

MP200 Mobile POS

Book 2

User Manual

Confidential

Version 2.4

Aug 2018

Castles Technology Co., Ltd.

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Revision History

| Version | Date | Descriptions | | |
|---------|--------------|---|--|--|
| 1.0 | Sep 10, 2014 | Initial creation. | | |
| | | 1. Add "Key Injection" on "System Menu" page | | |
| | | 2. UI arrangement on "SYSTEM INFO" page | | |
| 2.0 | Dec 19, 2014 | 3. Add "BT DIRECT ACCESS", "Halt Timeout", "PWM | | |
| 2.0 | Dec 19, 2014 | Auto", "PWM Mode", "PWM Time" on "SYS | | |
| | | SETTINGS" page | | |
| | | 4. UI arrangement on "Test Utility" page | | |
| | | 1. Add the description of Environment. | | |
| 2.1 | | 2. Add the description of Power. | | |
| | | 3. Add the UL caution of battery. | | |
| 2.2 | Sep 06, 2016 | 1. Add "2.4. Wireless communication". | | |
| 2.3 | Mar 06, 2018 | 1. Add warnings to "2.3 Power". | | |
| | | 1. Remove "GPRS" and "UMTS" from 2.4 Wireless | | |
| 2.4 | Aug 08, 2018 | communication. | | |
| 2.4 | Aug 00, 2010 | 2. Modify the description of RF Exposure Warning form | | |
| | | "20 centimeters" to "5 centimeters". | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

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1. Introduction

This document provides a guideline on operating and configuring Castles MP200 Mobile POS.

The scope of this document includes setting up the terminal, basic operation, application life cycle, and some advance features.

2. Hardware Setup

2.1. Parts of the Surface

Front Side

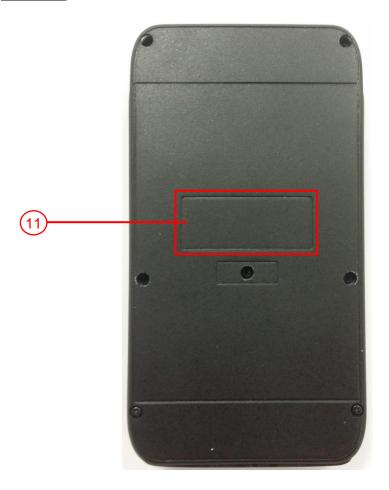


MP200

- 1. LCD Display (Mono Color)
- 2. Keyboard
- 3. Cancel Key
- 4. 0 / Funtion Key
- 5. Contactless Card Landing Zone Enter Key

- 6. Power Key
- 7. Up Key
- 8. Down Key
- 9. OK / Enter Key
- 10. Clear Key

<u>Rear Side</u>



11. Machine's Label



bottom Side



12. MSR 13. SCR





14. Power LED (Charging: Orange light, Fully charged: Green light)**15. Micro USB Socket**

2.2. Environment

Operating Temperature : 0°C to 50°C **Storage Temperature** : -20°C to 70°C **Operating Humidity** : 5% to 90% non-condensing **Storage Humidity** : 5% to 95% non-condensing

2.3. Power

Input : 5V, 1A

This product is intended to be supplied by a Listed Power Adapter rated output 5Vdc, min. 1A, Tma is 40 degree C minimum.

2.4. Wireless communication

- 1. WiFi 802.11 bg / WiFi 802.11 n
- 2. Contactless Reader (NFC) Working Frequency 13.56MHz.
- 3. Bluetooth

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.

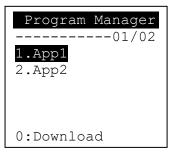
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

3. Basic Operation

3.1. Program Manager

Upon power on, terminal will enter Program Manager if not default application selected. All user applications are list in Program Manager. User may select an application and run the application or view the application info, delete the application or set to default run upon power on. User may enter System Menu to configure terminal settings.

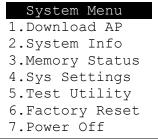
Program Manager



- Press [0] button to enter System Menu.
- Press [1] button to toggle default application selection.
- Press [2] button to delete application.
- Press [3] button to view application info.
- Press [OK] button to run application.
- Press [↑] or [↓] to select application.

System Menu

Page 1



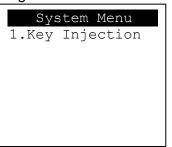
• Press [\downarrow] button to page 2.

Page 2

| System Menu |
|-----------------|
| 1.FK PWD Change |
| 2.Share obj Mng |
| 3.Castles TMS |
| 4.Font Mng |
| 5.Debug Tools |
| 6.ULD KEY HASH |
| 7.Plug-in Mng |
| |

- Press [↑] button to page 1.
- Press [↓] button to page 3.





Press [↑] button to page 2.

3.2. Download AP

Download user application or kernel modules firmware.

System Menu

| System Menu |
|-----------------|
| 1.Download AP |
| 2.System Info |
| 3.Memory Status |
| 4.Sys Settings |
| 5.Test Utility |
| 6.Factory Reset |
| 7.Power Off |

• Press [1] button to enter Download AP menu.

Download AP Menu



Select download source:

- Press [1] button to select source as RS232 or USB connection and enter ULD download mode.
- Press [2] button to select source as USB disk.
- Press [3] button to select source as SD card.

3.3. System Info

View kernel module firmware information.

System Menu

| System Menu |
|-----------------|
| 1.Download AP |
| 2.System Info |
| 3.Memory Status |
| 4.Sys Settings |
| 5.Test Utility |
| 6.Factory Reset |
| 7.Power Off |

• Press [2] button to enter System Info menu.

System Info Menu

SYSTEM INFO

---Kernel Ver---

LINUXKNL :VR0019

:VR0010

:VRF810

:VR9201

Page 1

BIOS SULD

ROOTFS

Page 2

KMS

DRV

USB

SAM

CL

SYSTEM INFO

KO Ver

SECURITY :VR0025

:VR0024

:VR0039

:VR0028

:VR0018

: N/A

Page 3

CACLENTRY

CAEMVL2AP

CAMPP

CAVPW CAEMVL2

| _ | 0 | |
|---|------|---------|
| | SYST | EM INFO |
| | K | 0 Ver2 |
| | SC | :VR0011 |
| | | |
| | | |
| | | |
| | | |
| | | |

■ Press [↓] button to next page.

| Page 4 | | Page | 5 | | Page 6 | |
|---|--|---------------------------------|-------------|---|--|--|
| SO V UART USBH MODEM ETHERNET FONT | INFO /er :VR0014 :VR0011 :VR0014 :VR0029 :VR0025 | PRT RTC ULD PPP KMS | PM | Ver2 :VR0020 :VR0013 :VR0022 EM:VR0026 :VR0022 | SYSTEM SO V GSM BARCODE TMS TLS CLVW | er3 :VR0018 :VR0013 :VR0013 :VR0011 :VR0018 |
| LCD | :VR0034 | FS Page 9 | <u> </u> | :VR0015 | CTOSAPI | :VR9029 |
| Page 8 SYSTEM HWM CRDL/ETHE | - | | STEM ID: | 0CA6A050 | Page 10 SYSTEM EXT SO T CACLMDL | INFO Ver P.1 :VRg103 |

| TIMM VET |
|------------------|
| CRDL/ETHE:ONCHIP |
| CLM-MP : N/A |
| AP Ver |
| ULDPM :VR0026 |
| |
| |
| |

--Factory S/N---

FFFFFFFFFFFFFFFFF

:VRg103 :VR0302

:VR0014

:VR9113 :VR0005

3.4. Memory Status

View terminal flash memory and RAM information.

