



# MICROCODE REVISION GUIDANCE

FEBRUARY 8 2018

# MCU RECOMMENDATIONS

The following table provides details on microcode updates currently planned by Intel

## LEGEND:

### Production Status:

- Planning – Intel is in pre-validation
- Pre-beta – Intel is performing early validation for this MCU
- Beta – Intel has released this production signed MCU under NDA for customer feedback
- Production – Intel has completed validation and is authorizing customers to use this MCU in a production environment

### Pre-Mitigation Production MCU:

- For products that have not yet released a Production MCU with mitigations for Variant 2 (Spectre), Intel recommends using this version of MCU. This does not impact mitigations for Variant 1 (Spectre) and Variant 3 (Meltdown).

### STOP deploying these MCU revs:

- Intel recommends to discontinue using these select versions of MCU that were previously released with mitigations for Variant 2 (Spectre) due to system stability issues.
- Lines with “\*\*\*\*” were previously recommended to discontinue use. Subsequent testing by Intel has determined that these were unaffected by the stability issues and have been re-released without modification.

**NOTE: ALL MCU REVISIONS IN THE TABLE ARE PRODUCTION SIGNED. NO CHANGES WILL BE REQUIRED TO THESE MCUS AS THEY MOVE FROM BETA TO PRODUCTION UNLESS A NEW REVISION IS REQUIRED TO ADDRESS ISSUES IDENTIFIED IN VALIDATION**

# MICROCODE UPDATE SCHEDULE AND VERSIONS

| Product Names                        | Public Name  | CPUID | Platform ID | Production Status | Pre-Mitigation Production MCU | STOP deploying these MCU revs | New Production MCU Rev |
|--------------------------------------|--|-------|-------------|-------------------|-------------------------------|-------------------------------|------------------------|
| Anniedale > Moorefield               | Intel® Atom® Processor Z3530, Z3560, Z3570, Z3580, Z3590   | 506A0 | 01          | Production        | ---                           | ---                           | 00000039               |
| Apollo Lake                          | Intel® Celeron® & Pentium® Processor Product Family  | 506C9 | 03          | Production        | ---                           | ---                           | 0000002E               |
| Apollo Lake                          | Intel® Pentium® J4205, N4200<br>Intel® Celeron® J3355, J3455, N3350, N3450<br>Intel® Atom® x5-E3930, x5-E3940, x7-E3950<br>Intel® Atom® A39xx Product Family   | 506CA | 03          | Production        | ---                           | ---                           | 00000008               |
| Arrandale, Clarkdale                 | Intel® Celeron® Mobile P4xxx, U3xxx Processor<br>Intel® Pentium® Mobile P6xxx, U5xxx Processor<br>Intel® Core™ i3-3xxE, i3-3xxM, i3-3xxUM Processor<br>Intel® Core™ i5-4xxM/UM, i5-5xxE/M/UM Processor<br>Intel® Core™ i7-6xxE/LE/UE/M/LM/UM Processor | 20655 | 92          | Planning          | 0x4                           | ---                           | ---                    |
| Arrandale, Clarkdale, Clarkdale Xeon | Intel® Xeon® Processor L3406   | 20652 | 12          | Planning          | 0xE                           | ---                           | ---                    |
| Avoton/Rangeley                      | Intel® Atom® Processor C2000 Product Family  | 406D8 | 01          | Production        | ---                           | ---                           | 00000129               |
| Bloomfield                           | Intel® Core™ i7-965/975 Extreme Processor<br>Intel® Core™ i7-9x0 Processor   | 106A4 | 03          | Planning          | 0x12                          | ---                           | ---                    |
| Bloomfield, Nehalem EP, Nehalem WS   | Intel® Core™ i7-920 Processor  | 106A5 | 03          | Planning          | 0x19                          | ---                           | ---                    |
| Broadwell DE A1                      | Intel® Xeon® Processor D-1500 NS Product Family  | 50665 | 10          | Beta              | ---                           | ---                           | ---                    |
| Broadwell DE V1                      | Intel® Xeon® Processor D-1500 Product Family   | 50662 | 10          | Beta              | 0x11                          | 0x14                          | ---                    |
| Broadwell DE V2,V3                   | Intel® Xeon® Processor D-1500 Product Family   | 50663 | 10          | Pre-Beta          | 0x700000C                     | 0x7000011                     | ---                    |

