PA-2400W

C Library Manual

(Version 1.00)

CASIO Computer Co., Ltd.

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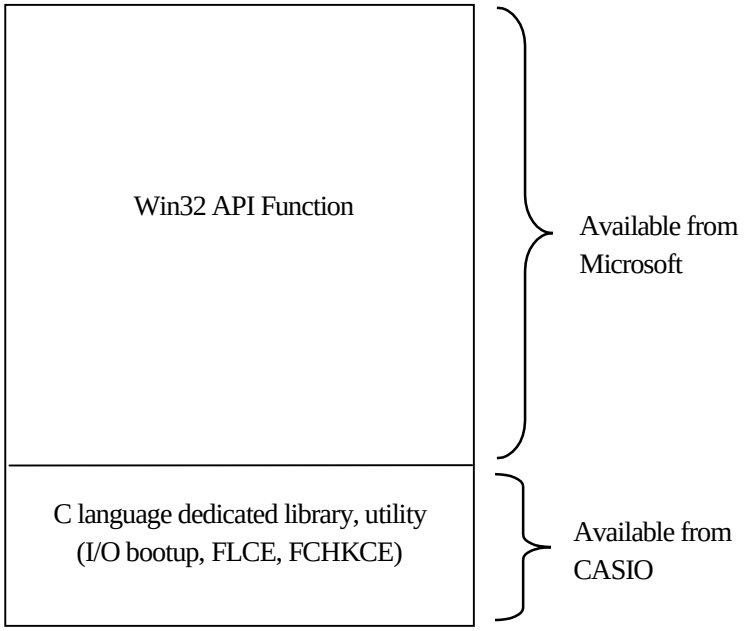
Preface

This manual describes the C language-dedicated library functions and utilities that run on the CASIO PA-2400W (hereinafter referred to as "H/PC", which stands for Handheld PC).
The PA-2400W uses the Windows CE operating system (Ver. 2.11), and uses the Win32 API functions to generate user application programs. However, more functions may be required if generating a business application, etc.
The C language-dedicated library functions and utilities described in this manual are used to support functions that are not supported by the API functions.
Information about the Win32 API functions can be retrieved using the Help function in the Windows 95 system.



1. Supported Files

The following files will be supported by the C-library functions and utilities described in this manual.

Table 1.1

File	Function	Description
System Library		
CasioSys.lib CasioSys.h	CA_BacklightOn	Turns on the backlight.
	CA_BacklightOff	Turns off the backlight.
	CA_BacklightCheck	Acquires the status of the backlight.
	SyncPowerOff	Turns off the power after completion of access to card.
	DisablePowerOff	Disables power off with the power button.
	EnablePowerOff	Enables power off with the power button.
	StatusPowerOff	Acquires the status of enable/disable power off with the power button.
	ApoCountReset	Resets the APO's counter.
	SoftReset	Performs soft-reset (warm-bootup).
	SetPowerOnAlarm	Enables or disables power on with the alarm.
	GetPowerOnAlarm	Acquires the status of enable/disable power on with the alarm.
	SetPowerEventStat	Enables or disables power-on notification.
	GetPowerEventStat	Acquires the status of enable/disable power-on notification.
SIPanel Library		
SIPanel.lib SIPanel.h SIPanel.dll (note 1) SIPanel.exe (for individual execution)	SIP_ExecutePanel	Starts up the SIPanel.
	SIP_ShowPanel	Displays the SIPanel on the LCD screen or erases it from the screen.
I/O Bootup Library		
Iobox1.lib Iobox1.h Iobox1.dll	iobox_chk	Checks the condition of connection between PA-2400W and I/O Box, and acquires a result of the status.
File Transfer Utility		
FLCE.EXE		Execution file
SND.LNK		Shortcut for PA-2400W-to-PA-2400W communication
RCV.LNK		Shortcut for PA-2400W-to-PA-2400W communication
IDLE.LNK		Shortcut for idle
File Check Utility		
FCHKCE.EXE		Execution file
MAKE.LNK		Shortcut for PA-2400W-to-PA-2400W communication
CHECK.LNK		Shortcut for downloading AP

Notes:

1. Since the “SIPanel.dll” and “SIPanel.exe” in English version are pre-installed in the ROM, you do not need to install it every time you use the software input panel. However, if you use other language versions of the SIPanel, you need to replace them.
2. Each library function or utility command can be made available to the user when the DLL/EXE file is copied into the Windows directory on the PA-2400W (see the figure below).

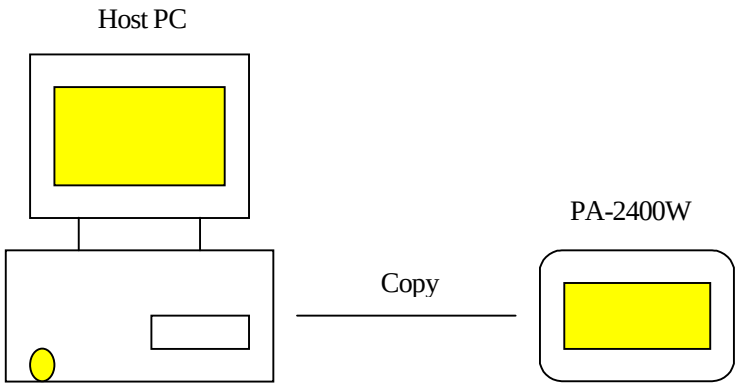


Fig. 1.1 System configuration

1.1 Dedicated Library and Utility

1.1.1 System Library

Table 1.2

No.	Function	Description	Page
1	CA_BacklightOn	Turns on the backlight.	11
2	CA_BacklightOff	Turns off the backlight.	12
3	CA_BacklightCheck	Acquires the status of backlight.	13
4	SyncPowerOff	Turns off after completion of access to a card.	14
5	DisablePowerOff	Disables power off with the power button.	15
6	EnablePowerOff	Enables power on with the power button.	16
7	StatusPowerOff	Acquires the status of enable/disable power off with the power button.	17
8	ApoCountReset	Resets the APO's counter.	18
9	SoftReset	Resets the system and then starts up warm bootup.	19
10	SetPowerOnAlarm	Enables or disables automatic power on with the alarm.	20
11	GetPowerOnAlarm	Acquires the status of automatic power on with the alarm.	21
12	SetPowerEventStat	Enables or disables power on event notification.	22
13	GetPowerEventStat	Acquires the status of enable/disable power on event notification.	24

1.1.2 SIPanel Library

Table 1.3

No.	Function	Description	Page
1	SIP_ExecutePanel	Starts up the SIPanel.	27
2	SIP_ShowPanel	Displays the SIP or erases it from the LCD screen.	28

1.1.3 I/O Bootup Library

Table 1.4 I/O Bootup library function

No.	Function	Description	Page
1	iobox_chk	Monitoring the connection status of PA-2400W with I/O Box	36

1.1.4 File Transfer Utility

Table 1.5 File transfer utility

No.	Command	Description	Page
1	FLCE /Y	Communication environment setup/Idle start	58
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4	FLCE /A	File transmission (append)	61
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8	FLCE	Idle start	65

1.1.5 File Check Utility

Table 1.6 File check utility

No.	Command	Description	Page
1	FCHKCE /G	Generation of a list file	81
2	FCHKCE /C	Comparison of list files	83

2. Development Environment

Your own application program can be developed by implementing the CASIO's dedicated library functions and utility commands listed in the previous pages under the following software development environment.

- Microsoft Visual C/C++ version 6.0
- Microsoft Windows CE Toolkit for Visual C/C++ 6.0
- Windows CE version 2.11 SDK (US version)

3. System Library

3.1 Overview

This System Library functions can provide you with various dedicated functions such as backlight control, power OFF supplement control, power-ON control with alarm, etc.
These functions to be described in the next pages are developed only for the PA-2400W and therefore not guaranteed for use with other hardware platforms. Also, please note that it is not a Windows CE general-purpose library.

3.2 Details of Function

Title		Function	CA_BacklightOn

Turns on the backlight. If this function is called while the backlight is already on, nothing will happen.

≪C Language Interface≫

【Calling Sequence】

```
BOOL CA_BacklightOn ()
```

【Parameters】

None

【Return Values】

TRUE : Normal end

【Header】

#include <CasioSys.h>

≪Remarks≫

The automatic backlight off will be remained active after this function is called. Duration of the automatic backlight off can be set at the control panel. For example, if the automatic backlight off is set to “disable mode” at the control panel, the function cannot be activated.

During an event of low battery, the backlight still can be turned on. However, because of inrush current at a time of turning on the backlight, the power of PA-2400W may be turned off. Always observe the battery condition before activation of the backlight.

Title		Function	CA_BacklightOff

Turns off the backlight.

≪C Language Interface≫

【Calling Sequence】

```
BOOL CA_BacklightOff()
```

【Parameters】

None

【Return Values】

TRUE : Normal end

【Header】

#include <CasioSys.h>

≪Remarks≫

This function can turn off the backlight which is turned on by a keyboard operation.

Title		Function	CA_BacklightCheck

Acquires the status of the backlight if it is set to on or off.

≪C Language Interface≫

【Calling Sequence】

```
BOOL CA_BacklightCheck()
```

【Parameters】

None

【Return Values】

TRUE	: Backlight is on.
FALSE	: Backlight is off.

【Header】

#include <CasioSys.h>

≪Remarks≫

Title		Function	SyncPowerOff

Turns off the power after access to an installed card is complete.

≪C Language Interface≫

【Calling Sequence】

```
BOOL SyncPowerOff()
```

【Parameters】

None

【Return Values】

TRUE : Normal end.

【Header】

#include <CasioSys. h>

≪Remarks≫

Title		Function	DisablePowerOff

Disables power-off with the power button. This setting is cleared when the power is turned on.

≪C Language Interface≫

【Calling Sequence】
BOOL DisablePowerOff()

【Parameters】
None

【Return Values】
TRUE : Normal end.

【Header】
#include <CasioSys. h>

≪Remarks≫

Title		Function	EnablePowerOff

Enables the power to be turned off with the power button.

≪C Language Interface≫

【Calling Sequence】

```
BOOL EnablePowerOff()
```

【Parameters】

None

【Return Values】

TRUE : Normal end.

【Header】

#include <CasioSys. h>

≪Remarks≫

Title		Function	StatusPowerOff

Acquires the status of “enable/disable the power to be turned off with the power button”.

≪C Language Interface≫

【Calling Sequence】

```
BOOL StatusPowerOff()
```

【Parameters】

None

【Return Values】

FALSE	: Disable “the power to be turned off with the power button.”
TRUE	: Enable “the power to be turned off with the power button.”

【Header】

#include <CasioSys. h>

≪Remarks≫

Title		Function	ApoCountReset

Resets the counter of APO time.
By calling this function before elapse of the APO time set at the control panel, APO can be disabled.

≪C Language Interface≫

【Calling Sequence】

```
BOOL ApoCountReset()
```

【Parameters】

None

【Return Values】

TRUE : Normal end.

【Header】

#include <CasioSys. h>

≪Remarks≫

Title		Function	SoftReset

Resets the system. After this function is called, a worm-bootup is performed.

≪C Language Interface≫

【Calling Sequence】

```
void SoftReset()
```

【Parameters】

None

【Return Values】

None

【Header】

#include <CasioSys. h>

≪Remarks≫

When this function is called, a warm-bootup is immediately performed. This will cause file and data being accessed to be erased. All files and devices being currently opened must be closed before this function is activated.

Title		Function	SetPowerOnAlarm

Enables or disables “the automatic power-on to be activated with the alarm”.

≪C Language Interface≫

【Calling Sequence】

```
BOOL SetPowerOnAlarm ( BOOL bMode);
```

【Parameters】

BOOL bMode

FALSE	: Disables “automatic power-on with the alarm”.
TRUE	: Enables “automatic power-on with the alarm”. (default)

【Return Values】

TRUE	: Normal end
FALSE	: Internal error

【Header】

#include <CasioSys. h>

≪Remarks≫

Related operations to the “automatic power-on” after this function is implemented are as follows.

Table 3.1

Setup of “SetPowerOnAlarm”	Setup at Control panel	When the power of PA-2400W is turned on	When the power of PA-2400W is off
“automatic power-on” disabled	Alarm off	Alarm cannot be activated.	No “automatic power-on”
	Alarm on	Alarm can be activated.	No “automatic power-on”
“automatic power-on” enabled	Alarm off	Alarm cannot be activated.	No “automatic power-on”
	Alarm on	Alarm can be activated.	Yes “automatic power-on”

Title		Function	GetPowerOnAlarm

Acquires the status of “automatic power-on with the alarm” if it is disabled or enabled.

≪C Language Interface≫

【Calling Sequence】

```
BOOL GetPowerOnAlarm()
```

【Parameters】

None

【Return Values】

TRUE	: Enable “automatic power-on with the alarm”.
FALSE	: Disable “automatic power-on with the alarm”.

【Header】

#include <CasioSys. h>

≪Remarks≫

Title		Function	SetPowerEventStat

Sets “power-on event notification” enabled or disabled.

≪C Language Interface≫

【Calling Sequence】

```
BOOL SetPowerEventStat( BOOL bMode)
```

【Parameters】

BOOL bMode

TRUE	: Enable “power-on event notification”.	
FALSE	: Disable “power-on event notification”.	(default)

【Return Values】

TRUE	: Normal end
FALSE	: Failure in opening registry

【Header】

#include <CasioSys. h>

≪Remarks≫

Settings by using this function remain active even after a RESET is performed.

