Subject: Application Note of Port GP0 to GP3 on PMX-1000

Description:

There are 5 GP ports, GP0 to GP4, in PMX-1000 SoC, each port have 8 bits, totally there are 40 bits can be programmable as GPIO (General Purpose Input Output) , 8051, Servo Control, SPI or I2C. The GP4 port is multiplexed with Serial Port 1, most of user use that port as Serial Port. Mainly this application note is for GP0 to GP3.

Define of PMX-1000 internal 8051:

Internally there is an 8051 micro processor in PMX-1000, it's already used to simulate the 8042 keyboard controller, A20 address line control, matrix keyboard control and the simulation of Advanced Power Management (see Appendix A) . Users can take advantage to use those functions which are completed by DMP but the 8051 can **not** be programmable by users themselves.

How to use those GP ports ?

Basically you just have to set the BIOS in the right option.
In PMX-1000 BIOS, the GPIO, Servo Control, SPI and I2C are all programmed. DMP staffs can provide a BIOS which enable the functions you need or provide the software tool then you can modify the BIOS by yourself. And unless you have the JTAG Printer Cable from DMP to reload the BIOS, or we don't suggest you to modify the BIOS by yourself, because you might crash the BIOS for unknown reason.

Please see as below for all the GP port functions in PMX-1000

PIN	Functions			PIN	Functions		
GP 00	GPIO	8051	SERVO	GP 20	GPIO	8051	SERVO
GP 01	GPIO	8051	SERVO	GP 21	GPIO	8051	SERVO
GP 02	GPIO	8051	SERVO	GP 22	GPIO	8051	SERVO
GP 03	GPIO	8051	SERVO	GP 23	GPIO	8051	SERVO
GP 04	GPIO	8051	SERVO	GP 24	GPIO	8051	SERVO
GP 05	GPIO	8051	SERVO	GP 25	GPIO	8051	SERVO
GP 06	GPIO	8051	SERVO	GP 26	GPIO	8051	SERVO
GP 07	GPIO	8051	SERVO	GP 27	GPIO	8051	SERVO
GP 10	GPIO	8051	SERVO	GP 30	GPIO	8051	SPI
GP 11	GPIO	8051	SERVO	GP 31	GPIO	8051	SPI
GP 12	GPIO	8051	SERVO	GP 32	GPIO	8051	SPI
GP 13	GPIO	8051	SERVO	GP 33	GPIO	8051	SPI
GP 14	GPIO	8051	SERVO	GP 34	GPIO	8051	I2C
GP 15	GPIO	8051	SERVO	GP 35	GPIO	8051	I2C
GP 16	GPIO	8051	SERVO	GP 36	GPIO	8051	I2C
GP 17	GPIO	8051	SERVO	GP 37	GPIO	8051	I2C

