Demo Software Manual

KA32180A, KA32182A & KA32183A Kirari LED Driver IC Demonstration Software (PC-GUI) User Manual

Software version: v1.00

CHARACTERISTICS

- Simulate LED patterns with default LED assignments using the matrix setup file (.mts) provided
- Design LED pattern and create pattern file (.ptf)
- Able to design multiple frames of LED pattern into single pattern file.
- Able to compose LED lighting pattern individually.
- Design and create playlist file which group all patterns into single playlist file (.pls)
- Able to compose playlist file with group of LED pattern files sequentially and continuously

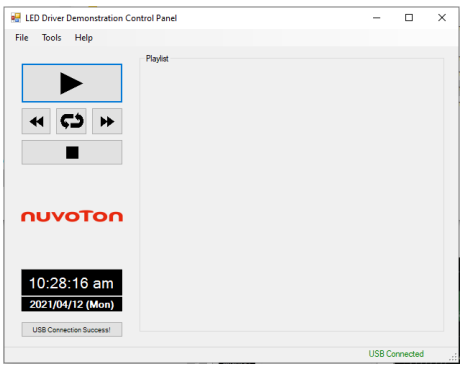
OVERVIEW

Kirari LED Driver Demo Software (PC-GUI) is designed for demonstration of Kirari LED driver IC (KA32180A/KA32182A/KA32183A).

This software together with Kirari LED driver demonstration board help users to design the required lighting pattern easily. Lighting pattern can then be displayed on LED board of Kiari Demo board to check on the required lighting effect.

Figures below shows the overview of the software GUI and Demo Kit setup.

Main Control Panel



Pattern Editor

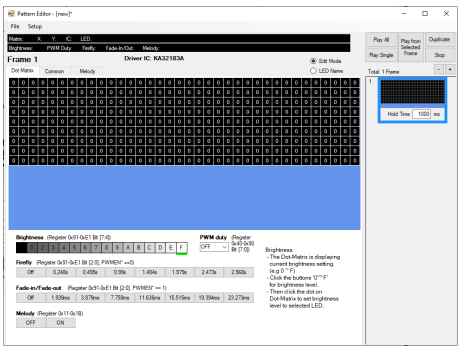


Figure 1: Kirari Demo Software (PC-GUI)

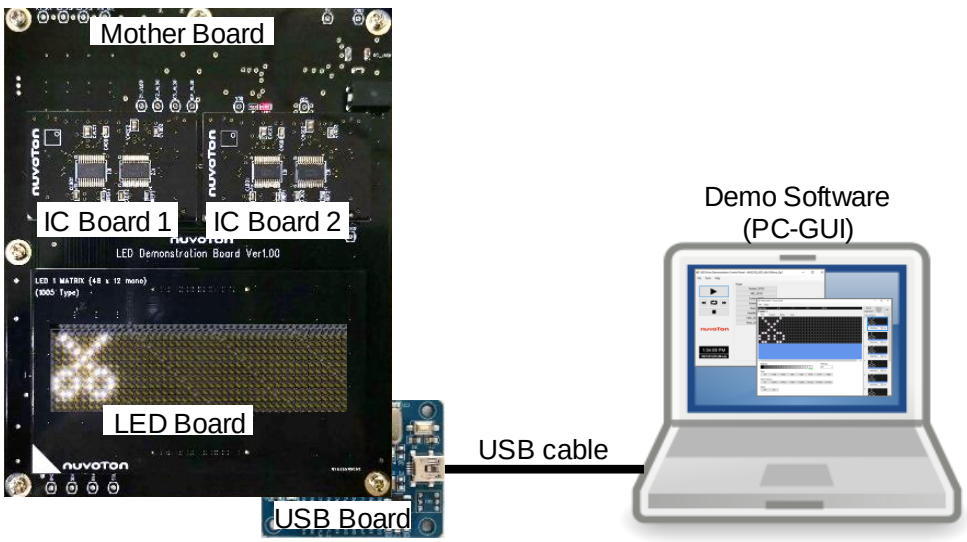


Figure 2: Kirari Demo Kit setup

Table of Contents

- CHARACTERISTICS..... 2
- OVERVIEW..... 2
- SOFTWARE INSTALLATION AND SETUP..... 4
    1. Contents of Demo Software..... 4
    2. Software Installation and Setup..... 5
- MAIN CONTROL PANEL..... 6
    1. Open Software 6
    2. Description of Controls..... 7
- PLAYLIST EDITOR..... 9
    1. Open Playlist Editor..... 9
    2. Description of Controls..... 9
- PATTERN EDITOR..... 11
    1. Open Pattern Editor..... 11
    2. Description of Pattern Editor Panel..... 12
- INPUT/OUTPUT FILES..... 25
    1. Matrix Setup File (.mts)..... 25
    2. Pattern File (.ptf)..... 25
    3. Command File (.cmf)..... 26
    4. Playlist File (.pls)..... 26
- NOTE..... 27
- REVISION HISTORY..... 28

SOFTWARE INSTALLATION AND SETUP

1. Contents of Demo Software

1> Software – Kirari LED Driver Demo Software

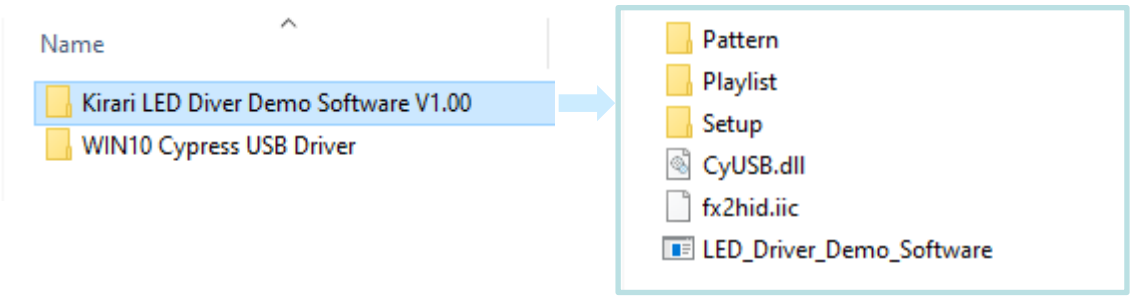


Figure 3: Contents of Kirari LED Driver Demo Software

Kirari LED Driver Demo Software V1.00 folder includes**:**

- **Pattern** folder – To save LED pattern file (*.ptf) created and its command file (*.cmf) which is auto-generated
- **Playlist** folder – To save playlist file (*.pls) of selected LED patterns
- **Setup** folder – To save matrix setup file (*.mts) used for new pattern design

- **CyUSB.dll** file – Essential file and not be removed, renamed and relocated.
- **fx2hid.iic** file – Essential file and not be removed, renamed and relocated.
- **LED_Driver_Demo_Software** file – Executable file (*.exe) of software

2> Driver – Cypress USB Driver

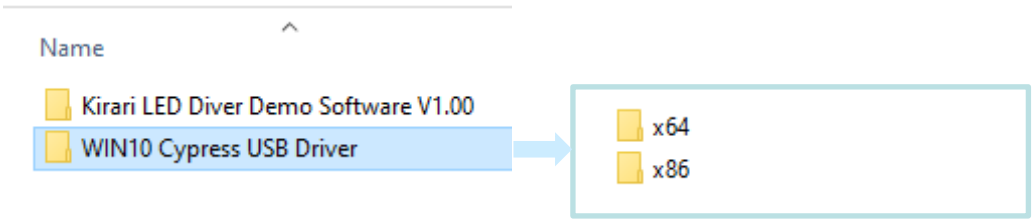


Figure 4: Contents of Cypress USB Driver

WIN10 Cypress USB Driver folder * includes:

- **x64** folder – Setup file for 64-bit CPU and operating system
- **x86** folder – Setup file for 32-bit CPU and operating system

** Note: The Cypress USB Driver provided is only for Windows 10. Contact Nuvoton Technology Singapore if other Windows version needed.*

SOFTWARE INSTALLATION AND SETUP (con't)

2. Software installation and setup

Install Cypress USB Driver (for Windows 10)

(1) Navigate to Settings by clicking the gear icon on the Start menu of PC desktop.
(2) Click Update & security.
(3) Select Recovery from the menu.
(4) Click Restart Now.
(5) Click Troubleshoot.
(6) Click Advanced Options. (refer to Figure 5)
(7) Choose Startup Settings. (refer to Figure 5)
(8) Click Restart (restart PC)
(9) Startup Settings Windows will show Type 7 (Disable driver signature enforcement) after restarting PC.
(10) Connect USB board to PC
(11) Navigate to Device Manager
(12) Right-Click Unknown device
(13) Click Update Driver
(14) Select driver software according to Windows Version (e.g. Win10\x64 from folder "WIN10 Cypress USB Driver")

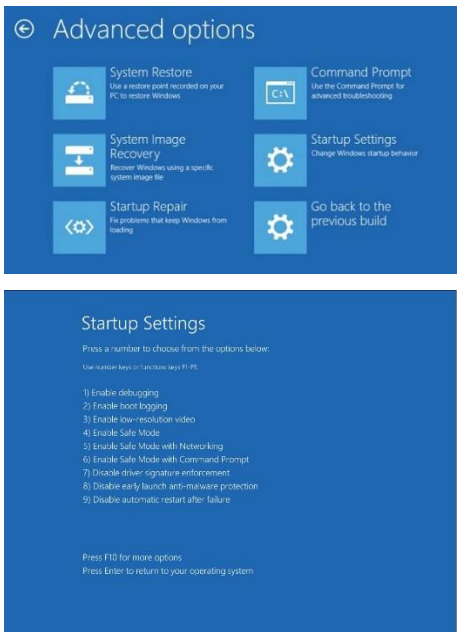


Figure 5: Windows10 setup pages

Enable the .NET Framework 3.5 in Control Panel

(1) Press the Windows key Screenshot of the Windows key logo. on your keyboard, type "Windows Features", and press Enter. The Turn Windows features on or off dialog box appears.
(2) Select the .NET Framework 3.5 (includes .NET 2.0 and 3.0) check box, select OK, and reboot your computer if prompted. (refer to Figure 6)