Sample program to acquire power-on event notification

```
#include <windows.h>

static          HANDLE      hEventOn = NULL;
static          HANDLE      hThreadOn = NULL ;

DWORD WINAPI OnThread()
{
        LONG WaitReturn;

            While(1) {
                        WaitReturn = WaitForSingleObject(hEventon, INFINITE);
                        If (WaitReturn == WAIT_OBJECT_0) {
                                MessageBox(NULL, TEXT("PowerONEvent"), TEXT("Event"), MB_OK);
                        }
                        ResetEvent(hEventOn);
            }
            return 0;
}

BOOL Initialize()
{
            DWORD ThreadIDOn;

            hEventOn = CreateEvent(NULL, TRUE, FALSE, TEXT("PA_OnEvent"));
            if( !hEventOn )
            {
                        return(FALSE);
            }
            hThreadOn = CreateThread(NULL, 0, OnThread, 0, 0, &ThreadIDOn);
            if(!hThreadOn)
            {
                        return(FALSE);
            }
            return(TRUE);
}

int WINAPI WinMain(HINSTANCE hInstance, HINSTANCE hPrevInstance, LPSTR lpCmdLine, int nCmdShow)
{
            if(Initialize() ) {
                        MessageBox(NULL, TEXT("Initialize Success"), TEXT("Initialize"), MB_OK);
                        While(1) {
                                Sleep(1000);
                        }
                        return(TRUE);
            }
            else        {
                        MessageBox(NULL, TEXT("Initialize Error"), TEXT("Initialize"), MB_OK);
                        return(FALSE);
            }
}
```

Title		Function	GetPowerEventStat

Acquires the status of “power-on event notification” if it is enabled or disabled.

≪C Language Interface≫

【Calling Sequence】

```
BOOL GetPowerEventStat()
```

【Parameters】

None

【Return Values】

TRUE	: Enable notification.
FALSE	: Disable notification.

【Header】

#include <CasioSys. h>

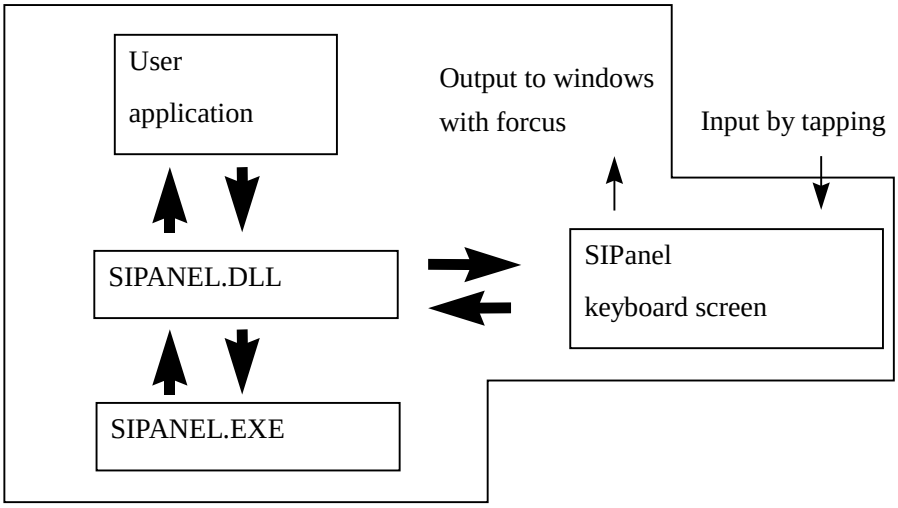
≪Remarks≫

4. SIPanel Library

4.1 Overview

In this chapter, the SIPanel which is executed on the Windows CE Ver.2.11 (on PA-2400W), and the DLL (Dynamic Link Library) which is called from a user application are described.

Fig. 4.1 System configuration (Windows CE Ver. 2.11)



Operation of this library requires the following files:

Table 4.1

File Name	Operation environment	Description
sipanel.dll	Windows CE ver. 2.11 (SH3)	Execution management library for starting up SIPanel
sipanel.exe	Windows CE ver. 2.11 (SH3)	Execution program for starting up SIPanel

Use the following files if developing a user application that controls the SIPanel with the execution management library of this system.

Table 4.2

File Name	Operation environment	Description
sipanel.lib sipanel.h	Windows CE ver. 2.11 (SH3)	Import library and header file for calling sipanel.dll

4.2 Use of SIPanel Library

Program for starting up the library

Before use of the SIPanel library, a dedicated program must be created to start up the library. The following is the method to call.

- Create a dedicated program to call the library, separate from application program for business use. This dedicated program must be programmed so that the SIPanel library is called when a message is released by the application program to the dedicated program. It should be stored in the root directory of "My Handheld PC".

- Avoid having the application program to call directly the SIPanel library. Instead, always use such the method that a message released by the application program can make the dedicated program start up the library.

- A sample program for the dedicated program mentioned above is on page xxx. You may refer to it to create your own dedicated program of calling the library.

Registry

After a dedicated program is created, the registry of the SIPanel must be rewritten to the following values. The values can be changed with "RegSetValueEx" function of Win32API.

Key name : LocalMachine\Software\Apps\SIPManager
SIPExeName = sipanel.exe -> SIPExeName = a name of the dedicated program

By having the registry values to be re-written, a user created program to start up the SIPanel can be also possible when the SIP button at upper-left corner of the PA-2400W is pushed. Or, if you wish to disable the startup, delete the values of Key name above.
Once user's own SIPanel startup program is created, the registry must be re-written (or the registry must be deleted). Otherwise, it may crash to the original SIPanel startup program of the built-in ROM when the SIP button is pushed.

4.3 Restrictions

The SIPanel function is subject to the following restrictions.

- The SIPanel screen may be hidden behind a display that is associated with an application, such as PowerPoint, if one is used.
- If the SIPanel library is called directly by application software, you may not be able to input characters into an object input area. Always follow the method described in Chapter 4.2 "Use of SIPanel Library" when it is called.

4.4 Details of Function

Title		Function	SIP_ExecutePanel

Initiation of the SIPanel
Initiates the SIPanel in the non-display mode. If it has already been initiated, it will be displayed as specified by the parameters.

≪C Language Interface≫

【Calling Sequence】
int SIP_ExecutePanel (LPCTSTR lpParam)

【Parameters】

LPCTSTR lpParam:

Pointer to the parameters string. One specification unit consists of a '/' and an alphabet (not case-sensitive) plus a numeral. To specify multiple units delimit them with a space (order of specification unit does not matter). All parameters other than those listed below will be ignored (invalid).

/T1	Adds a text area. If keyboard character is touched once it will be temporarily displayed in the text area, and, if the Return key is touched, it will be transferred to a currently active window. If the Return key is touched, it will be transferred to a currently active window.
/T0	Does not add a text area. (Initial condition default.)
/D1	Establishes a drag area in the upper section of the screen. This drag area is a range in which a mouse event is detected if the display position of the SIPanel is modified. Note: If the drag area extends beyond the display range, dragging is no longer possible.
/D3	Does not establish a drag area. Dragging is not possible.
/D0 or /D2	Establishes a drag area on the left side of the screen. (Initial condition default.)
/N2	Displays a panel that only contains numeric keys.
/N1	Adds numeric keys to the standard keyboard.
/N0	Does not add numeric keys to the standard keyboard. (Initial condition default.)
/L1	Activates the Caps Lock key.
/L0	Deactivates the Caps Lock key. (Initial condition default.)
/Px, y	Specifies the coordinates of the top left corner of the SIPanel. "x" should be between 0 and 479 of the X-axis coordinate, and "y" should be between 0 and 239 of the Y-axis coordinate "x" and "y" should be separated by a comma (","). The default values are x=0 and y=0.
/Sw, h	Specifies the width and height of the SIPanel to be displayed. "w", the width, should be between 1 and 480, and "h", the height, should be between 1 and 240. "w" and "h" should be separated by a comma (","). The default values are w=288 and h=100. Note: If values that are too small are specified, tapping the panel has no effect and, consequently, a key input is not possible.

Unless otherwise specified, the parameters will retain their previous values.
If SIPanel is initiated without a parameter being specified, the following condition is employed for the defaults.

```
SIP_ExecutePanel (L"/T0 /D0 /N0 /L0 /P0,0 /S288, 100");
```

【Return Values】

SIP_NO_ERROR	: Normal termination
SIP_SHOW	: Normal initiation, the SIPanel is in the display mode.
SIP_HIDE	: Normal initiation, the SIPanel is in the non-display mode.

【Header】
#include <SIPanel. h>

【Remarks】
The SIPanel screen may be hidden (HIDE state) if the function is called while the SIPanel is displayed. During the HIDE state, if the function is called without specifying parameters, the SIPanel will be displayed in the same mode specified by previous setting parameters.

Title		Function	SIP_ShowPanel

Display/Non-display of the SIPanel
Sets the SIPanel to display mode or non-display mode.

≪C Language Interface≫

【Calling Sequence】
int SIP_ShowPanel (int iCmdShow)

【Parameters】

int iCmdShow	SIP_SHOW	: Displays the SIPanel if it is in the non-display mode.
	SIP_HIDE	: Hides the SIPanel if it is in the display mode.

【Return Values】

SIP_NOT_FOUND	: SIPanel is not initiated.
SIP_SHOW	: SIPanel is being displayed.
SIP_HIDE	: SIPanel is hidden (not displayed).

【Header】
#include <SIPanel. h>

Sample program to start up the SIPanel

This is a source program of SipTsr.exe which must be used together with "CallSip.exe".

```
// SipTsr.cpp : Defines the entry point for the application. //

#include "stdafx. h"
#include "SIPanel. h"

TCHAR ClassName[] = TEXT("SipTsr");

// ***************************************************************************************//
// WndProc                                                                                //
// ***************************************************************************************//
LRESULT CALLBACK WndProc(HWND hwnd, UNIT message, WPARAM wParam, LPARAM IParam)
{

        switch (message) {
        case (WM_USER + 1):                                          //ten-key SIPanel
                SIP_ExecutePanel( TEXT("/N2 /T0 /P200.0 /S180, 120"));
                break;
        case (WM_USER + 2);                                      //SIPanel with text area
                SIP_ExecutePanel( TEXT("/T1 /N0 /P0, 0 /S320, 120"));
                break;
        case WM_DESTROY:
                PostQuitMessage(0);
                return 0;
        }
        return defWindowProc(hwnd, message, wParam, lParam);
}

// ***************************************************************************************//
//   InitApplication                                                                      //
// ***************************************************************************************//
BOOL InitApplication (HINSTANCE hInstance)
{
        WINDCLASSW wc;
        BOOL f;

        wc.style = CS_HREDRAW | CS_VREDRAW;
        wc. lpfnWndProc = WndProc;
        wc.cbClsExtra = 0;
        wc. cbWndExtra = DLGWINDOWEXTRA;
        wc. hInstance = hInstance;
        wc. hIcon = NULL;
        wc. hCursor = NULL;
        wc. hbrBackground = (HBRUSH) GetStockObject(LTGRAY_BRUSH);
        wc. lpszMenuName = NULL;
        wc. lpszClassName = ClassName;
        f= (RegisterClass(&wc));
        return f;
}

// ***************************************************************************************//
//   InitInstance                                                                         //
// ***************************************************************************************//
BOOL InitInstance(HINSTANCE hIntance, int nCmdShow)
{
        HWND hWnd;

        hWnd = CreateWindow( ClassName, NULL, WS_OVERLAPPED, 0, 0, 0, 0, NULL, NULL, hInstance,
                                                                                NULL);
```

```
        if (hWnd == 0)                          // Check whether values returned by CreateWindow() are valid.
            return (FALSE);
        if (lsWindow(hWnd) != TRUE)
            return (FALSE);

        return(TRUE);                                                   // Window handle hWnd is valid.
}

// ************************************************************************************************//
//   WinMain                                                                                       //
// ************************************************************************************************//
int WINAPI WinMain(     HINTANCE hInstance.
                        HINSTANCE       hPrevInstance,
                        LPTSTR          lpCmdLine,
                        int             ncmdShow)
{
        MSG msg;
        HWND hWnd;
        long lResult;
        HKEY hKeyResult;
        TCHAR TsrName[] = TEXT("SipTsr.exe");

        if ( hWnd = FindWindow( ClassName, NULL))    {
            SIP_ExecutePanel( TEXT(""));
            return FLASE;
        }

        if (hPrevInstance == 0) {
            if (InitApplication(hInstance) == FALSE)
                return(FALSE);
        }
        if (InitInstance(hInstance, nCmdShow) == FALSE)
            return(FALSE);

        lResult = RegOpenKeyEx( HKEY_LOCAL_MACHINE,                     // Open Registry
            TEXT( "Software\\Apps\\SIPManager"),
            0, KEY_WRITE, &hKeyResult);
        if ( lResult != ERROR_SUCCESS)
            return(FALSE);

        lResult = RegSetValueEx( hKeyResult,                            // Write Registry
            TEXT( "SIPExeName"), 0, REG_SZ,
            ( unsigned char *)TsrName    ,    sizeof( TsrName));
        if ( lResult !=ERROR_SUCCESS)
            return(FALSE);

        RegCloseKey( hKeyResult);                                       // Close Registry

        While (GetMessage(&msg, NULL, 0, 0) == TRUE) {
            DispatchMessage (&msg);
        }
        return TRUE;
}
```