System Menu

| System Menu |
|-----------------|
| 1.Download AP |
| 2.System Info |
| 3.Memory Status |
| 4.Sys Settings |
| 5.Test Utility |
| 6.Factory Reset |
| 7.Power Off |
| |

• Press [3] button to enter Memory Status menu.

Memory Status Menu

| MEMORY | STATUS |
|--------|----------|
| FLASH | Memory |
| Total: | 130688KB |
| Used : | 96648KB |
| | |
| SDRAM | Memory |
| Total: | 65408KB |
| Used : | 32148KB |
| | |

3.5. System Settings

| View or | change | terminal | system | settings. |
|---------|--------|----------|--------|-----------|
| | | | | |

| Setting | Descriptions |
|-------------------|--|
| Key Sound | Enable (Y) or disable (N) the beep sound when |
| | pressing any key. |
| Exec DFLT AP | Enable (Y) or disable (N) execution of default |
| | selected application. |
| USB CDC Mode | Enable (Y) or disable (N) USB CDC mode. |
| FunKey PWD | Enable (Y) or disable (N) password protection to |
| | access function key $(0 \sim 3)$ in Program Manager. |
| PMEnter PWD | Enable (Y) or disable (N) password protection to |
| | enter Program Manager. |
| SET USB Host | Enable (Y) or disable (N) USB host mode. |
| Base USB CDC | Enable (Y) or disable (N) USB CDC mode in base |
| | unit. [Portable model only] |
| List SHR Lib | Enable (Y) or disable (N) to list all shared libraries |
| | in Program Manager. |
| Key MNG Mode | <tbc></tbc> |
| BAT Threshld | Battery charging threshold value. [Portable model |
| | only] |
| Null Cradle | Enable (Y) if base is Type A cradle. [Portable |
| | model only] |
| Debug Mode | Enable (Y) or disable (N) console debug mode. |
| Debug Port | Serial port for console debug. |
| Mobil AutoON | Enable (Y) or disable (N) to auto turn on GSM |
| | module after start up the terminal. |
| Bklit Auto Off | Enable (Y) or disable (N) Auto Off LCD Backlight |
| Bklit Off Time | Threshold of Auto Off LCD Backlight |
| PWR KEY OFF | Power key function, power off (Y) or reboot(N) |
| GDB Mode | Enable (Y) or disable (N) GDB mode. |
| GDB Timeout | GDB connection timeout. |
| GDB Channel | GDB connection channel. |
| ETHER IP/PORT | GDB Ethernet connection setting. |
| DTO Time a Zara - | Set Time Zone of Real Time Clock. |
| RTC Time Zone | |

| NTP Update Freq | Frequency of Network Time Protocol updating. |
|------------------|---|
| BT DIRECT ACCESS | Enable (Y) or disable (N) Bluetooth direct access |
| | mode. |
| Halt Timeout | Set timeout for AP to back to Program Manager |
| | whenever AP is in halt state. |
| PWM Auto | Enable (Y) or disable (N) power saving mode. |
| PWM Mode | Select (STB) standby mode or (SLP) sleep mode |
| | for power saving mode. |
| PWM Time | Set time period by which to make terminal getting |
| | into power saving mode from idle state. |

System Menu

| System Menu |
|-----------------|
| 1.Download AP |
| 2.System Info |
| 3.Memory Status |
| 4.Sys Settings |
| 5.Test Utility |
| 6.Factory Reset |
| 7.Power Off |

• Press [4] button to enter System Settings menu.

System Settings Menu

Page 1

| SYS SETTINGS | | |
|------------------|---|---|
| Key Sound | : | Y |
| Exec DFLT AP | : | Y |
| -Default AP Name | | |
| USB CDC Mode | : | Y |
| FunKeyPWD | : | Ν |
| PMEnterPWD | : | Ν |
| 2: Next Page | | |

Page 3

| SYS SETTINGS | |
|----------------|------|
| Debug Mode | : N |
| Debug Port | : X |
| Mobil AutoON | : N |
| Bklit Auto Off | : N |
| Bklit Off Time | : X |
| PWR KEY OFF | : N |
| 1: Prev 2: | Next |
| | |

| - | | |
|---------------|----|----|
| SYS SETTINGS | | |
| SET USB Host | : | Ν |
| Base USB CDC | : | Х |
| List SHR Lib | : | Ν |
| Key MNG Mode | : | 0 |
| Bat Threshld | : | Х |
| Null Cradle | : | Х |
| 1: Prev 2: No | 22 | κt |



| SYS SETTING | S |
|---------------|------|
| GDB Mode | : N |
| GDB Timeout | : X |
| GDB Channel | : X |
| ETHER IP/PORT | |
| | |
| | |
| 1: Prev 2: | Next |
| | |

Page 5

| SYS SETT | INGS |
|--------------|---------|
| RTC Time Zon | :GMT |
| NTP Enable | : N |
| NTP Update F | : X |
| | |
| | |
| | |
| 1: Prev | 2: Next |
| | |

| SYS SETTINGS | 5 |
|------------------|------|
| BT DIRECT ACCESS | :X |
| Halt Timeout | :999 |
| PWM Auto | : N |
| PWM Mode | : X |
| PWM Time | : X |
| 1: Prev Page | |

- Press [↑] or [↓] button to select setting.
- Press [OK] button to change the setting value.
- Press [\Leftrightarrow] button to toggle Y \Rightarrow N \Rightarrow Y.
- Press [1] button to previous page.
- Press [2] button to next page.

3.6. Test Utility

Perform terminal hardware components diagnosis.

System Menu

Press [5] button to enter Test Utility menu.

Test Utility Menu

| Main Me | nu 9122 |
|---------|----------|
| 1.LCD | 2.KBD |
| 3.FLASH | 4.SCM |
| 5.Light | 6.MSR |
| 7.LED | 8.RTC |
| 9.FONT | 10.USB |
| 11.BT | 12.Power |
| -> | 1/2 |

- Press [1] and [OK] to diagnose LCD.
- Press [2] and [OK] to diagnose keyboard.
- Press [3] and [OK] to diagnose flash memory.
- Press [4] and [OK] to diagnose smart card module.
- Press [5] and [OK] to diagnose backlight.
- Press [6] and [OK] to diagnose magnetic stripe card reader.
- Press [7] and [OK] to diagnose LED.
- Press [8] and [OK] to diagnose RTC.
- Press [9] and [OK] to check FONT file in MP200.
- Press [10] and [OK] to diagnose USB.
- Press [11] and [OK] to check Bluetooth chip address and name.
- Press [12] and [OK] to test functionality of power saving.
- Press [↓] button to page 2.

| , age - | |
|---------|-----------|
| Main | Menu 9122 |
| 13.CL | 14.WiFi |
| | |
| | |
| | |
| | |
| -> | 2/2 |

- Press [13] and [OK] to diagnose contactless card reader.
- Press [14] and [OK] to diagnose WiFi.
- Press [↑] button to page 1.

3.7. Factory Reset

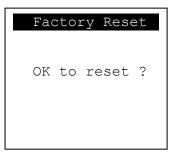
Perform factory reset, all user application, fonts and data will be deleted.

