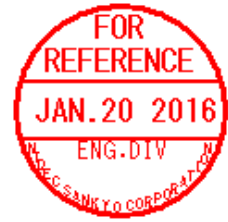


A *Nidec* Group Company  
**Sankyo**



Specification

Type Name :  
ISI221-0131

|           |                        |
|-----------|------------------------|
| Spec. No. | <b>ASR-NP-26819-01</b> |
|-----------|------------------------|

Notes :

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|--------------|--------------|-------------|-------------------|--------------------|---|-------------|------------|---------|--|
| Distribution | No. of sheet |             |                   |                    |   | .           | .          |         |  |
|              |              |             |                   |                    |   | .           | .          |         |  |
|              |              |             |                   |                    |   | .           | .          |         |  |
|              |              |             |                   |                    |   | .           | .          |         |  |
|              |              | B           | Change AC adapter | See front page     | EB-21104-01   | Dec.11.2015 | T.Tokunaga | T.Tatai |  |
|              |              | Sym.        | Revision          | Page               | Cha. No.  | Date        | By         | Appr.   |  |
|              |              |             |                   | Reference Document |   |             |            |         |  |
|              |              | Design      | T.Tokunaga        | Nov.28.2015        | T13A753A01: Outside Drawing<br>ASL-NP-26819-52, ASL-NP-26819-54: Driver spec.<br>AMO-NP-26819-21: USB-DS Instruction manual |             |            |         |  |
|              |              | Det-che     | M.Ikeda           | Nov.28.2015        |   |             |            |         |  |
|              |              | ISI221-0131 |                   |                    | NIDEC SANKYO CORPORATION  |             |            |         |  |
|              |              | Type Name   | Appro.            | T.Tatai            |   |             |            |         |  |

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## Revision History

| <u>Rev</u> | <u>Date</u> | <u>Author</u> | <u>Description</u>   |
|------------|-------------|---------------|--|
| A          | 2015-11-28  | T.Tokunaga    | New  |
| B          | 2015-12-10  | T.Tokunaga    | Page2, 9, 10, 16, 17 : Change AC adapter<br>Page8, 16, 23 : Correction<br>Page12 : 11-8 Radiated and Conducted Emissions<br>Delete"EN55022 Class B"<br>Add "FCC Part 15 C"<br>Page14 :12-5 Deformation of main scanning direction<br>(6 pixels→8 pixels) |

- Blank -

**1. Product name**

ID card reader

**2. Product number**

ISI221-0131

**3. Overview**

This device is an ID card reader for ID1 size card that is defined by ISO/IEC 7810. This device can be also used as a scanner that captures images of both sides on the card.

As an optional feature, it is possible to use a USB device server sold separately, it communicates with the host system by ETHERNET.

The host software environment should be Microsoft Windows 7 (32bit / 64bit), Windows 8 (32bit / 64bit) and Windows server (2008, 2008R2,2012, 2012R2) OS.

**Basic functions**

- Capture full color, IR and UV images
- Read magnetic stripe data defined by ISO/IEC 7811-2 and -6
- Communicate with contactless IC card defined by ISO/IEC 14443
- 1D/2D Barcode reading by DLL

**Optional feature : with USB device server sold separately**

- Correspond to THIN CLIENT model
- Base on SSL security design
- Exclusive device control

**4. Related standards**

ISO/IEC 7810

ISO/IEC 7811-1, -2 and -6

ISO/IEC 14443

USB2.0 compatible \*The logo is not received

ROHS compliance

FCC Part15C

AAMVA

## 5. Constituents

### 5-1 Design structure

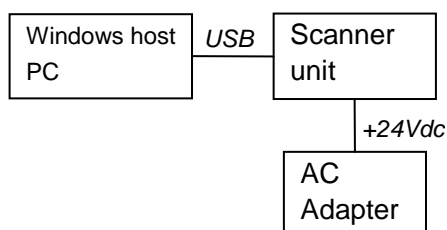



Figure 5-1 Configuration diagram

Block diagram of product See Figure B-1 in APPENDIX B

#### 5-1-1 Attached article

AC adapter of scanner unit 

Parts number: E11A879A01  
Vender name: SINPRO ELECTRONICS CO., LTD.  
Model number: SPU61A-108-NDS/AC  
Output: 24V 2.5A

#### 5-2 Usage of ultraviolet LED

This product uses the UV LED to the lighting of the image sensor.  
Light wavelength in this LED is 365nm that is not been condensed.

