

**Purpose:** This Product Change Notification (PCN) is to provide notification to Phytex customers of component, process or other relevant engineering changes on a Phytex hardware subassembly. Impact, qualification, validation and approval of this change shall be documented on the corresponding Customer-Specific Modification (KSM/KSP) form for the Phytex hardware subassembly.

Per JEDEC Standard JESD46-D Section 3.2.3; lack of acknowledgment of this PCN within 30 days constitutes acceptance of change.

Type of Change		
Notice Date: <b>2017. 12.11</b> <yyyy.mm.dd>	LPN #: <b>LPN-237e_6</b>	<b>Update</b>
<input checked="" type="checkbox"/> Major Change <input type="checkbox"/> Minor Change		
<b>Description of Change:</b> Legacy Serial and Parallel NOR Flash MPN Terminations. In an effort to maximize manufacturing efficiency for Micron’s NOR Flash memory product line, and to better align with industry trends towards higher-density memories, Micron will be discontinuing production over the coming years of NOR Flash devices produced in its Fab-13 Singapore facility. For full support of the new Micron part, the PCB PL1362.5 is necessary.		
<p style="background-color: yellow;">Update: The discontinued Serial NOR Flash Micron N25Q128A13ESE40F (IM671 H600320) and the Micron replacement MT25QL128ABA1ESE-0SIT (IM867 H600320) are in allocation. As results of this situation PHYTEC can not offer an interims stock and final stock for the discontinued Micron N25Q128A13ESE40F (IM671 H600320). PHYTEC could order the components IM671 H600320 for the next 6 month in dependence of demand. The new replacement is the Winbond W25Q128JVSIM (IM888 H600570), which needed a minimal adjustment in software for Bootloader and Kernel. For the replacement part of Winbond an update of the test-software is necessary and a newer version of the Bootloader will be programmed on standard modules. The new Bootloader is based on Yocto BSP16.1.1, the version is "barebox v2016.11.0".</p>		
<b>Referenced Documents:</b> Micron PCN: 32162		
<b>Type of Change:</b> Component Change	<b>Impacted Component:</b> Flash	<b>Software Update necessary:</b> yes
Product Affected		
<b>Affected PHYTEC Productgroup:</b>	phyFLEX-i.MX 6	
<b>Affected PHYTEC Productgroup Part:</b>	PFL-A-02	
Anticipated impact on Form, Fit, Function, EMI, Quality or Reliability (positive / negative):		
(1) No impact in form or fit with the Winbond W25Q128JVSIM (2) Impact in function with the Winbond W25Q128JVSIM (patches at the end of this document) (3) Impact in function with the Micron MT25QL128ABA1ESE-0SIT and older SOM PCB than PL1263.5 (4) Impact in function with all standard modules, the modules will be delivered with a new Bootloader version		
Possible Measures		
<input checked="" type="checkbox"/> Change to new Phytex product revision with replacement part <input checked="" type="checkbox"/> Change to different option of product <input type="checkbox"/> Change to different Phytex product <input type="checkbox"/> Interims stock \ final stock		
Schedule		
<b>Last Time Buy (current product version):</b> . . . <yyyy.mm.dd> (Last date to set an order for the current product version) <b>ORDERS ARE NON-CANCELABLE AND NON-RETURNABLE.</b>		
<b>Samples of new PHYTEC product revision orderable:</b>	2017.12.04	
<b>Planned Mass production of new PHYTEC product revision:</b>	Q1/2018 (in dependence from stock)	

Product Affected	
Affected Product Number	Replacement Product Number
PFL-A-02-1323740I.A0	PFL-A-02-1323740I.A0
PFL-A-02-13237E0.A3	PFL-A-02-13237E0.A4
PFL-A-02-13237E0I.A2	PFL-A-02-13237E0I.A3
PFL-A-02-13247E0X.A0	PFL-A-02-13247E0X.A1
PFL-A-02-23237E0.A4	PFL-A-02-23237E0.A5
PFL-A-02-23237E0I.A4	PFL-A-02-23237E0I.A5
PFL-A-02-23247E0X.A1	PFL-A-02-23247E0X.A2
PFL-A-02-55237E0.A4	PFL-A-02-55237E0.A5
PFL-A-02-55237E0I.A0	PFL-A-02-55237E0I.A1
PFL-A-02-KSMxy.Az	PFL-A-02-KSMxy.Az+1
PFL-A-02-KSPxy.Az	PFL-A-02-KSPxy.Az+1

