                   |
| equals, getClass, hashCode, notify, notifyAll, wait, wait, wait |







IllegalArgumentException - HORIZONTAL VERTICAL

See Also:

[ScrollbarComponent\(\)](#), [ScrollbarComponent\(int direction, int currentValue, int viewAmount, int minimum, int maximum, int chAmount\)](#)

 ScrollbarComponent

```
public ScrollbarComponent(int direction,
                          int currentValue,
                          int viewAmount,
                          int minimum,
                          int maximum,
                          int chAmount)
```

ScrollbarComponent

[HORIZONTAL](#) [VERTICAL](#)

IllegalArgumentException

ScrollbarComponent

IllegalArgumentException

Parameters:

direction -

currentValue -

viewAmount -

minimum - minimum

maximum - maximum

Throws:

IllegalArgumentException - HORIZONTAL VERTICAL

IllegalArgumentException - 가

See Also:

[ScrollbarComponent\(\)](#), [ScrollbarComponent\(int direction\)](#)

 `getDirection`

```
public int getDirection()
    ScrollbarComponent
```

VERTICAL

Returns:

See Also:

[setDirection\(int direction\)](#)

 `setDirection`

```
public void setDirection(int direction)
```

[HORIZONTAL](#) [VERTICAL](#),  
 IllegalArgumentException

Parameters:

direction -

Throws:

IllegalArgumentException - [HORIZONTAL](#) [VERTICAL](#)

See Also:

[getDirection\(\)](#)

 `getCurrentValue`

```
public int getCurrentValue()
    (currentValue)
```

Returns:

See Also:

[setCurrentValue\(int newValue\)](#)

 setCurrentValue

```
public void setCurrentValue(int newValue)
                           (currentValue)
```

Parameters:

newValue -

See Also:

[getCurrentValue\(\)](#)

 getMinimum

```
public int getMinimum()
```

Returns:

See Also:

[setMinimum\(int newMinimum\)](#)

 setMinimum

```
public void setMinimum(int newMinimum)
```

### . Minimum

Parameters:

newMinimum - 가

See Also:

[getMinimum\(\)](#)

 getMaximum

```
public int getMaximum()
```

Returns:

See Also:

[setMaximum\(int newMaximum\)](#)

 setMaximum

```
public void setMaximum(int newMaximum)
```

### . Maximum

Parameters:

newMaximum -

See Also:

[getMaximum\(\)](#)

 getViewAmount

```
public int getViewAmount()
```

Returns :

See Also:

[setViewAmount\(int newAmount\)](#)

 `setViewAmount`

```
public void setViewAmount(int newAmount)
```

Parameters:

`newAmount` -

See Also:

[getViewAmount\(\)](#)


 `getChangeAmount`

```
public int getChangeAmount()
```

Returns:

See Also:

[setChangeAmount\(int newChAmount\)](#)

 `setChangeAmount`

```
public void setChangeAmount(int newChAmount)
```

Parameters:

newChAmount -

See Also:

[getChangeAmount\(\)](#)

 getForegroundColor

```
public int getForegroundColor()
```

'0x00000000'

Returns:

See Also:

[setForegroundColor\(int\).](#)

 setForegroundColor

```
public void setForegroundColor(int fg)
```

0x00RRGGBB

'0x00000000'

Parameters:

fg -

See Also:

[getForegroundColor\(\).](#)

 paintContent

```
public void paintContent(Graphics g)
```

Description copied from class: Component

validate

)

(

-1

Overrides:

paintContent in class Component


Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

[Graphics](#)

 focusNotify

```
public void focusNotify(boolean b)
```

Description copied from class: Component

가 가 가  
repaint , .

Overrides:

focusNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

b - 가 true가 , 가 false

 keyNotify

```
public boolean keyNotify(int type,  
int key)
```

Description copied from class: Component

가 , setFocus  
가 가 . type KEY\_PRESSED,  
KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED , chr .

Overrides:

keyNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component


Parameters:

type - ; KEY\_PRESSED,  
KEY\_RELEASED, KEY\_REPEATED,  
KEY\_TYPED

chr - ; '0' - '9' '\*', '#' .

Returns:

가 가 , true .  
false .

 `getPreferredHeight`

`public int getPreferredHeight()`

Description copied from class: Component

. ContainerComponent


가 .

Overrides:

`getPreferredHeight` in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 `getPreferredHeight`

`public int getPreferredHeight(int w)`

Description copied from class: Component

가

. LabelComponent

TextFieldComponent,

TextAreaComponent

가

가

가

가 . 가 가 , 가 .

. , w가 -1

Overrides:




getPreferredHeight in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

w - 가 .

Returns:

 getPreferredWidth

```
public int getPreferredWidth()
```

Description copied from class: Component

가 . Container .

Overrides:

getPreferredWidth in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:



## Class ShellComponent

```

java.lang.Object
|
+--org.kwis.msp.lwc.Component
    |
    +--org.kwis.msp.lwc.ContainerComponent
        |
        +--org.kwis.msp.lwc.ShellComponent
  
```

Direct Known Subclasses:

AnnunciatorComponent, DialogComponent

```

public class ShellComponent
extends ContainerComponent
  
```

```

Card
.
ShellComponent AddComponent
.
Icdui Card
  
```

### Fields inherited from class org.kwis.msp.lwc.ContainerComponent

cmpFocus, cmps, insetBottom, insetLeft, insetRight, insetTop, ncomp, offsetX, offsetY, useFrame

### Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

---

Methods inherited from class org.kwis.msp.lwc.ContainerComponent


getComponent, getIndexOf, getNumberOfComponent, paint, paintFrame, removeComponent, repaint, scrollTo, setComponent, useFrame, validate

Methods inherited from class org.kwis.msp.lwc.Component

calcPreferredSize, canHandleInput, focusNotify, getBackground, getForeground, getHeight, getPreferredSize, getPreferredHeight, getPreferredWidth, getWidth, getXOnScreen, getYOnScreen, hasFocus, invalidate, isValid, paintContent, pointerNotify, setBackground, setEventListener, setFocus, setForeground, toString

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

 cd

protected Card cd

 cmpTitle

protected Component cmpTitle

 cmpWork

protected Component cmpWork

---

✎ cmpCommand

protected Component cmpCommand



✎ ShellComponent

public ShellComponent ()

Parameters:

✎ ShellComponent

public ShellComponent (boolean inflate)

. inflate

Parameters:

inflate -

✎ ShellComponent

public ShellComponent (int x,  
int y,  
int w,  
int h)

Parameters:

x -

y -

w -

h -

 ShellComponent

```
public ShellComponent(int x,  
                      int y,  
                      int w,  
                      int h,  
                      boolean bTrans)  
    . . . . . 가 bTrans
```

## Parameters:


x – .

y – .

w – .

h – .

bTrans – .

 layout

```
public void layout()
```

Description copied from class: Component

## Overrides:

layout in class Component

 repaint

```
public void repaint(int x,
                   int y,
                   int w,
                   int h)
```

Description copied from class: Component

|           |   |                    |
|-----------|---|--------------------|
| 가         | . | Card               |
| , repaint |   | repaint<br>paint() |

Overrides:

repaint in class ContainerComponent

Following copied from class: org.kwis.msp.lwc.Component


Parameters:

x - x

y - y


w -

h -

 show

```
public void show()
```

validate

 hide

```
public void hide()
```

 isShown

```
public boolean isShown()
```

Description copied from class: Component

|   |   |   |
|---|---|---|
| 가 | . | 가 |
|---|---|---|

true, false .

Overrides:

isShown in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 configure

```
public void configure(int x,
                    int y,
                    int w,
                    int h,
                    int mask)
```

Description copied from class: Component

```
        . mask
        . mask POS_MASK AND POS_MASK ,
        x, y . mask SIZE_MASK
AND SIZE_MASK , (w, h)
        repaint , paintContent
        layout 가
```

Overrides:

configure in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

x - 'x'

y - 'y'

w -

h -

mask - POS\_MASK | SIZE\_MASK가 , POS\_MASK가 x,

y, SIZE\_MASK가 w, h .

### getX

```
public int getX()
```

Description copied from class: Component

x . x

Overrides:

getX in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

x

### getY

```
public int getY()
```

Description copied from class: Component

y . y

Overrides:

getY in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

y

### showNotify

```
public void showNotify(boolean b)
```

Description copied from class: Component

. addComponent removeComponent  
(ShellComponent)가 show




Overrides:

showNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

bShow - 가

 serviceRepaints

```
public void serviceRepaints()
```

Description copied from class: Component

```
        . repaint        paint
        , paint        .
```

Overrides:

serviceRepaints in class Component

 addComponent

```
public void addComponent(int index,
                        Component cmp)
```

Description copied from class: ContainerComponent

```
        가        cmp가 가        가
```

```
cmp가 null        NullPointerException        cmp가
        가        IllegalArgumentException        .
```

```
index        '0'        가
```

```
IndexOutOfBoundsException        .
```

Overrides:

addComponent in class ContainerComponent

Following copied from class: org.kwis.msp.lwc.ContainerComponent

Parameters:

index -

cmp -

Throws:

IllegalArgumentException - cmp가 가

IndexOutOfBoundsException - index가

NullPointerException - cmp null

### addComponent

```
public int addComponent(Component cmp)
```

Description copied from class: ContainerComponent

가 . 가 .