## 6. Functions

### 6-1 Image scanning

#### 6-1-1 Imaging method

Monochrome contact image sensors CIS are mounted. These sensors can be used as a full-color sensor by the switching method with 3 color LEDs.

#### 6-1-2 Lighting source

R, G, B, IR and UV LED

Each wavelength is

|        |        |
|--------|--------|
| Red:   | 630 nm |
| Green: | 520 nm |
| Blue:  | 465 nm |
| IR:    | 940 nm |
| UV:    | 365 nm |

### 6-1-3 Image format

BMP image format

### 6-1-4 Image data size

|                             |  |
|-----------------------------|--|
| Full color image both side: | 17.47Mbyte (600dpi only)               |
| IR image both side:         | 5.82Mbyte (600dpi), 1.46MByte (300dpi) |
| UV image both side:         | 5.82Mbyte (600dpi), 1.46MByte (300dpi) |

### 6-1-5 Color mode and data length

|                       |       |
|-----------------------|-------|
| Full Color:           | 24bit |
| Grayscale image (IR): | 8bit  |
| Grayscale image (UV): | 8bit  |

### 6-1-6 Resolution

|                   |                |
|-------------------|----------------|
| Full Color image: | 600 dpi        |
| IR, UV image:     | 300 or 600 dpi |

### 6-1-7 Scan area

Entire region of the card is scanned to the image.  
Image quality is defined in the area shown in Figure B-2 at APPENDIX B.

### 6-1-8 Color mode

Both side images are scanned at once by the following color mode.

- Front face 600dpi full-color and back face 600dpi full-color.
- Front face 600dpi full-color, infrared and back face 600dpi full-color, infrared.
- Front face 600dpi full-color, UV and back face 600dpi full-color, UV.
- Front face 600dpi full-color, 300dpi infrared, UV and back face 600dpi full-color, 300dpi infrared, UV.
- Front face 600dpi infrared and back face 600dpi infrared.
- Front face 600dpi UV and back face 600dpi UV.

## 6-2 Contactless IC card communication: RFID

RFID read and write function is based on Type A, Type B communication method in ISO/IEC 14443.

## 6-3 Magnetic stripe reading: MSR

### 6-3-1 General description about MSR

Suitable card for this scanner is compliant with ISO/IEC 7810, 7811-2,-6 (JISX6301, 6302-2,-6) and AAMVA specification. The reading process of magnetic stripe is occurring at same time when the card is loading.

In this timing, the card is exposed still and the operator can touch the card. So, the reading process might be fail if the card is pulled or pushed by operator.

It is recommended inserting card again when the reading was fail.

Note: A reading failure due to the influence of the operator's hand does not count to the error in the reliability test.

### 6-3-2 Operating suggestions for MSR

The decoder performs in-depth analysis on the waveform and outputs a character string as a result.

One of the most outstanding features of the decoding system is a capability of detecting the defects on the signal waveform, which enables the estimation of their true values.

If the defect is within a certain range, the erroneous character may be estimated for the true value and reported to the host system accompanied by an alert message for potential misread.

Actually, the supervisor DLL denotes this kind of result delivered by MSR DLL as a read error in order to avoid misread.

## 6-4 Barcode reading

Supported barcode types

Code128, Code39, JAN/EAN8/13, PDF417

Minimum bar width: 0.25mm



#### 6-5 Transaction counter

Transaction counter is supported.

It counts up only when scan transaction succeeded.

When an error occurred in scan transaction, it does not count up.

Recorded count is reset at the factory.

#### 6-6 Transaction time : informative

Transaction time under the following condition is approximately 6 seconds.

Sequence : Loading card -> Front and back face scanning  
-> Transfer data(under USB 2.0 Hi-Speed) -> Eject card

Scan mode : Front face 600dpi full-color, 300dpi Ir and 300dpi UV.  
Back face 600dpi full-color, 300dpi Ir and 300dpi UV.

Measurement environment:

OS : Windows 7 -64bit SP1

CPU : Core i3 - 2.4GHz

RAM : 4.0GB

When other high volume tasks is not running.