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| Product Names                          | Public Name   | CPUID | Platform ID | Production Status | Pre-Mitigation Production MCU | STOP deploying these MCU revs | New Production MCU Rev |
|--|---|-------|-------------|-------------------|-------------------------------|-------------------------------|------------------------|
| Broadwell DE YO                        | Intel® Xeon® Processor D-1500 Product Family  | 50664 | 10          | Pre-Beta          | 0xF00000A                     | ---                           | ---                    |
| Broadwell H 43e                        | 5th Generation Intel® Core™ Mobile Processor Family   | 40671 | 22          | Pre-Beta          | 0x17                          | 0x1B                          | ---                    |
| Broadwell Server E, EP, EP4S, EX       | Intel® Xeon® Processor E5v4 Product Family  | 406F1 | EF          | Beta              | 0x22                          | 0xB000023, 0xB000025          | ---                    |
| Broadwell U/Y                          | 5th Generation Intel® Core™ Processor Family, Intel® Pentium® Mobile Processor Family, and Intel® Celeron® Mobile Processor Family  | 306D4 | C0          | Beta              | 0x25                          | 0x28                          | ---                    |
| Broadwell Xeon E3                      | Intel® Xeon® Processor E3-1200 v4 Product Family  | 40671 | 22          | Pre-Beta          | 0x17                          | 0x1B                          | ---                    |
| Broxton                                | Intel® Atom® Scalable Platform  | 506C2 | 01          | Production        | ---                           | ---                           | 00000010               |
| Cannon Lake U 2+2, 2+0(GT0)            | TBD   | 60663 | 80          | Beta              | ---                           | ---                           | ---                    |
| Cherry View (Cherry Trail, Braswell)   | Intel® Atom® x5-Zxxxx CPU   | 406C3 | 01          | Production        | ---                           | ---                           | 00000367               |
| Cherry View (Cherry Trail, Braswell)   | Intel® Celeron® Processor Jxxxx<br>Intel® Celeron® Processor N3xxx<br>Intel® Pentium® Processor J3xxx<br>Intel® Pentium® Processor N3xxx<br>Intel® Atom® x5-E8000 Processor | 406C4 | 01          | Production        | ---                           | ---                           | 00000410               |
| Clarksfield, Lynnfield, Lynnfield Xeon | Intel® Core™ i7-7xxQM, i7-8xxQM Processor<br>Intel® Core™ i7-9xxXM Extreme Processor<br>Intel® Core™ i5-7xx, i5-7xxS<br>Intel® Core™ i7-8xx, i7-8xxS, i7-8xxK               | 106E5 | 13          | Planning          | 0x08                          | ---                           | ---                    |

# MICROCODE UPDATE SCHEDULE AND VERSIONS

| Product Names                               | Public Name   | CPUID | Platform ID | Production Status | Pre-Mitigation Production MCU | STOP deploying these MCU revs | New Production MCU Rev |
|---|---|-------|-------------|-------------------|-------------------------------|-------------------------------|------------------------|
| Coffee Lake H (6+2),<br>Coffee Lake S (6+2) | 8th Generation Intel® Core™ Processor Family  | 906EA | 22          | Beta              | 0x70                          | 0x80                          | ---                    |
| Coffee Lake S (6+2) Xeon E3                 | 8th Generation Intel® Core™ Processor Family  | 906EA | 22          | Beta              | 0x72                          | 0x80                          | ---                    |
| Coffee Lake U43e                            | 8th Generation Intel® Core™ Processor Family  | 806EA | C0          | Beta              | 0x70                          | 0x80                          | ---                    |
| Coffee Lake-S (4+2) + KBL PCH               | 8th Generation Intel® Core™ Desktop Processor Family  | 906EB | 02          | Beta              | 0x72                          | 0x80                          | ---                    |
| Coffee Lake-S (4+2) Xeon E3                 | 8th Generation Intel® Core™ Processor Family  | 906EB | 02          | Pre-Beta          | 0x72                          | 0x80                          | ---                    |
| Cougar Mountain (AMT)                       | Intel® Puma™ 7 Home Gateway   | 606E1 | 01          | Production        | ---                           | ---                           | 0x105                  |
| Denverton (GLM)                             | Intel® Atom® Processor C3000 Product Family   | 506F1 | 01          | Production        | ---                           | ---                           | 00000020               |
| Gemini Lake                                 | Intel® Pentium® Silver processors N5xxx, J5xxx<br>Intel® Celeron® processors N4xxx, J4xxx   | 706A1 | 01          | Production        | ---                           | ---                           | 00000022               |
| Harpertown                                  | Intel® Xeon® Processor X33xx  | 10676 | 40          | Planning          | 0x60F                         | ---                           | ---                    |
| Harpertown, Wolfdale DP                     | Intel® Core™ 2 processor, Intel® Pentium® Processor E   | 1067A | 44          | Planning          | 0xA0B                         | ---                           | ---                    |
| Haswell (including H, S)                    | 4th Generation Intel® Core™ Mobile Processor Family, Intel® Pentium® Mobile Processor Family, and Intel® Celeron® Mobile Processor Family | 306C3 | 32          | Pre-Beta          | 0x23                          | 0x23                          | ---                    |
| Haswell E3                                  | Intel® Xeon® Processor E3-1200 v3 Product Family  | 306C3 | 32          | Planning          | 0x23                          | 0x23                          | ---                    |
| Haswell Perf Halo                           | Intel® Core™ Extreme Processor (5960x, 5930x, 5820x)  | 40661 | 32          | Planning          | 0x17                          | 0x18                          | ---                    |
| Haswell Server E, EP                        | Intel® Xeon® Processor E5v3 Product Family  | 306F2 | 6F          | Beta              | 0x3A                          | 0x3B                          | ---                    |

