”1” - Unprogrammed — ”0” - Programmed

1 Fuse Bits

- Atmeta328P Has three fuse Byte.

1.1 Extended Fuse Byte

7	6	5	4	3	2	1	0
-	-	-	-	-	BODLEVEL2	BODLEVEL1	BODLEVEL0

- V_{BOT} - Brown-out Threshold Voltage

BODLEVEL[2:0]	**Min** V_{BOT}	**Typ** V_{BOT}	**Max** V_{BOT}
111	BOD disabled		
101	2.5	2.7	2.9
100	4.0	4.3	4.6

1.2 High Fuse Byte

7	6	5	4	3	2	1	0
RSTDISBL	DWEN	SPIEN	WDTON	EESAVE	BOOTSZ1	BOOTSZ0	BOOTRST

High Fuse Byte	Description	Default Value
RSTDISBL	External reset disable - disable external reset pin and use as input or output pin	1
DWEN	debugWIRE enable - enabled debugWIRE interface	1
SPIEN	Enable serial program and data downloading	0 - enable SPI programming
WDTON	Watchdog timer always On	1
EESAVE	EEPROM memory is preserved through chip erase	1
BOOTSZ1	Select boot size	0
BOOTSZ0	Select boot size	0
BOOTRST	Select reset vector - select reset vector location	1

BOOTSZ[1:0]	Boot size	Pages	Application Flash Section	Boot Loader Falash Section
11	256 words	4	0x0000 - 0x3EFF	0x3F00 - 0x3FFF
10	512 words	8	0x0000 - 0x3DFF	0x3E00 - 0x3FFF
01	1024 words	16	0x0000 - 0x3BFF	0x3C00 - 0x3FFF
00	2048 words	32	0x0000 - 0x37FF	0x3800 - 0x3FFF

1.3 Low Fuse Byte

7	6	5	4	3	2	1	0
CKDIV8	CKOUT	SUT1	SUT0	CKSEL3	CKSEL2	CKSEL1	CKSEL0

High Fuse Byte	Description	Default Value
CKDIV8	Divide clock by 8	0 - Divide clock by 8 and use as CPU clock
CKOUT	Clock output	1
SUT1	Select start-up time	1
SUT0	Select start-up time	0
CKSEL3	Select clock source	0
CKSEL2	Select clock source	0
CKSEL1	Select clock source	1
CKSEL0	Select clock source	1

CKSEL[3:0]	Device Clocking Option
1111 - 1000	Low power crystall oscillator
0111 - 0110	Full swing crystal oscillator
0101 - 0100	Low frequency crystal oscillator
0011	Internal 128kHz RC oscillator
0010	Calibrated internal RC oscillator
0000	External clock

2 Signature Bytes

- All Atmel microcontrollers have a three-byte Signature code which identifies the devices.

Part	Sinature Bytes Address		
	0x000	0x001	0x002
ATmega328P	0x1E	0x95	0x0F

3 Calibration Byte

- The Atmel ATmega328P has a byte calibration value for the internal RC oscillator.
- This byte resides in the high byte of address 0x000 in the signature address space.
- During reset, this byte is automatically written into the **OSCCAL** register to ensure correct frequency of the calibrated RC oscillator.