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**Futaba Corporation of America Schaumburg, IL**

DRAWING TITLE:

**PRODUCT SPECIFICATION**

PART NUMBER:

**NAELW3601AA4 & NAELW3601BA4**

CUSTOMER NAME / PART NUMBER:

**STANDARD PRODUCT**

FILE NAME:

**NAELW3601AA4\_BA4\_revA4\_27Feb2019.docx**

CUSTOMER APPROVAL:

**N/A**

DATE PRINTED:

**18Apr19**

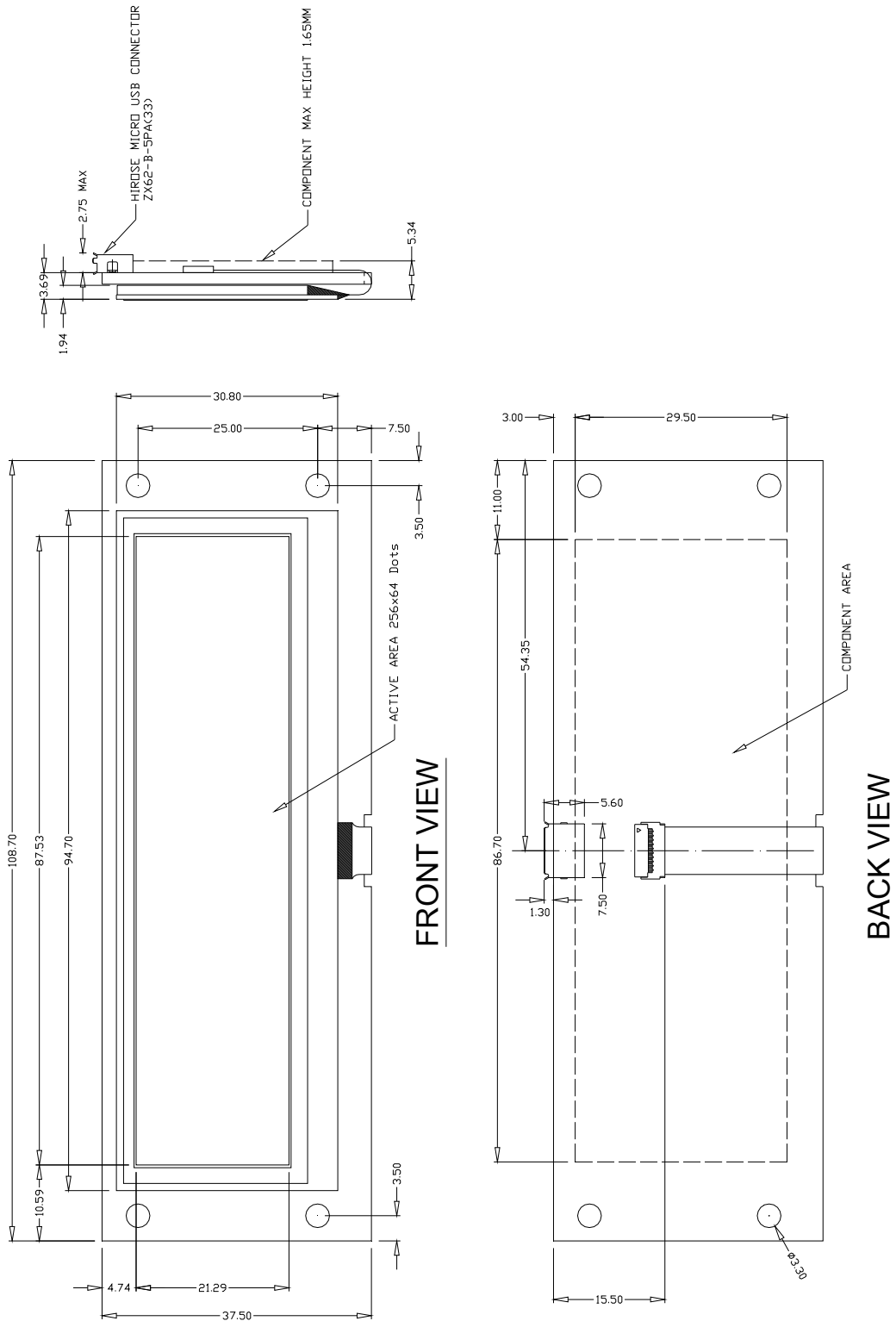
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# 4.0 MECHANICAL DRAWING

## 4.1 NAELW3601AA (HIROSE CONNECTOR)



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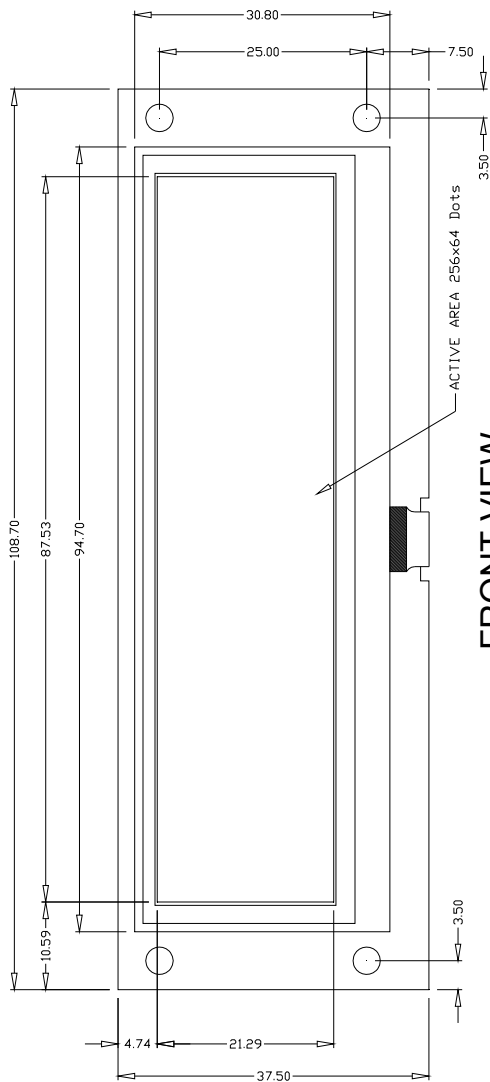
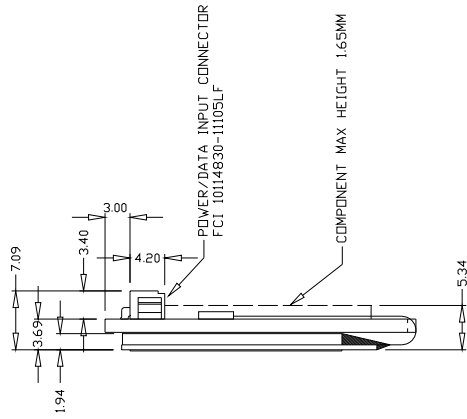
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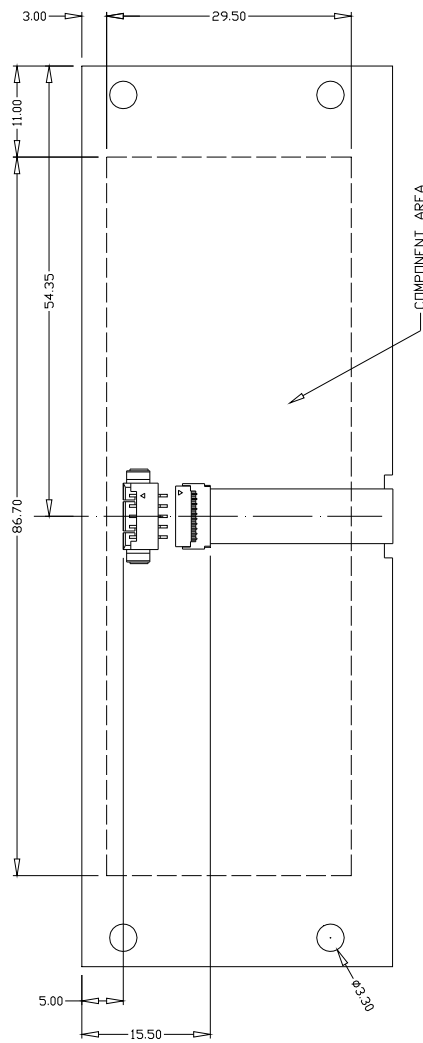
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## 4.2 NAELW3601BA (FCI CONNECTOR)



FRONT VIEW



BACK VIEW

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## 5.0 SPECIFICATIONS

### 5.1 ENVIRONMENTAL SPECIFICATIONS

| Item                         | Symbol | Min. | Max. | Unit | Comment   |
|------------------------------|--------|------|------|------|---|
| Operating Temperature        | Topr   | -20  | +75  | °C   |   |
| Storage Temperature          | Tstg   | -40  | +85  | °C   |   |
| Operating Humidity           | Hopr   | –    | TBD  | %RH  | without condensation  |
| Storage Humidity             | Hstg   | –    | TBD  | %RH  | without condensation  |
| Vibration<br>(non-operating) | –      | –    | TBD  | G    | total amplitude: 1.5mm<br>freq: 10 ~ 55 Hz sine wave<br>sweep time: 1 min / cycle<br>duration: 2 hrs / axis (X, Y, Z) |
| Shock<br>(non-operating)     | –      | –    | TBD  | G    | duration: 11ms<br>waveform: half sine wave<br>3 times / axis (X, Y, Z, -X, -Y, -Z)                                    |

### 5.2 ABSOLUTE MAXIMUM ELECTRICAL SPECIFICATIONS

| Item                 | Symbol           | Min. | Max. | Unit |
|----------------------|------------------|------|------|------|
| Supply Voltage       | V <sub>BUS</sub> | -0.3 | 6.0  | V    |
| Input Signal Voltage | V <sub>IS</sub>  | -0.3 | 6.0  | V    |

### 5.3 NORMAL ELECTRICAL SPECIFICATIONS

V<sub>BUS</sub> = 5.0V, -20 to +75C

| Item                                      | Symbol           | Min. | Typ. | Max. | Unit |
|---|------------------|------|------|------|------|
| Supply Voltage                            | V <sub>BUS</sub> | 4.75 | 5.0  | 5.25 | V    |
| Supply Current                            | I <sub>BUS</sub> | -    | 180  | 450  | mA   |
| Supply Current (Power Saver Mode)         | I <sub>BUS</sub> | -    | 8    | -    | mA   |
| Supply Current (USB Suspend State)        | I <sub>BUS</sub> | -    | 600  | -    | uA   |
| High Level Input (USB)                    | V <sub>IH</sub>  | 2.0  | -    | 3.6  | V    |
| Low Level Input (USB)                     | V <sub>IL</sub>  | -0.3 | -    | 0.8  | V    |
| Differential Input Sensitivity (D+)-( D-) | V <sub>DI</sub>  | 0.2  | -    | -    | V    |

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## 5.4 GENERAL OLED DISPLAY SPECIFICATIONS

| Item                      | Value                              | Unit              |
|---------------------------|------------------------------------|-------------------|
| Number of pixels          | 256 columns x 64 rows              | -                 |
| Active Area               | 94.7 x 30.8                        | mm                |
| Pixel Size                | 0.318 x 0.309                      | mm                |
| Pixel Pitch               | 0.342 x 0.333                      | mm                |
| Chromaticity x            | x = 0.27 – 0.37                    | -                 |
| Chromaticity y            | y = 0.29 – 0.39                    | -                 |
| Contrast Ratio            | 10,000 : 1                         | -                 |
| Luminance (all pixels on) | 105 (min.), 140 (typ.), 175 (max.) | Cd/m <sup>2</sup> |

## 5.5 RESET TIMING SPECIFICATIONS

| Item                            | Symbol            | Min. | Max. | Unit |
|---------------------------------|-------------------|------|------|------|
| Delay time after power-up reset | t <sub>WAIT</sub> | -    | 10   | ms   |

Notes:

1) All timing is specified using 20% and 80% of V<sub>CC</sub> as the reference points.

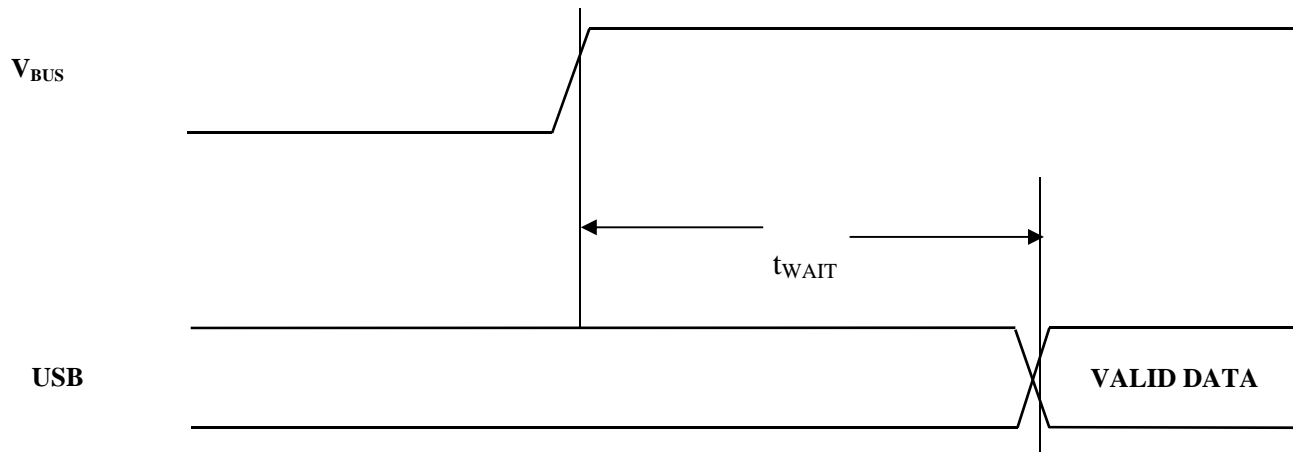


Figure 2: Reset Timing

The module resets automatically at power-up and initializes to the same conditions as after the Reset Command.

## 5.6 NON-VOLATILE FLASH ENDURANCE

The non-volatile Flash is capable of 100,000 erase write cycles with 20 year retention.

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## 6.0 FUNCTIONAL DESCRIPTION

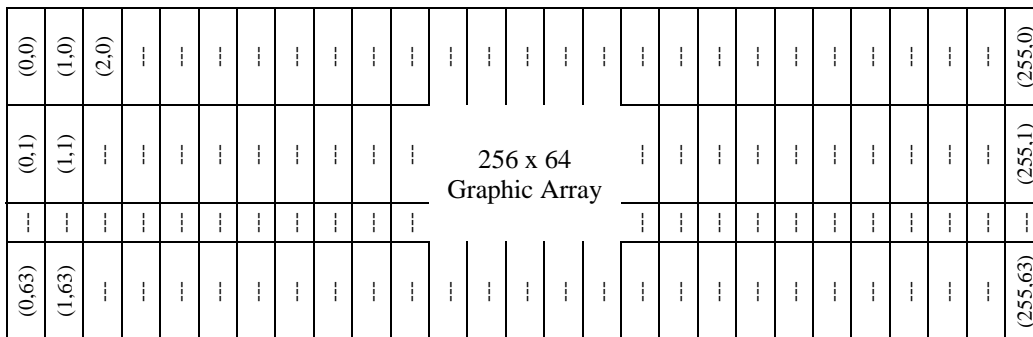
The module's OLED contains an array of 256 x 64 pixels that displays graphics and/or multiple lines of internal font table characters. The number of character lines and number of characters per line depends on the font size selected. Additionally, memory is provided for the user to create 16 user-defined characters that are stored in volatile RAM and an entire 224 character font table for each character size in non-volatile Flash.

The user sends character and graphical data to the module via its USB interface using simple command and data instructions. The display supports sixteen greyscale levels.