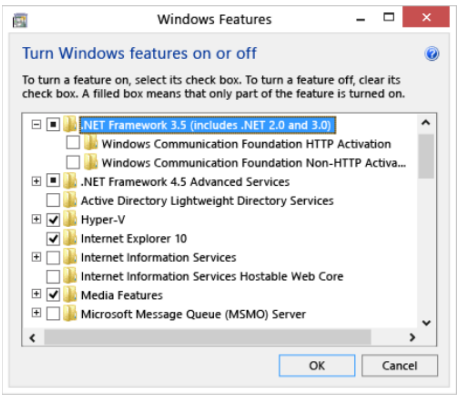


Figure 6: Enable .NET Framework3.5

Install the .NET Framework 3.5 on demand

(1) The .NET Framework 3.5 SP1 offline installer is available on the .NET Framework 3.5 SP1 Download page and is available for Windows versions prior to Windows 10.
(2) Choose Install this feature to enable the .NET Framework 3.5 as figure. This option requires an Internet connection. (refer to Figure 7)

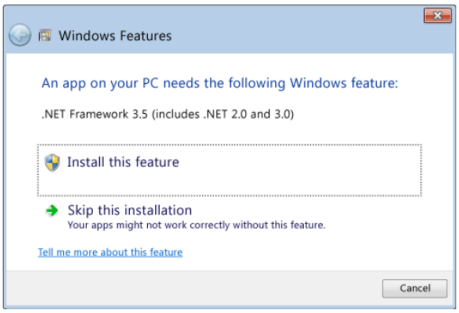


Figure 7: Install .NET Framework3.5

MAIN CONTROL PANEL

1. Open software

Open EXE Application “LED_Driver_Demo_Software as below:

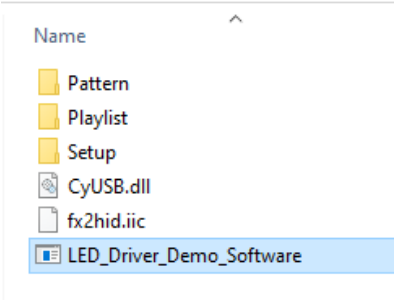
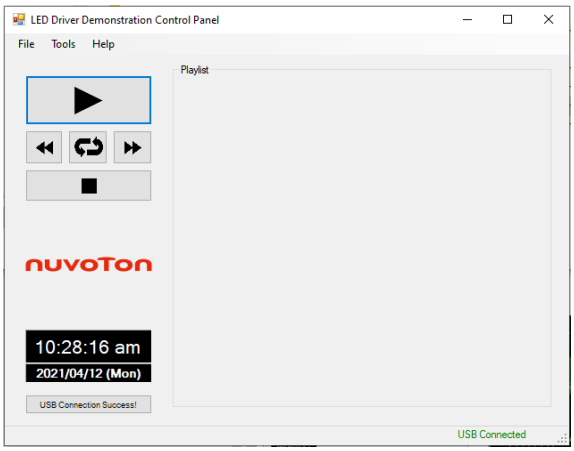


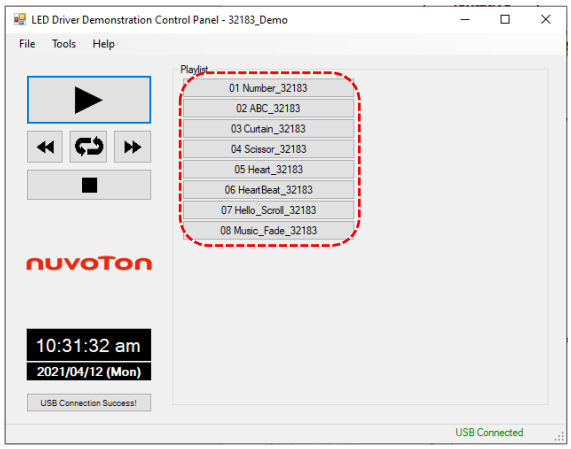
Figure 8: Open EXE application

The main controls panel shown as below:



Open software for 1st time

Figure 9: Open software for 1st time



Open software subsequently, recently opened playlist will be displayed on the playlist panel

Figure 10: Open software subsequently

MAIN CONTROL PANEL (con't)

2. Description of Controls

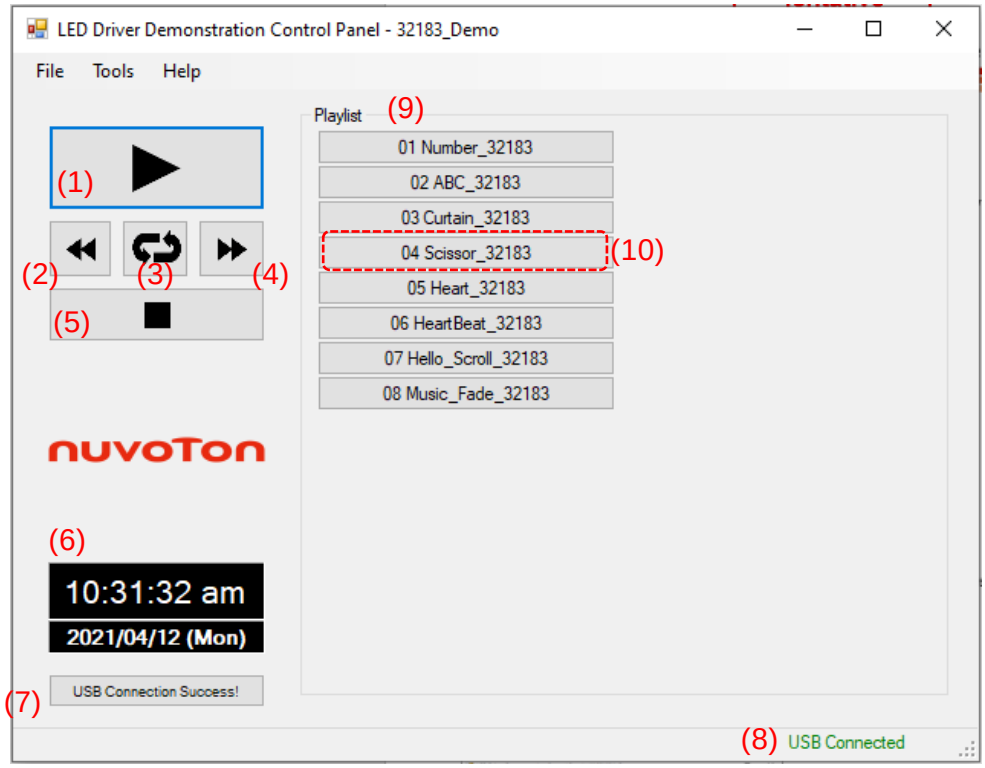


Figure 11: Example of Main Control Panel

(1) **Play** button – Play all patterns in sequence in Playlist Box
(2) **Skip back** button – Play previous pattern of current playlist
(3) **Repeat** button – Play current pattern(s) repeatedly (indefinitely)
- 'Repeat' mode is **ON**: The icon is **blue** in color.
- 'Repeat' mode is **OFF**: The icon is **black** in color.

(4) **Skip next** button – Play next pattern of current playlist
(5) **Stop** button – Stop to play pattern and reset Kirari LED driver
(6) **Time/Date** Display – Display current time and date
(7) USB Connection button – Plug in USB board and then click button to initialize the USB connection if USB connection is "USB Disconnected".
(8) USB connection status text – Detect the status of USB connection
- If USB connection OK – Status displays "**USB Connected**" in Green
- If USB connection Fail – Status displays "**USB Disconnected**" in Red

(9) **Playlist** box – Store the customized patterns
(10) **Single pattern play** button – Play selected pattern in playlist box

MAIN CONTROL PANEL (con't)

2. Description of Controls

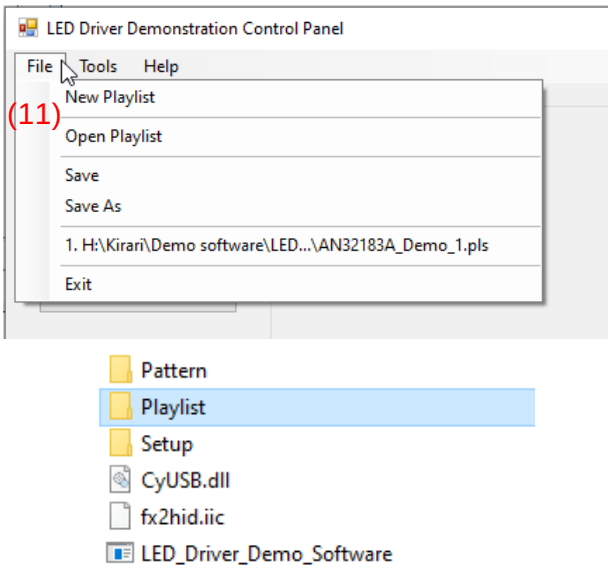


Figure 12: Example of FILE menu of Main Control Panel

(11) **File** menu list:

- **[New Playlist]** - To open playlist editor and create a new playlist file
- **[Open Playlist]** - To open an existing playlist file which saved in "Playlist" folder (refer to figure on left)
- **[Save]** - To save the current playlist file
- **[Save As]** - To save the current playlist file to a new location
- Recently opened playlists – Open up the recently opened playlist quickly
- **[Exit]** - To quit Main Control Panel

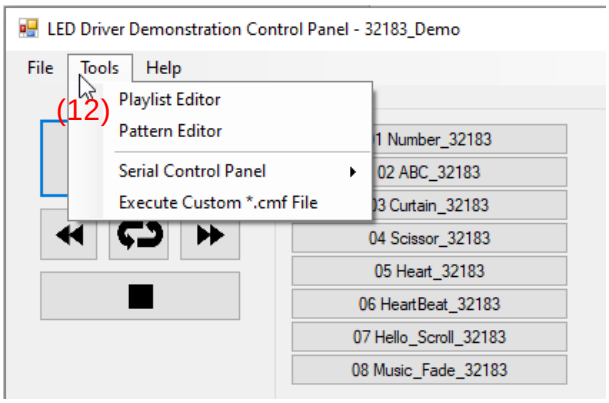


Figure 13: Example of TOOLS menu of Main Control Panel

(12) **Tool** menu list:

- **[Playlist Editor]** - To open up the playlist editor (refer to page 9 for Playlist Editor)
- **[Pattern Editor]** - To open up the pattern editor (refer to page 11 for Pattern Editor)
- **[Serial Control Panel]** - For internal use only
- **[Execute Custom *.cmf File]** – For internal use

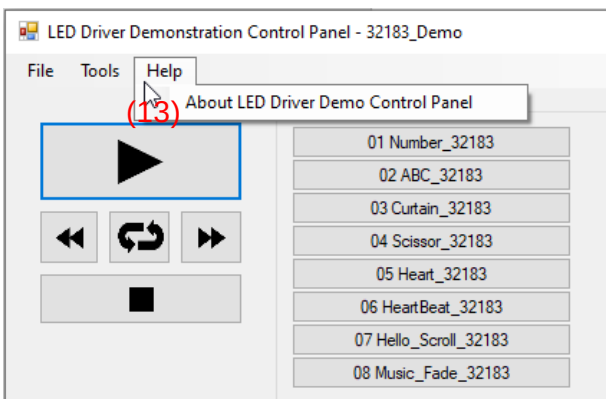


Figure 14: Example of HELP menu of Main Control Panel

(13) **Help** menu list:

- **[About LED Driver Demo Control Panel]** - Software version and disclaimer information

PLAYLIST EDITOR

1. Open Playlist Editor

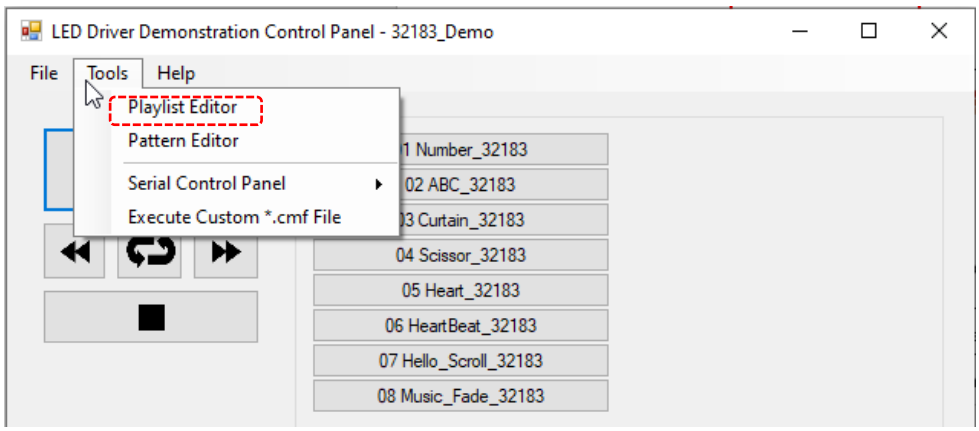


Figure 15: Example of open Playlist Editor

2. Description of Controls

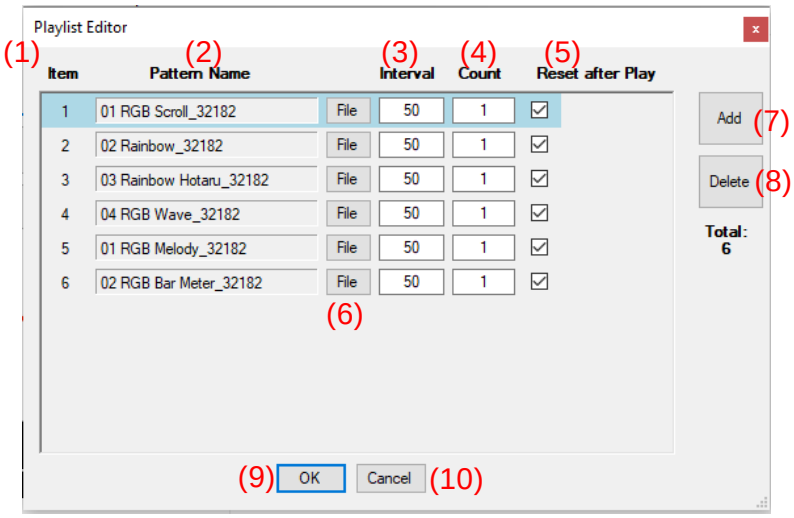


Figure 16: Example of Playlist Editor

(1) **Item** – The sequence number of selected pattern
(2) **Pattern Name** textbox – The name of pattern
(3) **Interval** – The interval (msec) between the end of this pattern and the start of next pattern
(4) Count textbox – Number of times this pattern is played in each play of the list
(5) **Reset after Play** checkbox – The drivers will be reset after each play of this pattern if box is checked

PLAYLIST EDITOR (con't)

2. Description of Controls (con't)

(6) **File** button – Search and select target pattern file which saved in "Pattern" folder

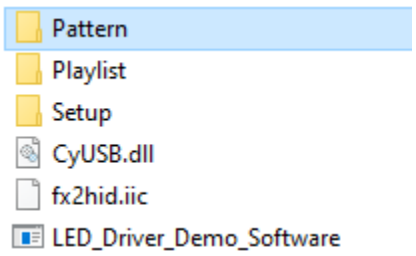


Figure 17: Example of PATTERN file

(7) Add button – Add a new pattern behind the selected pattern
(8) Delete button – Delete a pattern selected, the total number of patterns is shown under the button.
(9) OK button – To confirm the editing and exit.
(10) Cancel button – To discard the editing and exit.

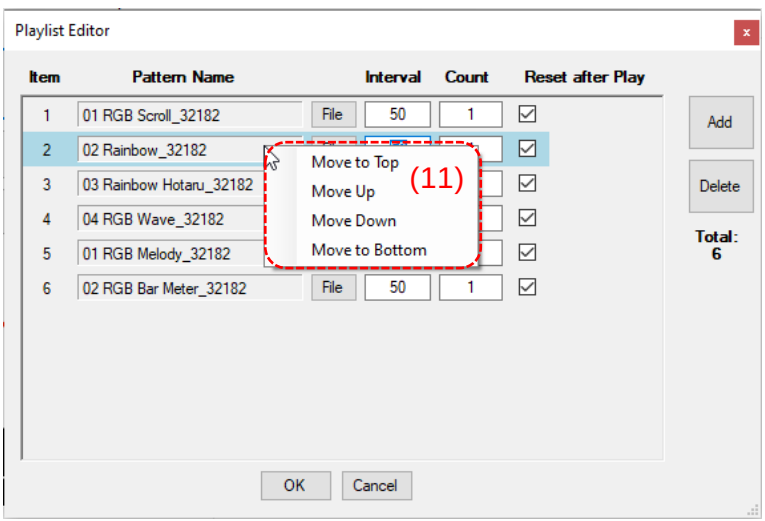


Figure 18: Example when right click the pattern file in Playlist Editor

(11) Right click the selected pattern to show sub menu:

- **Move to Top** – To move the selecting pattern up to the top of list
- **Move Up** – To move the selecting pattern up for 1 position
- **Move Down** – To move the selecting pattern down for 1 position
- **Move the Bottom** – To move the selecting pattern down to the bottom of list

PATTERN EDITOR

1. Open Pattern Editor

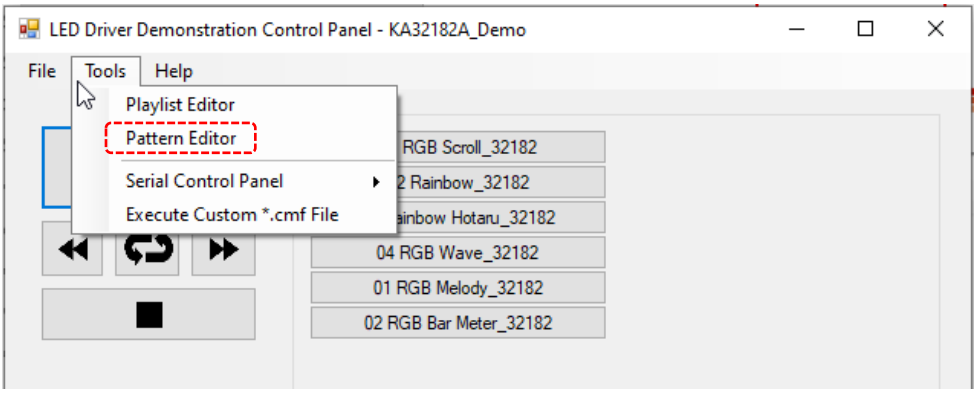


Figure 19: Example of open Pattern Editor

Step 1: Select the existing pattern file which saved in “Pattern” folder

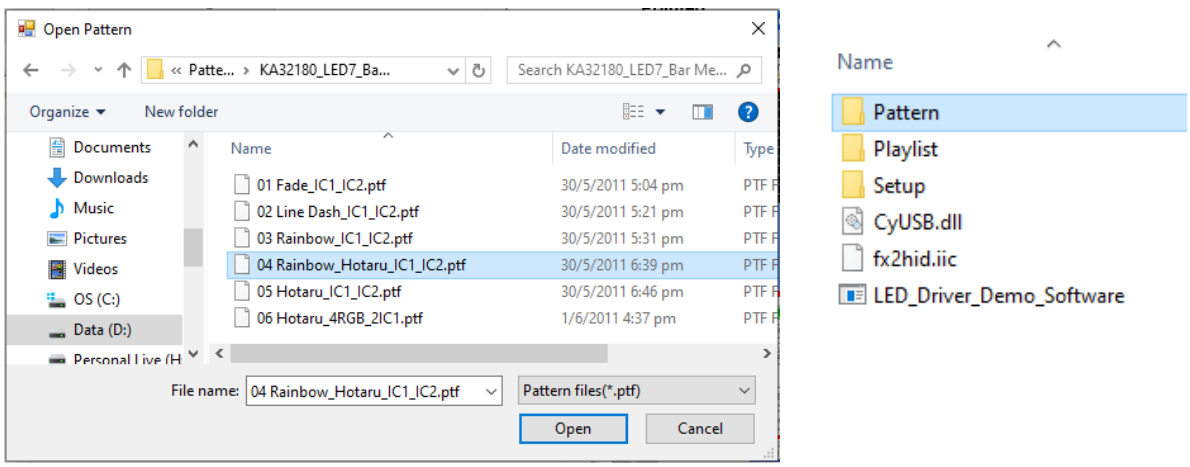


Figure 20: Example of selecting the existing pattern file

Step 2: Select the default setup file which saved in “Setup” folder if CANCEL above selection and create new pattern