Sample program of application software for business use

Install “SipTsr.exe”, and execute the following program.

```
// CallSip.cpp : Defines the entry point for the application.//

#include <Winuser.h>
#include "stdafx.h"

#define IDC_BTN_TEN        1
#define IDC_BTN_TEXT       2
#define IDC_EDIT           3

HINSTANCE hInst;                                        // The current instance
TCHAR ClassName[] = TEXT( "CallSip");                   // Class name of this program
TCHAR ClassName_TSR[] = TEXT("SipTsr");                 // Class name of "SipTsr"
HWND hbCallTen;
HWND hbCallText;
HWND heText;
BOOL CallSip( HWND, WPARAM);

// ************************************************************************************//
//        WndProc                                                                      //
// ************************************************************************************//
LRESULT CALLBACK WndProc(HWND hWnd, UINT message, WPARAM wParam, LPARAM lParam)
{
        switch (message) {
        case WM_COMMAND:
                if ( HIWORD(wParam) == BN_CLICKED) {
                        CallSip( hWnd, LOWORD(wParam));
                        SetFocus( heText);
                }
                break;
        case WM_CREATE:
                hbCallTen = CreateWindow( TEXT("button"), TEXT("Ten-key"),
                        ( WS_CHILD | WS_VISIBLE | BS_PUSHBUTTON), 20, 80, 90, 30,
                        hWnd, (HMENU)IDC_BTN_TEN, (HANDLE)hInst, NULL);

                hbCallText = CreateWindow( TEXT("button"), TEXT("Text Area"),
                        ( WS_CHILD | WS_VISIBLE | BS_PUSHBUTTON), 120, 80, 90, 30,
                        hWnd, (HMENU)IDC_BTN_TEXT, (HANDLE)hInst, NULL);

                heText = CreateWindow( TEXT("edit"), TEXT("\0"),
                        ( WS_CHILD | WS_VISIBLE | WS_BORDER | ES_NOHIDESEL),
                        20, 40, 200, 20, hWnd, (HMENU)IDC_EDIT, hInst, NULL);
                break;

                case WM_DESTROY:
                        PostQuitMessage(0);
                        return 0;
                }
                return DefWindowProc(hWnd, message, wParam, lParam);
}

// ************************************************************************************//
//         InitApplication                                                             //
// ************************************************************************************//
BOOL InitApplication (HINSTANCE hInstance)
{
        WNDCLASSW wc;
```

```
        wc.style = CS_HREDRAW | CS_VREDRAW;
        wc.lpfnWndProc = WndProc;
        wc.cbClsExtra = 0;
        wc.cbWndExtra = DLGWINDOWEXTRA;
        wc.hInstance = hInstance;
        wc.hIcon = NULL;
        wc.hCursor = NULL;
        wc.hbrBackground = (HBRUSH) GetStockObject(LTGRAY_BRUSH);
        wc.lpszMenuName = NULL;
        wc.lpszClassName = ClassName;

        return (RegisterClass(&wc));
}

// ************************************************************************************************//
// InitInstance                                                                                   //
// ************************************************************************************************//
BOOL InitInstance(HINSTANCE hInstance, int nCmdShow)
{
        HWND    hWnd;
        hInst = hInstance;                              // Store instance handle in our global variable
        hWnd = CreateWindow(ClassName, ClassName,
                ( WS_VISIBLE | WS_OVERLAPPED | WS_SYSMENU),
                0, 0, CW_USEDEFAULT, CW_USEDEFAULT, NULL, NULL, hInstance, NULL);
        if (hWnd == 0)                  // Check whether values returned by CreateWindow() are valid.
                return (FALSE);
        if (IsWindow(hWnd) != TRUE)
                return (FALSE);

        ShowWindow(hWnd, SW_SHOW);
        UpdateWindow(hWnd);

        return(TRUE);                                   // Window handle hWnd is valid.
}

int WINAPI WinMain(     HINSTANCE hInstance,
                        HINSTANCE hPrevInstance,
                        LPTSTR    lpCmdLine,
                        int       nCmdShow)
{
        MSG msg;

        if (hPrevInstance == 0) {
            if (InitApplication(hInstance) == FALSE) {
                NKDbgPrintfW( TEXT("CallSip : InitApp failed!\n"));
                return(FALSE);
            }
        }
        if (InitInstance(hInstance, nCmdShow) == FALSE) {
            NKDbgPrintfW( TEXT("CallSip : InitInst failed!\n"));
            return(FALSE);
        }
        while (GetMessage(&msg, NULL, 0, 0) == TRUE) {
             TranslateMessage(&msg);
             DispatchMessage(&msg);
        }
        return(msg.wParam);
}
```

```
BOOL CallSip( HWND hWnd, WPARAM wId)
{
        HWND hSip;
        UINT CmdMessage = WM_USER;

        hSip = FindWindow( ClassName_TSR, NULL);                    // Find "SipTsr"
        if ( hSip == NULL) {
            MessageBox( hWnd, TEXT("Error: FindWindow failed!"),
                    TEXT("SIPanel Sample"), MB_OK);
            return FALSE;
        }

         switch( wId) {
         case IDC_BTN_TEXT:
            CmdMessage++;
        case IDC_BTN_TEN:
            CmdMessage++;
            break;
        default:
            return FALSE;
        }
        SendMessage( hSip, CmdMessage, 0, 0);                       // Send message to SipTsr
        return TRUE;
}
```

4.5 SIPANEL.EXE

4.5.1 Overview

Initiate SIPANEL.EXE and call SIPANEL.DLL to control the SIPanel. The SIPanel will be initiated in the non-display mode. If it has already been initiated, it will be displayed as specified by the command line options. If it has already been displayed, it will be set to non-display and all parameters other than /Q will be ignored.

4.5.2 Options of Command Line

Format: `sipanel.exe [/Q] [/T|0|1|] [/D|0|1|] [/N|0|1|] [/L|0|1|] [/Px,y] [/Sw,h]`

One specification unit consists of a '/' and an alphabet (not case-sensitive) plus a number. To specify multiple units delimit them by inserting a space after each unit (order of unit specification does not matter). All parameters other than those listed below will be ignored (invalid).

/T1	Adds a text area. If keyboard character is touched once it will be temporarily displayed in the text area, and, if the Return key is touched, it will be transferred to a currently active window.
/T0	Does not add a text area. (Initial condition default.)
/D1	Establishes a drag area in the upper section of the screen. This drag area is a range in which a mouse event is detected if the display position of SIPanel is modified. **Note:** If the drag area extends beyond the display range, dragging is no longer possible.
/D3	Does not establish a drag area. Dragging is not possible.
/D0 or /D2	Establishes a drag area on the left side of the screen. (Initial condition default.)
/N2	Displays a panel that only contains numeric keys.
/N1	Adds numeric keys to the standard keyboard.
/N0	Does not add numeric keys to the standard keyboard. (Initial condition default.)
/L1	Activates the Caps Lock key.
/L0	Deactivates the Caps Lock key. (Initial condition default.)
/Px,y	Specifies the coordinates of the top left corner of the SIPanel. "x" should be between 0 and 479 of the X-axis coordinate, and "y" should be between 0 and 239 of the Y-axis coordinate. "x" and "y" should be separated by comma (","). The default values are x=0 and y=0.
/Sw,h	Specifies the width and height of SIPanel to be displayed. "w", the width, should be between 1 and 480, and "h", the height, should be between 1 and 240. "w" and "h" should be separated by a comma (","). The default values are w=320 and h=120.

Note:
If values that are to small are specified, tapping the panel has no effect and, consequently, a key input is not possible. Unless otherwise specified, the parameters will retain their previous values.

If SIPanel is initiated without a parameter being specified, the following condition is employed for the defaults:

```
sipanel.exe /T0 /D0 /N0 /L0 /P0, 0 /S288, 100
```

5. I/O Bootup Library

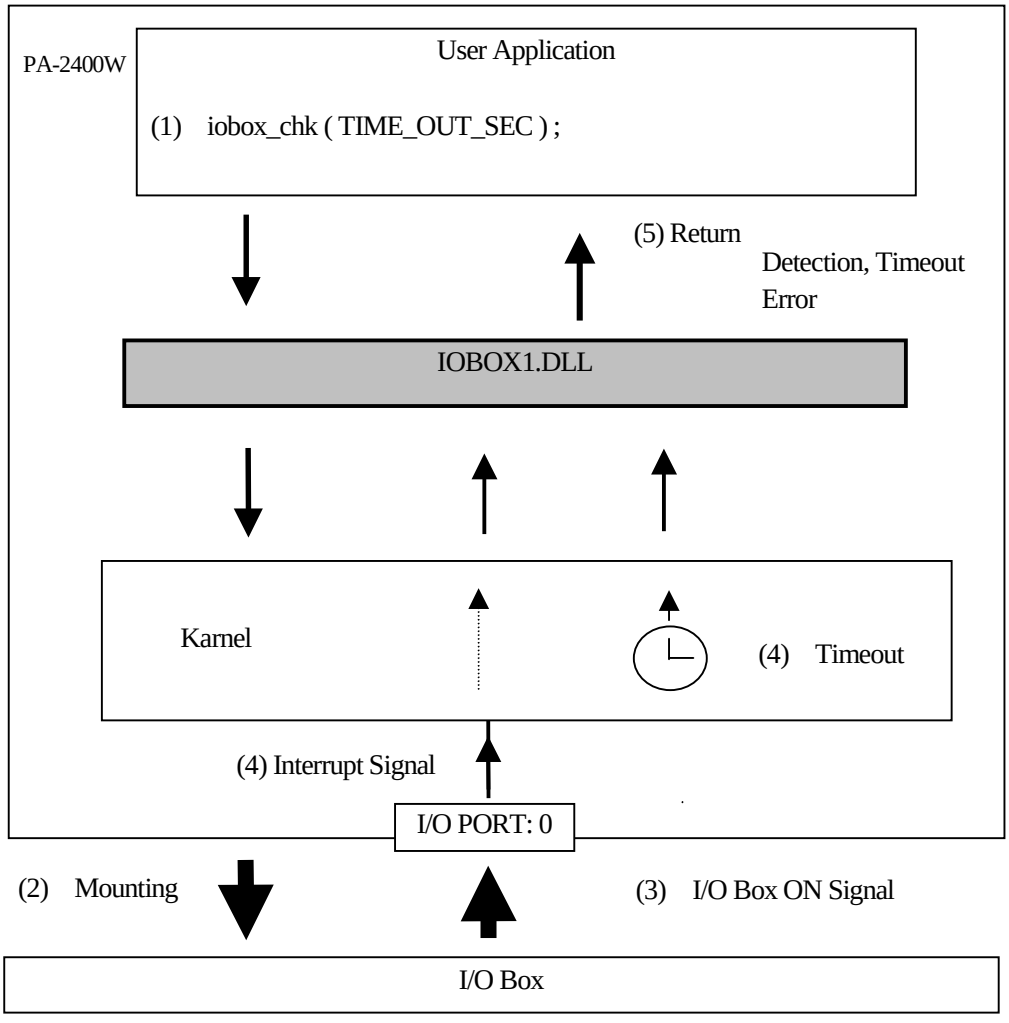
5.1 Overview

The I/O bootup library monitors the connection status of dedicated I/O Box and notifies user of the status.

5.2 Function

This library supports only one function, **iobox_chk()**. The **iobox_chk()** function monitors and detects, for a specified period, whether PA-2400W is mounted on I/O Box, and returns the result (mounting detected, timeout error, or error). Each time this function is used, it is necessary to also execute "Permit interrupt, Wait for interrupt and time-out, and Prohibit interrupt". The following diagram shows the range covered by this library.

Fig. 5.1



Because the interrupt signals are detected by their signal levels, they can be detected even if the order of (1) and (2) is changed. (The connection status can be detected whether this function is called before or after the PA-2400W is mounted on I/O Box is mounted, unless a timeout occurs.)

5.3 Details of Function

Title		Function	iobox_chk

This function monitors the connection and mounting status of PA-2400W terminal on I/O Box for a specified period of time and returns a result of it. When the power of I/O Box is turned off, the status is considered as improper connection of PA-2400W with I/O Box.
It returns also an error if other program uses this function at the same time. If the power switch of I/O Box is turned off during wait specified period, the monitoring can be continued from the state before the power is off.

≪C Language Interface≫

【Calling Sequence】

```
int    iobox_chk ( DWORD time_out );
```

【Parameters】

DWORD time_out : Maximum time to monitor the session (0 to 4,294,967,295 msec.)
INFINITE = No timeout
(4,294,967,295 msec. equals to INFINITE.)

【Return Values】

0	: Session establishment detected
1	: Timeout
-1	: Used exclusively by other program
Others	: Fail to call the function.

【Header】

```
#include <IoBox1. H>
```

≪Remarks≫

5.4 Use of iobox_chk

Internally, this function creates an event object of I/O Box and waits for the object for a specified time. During the wait time, it is possible to dispatch another task. Therefore, there are two ways of usage as stated below.

Sequential Mode

This mode is to call the function and check if the PA-2400W is connected to I/O Box. After a confirmation on the session establishment, the process continue to a next job.

