

# ***Penbex SDK 1.0 Beta5 Installation Guide***

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## **Introduction**

Penbex SDK is the development tool for writing application on PDA or mobile IA device with Penbex Operating System. You have to run with Microsoft Visual C 6.0 for source-code level debugging and invoke PDA emulator as result. The kit includes install image in disk# directories, and an image converter file name called Bmp2Gmp.exe. All other tool and documentations could be found after installation, under c:\Penbex directory as default.

## **System Requirement**

Regular PC with Window 98 operating system (Not for NT or Window 2000)  
Visual C 6.0 is necessary (otherwise, only GNU command mode develop environment will be installed.)  
Requires 31Mbytes disk space for SDK itself.

## **Installation**

Click on the Setup.exe file under disk1 directory, following installation procedure to complete. C:\penbex is the default location to install, there will have pbxsdk and pbxgsdk directories created under that.

Pbxgsdk directory contains related GNU stuff to create download binary for Penbex OS. Pbxsdk includes a whole workspace and libraries and header files to run on Visual C and builds a PDA emulator running on PC window environment for a full OS simulation. Bmp2Gmp.exe can be copied and ran from anywhere you want.

A PDF format of Penbex SDK Manual and Programming Guide are under \doc directory. Acrobat reader 4.0 or above from Adobe is required.

If you need to upgrade hardware PDA OS, you can find upgrade ROM image and

toolkit, called WinXbinMgr128.exe, under c:\penbex\pbxgsdk\ofw\ directory. Hardware reference platform is available on request from Penbex Data Systems, Inc. (<http://www.penbex.com/developer/>)

Be aware that if you re-install SDK, system will ask for removing old version first. After removed previous version of SDK, you have to install again from running Setup.exe.

## **Writing program on PDA emulator**

Start VC6.0 on PC window environment with the workspace named PenbexOS.dsw under c:\penbex\pbxgsdk\ as default. You can build and run a default Penbex OS emulator just press Ctrl-F5 key. All sample applications are already in the emulator. You can modify expreap.c file under “SDK SYSTEM” folder to add or remove applications listed in the desktop of the emulator.

To create a new project should follow the following steps: (as example)

1. Create a new folder under “PDA AP” folder in VC after open PenbexOS.dsw workspace, for example “HelloWorld”.
2. Create and add codes to “HelloWorld” folder, for example hello.c, hello.h and a 16x16 bmp file called hello.bmp (as in the appendix)
3. Add this application to the desktop of the emulator by adding two new lines in expreap.c

```
#include "hello.h"
```

and

```
AppAdd(GetBmp("hello.bmp"),XX,"hello.px","Hello",HelloMain,0,(void *)&cHelloVar,sizeof(HelloVar),(void **)&pHelloVar);
```

4. Press Ctrl-F5 or Click “Execute PenbexSDKEmu.exe” under “Build”.

## Build download application with GNU Add-in

GNU cross compiler and linker come with this SDK as a VC add-in function. If the Add-in button is not show on the toolbar, please select “Penbex Developer Studio Add-in” item under Menu “Tools/Customize/Add-ins and Macro Files”. There will have two add-in buttons available, one is “Build Penbex Project”, the other is “Stop Build”

Click on that “Build Penbex Project”, you can find a window pop up. Select application as the folder name you want to build and press “Rebuild” button. You can open a new tag called macro in the output window, to see the build process and result. As example, you will see message as follows:

```
===== Build [HelloWorld] =====
C:/PENBEX/Pbxgsdk/penbex/bin/m68k-penbex-coff-gcc
-IC:/PENBEX/Pbxgsdk/usr/include -D_GNU_ENV -mPIC -m68000 -c hello.c
C:/PENBEX/Pbxgsdk/penbex/bin/m68k-penbex-coff-ld -T
C:/PENBEX/Pbxgsdk/penbex/m68k-penbex-coff/lib/ldscript.dat -o HelloWorld.coff
C:/PENBEX/Pbxgsdk/penbex/m68k-penbex-coff/lib/crt0.o hello.o
C:/PENBEX/Pbxgsdk/penbex/m68k-penbex-coff/lib/libc.a
C:/PENBEX/Pbxgsdk/penbex/lib/gcc-lib/m68k-penbex-coff/2.96/libgcc.a
C:/PENBEX/Pbxgsdk/penbex/bin/m68k-penbex-coff-ld -d -r -T
C:/PENBEX/Pbxgsdk/penbex/m68k-penbex-coff/lib/ldscript.dat -o HelloWorld.coff
C:/PENBEX/Pbxgsdk/penbex/m68k-penbex-coff/lib/crt0.o hello.o
C:/PENBEX/Pbxgsdk/penbex/m68k-penbex-coff/lib/libc.a
C:/PENBEX/Pbxgsdk/penbex/lib/gcc-lib/m68k-penbex-coff/2.96/libgcc.a
makepbx HelloWorld.coff HelloWorld.ary HelloWorld.pbx "HelloWor.pbx" "HelloWorld" "1.0"
"2000/10/22" "PENBEX" "TRADITIONAL" 160 160 "hello.bmp"
Penbex (R) PDA Execution File(.PBX) Build Utility, VersionCopyright (C) Penbex Data
Systems, Inc.,1999,2000, All rights reserved.
```

PBX Format Version: v1.1

Small ICON.

