

TFIR-31 Series

**Compact Fixed Mount Image Reader
(Linear / 2D Scanner)**

OPERATION MANUAL

TOHKEN CO.,LTD.

**4th Edition
January 3, 2007**

[Memorandum]

Copyright © 2006 Tohken Inc. and/or its suppliers. All rights reserved.

COPYRIGHT NOTICE

The contents of this document may not be copied or supplied in any form, in whole or in part without prior written consent from Tohken

Tohken does not assume responsibility for errors or omissions and makes no guarantees or representations related to the quality, content or adequacy of the information contained in this document.

Tohken does not warrant or represent any license, either expressed or implied, granted under any patent, copyright, or other intellectual property of Tohken for any product or process that uses Tohken products or services. Tohken does not endorse third party products or services published in this document.

Tohken makes no guarantee of performance or suitability of its products, nor does Tohken assume any liability that occurs from the use of the product. Tohken reserves the right to make changes to its products and this document without any notice.

APPLICATION NOTICE

Tohken products are not designed or intended for 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 Tohken products shall indemnify and hold harmless Tohken and its shareholders against any claims of injury or death associated with unintended authorized use.

TRADEMARKS

Tohken, Tohken and the Tohken Logo are marks of Tohken Inc. The names of any companies and products mentioned in this document may be the marks of their respective owners.

CONTACT INFORMATION

Tohken Ltd., 2-7-1 Nishi-Shinjuku, Shinjuku-ku, Tokyo Japan 163-0710

Tel: +81-3-5325-4311

www.tohken.co.jp

Introduction

Thank you for purchasing this product.

This manual explains the features of this product, operation, system configuration, specifications, etc.

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

When there is any problem during normal use, please document it carefully to be reproduced by our support team.

The contents of this manual may be changed without a notice. Please check our website for regular updates

Safety Notice



**DO NOT
DISASSEMBLE**

Please do not disassemble this product as this will void the warranty and might cause an accident.



Follow

Please follow the warnings or notices of computers to be used with this product.



PULL OFF

Please stop using the product when there is smoke smell or strange sound to avoid fire.



CAUTION

Please do not use AC adapters other than the recommend AC power adaptor which is described in the “unpacking the carton” section. Failure to do so might affect the performance of the unit.

If the voltage or polarity used is different from the specification, it might cause product failure and could be the cause of an accident.

Handling with care



CAUTION

About backup data

This product has a memory backup function. This backup can not guaranteed if repair, reconstruction, and upgrade are performed on this Image Reader.



CAUTION

Please do not use this product at temperature or humidity ranges that are different from the product specifications or under the direct sunshine.



CAUTION

Please do not drip water, moisture, oil, etc. on the unit.



CAUTION

When stain or dust is stuck on the reading window, please follow the following steps to clean it:

- Wipe off stain lightly with cloth or swab (wet with alcohol)
- Wipe off again with the dry clothes.

DON NOT Wipe off with any chemicals.



CAUTION

This is a high-precision optical device. Avoid shocking the product such as fall.

Unpacking the product

After you open the shipping package containing the TFIR-31, take the following steps:

- 1- Check for damage that might occur during the shipping process. Report the damage immediately to the carrier who delivered the shipment.
- 2- Save the shipping container for later storage or shipping.
- 3- Make sure everything ordered is present.

Items included with the product

- AC Power Adaptor (Optional)

In case of purchase separately, select an adaptor with output DC5V +/- 5% and more than 7W.

Please confirm polarity and DC plug type as below.

Polarity: $\oplus - \ominus - \ominus$

DC plug type: EIAJ RC5320A Voltage Segment 2

Items included with the product	Quantity
TFIR-31(H) main unit	1 unit
Operation Manual	1 copy

Contents

INTRODUCTION	3
SAFETY NOTICE.....	3
HANDLING WITH CARE	4
UNPACKING THE PRODUCT	5
1.GETTING STARTED.....	9
1.1 SUPPORTED BARCODES	10
1.2 PICTURE TAKING.....	10
1.3 ORDERING INFORMATION.....	11
1.4 HOW IT WORKS	12
2. OPERATION.....	13
2.1 BASIC OPERATION	13
2.2 READING OPERATION	14
2.3 TRANSMITTING IMAGE DATA.....	15
2.4 SWING MODE.....	15
2.5 USB INTERFACE.....	15
3. DESCRIPTION OF READING OPERATION	16
3.1 NORMAL MODE.....	16
3.2 READ TIME OUT MODE.....	17
3.3 EXTERNAL SYNC MODE.....	21
3.4 CONTINUOUS READING MODE	23
3.5 TEST MODE	23
3.6 SWING MODE.....	24
3.7 PRESET MODE	25
1) Preset Mode 1	25
2) Preset Mode 2	25
3) Output the Preset status	27
3.8 DESCRIPTION OF DIAGNOSIS MODE	29
1) Confirmation for Output of Reading statistics and Decoding Time	29
2) Output decode time.....	29
3) Output of total decoding time	30
4) Symbol System Information	30

5) Symbol Code character System.....	30
6) Contrast Information	31
7) Quality Information	31
8) Output the coordinate of the symbol.....	32
3.9 AUTO DETECTION MODE.....	35
3.9.1 Overview.....	35
3.9.2 How to use	36
3.9.3 Flow chart.....	37
4. SERIAL COMMAND	38
4.1 TRANSMISSION SETTINGS	38
4.2 READING SYMBOLS	39
4.3 READING OPERATION (NORMAL OPERATION, ADJUSTMENT, DIAGNOSIS)	45
4.4 CAMERA CONTROL.....	47
4.5 PRESET MODE SETTING	48
4.6 REFERENCE SETTINGS	48
4.7 GENERAL OPERATIO / HELP	49
5.SPECIFICATIONS	50
5.1 GENERAL SPECIFICATIONS	50
5.2 FUNCTIONAL SPECIFICATION	51
5.3 FIELD OF VIEW AND DEPTH OF FIELD	52
5.4 DIMENSIONS.....	53
F type (Front View).....	53
S type (Side View)	54
5.5 INTERFACE	54
5.5 INTERFACE	55
6. INSTRUCTION FOR PLACING THE UNIT	58
6.1 RECOMMENDED PLACING (ANGLE AND WORKING DISTANCE)	58
6.2 HOW TO CONFIGURE TFIR-31'S PARAMETERS.....	59
7.TROUBLESHOOTING	60
7.1 THE UNIT DOES NOT WORK WHILE PUSHING THE READ TRIGGER SWITCH.	60
Is power supply voltage within specification?.....	60
Is power supply polarity correct?	60
Is the power rating of the power supply enough?	60

Is the format of serial command correct?.....	60
Others	60
7.2 BARCODE CANNOT BE READ.....	60
Is a code setup correct?	60
Is reading distance suitable?.....	60
Is the surface of the code glossy?	60
Is the reading window clean?.....	61
Is the print quality of the code good?	61
7.3 THE DATA DOES NOT TRANSMIT OR THE DATA ITSELF IS CORRUPTED.	62
Is the setup with host computer correct?	62
Do you set fixed digit for ITF	62

1. Getting started

The TFIR-31 is a compact high performance two-dimensional scanner that can read all traditional 1D and 2D symbologies.

The TFIR-31 bundles a 1.3 Mega pixel image engine, powered by Tohken's state of the art color imaging technology, with a powerful processing and communication board for best-in-class color image quality and scanning performance

Leading the industry in cost-effectiveness, imaging performance and low power consumption, the TFIR-31 provides OEMs and Machine building companies with linear and two dimensional barcode scanning, signature capture and color picture-taking capabilities.

The safe, high power LED-based illumination removes the risks involved with lasers without sacrificing performance. The leading edge field of view provides end-users with freedom from critical alignment which increases productivity.

The TFIR-31 is ideal for drop-in into machines, ATM, Kiosks, or any other AIDC applications.

. The TFIR-31 is available in either serial or USB 1.1 interface. The TFIR-31(H)-F and TFIR-31(H)-S has a RS-232C interface to connect to the host computer. The TFIR-31(H)U-F and TFIR-31(H)U-S have USB interface to connect to a host computer that runs Windows2000/XP.

1.1 Supported barcodes

The unit can read the following symbols:

1D bar codes:

- Code39
- Code128
- Codabar
- ITF (interleaved 2 of 5)
- JAN/EAN/UPC
- RSS
- Code93

2D codes:

- Data Matrix (ECC200)
- QR Code
- Micro QR
- PDF 417
- Micro PDF
- Mxi Code
- Composite

1.2 Picture taking

The TFIR-31 can take 24bit color and Grey scale pictures for example signature capture.

1.3 Ordering information

TFIR-31 $\frac{H}{1}$ $\frac{U}{2}$ $\frac{-X}{3}$

1. Resolution

If “H” follows “TFIR-31”, the scanner is high resolution type.

And if there is no “H”, the scanner is normal type.

2. Interface

If “U” follows “TFIR-31” or “TFIR-31H”, the scanner has USB interface.

And if there is no “U”, its interface is RS232C.

3. “F” or “S”

These are the position of the reading window. “F” means FRONT and “S” means SIDE.

According to this rule, there are 8 types of TFIR-31 family.

- **TFIR-31-F**
- **TFIR-31-S**
- **TFIR-31H-F**
- **TFIR-31H-S**
- **TFIR-31U-F**
- **TFIR-31U-S**
- **TFIR-31HU-F**
- **TFIR-31HU-S**

1.4 How it works

- Status LED

The status LED lights up either GREEN or RED depending on the operation:

- GREEN light indicates the completion of successful decoding of a symbol.
- Flashing GREEN light indicates the image data transmission in progress.
- RED light indicates the failure of decoding.

- Triggering Switch

This switch is used to initiate the read and decode of a symbol.

- Connecting Cable

- TFIR-31(H): RS-232C

When connecting to a host computer, a cable with D-sub 9Pins connector should be utilized.

For supplying the power to the unit, the AC power adapter should be plugged into its mating receptacle on the RS232 connector housing next to the D-sub 9Pins connector.

- TFIR-31(H)U/TFIR-31(H)U-HID : USB

The unit is supplied its power through USB cable via host computer.

2. Operation

2.1 Basic Operation

(1) When the power is turned on, the monitoring LED "P" goes on and a short "beep" sound is heard three times.

(2) Then two aiming beam indicate where the unit is seeing, where is the center of field of view.

(3) When SYNC is on, the TFIR captures the image and starts decoding the symbol.

The input SYNC can be used through:

- Soft trigger (serial command)
- SYNC signal input

(4) Successful reading characteristics:

- * Read data is sent by serial interface.
- * If DOUT=1, then the status LED turns green and the status signal goes on.

(5) Fail reading characteristics:

- * The buzzer remains silent.
- * An error code is sent by serial interface.
- * If DOUT=2, then the status LED turns RED and the status signal goes on.
- * If DOUT=0 or 1, then the status LED turns red.

(6) Back to step (2)

2.2 Reading Operation

The unit has various types of mode operations.

Reading operation means capture image and decode the symbol.

Operation Mode	Command	Function
Normal Mode	SYNCMODE=0	Single SYNC input performs single decode.
Reading Time out Mode	SYNCMODE=1	After trigger input, it starts setting interval time duration setting command TOTALLIM=.
External SYNC Mode	SYNCMODE=2	Read operation is continued while SYNC signal from the input is on.
Continue Reading Mode	continue	Sending continuous read command "continue" to the unit starts read until termination command received.
Test Mode	TEST=1	It measures the read rate. To stop operation, send command TEST=0.

For more details, please refer at Chapter 3.

2.3 Transmitting Image Data

Bitmap/image (name*.bmp, 1280 x 1024 pixel)

- Transmitting the data with serial interface takes about 160 seconds with baud rate 15.2Kbps (TFIR-31(H))
- In case of USB1.1, (TFIR-31(H)U), transmitting the data takes approximately 10 seconds

Notes:

The image size is changeable.

2.4 Swing Mode

Swing mode is used to setup the shutter or gain value.

2.5 USB Interface

- Please confirm that the USB port of the host PC is available.
- Plug into the USB port when the host PC is running.
- Please install the USB driver. This operation is needed only when the device is used for the first time.
- Please confirm the communication between the TfIR and the host is successful by using communication software such as hyperterminal or USBTerm (USBTerm can be downloaded from our secure website).
- After device driver is installed, a computer looks at USB port as virtual com port.
- The unit and computer transceiver data is using same communication protocol. It is necessary that the following functions are provided in software.

-The function for transmitting a serial command that's required for setup

-The function for receiving the barcode data from this unit

Note: The driver can be downloaded from our secure web site.

URL: <http://www.tohken.co.jp/>

3. Description of reading operation

DELAY : :The time from getting SYNC ON to reading

CHATT: The time for eliminating the chattering

IMAGE: The time for capturing an image

DECODE: The decoding time

DECODELIM: The maximum time for decoding

GOOUT: The time for outputting GO signal

NGOUT: The time for outputting NG signal

SERIAL: The time for outputting data through serial interface

MAXIMG: The maximum number of images

WAITIMG: The interval time for taking a image

3.1 Normal Mode

The SYNC input is turned ON by the single soft trigger (read start signal) then capture single image and it decodes.