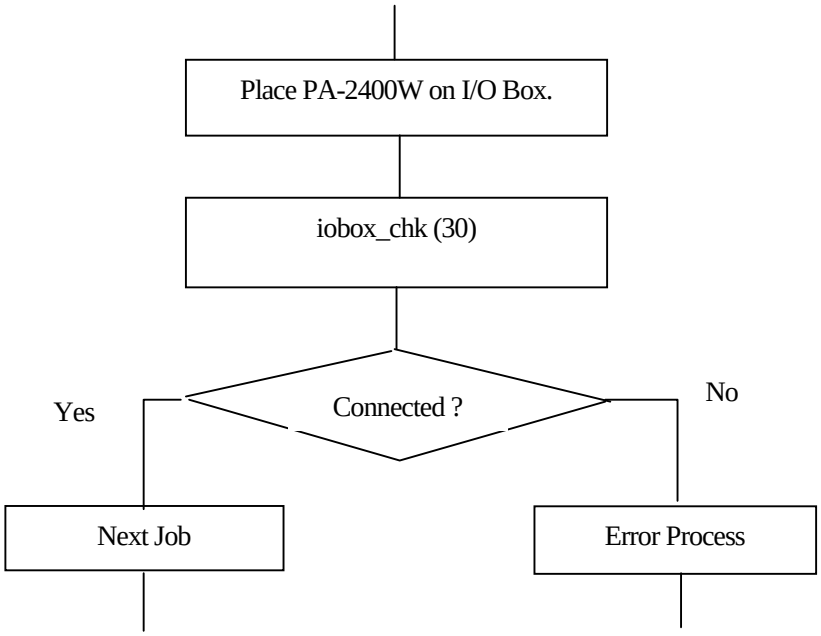


Fig. 5.2

Multiple-Thread Mode

Main program creates a thread (CreateThread( )) for session with I/O Box and calls the function within this thread to wait for the establishment of session with the I/O Box. While the main program waits in the loop, it makes necessary processes of each message.

After the created thread confirms the session, the sub-thread throws a message to the main program which makes the main program confirms the session. Refer to Chapter 5.5 “Sample Program” on page 38 for a sample program to use the function in “Multiple-Thread Mode”.

5.5 Sample Program

This sample program is created with the method of “Multiple-Thread Mode” under development environment of Visual C++ 5.0 plus and Windows CE SDK/DDK.
It introduces the **IOBOX1.C** program and its reference sources, and shows a list of environment variables.

```
// windows ce iobox sample file

#include <windows.h>
#include <commctrl.h>
#include "iobox1.h"

VOID ioProc( void);

TCHAR szAppName[ ] = TEXT("Hello Windows CE");
TCHAR szTitle[ ]   = TEXT("PA-2400 I/O BOX TEST");


LRESULT CALLBACK WndProc(HWND, UINT, WPARAM, LPARAM);

HINSTANCE    hInst = NULL;
HWND         hWndCB = NULL;

HANDLE hWnd;
HANDLE h;

const int WINDOW_WIDTH = 480;
const int WINDOW_HEIGHT = 214;

int WINAPI WinMain(HINSTANCE hInstance, HINSTANCE hPrevInstance, LPWSTR
                                                        lpCmdLine, int nCmdShow )
{
//    HWND          hWnd;
      MSG           msg;
      WNDCLASS      wc;

      wc.style          = 0L;
      wc.lpfnWndProc    = (WNDPROC) WndProc;
      wc.cbClsExtra     = 0;
      wc.cbWndExtra     = 0;
      wc.hInstance      = hInstance;
      wc.hIcon          = NULL;
      wc.hCursor        = NULL;
      wc.hbrBackground  = (HBRUSH) GetStockObject(WHITE_BRUSH);
      wc.lpszMenuName   = NULL;
      wc.lpszClassName  = szAppName;

      RegisterClass(&wc);
```

```
    InitCommonControls();      // Initialize common controls - command bar
    hInst = hInstance;         // Save handle to create command bar

    hWnd = CreateWindow(szAppName,                  // Class
                        szTitle,                    // Title
                        WS_OVERLAPPED,              // Style
                        100,                        // x-position
                        50,                         // y-position
                        WINDOW_WIDTH/2,             // x-size
                        WINDOW_HEIGHT/2,            // y-size
                        NULL,                       // Parent handle
                        NULL,                       // Menu handle
                        hInstance,                  // Instance handle
                        NULL);                      // Creation

    ShowWindow(hWnd, SW_SHOW);
    UpdateWindow(hWnd);

    while ( GetMessage(&msg, NULL, 0, 0))
    {
        TranslateMessage(&msg);
        DispatchMessage(&msg);
    }

    return(msg.wParam);
}

LRESULT CALLBACK WndProc(HWND hWnd, UINT message, WPARAM uParam,
                                                    LPARAM lParam )
{
    HDC             hdc;
    PAINTSTRUCT     ps;
    RECT            rect;

    DWORD           ThreadID;

    switch (message)
    {
    case WM_CREATE:
        sndPlaySound(TEXT("OpenProg"), SND_NODEFAULT | SND_ASYNC);

        hWndCB = CommandBar_Create(hInst, hWnd, 1);
        CommandBar_AddAdornments( hWndCB, 0L, 0L);
        return 0;
```

```
    case WM_PAINT:
        hdc = BeginPaint(hWnd, &ps);
        GetClientRect(hWnd, &rect);
        rect.top += CommandBar_Height(hWndCB);
        DrawText(hdc, TEXT("Hello Windows CE!"), -1, &rect,
        DT_SINGLELINE | DT_CENTER | DT_VCENTER);
        EndPaint(hWnd, &ps);
        return 0;

    case WM_LBUTTONDOWN:
        h = CreateThread(NULL, 0, ( LPTHREAD_START_ROUTINE)ioProc, NULL, 0,
            ( LPDWORD)&ThreadID); return 0;

    case WM_USER:
        switch( ( int)uParam) {
        case 0:
            MessageBox( hWnd, TEXT( "Connected!") , TEXT( "MessageBox"), MB_OK);
            break;
        case 1:
            MessageBox( hWnd, TEXT( "Time Out!")    , TEXT( "MessageBox"),
            MB_OK); break;
        case -1:
            MessageBox( hWnd, TEXT( "Other program is using!") ,
            TEXT( "MessageBox"), MB_OK); break;
        default:
            MessageBox( hWnd, TEXT( "Function call Failed!") , TEXT( "MessageBox"),
            MB_OK); break;
        }
//          TerminateThread( h,0);          // Close because thread is no longer required.
//          ExitThread( 0L);
            CloseHandle( h);
            return 0;

        case WM_CLOSE:
            sndPlaySound(TEXT("Close"), SND_NODEFAULT | SND_ASYNC);
            DestroyWindow(hWnd);
            return 0;

        case WM_DESTROY:
            PostQuitMessage(0);
            return 0;
```

```
        default:
            return (DefWindowProc(hWnd, message, uParam, lParam));
        }
        return (0);
}

VOID ioProc()
{
            int ret;

//          ret=iobox_chk( INFINITE);                   // Wait for infinite
            ret=iobox_chk( 5*1000);                     // Wait for 5 seconds

            PostMessage( hWnd, WM_USER, ret, 0L);
}

// End of Hello Windows CE program.
```

6. Registry of Libraries

In this chapter, registries which are used by the libraries of System and SIPanel are described. The I/O Startup Library does not use any registry.

6.1 System Library

The System Library uses the following registries. The values of each registry are automatically updated by dedicated API functions. User is required not to edit the values.

- Localmachine\HARDWARE\DEVICEMAP\AlarmWakeUp
  Set up "enable" or "disable" of the power ON by alram.
  Table 6.1

Key name	Form	Value	Description
Satus	DWORD	0	Disable the power ON by alarm.
		1	Enable the power ON by alarm. (default)

- LocalMachine\HARDWARE\DEVICEMAP\powerONEvent
  Set up "enable" or "disable" of the power ON event notification".
  Table 6.2

Key name	Form	Value	Description
Status	DWORD	0	Disable the power ON event notification.
		1	Enable the power ON event notification.

6.2 SIPanel Library

The SIPanel Library uses the following registries. User is required to edit the values of each registry.

- LocalMachine\Software\Apps\SIPmanager
  Specify a program to start up the SIPanel when the SIP button is pushed by operator.

Table 6.3

Key name	Form	Value	Description
SIPExeName	SZ	(file name)	Specify a file name of program which is started up when the SIP button is pushed. Default is "SIPanel.exe".
SIPQuitOpt	SZ	(character string of option)	Specify a character string of quit option which is attached to the program specified by "SIPExeName". Default is "/Q".
SIPNormOpt	SZ	(character string of option)	Specify startup option of the program specified by "SIPExeName". Default is not available.

Note:
If you wish to disable the SIP button, delete "SipExeName". If you create your own startup program for the SIPanel using this library, do not forget to delete or change "SIPExeName". Refer to Chapter 4.2 "Use of SIPanel Library".

7. File Transfer Utility

7.1 Overview

This file utility performs file transfer either between a host PC and PA-2400W or between two PA-2400W terminals. The dedicated upload/download utility (LMWIN) must run on the host PC.
As a result, functions that can be implemented by this utility depend on the upload/download utility dedicated for the host PC, as well as the file transfer protocol used between two FLCEs.
For this operation the following I/O interfaces of PA-2400W can be used:
(For more information about the hardware configuration of the I/O Box system, refer to the PA-2400W Hardware Manual.)

RS-232C Interface

- Interface (COM1 port) via the 16-pin cable (using the communication cable supplied with PA-2400W)
- Direct interface to the host PC

IrDA 1.0 Interface

- Interface (IrDA port) to the host PC via the Master or Satellite I/O Box
- Interface between two PA-2400W terminals

7.2 List of Supported Commands

Among file transmission protocol, this file transfer utility (FLCE) can support the following specific commands.

Table 7.1 List of supported commands

No.	Command	Supported	
		Specify on FLCE's command line	Request by comm. partner
1	File transmission	○	○
2	File reception	○	○
3	File append	○	○
4	File/directory delete	○	○
5	File mode/update	○	○
6	Directory creation	--	○
7	Time setup	○	○
8	Time request	--	○
9	Message display	--	○
10	Buzzer ON	--	○
11	File information acquisition	--	○
12	File information setup	--	○
13	Disk information acquisition	--	○
14	Acquisition of session ID and system information (see note 1)	--	○
15	IDLE notification (see note 1)	--	○
16	Order of termination (see note 1)	--	○

Notes:

1. Functions 14, 15 and 16 are used internally by the protocol. You do not need to specify these commands on the command line.
2. All files are transferred in binary mode with date/time of file creation and attribute.
3. If file transmission fails, a part of the file at reception side is disregarded and none of data in the file will be saved.

7.3 Use of FLCE

The FLCE is an execution program, and there are two methods for the use.

- FLCE individually
- FLCE as child-process in user application

In the individual use mode, it can be started up by a shortcut in which necessary parameters are set as argument. Or in case it is started up in IDLE startup mode, FLCE.EXE icon can be accessed for direct access. In user application, the FLCE can be started up as child-process with argument for file transmission and etc. After completion of the transmission, termination code can be acquired as a return value of the process.

Before transmission via COM1 port, there is operation you must follow. If you do not follow the operation, PC LINNK automatically starts up as RS-232C cable is connected, which will cause the transmission to fail. The operation continues to be active until the setup is changed or cold-bootup takes place.

Operation

1. Select “Set up” in the start menu.
2. Tap “Communication” to open.
3. Select “Connection with PC”.
4. Deselect “Connect with PC if communication is possible”
5. Tap the OK button.

If you wish to have a communication by using with H/PC Explore and PC LINK, select the menu stated in operation step 4 above.

Input Parameter

Command line argument	: communication command, communication option, transmission pathname, I/O interface to be used, baud rate, mode
Registry	: Set up registry only if the following default values must be changed. I/O interface to be used (RS-232C, IrDA), baud rate, drive letter (refer to Chapter7.9 “Setting Up Registry”.)

Output Parameter

Return value of Winmain	: termination code (refer to Chapter 7.10 “Termination Codes”.)

7.4 Termination of FLCE

This FLCE utility will terminate if;

- All specified commands are implemented normally, or notification of normal end is received from partner station.
- Specified command results abnormal state, or notification of abnormal end is received from partner station.
- Timeout for session establishment is 1 minute. If the session cannot be established within the period, timeout will cause an error. “INFINITE” of timeout (= no timeout) can be set for continuous session.
- The cancel button in the status window which appears after the FLCE startup is tapped.

7.5 Restrictions

The file transfer utility (FLCE) is subject to the following restrictions:

- The FLCE does not support communication with a 3-pin interface or PCMCIA card.
- The COM1 port and IrDA port cannot be used concurrently because they must use the same hardware. Before initiating the FLCE, terminate the other program that is using the COM1 or IrDA port.
- As the return value from the FLCE the termination codes which request formatting of a drive or resetting of the machine are defined. However, Windows CE Ver 2.11 does not support this function. If this function is required, incorporate it into the user application.

7.6 Communication Commands

Operational specifications for the FLCE should be made by initiating an appropriate command together with the following arguments. A maximum of twenty commands can be described at one time, and they will be processed sequentially in the order in which they are described. If a command encounters an error, communication is immediately terminated from the error and subsequent commands will no longer be processed. When the communication environment setup command is not specified, the default value is used.

Table 7.2 Types of Arguments

Type	Function	Command	Applicable Option	Example of Input
Setup command	Communication environment setup	/Y={device, baud rate, mode}	None	/Y={COM1, 115200, }
Operation command	File transmission	/ S	O, R	/ SOR
	File reception	/ R	O, R	/ ROR
	File transmission (append)	/ A	None	/ A
	File deletion	/ D	O, R	/ D
	File move	/ N	None	/ N
	Time transmission	/ T	None	/ T
	Idle startup	None	Script file name	

Options

O (Overwrite) :
Specification of forced overwrite of a read-only file
If this option is specified, even a read-only file will be overwritten.
If an overwrite of read-only file is attempted and this option is not specified, this command will be abnormally terminated. The attribute of source file will be duplicated onto a target file which has been overwritten.

R (Recursive call):
All files that exist under a specified directory are used as the objective of processing. If the specified directory has any sub-directories, the files in these sub-directories are also included as the objective of processing. The hierarchical directory system has a maximum depth of sixteen levels. If this option is not specified, only a file that is designated by its pathname will be the objective of processing.

