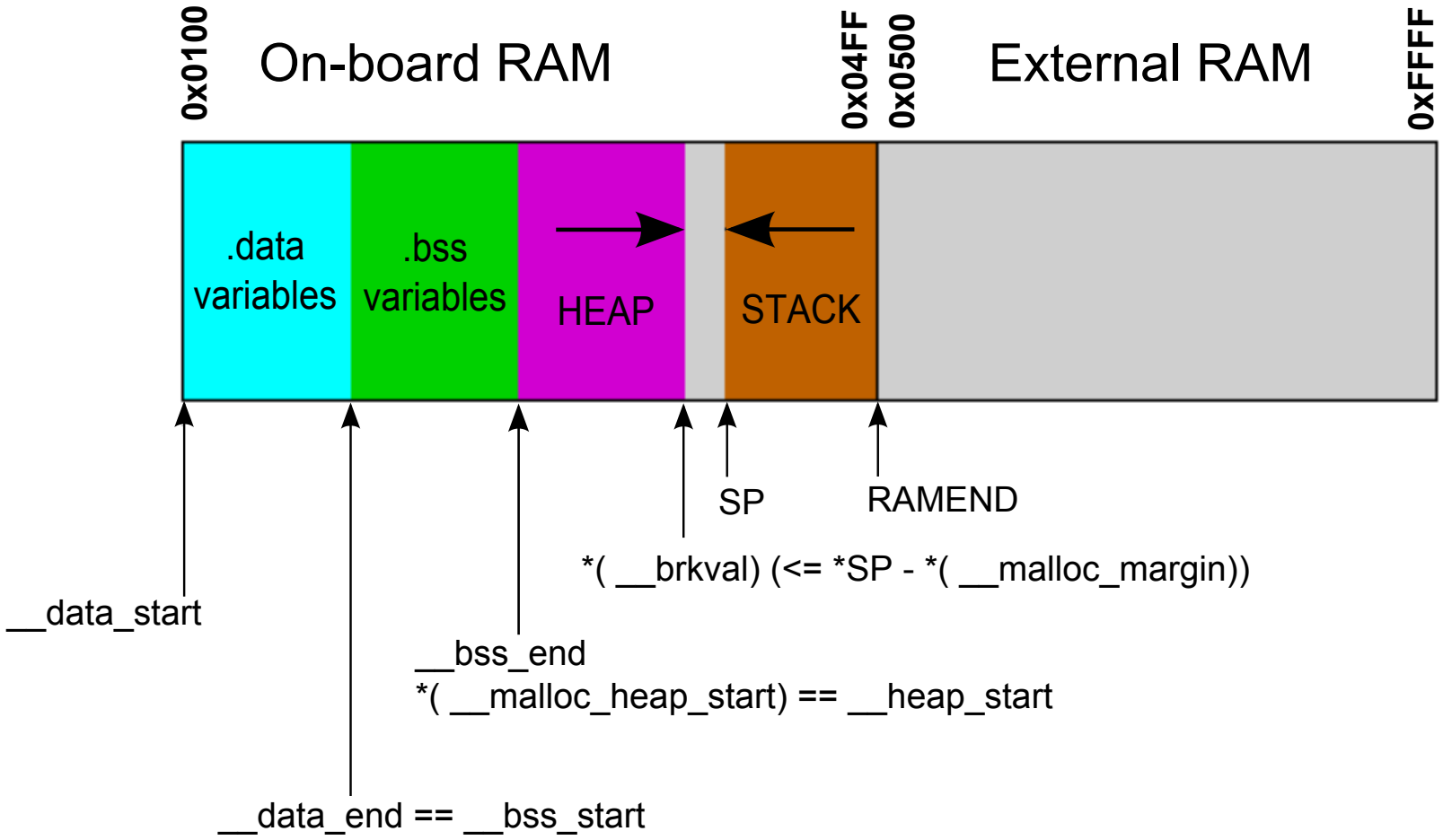
Using Memory Efficiently

Discussion VI (Version 2.0)