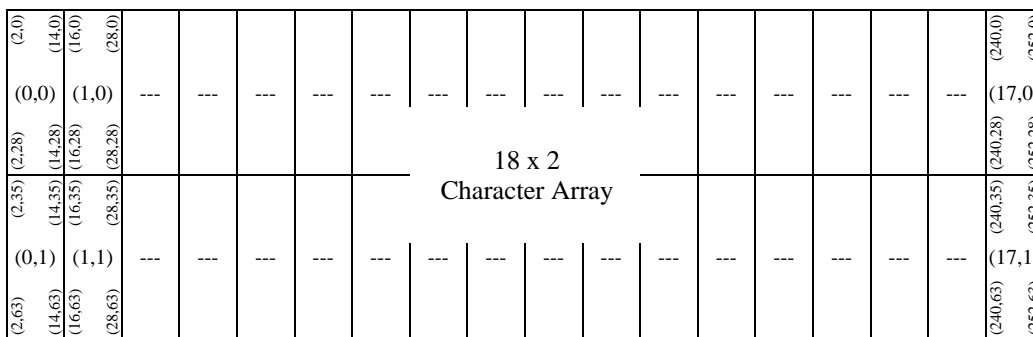
### 6.1 IMAGE MEMORY VS. OLED MEMORY

Image Memory consists of 256 x 32 (8192) bytes of RAM stored in the module's microcontroller which mirrors 8192 bytes of OLED Memory stored in the OLED driver IC. Data written to Image Memory transfers to OLED Memory using the Update OLED command. Each OLED display pixel requires 4-bits of data to set it to 1 of 16 greyscale levels (0 thru 15). Image Memory is addressed using either the Graphical Cursor or the Character Cursor.

The Graphical Cursor addresses each greyscale nibble using a (column, row) scheme starting from the upper leftmost pixel of the 256 x 64 array.



Likewise, the 13 x 29 Character Cursor addresses for each of the 18 x 2 characters use a (column, row) scheme starting from the upper leftmost character. The addresses vary depending on font size selected.



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The number of characters in the character array differs depending on Font Size as follows:

| Font Size | Character Array | Columns Between Characters | Starting Column |
|-----------|-----------------|----------------------------|-----------------|
| 5 x 8     | 42 x 8          | 1                          | 2               |
| 10 x 16   | 23 x 4          | 1                          | 2               |
| 13 x 29   | 18 x 2          | 1                          | 2               |
| 16 x 16   | 16 x 4          | 0                          | 0               |
| 32 x 32   | 8 x 2           | 0                          | 0               |

## 6.2 COMMANDS AND CHARACTERS

The user sends commands to the module as single-byte or multi-byte commands and characters are sent to the module as single or double bytes. All data is sent to the display via USB. Command codes range from 00h to 0Fh, UDF character codes from 10h to 1Fh and character codes from 20h to FFh. An ‘x’ indicates a “don’t care” bit in all commands.

| Command Byte 1 |    |    |    |    |    |    |    | Command Byte 2     |    |    |    |    |    |    |    | ---                |    |    |    |    |    |    |    | Command Byte N     |    |    |    |    |    |    |    |
|----------------|----|----|----|----|----|----|----|--------------------|----|----|----|----|----|----|----|--------------------|----|----|----|----|----|----|----|--------------------|----|----|----|----|----|----|----|
| 8-bit Command  |    |    |    |    |    |    |    | 8-bit Command Data |    |    |    |    |    |    |    | 8-bit Command Data |    |    |    |    |    |    |    | 8-bit Command Data |    |    |    |    |    |    |    |
| C7             | C6 | C5 | C4 | C3 | C2 | C1 | C0 | D7                 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | D7                 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | D7                 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |

| CMD Code | Description                                  |
|----------|--|
| 00h      | Reset / Initialize                           |
| 01h      | Clear Image Memory and/or Update OLED Memory |
| 02h      | Set Cursor Position                          |
| 03h      | Select Font                                  |
| 04h      | Define UDF Character                         |
| 05h      | Graphical Image Memory Write – Greyscale     |
| 06h      | Graphical Image Memory Write – Monochrome    |
| 07h      | Select Greyscale Level                       |
| 08h      | Select Power Saver Mode                      |
| 09h      | Image Memory Storage                         |
| 0Ah      |  |
| 0Bh      |  |
| 0Ch      |  |
| 0Dh      |  |
| 0Eh      |  |
| 0Fh      | Reserved for factory use                     |
| 10h~1Fh  | Write UDF Character to Image Memory          |
| 20h~FFh  | Write Font Table Character to Image Memory   |

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## 6.2.1 RESET / INITIALIZE

This three-byte command resets the module to the conditions listed below which are the same as at power-up. This command is also used to erase non-volatile Flash memory and select display orientation.

| Command Byte 1                | Command Byte 2                   | Command Byte 3                   |
|-------------------------------|----------------------------------|----------------------------------|
| 8-bit<br>Command<br>00h       | 8-bit<br>Command Validation Byte | 8-bit<br>Command Validation Byte |
| 0   0   0   0   0   0   0   0 | V15 V14 V13 V12 V11 V10 V9 V8    | V7 V6 V5 V4 V3 V2 V1 V0          |

### Reset / Initialize (V15:V8) = A5h, (V7:V0) = 5Ah:

- Image Memory and OLED Memory cleared
- Graphical Cursor Position and Character Cursor Position set to location 0,0
- Font set to CP437 / 13 x 29 font size
- User Defined Font characters stored in volatile RAM cleared
- Sets Character Grayscale Level to 100%
- OLED driver set to Normal Display Mode
- Power Saver Mode set to “on” (module’s switching power supply is on)
- Display Orientation set to Normal

### Erase Non-Volatile Flash Memory (V15:V8) = EEh:

- Erase Font Table from non-volatile Flash.
- Valid (V7:V4) Font Size, (V3:V0) Font Table values are: (0,0), (1,0), (2,0), (3,0), (4,0)

### Display Orientation Normal (V15:V8) = D0h, (V7:V0) = 2Fh:

- Display Orientation set so that USB connector is at bottom of image.

### Display Orientation Upside Down (V15:V8) = D1h, (V7:V0) = 2Eh:

- Display Orientation set so that USB connector is at top of image.

Note: If Command Byte 2 is invalid the command is terminated, if Command Byte 3 is invalid the command is ignored.

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## 6.2.2 CLEAR IMAGE MEMORY AND/OR UPDATE OLED MEMORY

This two-byte command clears the Image Memory (stored in the microcontroller’s RAM) and/or copies it to the OLED Memory (stored in the OLED’s driver). This command is also used to access a few internal OLED driver functions. A typical sequence would be to clear Image Memory, send character and/or graphical data to Image Memory, then update OLED Memory with the Image Memory data.

| Command Byte 1                | Command Byte 2                        |
|-------------------------------|---------------------------------------|
| 8-bit<br>Command<br>01h       | 8-bit<br>Command Data                 |
| 0   0   0   0   0   0   0   1 | D7   D6   D5   D4   D3   D2   D1   D0 |

### 8-bit Command Data (D7:D0):

- 0: Clear Image Memory without updating OLED Memory and set both cursors to 0,0
- 1: Clear OLED Memory without affecting Image Memory
- 2: Copy Image Memory to OLED Memory without affecting Image Memory
- 3: Clear both Image Memory and OLED Memory and set both cursors to 0,0
- 4: Set OLED driver to Normal Display Mode (does not affect Image or OLED Memory)
- 5: Set OLED driver to All On Display Mode (does not affect Image or OLED Memory)
- 6: Set OLED driver to All Off Display Mode (does not affect Image or OLED Memory)
- 7: Set OLED driver to Inverse Mode (does not affect Image or OLED Memory)

Note: If Command Byte 2 is invalid the command is ignored.

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### 6.2.3 SET CURSOR POSITION

This three-byte command sets either the Graphical Cursor Position or the Character Cursor Position depending on the GC bit. Graphical Cursor Position 0,0 is the upper left corner of the 256 x 64 display and Character Cursor Position 0,0 is in the upper left character of the display.

| Command Byte 1       |   |   |   |   |   |   |   | Command Byte 2      |    |    |    |    |    |    |    | Command Byte 3 |    |                  |    |    |    |    |    |    |  |
|----------------------|---|---|---|---|---|---|---|---------------------|----|----|----|----|----|----|----|----------------|----|------------------|----|----|----|----|----|----|--|
| 8-bit Command<br>02h |   |   |   |   |   |   |   | 8-bit Cursor Column |    |    |    |    |    |    |    | 1-bit GC       | x  | 6-bit Cursor Row |    |    |    |    |    |    |  |
| 0                    | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0                   | C7 | C6 | C5 | C4 | C3 | C2 | C1 | C0             | GC | x                | R5 | R4 | R3 | R2 | R1 | R0 |  |

#### 8-bit Cursor Column (C7:C0):

Valid Graphical Cursor Position columns are:  $0 \leq (C7:C0) \text{ value} \leq 255$

Valid Character Cursor Position columns depend on current Font Size setting:

- Font Size 5 x 8:  $0 \leq (C7:C0) \text{ value} \leq 41$
- Font Size 10 x 16:  $0 \leq (C7:C0) \text{ value} \leq 22$
- Font Size 13 x 29:  $0 \leq (C7:C0) \text{ value} \leq 17$
- Font Size 16 x 16:  $0 \leq (C7:C0) \text{ value} \leq 15$
- Font Size 32 x 32:  $0 \leq (C7:C0) \text{ value} \leq 7$

#### 6-bit Cursor Row (R5:R0):

Valid Graphical Cursor Position rows are:  $0 \leq (R5:R0) \text{ value} \leq 63$

Valid Character Cursor Position columns depend on current Font Size setting:

- Font Size 5 x 8:  $0 \leq (R5:R0) \text{ value} \leq 7$
- Font Size 10 x 16:  $0 \leq (R5:R0) \text{ value} \leq 3$
- Font Size 13 x 29:  $0 \leq (R5:R0) \text{ value} \leq 1$
- Font Size 16 x 16:  $0 \leq (R5:R0) \text{ value} \leq 3$
- Font Size 32 x 32:  $0 \leq (R5:R0) \text{ value} \leq 1$

#### 1-bit Graphical / Character Select (GC) :

GC = 0: Character Cursor Position is selected

GC = 1: Graphical Cursor Position is selected

Note: After Command Bytes 2 and 3 are both received, invalid values cause the command to be ignored.

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## 6.2.4 SELECT FONT

This two-byte command selects the Font Size and Font Table. The Character Cursor Position is set to 0,0 when the Font Size is changed.

| Command Byte 1       |   |   |   |   |   |   |   | Command Byte 2  |    |    |    |                  |    |    |    |
|----------------------|---|---|---|---|---|---|---|-----------------|----|----|----|------------------|----|----|----|
| 8-bit Command<br>03h |   |   |   |   |   |   |   | 4-bit Font Size |    |    |    | 4-bit Font Table |    |    |    |
| 0                    | 0 | 0 | 0 | 0 | 0 | 1 | 1 | S3              | S2 | S1 | S0 | T3               | T2 | T1 | T0 |

### 4-bit Font Size (S3:S0), 4-bit Font Table (T3:T0):

0,0: 5 x 8 UDF    1,0: 10 x 16 UDF    2,0: 13 x 29 UDF    3,0: 16 x 16 UDF    4,0: 32 x 32 UDF  
 0,1: 5 x 8 CP437    1,1: 10 x 16 CP437    2,1: 13 x 29 CP437    3,1: 16 x 16 Kanji    4,1: 32 x 32 Kanji  
 0,2: 5 x 8 CP852    1,2: 10 x 16 CP852    2,2: 13 x 29 CP852  
 0,3: 5 x 8 CP858    1,3: 10 x 16 CP858    2,3: 13 x 29 CP858  
 0,4: 5 x 8 CP866    1,4: 10 x 16 CP866    2,4: 13 x 29 CP866  
 0,5: 5 x 8 CP932    1,5: 10 x 16 CP932    2,5: 13 x 29 Katakana

Note: If Command Byte 2 is invalid the command is ignored.

## 6.2.5 DEFINE UDF CHARACTER

This multi-byte command defines a User Defined Font (UDF) character. Up to 16 UDF characters, of various Font Sizes, can be stored in volatile RAM and up to 224 UDF characters of each Font Size can be stored in non-volatile Flash. After erasing an entire UDF Table from Flash, up to 224 UDF characters can be defined, re-defining any one UDF within a table requires first erasing the entire UDF Table.

| Command Byte 1       |   |   |   |   |   |   |   | Command Byte 2   |    |    |    |    |    |    |    | Command Byte 3  |    |    |    | Command Byte 4   |    |    |    |                             |    |    |    |    |    |    |    |
|----------------------|---|---|---|---|---|---|---|------------------|----|----|----|----|----|----|----|-----------------|----|----|----|------------------|----|----|----|-----------------------------|----|----|----|----|----|----|----|
| 8-bit Command<br>04h |   |   |   |   |   |   |   | 8-bit UDF Number |    |    |    |    |    |    |    | 4-bit Font Size |    |    |    | 4-bit Font Table |    |    |    | 8-bit UDF Pixel Data Byte 1 |    |    |    |    |    |    |    |
| 0                    | 0 | 0 | 0 | 0 | 0 | 1 | 0 | U7               | U6 | U5 | U4 | U3 | U2 | U1 | U0 | S3              | S2 | S1 | S0 | T3               | T2 | T1 | T0 | P7                          | P6 | P5 | P4 | P3 | P2 | P1 | P0 |

| ---                       |    |    |    |    |    |    |    | Command Byte N+3            |    |    |    |    |    |    |    |
|---------------------------|----|----|----|----|----|----|----|-----------------------------|----|----|----|----|----|----|----|
| 8-bit UDF Pixel Data Byte |    |    |    |    |    |    |    | 8-bit UDF Pixel Data Byte N |    |    |    |    |    |    |    |
| P7                        | P6 | P5 | P4 | P3 | P2 | P1 | P0 | P7                          | P6 | P5 | P4 | P3 | P2 | P1 | P0 |

### 8-bit UDF Number (U7:U0):

10h <= (U7:U0) value <= 1Fh: UDF Character stored in volatile RAM ((T3:T0) = don't care)  
 20h <= (U7:U0) value <= FFh: UDF Character stored in non-volatile Flash

### 4-bit Font Size (S3:S0):

0 <= (S3:S0) value <= 4: Same Font Sizes as defined in Select Font command

### 4-bit Font Table (T3:T0):

(T3:T0) value = 0: Select UDF Table in non-volatile Flash

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## 6.2.6 GRAPHICAL IMAGE MEMORY WRITE - GREYSCALE

This multi-byte command writes graphical data to Image Memory. Each pixel is represented by a nibble that determines its greyscale level from 0h to Fh. Since one nibble represents one pixel, each byte sent to the display represents two pixels (last byte may only contain a meaningful lower nibble).

| Command Byte 1                | Command Byte 2                        | ---                                   | Command Byte N+2                      |
|-------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| 8-bit<br>Command<br>05h       | 8-bit<br>Number of Nibbles - 1        | 8-bit<br>Pixel Greyscale Data         | 8-bit<br>Pixel Greyscale Data N       |
| 0   0   0   0   0   1   0   1 | N7   N6   N5   N4   N3   N2   N1   N0 | G7   G6   G5   G4   G3   G2   G1   G0 | G7   G6   G5   G4   G3   G2   G1   G0 |

Nibbles are stored in Image Memory, lower nibble first, starting at the Graphical Cursor Position as they are received. The Graphical Cursor Position column is incremented after each nibble is written by 1. If the rightmost end of a row is reached the Graphical Cursor Position row is incremented by 1 and the column set to 0. The Graphical Cursor Position is set to 0,0 after the lower rightmost pixel is written.

### 8-bit Number of Nibbles - 1 (N7:N0):

00h <= (N7:N0) value <= FFh: Number of nibbles minus 1 to follow (00h = 1 nibble, FFh = 256 nibbles).

### 8-bit Pixel Greyscale Data (G7:G0):

(G3:G0): The greyscale level of the first pixel written per byte.

(G7:G4): The greyscale level of the second pixel written per byte. This nibble is ignored in the last byte if the Number of Nibbles is odd (i.e. (N7-N0) value even).

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## 6.2.7 GRAPHICAL IMAGE MEMORY WRITE - MONOCHROME

This multi-byte command writes graphical data to Image Memory. Each pixel is represented by a bit that determines its greyscale level based on the current Greyscale Level setting. Since one bit represents one pixel, each byte sent to the display represents eight pixels (last byte may contain fewer meaningful bits).

| Command Byte 1       |   |   |   |   |   |   |   | Command Byte 2             |    |    |    |    |    |    |    | ---                         |    |    |    |    |    |    |    | Command Byte N+2              |    |    |    |    |    |    |    |
|----------------------|---|---|---|---|---|---|---|----------------------------|----|----|----|----|----|----|----|-----------------------------|----|----|----|----|----|----|----|-------------------------------|----|----|----|----|----|----|----|
| 8-bit Command<br>06h |   |   |   |   |   |   |   | 8-bit Number of Pixels - 1 |    |    |    |    |    |    |    | 8-bit Pixel Monochrome Data |    |    |    |    |    |    |    | 8-bit Pixel Monochrome Data N |    |    |    |    |    |    |    |
| 0                    | 0 | 0 | 0 | 0 | 1 | 1 | 0 | N7                         | N6 | N5 | N4 | N3 | N2 | N1 | N0 | M7                          | M6 | M5 | M4 | M3 | M2 | M1 | M0 | M7                            | M6 | M5 | M4 | M3 | M2 | M1 | M0 |

Bits are stored in Image Memory, lower bit first, starting at the Graphical Cursor Position as they are received. The Graphical Cursor Position column is incremented after each bit is written by 1. If the rightmost end of a row is reached the Graphical Cursor Position row is incremented by 1 and the column set to 0. The Graphical Cursor Position is set to 0,0 after the lower rightmost pixel is written.

