

# PMC-APN-017

## Improve IC anti-interference ability under power plug test

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### 1. Important Notice

IDE after 0.91M1 will be optimized for `.Adjust_IC` Macro, which will help improve the stability and anti-interference ability of IC for repeated power plug and plug tests in a small number of specific applications.

### 2. Applied for

- (1) PFS172/PFS122
- (2) PFC232/PFx252
- (3) PFC151/PFC161
- (4) PFC460
- (5) PML100

### 3. Foreword

The startup stability of MCU is closely related to power supply, especially in the process of power supply. The waveform at the moment of power-on may be unstable, disorderly, and random bouncing up and down. In addition, the waveform of the power supply is also closely related to the circuit used, PCB layout, and components used in the application. Extreme or abnormal power surge may lead to startup failure of the chip, resulting in a state of suspected crash. Therefore, the simplest and most common method is to use uninterruptible power supply as one of the test items when the product is tested for startup reliability.

### 4. Description of power plug and unplug test

Some products will use uninterruptible power plug as a test item in the application testing process to verify the reliability of the product and IC. At present, it is known that some types of IC may be affected by the packaging of plastic sealing materials, wiring materials, packaging framework, packaging process and so on, making the chip VDD power supply circuit characteristics produced a small change, affecting the electrical performance of boot. A small percentage of chips running at high system frequencies and in smaller packages on PCB boards and circuits in some applications may fail the uninterruptible power plug test.

### 5. Improvement strategies

#### Strategy 1. Use IDE 0.91M1 later to compile and generate PDK writer files.

IDE versions after 0.91M1 will be partially optimized for the `.Adjust_IC` ( Macro ) instruction, which can effectively improve the stability and anti-interference capability of the IC under the power plug test.

Checksum will be changed after the old Code is recompiled with IDE 0.91M1, To keep the

# PMC-APN-017

## Improve IC anti-interference ability under power plug test

checksum of the original code unchanged, add the programming statement `.Check_Sum Modify 0x123456` in the.PRE file. Among them, 0x123456 should be changed to the original file checksum, which is only used as an example reference (as shown in Figure 5-1).

```

.JMP FPPA0 <?>, 0
// .JMP FPPA1 <?>, 1
.ROMADR 0x10
.PUT Interrupt <reti>, 8
.Check_Sum Modify 0x691FF8

```

Fig. 1: Specifying checksum unchanged

### Strategy 2. Use IDE/Writer versions later than 0.91M1 for writing.

IDE/Writer 0.91M1 will add PDK file automatic check and PDK file conversion functions. For PDK files generated before 0.91M1, a file transfer function menu will be provided, and customers can choose whether to convert. The converted PDK file will be the same as if it had been recompiled with the new version of the IDE. Using the newly generated PDK file to write IC can effectively improve the stability and anti-interference ability of IC in power plug test.

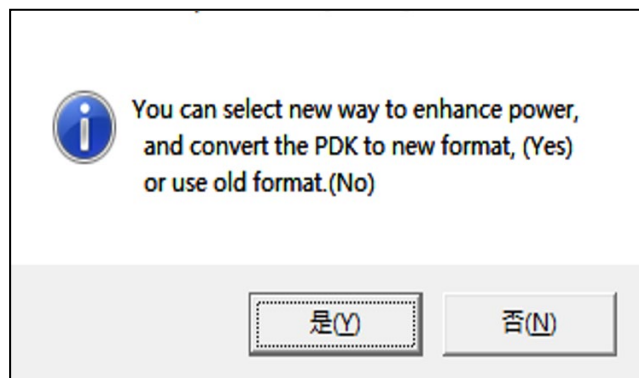


Fig. 2: Version after IDE \_ 0.91M1 PDK before downloading will automatically prompt whether to do the transfer operation

