



V6100 and V6110

Fixed Barcode Scanners

User Manual

Thank You for Your Purchase.

This manual explains the specifications, setup, installation, features, operation, and system configuration, of the V6100 AND V6110 series barcode scanners.

In order to use the product properly, read this manual carefully.

If you encounter any issue, please describe the detailed step to reproduce it for our investigation.

The contents of this manual may change without notice. Check our website for the most current version.

Safety notices



DO NOT disassemble. Disassembly will void the warranty and could cause damage or personal injury.



This product is intended for use in general electronics equipment (electronic computer, OA equipment, communications equipment, test and measurement equipment, machine tools, industrial robots, AV equipment, home appliances etc.).

Appropriate measures should be taken at use of unit/system related to safety and operation of transportation equipment (aircraft, train, automobile), traffic signal, gas leak detector, and safety devices.



Brady products are not designed or intended for the use as a component in life support appliances or as surgical implants nor in any other application where failure of the product could cause personal injury or death. The use of Brady products shall indemnify and hold harmless to Brady and its shareholders against any claims of injury or death associated with unintended authorized use.



- DATA BACKUP

This product has a memory backup function. This backup data restoration cannot be guaranteed if repair, reconstruction, or upgrades are performed on this product.

- DO NOT use this product at temperature or humidity ranges beyond that documented in the product specifications, or in direct sunlight.
- DO NOT expose this product to water, moisture, oil, etc.
- This product may be damaged in environments containing corrosive gas.
- DO NOT use any chemicals when cleaning.

If there are any dust particles on the image sensor, please clean the sensor as follows:

- Wipe lightly with cloth or swab (may be damp with alcohol).
- Wipe off any residual alcohol using a dry cloth.
- This is a high-precision optical device, avoid exposing this product to excessive force such as that sustained by a drop.



Do not install electrical wiring or plugin/unplug of cable when this product is powered on. These may result in an electrical damage to this product.

To minimize the risk of data loss, make sure to backup the hard drive before installing the software. Our company shall not be responsible for any troubles such as data loss or damages.

Locations for operation and storage

Avoid the following locations that could cause an accident or damage to the product.

- Exposed to ambient temperature outside the rating
- Exposed to relative humidity outside the rating
- Exposed to rapid temperature fluctuations (causing condensation)
- Exposed to direct sunlight or near heaters
- Exposed to direct vibration or shock
- In the presence of dust, salt, or iron particles
- In environments where static electricity can build into significant charges
- In the presence of flammable or explosive gases
- In the presence of corrosive gas

Long-term storage

Store away from direct sunlight and direct vibration or shock for long-term storage. Do not store this product at temperature or humidity ranges beyond that documented in the product specifications.

Precautions on Regulation and Standards

CE and FCC certified models:

V6100U, V6100R, V6100R5

V6110U, V6110R, V6110R5

FCC Regulations

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area may cause harmful interference in which case the user will be required to correct the interference at his own expense.

In instances where interference is experienced, the following measures are recommended to assist in mitigation:

- Reorient or reposition the equipment relative to the interference.
- Increase the separation distance between the equipment and the interference.
- Connect equipment to a separate power circuit than the interference if applicable.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and, (2) this device must accept any interference received, including interference that may cause undesired operation.

Innovation, Science and Economic Development (ISED)

Canada ICES-003: Information Technology Equipment (including Digital Apparatus)

Canada NMB-003: Équipement de technologie de l'information (incluant les appareils numériques)

CAN ICES-3 (A)/NMB-3(A)

Download information

The user manuals, software, and device drivers are available from:

<https://www.bradyid.com/V6100>

1. User Manual: This document.
2. Quick Start Guide: Describes basic usage of this product.
3. FixedConfig: Communication & configuration software.
4. Configuration Catalog: Configuration codes for V6100 and V6110 series.

NOTE: The terms scanner and scanner are used interchangeably in this document

Unpacking

Check that the box includes the items listed below. Please contact our sales representative if you find any missed or damaged item.

- Contents

Item	Quantity
V6100 or V6110 series scanner	1
V6100 and V6110 Quick Start Guide	1
FixedConfig Quick Start Guide	1

Optional accessories

Product name	Model	Scanner
24V AC adapter	AKA-24271A1	V6100R, V6110R
5V AC adapter	6A-161WP05-073	V6100R5, V6110R5

AC Power Adaptor

If purchased separately, select an adapter with output DC 5V $\pm 5\%$ or 24V $\pm 10\%$. Please confirm polarity and DC plug type as below.

Polarity: 

DC plug type: EIAJ RC5320A Voltage Segment 2

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1 **Overview**

- (1) V6100 and V6110 series is a fixed mount (stationary type) barcode scanner capable of 1-dimensional (1D) / 2-dimensional (2D) codes reading. This unit incorporates the most innovative digital camera technologies, image processing, and software techniques. This manual may also refer to 1D / 2D codes as "barcodes" or "symbols."
- (2) V6100 and V6110 series is a compact barcode scanner that can be mounted in a narrow space. IP65 enclosure allow use in harsh environments.
- (3) V6100 and V6110 series following features help to read challenging direct marking by laser maker or dot peen.
 - Image Preprocessing:
From raw image, V6100 and V6110 series can modify it by its image preprocess technique for better reading ratio or reading speed.
 - Table Mode:
Maximum 16 sets of configurations can be used seamlessly. This mode attempts to read by changing the set of configurations one by one until it reaches a successful decoding or the time limit is exceeded.
- (4) Cycle Buffer Function (MAXIMG) performs both the decoding and capturing images in parallel. This function eliminates the detailed timing tuning for moving barcodes.

1.1 **Supported symbologies**

1D barcode

Code39
Code128 / GS1-128 (EAN128)
Codabar (NW7)
ITF (Interleaved 2 of 5)
JAN / EAN / UPC
GS1 DataBar (RSS)
Code93

2D barcode

Data Matrix (ECC200)
QR Code / Micro QR Code
PDF417 / MicroPDF
Aztec Code
Composite Code

1.2 **Product lineup**

V6100 and V6110 series consists of 6 models.

Refer to “8.2 Reading Specifications” for details on the reading range.

Model name	Interface	Cable length	Power supply	Digital I/O	Minimum resolution (2D barcode)
V6100R	RS-232C	2m	DC 24V	Yes	0.25mm
V6100R5	RS-232C	2m	DC 5V	Yes	0.25mm
V6100U	USB (Full speed)	2m	DC 5V	No	0.25mm
V6110R	RS-232C	2m	DC 24V	Yes	0.125mm
V6110R5	RS-232C	2m	DC 5V	Yes	0.125mm
V6110U	USB (Full speed)	2m	DC 5V	No	0.125mm

(1) RS-232C type

Regarding RS-232C type, RS-232C, digital I/O (Input x1, Output x2) can be used.

(2) USB type

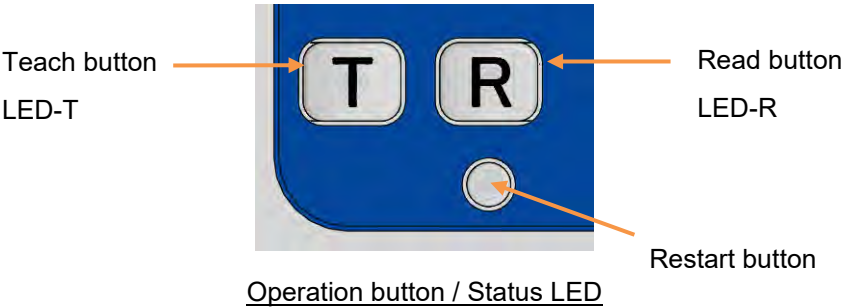
Regarding USB type, two types of operating modes can be used.

Please refer to Section 2.2 for instructions for switching the operating modes.

HID (Human Interface Device) mode:

The scanner can be used as a keyboard emulation device. The reading data is transmitted as if it was an input from the keyboard.

1.3 Product description



1.3.1 Operation button

- Teach button
For Auto Tuning function. In addition, switch to HID mode alternately by turning on the power while pressing the button (only for USB type).
- Read button
For a test / verification and Auto Tuning function, and also trigger input same like the external synchronizing signal.
- Restart button
For restarting the scanner.

1.3.2 Status LED (LED-T, LED-R)

The status is displayed by the LED color and lighting pattern of the operation button.

Status	LED
Power on	RS-232C : Turns red⇒green⇒off USB(COM) : Turns red⇒green⇒off USB(HID) : Turns red⇒orange⇒off
Reading barcodes	OK : Turns green NG : Turns red
Auto Tuning	In progress : Blinks orange Success : Turns green Failure : Blinks red 7 times Save - 3 tables : Blinks green 4 times - 1 table : Blinks green 3 times
Camera module error	Blinks red at short intervals
Connection error / Communication error	Blinks red 7 times at short intervals
Save settings	Blinks green 3 times

1.3.3 Interface cable

RS-232C type

- Power

V6100R, V6110R: Supply DC24V to the scanner.

V6100R5, V6110R5: Supply DC5V to the scanner.

- RS-232C interface: RxD, TxD, CTS, RTS

Used for transmitting the decoded data and status and receiving commands from host device.

V6100R5, V6110R5 following functions can be used by cutting the cable at the connector end.

Refer to "Interface" for wire color.

- 2 Digital output: OUT1, OUT2

These are photocoupler isolated digital signal outputs.

OUT1 and OUT2 outputs statuses of the reading operation and the reading results. Allocation and timing setting for each output can be configured by serial commands (refer to "General Operation").

Default settings of status assignments

Pin	Default
OUT1	GO signal
OUT2	NG signal

Status signals

Signal	Description
GO signal	GO signal is associated with Read OK, which is ON during the specified time when the barcode is decoded successfully. This signal is OFF when starting the next reading.
NG signal	NG signal is associated with Read NG, which is ON during the specified time when the barcode is not decoded successfully. This signal is OFF when starting the next reading.
Ready signal	Ready signal is ON when the barcode scanner is ready for reading.
Busy1 signal	Busy1 signal is ON during a reading (except switch chattering delay), and OFF after decoding.
Busy2 signal	Busy2 signal is ON during a reading (except switch chattering delay), and OFF after transmitting decoded data.



When changing these parameters, save the settings to the internal flash memory (using the WSETS command) and restart the scanner.

When using Busy2 signal, the settings RSCS=1 (Use RS/CS control).

- Digital input: SYNC

This signal is photocoupler isolated digital input used to trigger the reading action.

USB type

Select the device type (HID mode).

2 Preparation

2.1 RS-232C type

- (1) Connect with host device. (Refer to “Example of device configuration”)
- (2) Supply power to the scanner.

Default settings of RS-232C communication

Baud rate	: 9600bps
Data length	: 8bit
Parity	: None
Stop bit	: 1bit
Flow control	: None

2.2 USB type

The USB type can be switched to HID mode.

- Turn on the power while pressing the Teach button. When the status LED changes from red to green or orange, release the button.
- Read the following barcodes in order of (1) "Start the mode switching" ⇒ (2) "the mode you want to switch to" ⇒ (3) "Save the new mode", then reboot the scanner.



Start the mode switching



HID mode



Save the new mode
(Save to flash ROM)

2.2.1 HID mode

- (1) Check if USB port of the Windows PC is available.
- (2) Plug the USB connector into an available USB port while the PC is running. The status LED lights (red ⇒ orange ⇒ off) during start-up.
- (3) The PC will recognize the scanner as human interface device.
- (4) The PC will process the symbology data in the same way as the data entered with the keyboard.

2.3 **Reading flow (Note: in case of default setting)**

- (1) Input the trigger for reading start: 3 ways to do
 - The serial command “g”
 - The Read button of operation buttons
 - The digital input “SYNC input” (Only for RS-232C type)

When trigger is input, the status LED turns green and the reading operation starts.

- (2) Return the result: 2 ways

- a. Read OK

The decoded data is transmitted through the interface.

RS-232C type

- Digital output “GO” is ON and the status LED turns green.

USB type

- The status LED turns green.

- b. Read NG

The error code is transmitted through the interface.

RS-232C type

- Digital output “NG” is ON and the status LED turns red.

USB type

- The status LED turns red.

2.4 **Configuration**

Configure settings of the scanner by serial commands. However, the serial commands cannot be used in USB HID mode.

For some settings, you can use the 2D barcode menu for settings.

2.5 **Image data transfer**

The image data that the scanner captured can be transferred to the host PC using the configuration tool "FixedConfig". By changing the setting, it is possible to transfer when the scanner is in standby state or when reading process is complete.

Estimated transmission time of image data

Conditions: Bit map format (file name *.bmp, 752 x 480 pixels)

RS-232C type Baud rate 115.2kbps: Approx. 30 seconds

USB type USB2.0 (Full Speed): Approx. 1 second

Command	Description
MODE=0	Not sending data. (*)
MODE=1	Test mode: DO NOT USE
MODE=2	
MODE=3	Transfers image data every time (only for USB type)
MODE=4	Transfers image data when the reading is "NG". (only for USB type)
MODE=5	Transfers image data when the reading is "OK". (only for USB type)

*: Default setting

3 Operation Mode

V6100 and V6110 series has four operation modes as follows.

Operation mode	Command	Description
Single Reading Mode	SYNCMODE=0	Single reading for each SYNC input.
Timeout Mode	SYNCMODE=1	After SYNC input, the scanner continues reading during the duration time set by the "TOTALLIM" command. The scanner sends the error code when it fails in reading within the duration time.
External Trigger Mode	SYNCMODE=2	The barcode scanner continues reading during the SYNC input is ON. The "g" command (start reading command) is not accepted.
Auto-sense Mode	SYNCMODE=3	The scanner automatically detects the label, turns on the synchronization input, and performs barcode reading automatically.

The reading operation means that processing from image capture to barcode decoding.

The following diagnostic mode can be used while the scanner is in Single Reading Mode.

Diagnostic mode	Command	Description
Normal Mode	TEST=0	For normal use or for returning to Normal Mode.
Test Mode	TEST=1	For measurement of barcode reading rate.
Continuous Reading Mode	continue	Used to adjust the reading position. Exit this mode with the "stop" command.

The diagnostic modes are used for configuring the barcode scanner. Do not use this mode in normal operation.

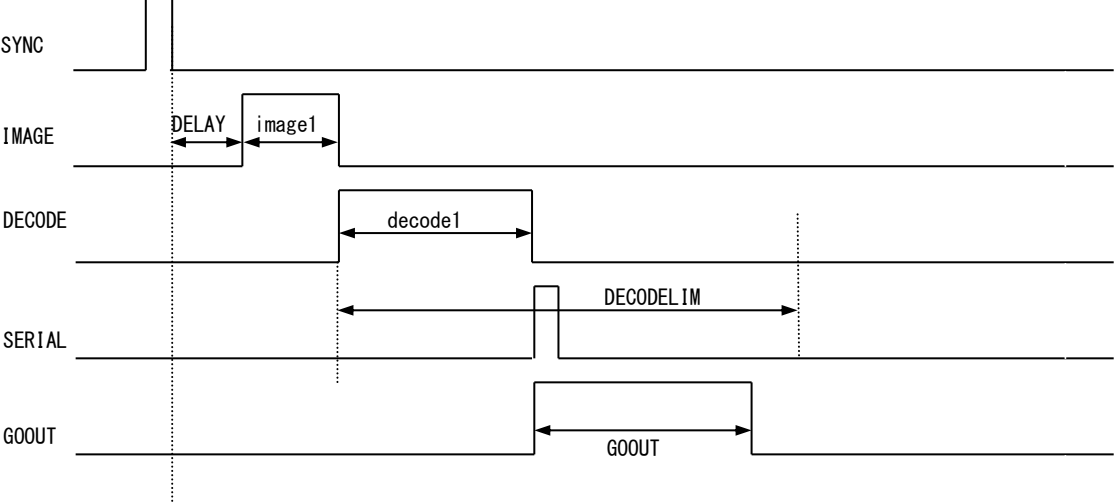
Glossary of terms

DELAY :	The time from SYNC ON to reading.
CHATT :	The time needed for eliminating the chattering.
IMAGE :	The duration for capturing an image.
DECODE :	The duration for decoding.
DECODELIM :	The maximum duration to attempt the decoding.
GOOUT :	The duration of GO signal.
NGOUT :	The duration of NG signal.
SERIAL :	The duration of data output through the serial interface.
MAXIMG :	The maximum number of images in the buffer.
WAITIMG :	The interval of image capture.
Soft trigger :	The SYNC by the serial command input.
Hard trigger :	The SYNC by digital input or the Read button.

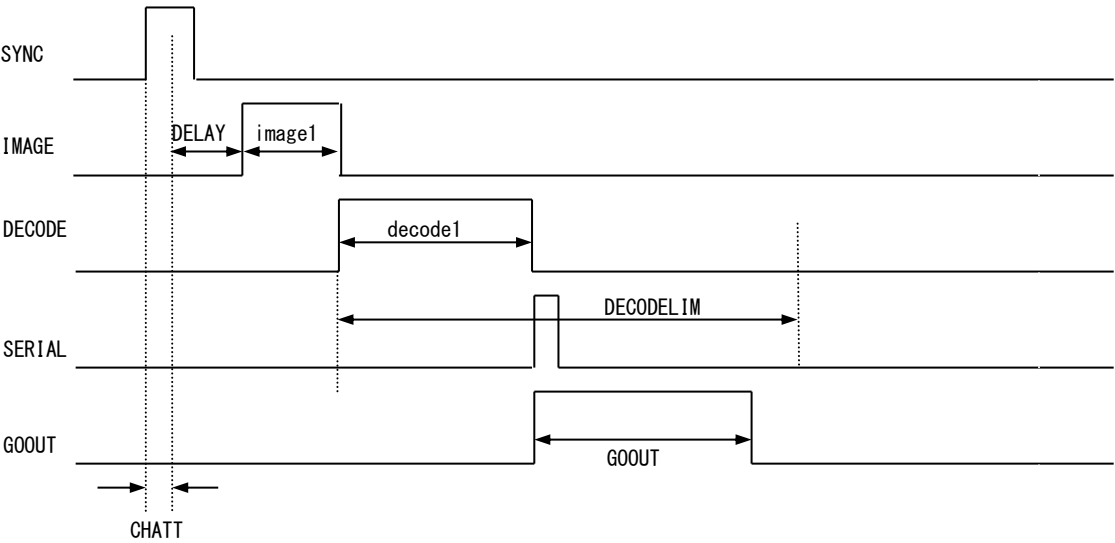
3.1 Single Reading Mode

The barcode scanner performs a single read for each SYNC input.

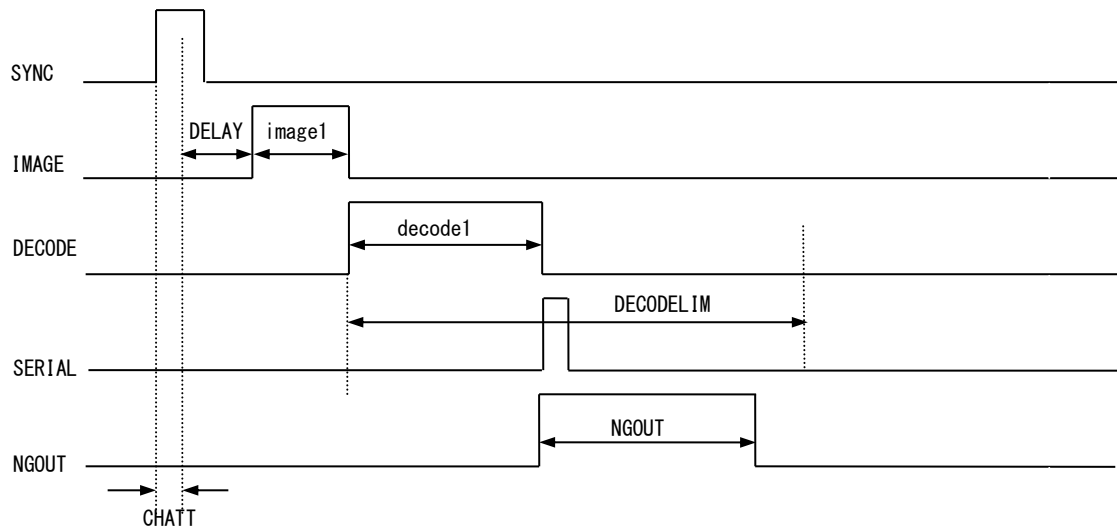
3.1.1 Soft trigger, Read OK, Data transmission: After decoding



3.1.2 Hard trigger, Read OK, Data transmission: After decoding



3.1.3 Hard trigger, Read NG, Data transmission: After decoding

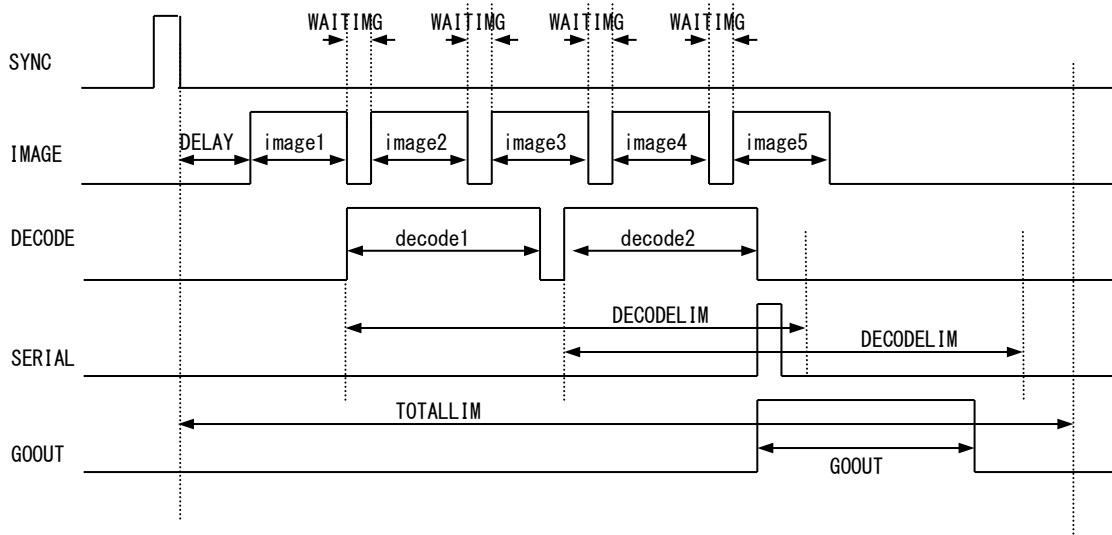


3.2 Timeout Mode

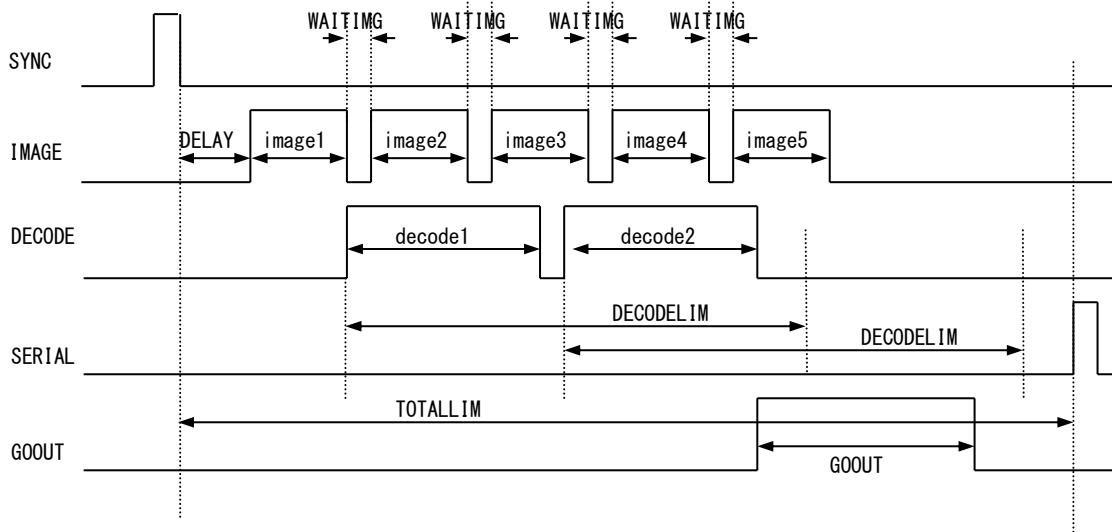
The barcode scanner reads the barcode repeatedly during the duration time, set by "TOTALLIM" after the SYNC input, or continues reading until the decoding is successful. If the barcode scanner cannot decode successfully in the duration time, it stops reading and sends an error code to the host. Typically, MAXIMG is set to a number greater than one. The multiple MAXIMG enables the Cycle Buffer Function and the parallel processing of the image capturing and decoding. This can reduce the processing time.