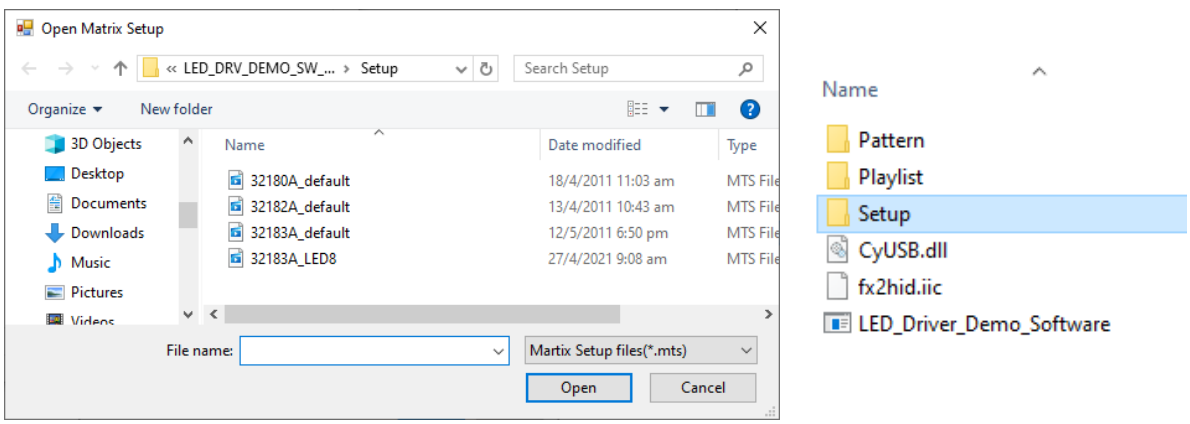


Figure 21: Example of selecting the default setup file

PATTERN EDITOR (con't)

2. Description of Pattern Editor Panel

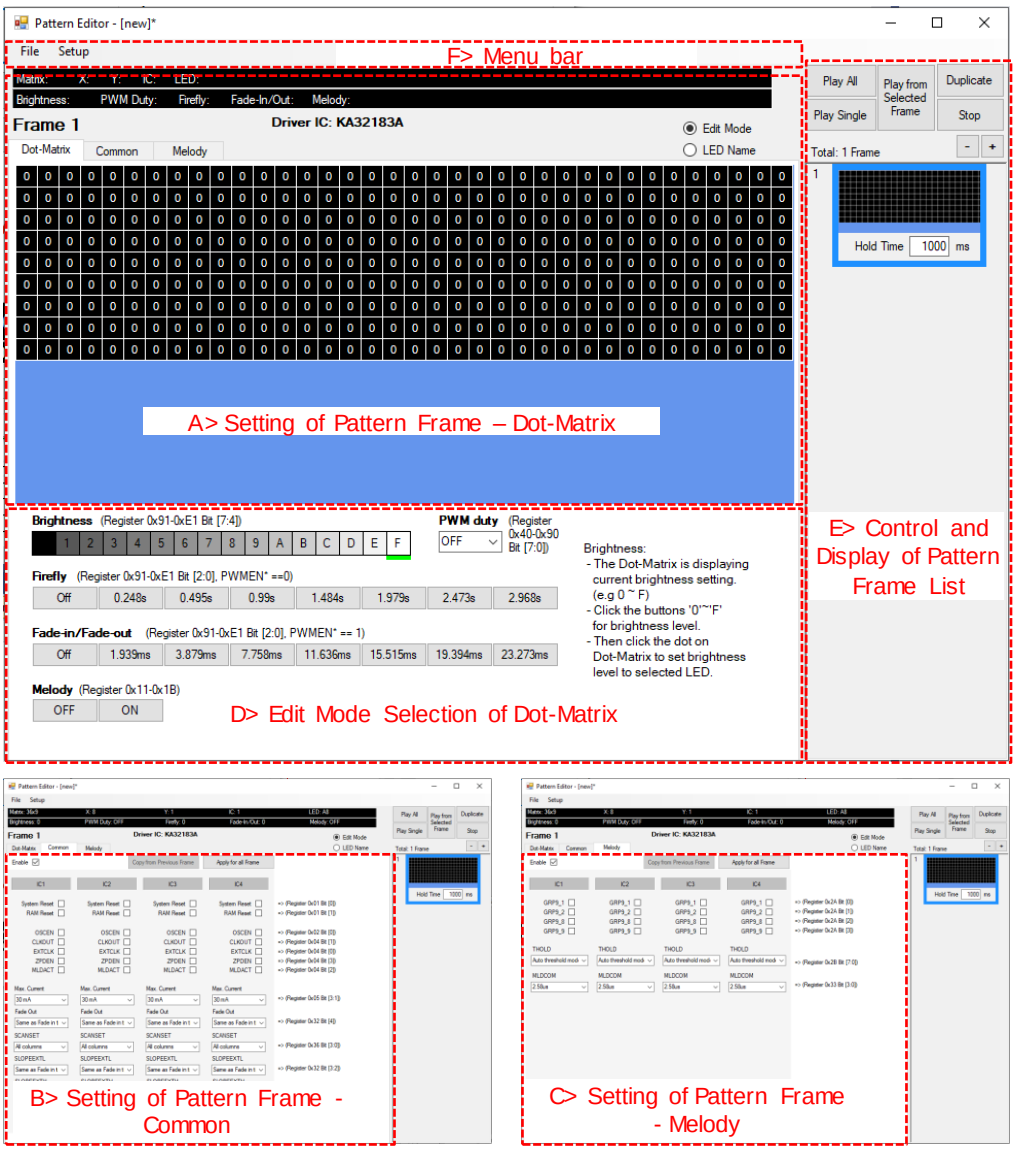


Figure 22: Example of Pattern Editor

A> Setting of Pattern Frame – Dot-Matrix
- To simulate the display of all LEDs of single pattern frame

B> Setting of Pattern Frame – Common
- To change general setting of LED drivers of single pattern frame

C> Setting of Pattern Frame – Melody
- To change melody setting of LED drivers of single pattern frame

D> Edit Mode Selection of Dot-Matrix
- To select edit mode for setting of Dot-Matrix (each LED) of single pattern frame

E> Control and Display of Pattern Frame List
- To control and display of pattern frame list (multi frames)

F> Menu bar
- To provide quick access to commonly used tasks within Pattern Editor.

PATTERN EDITOR (con't)

2. Description of Pattern Editor Panel (con't)

A> Setting of Pattern Frame – Matrix

Dot-Matrix is a panel to simulate the LED pattern which allows customer to set individual LED with IC functions like Brightness, PWM Duty, Firefly, Fade-in/out and Melody, and provides instant setting information when mouse move on a particular dot on the Dot-matrix.

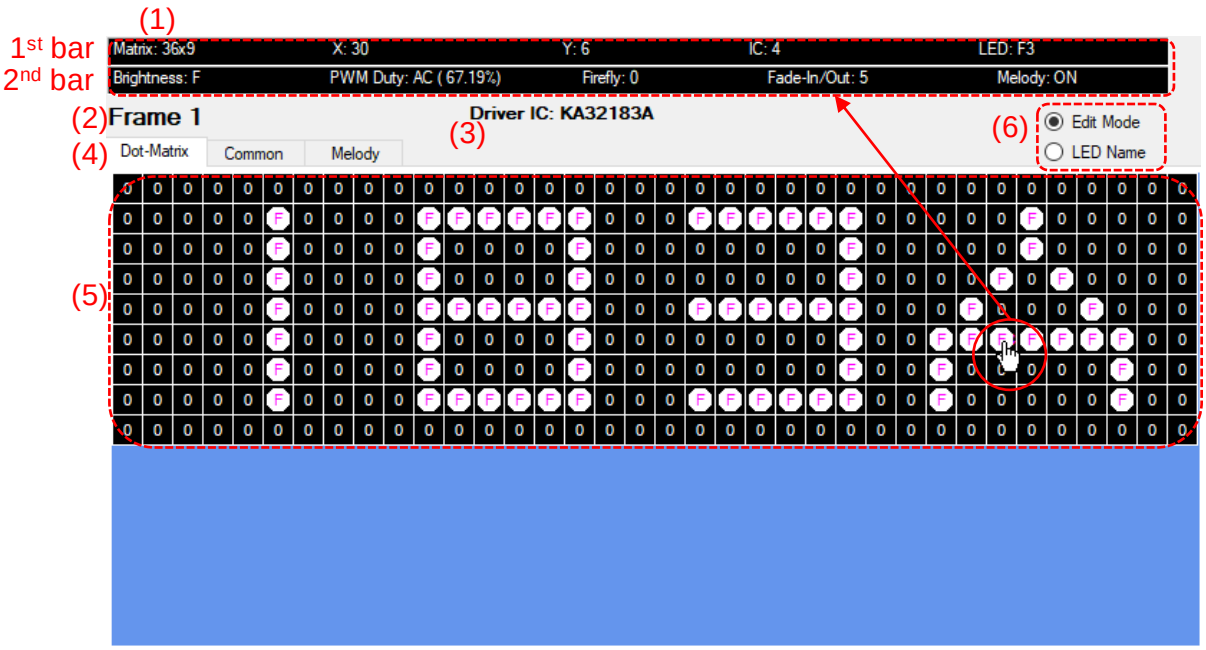


Figure 23: Example of current editing pattern using default setup file "32183A_default.mts"

(1) Information bar of Dot-Matrix (refer to figure above)

1st Bar – Display general information of each dot on Dot-Matrix panel

- **Matrix:** Dot-Matrix Name of current editing Dot-Matrix Panel
- **X:** X-coordinate of pointed dot on Dot-Matrix panel
- **Y:** Y-coordinate of pointed dot on Dot-Matrix panel
- **IC:** Which IC that the dot on Dot-Matrix panel is belong to (IC1~4)
- **LED:** LED Name of pointed dot on Dot-Matrix panel
  (refer to LED name assignment* of KA32183A on next page)