Fig. 3-1 Soft Triggert Trige, Read OK, Data Transmit; After decode

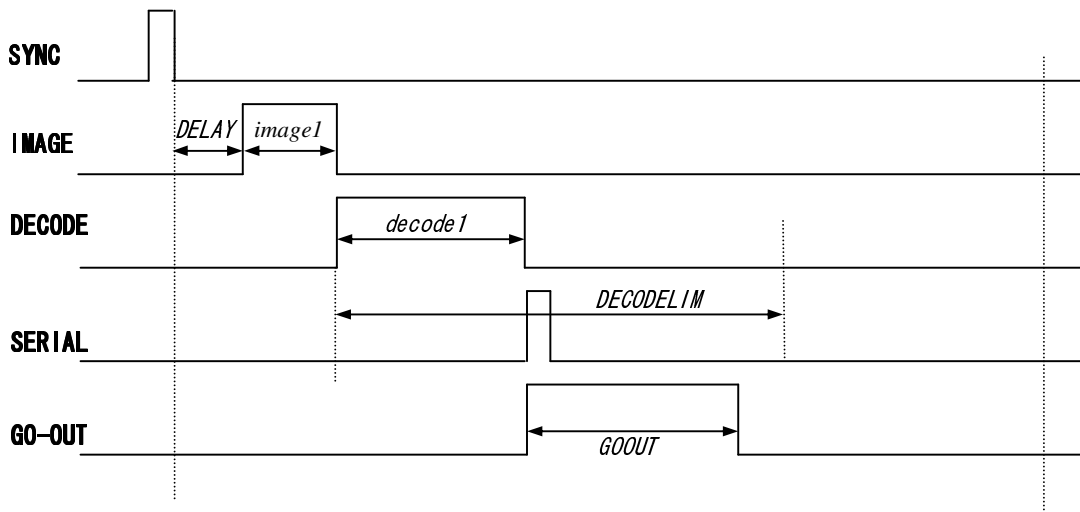


Fig. 3-2 Hard Trigger, Read OK, Data Transmit; After decode

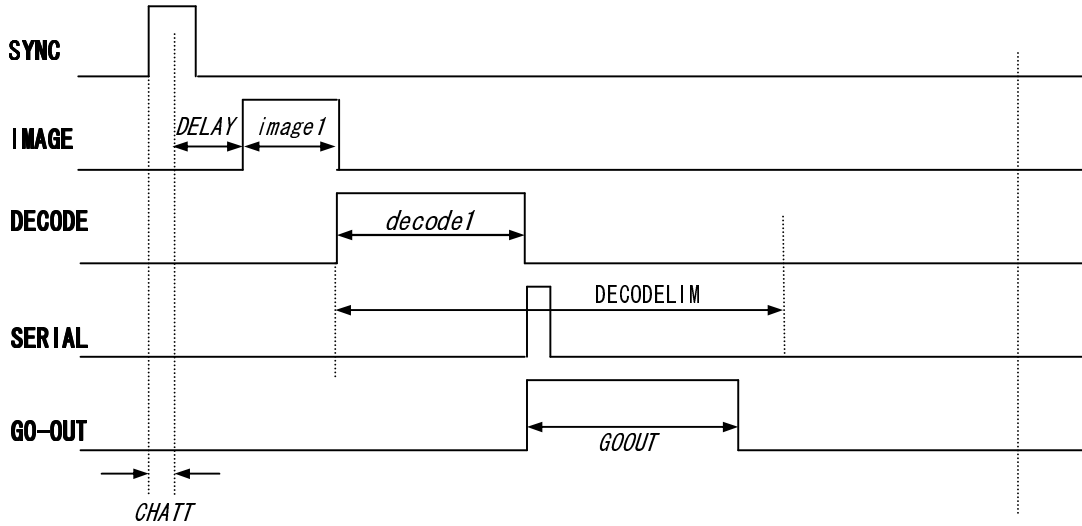
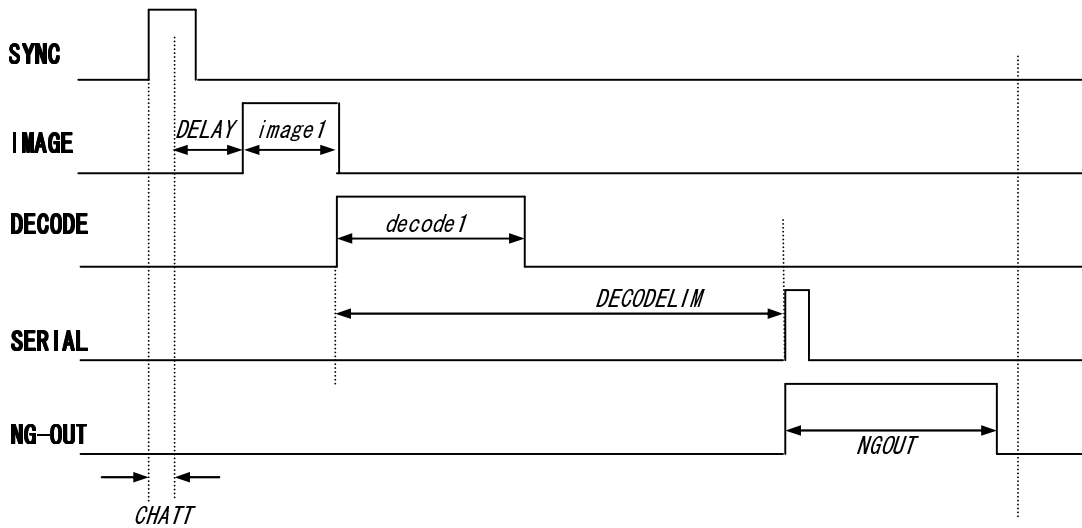


Fig. 3-3 Hard Trigger, Read NG, Data Transmit; After decode



3.2 Read Time Out Mode

After trigger input, the unit starts the timer for setting interval duration (setting command TOTALLIM=). When the reading operation is failed, an error code transmits after the end of the reading time set up by TOTALLIM.

Fig. 3-4 Soft Trigger Read OK, Data Transmit; After decode

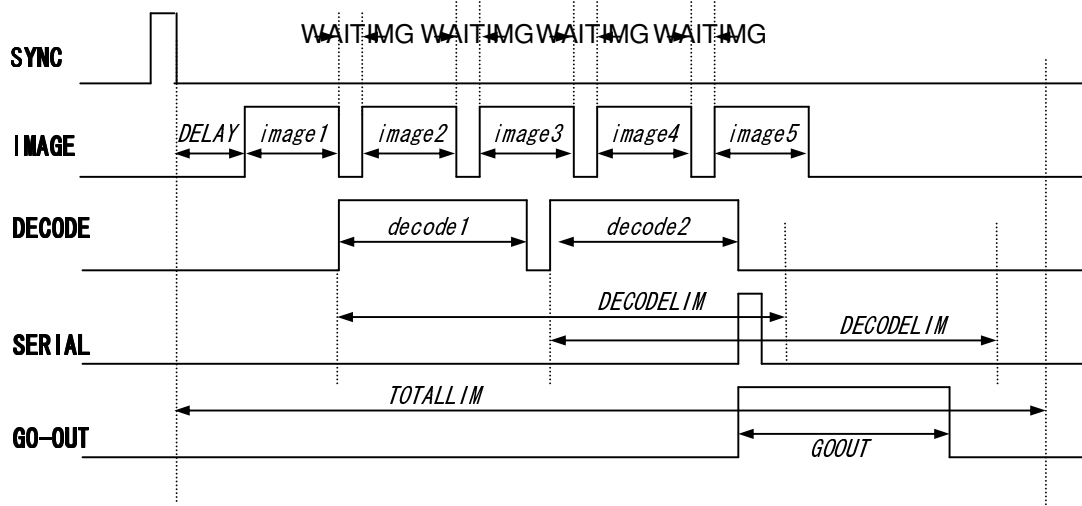


Fig. 3-5 Soft Trigger, Read OK, Data Transmit; After SYNC OFF

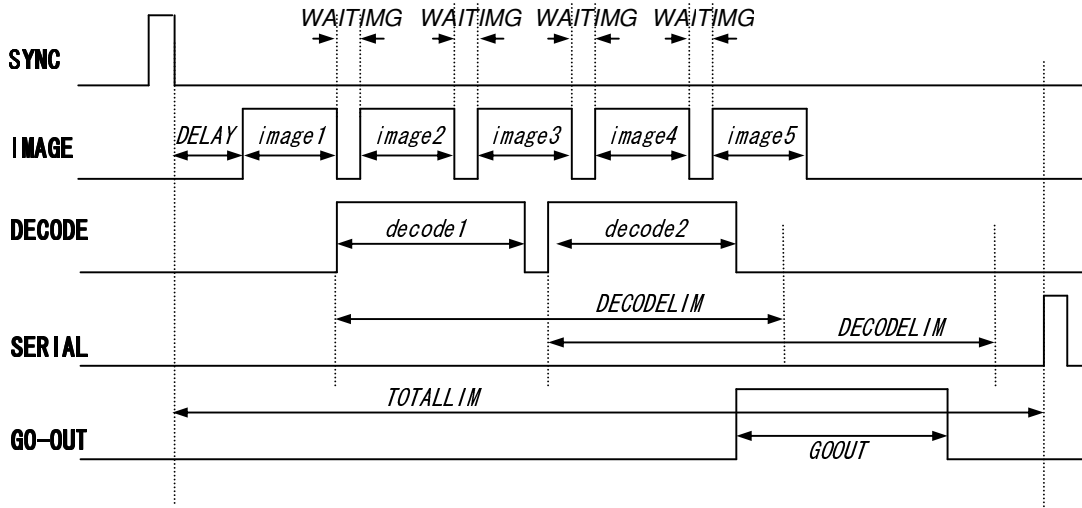


Fig. 3-6 Hard Trigger Read OK, Data Transmit; After decode

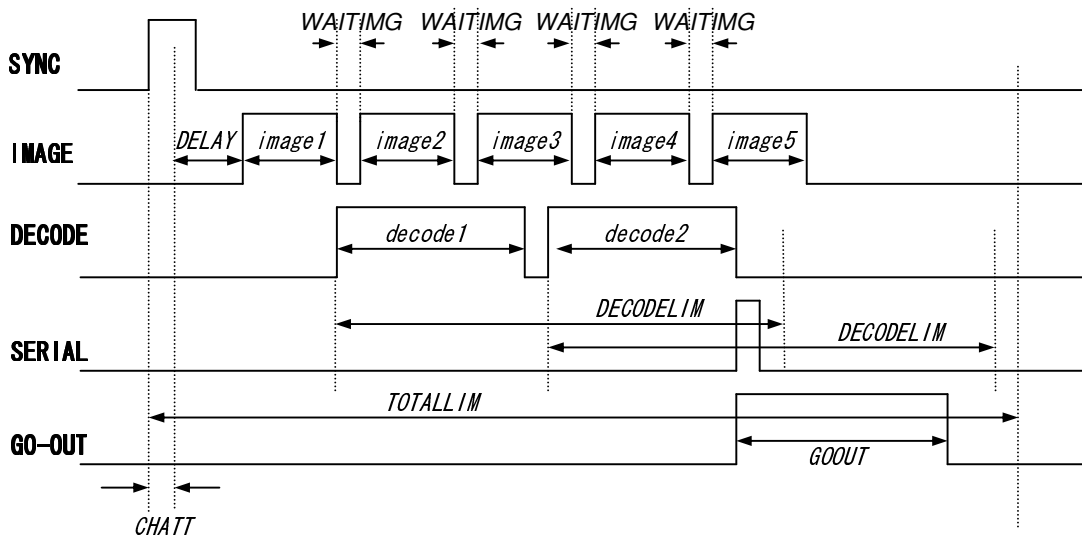


Fig. 3-7 Hard Trigger, Read OK, Data Transmit; After SYNC OFF

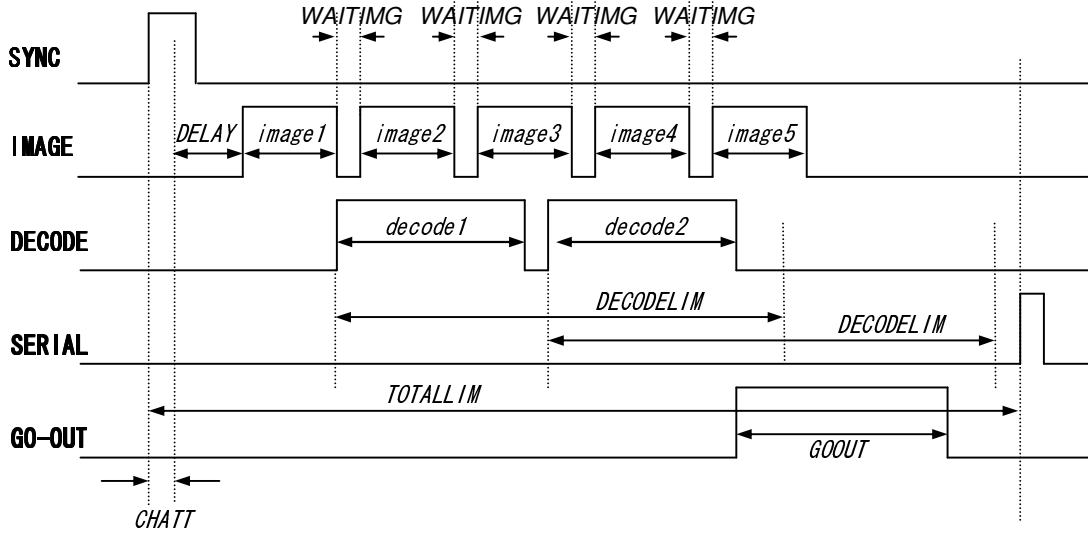


Fig. 3-8 Soft Trigger, Read NG, Data Transmit; Immediately after read or after SYNC OFF