The below timing charts explain the behavior of Cycle Buffer Function.

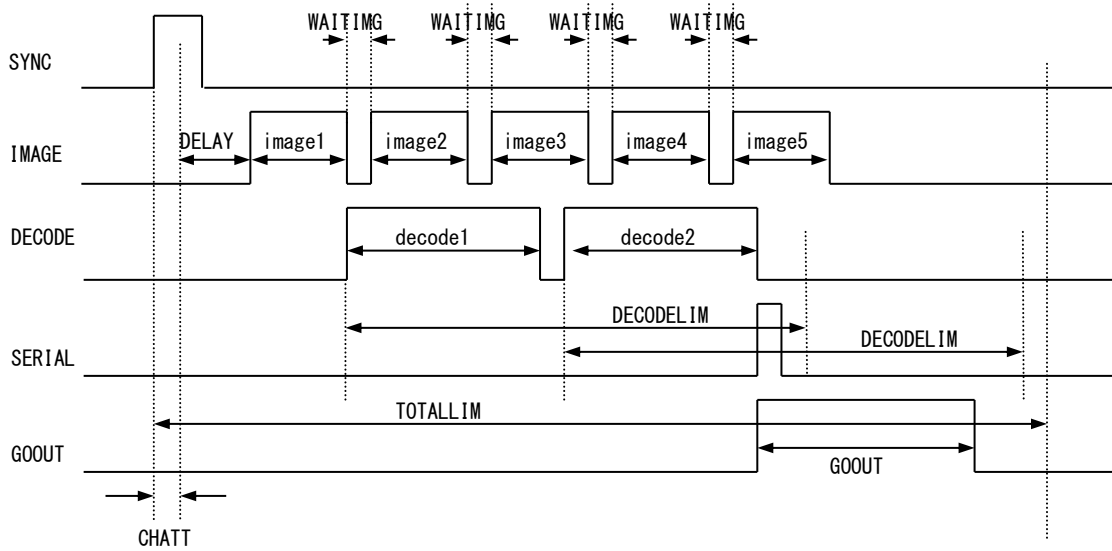
3.2.1 Soft trigger, Read OK, Data transmission: After decoding



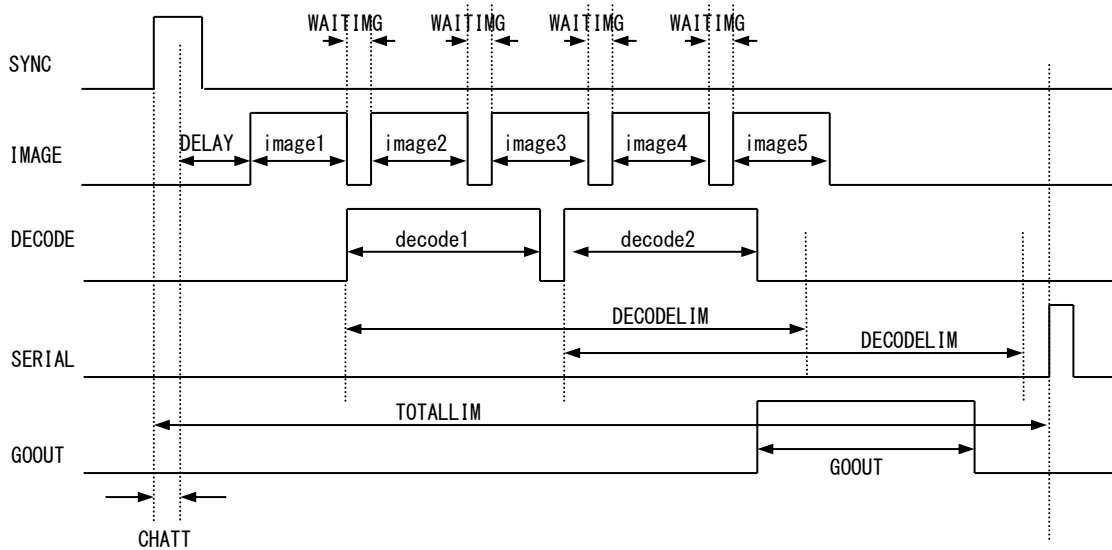
3.2.2 Soft trigger, Read OK, Data transmission: After SYNC OFF



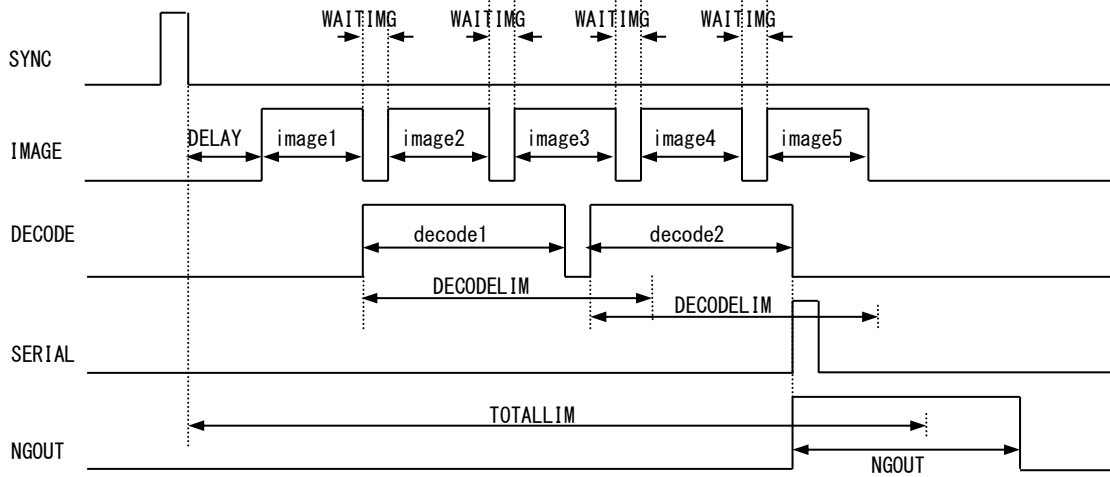
3.2.3 Hard trigger, Read OK, Data transmission: After decoding



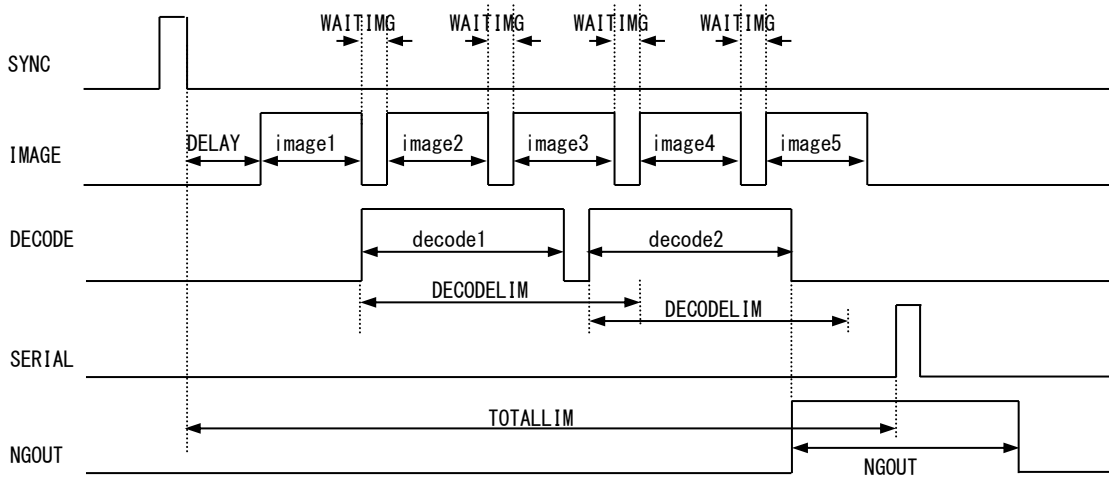
3.2.4 Hard trigger, Read OK, Data transmission: After SYNC OFF



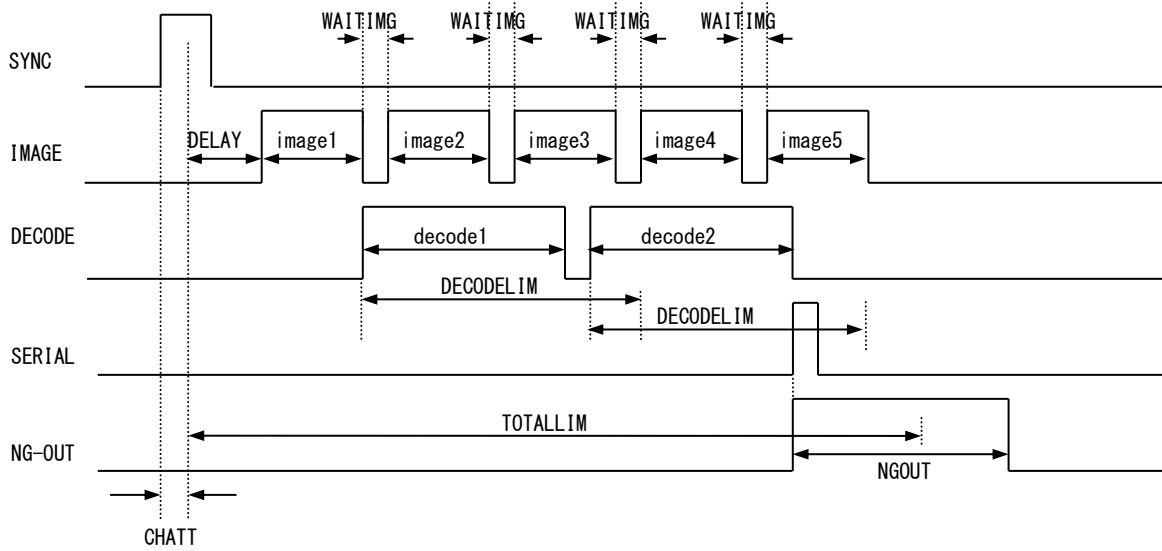
3.2.5 Soft trigger, Read NG, Data transmission: After decoding



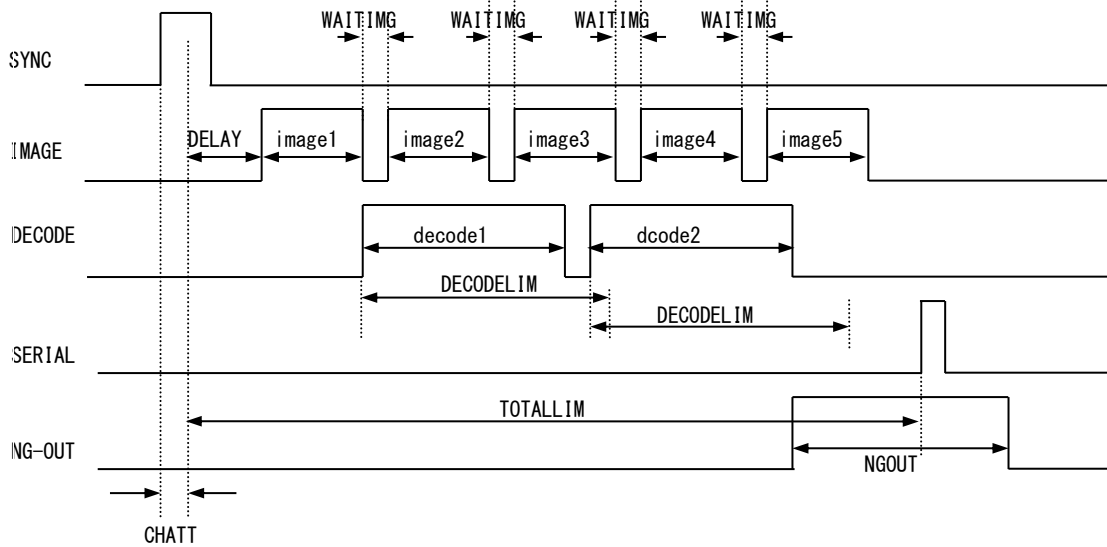
3.2.6 Soft trigger, Read NG, Data transmission: After SYNC OFF



3.2.7 Hard trigger, Read NG, Data transmission: After decoding



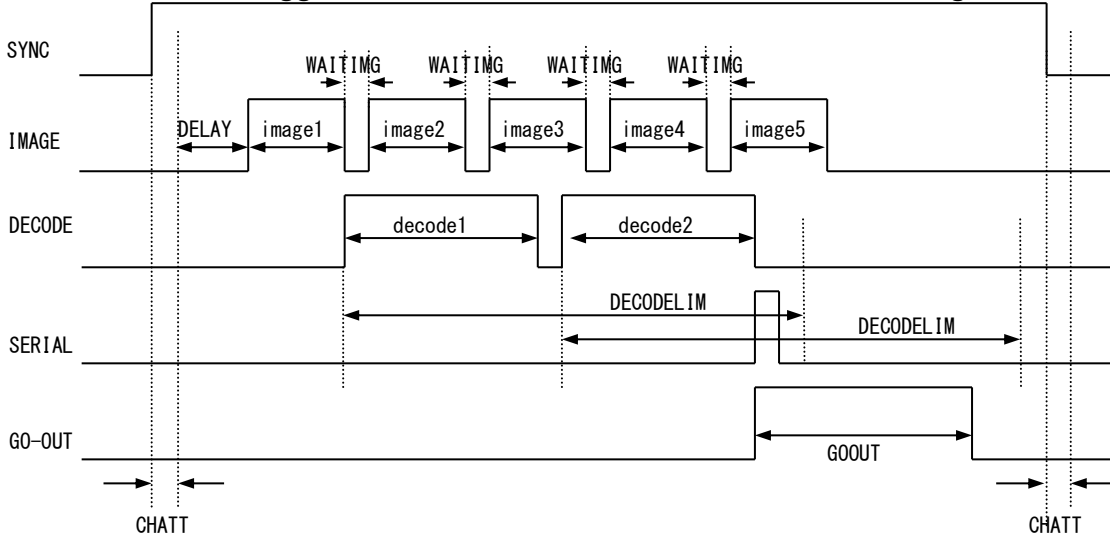
3.2.8 Hard trigger, Read NG, Data transmission: SYNC OFF



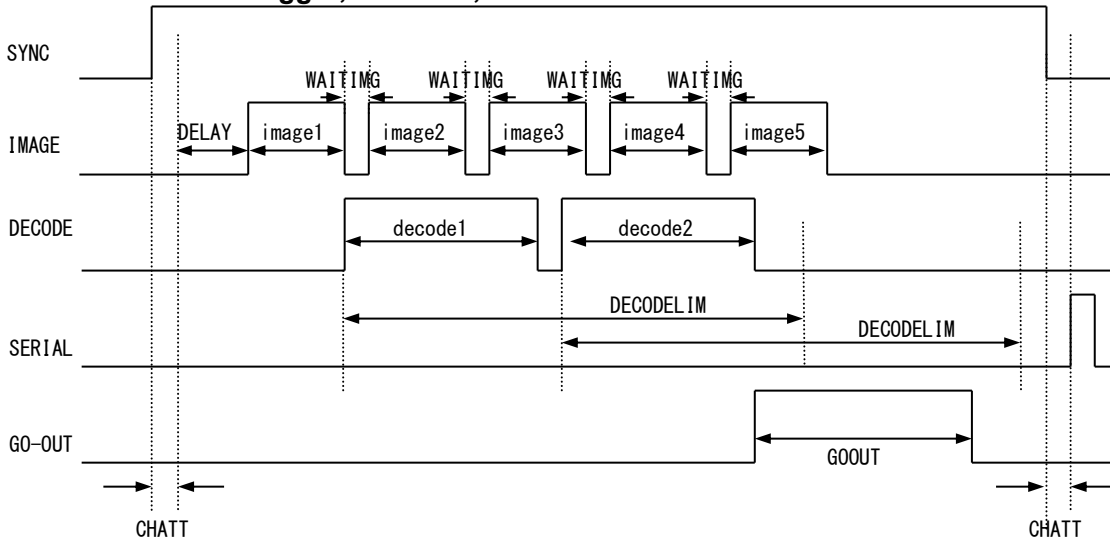
3.3 External Trigger Mode

The barcode scanner reads the barcode repeatedly during the SYNC input is active. Typically, MAXIMG is set to a number greater than one. The multiple MAXIMG enables the Cycle Buffer Function and the parallel processing of the image capturing and decoding. This can reduce the processing time. The below timing charts explain the behavior of Cycle Buffer Function.

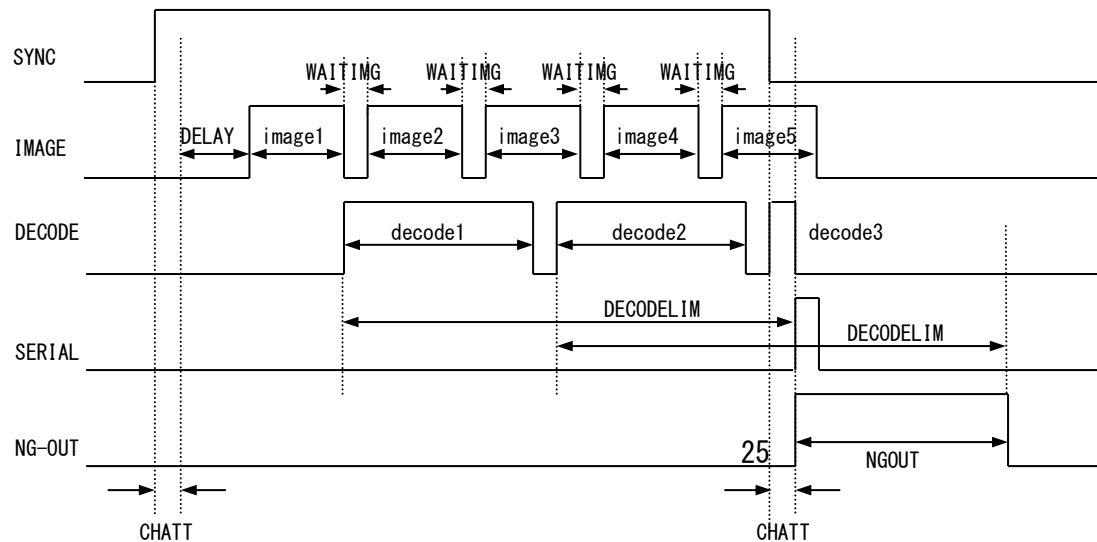
3.3.1 Hard trigger, Read OK, Data transmission: After decoding



3.3.2 Hard trigger, Read OK, Data transmission: After SYNC OFF



3.3.3 Hard trigger, Read NG, Data transmission: After decoding or SYNC OFF



3.4 Continuous Reading Mode

In Continuous Reading Mode, the barcode scanner reads repeatedly. It is useful for camera tunings. To put the barcode scanner in this mode, send the serial command "continue" to the barcode scanner, and then send the serial command "g" to start reading. To exit this mode, send the serial command "stop" to the barcode scanner.

It cannot be used in Auto-sense Mode.

3.5 Test Mode

In Test Mode, the barcode scanner can measure the reading ratio. It is for checking the reading condition and stability.