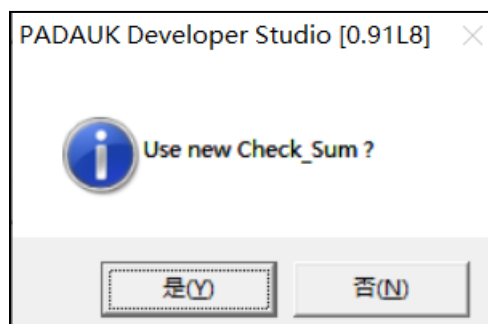


Fig. 3: Determines whether the converted PDK file use the new checksum value

# PMC-APN-017

## Improve IC anti-interference ability under power plug test

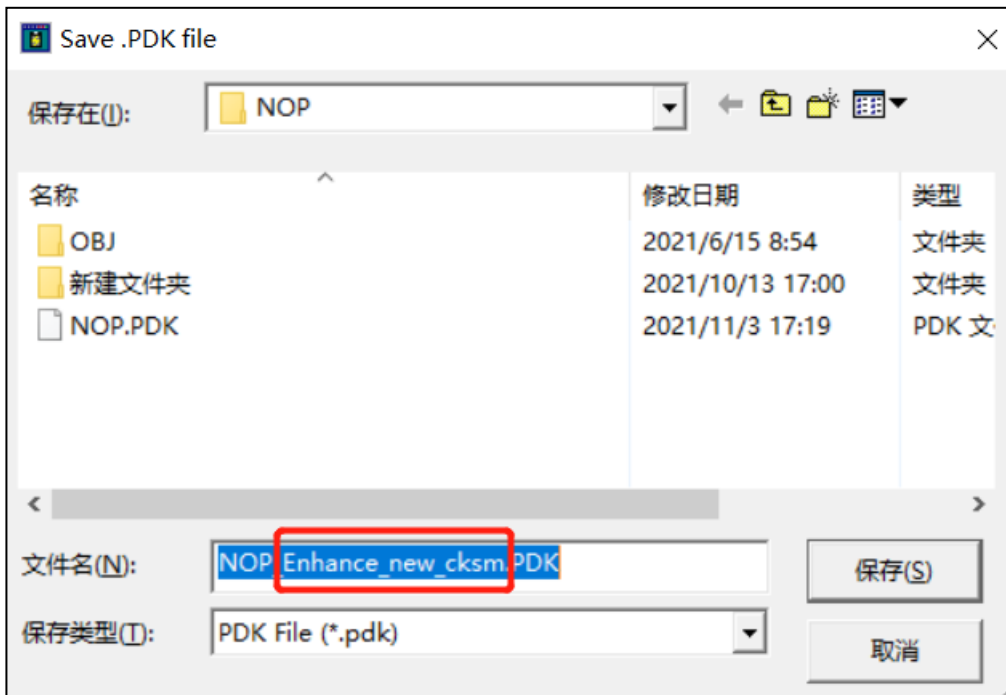


Fig. 4: Save the new PDK file and use the new checksum value

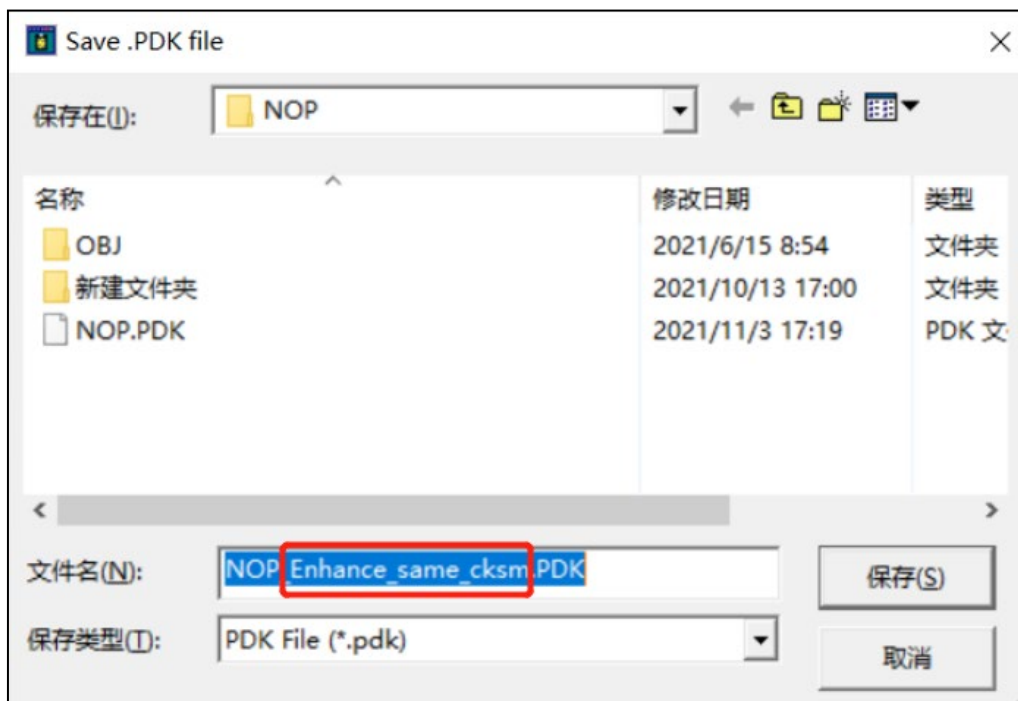


Fig. 5: Save the new PDK file and use the original checksum value

# PMC-APN-017

## Improve IC anti-interference ability under power plug test

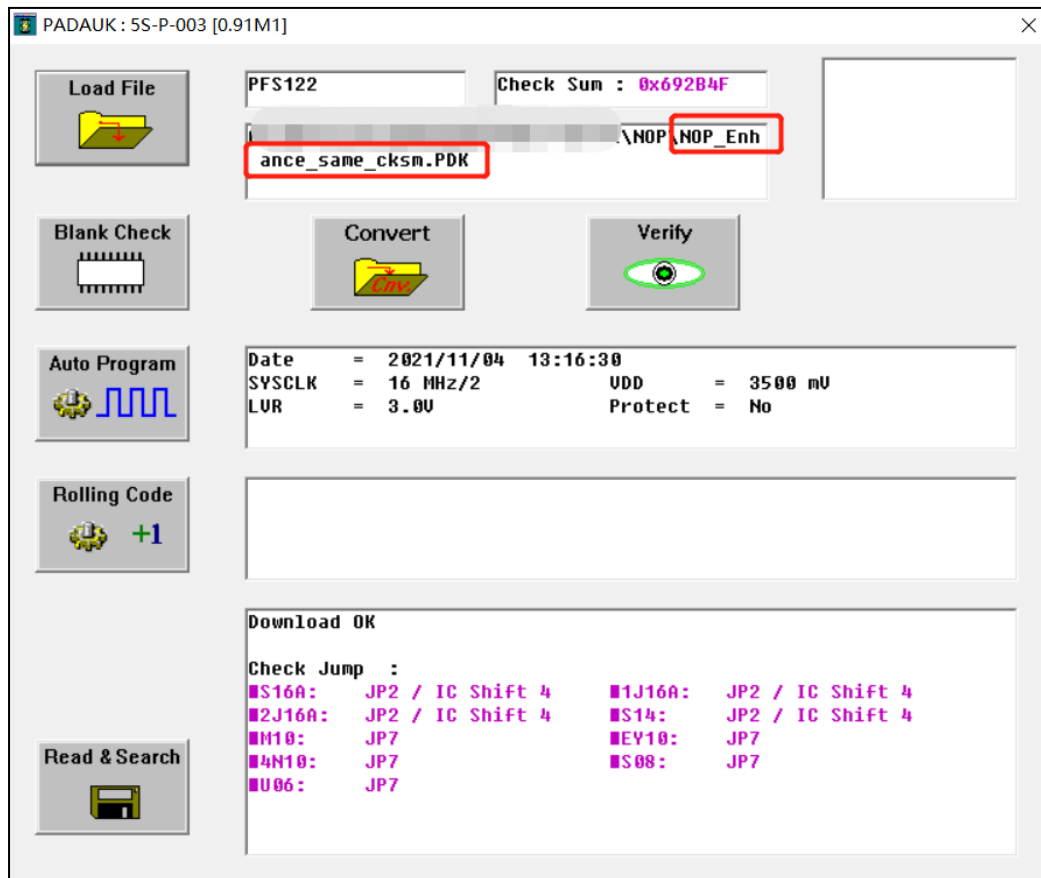


Fig. 6: After the file is converted, Writer automatically downloads the new PDK file

**Strategy 3. Use a lower system frequency to boot, and individual models can turn on the slow boot function at the same time.**

. *Adjust\_IC* first use 500KHz boot, after the system initialization is completed, then manually switch back to the needed system frequency. For PFS172/122 and PML100, you can set slow boot in the Code Option menu at the same time.

```

void FPPA0 (void)
{
    Step.1
