

Logical Operations

AND

x x x x x x x x

AND 1 1 1 1 1 1 1 1 0 ← mask

x x x x x x x 0

'a' 0110 0001

'A' 0100 0001

'b' 0110 0010

'B' 0100 0010

⋮

'y' 0111 1001

'Y' 0101 1001

'z' 0111 1010

'Z' 0101 1010

xxxx xxzz

AND

1101 1111

xx0x xxxx

Convert

lowercase

ASCII to

uppercase

ASCII)

10' 0011 0000
0 0000 0000

single-digit
ASCII

xxxx xxxx

11' 0011 0001
0000 0001

AND

0000 1111

mask

12' 0011 0010
0000 0010

⋮

Numeric
single
digit
value

19' 0011 1001
0000 1001

Convert uppercase ASCII letter
to lowercase ASCII letter

OR

xxxx	xxxx
0010	0000 ← mask

Convert an unsigned digit 0-9
to ASCII characters

OR

0000	xxxx
0011	0000

0011	xxxx
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Change to MSB

(Take the complement of the MSB)

x x x x x x x x

XDR 1 0 0 0 0 0 0 0

$\overline{1}$
x x x x x x x x