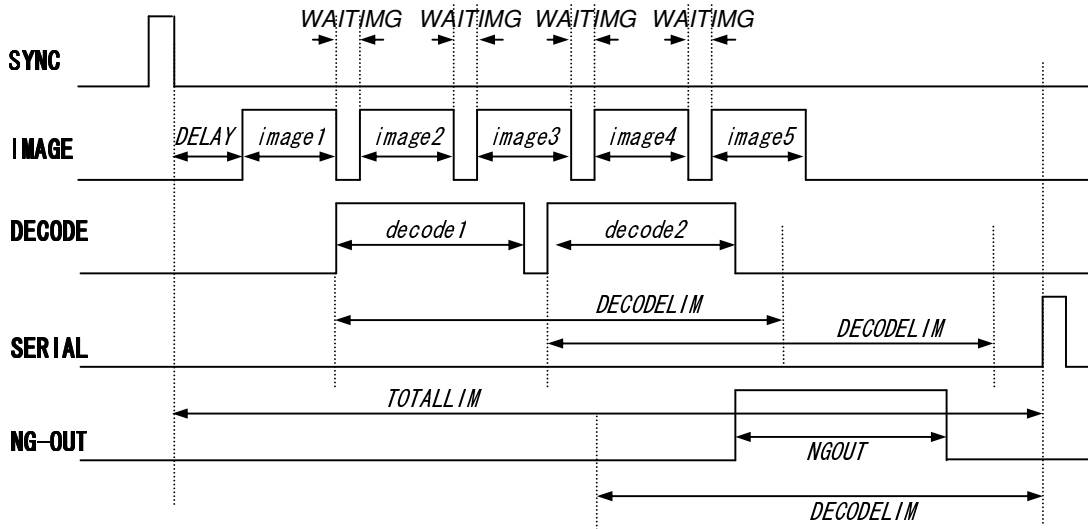
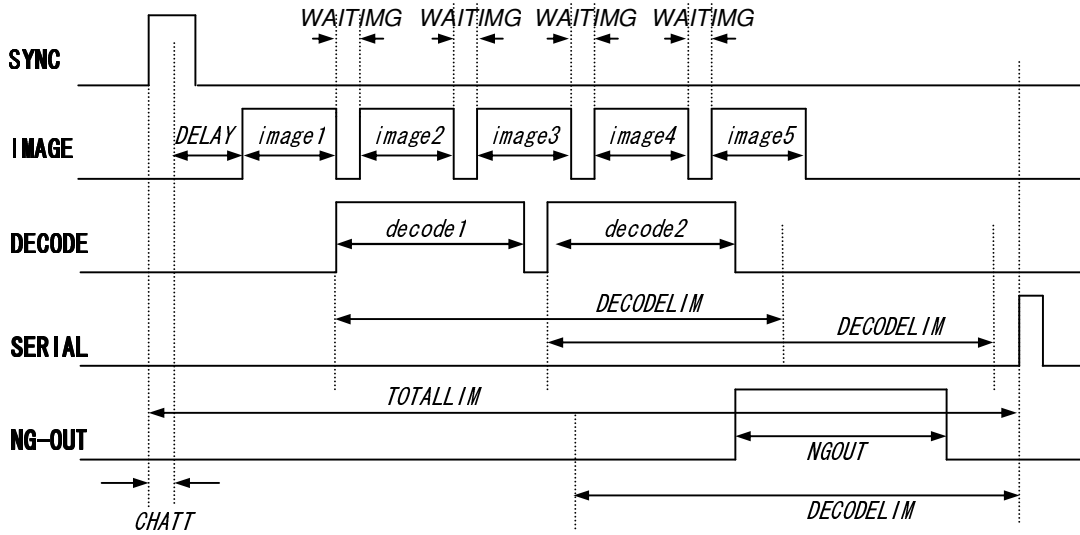


Fig. 3-9 Hard Trigger Read OK, Data Transmit; Immediately after read or after SYN V OFF



3.3 External SYNC Mode

Read Operation is continued while the SYNC signal from the input is on.

Fig. 3-10 Hard Trigger Read OK, Data Transmit; after decode

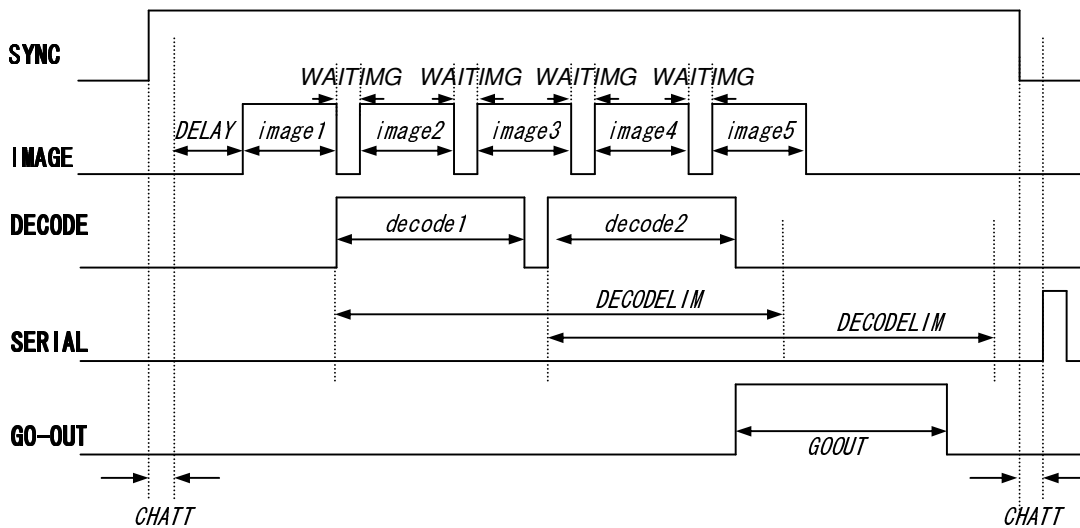


Fig. 3-11 Hard Trigger, Read OK, Data Transmit Immediately after read

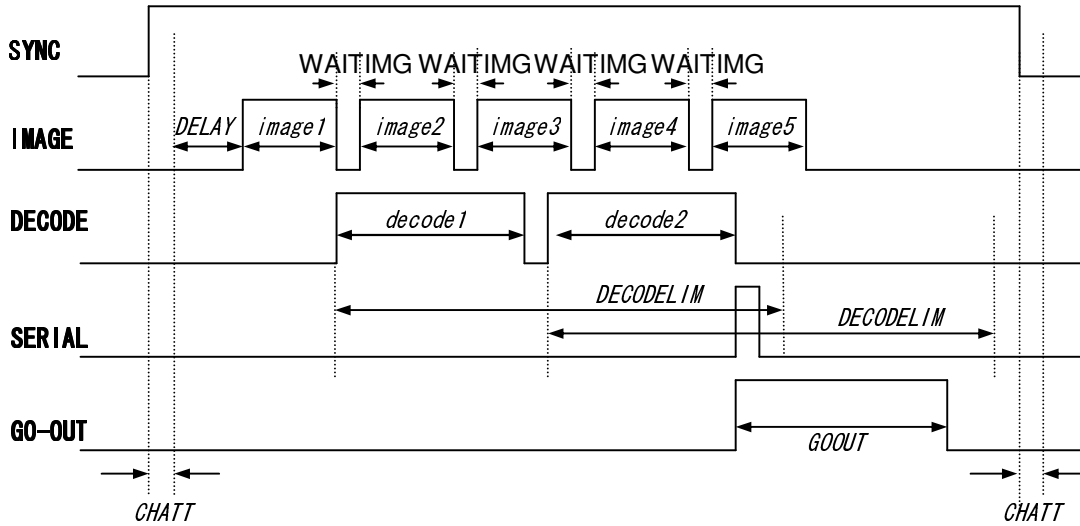
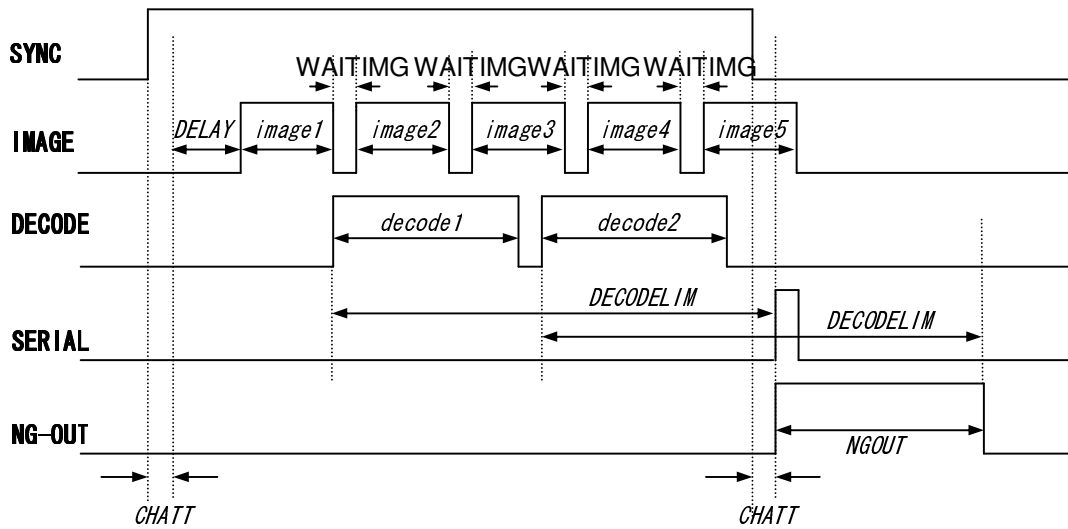


Fig. 3-12 Hard Trigger Read OK, Data Transmit; Immediately after read or after SYNC OFF



3.4 Continuous Reading Mode

Sending the continuous read command “continue” to the unit starts the next operation. Send the stop command “stop” to end operation. Use this mode for the camera adjustment.

3.5 Test Mode

To enter this mode, (TEST=1) command should be transmitted to the unit using serial interface and reading is started, the unit will start reading the symbol for 10 times (default). After each reading process, the user will notice that an asterisk (*) will appear on he screen

[Example Output TEST Mode 1 Reading]

```
**** TEST MODE ****
1 2 3 4 5 6 7 8 9 10
*****
NG   1:OK  99/SYNC 100
NG  1.00%:OK 99.00%
[Display ]
NGaaaaa:OKbbbb/SYNCCCC[CR]
NGddd.dd%:Okeee.ee%[CR]
```

Explanations;

aaaaa : Reading NG Count

(0 - 65535, It keeps number at 65535 when counts more than 65536)

bbbbbb : Reading OK Count

(0 - 65535, It keeps number at 65535 when counts more than 65536)

cccccc : SYNC Input Not display more than 65535)

ddd.dd: Reading NG Rate

(0.00-100.00, It displays to the second place below a decimal point)

eee.ee: Reading OK Rate

(0.00-100.00, It displays to the second place below a decimal point)

3.6 Swing Mode

The unit will enter this mode by sending “AGC=S” command to the unit. In this mode, image capture and decoding are performed based on a configuration that is previously stored for AGC and shutter speed for respective image capture.

In this mode, Up to eight shutter speed, AGC values and image preprocessing can be stored.

Command	Contents
SWAn=a	The AGC value of the n-th image is setup as a. a=0-255 *Value a can be set number 0 to 255. *When setup as SWAn=0, after the n-th setup is ignore, then setup of Image imag1 to imagn-1 are execution. Refer below table.
SWSn=a	The shutter speed of the n-th image is set as a. *Value a can be set number 0 to 7. Setting contents of shutter speed by value a, it will be same setting contents as SHUTT command (fixed mode).
SWLn=a	The illumination control of the n-th image is set as a. **Value a can be set the same number as the serial command “LIGHT=a”.

e.g. Pre-registered setup of Swing values

Swing pair number	Example Values Set
1	SWA1=185 (Gain:0-255) SWS1=3 (Shutt:0-7)
2	SWA2=210 (Gain:0-255) SWS2=3 (Shutt:0-7)
3	SWA3=0 (Gain:0-255) SWS3=3 (Shutt:0-7)
4	SWA4=255 (Gain:0-255) SWS4=0 (Shutt:0-7)
5	SWA5=255 (Gain:0-255) SWS5=0 (Shutt:0-7)
6	SWA4=255 (Gain:0-255) SWS4=0 (Shutt:0-7)
7	SWA4=255 (Gain:0-255) SWS4=0 (Shutt:0-7)
8	SWA4=255 (Gain:0-255) SWS4=0 (Shutt:0-7)

In the above-shown setup, Swing pair numbers 1 and 2 are enabled with Gain and Shutter settings. Set number 3 is set to zero, meaning that Swing pairs 3 through 8 are disabled.

3.7 Preset Mode

If only particular data is needed, the data should be memorized in TFIR in advance (Preset) so that TFIR outputs only the data when it decodes symbols.

e.g.

	Data	Type of the symbol
Symbol A	ABCDEFGG	Data Matrix
Symbol B	ABCDEFGG	Code39
Symbol C	ABCDEFGH	Data Matrix

If Preset data is “ABCDEFGG”, TFIR output the data of Symbol A and B.

This function has two modes, Preset Mode 1 and Preset Mode 2.

PREM=0[CR] (*) Preset Mode 0 (Preset mode is disable)
PREM=1[CR] Preset Mode 1 (Preset data is the first one from power ON)
PREM=2[CR] Preset Mode 2 (Preset data is determined in advance)

1) Preset Mode 1

In this mode, the Preset data is the first one since power turned ON.

Data comparing is done only by complete matching.

The Preset data must be set as often as TFIR’s power is turned ON because the data is not saved in TFIR’s non-volatile memory.

The procedure of Preset Mode 1

1. Send following commands.

PREM=1[CR]

WSETS[CR]

Save the setting in non-volatile memory

2. Reset the power of the unit
3. Then the data which TFIR read first is the Preset data

2) Preset Mode 2

In this mode, the Preset data is determined by serial command.

Data comparing is done not only by completely matching but also by partly matching.

It is possible to save the Preset data in TFIR’s non-volatile memory.