To set the barcode scanner in this mode and start, send the serial command "TEST=1" and "g" to the barcode scanner.

To exit this mode, send the serial command "TEST=0" to the barcode scanner.

Once this mode is started, the barcode scanner will output an asterisk "*" to the host for each 10% of the total number of reading (in the default setting, it is set to 10). The barcode scanner will stop the Test Mode after output an asterisk 10 times.

It cannot be used in Auto-sense Mode.

(Output example)

```
*** TEST MODE ***
1 2 3 4 5 6 7 8 9 10
* * * * *
NG 1: OK 99/SYNC 100
NG 1.00%: OK 99.00%
```

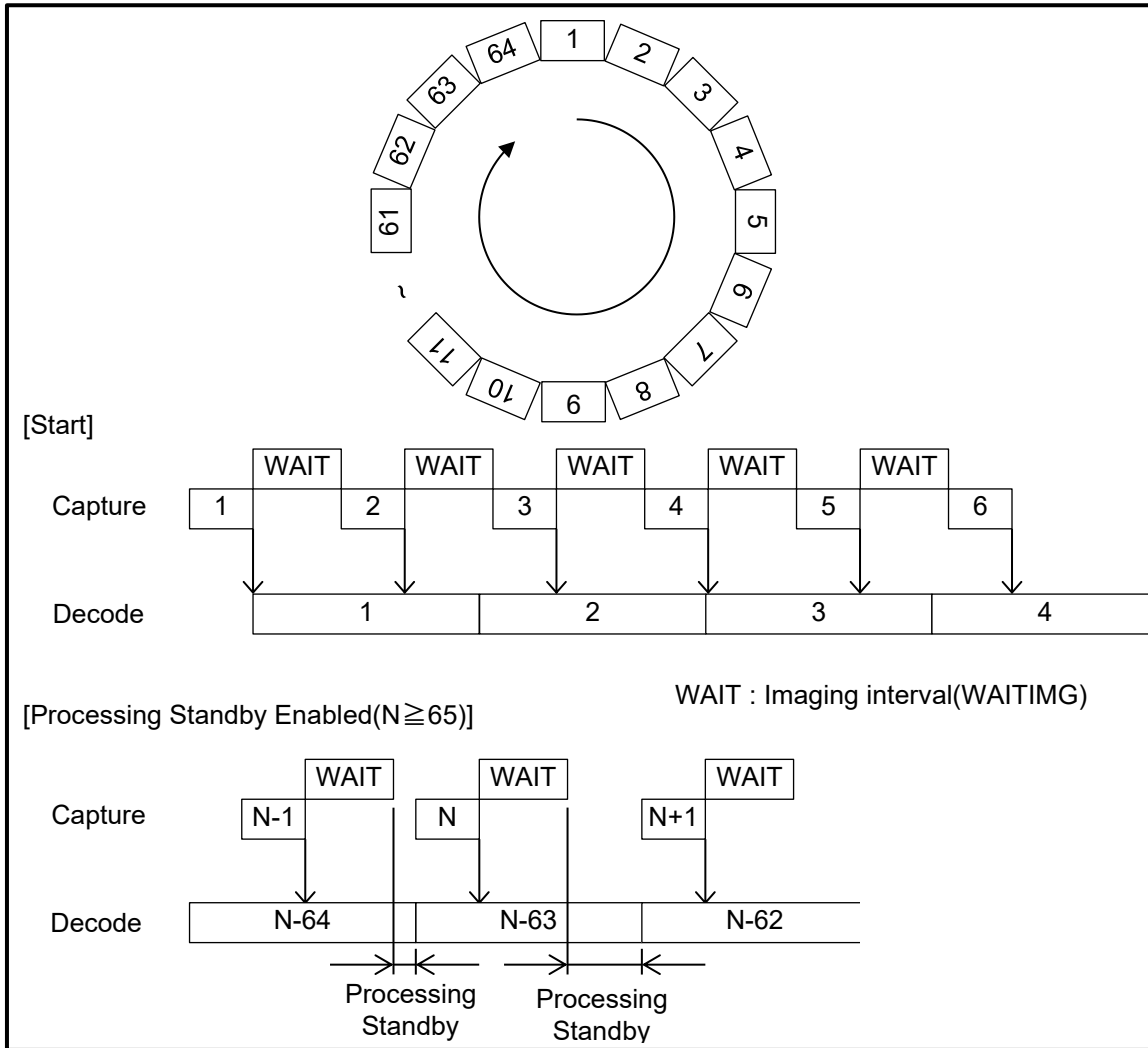
(Output format)

```
NGaaaa: OKbbbb/SYNCcccc[CR]
NGddd.dd%: Okeee.ee%[CR]
```

aaaaa :	NG Count	(0 - 1000, maximum number is 1000)
bbbbbb :	OK Count	(0 - 1000, maximum number is 1000)
cccccc :	SYNC Input	(NOT displayed more than 1000)
ddd.dd :	NG Rate	(0.00-100.00, Displayed to the second decimal place)
eee.ee :	OK Rate	(0.00-100.00, Displayed to the second decimal place)

3.6 Cycle Buffer Function

Cycle Buffer Function is for moving object, especially for the case it is difficult to catch the object within the field of view. In SYNCMODE=1 (Timeout Mode) or SYNCMODE=2 (External Trigger Mode), the Cycle Buffer Function is enabled when the MAXIMG number is greater than 1 (max. 64). If the Cycle Buffer Function is enabled, the barcode scanner captures multiple images after receiving the SYNC signal and then saves the images to the buffer memory (up to 64 images). The barcode scanner starts decoding from memory #1, if it is not successful, the barcode scanner will decode the image saved in memory #2. When the buffer memory reaches to #64, the next image will be saved into buffer memory location #1 if the barcode scanner has finished decoding that image. If the barcode scanner has not finished, the saving of 65th image will wait until the decoding of memory #1 is finished.



3.7 Concept of Cycle Buffer

This function focuses to avoid No Read by missing the object from the sight of V6100 and V6110 series. Decoding process can be postponed and the scanner focuses to obtain images which include the moving object. Please try to configure to finish the capture and decode within the time the scanner saves the images whose number is set by MAXIMG. The maximum value of MAXIMG is 64. Otherwise, the imaging interval will vary depending on the reading processing time after the number of imaging.

The less capture resolution (number of pixels), the less capture time and it results to shorten the imaging interval.

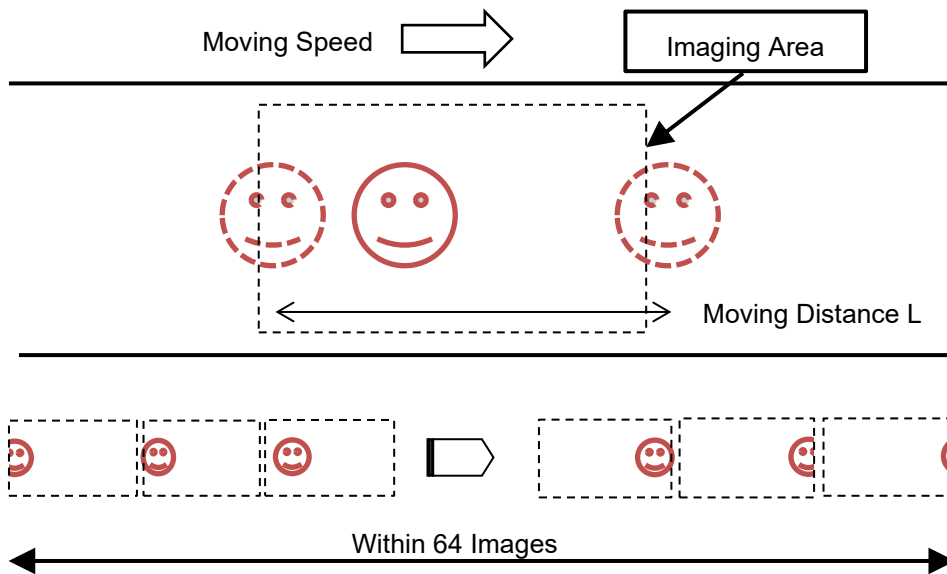
[Configuration Example]

The relation of Shutter Time (SHUTT), Capture Time (CAPIMG), Capture Interval (WAITIMG) and Total Imaging Cycle (CAPCYC) are as follows.

$$\text{CAPCYC} = \text{SHUTT} + \text{CAPIMG} + \text{WAITIMG}$$

Moving Time $T = L / V$ should be less than $(64 \times \text{CAPCYC})$

when the moving object's speed is V and the object's moving distance is L .



MAXIMG=64、SHUTT=1/1000s=1ms、CAPIMG=20ms、WAITIMG=10ms

Imaging Cycle is CAPCYC=SHUTT+CAPIMG+WAITIMG=1ms+20ms+10ms=31ms.

(1) Moving speed V when the imaging range is $L=100\text{mm}$ is:

$$L/V < 64 \times \text{CAPCYC}$$

$$\rightarrow V > L / (64 \times \text{CAPCYC}) = 100\text{mm} / (64 \times 31\text{ms}) = 0.05\text{m/s} = 3.0(\text{m/min.}) \therefore \underline{V > 3.0\text{m/min.}}$$

(2) Imaging range L when the moving speed is $V=30\text{m/min.} (= 500\text{mm/s} = 0.5\text{mm/ms})$ is:

$$L/V < 64(\text{CAPCYC})$$

$$\rightarrow L < 64 \times \text{CAPCYC} \times V = 64 \times 31\text{ms} \times 0.5\text{mm/ms} = 992\text{mm} \therefore \underline{L < 992\text{mm}}$$

4 **Configuration for barcode reading**

4.1 **Automatic parameter tuning (Auto-Tuning)**

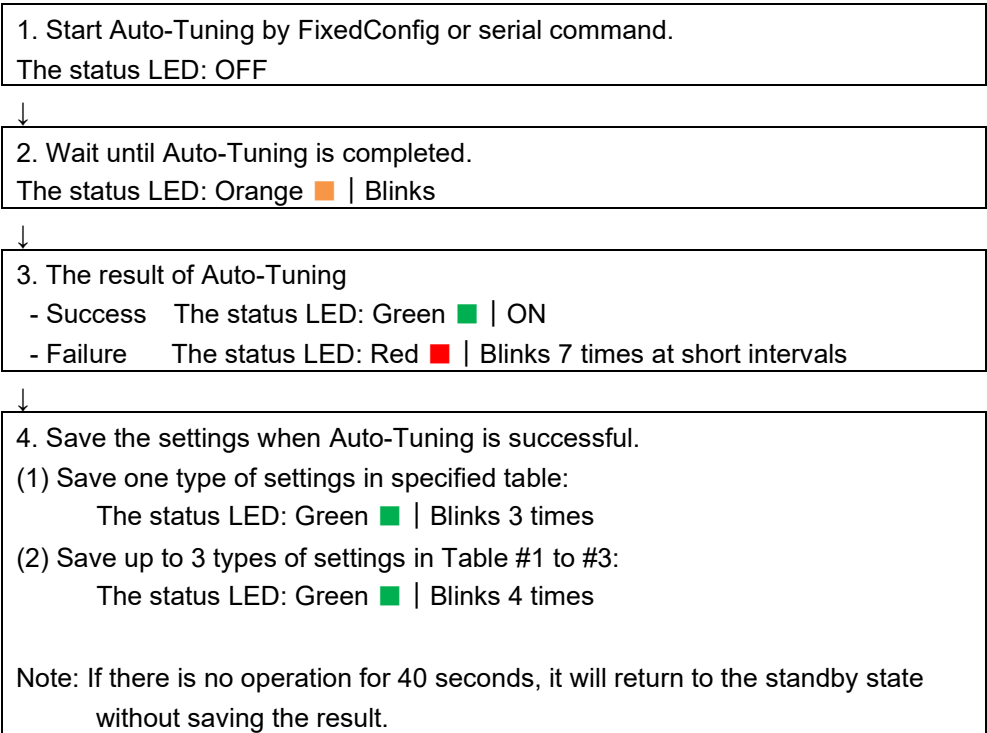
With this function, the barcode scanner can be configured automatically. This function is available by the communication from the host device as well as an easy button operation on the barcode scanner.

For details on the button operation, please refer to 4.1.3 “Auto-Tuning by button operation”.

4.1.1 **How to operate Auto-Tuning function**

Execute the Auto-Tuning by FixedConfig or serial command.

- Place and fix the barcode within the reading distance range.
- Follow the steps below.



DO NOT turn off power during Auto Tuning operation.
DO NOT send serial commands during Auto Tuning operation.

4.1.2 Commands for Auto Tuning

In Auto Tuning, you can configure the Auto Tuning operation, reference of tuning result, selection of storing method and setting of tuning condition.

- Start Auto Tuning

*setup

This command is to start this function.

- Force-quit Auto Tuning

*cancel

This function takes relatively long time. The barcode scanner will force-quit by this command.

- Check the scanner state

*?state

This command is to check the state of the scanner.

State	Response
Reading standby	STANDBY[CR]
Auto-Tuning in progress	RECEIVED[CR]
Auto-Tuning success: waiting for save settings	SAVEWAIT[CR]
Auto-Tuning failure	ABORTED[CR]
Read in progress	(No reply)

- Save the result of Auto Tuning (Up to 3 types)

*save

This command is to save the results. When the scanner receives this command within about 40 seconds after the completion of the tuning process, the results are saved in Table #1 to #3. If no command is received, the scanner will discard the results and return to reading standby state.

- Save the result of Auto Tuning (1 type)

*save2=a (a: Table number #1 - #16)

This command is to save one type of results. When the scanner received within about 40 seconds after the completion of the tuning process, the results are saved in Table "a". If no command is received, the scanner will discard the results and return to reading standby state. If no table is specified, the results are saved in Table #1.

- Refer to the saved result

?ddmtbl

This command is to refer to the saved result of Auto Tuning.

Output example of ?ddmtbl

```
***** STATUS *****
last table number=0(read only)
NEXTDDMTBL=1 (1-16)
DDMTBLNG=1 (0:OFF 1:ON)
ENABLEDDMTBL=1 (1-16)
EDITDDMTBL=1 (1-16)
TBLTX=0 (0:OFF 1:ON)
+++++ table 0 +++++
DDMtblname=table0
DDMcapmode=0, 0, 752, 480
DDMflash=100, 100
DDMshutt=3
DDMagain=9
DDMdgain=4
DDMblackval=64
DDMdecodeim=500
DDMlight=3
DDMmirror=2
DDMpreproc=0, 0, 0, 0, 0
+++++ table 1 +++++
DDMtblname=table1
DDMcapmode=0, 0, 752, 480
DDMflash=100, 100
DDMshutt=3
DDMagain=9
DDMdgain=4
DDMblackval=64
DDMdecodeim=500
DDMlight=3
DDMmirror=2
DDMpreproc=0, 0, 0, 0, 0
+++++ table 1 +++++
(omission)
+++++ table 16 +++++
DDMtblname=name
DDMcapmode=0, 0, 752, 480
DDMflash=100, 100
DDMshutt=2
DDMagain=9
DDMdgain=1
DDMblackval=128
DDMdecodeim=500
DDMlight=3
DDMmirror=2
DDMpreproc=0, 0, 0, 0, 0
***** END *****
V6100U : 064-V1.0a
```

4.1.3 Auto Tuning by button operation

Execute Auto Tuning by button operation of the scanner.

- Place and fix the barcode within the reading distance range.
- Follow the steps below.

1. Start Auto Tuning by holding down the Teach-button.

The status LED: Orange ■ | ON



2. Wait until Auto Tuning is completed.

The status LED: Orange ■ | Blinks



3. The result of Auto Tuning

- Success The status LED: Green ■ | ON
- Failure The status LED: Red ■ | Blinks 7 times at short intervals



4. Save the settings when Auto Tuning is successful.

(1) Save one type of settings in specified table:

(1-1) Holding down the Read button

The status LED: Red ■ | ON

(1-2) Save successful

The status LED: Green ■ | Blinks 3 times

(2) Save up to 3 types of settings in Table #1 to #3:

(2-1) Holding down the Teach button

The status LED: Red ■ | ON

(2-2) Save successful

The status LED: Green ■ | Blinks 4 times

Note: If there is no operation for 40 seconds, it will return to the standby state without saving the result.



DO NOT turn off power during Auto Tuning operation.

DO NOT send serial commands during Auto Tuning operation.

4.2 Table Mode [AGC=T]

V6100 and V6110 series works in Table Mode, which has up to 16 combinations of camera settings (hereinafter, referred to as “tables”) and uses each table in a sequence of the reading.

Switch to the table mode with the command “AGC=T”.
It cannot be used together with Auto Gain Control Mode.

The number of tables to be used is set by the command below.

ENABLEDDMTBL=a (a: 1 to 16)

e.g.1) Use 3 tables (a=3)

Table #1, #2 and #3 are enabled and Table #4 to #16 will not be used. If the barcode scanner successfully decodes a barcode with Table #1, Table #1 will be used in the next reading.

If the barcode scanner failed to decode a barcode with Table #1, the settings will switch to Table #2, and if it fails again, switch to Table #3.

If the barcode scanner failed to decode with Table #3, the settings will switch back to Table #1.

e.g.2) Use 1 table (a=1)

Only Table #1 is enabled. Table #2 to #16 will not be used. As the result, Table #1 is always used every reading.

Set the number of tables according to the reading target and the operating environment.

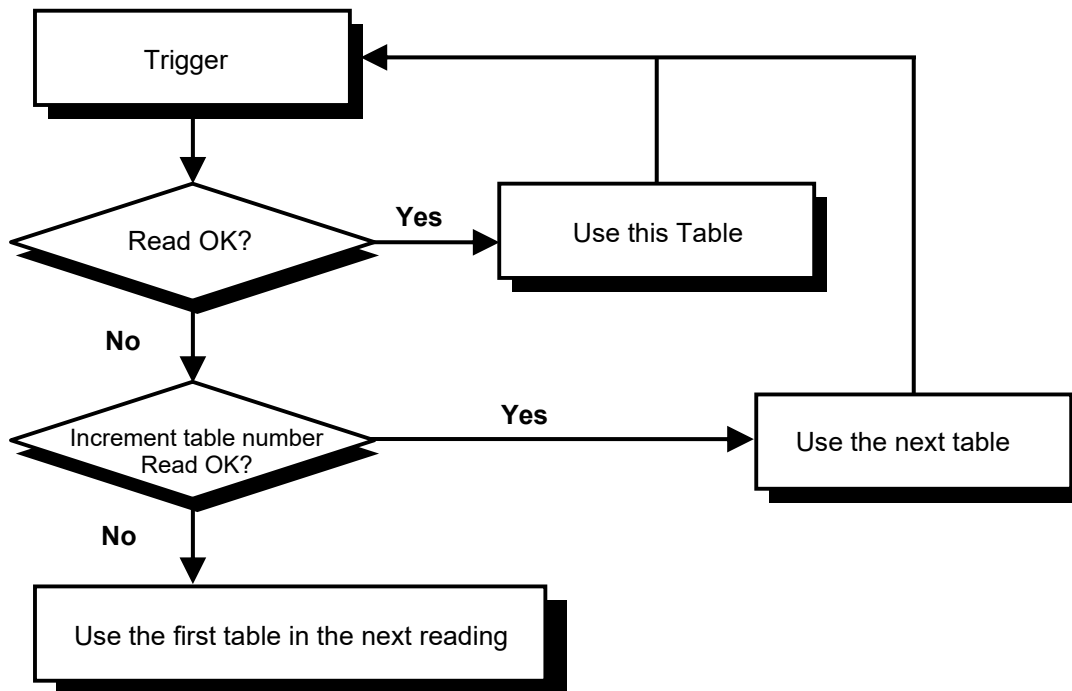
The following shows the structure of the Table. Each table has 11 types of parameters:

(1) Reading Area	[DDMcapmode]
(2) Illumination Control (ON/OFF)	[DDMlight]
(3) Illumination brightness	[DDMflash]
(4) Shutter Speed	[DDMshutt]
(5) Analog Gain	[DDMagain]
(6) Digital Gain	[DDMdgain]
(7) Black Level Illumination	[DDMblackval]
(8) Image Preprocessing	[DDMpreproc]
(9) Mirrored Image	[DDMmirror]
(10) Decode Time Limit	[DDMdecodelim]
(11) Table Name	[DDMtblname]

When the reading is successful, the barcode scanner uses the table settings for the next reading.
When the reading is unsuccessful, the barcode scanner attempts to read using the next table settings.

The flow chart of Table mode is shown below.

< Flow char of Table Mode >



4.2.1 Edit table

Edit tables with serial commands.

- (1) Set the target Table #.

Send the serial command below to assign the table number to be edited.

EDITDDMTBL=a (a: 1 to 16)

- (2) Configure the parameters.

Refer to section 4.3 "Setting parameters for Table Mode" for detailed information.

- (3) Edit another table

Repeat the step 1 & 2.

- (4) Check the target Table

You can check the target table status using the following command.