    ADJUST_IC SYSCLK=IHRC/32, IHRC=16MHz, VDD=5.0V;
    // WatchDog Disable, RAM 0 ~ 0xF temporary be used
    // You can add the follow code :
    // CLKMD.En_WatchDog = 1; // WatchDog Enable

    System_Initial(); Step.2
    $ CLKMD IHRC/2, En_IHRC, En_ILRC; Step.3

    while (1)
    {
        ...
        wdrreset;
    }
}
  
```

Fig. 7: Clock switching after low frequency startup initialization

# PMC-APN-017

## Improve IC anti-interference ability under power plug test



Fig. 8: Set the slow boot function in Code Option

Strategy 4. Optimize hardware application circuits, components and PCB layout to improve the stability of the power-on waveform.

### 6. Notes

- (1) Chips written using PDK generated prior to IDE/Writer 0.91M1 do not represent application problems or instability.
- (2) IDE/Writer 0.91M1 or later is recommended for compiling, writing and downloading programs.
- (3) Checksum compiled using IDE versions after 0.91M1 may be inconsistent with previous versions of the IDE.
- (4) When using IDE/Writer 0.91 M1 for writing, it is also compatible with the old version of the PDK file, but the chip written with the old version of the PDK file may not be able to improve the anti-interference ability of the power plug test. ( But it doesn't mean there's a problem with the application)
- (5) Use IDE/Writer 0.91M1 earlier version to write, but the downloaded PDK file is the PDK file generated by the new IDE, the written chip will also be equipped with improved power plug test anti-jamming ability.
- (6) For PFC460 / PGC464 / PGC434 IC series, PDK compiled by IDE/Writer before 0.91M1 May be fail to download and write. In this case, it is recommended that you must use the IDE version after 0.91M1 to recompile and generate a new PDK file, and then perform the writing action.

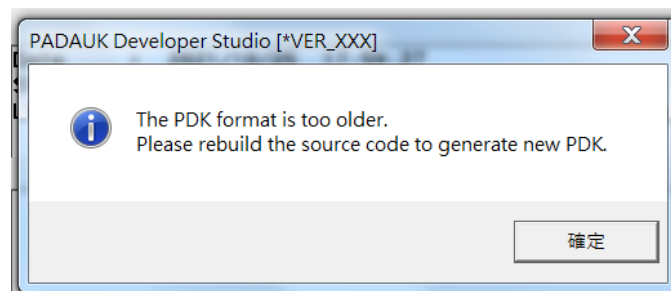


Fig. 9: PDK generated before IDE 0.91M1 may need to be recompiled and downloaded

- (7) Users can choose any of the above four strategies.
- (8) If you are not clear about the above instructions or have other questions, please contact FAE.