File Size = 1102(0x0000044e)

```

Crt0      (Offset,Size) = (0x00000114, 0x00000020)
Text      (Offset,Size) = (0x00000134, 0x00000108)
Data      (Offset(bss),Size(data,bss))
          = (0x0000023c(0x00000244), 0x0000000e(0x00000008,0x00000006))
RelocText (Offset,Size) = (0x0000024a, 0x00000008)
RelocData (Offset,Size) = (0x00000252, 0x00000000)
Res       (Offset,Size) = (0x00000252, 0x00000058)
Succeeded
Batch Build Complete

```

## How to use GNU compiler?

If you prefer to use GNU environment come with this SDK instead of VC6.0, you can build download applications using GNU tools. All GNU bins, libraries, header files, and sample codes are under c:\penbex\pbxgsdk\ as default.

Make sure your autoexec.bat file already includes the following lines:

```

SET ROOTDIR=C:\PENBEX\PBXGSDK
SET PATH=%ROOTDIR%\BIN;%ROOTDIR%\penbex\bin;%ROOTDIR%\usr\bin;%PATH%

```

Run Makeall.bat to rebuild all sample applications under directory c:\penbex\pbxgsdk\usr\src\, then you can find downloadable binary .pbx file under each sample program directory have been created successfully.

If you have problem to build .pbx file in either VC or GNU environments, please double check with your PATH system variable in DOS mode, which should include path at least as follows:

```

PATH=C:\PENBEX\PBXGSDK\BIN;C:\PENBEX\PBXGSDK\PENBEX\BIN;
C:\PENBEX\PBXGSDK\USR\BIN;C:\WINDOWS;

```

## Download application to PDA

If you have a PDA reference platform, you can download .pbx file for further testing on real hardware. Because software emulator PDA is not 100% similar to real platform, such as CPU performance may difference significantly. Try to download and test application on real PDA if necessary.

You can download .pbx file from PC serial port to PDA through cradle or cable. Download application by using any X-modem or Y-modem communication tool, such as HyperTerminal in standard Window bundled application. Set HyperTerminal to 8-N-1-N setting and correct COM port. When the PC is ready to send, just click left-top corner of real PDA platform or invoke system menu by clicking menu hard icon. Then click “Application/Download” to invoke application download tool, select either “Xmodem” or “Ymodem” button for receiving.

Delete application using the similar way as download application, just invoke system menu and click “Application/Delete”, then click the application icon which you want to delete.

Be aware that PDA OS should be the same or higher version of ROM image then the SDK version. (Refer to **Installation** for OS upgrade)

## Appendix

Hello.h

```
#ifndef helloh//[
#define helloh
#ifdef __cplusplus/[
extern "C"{
    #endif/]__cplusplus.
    typedef struct tagHelloVar {
        short down,up,move;
    }HelloVar;
    extern HelloVar cHelloVar;
    extern HelloVar *pHelloVar;
    void HelloMain(unsigned long argc,void *argv);
#ifdef __cplusplus/[
}
#endif
#endif
```

## Hello.c

```
#include "pbxall.h"
#include "hello.h"
HelloVar cHelloVar={0,};
HelloVar *pHelloVar;
static BOOL conProcess ( SysMsg *pMsg ) {
    register BOOL retValue=0;
    switch ( pMsg->type ){
    case MT_SYS_CONT_BEGIN:
        ContSetTitle( "Container Object Demo" );
        GmTextOut(60,50,"Hello World !!");
        ContRedraw();
        retValue=1;
        break;
    case MT_SYS_CONT_END:
        retValue=1;
        break;
    }
    return retValue;
}
#ifdef WIN32
    void HelloMain ( unsigned long argc,void *argv )
#else
    void PenbexMain ( DWORD argc,void *argv )
#endif
{
    auto SysMsg msg;
    pHelloVar=&cHelloVar;
    if(APP_RUN_NORMAL==argc) {
        SetContainerEntry(100,conProcess);
        SetActiveContainer(100);
        while(GetMsg(&msg)) {
            if(!SysProcess(&msg))
                AppProcess(&msg);
        }
    }
    NOUSE(argc);
    NOUSE(argv);
}
```

## Hello.bmp

Could be any 16x16 B/W icon image in BMP format.