



GENERAL SPECIFICATION

mC-Print3

< SECOND GENERATION >

REV. No. 1.70

Applicable Models

- MCP31CI
- MCP31CBI

- ◆ Refer to the online manual for detail the product setup or uses.



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We will not be held responsible for any damage caused by the result of operating this product or negligence.

Safety information

This section contains safety information for preventing harm to users of this product, to third persons, and damage to property.

Carefully read before using this product and use the product properly.

We are not liable for any damage that occurs as a result of incorrect use other than those detailed in the safety information or in the manual for this product, or for any damage that occurs due to repairs/changes made by a third party who is not part of our company or specified by our company.

Warning

Warning

- Immediately turn the power off and pull the power plug out of the electrical outlet if it emits heat, smoke, abnormal smells or abnormal sounds.
Then contact the seller.
If use of the product is continued, fire or electric shock may occur.
- Do not disassemble, repair or modify the product.
Otherwise, it may cause fire, electric shock or injury.
- When pulling out the power plug, always pull the plug and not the cable.
Otherwise, the power cable may be damaged, and a short circuit, fire or electric shock may occur.
- Do not damage, modify, forcefully bend, pull, twist, put a heavy object on, or squeeze the power cable.
Otherwise, the power cable may be damaged, and a short circuit, fire or electric shock may occur.
- Do not use a damaged power cable or power plug, or loose electrical outlet.
Otherwise, it may cause a short circuit, fire or electric shock.
- Do not touch the power plug with wet hands.
Otherwise, it may cause an electric shock.
- Do not touch the cutter blade. Otherwise, it may cause an injury.
 - There is a cutter inside the paper exit, so do not touch the blade even when it is not operating, as well as when it is operating.
 - The printer cover will be opened when replacing the paper roll, but as there is a cutter inside the printer cover, do not bring your face or hands close to the cutter blade when the printer cover is opened.
- If foreign matter such as liquid or metal fragments get inside this product, immediately cut off the power and pull the power plug out of the electrical outlet. Then contact the seller.
If use of the product is continued, fire or electric shock may occur.

Installation notes

Warning

Do not install the product in the following locations.

Otherwise, an electric shock or fire may occur.

- Locations where there is a danger of electricity or water leakages
- Locations that are in the vicinity of fire, that are subject to direct sunlight, or where heat may be trapped

Caution

Do not install the product in the following locations.

Otherwise, it may cause malfunction.

- Locations where there is static electricity or where a strong magnetic field is generated
- Locations where ventilation is poor or dusty locations
- This product uses DC motors and switches which require contact with electricity; therefore, avoid using in locations where silicone gas or flammable gas is volatilized.
- Locations where temperature and humidity exceed the usage environment conditions, or where condensation occurs
- Locations where the floor is not flat, or where vibrations occur, such as inside the car

Problems such as paper feed errors may occur.

- Do not use the same electrical outlet as the one where equipment that generates noise such as copiers and refrigerators are connected to.
- Location at a distance from an electrical outlet

Install in a location that is near the electrical outlet so that the power plug can be immediately pulled out if an abnormality occurs.

To install accessories and optional products

When installing accessories and optional products, turn the power of this product off, and pull the power plug out of the electrical outlet.

Carefully read the installation steps in the manual and install correctly.

Handling notes

Caution

- If not being used for a long time, pull the power plug out of the electrical outlet to ensure safety.
- When connecting or removing a cable, remove the power plug for both this product and the PC from the electrical outlet to ensure safety.
- Be careful not to forcibly pull the connected USB cable, LAN cable, power cable, or cash drawer cable.
- When removing the cable, always hold the plug part, and make sure that no excessive force is applied to the connector on the printer side.
- Do not connect a telephone line to the external device drive connector. In addition, to ensure safety, avoid using wiring connections that may cause an excessive voltage to be applied to the external device drive connector. Otherwise, it may lead to malfunctions.
- Do not open the printer cover while the printer is printing or cutting.
- Do not pull out the paper while the printer cover is closed.
- Be careful not to get your hands trapped when opening or closing the cover. Otherwise, it may cause an injury.
- As the heating element in the thermal printer head and the driver IC part can be easily damaged, do not allow direct contact with metals, sandpaper and such.
- Remove the cut paper from the printer promptly.
- Do not operate the printer if there is moisture (which has been caused by condensation or another factor) on the front surface of the print head.
- If the thermal sheet has a large amount of [Na⁺, K⁺, Cl⁻] then the life of the thermal printer head may be drastically shortened. We recommend using products with ion concentration of Na⁺ 500 ppm, K⁺ 150 ppm, Cl⁻ 300 ppm or less.
- Use in accordance with indicated environmental specifications. Even if the environmental temperature/humidity is within specifications, avoid drastic environmental condition changes. Refer to "2.4. Environmental specifications" for the environment suitable for using this product.
However, when you want to charge your smartphone or tablet from the printer, use both the printer and device within the temperature range that satisfies the environmental specifications of the respective products.
- If you are using drivers provided by Star Micronics, limit the maximum number of LAN interface printers that are connected to a single host device to 10.
- When disposing of this product, be sure to follow local ordinances and regulations.
- When a lightning strike occurs while the printer is in use, turbulence may occur to the printed result depending on the operating condition of the printer.
It is recommended to use the uninterruptible power system, etc. as a countermeasure for lightning strike.
- When replacing paper, remove the paper core remaining in the paper roll holder.

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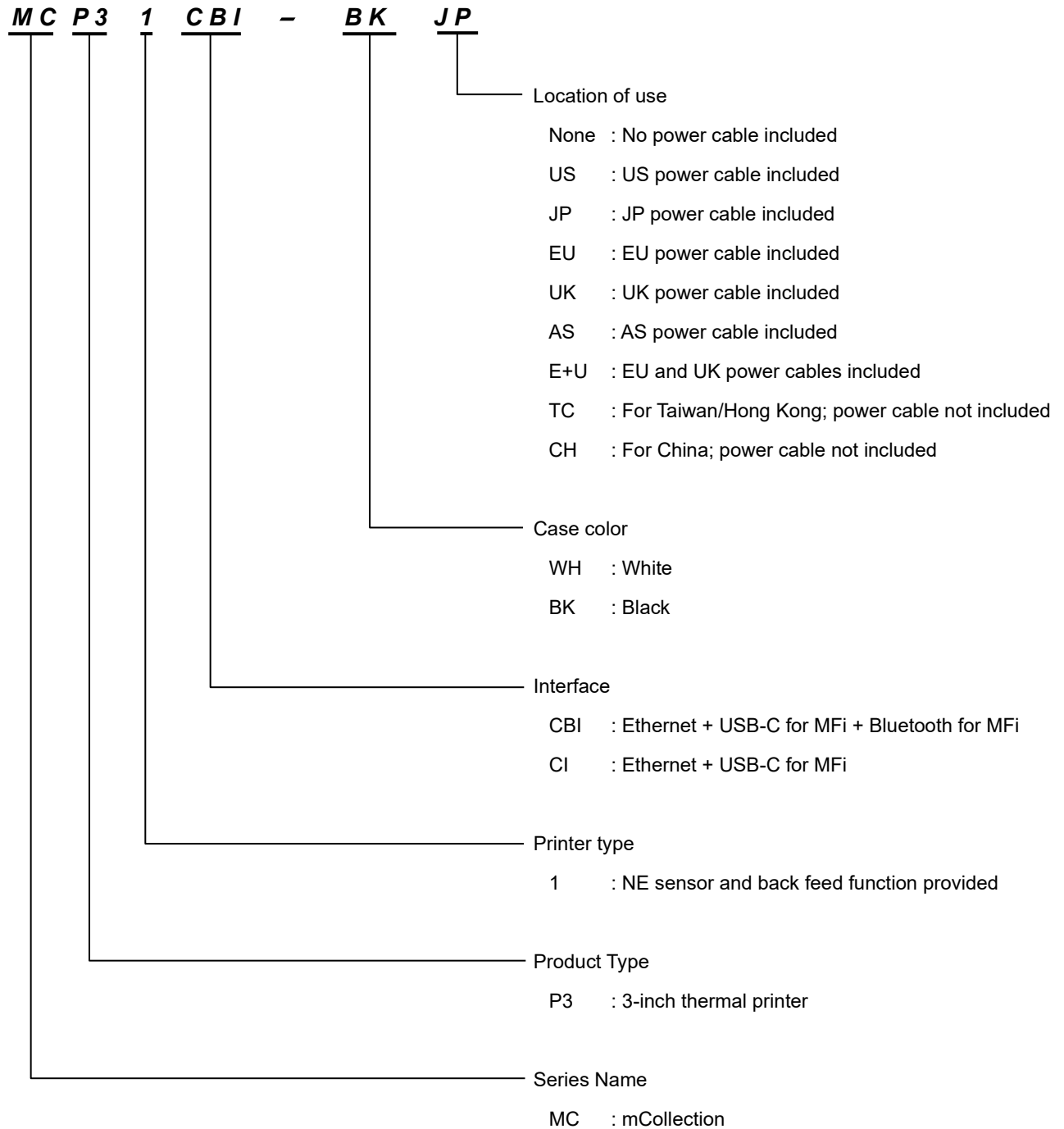
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1. Product Overview

mC-Print3 is a direct line thermal printer in the mCollection series.

1.1. Model name



1.2. Product Configuration (Accessories and Optional Products)

[Accessories]

- AC adapter
- Power cable 1.8 m
- Safety guide
- Setup sheet

<Note>

Accessories vary depending on the region where the printer was purchased.

[Options]

- | | | |
|---------------------|-------------------|--------------------------------------|
| ● Paper roll guide | Model | : Paper roll guide MC3 |
| ● USB A-C cable | Model | : USB cable, 1.8 m, black T1V |
| ● Wall-hanging kit | Model | : WB-MC30 |
| ● AC adapter | Model | : PS65AT-24A |
| | Connection | : Power connector |
| ● Buzzer unit | Model | : BU01-24-A (*1) |
| | Connection | : Connector to drive external device |
| ● Barcode reader | Model | : BCR-POP1 |
| | Connection | : USB-A port |
| | Supported barcode | : 1D |
| ● Customer display | Model | : SCD222U |
| | Connection | : USB-A port |
| ● Wireless LAN unit | Model | : MCW 10 |
| | Connection | : LAN port, USB-A port |
| ● Melody speaker | Model | : MCS10 (*3) |
| | Connection | : External device drive connector |

*1) No longer available in Japan.

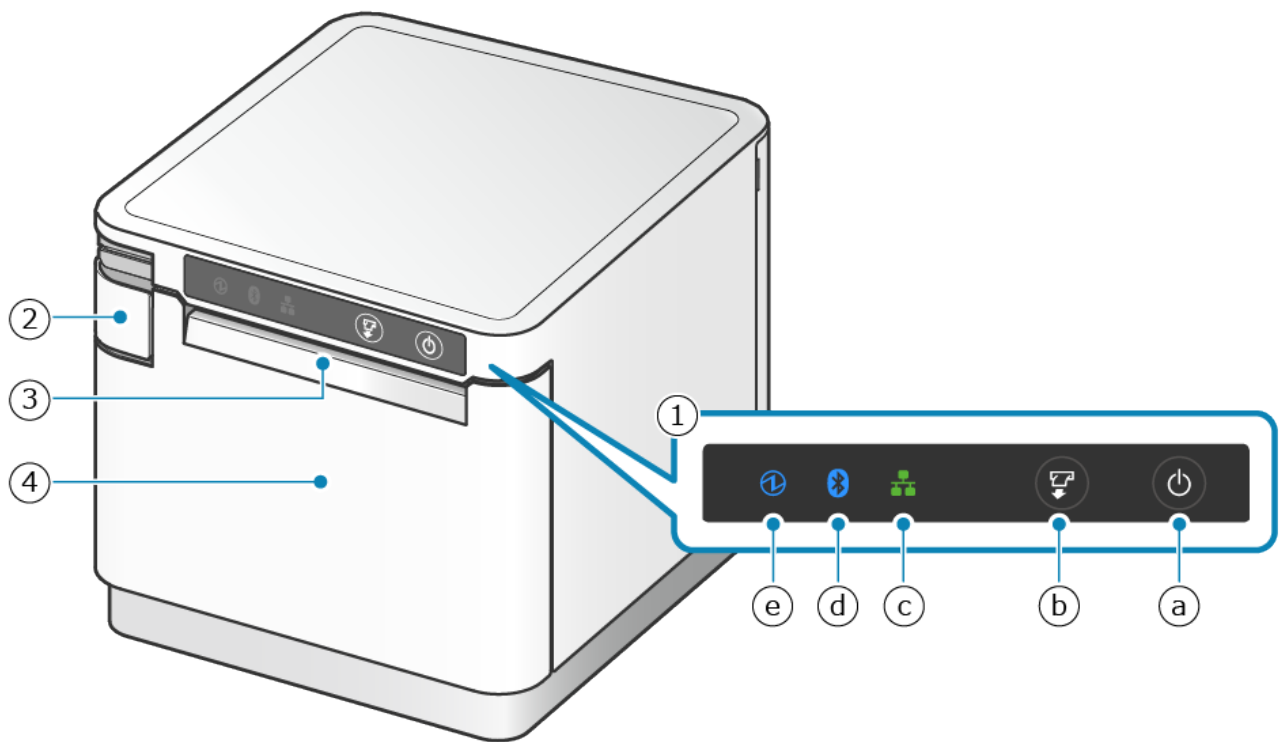
*2) Supports the external device drive commands. Commands related to the melody speaker are not supported.

For details, refer to Command Specifications from the link below.

<https://www.star-m.jp/supportsite-wsw.html>

1.3. Part names and functions

[Front / Side of the printer]



① Operation panel

This panel provides printer operation switches and printer status indicator LED lamps.

(a) Power button : Turns the power on/off.

(b) FEED button : Feeds paper.

Also, use this button to perform test printing.

(c) Network LED : Lights up green according to the network connection status.

(d) Bluetooth LED : Lights up blue according to the Bluetooth connection status. (Models which support Bluetooth only)

(e) Power LED : Lights up blue when the power is turned on.

For details, refer to “4. Operating Portion and Function”.

② Cover opening lever

Pull this lever to open the printer cover when setting the paper roll.

③ Paper exit

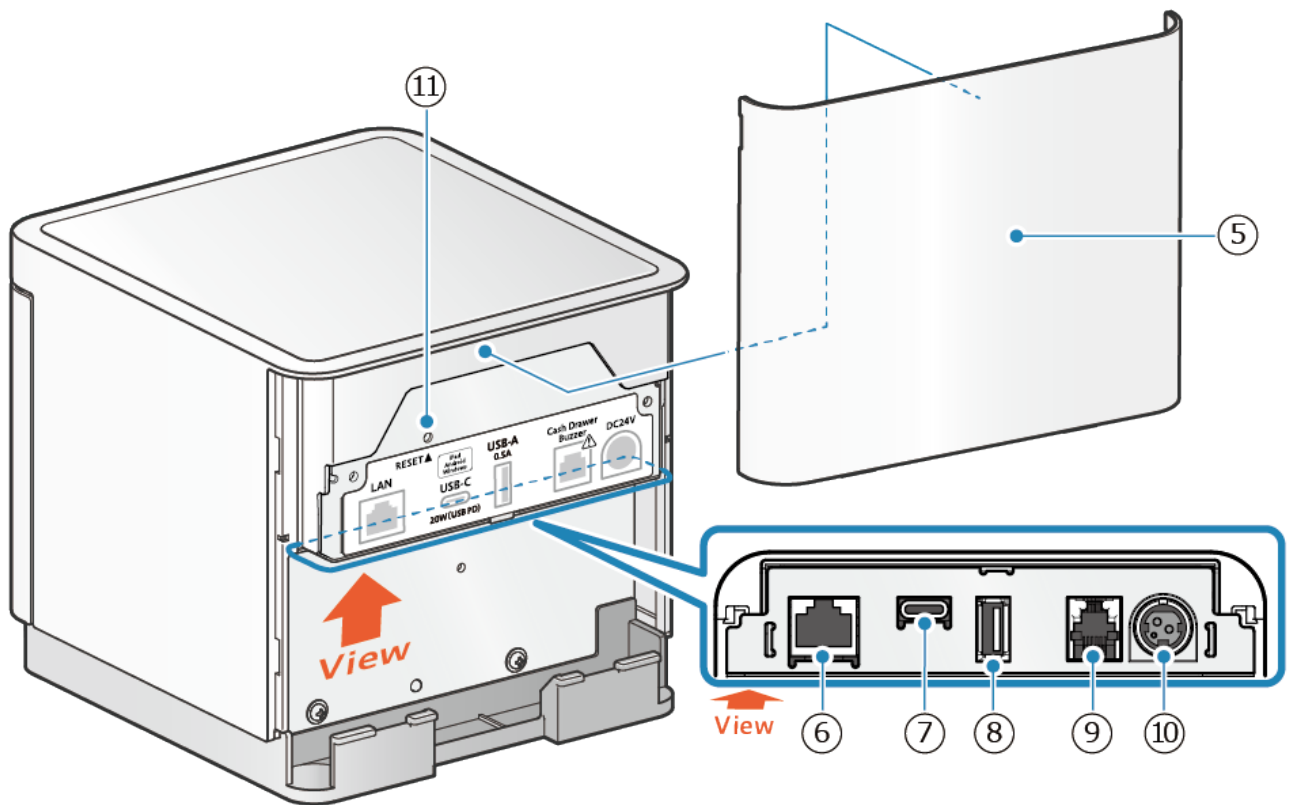
The printed paper is ejected from here.

④ Printer cover

Opens/Closes when setting the paper roll.

For details, refer to “4. Operating Portion and Function”.

[Back of the printer]

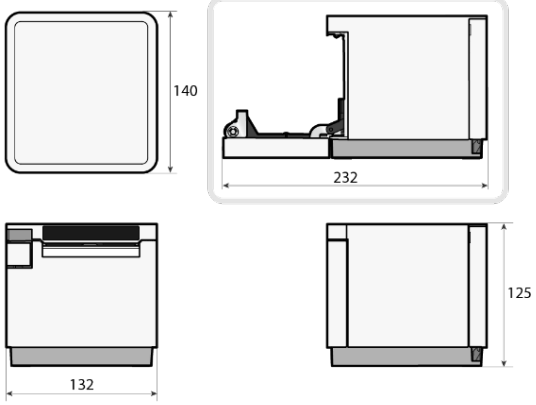


- ⑤ Rear cover
Remove this cover when connecting cables.
- ⑥ LAN port
Connect the network with the LAN cable.
- ⑦ USB-C port
Connect an iOS, Android or Windows device to the main unit to establish communication or supply power (up to 20 W).
- ⑧ USB-A port
Connects and communicates with a USB-compatible product (customer display barcode reader) specified by our company.
- ⑨ External device drive connector
Connects the buzzer, cash drawer and melody speaker.
- ⑩ Power connector
Connect the power adapter cable that comes with the printer.
- ⑪ RESET switch
Initializes the network or Bluetooth settings of the printer.

2. Product Specifications

2.1. General specifications

Item		Specification	
Printing specifications*1	Print method	Direct thermal (Thermosensitive type)	
	Dot configuration	576 dots/line	
	Print speed	Maximum 400 mm/sec (default)	
	Resolution	8 dots/mm (203 dpi)	
	Print width	Paper width: 79.5 ± 0.5 mm	72 mm (Left margin: 3.75 mm, Right margin: 3.75 mm)
		Paper width: 57.5 ± 0.5 mm	48 mm (Left margin: 4.75 mm, Right margin: 4.75 mm)
			50.8 mm (Left margin: 3.75 mm, Right margin: 2.95 mm)
	Paper width	79.5±0.5 (mm) / When using paper roll guide: 57.5±0.5 (mm)	
	Roll diameter	Maximum 83 mm	
	Top margin	2 to 11 mm (default 11 mm; configurable in 1.0 mm unit)	
	Paper feeding	Friction feeding method	
Barcode*2	1D	UPC-A, UPC-E, JAN/EAN8, JAN/EAN13, ITF, CODE39, CODE93, CODE128, CODABAR (NW-7) GS1-128, GS1 Omnidirectional, GS1 Truncated, GS1 Limited, GS1 Expanded	
	2D	PDF417, GS1 Stacked, GS1 Stacked Omnidirectional, GS1 Expanded Stacked, QR Code	
	Composite	GS1 Composite Symbols	
Font*3	Specification	European and US letter code	Code Page: Supported
		Chinese character code	Japanese: Supported Traditional Chinese (BIG5): Supported Simplified Chinese (GB18030): Supported
		Unicode	UTF-8: Supported (specific font only)
	Type	ANK:Font-A	12 x 24 dots/1.50 x 3.00 mm IBM Block: 12 x 32 dot /1.50 x 4.00 mm
		ANK:Font-B	9 x 24 dots/1.125 x 3.00 mm IBM Block: 9 x 32 dot /1.125 x 4.00 mm
		Japanese kanji characters: 96 alphanumeric characters	24 x 24 dots/3.00 x 3.00 mm
		Japanese kanji characters: Extended graphics, 128 characters	
		Japanese kanji characters: 3489 characters for JIS Level 1	
		Japanese kanji characters: 3390 characters for JIS Level 2	
		Japanese kanji characters: Special characters, 83 characters	
		Japanese kanji characters: 374 characters for NEC selected IBM extended characters	
		Japanese kanji characters: IBM extended, 388 characters	
		Japanese kanji characters: Single-byte kanji characters, 282 characters	
		Chinese characters (compliant with GB18030): 96 alphanumeric characters	24 x 24 dots/3.00 x 3.00 mm
		Chinese characters (compliant with GB18030): 28574 Chinese characters	
		Traditional Chinese BIG5(F): 96 alphanumeric characters	
		Traditional Chinese BIG5(F): 13877 Taiwanese characters	24 x 24 dots/3.00 x 3.00 mm

Item		Specification
Emulation		StarPRNT
Interface		USB-A x 1 Standard: USB2.0 Full-speed, USB BC1.2 SDP Power supply specifications: USB BC 1.2 SDP (maximum 2.5 W)
		USB-C x 1 Standard: USB2.0 Full-speed, USB BC1.2 C DP Power supply specifications: USB PD (maximum 20 W), USB-C Current (maximum 15 W), USB BC1.2 CDP (maximum 7.5 W), iAP2 (maximum 15 W)
		Ethernet x 1 10Base-T/100Base-TX (IEEE 802.3/IEEE 802.3u)
		DK-Port x 1 External device drive connector
Sensor	Head temperature	Temporarily stops printing to lower the temperature of the thermal head when the thermal head becomes hot. Printing stop: 70°C/Printing resume: 65°C When the temperature is 65°C or more and less than 70°C, a two-second interval is taken before printing operation.
	Temperature of the printed circuit board	If the temperature of the printed circuit board becomes high, printing stops temporarily to lower the temperature of the board.
	PE	Detects the trailing edge of paper.
	NE	Detects that paper is running out. Outer diameter of roll detectable by NE: Approximately $\phi 25$ mm
	Cover open	Detects the opening/closing of the printer cover.
	Cutter home position	Detects the home position of the cutter.
Auto cutter*4	Type	Guillotine type
	Cutting method	Partial cut (leaving one uncut portion at center)
	Cut duty	3 seconds/cut
	Thickness	49 μ m ~ 75 μ m
Printer orientation*5		Laid on flat surface / Wall-hanging (using wall-hanging kit) * The allowable angle range of the placement orientation is within $\pm 5^\circ$ in the horizontal direction.
External view	External dimensions	●When the cover is closed 132 (W) x 140 (D) x 125 (H) mm ●When the cover is open 132 (W) x 232 (D) x 125 (H) mm 
	Weight	Approx. 1.3 kg (without paper roll) (Reference figure)
Withstanding load		Approx. 2.0 kg (for top surface of mC-Print3)
Reliability	Dust and drip proofing	Equivalent to IP22
	Insect proofing	Design incorporates consideration for insect proofing.

[Notes about the general specifications]

Note *1) Printing specifications

<Print speed>

Print mode	Printing width 72 mm	Printing width other than 72 mm
During high speed mode	Maximum 400 mm/sec	Maximum 250 mm/sec
During medium speed mode	Maximum 250 mm/sec	Maximum 220 mm/sec
During low speed mode	Maximum 180 mm/sec	Maximum 180 mm/sec

- 1) The print speed will automatically change depending on conditions, such as the print pattern, print density, ambient temperature, power supply voltage fluctuations, data transmission speed, etc.
- 2) The print speed reaches 400 mm/s at the maximum under certain conditions with the default settings. It becomes easier to reach the maximum speed by reducing the print density.
- 3) You can change the above print mode with the memory switch.

<Print width>

- 1) You can change the print width setting with the memory switch.
- 2) 57.5±0.5 mm is in the case when the optional roll paper guide is used.

<Length of printing paper>

When sending print data with the length of printing paper to be cut is less than 24 mm, perform unloaded feed before cutting the printing paper into the length of 24 mm or more.

Be sure that the print paper length (cutting length) does not exceed 50 mm when the top margin is set to 10 mm or less.

(Paper jam may occur when the cut paper remains. There are no restrictions on the print paper length when the cut paper has been removed.)

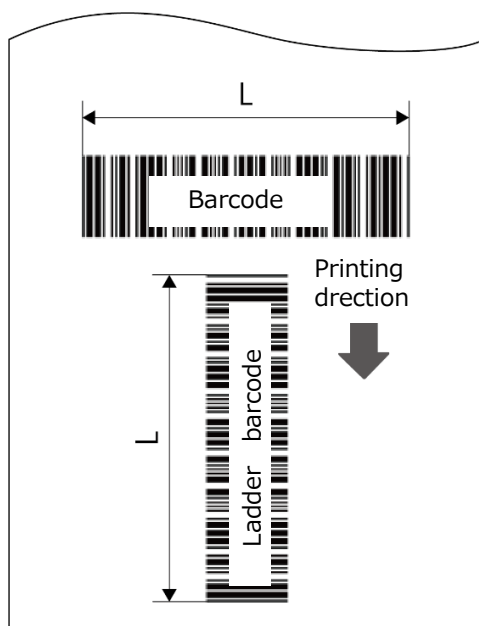
Note *2) Barcode

- 1) The barcode print quality largely depends on the color characteristics of the thermal paper, the environment (such as temperature and humidity) of the printer location, and the print density and print speed settings.

When you read the printed barcodes using a scanner or other type of device, we strongly recommend that you evaluate the data scanning quality beforehand.

- 2) If you cannot obtain the desired scanning quality with your scanner, try to reduce the print speed, increase the size of the minimum module, or change the barcode length. These adjustments may improve the barcode scanning quality.
- 3) If you use GS1 Composite Symbols, it is strongly recommended that you adjust the size that can be read by the scanner and evaluate the data scanning quality beforehand. If you release the scanner to widen the scan area, the scanner reading may not be obtained in a satisfactory manner.
- 4) If you print 2D barcodes, synthetic barcodes, or ladder barcodes by using a command, print speed will be forcibly changed to medium speed.