# MICROCODE UPDATE SCHEDULE AND VERSIONS

| Product Names               | Public Name   | CPUID | Platform ID | Production Status | Pre-Mitigation Production MCU | STOP deploying these MCU revs | New Production MCU Rev |
|-----------------------------|---|-------|-------------|-------------------|-------------------------------|-------------------------------|------------------------|
| Haswell Server EX           | Intel® Xeon® Processor E7v3 Product Family  | 306F4 | 80          | Pre-Beta          | 0x9 (Windows), 0xF (Linux)    | 0x10                          | ---                    |
| Haswell ULT                 | 4th Generation Intel® Core™ Mobile Processor Family, Intel® Pentium® Mobile Processor Family, and Intel® Celeron® Mobile Processor Family | 40651 | 72          | Beta              | 0x20                          | 0x21                          | ---                    |
| Ivy Bridge                  | 3rd Generation Intel® Core™ Mobile Processor Family, Intel® Pentium® Mobile Processor Family, and Intel® Celeron® Mobile Processor Family | 306A9 | 12          | Pre-Beta          | 0x1B (Windows), 0x1C (Linux)  | ---                           | ---                    |
| Ivy Bridge E3               | Intel® Xeon® Processor E3-1200 v2 Product Family  | 306A9 | 12          | Pre-Beta          | 0x1B (Windows), 0x1C (Linux)  | ---                           | ---                    |
| Ivy Bridge Server E, EN, EP | Intel® Xeon® Processor E5v2 Product Family  | 306E4 | ED          | Beta              | 0x428                         | 0x42A                         | ---                    |
| Ivy Bridge Server EX        | Intel® Xeon® Processor E7v2 Product Family  | 306E7 | ED          | Pre-Beta          | 0x70D                         | ---                           | ---                    |
| Jasper (embedded Nehalem)   | Intel® Celeron® Processor P1053<br>Intel® Xeon® Processor ECxxxx, LCxxxx  | 106E4 | 09          | Planning          | ---                           | ---                           | ---                    |
| Kaby Lake H/S/X/G           | 7th Generation Intel® Core™ Processor Family  | 906E9 | 2A          | Beta              | 0x70                          | 0x80                          | ---                    |
| Kaby Lake Refresh U 4+2     | 8th Generation Intel® Core™ Mobile Processor Family   | 806EA | C0          | Beta              | 0x70                          | 0x80                          | ---                    |
| Kaby Lake U/Y, U23e         | 7th Generation Intel® Core™ Mobile Processors   | 806E9 | C0          | Beta              | 0x70                          | 0x80                          | ---                    |
| Kaby Lake Xeon E3, Greenlow | 7th Generation Intel® Core™ Processor Family  | 906E9 | 2A          | Beta              | 0x70                          | 0x80                          | ---                    |
| Knights Landing             | Intel® Xeon® Phi™ Processor 72xx  | 50671 | 78          | Production        | ---                           | ---                           | 0x1B6                  |
| Knights Mill                | Intel® Xeon® Phi™ Processor Family  | 80650 | 08          | Production        | ---                           | ---                           | 0x18                   |