## 7. Interface

### 7-1 Scanner interface

Interface: USB2.0 High Speed / Mating Connector: USB-Type A

This device is Vendor-Specific Class device.

It is constituted by three end points, Bulk IN, Bulk OUT, and interrupt IN.

### 7-2 Scanner USB descriptor

This device does not receive USB Logo.

However, it is a level which can pass a compliance program.

Vendor ID : 0x077A

Product ID : 0x10BE

iManufacture : "NIDEC SANKYO CORPORATION"

iProduct : "ISI221-0131"

### 7-3 Data clear timing: Image data, MSR data, Recognized data

Device:

When a clear command is received

When an initial command is received

When next image capture command is received

Driver:

When an initialize API is called

When a clear API is called

### 7-4 Operable OS

Supported:

Windows Server 2008 SP2 (x86)

Windows Server 2008 SP2 (x64)

Windows Server 2008 R2 SP1 (x64)

Windows Server 2012 (x64)

Windows Server 2012 R2 (x64)

Windows 7 - 32 bit and 64 bit

Windows 8 - 32 bit and 64 bit

Not supported:

Windows Server 2008 (x86)

Windows Server 2008 (x64)

Windows Server 2008 R2 (x64)

It is not supported other OS that is not listed above.

## 8. Support software and documents

### 8-1 Utility and software

Scanner driver and installer (refer to Scanner driver specification)

Hardware control utility (refer to Maintenance manual)

### 8-2 Documents

Scanner driver specification : ASL-NP-26819-52

Maintenance manual : AMR-NP-26819-01

## 9. Intended cards

### 9-1 Card length

85.47~85.9mm

### 9-2 Card width

53.92~54.18mm

### 9-3 Thickness of card that can be transported

Transportable condition of card: 0.25~0.84mm

Within 1.32 mm when the height of emboss is contained.

The emboss area is specified by ISO/IEC 7811-1)

Scannable condition of image: 0.5~0.84mm

Within 1.32 mm when the height of emboss is contained.

The emboss area is specified by ISO/IEC 7811-1

Readable condition of MSR: 0.68~0.84mm

Within 1.32 mm when the height of emboss is contained.

The emboss area is specified by ISO/IEC 7811-1

### 9-4 Material

PVC, PET-G

### 9-5 Opacity

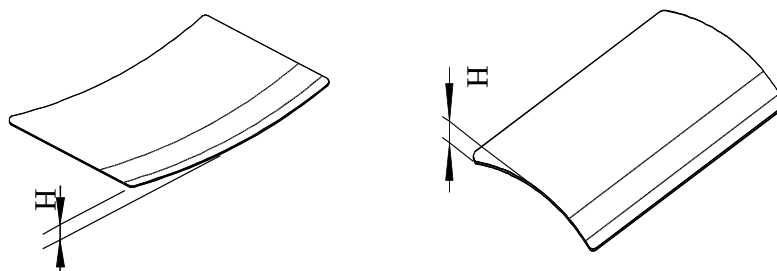
Opacity of card is specified by ISO/IEC7810 standard.

9-6 Distortional cards

Refer to the figure below.

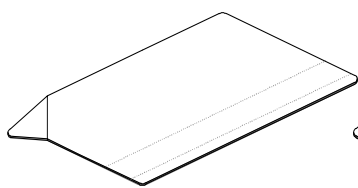
It is possible to use it up to the amount of the height of "H" with the card that uniformly curves in longer direction and direction of shorter hand.

- 1) Transfer: "H" within 3mm (containing emboss)
- 2) Imaging: "H" within 2.5mm (containing emboss) at 25 degrees C.  
△ "H" within 2.0mm at operating condition.
- 3) MSR: "H" less than 2.5mm (containing emboss) at 25 degrees C.  
"H" within 2.0mm at operating condition.

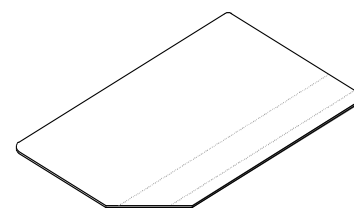
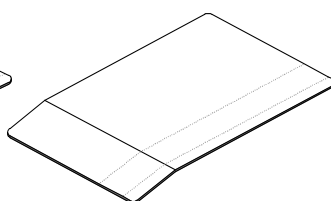


Bending of both direction in inside and outside

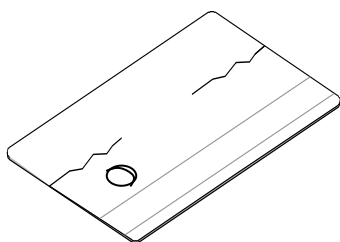
Note) Please do not use the card like the figures below.