Barcode type		Barcode			Ladder barcode		
		Module size	Print speed	L	Module size	Print speed	L
1D		15 mil or more	No limitation	Approx. 72 mm or less	20 mil or more	Medium speed or less	Approx. 72 mm or less
2D	PDF, GS1	15 mil or more	Medium speed or less	Approx. 72 mm or less	15 mil or more	Medium speed or less	Approx. 72 mm or less
	QR	15 mil or more	Medium speed or less	Approx. 72 mm or less	15 mil or more	Medium speed or less	Approx. 72 mm or less
Composite		15 mil or more	Medium speed or less	Approx. 72 mm or less	15 mil or more	Medium speed or less	Approx. 72 mm or less



Barcode : Barcode in which the direction of the bars is arranged parallel to the printing direction

Ladder barcode : Barcode in which the direction of the bars is arranged vertically to the printing direction

L : Barcode length

Note *3) Fonts

<Chinese characters>

- 1) Font settings can be changed through a utility or memory switch settings.
For Japanese kanji characters, the JIS level-1 kanji characters and the JIS level-2 kanji characters are compliant with JIS x0208-1990/1997.
Level-1 and level-2 JIS 2004 sample character style and SHIFT-JIS code are supported.
- 2) Chinese characters (compliant with GB18030) support 2-byte and 4-byte codes.

<UTF-8 support>

- 1) Chinese characters and western characters with UTF-8 code are supported.
- 2) Characters printable in UTF-8 code are western characters, including the code page owned by the printer, and the following types of Chinese characters.
 - Japanese kanji characters
 - Chinese characters (compliant with GB18030) 2-byte codes
 - Traditional Chinese BIG5
 - Hangul characters
- 3) UTF-8 does not support 4-byte code Chinese characters conforming to GB18030. The non-supported code is printed with "□".
- 4) The conventional character code and the UTF-8 code can be switched by a command or the memory switch.

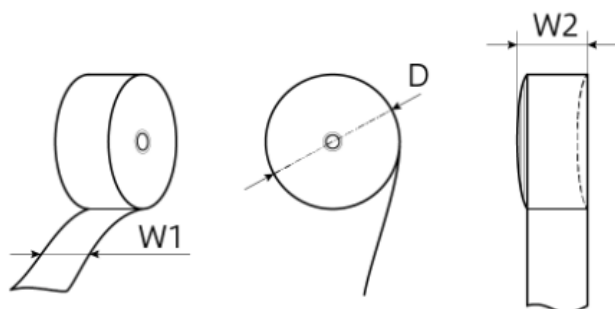
Note *4) Auto cutter

- 1) If the print at the leading edge of the paper is jammed, feed approximately 1 mm (8 dot line) of paper after the cutting motion.
- 2) The minimum length of printing paper is 24 mm.
When sending the printing data with the length of printing paper to be cut is less than 24 mm, perform unloaded feed before cutting the printing paper into the length of 24 mm or longer.
- 3) If an error occurs, open the printer cover, remove the cause of the error, then close the printer cover to restore normal operation.
When the printer is not recovered correctly or the printer cover does not open, turn the power on again.
- 4) Remove the sheet after the cutting process is completed.
Removing the paper while it is being cut may cause paper debris or paper jam.
Caution) Opening the printer cover while cutting may damage the printer.
- 5) Cutting position
The length from the top margin to the cutting position is approximately 11 mm.
The length from the print end position to the cutting position is approximately 2 mm.
- 6) The mechanical sensor detects errors in home position.

Note *5) Installation position

- 1) Do not place the printer in an unstable location where the printer might be shaken.

2.2. Paper specifications



- (1) Type : Thermal roll paper
- (2) Paper width [W1] : 79.5 ±0.5 mm / 57.5 ±0.5 mm (when using the optional roll paper guide)
- Note 1) Do not change the paper width while the printer is in operation.**
- 2) When using paper with the width of 57.5 ±0.5 mm, change the print width in “MSW4: Print width setting.”**
- (3) External dimensions : Winding diameter [D] Maximum roll diameter ø83 mm
Roll Width (wrap-up dimensions) [W2] 80 +0.5, -1 (mm)/58 +0.5, -1 (mm)
- (4) Paper thickness : 49 µm to 75 µm
- (5) Core inner/outer diameters : Inner diameter ø12 ±1 mm/Outer diameter ø18 ±1 mm
- (6) Color surface : Outside of roll
- (7) Recommended thermal paper

Manufacturer	Product name	Quality characteristics and use	Thickness (µm)
Mitsubishi Paper Mills Limited	P220AG	Normal type	65
	HP220A	Highly conserved type	65
	HP220AB-1	Highly conserved type	75
Nippon Paper Industries	TF50KS-E2D	Normal type	59
Oji Paper Company	PD150R	Normal type	75
	PD160R	Extremely highly conserved type	75
Domtar (Appvion)	Domtar POS 55S-2.3 (Alpha 400-2.3)	Normal type	58
	Domtar POS 48S-2.1 (Alpha 400-2.1)	Normal type	53
Koehler	KT48 FA	Normal type	53
	KT44 FA	Normal type	49
	Blue4est Lite	Non-chemical type	55
Mitsubishi Hi-tech	P5047(55)	Normal type	60

- Note 1) Depending on the type of paper and the usage environment, perform a thorough evaluation and change the print density as necessary.**
- 2) Change the print density by using the print density setting command <ESC><RS>‘d’n or “MSW2: Print density”.**
- 3) Adequate reading results of barcodes or characters may not be attained because of factors such as the scanner, paper type, or print density. Be sure to evaluate your scanner with the printer in advance.**

- 4) Pitch deviation may occur at the start of printing depending on the printing rate and paper type.
- 5) Color streaks and wrinkles may occur depending on the type of paper or usage environment.
- 6) Glue should not be used to secure the paper roll and the core. Also, do not fold the trailing edge of the paper.
- 7) Blue4est Lite is only for the paper width of 80 mm.
- 8) Disable the near end sensor when using Blue4est Lite.
The setting can be changed in the utility. The near end error may be detected even when the roll diameter is large because the color of the side of the paper roll is dark.
- 9) When the core outer diameter of the paper roll is smaller than $\varnothing 18$ mm and the top margin is 10 mm or less, a paper ejection error may occur.

2.3. De-curl function

This product is equipped with a de-curl function to fix the curl of the thermal paper roll. This feature is built into the paper transportation path in the printer, and the de-curling mechanism is always operating when the paper is being conveyed.

<Note>

- 1) This feature is to correct the curl only, and does not completely rid the paper of the curl.**
- 2) Depending on the standing time after the receipt is printed (interval until the next print out), a slight bend on the top part of the receipt may occur.**
- 3) Depending on the environment where this product is used and the type of thermal paper roll that is used, the extent of the curl correction differs.**
- 4) Depending on the thermal paper roll type and the remaining amount of thermal paper on the roll, the receipt may be warped in a direction opposite to the normal direction because of the de-curl function.**

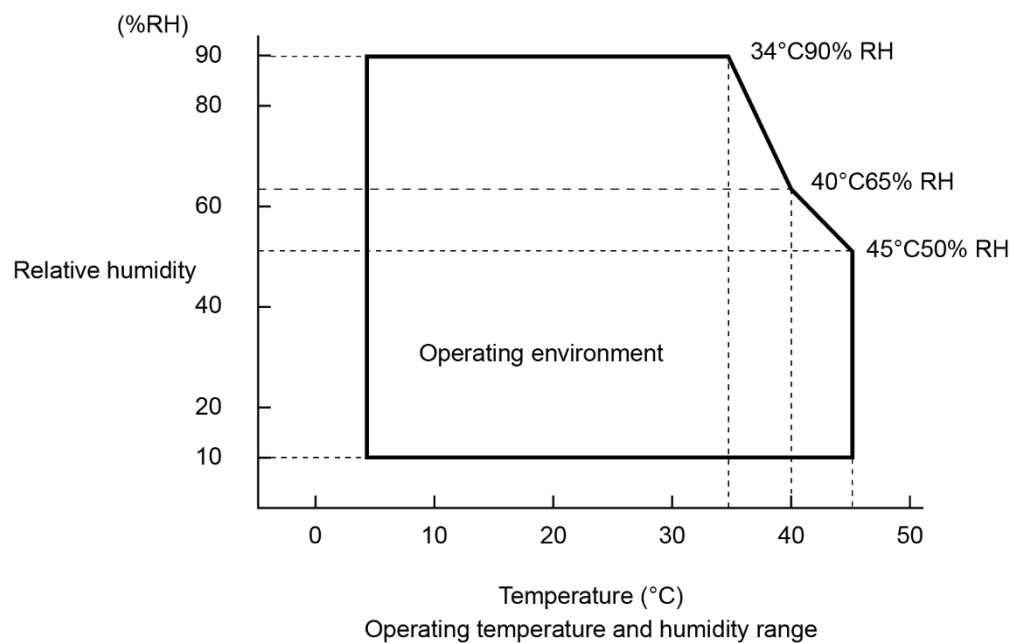
2.4. Environmental specifications

2.4.1. Operating environment

Temperature : 5°C to 45°C

Humidity : 10%RH to 90%RH (No condensation)

(See figure below.)



2.4.2. Storage environment (excluding roll paper)

Temperature : -20 to 60°C

Humidity : 10%RH to 90%RH (No condensation)

<Note> The worst combination of high temperature and humidity is 40°C and 90%RH (no condensation).

2.5. Power specifications

(1) Printer input specifications

- Operating voltage : 24 VDC $\pm 10\%$
- Rated power (Safety certification nameplate) : 24 VDC, 2.7 A

(2) Current consumption

at 24 VDC, room temperature, without USB power supply

- During power ON idling : Approx. 0.05 A (average)
- During ASCII printing : Approx. 2.3 A (average)

**<Note> Use the provided PS65AT-24A power adapter.
When performing continuous high-duty printing, limit it to a maximum of 3 seconds
and perform sufficient operation testing.**

(3) Power connector

- Power connector pin arrangement

Pin No.	Function
1	+24V
2	GND
3	N.C
Shell	Frame GND

- Model number : TCS7960 (HOSHIDEN) or equivalent
- Other party : TCP8927 (HOSHIDEN) or equivalent

(4) Specifications of the power adapter packaged with the printer

PS65AT-24A

- Input rating : 100 - 240 VAC $\pm 10\%$, 1.4 A, 50 - 60 Hz
- Output rating : 24.0 VDC $\pm 5\%$, 2.71 A

(5) Recovery from power failure

The printer can store the power ON/OFF status prior to power failure.

If a power failure occurs while the printer is ON, the printer will resume operation if the power is ON after power has been restored.

(If a power failure occurs while the power is OFF, the power will remain OFF.)

(6) Notes

<Preparing Power on the Customer Side>

The following must be considered to prepare a power supply on the customer side.

- Use a power supply that is 24 VDC $\pm 10\%$ and 2.7 A or more.
- Select a power supply with current capacity that is appropriate for the actual printing ratio.
- Use a power supply that is SELV output and conforms to either LPS (Limited Power Source) or Class 2.
- Use the power supply that meets the EMC standards for the country or region in which you are setting up the printer.

2.6. Reliability specification

2.6.1. Life

(1) Printer service life: 20 million lines

(2) Service life of thermal head and cutter: 200 km, 2 million cuts (representative value)

Manufacturer	Product name	Quality characteristics and use	Thickness (μm)	Thermal head service life		Cutter service life	
				Number of pulses (100 million)	Distance (km)	79.5 mm width (10 thousand cuts)	57.5 mm width (10 thousand cuts)
Mitsubishi Paper Mills Limited	P220AG	Normal type	65	1.0	200	200	100
	HP220A	Highly conserved type	65	1.0	100	200	100
	HP220AB-1	Highly conserved type	75	1.0	100	200	100
Nippon Paper Industries	TF50KS-E2D	Normal type	59	1.0	100	150	75
Oji Paper Company	PD150R	Normal type	75	1.0	100	200	100
	PD160R	Extremely highly conserved type	75	1.0	100	200	100
Domtar (Appvion)	Domtar POS 55S-2.3 (Alpha400-2.3)	Normal type	58	1.0	100	200	100
	Domtar POS 48S-2.1 (Alpha400-2.1)	Normal type	53	1.0	100	150	75
Koehler	KT48FA	Normal type	53	1.0	100	150	75
	KT44FA	Normal type	49	1.0	100	150	75
	Blue4est Lite	Non-chemical type	55	1.0	100	150	-
Mitsubishi Hi-tech	P5047(55)	Normal type	60	1.0	100	200	100

<Note>

- 1) The printing conditions shall be the average printing rate of 12.5% and head average resistance value change rate of $\pm 15\%$ or less.
- 2) The end of a part's life is defined as the point when the part starts to fail due to wear.
- 3) The end of the head's life is defined as the point when two or more adjacent dots are damaged. However, this does not include scratches caused by external materials being affixed to the head or accidental damage caused by the user.
- 4) When printing is repeatedly performed at an extremely high printing rate, the life of the thermal head may decrease drastically. Therefore, you have to carefully plan the print formats that will be used.
- 5) The above values provide reliability specifications assuming all printing operations use the recommended thermal paper. Reliability cannot be guaranteed if different paper is used.
- 6) Never change the paper width while the printer is in use.
If the paper width is changed, printing or cutting may not be conducted correctly.

2.6.2. MCBF

60 million lines

MCBF is defined as a general interval of failures, including random failures and wear-out failures, that occurs before the printer service life of 20 million lines is reached (*The service life of this printer is 20 million lines, and the MCBF of 60 million lines does not refer to durability life.)

2.6.3. MTBF

360,000 hours

MTBF is defined as the average time between the failures of the systems, including the circuit system, while random failures occur.

<Note> MTBF is a reliability index, and the operation of 360,000 hours is not guaranteed.

2.6.4. Shocks from vibration and falling

(1) Vibration (when packaged)

- Direction of vibration : X, Y, and Z
- Vibration frequency : 7 Hz to 100 Hz
- Sweep time : Logarithmic frequency sweep rate, 15 minutes for reciprocation
- Vibration acceleration : 1.5 G, constant
- Application time : One hour (Total 3 hours)
- Packaging : Minimum packaging
- Criterion : Destruction of the device, with no parts missing
Cracking and deformation of packaging and cushioning material will be unquestioned

(2) Drop shock (when packaged)

- Drop height : 65 cm
- Direction of drop : 1 angle, 3 corners, 6 surfaces
- Number of drops : One each time (Total of 10 drops)
- Packaging : Minimum packaging
- Criterion : Destruction of the device, with no parts missing
Cracking, detachments, and deformation of packaging and cushioning material will be unquestioned

(3) Drop shock (when not packaged)

- Drop height : 5 cm
- Direction of drop : 4 sides, side instructions
- Number of drops : One time each
- Criterion : Destruction of the device, with no parts missing

2.6.5. Noise

- Measurement standard : JIS X 7779 (ISO 7779)
- During operation : A-weighted sound pressure level approx. 56 dB

The above noise level is based on Star Micronics evaluation conditions that comply with JIS X7779.

The noise levels will vary depending on the paper that you use, the contents that you are printing, and the settings (print speed and print density) that you have made.

2.6.6. Dust-proof and drip-proof

Equivalent to IP22

<Note>

Based on JIS C 0920 (IEC 60529), this is the result of evaluation by a third-party evaluation organization, and does not guarantee the conformity to the standard, no damage, and no failure.

3. Communication Specifications

3.1. Ethernet interface

- (1) Communication specifications : 10Base-T / 100Base-TX
- (2) Connector : RJ-45 (8P8C)
Use the category-5 or higher cables.
- (3) Supported protocol : TCP/IP v4

TCP/IP specifications

Layer	Protocol	Reception port	Usage
Network layer	ARP, IP, ICMP		
	(ARP/Ping)		Temporary IP address setting
Transport layer	TCP, UDP		
Application layer	DHCP		Dynamic IP address setting
	LPD/LPR	515/TCP	Printing
	Raw Socket Print	9100/TCP	Retrieve print/printer status
	Reset with authorization	22222/TCP	Force reset
	SDP (Star Discovery Protocol)	22222/UDP	Search for printer on network
	TELNET	23/TCP	Network settings
	HTTP	80/TCP	Network settings Star CloudPRNT
	HTTPS	443/TCP	Network settings Star Micronics Cloud Services (*1) Star CloudPRNT
	MQTT	1883/TCP	Star CloudPRNT (*2)
	MQTTS	8883/TCP	Star CloudPRNT (*2)
	AMQPS	5671/TCP	Star Micronics Cloud Services (*1)

*1) Communication with Star Micronics Cloud Service is performed when the power is turned on, the status changes, or after a certain period of time has elapsed.

*2) Supported by F/W Ver. 5.1 and later.

(4) Network settings

The contents of the network settings can be checked by test printing. For details about the test printing procedure, refer to “4.2.2 Test print mode (Self-print mode).”

When changing the network, use Web Configuration or Star Quick Setup Utility.

Setting item	Input range	Initial value	Remark
IP Address	0.0.0.0 to 255.255.255.254	0.0.0.0	
Subnet Mask	0.0.0.0 to 255.255.255.255	0.0.0.0	
Default Gateway	0.0.0.0 to 255.255.255.255	0.0.0.0	
DHCP	ENABLE / DISABLE	ENABLE	
DHCP Timeout	ENABLE / DISABLE	ENABLE	
DNS 1	0.0.0.0 to 255.255.255.254	8.8.8.8	
DNS 2	0.0.0.0 to 255.255.255.254	8.8.4.4	
"user" Login Password	- 1 to 31 ASCII characters - ASCII character - Distinction between upper case and lower case characters	"guest"	Camouflaged with (*****) when changed from the initial value.
"root" Login Password	- 1 to 31 ASCII characters - ASCII character - Distinction between upper case and lower case characters	"public"	Always hidden by asterisks (*****).
Web Refresh Time (Sec.)	1 to 300	5	
9100 Multi Session	ENABLE / DISABLE	DISEABLE	
9100 Data Timeout (Sec.)	0, 30, 40, 60, 120, 180, 360	0	
Disconnect Message	ENABLE / DISABLE	DISEABLE	
SteadyLAN	ENABLE / DISABLE	DISEABLE	
TCP#9100	ENABLE / DISABLE	ENABLE	
TCP#9101	ENABLE / DISABLE	ENABLE	
LPR	ENABLE / DISABLE	ENABLE	
UDP#22222	ENABLE / DISABLE	ENABLE	
Telnet	ENABLE / DISABLE	DISEABLE	
TCP#80	ENABLE / DISABLE	ENABLE	Setting changes are supported by F/W Ver. 5.1 and later.
TCP#443	ENABLE / DISABLE	ENABLE	Setting changes are supported by F/W Ver. 5.1 and later.
TCP#22222	ENABLE / DISABLE	ENABLE	Setting changes are supported by F/W Ver. 5.1 and later.
Certificate	Self-Signed/CA Signed	Self-Signed	
Create Self-Signed Certificate		Not exist	
Import CA-Signed Certificate		Not exist	
Star CloudPRNT Cloud Service	ENABLE / DISABLE	DISEABLE	
Star CloudPRNT Service URL	- 1 to 511 ASCII characters	Blank	
Star CloudPRNT Polling time (Sec.)	- 1 to 7200 seconds	5	
Star CloudPRNT UserName	- 1 to 63 ASCII characters	Blank	
Star CloudPRNT Password	- 1 to 63 ASCII characters	Blank	
Star CloudPRNT TLS trust level	Use trusted CA-Certificate list / Use custom CA-Certificate / Accept all	Use trusted CA-Certificate list	
Star CloudPRNT	Use Star NTP service	Use Star NTP service	0.pool.ntp.org

Setting item	Input range	Initial value	Remark
NTP Server	Use custom NTP server		
Star CloudPRNT TLS1.2 Cypher Suites Encryption Level	HIGH + MEDIUM	HIGH + MEDIUM	
Star CloudPRNT TLS1.3	ENABLE / DISABLE	ENABLE	
Star CloudPRNT HTTP Response Timeout (Sec.)	10 sec/20 sec/30 sec/40 sec/50 sec/60 sec	60	

Basic function

3.1.1. LPD/LPR

The LPR protocol that LPD of this product supports conform to RFC1179 (partially not supported) and logical printer names in the list are used as queue names. LPR stands for "Line PRinter daemon protocol." It is originally a protocol for printing provided as a UNIX printing system and currently supported standardly also by Windows (NT or later). "LPR" may be used as an execution file name of the LPR print utility software.

The print server (Daemon) corresponding to LPR is called LPD (Line Printer Daemon).

LPD uses the TCP communication port 515.

- The reception buffer for printing data is 64 kB (shared with Raw Socket Print).
- This does not support banner printing.
- Specify "lp" when specifying a queue name in the port setting on the host device side.

In addition, select "Enable" when addition of the LPR byte counter setting can be selected.

3.1.2. Raw Socket Print

This product supports Raw Socket Print communication for printing under a TCP/IP environment.

Raw Socket Print regards all data flowing between TCP sessions as the data handled between the printer and host device and performs bidirectional data distribution.

The TCP communication port specifications are as shown in the table below.

Item	Specification	Description
Communication port number	TCP #9100	
Number of concurrent sessions	1 or 8	- The factory default setting is 1.
Data reception timeout	0 (disabled) / 30s / 40s / 60s / 120s / 180s / 300s	- The factory default setting is 0 (disabled). - Connection is shutdown forcibly at timeout.

- The reception buffer for printing data is 64 kB (shared with LPR).
- You can set the maximum number of reception sessions for port 9100 by TELNET and HTTP (Web Configuration).

When "9100 Multi Session: Enable" is set, the maximum number of reception sessions is 8. When "9100 Multi Session: Disable" is set, the maximum number of reception sessions is 1. If the number of connections exceeds these values, a rejection packet (TCP Reset) is generated on the host device after it is connected.

- When multi-session is enabled and printing data is received simultaneously from multiple sessions (host device), the session for which the printing data was received first takes the printer port, and the printing data for the other sessions is stored in the NIC reception buffer until the session closes. Also, the order in which sessions are received and the actual print order may not match.
- The data in the direction from the printer to host device is status information obtained from the printer.

* For the details of status information, refer to the [Commands Specifications](#).

- The TCP session disconnection (TCP FIN, RST) is considered to be the end of one document.

If special control, such as suspending a print job, is required, the host device performs processing.

If a RST packet is received when a TCP session is disconnected from the host device, part of the printing data may be deleted.

- Data reception data timeout "9100 Data Timeout" may be configured by TELNET, HTTP (Web Configuration). This configuration automatically releases the sessions that remain connected.

3.1.3. Status acquisition function

This printer supports the printer status acquisition function through TCP communication port 9101.

The TCP communication port specifications are as shown in the table below.

Item	Specification	Description
Communication port number	TCP #9101	
Number of concurrent sessions	4	
Data reception timeout	30 seconds	Connection is shutdown forcibly at timeout.

When the following command and parameter are received from the host device, printer status information (ASB) is sent back.

When the command out of range is received, connection is shutdown.

Command	16 hex	Parameter
'2'	32 H	Optional 50 bytes (time information)

3.1.4. Reset with authorization

With this function, regardless of the printer status (online/error conditions, such as during printing/waiting), it is possible to apply a forced reset from the host device.

For the execution of this function, the user login name and password is required for the user privileges.

By registering a password in TELNET, it is also possible to apply an execution restriction.

(-> See "3.1.9 TELNET server.")

This function can only be used when TCP#22222: "Enable" is set.

[Execution steps]

As outlined in the following procedure, wait for response from the printer after sending a command from the host device.

(1) Send a command from the host device to the printer

Command : <FS> '0' [UserName] <NUL> [Password] <NUL>

(16 hex) : 1CH 30H [UserName] 00H [Password] 00H

[UserName] : "user" (fixed)

[Password] : "guest" (Can be changed. Specify password after change.)

(2) Response from the printer to the host device

- Reset approval: The printer will, after replying with 00H, cut the connection (*1) and reset.
- Reset denial: The printer disconnects after responding 01H (*1). Reset is not performed.

*1) The connection response on the host device will not be checked.

3.1.5. TCP #9100 forced release

Release a specified host port number session from among connecting TCP#9100 sessions.

This function can only be used when TCP#22222: "Enable" is set.

[Execution steps]

As outlined in the following procedure, wait for response from the printer after sending a command from the host device.

(1) Send a command from the host device to the printer

Command : <FS> '3' *[Host Port Number]* <NUL>

(16 hex) : 1CH 33H *[Host Port Number]* 00H

[Host Port Number]: Host port number of the session subject to be released

(2) Response from the printer to the host device

- When this session is not connected : The printer will, after replying with 00H, cut the connection (*1).
(when already released)
- When this session is released : The printer disconnects after responding 01H (*1).

*1) The connection response on the host device will not be checked.

3.1.6. Discovery

This product uses a proprietary protocol SDP (Star Discovery Protocol) developed by Star Micronics.

SDP uses UDP communication port 22222.

SDP is used to search this product on the LAN through applications such as the setting utility.

Setting

3.1.7. IP address setting specifications

3.1.7.1. General description

The IP address of the printer is determined by the “fixed address (Static)” or “dynamic acquisition from the network with DHCP and ARP/Ping.” For the factory settings, the static address (Static) = unregistered and DHCP = enabled.

ARP/Ping is enabled when an address cannot be obtained for Static or DHCP.

The acquired IP address information can be confirmed in the test printing (self-printing) display below.

```
*****
Current IP Parameters Status
*****
IP Address      :xxx.xxx.xxx.xxx
                (※Protocol)
Subnet Mask     :xxx.xxx.xxx.xxx
Default Gateway :xxx.xxx.xxx.xxx
```

- * *Protocol* : The following address acquisition protocols are displayed in the parentheses for the IP address field.
- (Static) : Static (fixed address)
- (DHCP) : Retrieved from DHCP server
- (Ping ARP) : Retrieved using ARP/Ping
- (Didn't obtain) : Unable to retrieve the IP address

3.1.7.2. Fixed address (Static)

If the static IP address, subnet mask, and default gateway are registered, the printer always starts in a fixed condition when the power is turned on. DHCP and ARP/Ping are disabled.

Since the static address is unregistered in the factory settings, acquire a dynamic address with DHCP or ARP/Ping and then register a static address by TELNET and HTTP (Web Configuration).

(-> See “3.1.9.TELNET server” and “3.1.8. Web Configuration.”)

3.1.7.3. DHCP

If the DHCP (Dynamic Host Configuration Protocol) is enabled, the IP address, subnet mask, and default gateway are obtained from the network. When obtaining the address information in DHCP, ARP/Ping is disabled.

Check whether the DHCP server is installed in the LAN.