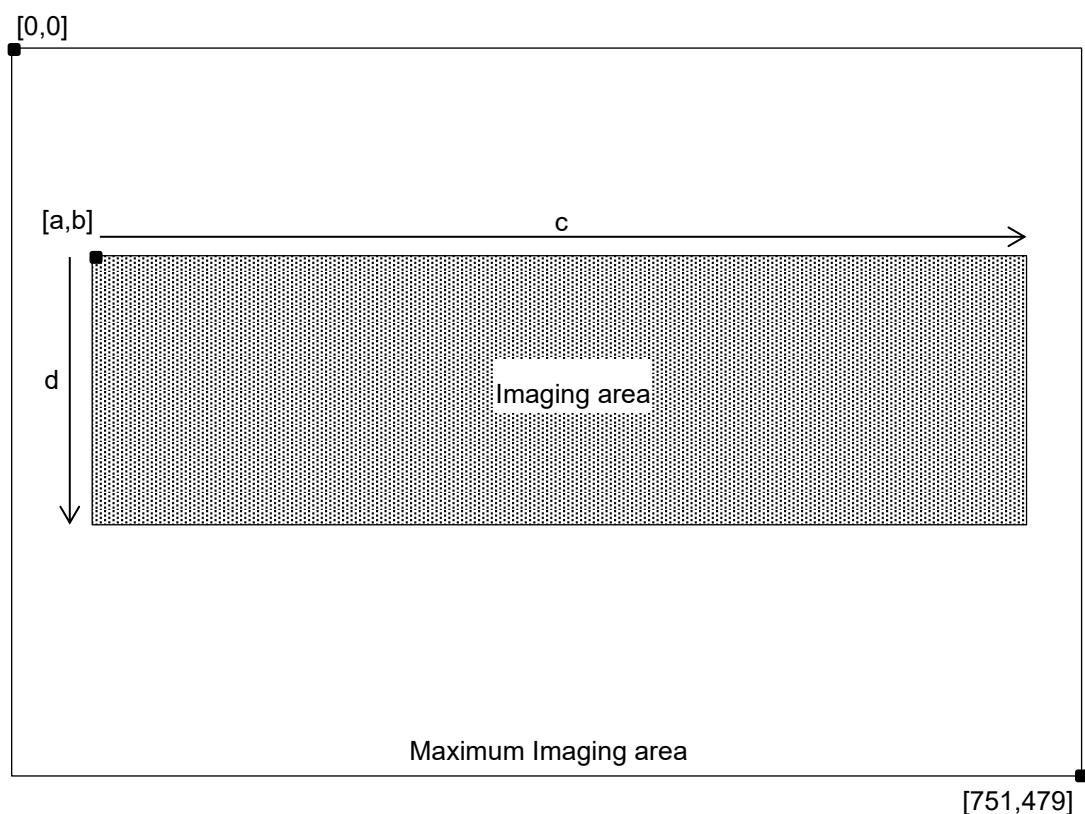
?ddmtbl

4.3 Setting parameters for Table Mode

4.3.1 Reading area [DDMcapmode]

This command specifies the reading area from an captured image.

The parameters are original coordinate and value of width (x) & height (y).



DDMcapmode=a,b,c,d

a: Coordinate origin X (0 to 742)

b: Coordinate origin Y (0 to 470)

c: Width (10 to 752)

d: Height (10 to 480)

- Specify the full screen

DDMcapmode=0,0,752,480

- Specify the 50 % of the center

DDMcapmode=188,120,376,240

† Configuring the reading area too narrow may deviate the barcode from the reading area and may cause a read error. Make sure that the size of the reading area fits the barcode.

4.3.2 Illumination control (ON/OFF) [DDMlight]

This command specifies the behavior of internal illumination.

DDMlight=a

- 0: OFF
- 3: ON when capturing an image
- 10: Always ON
- 11: ON during reading (SYMCMODE=1 or 2 only)

4.3.3 Illumination brightness [DDMflash]

This command specifies the brightness of each illumination.

• V6100R, V6100R5, V6100U

DDMflash=a,b

a (Inside illumination), b (Outside illumination)

0 : OFF

1 (dark) to 100 (bright): ON

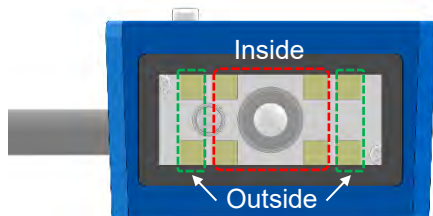
To set to ON, set in the range of 1 to 100, but you can set only the same value for a and b.

You cannot set different values.

If "b" is omitted, the value of "a" will be set.

e.g.) ○: Settable ×: Not settable

DDMflash=75,75	○: Both inside and outside ON (brightness 75)
DDMflash=75	○: Both inside and outside ON (brightness 75)
DDMflash=75,0	○: Inside ON (brightness 75), outside OFF
DDMflash=0,75	○: Inside OFF, outside ON (brightness 75)
DDMflash=75,25	×: Inside ON (brightness 75), outside ON (brightness 25)



• **V6110R, V6110R5, V6110U**

DDMflash=a,b

a (Upside illumination), b (Downside illumination)

0 : OFF

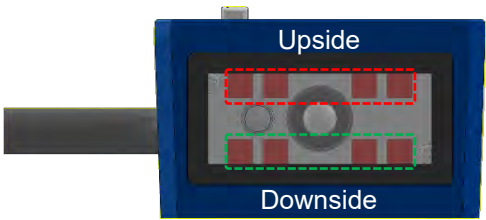
1 (dark) to 100 (bright): ON

To set to ON, set in the range of 1 to 100, but you can set only the same value for a and b.
You cannot set different values.

If “b” is omitted, the value of “a” will be set.

e.g.) O: Settable × : Not settable

DDMflash=75,75	O: Both upside and downside ON (brightness 75)
DDMflash=75	O: Both upside and downside ON (brightness 75)
DDMflash=75,0	O: Upside ON (brightness 75), downside OFF
DDMflash=0,75	O: Upside OFF, downside ON (brightness 75)
DDMflash=75,25	× : Upside ON (brightness 75), downside ON (brightness 25)



4.3.4 Shutter speed [DDMshutt]

This command specifies the shutter speed of the scanner. A slower shutter speed makes the image brighter but may introduce motion blur into the image.

DDMshutt=a

0: 1/60	1: 1/125	
2: 1/250	3: 1/500,	
4: 1/1000	5: 1/2000	
6: 1/4000	7: 1/6000,	
8: 1/8000	9: 1/10000	(Unit: seconds)

4.3.5 Analog gain [DDMagain]

This command specifies the analog gain of the camera.
A larger gain makes the image brighter.

DDMagain=a (a: 1 to 25, 1: Lowest gain, 25: Highest gain)

4.3.6 Digital gain [DDMdgain]

This command specified the digital gain of the camera.
A larger gain makes the image brighter.

DDMdgain=a (a: 1 to 12, 1: Lowest gain, 12: Highest gain)

4.3.7 Black level adjustment [DDMblackval]

This command is used to improve the contrast of an image taken by the scanner.
It may be suitable for lower contrast images.

DDMblackval=a (a: 1 to 255, 1: Black emphasis, 255: white emphasis)

4.3.8 Image preprocessing [DDMpreproc]

If the image quality is low, by using an appropriate image filter may improve the reading ratio.

4.3.9 Mirror image [DDMmirror]

This command enable / disable mirrored image barcode.

DDMmirror=a

- 0: Read only normal type (not mirrored)
- 1: Read only mirrored type
- 2: Read both of normal type and mirrored type

4.3.10 Decode time limit [DDMdecodelim]

This command specifies the decode time limit.

DDMdecodelim = a (a: 50 to 10000, Unit: ms)

4.3.11 Table name [DDMtblname]

This command specifies a name of the current table number. This command is just for a memo. It does not affect any performances of the scanner.

DDMtblname=a (a: Up to 16 one-byte characters)

4.4 Auto Gain Control Mode [AGC=E]

In Auto Gain Control Mode, the scanner automatically adjusts the parameter (shutter speed, analog gain and digital gain) settings to the ambient brightness.

Switch to the table mode with the command "AGC=E".

It cannot be used together with the Table mode.

4.5 Reading parameters for Auto Gain Control Mode

4.5.1 Reading area [CAPMODE]

CAPMODE=a,b,c,d

Refer to 4.3.1 "Reading area [DDMcapmode]" for details.

4.5.2 Illumination control (ON/OFF) [LIGHT]

LIGHT=a

Refer to 4.3.2 "Illumination control (ON/OFF) [DDMlight]" for details.

4.5.3 Illumination brightness [FLASH]

FLASH=a,b

Refer to 4.3.3 "Illumination brightness [DDMflash]" for details.

4.5.4 Shutter speed [SHUTT]

SHUTT=a

Refer to 4.3.4 "Shutter speed [DDMshutt]" for details.

4.5.5 Analog gain [AGAIN]

AGAIN=a

Refer to 4.3.5 "Analog gain [DDMagain]" for details.

4.5.6 Digital gain [DGAIN]

DGAIN=a

Refer to 4.3.6 "Digital gain [DDMdgain]" for details.

4.5.7 Black level adjustment [BLACKVAL]

BLACKVAL=a

Refer to 4.3.7 "Black level adjustment [DDMblackval]" for details.

4.5.8 Image preprocessing [IPFUNC0]

IPFUNC0=a,b,c,d,e

Refer to 4.3.8 "Image preprocessing [DDMpreproc]" for details.

4.5.9 Mirror image [MIRROR]

MIRROR=a

Refer to 4.3.9 "Mirror image [DDMmirror]" for details.

4.5.10 Decode time limit [DECODELIM]

DECODELIM=a

Refer to 4.3.10 "Decode time limit [DDMdecodelim]" for details.

5 **Auto-sense Mode**

In Auto-sense mode, the scanner automatically detects and reads the barcode. It detects the change in ambient brightness and the movement of the subject, etc., and performs scanning automatically. This function is useful for reading documents with barcodes printed on them in front of the scanner.



- The Auto-sense mode works with the brightness of normal room lighting, but may not be suitable for reading under extremely bright and dark environments such as outdoors, or under flickering lighting.
- In Auto-sense mode, other operation modes do not work.
*: Refer to 3 “Operation Mode”.
- In Auto-sense mode, the operation of the Teach button and the Read button are invalid.

5.1 **How to use**

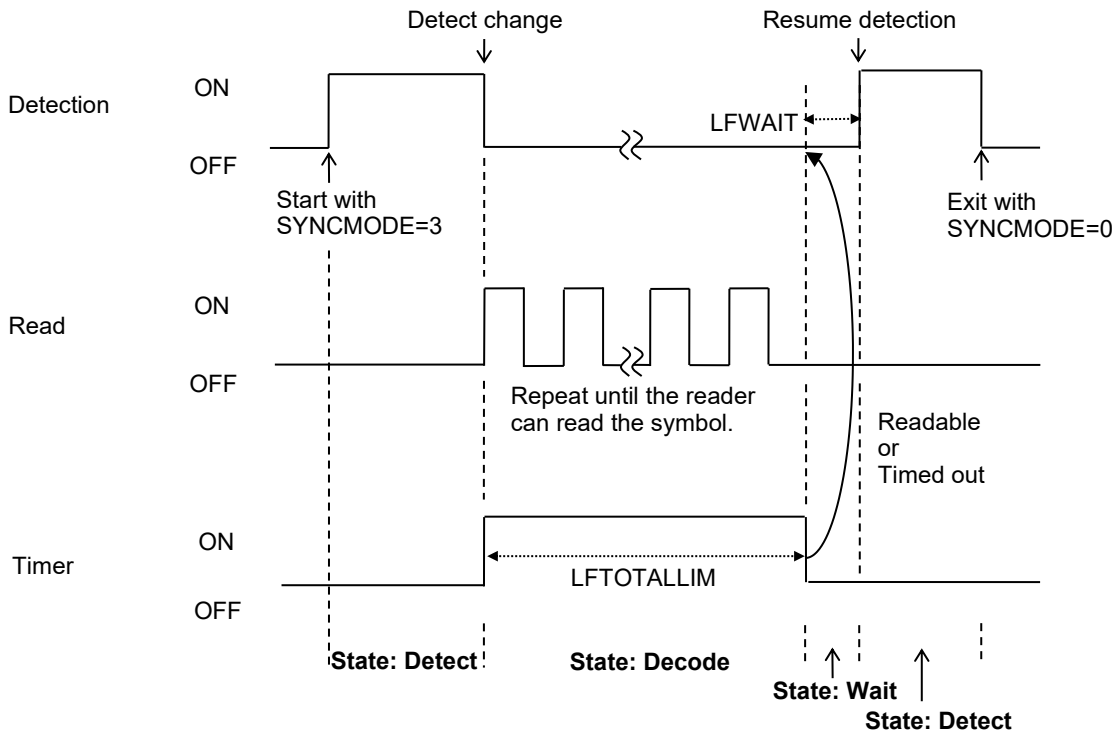
- Start Auto-sense Mode
 - Send the serial command “SYNCMODE=3” to the scanner.
 - Enable the Auto-sense Mode by reading the setting code. Refer to the 2D barcode menu.

However, it cannot start in the following cases.

- When set to continuous reading mode
 - When set to test mode
 - When running the Auto-Tuning function
-
- Exit Auto-sense Mode
 - Send the serial command “SYNCMODE=0” to the scanner.
 - Disable the Auto-sense Mode by reading the setting code. Refer to the 2D barcode menu.

5.2 Timing chart

While in Auto-sense mode, the scanner transitions in three states: detect, decode and wait.



5.3 Setting parameters for Auto-sense Mode

5.3.1 Aimer, Illumination [LFILLUM]

This command specifies the aimer and illumination during detection.

LFILLUM=a (a: 0 to 2)

0: Aimer OFF, Illumination OFF

1: Aimer ON, Illumination ON

2: Aimer OFF, Illumination ON

5.3.2 Detection sensitivity [LFSENS]

This command specifies the detection sensitivity. If the sensitivity is too good, lower the value; if not good, increase the value.

LFSENS=a (a: 0 to 4, 0: High sensitivity, 4: Low sensitivity)

5.3.3 Reading timeout [LFTOTALLIM]

After detection, the reading operation is performed until the barcode reading succeeds or the timeout occurs. Set this time.

LFTOTALLIM=a (a: 0 to 10, Unit: seconds)

5.3.4 Wait time for resuming detection [LFWAIT]

The scanner waits for a fixed time and resumes processing after a successful barcode read or read timeout. Set this wait time.

LFWAIT=a (a: 0 to 10, Unit: seconds)

5.3.5 Continuous reading of the same barcode [VERIFY]

In Continuous Reading Mode or Auto-sense Mode, this command specifies whether to permit continuous reading of the same barcode.

VERIFY=a (a: 0: Permission, 1: Prohibition)

5.3.6 Wait time for continuous reading of the same barcode [VWAIT]

This command specifies the prohibited time when VERIFY=1.

VWAIT=a (a: 1 to 20, Unit: x 500ms)

5.3.7 Status of auto-sense mode [?LF]

?LF

(Output example)

```
***** STATUS *****
LFILLUM=1 (0:off 1:aimer 2:flash)
LFSENS=2 (0-4)
LFTOTALLIM=3 (1-10[sec])
LFWAIT=1 (0-10[sec])
VERIFY=0 (0:off 1:on)
VWAIT=3 (1-20 x500[ms])
***** END *****
V6100U : 064-V1.0a
```

6.1 Preset Mode

In Preset Mode, V6100 and V6110 series reads only the barcodes whose data match the preset data. This function has two modes, their registration methods and data collation methods of preset data are different.

PREM=0[CR] (*): Preset Mode 0 (Preset Mode is disabled)

PREM=1[CR]: Preset Mode 1 (Preset data is the first decoded one after power-up)

PREM=2[CR]: Preset Mode 2 (Preset data is registered in advance)

*: Default

To disable Preset Mode, send the command "PREM=0".

6.1.1 Preset Mode 1

In this mode, the preset data is the first decoded data after power up. Data comparison is only successful when the code matches completely. The preset data must be set as every time the barcode scanner is powered on because the data is not saved to internal flash memory.

Setup procedure of Preset Mode 1:

1. Send the following commands

PREM=1[CR]

WSETS[CR]: Save the settings to internal flash memory.

2. Power-on reset

3. Read the barcode that contains the data to be used as the preset data.

6.1.2 Preset Mode 2

In this mode, the preset data is configured by the serial command. Data comparison is completed by both complete and partial matching. It is possible to save the preset data to internal flash memory.

Send the following command to set this mode:

PREM=2[CR]

SET=PREDaabcd[CR]: Set the preset data (data is "abcd")

SET=PRENa[CR]: Set the number of digits (a: 0 to 100)

WSETS[CR]: Save the settings to internal flash memory

e.g.1) Example 1: Only "12345" is valid

<u>12345</u> :	match
<u>1234</u> :	mismatch
<u>123456</u> :	mismatch
0 <u>12345</u> :	mismatch

PREM=2[CR]

SET=PRED12345[CR]

SET=PREN5[CR]

WSETS[CR]

e.g.2) Example 2: Valid when first 4 digits are "ABCD".

<u>ABCD</u> :	match
<u>ABCD</u> 333:	match
<u>ABCD</u> 777777:	match
<u>ABC</u> :	mismatch
<u>DABC</u> 333:	mismatch
<u>ABC7</u> 77777:	mismatch

PREM=2[CR]

SET=PREDABCD[CR]

SET=PREN0[CR]

WSETS[CR]

e.g.3) Example 3: Valid when the length is 10 digits and the data from 3rd-digits to 6th-digits are "ALFA".

00 <u>ALFA</u> 1234:	match
AA <u>ALFA</u> AAAA:	match
00 <u>ALFA</u> 12345:	mismatch
0 <u>ALFA1</u> 2345:	mismatch

PREM=2[CR]

SET=PRED??ALFA????[CR]

SET=PREN10[CR]

WSETS[CR]

6.1.3 Output the status of Preset Mode

?pre[CR] : Output the preset status

(Output example)

PREM=0 (0: non 1: power on 2: saved)

PRESET LENGTH: 13

DATA (HEX) :

34 39 3F 3F 3F 3F 3F 3F 3F

3F 3F 3F

DATA (ASCII) :

49??????????

(Output format)

PREM=a (0: non 1: power on 2: saved) [CR]

PRESET LENGTH: b[CR]

DATA (HEX) : [CR]

XX XX XX XX XX XX XX XX XX XX [CR]

XX XX XX XX XX XX XX XX XX XX [CR]

XX XX XX XX [CR]

DATA (ASCII) : [CR]

xxxxxxxxxxxxxxxxxxxxxxxx

a : Preset Mode

b : The digit of the length of the preset data

XX XX ... : Preset data character (in hex)

xxxxxx... : Preset data character (in ASCII/JIS)

If the preset data include control code, it is transferred to “*“.

6.2 Output Additional Information

6.2.1 Warning Information to avoid Read NG

Add warning information that can monitor the reading condition.

Output format: (CcccEeeeDddd)

ccc: Contrast information

eee: Unused error correction rate

ddd: Decodability margin

e.g.1) Read OK

Data Output: (C082E100D091)A123456A

The barcode scanner outputs the contrast value of a barcode including quiet zone. The decoder determines a rectangular area for the barcode and calculates the contrast value from its brightness level. If there are multiple barcodes, the calculated value is for the first decoded barcode.

e.g.2) Read NG

Data Output: (C000E000D000)BR

"000" is added in case of Read NG.

6.2.2 Symbology Type Information

Add symbology type information (data carrier identifiers) to the head of decoded symbology and output is in serial. Symbology type is not added at read NG.

Symbol Type	Example of Data Carrier Identifiers
Data Matrix	]d1
QR Code	]Q1
PDF417	]L0
Aztec Code	]z0
Code39	]A0
Code128	]C0
GS1-128	]C1
Codabar	]F0
Code93	]G0
ITF(Interleaved 2 of 5)	]I0
EAN/JAN 13 digits	]E0
EAN/JAN 8 digits	]E4
UPC	]E0
GS1 DataBar	]e0
Composite	]e1

6.2.3 Decoding Time

Add decoding time to the symbol data.

6.2.4 Total Reading Time Information

Add the number of images captured after trigger input and total time from trigger input to the serial data output. Total reading time is not added at read NG.

Output format: (aa, bbbbmms)

aa: Number of images, bbbbmms: Total time [ms]

6.2.5 Contrast Information

Add the Contrast Information of the last decoded image.

- Read OK

Calculate the contrast value of a symbol including a quiet zone. The decoder determines a rectangular area for the symbol and calculates the contrast value from its brightness level. If there are multiple symbols, the calculated value is for the first decoded symbol.

- Read NG

Calculate the contrast value for the whole image.

Output format: (aaa, bbb, ccc) 13 bytes
aaa : Maximum value of reflectance (000 to 255)
bbb : Minimum value of reflectance (000 to 255)
ccc : Contrast [%] = $100 \times (aaa - bbb) / 255$ (000 to 100)

6.2.6 Quality Information

The percentage of the Unused Error Correction codeword of the 2D barcode is added to the decoded data.

For example, if the decoder does not use any error correction, this value would be 100. The barcode scanner outputs the quality information individually if there are multiple symbols. Quality Information is not added at Reading Error.

Output format: (QT: ddd) 8 bytes
ddd: Quality (000 to 100)

6.2.7 Symbol Coordinates

The positional data of the symbol in the image is output along with the decoded data. There are two types of output information; barycentric coordinates and rectangular coordinates.

(1) Barycentric coordinates

The origin (+0000, +0000) is the left-top edge of a field of view.

(Example output)

10000000099070 (+0122, +0024)

(Output format)

Header + Data + (abbbb, acccc) + Terminator

a : + or -

bbbb: X coordinate of a symbol' s barycenter (9999 to +9999)

cccc: Y coordinate of a symbol' s barycenter (-9999 to +9999)

(2) Rectangular coordinates

The origin (+0000, +0000) is the left-top edge of a field of view.

(Example output)

10000000099070 (+0269, +0011) (+0455, +0086) (+0386, +0270) (+0198, +0199)

(Output format)

Header + Data + (A1) + (A2) + (A3) + (A4) + Terminator

A1 - A4 : (abbbb, acccc)

a : + or -

bbbb: X coordinates of four corners of a symbol (-9999 to +9999)

cccc: Y coordinates of four corners of a symbol (-9999 to +9999)

(3) Barycentric / Rectangular coordinates

Outputs coordinates of both barycenter and four corners of a symbology.