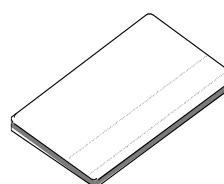
Bent card



Defective card



Cracked, holey card



Non-standard size

Note) unavailable medium

Receipt sheet, business card, Medium with clip adheres, Medium with stapler adhered, etc.

**10. Common specifications**


## 10-1 Dimension

Scanner unit: 122(W) x 113(H) x 260(D) [mm]

See Outside drawing: T13A753A01


## 10-2 Mass

Machine body: approx. 2.4kg

 AC adapter: approx. 250g (E11A879A01) AC cord set: approx. 170g

## 10-3 Power source

## 10-3-1 Power supply

 AC adapter of scanner unit:

Input: AC100V-240V\_50/60Hz\_1.45A

Please do not insert and pull out the DC jack during operation.

## 10-3-2 Power consumption

AC adapter of scanner unit:

Standby: Less than 7.2W

Operating: Less than 48W

Peak: less than 60W (The inrush current at power ON is excluded.)

## 10-4 Card transfer speed

Load / Eject: Typical 190mm/seconds

Imaging: Color &amp; UV &amp; IR Typical 81 mm/seconds

Color only Typical 108 mm/seconds

IR only or UV only Typical 162 mm/seconds

## 10-5 Eject length

More than 24 mm

## 10-6 Indicator lamp

|        |  |
|--------|--|
| POWER: | Green Lamp                                     |
|        | On: Power ON                                   |
|        | Off: Power OFF                                 |
| READY: | Green Lamp                                     |
|        | On: Device is ready to communicate.            |
|        | Off: Device is not ready to communicate.       |
|        | Blinks: Program downloads state.               |
| ERROR: | Red Lamp                                       |
|        | On: Error has occurred.                        |
|        | Off Error has not occurred. Or it was cleared. |

## 10-7 Sound noise


|            |              |
|------------|--------------|
| Operating: | Within 65 dB |
|------------|--------------|

It is measured at a position 1m away from the device.  
Measurement mode is A Lange FAST mode. (Refer to JIS-Z8731)

## 10-8 SG-FG connection state

SG and FG are connected at inside of this device.

## 10-9 Safety

|                             |                   |  |
|-----------------------------|-------------------|--|
| Scanner unit:               | not certified yet |  |
| AC adapter of scanner unit: | SPU61A-108-NDS/AC | UL/cUL  |

**11. Environmental condition**

## 11-1 Installation environment

Place: Lobby

The ID card reader device is intended for use stand-alone installed "in lobby or office".

Recommendation:

This means that the device is not exposed to outside weather conditions and dusty environmental. Particularly the silica in the dust will damage the glass of image sensor and will shorten the life of the devices.

## 11-2 Operating condition

## Operating:

+0 degrees C ~ 40 degrees C

30%~85% R.H no condensation

Maximum wet bulb is +30 degrees C

No warped card when temperature is between 0~+5 degrees C.

## Non-operating (power off):

-10 degrees C~ 60 degrees C

20%~85% R.H

No condensation

Maximum wet bulb is +35 degrees C

## 11-3 Transport condition

## Packed:

-10 degrees C ~ 60 degrees C

10%~90% R.H

No condensation

Maximum wet bulb is +40 degrees C

## Judgment by the test:

There is no functional error after 12 hours since the device is return to operating condition.

## 11-4 Vibration Test

## Operating: Vibration frequency: 5~50 Hz

Acceleration: 2.0 m/seconds<sup>2</sup> (0.2G) Constant

Sweep: Logarithmic change

Sweep time: 1minute / octave

5-50-5 Hz repeats, 10 minutes

Total testing time:0.5 hour (x, y, z every direction)

No abnormality is seen electrically and mechanically when the device is in use.