System Menu

| System Menu |
|-----------------|
| 1.Download AP |
| 2.System Info |
| 3.Memory Status |
| 4.Sys Settings |
| 5.Test Utility |
| 6.Factory Reset |
| 7.Power Off |

Press [6] button to enter Factory Reset menu.

Factory Reset Menu



Press [OK] button to perform factory reset.



Enter factory reset password. Default password: 8418

3.8. Power Off

Power off terminal.

System Menu

| System Menu |
|-----------------|
| 1.Download AP |
| 2.System Info |
| 3.Memory Status |
| 4.Sys Settings |
| 5.Test Utility |
| 6.Factory Reset |
| 7.Power Off |

• Press [7] button to power off terminal.

3.9. Function Key Password Change

Change function key access password.

System Menu (Page 2)

| System Menu |
|-----------------|
| 1.FK PWD Change |
| 2.Share obj Mng |
| 3.Castles TMS |
| 4.Font Mng |
| 5.Debug Tools |
| 6.ULD KEY HASH |
| 7.Plug-in Mng |
| |

• Press [1] button to enter FunKey Password menu.

FunKey Password Menu



Enter current password. (Default password is "0000")



- Enter new password.
- Enter new password again to confirm.

| FunKey Password |
|--------------------------|
| New Password: **** |
| Confirm Password **** |
| PWD Changed OK |

3.10.Share Object Management

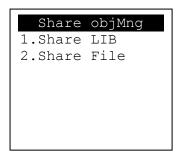
View share object in terminal.

System Menu (Page 2)

| System Menu |
|-----------------|
| 1.FK PWD Change |
| 2.Share obj Mng |
| 3.Castles TMS |
| 4.Font Mng |
| 5.Debug Tools |
| 6.ULD KEY HASH |
| 7.Plug-in Mng |

Press [2] button to enter Share Object Management menu.

Share Object Management Menu



- Press [1] button to view shared library.
- Press [2] button to view shared file.

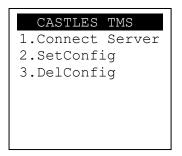
3.11.Castles TMS

Connect to TMS (Terminal Management Software) server, set or delete TMS configuration.

System Menu (Page 2)

• Press [3] button to enter Castles TMS menu.

Castles TMS Menu



- Press [1] button to connect to TMS server.
- Press [2] button to set TMS configuration.
- Press [3] button to delete TMS configuration.

3.12.Font Mng

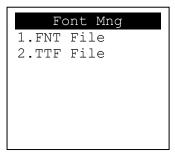
View Font Management.

System Menu (Page 2)

| System Menu |
|-----------------|
| 1.FK PWD Change |
| 2.Share obj Mng |
| 3.Castles TMS |
| 4.Font Mng |
| 5.Debug Tools |
| 6.ULD KEY HASH |
| 7.Plug-in Mng |
| |

Press [4] button to view Font Management.

FontManagment



- Press [1] button to view FNT Font list.
- Press [2] button to view TTF Font list.

3.13. Debug Tools

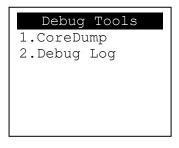
Perform the Debug Tools.

System Menu (Page 2)

| System Menu |
|-----------------|
| 1.FK PWD Change |
| 2.Share obj Mng |
| 3.Castles TMS |
| 4.Font Mng |
| 5.Debug Tools |
| 6.ULD KEY HASH |
| 7.Plug-in Mng |

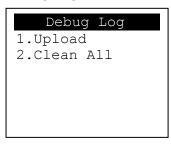
Press [5] go to the Debug Tools Menu.

Debug Tools



- Press [1] go get the Core Dump error from terminal.
- Press [2] go to the Debug Log Menu.

Debug Log



- Press [1] move the Debug Log from the memory of terminal to SD card.
- Press [2] clean all the Debug Log in MP200.

3.14.ULD Key Hash

View ULD user key hash value.

System Menu (Page 2)

| System Menu |
|-----------------|
| 1.FK PWD Change |
| 2.Share obj Mng |
| 3.Castles TMS |
| 4.Font Mng |
| 5.Debug Tools |
| 6.ULD KEY HASH |
| 7.Plug-in Mng |

• Press [6] button to view hash value.



3.15.Plug-in Mng

View Plug-in Management.

System Menu (Page 2)

| System Menu |
|-----------------|
| 1.FK PWD Change |
| 2.Share obj Mng |
| 3.Castles TMS |
| 4.Font Mng |
| 5.Debug Tools |
| 6.ULD KEY HASH |
| 7.Plug-in Mng |
| |

Press [7] button to view Plug-in Management.

| Plug-in Mng |
|--------------|
| |
| |
| |
| 1.Info 2.Del |

- Press [↑] or [↓]button to select item.
- Press [1] button to get item information.
- Press [2] button to delete item.

3.16.Key Injection

View Key Injection.

System Menu (Page 3)

| System Menu |
|-----------------|
| 1.Key Injection |
| |
| |
| |
| |
| |
| |
| |

• Press [1] button to view Key Injection.

| Select COM Port |
|------------------|
| 01/03 |
| 1. COM 1 |
| 2. COM 2 |
| 3. USB |
| |
| |
| OK:Select X:Exit |

- Press [1] to select COM 1.
- Press [2] to select COM 2.
- Press [3] to select USB.
- Press [OK] to set port.
- Press [X] to exit.

4. Secure File Loading

Castles implemented an interface in terminal named User Loader(ULD) to provide secure file loading to system memory. Loading of user application, kernel firmware, font and others must use User Loader.

The loading process is secure by signing the files using ULD Key System.

4.1. ULD Key System

The ULD Key System uses two key sets for securely managing the kernel updating and application downloading. Each key set contains two RSA key pairs. One is used for key encryption and the other is used for signature. These two key sets are specified as below:

ULD Manufacturer Key Set

- ULD Manufacturer Key Encryption Key (RSA)
- ULD Manufacturer Signature Key (RSA)

ULD User Key Set

- ULD User Key Encryption Key (RSA)
- ULD User Signature Key (RSA)

For MP200, the RSA key length is 2048bits.

4.1.1. ULD Manufacturer Key

The system consists of several kernel modules. These kernel modules are provided by the Manufacturer, and released in CAP format file with encryption and signing via ULD Manufacturer Keys.

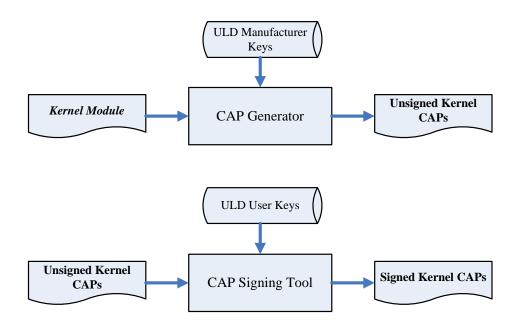
The ULD Manufacturer keys are managed and maintained by the manufacturer. The manufacturer uses these keys to generate kernel CAP files for updating the system. However, the system is not permitted to be updated with these kernel CAP files directly generated by the manufacturer. This is because only the user can have the privilege to decide whether the system is to be updated. Therefore, before system

updating, the kernel CAP files must be "signed" via ULD User Key to get the user permission. For simple expression, we call the kernel CAP files generated by the manufacturer as "unsigned kernel CAP(s)" and call the kernel CAP files "signed" by the user later as "signed kenel CAP(s)".