Overrides:

addComponent in class ContainerComponent

Following copied from class: org.kwis.msp.lwc.ContainerComponent

Parameters:

cmp - 가

Throws:

IllegalArgumentException - cmp가 가

NullPointerException - cmp null

### processEvent

```
protected boolean processEvent(int type,
                                int subtype,
                                int param1,
                                int param2)
```

Description copied from class: Component

Overrides:

processEvent in class ContainerComponent

Following copied from class: org.kwis.msp.lwc.Component


Parameters:

type -

subtype -

param1 - 가


param2 - 가

 setTitle

```
public void setTitle(Component cmp)
```

Parameters:

cmp -

 getTitle

```
public Component getTitle()
```

Returns:

 getWorkComponent

```
public Component getWorkComponent()
```

Component

Returns:

add Work

 setWorkComponent

```
public void setWorkComponent(Component cmp)
```

Component

Parameters:

cmp - Work

 removeAllComponents

```
public void removeAllComponents()
```

Description copied from class: ContainerComponent

Overrides:

removeAllComponents in class ContainerComponent

 removeComponent

```
public void removeComponent(Component cmp)
```

Description copied from class: ContainerComponent

```
keyNotify() 가  
false
```

Overrides:

removeComponent in class ContainerComponent

Following copied from class: org.kwis.msp.lwc.ContainerComponent

Parameters:

cmp -

 setCommand


```
public void setCommand(Component cmp,  
                        boolean bGrab)
```

```
keyNotify() 가 bGrab  
true
```

Parameters:

cmp - 가

bGrab -

 `getCommand`

`public Component getCommand()`

Returns:

 `getNextTraversalComponent`

`protected Component getNextTraversalComponent()`

Description copied from class: `ContainerComponent`

|   |   |   |      |   |
|---|---|---|------|---|
| 가 | . | 가 | .    | 가 |
| . | 가 | 가 | null | . |

Overrides:

`getNextTraversalComponent` in class `ContainerComponent`

Following copied from class: `org.kwis.msp.lwc.ContainerComponent`

Returns:

가

 `getPrevTraversalComponent`

`protected Component getPrevTraversalComponent()`

Description copied from class: `ContainerComponent`

|   |   |   |      |   |
|---|---|---|------|---|
| 가 | . | 가 | .    | 가 |
| . | 가 | 가 | null | . |

Overrides:

`getPrevTraversalComponent` in class `ContainerComponent`

Following copied from class: org.kwis.msp.lwc.ContainerComponent

Returns:

가

 setTitle

```
public void setTitle(String str)
```

Parameters:

str -

 getCard

```
public Card getCard()
```

Description copied from class: Component

|      |   |                |      |      |
|------|---|----------------|------|------|
|      |   | ShellComponent |      |      |
| Card | 가 |                | Card |      |
|      | , | 가              | 가    | null |

Overrides:

getCard in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

Card

See Also:

[Card](#)

 grabKey

```
public void grabKey(int key)
```

(Grab) GrabKeyListener

Listener

GameKey Display.getKeyCode()

Parameters:

key - grab (EventQueue )

See Also:

[setGrabKeyListener\(org.kwis.msp.lwc.GrabKeyListener, java.lang.Object\)](#),  
[ungrabKey\(int\)](#), [GrabKeyListener](#), [Display.getKeyCode\(int\)](#)

 ungrabKey

```
public void ungrabKey(int key)
    (Grab)
```

Parameters:

gameKey - ungrab (EventQueue )

See Also:

[grabKey\(int\)](#), [setGrabKeyListener\(org.kwis.msp.lwc.GrabKeyListener, java.lang.Object\)](#), [GrabKeyListener](#), [Display.getKeyCode\(int\)](#)

 setGrabKeyListener

```
public void setGrabKeyListener(GrabKeyListener listener,
    Object obj)
```

Listener . grabKey

Listener . Listener

Listener가 true , false

Parameters:

listener - Listener

obj - Listener

See Also:

[GrabKeyListener](#), [grabKey\(int\)](#), [ungrabKey\(int\)](#)

### ✎ keyNotify

```
protected boolean keyNotify(int type,
                             int chr)
```

Description copied from class: Component

```
        가 , setFocus
        가 . type KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED, KEY_TYPED , chr .
```

Overrides:

keyNotify in class ContainerComponent

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

```
type - ; KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED,
KEY_TYPED
```

```
chr - ; '0' - '9' '*', '#'
```

Returns:

```
        가 가 , true .
        false .
```

### ✎ controlInset

```
protected void controlInset(boolean flag)
```

Description copied from class: ContainerComponent

```
ContainerComponent . True
ContainerComponent , False
        '0' .
```

Overrides:

controlInset in class ContainerComponent



## Class TextBoxComponent

```

java.lang.Object
|
+--org.kwis.msp.lwc.Component
    |
    +--org.kwis.msp.lwc.TextComponent
        |
        +--org.kwis.msp.lwc.TextBoxComponent
  
```

```
public class TextBoxComponent
```

```
extends TextComponent
```

```
TextBoxComponentTextComponent
```

```
가 ContainerComponent
```

```
. TextComoponent
```

```
가
```

```
TextComponent.setMaxLength\(int maxLen\)
```

```
가
```

See Also:

[TextComponent](#), [TextFieldComponent](#)

Fields inherited from class org.kwis.msp.lwc.TextComponent

```
charCount, constChecker, constraint, CONSTRAINT_ANY, CONSTRAINT_NUMBER,
CONSTRAINT_PASSWORD, display, f, imHandler, iMode, isWide, m_cPos, m_td, maxLength,
modeViewer, tShell
```

Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

Methods inherited from class org.kwis.msp.lwc.TextComponent

focusNotify, getConstraint, getFont, getMaxLength, getString, setMaxLength, showNotify

Methods inherited from class org.kwis.msp.lwc.Component

calcPreferredSize, canHandleInput, getBackground, getCard, getForeground, getHeight, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, layout, pointerNotify, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, toString, validate

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

✍ `TextBoxComponent`

```
public TextBoxComponent(String data,
                        int constraints)
    {
        super(new TextComponent(
            null, 가, .,
            가, TextComponent.CONSTRAINT\_NUMBER,
```

[TextComponent.CONSTRAINT\\_PASSWORD](#),

[TextComponent.CONSTRAINT\\_ANY](#)

IllegalArgumentException , 가

IllegalArgumentException .

가

[TextComponent.setMaxLength\(int maxLen\)](#)

가

Parameters:

data - null

constraints -

 TextBoxComponent

```
public TextBoxComponent (String data,
                          int constraints,
                          int h)
```

TextComponent

, null 가 ,

가 가

가 [TextComponent.CONSTRAINT\\_NUMBER](#),

[TextComponent.CONSTRAINT\\_PASSWORD](#),

[TextComponent.CONSTRAINT\\_ANY](#)

IllegalArgumentException , 가

IllegalArgumentException .

가

[TextComponent.setMaxLength\(int maxLen\)](#)

가

Parameters:

data - null

constraints -

h -



 `setString`

```
public void setString(String data)
```

Description copied from class: `TextComponent`

```

        가
        IllegalArgumentException
        가
        가
        가
        가 null
        ""(empty String

```

Overrides:

`setString` in class `TextComponent`

Following copied from class: `org.kwis.msp.lwc.TextComponent`

Parameters:


`data` - `null`

Throws:

`IllegalArgumentExcepton` -

See Also:

[TextComponent.getString\(\)](#)

 `insert`

```
public void insert(char[] data,
                  int offset,
                  int len,
                  int index)
```

Description copied from class: `TextComponent`

```

        index
가
data가 null
NullPointerException
, index '0'

```

IndexOutOfBoundsException

가

가

len

IllegalArgumentException

Overrides:

insert in class TextComponent

Following copied from class: org.kwis.msp.lwc.TextComponent

Parameters:

data - 가

offset - 가 가

len - 가

index - 가

Throws:

NullPointerException - data가 null

IndexOutOfBoundsException - index '0'

IllegalArgumentException - 가 가  
len

IllegalArgumentException -  
가

 delete

```
public void delete(int index,
                  int len)
```

Description copied from class: TextComponent

index

len

index '0'

IndexOutOfBoundsException . len

IllegalArgumentException .

Overrides:

delete in class TextComponent

Following copied from class: org.kwis.msp.lwc.TextComponent

Parameters:

index - .

len -

Throws:

IndexOutOfBoundsException - len,index '0'

IllegalArgumentException - len

 getPreferredWidth

```
public int getPreferredWidth()
```

Description copied from class: Component

. Container

가 .

Overrides:

getPreferredWidth in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

.

 getPreferredHeight

```
public int getPreferredHeight(int w)
```

Description copied from class: Component

가

. LabelComponent

TextFieldComponent,

TextAreaComponent

가

가

가

가 . 가 가

,

가

.

. , w가 -1

Overrides:


getPreferredSize in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

w - 가 .

Returns:

 getPreferredSize

```
public int getPreferredSize()
```

Description copied from class: Component

. ContainerComponent

가 .

Overrides:

getPreferredSize in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 configure

```
public void configure(int x,
                    int y,
                    int w,
                    int h,
                    int mask)
```

Description copied from class: Component

. mask

. mask POS\_MASK AND POS\_MASK ,

```

        x, y          . mask    SIZE_MASK
AND              SIZE_MASK ,          (w, h)
        .
        repaint          ,          paintContent
        .                  layout          가
        .