Please see as below for all the GP port setting in BIOS.
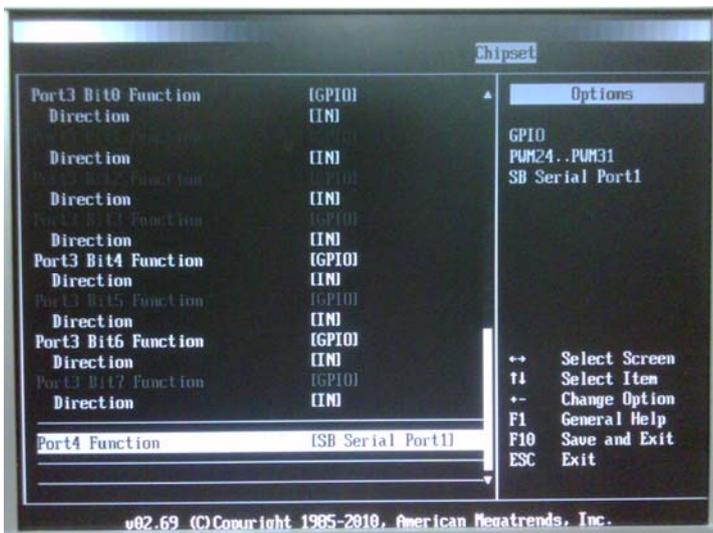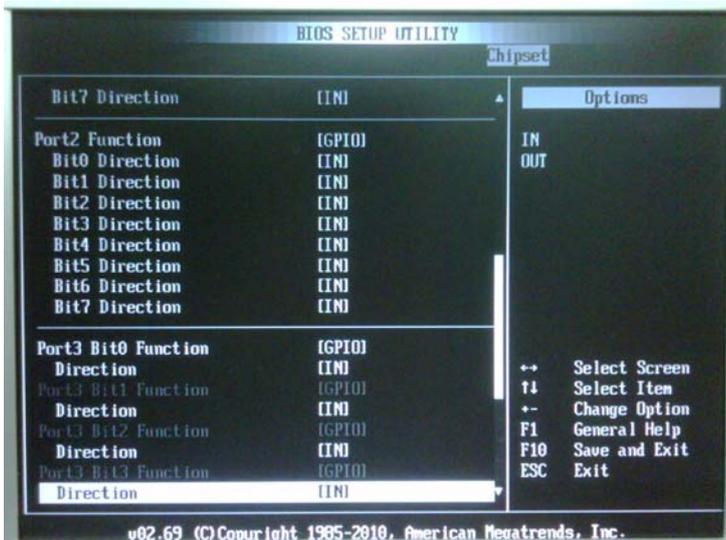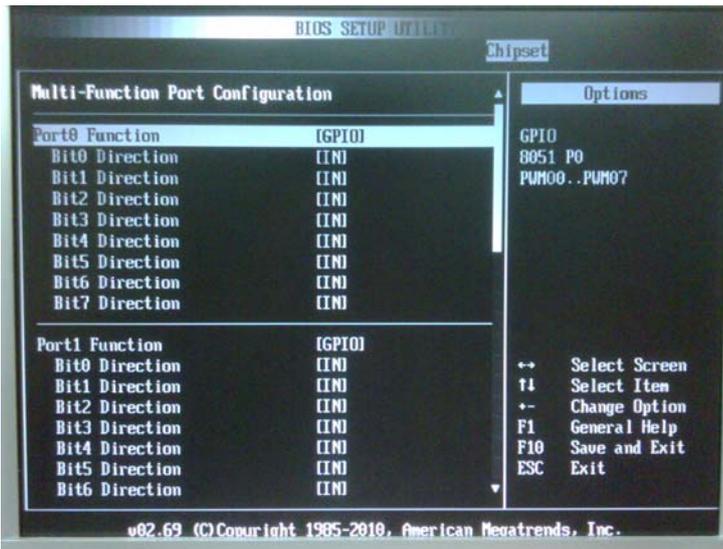
Example:

Below are two typical applications for PMX-1000, one is Netbook PC and the other is Box PC.

For all the Netbook PC, there must have a matrix keyboard, as each matrix keyboard has different pin assignment, you should provide your matrix keyboard datasheet to DMP Staff to make sure that matrix keyboard can be used with PMX-1000 and then ask the DMP staff to make a custom keyboard firmware to fit your matrix keyboard.

In Netbook application, from GP0 to GP3 ports are all used for matrix keyboard or simulation of Advanced Power Management, all the GP port are used and the functions are fixed, so its should be hidden in BIOS

In small BOX PC application, normally only two pins of GP3 will be used for power on/off control. All the other ports are free to use by demand, DMP staff can help to modify the BIOS depends on your hardware design.