**Note: LED name assignment could be different based on LED driver IC (KA32180A/ KA32182A/ KA32183A) and its pattern*

2nd Bar – Display edit mode selection of each dot on the Dot-Matrix panel

- **Brightness** – Brightness setting 0~F in Hex format
- **PWM Duty** – PWM duty "OFF" or other setting 00~FF (0~99.61%) in Hex and % format
- **Firefly** – Firefly setting 0~7 in Hex format
- **Fade In/Out** – Fade In/Out setting 0~7 in Hex format
- **Melody** – Melody setting ON/OFF in text format

PATTERN EDITOR (con't)

2. Description of Pattern Editor Panel (con't)

A> Setting of Pattern Frame – Matrix (con't)

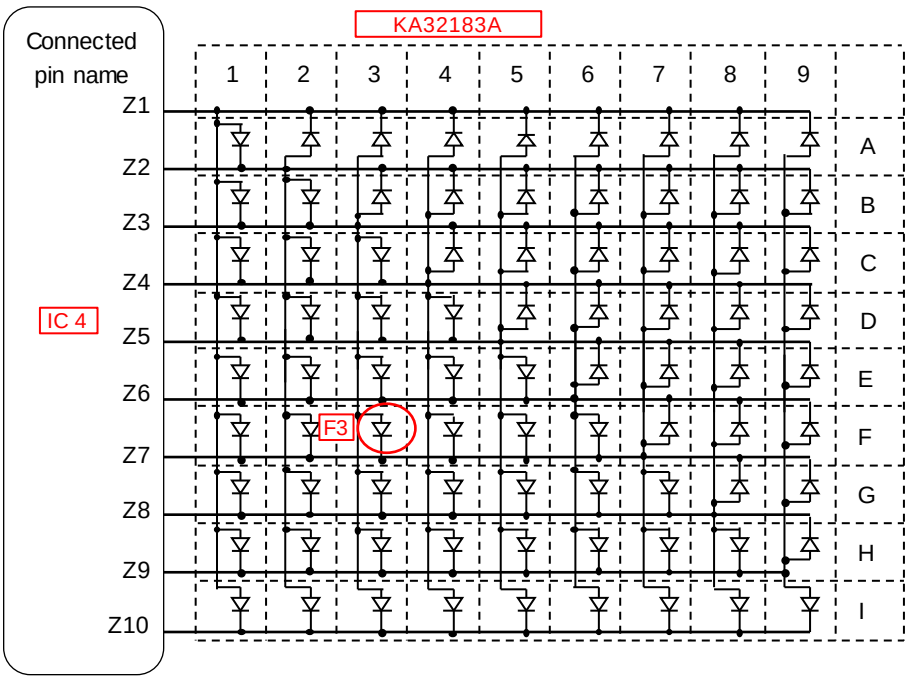


Figure 24: LED name assignment of KA32183A and LED name of pointed dot in previous example

Note: LED assignment of LED driver IC *(KA32180A/ KA32182A/ KA32183A)* are similar except for the matrix size, refer to IC Product Specification for details.

(2) Frame 1 Text – Name of current editing Pattern Frame
(3) Driver IC Text – Display the Driver IC name of Dot-Matrix Panel
(4) Dot-Matrix Tab – Dot-Matrix setting of current editing Pattern Frame

PATTERN EDITOR (con't)

2. Description of Pattern Editor Panel (con't)

A> Setting of Pattern Frame – Matrix (con't)

(5) Dot-Matrix Panel – Change setting of each dot on matrix panel

- Dot-Matrix panel is defined based on Driver IC and its default setup file (e.g "32183A_default.mts")
- Able to do mouse click to apply setting of selected edit mode to single dot on Dot-Matrix panel
- Able to do mouse drag and drop to apply same setting of selected edit mode to multi-dots on Dot-Matrix panel.
- If edit mode is "**Brightness**", the colored dot with brightness level in Hex will be shown, and the color of dot will be matched with button of Brightness control accordingly. (e.g "0~F") Refer to example below.
- If edit mode is "**PWM Duty**", the setting of PWM in Hex will be shown. (e.g "00~FF" for PWM duty setting, or blank when PWM OFF) Refer to example below.
- If edit mode is "**Firefly or Fade-In/Out**", the setting of Firefly or Fade-In/Out in Hex will be shown. (e.g "0~7") Refer to example below.
- If edit mode is "**Melody**", the setting of Melody in text will be shown. (e.g "M" when enable Melody Mode, or blank when disable Melody Mode) Refer to example below.
- The text of current editing setting shown on dot will shown in Red color and other setting in black color. Refer to example below.

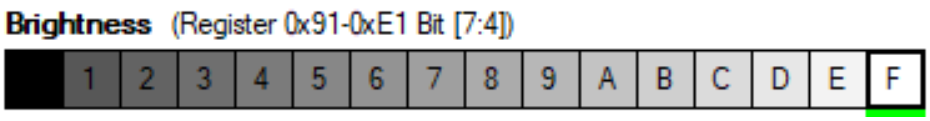


Figure 25: Buttons of Brightness control

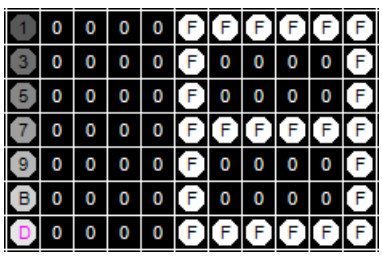


Figure 26: Edit mode - Brightness

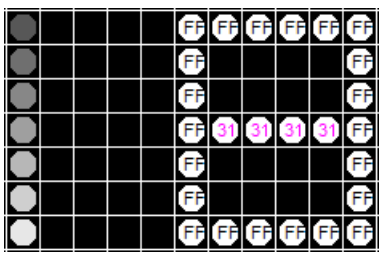


Figure 27: Edit mode – PWM Duty

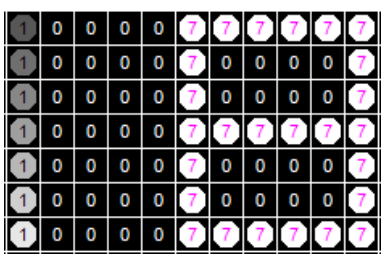


Figure 28: Edit mode – Firefly or Fade-In/Out

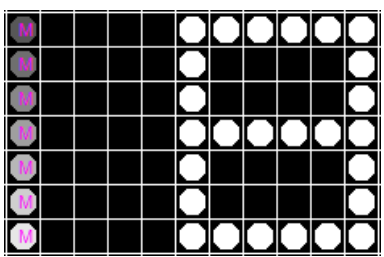


Figure 29: Edit mode – Melody

PATTERN EDITOR (con't)

2. Description of Pattern Editor Panel (con't)

A> Setting of Pattern Frame – Matrix (con't)

(6) **Edit Mode / LED Name** Radio Button

- When Edit Mode checked (default) – Allow user to do setting of selected edit mode.
- When LED Name checked – LED Name of all dots on Dot-Matrix panel will be shown. The Edit Mode panel are disabled and not allow user to do any setting of selected edit mode

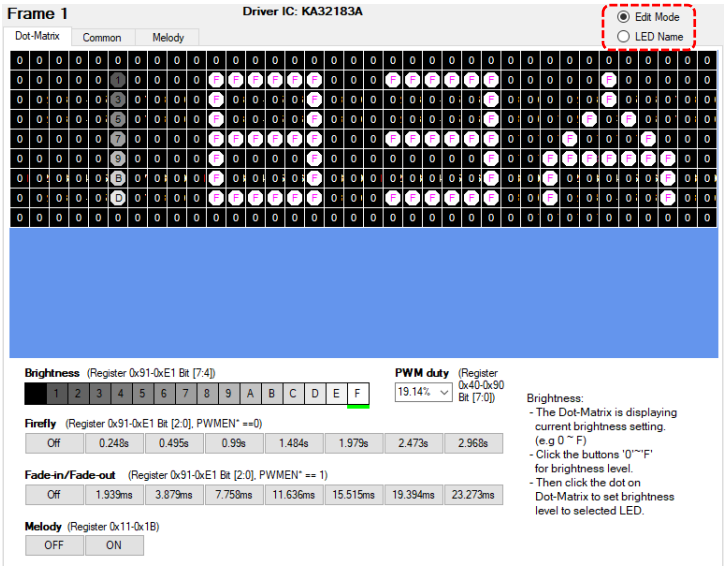


Figure 30: When Edit Mode checked

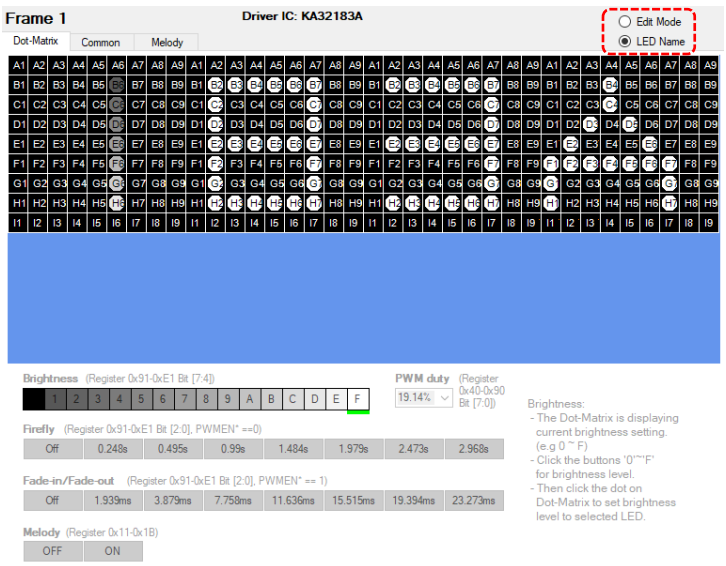


Figure 31: When LED Name checked

PATTERN EDITOR (con't)