```

Overrides:

configure in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

x - 'x'

y - 'y'

w -

h -

mask - POS\_MASK | SIZE\_MASK가 , POS\_MASK가 x,  
y , SIZE\_MASK가 w, h .

 keyNotify

```

public boolean keyNotify(int type,
                        int key)

```

Description copied from class: TextComponent

```

        가 , setFocus
        가 type KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED, KEY_TYPED , chr

```

[EventQueue.SOFT1](#)

InputMethodHandler notifykeyInput

[TextFieldComponent](#)

[TextBoxComponent](#)

Overrides:

keyNotify in class TextComponent



Following copied from class: org.kwis.msp.lwc.TextComponent

Parameters:

```
type - ; KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED,
KEY_TYPED
```

```
key - ; '0' - '9' '*', '#' .
```

Returns:

```
가 가 , true .
false .
```

### setFont

```
public void setFont (Font f)
```

Description copied from class: TextComponent

```
Font.getDefaultFont()
```

Overrides:

setFont in class TextComponent

Following copied from class: org.kwis.msp.lwc.TextComponent

Parameters:

f -

See Also:

[TextComponent.getFont\(\)](#)

### paintContent

```
public void paintContent (Graphics g)
```

Description copied from class: Component

```
validate , (
) -1 ,
```

Overrides:

paintContent in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

[Graphics](#)



## Class TextComponent

```

java.lang.Object
|
+--org.kwis.msp.lwc.Component
    |
    +--org.kwis.msp.lwc.TextComponent
  
```

Direct Known Subclasses:

TextBoxComponent, TextFieldComponent

```

public abstract class TextComponent
extends Component
  
```

[TextBoxComponent](#)

[TextFieldComponent](#)

TextFieldComponent    TextBoxComponent    [EventQueue.FIRE](#)  
   가                    가  
   [EventQueue.FIRE](#)

TextComponent    6가  
 CONSTRAINT\_NUMBER    '-',','  
 CONSTRAINT\_PASSWORD  
   '\*,'  
 CONSTRAINT\_EMAILADDRESS  
   ',                    ,                    ,  
 CONSTRAINT\_URL    URL  
   ',                    ,  
 CONSTRAINT\_PHONENUMBER

CONSTRAINT\_ANY

.\*

IllegalArgumentException

가 , setMaxLength(int  
maxLen) 가

InputMethodListener ActionListener

TextFieldComponent, TextBoxComponent

See Also:

TextFieldComponent, TextBoxComponent

#### Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

#### Methods inherited from class org.kwis.msp.lwc.Component

calcPreferredSize, canHandleInput, configure, getBackground, getCard, getForeground, getHeight, getPreferredSize, getPreferredSize, getPreferredSize, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, layout, paintContent, pointerNotify, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, toString, validate

#### Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

#### ✎ CONSTRAINT\_NUMBER

```
public static final int CONSTRAINT_NUMBER
    가 가 ' ' '-',
CONSTRAINT_NUMBER '1'.
```

#### ✎ CONSTRAINT\_PASSWORD

```
public static final int CONSTRAINT_PASSWORD
    가 가
CONSTRAINT_PASSWORD '2'.
```

#### ✎ CONSTRAINT\_ANY

```
public static final int CONSTRAINT_ANY
    가 가
가
CONSTRAINT_ANY '0'.
```

#### ✎ CONSTRAINT\_EMAILADDRESS

```
public static final int CONSTRAINT_EMAILADDRESS
    가 가
CONSTRAINT_EMAILADDRESS '3'.
```

#### ✎ CONSTRAINT\_URL

```
public static final int CONSTRAINT_URL
    가 가 URL
```

---

```
        , , . CONSTRAINT_URL
    '4'.
    ✎ CONSTRAINT_PHONENUMBER
public static final int CONSTRAINT_PHONENUMBER
    가 가
        CONSTRAINT_PHONENUMBER
    '5'.

    ✎ imHandler
protected InputMethodHandler imHandler

    ✎ m_cPos
protected int m_cPos

    ✎ charCount
protected int charCount

    ✎ constraint
protected int constraint

    ✎ m_td
protected char[] m_td

    ✎ iMode
```

---

protected int iMode

✎ display

protected Display display

Display

✎ modeViewer

protected org.kwis.msp.lwc.TextComponent.ModeViewer modeViewer

✎ isWide

protected boolean isWide

. true

false

✎ tShell

protected ShellComponent tShell

✎ maxLength

protected int maxLength

가 -1

✎ constChecker

protected org.kwis.msp.lwc.ConstraintChecker constChecker

가

✍ f

protected Font f

TextComponent

Font.getDefaultFont()

[setFont\(org.kwis.msp.lcd.uit.Font\)](#)

See Also:

[setFont\(Font f\)](#)

✍ setString

public void setString(String data)

가

가

IllegalArgumentException

가

가

가

가 null

""(empty String

Parameters:

data - null

Throws:

IllegalArgumentException -

See Also:

[getString\(\)](#)

✍ setMaxLength

public void setMaxLength(int maxLen)

가

'-1'





```
int len,
int index)
```

index

가 .

data가 null NullPointerException , index '0'

IndexOutOfBoundsException .

가 가 len

IllegalArgumentException .

Parameters:

data - 가

offset - 가 가

len - 가

index - 가

Throws:

NullPointerException - data가 null

IndexOutOfBoundsException - index '0'

IllegalArgumentException - 가 가  
len

IllegalArgumentException -  
가

 delete

```
public void delete(int index,
int len)
```

index len

index '0'

IndexOutOfBoundsException . len  
IllegalArgumentException .

Parameters:

index -

len -

Throws:

IndexOutOfBoundsException - len, index '0'

IllegalArgumentException - len


 `getConstraint`

```
public int getConstraint()
```

### [CONSTRAINT\\_ANY](#)

Returns:

constraints

 `focusNotify`


```
public void focusNotify(boolean b)
```

Overrides:

focusNotify in class Component

Parameters:

b - focus 가 true,가 false

 `showNotify`

```
protected void showNotify(boolean bShow)
```

Description copied from class: Component

. addComponent removeComponent  
(ShellComponent)가 show

Overrides:

showNotify in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

bShow - 가

 setFont

public void setFont (Font f)

Font.getDefaultFont()

Parameters:

f -

See Also:

[getFont\(\)](#)

 getFont

public Font getFont ()

Returns:

See Also:

[setFont\(Font f\)](#)

 keyNotify

public boolean keyNotify(int type,  
int key)

가 , setFocus



## Class TextFieldComponent

```

java.lang.Object
|
+--org.kwis.msp.lwc.Component
    |
    +--org.kwis.msp.lwc.TextComponent
        |
        +--org.kwis.msp.lwc.TextFieldComponent
  
```

```

public class TextFieldComponent
extends TextComponent
TextFieldComponentTextComponent
  
```

. TextComoponent

가

[TextComponent.setMaxLength\(int maxLen\)](#)

가

See Also:

[TextComponent](#), [TextBoxComponent](#)

Fields inherited from class org.kwis.msp.lwc.TextComponent

charCount, constChecker, constraint, CONSTRAINT\_ANY, CONSTRAINT\_NUMBER, CONSTRAINT\_PASSWORD, display, f, imHandler, iMode, isWide, m\_cPos, m\_td, maxLength, modeViewer, tShell

Fields inherited from class org.kwis.msp.lwc.Component

bg, evtListener, evtListenerObj, fg, FOCUS\_NOTIFY, h, HAS\_FOCUS\_MASK, INPUT\_MASK, KEY\_NOTIFY, KEY\_PRESSED, KEY\_RELEASED, KEY\_REPEATED, KEY\_TYPED, LAYOUT\_BOTTOM, LAYOUT\_HCENTER, LAYOUT\_LEFT, LAYOUT\_RIGHT, LAYOUT\_TOP, LAYOUT\_VCENTER, mask, parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

Methods inherited from class org.kwis.msp.lwc.TextComponent

focusNotify, getConstraint, getFont, getMaxLength, getString, setFont, setMaxLength, setString, showNotify

Methods inherited from class org.kwis.msp.lwc.Component

calcPreferredSize, canHandleInput, configure, getBackground, getCard, getForeground, getHeight, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, layout, pointerNotify, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, toString, validate

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

## TextFieldComponent

```
public TextFieldComponent(String data,
                          int constraint)
    TextFieldComponent
    null 가 .
```

가 [TextComponent.CONSTRAINT\\_NUMBER](#),  
[TextComponent.CONSTRAINT\\_PASSWORD](#),  
[TextComponent.CONSTRAINT\\_ANY](#)

IllegalArgumentException , 가  
 IllegalArgumentException .


가 ,  
[TextComponent.setMaxLength\(int maxLen\)](#) 가

Parameters:

data - null

constraints -



 insert

```
public void insert(char[] data,
                  int offset,
                  int len,
                  int index)
```

Description copied from class: TextComponent

가 . index  
 data가 null NullPointerException , index '0'

IndexOutOfBoundsException .  
 가 가 len  
 IllegalArgumentException .

Overrides:

insert in class TextComponent

Following copied from class: org.kwis.msp.lwc.TextComponent

Parameters:

data - 가



offset - 가 가

len - 가

index - 가

Throws:

NullPointerException - data가 null

IndexOutOfBoundsException - index '0'

IllegalArgumentException - 가 가  
len

IllegalArgumentException -  
가

 delete

```
public void delete(int index,
                  int len)
```

Description copied from class: TextComponent

index len

index '0'

IndexOutOfBoundsException . len

IllegalArgumentException .

Overrides:

delete in class TextComponent

Following copied from class: org.kwis.msp.lwc.TextComponent

Parameters:


index - .

len -

Throws:

IndexOutOfBoundsException - len,index '0'

IllegalArgumentException - len

 getPreferredWidth

```
public int getPreferredWidth()
```

Description copied from class: Component

. Container

가 .


Overrides:

getPreferredWidth in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

.

 getPreferredHeight

```
public int getPreferredHeight()
```

Description copied from class: Component

. ContainerComponent

가 .