PIN	Functions				Typical example NetBook PC	Box PC
GP 00	GPIO	8051	SERVO		8051_MatrixKB	
GP 01	GPIO	8051	SERVO		8051_MatrixKB	
GP 02	GPIO	8051	SERVO		8051_MatrixKB	
GP 03	GPIO	8051	SERVO		8051_MatrixKB	
GP 04	GPIO	8051	SERVO		8051_MatrixKB	
GP 05	GPIO	8051	SERVO		8051_MatrixKB	
GP 06	GPIO	8051	SERVO		8051_MatrixKB	
GP 07	GPIO	8051	SERVO		8051_MatrixKB	
GP 10	GPIO	8051	SERVO		8051_MatrixKB	
GP 11	GPIO	8051	SERVO		8051_MatrixKB	
GP 12	GPIO	8051	SERVO		8051_MatrixKB	
GP 13	GPIO	8051	SERVO		8051_MatrixKB	
GP 14	GPIO	8051	SERVO		8051_MatrixKB	
GP 15	GPIO	8051	SERVO		8051_MatrixKB	
GP 16	GPIO	8051	SERVO		8051_MatrixKB	
GP 17	GPIO	8051	SERVO		8051_MatrixKB	
GP 20	GPIO	8051	SERVO		8051_MatrixKB	
GP 21	GPIO	8051	SERVO		8051_MatrixKB	
GP 22	GPIO	8051	SERVO		8051_MatrixKB	
GP 23	GPIO	8051	SERVO		8051_MatrixKB	
GP 24	GPIO	8051	SERVO		8051_MatrixKB	
GP 25	GPIO	8051	SERVO		8051_MatrixKB	
GP 26	GPIO	8051	SERVO		8051_MatrixKB	
GP 27	GPIO	8051	SERVO		8051_MatrixKB	
GP 30	GPIO	8051	SPI		8051_NumLck	
GP 31	GPIO	8051	SPI		8051_CapLck	
GP 32	GPIO	8051	SPI		8051_BatDet	
GP 33	GPIO	8051	SPI		8051_LCD	
GP 34	GPIO	8051	I2C		8051_APM	8051_APM
GP 35	GPIO	8051	I2C		8051_APM	8051_APM
GP 36	GPIO	8051	I2C		8051_APM	
GP 37	GPIO	8051	I2C		8051_APM	

--------------------- End-----------------------------Next pages are Appendix A----------------------------