Notes:

1. The kernel modules are encrypted by a random-generated 3DES key, which is retrieved from the Key Encryption Block of the CAP by ULD Manufacturer Key Encryption Key, not directly encrypted by ULD RSA Key.

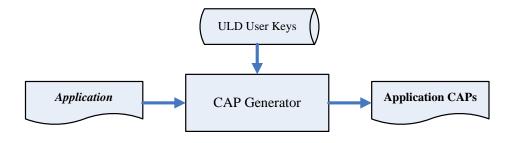
2. The "sign" action via ULD User Keys actually is done by" the second encryption". "The second encryption" is done by using the randomgenerated 3DES key, which is encrypted by ULD User Key Encryption Key, to perform Triple DES encryption again on the cipher data segment of the kernel CAP files. This ensures that the system cannot retrieve the correct data from the kernel CAPs without the user permission.



4.1.2. ULD User Key

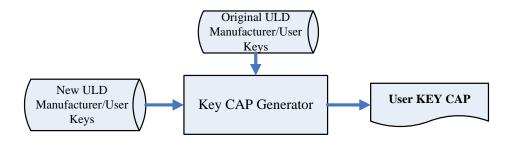
ULD User Key are used to encrypt and sign the user/shared applications. In addition, they are as goalkeepers to prevent the system updating without user permission. This is done by the kernel CAPs which are encrypted and signed by the manufacturer having to perform the "signed' action via ULD User Keys.

Notes: Applications are encrypted by a random-generated 3DES key, which is retrieved from the Key Encryption Block of the CAP by ULD User Key Encryption Key, not directly encrypted by ULD RSA Key.



4.1.3. Key Change

The ULD RSA Keys are able to be changed. The system uses a special CAP file, KEY CAP, for the manufacturer and user to change their own keys. The KEY CAP contains a new set of ULD keys (Key Encryption Key and Signature Key). These new keys are encrypted and signed via the original keys. In other words, if the user would like to change the ULD User Keys, they have to use their original ULD User Keys with the new ULD User Keys to generate a KEY CAP.



4.2. File Signing

4.2.1. Signing Kernel Module

Castles will release new version of kernel module in "unsigned" form. This files required to sign with ULD User Key before it can load to terminal.

Castles Technology provideds a tool named "CAP Signing Tool" to perform this task.

The CAP Signing Tool is located at: C:\Program Files\Castles\MP200\tools\Signing Tool

Run CAP Signing Tool



Insert Key Card and select smart card reader

Enter Key Card PIN

| <u>F</u> ile | <u>H</u> elp | | | |
|--------------|--------------|----------|----------|--------|
| File | Information | | | |
| | | | | |
| | lahc | | | |
| | | | | |
| | **** | | | |
| | | | Enter | Cancel |
| | | | Enter | |
| | | Select N | 1Cl File | |
| | | | | Reset |
| | | | | |

 CAP Signing Tool is ready, press "Select MCI File" button to browse the file.

| <u>F</u> ile <u>H</u> elp | | |
|---------------------------|-----------------|-------|
| File Inform | | |
| | | |
| | abc 😐 | |
| | HEX CA | 4P |
| Key R | eady | |
| | , | |
| | | |
| | Select MCI File | |
| | | |
| | | Reset |
| | | |
| | | |

• Output file will be located in "signed" folder.

4.2.2. Signing User Files

Following files are required to sign before load to terminal. This is to ensure the application data and codes confidential and integrity. The output file will be "CAP" file which is file format defined by Castles.

- User application
- User application data files
- User application library
- Font file
- Share library
- Share files
- System setting
- Key CAP (Manufacturer ULD Key Set)

Castles Technology provided a tool named "CAP Generator" to perform this task.

The CAP Generator is located at: C:\Program Files\Castles\MP200\tools\CAPG (KeyCard)

Run CAP Generator



| • | Insert Key | Card and | select | smart | card | reader |
|---|------------|----------|--------|-------|------|--------|
|---|------------|----------|--------|-------|------|--------|

| File Help File Information File Name App Name | Test Apr Choose Reader | Header Type 10 - Linux AP & Files Def Select Main Executable File 7z.dll |
|--|------------------------|--|
| App Version Company Date | 0001 CASTLES E2100PU 0 | 7z.exe 7-zip.dll CAPG.exe GPAPI.dll IFDAPI.dll |
| Step 2 : Sign Application | | Step 1 : Select AP Executable File |
| Enc Hash Sign Hash | | |

Enter Key Card PIN

| <u>F</u> ile <u>H</u> elp | |
|---------------------------|---|
| File Information | Header |
| | Type 10 - Linux AP & Files 💌 |
| File Name | 🗖 Def Select |
| | Main Executable File |
| App Name Test Application | 7z.dll 7z.exe |
| App Version 0001 | |
| Company PIN : **** | |
| Date | |
| | Enter Cancel |
| | |
| Step 2 : Sign Appl | ication Step 1 : Select AP Executable File |
| | |
| Enc Hash | |
| Sign Hash | |
| | |

| | CAP Generator is | ready, select the correct | Type from the list. |
|--|------------------|---------------------------|---------------------|
|--|------------------|---------------------------|---------------------|

| <u>F</u> ile <u>H</u> elp | | |
|---|--|---|
| File Information File Name App Name App Version Company Date | Test Application 1 0001 20121219 | Header Type 10 - Linux AP & Files We 10 - Linux AP & Files 11 - Linux Font Mai E 20 - Share Library 21 - Share Files 72 III 22 - AppData Files 72 III 22 - AppData Files 73 - Stare Files 74 - Carrow CAP GP AP-UT IFDAP1.dl |
| | Step 2 : Sign Application | Step 1 : Select AP Executable File |
| | | |
| Enc Hash | 3E278EA92CBF937370A24E5C219Df | F2172592E79A |
| Sign Hash | 45B7EC170D7260EB4B28AC9A00C3 | 74299991F84D |
| | | |

• Press "Step 1: Select AP Executable File" to select file to sign. This is valid for all the files to sign.

| <u>F</u> ile <u>H</u> elp | | |
|---------------------------|------------------------------|------------------------------------|
| -File Information- | | -Header |
| | | Type 10 - Linux AP & Files 🔍 |
| File Name | | 🔲 Def Select |
| App Name | ME LIEU-Mentel | Main Executable File |
| | V5_HelloWorld | V5_HelloWorld |
| App Version | 0001 | |
| Company - | | |
| Date | 20121219 | |
| | | |
| | | |
| Finist | ned! | |
| | | |
| | a | |
| | Step 2 : Sign Application | Step 1 : Select AP Executable File |
| | | |
| | | |
| Enc Hash | 3E278EA92CBF937370A24E5C219D | F2172592E79A |
| Sign Hash | 45B7EC170D7260EB4B28AC9A00C3 | 74200001 E94D |
| olginnaan | 4967EC170D7260EB4620AC9A00C3 | 74233331F04D |
| | | |

• Enter file details and press "Step 2: Sign Application" to sign the file. This is valid for all the files to sign.

| File Information Header |
|---|
| |
| Type 10 - Linux AP & Files |
| Def Select |
| File Name Main Executable File |
| App Name V5_HelloWorld V5_HelloWorld |
| App Version 0001 |
| Company |
| Date 20121219 |
| |
| |
| Finished! |
| |
| |
| |
| Step 2 : Sign Application Step 1 : Select AP Executable F |
| |
| |
| Enc Hash 3E278EA92CBF937370A24E5C219DF2172592E79A |
| Circulture |
| Sign Hash 45B7EC170D7260EB4B28AC9A00C374299991F84D |
| |

 The output file will be in a set. A "mci" file with one or more "CAP" files.CAP file contents the signed file binaries, where MCI file contents the list of CAP files.