Overrides:

getPreferredHeight in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 getPreferredHeight

```
public int getPreferredHeight(int wr)
```

Description copied from class: Component

가

---

```

        .
        LabelComponent
        TextFieldComponent,
TextAreaComponent
        가
        가
        가
        ,
        가
        .
        , w가 -1

```

Overrides:

getPreferredHeight in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

w - 가

Returns:

 paintContent

```
public void paintContent(Graphics g)
```

Description copied from class: Component

```

        .
        validate
        ,
        (
        )
        .
        -1

```

Overrides:

paintContent in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

[Graphics](#)

 keyNotify

```
public boolean keyNotify(int type,
                        int key)
```

Description copied from class: `TextComponent`

```

        가 , setFocus
        가 . type KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED, KEY_TYPED , chr

```

[EventQueue.SOFT1](#)

```

        InputMethodHandler notifykeyInput

```

[TextFieldComponent](#)

[TextBoxComponent](#)

Overrides:

`keyNotify` in class `TextComponent`

Following copied from class: `org.kwis.msp.lwc.TextComponent`

Parameters:

```

type - ; KEY_PRESSED,
KEY_RELEASED, KEY_REPEATED,
KEY_TYPED

```

```

key - ; '0'-'9' '*', '#'

```

Returns:

```

        가 가 , true
        false

```

## Class TickerComponent

```

java.lang.Object
|
+--org.kwis.msp.lwc.Component
   |
   +--org.kwis.msp.lwc.TickerComponent

```

```
public class TickerComponent
```

```
extends Component
```

```
TickerComponent
```

```

TickerComponent          TickerComponent          가
ContainerComponent      ,          가          가
                           가          ,          가

```

```
setDelay\(int\)
```

```
milleseconds
```

```
DEFAULT\_DELAY
```

```
IllegalArgumentException
```

```
TickerComponent
```

```
setTickerState\(boolean\)
```

```
. true
```

```
, false
```

```
true
```

```
TickerComponent
```

```
ContainerComponent
```

```
IllegalArgumentException
```

Fields inherited from class org.kwis.msp.lwc.Component

```

bg, evtListener, evtListenerObj, fg, FOCUS_NOTIFY, h, HAS_FOCUS_MASK, INPUT_MASK,
KEY_NOTIFY, KEY_PRESSED, KEY_RELEASED, KEY_REPEATED, KEY_TYPED, LAYOUT_BOTTOM,
LAYOUT_HCENTER, LAYOUT_LEFT, LAYOUT_RIGHT, LAYOUT_TOP, LAYOUT_VCENTER, mask,

```

parent, POINT\_DRAGGED, POINT\_PRESSED, POINT\_RELEASED, POINTER\_NOTIFY, POS\_MASK, PREFER\_SIZE\_MASK, prefH, prefW, SHOW\_NOTIFY, SIZE\_MASK, VALID\_MASK, w, x, y

Methods inherited from class org.kwis.msp.lwc.Component

calcPreferredSize, canHandleInput, configure, focusNotify, getBackground, getCard, getForeground, getHeight, getWidth, getX, getXOnScreen, getY, getYOnScreen, hasFocus, invalidate, isShown, isValid, keyNotify, layout, pointerNotify, processEvent, repaint, repaint, serviceRepaints, setBackground, setEventListener, setFocus, setForeground, showNotify, toString, validate

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

 DEFAULT\_DELAY

```
public int DEFAULT_DELAY
```

```
TickerComponent . 500 milliseconds
```

 TickerComponent

```
public TickerComponent(String str,
                        Image img)
```

```
TickerComponent . true
```

[DEFAULT\\_DELAY](#)

null 가 , null NullPointerException  
 null 가 .

Parameters:

str - TickerComponent

img - TickerComponent null

Throws:

NullPointerException - 가 null

 **setString**

```
public void setString(String str)
```

TickerComponent . 가

, null NullPointerException . null

Parameters:

str - TickerComponent

Throws:

NullPointerException - str null

See Also:

[getString\(\)](#), [setImage\(Image img\)](#)

 **getString**

```
public String getString()
```

TickerComponent .

Returns:

string TickerComponent

See Also:

[setString\(String str\)](#)

## ✍️ setImage

```
public void setImage(Image img)
```

TickerComponent

가

Parameters:

img - TickerComponent

See Also:

[getImage\(\)](#), [setString\(String str\)](#)

## ✍️ getImage

```
public Image getImage()
```

TickerComponent

Returns:

img TickerComponent

See Also:

[setImage\(Image img\)](#)

## ✍️ setDelay

```
public void setDelay(int delay)
```

TickerComponent

[DEFAULT\\_DELAY](#)

가

milliseconds

[IllegalArgumentException](#)

Parameters:

delay - milliseconds

Throws:

[IllegalArgumentException](#) - delay



✍️ `setTickerState`

```
public boolean setTickerState(boolean st)
```

```
TickerComponent /
true , false
true .
```

Parameters:

```
st - true : , false: .
```

✍️ `getPreferredHeight`

```
public int getPreferredHeight(int w)
```

Description copied from class: Component

```
. 가
LabelComponent TextFieldComponent,
TextAreaComponent 가 가 가
가 . 가 가 , 가 .
. , w가 -1
```

Overrides:

```
getPreferredHeight in class Component
```

Following copied from class: `org.kwis.msp.lwc.Component`

Parameters:

```
w - 가 .
```

Returns:

✍️ `getPreferredHeight`

```
public int getPreferredHeight()
```

Description copied from class: Component


```
. ContainerComponent
가 .
```

Overrides:

getPreferredHeight in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 getPreferredWidth

```
public int getPreferredWidth()
```

Description copied from class: Component

가 . Container  
가 .

Overrides:

getPreferredWidth in class Component

Following copied from class: org.kwis.msp.lwc.Component

Returns:

 paintContent

```
public void paintContent(Graphics g)
```

Description copied from class: Component

. validate , ( ) -1 ,

Overrides:

paintContent in class Component

Following copied from class: org.kwis.msp.lwc.Component

Parameters:

g - Graphics.

See Also:

---

Graphics

## 5.2.10. Handset(org.kwis.msp.handset)

Class HandsetProperty

java.lang.Object

|


+-org.kwis.msp.handset.HandsetProperty

```
public class HandsetProperty
```

```
extends Object
```

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 HandsetProperty

```
public HandsetProperty()
```

 getSystemProperty

```
public static String getSystemProperty (String id)  
                                throws IllegalArgumentException
```


Parameters:

id -

Returns:

Throws:

IllegalArgumentException -

 `setSystemProperty`

```
public static boolean setSystemProperty(String id, String val)
                                throws IllegalArgumentException
```

Parameters:

id -

val -

Returns:

true -

flase -

IllegalArgumentException -

Class BackLight

```
java.lang.Object
|
+--org.kwis.msp.handset.BackLight
```

```
public class BackLight
extends Object
LCD
```

|   |
|---|
| Methods inherited from class java.lang.Object                             |
| equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait |



on

```
public static void on(int id, int color, int duration)
throws IOException
```

가

|          |                |           |                         |
|----------|----------------|-----------|-------------------------|
| before() | ..             | Backlight | .                       |
| 0        | LCD            | 1         | LCD                     |
|          | 가              |           | 가                       |
| color    | 0xYYRRGGBB(    | color     | (network byte ordering) |
| )        | YY          RR | (Red), GG | (Green), BB             |
| (Blue)   |                |           |                         |

Parameters:

id –

color –

---

duration - 가 (msec ) .

Throws:

IOException -

✍ off

```
public static void off()  
                throws IOException
```

Throws:

IOException -

✍ before

```
public static void before()  
                throws IOException
```

Throws:


IOException -

✍ alwaysOn

```
public static void alwaysOn()  
                throws IOException
```


Throws:

IOException -



**Class Call**`java.lang.Object`

|

`+- org.kwis.msp.handset.Call``public class Call``extends Object`Methods inherited from class `java.lang.Object``equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait` **Call**`public Call()` **accept**`public static void accept()  
throws IOException`

Throws:


IOException –

 **reject**`public static void reject()  
throws IOException`

Throws:

IOException –

.

 end

```
public static void end()
    throws IOException
```

Throws:

IOException –

.

 place

```
public static void place(String phonenumber)
    throws IOException
```

.

Parameters:

phonenumber -

Throws:

IOException –

.

## Class LED

java.lang.Object

|

+- -org.kwis.msp.handset.LED

```
public class LED
```

```
extends Object
```

```
LED(Light Emitting Diodes)
```

.



|   |
|---|
| Methods inherited from class java.lang.Object                             |
| equals, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait |



✍ LED

public LED()



✍ getCount

public static int getCount()  
throws IOException

LED

Throws:

IOException -

✍ set

public static void set(int leds)  
throws IOException

LED on/off bit가 1 on, 0 off

)

LED가 4 LSB BIT 4

\* 0 bit

\* +-----+

\* | \*|\*|\*|\*|

\* +-----+

\*


set(0x3) led2

Parameters:

leds - 가 1 LED 가 on 0 off .

Throws:

IOException -

 get

```
public static int get()
    throws IOException
```

LED on/off

Returns:

led on/off bit OR

Throws:

IOException -

## 5.2.11. Media (org.kwis.msp.media)

Class Clip

java.lang.Object

|

+--org.kwis.msp.media.Clip

```
public class Clip
```

```
extends java.lang.Object
```

Player .

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait



### ✍ Clip

```
public Clip(String type,  
            byte[] buf)
```

가

```
Clip(String type, int bufSize)
```

Parameters:

type -

buf - 가

### ✍ Clip

```
public Clip(String type,  
            String filename)
```

가

```
Clip(String type, byte[] buf)
```

Parameters:

type -

filename - 가



### ✍ getType

```
public java.lang.String getType()
```

Type

Returns:

---

Type

 **setBuffer**

```
public boolean setBuffer(byte[] buf,  
                        int dataSize)
```

Parameters:

buf -

dataSize -

Returns:

true : , false : 가

 **getData**

```
public int getData(byte[] buf,  
                  int off,  
                  int len)
```

, getData(byte[] buf, int off, int len)

가

"VOCODERDEVICES"

Parameters:

buf - 가

off -

len -

Returns:

 **setPosition**

```
public boolean setPosition(int ms)
```

, `MediaUnsupportedException` .