## Non-operating (power off): Vibration frequency: 5~50 Hz

Acceleration: 4.0 m/seconds<sup>2</sup> (0.4G) constant

Maximum peak acceleration 30 m/secons<sup>2</sup> (3.0G)

Sweep: Logarithmic change

Sweep time: 1 minute / octave

5-50-5Hz repeats, 10 minutes

Total testing time: 0.5 hour (x, y, z every direction)

There is no functional error after vibration testing.

## 11-5 Mechanical shock test

Without packing:

Test method: Fixing at the end and drop down at another end  
Lift up angle: 30 degrees  
Lift up edge: Every 4 side  
Number of time: 2 times per one side  
Table situation: On the wood table

This test is done under non-operating.

With packing:

Test method: Free fall  
Lift up height: 600 mm  
Falling direction: 1 corner, 3 ridges and 6 faces  
Total falling times: 10 times

There is no degradation.

## 11-6 Attitude

Horizontal Attitude (Within +/- 5 degrees)

The device does not turn over in 15 degrees attitude.

## 11-7 USB Cable strength of scanner unit

The USB cable does not break when it is applied force of 60N (6.12 kgf ).

## 11-8 Radiated and Conducted Emissions

Reference document: ~~EN55022 Class B~~

FCC Part 15 B, FCC Part 15 C



## 11-9 Electrostatic discharge immunity test

## 11-9-1 Aerial discharge(with cover case)

Immunity level: +/- 10kV by 150pF / 330 ohms

It discharges 25 times per every electrical polarity (+/-) to the gate in the front face.

Unrecoverable error does not be occurred during operation. The phenomenon that automatically returns to normal operation is permitted.



**11-9-2 Contact discharge (without cover case)**

Immunity level: +/- 8kV by 150pF / 330 ohms

It discharges 25 times per every electrical polarity (+/-) to the gate in the front face, the knob of the top cover, and the card transportation knob.

This test is done while non-operating (power off).

The device should operate normally after powered on.

**11-9-3 Contact discharge (with cover case)**

Immunity level: +/- 6kV by 150pF / 330 ohms

It discharges 10 times per every electrical polarity (+/-) to the metal part that can be touched from the outside.

Unrecoverable error does not be occurred during operation. The phenomenon that automatically returns to normal operation is permitted.

**11-10 Radiated, Radio-frequency, electromagnetic field immunity test**

Reference document: EN/IEC 61000-4-3

Immunity level: 3V/m

**11-11 Electrical fast transient/burst immunity test**

Reference document: EN/IEC 61000-4-4

Immunity level: +/- 0.5kV

**11-12 Immunity to conducted disturbance, induced by radio-frequency fields**

Reference document: EN/IEC 61000-4- 6

Immunity level: 3V

**11-13 Power frequency magnetic field immunity test**

Reference document: EN/IEC 61000-4-8

Immunity level: 1A/m

**11-14 Thermal shock**

-10 degrees C / +60 degrees C

This test is done 10 cycles. One cycle requires one hour.

The device should operate normally after returned room temperature.

## 12. Image quality

### 12-1 MTF at full color mode

Minimum 35%, typical 70%

MTF means ratio between 0.5line pare and 3.0 line pare

### 12-2 Magnification of image

Main scanning direction: Within +/- 3.2%

Vertical scanning direction: Within +/- 3.2%

### 12-3 Image skew

+/- 1.5 degrees see figure 3-1 at Normal flat card

### 12-4 Target value of white level

The target value is 229 when the white reference card is read.

The white reference card is "S38A497A01".

### 12-5 Deformation by transfer of card (extend and shorten)

Long wave deformation: +/- 3 % (accuracy of card length)

Momentary deformation: +/- 25 %

(at 25.5mm from top of card and 17mm from back end)

Momentary deformation:


The accuracy of every 2mm regions is within following.

$-2 \leq X \leq +2[\text{pixel}]$  : No object.

$-4 \leq X < -2[\text{pixel}]$  ,  $+2 < X \leq +4[\text{pixel}]$  : Within 4 points.

$-8 \leq X < -4[\text{pixel}]$  ,  $+4 < X \leq +8[\text{pixel}]$  : Within 2 points.

2mm region contains 48 pixels at 600dpi.

Deformation of main scanning direction: within +/- 8 pixels (See Figure 3-2) 

Used card: Thickness is 0.76 mm, flat and no emboss card.