7.7 Method of Describing Pathname

- Enclose every pathname in a pair of parentheses. A pathname must have a length of 255 characters or less including the two parentheses. A 2-byte code character is counted as one character.
  Example: FLCE /S "\asio data*.dat" "d:\data\"
- Pathnames must be described in accordance with the path naming rules supported by OS of the machine on which the specified path is to be placed.
- Observe the following rules on drive letters when describing pathnames:
  1. Describe a pathname on the PA-2400W so it begins with root directory, without including a drive letter. (This rule should also be applied when the pathname of file or directory on the PA-2400W is specified from the upload/down utility (LMWIN) for host PC.)
  2. If a pathname with a drive letter is specified from the communication partner, the drive letter will be ignored by the FLCE on host PC. (In other words, this pathname specification is treated as being equal to a specification that begins with root directory without a drive letter.)
  3. If the communication partner (PC, etc.) runs under an OS that requires drive letter specification, and if the PA-2400W needs to describe the pathname of file or directory on the partner side, always attach an appropriate drive letter.

However, as an exception to 2. above, if the communication partner side designates a device on the Windows CE machine for retrieving the format or other disk information, define a drive letter as follows. These setups can be modified as required by making the appropriate description in the registry.

Default setting : Internal RAM → C: (Define the boot drive as C: to meet with specifications of PC/AT machine.)
PC card → D:

Table 7.3 Summary of drive letter handling

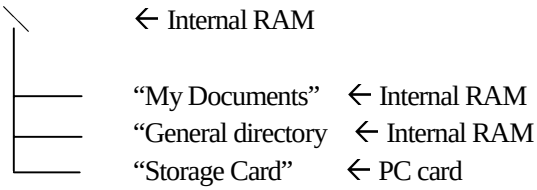
	Pathname specification on Windows CE	Pathname specification on other machines
Specify file or directory	Not required (ignored if described)	Depends on the OS.
Specify device	Follows the above mentioned rules.	Depends on the OS.

Drive letters D and E are used for external storage devices if concurrent use of multiple PC cards (compact flash card, ATA flash card) is allowed..

Note:
Identification between multiple PC cards depends on the Windows CE's specifications. Directory names of multiple PC cards are determined according to the order in which they were inserted into each slot, for example, "\Storage Card" and "\Storage Card2", thus no differentiation is made between these two cards in terms of device type. This is why neither of the cards can be assigned a fixed drive letter.

Reference:
Windows CE has no concept of a drive letter. Accordingly, an additional drive is assigned a directory directly under the root directory.

Example



7.8 Conditions at Communication Partner

7.8.1 Rules of Naming File and Directory Pathname

Specify the pathname of file or directory at the communication partner according to the naming rules of communication partner-side OS.

Table 7.4

Communication partner	8.3 format	Long file name	Drive letter
Windows95 /Windows NT	○	○	Required (Error if omitted)
DOS	○	X	Required (Error if omitted)
Windows CE	○	○	Not required (Ignored if specified)

○ : Specification permitted

X : Results in invalid pathname and termination from error if specified.

7.8.2 Specifying Non-existing File

If the pathname of file or directory which does not exist at the communication partner side, the following processing is performed;

Table 7.5

Communication partner	Reception	Delete	Move	Transmission, Transmission (append)
Windows 95/Windows NT				
DOS	A	C	B	D
Windows CE	A	C	B	D

Meaning of the alphabets:

A: Abnormally terminated if any of the multiple pathnames specified does not exist (even a file that actually exists will not be transferred).

B: Abnormally terminated if the specified pathname does not exist (transfer is not achieved).

C: If the specified pathname includes a pathname that does not exist, that pathname will be ignored (existing pathnames will be processed).

D: A new file will be created.

7.9 Setting Up Registry

By rewriting values in the registry it is possible to modify the default values of commands' parameters for communication environment, etc. However, use the command line argument (/Y) to specify the communication line or baud rate during normal use. Use this registry setup only if the default values require modification.
In other cases, where the drive letter definition requires modification, create the key (item) of a drive letter and describe on the key the pathname of a device which will be defined according to the specification.
If the registry has been set up, it will be remained valid until it is modified again or the system is cold-booted up. For a key (item) that is not set in the registry or a key (item) that has an incorrect setup the original default value will be used.

7.9.1 Setting Up Items

- Default value if the RS-232C baud rate registry has no setup :
  19,200 bps
- Default value if the IrDA baud rate registry has no setup :
  115.2 Kbps
- Default value if the communication line specification (232C= COM1 or IrDA) registry has no setup:
  IrDA
- Default value if the drive letter definition registry has no setup value:
  C → \(Object Store of internal RAM)
  D → \Storage Card\ (storage card)
- Default value if the command-to-response interval timeout registry has no setup :
  30 seconds
- Registry position
  \HKEY_CURRENT_USER\FLCE\
- Contents

Key name	Type	Value
BAUD	DWORD	Baud rate
DEVNM	STRING	Communication line (I/O device)
DRIVE\A	STRING	Path of a device defined as drive a:
DRIVE\B	STRING	Path of a device defined as drive b:
DRIVE\C	STRING	Path of a device defined as drive c:
:		:
DRIVE\Z	STRING	Path of a device defined as drive z:

- Values for communication line and baud rate setups
  Communication line : COM1, IrDA
  Baud rate : For RS-232C; 9600, 14400, 19200, 38400, 57600, 115200
  : For IrDA; Setting of baud rate cannot be allowed.
  Only the above permitted baud rates can be set. Setting with other baud rate can cause the default value to be set.

- Path to device
  A path to a device should be specified by the directory name to which the device is assigned.
  Example: Object Store of the internal RAM → \
  PC card or compact flash → \Storage Card\

7.9.2 Setting Up Registry with User Application

Modify the registry as required from your application while referencing the following sample program.

```
/************************************************/
/*  Registry Registration Program                */
/************************************************/

#include <windows.h>
#include <string.h>
#include <commctrl.h>

int WINAPI WinMain(HINSTANCE hInstance, HINSTANCE hPrevInstance,
                   LPWSTR lpCmdLine, int nCmdShow )
{
    HKEY hKey1;                                          // Open Handle
    LONG lReg1;                                          // Result code
    DWORD Disp1;                                         // Create or Open disposition
    int     err;

      const wchar_t SubKey1[]  = TEXT( "FLCE");   // Key for FLCE
    const   wchar_t Name[]     = TEXT( "RECVWAIT");
                                 // Name for the command-to-response interval timeout
    const   DWORD Value        = 1800L;
                                                   // Time-out value to be set (seconds)
    err=TRUE;

    // Open the registry key
    lReg1=RegCreateKeyEx( HKEY_CURRENT_USER, SubKey1, 0, NULL, 0, 0, 0,
                                                   &hKey1, &Disp1);

    if( lReg1 == ERROR_SUCCESS) {
        // Set the value.
        lReg1=RegSetValueEx( hKey1, Name, 0, REG_DWORD, ( const BYTE
                             *)&Value, sizeof( Value)); if( lReg1 != ERROR_SUCCESS)
            err=FALSE;
      // Close the registry key.
        lReg1=RegCloseKey( hKey1);
        if( lReg1 != ERROR_SUCCESS)
```

```
                    err=FALSE;
        }
        else {
                err=FALSE;
        }

        if( err==TRUE)
                MessageBox( NULL, TEXT( "Success setting registry!") , TEXT( "This is MessageBox"),
                                                                        MB_OK);
        else
                MessageBox( NULL, TEXT( "Fail setting registry!") , TEXT( "This is MessageBox"),
                                                                        MB_OK);

    return( err);
}
```

7.10 Termination Codes

The FLCE returns one of the codes listed in Table 7.6 as the termination code when communication is complete. Upper-level programs should perform an appropriate action to reference these values.
The communication function may return a code other than that described in the termination codes list. Such a code is received from the communication partner and specific (i.e. outside the standard protocol) to the software used on the communication partner side.
For information about these codes refer to the Upload/Download Manual of PA-2400W.

- Passing of termination code
  A termination code will be returned as a return value from Winmain. Upper-level programs should reference this return value using the "GetExitCodeProcess()" function.

- List of termination codes
  A category code (upper byte) indicates the error category, and an error detail code (lower byte) indicates the detail of the error. Category codes are defined as follows:

00h	Normal termination
DCh to F8h	Normal termination and notification of termination. Upper-level programs should take an action that is appropriate to each definition.
01h	Protocol error
02h	File-related error
0Fh	Argument-related error
A0h	Communication line-related error

Table 7.6 List of termination codes

Error Code		Meaning	Possible Cause	Remedy
Category code	Detail code			
00h	00h	Normally terminated	Normal.	-
DCh to F5h	00h	Normally terminated	Formatting of drive a:between 'A' and 'Z' is specified from the partner station. (For drive letter definitions, refer to Chapter 7.7 “Method of Describing Pathname”.)	Refer to Chapter 7.5 “Restrictions”.
F6h	00h	Normally terminated	Power-off is specified from the partner station.	Turn off the power.
F7h	00h	Normally terminated.	Resetting the power is specified from the partner station.	Refer to Chapter 7.5 “Restrictions”.
F8h	00h	Terminated due to interruption.	Communication is terminated because the break key is pressed on the PA-2400W (local station) or partner station.	Resume communication as required.
01h	00h	Protocol error	Data anomaly (data error occurred on the communication line).	Check the communication line connection.
02h	80h	File not found	Non-existent file is specified.	Check the specified file or directory.
02h	81h	Current directory delete error	An attempt has been made to delete the current directory.	Check the objective directory of deletion.
02h	82h	File write error	Write to the file is not possible.	Check if the file is ready to be written.
02h	83h	File read error	Read from the file is not possible.	Check if the file is ready to be read from.
02h	84h	Read only access error	An attempt has been made to overwrite or delete the read-only file.	Specify another file name or cancel the read-only attribute.
0Fh	01h	Argument parameter error	Incorrect argument description	Check the argument parameter.
0Fh	02h	Argument too long	Argument portion of the command line is too long	Reduce the length of the argument including FLCE to 255 characters or less.
A0h	10h	Communication port open error	One of the other programs is using COM1 or IrDA,or FLCE is already initiated.	Terminate the program that is using COM1 or IrDA.
A0h	20h	Line break error or IrDA duplicate open error	Either the cable was unplugged during communication or the IrDA connection is broken (where the PA-2400W is dismounted from I/O Box).	Check the cable connection and mounting condition of the PA-2400W on I/O Box.
			IrDA port is already open.	Terminate the other program that is using IrDA.
A0h	30h	Session-wait timeout error	Session was not established within 1 minute of startup.	Check the cable connection or check if the IrDA is ready for communication.

7.11 Log File

The FLCE will create a log file to record communication logs.

Log File Name

The current log file name is fixed to "FLCE.LOG".
This specification cannot be modified. Therefore, if the current log file needs to be stored, use another file name.

Location of Log File

A log file is created under the "\Windows\" directory.

Method of Creation

- Even if a log file already exists, a new log file is created (i.e. overwrites the old one).
- Append to the existing log file is not attempted.
- If a new file cannot be created, log file creation is aborted.
- If an argument of command parameter includes error, a log file will not be created.
- A log file starts to be created at the point in time when communication with the partner begins.

Format

1st line	Version information of FLCE.EXE will be outputted.
2nd line	Version information (1 byte) of the protocol will be outputted. The first version is "1".
3rd line	Communication partner machine code (maximum 3 bytes) will be outputted. AT .... IBM-PC compatible machine
4th line	Session ID information will be outputted. This will be outputted in a hexadecimal number (Example: 0x0000).
5th line	Last event information will be outputted.
6th line	Last phase information will be outputted.
7th line	Last status information will be outputted. Outputted as a hexadecimal number (Example: 0x0000).
8th line	Last transmission file name will be outputted.
9th line	Last reception file name will be outputted. Output will consist of the above eight lines

Output will consist of the above nine lines.

- Since with lines 2 through 4 the information acquired from the communication partner is outputted, this line will be outputted as a blank line for a log file on one of the PA-2400Ws that operates in the PC emulation mode for communication between two PA-2400Ws.
- One line must be less than 80 bytes in length. Therefore, if a file name inserted in the 8th or 9th line requires 65 bytes or more (15 bytes are used for the item name), characters on and after the 65th byte will not be outputted.

7.12 Precautions

- Under the state where the file transfer utility is operating, if a file is transmitted out or received in a folder that is opened by the Explorer, the transfer speed is reduced considerably.
  To avoid this close the folder that was opened by the Explorer and that contains the file to be transmitted before initiating the file transfer utility. Otherwise create a folder, other than the one opened by the Explorer, for file reception.
- If attempting PA-2400W-to-PA-2400W communication always use the CASIO AC adaptor to power.

7.13 Details of Command and Option

Title		Command	FLCE /Y

This command sets up the device, baud rate, and communication mode used for communication.

- If this command is omitted, the default value {IrDA, , } is used.
- Any of the parameters can be omitted. If this is done, the default values for each parameter will be used.
- Always insert this command directly after the word “FLCE”. Placing it in another place will result in a parameter error.

≪C Language Interface≫

【Calling Sequence】

FLCE /Y={ [<device>], [<baud rate>], [<mode>] }

(Comma must be written and no space allowed. Parameters in [ ] can be omitted.)

【Parameters】

Device ・ Select either "IrDA" or "COM1".

Baud rate ・ If "IrDA" is selected – the baud rate setting can not be allowed.

・ If "COM1" is selected - The following baud rates can be selected for RS-232C communication.
9600, 19200, 38400, 57600, 115200
Combinations other than those described above are not permitted and will cause a parameter error.

Mode ・ **"H"** - PA-2400W-to-PA-2400W command specification mode (Session-wait timeout is 1 minute.)
This option is used by one side which specifies the operation command when performing communication between two PA-2400Ws.
(The FLCE on the communication partner should operate in the idle start mode.)

