CHARACTER MODULE COMMANDS

COMMANDS/CODES/DISCRIPTION

COMMAND	CODE RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	DESCRIPTION	EXECUTING TIME (FOSC = 270KHZ)
CLEAR DISPLAY	0	0	0	0	0	0	0	0	0	1	CLEAR THE DISPLAY AND RETURN THE CURSOR TO THE HOME POSITION (ADDRESS 0)	82µS - 1.64MS
RETURN HOME	0	0	0	0	0	0	0	0	1	∗	RETURN THE CURSOR TO THE HOME POSITION (ADDRESS 0); ALSO RETURN A SHIFTED DISPLAY TO THE HOME POSITION. DDRAM CONTENTS REMAIN UNCHANGED.	40µS - 1.64MS
ENTRY MODE SET	0	0	0	0	0	0	0	1	I/D	S	SET THE CURSOR`S MOVE DIRECTION AND ENABLE/DISABLE THE DISPLAY	40µS
DISPLAY ON/OFF CONTROL	0	0	0	0	0	0	1	D	C	B	TURN THE DISPLAY ON/OFF(D), OR THE CURSOR ON/OFF(C), AND BLINK OF THE CHARACTER AT THE CURSOR POSITION(B).	40µS
CURSOR & DISPLAY SHIFT	0	0	0	0	0	1	S/C	R/L	∗	∗	MOVE THE CURSOR AND SHIFT THE DISPLAY WITHOUT CHANGING DD RAM CONTENTS.	40µS
FUNCTION SET	0	0	0	1	DL	N	F	∗	∗		SET THE DATA WIDTH(DL), THE NUMBER OF LINES IN DISPLAY(N), AND THE CHARACTER FONT(F).	40µS
SET CG RAM ADDRESS	0	0	0	1	ACG						SET THE CG RAM ADDRESS. CG RAM DATA CAN BE READ OR ALTERED AFTER MAKING THIS SETTING.	40µS
SET DD RAM ADDRESS	0	0	1	ADD							SET DD RAM ADDRESS. DATA MAY BE WRITTEN OR READ AFTER MAKING THIS SETTING.	40µS
READ BUSY FLAG & ADDRESS	0	1	BF	AC							READ THE BUSY FLAG(BF) INDICATING THAT AN INTERNAL OPERATION IS BEING PERFORMED AND READ THE ADDRESS COUNTER CONTENTS.	1µS
WRITE DATA TO CG RAM OR DD RAM	1	0	WRITE DATA								WRITE DATA INTO DD RAM OR CG RAM.	43µS
READ DATA FROM CG OR DD RAM	1	1	READ DATA								READ DATA FROM DD RAM OR CG RAM.	43µS

I/D=1: INCREMENT   I/D=0 DECREMENT
S=1: ACCOMPANIES DISPLAY SHIFT
S/C=1: DISPLAY SHIFT   S/C=0 CURSOR MOVE
R/L=1 SHIFT TO THE RIGHT
R/L=0: SHIFT TO THE LEFT
DL=1: 8 BITS   DL=0: 4 BITS
N=1: 5X10 DOTS   N=0: 5X7 DOTS
BF=1: BUSY
BF=0: CAN ACCEPT DATA
"∗": DON`T CARE FOSC: 27KHZ

DD RAM: DISPLAY DATA RAM
CG RAM: CHARACTER GENERATOR RAM

ACG: CG RAM ADDRESS

ADD: DD RAM ADDRESS
    CORRESPONDS TO CURSOR ADDRESS

AC: ADDRESS COUNTER USED FOR BOTH DD AND CG RAM ADDRESS.

EXECUTION TIME CHANGES WITH CHANGE IN INTERNAL OSCILLATION FREQUENCY (FOSC).

EXAMPLE: WHEN FOSC = 270KHZ

$40µS \times \frac{250}{270} = 37µS$

FONT TABLE CHARACTER TYPES (STD. ENGL./JAP.)

UPPER 4BIT

LOWER 4 BIT rows: LLLL (CG RAM (1)), LLLH (2), LLHL (3), LLHH (4), LHLL (5), LHLH (6), LHHL (7), LHHH (8), HLLL (1), HLLH (2), HLHL (3), HLHH (4), HHLL (5), HHLH (6), HHHL (7), HHHH (8)

UPPER 4BIT columns: LLLL, LLLH, LLHL, LLHH, LHLL, LHLH, LHHL, LHHH, HLLL, HLLH, HLHL, HLHH, HHLL, HHLH, HHHL, HHHH