(Example output)

10000000099070 (+0007, +0103) (+0269, +0011) (+0455, +0086) (+0386, +0270) (+0198, +0199)

(Output format)

Header + Data + (B) + (A1) + (A2) + (A3) + (A4) + Terminator

(B): Barycentric coordinate

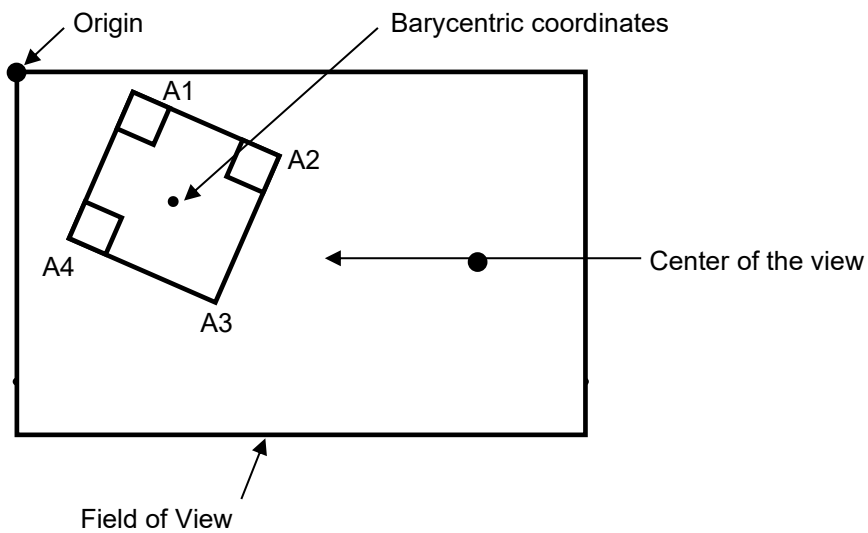
(A1) (A2) (A3) (A4): Rectangular coordinates

B, A1-A4: (abbbb, acccc)

a: + or -

bbbb: X coordinate of barycenter and X coordinate of four corners of a symbol (-9999 to +9999)

ccccc: Y coordinate of barycenter and Y coordinate of four corners of a symbol (-9999 to +9999)



6.2.8 Table Number

Adds setting table number used in the last decoding.

(Example output)

10000000099070 (TBL:3)

(Output format)

Header + Data + (TBL:a) + Terminator

a: Table number

6.2.9 Scanner Name

Adds the individual name of the barcode scanner.

(Example output)

(My Reader) 10000000099070

(Output format)

Header + (a) + Data + Terminator

a: Reader Name

6.3 Save Image

Maximum 64 captured images can be stored. The number of cycle buffer memory means the number of storable images.

MAXIMG=a[CR] a=1 to 64 Specify number of cycle buffer memory.

MAXIMG=1[CR] (*)

*: Default

6.3.1 Transmit processed image

Select an image to save from the 2 images captured before or after preprocessing. (Only for latest image)

IMGSEL=0[CR] Transmit captured image (Raw image)

IMGSEL=1[CR] (*) Transmit decoded image(*)

*: Default

6.3.2 Overwrite setting of cycle buffer memory

When the number of saved images exceeds the number of cycle buffer memories, you can select whether to overwrite the cycle buffer memory to continue imaging or to stop imaging without overwriting.

CAPLIM=0[CR] (*) Overwrites from the oldest image in the cycle buffer memory.

CAPLIM=1[CR] Interrupt the imaging.

*: Default

6.3.3 Preparation for transmitting the saved image

Using "FixedConfig" software allows the download of the saved image that has been completed the preparation of transmission to the host. (only for USB type)

IMGFRAME=0,0 (*) Preparation for the last saved image

*: Default

Any number of the buffer can be set. The setting after each SYNC command is necessary because it is set to the default by a SYNC command.

IMGFRAME=0, a[CR] a=1 to 64

Preparation for the image saved in buffer No. (a)

6.3.4 Output the settings of saving images

?IMG[CR] Output the status

(Output example)

***** STATUS *****

IMODE=a

PX=b

PY=c

WX=d

WY=e

IMGSEL=f (0:captured image 1:decoded image)

MAXIMG=g (1-64)

WAITIMG=h (0-1000[ms])

CAPLIM=i (0:OFF 1:ON)

ROTATE=j (0:disable 1:enable)

GOUTSIZE=k (0:752x480 1:376x240 2:188x120 3:94x60)

IMGFRAME=0,l (0:fixed value, 1-64:frame-no.)

***** END *****

V6100U : 064-V1.0a

a : Trimming

b,c,d,e : Trimming position (Left, Top, Width, Height)

f : Image type (Captured image, Decoded image)

g : Number of cycle buffer memory

h : Capturing time interval in the cycle buffer function
(Unit: ms)

i : Overwrite/not overwrite the cycle buffer memory when the number of
 captured image exceeds the number of cycle buffer memory

j : Image rotation (0 degree/180 degrees)

k : Image size for continuous image transfer

l : Cycle buffer memory number

6.4 **Save NG (No Read) Image**

Up to 10 decoded images can be saved when reading is NG (No Read).
The NG Image is cleared when the power is turned off.
FixedConfig supports the NG image acquisition function.

6.4.1 **Set image type**

This command specifies image type for the transfer.

IMGSEL=0[CR] Captured image (Raw image)
IMGSEL=1[CR] (*) Decoded image (Preprocessed image)
*: Default

6.4.2 **NG Image storage order**

Select the storage order when the number of NG Images exceeds 10.

IMGFULL=0[CR] Save the latest 10 NG Images

NG Image buffer No.									
1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10
11	12								

← storage order

IMGFULL=1[CR] (*) Save the 1st to 9th NG Images and the latest NG Image

NG Image buffer No.									
1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10
									11
									12

← storage Order

*: Default

6.4.3 Checking the number of stored NG Images

Outputs the number of saved NG Images (status).

?NGFRAME[CR] checking command

Sample Output

STS	Mark for starting output
NGNUM:6	Number of NG Images (6 NG Images can be extracted)
END	Mark of output completion

6.4.4 Preparation for transmitting the NG Image

Sets the NG image to be transferred to the host PC.

NGFRAME=a[CR] a=0 to 10

a=0 : Do not transfer NG Images (last decoded image) (*)

a=1-10 : Prepare to transfer the NG Image No. (a)
 (the oldest image is No.1)

*: Default

6.5 Simultaneous reading of multiple labels

In symbol reading mode, multiple (up to 10) labels can be read simultaneously.

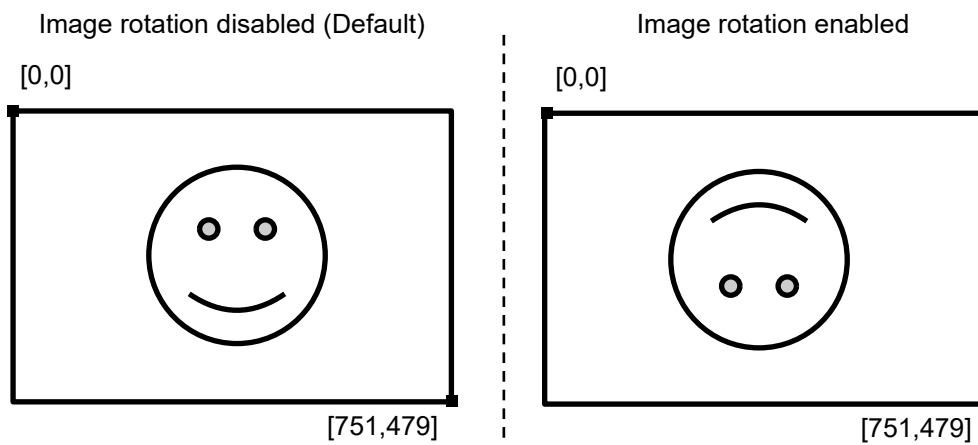
The order of reading data output can be configured like the following.

1. By completion of reading process
2. By preset number of digits
3. By preset matching characters
4. By preset symbologies

† Setting more symbols in an image than the number of preset symbols causes output failure.

6.6 Image Rotation

Rotates an image 180 degrees before a capture. The rotated image is used in all the process (decoding, saving data, etc.).



6.7 Register of SYNC ON/OFF command

The SYNC ON/OFF command of the barcode scanner can be registered with any 8 alphanumeric characters (available characters are 0x20 to 0x7E in 7.17 Table of Character Code). If an entered arbitrary character string is the same as an existing serial command, the command is not registered.

- SYNC ON command setting

SONCMD=a[CR] (a: Up to 8 alphanumeric characters)

The character string a is registered as SYNC ON command.

e. g.)

SONCMD=FIND[CR] Register "FIND" as SYNC ON command.

SONCMD=[CR] (*) Default value is not registered.

*: Default

- SYNC OFF command setting

SOFFCMD=a[CR] (a: Up to 8 alphanumeric characters)

The character string a is registered as SYNC OFF command.

e. g.)

SOFFCMD=END[CR] Register "END" as SYNC OFF command.

SOFFCMD=[CR] (*) Default value is not registered.

*: Default

Note: SYNC OFF command can only be used in Timeout Mode.

6.8 Save SETUP / Load SETUP

SETUP: Barcode scanner configuration parameters

Up to 20 setups can be stored in the barcode scanner. When the setup is loaded, the settings are reflected in the barcode scanner.

6.8.1 Settings targeted by Setup Save / Read Function

Settings targeted by Setup function are as follows.

Term	Command	Description
Symbologies	GS1GS=	Convert characters which indicate the data delimiter of GS1 related barcodes (FNC1)
Common	GS1AI=	Set the output method of GS1 AI
Symbologies	LABELS=	Number of labels
Multi-Labels	OUTFORM=	Setting of Output in the order
	SET=\$Na-b	Set label number and verification digit number
	SET=\$Ca-bbcc	Set label number and verification character
	SET=\$Sa-b	Set label number and verification symbologies
Symbologies	SET=AM	Set Disable/Enable Code39
Code39	C39SS=	Start / Stop code output setting of Code39
	DIGIT=A	Set minimum and maximum digit numbers of Code39
	EDIT=A	Set data output range of Code39
	SYMHEAD=A	Set header character of Code39
	SYMFOOT=A	Set footer character of Code39
Symbologies	SET=CM	Set Disable/Enable Code128
Code128	DIGIT=C	Set minimum and maximum digit numbers of Code128
	EDIT=C	Set data output range of Code128
	SYMHEAD=C	Set header character of Code128
	SYMFOOT=C	Set footer character of Code128

Term	Command	Description
Symbologies	SET=FM	Set Disable/Enable Codabar
Codabar	CODASS=	Start / Stop code output setting of Codabar
	CODACS=	Start / Stop code output setting of Codabar
	CODACHK=	Checksum algorithm setting of Codabar
	DIGIT=F	Set minimum and maximum digit numbers of Codabar
	EDIT=F	Set data output range of Codabar
	SYMHEAD=F	Set header character of Codabar
	SYMFOOT=F	Set footer character of Codabar
Symbologies	SET=IM	Set Disable/Enable ITF
ITF	DIGIT=I	Set minimum and maximum digit numbers of ITF
	EDIT=I	Set data output range of ITF
	SYMHEAD=I	Set header character of ITF
	SYMFOOT=I	Set footer character of ITF
Symbologies	SET=GM	Set Disable/Enable Code93
Code93	DIGIT=G	Set minimum and maximum digit numbers of Code93
	EDIT=G	Set data output range of Code93
	SYMHEAD=G	Set header character of Code93
	SYMFOOT=G	Set footer character of Code93
Symbologies	SET=EM	Set Disable/Enable UPC/EAN/JAN
UPC/EAN/JAN	JE13SUM=	Checksum output setting of EAN/JAN (standard 13 digits)
	JE8SUM=	Checksum output setting of EAN/JAN (standard 8 digits)
	UASUM=	Checksum output setting of UPC-A
	UESUM=	UESUM=a Checksum output setting of UPC-E
	UPCANS=	Number system output setting of UPC-A
	UPCENS=	Number system output setting of UPC-E
	UPCE=	Checksum output setting of UPC-E
	UPCTX=	Output format setting of UPC-A
	DIGIT=E	Set minimum and maximum digit numbers of UPC/EAN/JAN
	EDIT=E	Set data output range of UPC/EAN/JAN
	SYMHEAD=E	Set header character of UPC/EAN/JAN
	SYMFOOT=E	Set footer character of UPC/EAN/JAN

Term	Command	Description
Symbologies GS1 Databar	SET=eM-RSS	Set Disable/Enable GS1 Databar
	DIGIT=e -RSS	Set minimum and maximum digit numbers of GS1 Databar
	EDIT=e -RSS	Set data output range of GS1 Databar
	SYMHEAD=e -RSS	Set header character of GS1 Databar
	SYMFOOT=e -RSS	Set footer character of GS1 Databar
Symbologies DataMatrix	SET=dM	Set Disable/Enable DataMatrix
	DIGIT=d	Set minimum and maximum digit numbers of DataMatrix
	EDIT=d	Set data output range of DataMatrix
	SYMHEAD=d	Set header character of DataMatrix
	SYMFOOT=d	Set footer character of DataMatrix
Symbologies QR Code	SET=QM	Set Disable/Enable QR Code
	DIGIT=Qb,c	Set minimum and maximum digit numbers of QR Code
	EDIT=Qb,c	Set data output range of QR Code
	SYMHEAD=Q	Set header character of QR Code
	SYMFOOT=Q	Set footer character of QR Code
Symbologies Composite	SET=eM-CC	Set Disable/Enable Composite
	DIGIT=e -CC	Set minimum and maximum digit numbers of Composite
	EDIT=e -CC	Set data output range of Composite
	SYMHEAD=e -CC	Set header character of Composite
	SYMFOOT=e -CC	Set footer character of Composite
Symbologies PDF417	SET=LM	Set Disable/Enable PDF417
	DIGIT=L	Set minimum and maximum digit numbers of PDF417
	EDIT=L	Set data output range of PDF417
	SYMHEAD=L	Set header character of PDF417
	SYMFOOT=L	Set footer character of PDF417
Symbologies Aztec Code	SET=zM	Set Disable/Enable Aztec Code
	DIGIT=z	Set minimum and maximum digit numbers of Aztec Code
	EDIT=z	Set data output range of Aztec Code
	SYMHEAD=z	Set header character of Aztec Code
	SYMFOOT=z	Set footer character of Aztec Code

Term	Command	Description
Reading	BR=	No read message
	SONCMD=	Register the SYNC ON command
	SOFFCMD=	Register the SYNC OFF command
Operation Mode	SYNCMODE	Set Operation Mode
	VOUT=	Output timing
	TOTALLIM=	Decode timeout
	continue/stop	Continuous Reading Mode Enable/Disable
	contintvl=	Set a time interval of reading
Additional Information	CHKBCR=	Warning Information
	SYMBOLTX=	Symbology Information
	DTTX=	Decoding time
	TTTX=	Total time of decoding
	AGCTX=	Swing Value
	TBLTX=	Table Number
	MYNAME=	Individual name
	NAMETX=	Individual name to output data
	CONTTX=	Contrast Information
	CSX=	X-coordinate point of calculation (Origin)
	CSY=	Y-coordinate point of calculation (Origin)
	CWX=	X-coordinate point of calculation (Width)
	CWY=	Y-coordinate point of calculation (Width)
	QTTX=	Quality Information
	MRTX=	Mirrored Image Information
	XYTX=	Symbology Position Information
	PNTX=	Last read Setup Number
Delay Time	DELAY=	Delay time between SYNC input and start capturing
Decode Area	DECMODE=	Set Decode Area
Cycle Buffer	MAXIMG=	Number of captured images
Function	WAITIMG=	Capture interval of time when MAXIMG is greater than 1
	CAPLIM=	After the number of captures exceeds the MAXIMG
Image rotation	ROTATE=	Enable/disable image rotating (180a) at capturing images
Camera Control Mode	AGC=	Use the camera setting

Term	Command	Description
Table Mode	ENABLEDDMTBL=	Specify Number of Tables
	DDMTBLNG=	Specify the operation of Table Mode
	DDMcapmode=	Specify capturing area of the table
	DDMlight=	Set ON/OFF of illumination output
	DDMflash=	Set the brightness of internal illumination source
	DDMshutt=	Set the shutter speed of the table
	DDMagain=	Set the Analog gain of the table
	DDMdgain=	Set the Digital gain of the table
	DDMblackval=	Setting for improving the contrast of a captured image
	DDMpreproc=	Set the type of preprocessing
	DDMmirror=	Set the mirrored image of the table
	DDMdecodelim=	Setting of decoding time limit
	DDMtblname=	This command specifies a name of the current table number
Auto Gain Control Mode	CAPMODE=	Specify capturing area
	LIGHT=	Set ON/OFF of illumination output
	FLASH=	Set the brightness of internal illumination source
	SHUTT=	Set the shutter speed
	AGAIN=	Set the Analog gain
	DGAIN=	Set the Digital gain
	BLACKVAL=	Setting for improving the contrast of a captured image
	IPFUNC0=	Set the type of preprocessing
	MIRROR=	Set the mirrored image
	DECODELIM=	Setting of decoding time limit
Preset	PREM=	Set the Preset Mode
	SET=PREN	Set the number of digits for comparing
	SET=PRED	Set the preset data

Term	Command	Description
Auto sense	LFILLUM=	Set aimer and illumination in detection state
	LFSENS=	Set detection sensitivity
	LFTOTALLIM=	Set read timeout time in Auto-sense Mode
	LFWAIT=	Set the wait time for the next detection
	VERIFY=	Set whether to permit continuous reading of the same barcode
	VWAIT=	Set the prohibited time when VERIFY=1
NG Image storage order	IMGFULL=	Set the storage order the NG Image

6.8.2 Serial Command for Setup Save / Read Function

The commands related to setup are as follows:

PSAVE=a[CR]	(a: 1 to 20) Saves the current settings of the barcode scanner in the code reader as SETUP "a" .
PLOAD=a[CR]	(a: 1 to 20) Reflects the settings of SETUP in the code reader. If there is no SETUP "a" , the setting change is not performed.
PERASE[CR]	Erase the setting of all SETUPS in the code reader. †
PERASE=a[CR]	(a: 1 to 20) † Erase the setting of SETUP "a" in the code reader.
PNAME=a,b[CR]	(a: 1 to 20, b: Alphanumeric character 32 bytes) Sets a name to SETUP "a" .
WSETP[CR]	Saves the SETUP name in the core reader.
PNTX=a[CR]	(a: 0 to 1) † After power up, the read number of the SETUP is added to the read data. When the setup is not read, "--" is added and added. The output example is as follows. 12345 (SETUP:01)
?plist[CR]	Outputs the SETUP name.

(Output example of ?plist)

```
?plist
PNAME=1, SETUP1
PNAME=2, SETUP2
----- (omission) -----
PNAME=20,
```

7 **Serial Commands (RS-232C, USB)**

- The following serial commands can be used through both RS-232C and USB interface unless otherwise specified.

(Serial command format)

Serial command + [CR] (*) : Default (Backward compatible)

[Header] + Serial command + [Terminator]

- To add header and terminator characters to a serial command, send the command "CMDFORM=1". The header and terminator characters are same as the ones to add to decoded data. If there is no terminator, it is compatible with the conventional operation.
- To return the input format of the configuration commands to compatible (configuration command + [CR]), send the command "CMDFORM=0".

7.1 Communication settings

Term	Command	Description (*) : Default
Baud rate	BAUD=a	Baud rate of RS-232C a=1200: 1200bps, a=2400: 2400bps, a=4800: 4800bps a=9600: 9600bps (*), a=19200: 19200bps, a=38400: 38400bps a=57600: 57600bps, a=115200: 115200bps
Frame	FRAME=0 FRAME=1 FRAME=2 FRAME=3 FRAME=4 FRAME=5 FRAME=6 FRAME=7 FRAME=8 FRAME=9	(Length, Parity, Stop bit) 7 bits, Odd, 1 bit 7 bits, Odd, 2 bits 7 bits, Even, 1 bit 7 bits, Even, 2 bits 8 bits, None, 1 bit (*) 8 bits, None, 2 bits 8 bits, Parity, 1 bit 8 bits, Parity, 2 bits 8 bits, Even, 1 bit 8 bits, Even, 2 bits
Header	HEAD=a	Header character a=0: None (*) a=1: [SX] a=2: [EC]
Terminator	TERM=a	Terminator character a=0: None a=1: [EX] a=2: [EX][CR] a=3: [CR][LF] (*) a=4: [CR] a=5: [CR][TAB] a=6: [TAB][CR] a=7: [TAB]
Command Format	CMDFORM=0 CMDFORM=1	Command+[CR] or Command+[CR][LF] (*) [Header]+Command+[Terminator]
Separator	SEPA=a	Character code a=0: None a=1: '&' a=2: , (Comma) (*) a=3: [FS] (1C hex) a=4: [GS] (1D hex) a=5: [SP] (20 hex)
Prefix	PREFIX =a =a, ¥bb	Prefix character (Identifier) a=0: Disable (*), a=1: Enable bb: Identifier (Hex code (*1)) bb=00 (*) [NUL] When omitting " bb", configured identifier will not be changed.
Suffix	SUFFIX =a =a, ¥bb	Suffix character (Identifier) a=0: Disable (*), a=1: Enable bb: Suffix character (Hex code (*1)) bb=00 (*) [NUL] When omitting " bb", configured identifier will not be changed.
RS/CS control	RSCS=0 RSCS=1	Disable RTS/CTS flow control (*) Enable RTS/CTS flow control
Control code	LABELTX=0 LABELTX=1	Output control code as it is (*) Output control code in hexadecimal[Hex]
Timeout period	TXWAIT=a	Timeout period for data transmission a=1000-30000 [ms], 10ms step 1000[ms] (*)
Command response	CMDRES=a	Command response a=0: Disable, a=1: Enable (*)

(*1) Refer to "Table of Character Code".