The procedure of Preset Mode 2

1. Send following commands.

PREM=2[CR]

SET=PREDabcd[CR]

Setting characters used for comparing (abcd : data character)

SET=PRENa[CR]

Digits used for comparing (a : 0 to 100)

WSETS[CR]

Save the setting in non-volatile memory

-) Example 1 Make only "12345" valid

12345 match

1234 not match

123456 not match

012345 not match

PREM=2[CR]

SET=PRED12345[CR] :

to set characters used for comparing (12345 : data character)

SET=PREN5[CR] : Digits used for comparing (5 digits)

WSETS[CR] : Saving the setting in non-volatile memory

-) Example 2 Valid when former 4 digits is "ABCD"

ABCD match

ABCD7777 match

ABC not match

DABC333 not match

77ABCD777 not match

PREM=2[CR]

SET=PREDABCD[CR] :

to set characters used for comparing (ABCD : data character)

SET=PREN0[CR] : Digits used for comparing (no count)

WSETS[CR] : Saving the setting in non-volatile memory

-) Example 3 Valid when the length is 10 digits and the data is "ALFA"

00ALFA1234 match

AAALFAAAAA match

AAA L F A12345 not match

0ALFA12345 not match

PREM=3[CR]

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

to set characters used for comparing (??ALFA???? : data character)

SET=PREN10[CR] : Digits used for comparing (10 digits)

WSETS[CR] : Saving the setting in non-volatile memory

3) Output the Preset status

?pre[CR] Output the Preset status

(example of output)

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

PRESET LENGTH:41

DATA(HEX):

31 32 33 3F 3F 3F 3F 3F 3F 3F

3F 41 42 43 43 44 45 03 04 05

3F 3F 3F 3F 3F 3F 3F 3F 3F 3F

3F 3F 3F 3F 3F 3F 3F 3F 39 31

30

DATA(ASCII):

123???????ABCCDE***????????????????????910

(Format of output)

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]

xxxxxxxxxxxxxxxxxxxxxxxxxxxx

a :Preset Mode

b :The digit of 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 “*”.

3.8 Description of Diagnosis mode

1) Confirmation for Output of Reading statistics and Decoding Time

[Reading Ok and Ng Count Number Output Example]

```
*** TOTAL ***  
NG      1:OK  99/SYNC  100  
NG  1.00%:OK 99.00%
```

[Reading Ok and Ng Decoding Time Output Example]

```
*** DECODE TIME ***  
OK: min(0118ms),max(0124ms),ave(0120ms)  
NG: min(0148ms),max(0148ms),ave(0148ms)  
NG      1:OK  99/SYNC  100
```

Note

When setup mode is executed, Count Number and Total Decoding Time will be cleared.

2) Output decode time

The actual time consumed during symbol decoding, setting up disable or enable to the output data in the serial interface output.

Usually, during this mode (SYNCMODE=0), if the timeout time set up value passes when a label cannot be recognized in a image, decoding operation will be stopped and it will become reading NG process.

When in Timeout Mode (SYNCMODE=1), if a label cannot be recognized in an image, if it remains with reading timeout and time excels rather than decoding timeout, the next image capture (decoding) will be started, and if shorter than decoding timeout, it will become reading NG.

When External Synchronous Continuation Reading Mode is used(SYNCMODE=2), when a label cannot be recognized in a picture, the state of a synchronized signal is investigated, if it is in ON state, the next image (decoding) will be started, and if it is in an OFF state, it will become reading NG treatment.

3) Output of total decoding time

This unit can output, in addition to the decoded data, the total reading time (time from SYNC ON to an OK data output) as well as the number of pictures acquired from SYNC ON to the successful decoding. (This can not be done when reading result is NG.)

Display Format: aa. bbbbbbms

xxxxxxx Captured Image number

xxxxxxxxx Total Reading Time Unit [ms]

4) Symbol System Information

This can be used to enable or disable adding code character.

Display Format: aaBBBBB

aa: Symbol Code character

BBBBB: Symbol Data

5) Symbol Code character System

Symbol System	Code Character	Symbol System	Code Character
Code39	]A0	UPC/EAN/JAN	No Code
Code128	]C0	Data Matrix	]d1
EAN-128	]C1	Maxi Code	]U1
CODABAR	]F0	PDF417	]L0
ITF	]I0	QR Code	]Q1

6) Contrast Information

This is used to enable or disable adding image contrast information.

It outputs image contrast information after the last captured and decoded image.

i) In case of OK reading

The contrast information in the symbol recognition area is transmitted.

The rectangular coordinate from the minimum and maximum of the square coordinates of a symbol is calculated from the area of contrast information.

When two or more symbols exist, the contrast information on the previously recognized is outputted.

ii) In case of NG reading

The contrast information in the setup area is transmitted. (Default setup: All image area)

Format: aaa, bbb, ccc

aaa: Contrast Maximum value (0 - 255)

bbb: Contrast Minimum value (0 - 255)

ccc: $100 \times (\text{Maximum value} - \text{Minimum value}) / 255$ (0 - 100)

Data Length: 13 byte

7) Quality Information

This is used to enable or disable adding quality information.

For 2-dimensional symbol, it will only output the percentage that error correction was NOT performed. In case of using good quality of symbol, it will output 100. This can not be used when reading NG.

Format: QT: ddd

ddd: Contrast Maximum value (0 - 255)

Data Length: 8 byte

8) Output the coordinate of the symbol

The setting to output the information of the symbol's position in the field of view is available. There are three types of output, coordinate of the center and/or the coordinate of four apexes.

1) The center

When TFIR reads a symbol, the coordinate of the symbol's center will be outputted.

The origin (000, 000) is the center of field of view.

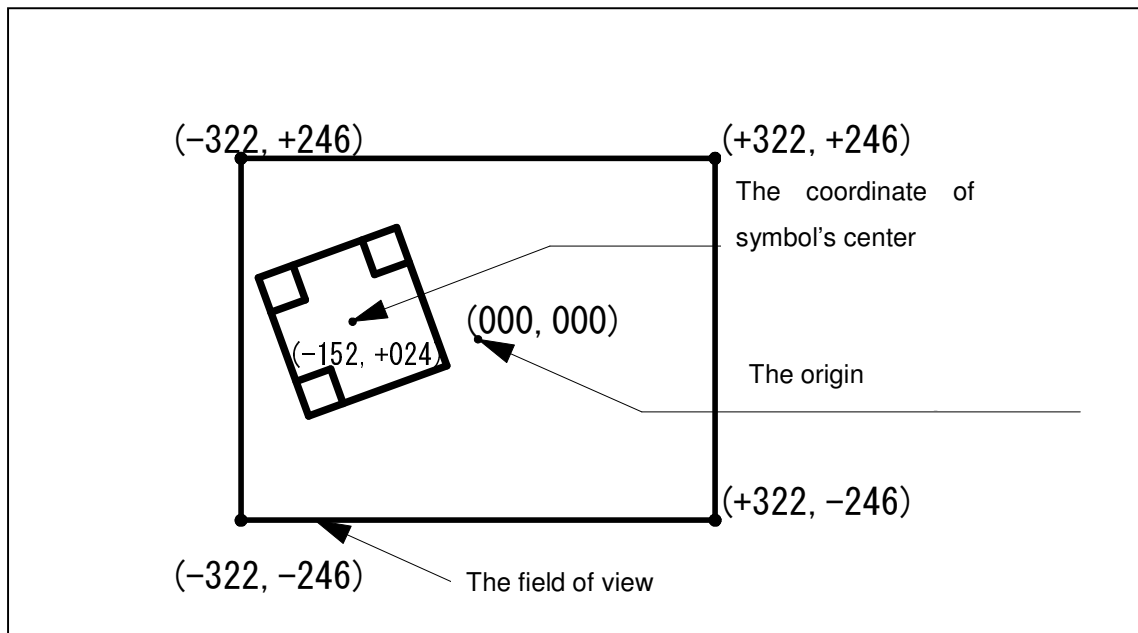
(Exsample)

100000000990703(-122,+024)

(Format)

Header + Data + (abbb,accc) + Terminator

a	:	+ or -
b	:	x (0 to 999)
c	:	y (0 to 999)



2) Four apexes

When TFIR reads a symbol, the coordinate of the symbol's four apexes will be outputted.
The origin (000, 000) is the left-top edge of field of view.

(Example)

100000000990703(+269,+011)(+455,+086)(+386,+270)(+198,+199)

(Format)

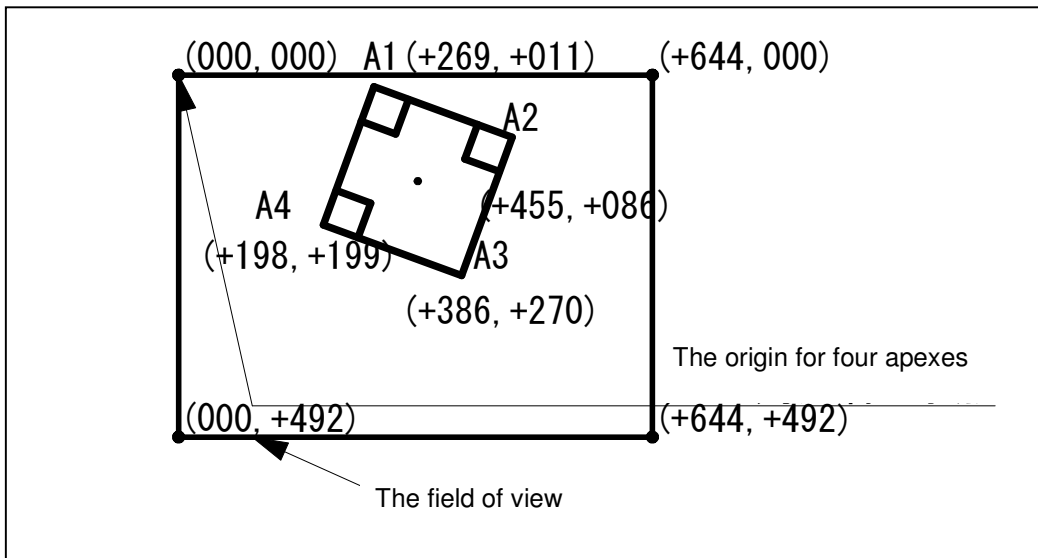
Header + Data + (A1) + (A2) + (A3) + (A4) + Terminator

A1 – A4 : (abbb,accc)

a : + or -

b : x (0 to 999)

c : y (0 to 999)



3) The center and four apexes

When TFIR reads a symbol, the coordinate of the symbol's four apexes will be outputted.

The origin for the center is the center of field of view, and for four apexes is left-top edge of field of view.

(Example)

100000000990703(+007,+103)(+269,+011)(+455,+086)(+386,+270)(+198,+199)

(Format)

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

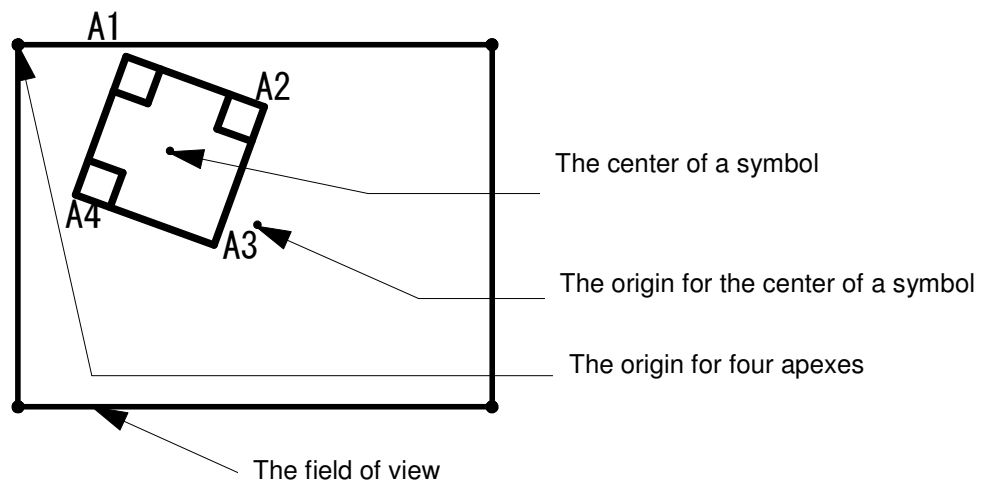
B : The center of a symbol

B, A1 – A4 : (abbb,accc)

a : + or -

b : x (0 to 999)

c : y (0 to 999)



3.9 Auto detection mode

3.9.1 Overview

By using this mode, TFIR-31 can read and decode symbols automatically.

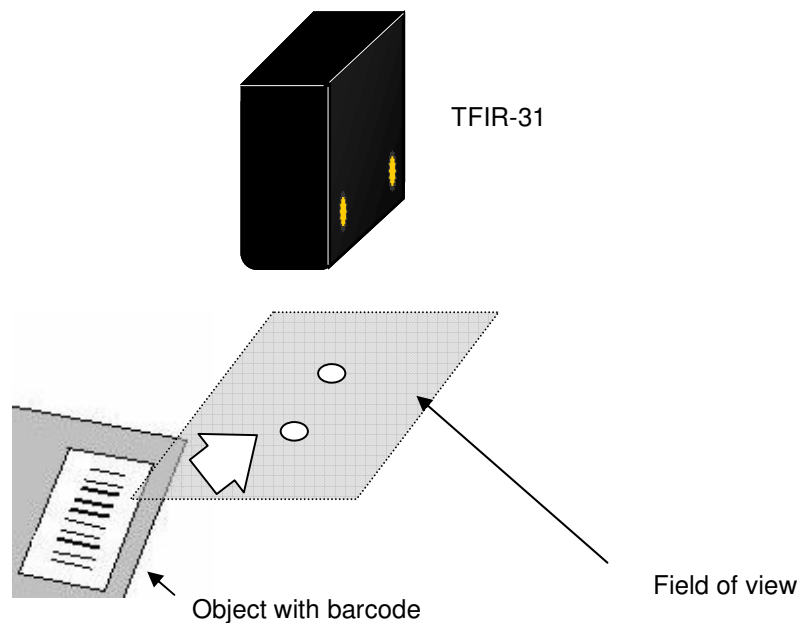
TFIR-31 detects changes of image in its field of view, like change of environmental brightness, motion of objects. When there is such a change, TFIR-31 starts to capture an image and tries to decode.