Condition 1 – Shut down in Windows XP

```
┌─────────────────────────┐
│      Click "Turn off"   │
└─────────────────────────┘
              │
              ▼
┌─────────────────────────┐
│  Windows XP will turn   │
│  off all application    │          ┌──────────────────┐
└─────────────────────────┘          │                  │
              │                      │    Shut down     │
              ▼                      │                  │
┌─────────────────────────┐         └──────────────────┘
│  Windows XP will inform │                  ▲
│  BIOS to enable APM     │                  │
│  function               │                  │
└─────────────────────────┘                  │
              │                              │
              ▼                              │
┌─────────────────────────┐                  │
│  GP34 (Output) to low(0)│──────────────────┘
└─────────────────────────┘
```
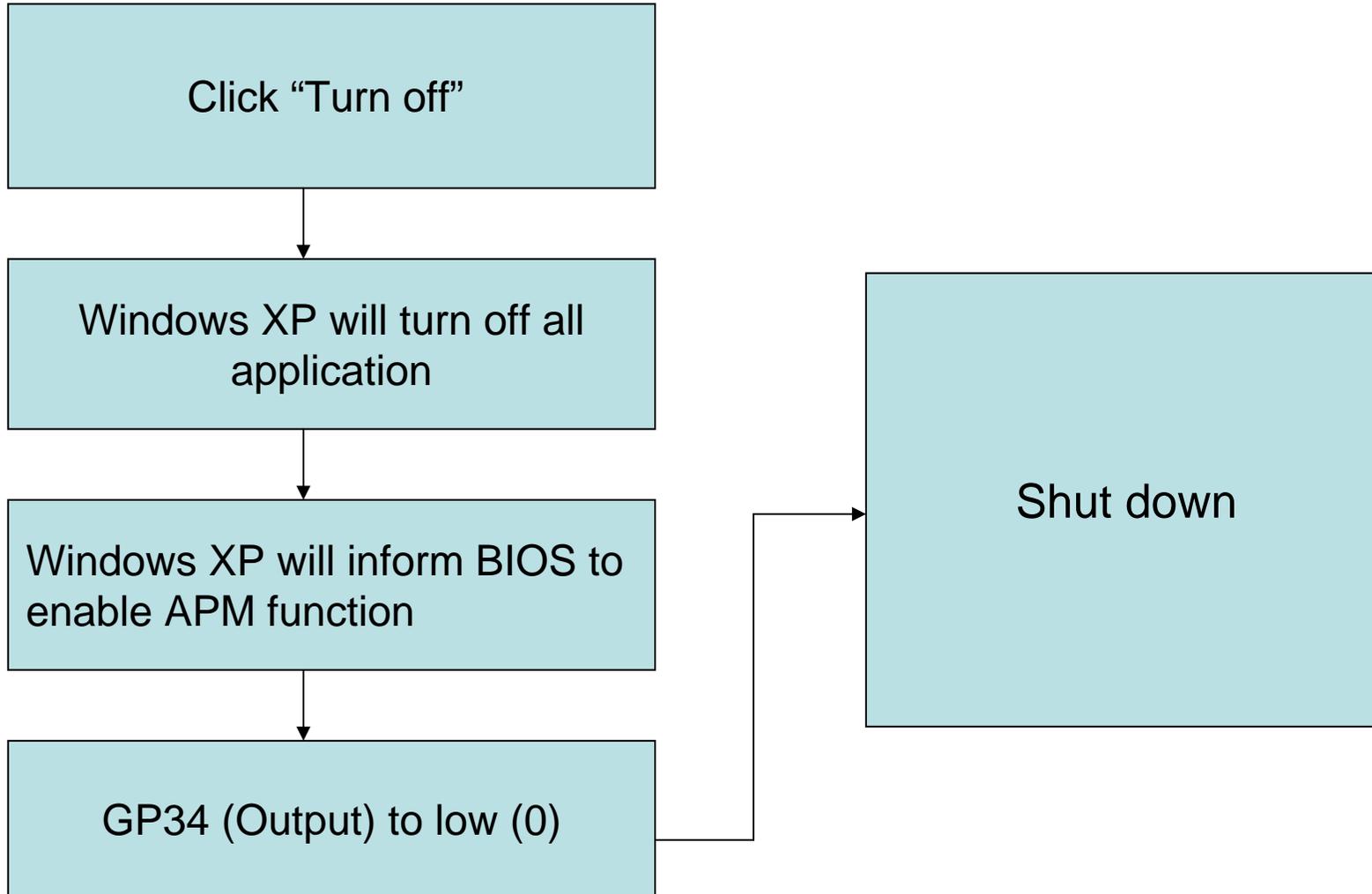
Condition 2 – Hibernate in Windows XP

```
┌─────────────────────────┐        ┌─────────────────────────────┐
│                         │        │         LCD Detect          │
│    Click "Hibernate"    │        │   GP36 Output to low (0)    │
│                         │        │                             │
└───────────┬─────────────┘        └──────────────┬──────────────┘
            │                                      │
            ▼                                      │
┌─────────────────────────┐                        │
│  Windows XP will save   │◄───────────────────────┘
│   the current settings  │
│      to Hard Disk       │
└───────────┬─────────────┘
            │
            ▼