DHCP is enabled in the factory settings. If returning the setting from a static address to DHCP, make a change by initializing the network settings or with TELNET and HTTP (Web Configuration).

(-> See “3.1.9.TELNET server” and “3.1.8. Web Configuration.”)

- DHCP Request differs according to the DHCP Timeout setting. (-> See “4.2.7.Special function setting mode.”)

DHCP Timeout = ON : Occurs 3 times between TCP/IP start-up to 20 seconds afterwards.

DHCP Timeout = OFF : Occurs infinite times until the address information is obtained.

- The address obtained using DHCP is erased when the power is turned OFF.

3.1.7.4. ARP/Ping

A temporary IP address by ARP/Ping can be set by registering a combination of the IP address and MAC address of the printer to the ARP (Address Resolution Protocol) table on the host device and transmitting a ping.

The temporary IP address set by the ARP/Ping is possible to receive when the fixed IP address is not specified and the IP address is not obtained by DHCP. The address can be acquired by ARP/Ping only once.

- Subnet mask and default gateway cannot be specified for ARP/Ping.
- Address obtained by ARP/Ping disappears when the power is turned OFF.

Refer to “11.1 Example of ARP/Ping execution” for execution examples.

3.1.8. Web Configuration

This product is equipped with an HTTP (Hyper Text Transfer Protocol) server which allows you to change network settings, display network information, monitor the printer status, etc. by accessing a browser.

The HTTP server uses the TCP-UDP communication port 80.

- The HTTP version is of the HTTP 1.1 specifications.

- Up to 2 devices can be connected at the same time.

If three or more devices need to access the site, attempt connection (reload) 5 seconds after the previous two devices completes reading.

- Enable "JavaScript" in the web browser settings.

- User website [login not required]: <http://IP Address/index.htm>

Example) <http://192.168.10.1/index.htm>

- Administrator website [login required]: <http://IP Address/html/main.htm>

Example) <http://192.168.10.1/html/main.htm>

- Check and change of network settings and password settings [login required]

By specifying set print execution when settings are written, it is possible to confirm whether the contents have been written correctly to nonvolatile memory. In addition, if the writing is successful, a printer reset is automatically performed.

- Displaying network information [login not required]

- Displaying printer information [login not required]

The printer status display is updated automatically at the set refresh time.

- The HTTP server is enabled only when TCP#80: "Enable" is set.

Accounts (Usernames and passwords) accessible from the web browser are as shown below.

Items that can be checked and set differ depending on the account.

Account	Username	Password	Target
User	Login not required		General user (Information display only)
Root user	"root"	"public" - ASCII characters between 1 to 31 characters (changeable)	System administrator (Information display and writing)

The following web browser versions have been checked and are supported.

- Windows11 : Chrome 116, Microsoft Edge 116, Firefox 117
- macOS 13 Ventura : Safari 16.6
- iOS 16.6.1 : Safari 16.6
- Android 13 : Chrome 116

Refer to "11.3.1. Web Configuration" for supported cypher suite when using HTTPS.

3.1.9. TELNET server

3.1.9.1. Specification

The TELNET (TELEcommunication NETwork) of this product allows you to change network settings such as IP parameters or passwords in an interactive menu format, or display network information or the printer status.

The Username of each login account, password and access privileges are as shown in the following chart.

Account	Username (fixed)	Password	Target
User	"user"	"guest" (factory setting) - ASCII characters between 1 to 31 characters	Common user (Read-out Rights)
Root	"root"	"public" (factory setting) - ASCII characters between 1 to 31 characters	System administrator (Read-out/Writing)

- By specifying set print execution when settings are written, it is possible to confirm whether the contents have been written correctly to nonvolatile memory. In addition, if the writing is successful, a printer reset is automatically performed.
- Possible to be executed with a host device with a dedicated software (Windows) or by entering commands in an interactive menu format.

3.1.9.2. IP address setting

The input range for a fixed address and DHCP is shown in the following table.

Category	Setting item	Input range	Default value (Factory setting)
Static address (Static)	IP Address	0.0.0.0 to 255.255.255.255	0.0.0.0
	Subnet Mask	0.0.0.0 to 255.255.255.255	0.0.0.0
	Default Gateway	0.0.0.0 to 255.255.255.255	0.0.0.0
Dynamic address	DHCP	ENABLE / DISABLE	ENABLE

<Note> If you set a fixed address, it will automatically be "DHCP: DISABLE".

When set to "DHCP: ENABLE" all the fixed address fields will automatically become 0.0.0.0.

3.1.9.3. Password setting

The password input range is shown in the following table.

Setting item	Input range	Default value (Factory setting)
"user" Login Password (*1)	- 1 to 31 characters - ASCII characters (Upper case/Lower case)	"guest"
"root" Login Password	- 1 to 31 ASCII characters - ASCII characters (Upper case/Lower case)	"public"

*1) The "user" Login Password will be displayed if it is the default value ("guest") but if it is changed from the default, it will be hidden and displayed as (*****).

3.1.9.4. Raw Socket Print setting

The Raw Socket maximum input range of the number of connected session is shown in the following table.

Setting item	Input range	Default value (Factory setting)
9100 Multi Session	ENABLE / DISABLE	DISEABLE

3.1.9.5. Disconnect warning print setting

The input range is shown in the following table.

Setting item	Input range	Default value (Factory setting)
Disconnect Message	ENABLE / DISABLE	DISEABLE

3.1.9.6. Status display, etc.

Status display is possible for the following items.

- (1) Display firmware version
Displays the version number of the main program and boot program.
- (2) Display current IP parameters / status
Displays IP parameters in operation.
The protocol used to retrieve the address is displayed inside the parenthesis of the IP address.
- (3) Display printer device ID
Displays the device ID of the printer. Format conforms to IEEE1284.
- (4) Display printer status
Displays the printer status in hexadecimal dump format.

3.1.10. Print disconnect warning

If any of the following network errors are detected, the printer will automatically print a warning.

- (1) Link down [Physically disconnected]
* See "4.4 LED indicator and errors."
A warning is printed when a link-down state [physically disconnected] has continued for 4 seconds.
- (2) Link down [IP address not obtained]
* See "4.4 LED indicator and errors."
A warning is printed when a link-down state [IP address not obtained] has been detected.
However, if DHCP is enabled, when the IP address is waiting acquisition (state is not a time-out), warning printing is not performed.

This function can be enabled/disabled by TELNET and HTTP (Web Configuration).

It is disabled in the factory setting.

(-> See "3.1.9. TELNET server" and "3.1.8. Web Configuration.")

In addition, the setting status can be confirmed with test printing (self-print).

Print sample



3.1.11. SSL/TLS communication

3.1.11.1. General description

This product can encrypt HTTPS and AMQPS communication using SSL (Socket Security Layer) or TLS (Transport Layer Security).

3.1.11.2. Specifications for during server operation

The services in which the printer operates as a SSL/TLS server are the following.

- Web Configuration

3.1.11.2.1. Specification

<Communication specifications>

SSL/TLS version	: TLS1.2 (SSL3.3)
Application protocol	: HTTPS (Server Authentication)(*1)
TCP communication port No.	: 443
Certificate	: Self-signed certificate or CA-signed certificate
Encryption algorithm	: AES 128/256, RC4, 3DES
Hash algorithm	: SHA-256, SHA-1, MD5

(*1) See "11.3.1. Web Configuration" for the supported cypher suite.

Regarding the certificate required to authenticate with the client's device, it is necessary to register either a self-signed certificate or a CA-signed certificate.

The basic settings (certificate selection, with/without certificate registration) may be checked by test printing. SSL/TLS communication is enabled when TCP#443: "Enable" is set and any of the above certificates is registered.

3.1.11.2.2. Self-signed certificates

Creates and signs a server certificate on the web settings screen of the printer unit.

The input items on the "Self-Signed Certificate" screen of the web settings are shown in the following table.

Input items when creating a certificate

Variable name	Max length of string	[Example]	Default value
Country Name (2 letter code)	2	<i>JP</i>	(Blank)
State or Province Name	128	<i>Shizuoka city</i>	(Blank)
Locally Name (e.g. city)	128	<i>Suruga-ku, Nakayoshida</i>	(Blank)
Organization Name (e.g. company)	128	<i>Star Micronics Co., Ltd.</i>	(Blank)
Domain (IP Address)	128	<i>192.168.1.175</i>	(Blank)
Expiration Date (e.g. YYYY/MM/DD)	2018.01.01 to 2049.12.31	<i>2020/12/31</i>	(Blank)

- To register a certificate in the web browser, click [Create Self-Signed Certificate] and then click [Download].
- Once the certificate has been registered, it cannot be deleted by initializing the network settings.
To delete a certificate file, click [Delete] after clicking [Create Self-Signed Certificate].
- Enter the expiration date of the certificate in the "Expiration Date" field.
The expiration date may be specified up to "2064.12.31." However, the web browser will misinterpret the expiration date as 1950 or later, and cause an error when specifying a date from 2050 or later. Consequently the maximum date is fixed at "2049.12.31."
For your information, the effective date is fixed at "2023.01.01." and the time is fixed at 00:00:00 (GMT) for both the start date and the end date.
- The minimum required items for creating a certificate are the "Domain" and "Expiration", but we recommend you input information for all items.
- For Domain, enter the IP address of the printer. Subject Alt Name (SAN) item is also generated based on the input value. See in the appendix "11.2 Example procedures for registration of SSL/TLS **certificates**" for procedure for creating and signing a self-signed certificate.

3.1.11.2.3. CA signed certificates

You can import a server certificate created externally and signed by CA (Certification Authority) and a private key to the printer NIC. The server certificate signed by the CA (Certification Authority) and private key can be imported to the printer and used.

<Server certificate specification>

- Encoding type : Base64 (file extension = PEM)
- Types of the certificate file : PKCS #1
- Key length : RSA 2048 bit or 1024 bit
- Register the CA (Certification Authority) above as a "Trusted Root Certification Authorities" in the web browser.
- To delete the certificate registered to the NIC, click [Delete] after selecting [Import CA-Signed Certificate]. However, the [Delete] button is disabled unless both a CA-signed certificate and a CA-signed private key are registered.
- Once the certificate has been registered, it cannot be deleted by initializing the network. To delete the certificate file, click [Import CA-Signed Certificate] and then click [Delete] on the SSL/TLS settings screen.
An example procedure for importing a CA-signed certificate to NIC is indicated in "11.2. Example procedures for registration of SSL/TLS certificates" in appendix.

3.1.11.3. Specifications for client

The services in which the printer operates as a SSL/TLS client are the following.

- Star CloudPRNT
- Star Micronics Cloud Services

3.1.11.3.1. Specifications

<Communication specifications>

SSL/TLS version	: TLS1.2, TLS1.3
Application protocol	: HTTPS, AMQPS (*1) , MQTTS(*1, *2)
TCP communication port number	: 443, 5671, 8883
Certificates	: Preinstalled CA certificate or custom CA certificate
Encryption algorithm	: AES 128/256 (GCM, CBC), ChaCha20 (Poly1305), RC4, 3DES
Hash algorithm	: SHA-256, SHA-1, MD5

*1) See “11.3.1 Star CloudPRNT” for supported cypher suits.

*2) MQTTS is supported by F/W Ver. 5.1 and later.

Convenient function

3.1.12. Star Micronics Cloud Service

If you connect the printer to Star Micronics Cloud Services, helpful cloud services for operating your store are available for free.

<Services for stores>

- Device Monitor : You can check the printer status and the number of receipts in the graph.
- Digital Journal : You can check the digitized receipt data in the cloud at any time.
- PromoPRNT : You can configure the setting for issuing paper coupons and manage the schedule in the cloud.

<Services for developers>

- Device Manager API : The printer status and receipt printing data can be acquired by webAPI.
Also, printer settings can be remotely configured using webAPI.
- Star Quick Setup Utility Customizer : The Star Quick Setup Utility display items can be customized.
- Star Document Markup Designer : The printing data of Star Document Markup can be created by GUI.

A wide range of other services will be also available. For details, please access the following website.

Star Micronics Cloud Services (www.starmicronicscloud.com)

3.1.13. Star CloudPRNT function

3.1.13.1. General description

Star CloudPRNT is a protocol that enables printing to a printer and peripheral device control from a back-end service on a remote server. Two communications protocols are available: Version HTTP and Version MQTT.

For details about the server specifications, refer to “[Star CloudPRNT Protocol Guide](#)”

Version MQTT is supported by F/W Ver. 5.1 and later.

<CloudPRNT Communication Protocol Version HTTP>

The Star CloudPRNT function can perform print control (printing, etc.) by polling via a network between a remote server (*1) and this product.

This product performs polling to the remote server for the printer information (status, printer identifier, etc.) and the remote server notifies this product of that the data has been prepared on the remote server in the response to the polling. At that time, this product acquires the printing data from the remote server and can print the data.

<CloudPRNT Communication Protocol Version MQTT>

Using not only the HTTP protocol but also the MQTT protocol for communications between a remote server (*) and the device can reduce the communications delay and allow faster printer control.

Version MQTT provides the following two methods.

- Trigger POST
- Full MQTT/Pass URL

*1) Communication with the product must be installed on the remote server based on the Star CloudPRNT specifications.

3.1.13.2. Specifications

<Communication specifications>

TCP/IP version	: TCP/IP v4
Communication protocol	: HTTP/HTTPS (Version HTTP)、HTTP/HTTPS/MQTT/MQTTS (Version MQTT)
Communication data format	: Compatible with REST/JSON format
Communication session start	: Started from the product side.

With Version MQTT, a server setting information retrieval request (GET) is issued when the printer starts, and the protocol to operate is decided based on the GET response.

[When not printing (*1)]

- Version HTTP/Trigger POST

Printer information is sent to the server by POST request.

- Full MQTT/Pass URL

Printer information is sent to the server by MQTT Publish.

[When printing]

- Version HTTP/Trigger POST/Pass URL

Printing data is acquired from the server by GET request.

- Full MQTT

Printing data is acquired from the server by MQTT Subscribe.

Communication session end : Ended from the server side.

[When not printing (*1)]

When there is data on the server, print job notification, non-printing control commands, and other information is sent to the printer.

[When printing]

The printing data on the server is sent to the printer.

*1) Control other than status notification and printing

With Version HTTP, this communication session performs continual polling at the specified polling cycle.

<Request/response specifications between server and printer>

For details of the process flow between the server and printer, the HTTP request/response specifications, and detailed specifications of MQTT topics/messages, refer to the Protocol Guide.

- Version HTTP process flow

https://star-m.jp/products/s_print/sdk/StarCloudPRNT/manual/en/protocol-guide.html#uklink02

- Trigger POST process flow

https://star-m.jp/products/s_print/sdk/StarCloudPRNT/manual/en/protocol-guide.html#uklink04

- Full MQTT/Pass URL process flow

https://star-m.jp/products/s_print/sdk/StarCloudPRNT/manual/en/protocol-guide.html#uklink05

- Version HTTP request/response specifications

https://star-m.jp/products/s_print/sdk/StarCloudPRNT/manual/en/protocol-reference/http-method-reference/index.html

- Version MQTT topic/message specifications

https://star-m.jp/products/s_print/sdk/StarCloudPRNT/manual/en/protocol-reference/mqtt-method-reference/index.html

<Web Configuration UI setting specifications>

The screenshot displays the 'mC-Print3 Network Utility' web interface. On the left is a navigation menu with sections: Home, Network Configuration (containing links to IP Parameters, System Configuration, Change Password, Star Micronics Cloud, CloudPRNT, SSL/TLS, Miscellaneous, Save, and Set Default), Display Status (containing Device Status), System Access (containing Logout), and Manual (containing Online Manual). The 'CloudPRNT' option is highlighted. The main content area is titled 'CloudPRNT' and contains the following settings:

- CloudPRNT Service:** A dropdown menu currently set to 'DISABLE'.
- Server URL:** An empty text input field.
- Polling time (Sec.):** A text input field containing the value '5'.
- HTTP Response Timeout (Sec.):** A dropdown menu currently set to '60'.
- User Name:** An empty text input field.
- Password:** An empty text input field.

Below these fields are two buttons: 'submit' (in blue) and 'cancel' (in grey). Below the CloudPRNT section is another section titled 'TLS Client Settings' with the following options:

- TLS trust level:** Three radio button options: 'Use trusted CA-Certificate list' (selected), 'Use custom CA-Certificate set', and 'Accept all (Warning - not secure!)'.
- NTP Server:** Two radio button options: 'Use Star NTP service' (selected) and 'Use custom NTP server'.
- TLS1.2 Cipher Suites Encryption Level:** A dropdown menu currently set to 'HIGH + MEDIUM'.
- TLS1.3:** A dropdown menu currently set to 'ENABLE'.

At the bottom of the TLS Client Settings section are two buttons: 'submit' (in blue) and 'cancel' (in grey). The footer of the page contains the text: 'mC-Print3 Network Utility. Copyright(C) 2018 Star Micronics co., Ltd. All Rights Reserved.'

- Items set from the CloudPRNT menu of the product Web Configuration UI.
 - CloudPRNT Service : Enables/disables the service. Factory default setting = Disabled
 - Server URL : Enter the server URL as “http://....” etc.
 With Version MQTT, a server setting information retrieval request (GET) is issued based on this URL in order to decide the operation protocol.
 - Polling time : Enter the polling interval (second). Factory default setting = 5 sec
 - HTTP Response Timeout : Timeout time (seconds) when no response is returned from the server such as during polling or acquisition of data. “10, 20, 30, 40, 50 or 60” can be selected. Factory default setting = 60 sec
 - Use Name/Password : Register the cloud server security information if needed. (option)

- TLS trust level : Set the certificate (PEM format) according to the server-side specifications when conducting secure communication with the server.
When "Use custom CA-certificate set" is selected, the server certificate is also used in the trusted CA-certificate list (F/W Ver. 5.1 and later).
- NTP Server : Sets the NTP server used for time information inquiries. The StarNTP service (0.pool.ntp.org) is selected as the factory default setting. As necessary, enter the URL of the user's own NTP server.
- TLS1.2 Cypher Suites Encryption Level :
Sets the encryption level of TLS1.2 encryption suite. HIGH + MEDIUM or MEDIUM can be selected. Refer to "11.3.2. Star CloudPRNT" for encryption suites corresponding to each setting. Factory default setting = HIGH + MEDIUM
- TLS1.3 : Sets whether TLS1.3 is enabled or disabled. Refer to "11.3.2. Star CloudPRNT" for the encryption suites corresponding to enabled TLS1.3.
Factory default setting = Enabled.

3.2. USB interface

3.2.1. USB-C port

- (1) Communication standard : USB2.0 Full-speed Device/Host
- (2) Power supply : USB PD (maximum 20 W), USB-C Current (maximum 15 W)
USB BC 1.2 CDP (maximum 7.5 W), iAP2 (maximum 15 W)
- (3) Device classes : Printer classes, CDC-ECM, RNDIS
- (4) Supported protocol : AOA/iAP2/SteadyLAN
- (5) Connector : USB-C

Use a cable suitable for the terminal you use for connection with a device.

Refer to “3.2.1.4USB-C function setting” for details of cables.

In addition, be sure to fully verify operation with the actual device before beginning actual use.

3.2.1.1. Using an iOS device

With an iOS device, it is possible to perform charging of the device while communicating.

When USB communication is not required and the printer is used only for charging a device, set the USB-C function to power supply only mode.

For details, refer to “3.2.1.4USB-C function setting.”

3.2.1.2. Using an Android device

With an Android device, it is possible to charge devices while communicating regardless of the support for PD. Android OS version 9 and later are supported.

When connecting an Android device to the USB-C port for the purpose of communication, start the Android device, connect the device to the printer using the USB cable, and then turn ON the printer.

If communication or power supply does not operate, operation may become possible if you disconnect and reconnect the cable.

3.2.1.3. Using a Windows/macOS device

- Using a device equipped with a USB-A port

Prepare the USB cable (C-A). Communication with the device is possible.

- Using a device equipped only with a USB-C port

Prepare the USB cable (C-C).

If the USB-C port supports charging by USB PD, it is possible to perform charging of the device while communicating.

If communication is not possible, communication with the device can be made possible by changing the USB-C function setting to “Data only.”

For details, refer to “3.2.1.4. USB-C function setting.”

3.2.1.4. USB-C function setting

The USB-C port of this product automatically identifies the connected terminal to make communication available. If this product does not perform the operation you expect, the operation of the USB-C port can be switched by the USB-C function setting.

Details are as shown in the following table.

Details of USB-C function setting

USB-C function setting	Description
Power supply + communication (default)	This setting performs both power supply to the device and communication with the device. With this setting, power supply and communication with the following devices are possible. - iPad - iPhone - Android - Windows/macOS (USB-C port that supports charging by USB PD) With this setting, communication with the following devices is possible. - Windows/macOS (USB-A port)
Data only	This setting performs communication with some devices. Power supply to the device is not possible. Use this setting when communication with a higher-level device is not possible with the power supply + communication setting. With this setting, communication with the following devices is possible. - Windows (USB-C port that does not support charging by USB PD)
Power supply only	This setting performs only power supply to the device. Communication with the device is not possible. Apply this setting when USB communication is not required and the printer is used only for charging.

To change the setting, use Star Quick Setup Utility, USB-C function switching mode, memory switch.

Whether or not power supply to the device is possible and whether or not communication with the device is possible according to the combination of device information, cable used, and printer USB-C function setting (power supply + communication mode, data only mode) are as shown below.

Be sure to fully verify operation with the actual device before beginning actual use.

Operation availability according to combination

Device information		Cable	Printer information		Operation	
Type	Connector		Connector	USB-C function setting	Power supply	Communication
iPad iPhone	USB-C	USB-C – USB-C (*1)	USB-C	Power supply + communication (default)	✓	✓
				Data only	-	-
	Lightning	Lightning – USB-C (*2)		Power supply + communication (default)	✓	✓
				Data only	-	-
Android	USB-C	USB-C – USB-C (*1)		Power supply + communication (default)	✓	✓
				Data only	-	✓
	USB Micro-B	USB Micro-B – USB-C (*3)		Power supply + communication (default)	✓	✓
				Data only	-	-
Windows /macOS	USB-A	USB-A – USB-C (*3)		Power supply + communication (default)	-	✓
				Data only	-	✓
	USB-C Charging (USB PD) supported	USB-C – USB-C (*1)		Power supply + communication (default)	✓	✓
				Data only	-	✓
	USB-C Charging (USB PD) not supported	USB-C – USB-C (*1)		Power supply + communication (default)	-	-
				Data only	-	✓

*1) Cable with a maximum length of 2 m that conforms to the USB2.0 standard and supports 3.0 A or higher

*2) Apple genuine cable or MFi certified cable with a maximum length of 2 m

*3) Cable with a maximum length of 2 m that conforms to the USB2.0 standard

3.2.2. USB-A port

- (1) Communication standard : USB2.0 Full-speed Host
- (2) Power supply : Maximum 2.5 W
- (3) Connector : USB-A

When one of the following devices is connected, it performs communication as the USB host and supplies 5 V/0.5 A at the maximum.

- Customer display (SCD222U)
- Barcode reader (BCR-POP1)
- HID device (keyboard interface)
- USB memory device
- USB HUB

Communication is not possible with USB devices other than above, but power of up to 5 V/0.5 A is supplied.

**<Note> If communication with connected devices is impossible, it will be indicated by the LED.
See “4.4 LED indicator and errors”.**

3.2.3. Commercially available for use

The following is a commercially available USB device that has been tested and can be connected to the USB-A port.

- Barcode reader
BSH-20U, BSH-20B, BSD-40U, BSH-32U, BSH-32B

<Note>

- 1) Contact distributors for available models for purchase.**
- 2) Only one barcode reader can be connected (either the barcode reader listed above or the optional dedicated barcode reader (BCR-POP1)).**

- HID device
Target: HID device with USB keyboard interface

<Note>

- 1) Simultaneous use with barcode reader is not possible.**
- 2) The operation of all commercially available HID devices is not guaranteed. Be sure to fully verify operation with the actual device before beginning actual use.**

● USB memory device

<Specifications of USB memory devices that can be connected>

File system	: FAT12/16/32
Device class	: Mass Storage
Devices subclass	: SCSI transparent command set
Device protocol	: Bulk-Only Transport

<Application>

Rewrite the F/W of the printer by saving the JSON file in which the Star Configuration is described and the printer F/W data in the USB memory device.

<Note>

- 1) **Even when the USB flash drive satisfies the above specifications, it may not be possible to use the device when an extension cable is used, or for other reason such as compatibility with the printer USB host. In such a case, use another USB flash drive.**
- 2) **For details about the Star Configuration Format and the F/W rewrite procedure, refer to the download site provided in “7. Firmware Update.”**

● USB HUB

Intended for: USB hub with USB-A plug

<Note>

- 1) **The operation of all commercially available USB hubs is not guaranteed. Be sure to fully verify operation with the actual device before beginning actual use. A list of USB hubs where operation was tested is shown below.**
- 2) **Only one USB hub can be connected to the printer.**
- 3) **The devices which can be connected to a USB hub are the following.**
 - 1 barcode reader or commercially available HID device
 - Optional customer display SCD222U
 - Commercially available USB memory
- 4) **A host terminal cannot be connected to the USB hub and used.**
- 5) **The performance and quality of the USB hub are determined by the standards of the USB hub manufacturer.**
- 6) **When the USB hub receives power supply from the printer, ensure that the hub power consumption is 5 V/0.5 A or less (total of the hub and USB devices connected to the hub). If the power consumption deviates from the specification, there may be interference with printer operation.**

3.3. Bluetooth interface (Bluetooth-supported models only)

3.3.1. Wireless communication unit

Bluetooth specifications	: Bluetooth V5.0 (BR/EDR-supported), class 2
Carrier frequency bandwidth	: 2,402 MHz to 2,480 MHz
Supported profile	: SSP
Security	: SSP
iOS accessory protocol	: iAP2

<Note>

- 1) If the Bluetooth module of this product being used is V2.0 or earlier, a PIN Code is required to connect via Bluetooth to this unit. The PIN Code for this is "1234."
- 2) The printer has been confirmed to operate under the following conditions.
 - Distance from the host device is five meters.However, there should be no obstacles between the host device and printer and their surrounding areas that interfere with communication.
In addition, since the communication distance varies depending on the surrounding reception environment, obstacles, installation environment, etc., an evaluation should be thoroughly performed at the time of setup.
- 3) Interference distance 10 m
- 4) Low Energy (LE) is not supported

3.3.2. Bluetooth settings

Setting item	Initial Value
Device name (*1)	mC-Print3 - "5-digit identification number unique to each product"
iOS port name	mC-Print3
New pairing permission	Valid
Auto Connection	Valid (iOS auto detection)

The above settings can be checked from the test printing results and can be changed by using the Star Quick Setup Utility.