7.2 Symbolologies settings

Term	Command	Description (*) : Default
Common	SET=#M0	Disable all symbolologies reading
	SET=#M1	Enable all symbolologies reading
	SYMHEAD =#a =#a, ¥bb	Header character (Identifier) for all symbolologies a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) When omitting " bb" , configured identifier will not be changed.
	SYMFOOT =#a =#a, ¥bb	Footer character (Identifier) for all symbolologies a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) When omitting " bb" , configured identifier will not be changed.
	GS1GS =a =a, ¥bb	Convert characters (FNC1) that indicates the data delimiter (Identifier) of GS1 symbols a=0: Disable a=1: Enable (*) bb: Delimiter (Hex code (*1)) bb=1D (*) [GS] When omitting " bb" , configured identifier will not be changed.
	GS1AI=a	Put the application identifier of GS1 symbol in brackets a=0: Disable (*) a=1: Enable
Multiple labels	LABELS=a	Number of labels a=1-10 a=1 (*)
	OUTFORM=0	Output data in order of decoding (*)
	OUTFORM=1	Output data in specified digit order
	OUTFORM=2	Output data in specified character order
	OUTFORM=3	Output data in order of specified symbolologies
	SET=\$Na-b	Set label number and verification digit number a=1-10: Label number, b=0-9999: Digit number
	SET=\$Ca-bbcc	Set label number and verification character a=1-10: Label number, bb: The first character in Hex code (*1) cc: The second character in Hex code (*1)
	SET=\$Sa-b	Set label number and verification symbolologies a=1-10: Labe number, b: Symbol identifier (as follows) A:Code39 C:Code128 F:Codabar I:ITF G:Code93 E:JAN/EAN/UPC R:GS1 Databar c:Composite Code d:DataMatrix Q:QR Code L:PDF417 z:Aztec Code

(*1) Refer to "Table of Character Code" .

Term	Command	Description (*) : Default
Code39	SET=AM0	Disable Code39
	SET=AM1	Enable Code39; disable C/D check (*)
	SET=AM2	Enable Code39; enable C/D check and output
	SET=AM3	Enable Code39; enable C/D check; disable C/D output
	SET=AM4	Enable Code39; disable C/D check; enable FULL ASCII mode
	SET=AM5	Enable Code39; enable C/D check and output; enable FULL ASCII mode
	SET=AM6	Enable Code39; enable C/D check; disable C/D output; enable FULL ASCII mode
	C39SS=0	Disable Code39 start/stop code output (*)
	C39SS=1	Enable Code39 start/stop code output
	DIGIT=Ab, c	Set the minimum number of digits (b) and maximum number of digits (c) of Code39
	EDIT=Ab, c	Set the start digit (b) and number of digits (c) of Code39 decoded data output
	SYMHEAD =Aa =Aa, ¥bb	Header character of Code39 a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=41 (*) character "A" When omitting " bb", configured identifier will not be changed.
	SYMFOOT =Aa =Aa, ¥bb	Footer character of Code39 a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=41 (*) character "A" When omitting " bb", configured identifier will not be changed.
Code128 GS1-128	SET=CM0	Disable Code128
	SET=CM1	Enable Code128 (*)
	DIGIT=Cb, c	Set the minimum number of digits (b) and maximum number of digits (c) of Code128
	EDIT=Cb, c	Set the start digit (b) and number of digits (c) of Code128 decoded data output
	SYMHEAD =Ca =Ca, ¥bb	Header character of Code128 a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=43 (*) character "C" When omitting " bb", configured identifier will not be changed.
	SYMFOOT =Ca =Ca, ¥bb	Footer character of Code128 a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=43 (*) character "C" When omitting " bb", configured identifier will not be changed.
Codabar	SET=FM0	Disable Codabar
	SET=FM1	Enable Codabar; disable C/D check (*)
	SET=FM2	Enable Codabar; enable C/D check and output
	SET=FM3	Enable Codabar; enable C/D check; disable C/D output
	CODASS=0	Disable Codabar start/stop code output
	CODASS=1	Enable Codabar start/stop code output (*)
	CODACS=0	Set Codabar start/stop code to lower case
	CODACS=1	Set Codabar start/stop code to upper case (*)
	CODACHK=0	Codabar check digit calculation method: modulus16 (*)
	CODACHK=1	Codabar check digit calculation method: 7DR
	DIGIT=Fb, c	Set the minimum number of digits (b) and maximum number of digits (c) of Codabar

Codabar (continued)	EDIT=Fb, c	Set the start digit (b) and number of digits (c) of Codabar decoded data output
	SYMHEAD =Fa =Fa, ¥bb	Header character of Codabar a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=46 (*) character "F" When omitting " bb", configured identifier will not be changed.
	SYMFOOT =Fa =Fa, ¥bb	Footer character of Codabar a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=46 (*) character "F" When omitting " bb", configured identifier will not be changed.
ITF	SET=IM0 SET=IM1 SET=IM2 SET=IM3	Disable ITF Enable ITF; disable C/D check (*) Enable ITF; enable C/D check and output Enable ITF; enable C/D check; disable C/D output
	DIGIT=Ib, c	Set the minimum number of digits (b) and maximum number of digits (c) of ITF
	EDIT=Ib, c	Set the start digit (b) and number of digits (c) of ITF decoded data output
	SYMHEAD =Ia =Ia, ¥bb	Header character of ITF a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=49 (*) character "I" When omitting " bb", configured identifier will not be changed.
	SYMFOOT =Ia =Ia, ¥bb	Footer character of ITF a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=49 (*) character "I" When omitting " bb", configured identifier will not be changed.
Code93	SET=GMO SET=GM1	Disable Code93 Enable Code93 (*)
	DIGIT=Gb, c	Set the minimum number of digits (b) and maximum number of digits (c) of Code93
	EDIT=Gb, c	Set the start digit (b) and number of digits (c) of Code93 decoded data output
	SYMHEAD =Ga =Ga, ¥bb	Header character of Code93 a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=47 (*) character "G" When omitting " bb", configured identifier will not be changed.
	SYMFOOT =Ga =Ga, ¥bb	Footer character of Code93 a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=47 (*) character "G" When omitting " bb", configured identifier will not be changed.
UPC/EAN/JAN	SET=EM0 SET=EM1	Disable UPC/EAN/JAN Enable UPC/EAN/JAN (*)
	JE13SUM=0 JE13SUM=1	EAN/JAN (standard 13 digits); enable checksum output (*) EAN/JAN (standard 13 digits); disable checksum output
	JE8SUM=0 JE8SUM=1	EAN/JAN (standard 8 digits); enable checksum output (*) EAN/JAN (standard 8 digits); disable checksum output
	UASUM=0 UASUM=1	UPC-A; enable checksum output (*) UPC-A; disable checksum output
	UESUM=0 UESUM=1	UPC-E; enable checksum output (*) UPC-E; disable checksum output

UPC/EAN/JAN (continued)	UPCANS=0	UPC-A; enable number system character output (*)
	UPCANS=1	UPC-A; disable number system character output
	UPCENS=0	UPC-E; enable number system character output (*)
	UPCENS=1	UPC-E; disable number system character output
	UPCE=0	UPC-E; output in UPC-A format (*)
	UPCE=1	UPC-E; output in UPC-E format
	UPCTX=0	UPC-A; disable "0" addition at the beginning of data (*)
	UPCTX=1	UPC-A; enable "0" addition at the beginning of data
	DIGIT=Eb, c	Set the minimum number of digits (b) and maximum number of digits (c) of UPC/EAN/JAN
GS1 DataBar	EDIT=Eb, c	Set the start digit (b) and number of digits (c) of UPC/EAN/JAN decoded data output
	SymHEAD =Ea =Ea, ¥bb	Header character of UPC/EAN/JAN a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=45 (*) character "E" When omitting " bb", configured identifier will not be changed.
	SymFOOT =Ea =Ea, ¥bb	Footer character of UPC/EAN/JAN a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=45 (*) character "E" When omitting " bb", configured identifier will not be changed.
	SET=eM00-RSS	Disable GS1 DataBar (*)
	SET=eM01-RSS	Enable GS1 DataBar; Expanded
	SET=eM02-RSS	Enable GS1 DataBar; Expanded Stacked
	SET=eM04-RSS	Enable GS1 DataBar; Limited
	SET=eM08-RSS	Enable GS1 DataBar; Omni directional, Truncated
	SET=eM10-RSS	Enable GS1 DataBar; Stacked, Stacked Omni directional
	SET=eM1F-RSS	Enable GS1 DataBar; All types
	DIGIT=eb, c-RSS	Set the minimum number of digits (b) and maximum number of digits (c) of GS1 DataBar
	EDIT=eb, c-RSS	Set the start digit (b) and number of digits (c) of GS1 DataBar decoded data output
	SymHEAD =ea, ¥bb-RSS	Header character of GS1 DataBar a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=52 (*) character "R" When omitting " bb", configured identifier will not be changed.
	SymFOOT =ea, ¥bb-RSS	Footer character of GS1 DataBar a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=52 (*) character "R" When omitting " bb", configured identifier will not be changed.

(*1) Refer to "Table of Character Code".

Term	Command	Description (*) : Default
DataMatrix	SET=dM0	Disable DataMatrix
	SET=dM1	Enable DataMatrix; Square, Normal label
	SET=dM2	Enable DataMatrix; Square, Black/White inverted label
	SET=dM3	Enable DataMatrix; Square, B/W inverted and Normal label
	SET=dM5	Enable DataMatrix; Square and Rectangle, Normal label
	SET=dM6	Enable DataMatrix; Square and Rectangle, B/W inverted and Normal label
	SET=dM7	Enable DataMatrix; All types (*)
	DIGIT=db, c	Set the minimum number of digits (b) and maximum number of digits (c) of DataMatrix
	EDIT=db, c	Set the start digit (b) and number of digits (c) of DataMatrix decoded data output
	SYMHEAD =da =da, ¥bb	Header character of DataMatrix a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=64 (*) character "d" When omitting "bb", configured identifier will not be changed.
	SYMFOOT =da =da, ¥bb	Footer character of DataMatrix a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=64 (*) character "d" When omitting "bb", configured identifier will not be changed.
QR Code Micro QR Code	SET=QM0	Disable QR Code
	SET=QM1	Enable QR Code; Normal label
	SET=QM2	Enable QR Code; Black/White inverted label
	SET=QM3	Enable QR Code; B/W inverted and Normal label (*)
	DIGIT=Qb, c	Set the minimum number of digits (b) and maximum number of digits (c) of QR Code
	EDIT=Qb, c	Set the start digit (b) and number of digits (c) of QR Code decoded data output
	SYMHEAD =Qa =Qa, ¥bb	Header character of QR Code a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=51 (*) character "Q" When omitting "bb", configured identifier will not be changed.
	SYMFOOT =Qa =Qa, ¥bb	Footer character of QR Code a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=51 (*) character "Q" When omitting "bb", configured identifier will not be changed.
Composite Code	SET=eM00-CC	Disable Composite (*)
	SET=eM01-CC	Enable EAN/UPC Composite
	SET=eM02-CC	Enable GS1 DataBar Composite
	SET=eM04-CC	Enable GS1-128 Composite
	SET=eM07-CC	Enable all types of Composite
	DIGIT=eb, c-CC	Set the minimum number of digits (b) and maximum number of digits (c) of Composite
	EDIT=eb, c-CC	Set the start digit (b) and number of digits (c) of Composite decoded data output
	SYMHEAD =ea, ¥bb-CC	Header character of Composite a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=63 (*) character "c" When omitting "bb", configured identifier will not be changed.

Composite Code (continued)	SYMFOOT =ea, ¥bb-CC	Footer character of Composite a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=63 (*) character “c” When omitting “bb”, configured identifier will not be changed.
PDF417	SET=LM0 SET=LM1	Disable PDF417 Enable PDF417 (*)
	DIGIT=Lb, c	Set the minimum number of digits (b) and maximum number of digits (c) of PDF417
	EDIT=Lb, c	Set the start digit (b) and number of digits (c) of PDF417 decoded data output
	SYMHEAD =La =La, ¥bb	Header character of PDF417 a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=64 (*) character “L” When omitting “bb”, configured identifier will not be changed.
	SYMFOOT =La =La, ¥bb	Footer character of PDF417 a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=64 (*) character “L” When omitting “bb”, configured identifier will not be changed.
Aztec Code	SET=zM0 SET=zM1 SET=zM2 SET=zM3	Disable Aztec Code (*) Enable Aztec Code; Normal label Enable Aztec Code; Black/White inverted label Enable Aztec Code; B/W inverted and Normal label
	DIGIT=zb, c	Set the minimum number of digits (b) and maximum number of digits (c) of Aztec Code
	EDIT=zb, c	Set the start digit (b) and number of digits (c) of Aztec Code decoded data output
	SYMHEAD =za =za, ¥bb	Header character of Aztec Code a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=51 (*) character “z” When omitting “bb”, configured identifier will not be changed.
	SYMFOOT =za =za, ¥bb	Footer character of Aztec Code a=0: Disable (*) a=1: Enable bb: Identifier (Hex code (*1)) bb=51 (*) character “z” When omitting “bb”, configured identifier will not be changed.

(*1) Refer to “Table of Character Code” .

7.3 Symbol Reading (Operation, Adjustment and Diagnostic mode)

Term	Command	Description (*) : Default
Reading	g	Start reading (SYNC ON)
	BR=a	Read error message a=0: None a=1: "BR" (*) a=2: "ERROR" a=3: "?" a=4: None (Header, Terminator and Additional information are output) a=5: "NO READ"
	SONCMD=a	Register the SYNC ON command (alphanumeric 8 digits) a=None (*)
	SOFFCMD=a	Register the SYNC OFF command (alphanumeric 8 digits) a=None (*)
Operation Mode	SYNCMODE=a	a=0: Normal Mode (*) a=1: Reading Timeout Mode a=2: External Trigger Mode a=3: Auto-sense Mode
	VOUT=a	Data output timing a=0: After decoding (*) a=1: After SYNC off
	TOTALLIM=a	Decode timeout a=100-30000 [ms], 10[ms] step a=3000[ms] (*)
Continuous Reading Mode	continue	Enable Continuous Reading Mode
	stop	Exit Continuous Reading Mode (back to Normal Mode) (*)
	contintvl=a	Set the interval to the next reading a=0-10000 [ms] a=1000(*)
Test Mode	TEST=a	a=0: Normal Mode (*) a=1: Test Mode
	TMN=a	Number of reading times a=10-1000 (10 steps) a=10(*)
I/O Test	IOTEST=a, b	Set output time a=D1: OUT1 port D2: OUT2 port b=0: OFF (*) 10-10000: ON time, Units: ms -1: Remain ON
Reading Statistics	?total	Check the number of SYNC, Read OK and Read NG since power-on
	clrtotal	Clear memory
Decoding time	?dect	Check the decode time (minimum, maximum, average) of Read OK and Read NG from power-on
	clrdect	Clear memory
Warning Information	CHKBCR=a	a=0: Disable addition of information to read data (*) a=1: Enable addition of information to read data
Symbology Information	SYMBOLTX=a	a=0: Disable addition of information to read data (*) a=1: Enable addition of information to read data
Decoding time	DTTX=a	a=0: Disable addition of information (*) a=1: Enable addition of information
Total time of decoding	TTTX=a	a=0: Disable addition of information (*) a=1: Enable addition of information Info.) Number of decoded images and decoding time
Shutter speed, Analog gain and Digital gain	AGCTX=a	a=0: Disable addition of information (*) a=1: Enable addition of information
Table Number	TBLTX=a	a=0: Disable addition of information (*) a=1: Enable addition of information
Reader Name	MYNAME=a	Set reader name (31 characters or less) (*) My Reader
Addition of reader name	NAMETX=a	a=0: Disable addition of information (*) a=1: Enable addition of information
Contrast Information	CONTTX=a	a=0: Disable addition of information (*) a=1: Enable addition of information
	CSX=a	X coordinate of base point of calculation area for Read NG

		a=0-742 a=0 (*)
	CSY=a	Y coordinate of base point of calculation area for Read NG a=0-480 a=0 (*)
	CWX=a	X coordinate of width of calculation area for Read NG a=10-752 a=752 (*)
	CWY=a	Y coordinate of width of calculation area for Read NG a=10-480 a=480 (*)
Quality Information	QTTX=a	a=0: Disable addition of information (*) a=1: Enable addition of information
Mirrored Image Information	MRTX=a	a=0: Disable addition of information (*) a=1: Enable addition of information Add "MR-ON" when it is a mirrored image Add "MR-OFF" when it is not a mirrored image
Symbol Position Information	XYTX=a	a=0: Disable addition of information (*) a=1: Enable addition of barycentric coordinate data a=2: Enable addition of rectangular coordinate data a=2: Enable addition of barycentric and rectangular coordinate data
Setup Number Information	PNTX=a	a=0: Disable addition of information (*) a=1: Enable addition of information
Delay time	DELAY=a	Delay time from SYNC ON to exposure start a=0-30000 [ms] a=0 (*)
Decode Area	DECMODE=0, Left, Top, Width, Height	Set decode area Not link with captured area Left 0-742 0 (*) Top 0-470 0 (*) Width 10-752 752 (*) Height 10-480 480 (*)
Cycle Buffer Function	MAXIMG=a	Number of captured images a=1-64 a=1 (*)
	WAITIMG=a	Capture interval time a=0-1000 [ms] a=100 (*)
	CAPLIM=a	Operation setting when the number of captures exceeds the MAXIMG a=0: Overwrites cycle buffer memory and continue capturing (*) a=1: Stop capturing without overwriting the cycle buffer memory

7.4 Auto Tuning

Term	Command	Description (*) : Default
Auto-Tuning	*setup	Start Auto-Tuning
Cancel	*cancel	Cancel running Auto-Tuning
Auto-Tuning Status	*?state	Get the status of running Auto-Tuning STANDBY RECEIVED Running Auto-Tuning SAVEWAIT Waiting for saving the tuning result ABORTED Auto-Tuning failed (No reply) Reading
Save Tuning Result (3 Types)	*save	Save the tuning result to Table #1 to #3
Save Tuning Result (1 type)	*save2=a	Save the tuning result to the specified table a=1-16

7.5 Camera Control (1)

Term	Command	Description (*) : Default
Image Rotation	ROTATE=a	Rotation of captured image a=0: Disable rotation (*) a=1: Enable rotation

7.6 Camera Control (2) (for Table Mode)

Term	Command	Description (*) : Default
Camera Control Mode	AGC=T	Use camera setting in Table Mode (*)
Number of Tables	ENABLEDDMTBL=a	Number of tables to enable a=1-16 a=16 (*) In case of a=3, Table #1, #2 and #3 are enabled and Table #4 through #16 are disabled. In case of a=1, Table #1 is enabled. The shutter speed, digital gain and the illumination setting are fixed.
Number of edit table	EDITDDMTBL=a	Specify the table to be edited a=1-16 a=1 (*) e.g.) When setting DDMagain value of Table #3 to 2, enter the command as follows. EDITDDMTBL=3 DDMagain=2
Copy Table settings	CPDDMTBL=a, b or a, b-c	Copy the settings of Table #a to Table #b Copy the settings of Table #a from Table #b to Table #c
Operation of Table Mode	DDMTBLNG=a	Specify the operation of Table Mode a=0: Start reading from the table number that decoded last. If the decode failed, start reading from the next table number. a=1: Start with Table #1 every time (*)

7.7 Camera Control (3) (for Table Mode)

Term	Command	Description (*) : Default
Capturing area	DDMcapmode= Left, Top, Width, Height	Specify capturing area of the Table Left 0-742 0(*) Top 0-470 0(*) Width 10-752 752(*) Height 10-480 480(*)
Illumination Control	DDMlight=a	Specify illumination ON/OFF setting of the Table a=0: OFF a=3: ON (When imaging) (*) a=10: ON (Always) a=11: ON (During attempting to read: SYNCMODE=1 or 2)
Illumination brightness	DDMflash=a, b	Specify the illumination brightness a=0 (OFF), 1 (dark) ~ 100 (bright) a=100 (*) b=0 (OFF), 1 (dark) ~ 100 (bright) b=100 (*) When a value in the range of 1 to 100 is set, set a=b. When b is omitted, b=a is set.
Shutter speed	DDMshutt=a	Specify the shutter speed of the Table a=0-9 0 : 1/60 [sec] 1 : 1/125 2 : 1/250 (*) 3 : 1/500 4 : 1/1000 5 : 1/2000 6 : 1/4000 7 : 1/6000 8 : 1/8000 9 : 1/10000
Analog Gain	DDMagain=a	Specify the analog gain of the Table a=1 (Lowest) to 25 (Highest) a=9 (*)
Digital Gain	DDMdgain=a	Specify the digital gain of the Table a=1 (Lowest) to 12 (Highest) a=1 (*)
Black Level adjustment	DDMblackval=a	For improving the contrast of a captured image a=1 (Black emphasis) to 255 (White emphasis) a=128 (*)
Image Preprocessing	DDMpreproc= a, b, c, d, e	Set the type of preprocessing a, b, c, d, e : Command for preprocessing (Described later) a, b, c, d, e =0, 0, 0, 0, 0 (*) Up to 5 stages of function can be set
Mirrored Image	DDMmirror=a	Set reading of mirrored image of the Table a=0: Read only normal type (not mirrored) a=1: Read only mirrored type a=2: Read normal type and if it fails, try to read it as mirrored type (*)
Decoding time limit	DDMdecodelim=a	Set time limit for decoding process in the Table a=50-10000 [ms], 10[ms] step a=500 (*)
Table Name	DDMtblname=a	Set table name a=Table name (16 characters or less) (*)name