・ **"I"** - Normal mode (Session-wait timeout is infinite.)

・ Only **"H"** or **"I"** can be specified.

・ If mode specification is omitted, the normal mode with the session-wait timeout set to 1 minute is automatically specified.

Table 7.7

Startup	Communication Partner	Session Wait Timeout	
		1 minute	Infinite
Idle (including script)	PC (I/O Box)/PA-2400W	No mode specification	Mode Specification, “I”
Designation of Operation command	PC (I/O Box)		
	PA-2400W	Mode specification, “H”	-

【Startup Examples】

- **FLCE /Y={COM1, 115200, } /S "\casio*.dat" "d:\casiodat\"**
  Communication is performed using the RS-232C port at a baud rate of 115.2 Kbps. (Session-wait timeout is 1 minute.)
- **FLCE /Y={, , I} /S "\casio*.dat" "d:\casiodat\"**
  Communication is performed through command specification with the device name and the baud rate are default-set. (Session-wait timeout is infinite.)
- **FLCE /Y={, , H} /S "\casio*.dat" "d:\casiodat\"**
  Communication is performed between two PA-2400Ws through command specification with the device name and the baud rate are default-set. (Session-wait timeout is 1 minute.)
- **FLCE /Y={, , I}**
  Communication is performed in the idle mode with the device name and the baud rate are default-set. (Session-wait timeout is 1 minute.)
- **FLCE /Y={, , } /S "\casio*.dat" "d:\casiodat\"**
  Communication is performed under the same conditions (with default values) of which "/Y" is omitted.

Title		Command	FLCE /S

This command transfers a file on the PA-2400W to the communication partner side of PA-2400W.

- If an identical file name exists in the destination directory of the partner side, it will be overwritten.
- If the directory that is specified as the destination directory does not exist, it will be automatically created.
- The progress of file transfer will be displayed.
- File pathnames will be processed in order from the left of the command line. If any of the file pathnames to be transmitted do not exist on the PA-2400W side, the FLCE is immediately terminated by an error, and file pathnames placed at the right of that pathname will no longer be transmitted.

≪C Language Interface≫

【Calling Sequence】

FLCE /S[<Option>] <Transmission file pathname> [<Transmission file pathname>] [...]
<Pathname of destination directory>

(Parameters in [ ] can be omitted.)

【Parameters】

Option

O: Specification of forced overwrite of read-only file

- If this option is specified, even read-only file will be overwritten.
- If an overwrite is attempted for read-only file and this option is not specified, this command will be abnormally terminated

R: Recursive call

- All the files that exist under the directory specified by the transmission file pathname are used as the objective of file transfer.
- If the specified directory has any sub-directories, they will be also included in the destination directories for the file transmission.
- The hierarchical directory system has a maximum depth of sixteen levels.
- Even if this option is specified, the transmission file pathname should be specified by the full pathname.
- If this option is not specified, only a file that is designated by the transmission file pathname can be the objective of processing.

Transmission file pathname

- Specify a file that exists on the PA-2400W side by its full pathname.
- To specify all files enter "*.*" as file name.
- A wild card can be used for file name.
- Directory names or file names can be described using 2-byte code characters

Destination directory pathname

- As the last input parameter of this command describe the destination directory name of the communication partner side. If the specified directory does not exist, it will be automatically created by specified name.
- Enter a "\" as the delimiter of directory name. If not, it will result a parameter error.
- A wild card can be used for the file name.
- Directory names can be described using 2-byte code characters.
- Name the destination side directory pathname in accordance with the naming rules of the communication partner-side OS.

  Example: “d:\” Root directory specification
  “d:\casio\12\” Sub-directory specification
  “d:\casio” Incorrect specification.

【Startup Examples】

- **FLCE /S "\casio*.dat" "d:\casiodat\"**
  This transfers file that is located in the "casio" directory of the PA-2400W which has a "dat" extension to the "d:\casiodat\" directory of the communication partner side of PA-2400W.
- **FLCE /SR "\casio*.dat" "d:\casiodat\"**
  This transfers all files under the "casio" directory (including the sub-directories) of the PA-2400W which have a "dat" extension to the "d:\casiodat\" directory of the communication partner side.

Title		Command	FLCE /R

This command uses a pathname request to specify file that exists on the communication partner side, then receive the file.

- If an identical file name exists in the reception directory of the PA-2400W, it will be overwritten.
- If the directory that is specified as the reception directory does not exist, it will be automatically created.
- The progress of file transfer will be displayed.
- All other operations which must follow conditions at the communication partner, refer to Chapter 7.8 “Conditions at Communication Partner”.

≪C Language Interface≫

【Calling Sequence】

FLCE /R[<Option>] <Request file pathname> [<Request file pathname >] [...] <Reception directory pathname>

(Parameters in [ ] can be omitted.)

【Parameters】

Option **O: Specification of forced overwrite of a read-only file**

- If this option is specified, even read-only file will be overwritten.
- If an overwrite is attempted on read-only file and this option is not specified, this command will be abnormally terminated.

R: Recursive call

- All files that exist under the directory specified by the transmission file pathname are used as the objective of file transfer. If the specified directory has any sub-directories, they will also be included in the destination directories for file transmission.
- Even if this option is specified, the transmission file pathname should be specified by full pathname.

Pathname of requested file

- Specify an objective file of reception that exists on the communication partner side by its full pathname.
- To specify all files enter "*.*" as file name.
- A wild card can be used for file name.
- Directory names or file names can be described using 2-byte code characters.
- Specify a pathname of requested file according to the naming rules of the communication partner-side OS. Refer to Chapter 7.8 “Conditions at Communication Partner”.

Destination directory pathname

- As the last input parameter of this command describe the destination directory name of the communication partner side.
- If specified directory does not exist, it will be automatically created by the specified name.
- Enter a "\" as the delimiter of the directory name. If not, it will result a parameter error.
- Directory names can be described by using 2-byte code characters.

Example “\” Root directory specification
“\casio\12\” Sub-directory specification
“\casio” Incorrect specification

【Startup Examples】

- **FLCE /R "a:\12*.dat" "d:\casio*.*" "\casio data\"**
  This transfers all files under the "12" directory of drive A: of the communication partner side which have a "dat" extension and all files under the "casio" of drive D: to the "casio data" directory of the PA-2400W.
- **FLCE /RR "a:\12*.dat" "d:\casio*.*" "\casio data\"**
  This transfers all files under the "12" directory (including the sub-directories) of drive A: of the communication side which have a "dat" extension and all files under the "casio" directory (including the sub-directories) of drive D: to the "casio data" directory of the PA-2400W.

Title		Command	FLCE /A

This command transfers the contents of file that exists on the PA-2400W and specified by the append file pathname to the communication partner side of PA-2400W, and append the contents to file that exists on the communication partner side.

- If file specified by the target file pathname does not exist on the communication partner side, it will be automatically created.
- The date and time of the target file will be set to current system date and time of a machine where the target file is processed for the append operation.
- If the file transfer fails in mid-course, the target file restores the condition that existed before communication started.
- File data will be appended as binary data. (If the target file is terminated by EOF code, the data will be appended after the EOF code.)
- The progress of file transfer will be displayed.
- If a transmission file pathname that does not exist on the PA-2400W is specified, the FLCE is immediately terminated by error. If this occurs, even files that exist will not be transmitted.

≪C Language Interface≫

【Calling Sequence】

FLCE /A <Appended file pathname> <Target file pathname>

【Parameters】

Appended file pathname

- Specify an objective file of transmission that exists on the PA-2400W by its full pathname.
- A wild card cannot be used for the file name
- Directory names or file names can be described by using 2-byte code characters.

Target file pathname

- Specify file that is the target of append and that exists on the communication partner side by its full pathname. If the specified file does not exist, it will be automatically created by specified file name.
- A wild card cannot be used for file name.
- Directory names can be described by using 2-byte code characters.
- Create the target file pathname in accordance with the naming rules of the communication partner-side OS.

【Startup Example】

- **FLCE /A "\MY\casio.dat " "b:\your\master.dat"**

  This appends the contents of the "casio.dat" file to the "master.dat" file on the communication partner side.

Title		Command	FLCE /D

This command deletes a specified file or directory that exists on the communication partner side.

- For all other operations which must follow the conditions at the communication partner side, refer to Chapter 7.8 “Conditions at Communication Partner”.
- The progress of file transfer will not be displayed.

≪C Language Interface≫

【Calling Sequence】

FLCE /D[<Option>] <Deleted pathname> [<Deleted pathname>] [...]
(Parameters in [ ] can be omitted.)

【Parameters】

Option **O: Specification of forced overwrite of a read-only file**

- If this option is specified, even read-only file will be deleted.
- If a deletion is attempted for read-only file and this option is not specified, this command will be abnormally terminated.

R: Recursive call.

- All files that exist under the directory specified by deleted file pathname are used as the objective of file deletion.
- If specified directory has any sub-directory, it will also be included in the objective of deletion.
- The hierarchical directory system has a maximum depth of sixteen levels.
- If this option is specified, the deleted file pathname should be specified by full pathname.
- If this option is not specified, only file that is designated by the deleted file pathname can be the objective of deletion.

Pathname of file to be deleted

- Without the R option
  Specify an objective file of deletion that exists on the communication partner side by its full pathname.
  A wild card can be used for file name.
  To specify all files enter "*.*" as file name.
- With the R option
  Specify an objective file of deletion that exists on the communication partner side by its full Pathname. Enter a "\" as the delimiter of the directory name.
  Directory names or file names can be described by using 2-byte code characters.
  Specify pathname of requested file according to the naming rules of the communication partner side OS.

【Startup Examples】

- **FLCE /D** "a:\12*.dat" "b:\casio\970613.dat"
  This deletes files under "a:\12*.dat" and "b:\casio\970613.dat" of the communication partner side.

- **FLCE /DR** "a:\casio\"
  This deletes all files and directories under the "a:\casio\" directory of the communication partner side.

Title		Command	FLCE /N

This command moves a file that is specified by the move source pathname and that exists on the communication partner side to the move destination-side path.

- Specify a file name for the move destination-side pathname. The move source file will be saved by specified file name on the move destination side.
- For all operations which must follow the conditions at communication partner side, refer to Chapter 7.8 " Conditions at Communication Partner".
- The progress of file transfer will not be displayed.

≪C Language Interface≫

【Calling Sequence】

FLCE /N <Source pathname> <Destination pathname>

【Parameters】

Source pathname

- Specify a file that is the objective of the move and that exists on the communication partner side by its full pathname.
- A wild card cannot be used for file name.
- Directory names or file names can be described by using 2-byte code characters.
- Name the move source path in accordance with the naming rules of the communication partner-side OS.

Destination pathname

- Specify the destination path on the communication partner side by its full pathname.
- If the specified source file name differs from the destination file name, the source file name will be changed to the destination file name after transfer.
- If the directory that is specified by the destination pathname does not exist, it will be automatically created.
- A wild card cannot be used for file name.
- Directory names or file names can be described by using 2-byte code characters.
- Name the destination path in accordance with the naming rules of the communication partner-side OS.

【Startup Examples】

- **FLCE /N "a:\12\kk.dat" "a:\casio\"**
  This moves the "a:\12\kk.dat" file on the communication partner side to the "a:\casio\" directory.

- **FLCE /N "a:\12\kk.dat" "a:\casio\sj.dat"**
  This modifies the "a:\12\kk.dat" file on the communication partner side to the "a:\casio\sj.dat" file.

Title		Command	FLCE /T

This command transfers the system date and time of the PA-2400W to the communication partner side for setting.

- Transmitted date and time is a local time.
- Depending on the line condition, a few seconds of error may result.

≪C Language Interface≫

【Calling Sequence】

FLCE /T

【Parameters】

None

【Setup Example】

- **FLCE /SR "\casio ap*.*" "\casio ap\" /T**

  Transfers all files under the "casio ap" directory (including sub-directories) of the PA-2400W to the "\casio ap\" directory of the communication partner side for setting up.

Title		Command	FLCE (Idle Start)

This command passes the request right to the communication partner side and operates according to a command that is requested by the communication partner.

- If starting up the PA-2400W with this mode, only the /Y command can be specified.
  (If this is done, the normal mode instead of the idle start mode is entered. In other cases, if script file name is specified, a parameter error results and the function is terminated.)
- Do not designate "H" as mode parameter when specifying the "/Y" command.
  (If "H" is specified a parameter error results and the function is terminated.)
- This command will be normally terminated by the reception of termination command except termination due to error condition.
- If a script file name is specified, communication will be performed according to the contents of the script file that exists on the communication partner side.
- If a script file name that does not exist on the communication partner side is specified, an error code will be returned. However, in PA-2400W-to-PA-2400W communication mode, a script file will not be processed. Therefore, it will be ignored if specified.

≪C Language Interface≫

【Calling Sequence】

FLCE [/Y= { [Device], [Baud rate], [Mode] }] [Script file name]

【Parameters】

Script file name

Specify a script file name that exists on the communication partner side. Always enclose a script file name with quotation marks, “ “.

【Startup Examples】

Descriptions of parameters, such as those for file specification, are eliminated in these examples.
In addition, assume the local machine is PA-2400W.