(*1) Device name

Holds a Bluetooth device ID consisting of maximum 16 digits as a unique identification code specifically (mC-Print3 "unique five-digit identification number") on the inside of the printer.

3.3.3. Confirm Bluetooth settings

The Bluetooth settings can be checked by test printing (self-printing).

For details, see “4.2.2 Test print mode (Self-print mode)”.

Test printing sample



You can scan the QR code with Star Quick Setup Utility to pair the printer with a device or select the printer to connect to.

3.3.4. Function to prevent unauthorized Bluetooth connections

This product, as a function to prevent unauthorized access from a tablet or PC that is not connected, has a function to prohibit Bluetooth connections from devices other than those where a Bluetooth connection has already been established. For security purposes, after a Bluetooth connection has been established for the devices to be used, it is recommended that you open Star Quick Setup Utility and disable the setting for “New Pairing Permission”. The factory default setting is set to “Valid”.

If the “New Pairing Permission” setting is “Valid” : No limit with the Bluetooth connection

If the “New Pairing Permission” setting is “Invalid” : No new Bluetooth connection is allowed

“New Pairing Permission”: Notes when “Invalid” is chosen

When the following cases occur when “New Pairing Permission: Invalid” is set, Bluetooth connection needs to be initialized. After initialization is carried out and this product is connected via Bluetooth, it is recommended to disable “New Pairing Permission” again for enhanced security.

- If changing the tablet or PC with the Bluetooth connection because of loss or malfunction
- If a Bluetooth connection information to this product is deleted from the Bluetooth settings of the tablet or PC

See “4.3.1 Initializing the Bluetooth, Network settings” for the initialization procedure.

3.3.5. Auto Connection function (iOS only)

This product is equipped with the Auto Connection function because it is always used in a 1-to-1 connection with an iPad or other iOS device. When the Auto Connection function is used because this product connects automatically to the iOS device most recently connected when the connection was interrupted, it is not necessary to attempt connection again manually.

If the device you connected to last time is not iOS, the behavior is the same as that of Auto Connection OFF.

	Auto Connection : ON (Default)	Auto Connection : OFF
Reconnection with upper level terminal (device)	1) After the power is turned ON for this product, it attempts to automatically connect to the most recently connected iOS device. 2) If step 1) fails, wait for a connection from another device. 3) If not connected in step 2), return to step 1).	Wait for the connection from the upper level terminal (device) after the printer is turned ON. Select the device name of this product from the Bluetooth settings screen of the upper level terminal.
Changes to the upper level terminal (device)	Turn the Bluetooth function of the upper level terminal (device) which has the automatic connection destination set to OFF and select the device name of the printer that needs change in the Bluetooth settings on the screen of the upper level terminal (device).	After the power is turned ON for this unit, select the device name of the printer from the Bluetooth settings screen of the upper level terminal (device).
Application Example	The printer is used on a one-to-one basis with the upper level terminal (device).	The printer is used with multiple upper level terminals (devices).

Auto Connection can be switched ON and OFF by operating this product or using Star Quick Setup Utility.

3.3.6. Notes on Bluetooth Interface

Waiting time until the start of the communication : Recommended 100 msec or longer

After connection to the upper level terminal (device), as post-processing was performed in the Bluetooth module, it is recommended that a waiting time of 100 msec or more should be applied between port open and the start of sending data for the application. Note that the above value changes according to the developmental environment of the application and operating environment (upper level terminal (device) type and usage environment), therefore it is necessary to conduct sufficient operational tests in advance, and determine a waiting time.

Waiting time until reconnection : Recommended 500 msec or longer

After disconnection from the upper level terminal (port close), post-processing is performed in the Bluetooth module. Therefore, it is recommended that a waiting time of 500 msec or longer should be applied before reconnection starts (before the next time the port opens after it is closed) for the application. Note that the above value changes according to the developmental environment of the application and operating environment (upper level terminal (device) type and usage environment), therefore it is necessary to conduct sufficient operational tests in advance, and determine a waiting time.

Disconnection timing

Even if data transfer from the application of upper level terminal (device) is already completed, data may remain in the printer internal buffer. When the port is closed, the data left in the buffer may be discarded. When printing or disconnecting wireless connection, check the status and ensure that the transmitted data has been printed.

Consider retries on upper level terminal

We recommend a retry implementation on the upper level terminal, considering the risk of connection failure due to wireless communications. Perform appropriate operation tests in advance because the waiting time depends on the execution environment (the type of upper level terminal (device) and the usage environment).

Notes when using the Bluetooth USB Adapter

Always check the applicable specifications and verify the printer operation carefully.

Notes if you have made changes in Bluetooth settings, or had it reset

To reflect the changed contents to the upper level terminal (device), delete the Bluetooth connection information for the upper level terminal (device) and restart the associated application or system. After restarting, connect via Bluetooth again.

3.4. Printing with multiple interfaces

This printer supports printing using multiple interfaces, and the interfaces can be dynamically switched during use without turning the printer power off/on or disconnecting and reconnecting the interface cable.

There is 1 receiving buffer for commands and printing data, and the interface of the data which was received first occupies the receiving buffer. When the receiving buffer is kept empty for a certain length of time, the receiving buffer can be released to change the interface. You can change the interface switching wait time by using Star Quick Setup Utility or memory switch.

For details, see "9.2 Software", "8.11 MSWE".

<Restrictions>

1) Simultaneous use of USB-C and Bluetooth by iOS

When the iOS device already connected via Bluetooth is connected to the USB-C of this product, Bluetooth connection will be cut and the connection destination is automatically changed to the USB-C. Then, when the connection to the USB-C is cut, the Auto Connection Function automatically establishes Bluetooth connection and the connection destination is automatically changed to Bluetooth.

2) Loss of printing data and connection release due to Bluetooth communication of iOS

When iOS communicates via Bluetooth, failures such as loss of printing data and interruption of communication may occur under any of the following conditions.

- The iOS device has sent data of 8 KB or larger via Bluetooth while another interface occupies receiving buffer.
- The iOS device has sent data of 72 KB or larger via Bluetooth while this product is offline (printing cannot be performed due to no paper error etc.).

In order to avoid the above failure, be sure to check that this product is in the online state (there is no error and printing can be performed) before sending printing data.

<Action with our software>

If you use StarPRNT SDK, carefully check that printing is completed using beginCheckedBlock/endCheckedBlock in order to send the printing data after confirming that the printer is in the online state.

This action with our software is required only for StarPRNT SDK.

When communication is disconnected with the Auto Connection Function of the printer set to ON, turn the printer OFF once, then turn it ON again; Bluetooth connection is recovered.

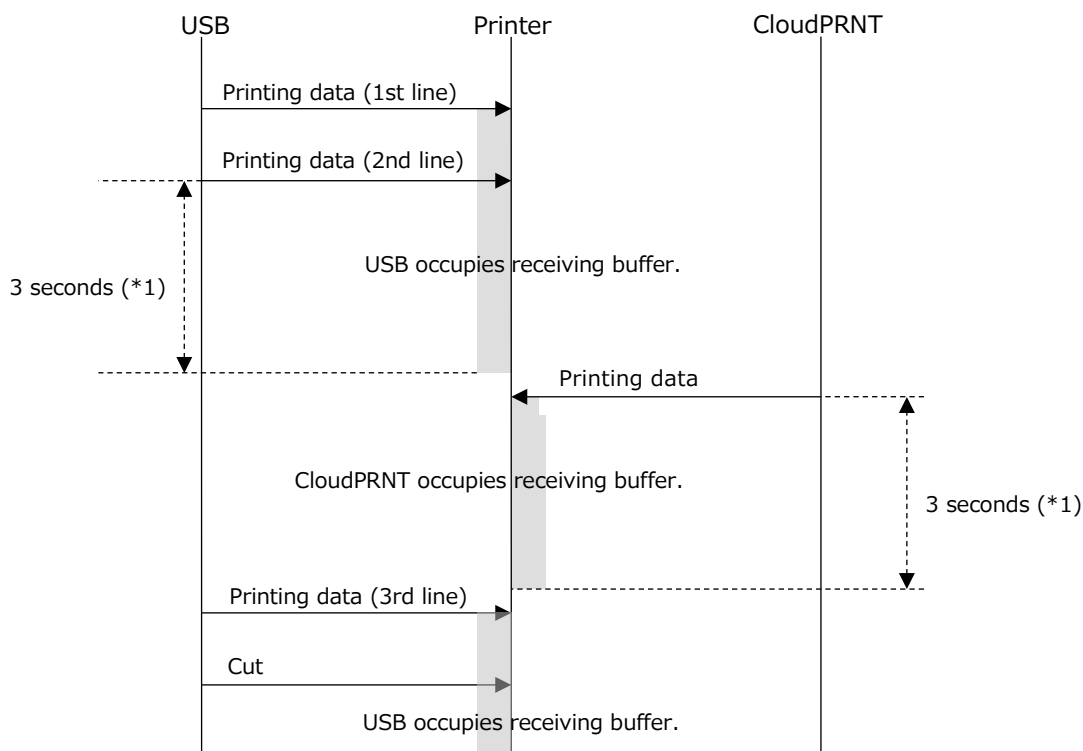
When the Auto Connection Function is set to OFF, perform Bluetooth pairing again.

3) Mixing of printing data

When using multiple interfaces in parallel and the data transmission interval is equal to or longer than the interface switching wait time, then data may become mixed.

For example, when sharing a single printer with USB and CloudPRNT, and as shown in the figure below the transmission interval for USB printing data (2nd line) and printing data (3rd line) is 3 seconds (*) or more, then mixing of the CloudPRNT printing data occurs.

Example) Cases when data mixing occurs with USB and CloudPRNT



*1) When the interface switching wait time is default (3 seconds), data mixing can be prevented by paying attention to the following.

When sending printing data from the application to the printer, send one entire document all at once without a transmission interval within the document.

When the transmission interval within a document is 3 seconds or more, set a longer interface switching wait time.

3.5. SteadyLAN

SteadyLAN overview

By connecting a Windows, Android (terminal supporting USB PD only) or iOS device to the printer connected to the network, the terminal can use the Internet without requiring Wi-Fi connection. At the same time, the device can communicate with the printer via USB communication or LAN communication, and is also charged from the printer.

This simplifies wiring. Also, since all parts of the solution are wired, more stable network connections are possible.

- This can be switched between enabled and disabled using commands and Star Quick Setup Utility. The default is disabled.
- The terminal Ethernet MAC address is assigned by the printer when the USB-C cable is connected. The assigned MAC address can be checked by self-printing mode of the printer. For details, see “4.2.2 Test print mode (Self-print mode)”.
- iOS 10.1.1 and later, Android 9 and later, and Windows10 and later are supported.
- It is necessary to Install the printer driver for use in Windows.

This printer supports the following operating modes.

Operating mode	iOS	Android	Windows
SteadyLAN for iOS	Possible	Possible	Possible
SteadyLAN for Android	Possible	Possible	Possible
SteadyLAN for Windows	Possible	Possible	Possible
SteadyLAN for all OS	Possible	Possible	Possible

iOS, Android and Windows are supported in all operating modes because the printer automatically recognizes the OS of the connected terminal.

SteadyLAN for iOS/for Android/for Windows is the setting to maintain the compatibility with mC-Print3 first generation.

List of devices where operation was tested

Product Model	OS version
iPad Pro 11-inch (4th generation)	iPadOS 16.5.1
iPad Air (5th generation)	iPadOS 16.5.1
iPad (10th generation)	iPadOS 16.5.1
iPad (9th generation)	iPadOS 15.7
iPhone 14	iOS 16.5.1
Google Pixel 4	Android 10
Google Pixel 7	Android 13
Samsung Galaxy Tab S8+	Android 13
Pixel Tablet	Android 13
Microsoft Surface Go 3	Windows 11
Microsoft Surface Pro 9	Windows 11

[Precautions]

- When SteadyLAN is enabled, the communication speed is approximately 1 Mbps and may be slower than the wireless LAN.
- It is recommended that the terminal Wi-Fi setting be turned OFF.
- After the SteadyLAN setting is changed and then a Windows terminal is connected to USB, a new printer queue is created and the printer queue is changed. In this case, delete the original printer queue.
- Depending on the type of the device, when using the SteadyLAN function in a closed network environment (environment not connected to the Internet), if the device power is turned OFF and then turned ON while the device is connected to the printer, network communication may not be possible or the device may not start.

If this occurs, try disconnecting and reconnecting the USB cable that connects the printer and device.

3.6. Connector to drive external device

This printer is equipped with a drive circuit to drive external devices (such as an optional cash drawer or an external buzzer).

The connector for driving an external device (6P modular jack connector) is mounted on the output side of the drive circuit.

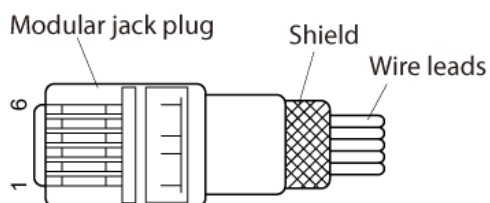
Connect the cable to this connector when using the drive circuit.

Please prepare a cable by yourself. The recommended cable specifications are as follows.

[Recommended cables]

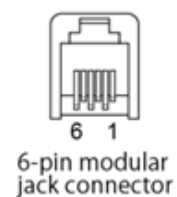
RJ12 plug (6P6C)

Pin No. 1 (frame ground) shall be a shield wire.

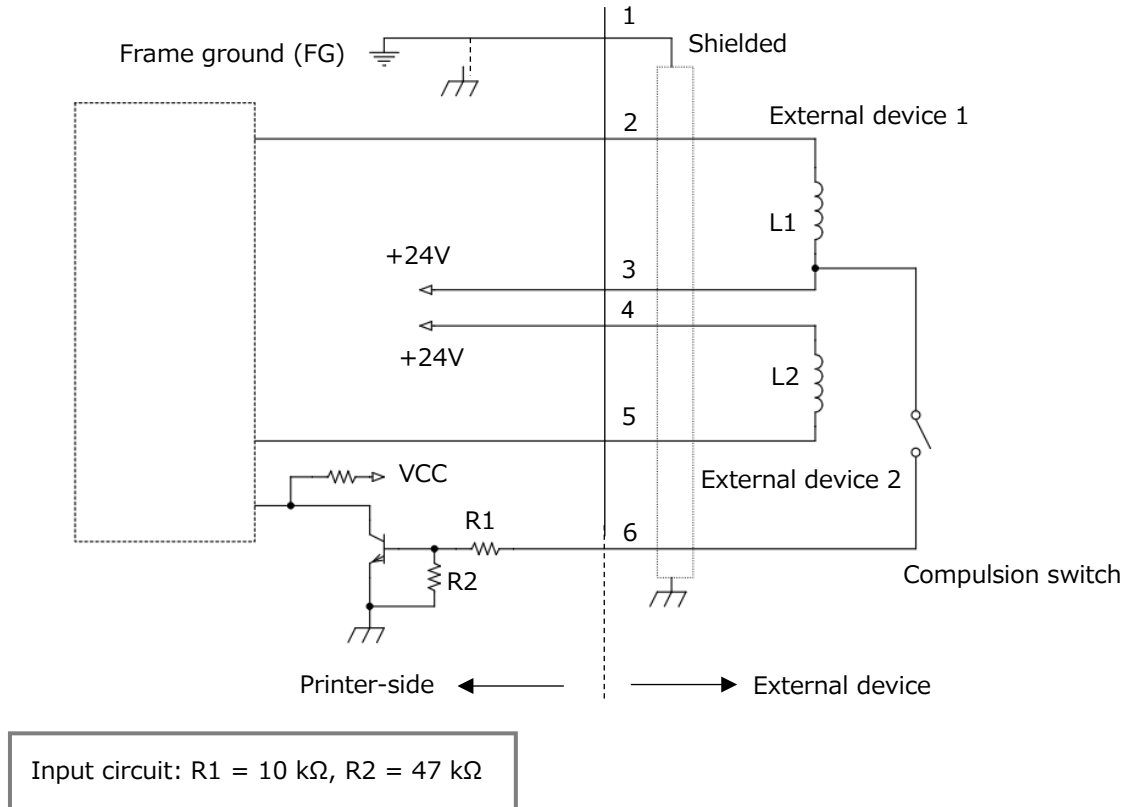


[Pin No.]

Pin No.	Signal Name	Signal direction
1	Frame ground (FG)	
2	Drive signal 1	Output
3	+24V	
4	+24V	
5	Drive signal 2	Output
6	Compulsion switch open/close signal	Input



[Connection figure]



- Note 1)** External device 1 and external device 2 cannot be driven simultaneously.
- 2)** When connecting a device other than an external buzzer, such as a cash drawer, reduce the duty to 20% or less.
- 3)** When a device other than an external buzzer and melody speaker is connected, never use the external buzzer drive command. Otherwise, the connected device and the circuit of this product may become damaged.
- 4)** The conditions of the external device connection and compulsion switch can be found in the status.
- 5)** L1 and L2 must be 24 ohms or more, or the input current must be 1 A or less.

4. Operating Portion and Function

4.1. Power button

To turn on the power, press the power button and then release it when the Power LED lights up.

To turn off the power, press and hold the power button for 1 second or longer.

The function can be disabled by switching MSWF-A.

4.2. FEED button

The FEED button enables functions such as paper feed and self-printing.

The following details each function:

4.2.1. Paper feed

Press this button offline to feed paper.

The function can be disabled by switching MSWF-9.

4.2.2. Test print mode (Self-print mode)

In self-printing mode, information such as the firmware version, the connection state, model name and firmware version of the melody speaker, memory switch settings, Bluetooth settings and network settings is printed.

<How to enter self-printing mode >

To enter self-printing mode, turn on the power while holding down the FEED button.

After self-printing has ended, normal mode is automatically resumed.

4.2.3. Hexadecimal dump print mode

Open the printer cover, and turn on the power while holding down the FEED button.

When the power LED starts flashing blue, release the FEED button while the LED is flashing.

When the printer cover is closed, the title "Hex Dump Mode" is printed to enter hexadecimal dump print mode.

From then onward, received data will be printed in hexadecimal.

To finish the hexadecimal dump print function, turn OFF the printer.

<Note> If the power LED stops flashing and stays lit blue before releasing the FEED button, turn off the power and repeat the same steps from the beginning.

4.2.4. USB-C function switching mode

<How to enter USB-C function switching mode>

After turning on the power, open the printer cover and press and hold the Feed button for 5 seconds or more. Release the button when the red LED starts flashing.

Subsequently each time the button is pressed, the LED changes in sequence [1] (default state) → [2] → [3] → [1] → [2] → ..., indicating the USB-C function.

- ① Red flashing = Data only
- ② Blue flashing = Power supply only
- ③ Purple flashing = Power supply and data

Close the cover when the LED display of the desired function is active. The setting is saved and then the hardware is reset and self-printing is performed automatically. For details, refer to “3.2.1.4 USB-C function setting.”

4.2.5. Printer's saved information print mode

When holding down the FEED button in cutting mode after self-printing mode has ended, the printer enters printer's saved information print mode.

In this mode, the saved interface logs, all registered logos and retailer coupons are printed.

4.2.6. Special function setting mode

* Procedure for special function settings: A → B → C → D

A Entering special mode

Open the cover + Press the FEED button + Turn on the power

→ The blue LED flashes for 5 sec (every 0.25 sec).

→ The blue LED lights.

→ Turn off the FEED button.

→ Press the FEED button 3 times.

→ Enter special mode.

B Selecting mode

Press the FEED button → LED changes: B1 ⇒ B2 ⇒ B3 ⇒ B4 ⇒ B5 ⇒ B1 ⇒ ...*1

B1 Blue LED lighting = Cutter setting mode

B2 Red LED lighting = DHCP timeout setting mode

B3 Purple LED lighting = USB serial number setting mode

B4 Blue LED flashing (every 0.5 sec) = MSW initialization mode

B5 Red LED flashing (every 0.5 sec) = NE sensor adjustment mode (Remove paper for adjusting sensor.)

→ Close the cover → Setting mode is determined

C Settings selection

C1 Cutter setting mode → Press the FEED button → LED changes: C1-1 ⇔ C1-2

→ To D: Saving the setting

C1-1 Blue flashing (every 0.25 sec) = Cutter enabled

C1-2 Red flashing (every 0.25 sec) = Cutter disabled

C2 DHCP timeout setting mode → Press the FEED button → LED changes: C2-1 ⇔ C2-2

→ To D: Saving the setting

C2-1 Blue flashing (every 0.25 sec) = DHCP timeout enabled

C2-2 Red flashing (every 0.25 sec) = DHCP timeout disabled

C3 USB serial number setting mode → Press the FEED button → LED changes: C3-1 ⇔ C3-2

→ To D: Saving the setting

C3-1 Blue flashing (every 0.25 sec) = USB serial number enabled

C3-2 Red flashing (every 0.25 sec) = USB serial number disabled

C4 MSW initialization mode

MSW initialization → Hardware reset

C5 NE sensor adjustment mode

Automatic sensor adjustment → Hardware reset

D Saving the setting

Hold down the FEED button for 1 sec = Setting is saved.

→ Hardware reset

4.3. RESET switch

4.3.1. Initializing the Bluetooth, Network settings

You can return the communication settings to the factory default settings by initializing the Bluetooth and network settings. Refer to “3.3.2. Bluetooth settings” for setting items subject to initialization of the Bluetooth settings and their default values.

If you want communication with a paired connection device after Bluetooth settings are initialized, it is necessary to pair the device again.

Refer to “3.1 Ethernet interface, (4) Network” for setting items subject to initialization of the network settings and their default values.

* Communication settings initialization procedure A → B → C

A Entering communication settings initialization mode

Press Reset SW + Turn on the power

→ Network LED flashing

→ Reset SW off

→ Enters communication settings Initialization mode

B Selecting mode

Press the FEED button → LED indicator changes: B1 → B2 → B3 → B1 → ...

B1 Network LED flashing = Network configuration initialization mode

B2 Bluetooth LED flashing = Bluetooth settings initialization mode

B3 Network LED flashing, Bluetooth LED flashing = Network configuration initialization + Bluetooth setting initialization mode

C Initialization execution

Holding down the FEED button for 1 second resets the printer.

It then returns to standby status, and initialization is completed.

4.3.2. Auto Connection setting change

You can change the Auto Connection settings according to the following operation:

If enabled, the setting will be disabled; if disabled, the setting will be enabled.

Load paper, turn on the power, and bring the printer in the standby status

Hold down the RESET switch on the back of this product until the printer resets (*1).

Perform self-printing to verify that the setting is correct.

*1) When the printer has reset, an initial operation sound will be heard.

4.4. LED indicator and errors

4.4.1. Automatic recovery error (online)

Error type	Power LED	Cause	Restoration method
High head temperature detection (Printing stop)	Blue flashing (1 time)	The head temperature is high.	Automatically recovered when head temperature drops.
Circuit board high temperature detection (Printing stop)	Blue flashing (2 times)	The circuit board temperature is high.	Automatically recovered when the circuit board temperature drops.

4.4.2. Recoverable error (online)

Error type	Power LED	Cause	Restoration method
NE error	Red and blue flashing Blue lighting for 3.75 seconds Red lighting for 0.25 seconds (Cycle: 4 sec)	Paper is running out.	Replace the paper roll.

4.4.3. Recoverable error (offline)

Error type	Power LED	Cause	Restoration method
Cover open error	Red lighting	The cover is open.	Close the cover.
No-paper error	Continuous red flashing (Cycles of 1 sec)	There is no paper.	Set the paper.

4.4.4. Irrecoverable error (offline)

Error type	Power LED	Cause	Restoration method
Auto cutter error	Continuous purple flashing (Cycle: 0.25 sec)	Paper is jammed or the cutter is malfunctioning.	Turn off the power, and eliminate the cause of the error. After confirming that the cutter blade has returned to the home position, turn on the power. If the error cannot not be eliminated, a repair is required.
Power voltage error	Purple flashing (1 time)	The power supply voltage is abnormal (While waiting)	A repair is required.
Head thermistor error	Purple flashing (2 times)	Head thermistor resistance is abnormal.	A repair is required.
FLASH error	Purple flashing (4 times)	FLASH access is faulty.	A repair is required.
EEPROM error	Purple flashing (5 times)	EEPROM access is faulty.	A repair is required.
RAM error	Purple flashing (6 times)	External RAM access is faulty.	A repair is required.

If you need help with repairs, please contact the seller.

4.4.5. Network link status display

Type	Network LED	Cause	Restoration method
Link up	ON	TCP/IP communication possible	
Link down [Physical disconnection]	OFF	Connection has been physically cut off. (The Ethernet link is down.)	Check the connection of the communication cable between the printer and hub router, and turn the power on again.
Link down [IP address not acquired]	Flashing (Cycle: 0.25 sec.)	<When DHCP is enabled> IP address cannot be acquired from the network.	After confirming the wiring path and the DHCP server, turn the power on again (*1).
		<When DHCP is disabled> IP address = 0.0.0.0 is specified	After initializing the network settings, set the correct IP address (*1).

*1) To set a temporary IP address, run ARP/Ping.

4.4.6. Bluetooth status display (Models which support Bluetooth only)

Type	Bluetooth LED
Ready status (pairing/connection possible)(*1)	OFF
Connected	ON

*1) When the [New Pairing Permission] settings are OFF, pairing is not possible even in the ready state.

4.4.7. Firmware status display

Type	Power LED
Writing Firmware (Printing stop)	Continuous red and blue alternate flashing(irregular cycle)

4.4.8. USB host status display

Type	Power LED
When the device is connected to a charger or an unsupported USB device	Continuous red and blue alternate flashing (5 sec, Cycle: 1 sec.)
Connection of incompatible USB HUB (When more than the prescribed number of	Continuous red and blue alternate flashing (5 sec, Cycle: 0.5 sec.)

5. Maintenance

For comfortable and safe use, perform maintenance periodically.

Perform maintenance every six months or after printing of one million lines.

Paper particles are accumulated on the surface of the thermal head and cause irregularities of the print density depending on the paper type and printing frequency even within the maintenance interval above.

Please read the following precautions carefully before cleaning.

Warning

- Be sure to turn off the power before performing maintenance.
Otherwise, it may cause an electric shock or injury if the power is on during maintenance.
- Do not perform maintenance with wet hands.
Otherwise, it may cause an electric shock.
- Periodically maintain the power cable.
If usage of a damaged (e.g. cracked) cable is continued, it may cause fire or electric shock.

Caution

- Do not use benzine, thinner, trichlorethylene, and ketone solvents. Do not also dampen or damage the interior of this product during maintenance. Otherwise, it may lead to malfunctions.
- Do not touch any of the other interior sections that are not noted in this product manual. Otherwise, it may cause an injury or burns.
- The thermal head is easily damaged. Be careful not to damage it while cleaning.
- Do not clean the thermal head immediately after printing when it is still hot.
- There is risk that static electricity may damage the head after the thermal head is cleaned so be careful about static electricity.
- After cleaning the thermal head, be sure to check that the alcohol has completely dried before turning on the power.