### 8-bit Number of Bits - 1 (N7:N0):

00h <= (N7:N0) value <= FFh: Number of bits minus 1 to follow (00h = 1 bit, FFh = 256 bits).

### 8-bit Pixel Monochrome Data (M7:M0):

(M7:M0): Mx = 0; pixel off, Mx = 1; pixel on at current Greyscale Level setting. Extra bits are ignored.

## 6.2.8 SELECT GREYSCALE LEVEL

This two-byte command sets the greyscale level of subsequent characters written to Image Memory to one of 15 levels. The greyscale level of characters already in Image Memory is not affected.

| Command Byte 1       |   |   |   |   |   |   |   | Command Byte 2 |   |   |   |                       |    |    |    |
|----------------------|---|---|---|---|---|---|---|----------------|---|---|---|-----------------------|----|----|----|
| 8-bit Command<br>07h |   |   |   |   |   |   |   |                |   |   |   | 4-bit Luminance Level |    |    |    |
| 0                    | 0 | 0 | 0 | 0 | 1 | 1 | 1 | x              | x | x | x | L3                    | L2 | L1 | L0 |

### 4-bit Luminance Level (L3:L0):

|             |             |             |             |
|-------------|-------------|-------------|-------------|
| 0000: 0%    | 0001: 0%    | 0010: 13.3% | 0011: 20%   |
| 0100: 26.7% | 0101: 33.3% | 0110: 40%   | 0111: 46.7% |
| 1000: 53.3% | 1001: 60%   | 1010: 66.7% | 1011: 73.3% |
| 1100: 75%   | 1101: 86.7% | 1110: 93.3% | 1111: 100%  |

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## 6.2.9 SELECT POWER SAVER MODE

This two-byte command selects the Power Saver Mode.

| Command Byte 1          |   |   |   |   |   |   |   | Command Byte 2 |   |   |   |   |   |   |   |      |
|-------------------------|---|---|---|---|---|---|---|----------------|---|---|---|---|---|---|---|------|
| 8-bit<br>Command<br>08h |   |   |   |   |   |   |   |                |   |   |   |   |   |   |   | Mode |
| 0                       | 0 | 0 | 0 | 1 | 0 | 0 | 0 | x              | x | x | x | x | x | x | x | M0   |

### 1-bit Mode (M0):

- 0: Turns off the module's switching power supply (OLED Display will go blank)
- 1: Turns on the module's switching power supply (OLED will display previous image)

## 6.2.10 IMAGE MEMORY STORAGE

This two-byte command copies Image Memory to non-volatile Flash and vice versa. Up to 16 images can be stored and retrieved.

| Command Byte 1          |   |   |   |   |   |   |   | Command Byte 2        |    |    |    |                      |   |    |    |
|-------------------------|---|---|---|---|---|---|---|-----------------------|----|----|----|----------------------|---|----|----|
| 8-bit<br>Command<br>09h |   |   |   |   |   |   |   | 4-bit<br>Image Number |    |    |    | 2-bit<br>Sub-Command |   |    |    |
| 0                       | 0 | 0 | 0 | 1 | 0 | 0 | 1 | I3                    | I2 | I1 | I0 | x                    | x | S1 | S0 |

### 4-bit Image Number (I3:I0):

0h <= (I3:I0) value <= Fh: Image Number to be stored/restored.

### 2-bit Sub-Command (S1:S0):

- 0: Copy Image Memory to non-volatile Flash location specified by Image Number I3:I0 (neither Image Memory nor OLED Memory are affected)
- 1: Copy non-volatile Flash location specified by Image Number I3:I0 to Image Memory (OLED Memory is not affected)
- 2: See Demo Mode Section
- 3: See Demo Mode Section

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### 6.2.10.1 DEMO MODE

This two-byte/multi-byte command sets the timing values for the Demo Mode sequence. When the Demo Mode is enabled, the module will sequentially display each stored image that has a non-default timing value associated with it for the appropriate amount of time. If all of the timing values are set to the default value, the Demo Mode is disabled. The Demo Mode is terminated by either removing power or by receipt of the first USB byte.

|                   |   |   |   |   |   |   |   |                  |   |   |   |                   |   |           |                             |    |    |    |     |    |    |           |                             |    |    |    |    |    |    |    |    |
|-------------------|---|---|---|---|---|---|---|------------------|---|---|---|-------------------|---|-----------|-----------------------------|----|----|----|-----|----|----|-----------|-----------------------------|----|----|----|----|----|----|----|----|
| Command Byte 1    |   |   |   |   |   |   |   | Command Byte 2   |   |   |   | Command Byte 3    |   |           |                             |    |    |    | --- |    |    |           |                             |    |    |    |    |    |    |    |    |
| 8-bit Command 09h |   |   |   |   |   |   |   | 4-bit Don't Care |   |   |   | 2-bit Sub-Command |   | 1-bit Ori | 7-bit Time Value of Image 0 |    |    |    |     |    |    | 1-bit Ori | 7-bit Time Value of Image N |    |    |    |    |    |    |    |    |
| 0                 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | x                | x | x | x | x                 | x | S1        | S0                          | O0 | T6 | T5 | T4  | T3 | T2 | T1        | T0                          | O0 | T6 | T5 | T4 | T3 | T2 | T1 | T0 |

|                 |                              |    |    |    |    |    |    |
|-----------------|------------------------------|----|----|----|----|----|----|
| Command Byte 18 |                              |    |    |    |    |    |    |
| 1-bit Ori       | 7-bit Time Value of Image 15 |    |    |    |    |    |    |
| O0              | T6                           | T5 | T4 | T3 | T2 | T1 | T0 |

#### 2-bit Sub-Command (S1:S0):

- 0: See Image Memory Storage Section
- 1: See Image Memory Storage Section
- 2: Erase all 16 time values from non-volatile Flash, Demo Mode disabled (2-byte command)
- 3: Store all 16 time values in non-volatile Flash (18-byte command)

#### 1-bit Demo Mode Image Orientation (O0):

- 0: Display associated stored image with upside down orientation during Demo Mode
- 1: Display associated stored image with normal orientation during Demo Mode

#### 7-bit Demo Mode Time Value (T6:T0):

- (T6:T0) value = 7Fh: Default value, associated image is not displayed in the Demo Mode sequence
- 0h <= (T6:T0) value <= 7Eh: Associated image displayed for approximately 64 ms times value+1

If enabled, the Demo Mode sequence begins after a slight delay at power-up in order for enumeration with the USB host to complete. This delay allows the USB host to set the USB port's maximum power consumption to the value in the configuration descriptor exchanged during enumeration before demo screens are displayed. If a 5 volt supply without USB capability or a slow USB host is used to power the module, the Demo Mode sequence will begin after the delay without completing enumeration. However, the module will continue to try to enumerate throughout the Demo Mode sequence. Because the Demo Mode ignores USB sleep requests (no SOF packets for 3 ms), the USB host needs to maintain the USB port's maximum power consumption setting during the Demo Mode sequence. If the USB host cannot maintain the maximum power consumption setting, the Demo Mode should not be used in order to abide by the USB specification.

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### 6.2.11 WRITE CHARACTER

This single-byte or two-byte command writes the specified character to the Image Memory at the current Character Cursor Position. When the right end of a character row is reached, characters continue on the left side of next character row. When the bottom row is filled, characters restart at the left of the top row.

|                       |    |    |    |    |    |    |    |
|-----------------------|----|----|----|----|----|----|----|
| Command Byte 1        |    |    |    |    |    |    |    |
| 8-bit                 |    |    |    |    |    |    |    |
| Single Byte Character |    |    |    |    |    |    |    |
| 10h to FFh            |    |    |    |    |    |    |    |
| C7                    | C6 | C5 | C4 | C3 | C2 | C1 | C0 |

Writing characters from Font Tables 3,1 (16 x 16 Kanji) or 4,1 (32 x 32 Kanji) requires two bytes.

|                                   |    |    |    |    |    |    |    |                                  |    |    |    |    |    |    |    |
|-----------------------------------|----|----|----|----|----|----|----|----------------------------------|----|----|----|----|----|----|----|
| Command Byte 1                    |    |    |    |    |    |    |    | Command Byte 2                   |    |    |    |    |    |    |    |
| 8-bit                             |    |    |    |    |    |    |    | 8-bit                            |    |    |    |    |    |    |    |
| Two Byte Character - First Byte   |    |    |    |    |    |    |    | Two Byte Character - Second Byte |    |    |    |    |    |    |    |
| 81h to 84h, 87h to 9Fh, E0 to EAh |    |    |    |    |    |    |    | 40h to FFh                       |    |    |    |    |    |    |    |
| F7                                | F6 | F5 | F4 | F3 | F2 | F1 | F0 | S7                               | S6 | S5 | S4 | S3 | S2 | S1 | S0 |

Note: If Command Byte 2 is invalid the command is ignored.

The 16 UDF characters between 10h and 1Fh are written to the Image Memory in the currently selected Font Size regardless of how they are defined. For example just the upper left 5 x 8 portion of a 32 x 32 defined UDF is written if the current Font Size is 5 x 8, similarly, a 5 x 8 defined UDF would be written in the upper left portion if Font Size 32 x 32 is selected along with pseudo-random data for the remainder of the 32 x 32 character's pixels.

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7.0 FONT TABLES

7.1 CODE PAGE 437 --- 5 X 8, 10 X 16 AND 13 X 29

|     | 2xH | 3xH | 4xH | 5xH | 6xH | 7xH | 8xH | 9xH | AxH | BxH | CxH | DxH | ExH | FxH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| x0H |     | 0   | @P  | '   | p   | Ç   | É   | á   |     |     | L   | ll  | α   | ≡   |
| x1H | !   | 1   | AQ  | aq  | ü   | æ   | í   |     |     |     | l   | τ   | β   | ±   |
| x2H | ”   | 2   | BR  | br  | é   | é   | ó   |     |     |     | τ   | τ   | Γ   | ≥   |
| x3H | #   | 3   | C   | S   | s   | â   | ô   | ú   |     |     | l   | l   | π   | ≤   |
| x4H | \$  | 4   | D   | T   | dt  | ä   | ö   | ñ   |     |     | -   | l   | Σ   | ƒ   |
| x5H | %   | 5   | E   | U   | eu  | à   | ò   | Ñ   |     |     | +   | f   | σ   | J   |
| x6H | &   | 6   | F   | V   | vu  | å   | û   | °   |     |     | f   | Γ   | μ   | ÷   |
| x7H | '   | 7   | G   | W   | gw  | ç   | ù   | °   |     |     | π   | l   | τ   | ≈   |
| x8H | (   | 8   | H   | X   | hx  | ê   | ÿ   | ¿   |     |     | l   | +   | φ   | °   |
| x9H | )   | 9   | I   | Y   | iy  | ë   | ö   | -   |     |     | l   | l   | θ   | •   |
| xAH | *   | :   | J   | Z   | jz  | è   | ü   | -   |     |     | l   | l   | Ω   | ·   |
| xBH | +   | ;   | K   | [   | k   | (   | ï   | ¢   | ½   |     | l   | l   | δ   | √   |
| xCH | ,   | <   | L   | \   | l   | l   | î   | €   | ¼   |     | l   | l   | ∞   | ⁿ   |
| xDH | -   | =   | M   | ]   | m   | )   | ï   | ¥   | ï   |     | =   | l   | φ   | ²   |
| xEH | .   | >   | N   | ^   | n   | ~   | Ä   | Å   | ¼   |     | +   | l   | €   | ■   |
| xFH | /   | ?   | O   | _   | o   | Δ   | Å   | f   | >   |     | l   | l   | ∩   |     |

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7.2 CODE PAGE 852 --- 5 X 8, 10 X 6 AND 13 X 29

|     | 2xH | 3xH | 4xH | 5xH | 6xH | 7xH | 8xH | 9xH | AxH | BxH | CxH | DxH | ExH | FxH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| x0H |     | 0   | @P  | '   | p   | Ç   | É   | á   |     |     | L   | d   | ó   | -   |
| x1H | !   | 1   | AQ  | aq  | ü   | í   |     |     |     |     | ±   | Ð   | ß   | '   |
| x2H | "   | 2   | BR  | br  | é   | í   | ó   |     |     |     | T   | Ď   | Ô   | ¸   |
| x3H | #   | 3   | C   | S   | ç   | â   | ô   | ú   |     |     | F   | È   | Ñ   | ¸   |
| x4H | \$  | 4   | D   | T   | dt  | ä   | ö   | Ä   | †   | †   | -   | d   | ñ   | ¸   |
| x5H | %   | 5   | E   | U   | eu  | ů   | ř   | á   | †   | †   | †   | Ň   | ň   | š   |
| x6H | &   | 6   | F   | U   | fu  | ć   | ź   | â   | †   | †   | †   | İ   | ş   | ÷   |
| x7H | '   | 7   | G   | W   | g   | w   | ç   | š   | ž   | ě   | ä   | î   | š   | ¸   |
| x8H | (   | 8   | H   | X   | h   | x   | ł   | ś   | ŕ   | ŕ   | ŕ   | ě   | ř   | ó   |
| x9H | )   | 9   | I   | Y   | i   | y   | ë   | ö   | †   | †   | †   | ú   | ¸   |     |
| xAH | *   | :   | J   | Z   | j   | z   | ó   | ü   | †   | †   | †   | ŕ   | ¸   |     |
| xBH | +   | ;   | K   | [   | k   | (   | ö   | ř   | ž   | †   | †   | †   | ú   | ú   |
| xCH | ,   | <   | L   | \   | l   |     | î   | č   | †   | †   | †   | ŕ   | ř   |     |
| xDH | -   | =   | M   | ]   | m   | )   | ź   | ł   | ŕ   | ŕ   | ŕ   | †   | ý   | ř   |
| xEH | .   | >   | N   | ^   | n   | ~   | ä   | x   | «   | z   | †   | ú   | t   | ¸   |
| xFH | /   | ?   | O   | _   | o   | o   | ć   | č   | »   | †   | †   | ¸   | '   |     |

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7.3 CODE PAGE 858 --- 5 X 8, 10 X 16 AND 13 X 29

|     | 2xH | 3xH | 4xH | 5xH | 6xH | 7xH | 8xH | 9xH | AxH | BxH | CxH | DxH | ExH | FxH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| x0H |     | 0   | @P  | '   | pçÉ | á   |     |     |     |     | L   | öó  | -   |     |
| x1H | !   | 1   | AQ  | aq  | üæ  | í   |     |     |     |     | ±   | ±   | ±   | ±   |
| x2H | "   | 2   | BR  | br  | é   | ó   |     |     |     |     | ±   | ±   | ±   | ±   |
| x3H | #   | 3   | C   | S   | s   | â   | ô   | ú   |     |     | ±   | ±   | ±   | ±   |
| x4H | \$  | 4   | D   | T   | dt  | ä   | ö   | ñ   |     |     | ±   | ±   | ±   | ±   |
| x5H | %   | 5   | E   | U   | eu  | à   | ò   | Ñ   | Á   |     | ±   | ±   | ±   | ±   |
| x6H | &   | 6   | F   | U   | fu  | å   | ú   | °   | Â   | ä   | í   | µ   | ÷   |     |
| x7H | '   | 7   | G   | W   | gw  | ç   | ù   | °   | À   | Ã   | î   | þ   |     |     |
| x8H | (   | 8   | H   | X   | hx  | ê   | ÿ   | ¿   | ®   |     | ±   | ±   | ±   | ±   |
| x9H | )   | 9   | I   | Y   | iy  | ë   | Ö   | ®   |     |     | ±   | ±   | ±   | ±   |
| xAH | *   | :   | J   | Z   | jz  | è   | Ü   | -   |     |     | ±   | ±   | ±   | ±   |
| xBH | +   | ;   | K   | [   | k   | (   | ï   | ø   | ½   | ¼   | ±   | ±   | ±   | ±   |
| xCH | ,   | <   | L   | \   | l   |     | î   | €   | ¼   | ¼   | ±   | ±   | ±   | ±   |
| xDH | -   | =   | M   | ]   | m   | )   | ì   | ø   | ì   | ç   | =   | ±   | ±   | ±   |
| xEH | .   | >   | N   | ^   | n   | ~   | Ä   | x   | «   | ¥   | ±   | ±   | ±   | ±   |
| xFH | /   | ?   | O   | _   | o   | o   | Å   | f   | >   | ±   | ±   | ±   | ±   | ±   |