Parameters:

`ms` - (milli second)

Returns:

`true` :

`false` :

 `getVolume`

`public final int getVolume()`

가 0 , 100 .

Parameters:

Returns:

: (0-100 )

 `setVolume`

`public final boolean setVolume(int level)`

가 0 ,

100 .

Parameters:

`level` - (0-100 )

 `setListener`

`public void setListener(PlayListener listener)`

listener .

Parameters:

`listener` - listener, null

 playStart

```
protected void playStart(boolean repeat)
```

```
Player.play(Clip clip, boolean repeat) repeat
```

Parameters:

repeat - Player.play() repeat

 playUpdate

```
public void playUpdate(int event, int parm)
```

```
PlayListener.playUpdate()
```

Parameters:

event -

parm - event 가

## Class Player

java.lang.Object

|

+- -org.kwis.msp.media.Player


```
public class Player
```

```
extends java.lang.Object
```

static

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 pause

```
public static boolean pause(Clip clip)
```

```
( / )
```

```
listener
```

```
PAUSE
```

```
가
```

```
가
```

```
가
```

```
,
```

```
pause
```

```
pause
```

```
, MediaUnsupportedException
```


Parameters:

clip -

Returns:

true :

false :

 stop

```
public static boolean stop(Clip clip)
```

```
( / ) 가  
listener STOP 가 .
```

Parameters:

clip -

Returns:

true :

false :

 resume

```
public static boolean resume(Clip clip)
```

```
( / ) 가  
listener RESUME 가 .
```

. resume

resume

MediaUnsupportedException .


Parameters:

clip -

Returns:

true :

false :

 play

```
public static boolean play(Clip clip,  
                           boolean repeat)
```

```
가  
listener START 가 .
```

UnavailableException .

가

```
listener END_OF_DATA 가 .
```

가

Clip.putData()



Parameters:

clip -

repeat - false 1, true

Returns:

true :

false :

 record

public static boolean record(Clip clip)

가 , MediaUnsupportedException 가  
listener RECORD 가  
, UnavailableException  
가 listener FULL\_OF\_DATA 가  
가

Clip.GetData()

Parameters:

clip -

Returns:

true :

false :

## Interface PlayerListener

```
public interface PlayerListener
```

```
    ✎ ERROR
```

```
public static final int ERROR
```

```
    가 -1 .
```

```
    ✎ END_OF_DATA
```

```
public static final int END_OF_DATA
```

```
    1 .
```

```
    ✎ STARTED
```

```
public static final int START
```

```
    2 .
```

```
    ✎ STOPPED
```

```
public static final int STOP
```

```
    / 3 .
```

```
    ✎ PAUSED
```

```
public static final int PAUSE
```

```
    / 4 .
```

```
    ✎ RESUMED
```

```
public static final int RESUME
```

```
    5 .
```

```
    ✎ RECORDED
```

```
public static final int RECORD
```


```
    6 .
```

```
    ✎ FULL_OF_DATA
```

```
public static final int FULL_OF_DATA
```

```
    가 , 7 .
```



 playerUpdate

```
public void playerUpdate(Clip clip, int event, int parm)
```

가 .

Parameters:

Clip ? 가

event -

parm - event 가



## Class UnavailableException

java.lang.Object

|

+- java.lang.Throwable

|

+- java.lang.Exception

|

+- java.lang.RuntimeException

|

+- org.kwis.msp.media.UnavailableException

```
public class UnavailableException
```

```
extends RuntimeException
```


```
exception .
```

Methods inherited from class java.lang.Throwable

getMessage, printStackTrace, toString


Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

 UnavailableException

```
public UnavailableException()
```

```
UnavailableException .
```

 UnavailableException

public UnavailableException(String s)

UnavailableException .

Parameters:

s - UnavailableException .



**Class Vibrator**

java.lang.Object

|


+- org.kwis.msp.media.Vibrator

public class Vibrator

extends java.lang.Object

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 on

```
public static void on(int level,
                    int duration)
```

```
가          가          .          가
                    duration
                    . level
0 vibrator가          level
0-100          . 100          가          가          0 가
                    . 0-100          가
                    가          .          가
                    가          가
```

```
HandsetProperty.getSystemProperty("VIBRATORLEVEL")
```

```
)          가          => 1-100 :
          가 ,          => 1-50 :          , 51-100 :
          가 , ,          => 1-33:          , 34-66:          , 67-100:
```

Parameters:

level - 0 off, 1-100

duration - (milliseconds), 0

Class Volume

java.lang.Object

|


+-org.kwis.msp.media.Volume

public class Volume

extends java.lang.Object

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 get


public static int get()

HandsetProperty.getSystemProperty("VOLUMELEVEL")  
 ) 가 , => 1-50 : 51-100 :  
 0 - 100 가 . 0-100 가  
 Clip.getVolume() 가

가 , , => 1-33: , 34-66: , 67-100:

Parameters:

Returns:

 set

public static void set(int level)

0 , 100 . , Clip API .

Parameters:

level - (0-100 )

-

### Class MediaUnsupportedException

java.lang.Object

|

+-- java.lang.Throwable

|

+-- java.lang.Exception

|

+-- org.kwis.msp.media.MediaUnsupportedException

public class MediaUnsupportedException

extends Exception

exception .

Methods inherited from class java.lang.Throwable

getMessage, printStackTrace, toString



---

Methods inherited from class java.lang.Object

equals, getClass, hashCode, notify, notifyAll, wait, wait, wait

✎ MediaUnsupportedException

```
public MediaUnsupportedException()
```

```
MediaUnsupportedException .
```

✎ MediaUnsupportedException

```
public MediaUnsupportedException(String s)
```

```
MediaUnsupportedException .
```

Parameters:

```
s - IOException .
```

.

.

## **6.**

1. TIA/EIA/IS -637 Short Message Services for Wideband Spread Spectrum Cellular Systems

# 7.

## 7.1. (EUC\_KR)

KSC5601 (0xA1A0-0xACFF) (0xE1A0-ECFF)

Unicode Character Value = KSC5601 Character Value | 0xE000  
 KSC5601 Character Value = Unicode Character Value & 0xFFFF

| Code  | KSC5601 | character                                 |
|---|---------|---|
| 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F |         | .   |
| A1A0  |         | ·   |
| A1B0  |         | “ ” { } ‘ ’                               |
| A1C0  |         | ÷   |
| A1D0  |         | §   |
| A1E0  |         | =   |
| A1F0  |         | ¬   |
| 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F |         |   |
| A2A0  |         | ˘ ˙ ˚ ˛ ˜ ˝ ˆ ˜ ˚ ˛ ˜ ˝                   |
| A2B0  |         | ‰ ‰                                       |
| A2C0  |         |   |
| A2D0  |         | ¶ † ‡                                     |
| A2E0  |         | Co. ™ am pm © ? ? ? ? ? ? ? ?             |
| A2F0  |         | ? ? ? ? ? ? ? ? ? ? ? ? ? ?               |
| 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F |         |   |
| A3A0  |         | ! " # \$ % & ' ( ) * + , - . /            |
| A3B0  |         | 0 1 2 3 4 5 6 7 8 9 : ; < = > ?           |
| A3C0  |         | @ A B C D E F G H I J K L M N O           |
| A3D0  |         | P Q R S T U V W X Y Z [ \ ] ^ _           |
| A3E0  |         | ` a b c d e f g h i j k l m n o           |
| A3F0  |         | p q r s t u v w x y z {   } ~             |
| 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F |         |   |
| A4A0  |         | ㄱ ㅋ ㆁ ㄴ ㄷ ㄹ ㅁ ㅂ ㅅ ㅈ ㅊ ㅋ ㆁ ㄴ ㄷ ㄹ ㅁ ㅂ ㅅ ㅈ ㅊ |
| A4B0  |         | ㅎ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ   |
| A4C0  |         | ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ     |
| A4D0  |         | ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ     |
| A4E0  |         | ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ     |
| A4F0  |         | ㅇ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ ㅅ ㅈ ㅊ   |
| 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F |         |   |

A5A0                                   ? ? ? ? ?  
 A5B0                                   ? ? ? ? ? ?  
 A5C0   ?  
 A5D0                                   ? ? ? ? ? ? ?  
 A5E0   ?  
 A5F0                                   ? ? ? ? ? ?

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

A6A0  
 A6B0  
 A6C0  
 A6D0  
 A6E0                                   ? ? ? ? ? ? ? ? ?  
 A6F0   ? ? ? ? ? ? ? ? ? ? ? ? ? ? ?

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

A7A0     μℓ Mℓ dℓ     kℓ cc mℓ<sup>3</sup> cℓ<sup>3</sup> nℓ<sup>3</sup> kℓ<sup>3</sup> fm nm μm mm cm  
 A7B0 km mℓ<sup>3</sup> cℓ<sup>3</sup> nℓ<sup>3</sup> kℓ<sup>3</sup> ha μg mg kg kt cal kcal dB % m/s ps  
 A7C0 ns μs ms pV nV μV mV kV MV pA nA μA mA kA pW nW  
 A7D0 μW mW kW MW Hz kHz MHz GHz THz     kΩ MΩ pF nF μF mol  
 A7E0 cd rad rad/s sr Pa kPa MPa GPa Wb Im lx Bq Gy Sv C/kg  
 A7F0   ? ?

