### Notes:

- RS = 0 to select the Instruction register.
- R/W = 0 so that data is written to the LCD module.

- The second 100 µs time delay is not documented, this figure is speculation, it may be possible to check the busy flag here.

- N and F must be set in the first non-special Function Set instruction and cannot be changed subsequently.

- All time delays specified after the Function Set are based on worst case instruction execution time (clock may be as low as 190 kHz).

- The first Display ON/OFF Control instruction should probably be performed as specified (some programmers set D, C, and B here).

### Character Mode Liquid Crystal Display Module Initialization by Instruction (8-bit data interface)

#### Power on

- **Wait for more than 100 ms**

#### Special case of ‘Function Set’

- **0 0 1 1 * * * **
  - (lower four bits are irrelevant)
  - **Wait for more than 4.1 ms**

#### Special case of ‘Function Set’

- **0 0 1 1 * * * **
  - **Wait for more than 100 µs**

#### Special case of ‘Function Set’

- **0 0 1 1 * * * **
  - **Wait for more than 100 µs**

#### 'Function Set'

- **0 0 1 1 N F **
  - (I = 1, N and F as required)
  - **Wait until busy flag is clear**

#### 'Display ON/OFF Control'

- **0 0 0 0 1 0 0 0**
  - (D=0, C=0, B=0)
  - **Wait for more than 53 µs or until busy flag is clear**

#### 'Clear Display'

- **0 0 0 0 0 0 1**
  - (no configurable bits)
  - **Wait for more than 3 ms or until busy flag is clear**

#### 'Entry Mode Set'

- **0 0 0 0 1 I/D S**
  - (I/D and S as required)
  - **Wait for more than 53 µs or until busy flag is clear**

#### Initialization Ends

- **0 0 0 0 1 C B**
  - (D=1, C and B as required)
  - **Wait for more than 53 µs or until busy flag is clear**

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