Engineering Change (Component, Firmware, Process, other)		
Current Part		New Part
IM671 H600320	<b>PHYTEC Internal Part #</b>	IM867 H600320 => allocation
Micron	<b>Manufacturer</b>	Micron
N25Q128A13ESE40F	<b>Manufacturer Part #</b>	MT25QL128ABA1ESE-OSIT
Serial NOR flash 128 Mbit	<b>Description</b>	Serial NOR flash 128 Mbit
	<b>PHYTEC Internal Part #</b>	IM888 H600570
	<b>Manufacturer</b>	Winbond
	<b>Manufacturer Part #</b>	W25Q128JVSIM
	<b>Description</b>	Serial NOR flash 128 Mbit

Technical Parameter			
Parameter	Original N25Q128A13ESE40F	Replacement W25Q128JVSIM	Assessment <sup>1</sup>
Package, pitch, form	8-pin SOP2 (208 mil), 5.49 x 8.1 x 2.16 mm, pitch 1.27 mm	8-pin SOP2 (208 mil), 5.49 x 8.1 x 2.16 mm, pitch 1.27 mm	2
Temperature	-40 to 85 °C	-40 to 85 °C	2
Supply voltage	VCC: 2.7 to 3.6 V ESD: +- 2000 V	VCC: 2.7 to 3.6 V ESD: +- 2000 V	2
Density	16 MByte (128 Mbit)	16 MByte (128 Mbit)	2
Interface	SPI-Interface	SPI-Interface	2
Count of chip select	1	1	2
Load capacitance	Max. 30 pF	Max. 30 pF	2

<sup>1</sup> Assessments:  
 1: Effects are to be expected  
 2: No negative effects are to be expected

Input rise and fall times	Max. 5 ns	Max. 5 ns	2
Input/output capacitance	Cin/out DQx: max. 8 pF Cin: max 6 pF	Cin/out DQx: max. 8 pF Cin: max 6 pF	2
Clock frequency	READ: max 54 MHz Other: max 108 MHz	READ: max 50 MHz Other: max 133 MHz	2
Page program time	Max. 5 ms	Max. 3 ms	2
Erase time	Sector erase: max. 3 s	Sector erase: max. 400 ms	2
Operating current	Program: max. 20 mA Erase: max. 20 mA Operating (fast): max. 15 mA	Program: max. 25 mA Erase: max. 25 mA Operating (fast): max. 15 mA	2
Standby current	Max. 100 µA	Max. 60 µA	2
Data retention	More than 20 years	Typ. 20 years	2
Erase cycle	Min. 100000 cycles per sector	Min. 100000 cycles per sector	2
Device ID	Manufacturer ID: 20h Device ID: BA18h	Manufacturer ID: EFh Device ID: 7018h	1
Security / write protection	<ul style="list-style-type: none"> <li>- Software write protection applicable</li> <li>- Hardware write protection</li> <li>- Additional smart protections, available upon request</li> </ul>	<ul style="list-style-type: none"> <li>- Software write protection</li> <li>- Hardware write protection</li> <li>- Power Supply Lock-Down and OTP protection</li> <li>- Top/Bottom, Complement array protection</li> <li>- Individual Block/Sector array protection</li> <li>- 64-Bit Unique ID for each device</li> <li>- Discoverable Parameters (SFDP) Register</li> <li>- 3X256-Bytes Security Registers with OTP locks</li> <li>- Volatile &amp; Non-volatile Status Register Bits</li> </ul>	2

**PHYTEC Qualification**

The new product(s) were qualified according to our company qualification procedure and best practices.