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7.4 CODE PAGE 866 --- 5 X 8, 10 X 16 AND 13 X 29

|     | 2xH | 3xH | 4xH | 5xH | 6xH | 7xH | 8xH | 9xH | AxH | BxH | CxH | DxH | ExH | FxH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| x0H |     | 0   | @P  | '   | p   | A   | P   | a   |     |     | Л   | Ц   | р   | Ё   |
| x1H | !   | 1   | AQ  | aq  | Б   | С   | б   | с   |     |     | Л   | Т   | с   | ё   |
| x2H | "   | 2   | B   | R   | b   | r   | В   | Т   | в   |     | Т   | Т   | Т   | Е   |
| x3H | #   | 3   | C   | S   | c   | s   | Г   | У   | г   | Г   | Л   | У   | е   |     |
| x4H | \$  | 4   | D   | T   | d   | t   | Д   | Ф   | д   | Ф   | Л   | Ф   | И   |     |
| x5H | %   | 5   | E   | U   | e   | u   | Е   | Х   | е   | Х   | Г   | Х   | И   |     |
| x6H | &   | 6   | F   | V   | f   | v   | Ж   | Ц   | ж   | Ц   | Г   | Ц   | У   |     |
| x7H | '   | 7   | G   | W   | g   | w   | З   | Ч   | з   | Ч   | Г   | Ч   | У   |     |
| x8H | (   | 8   | H   | X   | h   | x   | И   | Ш   | и   | Ш   | Л   | Ш   | О   |     |
| x9H | )   | 9   | I   | Y   | i   | y   | Й   | Щ   | й   | Щ   | Г   | Щ   | О   |     |
| xAH | *   | :   | J   | Z   | j   | z   | К   | Ь   | к   | Ь   | Л   | Ь   | .   |     |
| xBH | +   | ;   | K   | [   | k   | [   | Л   | Ы   | л   | Ы   | Т   | Ы   | Г   |     |
| xCH | ,   | <   | L   | \   | l   | \   | М   | Ь   | м   | Ь   | Г   | Ь   | №   |     |
| xDH | -   | =   | M   | ]   | m   | ]   | Н   | Э   | н   | Э   | =   | Э   | Г   |     |
| xEH | .   | >   | N   | ^   | n   | ^   | О   | Ю   | о   | Ю   | Г   | Ю   | .   |     |
| xFH | /   | ?   | O   | _   | o   | _   | П   | Я   | п   | Я   | Г   | Я   |     |     |

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7.5 CODE PAGE 932 --- 5 X 8 AND 10 X 16

|     | 2xH | 3xH   | 4xH | 5xH | 6xH | 7xH | 8xH | 9xH | AxH | BxH | CxH | DxH | ExH | FxH |
|-----|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| x0H |     | 0aP`P |     |     |     |     |     |     |     |     |     |     |     |     |
| x1H | !   | 1Aa9  |     |     |     |     |     |     |     |     |     |     |     |     |
| x2H | "   | 2BRbr |     |     |     |     |     |     |     |     |     |     |     |     |
| x3H | #   | 3CScs |     |     |     |     |     |     |     |     |     |     |     |     |
| x4H | \$  | 4DTdt |     |     |     |     |     |     |     |     |     |     |     |     |
| x5H | %   | 5EUeu |     |     |     |     |     |     |     |     |     |     |     |     |
| x6H | &   | 6FUfu |     |     |     |     |     |     |     |     |     |     |     |     |
| x7H | '   | 7GWsw |     |     |     |     |     |     |     |     |     |     |     |     |
| x8H | <   | 8HXhx |     |     |     |     |     |     |     |     |     |     |     |     |
| x9H | >   | 9IYiy |     |     |     |     |     |     |     |     |     |     |     |     |
| xAH | *   | JZjz  |     |     |     |     |     |     |     |     |     |     |     |     |
| xBH | +   | KCk<  |     |     |     |     |     |     |     |     |     |     |     |     |
| xCH | ,   | <L¥1  |     |     |     |     |     |     |     |     |     |     |     |     |
| xDH | =   | MIm>  |     |     |     |     |     |     |     |     |     |     |     |     |
| xEH | .   | >N^n  |     |     |     |     |     |     |     |     |     |     |     |     |
| xFH | /   | ?0    |     |     |     |     |     |     |     |     |     |     |     |     |

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7.6 KATAKANA --- 13 X 29

|     | 2xH | 3xH | 4xH | 5xH | 6xH | 7xH | 8xH | 9xH | AxH | BxH | CxH | DxH | ExH | FxH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| x0H |     | 0   | @P  | '   | p0  | 月   | =   | ク   | タ   | ハ   | ム   | ヰ   |     |     |
| x1H | !   | 1   | AQ  | aq  | 1   | 火   | ア   | ケ   | チ   | ハ   | メ   | エ   |     |     |
| x2H | ”   | 2   | BR  | br  | 2   | 木   | ア   | ゲ   | チ   | ヒ   | モ   | ヨ   |     |     |
| x3H | #   | 3   | CS  | cs  | 3   | 木   | イ   | コ   | シ   | ヒ   | ヤ   | ン   |     |     |
| x4H | \$  | 4   | DT  | dt  | 4   | 金   | イ   | コ   | シ   | ヒ   | ヤ   | ウ   |     |     |
| x5H | %   | 5   | EU  | eu  | 5   | 土   | ウ   | サ   | ジ   | フ   | ユ   | カ   |     |     |
| x6H | &   | 6   | FU  | fu  | 6   | 日   | ウ   | ザ   | テ   | ブ   | ユ   | ク   |     |     |
| x7H | '   | 7   | GW  | gw  | 7   | 年   | エ   | シ   | デ   | ラ   | ヨ   | ウ   |     |     |
| x8H | (   | 8   | HX  | hx  | 8   | 分   | エ   | シ   | ト   | ヘ   | ヨ   | ヰ   |     |     |
| x9H | )   | 9   | IY  | iy  | 9   |     | オ   | ス   | ト   | ヘ   | ラ   | エ   |     |     |
| xAH | *   | :   | JZ  | jz  | T   |     | オ   | ス   | ナ   | ヘ   | リ   | ヲ   |     |     |
| xBH | +   | ;   | K   | [k  | (   | 人   | 大   | カ   | セ   | ニ   | ホ   | ル   | .   |     |
| xCH | ,   | <   | L   | \   |     | ↑   | 中   | ガ   | セ   | ヌ   | ホ   | レ   | ー   |     |
| xDH | -   | =   | M   | ]m  | }   | →   | 小   | キ   | ソ   | ネ   | ホ   | ロ   | \   |     |
| xEH | .   | >   | N   | ^n  | ~   | ↓   | ¥   | キ   | ソ   | ノ   | マ   | ウ   | \   |     |
| xFH | /   | ?   | O   | _o  | o   | ←   | 計   | ク   | タ   | ハ   | ミ   | ウ   | 7   |     |

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### 7.7 KANJI --- 16 X 16 AND 32 X 32

| 81  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH |     | 、   | 。   | ，   | ・   | ∴   | ∵   | ？   | ！   | ”   | 。   |     |     |     |     |     |
| 5xH |     | 、   | 、   | 、   | 、   | 〃   | 全   | 々   | 〆   | 〇   | 一   | 一   | 一   | ／   | ＼   |     |
| 6xH |     | ～   | ∥   |     | …   | ..  | “   | ”   | ( ) | [ ] | [ ] | {   |     |     |     |     |
| 7xH |     | }   | <   | >   | 《   | 》   | 「   | 」   | 『   | 』   | 【   | 】   | +   | -   | ±   | ×   |
| 8xH |     | ÷   | =   | ≠   | <   | >   | ≦   | ≧   | ∞   | ∴   | ♂   | ♀   | °   | '   | ”   | °C  |
| 9xH |     | \$  | ¢   | £   | %   | #   | &   | *   | @   | §   | ☆   | ★   | ○   | ●   | ◎   | ◇   |
| AxH |     | □   | ■   | △   | ▲   | ▽   | ▼   | ※   | 〒   | →   | ←   | ↑   | ↓   | =   |     |     |
| BxH |     |     |     |     |     |     |     |     |     | ∈   | ∋   | ⊆   | ⊇   | ⊂   | ⊃   | ∪   |
| CxH |     |     |     |     |     |     |     |     |     | ∧   | ∨   | ∩   | ⇒   | ⇔   | ∇   | ∃   |
| DxH |     |     |     |     |     |     |     |     |     | ∠   | ⊥   | ∧   | ∂   | ∇   | ≡   |     |
| ExH |     | ≡   | ≪   | ≫   | √   | ∞   | ∞   | ∴   | ∴   | ∴   | ∴   |     |     |     |     |     |
| FxH |     | Å   | %   | #   | b   | ♪   | †   | ‡   | ¶   |     |     |     |     |     |     | ○   |

| 82  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 0   |
| 5xH |     | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   |     |     |     |     |     |     |
| 6xH |     | A   | B   | C   | D   | E   | F   | G   | H   | I   | J   | K   | L   | M   | N   | O   |
| 7xH |     | Q   | R   | S   | T   | U   | V   | W   | X   | Y   | Z   |     |     |     |     |     |
| 8xH |     | a   | b   | c   | d   | e   | f   | g   | h   | i   | j   | k   | l   | m   | n   | o   |
| 9xH |     | p   | q   | r   | s   | t   | u   | v   | w   | x   | y   | z   |     |     |     |     |
| AxH |     | あ   | い   | い   | う   | う   | え   | え   | お   | お   | か   | か   | き   | ぎ   | く   | ぐ   |
| BxH |     | け   | こ   | こ   | さ   | さ   | し   | じ   | ず   | ず   | せ   | せ   | そ   | ぞ   | た   | だ   |
| CxH |     | ち   | っ   | つ   | づ   | て   | で   | と   | ど   | な   | に   | ぬ   | ね   | の   | は   | ば   |
| DxH |     | ひ   | び   | び   | ふ   | ぶ   | ぶ   | へ   | べ   | へ   | ほ   | ぼ   | ぼ   | ま   | み   | む   |
| ExH |     | も   | ゃ   | や   | ゅ   | ゆ   | よ   | よ   | ら   | り   | る   | れ   | ろ   | わ   | わ   | ゑ   |
| FxH |     | を   | ん   |     |     |     |     |     |     |     |     |     |     |     |     |     |

| 83  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH |     | ァ   | ア   | ィ   | イ   | ウ   | ウ   | ェ   | エ   | オ   | オ   | カ   | ガ   | キ   | ギ   | ク   |
| 5xH |     | ヶ   | ゲ   | ゴ   | ゴ   | サ   | ザ   | シ   | ジ   | ス   | ズ   | セ   | ゼ   | ソ   | ゾ   | タ   |
| 6xH |     | チ   | ヂ   | ッ   | ツ   | ツ   | テ   | デ   | ト   | ド   | ナ   | ニ   | ヌ   | ネ   | ノ   | ハ   |
| 7xH |     | パ   | ヒ   | ピ   | ピ   | フ   | ブ   | フ   | ヘ   | ベ   | ペ   | ホ   | ボ   | ポ   | マ   | ミ   |
| 8xH |     | ム   | メ   | モ   | ヤ   | ユ   | ユ   | ヨ   | ヨ   | ラ   | リ   | ル   | レ   | ロ   | ワ   | ワ   |
| 9xH |     | キ   | ユ   | ン   | ヴ   | カ   | ケ   |     |     |     |     |     |     |     |     | Α   |
| AxH |     | Β   | Γ   | Δ   | Ε   | Ζ   | Η   | Θ   | Ι   | Κ   | Λ   | Μ   | Ν   | Ξ   | Ο   | Π   |
| BxH |     | Σ   | Τ   | Υ   | Φ   | Χ   | Ψ   | Ω   |     |     |     |     |     |     |     | α   |
| CxH |     | β   | γ   | δ   | ε   | ξ   | η   | θ   | ι   | κ   | λ   | μ   | ν   | ξ   | ο   | π   |
| DxH |     | σ   | τ   | υ   | φ   | χ   | ψ   | ω   |     |     |     |     |     |     |     |     |
| ExH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| FxH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

| 84  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH |     | А   | Б   | В   | Г   | Д   | Е   | Ё   | Ж   | З   | И   | Й   | К   | Л   | М   | Н   |
| 5xH |     | П   | Р   | С   | Т   | У   | Ф   | Х   | Ц   | Ч   | Ш   | Щ   | Ъ   | Ы   | Ь   | Э   |
| 6xH |     | Я   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 7xH |     | а   | б   | в   | г   | д   | е   | ё   | ж   | з   | и   | й   | к   | л   | м   | н   |
| 8xH |     | о   | п   | р   | с   | т   | у   | ф   | х   | ц   | ч   | ш   | щ   | ъ   | ы   | ь   |
| 9xH |     | ю   | я   |     |     |     |     |     |     |     |     |     |     |     |     |     |
| AxH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| BxH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| CxH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| DxH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| ExH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| FxH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

| 87  | x0H | x1H | x2H | x3H | x4H  | x5H | x6H            | x7H | x8H | x9H | xAH | xBH | xCH  | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|------|-----|----------------|-----|-----|-----|-----|-----|------|-----|-----|-----|
| 4xH |     | ①   | ②   | ③   | ④    | ⑤   | ⑥              | ⑦   | ⑧   | ⑨   | ⑩   | ⑪   | ⑫    | ⑬   | ⑭   | ⑮   |
| 5xH |     | ⑰   | ⑱   | ⑲   | ⑳    | I   | II             | III | IV  | V   | VI  | VII | VIII | IX  | X   | ミ   |
| 6xH |     | キ   | ロ   | セ   | メ    | グ   | ラ              | ト   | アル  | ヘ   | タル  | リ   | ツ    | ワ   | カ   | ロ   |
| 7xH |     | cm  | km  | mg  | kg   | cc  | m <sup>2</sup> |     |     |     |     |     |      |     |     | 平成  |
| 8xH |     | ”   | ”   | No. | K.K. | TEL | Ⓢ              | Ⓜ   | Ⓣ   | Ⓝ   | Ⓡ   | Ⓣ   | Ⓝ    | Ⓡ   | (株) | (有) |
| 9xH |     | ≡   | ≡   | ∫   | ∫    | ∑   | √              | ⊥   | ∠   | ∠   | ∠   | ∠   | ∠    | ∠   | ∠   | ∠   |
| AxH |     |     |     |     |      |     |                |     |     |     |     |     |      |     |     |     |
| BxH |     |     |     |     |      |     |                |     |     |     |     |     |      |     |     |     |
| CxH |     |     |     |     |      |     |                |     |     |     |     |     |      |     |     |     |
| DxH |     |     |     |     |      |     |                |     |     |     |     |     |      |     |     |     |
| ExH |     |     |     |     |      |     |                |     |     |     |     |     |      |     |     |     |
| FxH |     |     |     |     |      |     |                |     |     |     |     |     |      |     |     |     |

| 88  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 5xH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 6xH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 7xH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 8xH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 9xH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 亜   |
| AxH |     | 唾   | 娃   | 阿   | 哀   | 愛   | 挨   | 始   | 逢   | 葵   | 茜   | 穉   | 惡   | 握   | 渥   | 旭   |
| BxH |     | 芦   | 鯨   | 梓   | 庄   | 幹   | 扱   | 宛   | 姐   | 虻   | 飴   | 絢   | 綾   | 鮎   | 或   | 粟   |
| CxH |     | 安   | 庵   | 按   | 暗   | 案   | 闇   | 鞍   | 杏   | 以   | 伊   | 位   | 依   | 偉   | 困   | 夷   |
| DxH |     | 威   | 尉   | 惟   | 意   | 慰   | 易   | 椅   | 為   | 畏   | 異   | 移   | 維   | 緯   | 胃   | 萎   |
| ExH |     | 謂   | 違   | 遺   | 医   | 井   | 亥   | 域   | 育   | 郁   | 磯   | 一   | 壹   | 溢   | 逸   | 稻   |
| FxH |     | 芋   | 鯛   | 允   | 印   | 咽   | 員   | 因   | 姻   | 引   | 飲   | 淫   | 胤   | 蔭   |     |     |