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

A8A0     Æ Ð <sup>a</sup> H ? ? ? ? ? L Ø Œ ° Æ T ?  
 A8B0   ?  
 A8C0  
 A8D0  
 A8E0  
 A8F0                                   ½             ¼ ¾

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

A9A0     æ d ð h i ? ? ? l ø œ ß þ t ?  
 A9B0   ?  
 A9C0  
 A9D0  
 A9E0  
 A9F0                                   1 2 3

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

AAA0     あ あ い い う う え え お お か が き ぎ く  
 AAB0     ぐ け げ こ ご さ ざ し じ す ず せ ぜ そ ぞ た  
 AAC0     だ ち ぢ っ っ づ て で と ど な に ぬ ね の は  
 AAD0     ば ば ひ び び ぶ ぶ ぶ へ べ ほ ぼ ま み  
 AAEO     む め も や や ゅ ゅ ょ ょ り り る る わ わ  
 AAF0     ゐ ゑ を ん

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

ABA0     ア ア イ イ ウ ウ エ エ オ オ カ ガ キ ギ ク  
 ABB0     グ ケ ゲ コ ゴ サ ザ シ ジ ス ズ セ ゼ ソ ゾ タ  
 ABC0     ダ チ チ ッ ッ ツ テ デ ト ド ナ ニ ヌ ネ ノ ハ  
 ABD0     バ バ ヒ ビ ビ フ ブ プ ヘ ベ ル ホ ボ ボ マ ミ  
 ABE0     ム メ モ ヤ ヤ ユ ユ ヨ ヨ ラ リ ル レ ロ ヲ  
 ABFO     ヰ ヱ ヲ ン ヴ カ ケ ?

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

ACAO  
ACB0  
ACCO  
ACDO  
ACE0  
ACFO

? ? ? ? ? ? ? ? ? ? ? ? ?  
?

## 7.2. API 가/

## API

API 가

### 7.2.1. C API

#### MC\_knIMExecute

```
M_Int32 MC_knIMExecute(char* symName, int parmCnt, ...)
```

가

(partial)

(overlay)

MC\_knICEecute()

symName - [in]

가

(symbolic)

parmCnt - [in]

ID

M\_E\_ACCESS -

,

M\_E\_NOMEMORY - 가

M\_E\_INVALID -

가

## ✎ MC\_knlLoad

```
M_Int32 MC_knlLoad(char* execName, int parmCnt, ...)
```

```
(non-blocking)
```

```
execName - [in] , MC_knlGetExecNames()
```

```
parmCnt - [in]
```

```
ID
```

```
M_E_ACCESS - ,
M_E_NOMEMORY - 가
M_E_INVALID - 가
```

## ✎ MC\_knIMLoad

```
M_Int32 MC_knIMLoad(char* symName, int parmCnt, ...)
```

(partial)

```
MC_knILoad()
```

symName - [in]                   가                   (symbolic)

parmCnt - [in]

ID

M\_E\_ACCESS -                   ,

M\_E\_NOMEMORY -           가

M\_E\_INVALID -           가



## 7.2.2. API

### mExecute

```
public static int mExecute(java.lang.String symName,
                          java.lang.String[] args)
```

가

(partial)

(overlay)

execute()

Parameters:

symName - 가 (symbolic)

args - Main method()

Returns:

ID ,

### load

```
public static int load(java.lang.String execName,
                      java.lang.String[] args)
```

(non-blocking)

Parameters:

execName - , getExecNames()

args - Main method() parameter

Returns:

load ID ,

See Also:

getExecNames(String prgName, String version, String vendor)

 mLoad

```
public static int mLoad(java.lang.String symName,
                        java.lang.String[] args)
```

(partial)

load()

Parameters:

symName - 가 (symbolic)

args - Main method() parameter

Returns:

load ID ,

## 7.3. SMS API

SMS

### 7.3.1.

가 Teleservice ID

SMS . (Identification, TIA/EIA/IS-637 )

### 7.3.2. Java API

☞ org.kwis.msf.io.URL

SMS URL.find() URL(RFC1738 )

|     |                |  |                                  |
|-----|----------------|--|----------------------------------|
|     | URL            |  |                                  |
| SMS | sms://<<br>< > | >:<br>sms://SHORTME<br>SSAGE:read<br>sms://SHORTME<br>SSAGE:send<br>sms://SHORTME<br>SSAGE:delread | . read:<br>. delread:<br>. send: |

### 7.3.3. C API

SMS API . SMS API  
 , , 가 가 . SMS  
 API 가  
 가 . SMS

MC\_phnSmsOpen()  
가

## ✎ MC\_SmsData

```

typedef MC_SmsData {
    /// SMS Message
    M_Byte index;
    ///
    , 1
    M_Byte class;
    /// ASCII
    )016-123-4567 ->0161234567
    M_Byte callback[12];
    /// data size.
    M_Byte cb_size;
    ///
    M_Byte data[256];
    ///
    M_Byte data_size;
    /**
        year 2byte,etc 1byte.
        <pre>
            2 byte 1 byte 1 byte 1 byte 1 byte 1 byte
        </pre>
    */
    M_Byte timer[7];
} MC_SmsData;

```

SMS 가

## ✍ MC\_SmsCmd

```
typedef enum MC_SmsCmd{  
    MC_SMSCMD_READONLY = 0, //  
    MC_SMSCMD_CHANGEREAD, //  
  
    MC_SMSCMD_DELETE, //  
} MC_SmsCmd;
```

SMS

### ✎ MC\_phnSmsOpen

```

SMS
SMS
    del 0
    가
    "SHORTMSG, "BROADCAST",
    "VOICEMAIL"
cmd
    SMS
    가 MC_phnSmsRead()
    " ", " ", "
" 가 가
    MC_SMSCMD_READONLY , MC_SMSCMD_CHANGEREAD,
MC_SMSCMD_DELETE
    " "
    MC_phnSmsRead()
MC_SmsData class
    " " 0, " " 1
    MC_phnSmsOpen()
    MC_phnSmsRead()
    MC_phnSmsClose() 가
    MC_phnSmsOpen()
MC_phSmsRead() 가
    
```

M\_Int32 MC\_phnSmsOpen(M\_Byte\* telIDString, MC\_SmsCmd cmd)

telIDString - ( "SHORTMSG" )  
 cmd - MC\_phnSmsRead()


SMS

- M\_E\_NOTSUP -
- M\_E\_NOENT - 가
- M\_E\_ISCONN - OPEN

MC\_phnSmsRead





 MC\_phnSmsClose

SMS . MC\_telSmsRead()  
가 .

M\_Int32 MC\_phnSmsClose(M\_Int32 fd)

fd - SMS

0

MC\_E\_BADFD( 가 )

## ✍ MC\_phnSmsRead

SMS

M\_Int32 MC\_phnSmsRead(M\_Int32 fd, MC\_SmsData\* buf)

fd - SMS

buf - 가

0 1

M\_E\_BADFD - 가

M\_E\_NOENT - 가

M\_E\_INVALID - 가 가 NULL

MC\_phnSmsOpen

## ✍ MC\_phnSmsSend

```

SMS . telIDString MC_phnSmsOpen() .
buf SMS .
    256 .

```

```

M_Int32 MC_phnSmsSend(M_Byte* telIDString, M_Char* telnum, M_Byte* buf,
M_Int32 len)

```

```

telIDString -
telnum -
buf -
len -

```

0

```

M_E_NOTSUP -
M_E_INVALID - 가
M_E_ERROR -

```

### 7.3.4. HAL API

```

        SMS
    가
        SMS
        . SMS
        가
        가
        가
        . SMS
        SMS
        가
        MH_SMSEV_NEW
        MH_pI tEvent()
        SMS
        MH_SMS_EVENT
    MH_SMSEvent
    
```



```

// SMS
. TIA/EIA/IS - 637

typedef struct MH_SmsData{
    M_Byte index; // SMS
    M_Byte class; /*
        , 1
        */
    M_Byte callback[16]; /* ASCII
    */
    M_Byte cb_size; // callback
    M_Byte data[512]; // ,CBS user data + url
    callback + image data = max 512
    M_Byte data_size; //
    M_Byte timer[7]; // 0-99
    /**
    
```

|        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|
|        |        |        |        |        |        |
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

```

    */
} MH_SmsData;

// 가 SMS
typedef enum MH_SmsCmd{
    MH_SMSCMD_READONLY = 0, //
    
```

---

```

        MH_SMSCMD_CHANGEREAD , //


        MH_SMSCMD_DELETE, //
    } MH_SmsCmd;

//SMS
typedef enum MH_SUB_SMS_EVENT {
    MH_SMSEV_NEW = 0,          //          가
    MH_SMSEV_SEND_NOTIFY //          가
} MH_SUB_SMS_EVENT;

//SMS
typedef struct MH_SMSEvent {
    M_Int32 event;          // MH_SUB_SMS_EVENT
    M_Int32 parm1;         //event가 MH_SMSEV_SEND_NOTIFY
                        , -1
                        //event가 MH_SMSEV_NEW

    M_Int32 parm2;//event가 MH_SMSEV_NEW          tele -
Service ID
} MH_SMSEvent;

```

 MH\_smsOpen

SMS . telIDString  
 (Teleservice)가  
 가  
 가

| String      |  |
|-------------|--|
| “SHORTMSG”  |  |
| “BROADCAST” |  |
| “VOICEMAIL” |  |

cmd SMS 가  
 MH\_smsGetNext() 가 “ ”,  
 “ ”, “ ” 가 가 MH\_SMSCMD\_READONLY ,  
 MH\_SMSCMD\_CHANGEREAD, MH\_SMSCMD\_DELETE . “ ”  
 MH\_smsGetNext() MH\_smsGetNext()  
 SMS MH\_SmsData class “ ” 0,  
 “ ” 1 . MH\_smsOpen() MH\_smsGetNext()  
 MH\_smsClose() 가  
 MH\_smsOpen() MH\_smsGetNext() 가

M\_Int32 MH\_smsOpen (M\_Char \* tID, MH\_SmsCmd cmd)