┌─────────────────────────┐
│  Windows XP will inform │
│    BIOS to enable APM   │
│        function         │
└───────────┬─────────────┘
            │
            ▼
┌─────────────────────────┐        ┌─────────────────────────────┐
│                         │        │                             │
│ GP34 (Output) to low (0)│───────▶│         Shut down           │
│                         │        │                             │
└─────────────────────────┘        └─────────────────────────────┘
```
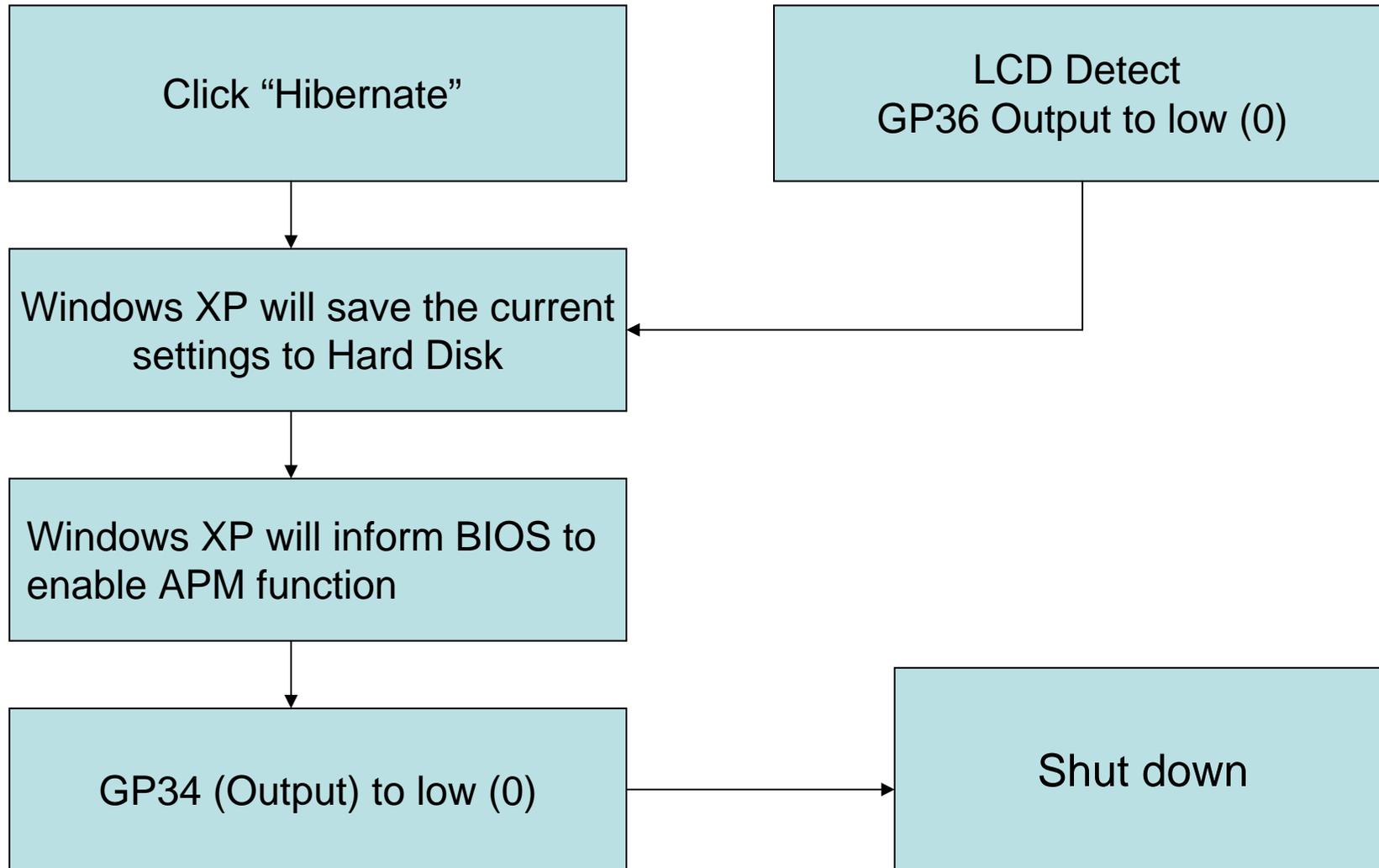
Condition 3 – Stand By in Windows XP

```
┌─────────────────────────┐              ┌─────────────────────────┐
│                         │         ┌───▶│  Press any key of keyboard│
│     Click "stand By"    │         │    │    Or move the mouse      │
│                         │         │    └─────────────┬───────────┘
└────────────┬────────────┘         │                  │
             │                      │                  ▼
             ▼                      │    ┌─────────────────────────┐
┌─────────────────────────┐         │    │                         │
│ Windows XP will inform   │         │    │  Turn on and run Windows │
│ BIOS to enable APM       │         │    │                         │
│ Function                 │         │    └─────────────────────────┘
└────────────┬────────────┘         │
             │                      │
             ▼                      │    ┌─────────────────────────┐
┌─────────────────────────┐         │    │                         │
│ Turn off LCD backlight   │         └───▶│ No any key has been touched│
│ (GP33)                   │              │                         │