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| 8G  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 院   | 陰   | 隱   | 韻   | 吋   | 右   | 宇   | 烏   | 羽   | 迂   | 雨   | 卯   | 鵝   | 窺   | 丑   | 確   |
| 5xH | 白   | 涸   | 噓   | 頌   | 鬱   | 蔚   | 鰻   | 姥   | 厥   | 浦   | 瓜   | 閏   | 粵   | 云   | 運   | 雲   |
| 6xH | 荏   | 飢   | 叢   | 營   | 嬰   | 影   | 映   | 曳   | 榮   | 永   | 泳   | 洩   | 瑛   | 盈   | 穎   | 穎   |
| 7xH | 英   | 衛   | 詠   | 銳   | 液   | 疫   | 益   | 馭   | 悅   | 謁   | 越   | 閱   | 覆   | 厭   | 門   |     |
| 8xH | 園   | 堰   | 奄   | 宴   | 延   | 怨   | 掩   | 援   | 沿   | 演   | 炎   | 焰   | 煙   | 燕   | 猿   | 緣   |
| 9xH | 艷   | 苑   | 菌   | 遠   | 鉛   | 鴛   | 塩   | 於   | 汚   | 甥   | 凹   | 央   | 奧   | 往   | 庀   | 押   |
| AxH | 旺   | 橫   | 欧   | 段   | 王   | 翁   | 襖   | 鶯   | 鷗   | 黃   | 岡   | 冲   | 荻   | 億   | 屋   | 憶   |
| BxH | 臆   | 桶   | 牡   | 乙   | 俺   | 卸   | 恩   | 温   | 穩   | 音   | 下   | 化   | 佞   | 何   | 伽   | 伽   |
| CxH | 佳   | 加   | 可   | 嘉   | 夏   | 嫁   | 家   | 寡   | 科   | 暇   | 果   | 架   | 歌   | 河   | 火   | 珂   |
| DxH | 禍   | 禾   | 稼   | 箇   | 花   | 苛   | 茄   | 荷   | 華   | 菓   | 蝦   | 課   | 嘩   | 貨   | 迥   | 過   |
| ExH | 霞   | 蚊   | 俄   | 峨   | 我   | 牙   | 画   | 臥   | 芽   | 蛾   | 賀   | 雅   | 餓   | 駕   | 介   | 會   |
| FxH | 解   | 回   | 塊   | 壞   | 迴   | 快   | 怪   | 悔   | 恢   | 懷   | 戒   | 拐   | 改   |     |     |     |

| 8A  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 魁   | 晦   | 械   | 海   | 灰   | 界   | 皆   | 繪   | 芥   | 蟹   | 開   | 階   | 貝   | 凱   | 効   | 外   |
| 5xH | 咳   | 害   | 崖   | 慨   | 概   | 涯   | 碍   | 蓋   | 街   | 該   | 鎧   | 骸   | 涇   | 馨   | 蛙   | 垣   |
| 6xH | 柿   | 蚶   | 鈎   | 劃   | 嚇   | 各   | 廓   | 括   | 挽   | 格   | 核   | 殼   | 獲   | 確   | 穫   | 覺   |
| 7xH | 角   | 赫   | 較   | 郭   | 閣   | 隔   | 革   | 學   | 岳   | 樂   | 額   | 顎   | 掛   | 笠   | 櫟   |     |
| 8xH | 櫃   | 梶   | 鯁   | 漚   | 割   | 喝   | 恰   | 括   | 活   | 渴   | 滑   | 葛   | 褐   | 轄   | 且   | 鯉   |
| 9xH | 叶   | 柁   | 樺   | 樞   | 株   | 兜   | 竈   | 蒲   | 釜   | 鎌   | 喙   | 鳴   | 栢   | 茅   | 萱   | 粥   |
| AxH | 刈   | 苜   | 瓦   | 乾   | 侃   | 冠   | 寒   | 刊   | 勘   | 勸   | 卷   | 喚   | 堪   | 姦   | 完   | 官   |
| BxH | 寬   | 干   | 幹   | 患   | 感   | 慣   | 憾   | 換   | 敢   | 柑   | 桓   | 棺   | 款   | 歡   | 汗   | 漢   |
| CxH | 澗   | 灌   | 環   | 甘   | 監   | 看   | 竿   | 管   | 簡   | 緩   | 缶   | 翰   | 肝   | 艦   | 莞   | 觀   |
| DxH | 諫   | 貫   | 還   | 鑑   | 間   | 閑   | 閑   | 陷   | 韓   | 館   | 丸   | 含   | 岸   | 巖   | 玩   | 奇   |
| ExH | 癌   | 眼   | 岩   | 翫   | 賈   | 雁   | 頑   | 顏   | 願   | 企   | 仗   | 危   | 喜   | 器   | 基   |     |
| FxH | 嬉   | 寄   | 岐   | 希   | 幾   | 忌   | 揮   | 机   | 旗   | 既   | 期   | 棋   | 棄   |     |     |     |

| 8B  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 機   | 歸   | 毅   | 氣   | 汽   | 畿   | 祈   | 季   | 稀   | 紀   | 徽   | 規   | 記   | 貴   | 起   | 軌   |
| 5xH | 輝   | 飢   | 騎   | 鬼   | 龜   | 偽   | 儀   | 妓   | 宜   | 戲   | 技   | 擬   | 欺   | 犧   | 疑   | 祇   |
| 6xH | 義   | 蟻   | 誼   | 議   | 掬   | 菊   | 鞠   | 吉   | 吃   | 喫   | 桔   | 橘   | 詰   | 砧   | 杵   | 黍   |
| 7xH | 却   | 客   | 脚   | 虐   | 逆   | 丘   | 久   | 仇   | 休   | 及   | 吸   | 宮   | 弓   | 急   | 救   |     |
| 8xH | 朽   | 求   | 汲   | 泣   | 灸   | 球   | 究   | 窮   | 笈   | 級   | 糾   | 給   | 旧   | 牛   | 去   | 居   |
| 9xH | 巨   | 拒   | 扱   | 挈   | 渠   | 虛   | 許   | 距   | 鋸   | 漁   | 禦   | 魚   | 亨   | 亨   | 京   | 供   |
| AxH | 俠   | 橋   | 兇   | 競   | 共   | 凶   | 協   | 匡   | 卿   | 叫   | 香   | 境   | 峽   | 強   | 疆   | 怯   |
| BxH | 恐   | 恭   | 挾   | 教   | 橋   | 況   | 狂   | 狹   | 矯   | 胸   | 脅   | 興   | 鄉   | 鏡   | 響   | 均   |
| CxH | 饗   | 驚   | 仰   | 凝   | 堯   | 曉   | 業   | 局   | 曲   | 極   | 玉   | 桐   | 秆   | 僅   | 勤   | 均   |
| DxH | 巾   | 錦   | 斤   | 欣   | 欽   | 琴   | 禁   | 禽   | 筋   | 緊   | 芹   | 菌   | 衿   | 襟   | 謹   | 近   |
| ExH | 金   | 吟   | 銀   | 九   | 俱   | 句   | 區   | 狗   | 玖   | 矩   | 苦   | 躬   | 驅   | 駢   | 駒   | 具   |
| FxH | 愚   | 虞   | 喰   | 空   | 偶   | 寓   | 遇   | 隅   | 串   | 櫛   | 櫛   | 屑   | 屈   |     |     |     |

| 8C  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 掘   | 窟   | 沓   | 靴   | 轡   | 窪   | 熊   | 隈   | 彙   | 栗   | 縑   | 桑   | 鍬   | 勳   | 君   | 薰   |
| 5xH | 訓   | 群   | 軍   | 郡   | 卦   | 袞   | 係   | 傾   | 刑   | 兄   | 啓   | 圭   | 珪   | 型   | 契   | 經   |
| 6xH | 形   | 徑   | 惠   | 慶   | 慧   | 憇   | 揭   | 携   | 敬   | 景   | 桂   | 溪   | 畦   | 稽   | 系   | 經   |
| 7xH | 繼   | 繫   | 野   | 荊   | 荳   | 蚩   | 計   | 詣   | 警   | 輕   | 頸   | 鷄   | 芸   | 迎   | 鯨   |     |
| 8xH | 劇   | 載   | 擊   | 激   | 際   | 桁   | 傑   | 欠   | 決   | 潔   | 穴   | 結   | 血   | 訣   | 月   | 件   |
| 9xH | 俟   | 倦   | 健   | 兼   | 券   | 劍   | 喧   | 圈   | 堅   | 嫌   | 建   | 憲   | 懸   | 拳   | 捲   | 檢   |
| AxH | 權   | 牽   | 犬   | 獻   | 研   | 硯   | 絹   | 梟   | 肩   | 見   | 謙   | 賢   | 軒   | 遣   | 鍵   | 險   |
| BxH | 顯   | 驗   | 顛   | 元   | 原   | 嚴   | 幻   | 弦   | 減   | 源   | 玄   | 現   | 絃   | 骸   | 言   | 諺   |
| CxH | 限   | 乎   | 個   | 古   | 呼   | 固   | 姑   | 孤   | 己   | 庫   | 弧   | 戶   | 故   | 枯   | 湖   | 狐   |
| DxH | 糊   | 袴   | 股   | 胡   | 菰   | 虎   | 誇   | 跨   | 鈞   | 履   | 顧   | 鼓   | 五   | 互   | 伍   | 鯉   |
| ExH | 吳   | 吾   | 娛   | 後   | 御   | 悟   | 梧   | 檣   | 湖   | 碁   | 語   | 誤   | 護   | 向   |     |     |
| FxH | 交   | 佼   | 候   | 候   | 倖   | 光   | 公   | 功   | 効   | 効   | 厚   | 口   | 向   |     |     |     |

| 8D  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 后   | 喉   | 坑   | 垢   | 好   | 孔   | 孝   | 宏   | 工   | 巧   | 巷   | 幸   | 庑   | 康   | 弘   | 浩   |
| 5xH | 恒   | 慌   | 抗   | 拘   | 控   | 攻   | 昂   | 晃   | 更   | 杭   | 校   | 梗   | 構   | 江   | 洪   | 浩   |
| 6xH | 港   | 溝   | 甲   | 皇   | 硬   | 稿   | 糠   | 紅   | 絃   | 絞   | 綱   | 耕   | 考   | 肯   | 肱   | 腔   |
| 7xH | 膏   | 航   | 荒   | 行   | 衡   | 講   | 貢   | 購   | 郊   | 醇   | 鉞   | 砒   | 鋼   | 閣   | 降   |     |
| 8xH | 項   | 香   | 高   | 鴻   | 剛   | 劫   | 号   | 壕   | 拷   | 濠   | 豪   | 轟   | 翹   | 克   | 刻   | 刻   |
| 9xH | 告   | 國   | 毅   | 酷   | 鵠   | 黑   | 獄   | 澆   | 腰   | 甌   | 忽   | 惚   | 骨   | 狽   | 込   | 此   |
| AxH | 頃   | 今   | 困   | 坤   | 壑   | 婚   | 恨   | 懇   | 昏   | 昆   | 根   | 梱   | 混   | 痕   | 紺   | 良   |
| BxH | 魂   | 些   | 佐   | 又   | 唆   | 嵯   | 左   | 差   | 查   | 沙   | 瑤   | 砂   | 詐   | 鎖   | 綵   | 坐   |
| CxH | 座   | 挫   | 債   | 催   | 再   | 最   | 哉   | 塞   | 妻   | 宰   | 彩   | 才   | 採   | 裁   | 歲   | 濟   |
| DxH | 災   | 采   | 犀   | 碎   | 砦   | 祭   | 齋   | 細   | 菜   | 裁   | 載   | 劑   | 在   | 材   | 罪   | 罪   |
| ExH | 財   | 冚   | 坂   | 阪   | 堺   | 榭   | 肴   | 咲   | 崎   | 埼   | 碕   | 作   | 削   | 咋   |     |     |
| FxH | 昨   | 朔   | 柵   | 窄   | 策   | 索   | 錯   | 櫻   | 鮭   | 筴   | 匙   | 冊   | 刷   |     |     |     |

| 8E  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 察   | 撈   | 撮   | 擦   | 札   | 殺   | 薩   | 雜   | 阜   | 鯖   | 捌   | 鏽   | 鮫   | 皿   | 晒   | 三   |
| 5xH | 傘   | 參   | 山   | 慘   | 撒   | 散   | 棧   | 燦   | 珊   | 產   | 算   | 纂   | 蚕   | 讚   | 贊   | 酸   |
| 6xH | 餐   | 斬   | 暫   | 殘   | 仕   | 仔   | 伺   | 使   | 刺   | 司   | 史   | 嗣   | 四   | 士   | 始   | 姊   |
| 7xH | 姿   | 子   | 屍   | 市   | 師   | 志   | 思   | 指   | 支   | 攷   | 斯   | 施   | 旨   | 枝   | 止   |     |
| 8xH | 死   | 氏   | 獅   | 社   | 私   | 糸   | 紙   | 紫   | 肢   | 脂   | 至   | 視   | 詞   | 詩   | 試   | 誌   |
| 9xH | 諮   | 資   | 賜   | 雌   | 飼   | 齒   | 事   | 似   | 侍   | 兒   | 字   | 寺   | 慈   | 持   | 時   | 次   |
| AxH | 滋   | 治   | 爾   | 璽   | 痔   | 磁   | 示   | 而   | 耳   | 自   | 蒔   | 辭   | 汐   | 鹿   | 式   | 識   |
| BxH | 鳴   | 竺   | 軸   | 穴   | 雲   | 七   | 叱   | 執   | 失   | 嫉   | 室   | 悉   | 濕   | 漆   | 疾   | 質   |
| CxH | 實   | 蔀   | 篠   | 偲   | 柴   | 芝   | 屢   | 蕊   | 邪   | 借   | 勺   | 尺   | 杓   | 灼   | 酌   | 煮   |
| DxH | 社   | 紗   | 者   | 謝   | 車   | 遮   | 蛇   | 邪   | 借   | 手   | 殊   | 狩   | 珠   | 種   | 腫   | 趣   |
| ExH | 錫   | 若   | 寂   | 弱   | 惹   | 主   | 取   | 守   | 手   | 殊   | 狩   | 珠   | 種   | 腫   | 趣   |     |
| FxH | 酒   | 首   | 儒   | 受   | 呪   | 壽   | 授   | 樹   | 綬   | 需   | 囚   | 収   | 周   |     |     |     |