5.1. Daily maintenance

5.1.1. External view

- Wipe dust and dirt off the plastic area using a dry, soft, and clean cloth.
- If the device is very dirty, gently wipe off the dirt with a soft cloth wrung out of water containing a very small amount of neutral detergent. Then, dry it with a dry, soft cloth.

5.1.2. Thermal head

- Apply alcohol solvent (ethanol, isopropyl alcohol) to a cotton swab (or soft cloth), and wipe the thermal area of the head.
- Remove the accumulated adhesive and paper powder from the surface of the thermal head.

5.1.3. Platen Rubber Roller

- Wipe dirt off the rubber roller with a dry, soft cloth.
- Clean the entire surface of the rubber roller while rotating the roller.

5.1.4. Paper holder

- Remove dirt, dust, and paper particles, etc. from the feeding path.

5.2. Actions in the event of paper jamming

If a paper jam occurs, turn off the power and then perform the following.

- Open the printer cover and remove jammed paper.
To avoid part damage, never pull-out jammed paper forcibly with the printer cover closed.
- If the printer cover does not open, turn off the power once and on again to open the cover.

6. Log Function

6.1. Interface log

This product saves the information of “when and which interface was used for communication” as the log. Reading the log is helpful to correctly understand the usage environment of the printer and perform troubleshooting.

Up to 10 latest logs are saved. There are following log types.

When log events related to the same interface and event type occur successively, a new log is not saved and only the log time is updated.

- Interface (Ethernet, USB, Bluetooth, etc.)
- Event (data reception, link up/down, connection/disconnection, etc.)
- Time or time duration elapsed after starting the printer when an event has occurred(*1)

*1) The time is recorded when the LAN cable is connected to the printer and the time can be acquired from the NTP server.

When the time cannot be acquired, the time duration elapsed after starting the printer is recorded.

Logs are saved to non-volatile memory at the following timing.

- At elapsing of every 5 minutes after starting the printer
- Before turning power off with the power button
- Before hardware reset
- Before executing the log information transmission command (ESC GS J)

The saved logs can be checked by the command, Star Quick Setup Utility or printer’s saved information print mode.

Interfaces and event types to be saved as logs are as follows.

Interface	Event	Description
Ethernet	Link Up	Ethernet link-up
	Link Down	Ethernet link-down
	Data Received	Data has been received by Ethernet (TCP#9100).
USB (Printer Class)	Connected	A Windows or Android device has been connected via USB printer class.
	Disconnected	Connection with a Windows or Android device via USB printer class has been disconnected.
	Data Received	Data has been received from a Windows or Android device via USB printer class.
USB (AOA)	Connected	An Android device has been connected via USB AOA protocol.
	Disconnected	Connection with an Android device via USB AOA protocol has been disconnected.
	Data Received	Data has been received from an Android device via USB AOA Protocol.
USB (iAP2)	Connected	An iOS device has been connected via USB protocol.
	Disconnected	Connection with an iOS device via USB has been disconnected.
	Data Received	Data has been received from an iOS device via USB.

Interface	Event	Description
Bluetooth	Connected	A Windows or Android device has been connected via Bluetooth.
	Disconnected	Connection with a Windows or Android device via Bluetooth has been disconnected.
	Data Received	Data has been received from a Windows or Android device via Bluetooth.
Bluetooth (iAP2)	Connected	A iOS device has been connected via Bluetooth.
	Disconnected	Connection with an iOS device via Bluetooth has been disconnected.
	Data Received	Data has been received from an iOS device via Bluetooth.
CloudPRNT (HTTP)	POST Response Success	A request of HTTP POST method has been completed successfully.
	POST Response Failure	A response other than the successful response has been received from the server for the request of HTTP POST method.
	POST Request Failed	No response was received from the server for the request of HTTP POST method.
	GET Response Success	A request of HTTP GET method has been completed successfully.
	GET Response Failure	A response other than the successful response has been received from the server for the request of HTTP GET method.
	GET Request Failed	No response was received from the server for the request of HTTP GET method.
	DELETE Response Success	A request of HTTP DELETE method has been completed successfully.
	DELETE Response Failure	A response other than the successful response has been received from the server for the request of HTTP DELETE method.
	DELETE Request Failed	No response was received from the server for the request of HTTP POST method.
CloudPRNT (MQTT)	Connected	Connected to MQTT broker.
	Disconnected	Disconnected from to MQTT broker.
	Data Received	Received MQTT message.

7. Firmware Update

The following are the methods for updating the firmware of this product.

The initial version of the firm ware is Version 5.0.

Method	Reference
Star Quick Setup Utility	Update the firmware using an iOS or Android device. iOS : App Store Android : Google Play
Star Windows Software	Update the firmware using a Windows terminal. Download site
USB flash drive	Update the firmware using a USB flash memory. Procedure for Firmware Rewriting Using USB Flash Drive
Star CloudPRNT (*1)	Update the firmware remotely from the remote server. Star CloudPRNT Protocol Guide
SMCS Device Manager API (*1)	Using the OAuth 2.0 authorization code flow, update the firmware remotely with WebAPI. Device Manager API

*1) Solutions for developers to be incorporated into the application

8. Memory Switch

Reading of the memory switch is carried out when the power is turned on or when a reset command is executed. If settings have been changed, they are enabled by turning on the power again or by using a reset command.

The settings of the memory switch can be rewritten by any of the following methods:

- Command
- Star Quick Setup Utility
- Star Windows Software

8.1. MSW0

bit	Function	OFF/"0"	ON/"1"	Remark
F				
E	Special location of use	(See the table below.)	(See the table below.)	*3
D	Special location of use	(See the table below.)	(See the table below.)	*3
C	Special location of use	(See the table below.)	(See the table below.)	*3
B				
A	Multi-byte character	(See the table below.)	(See the table below.)	*1
9	Multi-byte character	(See the table below.)	(See the table below.)	*1
8	Multi-byte character	(See the table below.)	(See the table below.)	*1
7				
6				
5	SHIFT-JIS kanji character mode	Enabled	Disabled	*2
4	Specification for location of use	SBCS (Single-byte character countries)	MBCS (Multi-byte character countries)	*4
3				
2				
1				
0				

*1) Multi- byte characters: This function is valid only when set to MBCS setting

N	MSW0-A	MSW0-9	MSW0-8	Multi-byte character
"0"	0	0	0	Simplified Chinese (GB18030)
"1"	0	0	1	Japanese kanji character
"2"	0	1	0	Traditional Chinese (BIG5)
"3"	0	1	1	Simplified Chinese (GB18030)
"4"	1	0	0	(Reserved)
"5"	1	0	1	(Reserved)
"6"	1	1	0	(Reserved)
"7"	1	1	1	(Reserved)

*2) SHIFT-JIS kanji character mode

This setting is enabled only when Japanese kanji character is selected and MBCS is set.

Refer to the table below for the details of the JIS kanji character mode/SHIFT-JIS kanji character mode when Japanese kanji character is selected.

(JIS kanji character mode is disabled when the power is turned on.)

< SHIFT-JIS/JIS specifications when Japanese kanji character is selected >

SHIFT-JIS kanji character mode	JIS kanji character mode	Print mode
Disabled	Disabled	Japanese kanji character ANK mode (MSW0-5 = "1")
Enabled	Disabled	SHIFT-JIS kanji character mode (MSW0-5 = "0")
Disabled	Enabled	JIS kanji character mode
Enabled	Enabled	JIS kanji character mode

*3) Special locations of use

Select locations of use requiring dedicated specifications such as character type and baseline.

N	MSW0-E	MSW0-D	MSW0-C	Location of use	Specification overview	Remark
"0"	0	0	0	Standard		
"1"	0	0	1	Thailand	Thai 1-path specification is supported. Dedicated ANK fonts are selected. Dedicated baseline is adopted.	Page mode, international character setting, slash 0 selection, and large fonts are disabled.
"2"	0	1	0	(Reserved)		
"3"	0	1	1	(Reserved)		
"4"	1	0	0	(Reserved)		
"5"	1	0	1	(Reserved)		
"6"	1	1	0	(Reserved)		
"7"	1	1	1	(Reserved)		

*4) Initial values of UTF-8 fuzzy character setting by specification for location of use.

MSW0-4	Specification for location of use	Initial value of UTF-8 fuzzy character setting
0	SBCS (Single-byte character countries)	Single-byte characters are prioritized.
1	MBCS (Multi-byte character countries)	Two-byte characters are prioritized.

8.2. MSW1

bit	Function	OFF/"0"	ON/"1"	Remark
F				
E				
D				
C				
B				
A				
9				
8				
7				
6	Font Types (Font-A, Font-B)	Standard font	Large font	*2
5				
4	Zero style	Normal zero	Slashed zero	
3	International characters	(See the table below.)		*1
2	International characters	(See the table below.)		*1
1	International characters	(See the table below.)		*1
0	International characters	(See the table below.)		*1

*1) International characters

n	MSW1-3	MSW1-2	MSW1-1	MSW1-0	International characters
"0"	0	0	0	0	USA
"1"	0	0	0	1	France
"2"	0	0	1	0	Germany
"3"	0	0	1	1	UK
"4"	0	1	0	0	Denmark 1
"5"	0	1	0	1	Sweden
"6"	0	1	1	0	Italy
"7"	0	1	1	1	Spain 1
"8"	1	0	0	0	Japan
"9"	1	0	0	1	Norway
"A"	1	0	1	0	Denmark 2
"B"	1	0	1	1	Spain 2
"C"	1	1	0	0	Latin America
"D"	1	1	0	1	Korea
"E"	1	1	1	0	Ireland
"F"	1	1	1	1	Legal

<Note>

This setting is disabled when Japanese kanji character is selected and MBCS is set. International character setting is fixed to "Japan (n=8)"

*2) Font type (Font-A, Font-B)

Large fonts are not compatible with all of the code page types. Accordingly, even if a large font has been selected by this MSW, the selection may be disabled in some code pages.

The following table shows the compatibility with large fonts by code page.

In the table, the code pages that are not compatible with large fonts will output characters in a standard font even if a large font is selected by this MSW.

(✓ : Large fonts compatible, - : Large fonts not compatible)

PAGE	Code page	Compatibility with large fonts
0	Normal	✓
1	CodePage437 (USA,Std. Europe)	✓
2	Katakana	-
3	CodePage437 (USA,Std. Europe)	✓
4	Codepage 858 (Multilingual)	✓
5	Codepage 852 (Latin-2)	✓
6	Codepage 860 (Portuguese)	✓
7	Codepage 861 (Icelandic)	✓
8	Codepage 863 (Canadian French)	✓
9	Codepage 865 (Nordic)	✓
10	Codepage 866 (Cyrillic Russian)	✓
11	Codepage 855 (Cyrillic Bulgarian)	✓
12	Codepage 857 (Turkey)	✓
13	Codepage 862 (Israel (Hebrew))	-
14	Codepage 864 (Arabic)	-
15	Codepage 737 (Greek)	✓
16	Codepage 851 (Greek)	✓
17	Codepage 869 (Greek)	✓
18	Codepage 928 (Greek)	✓
19	Codepage 772 (Lithuanian)	✓
20	Codepage 774 (Lithuanian)	✓
21	Codepage 874 (Thai)	-
32	Codepage 1252 (Windows Latin-1)	✓
33	Codepage 1250 (Windows Latin-2)	✓
34	Codepage 1251 (Windows Cyrillic)	✓
64	Codepage 3840 (IBM-Russian)	✓
65	Codepage 3841 (Gost)	✓
66	Codepage 3843 (Polish)	✓
67	Codepage 3844 (CS2)	✓
68	Codepage 3845 (Hungarian)	✓
69	Codepage 3846 (Turkish)	✓
70	Codepage 3847 (Brazil-ABNT)	✓
71	Codepage 3848 (Brazil-ABICOMP)	✓
72	Codepage 1001 (Arabic)	-
73	Codepage 2001 (Lithuanian-KBL)	✓
74	Codepage 3001 (Estonian-1)	✓
75	Codepage 3002 (Estonian-2)	✓
76	Codepage 3011 (Latvian-1)	✓

PAGE	Code page	Compatibility with large fonts
77	Codepage 3012 (Latvian-2)	✓
78	Codepage 3021 (Bulgarian)	✓
79	Codepage 3041 (Maltese)	✓
96	Thai Character Code 42 (Thai)	-
97	Thai Character Code 11 (Thai)	-
98	Thai Character Code 13 (Thai)	-
102	Thai Character Code 18 (Thai)	-

8.3. MSW2

bit	Function	OFF/"0"	ON/"1"	Remark
F				
E	(Reserved)			
D	(Reserved)			
C	180° inversion	Disabled	Enabled	*4
B				
A				
9				
8	Block print start timing	Detect Page End	Detect Line End	*3
7				
6				
5	Print speed	(See the table below.)		*1
4	Print speed	(See the table below.)		*1
3				
2	Print density	(See the table below.)		*2
1	Print density	(See the table below.)		*2
0	Print density	(See the table below.)		*2

*1) Print speed

n	MSW2-5	MSW2-4	Single-color mode
"0"	0	0	High Speed (Max. 400 mm/sec)
"1"	0	1	Medium Speed (Max. 250 mm/sec)
"2"	1	0	Low Speed (Max. 180 mm/sec)
"3"	1	1	(Reserved)

*2) Print density

n	MSW2-2	MSW2-1	MSW2-0	Print density
"0"	0	0	0	Standard
"1"	0	0	1	+ 1
"2"	0	1	0	+ 2
"3"	0	1	1	+ 3
"4"	1	0	0	+ 4
"5"	1	0	1	-1
"6"	1	1	0	-2
"7"	1	1	1	-3

*3) Block print start timing

This function selects the control at the time of print start (Detect Page End, Detect Line End).

When line units are selected, printing starts immediately. However, printing can sometimes be intermittent. Compared to Detect Page End, print quality may be poor (appearance of white lines, etc.) or the printer may make a loud noise.

If Detect Page End is selected, intermittent printing does not occur before the image buffer length (300 mm). However, compared to Detect Line End, it may take longer to start printing.

*4) 180° inversion

When this function is enabled and a print data length is less than 300 mm, print data is inverted by 180° by the following triggers.

If the print data length is 300 mm or more, the 180° inversion function is ignored.

Also, if any of the following 180° inversion trigger commands is not sent consecutively after print data has been sent, the 180° inversion function is ignored.

<180°-Inversion trigger commands>

- Cut command : <ESC> d n
- Form feed command : <FF>

8.4. MSW3

bit	Function	OFF/ "0"	ON/"1"	Remark
F	Code page	(See the table below.)		*2
E	Code page	(See the table below.)		*2
D	Code page	(See the table below.)		*2
C	Code page	(See the table below.)		*2
B	Code page	(See the table below.)		*2
A	Code page	(See the table below.)		*2
9	Code page	(See the table below.)		*2
8	Code page	(See the table below.)		*2
7				
6				
5	Kanji characters per line	(See the table below.)		*1
4	Characters per line	(See the table below.)		*1
3				
2				
1				
0	Amount of line feed	4mm	3mm	

*1) Kanji characters per line/ANK characters per line

< SBCS >

MSW3-4	Character type	Character size (font + right space)	Printing width (MSW4-0 to MSW4-2)	Font-A Characters per line
0	ANK	12(12+0)dot	72 mm (576dot)	48
			48.0mm (384dot)	32
			50.8 mm (406dot)	33
1	ANK	15(12+3)dot	72 mm (576dot)	38
			48.0mm (384dot)	25
			50.8 mm (406dot)	27

<Japanese kanji character (when Japanese kanji character is selected and MBCS is set)>

MSW3-5	Character type	Character size (left space + font + right space)	Printing width (MSW4-0 to MSW4-2)	Font-A Characters per line
0	Two-byte kanji character	26(1+24+1)dot	72 mm (576dot)	22
			48.0mm (384dot)	14
			50.8 mm (406dot)	15
	Single-byte kanji character	13(0+12+1)dot	72 mm (576dot)	44
			48.0mm (384dot)	29
			50.8 mm (406dot)	31
1	Two-byte kanji character	30(3+24+3)dot	72 mm (576dot)	19
			48.0mm (384dot)	12
			50.8 mm (406dot)	13
	Single-byte kanji character	15(1+12+2)dot	72 mm (576dot)	38
			48.0mm (384dot)	25
			50.8 mm (406dot)	27

MSW3-4	Character type	Character size (font + right space)	Printing width (MSW4-0 to MSW4-2)	Font-A Characters per line
0	ANK	12(12+0)dot	72 mm (576dot)	48
			48.0mm (384dot)	32
			50.8 mm (406dot)	33
1	ANK	15(12+3)dot	72 mm (576dot)	38
			48.0mm (384dot)	25
			50.8 mm (406dot)	27

<Other than Japanese kanji character (when characters other than Japanese kanji character are selected and MBCS is set)>

MSW3-5	Character type	Character size (left space + font + right space)	Print width (MSW4-0 to MSW4-2)	Font-A Characters per line
0	Kanji character	26(1+24+1)dot	72 mm (576dot)	22
			48.0mm (384dot)	14
			50.8 mm (406dot)	15
1	Kanji character	30(3+24+3)dot	72 mm (576dot)	19
			48.0mm (384dot)	12
			50.8 mm (406dot)	13

MSW3-4	Character type	Character size (font + right space)	Print width (MSW4-0 to MSW4-2)	Font-A Characters per line
0	ANK	13(12+1)dot	72 mm (576dot)	44
			48.0mm (384dot)	29
			50.8 mm (406dot)	31
1	ANK	15(12+3)dot	72 mm (576dot)	38
			48.0mm (384dot)	25
			50.8 mm (406dot)	27

*2) Code pages

When setting SBCS

n	MSW3-F	MSW3-E	MSW3-D	MSW3-C	MSW3-B	MSW3-A	MSW3-9	MSW3-8	Character Table
"00"	0	0	0	0	0	0	0	0	Normal*
"01"	0	0	0	0	0	0	0	1	CodePage437 (USA,Std. Europe)
"02"	0	0	0	0	0	0	1	0	Katakana
"03"	0	0	0	0	0	0	1	1	CodePage437 (USA,Std. Europe)
"04"	0	0	0	0	0	1	0	0	Codepage 858 (Multilingual)
"05"	0	0	0	0	0	1	0	1	Codepage 852 (Latin-2)
"06"	0	0	0	0	0	1	1	0	Codepage 860 (Portuguese)
"07"	0	0	0	0	0	1	1	1	Codepage 861 (Icelandic)
"08"	0	0	0	0	1	0	0	0	Codepage 863 (Canadian French)
"09"	0	0	0	0	1	0	0	1	Codepage 865 (Nordic)
"0A"	0	0	0	0	1	0	1	0	Codepage 866 (Cyrillic Russian)
"0B"	0	0	0	0	1	0	1	1	Codepage 855 (Cyrillic Bulgarian)
"0C"	0	0	0	0	1	1	0	0	Codepage 857 (Turkey)
"0D"	0	0	0	0	1	1	0	1	Codepage 862 (Israel (Hebrew))
"0E"	0	0	0	0	1	1	1	0	Codepage 864 (Arabic)
"0F"	0	0	0	0	1	1	1	1	Codepage 737 (Greek)
"10"	0	0	0	1	0	0	0	0	Codepage 851 (Greek)
"11"	0	0	0	1	0	0	0	1	Codepage 869 (Greek)
"12"	0	0	0	1	0	0	1	0	Codepage 928 (Greek)
"13"	0	0	0	1	0	0	1	1	Codepage 772 (Lithuanian)
"14"	0	0	0	1	0	1	0	0	Codepage 774 (Lithuanian)
"15"	0	0	0	1	0	1	0	1	Codepage 874 (Thai)
"20"	0	0	1	0	0	0	0	0	Codepage 1252 (Windows Latin-1)
"21"	0	0	1	0	0	0	0	1	Codepage 1250 (Windows Latin-2)
"22"	0	0	1	0	0	0	1	0	Codepage 1251 (Windows Cyrillic)
"40"	0	1	0	0	0	0	0	0	Codepage 3840 (IBM-Russian)
"41"	0	1	0	0	0	0	0	1	Codepage 3841 (Gost)
"42"	0	1	0	0	0	0	1	0	Codepage 3843 (Polish)
"43"	0	1	0	0	0	0	1	1	Codepage 3844 (CS2)
"44"	0	1	0	0	0	1	0	0	Codepage 3845 (Hungarian)
"45"	0	1	0	0	0	1	0	1	Codepage 3846 (Turkish)
"46"	0	1	0	0	0	1	1	0	Codepage 3847 (Brazil-ABNT)
"47"	0	1	0	0	0	1	1	1	Codepage 3848 (Brazil-ABICOMP)
"48"	0	1	0	0	1	0	0	0	Codepage 1001 (Arabic)
"49"	0	1	0	0	1	0	0	1	Codepage 2001 (Lithuanian-KBL)
"4A"	0	1	0	0	1	0	1	0	Codepage 3001 (Estonian-1)
"4B"	0	1	0	0	1	0	1	1	Codepage 3002 (Estonian-2)
"4C"	0	1	0	0	1	1	0	0	Codepage 3011 (Latvian-1)
"4D"	0	1	0	0	1	1	0	1	Codepage 3012 (Latvian-2)
"4E"	0	1	0	0	1	1	1	0	Codepage 3021 (Bulgarian)
"4F"	0	1	0	0	1	1	1	1	Codepage 3041 (Maltese)

n	MSW3-F	MSW3-E	MSW3-D	MSW3-C	MSW3-B	MSW3-A	MSW3-9	MSW3-8	Character Table
"60"	0	1	1	0	0	0	0	0	Thai Character Code 42 (Thai)
"61"	0	1	1	0	0	0	0	1	Thai Character Code 11 (Thai)
"62"	0	1	1	0	0	0	1	0	Thai Character Code 13 (Thai)
"66"	0	1	1	0	0	1	1	0	Thai Character Code 18 (Thai)
"80"	1	0	0	0	0	0	0	0	UTF-8
"FF"	1	1	1	1	1	1	1	1	User Setting (Blank code page)

MBCS (UTF-8)

n	MSW3-F	MSW3-E	MSW3-D	MSW3-C	MSW3-B	MSW3-A	MSW3-9	MSW3-8	UTF-8
Other than "80"	*	*	*	*	*	*	*	*	UTF-8 disabled (*1)
"80"	1	0	0	0	0	0	0	0	UTF-8 enabled (*2)

*1) When the UTF-8 code is invalid, the Chinese character code is specified by JIS Shift JIS/GB/BIG5/KS code.

*2) When UTF-8 is enabled, kanji character code is defined in UTF-8.

Kanji characters that can be printed in UTF-8 are only those types set in "MSW0: Multi-byte character."

8.5. MSW4

bit	Function	OFF/"0"	ON/"1"	Remark
F				
E				
D				
C				
B				
A				
9				
8				
7				
6				
5				
4				
3				
2	Print width	(See the table below)		*1
1	Print width	(See the table below)		*1
0	Print width	(See the table below)		*1

*1) Printing Region

n	MSW4-2	MSW4-1	MSW4-0	Print width
"0"	0	0	0	72 mm (576dot)
"1"	0	0	1	(Reserved)
"2"	0	1	0	48 mm (384dot)
"3"	0	1	1	50.8 mm (406dot)
"4"	1	0	0	(Reserved)
"5"	1	0	1	(Reserved)
"6"	1	1	0	(Reserved)
"7"	1	1	1	(Reserved)

8.6. MSW7

bit	Function	OFF/"0"	ON/"1"	Remark
F	ASB function (Ethernet)	Enabled	Disabled	*2
E	ASB function (Bluetooth)	Disabled	Enabled	*2
D				
C	ASB function (USB-C)	Enabled	Disabled	*2
B	NSB function (Ethernet)	Enabled	Disabled	*1
A				
9				
8	NSB function (USB-C)	Enabled	Disabled	*1
7				
6				
5				
4				
3				
2				
0	Error sound playback function	Disabled	Enabled	*3

*1) NSB

For USB-C I/F, this function sends automatic status for each BULK IN transaction.

If the Ethernet interface is used, this function sends automatic status when the print port (TCP #9100) is connected.

Bluetooth I/F is not supported. (Always disabled)

*2) ASB function

This function sends automatic status every time the status of the printer changes

*3) Error sound playback function

This function is applied when the melody speaker is connected.

For the details of the error sound playback function, refer to the melody speaker product specifications.

8.7. MSW8

bit	Function	OFF/"0"	ON/"1"	Remark
F	Horizontal reduced printing	(See the table below.)		*1
E	Horizontal reduced printing	(See the table below.)		*1
D	Horizontal reduced printing	(See the table below.)		*1
C	Horizontal reduced printing	(See the table below.)		*1
B				
A				
9				
8				
7	Barcode reduced printing	Reduced	Not reduced	*2
6				
5				
4				
3	Horizontal paper saving	Disabled	Enabled	*3
2	Vertical paper saving	Disabled	Enabled	*4
1				
0				

*1) Horizontal reduced printing

n	MSW8-F	MSW8-E	MSW8-D	MSW8-C	Horizontal reduced printing
"0"	0	0	0	0	Disabled
"1"	0	0	0	1	Enabled (67%)
"2"	0	0	1	0	
...	...	...	...	...	
"F"	1	1	1	1	

When the horizontal reduced printing function is enabled, data with a printing width of 72 mm is printed based on the above reduction ratio, according to the current printing width setting (MSW4-0 to 2).

*2) Barcode reduced printing

This function is applied when the reduced printing function is enabled.

Restriction when the barcode reduced printing function is disabled.

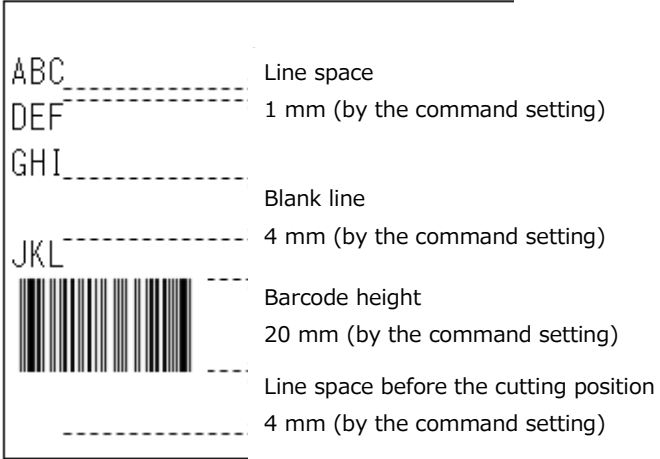
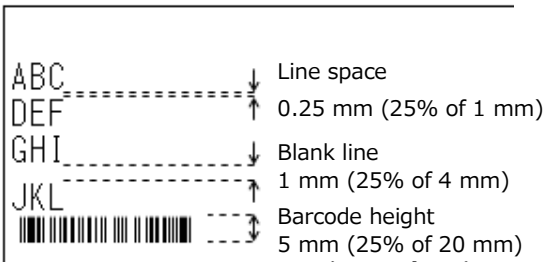
- Characters or bit images that run in the vertical direction of a barcode are not printed in reduced size.