# MICROCODE UPDATE SCHEDULE AND VERSIONS

| Product Names                  | Public Name   | CPUID | Platform ID | Production Status | Pre-Mitigation Production MCU  | STOP deploying these MCU revs | New Production MCU Rev |
|--------------------------------|---|-------|-------------|-------------------|--------------------------------|-------------------------------|------------------------|
| Nehalem EX                     | Intel® Xeon® 65xx, Intel® Xeon® 75xx  | 206E6 | 04          | Planning          | 0x0B                           | ---                           | ---                    |
| Penryn QC, Wolfdale, Yorkfield | Intel® Core™2 Extreme Processor QX9300, QX9650, QX9770, QX9775, X9000, X9100<br>Intel® Core™2 Quad Processor Q8200, Q8200S, Q8300, Q8400, Q8400S, Q9300, Q9400, Q9400S, Q9450, Q9500, Q9505, Q9505S, Q9550, Q9550S, Q9650, Q9000, Q9100<br>Intel® Core™2 Duo Processor E7200, E7300, E7400, E7500, E7600, E8190, E8200, E8300, E8400, E8500, E8600, T6400, T6500, T6670, T8100, T8300, T9300, T9400, T9500, T9550, T9600, T9800, T9900, SU9300, SU9400, SU9600, SP9300, SP9400, SP9600, SL9380, SL9400, SL9600, SL9300, P7350, P7370, P7450, P7550, P7570, P8400, P8600, P8700, P8800, P9500, P9600, P9700<br>Intel® Core™2 Solo Processor SU3500, ULV SU3500, ULV SU3300<br>Intel® Pentium® Processor E5200, E5300, E5400, E5500, E5700, E5800, E6300, E6500, E6500K, E6600, E6700, E6800, T4200, T4300, T4400, T4500<br>Intel® Celeron® Processor 900, 925, E3200, E3300, E3400, E3500, SU2300, T3100, T3300, T3500, ULV 763<br>Intel® Celeron® M Processor ULV 722, ULV 723, ULV 743 | 1067A | B1          | Planning          | 0xAOC (Windows), 0xA0B (Linux) | ---                           | ---                    |

# MICROCODE UPDATE SCHEDULE AND VERSIONS

| Product Names                  | Public Name  | CPUID | Platform ID | Production Status | Pre-Mitigation Production MCU | STOP deploying these MCU revs | New Production MCU Rev |
|--------------------------------|--|-------|-------------|-------------------|-------------------------------|-------------------------------|------------------------|
| Sandy Bridge                   | Intel® Core™ i3-21xx/23xx-T/M/E/UE Processor<br>Intel® Core™ i5-23xx/24xx/25xx-T/S/M/K Processor<br>Intel® Core™ i7-2xxx-S/K/M/QM/LE/UE/QE Processor<br>Intel® Core™ i7-29xxXM Extreme Processor<br>Intel® Celeron® Desktop G4xx, G5xx Processor<br>Intel® Celeron® Mobile 8xx, B8xx Processor<br>Intel® Pentium® Desktop 350, G6xx, G6xxT, G8xx Processor<br>Intel® Pentium® Mobile 9xx, B9xx Processor | 206A7 | 12          | Pre-Beta          | 0x29                          | ---                           | ---                    |
| Sandy Bridge E3                | Intel® Xeon® Processor E3-1200 Product Family  | 206A7 | 12          | Pre-Beta          | 0x29                          | ---                           | ---                    |
| Sandy Bridge Server EN/EP/EP4S | Intel® Xeon® Processor E5 Product Family   | 206D6 | 6D          | Pre-Beta          | 0x619                         | ---                           | ---                    |
| Sandy Bridge Server EN/EP/EP4S | Intel® Xeon® Processor E5 Product Family   | 206D7 | 6D          | Pre-Beta          | 0x710                         | ---                           | ---                    |
| Skylake D, Bakerville          | Intel® Xeon® D-2100 processor  | 50654 | B7          | Beta              | 0x2000035                     | 0x200003A,<br>0x200003C       | ---                    |
| Skylake E3                     | Intel® Xeon® Processor E3-1200 v5 Product Family   | 506E3 | 36          | Beta              | 0xBA                          | ---***                        | ---                    |
| Skylake H/S                    | 6th Generation Intel® Core™ Processor Family   | 506E3 | 36          | Production        | ---                           | ---***                        | 0xC2***                |
| Skylake Server                 | Intel® Xeon® Scalable Processor Family   | 50654 | B7          | Beta              | 0x2000035                     | 0x200003A<br>0x200003C,       | ---                    |
| Skylake U/Y                    | 6th Generation Intel® Core™ m Processors   | 406E3 | C0          | Production        | ---                           | ---***                        | 0xC2***                |
| Skylake U23e                   | 6th Generation Intel® Core™ m Processors   | 406E3 | C0          | Production        | ---                           | ---***                        | 0xC2***                |