This function is designed to read documents with printed barcodes. For example, it is suitable for use on the counter at post office.



Auto Detection mode may not work well under too high, too low or unstable brightness.

With Auto Detection mode, triggering by serial command and digital signal input do not work. Plus, neither does capturing an image, receiving a Hex program, executing a Macro program, continuous reading and test mode. Please turn Auto Detection mode OFF if those function are needed to be used.



3.9.2 How to use

To put TFIR-31 in the auto detection mode, please follow one of the following methods:

- Send the serial command "SYNCMODE=3<CR>" to the scanner.
- Read the corresponding barcode from the configuration barcode set.

To exit the auto detection mode, please follow one of the following methods:

- Send the serial command "SYNCMODE=0 (or 1 or 2)<CR>" to the scanner.
- Read the corresponding barcode from the configuration barcode set.

At any time, the serial command "?LF<CR>" can be sent to check which mode the scanner is set to. The following are the strings showing settings of auto detection mode.

```
***** STATUS ***** TFIR-31
LFMOVELIM=2 (0:100ms 1:300ms 2:500ms 3:1000ms
              4:1500ms 5:2000ms 6:2500ms 7:3000ms)
LFDECLIM=2(x500mS 1-20)
LFPOINTER=1 (0:OFF 1:ON)
VSENS=2 (0-4)
LFVERIFY=1 (0:OFF 1:ON) LFWAIT=6(x500mS 1-20 )
***** END ***** TFIR-31
```

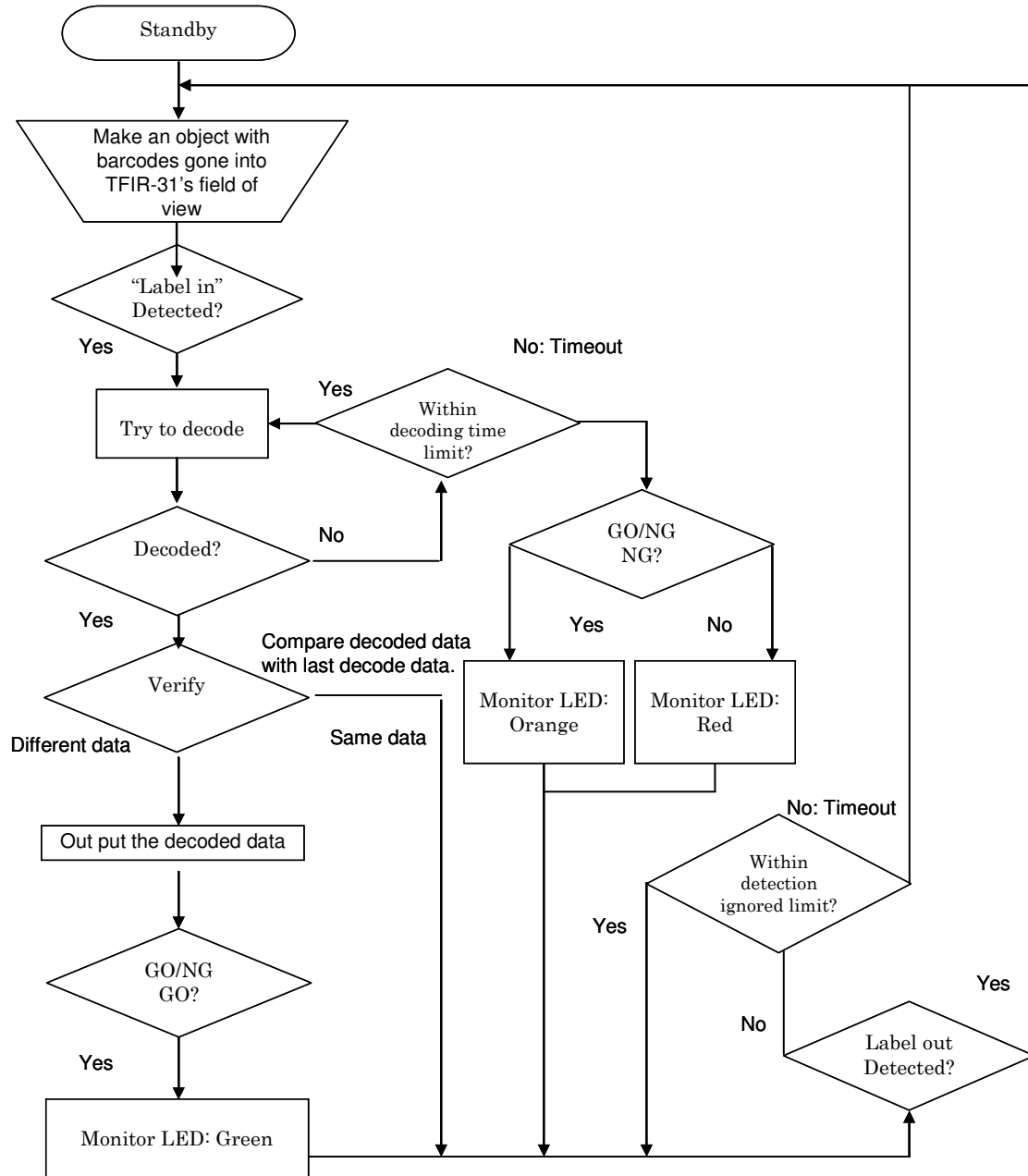
*Please see status4 by sending "?4" serial command.

Explanations of status "LF"

Command	Description
LFMOVELIM=_	Detection ignored time (ms)
LFDECLIM=_	Time for LFMOVELIM (within this time the scanner ignores the detection of an object) (s)
LFPOINTER=_	Aiming beam during auto detection mode
VSENS=_	Sensitivity against change of image
LFVERIFY=_	Avoid to read same data
LFVERIFYLIM=_	Time for LFVERIFY (within this time the scanner doesn't read same data continuously)
HELPLF	Call the list of serial commands for Auto Detection mode

3.9.3 Flow chart

Aiming beam: Blinking



4. Serial Command

4.1 Transmission Settings

Default Setting:*

Item	Serial Command	Contents
Baud Rate	BAUD=1200	Baud Rate Setting 1200bps
	BAUD=2400	Baud Rate Setting 2400bps
	BAUD=4800	Baud Rate Setting 4800bps
	BAUD=9600	Baud Rate Setting 9600bps(*)
	BAUD=19200	Baud Rate Setting 19200bps
	BAUD=38400	Baud Rate Setting 38400bps
	BAUD=57600	Baud Rate Setting 57600bps
	BAUD=115200	Baud Rate Setting 115200bps
	Frame	FRAME=0	Frame Setting 7O1
FRAME=1		Frame Setting 7O2
FRAME=2		Frame Setting 7E1
FRAME=3		Frame Setting 7E2
FRAME=4		Frame Setting 8N1(*)
FRAME=5		Frame Setting 8N2
FRAME=6		Frame Setting 8O1
FRAME=7		Frame Setting 8O2
FRAME=8		Frame Setting 8E1
FRAME=9		Frame Setting 8E2
Header	HEAD=0	Header Setting Non(*)
	HEAD=1	Header Setting, [SX]
	HEAD=2	Header Setting, [EC]
Terminator	TERM=0	Terminator Setting, Non
	TERM=1	Terminator Setting, [EX]
	TERM=2	Terminator Setting, [EX][CR]
	TERM=3	Terminator Setting, [CR][LF] (*)
	TERM=4	Terminator Setting, [CR]
	TERM=5	Terminator Setting, [CR][TAB]
	TERM=6	Terminator Setting, [TAB][CR]

Item	Serial Command	Contents
Separator	SEPA=0	Separator Setting, Non
	SEPA=1	Separator Setting, &
	SEPA=2	Separator Setting, ,
	SEPA=3	Separator Setting, [FS] (1C hex) (*)
	SEPA=4	Separator Setting, [GS] (1D hex)
	SEPA=5	Separator Setting, [SP] (20 hex)
RS/CS Control	RSCS=0	Not use RS-CS control signal
	RSCS=1	Use RS-CS control signal(*)
Control Character	LABELTX=0	Output control code: Pass through control characters(*)
	LABELTX=1	Output control code: Convert control characters to hex digits as an ASCII
Timeout Duration	TXWAIT=a	Decoding Data Timeout duration a=1000-2500; unit[msec],10[msec]per

4.2 Reading Symbols

Item	Command	Contents
Common Setting	SET=#M0	Disable reading of all 1-D and 2-D Symbol System
	SET=#M0	Enable reading of all 1-D and 2-D Symbol System
Code39	SET=AM0	Disable reading of Code39(*)
	SET=AM1	Read Code39, Disable C/D Check
	SET=AM2	Read Code39, Enable C/D Check, C/D Transmit
	SET=AM3	Read Code39, Enable C/D Check, No C/D Transmit
	SET=AM4	Read Code39, Disable C/D Check , Enable FULL ASCII
	SET=AM5	Read Code39, Enable C/D Check, C/D Transmit, Enable FULL ASCII
	SET=AM6	Read Code39, Enable C/D Check, No C/D Transmit, Enable FULL ASCII
	C39SS=0	Disable Transmit Start/Stop Code of Code39(*)
	C39SS=1	Enable Transmit Start/Stop Code of Code39
	DIGIT=Ab,c	Set reading range of Code39 Min. digits (b digits), Max. digits(c digits)
EDIT=Ab,c	Code39 with edit Transmit specific "b" digits through "c" digits	

Code128	SET=CM0	Disable reading of Code128(*)
	SET=CM1	Enable reading of Code128
	DIGIT=Cb,c	Set Code128 reading range from Min. digits (b digits) to Max. digits(c digits)
	EDIT=Cb,c	Edit Transmit specific "b" digits through "c" digits of Code128
EAN-128	SET=eM0	Disable reading of EAN128(*)
	SET=eM1	Enable reading of EAN128
	E128GS=0	Disable Control Character [GS] Transmitting is set for EAN-128
	E128GS=1	Enable Control Character [GS] Transmitting is set for EAN-128
	DIGIT=eb,c	Set EAN128 reading range from Min. digits (b digits) to Max. digits(c digits)
	EDIT=eb,c	Edit Transmit specific "b" digits through "c" digits of EAN128
ITF	SET=IM0	Disable reading of ITF(*)
	SET=IM1	Enable reading of ITF, Disable C/D Check
	SET=IM2	Enable reading of ITF, Enable C/D Check, C/D Transmit
	SET=IM3	Enable reading of ITF, Enable C/D Check, No C/D Transmit
	DIGIT=lb,c	Set reading range of ITF Min. digits (b digits), Max. digits(c digits)
	EDIT=lb,c	ITF with edit Transmit specific "b" digits through "c" digits
Code93	SET=GM0	Disable reading of Code93 (*)
	SET=GM1	Enable reading of Code93
	DIGIT=Gb,c	Set reading range of Code93 Min. digits (b digits), Max. digits (c digits)
	EDIT=Gb,c	Code93 with edit Transmit specific "b" digits through "c" digits
	SYMHEAD=G a	Set a header of Code93 optionally
	=Ga,¥bb =Ga,c =Ga,[dd]	a=0; disable (*), a=1; enable bb; the character used for comparing (Hex)、c; character dd; the character in ASCIIcode(¥00-¥1F) bb,c,dd; when it is skipped, the latest character is remained
	SYMFOOT=G a	Set a header of Code93 optionally
=Ga,¥bb =Ga,c =Ga,[dd]	a=0; disable (*), a=1; enable bb; the character used for comparing (Hex)、c; character dd; the character in ASCIIcode(¥00-¥1F) bb,c,dd; when it is skipped, the latest character is remained	

Item	Command	Contents
UPC/EAN/JAN	SET=EM0	Disable reading UPC/EAN/JAN(*)
	SET=EM1	Enable reading UPC/EAN/JAN
	JE13SUM=0	Enable Check Sum Transmitting is set for Standard JAN/EAN (Include Add-on) (*)
	JE13SUM=1	Disable Check Sum Transmitting is set for Standard JAN/EAN (Include Add-on)
	JE8SUM=0	Enable Check Sum Transmitting is set for Shortened JAN/EAN(Include Add-on) (*)
	JE8SUM=1	Disable Check Sum Transmitting is set for Shortened JAN/EAN(Include Add-on)
	UASUM=0	Enable Check Sum Transmitting is set for UPC-A(*)
	UASUM=1	Disable Check Sum Transmitting is set for UPC-A
	UESUM=0	Enable Check Sum Transmitting is set for UPC-E (*)
	UESUM=1	Disable Check Sum Transmitting is set for UPC-E
	UPCANS=0	Enable Number System Transmitting is set for UPC-A(*)
	UPCANS=1	Disable Number System Transmitting is set for UPC-A
	UPCENS=0	Enable Number System Transmitting is set for UPC-E(*)
	UPCENS=1	Disable Number System Transmitting is set for UPC—E
	UPCE=0	Convert UPC-E codes to UPC-A format (*)
	UPCE=1	Leave UPC-E formats unchanged
	UPCTX=0	Leaves 12 digit codes unchanged(*)
	UPCTX=1	Adds a leading zero to 12 digit UPC codes UPC-A
	DIGIT=Eb,c	Set reading range of UPC/JAN/EAN Min. digits (b digits), Max. digits(c digits)
	EDIT=Eb,c	UPC/JAN/EAN with edit Transmit specific "b" digits through "c" digits