[in] telIDString teleservice ID String  
 [in] cmd

SMS

M\_E\_NOTSUP -

M\_E\_ERROR -

M\_E\_ISCONN -

가

 MH\_smsGetAvailable

|                 |   |                 |
|-----------------|---|-----------------|
| SMS             | . | MC_smsGetNext() |
| 1               |   | 가 가             |
| MC_smsGetNext() | 가 | 1               |
| .               |   |                 |

M\_Int32 MH\_smsGetAvailable (M\_Int32 tID)

[in] tID


:

:

M\_E\_ERROR -

MH\_smsGetNext



 MH\_smsClose

SMS

```
void MH_smsClose (M_Int32 tID)
```

[in] tID SMS

---

## ✎ MH\_smsGetNext

SMS . 가  
M\_E\_NOENT 가 .

```
M_Int32 MH_smsGetNext (
    M_Int32 tID,
    MH_SmsData *buf,
)
```

[in] tID SMS  
[out] buf 가

0

M\_E\_NOENT- 가

M\_E\_ERROR -

## ✍ MH\_smsSend

```

SMS . . . . . HAL . . . . .
      256 . . . . .
MH_smsOpen() . . . . . M_E_WOULDBLOCK
      . . . . .
      . . . . . MH_SMSEV_SEND_NOTIFY
      . . . . .

M_Int32 MH_smsSend (M_Char* telIDString, M_Char* telnum, M_Byte* buf,
M_Int32 len)

[in] telIDString
[in] telnum
[in] buf . . . . . 256
[in] len

:
0 :
    M_E_ERROR -
    M_E_NOTSUP -
    M_E_WODULDBLOCK -

```

MH\_smsOpen

 MH\_smsGetMaximumLength

SMS

M\_Int32 MH\_smsGetMaximumLength (M\_Char\* telIDString)

[in] telIDString

:

:

M\_E\_NOTSUP -

## ✍ MH\_smsGetDirect

가 가 M\_E\_NOENT 가 ..

M\_Int32 MH\_smsGetDirect (M\_Char \* telIDString, M\_Int32 idx, MH\_SmsData \*buf)

[in] telIDString tele-Service ID String( .)

[in] idx

[out] buf 가

:

0

:

M\_E\_NOTSUP - tele -Service ID String

M\_E\_NOENT - 가 가

---

✎ MH\_smsSetStateDirect

M\_Int32 MH\_smsSetStateDirect(M\_Char \* telIDString,M\_Int32 idx,MH\_SmsCmd cmd)

[in] telIDString tele-Service ID String( .)

[in] idx

[in] cmd

:

0

:

M\_E\_NOTSUP -

M\_E\_ERROR - ,MH\_smsOpen

API

## 7.4. Media API

Media

### 7.4.1. C API

 MC\_MdaToneType

```
typedef enum MC_MdaToneType {
MC_MDA_TONE_0 = 0      //DTMF for 0 key
MC_MDA_TONE_1 ,      //DTMF for 1 key
MC_MDA_TONE_2 ,      //DTMF for 2 key
MC_MDA_TONE_3 ,      //DTMF for 3 key
MC_MDA_TONE_4 ,      //DTMF for 4 key
MC_MDA_TONE_5 ,      //DTMF for 5 key
MC_MDA_TONE_6 ,      //DTMF for 6 key
MC_MDA_TONE_7 ,      //DTMF for 7 key
MC_MDA_TONE_8 ,      //DTMF for 8 key
MC_MDA_TONE_9 ,      //DTMF for 9 key
MC_MDA_TONE_A ,      //DTMF for A key
MC_MDA_TONE_B ,      //DTMF for B key
MC_MDA_TONE_C ,      //DTMF for C key
MC_MDA_TONE_D ,      //DTMF for D key
MC_MDA_TONE_POUND ,  //DTMF for # key
MC_MDA_TONE_STAR ,   //DTMF for * key
MC_MDA_NOTE_A4 ,     //4400 Hz -Piano Notes-
MC_MDA_NOTE_AS4 ,   //4661 Hz
MC_MDA_NOTE_B4 ,     //4938 Hz
MC_MDA_NOTE_C4 ,     //5232 Hz
MC_MDA_NOTE_CS4 ,    //5543 Hz
MC_MDA_NOTE_D4 ,     //5873 Hz
MC_MDA_NOTE_DS4 ,    //6222 Hz
MC_MDA_NOTE_E4 ,     //6592 Hz
```



---

```
MC_MDA_NOTE_F4 , //6985 Hz
MC_MDA_NOTE_FS4 , //7399 Hz
MC_MDA_NOTE_G4 , //7840 Hz
MC_MDA_NOTE_GS4 , //8306 Hz
MC_MDA_NOTE_A5 , //8800 Hz
MC_MDA_NOTE_AS5 , //9322 Hz
MC_MDA_NOTE_B5 , //9877 Hz
MC_MDA_NOTE_C5 , //10465 Hz
MC_MDA_NOTE_CS5 , //11087 Hz
MC_MDA_NOTE_D5 , //11746 Hz
MC_MDA_NOTE_DS5 , //12443 Hz
MC_MDA_NOTE_E5 , //13185 Hz
MC_MDA_NOTE_F5 , //13970 Hz
MC_MDA_NOTE_FS5 , //14799 Hz
MC_MDA_NOTE_G5 , //15680 Hz
MC_MDA_NOTE_GS5 , //16612 Hz
MC_MDA_NOTE_A6 , //17600 Hz
MC_MDA_NOTE_AS6 , //18647 Hz
MC_MDA_NOTE_B6 , //19755 Hz
MC_MDA_NOTE_C6 , //20931 Hz
MC_MDA_NOTE_CS6 , //22174 Hz
MC_MDA_NOTE_D6 , //23493 Hz
MC_MDA_NOTE_DS6 , //24891 Hz
MC_MDA_NOTE_E6 , //26370 Hz
MC_MDA_NOTE_F6 , //27937 Hz
MC_MDA_NOTE_FS6 , //29599 Hz
MC_MDA_NOTE_G6 , //31359 Hz
MC_MDA_NOTE_GS6 , //33224 Hz
MC_MDA_NOTE_A7 , //35200 Hz
} MC_MdaToneType;
```

TONE TYPE

## ✎ MC\_mdaSetWaterMark

MC\_MDA\_STATUS\_END\_OF\_DATA, MC\_MDA\_STATUS\_FULL\_OF\_DATA 가  
 (WaterMark) . 90% ,  
 90% MC\_MDA\_STATUS\_END\_OF\_DATA 가 ,  
 90% MC\_MDA\_STATUS\_FULL\_OF\_DATA 가  
 . 100% .

```
void MC_mdaSetWaterMark(MC_MdaClip* clip, M_Int32 percent)
```

clip – [in]

percent – [in] (0-100)



## MC\_mdaClipPutToneData

"audio/TONE"

, MC\_mdaClipPutToneData()

가 가 가

```
M_Int32 MC_mdaClipPutToneData (MC_MdaClip* clip, MC_MdaToneType tone[],
M_Int duration[], M_Int32 number)
```

clip – [in]

tone – [in]

duration – [in]

number – [in]

## ✎ MC\_mdaClipPutFreqToneData

"audio/FREQTONE"

, MC\_mdaClipPutFreqToneData()

가 가 가

```
M_Int32 MC_mdaClipPutFreqToneData (MC_MdaClip* clip, M_Int32 hiFreq[],
M_Int32 lowFreq[], M_Int32 duration, M_Int32 number)
```

clip – [in]

hiFreq – [in] HZ

lowFreq – [in] HZ

duration – [in]

number – [in]

## 7.4.2. Java API

가 Media (org.kwis.msp.media)

## Class Clip

java.lang.Object

|

+- -org.kwis.msp.media.Clip

```
public class Clip
```

```
extends java.lang.Object
```

Player

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

 SND\_TONE\_0

```
public static final int SND_TONE_0
```

DTMF for 0 key.      0      .

 SND\_TONE\_1

```
public static final int SND_TONE_1
```

DTMF for 1 key.      1      .

 SND\_TONE\_2

```
public static final int SND_TONE_2
```

DTMF for 2 key.      2      .

 SND\_TONE\_3

```
public static final int SND_TONE_3
```

```
DTMF for 3 key.    3    .
```

 SND\_TONE\_4

```
public static final int SND_TONE_4
```

```
DTMF for 4 key.    4    .
```

 SND\_TONE\_5

```
public static final int SND_TONE_5
```

```
DTMF for 5 key.    4    .
```

 SND\_TONE\_6

```
public static final int SND_TONE_6
```

```
DTMF for 6 key.    6    .
```

 SND\_TONE\_7

```
public static final int SND_TONE_7
```

```
DTMF for 7 key.    7    .
```

 SND\_TONE\_8

```
public static final int SND_TONE_8
```

```
DTMF for 8 key.    8    .
```

 SND\_TONE\_9

```
public static final int SND_TONE_9
```

```
DTMF for 9 key.      9      .
```

 SND\_TONE\_A

```
public static final int SND_TONE_A
```

```
DTMF for A key.     10     .
```

 SND\_TONE\_B

```
public static final int SND_TONE_B
```

```
DTMF for B key.     11     .
```

 SND\_TONE\_C

```
public static final int SND_TONE_C
```

```
DTMF for C key.     12     .
```

 SND\_TONE\_D

```
public static final int SND_TONE_D
```

```
DTMF for D key.     13     .
```

 SND\_TONE\_POUND


public static final int SND\_TONE\_POUND

DTMF for # key. 14 .

 SND\_TONE\_STAR


public static final int SND\_TONE\_STAR

DTMF for \* key. 15 .