<input type="checkbox"/> PCB redesign was necessary, because	<input checked="" type="checkbox"/> Software Adaption was necessary, because Linux: Manufacture and Device unknown  Windows: Manufacture and Device unknown  Android: Manufacture and Device unknown
<input checked="" type="checkbox"/> Software tests were conducted with  BSP for testing: (1) i.MX 6 PD13.2.4 (barebox 2013.08.0-PD13.2.4) (2) i.MX 6 PD15.3.0 (barebox 2015.11.0-i.MX6-PD15.3.0) (3) i.MX 6 PD16.1.1 (barebox 2016.11.0-i.MX6-PD16.1.1)  Test steps and programs: (1) Hard boot and soft boot tests in our software test rack (2) MTD tools, memspeed, normal production test (3) Boot and MTD tests at room temperature and in climatic chamber, with a temperature of -40 °C, +70 °C and a temperature curve from -40 to + 70 °C (4) Thermal behavior of the module (5) Different mounting options of the module	

**Recommended Measures for Customer**

<input checked="" type="checkbox"/> Software update or patch <input checked="" type="checkbox"/> Linux BSP: fix release PD16.1.1 and in the upcoming new BSP PD18.1.0, also Patch in this document <input checked="" type="checkbox"/> backward compatible Link: <a href="ftp://ftp.phytec.de/pub/Software/Linux/BSP-Yocto-i.MX6/BSP-Yocto-i.MX6-PD16.1.1/">ftp://ftp.phytec.de/pub/Software/Linux/BSP-Yocto-i.MX6/BSP-Yocto-i.MX6-PD16.1.1/</a> <input type="checkbox"/> Windows BSP: <input type="checkbox"/> backward compatible Link: <input type="checkbox"/> Android BSP: <input type="checkbox"/> backward compatible Link:
<input type="checkbox"/> Update Programming Tool
<input checked="" type="checkbox"/> Fit integration test with your system and case. Phytec recommends that customers take this opportunity to review these changes against current application notes, system design considerations and customer environment conditions to assess impact (if any) to their application.  Check your test or program system with the new Bootloader (different prompt message). Yocto BSP is different to the PTXdist BSP, Yocto use a Otfree, Kernel and Rootfilesystem instead of Kernel and Rootfilesystem at PTXdist. To program a Bootloader based on PTXdist with the Yocto based Bootloader, is no problem.

**Note:**  
 Technical differences and similarities in the tables above may not be complete. Please refer to the manufacture datasheets for a complete comparison.

**Patch for PD13.2.4 (PTXdlist Version)**

Index: barebox-2013.08.0/drivers/mtd/devices/m25p80.c

```

=====
--- barebox-2013.08.0.orig/drivers/mtd/devices/m25p80.c 2017-10-12 14:55:30.072223277 +0200
+++ barebox-2013.08.0/drivers/mtd/devices/m25p80.c 2017-10-12 15:13:27.492436490 +0200
@@ -650,6 +650,9 @@
 { "640s33b", INFO(0x898913, 0, 64 * 1024, 128, 0) },
 { "n25q064", INFO(0x20ba17, 0, 64 * 1024, 128, 0) },

+ /* ISSI */
+ { "is25lp128", INFO(0x9d6018, 0, 64 * 1024, 256, 0) },
+
+ /* Macronix */
+ { "mx25l2005a", INFO(0xc22012, 0, 64 * 1024, 4, SECT_4K) },
+ { "mx25l4005a", INFO(0xc22013, 0, 64 * 1024, 8, SECT_4K) },
@@@ -745,6 +748,8 @@@
 { "w25q64", INFO(0xef4017, 0, 64 * 1024, 128, SECT_4K) },
 { "w25q80", INFO(0xef5014, 0, 64 * 1024, 16, SECT_4K) },
 { "w25q80bl", INFO(0xef4014, 0, 64 * 1024, 16, SECT_4K) },
+ { "w25q128jv", INFO(0xef7018, 0, 64 * 1024, 256, 0) },
+ { "w25q128jv", INFO(0xef4018, 0, 64 * 1024, 256, 0) },

+ /* Catalyst / On Semiconductor -- non-JEDEC */
+ { "cat25c11", CAT25_INFO( 16, 8, 16, 1) },