2. Description of Pattern Editor Panel (con't)

B> Setting of Pattern Frame – Common

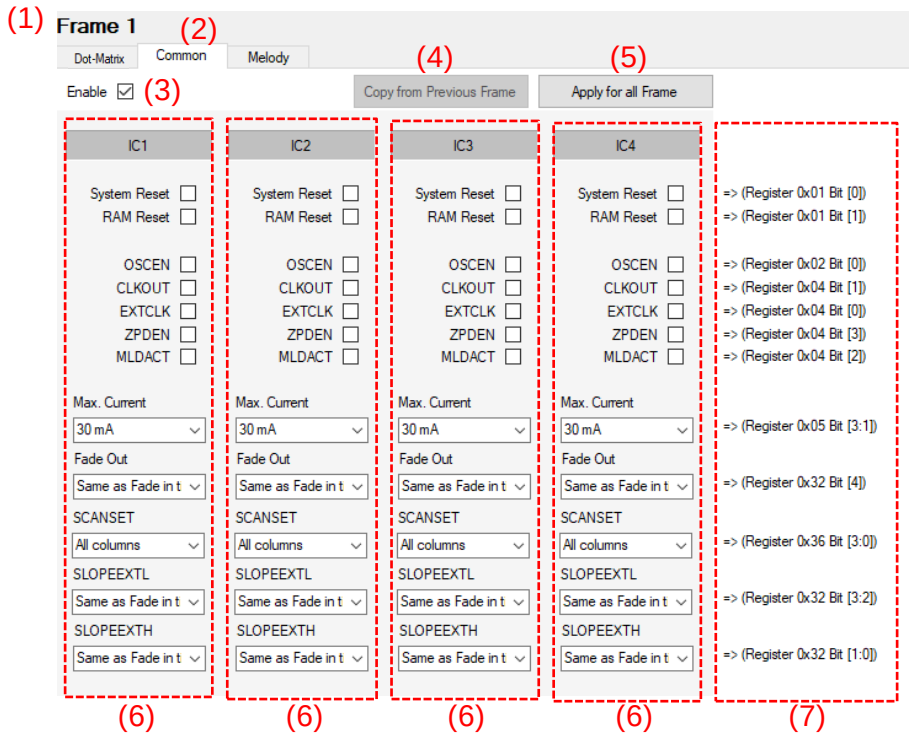


Figure 32: Example of Setting of Pattern Frame – Common

(1) **Frame 1** Text – Name of current editing Pattern Frame
(2) **Common** Tab – General setting of LED driver of current editing Pattern Frame
(3) **Enable** checkbox – Enable or disable the assignment of settings
(4) **Copy from Previous Frame** button – Copy general setting from previous frame by single click
  - Disabled when 1st Frame in Frame list been selected

(5) **Apply for all Frame** button – Apply current settings to all frames in frame list.
(6) General settings* of LED Driver IC1~ IC4
  - Checkbox – **System Reset / RAM reset / OSCEN / CLKOUT / EXTCLK / ZPDEN / MLDACT**
  - DropdownList – **Max. Current / Fade Out / SCANSET / SLOPEEXTL / SLOPEEXTH**

**Note:* General setting of *LED driver IC (KA32180A/ KA32182A/ KA32183A)* are slightly different

(7) Register information of above general settings

PATTERN EDITOR (con't)

2. Description of Pattern Editor Panel (con't)

C> Setting of Pattern Frame – Melody

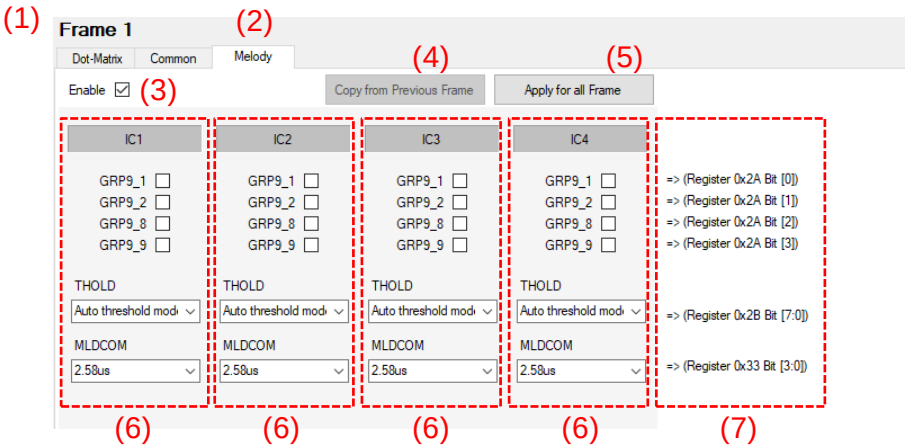


Figure 33: Example of Setting of Pattern Frame – Melody

(1) **Frame 1** Text – Name of current editing Pattern Frame
(2) **Melody** Tab – Melody setting of LED driver of current editing Pattern Frame
(3) **Enable** checkbox – Enable or disable the assignment of settings
(4) **Copy from Previous Frame** button – Copy melody setting from previous frame by single click
- Disabled when 1st Frame in Frame list been selected

(5) **Apply for all Frame** button – Apply current settings to all frames in frame list.
(6) Melody settings of LED Driver IC1~ IC4
- Checkbox – **GRP9_1 / GRP9_2 / GRP9_8 / GRP9_9**
- DropdownList – **THOLD / MLDCOM**

**Note:* Melody setting of *LED driver IC (KA32180A/ KA32182A/ KA32183A)* are slightly different

(7) Register information of above melody settings

PATTERN EDITOR (con't)

2. Description of Pattern Editor Panel (con't)

D> Edit Mode Selection of Dot-Matrix

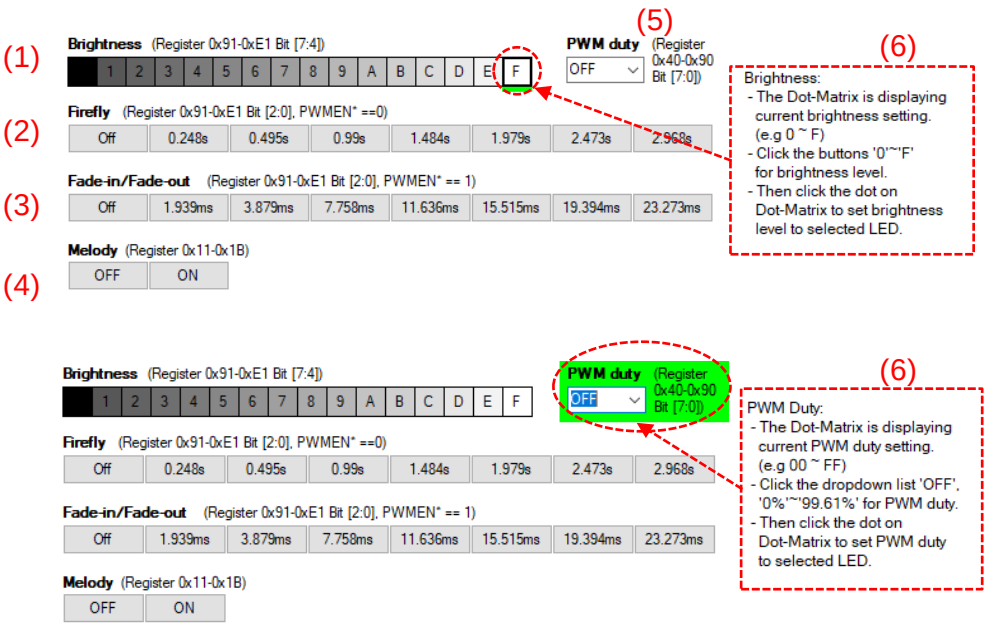


Figure 34: Example of Edit Mode Selection of Dot-Matrix

(1) **Brightness** – Control brightness of Dot-Matrix of current editing Pattern Frame
- Controlled by Register BRTA [3:0]
- Buttons **"0" ~ "F"** - click to set brightness level of Dot-Matrix
- When Brightness is selected, background color of control will be highlighted in green, user able to do brightness setting on pointed dot of Dot-Matrix Panel.

(2) **Firefly** – Control Firefly (auto repetition of the sequence) of Dot-Matrix of current editing Pattern Frame
- Controlled by Register SDT[2:0] & PWMEN = 0
- Buttons **"OFF" & others** - click to set firefly control timing of Dot-Matrix
- When Firefly is selected, background color of control will be highlighted in green, user able to do firefly setting on pointed dot of Dot-Matrix Panel.

(3) **Fade-in/Fade-out** – Control Fade-in/Fade-out (timing for PWM duty changing) of Dot-Matrix of current editing Pattern Frame
- Controlled by Register SDT[2:0] & PWMEN = 1
- Buttons **"OFF" & others** - click to set fade-in/fade-out control timing of Dot-Matrix
- When Fade-in/Fade-out is selected, background color of control will be highlighted in green, user able to do fade-in/out setting on pointed dot of Dot-Matrix Panel.

PATTERN EDITOR (con't)

2. Description of Pattern Editor Panel (con't)

D> Edit Mode Selection of Dot-Matrix (con't)

(4) Melody – Enable / Disable Melody mode of Dot-Matrix of current editing Pattern Frame
- Controlled by Register MLD
- Buttons **"OFF"** – Disable Melody mode of Dot-Matrix
- Buttons **"ON"** – Enable Melody mode of Dot-Matrix
- When Melody is selected, background color of control will be highlighted in green, user able to do melody setting on pointed dot of Dot-Matrix Panel.

(5) **PWM duty** – Control PWM duty of Dot-Matrix of current editing Pattern Frame
- Controlled by Register DTA [7:0]
- Dropdownlist **"OFF"** – Select to disable PWM mode
- Dropdownlist **others** – Select to set PWM duty of Dot-Matrix
- When PWM duty is selected, background color of control will be highlighted in green, user able to do PWM duty setting on pointed dot of Dot-Matrix Panel.