Note: If user would like to load multiple set of signed file, create a new file with extension of "mmci". Then put the mmci file contents with the list of mci file.



4.3. File Loading

There are several ways of loading file to MP200.

- Download by User Loader
- Download by user application
- Download by Castles TMS

User Loader is a tool provided by Castles Technology. It's the formal way to download file to terminal.

User may implement their own ways of updating application or files using CTOS API provided, **CTOS_UpdateFromMMCI().**

Castles TMS (CTMS or CASTLES Terminal Management System) is provided by Castles Technology. It's use to perform remote download via Ethernet, GPRS/UMTS or modem.

4.3.1. Download by User Loader

The User Loader works for MP200.

The Loader is located at: C:\Program Files\Castles\MP200\tools\Loader

Run User Loader



Select COM port

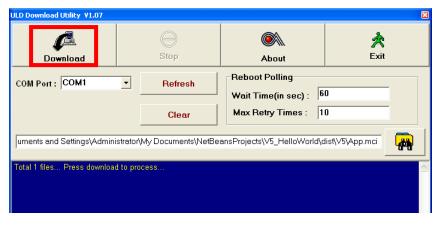
| ULD Download Utility ¥1.07 | | 1 | 8 |
|---------------------------------|------------------------|-----------------------------|-----------------|
| ß | | | 余 |
| Download | Stop | About | Exit |
| COM Port COM1 - | Refresh | Reboot Polling | |
| | | Wait Time(in sec) : 6 | 0 |
| | Clear | Max Retry Times : 1 | 0 |
| uments and Settings\Administrat | tor\My Documents\NetBe | ansProjects\V5_HelloWorld\c | list\V5\App.mci |
| Total 1 files Press download to | process | | |
| | | | |
| | | | |

Browse and select mci file or mmci file

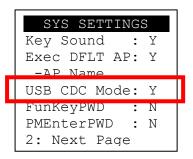
| ULD Download Utility ¥1.07 | | | × |
|------------------------------|-------------------------------------|--|-----------------------|
| Download | Stop | About | À Exit |
| COM Port : COM1 | Refresh | Reboot Polling Wait Time(in sec) : [6 | 0 |
| uments and Settings\Admini | Clear strator/My Documents/NetBe | ansProjects\V5_HelloWorld\ | 0 dist(\/5\App.mci |
| Total 1 files Press downloar | d to process | | |

- Setup terminal to enter download mode
 - Press [0] button in Program Manager (PM)
 - Press [1] button to select "1. Download AP"
 - Press [1] button again to select download via RS232 or USB

• Press "Download" button to start.



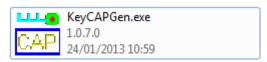
Note: To download using USB cable, terminal must enable CDC mode. Set USB CDC Mode to Y.



4.4. Changing ULD User Key

User may change their ULD User Key Set stored in Key Card. Castles Technology provided a tool named "Secure Key Generator" to perform this task.

Run Secure Key Generator



Insert Key Card and select smart card reader

| ile Uption He | Key CAP Generator (RSA) V3.3 | | <u>e</u> |
|----------------|------------------------------|---|------------------------|
| 18 bits motion | | Update PIN | Save to Card |
| | | Get Hash | Reset |
| | Secure Key 0001 | BSA Key for Kenc Public Key Modulus (N) | Length = |
| | | Public Key Exponent [E] Private Key Exponent [U] HASH | Reader ES EZ100PU 0 |
| | Make Key CAP File | RSA Key for Signature Public Key Modulus (N) | Length = |
| | | Public Key Exponent (E) Private Key Exponent (D) | |
| | | HASH | |
| | | | |

• Enter Key Card PIN, default PIN is "1234".

| | Update PIN | Save to Card |
|-------------------|---|--------------|
| Secure Key | Get Hash | Reset |
| 0001 | RSA Key for Kenc Public Key Modulus (N) | Length = |
| | Public Key Exponent (E) | |
| | | Enter Cancel |
| Make Key CAP File | RSA Key for Signature Public Key Modulus (N) | Length = |
| | Public Key Exponent (E) Private Key Exponent (D) | |
| | HASH | |

 To change Key Card PIN, press "Update PIN" button. If not, please skip this steps.

| VEGA3000 Secure Key CAP Generator (RSA) V3.3 | | 1 |
|--|---|--------------|
| <u>File Option Help</u> | -New Key | |
| | Update PIN | Save to Card |
| | Get Hash | Reset |
| Acto Names Secure Key | RSA Key for Kenc | |
| App Version 0001 | Public Key Modulus (N) Length = | |
| | Public Key Exponent (E) Private Key Exponent (D) HASH | |
| Make Key CAP File | RSA Key for Signature Public Key Modulus [N] Length = | |
| | Public Key Exponent (E) Private Key Exponent (D) HASH | |
| | | |

 Enter new PIN, enter new PIN again to confirm, then press [Enter] button to change PIN in Key Card.

| Form3 PIN Block | | | |
|--------------------|-------|-------|--------|
| New PIN : | Į. | | |
| Conform PIN : | | | |
| | Reset | Enter | Cancel |

• To view current key set hash value, goto "Option" and select key.

| VEGA38000 Service Key CAP Generator (RSA) V3.3 | |
|---|---|
| Hie Option Help | |
| Key | New Key Update PIN Save to Card |
| File Name Secure Key App Films Secure Key App Version 0001 Compton Image: Compton | Get Hash Reset RSA Key for Kenc Public Key Modulus (N) |
| | Public Key Exponent (E) Private Key Exponent (D) HASH |
| Make Key CAP File | RSA Key for Signature Public Key Modulus (N) Length = Public Key Exponent (E) Private Key Exponent (D) HASH |
| | |

| irrent Key Setting | |
|---|--|
| itatus | |
| Load Key OK! | |
| | |
| RSA Key for Kenc | |
| Public Key Modulus (N) | Key Length = 256 |
| *************************************** | *************************************** |
| Public Key Exponent (E) | |
| | |
| Private Key Exponent (D) | ***** |
| 1 | ***** |
| HASH | |
| 277BF11E6827FF2A263DEDE6DEC84 | B2BE9B3E576 |
| 1 | |
| RSA Key for Signature | |
| | 14 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - |
| Public Key Modulus (N) | Key Length = 256 |
| Public Key Modulus (N) | |
| *************************************** | |
| *************************************** | |
| Public Key Exponent (E) | |
| Public Key Exponent (E) | ***** |
| Public Key Exponent (E) ****** Private Key Exponent (D) | *************************************** |
| Public Key Exponent (E) Private Key Exponent (D) Private Key Exponent (D) Private Key Exponent (D) | ***** |
| ************************************ | ***** |
| Public Key Exponent (E) Private Key Exponent (D) Private Key Exponent (D) Private Key Exponent (D) | ***** |