*3) Horizontal Paper Saving

If enabled, font A is automatically replaced by font B.

*4) Vertical Paper Saving

If enabled, the line space is automatically reduced to 25% of the original size, the height of blank lines to 25%, the height of barcodes to 25%, and the height of blank lines before the cutting position to 0%. If the line space is reduced to less than 2 dots (0.25 mm) by this setting, the line space is set to 2 dots. If the barcode height is reduced to less than 30 dots (3.75 mm) by this setting, the barcode height is set to 30 dots. This setting is disabled in page mode.

	Printing result
Vertical paper saving disabled	 Line space 1 mm (by the command setting) Blank line 4 mm (by the command setting) Barcode height 20 mm (by the command setting) Line space before the cutting position 4 mm (by the command setting)
Vertical paper saving enabled	 Line space 0.25 mm (25% of 1 mm) Blank line 1 mm (25% of 4 mm) Barcode height 5 mm (25% of 20 mm)

8.8. MSA

bit	Function	OFF/"0"	ON/"1"	Remark
F				
E				
D				
C				
B				
A				
9				
8	NE sensor	Enabled	Disabled	
7				
6				
5				
4				
3				
2				
1				
0				

8.9. MSWB

bit	Function	OFF/"0"	ON/"1"	Remark
F				
E	Detect communication connection status	Enabled	Disabled	*1
D				
C	Print process during error recovery	Print data is discarded.	Re-print	*2
B				
A				
9				
8				
7				
6				
5				
4				
3				
2				
1				
0				

*1) Communication connection status detection

If this function is enabled, the communication connection status of the interface is monitored.

If the command is being received when disconnection is detected, the command analysis will be terminated.

If data cancel mode is enabled when a disconnection is detected, data cancellation will be performed until the document end command.

*2) Print process during error recovery

This function is only enabled in page mode.

MSWB-C = 0 (Print data destruction)	MSWB-C = 1 (Reprinted)
When an error occurs, discard the continued print data	When the ON-LINE status is recovered, restart printing from the top of the page when the error occurred

8.10. MSWC

bit	Function	OFF/"0"	ON/"1"	Remark
F				
E				
D				
C				
B				
A				
9				
8				
7				
6				
5				
4				
3	USB-C function	(See the table below)		*1
2	USB-C function	(See the table below)		*1
1	USB serial number	Disabled	Enabled	
0				

*1) USB-C function

n	MSWC-3	MSWC-2	USB-C function
"0"	0	0	Power supply + communication
"1"	0	1	Power supply only
"2"	1	0	Data only
"3"	1	1	(Reserved)

For details, see "3.2.1.4 USB-C function setting".

8.11. MSWE

bit	Function	OFF/"0"	ON/"1"	Remark
F				
E				
D				
C				
B	I/F switching wait time	(See the table below.)		*1
A	I/F switching wait time	(See the table below.)		*1
9	I/F switching wait time	(See the table below.)		*1
8	I/F switching wait time	(See the table below.)		*1
7				
6				
5				
4				
3				
2				
1				
0				

*1) I/F switching wait time

n	MSWE-B	MSWE-A	MSWE-9	MSWE-8	I/F switching wait time
"0"	0	0	0	0	3 seconds
"1"	0	0	0	1	1 second
"2"	0	0	1	0	2 seconds
"3"	0	0	1	1	3 seconds
"4"	0	1	0	0	4 seconds
"5"	0	1	0	1	5 seconds
"6"	0	1	1	0	6 seconds
"7"	0	1	1	1	7 seconds
"8"	1	0	0	0	8 seconds
"9"	1	0	0	1	9 seconds
"A"	1	0	1	0	10 seconds
"B"	1	0	1	1	(Reserved)
"C"	1	1	0	0	(Reserved)
"D"	1	1	1	0	(Reserved)
"E"	1	1	1	1	(Reserved)
"F"	1	1	1	1	(Reserved)

8.12. MSWF

bit	Function	OFF/"0"	ON/"1"	Remark
F				
E				
D				
C				
B				
A	Power off by Power button	Enabled	Disabled	
9	Paper feed with the feed button	Enabled	Disabled	
8	Cutter drive	Enabled	Disabled	
7				
6				
5				
4				
3				
2				
1				
0				

8.13. MSWR

bit	Function	OFF/"0"	ON/"1"	Remark
F				
E				
D				
C				
B	Top margin setting	(See the table below.)		*1
A	Top margin setting	(See the table below.)		*1
9	Top margin setting	(See the table below.)		*1
8	Top margin setting	(See the table below.)		*1
7				
6				
5	External device automatic drive	(See table below.)		*2
4	External device automatic drive	(See table below.)		*2
3				
2				
1				
0				

*1) Top margin settings

n	MSWR-B	MSWR-A	MSWR-9	MSWR-8	Top margin
"0"	0	0	0	0	11 mm (Back feed disabled)
"1"	0	0	0	1	(Reserved)
"2"	0	0	1	0	2mm
"3"	0	0	1	1	3mm
"4"	0	1	0	0	4mm
"5"	0	1	0	1	5mm
"6"	0	1	1	0	6mm
"7"	0	1	1	1	7mm
"8"	1	0	0	0	8 mm
"9"	1	0	0	1	9mm
"A"	1	0	1	0	10mm
"B"	1	0	1	1	11mm
"C"	1	1	0	0	(Reserved)
"D"	1	1	0	1	(Reserved)
"E"	1	1	1	0	(Reserved)
"F"	1	1	1	1	(Reserved)

*2) External device automatic drive (F/W Ver 3.81 or later)

When cutting is performed with one of the following cut commands, the external device is driven automatically under the set conditions.

- <ESC>'d' n : Auto cutter

n	MSWR-5	MSWR-4	Drive condition
"0"	0	0	Disabled
"1"	0	1	Setting1 ON: 0.6 sec, OFF: 0.2 sec, Repeats 2 times (for buzzer sound)
"2"	1	0	Setting2 ON: 1.0 sec, OFF: 1.0 sec, Repeats 2 times (for buzzer sound)
"3"	1	1	Setting3 ON: 0.3 sec, OFF: 0.6 sec, Repeats 5 times (for buzzer sound)

Note) Since no printing or paper feed is performed during an external device drive, the next printing starts after the drive time (max. 4.5 sec) specified above has elapsed.

When MCS10 is connected, the length of the buzzer sound and the number of repetitions of the buzzer may not be as specified.

9. Application Development

Information regarding the development of the application that controls this printer is as follows.

9.1. Supported emulation

StarPRNT emulation

9.2. Software

I Development kit I

Name	General description
StarXpand SDK for iOS/Android	This is a development kit to control the printer from a native application. This is a new SDK that updated the StarPRNT SDK. User Manual: https://www.star-m.jp/starxpandsdk-oml.html
StarXpand SDK for ReactNative	This is a development kit to control the printer from a native application using ReactNative. User Manual: https://www.star-m.jp/react-native-stario10-oml.html
StarPRNT SDK	This is a development kit to control the printer from a native application. User Manual: https://www.star-m.jp/starprntsdk-oml-ios.html
Star Micronics Cloud Services	This service allows access to printer data by connecting Star Micronics printers to the Star Micronics Cloud. User Manual: https://www.starmicronicscloud.com
starwebPRNT SDK	This is a development kit to print from a variety of devices, such as PCs and tablets, through a web browser. User Manual: https://www.star-m.jp/starwebprnt-oml.html
Star PassPRNT SDK	This is a development kit to call print from another application by using URL scheme. You can receive print data and print it on Star Micronics printer. User Manual: https://www.star-m.jp/starpassprntsdk-oml-ios.html
Star CloudPRNT SDK	Star CloudPRNT is a protocol that enables printing from remote servers. User Manual: https://www.star-m.jp/starcloudprntsdk-oml.html

I Driver I

Name	General description	Operating environment
Star Windows Driver	This is required when using the Star Micronics Printer with the Windows printer driver. The Windows printer driver is used when printing from a Windows application. Included in Star Windows Software.	Windows
Star OPOS Driver	This is required when using Star Micronics printer and peripherals with the OPOS driver. Included in Star Windows Software.	Windows
Star JavaPOS Driver	This is required when using Star Micronics printers and peripherals with the JavaPOS driver.	Windows, Linux and macOS
Star CUPS Driver	This is required when using Star Micronics printers and peripherals with the CUPS driver.	Linux, macOS

I Utility I

Name	General description	Operating environment
Star Quick Setup Utility	This allows you to perform communication settings and initial settings, check printer operation, and change printer settings.	iOS, Android
Star Windows Software	This provides the Windows printer driver, the OPOS driver, and printer utilities. This enables installation of the printer driver and setting of the OPOS driver, as well as communication setting, initial setting, printer behavior check, and printer setting change by printer	Windows

I Download I

You can download various software and manuals from the following website.

<https://www.star-m.jp/supportsite-wsw.html>

I Authentication Process of Applications for MFi-supported Printers I

If you design and develop an iOS application compatible with Star Micronics MFi authentication printers and register it in the Apple iTunes App Store, please check the following URL.

<https://www.star-m.jp/prjump/000173.html>

10. Related Regulations

10.1. Electrical safety / EMC

Country	Electrical safety	EMC
International	CB	-
USA	UL	FCC (EMI Class A)
Canada	c-UL	ISED (EMI Class A)
EU	CE, UKCA (EMI Class A)	
Australia/New Zealand	-	RCM (EMI Class A)
Japan	-	VCCI (EMI Class A)
China	CCC (EMI Class A)	

10.2. Radio Law

Applies to <CBI model> only.

Country	Radio wave
The United States	FCC
Canada	ISED
EU	CE, UKCA
Australia/New Zealand	RCM
Japan	Construction design authentications
Mexico	IFETEL

10.3. Environment Regulation

Country	Environment
EU	CE, UKCA (RoHS Directive) WEEE Directive Packaging and package waste material directive REACH Regulation
China	RoHS in China

10.4. Energy Star

Energy Star Program compliant

11. Appendix

11.1. Example of ARP/Ping execution

Assumption: MAC address of printer = 00:11:62:12:34:56, Temporary IP address to set = 192.168.10.2

1. Turn on the power.

Wait until the printer is ready to receive ARP/Ping (usually, about 25 seconds).

Alternatively, execute self-printing and wait until the following is printed:

```
*****
Current IP Parameters Status
*****
IP Address      :0.0.0.0 (Didn't obtain)
Subnet Mask     :0.0.0.0
Default Gateway :0.0.0.0
```

2. Execute the command prompt as an administrator to start up.
3. To avoid address duplication, clear the existing ARP table on the host device from the command line.

```
arp -d 192.168.10.2
arp -a
```

4. Register the combination of IP address and MAC address to the ARP table on the host device.

(Linux/Mac) Shell

```
arp -s 192.168.10.2 00:11:62:12:34:56
arp -a
```

(Windows) Command prompt

```
arp -s 192.168.10.2 00-11-62-12-34-56
arp -a
```

5. Run ping from the host device.

```
ping 192.168.10.2
```

6. Check that an echo response is returned from the NIC through the specified address.
Note that the initial echo response is not returned since it is used to retrieve the IP address.
Response is returned for the second ping and later.

```
ping 192.168.10.2
→ No response (timeout)
ping 192.168.10.2
→ echo response
ping 192.168.10.2
→ echo response
ping 192.168.10.2
→ echo response
```

7. Lastly, delete the ARP table registered in (4).

Be sure to carry out this operation to avoid address duplication.

```
arp -d 192.168.10.2
arp -a
```

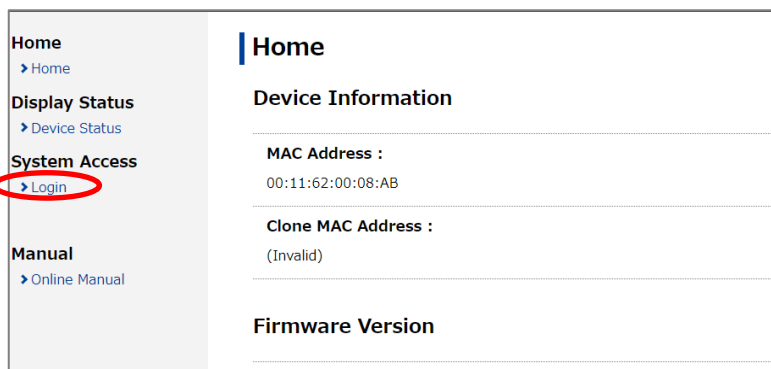
11.2. Example procedures for registration of SSL/TLS certificates

To use SSL/TLS communication (HTTPS), you must configure settings for the use of either a self-signed certificate or CA-signed certificate. The following shows procedures.

11.2.1. Using a self-signed certificate

1. Create a certificate on the printer.

Access the printer's IP address (in this example, <http://192.168.1.81>) from the browser, and then log in with root privileges.



Home

- Home

Display Status

- Device Status

System Access

- Login**

Manual

- Online Manual

Home

Device Information

MAC Address :

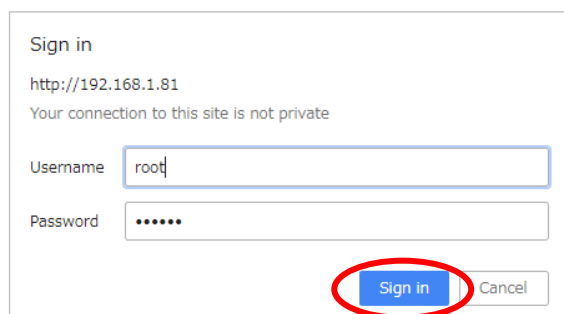
00:11:62:00:08:AB

Clone MAC Address :

(Invalid)

Firmware Version

Enter the Username, "root," the password, "public" (factory setting), and then click [Login].



Sign in

<http://192.168.1.81>

Your connection to this site is not private

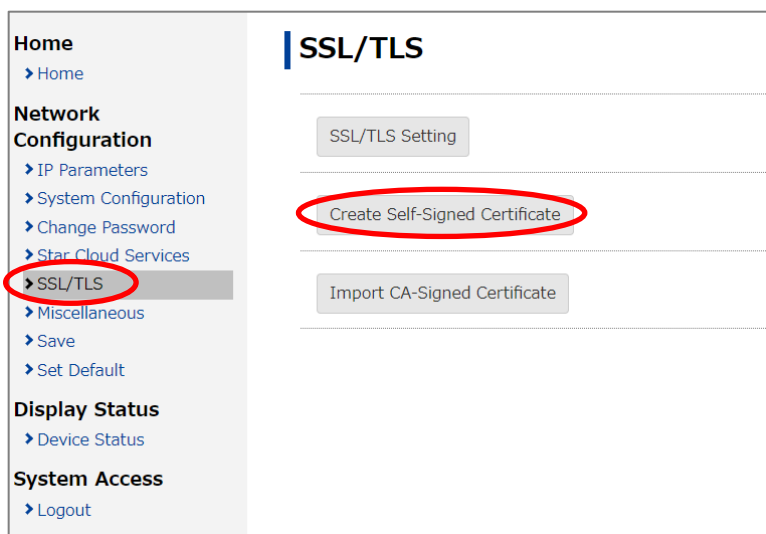
Username

Password

Sign in Cancel

Click [SSL/TLS].

Click [Create Self-Signed Certificate].



Home

- Home

Network Configuration

- IP Parameters
- System Configuration
- Change Password
- Star Cloud Services
- SSL/TLS**
- Miscellaneous
- Save
- Set Default

Display Status

- Device Status

System Access

- Logout

SSL/TLS

SSL/TLS Setting

Create Self-Signed Certificate

Import CA-Signed Certificate

In "Self-Signed Certificate," fill in each field, and click [Create] to create a certificate in the printer.

For the "Domain", enter the printer's IP address (the static value).

*) The following screen shows entry examples.

Home
▶ Home

Network Configuration
▶ IP Parameters
▶ System Configuration
▶ Change Password
▶ Star Cloud Services
▶ **SSL/TLS**
▶ Miscellaneous
▶ Save
▶ Set Default

Display Status
▶ Device Status

System Access
▶ Logout

Manual
▶ Online Manual

Self-Signed Certificate

Country Name (2 letter code)
JP

State or Province Name
Shizuoka

Locally Name (eg, city)
Shizuoka

Organization Name (eg, company)
Star Micronics

Organization Unit Name (eg, section)
Software Dev.

Domain
192.168.1.81

Expiration Date (eg, YYYY/MM/DD)
2020 / 12 / 1

create download delete

The following screen appears when a certificate is successfully created.

Home
▶ Home

Network Configuration
▶ IP Parameters
▶ System Configuration
▶ Change Password
▶ Star Cloud Services
▶ **SSL/TLS**
▶ Miscellaneous
▶ Set Default

Create Self-Signed Certificate OK.

Please execute "Save" menu if these settings are correct.

Return to [Previous page <SSL/TLS Setting>](#)
(Don't use "Back" button of browser to return.)

2. Enable the printer's self-signed certificate setting.

Click [SSL/TLS]. Click [SSL/TLS Setting].

Home
▶ Home

Network Configuration
▶ IP Parameters
▶ System Configuration
▶ Change Password
▶ Star Cloud Services
▶ **SSL/TLS**
▶ Miscellaneous
▶ Save
▶ Set Default

Display Status
▶ Device Status

System Access
▶ Logout

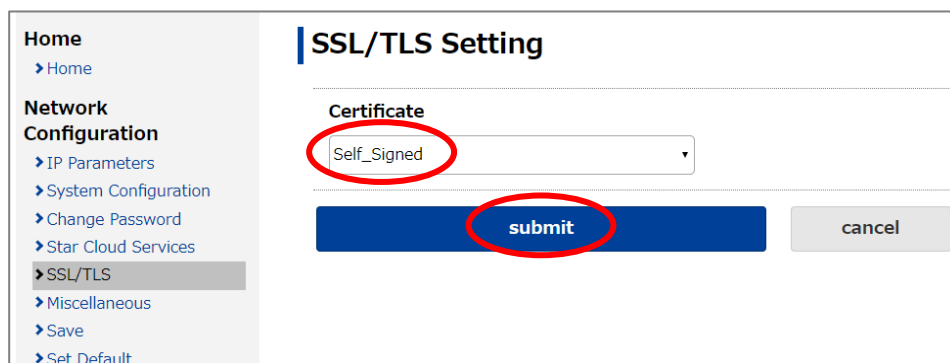
SSL/TLS

SSL/TLS Setting

Create Self-Signed Certificate

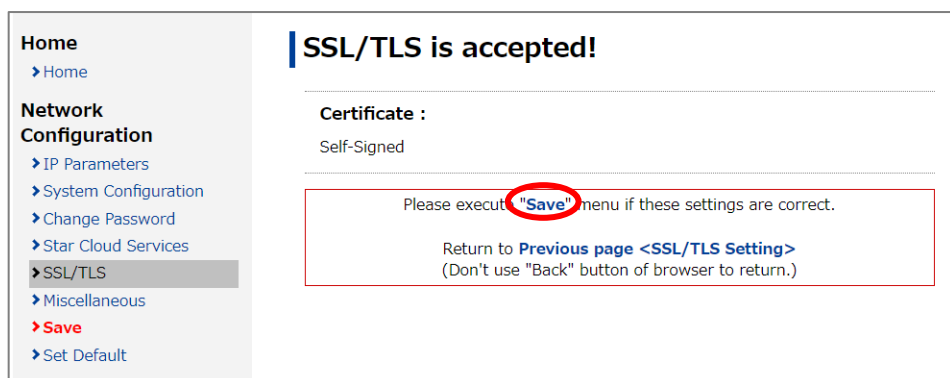
Import CA-Signed Certificate

In [Certificate], select [Self-Signed] and click [Submit].



The screenshot shows the 'SSL/TLS Setting' page. On the left is a navigation menu with 'Home' and 'Network Configuration' (containing links to IP Parameters, System Configuration, Change Password, Star Cloud Services, SSL/TLS, Miscellaneous, Save, and Set Default). The main content area has the title 'SSL/TLS Setting'. Below it, the 'Certificate' dropdown menu is set to 'Self_Signed'. At the bottom, there is a blue 'submit' button and a grey 'cancel' button. The 'submit' button is circled in red.

The following is displayed. Check that Certificate: shows Self-Signed.

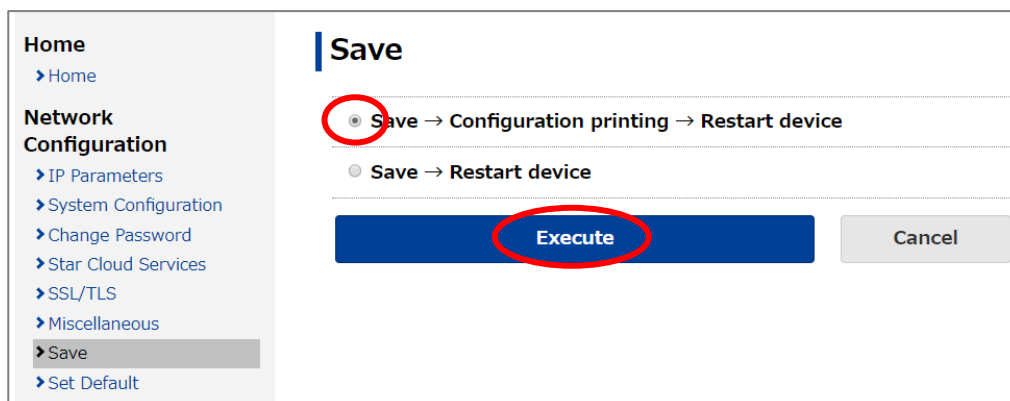


The screenshot shows the 'SSL/TLS is accepted!' page. The left navigation menu is the same as the previous screenshot, but the 'Save' link is now highlighted in red. The main content area has the title 'SSL/TLS is accepted!'. Below it, the 'Certificate' field shows 'Self-Signed'. A message box contains the text: 'Please execut "Save" menu if these settings are correct. Return to Previous page <SSL/TLS Setting> (Don't use "Back" button of browser to return.)'. The 'Save' button in the message box is circled in red.

Click [Save]. On the save screen select [Save → Configuration printing → Restart device], and then click [Execute].

The printer outputs the settings. Check that the settings are as shown below:

- Self-signed Certificate: Exist
- Certificate: Self-Signed



The screenshot shows the 'Save' page. The left navigation menu is the same as the previous screenshots. The main content area has the title 'Save'. Below it, there are two radio button options: 'Save → Configuration printing → Restart device' (which is selected and circled in red) and 'Save → Restart device'. At the bottom, there is a blue 'Execute' button and a grey 'Cancel' button. The 'Execute' button is circled in red.

The printer's self-signed certificate has been successfully created.

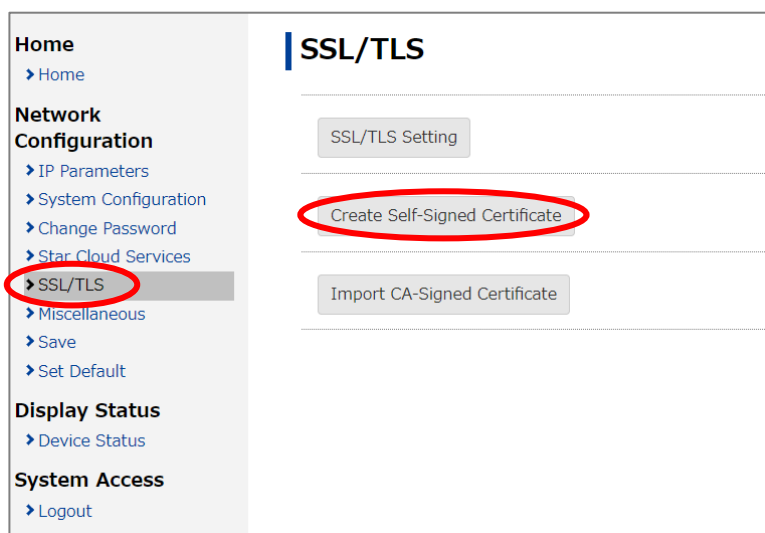
3. Import the certificate to the browser.

Import the certificate created in the NIC to the browser of the client device.

■ For Windows devices (Windows 11 example)

Click [SSL/TLS].

Click [Create Self-Signed Certificate].



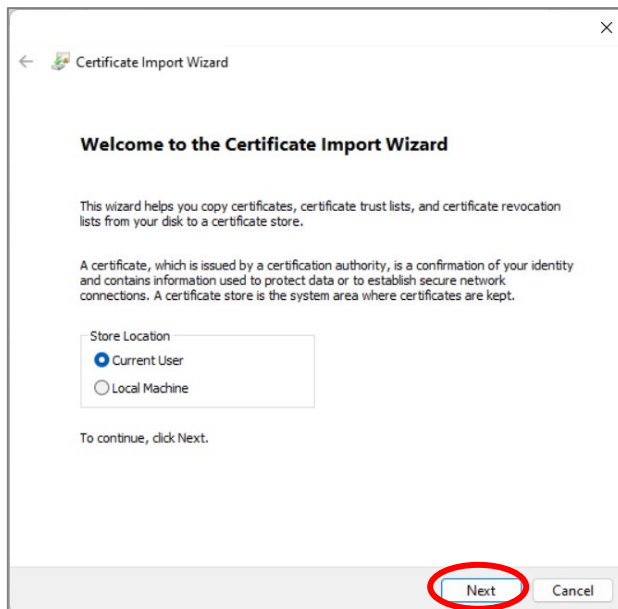
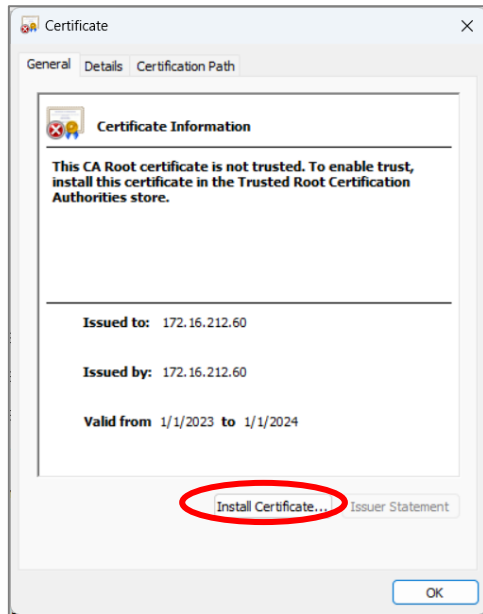
Click [Download], and save the certificate file (with an optional name) in any place of Windows.

(In this example, it is saved with a name “StarCertificate.cer.”)