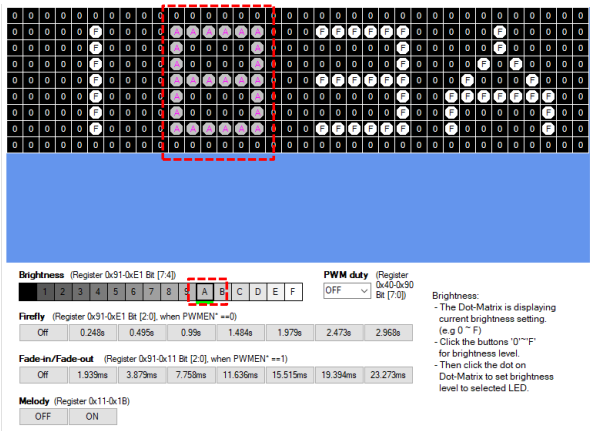
(6) Text display – Description of above edit mode which highlighted in Green.

PATTERN EDITOR (con't)

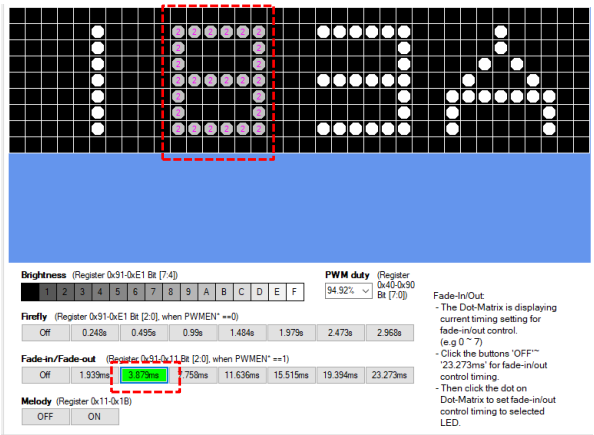
2. Description of Pattern Editor Panel (con't)

D> Edit Mode Selection of Dot-Matrix (con't)

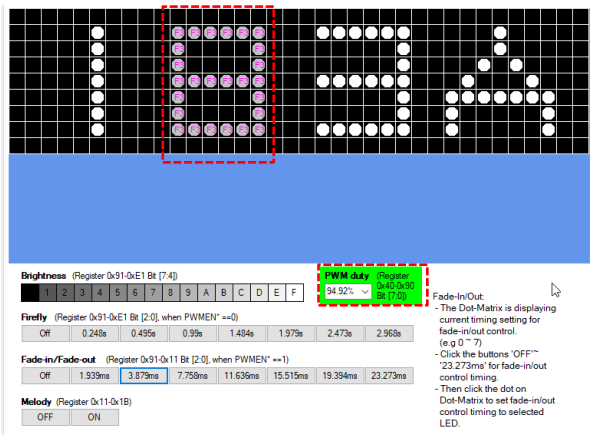
Example of setting of Dot-matrix



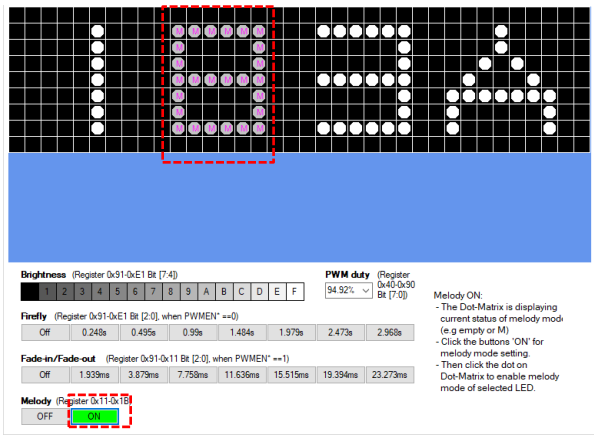
<step1> Click "A" button to set brightness



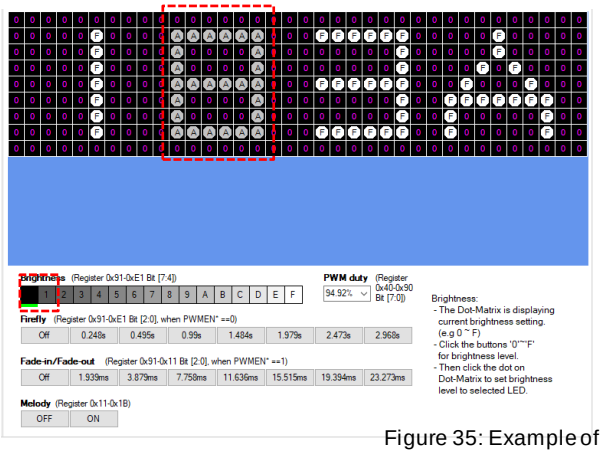
<step2> Click "3.879ms" button to set Fade-in/Fade-out timing



<step3> Select "94.92%" to set PWM duty



<step4> Click "ON" to enable Melody mode



<step5> Click any button of Brightness (e.g "0") to check the brightness setting of all Dot-matrix

Figure 35: Example of setting of Dot-Matrix

PATTERN EDITOR (con't)

2. Description of Pattern Editor Panel (con't)

E> Control and Display of Pattern Frame List

(1) **Play All** button – Play all frames in the frame list in sequence
(2) **Play Single** button – Play single frame selected repeatedly
(3) **Play from Selected Frame** button – Play from selected frame to last frame in sequence
(4) Duplicate button – Duplicate setting of selected frame and paste below it
(5) Stop button – Stop current playing frame
(6) Total: x Frames text display – Display the total number of frame in frame list
(7) **"-"** button – Delete selected frame from frame list
(8) **"+"** button – Add a new frame to the last
(9) Frame Number display – Display the frame number
(10) **Frame picture** – Display the miniature picture of pattern frame accordingly
(11) **Hold Time** textbox – Set hold time between selected frame and next frame when playing
(12) Right click the selected frame to show sub menu:

- **Duplicate** – Same as above button
- **Insert** – Insert a new frame to below
- **Move to top** – Move selected frame to top (1st frame)
- **Move up** – Move up selected frame to above
- **Move down** – Move down selected frame to below
- **Move to bottom** – Move selected frame to bottom (last frame)
- **Apply hold time to all frames** – duplicate the hold time of selected frame to all frames

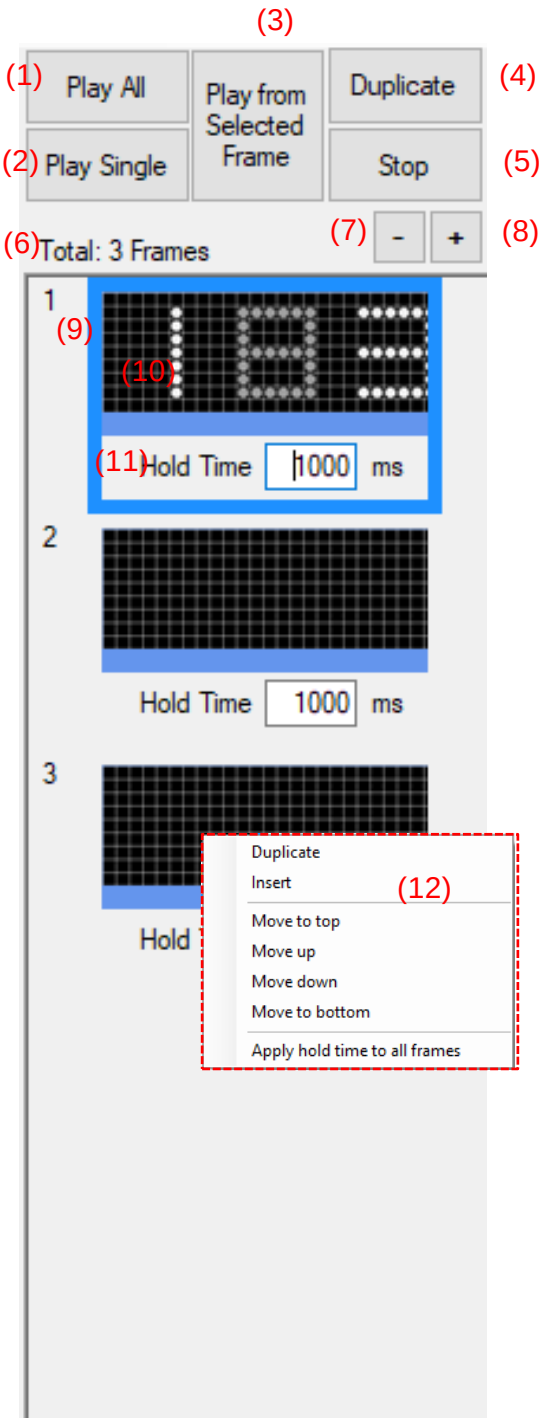


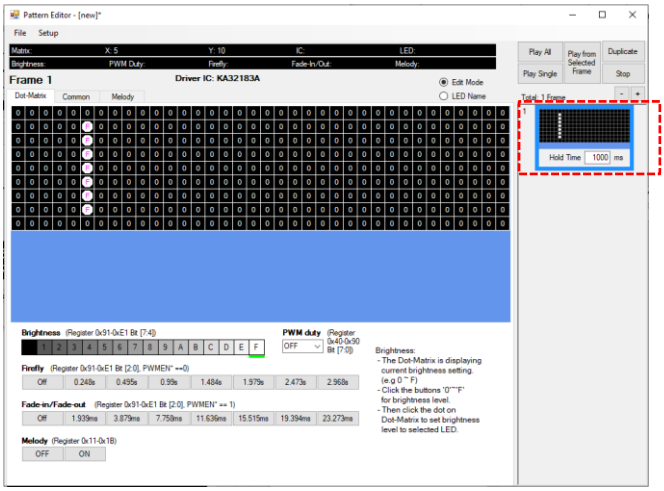
Figure 36: Example of Control and Display of Pattern Frame List

PATTERN EDITOR (con't)