CODABAR	SET=FM0	Disable Reading CODABAR(*)
	SET=FM1	Read CODABAR, Disable C/D Check
	SET=FM2	Read CODABAR , Enable C/D Check, C/D Transmit
	SET=FM3	Read CODABAR , Enable C/D Check, No C/D Transmit
	CODASS=0	Enable Transmit Start/Stop Code by small letter of CODABAR
	CODASS=1	Enable Transmit Start/Stop Code by Capital I letter of CODABAR(*)
	CODACS=0	Disable Transmit Start/Stop Code of CODABAR
	CODACS=1	Enable Transmit Start/Stop Code of CODABAR(*)
	DIGIT=Fb,c	Set reading range of CODABAR Min. digits (b digits), Max. digits(c digits)
	EDIT=Fb,c	CODABAR with edit Transmit specific "b" digits through "c" digits
DataMatrix	SET=dM0	Disable reading of DataMatrix
	SET=dM1	Enable reading of Square DataMatrix
	SET=dM2	Enable reading of Square, Black & White Reversed DataMatrix
	SET=dM3	Enable reading of Square, Black & White Reversed and Normal DataMatrix
	SET=dM5	Enable reading of Square, Rectangle and Normal DataMatrix
	SET=dM6	Enable reading of Square, Rectangle, Black & White Reversed DataMatrix
	SET=dM7	Enable reading of all kinds (SET=dM1 through dM6) of DataMatrix
		DIGIT=db,c	Set reading range of DataMatrix Min. digits (b digits), Max. digits(c digits)
	EDIT=db,c	DataMatrix with edit Transmit specific "b" digits through "c" digits

Item	Command	Contents
MaxiCode	SET=UM00	Disable reading of MaxiCode(*)
	SET=UM01	Enable reading of MaxiCode Mode0
	SET=UM02	Enable reading of MaxiCode Mode1
	SET=UM04	Enable reading of MaxiCode Mode2
	SET=UM08	Enable reading of MaxiCode Mode3
	SET=UM10	Enable reading of MaxiCode Mode4
	SET=UM20	Enable reading of MaxiCode Mode5
	SET=UM3F	Enable reading of MaxiCode Mode 0 through 5
	MAXIPS=0	Transmitting only primary data, when only the Primary data was readable. (*)
	MAXIPS=1	Not Transmitting only primary data, when only the Primary data was readable.
	DIGIT=Ub,c	Set reading range of MaxiCode Min. digits (b digits), Max. digits (c digits)
	EDIT=Ub,c	MaxiCode edit Transmit specific "b" digits through "c" digits of
PDF417	SET=LM0	Disable reading of PDF417(*)
	SET=LM1	Enable reading of PDF417
	DIGIT=Lb,c	Set reading range of PDF417 Min. digits (b digits), Max. digits(c digits)
	EDIT=Lb,c	PDF417Edit Transmit specific "b" digits through "c" digits of
QR – Code	SET=QM0	Disable reading of QR-Code
	SET=QM1	Enable reading of Normal QR-Code Label
	SET=QM2	Enable reading of white on black QR-Code label
	SET=QM3	Enable reading of Normal and white on black QR-Code label(*)
	DIGIT=Qb,c	Set reading range of QR-Code Min. digits (b digits), Max. digits(c digits)
	EDIT=Qb,c	Edit Transmit specific "b" digits through "c" digits of QR-Code

Common Setting	DECODELIM=a	Set decoding limit time , a=100-3000,unit[ms], every 100[ms]
	TOTALLIM=a	Read limit time when SYNCMODE=1, a=100-30000,unit[ms]
	MIRROR=0 MIRROR=1	Reading performed Normal Label (Not Mirror Image) (*) Reading performed Mirror Image Label
	MIRROR=2 MIRROR=3	Reading performed Normal Label, then in case of No read occurred, try to read Mirror Image. Reading performed Mirror Image, then in case of No read occurred, try to read Normal Label.
RSS	SET=eM00-RSS	Disable reading of RSS(*)
	SET=eM01-RSS	Enable reading of RSS Expanded
	SET=eM02-RSS	Enable reading of RSS Expanded Stacked
	SET=eM04-RSS	Enable reading of RSS Limited
SET=eM08-RSS	Enable reading of RSS-14 and RSS-14 Truncated	
SET=eM10-RSS	Enable reading of RSS-14 Stacked and RSS-14 Stacked Omnidirectional	
SET=eM1F-RSS	Enable reading of all types of RSS	
DIGIT=eb,c-RSS	Set reading range of RSS Min. digits (b digits), Max. digits(c digits)	
EDIT=eb,c-RSS	Edit Transmit specific "b" digits through "c" digits of RSS	
Multiple Label	OUTFORM=0	Sequence of reading data output:: Transmitting by ordered Code character(*)
	OUTFORM=1	Set specific label number and verify digits / a=1-4; Label Number, b=0-2047; Digit
	OUTFORM=2	Set specific label number and verify character / a=1-4; label Number, bb; top character (Hexadecimal), cc; 2 nd character (Hexadecimal)
	OUTFORM=3	Set specific label number and verify symbol / a=1-4; Label Number, b; Symbol code
	SET=\$Na-b	Set specific label number and verify digits a=1-4; Label Number, b=0-2047; Digit
	SET=\$Ca-bbcc	Set specific label number and verify character a=1-4; label Number, bb; top character (Hexadecimal), cc; 2 nd character (Hexadecimal)
	SET=\$Sa-b	Set specific label number and verify symbol / a=1-4; Label Number, b; Symbol code

4.3 Reading Operation (Normal Operation, Adjustment, diagnosis)

Item	Command	Contents
Reading	g	Start Reading (SYNC ON)
	BR=a	The message to send in event of read error a=0; None, a=1; "BR", BR=2; "ERROR", BR=3; "?"
Normal Operation Mode	LABELS=a SYNCMODE=a	Number of labels to read a=1-4 label(s) a=0; Normal Mode(*), a=1; Reading Time out Mode, a=2; External SYNC Mode
	VOUT=0	Output read data immediately after read(*)
	VOUT=1	Output read data after SYNC off
Continue Reading	continue	Set the Continuous Reading Mode
	stop	Terminate Continuous Reading Mode(*)
	contintvl=a	Sets the wait interval between successive reads of the continuous reading mode. a=0-9; Unit(sec) a=10-999; Unit(msec)
	?contintvl VERIFY=a	The command makes confirmation of waiting time for next reading start. a=0; Not prevent decoded twice(*), a=1; Prevent decoded twice
	VWAIT=a	Setting prevent decoded twice, a=1-20 ; Unit[every 500msec] It is automatically extend when it read the same label twice in reading prevention time.
Test Mode	TEST=0	Normal Operation Mode(*)
	TEST=1	Test Mode
	TMN=a	Sets the number of times to perform decode (virtual SYNCs) for each SYNC ON event in the TEST Mode 1. a=10-1000 (10Unit) (*)
Reading Statistics	?total	Transmit a statistical report of reading quality (OK and NG)
	clrtotal	Clear Actual Reading Quality Statistics
	?dect	Transmit a statistical report of reading time when OK and NG status
	clrdect	Clear Actual reading time Statistics
Character Code for Symbol ID.	SYMBOLTX=a	a=0; Not appending character code for symbol identification(*), a=1; Appending character code for symbol identification
Decode Time	DTTX=a	a=0; Decoding time is NOT added to output read data. (*) a=1; Decoding time is added to output read data.
Total Decoding Time	TTTTX=a	a=0; Total decoding time is NOT added to output read data(*), a=1; Total decoding time is added to output read data
Added Swing Value	AGCTX=0	Swing value is NOT added to output read data(*)
	AGCTX=1	Swing value is added to output read data
Added Mirror Image Setting	MRTX=0	Not appending mirror image setting information (*)
	MRTX=1	Appending mirror image setting information In case of mirror image, added "MIRROR_ON". In case of NOT mirror image, added "MIRROR_OFF".

Auto Detection mode

Item	Command	Contents
Detection ignored time (ms)	LFMOVEлим=_	0:50 1:100 2:200 3:500 4:1000 5:2000 6:3000 7:5000
Time for LFMOVEлим	LFDECLIM=_	1~40 : 0.5 (s)~10 (s) [Step: 0.5(s)]
Aiming beam during auto detection mode	LFPOINTER=_	0: Off 1: Blink
Sensitivity against change of image	VSSENS=_	0 0: Highest 1:2nd highest 2: Normal (Default) 3: 2nd lowest 4: Lowest
Avoid to read same data?	LFVERIFY=_	0: No 1: Yes
Time for LFVERIFY	LFVERIFYлим=_	1~20 : 0.5 (s)~10 (s) [Step: 0.5(s)]

4.4 Camera Control

Item	Command	Contents
AGC	AGC=a	AGC value transmitted to the camera a = 11-255
	AGC=D	Fixed AGC value transmitted to the camera(*)
	AGC=E	Dynamic AGC value transmitted to the camera
	AGC=S	AGC value transmitted to the camera, , Change shutter setting for wing mode
Shutter Speed	SHUTT=0	Shutter Speed Settings 1/60sec
	SHUTT=1	Shutter Speed Settings 1/125sec
	SHUTT=2	Shutter Speed Settings 1/250sec(*)
	SHUTT=3	Shutter Speed Settings 1/500sec
	SHUTT=4	Shutter Speed Settings 1/1000sec
	SHUTT=5	Shutter Speed Settings 1/2000sec
	SHUTT=6	Shutter Speed Settings 1/4000sec
	SHUTT=7	Shutter Speed Settings 1/10000sec
Swing	SWAa=b	AGC value transmitted to the camera when it used in swing mode a=1-8(Swing value), b=0-255(AGC Value)
	SWSa=b	Shutter Speed Setting when it used in Swing mode a=1-8(Swing Value), b=0-7(Shutter Speed Value)
Illumination	LIGHT=2	Lighting function setting, OFF
	LIGHT=3	Lighting function setting, Reading Always ON
	LIGHT=4	Lighting function setting, Reading ON (Flash) (*)
Others	DELAY=a	Sets reading start delay time from SYNC ON. a=0-30000ms, every 10msec
	MAXIMG=a	Set the number of image captures, x=1-8 [Images]
	WAITIMG=a	Intervals between captures when plural image captures are set. a=0-1000; Unit[ms]

4.5 Preset Mode Setting

Item	Command	Contents
Preset	?pre	Confirmation of preset status
	PREM=0	Preset Mode 0: Disable preset function(*)
	PREM=1	Preset Mode 1: Enable preset function, after power is switched ON, the first OK read data is registered within the reader as "preset" data.
	PREM=2	Preset Mode 2: Enable preset function, the preset data is registered within flash memory.
	SET=PRENa	Sets the number of digits of preset data to compare a: Digits, a=0-100 When set 0: Free digits
	clrpre	Clears the preset digit number
	SET=PREDa	Sets the actual value of the characters to compare against
	clrpred	Clears the preset data characters

4.6 Reference Settings

Item	Command	Contents
Sets Confirmation	?	Status Transmission (1 st page)
	??	Status Transmission (2 nd page)
	???	Status Transmission (3 rd page)
	?4	Status Transmission (4 th page)
	?5	Status Transmission (5 th page)
	?6	Status Transmission (6 th page)

4.7 General Operatio / Help

Item	Command	Contents
Initialize Setting	SET=DFT	Set all default
Save Setting	WSETS	Save setting
Buzzer	buz=a	a=0; During Reading operation Buzzer off, a=1; Buzzer on (*)
Digital In/Output	CHATT=a	Debouncing Time a=0 None、a=1; 10msec、a=2 20msec
	GOOUT=a	a=0; GO output setting Hold (until next SYNC input) a=100-20000; GO output setting One shot (unit[ms])
	NGOUT=a	a=0; NG output setting Hold (until next SYNC input) a=100-20000; NG output setting One shot (unit[ms])
Help	HELP	Transmit Serial Command List(1 st page)
	HELP2	Transmit Serial Command List(2 nd page)
	HELP3	Transmit Serial Command List(3 rd page)
	HELP4	Transmit Serial Command List(4 th page)

5. Specifications

5.1 General specifications

Physical Dimensions

- Length 58 mm
- Width 59 mm
- Depth 24 mm (without protrusions)
- Weight approx. 50g

Reading Field *

- Pitch ± 35 degrees
- Skew ± 35 degrees
- Rotation 360 degrees
- Ambient Light 0 – 10,000lx.