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| 8F  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 宗   | 就   | 州   | 修   | 愁   | 拾   | 洲   | 秀   | 秋   | 終   | 繡   | 習   | 臭   | 舟   | 蒐   | 衆   |
| 5xH | 襲   | 讐   | 蹴   | 輯   | 週   | 酉   | 酬   | 集   | 醜   | 什   | 住   | 充   | 十   | 從   | 戎   | 柔   |
| 6xH | 汁   | 洪   | 獸   | 縱   | 重   | 銃   | 叔   | 夙   | 宿   | 淑   | 祝   | 縮   | 肅   | 塾   | 熟   | 出   |
| 7xH | 術   | 述   | 俊   | 峻   | 春   | 瞬   | 竣   | 舜   | 駿   | 准   | 循   | 旬   | 楯   | 殉   | 淳   |     |
| 8xH | 準   | 潤   | 盾   | 純   | 巡   | 遵   | 醇   | 順   | 処   | 初   | 所   | 暑   | 曙   | 渚   | 庶   | 緒   |
| 9xH | 署   | 書   | 薯   | 諸   | 助   | 叙   | 女   | 序   | 徐   | 恕   | 鋤   | 除   | 傷   | 償   | 勝   |     |
| AxH | 匠   | 升   | 召   | 哨   | 商   | 唱   | 嘗   | 獎   | 妾   | 娼   | 宵   | 將   | 小   | 少   | 尚   | 庄   |
| BxH | 床   | 廠   | 彰   | 承   | 抄   | 招   | 掌   | 捷   | 昇   | 昌   | 昭   | 晶   | 松   | 稍   | 樟   | 樵   |
| CxH | 沼   | 消   | 涉   | 湘   | 燒   | 焦   | 照   | 症   | 省   | 硝   | 礁   | 祥   | 稱   | 章   | 笑   | 粧   |
| DxH | 紹   | 肖   | 莒   | 蔣   | 蕉   | 衝   | 裳   | 訟   | 証   | 詔   | 詳   | 象   | 賞   | 醬   | 鉦   | 鍾   |
| ExH | 鐘   | 障   | 鞞   | 上   | 丈   | 丞   | 乘   | 冗   | 剩   | 城   | 場   | 壤   | 孃   | 常   | 情   | 擾   |
| FxH | 条   | 杖   | 淨   | 狀   | 疊   | 穰   | 蒸   | 讓   | 釀   | 錠   | 囑   | 埴   | 飾   |     |     |     |

| 90  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 拭   | 植   | 殖   | 燭   | 織   | 職   | 色   | 觸   | 食   | 蝕   | 辱   | 尻   | 伸   | 信   | 侵   | 唇   |
| 5xH | 振   | 寢   | 審   | 心   | 慎   | 振   | 新   | 晉   | 森   | 榛   | 浸   | 深   | 申   | 疹   | 真   | 神   |
| 6xH | 秦   | 紳   | 臣   | 芯   | 薪   | 親   | 診   | 身   | 辛   | 進   | 針   | 震   | 人   | 仁   | 刃   | 塵   |
| 7xH | 千   | 尋   | 甚   | 盡   | 腎   | 訊   | 迅   | 陣   | 鞞   | 筈   | 諷   | 須   | 酢   | 囟   | 厨   |     |
| 8xH | 逗   | 吹   | 垂   | 帥   | 推   | 水   | 炊   | 睡   | 粹   | 翠   | 衰   | 遂   | 醉   | 錐   | 隨   |     |
| 9xH | 瑞   | 髓   | 崇   | 嵩   | 數   | 樞   | 趨   | 雛   | 据   | 杉   | 相   | 營   | 頗   | 雀   | 澄   |     |
| AxH | 摺   | 寸   | 世   | 瀨   | 畝   | 是   | 淒   | 制   | 勢   | 姓   | 征   | 性   | 成   | 政   | 整   | 星   |
| BxH | 晴   | 棲   | 栖   | 正   | 清   | 性   | 生   | 盛   | 精   | 聖   | 聲   | 製   | 西   | 誠   | 誓   | 請   |
| CxH | 逝   | 醒   | 青   | 靜   | 齊   | 稅   | 脆   | 隻   | 席   | 惜   | 戚   | 斥   | 昔   | 析   | 積   | 石   |
| DxH | 籍   | 績   | 脊   | 責   | 赤   | 跡   | 蹟   | 碩   | 切   | 拙   | 接   | 掇   | 折   | 設   | 竊   | 節   |
| ExH | 說   | 雪   | 絕   | 舌   | 蟬   | 仙   | 先   | 千   | 占   | 宣   | 專   | 尖   | 川   | 戰   | 扇   | 撰   |
| FxH | 栓   | 梅   | 泉   | 淺   | 洗   | 染   | 潛   | 煎   | 煽   | 旋   | 穿   | 箭   | 線   |     |     |     |

| 91  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 緘   | 羨   | 腺   | 舛   | 船   | 薦   | 詮   | 賤   | 踐   | 選   | 遷   | 錢   | 銑   | 閃   | 鮮   | 前   |
| 5xH | 善   | 漸   | 然   | 全   | 禪   | 繕   | 膳   | 噉   | 塑   | 岨   | 措   | 曾   | 曾   | 楚   | 狙   |     |
| 6xH | 疏   | 疎   | 礎   | 祖   | 粗   | 素   | 組   | 蘇   | 訴   | 阻   | 遯   | 鼠   | 僧   | 創   | 雙   |     |
| 7xH | 叢   | 倉   | 喪   | 壯   | 奏   | 爽   | 宋   | 層   | 匣   | 惣   | 想   | 搜   | 掃   | 搔   |     |     |
| 8xH | 操   | 早   | 曹   | 巢   | 槍   | 槽   | 漕   | 燥   | 爭   | 瘦   | 相   | 窞   | 糟   | 綜   | 聰   | 臍   |
| 9xH | 草   | 莊   | 葬   | 蒼   | 藻   | 裝   | 走   | 送   | 遭   | 鎗   | 霜   | 騷   | 像   | 增   | 憎   | 臟   |
| AxH | 葳   | 贈   | 造   | 促   | 側   | 則   | 即   | 息   | 捉   | 束   | 測   | 足   | 速   | 俗   | 屬   | 賊   |
| BxH | 族   | 統   | 卒   | 袖   | 其   | 掬   | 存   | 孫   | 尊   | 損   | 村   | 遜   | 他   | 多   | 太   | 汰   |
| CxH | 訖   | 唾   | 墮   | 妥   | 惰   | 打   | 柁   | 舵   | 檣   | 陀   | 馱   | 驂   | 體   | 堆   | 對   | 耐   |
| DxH | 岱   | 帶   | 待   | 怠   | 態   | 戴   | 替   | 泰   | 滯   | 胎   | 腿   | 苔   | 袋   | 貸   | 退   | 逮   |
| ExH | 隊   | 黛   | 鯛   | 代   | 台   | 大   | 第   | 醍   | 題   | 鷹   | 滝   | 龍   | 卓   | 啄   | 宅   | 托   |
| FxH | 扞   | 拓   | 沢   | 濯   | 琢   | 託   | 鐸   | 濁   | 諾   | 茸   | 風   | 蜻   | 只   |     |     |     |

| 92  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 叩   | 但   | 達   | 辰   | 奪   | 脫   | 巽   | 豎   | 迪   | 棚   | 谷   | 狸   | 鱈   | 樽   | 誰   | 丹   |
| 5xH | 單   | 嘆   | 坦   | 担   | 探   | 旦   | 歎   | 淡   | 湛   | 炭   | 短   | 端   | 筭   | 綻   | 耽   | 弛   |
| 6xH | 蛋   | 誕   | 鍛   | 团   | 壇   | 彈   | 斷   | 暖   | 檀   | 段   | 男   | 談   | 值   | 知   | 地   |     |
| 7xH | 恥   | 智   | 池   | 痴   | 稚   | 置   | 致   | 蜘   | 遲   | 馳   | 畜   | 竹   | 筑   | 蓄   |     |     |
| 8xH | 逐   | 秩   | 窒   | 茶   | 嫡   | 着   | 中   | 仲   | 宙   | 忠   | 抽   | 昼   | 柱   | 注   | 虫   | 衷   |
| 9xH | 註   | 耐   | 鈔   | 駐   | 樗   | 瀦   | 猪   | 苧   | 著   | 貯   | 丁   | 兆   | 凋   | 喋   | 寵   | 帖   |
| AxH | 帳   | 疔   | 弔   | 張   | 彫   | 微   | 懲   | 挑   | 暢   | 朝   | 潮   | 牒   | 町   | 眺   | 聽   | 脹   |
| BxH | 腸   | 蝶   | 調   | 課   | 超   | 跳   | 銚   | 長   | 頂   | 烏   | 勅   | 抄   | 直   | 朕   | 沈   | 珍   |
| CxH | 質   | 鎮   | 陳   | 津   | 墜   | 椎   | 槌   | 迫   | 鎚   | 痛   | 通   | 塚   | 柁   | 楓   | 佃   | 耐   |
| DxH | 漬   | 柘   | 辻   | 蔦   | 綴   | 鏢   | 椿   | 潰   | 坪   | 壺   | 婦   | 紬   | 爪   | 吊   | 鈞   | 鶴   |
| ExH | 亭   | 低   | 停   | 偵   | 剃   | 貞   | 呈   | 堤   | 定   | 帝   | 底   | 庭   | 廷   | 弟   | 悌   |     |
| FxH | 挺   | 提   | 梯   | 汀   | 碇   | 禎   | 程   | 締   | 艇   | 訂   | 諦   | 蹄   | 遁   |     |     |     |

| 93  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 邸   | 鄭   | 釘   | 鼎   | 泥   | 擢   | 敵   | 滴   | 的   | 笛   | 適   | 鏞   | 溺   | 哲   | 徹   | 点   |
| 5xH | 撤   | 轍   | 迭   | 鉄   | 典   | 填   | 天   | 展   | 店   | 添   | 纏   | 甜   | 貼   | 軫   | 顛   |     |
| 6xH | 佗   | 殿   | 澱   | 田   | 電   | 兎   | 吐   | 堵   | 塗   | 妬   | 屠   | 徒   | 斗   | 杜   | 渡   | 登   |
| 7xH | 菟   | 賭   | 途   | 都   | 鍍   | 砥   | 砺   | 努   | 度   | 土   | 奴   | 怒   | 倒   | 党   | 冬   |     |
| 8xH | 凍   | 刀   | 唐   | 塔   | 塘   | 套   | 宕   | 島   | 嶋   | 悼   | 投   | 搭   | 東   | 桃   | 棒   | 棟   |
| 9xH | 盜   | 淘   | 湯   | 涛   | 燈   | 當   | 痘   | 禱   | 等   | 答   | 筒   | 糖   | 統   | 到   | 董   |     |
| AxH | 蕩   | 藤   | 討   | 騰   | 豆   | 踏   | 逃   | 透   | 鐙   | 陶   | 頭   | 騰   | 閏   | 働   | 動   | 同   |
| BxH | 堂   | 導   | 撞   | 撞   | 洞   | 瞳   | 童   | 桐   | 苟   | 道   | 銅   | 峠   | 錫   | 匿   | 得   | 德   |
| CxH | 澆   | 特   | 督   | 禿   | 篤   | 毒   | 独   | 読   | 柝   | 橡   | 凸   | 突   | 椽   | 届   | 鳶   | 苦   |
| DxH | 寅   | 酉   | 滯   | 噸   | 屯   | 惇   | 敦   | 沌   | 豚   | 遁   | 頓   | 吞   | 曇   | 鈍   | 奈   | 那   |
| ExH | 內   | 乍   | 風   | 雍   | 謎   | 灘   | 捺   | 鍋   | 櫛   | 馴   | 繩   | 纈   | 南   | 楠   | 軟   | 難   |
| FxH | 汝   | 二   | 尼   | 忒   | 迓   | 賑   | 肉   | 虹   | 廿   | 日   | 乳   | 入   |     |     |     |     |

| 94  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 如   | 尿   | 菲   | 任   | 妊   | 忍   | 認   | 濡   | 襴   | 祢   | 寧   | 葱   | 貓   | 熱   | 年   | 念   |
| 5xH | 捻   | 燃   | 粘   | 乃   | 迺   | 之   | 之   | 棼   | 囊   | 惱   | 濃   | 納   | 能   | 腦   | 農   |     |
| 6xH | 視   | 蚤   | 巴   | 把   | 播   | 霸   | 杷   | 波   | 派   | 琶   | 破   | 婆   | 罵   | 芭   | 馬   | 俳   |
| 7xH | 廢   | 拜   | 排   | 敗   | 杯   | 盃   | 牌   | 背   | 肺   | 輩   | 配   | 倍   | 培   | 媒   | 梅   |     |
| 8xH | 煤   | 煤   | 狽   | 買   | 壳   | 陪   | 陪   | 這   | 蠅   | 秤   | 矧   | 菽   | 伯   | 剥   | 博   | 拍   |
| 9xH | 柏   | 泊   | 白   | 箔   | 粕   | 舶   | 薄   | 迫   | 曝   | 漠   | 爆   | 縛   | 莫   | 駁   | 麥   | 函   |
| AxH | 箱   | 裕   | 箸   | 筭   | 筭   | 櫨   | 幡   | 肌   | 畑   | 阜   | 八   | 伴   | 判   | 髡   | 髡   | 髮   |
| BxH | 伐   | 罰   | 拔   | 筏   | 閱   | 鳩   | 嘶   | 塙   | 蛤   | 隼   | 繁   | 般   | 藩   | 販   | 反   | 帆   |
| CxH | 搬   | 斑   | 板   | 汜   | 汎   | 版   | 犯   | 班   | 畔   | 繁   | 匪   | 卑   | 否   | 妃   | 庇   | 悲   |
| DxH | 頒   | 飯   | 挽   | 晚   | 番   | 盤   | 磬   | 蕃   | 蛮   | 秘   | 毘   | 毘   | 肥   | 被   | 被   | 費   |
| ExH | 扉   | 批   | 披   | 斐   | 比   | 泌   | 疲   | 皮   | 碑   | 毘   | 毘   | 肥   | 被   | 被   | 被   | 費   |
| FxH | 避   | 非   | 飛   | 樋   | 篋   | 備   | 尾   | 微   | 枇   | 毘   | 毘   | 肥   | 被   | 被   | 被   | 費   |

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| 95  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 鼻   | 柶   | 稗   | 匹   | 疋   | 髭   | 彦   | 膝   | 菱   | 肘   | 弼   | 必   | 畢   | 筆   | 逼   | 松   |
| 5xH | 姪   | 媛   | 紐   | 百   | 謬   | 佞   | 彪   | 標   | 水   | 漂   | 瓢   | 票   | 表   | 評   | 豹   | 廟   |
| 6xH | 描   | 病   | 秒   | 苗   | 錨   | 蒜   | 蛭   | 鱸   | 品   | 彬   | 斌   | 浜   | 瀕   | 貧   | 賓   |     |
| 7xH | 頻   | 敏   | 瓶   | 不   | 付   | 埠   | 夫   | 婦   | 富   | 富   | 布   | 府   | 扶   | 敷   |     |     |
| 8xH | 斧   | 普   | 浮   | 父   | 符   | 腐   | 膚   | 芙   | 譜   | 負   | 賦   | 赴   | 阜   | 附   | 侮   | 撫   |
| 9xH | 武   | 舞   | 葡   | 蕪   | 部   | 封   | 楓   | 風   | 葺   | 蔞   | 伏   | 副   | 復   | 幅   | 服   | 福   |
| AxH | 腹   | 復   | 覆   | 淵   | 弗   | 扌   | 沸   | 仏   | 物   | 鮒   | 分   | 吻   | 噴   | 墳   | 憤   | 扮   |
| BxH | 焚   | 奮   | 粉   | 糞   | 紛   | 雰   | 文   | 聞   | 丙   | 併   | 兵   | 堀   | 幣   | 平   | 弊   | 柄   |
| CxH | 並   | 蔽   | 閉   | 陸   | 米   | 頁   | 僻   | 壁   | 癖   | 碧   | 別   | 警   | 蔑   | 篋   | 偏   | 變   |
| DxH | 片   | 篇   | 編   | 辺   | 返   | 遍   | 便   | 勉   | 媿   | 弁   | 鞭   | 保   | 舖   | 鋪   | 圃   | 捕   |
| ExH | 步   | 甫   | 補   | 輔   | 穗   | 募   | 慕   | 戊   | 暮   | 母   | 簿   | 菩   | 倣   | 俸   | 包   |     |
| FxH | 呆   | 報   | 奉   | 宝   | 峰   | 峯   | 崩   | 庖   | 抱   | 捧   | 放   | 方   | 朋   |     |     |     |

| 96  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 法   | 泡   | 烹   | 砲   | 縫   | 胞   | 芳   | 萌   | 蓬   | 蜂   | 褒   | 訪   | 豐   | 邦   | 鋒   | 飽   |
| 5xH | 鳳   | 鵬   | 乏   | 亡   | 傍   | 剖   | 坊   | 妨   | 帽   | 忘   | 忙   | 房   | 暴   | 望   | 某   | 棒   |
| 6xH | 冒   | 紡   | 肪   | 膨   | 謀   | 貌   | 貿   | 鉢   | 防   | 吠   | 頰   | 北   | 僕   | 卜   | 墨   | 撲   |
| 7xH | 朴   | 牧   | 睦   | 穆   | 釘   | 勃   | 沒   | 殆   | 堀   | 幌   | 奔   | 本   | 翻   | 凡   | 盆   |     |
| 8xH | 摩   | 磨   | 魔   | 麻   | 埋   | 妹   | 味   | 枚   | 每   | 哩   | 禎   | 幕   | 膜   | 枕   | 鮪   | 枉   |
| 9xH | 鱒   | 樹   | 亦   | 侯   | 又   | 抹   | 末   | 沫   | 迄   | 俚   | 繭   | 磨   | 萬   | 慢   | 滿   | 漫   |
| AxH | 蔓   | 味   | 未   | 魅   | 已   | 箕   | 岬   | 密   | 蜜   | 湊   | 蓑   | 稔   | 脈   | 妙   | 耗   | 民   |
| BxH | 眠   | 務   | 夢   | 無   | 牟   | 矛   | 霧   | 鷓   | 掠   | 婿   | 娘   | 冥   | 名   | 命   | 明   | 盟   |
| CxH | 迷   | 銘   | 鳴   | 姪   | 牝   | 滅   | 免   | 棉   | 綿   | 緬   | 面   | 麵   | 摸   | 模   | 茂   | 妄   |
| DxH | 孟   | 毛   | 猛   | 盲   | 網   | 耗   | 蒙   | 儲   | 木   | 默   | 目   | 李   | 勿   | 餅   | 尤   | 戾   |
| ExH | 粗   | 貫   | 問   | 悶   | 紋   | 門   | 匆   | 也   | 冶   | 夜   | 爺   | 耶   | 野   | 弥   | 矢   | 厄   |
| FxH | 役   | 約   | 藥   | 訊   | 躍   | 靖   | 柳   | 數   | 鏈   | 愉   | 愈   | 油   |     |     |     |     |