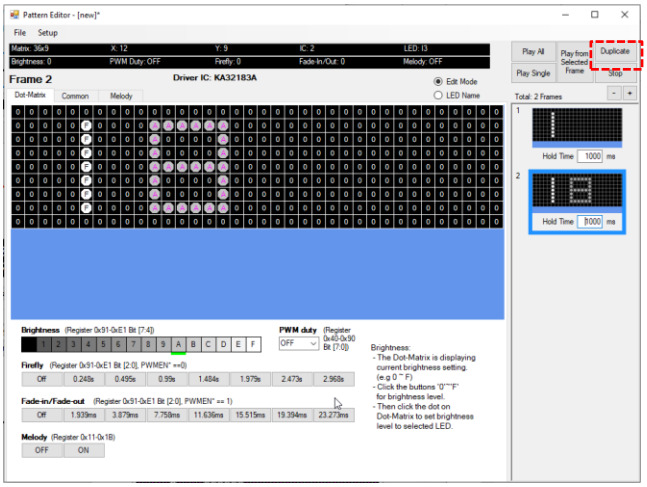
2. Description of Pattern Editor Panel (con't)

E> Control and Display of Pattern Frame List (con't)

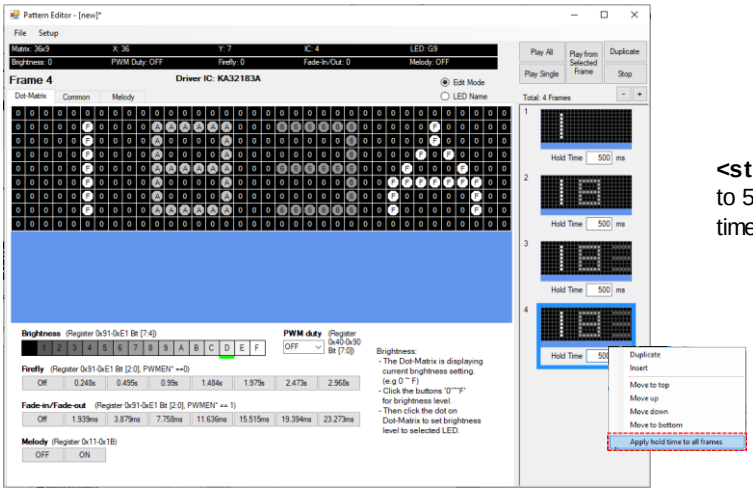
Example of Control and Display of Pattern Frame List



<step1> Create 1st pattern with settings which presents miniature picture as designed pattern on Dot-Matrix panel.



<step2> Duplicate 1st pattern. Then modify the settings of 2nd pattern based on previous one to accelerate the pattern design.



<step3> Duplicate as above. Change hold time to 500ms and then right click to apply this hold time to all frames.

Figure 37: Example of Control and Display of Pattern Frame List

PATTERN EDITOR (con't)

2. Description of Pattern Editor Panel (con't)

F> Menu bar

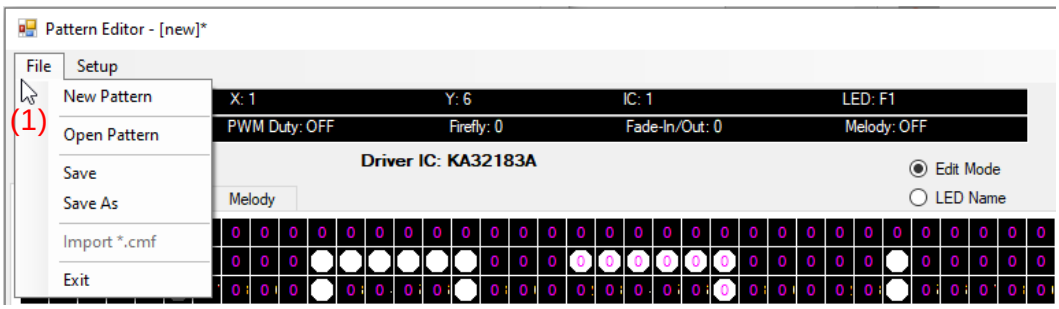


Figure 38: Example of FILE menu of Pattern Editor

(1) **File** menu list:

- **[New Pattern]** - To create a new pattern file
- **[Open Pattern]** - To open an existing pattern file
- **[Save]** – To save existing pattern file
- **[Save As]** - To save the current pattern file to a new location
- **[Import *.cmf]** - For internal use only.
- **[Exit]** – To quit the Pattern Editor

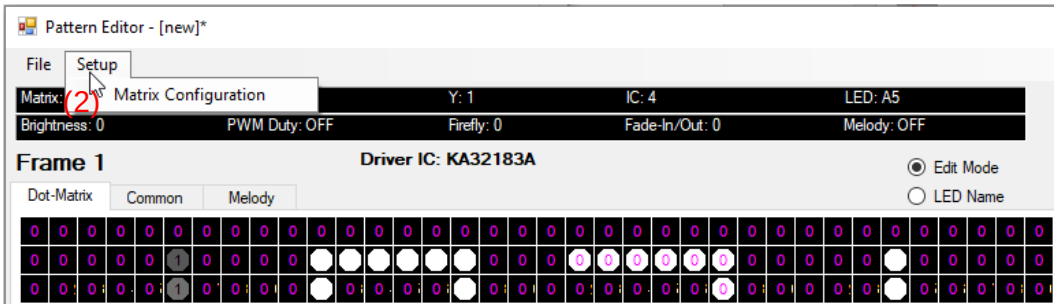


Figure 39: Example of SETUP menu of Pattern Editor

(2) **Setup** menu list:

- **[Matrix Configuration]** - For internal use only.

INPUT / OUTPUT FILES

1. Matrix Setup File (.mts)

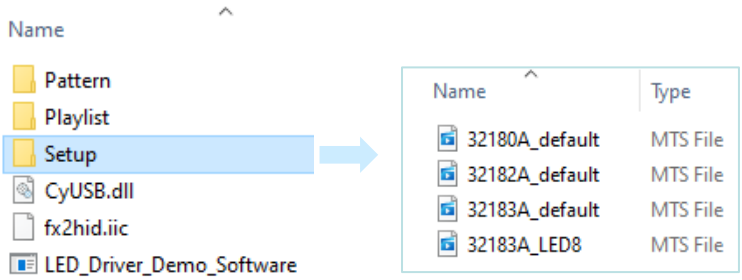


Figure 40: Example of files of SETUP folder

- File Type: *.mts
- Saved in **"Setup"** folder
- Default LED assignments of specific IC provided
- Used for new pattern design
- Not allowed edit

2. Pattern File (.ptf)

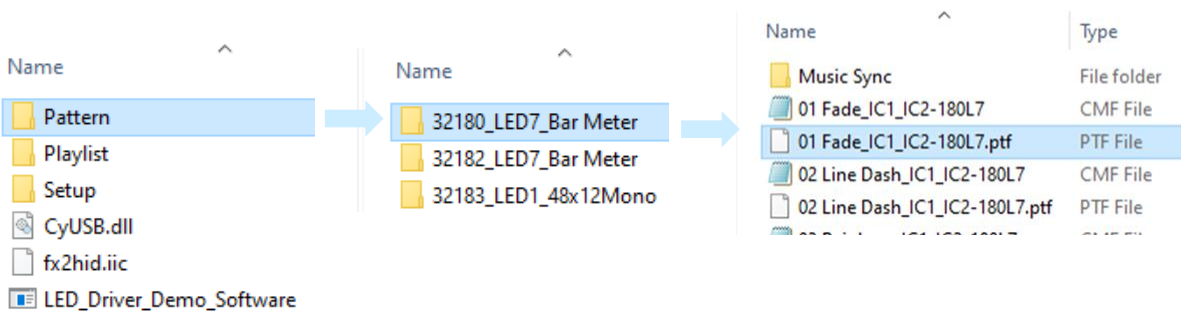


Figure 41: Example of files of PATTERN folder

- File Type: *.ptf
- Saved in **"Pattern"** folder
- Designed LED pattens
- File editable

INPUT / OUTPUT FILES (con't)

3. Command file (.cmf)

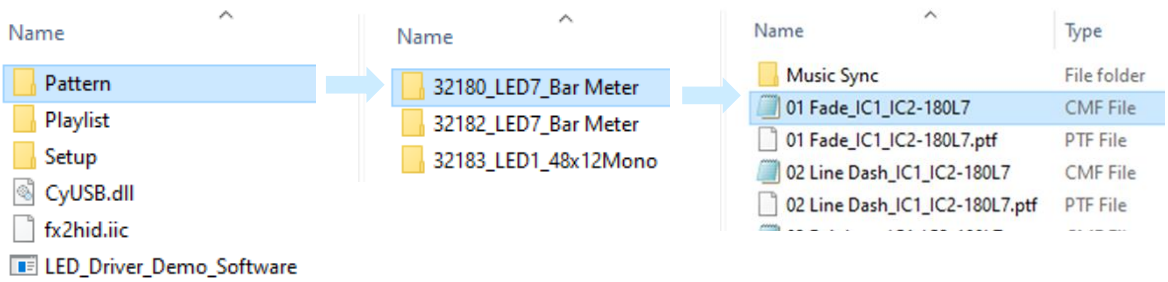


Figure 42: Example of files of PATTERN folder

- File Type: *.cmf
- Saved in **"Pattern"** folder
- Auto-generated command file when saving pattern file
- For internal use
- Not allowed edit

4. Playlist File (.pls)

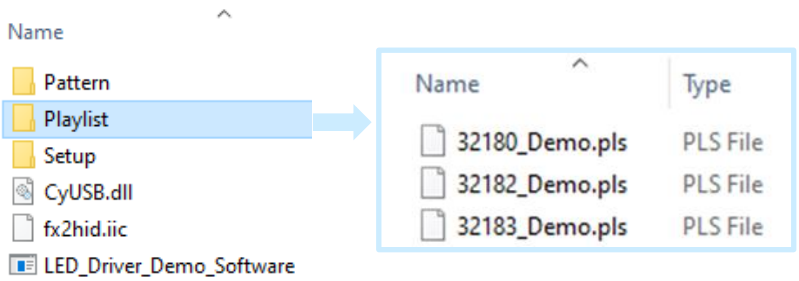


Figure 43: Example of files of PLAYLIST folder

- File Type: *.pls
- Saved in **"Playlist"** folder
- Group of patterns into one playlist file
- File editable

REVISION HISTORY

Date	Revision	Description
2021.4.22	1.00	1. initially issued.
2021.9.02	1.10	1. modifications