Compatible bar codes

2D codes

Data Matrix (ECC200), Maxi Code, PDF417
Micro PDF, QR Code, Micro QR, Composite

1D bar codes

UPC/EAN/JAN, CODE 39, CODE 128,
EAN 128, ITF, CODABAR, Code93, RSS

Camera

- Imaging Device : 1/3 inch CMOS
- Color and Monochrome
- The number of effective pixels:
1280(X) x 1024(Y), Approx. 1.3 M pixels

External input and output

- Serial Interface: RS-232C/RS-422/USB 1.1
- Data form: ASCII
- Transmission speed: 1200bps - 115.2kbps
- Digital I/O
Output: 1 (Open collector)
Input: 1

Power-supply voltage

- Rated voltage 5VDC +/- 10%
(Ripple 100mVp-p)
- Consumption current : 0.4A

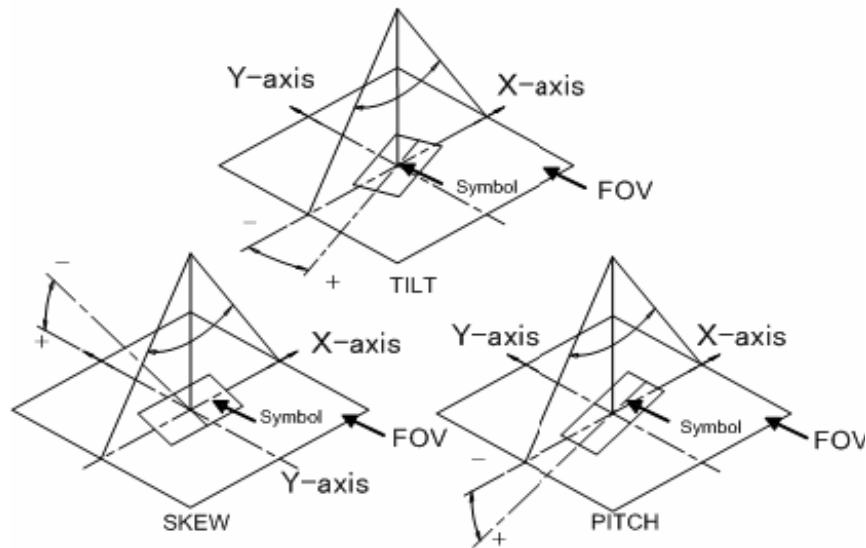
Environment

- Operating temperature range: 0 to 40 °C
- Storage temperature range: -20 to 65 °C
- Humidity: 35 to 85% RH (non condensing)

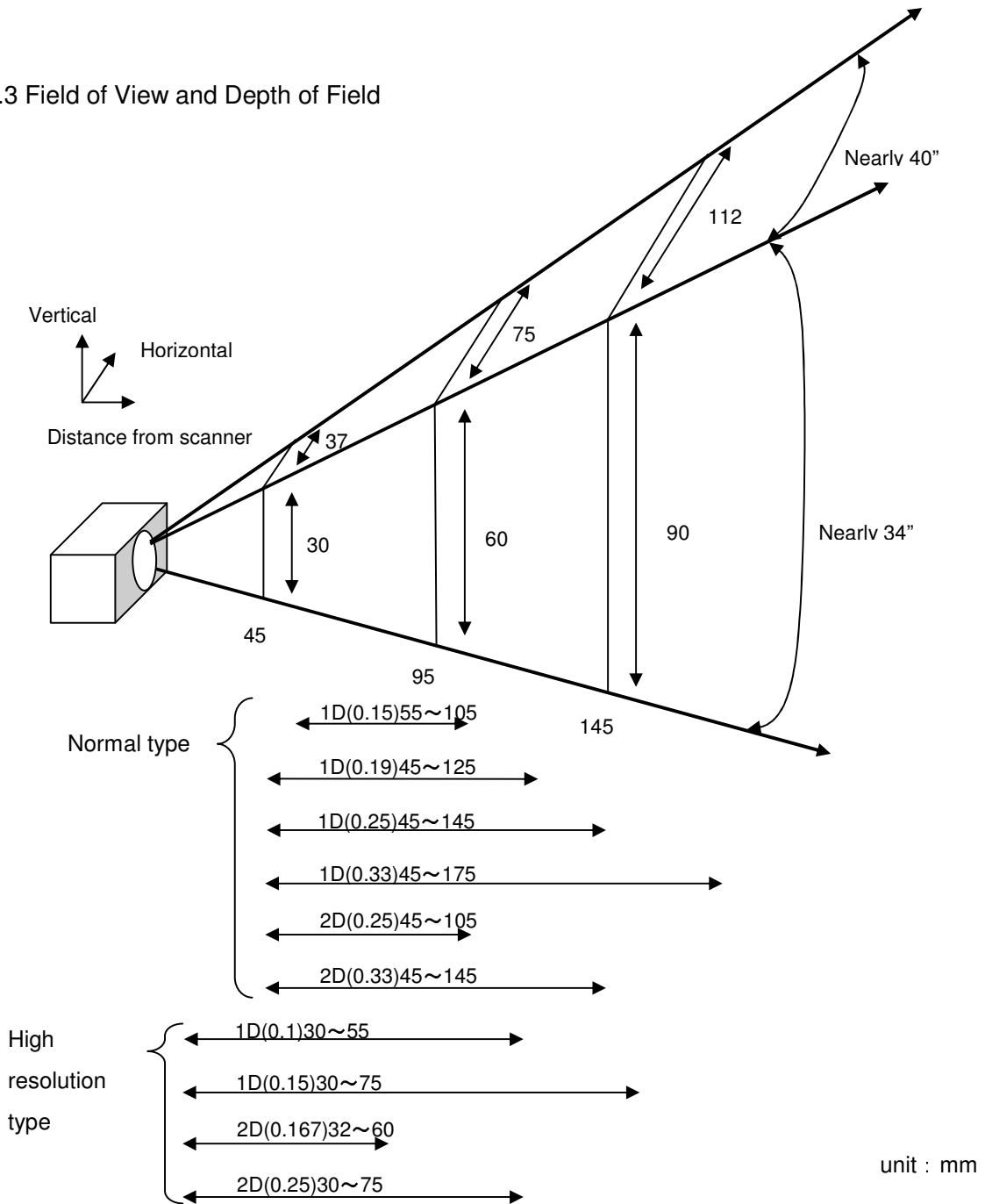
5.2 Functional specification

Reading Direction

- PITCH : ± 35 degree
- SKEW : ± 35 degree
- TILT : 360 degree
- Ambient Light : 0 to 10,000 lux



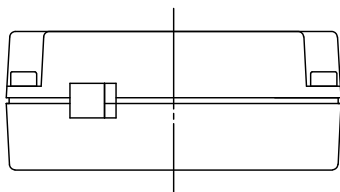
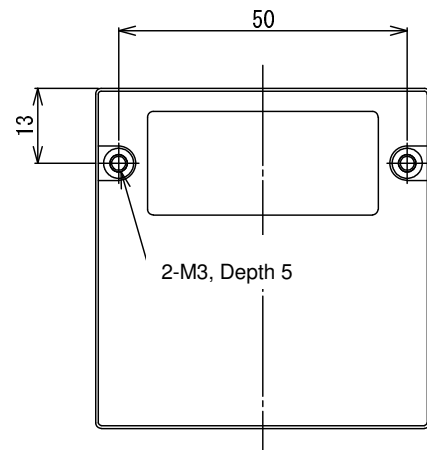
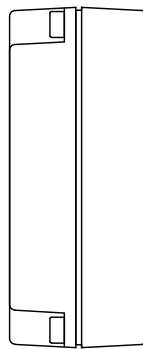
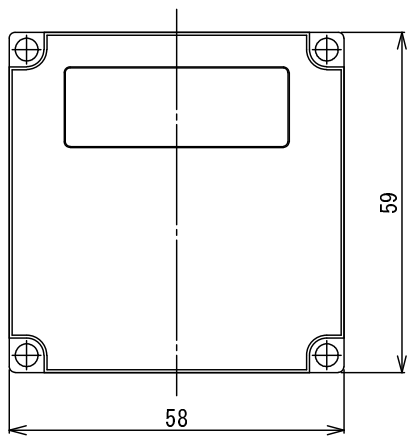
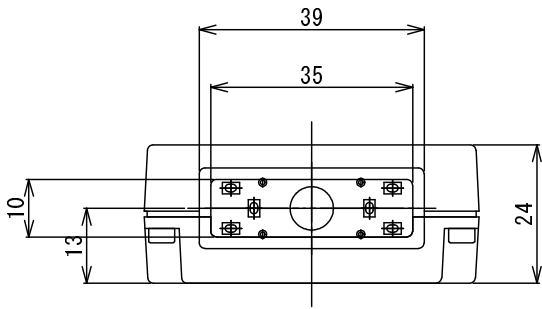
5.3 Field of View and Depth of Field



- Reading ability depends on environment (brightness etc) and the printing quality of scanned barcodes.
- Measured in 500 to 1000(lx) of homogeneous brightness, printed with good quality, no pitch and no skew.

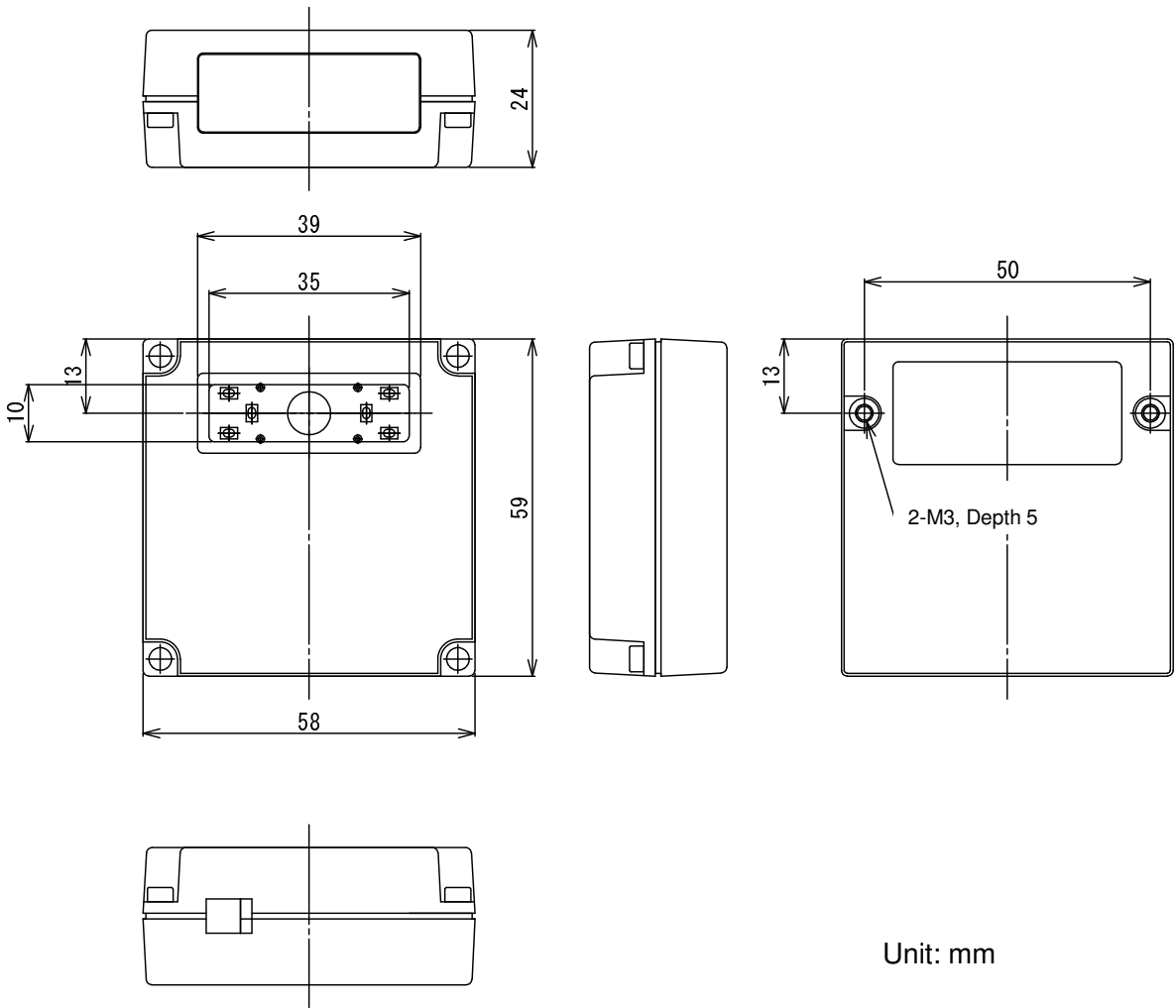
5.4 Dimensions

F type (Front View)



Unit: mm

S type (Side View)



5.5 Interface

1) RS-232C (without connector)

No	Signal	Function	Directions	Color of cable
1	Vcc	+5V		Red
2	GND	Power Return / Signal Earth		Black
3	SD(TXD)	Transmitted Data	Output	Gray
4	RD(RXD)	Received Data	Input	Brown
5	RS(RTS)	Request To Send	Output	Blue
6	CS(CTS)	Clear To Send	Input	Green
7	MONIRx	for external apparatus	Input	Yellow
8	MONITx	for external apparatus	Output	Orange
9	SYNC	Synchronous Input	Input	Pink
10	OUT	GO/NG Output	Output	White
POS*	FG	Frame Ground		

“Directions” → from the unit to host

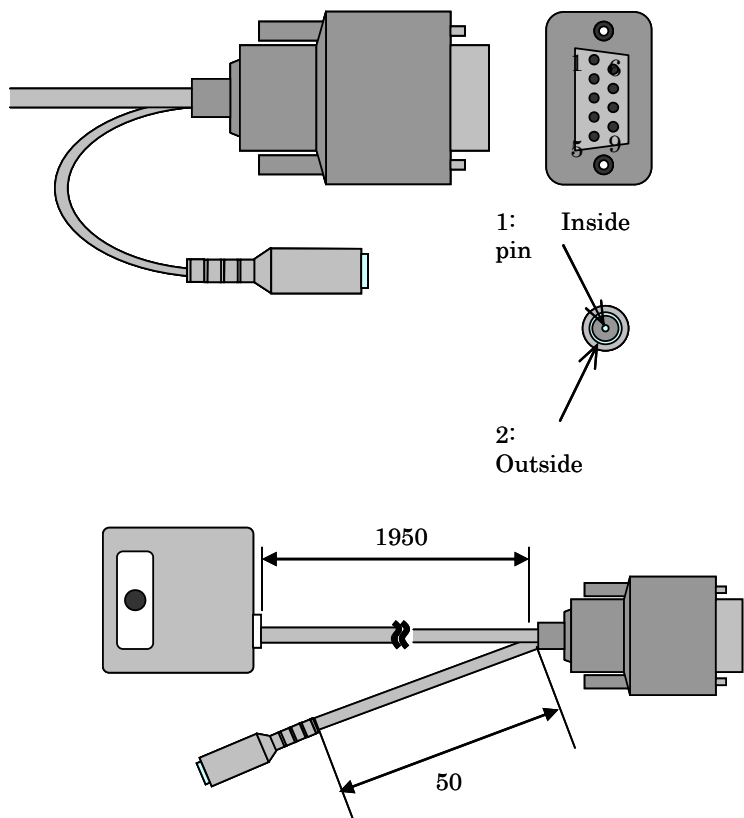
*POS → plastic outer sheath

2) With Dsub9 connector

Host connection : Dsub9 (female)