| 97  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 論   | 輪   | 唯   | 佑   | 優   | 勇   | 友   | 有   | 幽   | 悠   | 憂   | 揖   | 有   | 袖   | 湧   | 涌   |
| 5xH | 猶   | 猷   | 由   | 祐   | 裕   | 誘   | 遊   | 邑   | 郵   | 雄   | 融   | 夕   | 予   | 余   | 与   | 譽   |
| 6xH | 輿   | 預   | 傭   | 幼   | 妖   | 容   | 庸   | 揚   | 搖   | 擁   | 曜   | 楊   | 樣   | 洋   | 溶   | 熔   |
| 7xH | 用   | 窯   | 羊   | 耀   | 葉   | 蓉   | 要   | 謡   | 踊   | 遙   | 陽   | 養   | 慾   | 抑   | 欲   |     |
| 8xH | 沃   | 浴   | 翌   | 翼   | 淀   | 羅   | 螺   | 裸   | 來   | 萊   | 賴   | 雷   | 洛   | 絡   | 落   | 酪   |
| 9xH | 乱   | 卵   | 嵐   | 欄   | 濫   | 藍   | 蘭   | 覽   | 利   | 吏   | 履   | 李   | 梨   | 理   | 璃   | 痢   |
| AxH | 裏   | 裡   | 里   | 離   | 陸   | 律   | 率   | 立   | 律   | 掠   | 略   | 劉   | 流   | 溜   | 琉   | 留   |
| BxH | 硫   | 粒   | 隆   | 龍   | 侶   | 慮   | 旅   | 虜   | 了   | 亮   | 僚   | 兩   | 凌   | 寮   | 寮   | 料   |
| CxH | 梁   | 涼   | 獠   | 療   | 瞭   | 稜   | 糧   | 良   | 諒   | 遼   | 量   | 陵   | 領   | 力   | 綠   | 倫   |
| DxH | 厘   | 林   | 淋   | 麟   | 臨   | 輪   | 麟   | 麟   | 璫   | 瑤   | 墨   | 淚   | 累   | 類   | 令   | 曆   |
| ExH | 伶   | 例   | 冷   | 勵   | 嶺   | 玲   | 禮   | 苓   | 鈴   | 隸   | 零   | 靈   | 麗   | 齡   |     |     |
| FxH | 歷   | 列   | 劣   | 烈   | 裂   | 廉   | 戀   | 憐   | 漣   | 煉   | 鍊   | 聯   |     |     |     |     |

| 98  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 蓮   | 連   | 鍊   | 呂   | 魯   | 魯   | 魯   | 魯   | 魯   | 魯   | 魯   | 魯   | 魯   | 魯   | 魯   | 魯   |
| 5xH | 榔   | 浪   | 漏   | 牢   | 狼   | 籠   | 老   | 聾   | 蠟   | 郎   | 六   | 婁   | 廊   | 弄   | 朗   | 樓   |
| 6xH | 倭   | 和   | 話   | 歪   | 賄   | 脇   | 惑   | 梓   | 驚   | 互   | 巨   | 鯨   | 鯨   | 鯨   | 鯨   | 鯨   |
| 7xH | 灣   | 碗   | 腕   |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 8xH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 9xH |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 式   |
| AxH | 丐   | 丕   | 个   | 非   | 、   | 井   | 丿   | 乂   | 乖   | 乘   | 亂   | 丿   | 豫   | 事   | 舒   | 式   |
| BxH | 于   | 亞   | 亟   | 一   | 亢   | 京   | 毫   | 亶   | 从   | 仍   | 仄   | 仆   | 仆   | 仗   | 仗   | 仗   |
| CxH | 仟   | 价   | 伉   | 佚   | 估   | 佛   | 佝   | 佞   | 俎   | 倂   | 倂   | 倂   | 倂   | 倂   | 倂   | 倂   |
| DxH | 侑   | 佯   | 來   | 侖   | 儘   | 俛   | 俛   | 俛   | 俛   | 俛   | 俛   | 俛   | 俛   | 俛   | 俛   | 俛   |
| ExH | 倨   | 偏   | 倪   | 佻   | 倅   | 倅   | 倅   | 倅   | 倅   | 倅   | 倅   | 倅   | 倅   | 倅   | 倅   | 倅   |
| FxH | 會   | 偕   | 修   | 偈   | 做   | 偕   | 偕   | 偕   | 偕   | 偕   | 偕   | 偕   | 偕   | 偕   | 偕   | 偕   |

| 99  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 僉   | 僊   | 傳   | 僂   | 僊   | 僊   | 僊   | 僊   | 僊   | 僊   | 僊   | 僊   | 僊   | 僊   | 僊   | 僊   |
| 5xH | 儕   | 儕   | 儕   | 儕   | 儕   | 儕   | 儕   | 儕   | 儕   | 儕   | 儕   | 儕   | 儕   | 儕   | 儕   | 儕   |
| 6xH | 僉   | 僉   | 僉   | 僉   | 僉   | 僉   | 僉   | 僉   | 僉   | 僉   | 僉   | 僉   | 僉   | 僉   | 僉   | 僉   |
| 7xH | 冪   | 冪   | 冪   | 冪   | 冪   | 冪   | 冪   | 冪   | 冪   | 冪   | 冪   | 冪   | 冪   | 冪   | 冪   | 冪   |
| 8xH | 凰   | 凰   | 凰   | 凰   | 凰   | 凰   | 凰   | 凰   | 凰   | 凰   | 凰   | 凰   | 凰   | 凰   | 凰   | 凰   |
| 9xH | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   |
| AxH | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   | 劓   |
| BxH | 匆   | 匆   | 匆   | 匆   | 匆   | 匆   | 匆   | 匆   | 匆   | 匆   | 匆   | 匆   | 匆   | 匆   | 匆   | 匆   |
| CxH | 卅   | 卅   | 卅   | 卅   | 卅   | 卅   | 卅   | 卅   | 卅   | 卅   | 卅   | 卅   | 卅   | 卅   | 卅   | 卅   |
| DxH | 廠   | 廠   | 廠   | 廠   | 廠   | 廠   | 廠   | 廠   | 廠   | 廠   | 廠   | 廠   | 廠   | 廠   | 廠   | 廠   |
| ExH | 吭   | 吭   | 吭   | 吭   | 吭   | 吭   | 吭   | 吭   | 吭   | 吭   | 吭   | 吭   | 吭   | 吭   | 吭   | 吭   |
| FxH | 咀   | 咀   | 咀   | 咀   | 咀   | 咀   | 咀   | 咀   | 咀   | 咀   | 咀   | 咀   | 咀   | 咀   | 咀   | 咀   |

| 9A  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 咫   | 晒   | 咤   | 咤   | 咤   | 咤   | 咤   | 咤   | 咤   | 咤   | 咤   | 咤   | 咤   | 咤   | 咤   | 咤   |
| 5xH | 唾   | 唾   | 唾   | 唾   | 唾   | 唾   | 唾   | 唾   | 唾   | 唾   | 唾   | 唾   | 唾   | 唾   | 唾   | 唾   |
| 6xH | 啞   | 啞   | 啞   | 啞   | 啞   | 啞   | 啞   | 啞   | 啞   | 啞   | 啞   | 啞   | 啞   | 啞   | 啞   | 啞   |
| 7xH | 噴   | 嘔   | 嘔   | 嘔   | 嘔   | 嘔   | 嘔   | 嘔   | 嘔   | 嘔   | 嘔   | 嘔   | 嘔   | 嘔   | 嘔   | 嘔   |
| 8xH | 噫   | 噫   | 噫   | 噫   | 噫   | 噫   | 噫   | 噫   | 噫   | 噫   | 噫   | 噫   | 噫   | 噫   | 噫   | 噫   |
| 9xH | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   | 嚼   |
| AxH | 國   | 國   | 國   | 國   | 國   | 國   | 國   | 國   | 國   | 國   | 國   | 國   | 國   | 國   | 國   | 國   |
| BxH | 垆   | 垆   | 垆   | 垆   | 垆   | 垆   | 垆   | 垆   | 垆   | 垆   | 垆   | 垆   | 垆   | 垆   | 垆   | 垆   |
| CxH | 坳   | 坳   | 坳   | 坳   | 坳   | 坳   | 坳   | 坳   | 坳   | 坳   | 坳   | 坳   | 坳   | 坳   | 坳   | 坳   |
| DxH | 墟   | 墟   | 墟   | 墟   | 墟   | 墟   | 墟   | 墟   | 墟   | 墟   | 墟   | 墟   | 墟   | 墟   | 墟   | 墟   |
| ExH | 壘   | 壘   | 壘   | 壘   | 壘   | 壘   | 壘   | 壘   | 壘   | 壘   | 壘   | 壘   | 壘   | 壘   | 壘   | 壘   |
| FxH | 夸   | 夸   | 夸   | 夸   | 夸   | 夸   | 夸   | 夸   | 夸   | 夸   | 夸   | 夸   | 夸   | 夸   | 夸   | 夸   |

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| 9B  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 奸   | 妲   | 姹   | 佞   | 佞   | 妣   | 妲   | 媧   | 媧   | 姜   | 妍   | 姘   | 姚   | 娥   | 娟   | 娑   |
| 5xH | 娜   | 娉   | 娉   | 娉   | 娉   | 娉   | 娉   | 娉   | 娉   | 娉   | 娉   | 娉   | 娉   | 娉   | 娉   | 娉   |
| 6xH | 媽   | 媽   | 媽   | 媽   | 媽   | 媽   | 媽   | 媽   | 媽   | 媽   | 媽   | 媽   | 媽   | 媽   | 媽   | 媽   |
| 7xH | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   | 嬖   |
| 8xH | 它   | 它   | 它   | 它   | 它   | 它   | 它   | 它   | 它   | 它   | 它   | 它   | 它   | 它   | 它   | 它   |
| 9xH | 寶   | 寶   | 寶   | 寶   | 寶   | 寶   | 寶   | 寶   | 寶   | 寶   | 寶   | 寶   | 寶   | 寶   | 寶   | 寶   |
| AxH | 屏   | 屏   | 屏   | 屏   | 屏   | 屏   | 屏   | 屏   | 屏   | 屏   | 屏   | 屏   | 屏   | 屏   | 屏   | 屏   |
| BxH | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   | 嶂   |
| CxH | 崑   | 崑   | 崑   | 崑   | 崑   | 崑   | 崑   | 崑   | 崑   | 崑   | 崑   | 崑   | 崑   | 崑   | 崑   | 崑   |
| DxH | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   | 嶠   |
| ExH | 厄   | 厄   | 厄   | 厄   | 厄   | 厄   | 厄   | 厄   | 厄   | 厄   | 厄   | 厄   | 厄   | 厄   | 厄   | 厄   |
| FxH | 幣   | 幣   | 幣   | 幣   | 幣   | 幣   | 幣   | 幣   | 幣   | 幣   | 幣   | 幣   | 幣   | 幣   | 幣   | 幣   |

| 9C  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 廖   | 廣   | 廡   | 廡   | 廡   | 廡   | 廡   | 廡   | 廡   | 廡   | 廡   | 廡   | 廡   | 廡   | 廡   | 廡   |
| 5xH | 弃   | 弃   | 弃   | 弃   | 弃   | 弃   | 弃   | 弃   | 弃   | 弃   | 弃   | 弃   | 弃   | 弃   | 弃   | 弃   |
| 6xH | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   |
| 7xH | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   | 豕   |
| 8xH | 估   | 估   | 估   | 估   | 估   | 估   | 估   | 估   | 估   | 估   | 估   | 估   | 估   | 估   | 估   | 估   |
| 9xH | 協   | 協   | 協   | 協   | 協   | 協   | 協   | 協   | 協   | 協   | 協   | 協   | 協   | 協   | 協   | 協   |
| AxH | 俊   | 俊   | 俊   | 俊   | 俊   | 俊   | 俊   | 俊   | 俊   | 俊   | 俊   | 俊   | 俊   | 俊   | 俊   | 俊   |
| BxH | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   |
| CxH | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   |
| DxH | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   |
| ExH | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   |
| FxH | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   | 愠   |

| 9D  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 戛   | 戛   | 戛   | 戛   | 戛   | 戛   | 戛   | 戛   | 戛   | 戛   | 戛   | 戛   | 戛   | 戛   | 戛   | 戛   |
| 5xH | 抉   | 抉   | 抉   | 抉   | 抉   | 抉   | 抉   | 抉   | 抉   | 抉   | 抉   | 抉   | 抉   | 抉   | 抉   | 抉   |
| 6xH | 拜   | 拜   | 拜   | 拜   | 拜   | 拜   | 拜   | 拜   | 拜   | 拜   | 拜   | 拜   | 拜   | 拜   | 拜   | 拜   |
| 7xH | 挾   | 挾   | 挾   | 挾   | 挾   | 挾   | 挾   | 挾   | 挾   | 挾   | 挾   | 挾   | 挾   | 挾   | 挾   | 挾   |
| 8xH | 振   | 振   | 振   | 振   | 振   | 振   | 振   | 振   | 振   | 振   | 振   | 振   | 振   | 振   | 振   | 振   |
| 9xH | 攝   | 攝   | 攝   | 攝   | 攝   | 攝   | 攝   | 攝   | 攝   | 攝   | 攝   | 攝   | 攝   | 攝   | 攝   | 攝   |
| AxH | 擒   | 擒   | 擒   | 擒   | 擒   | 擒   | 擒   | 擒   | 擒   | 擒   | 擒   | 擒   | 擒   | 擒   | 擒   | 擒   |
| BxH | 擴   | 擴   | 擴   | 擴   | 擴   | 擴   | 擴   | 擴   | 擴   | 擴   | 擴   | 擴   | 擴   | 擴   | 擴   | 擴   |
| CxH | 收   | 收   | 收   | 收   | 收   | 收   | 收   | 收   | 收   | 收   | 收   | 收   | 收   | 收   | 收   | 收   |
| DxH | 斷   | 斷   | 斷   | 斷   | 斷   | 斷   | 斷   | 斷   | 斷   | 斷   | 斷   | 斷   | 斷   | 斷   | 斷   | 斷   |
| ExH | 杏   | 杏   | 杏   | 杏   | 杏   | 杏   | 杏   | 杏   | 杏   | 杏   | 杏   | 杏   | 杏   | 杏   | 杏   | 杏   |
| FxH | 晰   | 晰   | 晰   | 晰   | 晰   | 晰   | 晰   | 晰   | 晰   | 晰   | 晰   | 晰   | 晰   | 晰   | 晰   | 晰   |