UMBC - CE

October 7, 2014

Version 1.0 - Initial Document
Version 2.0 - Fixed Typos


0x0100
On-board RAM
0x04FF
0x0500
External RAM
0xFFFF
.data variables
.bss variables
HEAP
STACK
SP
RAMEND
*(__brkval) (<= *SP - *(__malloc_margin))
__data_start
__bss_end
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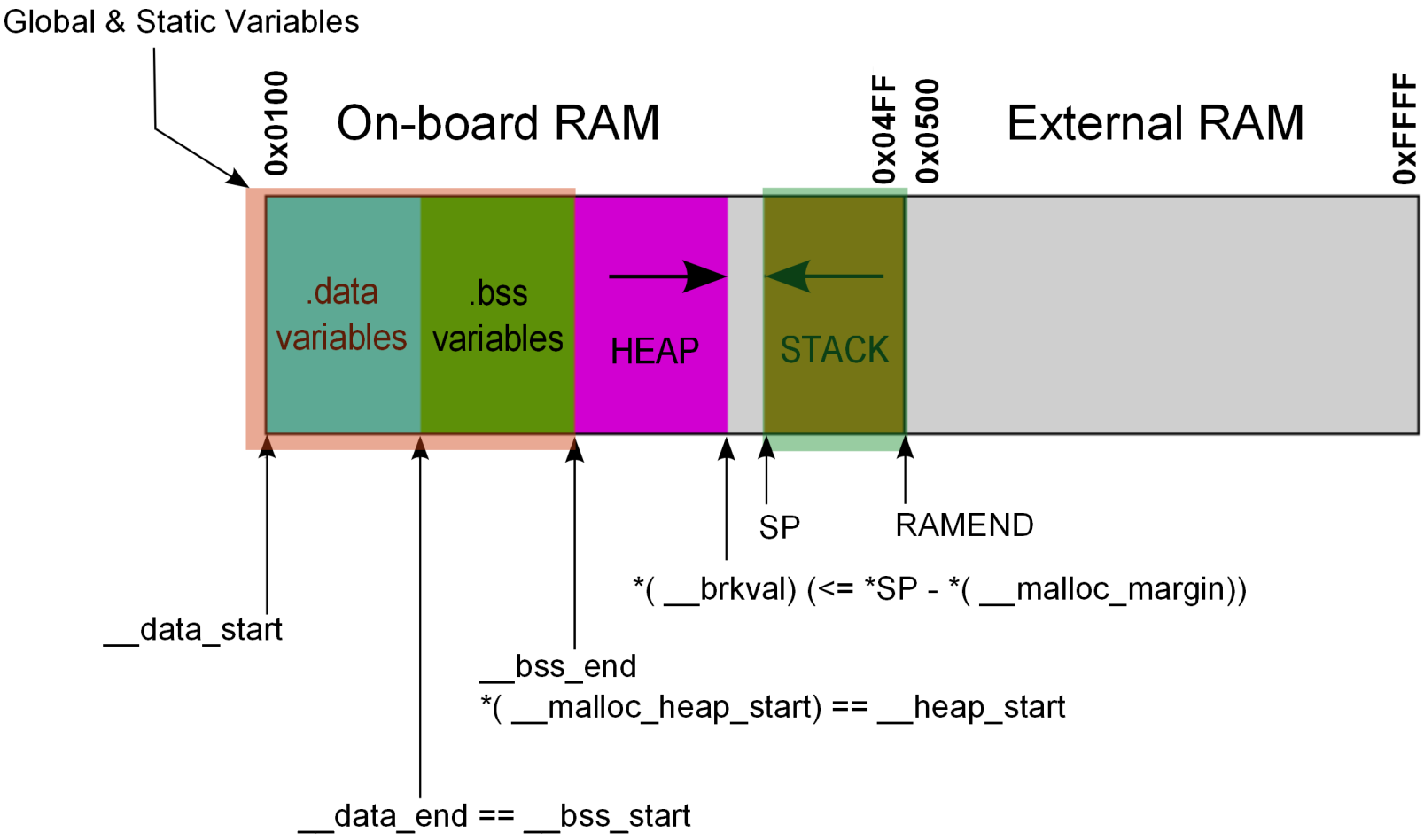
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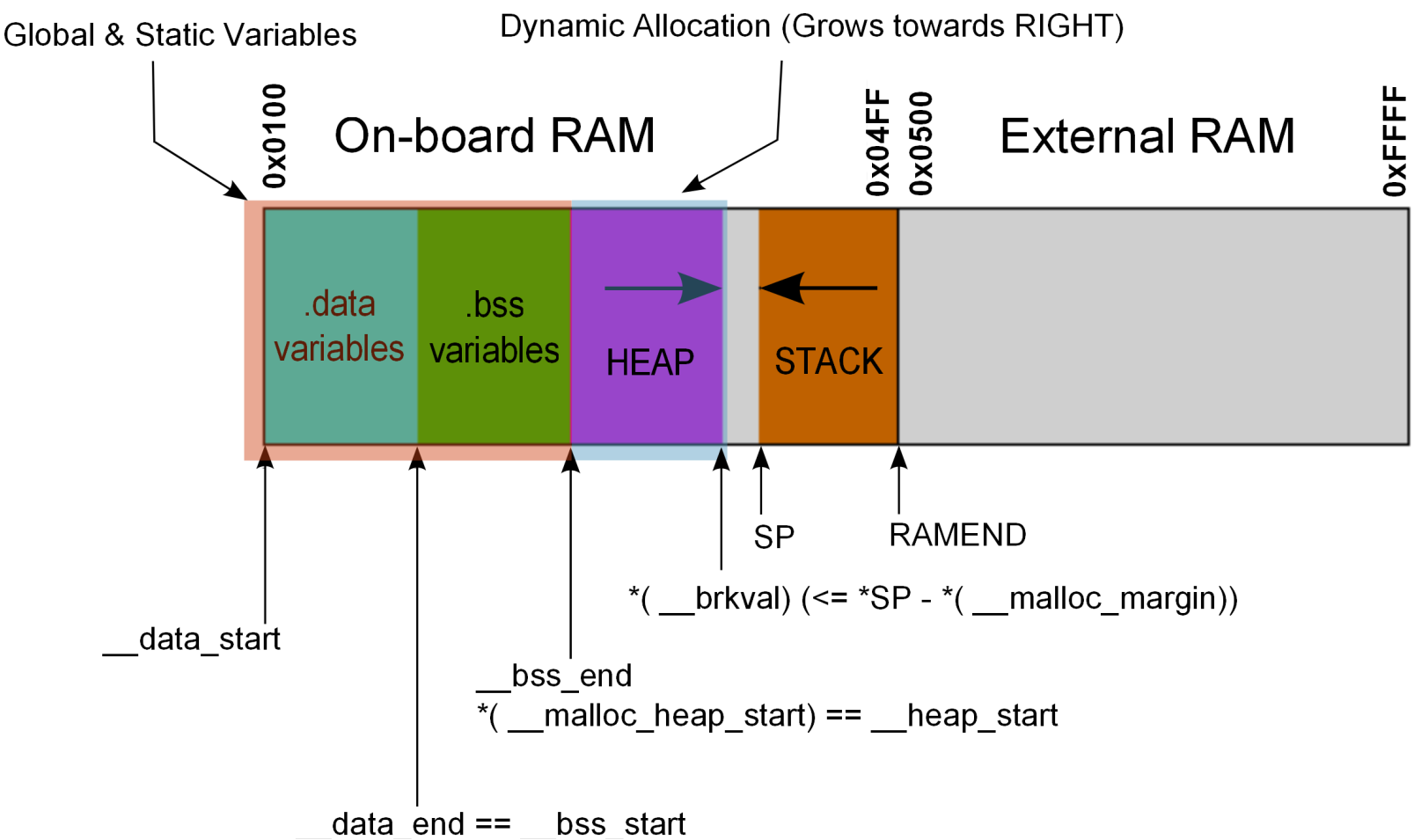
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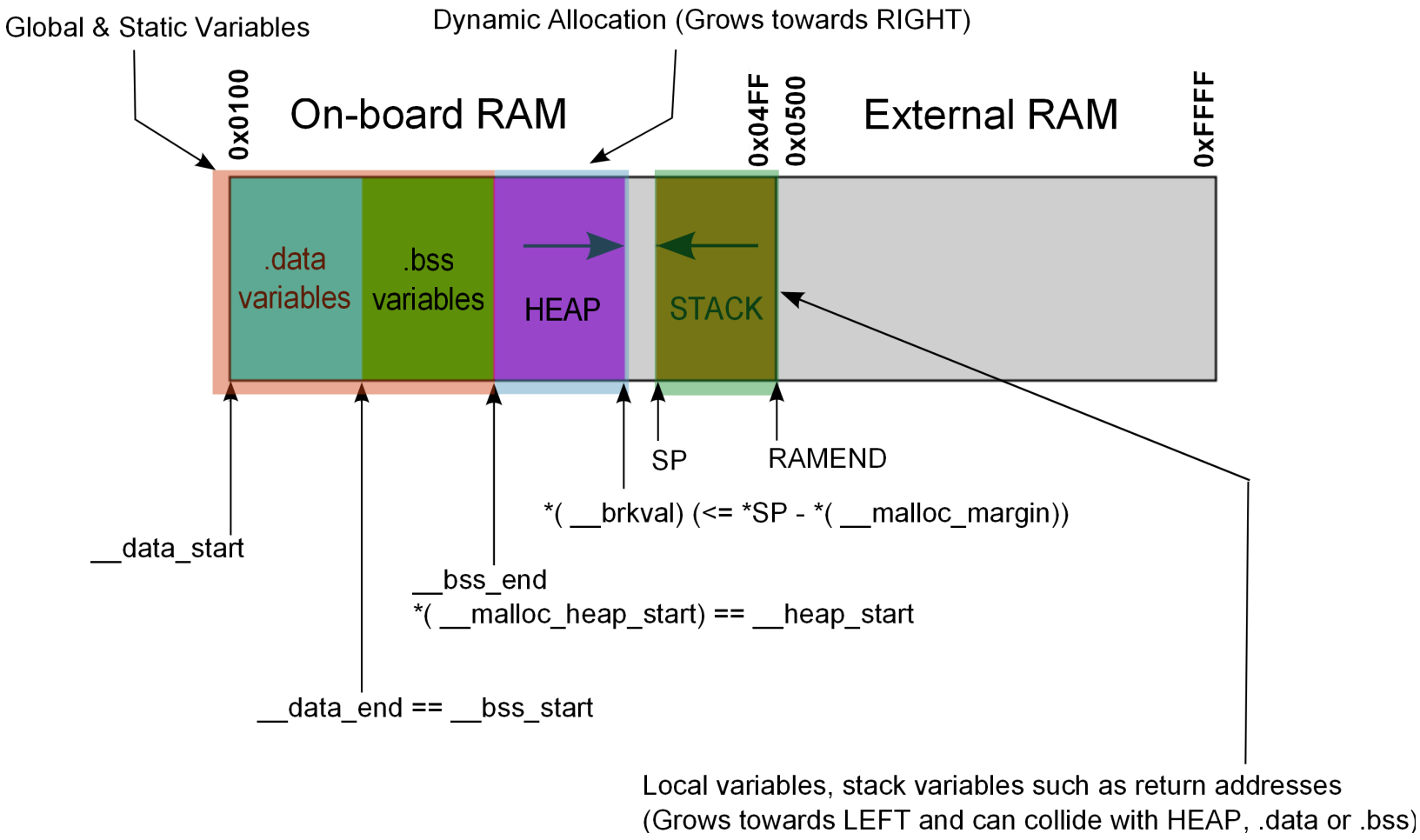
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Local variables, stack variables such as return addresses
(Grows towards LEFT and can collide with HEAP, .data or .bss)

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- Documentation for memory sections available from here

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- Example functions available in stdio.h
  - printf_P
  - sprintf_P
  - fprintf_P
  - fputs_P
  - fscanf_P

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Examples

```
PGM_P progPtr;
progPtr =myString;

//Somewhere in your code

  while(pgm_read_byte(progPtr)!='\0'){

  printf("%c",pgm_read_byte(progPtr));
  progPtr++;

  }
```

Examples

```
#include <avr/pgmspace.h>
void lcd_puts_P(const char c[]) { //same const char *c
uint8_t ch = pgm_read_byte(c);
while(ch != 0) {
lcd_putc(ch);
ch = pgm_read_byte(++c);
}  }
// Usage:  Note PSTR macro which simplifies placing string
//         literals in flash ROM
//   Code: lcd_puts_P(PSTR("Hello World"));
//     Or: const PROGMEM char SOME_STRING[]  = "Repeated Use";
//         lcd_puts_P(SOME_STRING);
```