Signal	Pin No.
N C	1
S D	2
R D	3
N C	4
G N D	5
N C	6
C S	7
R S	8
N C	9

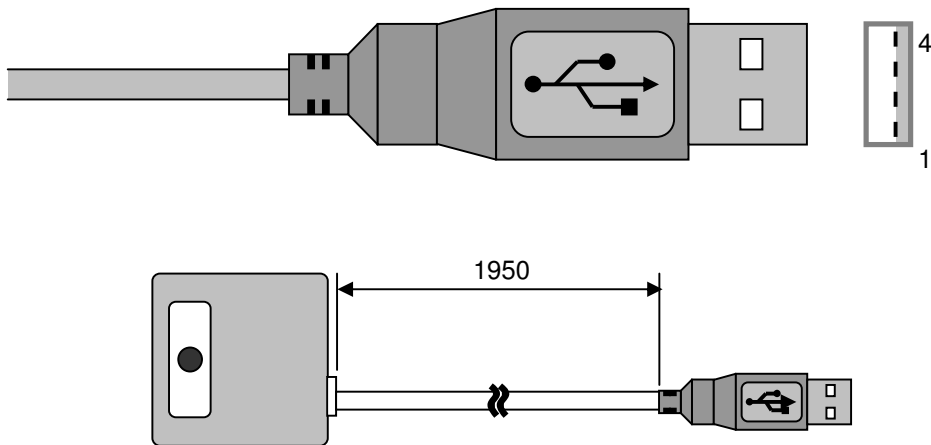
Signal	Pin No.
Vcc	1
GND	2



AC adaptor jack : EIAJ – Type II

3) USB

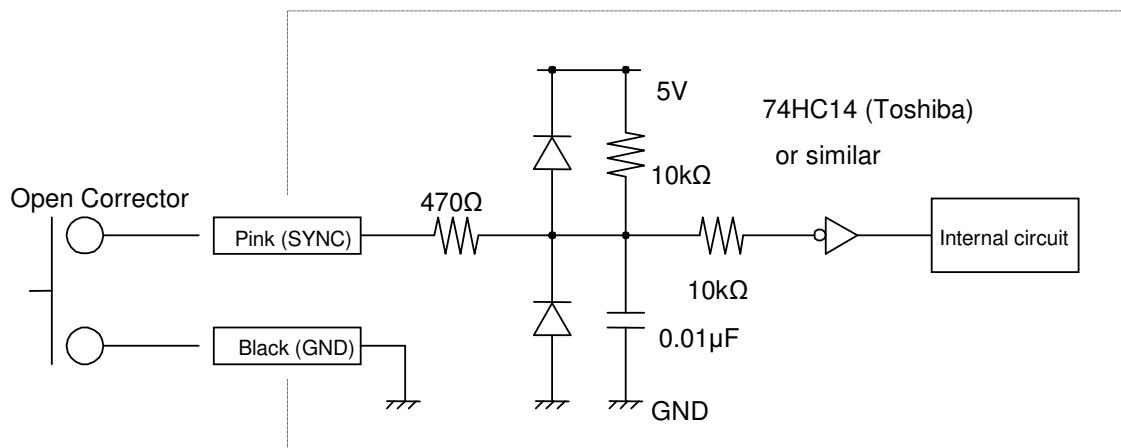
Pin No	Signal	Function	Directions	Color of cable
1	Vcc	+5V		Red
2	DAT-	Half-duplex differential signaling -	In & Out	White
3	DAT+	Half-duplex differential signaling +	In & Out	Green
4	GND	Ground		Black



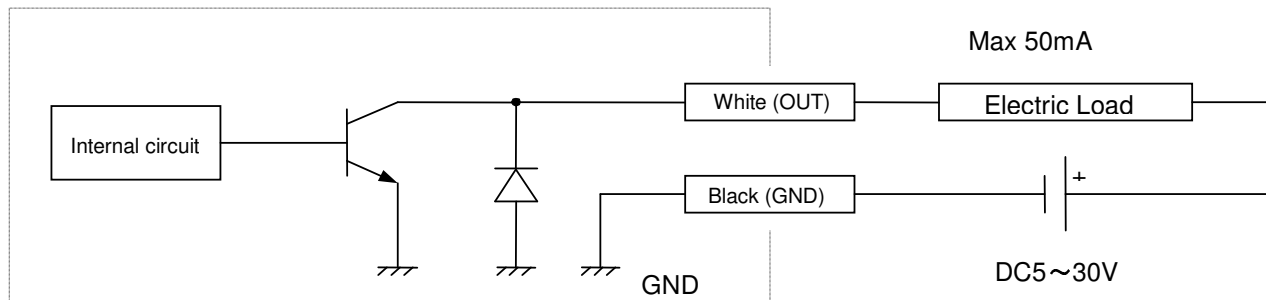
Note: for TFIR-31(H)U a USB connector plug A is used

4) Circuit for inputting and outputting DIO (RS-232C)

4)-1 Synchronous Input



4)- 2 GO/NG output

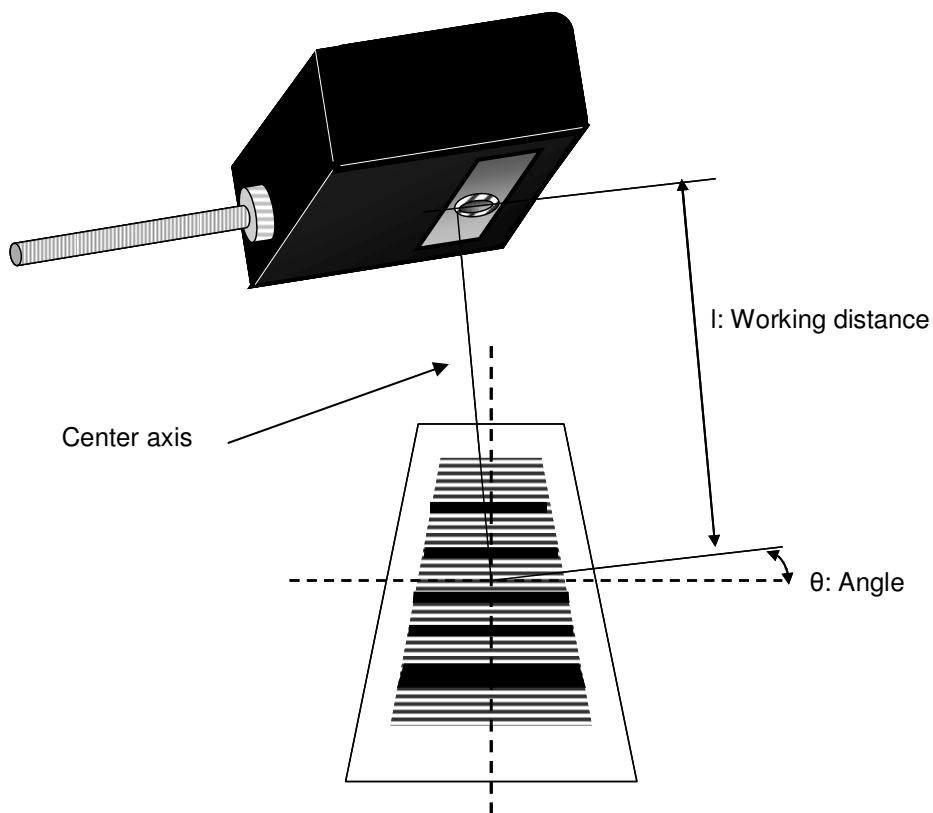


6. Instruction for placing the unit

6.1 Recommended placing (angle and working distance)

l: Working distance (distance from the center of reading window from the center of barcode)

θ : Tilt angle



The TFIR-31 is designed to read motionless barcode. For best performance, please make the center axis aim to the center of barcode.

The working distance depends on both the size and resolution of the target barcode.. Please refer to the working distance and FOV chart on page 51.

Reflective media can over-expose areas of the barcode. In this case, it is advised to tilt the reader relative to the surface of the barcode to direct reflections away from the camera. In such cases, the tilt angle " θ " should be increased to about 10 degree.

6.2 How to configure TFIR-31's parameters

To achieve full performance, TFIR-31's parameters that control its functions should be configured properly.

When all available symbols are selected, the decoding time and the length of time the device is active will be increased. In order to make the decoding faster and to reduce the consumed power, unused barcodes should be disabled. Please refer to section 4.2 that explains how to enable or disable symbols.

Gain control

- 1). Automatic Gain Control (AGC) function provides consistent image quality to the barcode algorithm by automatically configuring shutter speed and gain value automatically. If TFIR-31 is used for diverse labels or used where the brightness is variable, AGC function works to absorb the changes. To activate this function, send serial command "AGC=E" and make trigger several times under the aimed environment.
- 2). If the brightness and state of label are stabilized, AGC function is not needed. To disable the automatic gain control, Please send serial command "AGC=D".
 - a) If the value of gain is not know, AGC function helps to find suitable setting of shutter speed and value of gain.
 - b) If the value of gain is known, please configure directly by sending serial command "AGC=x" (x = value of gain: 0 to 255).
- 3). SWING mode (AGC=S) can enhance the performance if there are different types of labels in the application. Maximum 8 combinations of shutter speed and gain can be set. Refer section "3.6 Swing mode" and "4.5 Camera control" that explain how to configure and the function itself.

7.Troubleshooting

7.1 The unit does not work while pushing the read trigger switch.

Is power supply voltage within specification?

Power supply voltage should be DC 3V-6V. If the DC voltage is not within the specified range not only the unit will not operate, but there is a strong possibility of damaging the unit.

Is power supply polarity correct?

When it is connected with reverse polarity, the unit does not operate. In this case there is no damage happen to the unit.

Is the power rating of the power supply enough?

Unless the power supply capacity is enough, the reader may not operate.

Is the format of serial command correct?

After the unit is turned on, it is ready to receive serial commands. Please be sure to add [CR] after the serial command which is about to be sent. Simply saying, after input the serial command, please press “enter”

The serial command “WSETS” is used to save all of settings to the unit’s flash memory.

When serial commands are sent continuously, it is recommended to have at least 500ms interval between one serial command and another.

Others

With USB interface, sometimes the unit can not work after host PC restarts from standby mode.

Removing the unit in advance is encouraged.

7.2 Barcode Cannot be Read.

Is a code setup correct?

Check the settings of the reader and that the 2D code is enabled

Is reading distance suitable?

Reading may be impossible when the reading distance is outside the working range of reading depth. Moreover the printing quality of the code may make it non-readable even if it is within the reading range limits.

Is the surface of the code glossy?

If the surface of the code is glossy, the illumination will be sometimes reflected like a mirror.

To avoid this, put the scanner in angle relative to the symbol.

Is the reading window clean?

If the window becomes dirty or stained, the image taken by the reader might not be good enough for reading. Clean with a lens cleaner or similar anti-scratching (non-abrasive) method.

Is the print quality of the code good?

Please check whether print quality of the cells, code size, etc. conforms to the standard.

7.3 The data does not transmit or the data itself is corrupted.

Is the setup with host computer correct?

Please check whether the baud rate and frame format is the same as that of the host computer. If frame format differs, it may seem that data is transmitted incorrectly.

Do you set fixed digit for ITF

In some cases, cancellation of significant digits (reading it through with a few digits than a printed digits) in ITF(Interleaved 2 of 5) might be used. We recommend setting specific digit of ITF.

[Memorandum]

Warranty Obligations

This warranty obligation is limited to terms set forth below: TOHKEN warrants this hardware product against defects one year from the date of purchase.

<Warranty Coverage>

1. TOHKEN will repair the product at no charge, for hardware defects occurring when used in accordance with the manual and catalog, under normal operating conditions.

2. Warranty is not covered in following cases:

- a.) Defects or damage as a result of improper usage or modification.
- b.) Defects or damage caused by fire, pollution, abnormal voltage, or natural disasters, such as earthquake, thunderstorm or flood.

When you are not sure about repairs outside of these terms, please ask your local representative or the manufacturer.

TOHKEN CO., LTD

Head quarters

2-7-1 Nishi-Shinjuku, Shinjuku-ku, Tokyo Japan 163-0710

Sales 03-5325-4311 to 4315

Sales Promotion 03-5325-4322

Nagoya office

4-2-12 Meieki, Nakamura-ku, Nagoya Japan 450-0002

Sales 052-565-9091

Osaka office

2-9-1 Higashi-Tenman, Kita-ku, Osaka Japan 530-0044

Sales 06-6353-5476

Fukuoka office

8-36 Hakata-eki Chuogai, Hakata-ku, Fukuoka Japan 812-0012

Sales 092-441-3638

Hitachi office

2-1-10 Hashikabe, Hitachinaka, Ibaragi Japan 312-054

Sales 029-276-9555

Field support department (Technical Center 3)

1-43-2 Tamagawa, Chofu, Tokyo Japan 182-0025

Field support 042-484-5190