 SND\_NOTE\_A4

public static final int SND\_NOTE\_A4

440.0 Hz -Piano Notes -. 16 .

 SND\_NOTE\_AS4

public static final int SND\_NOTE\_AS4

466.1 Hz. 17 .

 SND\_NOTE\_B4

public static final int SND\_NOTE\_B4


493.8 Hz . 18 .

 SND\_NOTE\_C4


public static final int SND\_NOTE\_C4

523.2 Hz. 19 .




 SND\_NOTE\_CS4

```
public static final int SND_NOTE_CS4
554.3 Hz.    20    .
```

 SND\_NOTE\_D4

```
public static final int SND_NOTE_D4
587.3 Hz.    21    .
```

 SND\_NOTE\_DS4

```
public static final int SND_NOTE_DS4
622.2 Hz.    22    .
```

 SND\_NOTE\_E4


```
public static final int SND_NOTE_E4
659.2 Hz .    23    .
```

 SND\_NOTE\_F4

```
public static final int SND_NOTE_F4
698.5 Hz .    24    .
```

 SND\_NOTE\_FS4


```
public static final int SND_NOTE_FS4
739.9 Hz .    25    .
```

 SND\_NOTE\_G4

```
public static final int SND_NOTE_G4  
784.0 Hz .    26    .
```

 SND\_NOTE\_GS4

```
public static final int SND_NOTE_GS4  
830.6 Hz.    27    .
```

 SND\_NOTE\_A5

```
public static final int SND_NOTE_A5  
880.0 Hz .    28    .
```

 SND\_NOTE\_AS5

```
public static final int SND_NOTE_AS5  
932.2 Hz.    29    .
```


 SND\_NOTE\_B5

```
public static final int SND_NOTE_B5  
987.7 Hz .    30    .
```

 SND\_NOTE\_C5


public static final int SND\_NOTE\_C5

1046.5 Hz . 31 .

 SND\_NOTE\_CS5


public static final int SND\_NOTE\_CS5

1108.7 Hz . 32 .

 SND\_NOTE\_D5

public static final int SND\_NOTE\_D5

1174.6 Hz . 33 .

 SND\_NOTE\_DS5

public static final int SND\_NOTE\_DS5

1244.3 Hz . 34 .

 SND\_NOTE\_E5


public static final int SND\_NOTE\_E5

1318.5 Hz . 35 .


 SND\_NOTE\_F5

public static final int SND\_NOTE\_F5


1397.0 Hz . 36 .

 SND\_NOTE\_FS5


```
public static final int SND_NOTE_FS5
1479.9 Hz .    37    .
```

 SND\_NOTE\_G5


```
public static final int SND_NOTE_G5
1568.0 Hz .    38    .
```

 SND\_NOTE\_GS5

```
public static final int SND_NOTE_GS5
1661.2 Hz .    39    .
```

 SND\_NOTE\_A6


```
public static final int SND_NOTE_A6
1760.0 Hz .    40    .
```

 SND\_NOTE\_AS6


```
public static final int SND_NOTE_AS6
1864.7 Hz .    41    .
```

 SND\_NOTE\_B6


```
public static final int SND_NOTE_B6
1975.5 Hz .    42    .
```

 SND\_NOTE\_C6


```
public static final int SND_NOTE_C6
2093.1 Hz .    43    .
```

 SND\_NOTE\_CS6

```
public static final int SND_NOTE_CS6
2217.4 Hz .    44    .
```

 SND\_NOTE\_D6

```
public static final int SND_NOTE_D6
2349.3 Hz .    45    .
```

 SND\_NOTE\_DS6

```
public static final int SND_NOTE_DS6
2489.1 Hz .    46    .
```

 SND\_NOTE\_E6

```
public static final int SND_NOTE_E6
2637.0 Hz .    47    .
```

 SND\_NOTE\_F6

```
public static final int SND_NOTE_F6
```

```
2793.7 Hz .    48    .
```

```
✎ SND_NOTE_FS6
```

```
public static final int SND_NOTE_FS6
```

```
2959.9 Hz .    49    .
```

```
✎ SND_NOTE_G6
```

```
public static final int SND_NOTE_G6
```

```
3135.9 Hz .    50    .
```

```
✎ SND_NOTE_GS6
```

```
public static final int SND_NOTE_GS6
```

```
3322.4 Hz .    51    .
```

```
✎ SND_NOTE_A7
```

```
public static final int SND_NOTE_A7
```

```
3520.0 Hz .    52    .
```



```
✎ Clip
```

```
public Clip(String type,  
             int bufSize)
```

```

    CLIP
    HandsetProperty.getSystemProperty() "SOUNDDEVICES", "MEDIADVICES"
        MIME "audio/xxx",
    "video/xxx" MIME "audio/TONE" putData(int[]
tone, int[] duration, int off, int len) 가
    "audio/FREQTONE" putData(int[] hiFreq, int[] lowFreq, int[] duration,
int off, int len) 가 putData(byte[]
buf, int off, int len) CLIP . CLIP

    CLIP CLIP listener 가
    / 가
    CLIP object IllegalArgumentException

```

Parameters:

type -

bufSize -

1. "audio/TONE" 가 3 putData(int[] tone, int[] duration, int off, int len) int[3] tone, int[3] duration
2. "audio/FREQTONE" 가 3 putData(int[] hiFreq, int[] lowFreq, int[] duration, int off, int len) int[3] hiFreq, int[3] lowFreq, int[3] duration가
3. 가 3 , putData(byte[] buf, int off, int len) byte[3] buf가

### Clip

```
public Clip(String type)
```

```
    . Clip(String type, int bufSize) ,
```

```
    , 가
    setBuffer() .
```

Parameters:

type -

### Clip

```
public Clip(String type,
            byte[] buf)
    "audio/TONE", "audio/FREQTONE"
    . Clip(String type, int bufSize)
```

Parameters:

type -

buf - 가

✍ Clip

```
public Clip(int[] tone,
            int[] duration)
    "audio/TONE"
    . Clip(String type, int bufSize)
```

Parameters:

tone - 가

duration - 가

✍ Clip

```
public Clip(int[] hiFreq,
            int[] lowFreq,
            int[] duration)
    "audio/FREQTONE"
    . Clip(String type, int bufSize)
```

Parameters:

hiFreq - 가

lowFreq - 가

duration - 가

✍ Clip

```
public Clip(String type,
```



String filename)

가

Clip(String type, byte[] buf)

Parameters:

type -

filename - 가



 getType

public java.lang.String getType()

Type

Returns:

Type

 setBuffer

public boolean setBuffer(byte[] buf,  
int dataSize)

Parameters:

buf -

dataSize -

Returns:

true : , false : 가

 setBuffer

public boolean setBuffer(int[] tone,

```

        int[] duration,
        int dataSize)
        . "audio/TONE"

```

Parameters:

buf -

dataSize -

Returns:

true : , false : 가

#### setBuffer

```

public boolean setBuffer(int[] hiFreq,
                        int[] lowFreq,
                        int[] duration,
                        int dataSize)
        . "audio/FREQTONE"

```

Parameters:

buf -

dataSize -

Returns:

true : , false : 가

#### setWaterMark

```

public void setWaterMark(int percent)
END_OF_DATA, FULL_OF_DATA 가 (WaterMark)
90% , 90%
END_OF_DATA 가 , 90%
FULL_OF_DATA 가 . 100% .

```

Parameters:

percent - (0-100)

### putData

```
public int putData(byte[] buf,
                  int off,
                  int len)
    "audio/TONE", "audio/FREQTONE"
    .
    .
    .
    , putData(byte[] buf, int off, int len)
    가 가 가
```

Parameters:

buf -

off - offset

len -

Returns:

### putData

```
public int putData(int[] buf,
                  int off,
                  int len)
    "audio/TONE", "audio/FREQTONE"
    .
    .
    .
    , putData(int[] buf, int off, int len)
    가 가 가
```

Parameters:

buf -

off - offset

len -

Returns:

### putData

```
public int putData(int[] tone,
                  int[] duration,
                  int off,
                  int len)
    "audio/TONE"
    , putData(int[] tone, int[] duration, int off, int len)()
    가 가 가
```

Parameters:

tone - SND\_TONE\_XXX, SNT\_NOTE\_XXX

duration -

off - offset

len -

Returns:

### putData

```
public int putData(int[] hiFreq,
                  int[] lowFreq,
                  int[] duration,
                  int off,
                  int len)
    "audio/FREQTONE"
    , putData(int[] hiFreq, int[] lowFreq, int[] duration, int
off, int len)
    가 가 가
```

Parameters:

hiFreq - HZ

lowFreq - HZ

duration -

off - offset

len -

Returns:

 getData

```
public int getData(byte[] buf,
                  int off,
                  int len)
```

```
    , getData(byte[] buf, int off, int len)
```

가

"VOCODERDEVICES"


Parameters:

buf - 가

off -

len -

Returns:

 availableDataSize

```
public int availableDataSize()
```

```
    가 ( 가 )
```

Returns:

가

## ✍ clearData

```
public void clearData()
```

가

## ✍ setPosition

```
public boolean setPosition(int ms)
```

, MediaUnsupportedException

Parameters:

ms - (milli second)

Returns:

ture :

false :

## ✍ getVolume

가 0 , 100

Parameters:

Returns:

: (0-100 )

## ✍ setVolume

```
public final boolean setVolume(int level)
```

가 0 ,

100 .

Parameters:

level - (0-100 )

✍ `setListener`

```
public void setListener(PlayListener listener)
```

```
listener .
```

Parameters:

listener - listener, null

✍ `playStart`

```
protected void playStart(boolean repeat)
```

```
Player.play(Clip clip, boolean repeat) repeat
```

Parameters:

repeat - Player.play() repeat

✍ `playUpdate`

```
public void playUpdate(int event, int parm)
```

```
. PlayListener.playUpdate() .
```

Parameters:

event -

parm - event 가