Session with PC

- **FLCE**
  Communication partner: Upload/download utility at host PC (command specification mode)
- **FLCE "casio.scr"**
  Communication partner: Upload/download utility at host PC (server mode)
- **FLCE /Y={COM1, , } "casio.scr"**
  Communication partner: Connected via cable to the Upload/Download utility at host PC

Session between PA-2400W-and-PA-2400W

- **FLCE**
  Communication partner: FLCE /Y= { , ,H } /S
- **FLCE**
  Communication partner: FLCE /Y= { , ,H } /R

7.14 Command and Status

Table 7.8

No.	Commands of the protocol	Status		Remarks
		Specification by FLCE	Request by partner	
1	File transmission	C	C	
2	File reception	C	C	
3	File append	C	C	
4	File/directory delete	A	B	
5	File move/update	A	B	
6	Directory creation	-	B	
7	Time setup	A	A	
8	Time request	-	A	
9	Message display	-	D	
10	Buzzer ON	-	A	
11	Acquisition of file information	-	A	
12	Setup of file information	-	A	
13	Acquisition of disk information	-	A	
14	Acquisition of session ID/system information			These commands are for internal operations.
15	IDLE notification			
16	Termination command			

Meaning of the status

A : A command currently running or requested is displayed.

B : In addition to the displayed content in A above, file or directory that is being processed in the PA-2400W is displayed.

C : In addition to the displayed content in A above, the progress of file being transmitted is displayed.

D : Text message transmitted by the communication partner is displayed.

When the FLCE is called, status display window appears. In this display window, there is a status display which is described in Table 7.8 and the cancel button. The statuses A to D are displayed in the same status display window.

7.15 Retry Process When Downloading File

In this chapter, retry process for downloading files by the FLCE at time of a communication error is explained.

7.15.1 Overview

The retry process for file transmission can be implemented by the file transmission command with update option of the LMWIN. The update option enables file transmission only if a file to be transmitted by the PA-2400W is not existed at the communication partner side of PA-2400W. The verification of files can be done by verifying date/time of both the files. If the file to be transmitted has a newer date/time than that of the file at the communication partner side, or the same file is not existed in the communication partner side, the file transmission can be possible.
At a time of retry to transfer files by using the file transmission command with update option, files that are already transferred successfully can be skipped and only files that are not transferred can be transferred.

7.15.2 Retry Method

Preparation at PC

First, create script files for normal file transmission and retry file transmission (not using the script file for normal file transmission, the retry process can be possible by using normal file transmission mode with update option. However it takes a longer time.).
Example: Script file for normal file transmission

```
/S   "c:\la\hpcall\*.*"   "\"
/S   "c:\la\hpcall\card\*.*"   "\storage card\"
/S   "c:\la\hpcall\soft\*.*"   "\soft\"
```

For the script file of retry file transmission, append "U" to the /S option for the update option.
Example: Script file for retry file transmission

```
/SU   "c:\la\hpcall\*.*"   "\"
/SU   "c:\la\hpcall\card\*.*"   "\storage card\"
/SU   "c:\la\hpcall\soft\*.*"   "\soft\"
```

Using the LMWIN's script editor, the U option can be appended by checking the checkbox of "Update" in the Send menu.

Preparation at PA-2400W

The flow of retry operation is as follows. The operation is recommended only if such error as 0x0100 protocol error (data error on line) or 0xA020 line broken error occurs.

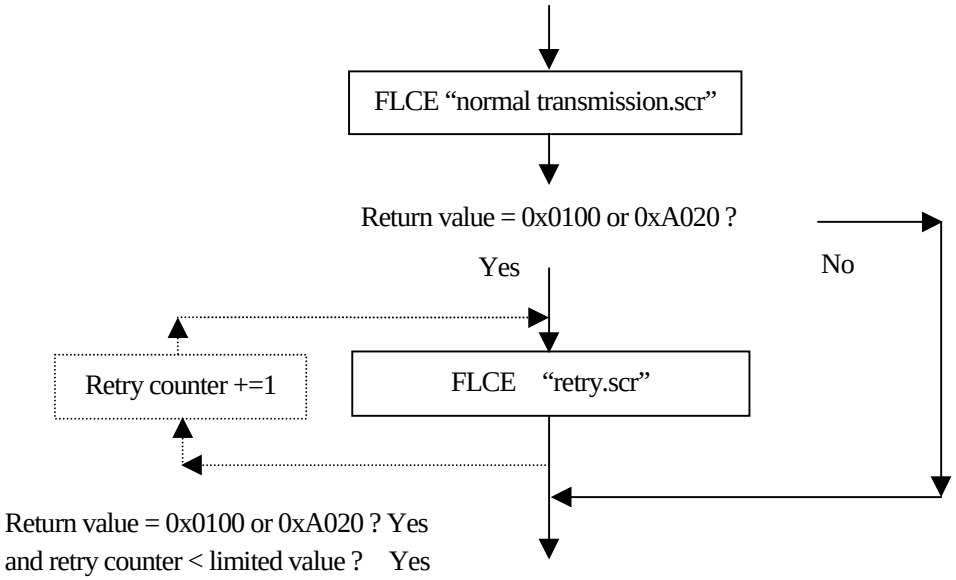


Fig. 7.1

According to the flow chart above, another retry after the initial retry operation can be possible. However, if there is fatal error exists, recovery routine of the error may run into a trap and never be able to escape from it. One time retry operation can recover from most of error states.

7.15.3 Restriction

When you download a file to the PA-2400W where the same file exists, set up newer date time/date into the file before downloading it. This will avoid unnecessary retry operation which is started up by the time/date verification function.

8. File Check Utility

8.1 Overview

The file check utility is used to check if an objective file has been successfully installed on the communication partner-side of PA-2400W. This utility has the capability to detect an installation error irrespective of file transfer method used.
The transfer method involves a file transferred either between a host PC and PA-2400W or between two PA-2400Ws. It also includes copy operations from the card. The term, "host PC", includes a personal computer (PC) and PA-2400W which emulate the operation of PC.

8.2 List of Commands

The file check utility includes the following commands.

Table 8.1 List of commands

Command	Description
List file generation	Generates a list file required for file checks (at file transmission side).
List file comparison	Compares list files (at file reception side).

Note:
Widows CE can check if the FCHKCE.EXE has been transferred to PA-2400W or not. However, if there is any broken part of the file in the header, the program may run without showing error indication.

8.3 Operation Method

This File Check Utility is to check if a file has been correctly copied to other PA-2400W or not.
In this chapter, operating method to copy a file from PC to PA-2400W via RS-232C interface is described.

Downloading file from PC to PA-2400W

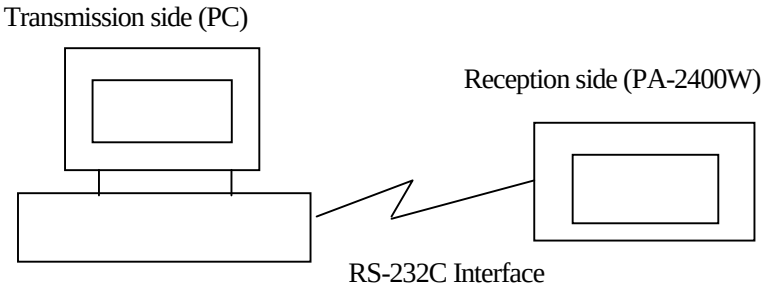


Fig. 8.1

Operation:

1) Set a file correctly at the PC side which is to be downloaded to PA-2400W.
2) Specify the file at command line and creation of list file (FCHK.LOG).
3) Create list file on transmission side of PC by using the File Check utility.
   FCHK /G [/Option] <file name list or Script file name>
   <Destination directory name> [FCHK.LOG File output Directory name]
   FCHK.LOG file is generated [FCHK.LOG file = list file]
4) As file is copied to PA-2400W (use H/PC's Explorer, etc. to copy), FCHK.LOG file should be copied as well to the <Destination directory name> directory file that is specified by parameter. (FCHK.LOG file must be copied along with the file.)
5) By having the File Check utility run on the PA-2400W, make sure that the file and list file (FCHK.LOG) are correctly copied (transferred from PC to PA-2400W).

Copying file with PC card (from PA-2400W to PA-2400W)

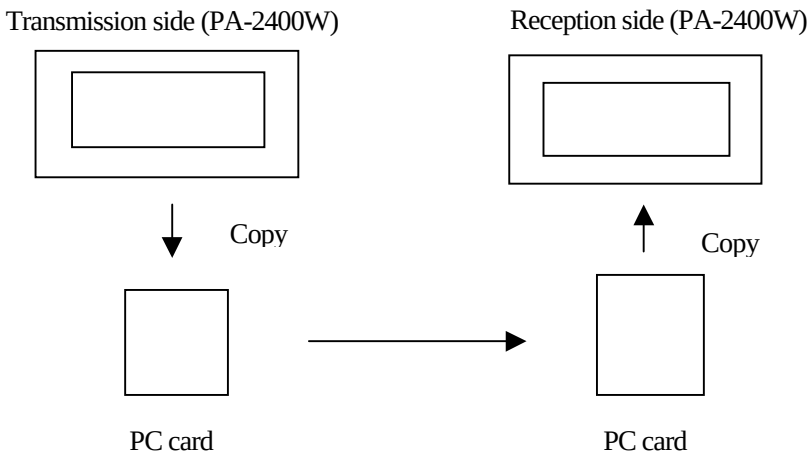


Fig. 8.2

Operation:

1) Set a file correctly at the transmission side of PA-2400W.
2) Specify a file (to be copied) in script file and creation of list file (FCHK.LOG) in the same script file.
3) Create list file on the transmission side of PA-2400W by using the File Check utility.
   FCHK /G /SC <Script file name> <Destination directory name>
   FCHK.LOG file is generated [FCHK.LOG file = list file]
4) As file is copied to an installed PC card (use the icon "My Handheld PC" to copy), FCHK.LOG file should be copied to the card as well.
5) Copy the file to specified directory (use the icon "My Handheld PC" to copy) on the reception side from the card. After copying the file, have the File Check utility run on the reception side to check if both the files, file to be copied and list file (FCHK.LOG), are copied correctly.

8.4 Describing Method

8.4.1 Pathname

- Always enclose a pathname in a pair of quotation marks. One pathname must be 255 characters or less including the two quotation marks. A 2-byte code character is counted as one character.
  Example: FCHKCE /G "\casio data*.dat" "d:\data\" "\casio data\"
- Pathnames should be described in accordance with the path naming rules supported by OS of machine on which the specified path is to be placed.
- Observe the following rules for drive letters if describing pathnames:
  Specify a pathname on the PA-2400W so it begins with the root directory (of My Handheld PC) and do not include a drive letter.
  If a pathname with a drive letter is specified, the drive letter will be ignored by the FCHKCE on the PA-2400W side (This pathname specification is treated equal to a specification from the root directory without a drive letter.)
  If the communication partner (PC, etc.) runs on an OS that requires drive letter specification, and if the PA-2400W requires the pathname of a file or directory on the partner side to be specified, always attach the appropriate drive letter.

8.4.2 Rules of Naming File and Directory Pathname

Table 8.2

	8.3 Format	Long File Name	Drive letter
Windows 95/Windows NT	O	O	Required (Error if omitted)
DOS	O	X	Required (Error if omitted)
Windows CE	O	O	Not required (ignored if written)

O : Specification permitted

X : If specified, results in invalid pathname and termination by error.

8.5 Details about Command and Option

- The total number of characters must be 255 characters or less including "FCHKCE".
- If at least one incorrect parameter, such as an incorrect description, an incorrect command, or an option that is not permitted to make a specification to the command, exists, the file check utility is not initiated but is terminated by the error.
- Separate the parameters by inserting a space (1-byte) between two parameters.
- The /G option or /C option should be placed immediately after "FCHKCE".
- To specify multiple transmission source file names, separate the pathnames with a space (1-byte).

Examples of Correct Startup :
FCHKCE^/G^"\casio data\data1.dat"^"\casio data\data2.dat"^"d:\data\"^"\casio data\"

^ : Space code

FCHKCE^/G^/SC^"\casio data\fchkce.scr"^"\casio data\"

FCHKCE^/C^"\casio data\"

Example of Incorrect Startup (no /G or /C option):
FCHKCE "\casio data\data1.dat" "\casio data\data2.dat" "d:\data\" "\casio data\"

- Uppercase and lowercase characters can be used for commands and options.
- The order in which options other than /G or /C is specified does not matter.

Examples of specification for command and option:
FCHKCE /g /r /AO
FCHKCE /G /ao /R

8.6 Command of FCHKCE

8.6.1 Generation of List File

- If the names of files to be transferred (copied) from PA-2400W are specified, this command will create a list of files to be transferred (copied) and a list file that contains the checksum data calculated from all the files to be transferred. Furthermore, the checksum data of this list file is also generated. The name of a list file created with this command is set to "FCHK.LOG".

- If the list file is successfully created, a return value “0” will be passed to this command as the program termination code. If list file creation fails, this command receives a return value that is not "0" and is abnormally terminated. In either case a history file is generated.
(FCHKG.HIS is created in [FCHK.LOG File output Directory name]).

- The history file is generated to track the process of creating a list file. The user must transmit (copy) the list file generated by this command to the partner station (child machine side) when performing any file transfer (file copy).

- Information to be set in the list file includes:
    1) File size
    2) Date and time of update
    3) Transfer (copy) destination pathname (file name)
    4) Number of transferred (copied) files
    5) Checksum data of all the transferred (copied) files
    6) Checksum data of list file

- The checksum data of all the transferred (copied) files consists of the result in which each piece of double-word data in all the objective files is XORed sequentially from beginning to end.
However, the checksum data of a list file is generated to obtain the sum of each double-word contained in the list file, then a value is calculated that offsets the sum to zero. Use this offset value as the checksum data.