Note: The default values are the same in Table #1 to #16

7.8 Camera Control (3) (for Auto Gain Control Mode)

Term	Command	Description (*) : Default
Camera Control Mode	AGC=E	Use camera setting in Auto Gain Control Mode
Capture area	CAPMODE= Left, Top, Width, Height	Specify capturing area Left 0-742 0 (*) Top 0-470 0 (*) Width 10-752 752 (*) Height 10-480 480 (*)
Illumination Control	LIGHT=a	Specify illumination ON/OFF setting a=0: OFF a=3: ON (When imaging) (*) a=10: ON (Always) a=11: ON (During attempting to read: SYNCMODE=1 or 2)
Illumination brightness	FLASH=a,b	Specify the illumination brightness a=0 (OFF), 1 (dark) ~ 100 (bright) a=100 (*) b=0 (OFF), 1 (dark) ~ 100 (bright) b=100 (*) When a value in the range of 1 to 100 is set, set a=b. When b is omitted, b=a is set. Specify the illumination brightness
Shutter speed	SHUTT=a	Specify the shutter speed a=0-9 0 : 1/60 [sec] 1 : 1/125 2 : 1/250 (*) 3 : 1/500 4 : 1/1000 5 : 1/2000 6 : 1/4000 7 : 1/6000 8 : 1/8000 9 : 1/10000
Analog Gain	AGAIN=a	Specify the analog gain a=1 (Lowest) to 25 (Highest) a=9 (*)
Digital Gain	DGAIN=a	Specify the digital gain a=1 (Lowest) to 12 (Highest) a=1 (*)
Black Level adjustment	BLACKVAL=a	For improving the contrast of a captured image a=1 (Black emphasis) to 255 (White emphasis) a=128 (*)
Image Preprocessing	IPFUNC0= a, b, c, d, e	Set the type of preprocessing a, b, c, d, e: Command for preprocessing (Described later) a, b, c, d, e=0, 0, 0, 0, 0 (*) Up to 5 stages of function can be set
Mirrored Image	MIRROR=a	Set reading of mirrored image of the Table a=0: Read only normal type (not mirrored) a=1: Read only mirrored type a=2: Read normal type and if it fails, try to read it as mirrored type (*)
Decoding time limit	DECODELIM=a	Set time limit for decoding process a=50-10000 [ms], 10[ms] step a=500 (*)

7.9 Image Preprocessing

Term	Command	Description
None	0	No Image Preprocessing
Black Erosion	1	Erosion 2x2
	3	Erosion 3x3
	5	Erosion 5x5
	7	Erosion 2x1 (w)
	9	Erosion 1x2 (h)
White Erosion	2	Dilation 2x2
	4	Dilation 3x3
	6	Dilation 5x5
	8	Dilation 2x1 (w)
	10	Dilation 1x2 (h)
Reverse	20	White & Black Reverse
Contrast Enhancement	21	Cont(L12cut): Truncate the 12% of dark side
	22	Cont(L22cut): Truncate the 25% of dark side
	23	Cont(H23cut): Round up the 12% of bright side
	24	Cont(H24cut): Round up the 25% of bright side
	25	Cont(LH12cut): Truncate the 12% of dark side and round up the 12% of bright side
	26	Cont(LH22cut): Truncate the 25% of dark side and round up the 25% of bright side
Gamma Correction	27	Gamma(r=2.0): Perform a Gamma Correction (2.0)
Smoothing Filter	40	Low pass 3x3 Smoothing Filter, Average value
Median Filter	41	Median filter 3x3, Median value
Down Size	70	Down Size (Quick): Image reduction (speed priority)
Down Size	71	Down Size (Average): Image reduction (luminance average)

7.10 Preset Mode

Term	Command	Description (*) : Default
Preset	?pre	Get the status of Preset Mode settings
	PREM=0	Preset Mode 0: Disable Preset Mode (*)
	PREM=1	Preset Mode 1: Compare with the first read data after power on
	PREM=2	Preset Mode 2: Compare with registered data
	SET=PRENa	Set the number of digits for comparing a=0 to 100, a=0: No count
	clrpren	Clear the value of SET=PRENa
	SET=PREDa	Set the preset data
	clrpred	Clear the value of SET=PREDa

7.11 Auto sense

Term	Command	Description (*) : Default
Aimer / Illumination	LFILLUM=a	Set aimer and illumination in detection state a=0: Aimer OFF, Illumination OFF a=1: Aimer ON, Illumination OFF (*) a=2: Aimer OFF, Illumination ON
Detection sensitivity	LFSENS=a	Set detection sensitivity a=0: High a=1: Slightly high a=2: Normal (*) a=3: Slightly low a=4: Low
Read timeout time	LFTOTALLIM=a	Set read timeout time in Auto-sense Mode a=1-10 [s] a=3 (*)
Wait time	LFWAIT=a	Set the wait time for the next detection a=1-10 [s] a=1 (*)
Continuous reading of the same symbol	VERIFY=a	Set whether to permit continuous reading of the same symbol. a=0: Permission (*) a=1: Prohibition
Wait time for continuous reading of the same symbol	VWAIT=a	Set the prohibited time when VERIFY=1. a=1-20, Unit: x 500[ms] a=3 (*)

7.12 Image Output

Term	Command	Description (*) : Default
Output target of image	Mode=a	Set the image transfer after reading a=0 : Disable (*) a=1 or 2 : Reserved. DO NOT USE a=3 : Output OK/NG image in binary format a=4 : Output NG image in binary format a=5 : Output OK image in binary format
Output image size	GOUTSIZE=a	Set the image size a=0: 752x480 (*) a=1: 376x240 a=2: 188x120 a=3: 94x60
Image type	IMGSEL=a	Select image type a=0: Captured image (raw data) a=1: Decode image (processing data) (*)
Trimming	IMODE=a	a=0: Disable trimming (*) a=1: Enable trimming
Trimming position	PX=a	Set the area of image to trim Start position (X coordinate) a=0-751 a=0 (*)
	PY=a	Start position (Y coordinate) a=0-479 a=0 (*)
	WX=a	Width (X direction) a=1-752 a=752 (*)
	WY=a	Width (Y direction) a=1-480 a=480 (*)

7.13 Save NG (No Read) Image

Term	Command	Description (*) : Default
Image type	IMGSEL=a	Select image type a=0: Captured image (raw data) a=1: Decode image (processing data) (*)
Storage order	IMGFULL=a	a=0: Save the latest 10 NG Images a=1: Save the 1st to 9th NG Image and the latest NG Image (*)
Number of stored NG Images	?NGFRAME	Checking the number of stored NG Images
Preparation for transmitting	NGFRAME=a	a=0: Do not transfer NG Images (last decoded image) (*) a=1-10: Prepare for transfer of specified NG image

7.14 Configuration Reference

Term	Command	Description
Configuration reference	?	Status transmission (First page)
	?2 or ??	Status transmission (Second page)
	?3 or ???	Status transmission (Third page)
	?4	Status transmission (Fourth page)
	?5	Status transmission (Fifth page)
	?img or ?IMG	Status transmission (Settings for image output)
	?ddmtbl or ?DDMTBL	Status transmission (Settings for Table mode)
	?lf or ?LF	Status transmission (Settings for Auto-sense mode)
	?pre or ?PRE	Status transmission (Settings for Preset mode)
	?tx or ?TX	Status transmission (Settings for additional information)

7.15 Setup

Term	Command	Description
Setup	PSAVE=a	Save current settings as SETUP-a in flash memory a=1-20
	PLOAD=a	Load SETUP-a settings saved in flash memory a=1-20
	PERASE	Erase the setting of all SETUPS in the code reader.
	PERASE=a	Erase the setting of setup a in the code reader. a=1-20
	PNAME=a, b	Name the SETUP a=1-20 b=(32 alphanumeric characters or less)
	WSETP	Save the SETUP name
	?plist	Output a list of SETUP names

7.16 General Operation

Term	Command	Description (*) : Default
Initialization	SET=DFT	Reset to factory default
Save settings	WSETS	Save settings to internal flash memory
Digital I/O	CHATT=a	Debouncing time a=0: None a=1: 10[ms] (*) a=2: 20[ms]
	GOOUT=a	Set hold time of GO output (Hold off at next SYNC IN) a=100-20000 [ms] a=300 (*)
	NGOUT=a	Set hold time of NG output (Hold off at next SYNC IN) a=100-20000 [ms] a=300 (*)
Digital I/O signal assignment	DOUT1=a	Assign the signal on OUT1 port a=0: Disable a=1: GO (Read OK) (*) a=2: NG (Read NG) a=3: Ready a=4: Busy1 a=5: Busy2
	DOUT2=a	Assign the signal on OUT2 port a=0: Disable a=1: GO (Read OK) a=2: NG (Read NG) (*) a=3: Ready a=4: Busy1 a=5: Busy2
RESET	RESET	Reboot the reader.

7.17 Table of Character Code

		Upper Byte															
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Lower Byte	0	NUL	DLE	SP	0	@	P	`	p								
	1	SOH	DC1	!	1	A	Q	a	q								
	2	STX	DC2	"	2	B	R	b	r								
	3	ETX	DC3	#	3	C	S	c	s								
	4	EOT	DC4	\$	4	D	T	d	t								
	5	ENQ	NAK	%	5	E	U	e	u								
	6	ACK	SYN	&	6	F	V	f	v								
	7	BEL	ETB	'	7	G	W	g	w								
	8	BS	CAN	(	8	H	X	h	x								
	9	HT	EM	)	9	I	Y	i	y								
	A	LF	SUB	*	:	J	Z	j	z								
	B	VT	ESC	+	;	K	[	k	{								
	C	FF	FS	,	<	L	\	l									
	D	CR	GS	-	=	M	]	m	}								
	E	SO	RS	.	>	N	^	n	~								
	F	SI	US	/	?	O	_	o	DEL								

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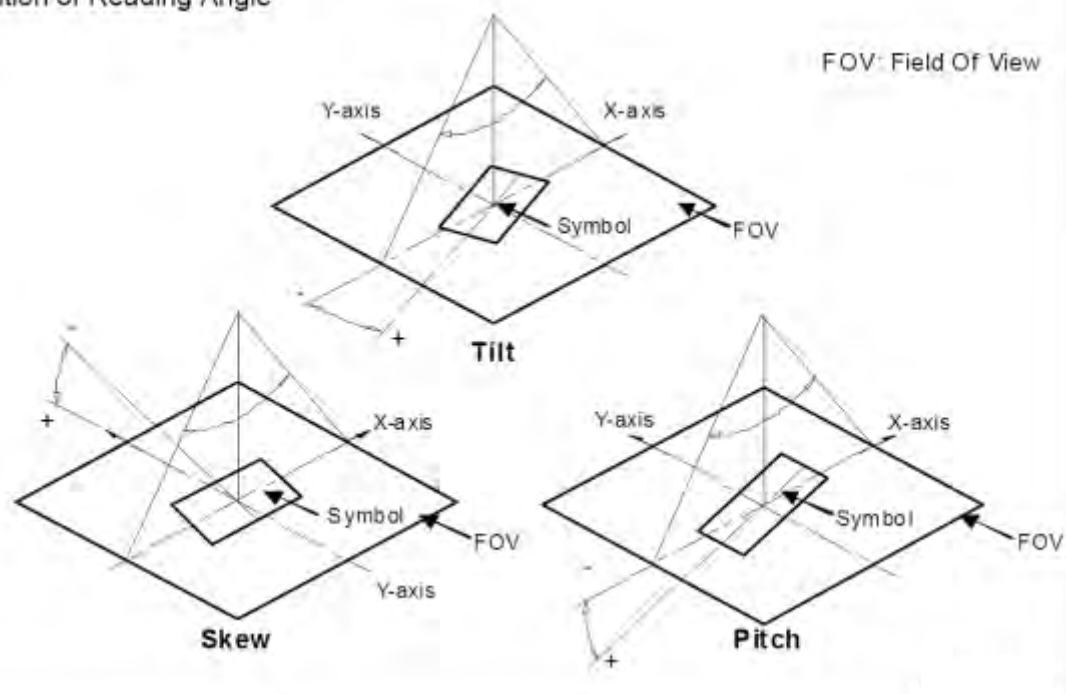
8 Specifications

8.1 Specifications

		V6100R V6110R	V6100R5 V6110R5	V6100U V6110U
Supported Symbologies	Barcode	Code39, Code128 / GS1-128, Codabar(NW7) GS1 DataBar, ITF(Interleaved 2 of 5) JAN / UPC / EAN(JAN) , Code93		
	2D barcode	Data Matrix(ECC200), QR Code / Micro QR Code PDF417 / MicroPDF, AztecCode, CompositeCode		
Reading angle		PITCH: ±35° SKEW: ±35° TILT: 360°		
Minimum resolution		V6100* Barcode: 0.15 mm 2D barcode: 0.25 mm V6110* Barcode: 0.125 mm 2D barcode: 0.125 mm		
Image sensor	sensor	1/3-inch, Monochrome		
	Active pixels	752 (X) × 480 (Y) (Approx. 0.36 million pixels)		
Illumination		V6100* High-intensity white LED V6110* High-intensity red LED		
Aimer		Red LED		
Power rating	Supply Voltage	DC 24 V ± 10%	DC 5 V ± 10%	DC 5 V ± 5%
	Current consumption	150 mA or less	500 mA or less	500 mA or less
Digital input	Input method	Photo-coupler isolation x1		-
	Input resistance	2.2 kΩ	360 Ω	
	ON voltage	10.8 to 28 V	3.5 to 14 V	
	OFF voltage	0 to 0.8 V	0 to 0.8 V	
Digital output	Output method	Photo-coupler isolation x2		-
	Maximum rating	DC 30 V 50 mA		
Interface		RS-232C(1200~115200 bps)		USB2.0(Full Speed)
Cable length		2 m		
Environmental tolerance	Operating temperature	0 ~ 40 °C		
	Operating humidity	35 ~ 85 %R.H. (No condensing)		
	Storage temperature	-20 ~ 60 °C		
	Storage humidity	35 ~ 85 %R.H. (No condensing)		
	Vibration tolerance	10 to 55 Hz amplitude 1.5 mm (total width) X, Y, Z 1 hour for every direction (Note 1)		
	Enclosure rating	IP65		
	Ambient illuminance	Less than 10000 lx		
Dimensions		40(W)mm × 36(D)mm × 24(H)mm (without protrusions)		
Weight		Approx. 30 g (without the cable)		

Note 1: Not a guaranteed spec., but a test result.

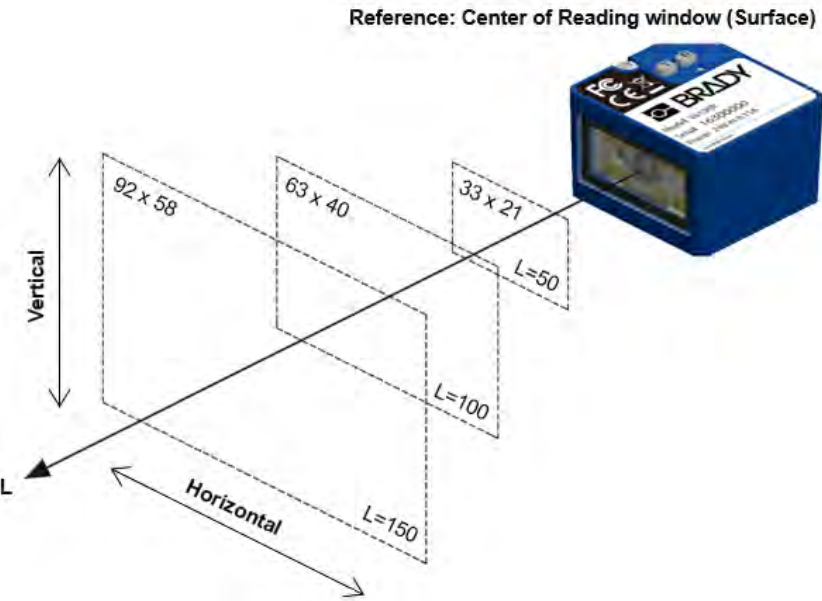
Definition of Reading Angle



8.2 Reading Specifications

8.2.1 Field of view

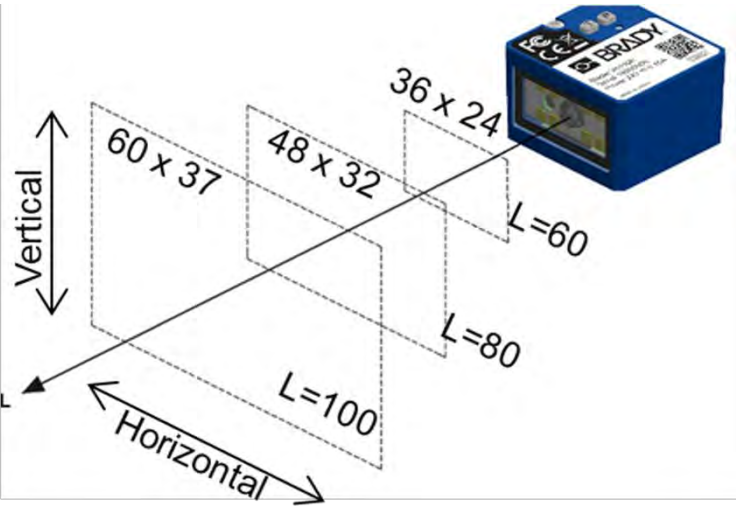
- V6100R, V6100R5, V6100U
-



Unit: mm

Distance L	50	100	150	200
Horizontal	33	63	92	122
Vertical	21	40	58	77

- V6110R, V6110R5, V6110U



Unit: mm

Distance L	40	60	80	100
Horizontal	24	36	48	60
Vertical	17	24	32	37

8.2.2 Reading range

- **V6100R, V6100R5, V6100U**

Unit: mm

Narrow bar width / Cell size	Near	Far
Barcode 0.15	75	110
Barcode 0.19	65	145
Barcode 0.25	55	180
Barcode 0.33	40	195
2D barcode 0.25	65	90
2D barcode 0.33	50	125
2D barcode 0.38	40	145

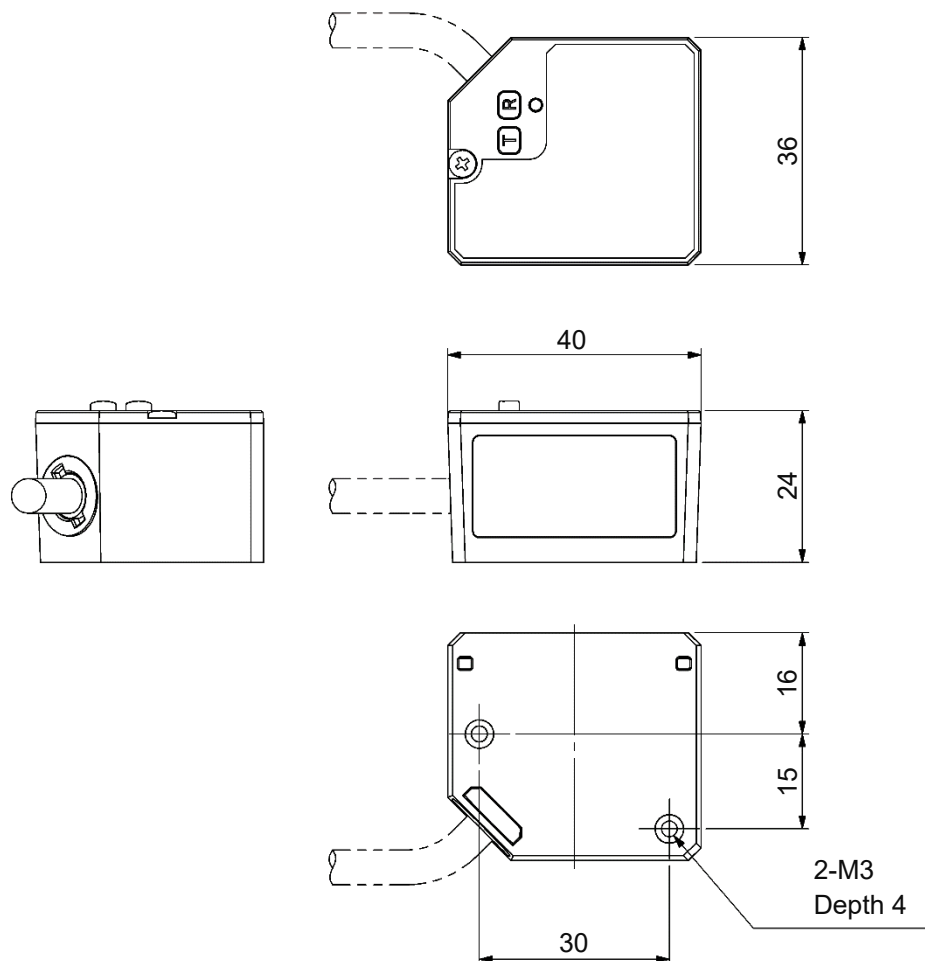
- **V6110R, V6110R5, V6110U**

Unit: mm

Narrow bar width / Cell size	Near	Far
Barcode 0.125	49	60
Barcode 0.167	42	90
Barcode 0.19	38	100
2D barcode 0.125	53	58
2D barcode 0.167	48	80
2D barcode 0.19	43	90

* Under the conditions of use of our specified barcodes.

8.3 Dimensions



Unit: mm



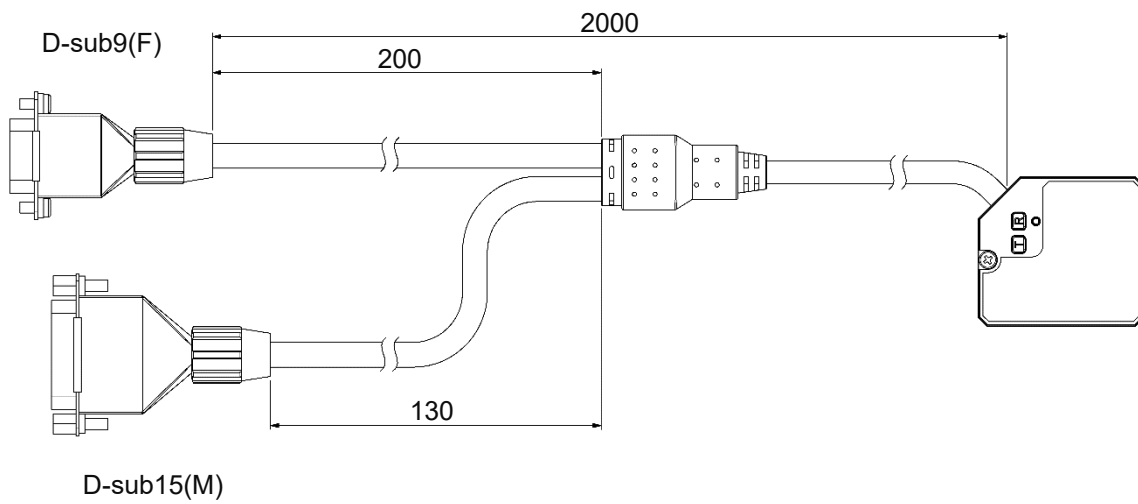
WARNING

DO NOT tighten the screws more than the depth of mounting holes or the maximum tightening torque is as below.