```

Kernel Patch: 2711-NOR-ISSI-IS25LP128-Winbond-W25Q128JVSIX.patch

Index: linux-3.0.35/drivers/mtd/devices/m25p80.c

```

=====
--- linux-3.0.35.orig/drivers/mtd/devices/m25p80.c 2017-10-16 15:52:40.014545170 +0200
+++ linux-3.0.35/drivers/mtd/devices/m25p80.c 2017-10-16 15:53:47.414215527 +0200
@@@ -678,6 +678,9 @@@
 { "320s33b", INFO(0x898912, 0, 64 * 1024, 64, 0) },
 { "640s33b", INFO(0x898913, 0, 64 * 1024, 128, 0) },

+ /* ISSI */
+ { "is25lq128", INFO(0x9d6018, 0, 64 * 1024, 256, 0) },
+
+ /* Macronix */
+ { "mx25l4005a", INFO(0xc22013, 0, 64 * 1024, 8, SECT_4K) },
+ { "mx25l8005", INFO(0xc22014, 0, 64 * 1024, 16, 0) },
@@@ -763,6 +766,8 @@@
 { "w25q32", INFO(0xef4016, 0, 64 * 1024, 64, SECT_4K) },
 { "w25x64", INFO(0xef3017, 0, 64 * 1024, 128, SECT_4K) },
 { "w25q64", INFO(0xef4017, 0, 64 * 1024, 128, SECT_4K) },
+ { "w25q128", INFO(0xef7018, 0, 64 * 1024, 256, 0) }, /* W25Q128JVSIM */
+ { "w25q128", INFO(0xef4018, 0, 64 * 1024, 256, 0) }, /* W25Q128JVSQ */

+ /* Catalyst / On Semiconductor -- non-JEDEC */
+ { "cat25c11", CAT25_INFO( 16, 8, 16, 1) },

```

**Patch for PD15.3.0 (Yocto Version)**

Barebox Patch: 0001-New-NOR-ISSI-IS25LP128-Winbond-W25Q128JVSIM.patch

---

drivers/mtd/spi-nor/spi-nor.c | 4 ++++  
1 file changed, 4 insertions(+)

diff --git a/drivers/mtd/spi-nor/spi-nor.c b/drivers/mtd/spi-nor/spi-nor.c  
index 27f4abc..b32711b 100644

--- a/drivers/mtd/spi-nor/spi-nor.c

+++ b/drivers/mtd/spi-nor/spi-nor.c

```
@@ -487,6 +487,9 @@ static const struct spi_device_id spi_nor_ids[] = {  
    {"320s33b", INFO(0x898912, 0, 64 * 1024, 64, 0)},  
    {"640s33b", INFO(0x898913, 0, 64 * 1024, 128, 0)},
```

```
+ /* ISSI */
```

```
+ {"is25lq128", INFO(0x9d6018, 0, 64 * 1024, 256, 0)},
```

```
+
```

```
/* Macronix */
```

```
 {"mx25l2005a", INFO(0xc22012, 0, 64 * 1024, 4, SECT_4K)},
```

```
 {"mx25l4005a", INFO(0xc22013, 0, 64 * 1024, 8, SECT_4K)},
```

```
@@ -607,6 +610,7 @@ static const struct spi_device_id spi_nor_ids[] = {
```

```
 {"w25q80", INFO(0xef5014, 0, 64 * 1024, 16, SECT_4K)},
```

```
 {"w25q80bl", INFO(0xef4014, 0, 64 * 1024, 16, SECT_4K)},
```

```
 {"w25q128", INFO(0xef4018, 0, 64 * 1024, 256, SECT_4K)},
```

```
+ {"w25q128", INFO(0xef7018, 0, 64 * 1024, 256, SECT_4K)},
```

```
 {"w25q256", INFO(0xef4019, 0, 64 * 1024, 512, SECT_4K)},
```

```
/* Catalyst / On Semiconductor -- non-JEDEC */
```

```
--
```