- To generate new user key set
 - Please generate the RSA key by yourself, the length of the RSA key set should be 2048 (bits).
 - Copy RSA key components to RSA Key for Kenc in Secure Key Generator.

| e Option He | 4 | -New Key | |
|-------------|-------------------|-------------------------------------|---------------------------|
| | | Update PIN | Save to Card |
| | | Get Hash | Reset |
| | Secure Key | RSA Key for Kenc | |
| | 0001 | Public Key Modulus (N) | Key Length = 256 |
| | | EC3AAE48CBA638EC97A9D2EF2DE68D5562 | 278EE3876C072F8C80443A84E |
| | | Public Key Exponent (E) 010001 | |
| | | Private Key Exponent (D) | |
| | | ACF038CE61F0AD798C57CA64AE1E2C743F0 | 3455A90E.AD34766CFE78D-4C |
| | | HASH | |
| | | | |
| - | | RSA Key for Signature | |
| | - | Public Key Modulus (N) | Length = |
| | Make Key CAP File | | |
| | | Public Key Exponent (E) | |
| | | Ptivate Key Exponent (D) | |
| | | | |
| | | HASH | |
| | | | |

• Generate second RSA key set for Signature.

| Eile Option Hel | Key CAP Generator (RSA) V3.3 | E |
|---|------------------------------|---|
| File Internetion File Name App Name App Version Company | Secure Key 0001 | New Key Save to Card Get Hash Reset RSA.Key for Kenc Reset Public Key Modulus (N) Key Length = 256 EC3AAE.480E8A638EC97ASD.2E.F2DE.88D556278EE.9876C072F8C80443A84EE Public Key Exponent.(E) Public Key Exponent.(E) (010001 Private Key Exponent.(D) 4CF038CE51F0AD738C57CA64AE1E2C743FD3455A30EAD34766CFE.78D4C5 HASH |
| (| Make Key CAP File | BSA Key for Simplese Public Key Modulus (N) Key Length = 256 SSECSF37500D08AAE26F374C4831080695EADED4691E00FA87FF2DEA015 Public Key Exponent. (E) 010001 |
| | | Pixale Key Exponent (D) 26AC4EEC84FED3184C3D0335C00697E46529E9DD8B35368D4E2E6544EF6 NASH |

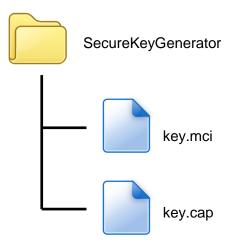
Click [Get Hash] button to calculate the hash value for key sets.

| | ey CAP Generator (RSA) V3.3 | 2 |
|---|-----------------------------|---|
| Ele Option Help File Intormation File Name App Name App Version | Secure Key 0001 | New Key Update PIN Get Hash Reset PLole Key Modulus (N) Key Length = 256 |
| | | Public Key Modula (N) EC:3AAE 4BCBA638EC97A9D 2EF2DE08D556278EE3976C072F902B0443A64EE Public Key Exponent (E) [010001] Primate Key Exponent (D) [40F0380261F0AD79805770664AE1620743FD3455A306AD347660FE78D405] HASH [608F32738038A3167710EE468E4A27EDE08/31A48F |
| - | Make Key CAP File | RSA Key for Signature Public Key Modukus (N) Key Length = 256 Sec 3F3750CD 08AAE28F374C483108089EADED4691E0DFA87FF2DEAD15 Public Key Exponent (E) D10001 Private Key Exponent (D) |
| Generate HASH C | KI | 26AC4EEC84FED31B4C30-0935C00697E46529ESDD8835368D4E2E6544EF6 HA5H 945E4224208F950E24583097C8FA8B5EE73788F2 |

- Please copy down all the values into a text file and keep in a safe place. You will need this if you need to create duplicate Key Card.
- To generate the key CAP for the newly generated user key set, press [Make Key CAP File] button.

| Eile Option Help | | |
|-------------------|--------------------|---|
| File Information- | | New Key Update PIN Save to Carr |
| | Secure Key 0001 | Get Hash Reset RSA.Key for Kenc RSA.Key for Kenc Public Key Modulus (N) Key Length = 256 EC344E 48C8A638EC97A9D2EF2DE88D556278EE9876C072F80C80443A84E |
| | | Public Key Exponent (E) 010001 Private Key Exponent (D) 4CF038CE61F0AD738C57CA64AE1E2C743FD3455A30EAD34766CFE78D4C HA5H 6DIBF3279803A316771DEE4E8E4A27EDE0831A48F |
| | Make Key CAP File | RSA Key for Signature Public Key Modulus (N) Key Length = 256 (SSECSF37500DBAAE25F374C483108089EADED4691E00FAB7FF2DEA015 |
| | | Public Key Exponent (E) [010001 Private Key Exponent (D) [26AC4EEC84FED31B4C3D0935C00597E46529E30D B835368D 4E2E6544EFE HASH |
| Generate HASH 0 | | 1455H 945E4224208F950E245B3097C8FABB9EE73788F2 |

• The output file will be located in the Secure Key Generator folder.



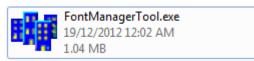
 To update the newly generated key set to Key Card, press [Save to Card] button to write the key set to Key Card.

| ile Option Help | C New Key |
|---|--|
| | Update PIN Save to Card |
| | Get Hash Reset |
| Secure Key | PSA Keylor Kenc |
| 0001 | Public Key Modulus (N) Key Length = 256 |
| A CALEMAN AND AND A CALEMAN AND AND A CALEMAN AND AND AND AND AND AND AND AND AND A | E C3AAE 48/CBA638E C97A9D 2EF2DE 88D556278EE 9876C072F8C80443A84EE |
| | Public Key Exponent (E) 010001 |
| | Private Key Exponent (D) 40F03802651F0AD798057CA64AE1E20743FD3495A30EAD347660FE76D405 |
| | HASH |
| | 608F3279809A316771DEE4E8E4A27EDE0831A48F |
| | RSA Key for Signature |
| Make Key CAP File | Public Key Modulus (N) Key Length = 255 |
| Make Ney CAC File | 99EC9F3750CDD 8AAE.26F374C48/3108D/89EADED4691E0DFAB7FF2DEA015 |
| | Public Key Exponent (E) 010001 |
| | Private Key Exponent (DI) |
| | 26AC4EEC84FED/3184C300935C00697E46529E90D8835368D4E2E6544EF8 |
| | HASH |
| | 945E4224208F950E245B3097C8FABB9EE73788F2 |

5. Font Management

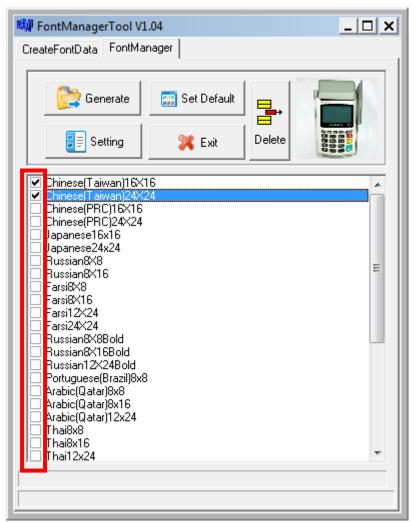
5.1. Loading New Font

Run FontManager.exe

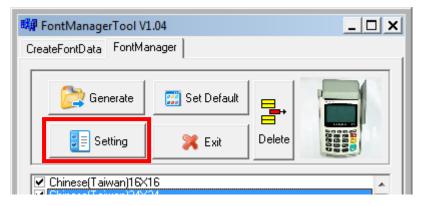


Located at C:\Program Files\Castles\Font Manager

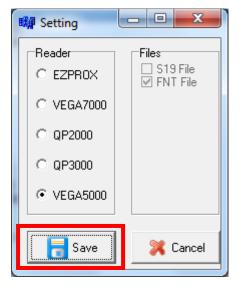
Select font to download



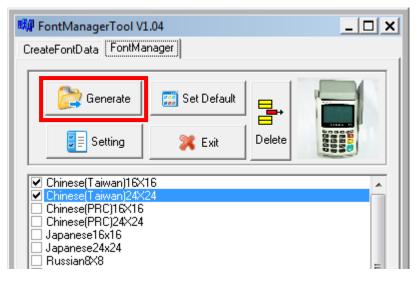
• Press [Setting] button to configure terminal type.