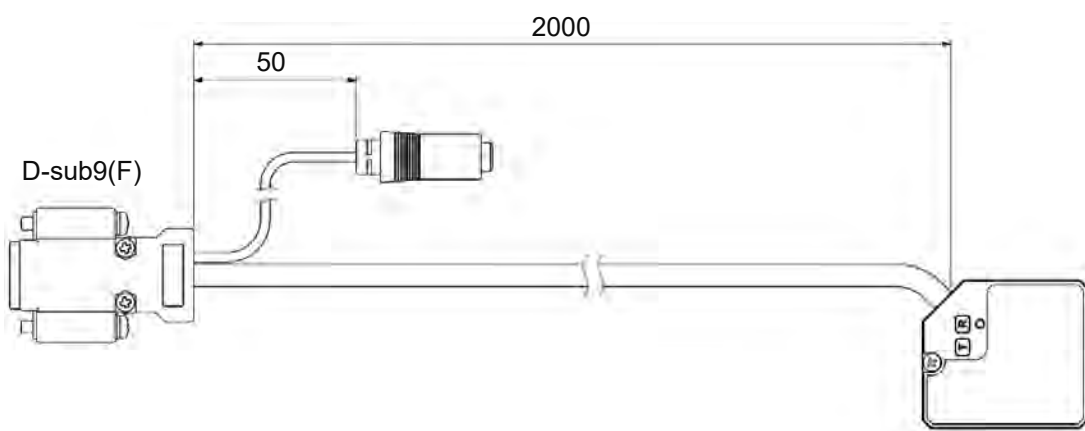
M3: 0.7 [N·m]

RS-232C type

• V6100R, V6110R



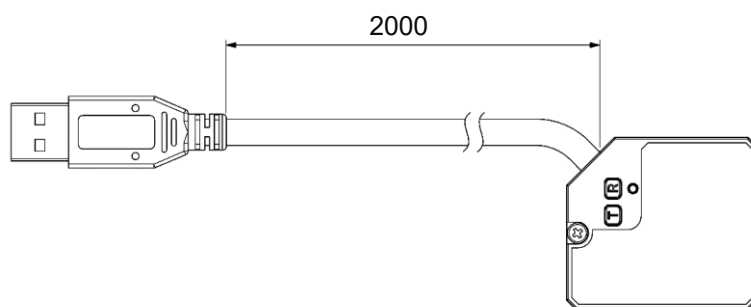
• V6100R5, V6110R5



Cut the cable at the connector end when using cable with loose-wires.

Refer to 8.4 “Interface” for wire color.

USB type



Unit: mm

8.4 Interface

8.4.1 RS-232C type

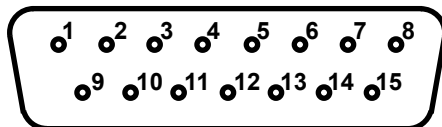
• V6100R, V6110R

(1) Power, I/O interface

Connector: D-sub 15pin (Male)

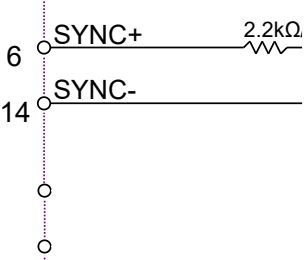
Lock screw: #4-40UNC (Female)

Connector pin assignment



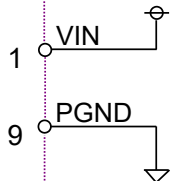
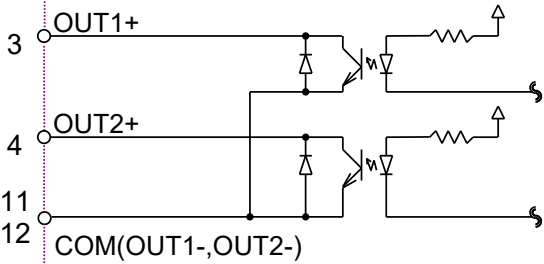
Pin	Color	Name	Function	Direction
1	Red	VIN	+24V	
2		N.C	Not connected	
3	Sky blue	OUT1+	Digital Output 1	Output
4	Yellow	OUT2+	Digital Output 2	Output
5		N.C	Not Connected	
6	Pink	SYNC+	SYNC Input (+ side of Photo coupler)	Input
7	Orange	Reserved	Reserved (Do Not Connect)	
8		N.C	Not Connected	
9	Black	PGND	Power Ground	
10		N.C	Not Connected	
11	Sky blue ■	OUT1-	Digital Output Common (Connected internally)	Output
12	Yellow ■	OUT2-		
13		N.C	Not Connected	
14	Pink ■	SYNC-	SYNC Input (- side of Photo coupler)	Input
15	Orange ■	Reserved	Reserved (Do Not Connect)	
Case	Shield		Connect the shield to the ground as FG.	

Internal
equivalent
circuit



		Split Position			Shield
TX	gray				gray
RX	brown				brown
SGND	purple				Purple
CTS	green				green
RTS	blue				blue
.					
VIN	red				red
PGND	black				black
OUT1+	skyblue				skyblue
.	skyblue				skyblue
OUT2+	yellow				yellow
COM1-	yellow				yellow
SYNC+	pink				pink
SYNC-	pink				pink
Reserved	orange				orange
Reserved	orange				orange
					Shield

*Ground the shield as FG.

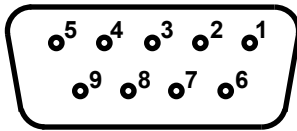


VIN voltage
DC24V

(2)RS-232C interface

- Connector: D-sub 9pin (Female)
Lock screw: #4-40UNC (Male)

Connector pin assignment



Pin	Color	Name	Function	Direction
1		N.C	Not Connected	
2	Gray	TXD	RS-232C Transmit Data	Output
3	Brown	RXD	RS-232C Receive Data	Input
4		N.C	Not Connected	
5	Purple	SGND	Signal Ground	
6		N.C	Not Connected	
7	Green	CTS	RS-232C Clear To Send	Input
8	Blue	RTS	RS-232C Request To Send	Output
9		N.C	Not Connected	

• **V6100R5, V6110R5**

(1) Power

Connector: DC Jack [EIAJ - Type II]

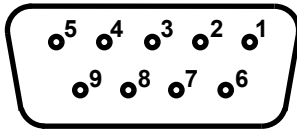


(2) RS-232C interface

Connector: D-sub 9pin (Female)

Lock screw: #4-40UNC (Male)

Connector pin assignment



Pin	Color	Name	Function	Direction
1		N.C	Not Connected	
2	Gray	TXD	RS-232C Transmit Data	Output
3	Brown	RXD	RS-232C Receive Data	Input
4		N.C	Not Connected	
5	Purple	SGND	Signal Ground	
6		N.C	Not Connected	
7	Green	CTS	RS-232C Clear To Send	Input
8	Blue	RTS	RS-232C Request To Send	Output
9		N.C	Not Connected	

(3) IO interface

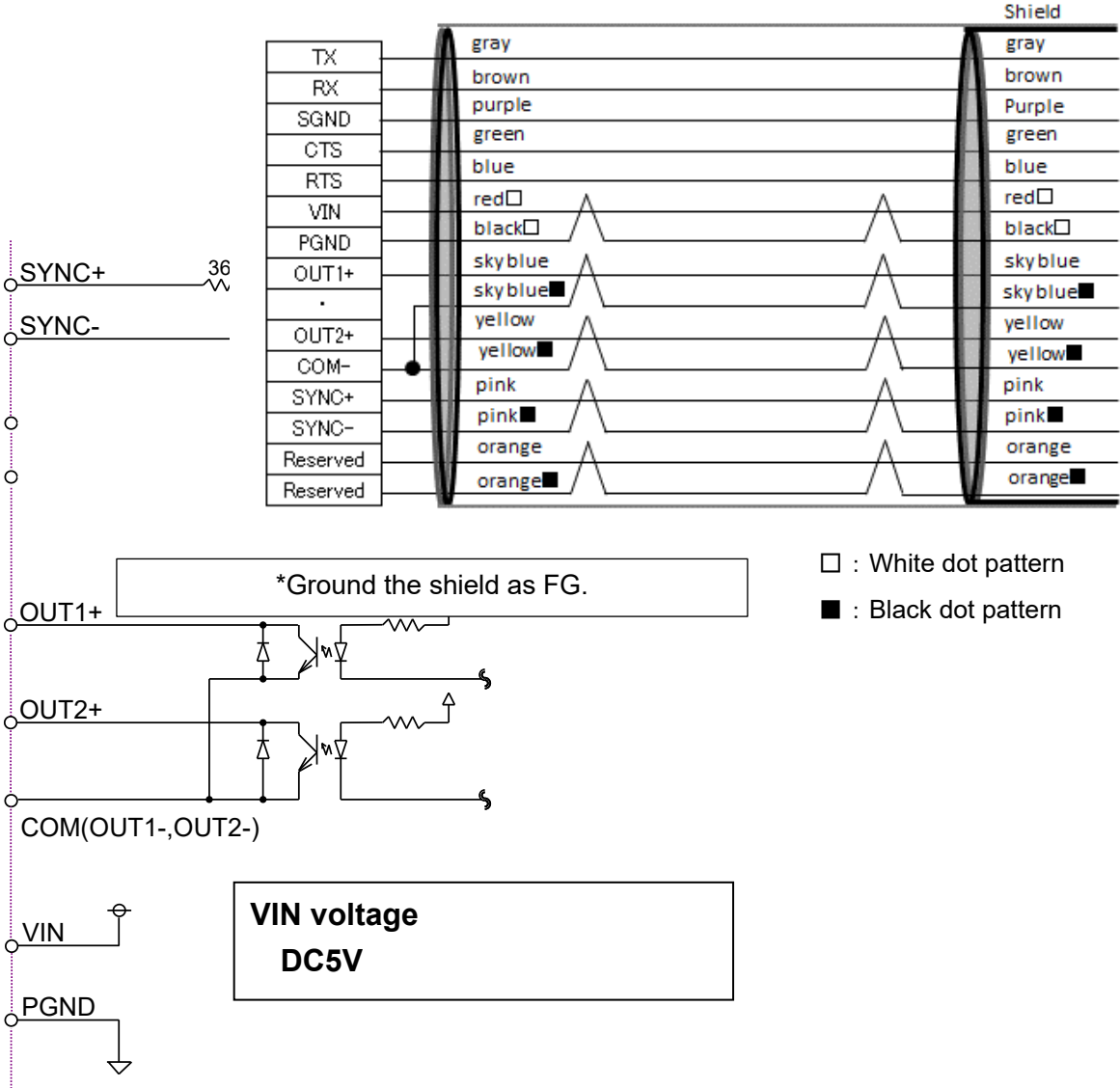
The IO interface can be used by cutting the cable at the connector end.

Pin assignment

Color	Name	Function	Direction
Red □	VIN	+5V	
Sky blue	OUT1+	Digital Output 1	Output
Yellow	OUT2+	Digital Output 2	Output
Pink	SYNC+	SYNC Input (+ side of Photo coupler)	Input
Orange	Reserved	Reserved (Do Not Connect)	
Black □	PGND	Power Ground	
Sky blue ■	OUT1-	Digital Output Common (Connected internally)	Output
Yellow ■	OUT2-		
Pink ■	SYNC-	SYNC Input (- side of Photo coupler)	Input
Orange ■	Reserved	Reserved (Do Not Connect)	
Shield		Connect the shield to the ground as FG.	

Connection table for loose-wires

Internal
equivalent
circuit



8.4.2 USB type
USB connector Type-A

9 Accessories

9.1 Accessories for V6100R, V6110R

9.1.1 Power supply unit

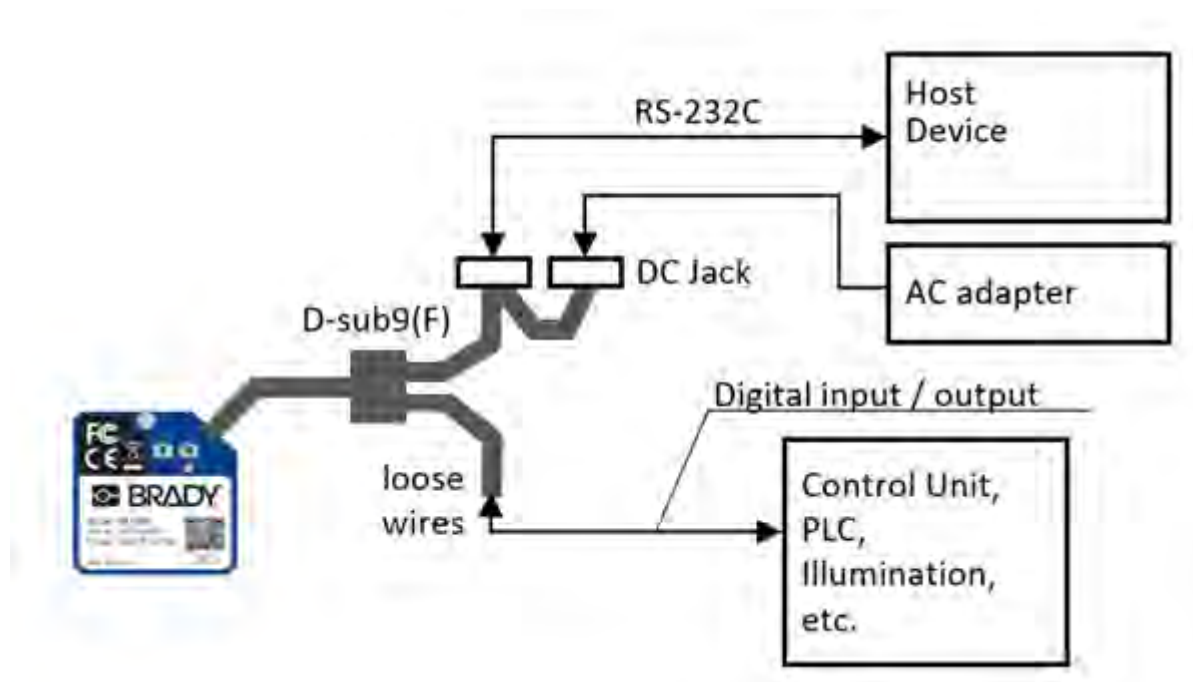
Scanner Models	Interface	Power Supply	Digital I/O	Minimum Resolution (2D code)
V6100R	RS-232C	DC 24V	Yes	0.25 mm
V6100R5	RS-232C	DC 5V	Yes	0.25 mm
V6100U	USB (Full Speed)	DC 5V	No	0.25 mm
V6110R	RS-232C	DC 24V	Yes	0.125 mm
V6110R5	RS-232C	DC 5V	Yes	0.125 mm
V6110U	USB (Full speed)	DC 5V	No	0.125 mm

9.1.2 Example of device configuration

• V6100R, V6110R

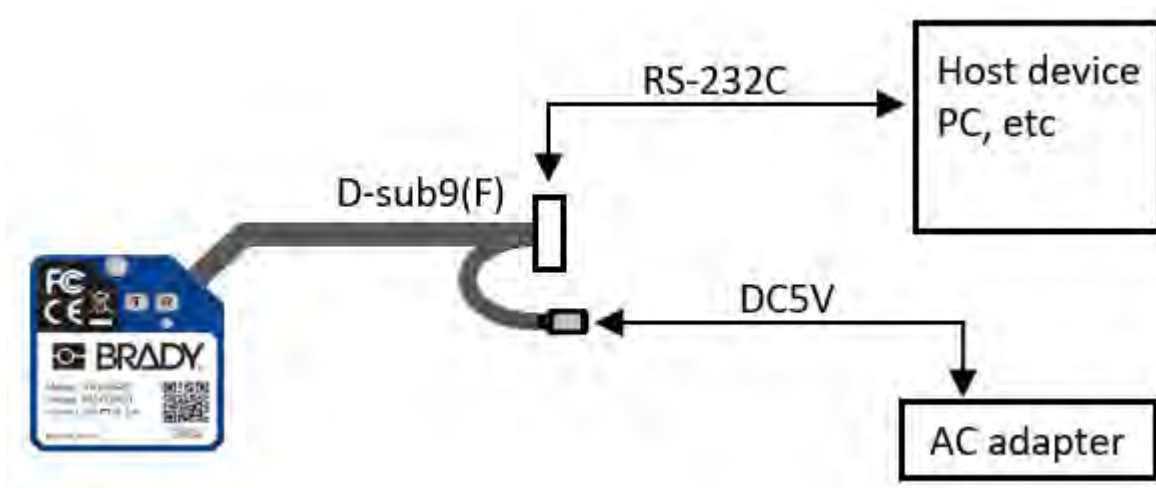
The following are the conditions that are used for this configuration:

- Use an external sensor to input SYNC
- Use digital outputs of V6100R, V6110R

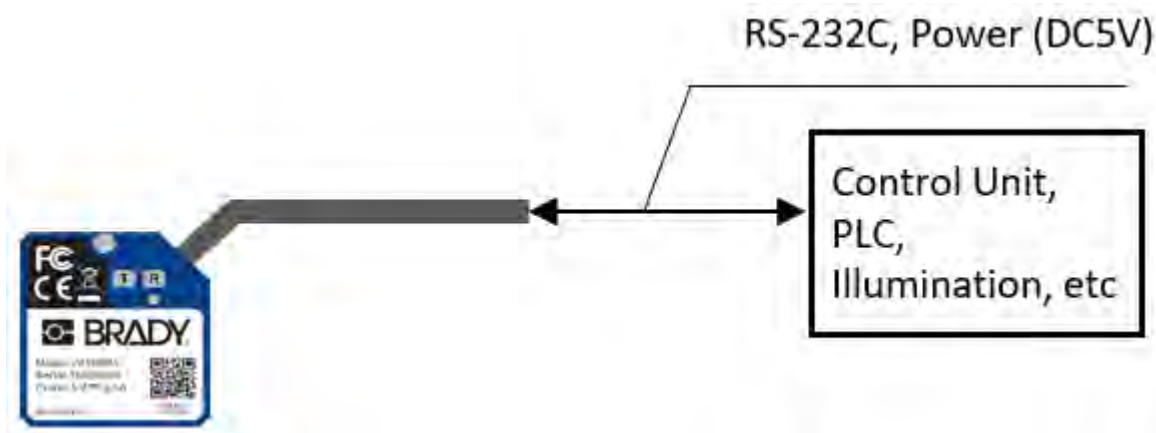


- V6100R5, V6110R5

Use an AC adapter



Use the cable with loose-wires



To avoid damage to the scanner, turn off the power to the devices attached to the scanner when plugging in or unplugging the cables.

10 Troubleshooting

If any problem occurs during the operation, try the following methods to recover.

The host device which is the access point may cause a problem. Refer to the instruction manual of your host device.

10.1 The scanner does not start up or cannot communicate with a PC.

➤ **Is power supply voltage within the specifications?**

Check that the power supply voltage is as follows:

If the voltage is out of the specification range, the scanner may not operate properly or may be damaged.

V6100R, V6110R: DC24V +/- 10%

V6100R5, V6110R5: DC5V +/- 10%

➤ **Is V6100 and V6110 series properly connected to the host device?**

Make sure that the scanner is properly connected to the host device.

In the RS-232C interface, all communication conditions including the baud rate must be the same.

➤ **Is the format of serial command correct?**

Serial commands are always accepted when the scanner is in standby state.

Add a carriage return code [CR] at the end of the serial command.

Push the Enter button to enter serial command in the terminal software.

After configuring the scanner, send the command WSETS to save the settings to internal flash memory. If you turn off the scanner without saving, the settings will not be saved.

Take a command transmission interval of 500 ms or more to avoid unwanted errors during the scanner setting.

10.2 Barcode cannot be decoded

➤ Is the barcode setting correct?

Make sure that the symbology and number of digits settings are correct.

If the barcode type or number of digits is out of the setting, the scanner cannot read.

➤ Are the reading distance and the print quality suitable?

Set the barcode within the reading specification range.

If the barcode is damaged or the print quality is low, the scanner may not decode even within the reading range.

➤ Is the reading window clean?

The quality of captured images is affected by the condition of the reading window. Dust, dirt, etc. on the reading window may alter the reading performance. Clean with a cleaner or similar non-abrasive method.

➤ Is the print quality of the barcode good?

Make sure the quality of the barcode (1D: Module width and Wide/Narrow bar width ratio, 2D: Cell size) meet the standards.

10.3 Others

Press the restart button to perform a hardware reset. After the scanner is turned off, it will restart.

The cable of V6100R(R5) and V6110R(R5) are shielded cable. Ground the shield when using the cable with loose-wires.

If there is anything unclear or if you have any problems that cannot be resolved by the above check, contact technical support.

Warranty Obligations

Exclusive of the cases with special mentions in quotations, contracts or specifications, Brady warrants this product as follows.

1. Term of Warranty

One year from the date of purchase.

2. Warranty Coverage

Brady shall repair or replace the product at no charge if any defects in the Products are suspected to be due to design or manufacturing error.

This warranty does not cover, and Brady will not be held liable, for any damages incurred by the use of this product.

The above warranty shall not apply to any Product;

- (1) which has not been used and maintained in accordance with the operating instructions,
- (2) which has been repaired or altered by anyone other than Brady authorized personnel,
- (3) which has been subject to unusual physical or electrical stress, misuse, abuse, negligence, natural disasters, fire, pollution etc.,
- (4) other defects that may arise through no fault of Brady.

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