2.7.4

-----  
Kernel Patch: 0001-New-NOR-ISSI-IS25LP128-Winbond-W25Q128JVSIM.patch

---

drivers/mtd/spi-nor/spi-nor.c | 4 ++++  
1 file changed, 4 insertions(+)

diff --git a/drivers/mtd/spi-nor/spi-nor.c b/drivers/mtd/spi-nor/spi-nor.c  
index 14a5d23..7fb3231 100644

--- a/drivers/mtd/spi-nor/spi-nor.c

+++ b/drivers/mtd/spi-nor/spi-nor.c

```
@@ -560,6 +560,9 @@ static const struct spi_device_id spi_nor_ids[] = {  
    {"320s33b", INFO(0x898912, 0, 64 * 1024, 64, 0)},  
    {"640s33b", INFO(0x898913, 0, 64 * 1024, 128, 0)},
```

```
+ /* ISSI */
```

```
+ {"is25lq128", INFO(0x9d6018, 0, 64 * 1024, 256, 0)},
```

```
+
```

```
/* Macronix */
```

```
 {"mx25l2005a", INFO(0xc22012, 0, 64 * 1024, 4, SECT_4K)},
```

```
 {"mx25l4005a", INFO(0xc22013, 0, 64 * 1024, 8, SECT_4K)},
```

```
@@ -679,6 +682,7 @@ static const struct spi_device_id spi_nor_ids[] = {
```

```
 {"w25q80", INFO(0xef5014, 0, 64 * 1024, 16, SECT_4K)},
```

```
 {"w25q80bl", INFO(0xef4014, 0, 64 * 1024, 16, SECT_4K)},
```

```
 {"w25q128", INFO(0xef4018, 0, 64 * 1024, 256, SECT_4K)},
```

```
+ {"w25q128", INFO(0xef7018, 0, 64 * 1024, 256, SECT_4K)},
```

```
 {"w25q256", INFO(0xef4019, 0, 64 * 1024, 512, SECT_4K)},
```

```
/* Catalyst / On Semiconductor -- non-JEDEC */
```

```
--
```

2.7.4

Qualification Report					
Test Scenario	BSP	Test Condition	Test Units	Fails	Results
Barebox and Kernel hard- and soft- NOR-boot-tests	PD15.3.0 barebox v2015.11.0 Linux Kernel v4.1.18	Test rack at 25 °C 1000 cycles hard boots per unit 1000 cycles soft boots per unit	6	0	pass
Barebox and Kernel hard- and soft- NOR-boot-tests	PD16.1.1 barebox v2016.11.0 Linux Kernel v4.1.46	Test rack at 25 °C 1000 cycles hard boots per unit 1000 cycles soft boots per unit	6	0	pass
Temperature based Barebox hard-boot tests	PD13.2.4 barebox v2013.08.0	Climatic chamber at -40 °C 6000 cycles	3	0	pass
Linux mtd tools tests / mtd speed test	PD13.2.4 barebox v2013.08.0	Climatic chamber with a temperature curve 1 h -40 °C to 1 h +70 °C @22 h 386 cycles finished with a average time of 207 seconds per cycle	3	0	Min. 197 s Max. 218 s pass
Barebox detect of the NOR flash	PD13.2.4 barebox v2013.08.0 PD15.3.0 barebox v2015.11.0 PD16.1.1 barebox v2016.11.0	String to detect m25p80@00: w25q128jv (16384 Kbytes)	6	0	pass
Kernel detect of the NOR flash	PD13.2.4 Linux Kernel 3.0.35 PD15.3.0 Linux Kernel v4.1.18 PD16.1.1 Linux Kernel v4.1.46	String to detect m25p80 spi2.0: found w25q128 m25p80 spi2.0: w25q128 (16384 Kbytes)	6	0	pass
Thermal behavoir of the NOR flash	PD16.1.1 barebox v2016.11.0 Linux Kernel v4.1.46	Thermal picture at 25 °C and running mtd speed test	1	0	pass

Please contact our order team discuss interims or final stock of components for PHYTEC products.  
Please contact our support team, if you need any further information.

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### Revision History of the Document

- \_1: Initial document
- \_2: Update of some points
- \_3: Final version
- \_4: Update to other replacement Winbond
- \_5: Update with information about new Bootloader for standard products
- \_6: Update with qualification report