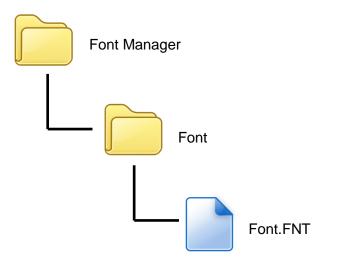
Select VEGA5000, press [Save] button to save and return font manager.



Press [Generate] to create the font file.



 Output file "Font.FNT" will be located at sub-directory named "Font" in "Font Manager" folder.



• Sign the file using CAP Generator, the type must set to "11 – Linux Font".

| 👼 Vega5000 CAP G | ienerator v2.2 | |
|---------------------------|-------------------------------|------------------------------------|
| <u>F</u> ile <u>H</u> elp | | |
| -File Information- | | -Header Type 11 - Linux Font |
| File Name | | Main Executable File |
| App Name | Linux Font | Font.FNT |
| App Version | 0001 | |
| Company | | |
| Date | 20121219 | |
| | | |
| | Step 2 : Sign Application | Step 1 : Select AP Executable File |
| | | |
| Enc Hash | 3E278EA92CBF937370A24E5C219DF | F2172592E79A |
| Sign Hash | 45B7EC170D7260EB4B28AC9A00C3 | 74299991F84D |
| | | |

• Lastly, download the signed file (CAP file) to terminal using Loader.

5.2. Custom Font

User may create font they preferred for displaying or printing on terminal.

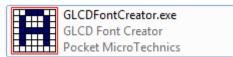
There are two zone defined:

Zone 0x00 ~ 0x7F – ASCII characters, you may replace with the font type preferred or your own language character set.

Zone $0x80 \sim 0xFF$ – Free to use, you may use for symbols.

Following steps demonstrate how to create a 12x24 font.

Run GLCD Font Creator



| GLCD Font Creator 1.1.0 - mikr | oElektronika Edition | | |
|--------------------------------|--|---------------------|-------|
| File Edit Effects Batch Tools | Help | | |
| 🛐 New Font | New Font From Scratch | | 6 |
| 💕 Open Font | Minport An Existing System Font | | Previ |
| Save Font | 📕 New HD44780 LCD Custom Characters Set | Set Full Column | |
| Save Char Ctrl+S | Right Click : Clear Pixel Ctrl+Right Click | : Clear Full Column | |
| Export for MikroElektronika | | | Tools |
| Quit | | | |
| - | _ | | Shift |
| | | | |
| | | | |
| | | | |

Select the font needed, simply choose a font size. The final value of font size • should be determine by the minimum pixel width. You may need to repeat this steps few times to find the best fit font size.

| Font | | | × |
|--|-------------------------------------|---|--------------|
| Eont: Britannic Britannic Broadway Brusk Script MC7 Calibri Californian FB | Font style: Bold Bold Oblique | Size: 11 12 14 16 18 20 22 ▼ | OK Cancel |
| Effects Stri <u>k</u> eout Underline <u>C</u> olor: | Sample AaBbYyZ | 'z | |
| Custom | Sc <u>ri</u> pt: Westem | • | |

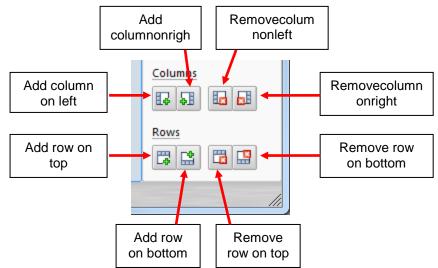
Set the import range from 0 to 127.

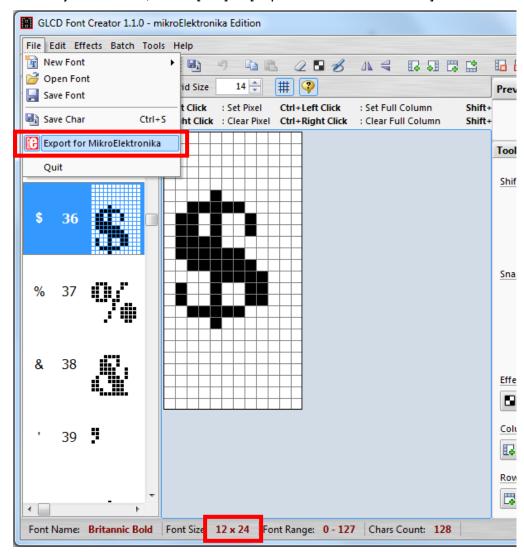
| Import font |
|--|
| |
| Font Name Britannic Bold |
| Range |
| From 0 🚔 To 127 🚖 |
| Optimize Imported Font |
| Remove : |
| Common blank Rows at TOP of all chars |
| Common blank Rows at BOTTOM of all chars |
| Common blank Columns at LEFT of all chars |
| Common blank Columns at RIGHT of all chars |
| ✓ <u>O</u> k |

| ile <u>E</u> dit Effe <u>d</u> | | | | 0 | | | | | | |
|--------------------------------|--------|------------|-------------|------------------|------------|----------|--------|--------------|----------|---|
| 🛐 🕶 🧀 🔚 | Export | Grid Size | | ► 2 🖬 쒿 # 🖓 | | 16 91 L6 | 6 | | | - |
| har Code G | LCD ^ | Left Click | : Set Pixel | Ctrl+Left Click | : Set Full | Caluma | Shift+ | Preview | Blue 🔻 | |
| | | | | Ctrl+Right Click | | | Shift+ | | | |
| 0 | | | | | | | | | | |
| | | | | | | | | Tools | | _ |
| | | | | | | | | Shift / Mo | ve | |
| | | | | | | | | ſ | • | |
| 1 | | | | | | | | 4 | 5 4 | |
| | | | | | | | | | 4 | |
| | | | | ++ | | | | U. | | |
| 2 | | | | +-+-1 | | | | Snap To B | | |
| Z | | | | | | | | | 1 | |
| | | | | | | | | H | | |
| | | | | | | | | l | U | |
| 3 | | | | | | | | | | |
| | | | | | | | | Effects | | |
| | | | | | | | | B 💋 | 4⊾ 🚭 | |
| 4 | | | | | | | | Columns | | |
| 4 | | | | | | | | 14 41 | | |
| | | | | | | | | | | |
| | - | | | | | | | Rows | m 🖪 | |
| • | • | | | | | | | 1 | 1 | |

• Check the minimum pixel width and height.