- The checksum data will be outputted as a list file as follows:
FILE_CHECKSUM=HHHHLLLL (HHHH: HIGH-WORD / LLLL: LOW-WORD)
LIST_CHECKSUM=HHHHLLLL (HHHH: HIGH-WORD / LLLL: LOW-WORD)
If an error occurs while generating the checksum of the list file (FCHK.LOG) which has already been generated, the list file will be aborted. However, a generated list file will not be deleted even if an error occurs during the analysis of command parameters.

8.6.2 Comparison by List File

With this command the following comparison will be made:

- Comparison between the file information transferred (copied) by the PA-2400W (parent machine) and the contents of the list file (FCHK.LOG).

- Comparison between the checksum data of the list file and the result of checksum calculation performed again for the list file.

- Comparison between the checksum data included in the list file and the result of checksum calculation performed again for all the entire files that were transmitted (copied).

- If list file comparison is successfully completed, a return value “0” will be passed to this command as the program termination code. If list file comparison fails, this command receives a return value that is not "0" and is abnormally terminated. In either case a history file is generated (FCHKC.HIS is created in [FCHK.LOG file pathname]). The history file is generated as track the process of comparing the transmitted (copied) file and the list file.

- The objective information to be compared in the files includes:
    1) File size
    2) Date and time of update
    3) Transfer (copy) destination pathname (file name)
    4) Number of transferred (copied) files
    5) Checksum data of all the transferred (copied) files
    6) Checksum data of list file

- The checksum data of all the transferred (copied) files consists of the result in which each piece of double-word data in all the objective files is XORed sequentially from beginning to end.
  However, the checksum data of a list file is generated to obtain the sum of each double-word contained in the list file, then a value is calculated that offsets the sum to zero. Use this offset value as the checksum data.

8.7 Format of List File

The format of list file to be generated with the file check utility is shown below.

<FCHKLOG> :: = <FILENO> <FILEINFO> <FILECHECKSUM> <LISTCHECKSUM> null

<FILENO> :: = FILE_NO= <dec_num> <LS>

<FILEINFO> :: = <INFO> <LS>

<INFO> :: = <PATH> SP <SIZE> SP <DATE>

<LS> :: = CR

<FILECHECKSUM> :: = FILE_CHECKSUM= <hex_char> <LS>

<LISTCHECKSUM> :: = LIST_CHECKSUM= <hex_char> <LS>

<dec_num> :: = decimal number

<hex_char> ::= hexadecimal number represented by characters.

Example:

FILE_NO=3

“A:\AP\MENU.EXE” 12345 19960728-0630

“A:\CONFIG.SYS” 1000 19960308-2058

“A:\AUTOEXEC.BAT” 512 19960206-2340

FILE_CHECKSUM=XXXXXXXX

LIST_CHECKSUM=XXXXXXXX

8.8 Syntax Analysis of Script File

If a script file name is specified when generating a list file, the syntax of the script file is analyzed as follows before generating the list file. The specifications of the script file syntax is given below.

```
<SCRIPT FILE> :: = <COMMANDS>
<COMMANDS> :: = <COMMANDS>  <COMMAND>  |  null
<COMMAND> :: = ?/? <CMDBODY>  <LS>
<CMDBODY> :: =  <APPEND>
    |  <CHILD_PROC>
    |  <DELETE>
    |  <FORMAT>
    |  <BEEP>
    |  <RENAME>
    |  <RECEIVE>
    |  <SEND>
    |  <PRINT>
    |  <TIME_ADJUST>
    |  <END_SESSION>

<APPEND> :: = <APPEND_CMD> <APPEND_OPTION> <SP> <PATHNAME_PAIR>
<CHILD_PROC> :: = <CHILD_PROC_CMD> <SP> <CMD_PARAMETER>
<FORMAT> :: = <FORMAT_CMD> <SP> <DRIVE>
<BEEP> :: = <BEEP_CMD>
<RENAME> :: = <RENAME_CMD> <SP> <PATHNAME_PAIR>
<RECEIVE> :: = <RECEIVE_CMD> <OPTIONS> <SP> <PATHNAME_LIST>
<SEND> :: = <SEND_CMD> <OPTION> <SP> <PATHNAME_LIST>
<PRINT> :: = <PRINT_CMD> <SP> <STRING>
<TIME_ADJUST> :: = <TIME_CMD> <SP> <TIME_VALUE>
<END_SESSION> :: = <END_CMD> <PARAM>

<APPEND_CMD> :: = 'A'
<CHILD_PROC_CMD> :: = 'C'
<FORMAT_CMD> :: = 'F'
<BEEP_CMD> :: = 'B'
<RENAME_CMD> :: = 'N'
<RECEIVE_CMD> :: = 'R'
<SEND_CMD> :: = 'S'
<PRINT_CMD> :: = 'P'
<TIME_CMD> :: = 'T'
<END_CMD> :: = '/'
```

```
<PATHNAME_PAIR> :: = <PATHNAME> <DELM> <PATHNAME>
<CMD_PARAMETER> :: = <CMD_NAME> <STRING>
<CMD_NAME> :: = <PATHNAME>
<PATHNAME_LIST> :: = <PATHNAME> <DELM> <PATHNAME_LIST> | <PATHNAME>
<DRIVE> :: = <DRIVE_LETTER> ':'

<TIME_VALUE> :: = <DATE> <TIME>
<OPTIONS> :: = <OPTIONS> <OPTION> | null

<OPTION> :: = <RECURSIVE_OPTION> | <UPDATE_OPTION>
<RECURSIVE_OPTION> :: = 'R'
<UPDATE_OPTION> :: = 'U'
<APPEND_OPTION>::='S' | 'R'
<STRING> :: = ""<CHARS>""
<DELM> :: = <SP>
<LS> :: = CR | <SP>
<SP> :: = <SP> SP | SP
<PARAM> :: = <SP> <NUMBER>
```

With this file check utility <CMD_BODY> is searched in the objective script file. If <SEND> (='S' : See Note is found in the <CMD_BODY>, <PATHNAME_LIST> line that follows, <SEND> is determined to be the destination pathname and a list file (FCHK.LOG) is generated.
Other <CMD_BODY> lines not accompanying <SEND> will be ignored in the list file generation.

Note :
The commands and options that can be the objective of generating a list file are given below.

1) "/S"
2) "/SO"
3) "/SR"
4) "/SOR"
5) "/SRO"

8.9 Error Messages/Codes

Table 8.3

Code	Message	Meaning	Remedy
00	The making of list file completed. The contents of list file agreed.	Normal termination	Not necessary.
01	Specified pathname not found.	File name specified by list file does not exist.	Specify an existing pathname or file name.
02	The list file making error.	Physical error occurs during list file creation.	Execute the same program again.
03	FCHK.LOG not found.	List file (FCHK.LOG) could not be found by list file check.	Specify directory where the list file is located.
04	The contents of list file didn't agree. (The pathname discords)	Verification result of list file check is not matched. (No pathname matched)	Start up the file check utility again from the beginning.
05	The contents of list file didn't agree. (The size discords)	Verification result of list file check is not matched. (No size matched)	Start up the file check utility again from the beginning.
06	The contents of list file didn't agree. (The date/the time discord)	Verification result of list file check is not matched. (No date/time matched)	Start up the file check utility again from the beginning.
07	The contents of list file didn't agree. (All the file check-sum data discord).	Verification result of list file check is not matched. (No all file check-sum matched)	Start up the file check utility again from the beginning.
08	The contents of list file didn't agree. (The list file check-sum data discord)	Verification result of list file check is not matched. (No check-sum data of the list files matched)	Start up the file check utility again from the beginning.
09	Script file not found	Script file with specified file name was not found.	Specify directory where the script file is located.
0A	Script file syntax error	Specified script file includes syntax error.	Re-write the script file correctly.
0B	List file read-in error	Physical error occurs during list file check while the list file (FCHK.LOG) was being read.	Execute the same program again.
0C	Illegal option	Startup option is illegal.	Review the start-up option.
0D	Parameter error	Specified parameter has error.	Review the specified parameter.
10	Script file read-in error	Error occurs in the process of reading in script file.	Execute the same program again.
11	File size excess over the size of script file.	The size of specified script file is 32,001 bytes or greater.	Reduce the script file size to 32,000 bytes or less.
12	Number of files excess over the number of log-in files.	There are 65,001 files or more that are to be logged in.	Reduce the number of objective files to 65,000 or less
13	Output pathname of specified list file wasn't found.	Output destination pathname of the specified FCHK.LOG file was not found.	Specify directory that actually exists.

8.10 Restriction

Because of the limitation from Windows CE some of the files contained in the “\Windows\” folder cannot be duplicated. As a result, they will not be listed in the list file.

8.11 Details of Command and Option

Title		Command	FCHKCE /G

If the names of files to be transferred (copied) from the PA-2400W are specified, this command will create a list of files to be transferred (copied) and a list file that contains the checksum data calculated from all the files to be transferred. It also calculates the checksum data of this list file.

The maximum number of objective files that can be logged is 65,000.
The maximum size of a script file is 3,200 bytes.

≪C Language Interface≫

【Calling Sequence】

FCHKCE /G [</Option>] <file name list or script file name > <Destination directory name >
[<FCHK.LOG file output directory name>]
(Parameters in [ ] can be omitted.)

【Return Value】

Return code (refer to Chapter 8.9 “Error Messages/Codes”.)

【Parameters】

Option **/SC: Specification of a script file name**

- The objective script file is specified by this parameter to indicate the file name. FCHKCE.EXE will analyze the file names to be transmitted against the contents of this script file and then create a list file.

/R: Specification of recursive call

- All the files that exist under the directory specified by the parameter of the file pathname are used as the objective of creating a list file. If the specified directory has sub-directories, files located in them are also used as the objective of creating a list file.
- The hierarchical directory system has a maximum depth of sixteen levels.
- If this option is not specified, only files that are designated by the file names list can be the objective of list file creation.

/AO: Append output

- If the FCHK.LOG file exists in the directory specified by [FCHK.LOG file output directory name], log file will be created and appended to the FCHK.LOG file.
- If the FCHK.LOG file does not exist in the directory specified by [FCHK.LOG file output directory name], a new log file will be created. (However, if the specified directory itself does not exist, this command will be abnormally terminated.)
- This append output is achieved in such a simple way that a new list file is appended to the end of existing list file. If part of the existing list file needs to be modified, create a list file again instead of performing this append output.

File name list or Script file name

- Describe the list of files to be transmitted (copied). These files should be located on the transmission (copy) source side. As the last input parameter of this command describe the destination directory name of the communication partner side. If the specified directory does not exist, it will be automatically created under the specified name. If specifying multiple transmission (copy) source file names, separate the pathnames with a space (1-byte).
- A wild card can be used for file name.
- If the “/SC” option is specified, also specify the pathname of the script file.

Destination directory name

- Specify the destination directory name of the file transmission (copy).
- Specify the directory name in accordance with the naming rules of OS used on the transmission (copy) destination side.
- If "/SC" option is specified, this parameter can be disabled.
- Add a "\" to the end of the directory name as the delimiter.

Example: "b:\" Root directory specification
"b:\PA\12\" Sub-directory specification
"b:\PA" Incorrect specification

FCHK.LOG file output directory name

- Specify the output destination directory name of the FCHK.LOG file.
- Specify the directory name in accordance with the naming rules of OS on the local machine side.
- Add a "\" to the end of the directory name as the delimiter.
- If this parameter is omitted, the FCHK.LOG file will be created in the current directory.

Example: "b:\" Root directory specification
"b:\PA\12\" Sub-directory specification
"b:\PA" Incorrect specification

【Startup Examples】

- **FCHKCE /G "\casio*.dat" "\casio data\" "\casio\"**
  This transfers all files under the "\casio\" directory of the transmission side of PA-2400W which have a "dat" extension to the "\casio data\" directory of the communication partner side. And, create list file in the "\casio\" directory of the transmission side.

- **FCHKCE /G /R "\casio*.dat" "\casio data\" "\casio\"**
  This transfers all files under the "\casio\" directory (including sub-directories) of the transmission side of PA-2400W which have a "dat" extension to the "\casio data\" directory of the communication partner side. And, create list file in the "\casio\" directory of the transmission side.

- **FCHKCE /G /SC "\casio\fchkce.scr" "\casio\"**
  This creates list file in the "\casio\" directory of the transmission side of PA-2400W by following content of script file "fchkce.scr" in the "\casio\" directory of the transmission side.

Title		Command	FCHKCE /C

This command will perform the following comparisons; a comparison between the file information transferred (copied) from the partner station (parent machine) and the contents of the list file (FCHK.LOG), a comparison between the checksum data of the list file and the result of checksum calculation performed again for the list file, and a comparison between the checksum data included in the list file and the result of checksum calculation performed again for all the files that were transmitted (copied).
There can be a maximum of 65,000 objective files for comparison.

≪C Language Interface≫

【Calling Sequence】

FCHKCE /C [</Option>] <FCHK.LOG file pathname >
(Parameters in [ ] can be omitted.)

【Return Value】

Return code (refer to Chapter 8.9 “Error Messages/Codes”.)

【Parameters】

Option **/D: Does not compare the update data.**

- Generally, the update date/time will be automatically changed to the current time of PA-2400W if file transfer is performed through Explorer of PA-2400W.
- Set this option to omit the update date/time from the objective of comparison. (A copy operation performed between the FLCE and PC card will not update the date/time.)

FCHK.LOG file pathname

- Specify the pathname of the FCHK.LOG list file in accordance with the naming rules of OS.
- Total number of files which can be verified is 65,000 or less. Value of “FILE_NO=” is 65,001 or greater will cause error and force the utility to be terminated.

【Startup Example】

FCHKCE /C “\casio data\“

This checks all transferred files by following content of list file in the “\casio data\“ directory of the transmission side of PA-2400W.