

Normally, instructions that perform data transfer with internal RAM are used the most. However, auto-incrementation by 1 (or auto-decrementation by 1) of internal HD44780U RAM addresses after each data write can lighten the program load of the MPU. Since the display shift instruction (Table 11) can perform concurrently with display data write, the user can minimize system development time with maximum programming efficiency.

When an instruction is being executed for internal operation, no instruction other than the busy flag/address read instruction can be executed.

Because the busy flag is set to 1 while an instruction is being executed, check it to make sure it is 0 before sending another instruction from the MPU.

Note: Be sure the HD44780U is not in the busy state (BF = 0) before sending an instruction from the MPU to the HD44780U. If an instruction is sent without checking the busy flag, the time between the first instruction and next instruction will take much longer than the instruction time itself. Refer to Table 6 for the list of each instruction execution time.

Table 6 Instructions

| Instruction | Code | | | | | | | | | | Description | Execution Time (max) (when f_{cp} or f_{osc} is 270 kHz) |
|--------------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|--|
| | RS | R/W | DB7 | DB6 | DB5 | DB4 | DB3 | DB2 | DB1 | DB0 | | |
| Clear display | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | Clears entire display and sets DDRAM address 0 in address counter. | |
| Return home | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | — | Sets DDRAM address 0 in address counter. Also returns display from being shifted to original position. DDRAM contents remain unchanged. | 1.52 ms |
| Entry mode set | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | I/D | S | Sets cursor move direction and specifies display shift. These operations are performed during data write and read. | 37 μ s |
| Display on/off control | 0 | 0 | 0 | 0 | 0 | 0 | 1 | D | C | B | Sets entire display (D) on/off, cursor on/off (C), and blinking of cursor position character (B). | 37 μ s |
| Cursor or display shift | 0 | 0 | 0 | 0 | 0 | 1 | S/C | R/L | — | — | Moves cursor and shifts display without changing DDRAM contents. | 37 μ s |
| Function set | 0 | 0 | 0 | 0 | 1 | DL | N | F | — | — | Sets interface data length (DL), number of display lines (N), and character font (F). | 37 μ s |
| Set CGRAM address | 0 | 0 | 0 | 1 | ACG | ACG | ACG | ACG | ACG | ACG | Sets CGRAM address. CGRAM data is sent and received after this setting. | 37 μ s |
| Set DDRAM address | 0 | 0 | 1 | ADD | ADD | ADD | ADD | ADD | ADD | ADD | Sets DDRAM address. DDRAM data is sent and received after this setting. | 37 μ s |
| Read busy flag & address | 0 | 1 | BF | AC | AC | AC | AC | AC | AC | AC | Reads busy flag (BF) indicating internal operation is being performed and reads address counter contents. | 0 μ s |