- If the pixel width of the font size is larger than expected, then you have to repeat the previous steps to import font with smaller size.
- Use the following buttons to adjust the font size to match with expected font size.





■ After adjust font size, select [File] ⇒ [Export for MicroElektronika].

Select output format as [mikroC].

| Generate Code For Use With |
|----------------------------------|
| mikroC GLCD Lib 🔘 X-4 |
| Font height > 8bits, only X-GLCD |
| |
| |
| CD Lib. |
| |

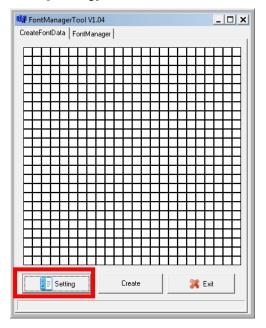
 Remove comment "// Code for char " from offset 0x00 to 0x1F. Remove empty line if found. Then click [Save] button to save to file.

| ont Name Brit | annic_Bold12x24 | | | Fro | m Char 0 | To Char 12 |
|----------------|--|------------------------|------------|--------------|------------|--------------------|
| | | | | G | enerate Co | de For Use With |
| | | | | | | GLCD Lib |
| i mikroBasic | 🚺 mikroPaso | al 🕒 mikroC | | | | |
| 0x00, 0x00, | 0x00, 0x00 0x00, 0x00 0x00, 0x00 0x00, 0x00 | , // Code , // Code | for for | char char | | ← Remove |
| 0x00, | 0x00, 0x00 | , // Code | for | char | | Remove |
| | 0x00, 0x00 0x00, 0x00 | | | | | ← Remove Remove |
| 0x00, ∢ | 0x00, 0x00 | , // Code | for | char | | Kelliove |

Run Font Manager Tool.



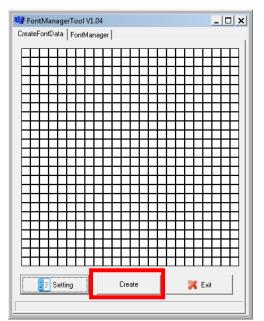
Click [Setting] button



• Enter the file name, font id, and select the size.

| 🗱 DataSetting 📃 🗖 🗙 | | | |
|---------------------|--|--|--|
| FileName: | | | |
| Britannic | | | |
| ID:(HEX) | | | |
| A000 | | | |
| Style: | | | |
| thin 💌 | | | |
| Size: | | | |
| 12 * 24 | | | |
| Version:(HEX) | | | |
| 0001 | | | |
| ОК | | | |
| | | | |

 Click [Create] button, and select the C file previously created using GLCD Font Generator.



 Select [Font Manager] tab and tick the newly createdfont, and press [Generate] button to export to FNT file.

| 🙀 FontManagerTool V1.04 | | | _ 🗆 🗙 | |
|--|---------------|--------|-------|--|
| CreateFontData FontMa | nager | | 1 | |
| Cenerate | 🧱 Set Default | | | |
| Setting | 💢 Exit | Delete | | |
| Portuguese(Brazil)8x8 Arabic(Qatar)8x8 Arabic(Qatar)8x16 Arabic(Qatar)12x24 Thai8x8 Thai8x8 Thai8x8 Czech8x8 Czech8x8 Czech8x16 Czech8x8 Czech8x16 Spanish8x16 Spanish8x16 Spanish12x24 Chinese(T aiwan)Plus16×16 Chinese(T aiwan)Plus16×16 Turkish8x16 Turkish8x16 Turkish8x16 Chinese(PRC)16×16(minisun) Chinese(PRC)24×24(minisun) W Britannic12×24 | | | | |
| | | | | |
| 1 | | | | |

Use CAP Generator to conver the FNT file to CAP.

Set type to [11 – Linux Font], press [Step 1] button select the FNT file. Then press [Step 2] to generate CAP file.

| VEGA5000 CapGe | en Evaluation Version v2.2 | | |
|---------------------------|--|------------------------------------|--|
| <u>F</u> ile <u>H</u> elp | | | |
| -File Information- | | Header Type 11 - Linux Font | |
| File Name | | Main Executable File | |
| App Name | Linux Font | Font.FNT | |
| App Version | 0001 | | |
| Company | | | |
| Date | 20130117 | | |
| | Step 2 : Sign Application | Step 1 : Select AP Executable File | |
| Enc Hash | 9572BC621C1D54060856D00BCC207000D3320077 | | |
| Sign Hash | A927768EA7DD7B9E7E3F395C10726B6F43B35C5A | | |
| | | | |

- Download the font CAP file to terminal.
- In terminal application, add following code to display message using the newly created font.

```
CTOS_LanguageConfig(0xA000,d_FONT_12x24,0,d_FALSE);
CTOS_LanguageLCDSelectASCII(0xA000);
CTOS_LCDTPrintXY(1, 1, "ABCDEFGH");
```

Or print message using the newly created font.

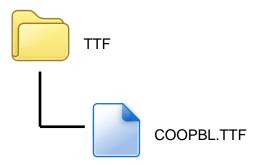
```
CTOS_LanguagePrinterSelectASCII(0xA000);
CTOS_PrinterPutString("ABCDEFGH");
```

5.3. Using TrueType Font (TTF)

TrueType Font (TTF) is supported in MP200. You may download the TrueType font preferred to terminal for displaying or printing.

Following steps demonstrate how to use "Cooper Black" TrueType font.

• Copy the TTF file needed to a empty folder.



Use CAP Generator to conver the TTF file to CAP.
 Set type to [11 – Linux Font], press [Step 1] button select the TTF file.
 Then press [Step 2] to generate CAP file.

| VEGA3000 ULD | CAP Generator (Evaluation) 3.2 | X |
|--------------------------|----------------------------------|------------------------------------|
| <u>File</u> <u>H</u> elp | | |
| File Information | | Type 11 - Linux Font |
| File Nome | | Main Executable File |
| App Name | Linux Font | COOPSL TTF |
| App Version | 0001 | |
| Company | | |
| Date | 20130117 | |
| Finish | ed! Step 2 : Sign Application | Step 1 : Select AP Executable Filg |
| | | |

Download the font CAP file to terminal.

 In terminal application, add following code to display message using the newly added font.

```
CTOS_LCDTTFSelect("COOPBL.TTF", 0);
CTOS_LCDFontSelectMode(d_FONT_TTF_MODE);
CTOS_LCDTSelectFontSize(0x203C); // 32x60
CTOS_LCDTClearDisplay();
CTOS_LCDTPrintXY(1, 1, "Hello World");
```

Or print message using the newly added font.

```
CTOS_PrinterTTFSelect("COOPBL.TTF", 0);
CTOS_PrinterFontSelectMode(d_FONT_TTF_MODE);
CTOS_LanguagePrinterFontSize(0x203C, 0, 0); // 32x60
CTOS_PrinterPutString("Hello World");
```

6. FCC Warning

Federal Communication Commission interference statement. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: -Reorient or relocate the receiving antenna. -Increase the separation between the equipment and receiver. -Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. -Consult the dealer or an experienced radio/TV technician for help.

FCC Caution

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference and
- (2) this device must accept any interference received, including interference that may cause undesired operation

RF Exposure Warning

The equipment complies with RF exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

This equipment should be installed and operated with a minimum distance of 5 centimeters between the radiator and your body.

~ END ~