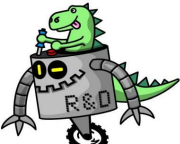


ARDUINO CHEAT SHEET V.02c

Mostly taken from the extended reference:
<http://arduino.cc/en/Reference/Extended>
 Gavin Smith – Robots and Dinosaurs, The Sydney Hackspace



	ATmega168	ATmega328	ATmega1280
Flash (2k for bootloader)	16kB	32kB	128kB
SRAM	1kB	2kB	8kB
EEPROM	512B	1kB	4kB

Structure

```
void setup() void loop()
```

Control Structures

```
if (x<5) { } else { }
switch (myvar) {
  case 1:
    break;
  case 2:
    break;
  default:
    break;
}
for (int i=0; i<= 255; i++){ }
while (x<5) { }
do { } while (x<5);
continue; //Go to next in do/for/while loop
return x; // Or 'return;' for voids.
goto // considered harmful :-)
```

Further Syntax

```
// (single line comment)
/* (multi-line comment) */
#define DOZEN 12 //Not baker's!
#include <avr/pgmspace.h>
```

General Operators

```
= (assignment operator)
+ (addition) - (subtraction)
* (multiplication) / (division)
% (modulo)
== (equal to) != (not equal to)
< (less than) > (greater than)
<= (less than or equal to)
>= (greater than or equal to)
&& (and) || (or) !(not)
```

Pointer Access

```
& reference operator
* dereference operator
```

Bitwise Operators

```
& (bitwise and) | (bitwise or)
^ (bitwise xor) ~ (bitwise not)
<< (bitshift left) >> (bitshift right)
```

Compound Operators

```
++ (increment) -- (decrement)
+= (compound addition)
-= (compound subtraction)
*= (compound multiplication)
/= (compound division)
&= (compound bitwise and)
|= (compound bitwise or)
```

Constants

```
HIGH | LOW
INPUT | OUTPUT
true | false
143 // Decimal number
0173 // Octal number
0b11011111 //Binary
0x7B // Hex number
7U // Force unsigned
10L // Force long
15UL // Force long unsigned
10.0 // Forces floating point
2.4e5 // 240000
```

Data Types

```
void
boolean (0, 1, false, true)
char (e.g. 'a' -128 to 127)
unsigned char (0 to 255)
byte (0 to 255)
int (-32,768 to 32,767)
unsigned int (0 to 65535)
word (0 to 65535)
long (-2,147,483,648 to 2,147,483,647)
float (-3.4028235E+38 to 3.4028235E+38)
double (currently same as float)
sizeof(myint) // returns 2 bytes
```

Strings

```
char S1[15];
char S2[8]='a','r','d','u','i','n','o';
char S3[8]='a','r','d','u','i','n','o','\0';
//Included \0 null termination
char S4[] = "arduino";
char S5[8] = "arduino";
char S6[15] = "arduino";
```

Arrays

```
int myInts[6];
int myPins[] = { 2, 4, 8, 3, 6 };
int mySensVals[6] = { 2, 4, -8, 3, 2};
```

Conversion

```
char() byte()
int() word()
long() float()
```

Qualifiers

```
static // persists between calls
volatile // use RAM (nice for ISR)
const // make read-only
PROGMEM // use flash
```

Digital I/O

```
pinMode(pin, [INPUT,OUTPUT])
digitalWrite(pin, value)
int digitalRead(pin)
//Write High to inputs to use pull-up res
```

Analog I/O

```
analogReference([DEFAULT,INTERNAL,EXTERNAL])
int analogRead(pin) //Call twice if switching pins from high Z source.
analogWrite(pin, value) // PWM
```

Advanced I/O

```
tone(pin, freqhz)
tone(pin, freqhz,duration_ms)
noTone(pin)
shiftOut(dataPin, clockPin, [MSBFIRST,LSBFIRST], value)
unsigned long pulseIn(pin, [HIGH,LOW])
```

Time

```
unsigned long millis() // 50 days overflow.
unsigned long micros() // 70 min overflow
delay(ms)
delayMicroseconds(us)
```

Math

```
min(x, y) max(x, y) abs(x)
constrain(x, minval, maxval )
map(val, fromL, fromH, toL, toH)
pow(base, exponent) sqrt(x)
sin(rad) cos(rad) tan(rad)
```

Random Numbers

```
randomSeed(seed) // Long or int
long random(max)
long random(min, max)
```

Bits and Bytes

```
lowByte() highByte()
bitRead(x,bitn) bitWrite(x,bitn,bit)
bitSet(x,bitn) bitClear(x,bitn)
bit(bitn) //bitn: 0-LSB 7-MSB
```

External Interrupts

```
attachInterrupt(interrupt, function, [LOW,CHANGE,ISING,FALLING])
detachInterrupt(interrupt)
interrupts()
noInterrupts()
```

Libraries:

```
Servo.
begin([300, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200])
end()
int available()
int read()
flush()
print()
println()
write()
```

EEPROM (#include <EEPROM.h>)

```
byte read(intAddr)
write(intAddr,myByte)
```

Servo (#include <Servo.h>)

```
attach(pin , [min_uS, max_uS])
write(angle) // 0-180
writeMicroseconds(uS) //1000-2000, 1500 is midpoint
read() // 0-180
attached() //Returns boolean
detach()
```

SoftwareSerial(RxPin,TxPin)

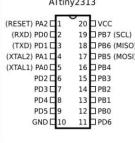
```
// #include<SoftwareSerial.h>
begin(longSpeed) // up to 9600
char read() // blocks till data
print(myData) or println(myData)
```

Wire (#include <Wire.h>) // For I2C

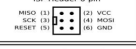
```
begin() // Join as master
begin(addr) // Join as slave @ addr
requestFrom(address, count)
beginTransmission(addr) // Step 1
send(mybyte) // Step 2
send(char * mystring)
send(byte * data, size)
endTransmission() // Step 3
byte available() // Num of bytes
byte receive() //Return next byte
onReceive(handler)
onRequest(handler)
```

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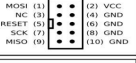
ATtiny2313




ISP Header 6-pin



ISP Header 10-pin



FTDI Cable



ATmega48/88/168/328 Arduino