| 9E  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 曄   | 曄   | 曄   | 曄   | 曄   | 曄   | 曄   | 曄   | 曄   | 曄   | 曄   | 曄   | 曄   | 曄   | 曄   | 曄   |
| 5xH | 霸   | 霸   | 霸   | 霸   | 霸   | 霸   | 霸   | 霸   | 霸   | 霸   | 霸   | 霸   | 霸   | 霸   | 霸   | 霸   |
| 6xH | 杼   | 杼   | 杼   | 杼   | 杼   | 杼   | 杼   | 杼   | 杼   | 杼   | 杼   | 杼   | 杼   | 杼   | 杼   | 杼   |
| 7xH | 拆   | 拆   | 拆   | 拆   | 拆   | 拆   | 拆   | 拆   | 拆   | 拆   | 拆   | 拆   | 拆   | 拆   | 拆   | 拆   |
| 8xH | 梳   | 梳   | 梳   | 梳   | 梳   | 梳   | 梳   | 梳   | 梳   | 梳   | 梳   | 梳   | 梳   | 梳   | 梳   | 梳   |
| 9xH | 梵   | 梵   | 梵   | 梵   | 梵   | 梵   | 梵   | 梵   | 梵   | 梵   | 梵   | 梵   | 梵   | 梵   | 梵   | 梵   |
| AxH | 棧   | 棧   | 棧   | 棧   | 棧   | 棧   | 棧   | 棧   | 棧   | 棧   | 棧   | 棧   | 棧   | 棧   | 棧   | 棧   |
| BxH | 輪   | 輪   | 輪   | 輪   | 輪   | 輪   | 輪   | 輪   | 輪   | 輪   | 輪   | 輪   | 輪   | 輪   | 輪   | 輪   |
| CxH | 棟   | 棟   | 棟   | 棟   | 棟   | 棟   | 棟   | 棟   | 棟   | 棟   | 棟   | 棟   | 棟   | 棟   | 棟   | 棟   |
| DxH | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   |
| ExH | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   |
| FxH | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   | 樞   |

| 9F  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   |
| 5xH | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   | 槩   |
| 6xH | 戲   | 戲   | 戲   | 戲   | 戲   | 戲   | 戲   | 戲   | 戲   | 戲   | 戲   | 戲   | 戲   | 戲   | 戲   | 戲   |
| 7xH | 彈   | 彈   | 彈   | 彈   | 彈   | 彈   | 彈   | 彈   | 彈   | 彈   | 彈   | 彈   | 彈   | 彈   | 彈   | 彈   |
| 8xH | 麾   | 麾   | 麾   | 麾   | 麾   | 麾   | 麾   | 麾   | 麾   | 麾   | 麾   | 麾   | 麾   | 麾   | 麾   | 麾   |
| 9xH | 汾   | 汾   | 汾   | 汾   | 汾   | 汾   | 汾   | 汾   | 汾   | 汾   | 汾   | 汾   | 汾   | 汾   | 汾   | 汾   |
| AxH | 泛   | 泛   | 泛   | 泛   | 泛   | 泛   | 泛   | 泛   | 泛   | 泛   | 泛   | 泛   | 泛   | 泛   | 泛   | 泛   |
| BxH | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   |
| CxH | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   | 涓   |
| DxH | 渙   | 渙   | 渙   | 渙   | 渙   | 渙   | 渙   | 渙   | 渙   | 渙   | 渙   | 渙   | 渙   | 渙   | 渙   | 渙   |
| ExH | 游   | 游   | 游   | 游   | 游   | 游   | 游   | 游   | 游   | 游   | 游   | 游   | 游   | 游   | 游   | 游   |
| FxH | 溟   | 溟   | 溟   | 溟   | 溟   | 溟   | 溟   | 溟   | 溟   | 溟   | 溟   | 溟   | 溟   | 溟   | 溟   | 溟   |

| 9G  | x0H | x1H | x2H | x3H | x4H | x5H | x6H | x7H | x8H | x9H | xAH | xBH | xCH | xDH | xEH | xFH |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4xH | 漾   | 漾   | 漾   | 漾   | 漾   | 漾   | 漾   | 漾   | 漾   | 漾   | 漾   | 漾   | 漾   | 漾   | 漾   | 漾   |
| 5xH | 漚   | 漚   | 漚   | 漚   | 漚   | 漚   | 漚   | 漚   | 漚   | 漚   | 漚   | 漚   | 漚   | 漚   | 漚   | 漚   |
| 6xH | 濮   | 濮   | 濮   | 濮   | 濮   | 濮   | 濮   | 濮   | 濮   | 濮   | 濮   | 濮   | 濮   | 濮   | 濮   | 濮   |
| 7xH | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   | 瀾   |
| 8xH | 烙   | 烙   | 烙   | 烙   | 烙   | 烙   | 烙   | 烙   | 烙   | 烙   | 烙   | 烙   | 烙   | 烙   | 烙   | 烙   |
| 9xH | 煩   | 煩   | 煩   | 煩   | 煩   | 煩   | 煩   | 煩   | 煩   | 煩   | 煩   | 煩   | 煩   | 煩   | 煩   | 煩   |
| AxH | 耀   | 耀   | 耀   | 耀   | 耀   | 耀   | 耀   | 耀   | 耀   | 耀   | 耀   | 耀   | 耀   | 耀   | 耀   | 耀   |
| BxH | 抵   | 抵   | 抵   | 抵   | 抵   | 抵   | 抵   | 抵   | 抵   | 抵   | 抵   | 抵   | 抵   | 抵   | 抵   | 抵   |
| CxH | 貉   | 貉   | 貉   | 貉   | 貉   | 貉   | 貉   | 貉   | 貉   | 貉   | 貉   | 貉   | 貉   | 貉   | 貉   | 貉   |
| DxH | 獎   | 獎   | 獎   | 獎   | 獎   | 獎   | 獎   | 獎   | 獎   | 獎   | 獎   | 獎   | 獎   | 獎   | 獎   | 獎   |
| ExH | 珥   | 珥   | 珥   | 珥   | 珥   | 珥   | 珥   | 珥   | 珥   | 珥   | 珥   | 珥   | 珥   | 珥   | 珥   | 珥   |
| FxH | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   | 瑩   |

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## 8.0 CONNECTOR INTERFACE

### 8.1 NAELW3601AA

The hardware interface to the module is via a 5-position USB micro-B connector (J3).

| Pin | Function |
|-----|----------|
| 1   | 5V       |
| 2   | USB D-   |
| 3   | USB D+   |
| 4   | NC       |
| 5   | GND      |

Connector: Hirose p/n ZX62-B-5PA(33)  
(shield connected to ground via ferrite bead)

### 8.2 NAELW3601BA

The hardware interface to the module is via a 5-position connector (J1).

| Pin | Function |
|-----|----------|
| 1   | 5V       |
| 2   | GND      |
| 3   | GND      |
| 4   | USB D-   |
| 5   | USB D+   |

Connector: FCI p/n 10114830-11105LF

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## 9.0 USB CONFIGURATION

### 9.1 STANDARD DEVICE DESCRIPTOR

| Offset | Field              | Description  | Size | Value | Comment     |
|--------|--------------------|--|------|-------|-------------|
| 0      | bLength            | Size of descriptor in bytes                                | 1    | 12h   |             |
| 1      | bDescriptorType    | Device descriptor type                                     | 1    | 01h   |             |
| 2, 3   | bcdUSB             | USB release number in BCD                                  | 2    | 0200h | rev 2.0     |
| 4      | bDeviceClass       | Class code   | 1    | 00h   |             |
| 5      | bDeviceSubClass    | Subclass code  | 1    | 00h   |             |
| 6      | bDeviceProtocol    | Protocol code  | 1    | 00h   |             |
| 7      | bMaxPacketSize     | Max packet size for endpoints                              | 1    | 40h   | 64 bytes    |
| 8, 9   | idVendor           | Vendor ID  | 2    | 1008h | Futaba      |
| 10, 11 | idProduct          | Product ID   | 2    | 103Ah |             |
| 12, 13 | bcdDevice          | Device release number in BCD                               | 2    | 00A0h | FW version  |
| 14     | iManufacturer      | Index of string descriptor describing manufacturer         | 1    | 01h   | Futaba      |
| 15     | iProduct           | Index of string descriptor describing product              | 1    | 02h   | NAELW3601xx |
| 16     | iSerialNumber      | Index of string descriptor describing device serial number | 1    | 00h   |             |
| 17     | bNumConfigurations | Number of possible configurations                          | 1    | 01h   |             |

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## 9.2 STANDARD CONFIGURATION DESCRIPTOR

| Offset | Field               | Description  | Size | Value | Comment                                    |
|--------|---------------------|--|------|-------|--|
| 0      | bLength             | Size of descriptor in bytes                              | 1    | 09h   |  |
| 1      | bDescriptorType     | Configuration descriptor type                            | 1    | 02h   |  |
| 2, 3   | bTotalLength        | Total length of data returned for this configuration     | 2    | 0029h | 41 bytes                                   |
| 4      | bNumInterfaces      | Number of interfaces supported by this interface         | 1    | 01h   |  |
| 5      | bConfigurationValue | Value to use as an argument                              | 1    | 01h   |  |
| 6      | bConfiguration      | Index of string descriptor describing this configuration | 1    | 03h   | OLED                                       |
| 7      | bmAttributes        | Configuration characteristics                            | 1    | 80h   | Bus powered<br>Disable<br>Remove<br>Wakeup |
| 8      | bMaxPower           | Maximum power consumption                                | 1    | E1h   | 450mA                                      |

## 9.3 INTERFACE DESCRIPTOR

| Offset | Field              | Description  | Size | Value | Comment      |
|--------|--------------------|--|------|-------|--------------|
| 0      | bLength            | Size of descriptor in bytes                          | 1    | 09h   |              |
| 1      | bDescriptorType    | Interface descriptor type                            | 1    | 04h   |              |
| 2      | bInterfaceNumber   | Number of this interface                             | 1    | 00h   |              |
| 3      | bAlternateSetting  | Value used to select this alternate setting          | 1    | 00h   |              |
| 4      | bNumEndpoints      | Number of endpoints used by this interface           | 1    | 02h   | IN, OUT      |
| 5      | bInterfaceClass    | Class code   | 1    | 03h   | HID          |
| 6      | bInterfaceSubClass | Subclass code  | 1    | 00h   |              |
| 7      | bInterfaceProtocol | Protocol code  | 1    | 00h   |              |
| 8      | iInterface         | Index of string descriptor describing this interface | 1    | 04h   | OLED control |

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## 9.4 IN ENDPOINT DESCRIPTOR

| Offset | Field            | Description  | Size | Value | Comment            |
|--------|------------------|--|------|-------|--------------------|
| 0      | bLength          | Size of this descriptor in bytes   | 1    | 07h   |                    |
| 1      | bDescriptorType  | Endpoint descriptor type   | 1    | 05h   |                    |
| 2      | bEndpointAddress | The address of the endpoint on the USB device described by this descriptor | 1    | 81h   | EP1, IN            |
| 3      | bmAttributes     | The endpoint's attributes  | 1    | 03h   | Interrupt transfer |
| 4      | wMaxPacketSize   | Maximum packet size of this endpoint                                       | 1    | 40h   | 64 Bytes           |
| 5      | bInterval        | Interval for polling endpoint data transfers                               | 1    | FFh   | 255 mS             |

## 9.5 OUT ENDPOINT DESCRIPTOR

| Offset | Field            | Description  | Size | Value | Comment            |
|--------|------------------|--|------|-------|--------------------|
| 0      | bLength          | Size of this descriptor in bytes   | 1    | 07h   |                    |
| 1      | bDescriptorType  | Endpoint descriptor type   | 1    | 05h   |                    |
| 2      | bEndpointAddress | The address of the endpoint on the USB device described by this descriptor | 1    | 01h   | EP1, OUT           |
| 3      | bmAttributes     | The endpoint's attributes  | 1    | 03h   | Interrupt transfer |
| 4      | wMaxPacketSize   | Maximum packet size of this endpoint                                       | 1    | 40h   | 64 Bytes           |
| 5      | bInterval        | Interval for polling endpoint data transfers                               | 1    | 01h   | 1 mS               |

## 9.6 HID CLASS DESCRIPTOR

| Offset | Field             | Description                        | Size | Value | Comment      |
|--------|-------------------|------------------------------------|------|-------|--------------|
| 0      | bLength           | Size of HID descriptor             | 1    | 09h   |              |
| 1      | bDescriptorType   | HID descriptor type                | 1    | 21h   |              |
| 2, 3   | bcdHID            | HID class specification            | 2    | 0110h | HID rev 1.10 |
| 4      | bCountryCode      | Country code of localized hardware | 1    | 00h   |              |
| 5      | bNumDescriptors   | Number of class descriptors        | 1    | 01h   |              |
| 6      | bDescriptorType   | Type of class descriptor           | 1    | 22h   |              |
| 7, 8   | bDescriptorLength | Descriptor length                  | 2    | 002Fh | 47 bytes     |

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## 9.7 HID CLASS REPORT DESCRIPTOR

| Main Item Type  | Value         | Description              |
|-----------------|---------------|--------------------------|
| Usage Page      | 06h, 00h, FFh | Vendor defined           |
| Usage           | 09h, 00h      | OLED control             |
| Collection      | A1h, 01h      | Application              |
|                 |               |                          |
| Usage           | 09h, 02h      | Data input               |
| Logical Minimum | 15h, 00h      | 0                        |
| Logical Maximum | 26h, FFh, 00h | 255                      |
| Report Size     | 75h, 08h      | 8 bits                   |
| Report Count    | 95h, 40h      | 64 bytes                 |
| Input           | 81h, 02h      | Data, variable, absolute |
|                 |               |                          |
| Usage           | 09h, 03h      | Data output              |
| Logical Minimum | 15h, 00h      | 0                        |
| Logical Maximum | 26h, FFh, 00h | 255                      |
| Report Size     | 75h, 08h      | 8 bits                   |
| Report Count    | 95h, 40h      | 64 bytes                 |
| Output          | 91h, 02h      | Data, variable, absolute |
|                 |               |                          |
| Usage           | 09h, 04h      | Feature                  |
| Logical Minimum | 15h, 00h      | 0                        |
| Logical Maximum | 26h, FFh, 00h | 255                      |
| Report Size     | 75h, 08h      | 8 bits                   |
| Report Count    | 95h, 40h      | 64 bytes                 |
| Feature         | B1h, 02h      | Data, variable, absolute |
|                 |               |                          |
| End Collection  | C0h           | End collection           |

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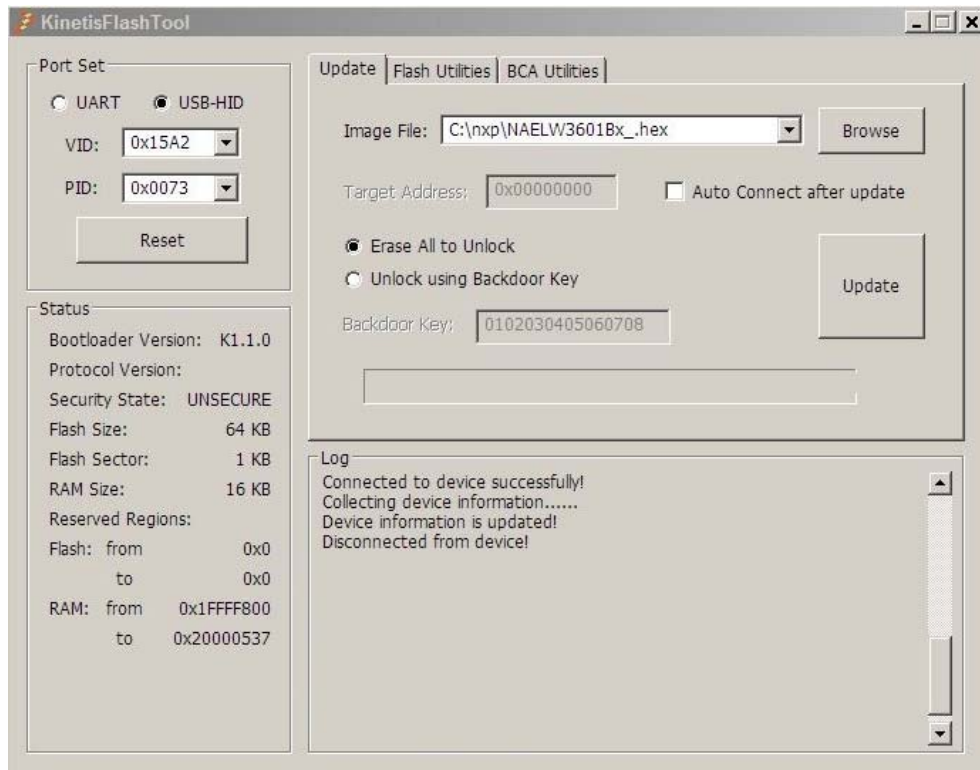
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## 10.0 SOFTWARE BOOTLOADER

The built-in bootloader allows the module's software to be updated over USB using NXP's Kinetis Flash Tool (or equivalent). The USB bootloader is enabled for 1 second at power up using VID 0x15A2 and PID 0x0073, afterwards normal USB operation begins with VID 0x1008 and PID 0x103A. See the Kinetis Flash Tool User's Guide for details.



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