# MICROCODE UPDATE SCHEDULE AND VERSIONS

| Product Names                       | Public Name  | CPUID | Platform ID | Production Status | Pre-Mitigation Production MCU | STOP deploying these MCU revs | New Production MCU Rev |
|-------------------------------------|--|-------|-------------|-------------------|-------------------------------|-------------------------------|------------------------|
| Skylake X, Basin Falls              | Intel® Core™ i9 79xxX, 78xxX   | 50654 | B7          | Beta              | 0x200002E                     | 0x200003A, 0x200003C          | ---                    |
| SoFIA 3G ES2.1 and Granite 4        | Intel® Atom® x3-C3130 Processor  | 506D1 | 02          | Production        | ---                           | ---                           | 00000103               |
| SoFIA 3GR                           | Intel® Atom® x3-C3230RK Processor<br>Intel® Atom® x3-C3200RK Processor   | 506D1 | 02          | Planning          | ---                           | ---                           | ---                    |
| Tangier (SLM)                       | Intel® Atom® Processor Z34XX   | 406A8 | 01          | Production        | ---                           | ---                           | 00000831               |
| Tangier (SLM)                       | Intel® Atom® Processor Z34XX   | 406A9 | 01          | Production        | ---                           | ---                           | 00000831               |
| Valleyview, Baytrail M/D/I D0, D1   | Intel® Atom® Processor E3800 Product Family<br>Intel® Celeron® Processor N2807, N2930<br>Intel® Pentium® Processor J1800, J1900              | 30679 | 0C          | Production        | ---                           | ---                           | 0000090A               |
| Valleyview, Baytrail M/D/T C0       | Intel® Celeron® Processor Nxxxx<br>Intel® Pentium® Processor Jxxxx<br>Intel® Atom® Processor Z3740D<br>Intel® Pentium® Processor J2900       | 30678 | 02          | Production        | ---                           | ---                           | 00000836               |
| Valleyview, Baytrail M/D/T/I B2, B3 | Intel® Celeron® Processor Nxxxx<br>Intel® Pentium® Processor Jxxxx<br>Intel® Atom® Processor Z3740D  | 30673 | 01          | Production        | ---                           | ---                           | 0000326                |
| Westmere EX (EGL, WSM)              | Intel® Xeon® Processor E7 Product Family   | 206F2 | 05          | Planning          | 0x37                          | ---                           | ---                    |
| Westmere WS, Westmere EP, Gulftown  | Legacy Intel® Xeon® Processor 5600 Product Family, W36xx<br>Intel® Core™ i7-970, 980<br>Intel® Core™ Processor Extreme Edition i7-980X, 990X | 206C2 | 03          | Planning          | 0xF                           | ---                           | ---                    |

# MICROCODE UPDATE SCHEDULE AND VERSIONS

| Product Names                                      | Public Name   | CPUID | Platform ID | Production Status | Pre-Mitigation Production MCU  | STOP deploying these MCU revs | New Production MCU Rev |
|--|---|-------|-------------|-------------------|--------------------------------|-------------------------------|------------------------|
| Wolfdale DP  | Intel® Xeon® 5200 Family  | 10676 | 04          | Planning          | 0x60F                          | ---                           | ---                    |
| Wolfdale, Wolfdale Xeon, Yorkfield Xeon            | Intel® Xeon® Processor X, E, L  | 10676 | 91          | Planning          | 0x610 (Windows), 0x60F (Linux) | ---                           | ---                    |
| Wolfdale, Wolfdale Xeon, Yorkfield, Yorkfield Xeon | Intel® Celeron® Desktop E3xxx Processor<br>Intel® Core™2 Duo E7xxx, E8xxx Processor<br>Intel® Pentium® E5xxx, E6xxx, E6xxxK Processor<br>Intel® Core™2 Quad Q9xxx, Q8xxx, Q9xxxS Processor<br>Intel® Core™ Extreme QX9xxx Processor | 1067A | 44          | Planning          | 0xA0B                          | ---                           | ---                    |
| XGold 7272   | Intel® XMM™ 7272 Modem  | 60650 | 01          | Production        | ---                            | ---                           | 00000015               |
| Yorkfield, XE, Xeon                                | Intel® Core™2 Extreme Processor, Intel® Core™2 Quad Processor   | 10677 | 10          | Planning          | 0x70B (Windows), 0x70A (Linux) | ---                           | ---                    |

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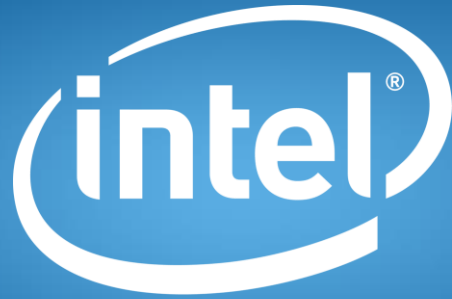
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