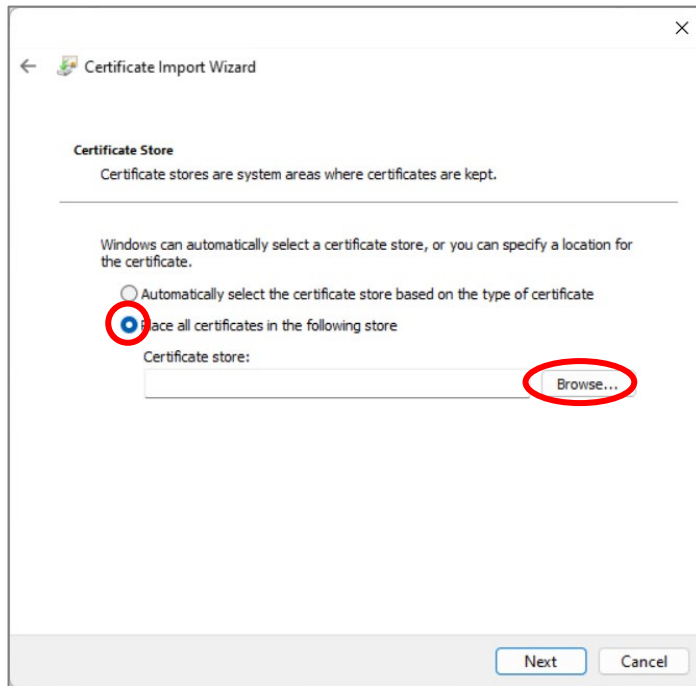
A screenshot of the 'Self-Signed Certificate' form. The sidebar menu on the left is the same as the previous image, with 'SSL/TLS' highlighted. The main form contains several input fields: 'Country Name (2 letter code)', 'State or Province Name', 'Locally Name (eg, city)', 'Organization Name (eg, company)', 'Organization Unit Name (eg, section)', 'Domain', and 'Expiration Date (eg, YYYY/MM/DD)'. At the bottom of the form are three buttons: 'create', 'download' (circled in red), and 'delete'.

On the client device, double click the saved certificate file.

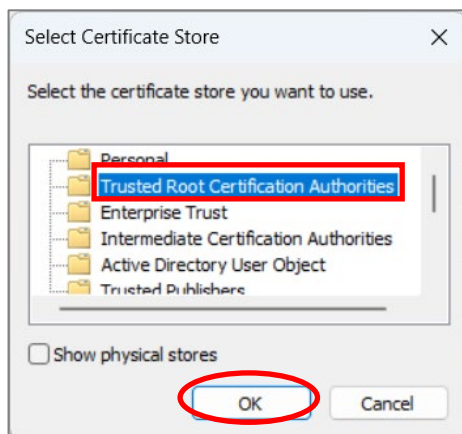
Click [Install Certificate].



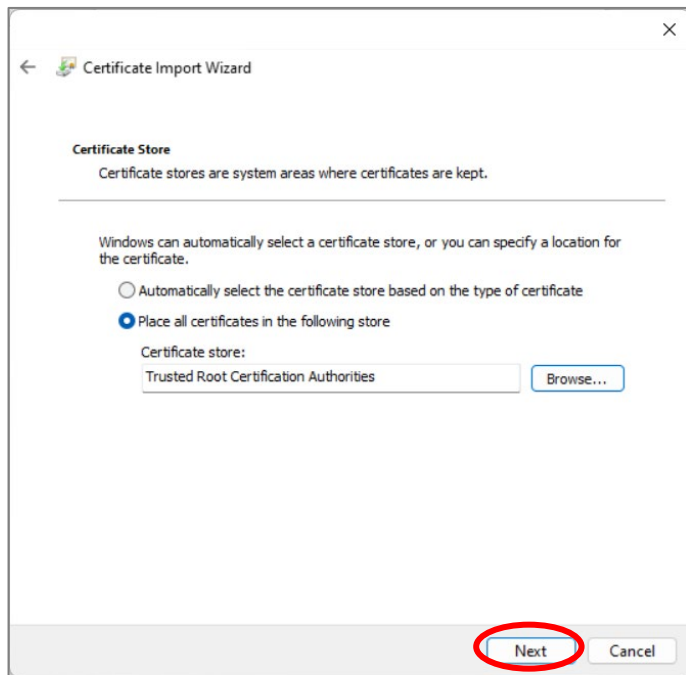
Select “Place all certificates in the following store,” and click [Browse].



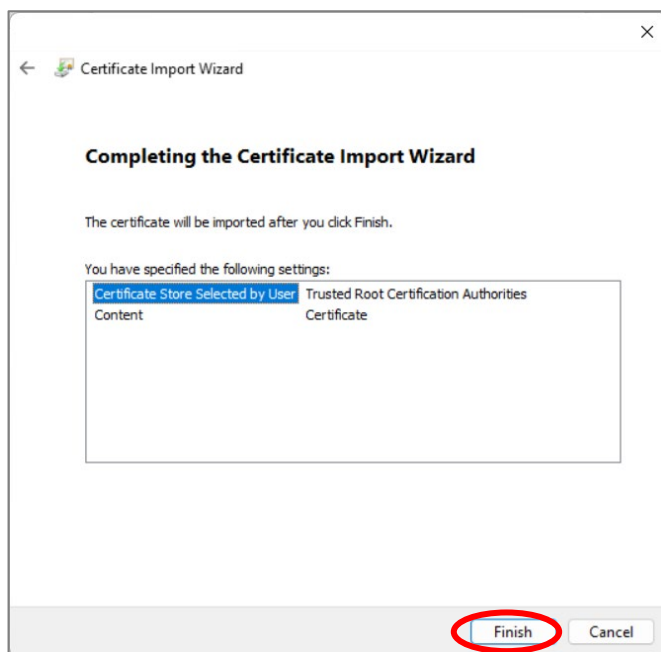
Select “Trusted Root Certification Authorities,” and click [OK].



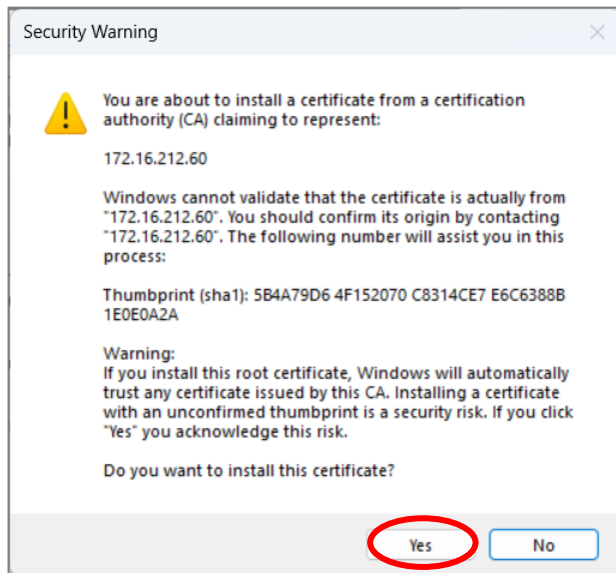
Click [Next].



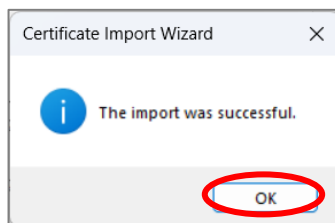
Click [Finish].



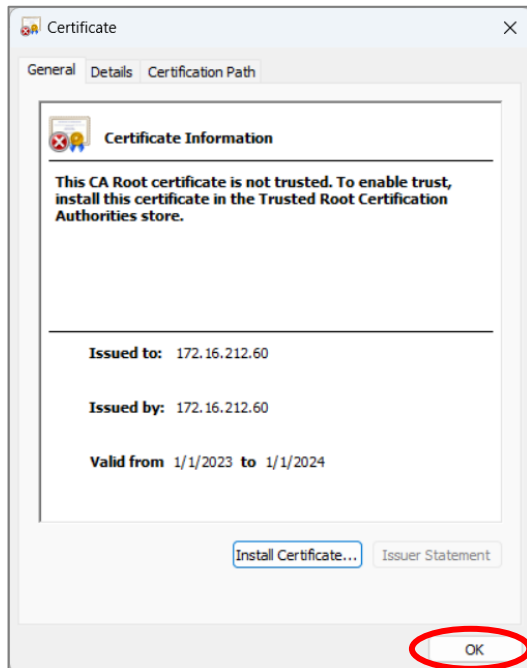
When the following message appears, click [Yes].



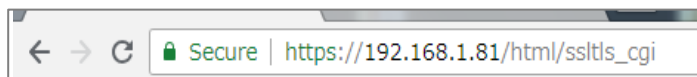
Click [OK].



Click [OK] to exit. The procedure is complete.



Turn on the printer again. You can access the web screen of the printer through the address beginning with "https://."



Note that depending on the environment of client devices, you may need to add the address to "Trusted sites." (Combination of Windows 10 and Microsoft Edge, etc.)

→ Refer to "11.2.3 Supplementary information."

[References]

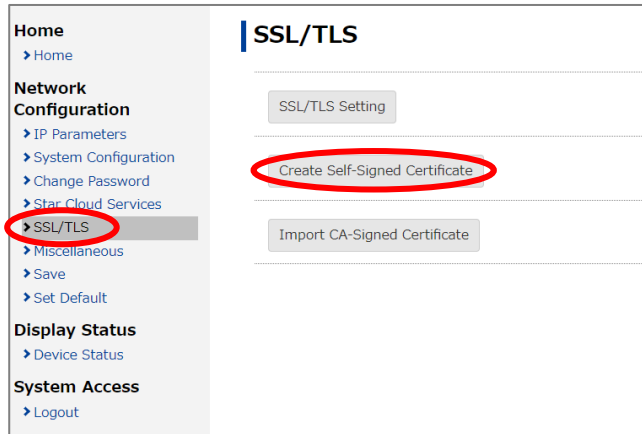
When importing a certificate file to the browser on Windows 8/8.1/10/11, open Certificate Manager "certmgr.msc" in Windows Administrative Tools, and then perform the following procedure.

1. Select "Trusted Root Certification Authorities" → "Certificates".
 2. From the "Operation" menu, select "All tasks" → "Import".
 3. Import a self-signed certificate in accordance with the Certificate Import Wizard.
- Confirm that the certificate has been imported by checking "Trusted Root Certification Authorities" → "Certificate."

■ For iOS devices

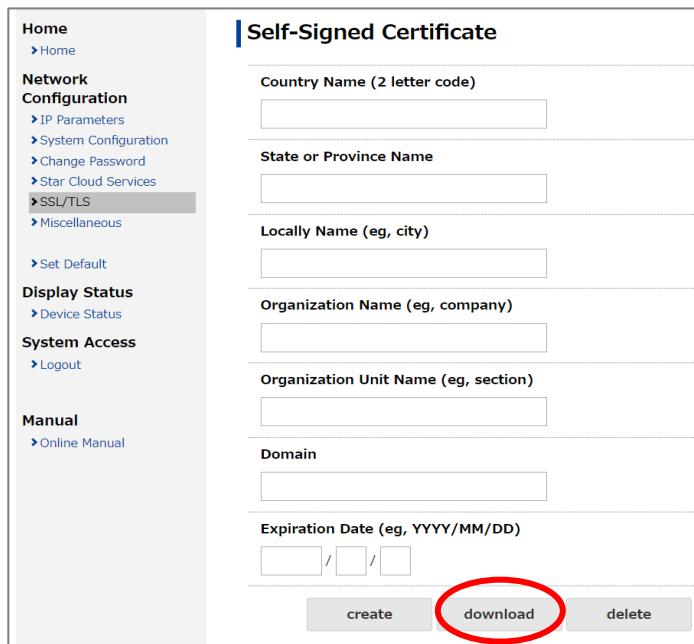
Start the browser (Safari) to access the printer's IP address (in this example, <http://192.168.192.63>), and log in with root privileges. Select [SSL/TLS] then [Create Self-Signed Certificate].

<Note> For iOS devices, Safari must be used because it is the only browser that allows downloading certificates.



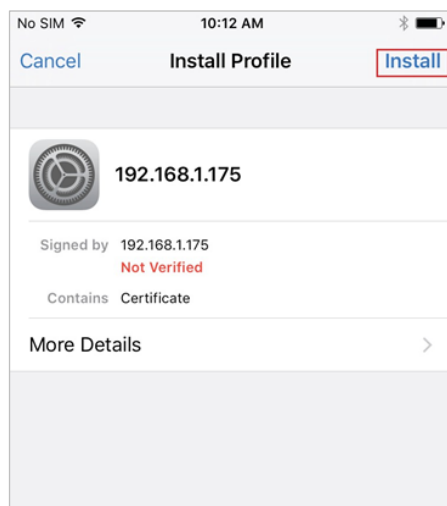
The screenshot shows the printer's web interface. On the left is a navigation menu with sections: Home, Network Configuration, Display Status, System Access, and Manual. The 'SSL/TLS' option under Network Configuration is highlighted with a red circle. The main content area is titled 'SSL/TLS' and contains three buttons: 'SSL/TLS Setting', 'Create Self-Signed Certificate' (circled in red), and 'Import CA-Signed Certificate'.

Select [Download].

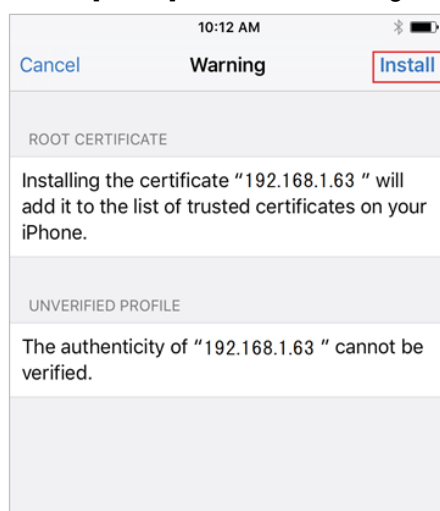


The screenshot shows the 'Self-Signed Certificate' configuration page. It contains several input fields: 'Country Name (2 letter code)', 'State or Province Name', 'Locally Name (eg, city)', 'Organization Name (eg, company)', 'Organization Unit Name (eg, section)', 'Domain', and 'Expiration Date (eg, YYYY/MM/DD)'. At the bottom, there are three buttons: 'create', 'download' (circled in red), and 'delete'.

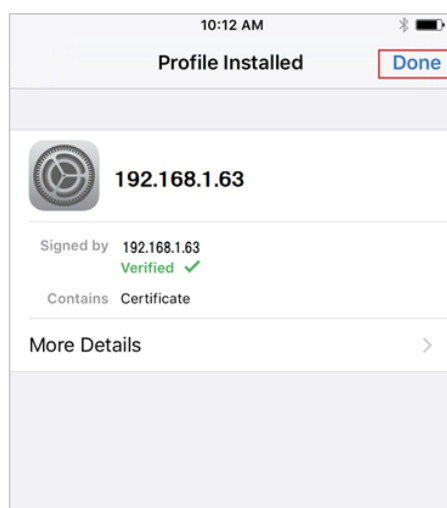
Select [Install] when the following screen appears



Select [Install] when the following screen appears.



When the following screen appears, the installation is complete. Click [Done] to exit.

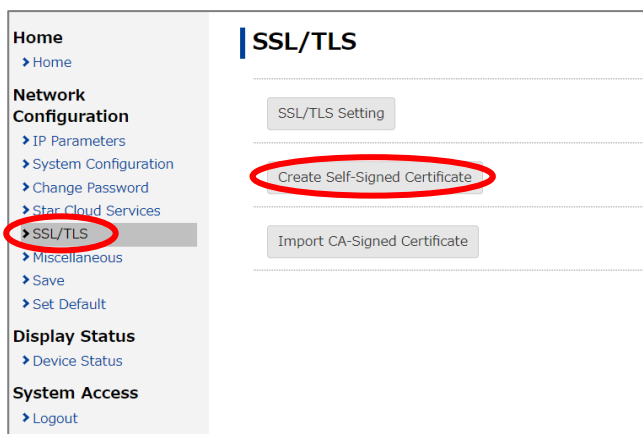


Turn on the printer again. You can access the web screen of the printer through the address beginning with "https://."

If you use iOS 10.3 or later, additional settings are required on the iOS side. Also refer to "11.2.4 Settings required for certificate registration on iOS 10.3 or later"

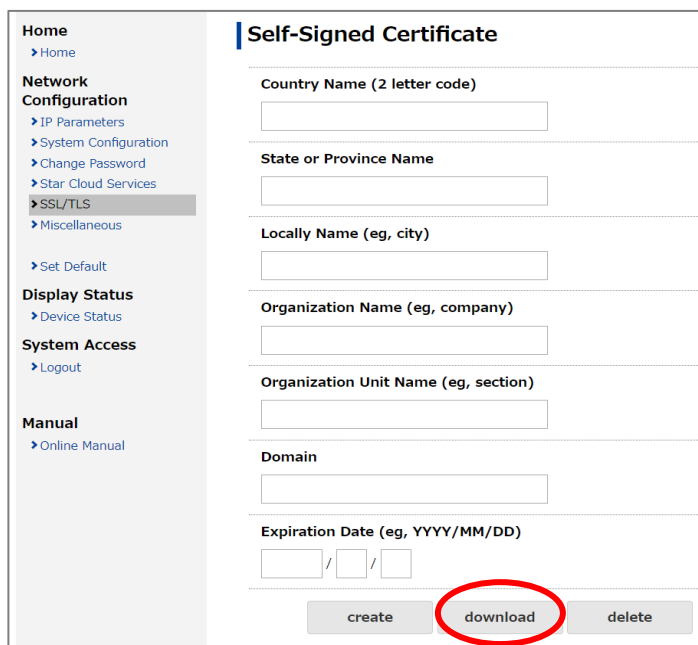
■ For Android devices

Start the browser (Chrome) to access the printer's IP address (in this example, <http://192.168.192.63>), and log in with root privileges. Select [SSL/TLS] then [Create Self-Signed Certificate].



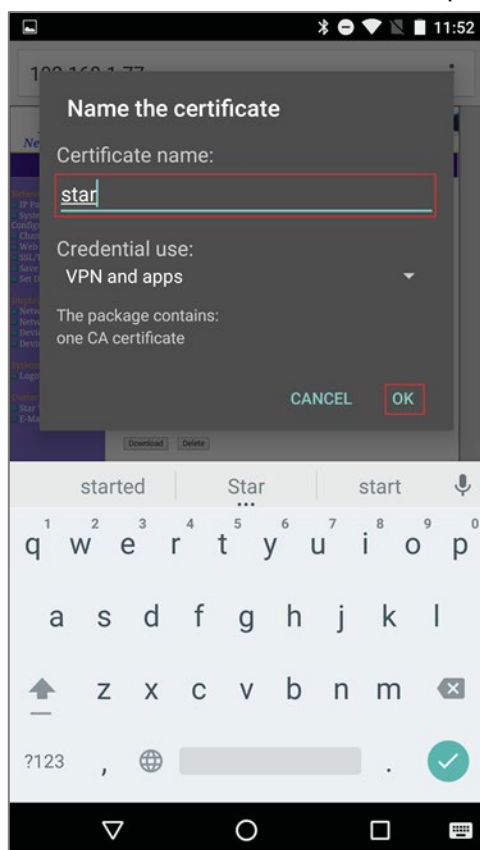
The screenshot shows the printer's web interface. On the left is a sidebar with a menu. Under the 'Network Configuration' section, the 'SSL/TLS' option is highlighted and circled in red. The main content area is titled 'SSL/TLS' and contains two buttons: 'SSL/TLS Setting' and 'Create Self-Signed Certificate'. The 'Create Self-Signed Certificate' button is circled in red.

Select [Download].

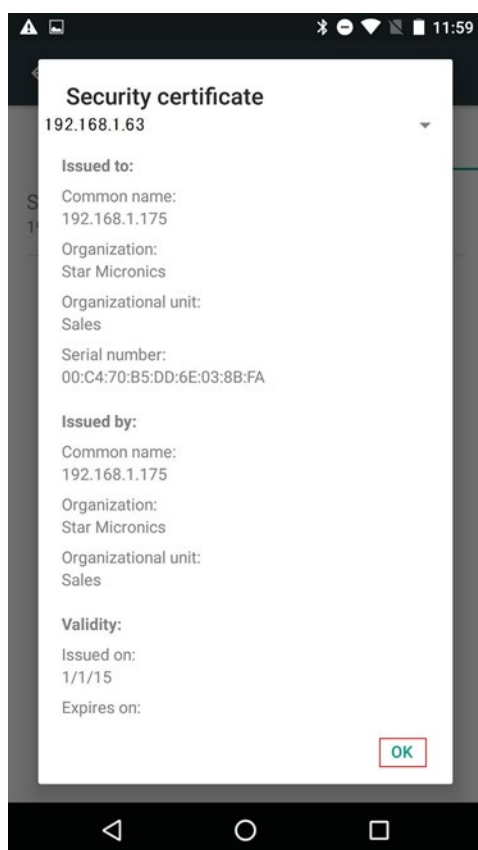


The screenshot shows the 'Self-Signed Certificate' configuration page. The left sidebar is the same as the previous screenshot. The main content area has a title 'Self-Signed Certificate' and several input fields: 'Country Name (2 letter code)', 'State or Province Name', 'Locally Name (eg, city)', 'Organization Name (eg, company)', 'Organization Unit Name (eg, section)', 'Domain', and 'Expiration Date (eg, YYYY/MM/DD)'. At the bottom of the form are three buttons: 'create', 'download', and 'delete'. The 'download' button is circled in red.

When the name of the certificate is required, enter any name ("star" in this procedure) and click [OK].



When the details of the certificate appear, the installation is complete. Click [OK] to exit.



Turn on the printer again. You can access the web screen of the printer through the address beginning with "https://."

11.2.2. Using CA-signed certificates

Import the server certificate created externally and signed by a CA (certification authority) and the private key to the printer.

In the browser, you must register the CA (certification authority) as “Trusted Root Certification Authorities.”

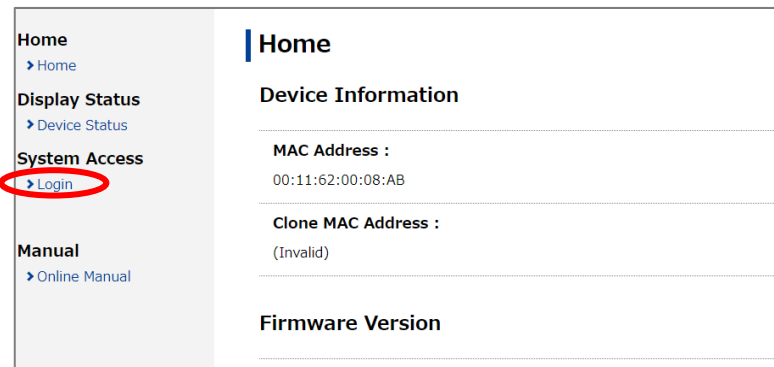
1. Prepare the server certificate and the private key.

Prepare the files of the server certificate signed by an external certification authority (CA) and the private key that meet the following requirements.

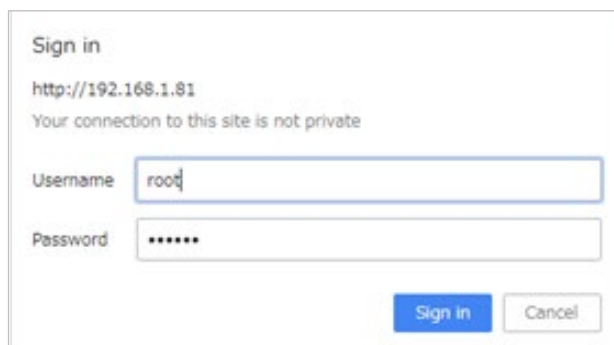
- Encoding type: Base64 (file extension: PEM)
- Certificate file type: PKCS #1
- Key length: RSA 2048 bits or 1024 bits

2. Import the server certificate and the private key to the NIC.

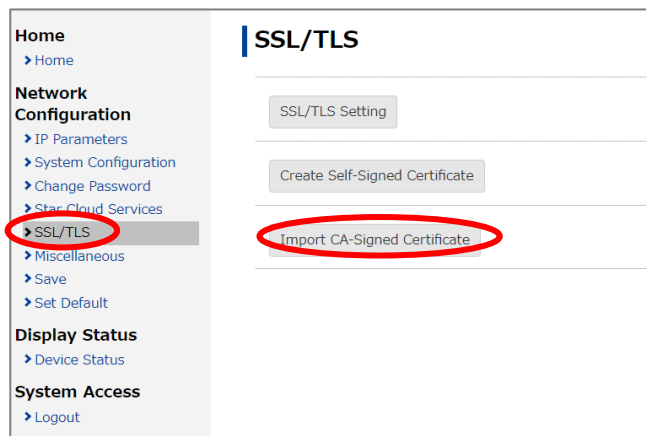
Access the printer's IP address (in this example, <http://192.168.1.81>) from the browser, and then log in with root privileges.



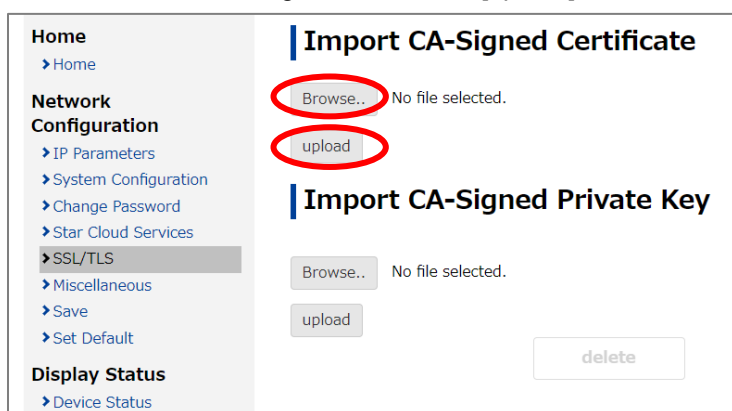
Enter the Username, “root,” the password, “public” (factory setting), and then click [Sign in].



Click [SSL/TLS]. Click [Import CA-Signed Certificate].