└────────────┬────────────┘              └─────────────┬───────────┘
             │                                          │
             ▼                                          ▼
┌─────────────────────────┐              ┌─────────────────────────┐
│ Detect any signal from   │              │                         │
│ Keyboard Or Mouse        │──────────────│      Keep standby        │
│                         │              │                         │
└─────────────────────────┘              └─────────────────────────┘
```
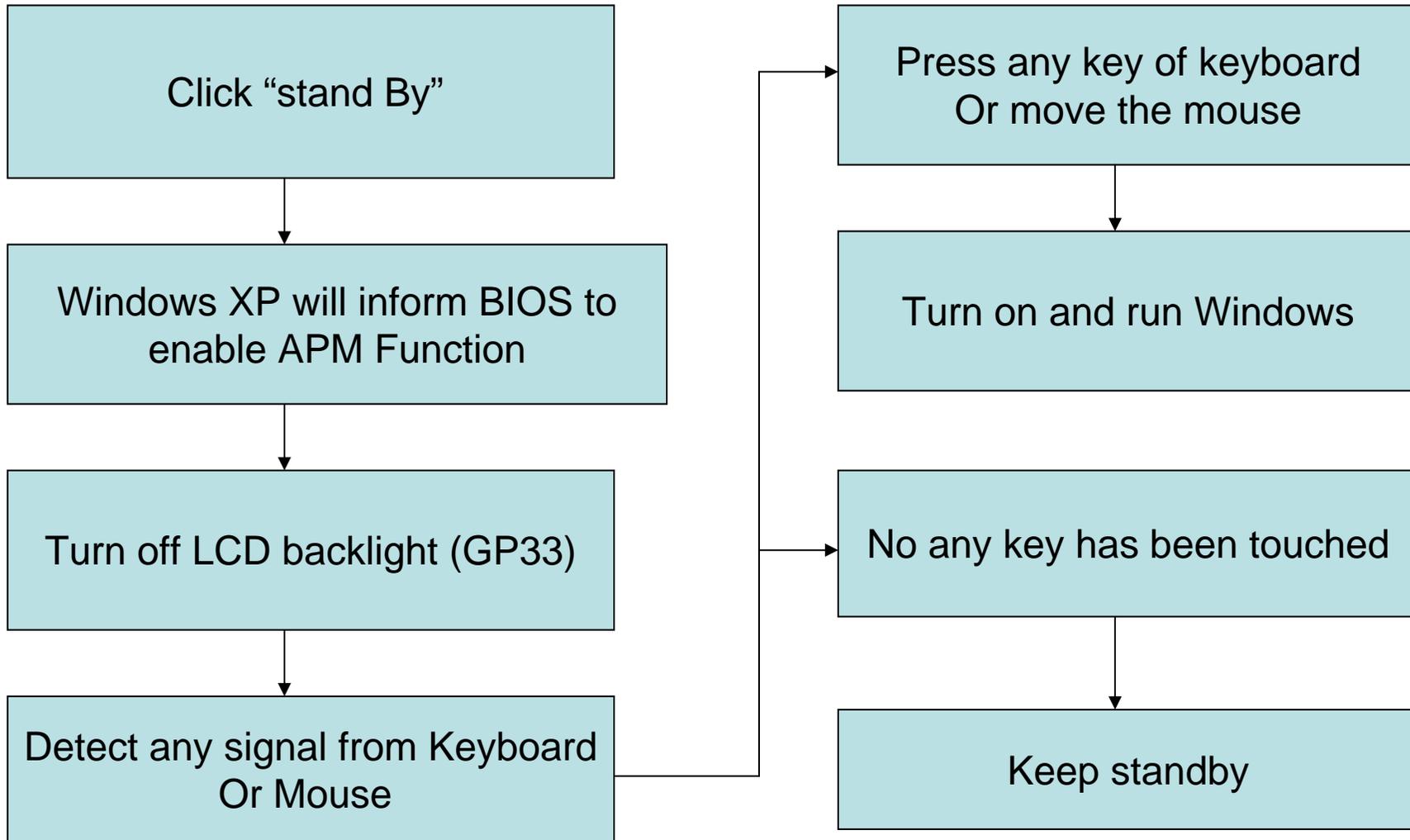
Condition 4 - Power Off by Power Button

```
┌─────────────────┐      ┌─────────────────────┐      ┌─────────────────┐
│  Power Button   │─────▶│ Push within 3 seconds│─────▶│  Nothing Happen │
│                 │      │   Or no touching     │      │                 │
└─────────────────┘      └─────────────────────┘      └─────────────────┘
         │
         ▼
┌──────────────────────────────┐
│ Keep pushing around 4 to 5   │
│ seconds                      │
└──────────────────────────────┘
         │
         ▼
┌──────────────────────────────┐      ┌─────────────────────┐
│ GP35 (Input) gets the signal │      │                     │
│ high (1) from SBVIN1         │      │     Shut down       │
└──────────────────────────────┘      │                     │
         │                            └─────────────────────┘
         ▼                                      ▲
┌──────────────────────────────┐                │
│ BIOS will inform Keyboard     │───────────────┘
│ Firmware to make GP34 (Output)│
│ to low (0)                    │
└──────────────────────────────┘
```