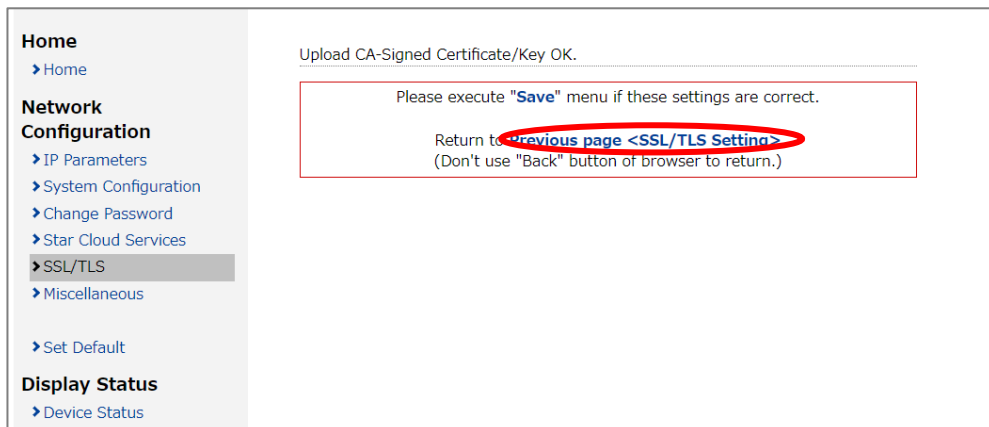


Click [Browse] in the “Import CA-Signed Certificate” section. Select the certificate file to import, from the client device’s file dialog, and then click [upload].



The following screen appears when the file has been successfully imported.

Click [Return to Previous page] to return to the previous page, and register the private key next.



Click [Browse] in the Import CA-Signed Private Key section. Select the private key file from the client device's file dialog, and then click [upload].

The screenshot shows the 'Import CA-Signed Private Key' section of a web interface. On the left is a sidebar menu with categories: Home, Network Configuration, and Display Status. Under Network Configuration, 'SSL/TLS' is selected. The main content area has two sections: 'Import CA-Signed Certificate' and 'Import CA-Signed Private Key'. The 'Import CA-Signed Private Key' section contains a 'Browse...' button (circled in red), the text 'No file selected.', an 'upload' button (circled in red), and a 'delete' button.

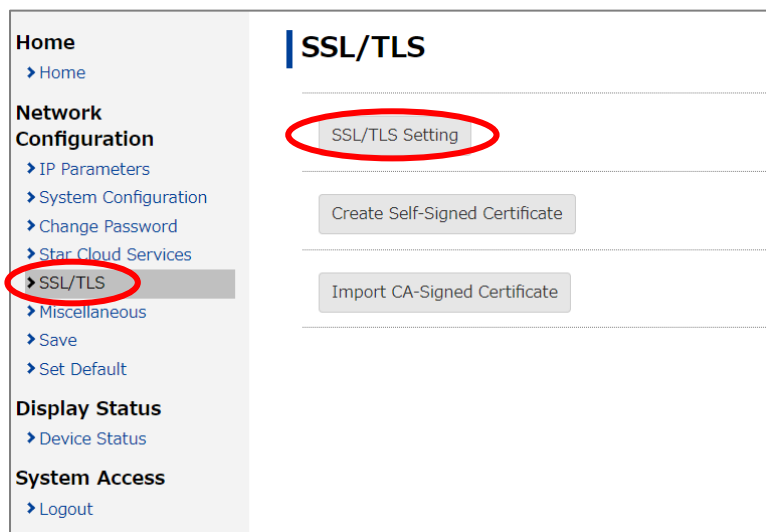
The following screen appears when the file has been successfully imported.

The screenshot shows a confirmation message: 'Upload CA-Signed Certificate/Key OK.' Below this, a red-bordered box contains the text: 'Please execute "Save" menu if these settings are correct. Return to "Previous page <SSL/TLS Setting>" (Don't use "Back" button of browser to return.)'. The text 'Previous page <SSL/TLS Setting>' is circled in red. The sidebar menu on the left is identical to the previous screenshot, with 'SSL/TLS' selected under 'Network Configuration'.

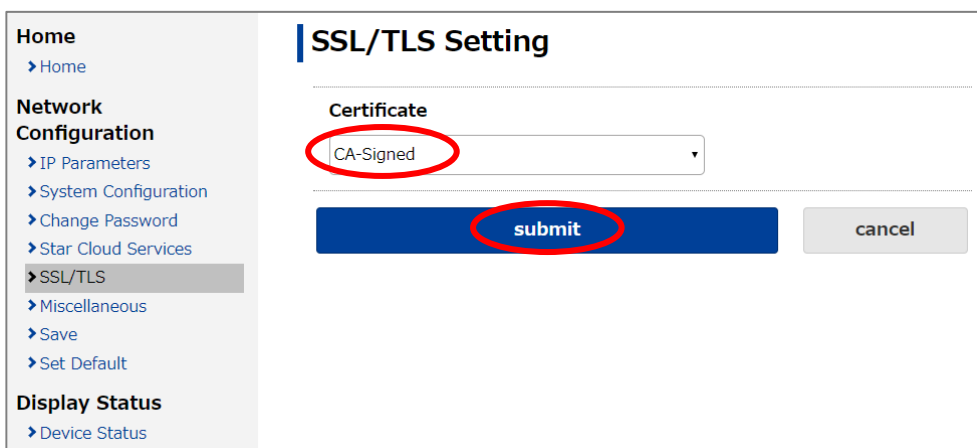
The registration is complete.

3. Enable the CA-signed certificate setting.

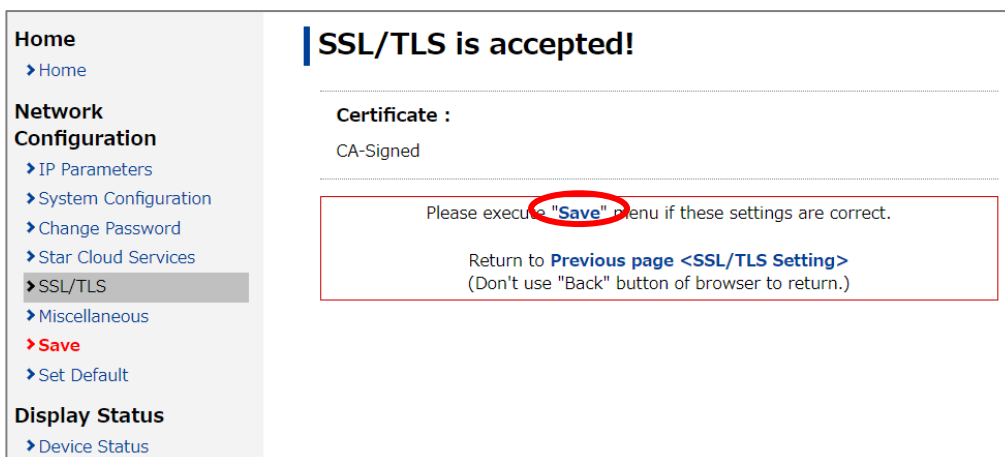
Click [SSL/TLS]. Click [SSL/TLS Setting].



In "Certificate," select "CA-Signed" and click [Submit].



The following is displayed. Check that Certificate: shows CA-Signed.

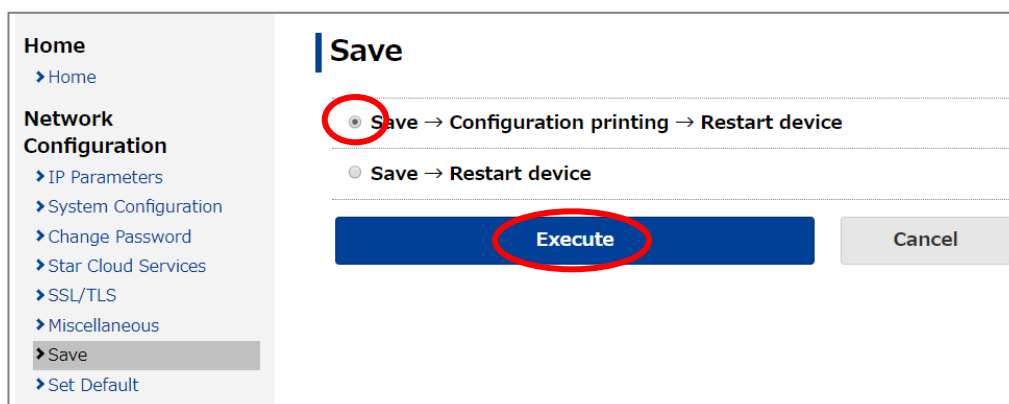


Click [Save]. In the Save screen, select “Save → Configuration printing → Restart device.”

Click [Execute].

The printer outputs the settings. Check that the settings are as shown below:

- CA-Signed Certificate: Exist
- Certificate: CA-Signed



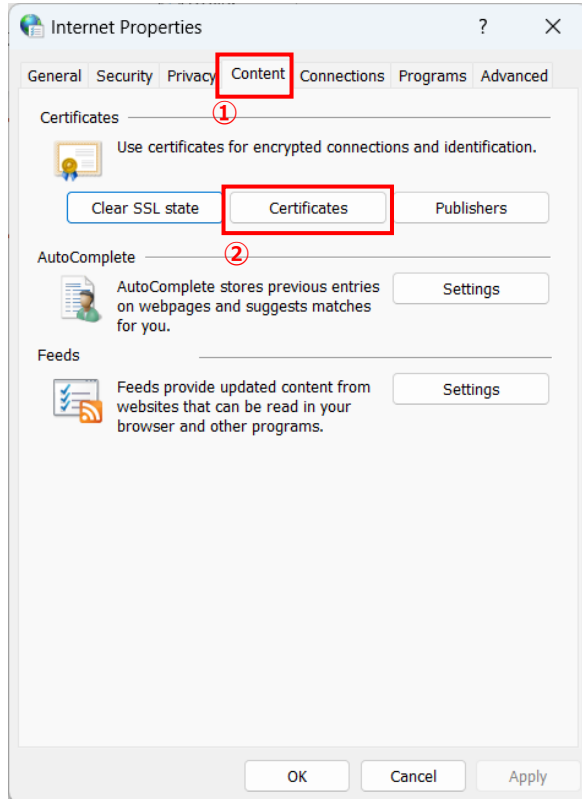
The server certificate and the private key have been successfully imported to the NIC.

[Registering in the web browser]

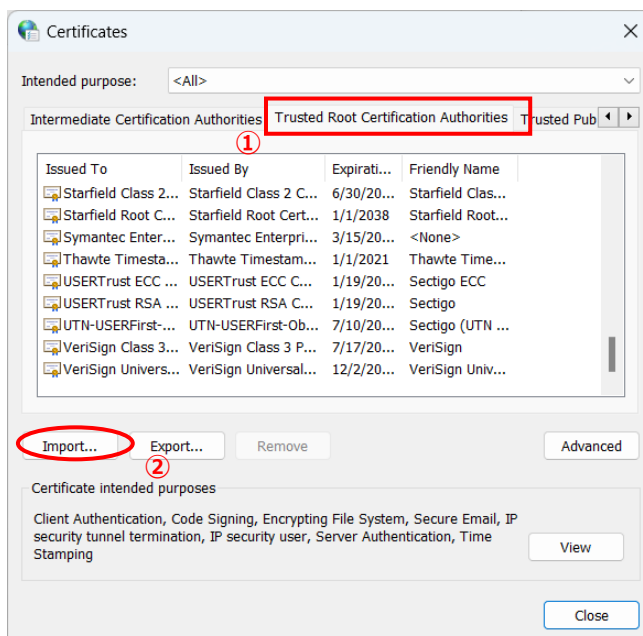
In the browser of the client device, register the certification authority (CA) that signed the server certificate as “Trusted Root Certification Authorities.” (This step is not necessary if it is already registered.)

■ For Windows devices (Windows 11 example)

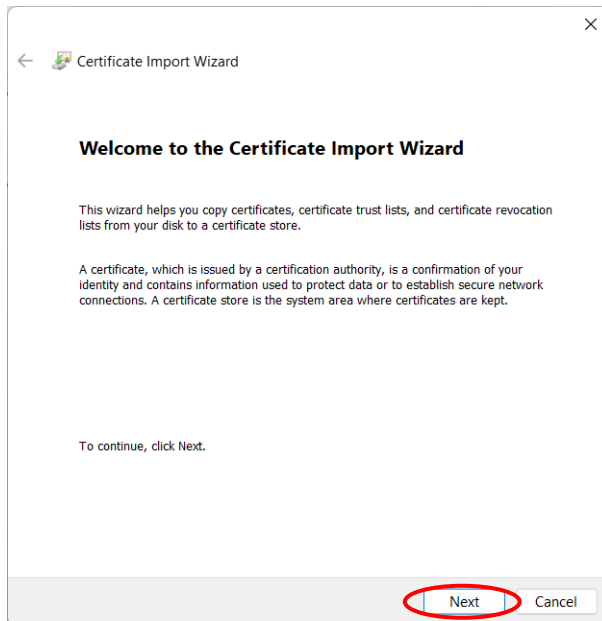
Open the Internet Options screen in the Control Panel. Select the [Content] tab and click [Certificates].



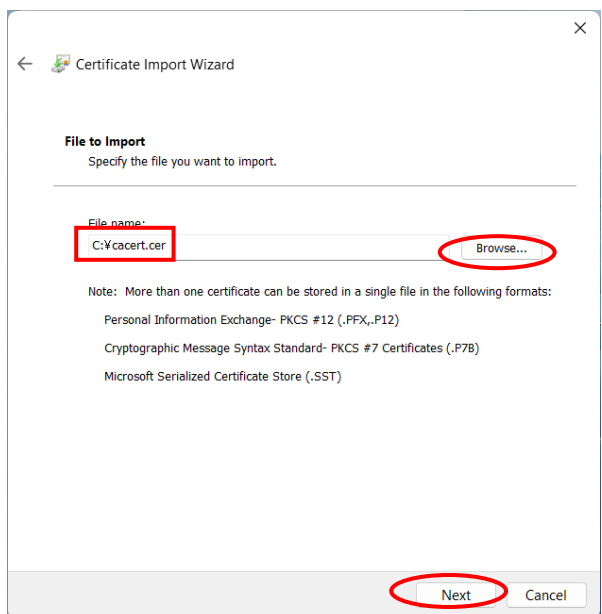
Select the [Trusted Root Certification Authorities] tab, and then click [Import].



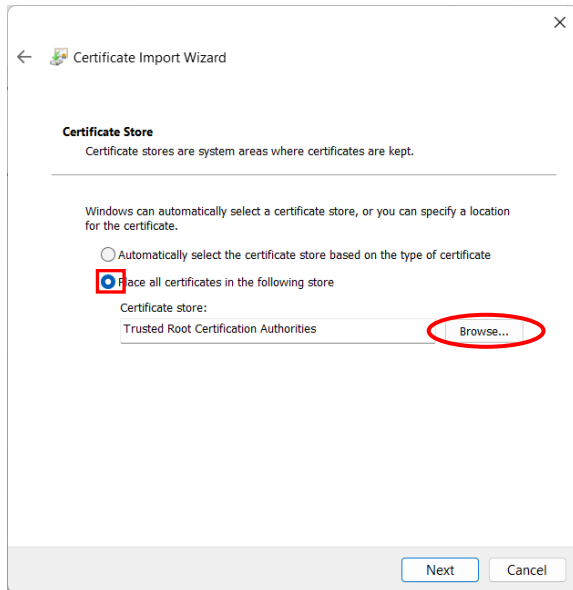
Click [Next].



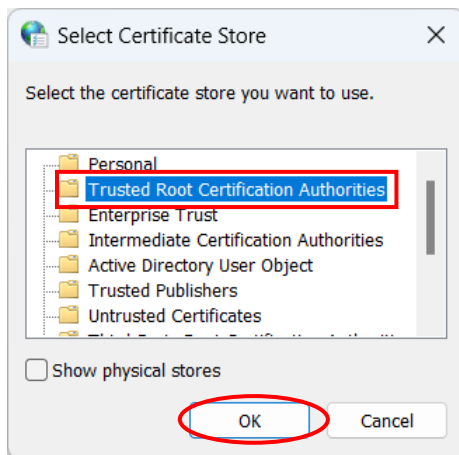
Click [Browse]. Specify the certificate file of the certification authority (CA) that signed the server certificate ("cecert.crt" in this procedure), and then click [Next].



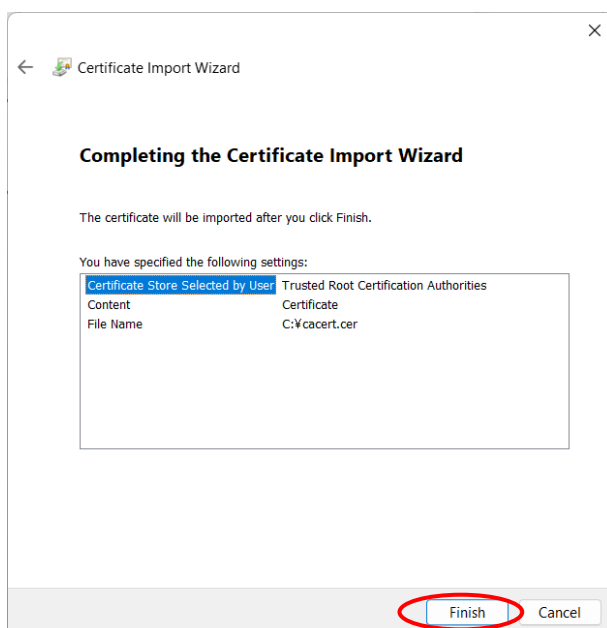
Select “Place all certificates in the following store,” and click [Browse].



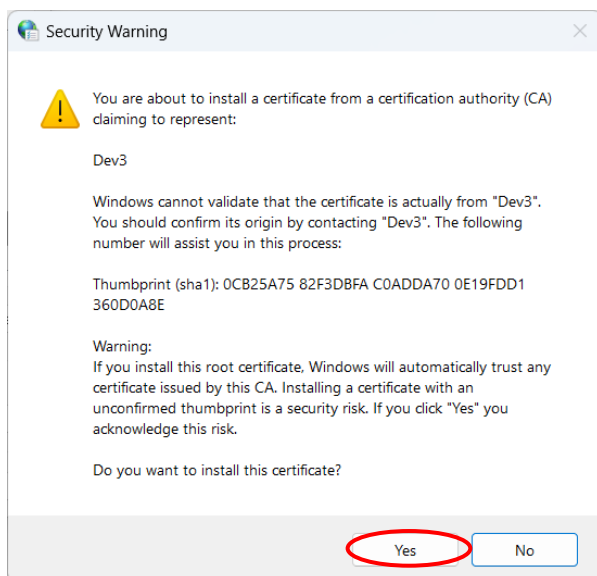
Select “Trusted Root Certification Authorities,” and click [OK]



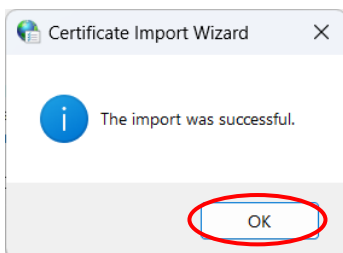
Click [Finish].



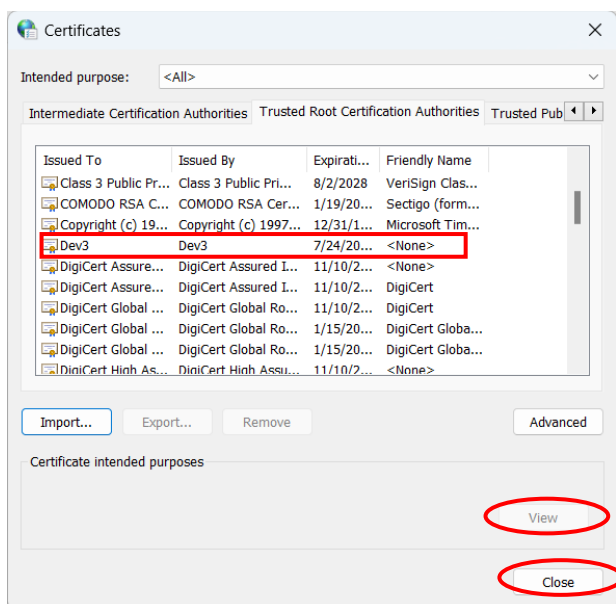
Click [Yes]. (The following shows “Dev3” as an example name of the certification authority (CA) that has been imported to the printer.)



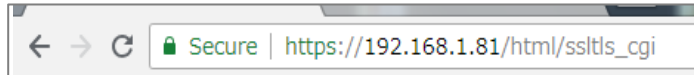
Click [OK].



Check that the certification authority (CA) has been registered.
Click [View] to check the details of the certificate. Then, click [Close] to exit.



Turn on the printer again. You can access the web screen of the printer through the address beginning with “https://.”



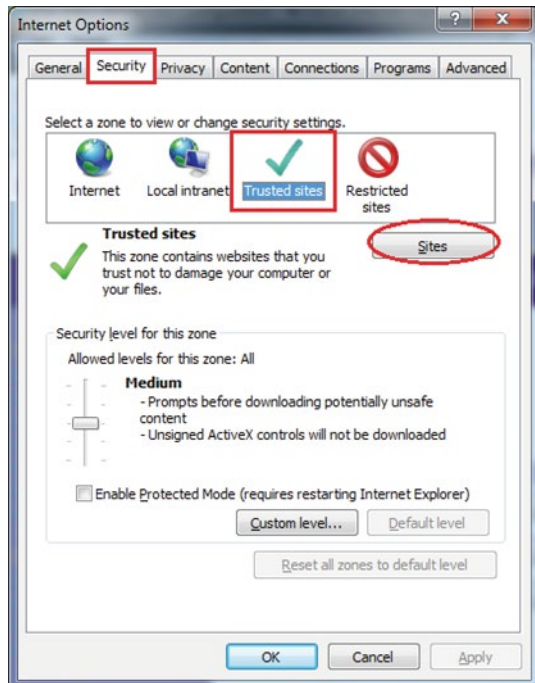
Note that depending on the environment of client devices, you may need to add the address to “Trusted sites.” (→ Refer to “11.2.3 Supplementary information.”)

11.2.3. Supplementary information

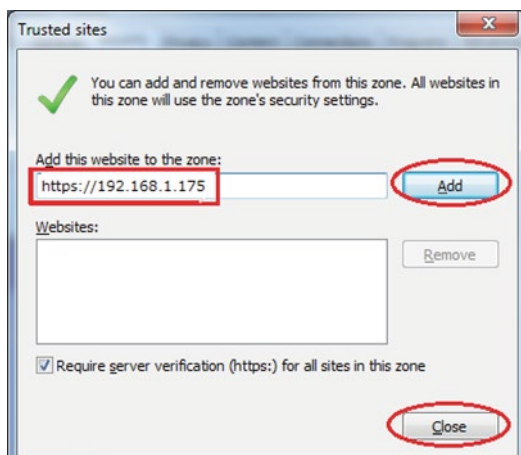
Depending on the environment of client devices, you may need to add an address to “Trusted sites” in the browser.

The following is a setting example on Internet Explorer (Windows).

In the [Security] tab of Internet Options, select “Trusted Sites” and click [Sites].



Enter the printer's IP address beginning with “https://” (the domain value of the certificate). Click [Add], and then click [Close].



Return to the Internet Options screen and click [OK] to exit.

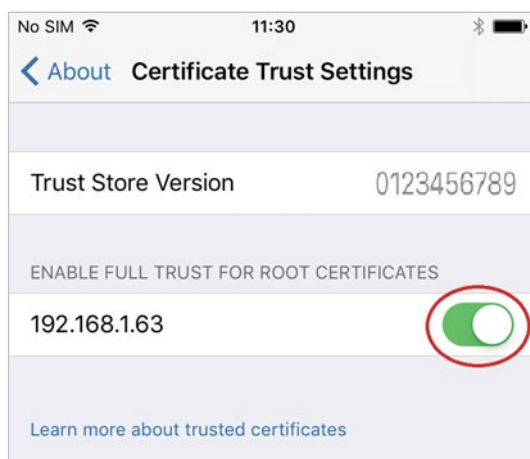
11.2.4. Settings required for certificate registration on iOS 10.3 or later

With the iOS 10.3 or later, if a certificate has been manually installed, it is not automatically trusted for SSL communication. Setup with the iOS device is required.

As reference information, the following is a setup example with the iOS.

(For details, refer to the Apple website: <https://support.apple.com/ja-jp/HT204477>)

1. Import the certificate following the procedures of “■ iOS device in 3. Import the certificate to the browser” of “11.2.1 Using a self-signed certificate.”
2. Select in the order of “Settings” > “General” > “About” > “Certificate Trust Settings.”
3. Under “Enable full trust for root certificates,” turn on trust for the certificate.



11.3. Cypher suite support list

The following lists cypher suites supported by services that use SSL/TLS communication.

(✓: Supported, -: Not supported)

11.3.1. Web Configuration

Service name		Web Configuration
Cypher suite name	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	-
	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	-
	TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256	-
	TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA	-
	TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256	-
	TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384	-
	TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	-
	TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384	-
	TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256	-
	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA	-
	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256	-
	TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA	-
	TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384	-
	TLS_RSA_WITH_AES_128_GCM_SHA256	-
	TLS_RSA_WITH_AES_256_GCM_SHA384	-
	TLS_RSA_WITH_AES_128_CBC_SHA	✓
	TLS_RSA_WITH_AES_128_CBC_SHA256	-
	TLS_RSA_WITH_AES_256_CBC_SHA	✓
	TLS_RSA_WITH_AES_256_CBC_SHA256	-
	TLS_RSA_WITH_3DES_EDE_CBC_SHA	✓
	TLS_RSA_WITH_RC4_128_SHA	✓
	TLS_RSA_WITH_RC4_128_MD5	✓

11.3.2. Star CloudPRNT

Service name		Star CloudPRNT			
TLS1.3		ENABLE(*)		DISABLE	
Encryption level setting of TLS1.2 cypher suite		HIGH + MEDIUM(*)	MEDIUM	HIGH + MEDIUM(*)	MEDIUM
Cypher suite name	TLS_AES_128_GCM_SHA256	✓	✓	-	-
	TLS_AES_256_GCM_SHA384	✓	✓	-	-
	TLS_CHACHA20_POLY1305_SHA256	✓	✓	-	-
	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	✓	-	✓	-
	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	✓	-	✓	-
	TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256	✓	-	✓	-
	TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA	✓	-	✓	-
	TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256	✓	-	✓	-
	TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384	✓	-	✓	-
	TLS_RSA_WITH_AES_128_GCM_SHA256	✓	-	✓	-
	TLS_RSA_WITH_AES_256_GCM_SHA384	✓	-	✓	-
	TLS_RSA_WITH_AES_128_CBC_SHA	✓	✓	✓	✓
	TLS_RSA_WITH_AES_128_CBC_SHA256	✓	-	✓	-
	TLS_RSA_WITH_AES_256_CBC_SHA	✓	✓	✓	✓
	TLS_RSA_WITH_AES_256_CBC_SHA256	✓	-	✓	-
	TLS_RSA_WITH_3DES_EDE_CBC_SHA	✓	✓	✓	✓
	TLS_RSA_WITH_RC4_128_SHA	✓	✓	✓	✓
	TLS_RSA_WITH_RC4_128_MD5	✓	✓	✓	✓

*) Factory default setting



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