### 13. Reliability

#### 13-1 Product life

500,000 transactions or 7 years

Recommended replacement cycle of rubber roller is 200,000 transactions.

Note) Since reliability of rubber parts are greatly influenced by the ambient temperature, humidity and environment, the replacement timing of the rubber roller may become earlier than the above-mentioned value.

One transaction contains follows.

“Card load → Transfer → image scan → Transfer → Eject”

Ambient environment is room condition.

Maintenance is required.

#### 13-2 Error ratio

Within 1/10000 transaction

Error means card jam and false operation.

Normal flat card is used for the test in room condition.

Magnetic stripe read error rate: Less than 5 errors per 5,000 cycles  
when the test card as Sankyo TEST CARD flat is used in room condition.

#### 13-3 MTBF and Lamp life

Main unit circuit: more than 62,000hours

AC adapter of scanner: more than 100,000 hours

Lamp life

1,000 hours (degrading -20%) cumulative

5,000 hours (degrading -30%) cumulative

Testing condition: 20 degrees C, Duty 20%

Note) 1,000 hours is more than 7,200,000 transactions.

#### 13-4 Environmental protection

RoHS compliant

**14. Product Warranty**

## 14-1 Warranty period:

One year from delivery



If there are any problems or it becomes malfunctioning within one year after it passes delivery incoming inspection, it should be repaired or replaced in warranty free of charge.

## 14-2 Repair and maintenance

After the above warranty period, any repair or replacement should be made as out of warranty and be charged.

(Any serious design fault or manufacturing failure should be discussed how to be handled between the buyer and the seller.)

## 14-2-1 Maintenance parts

|    |                               |            |  |
|----|-------------------------------|------------|--|
| 1. | White reference card          | S38A497A01 |  |
| 2. | AC adapter of scanner unit    | E11A879A01 |   |
| 3. | AC cord set for above adapter | S41A252A01 |  |

## 14-2-2 Period of maintenance works

Maintenance period is 1 year. (Informative)

Cleaning is needed when error occurred.

## 14-2-3 Cleaning notice

Solvent use is not permitted.

Neutral detergent is recommended for cleaning.

**15. Labeling**

The label on the unit contains the following contents.

Model name

Lot Number

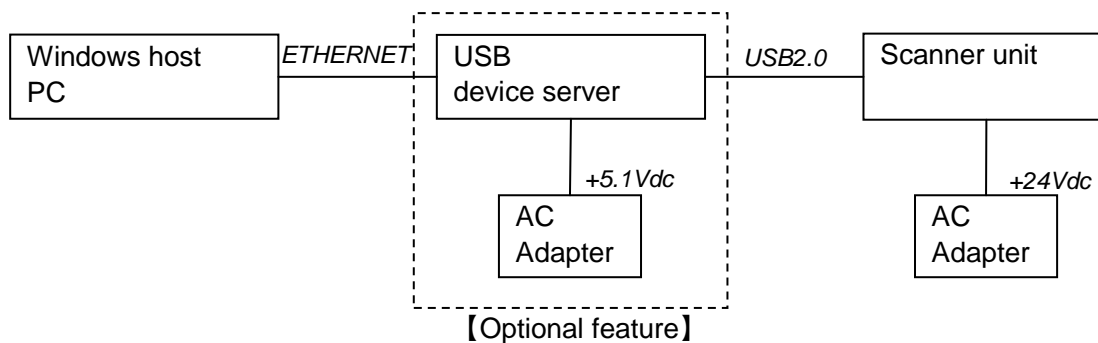
Unit revision

See outside drawing.

**16. Optional feature (USB device server)**

As an optional feature, it is possible to use a USB device server (sold separately), it communicates with the host system by ETHERNET.

## 16-1 Design structure (communicating with the host system by ETHERNET)




## 16-2 Selling separately (Optional feature)

## USB device server

Parts number: G10A913A01  
 Vender name: NIDEC SANKYO CORPORATION  
 Model number: G10A913A01

## AC adapter of device server

Parts number: E11A763A01  
 Vender name: UNIFIVE Co.,Ltd.  
 Model number: US115-05  
 Output: 5.1V 2.5A  
 Safety: UL/cUL 

## 16-3 Support software and documents

## 16-3-1 Utility and software

USB device server driver and installer  
 USB device server maintenance utility

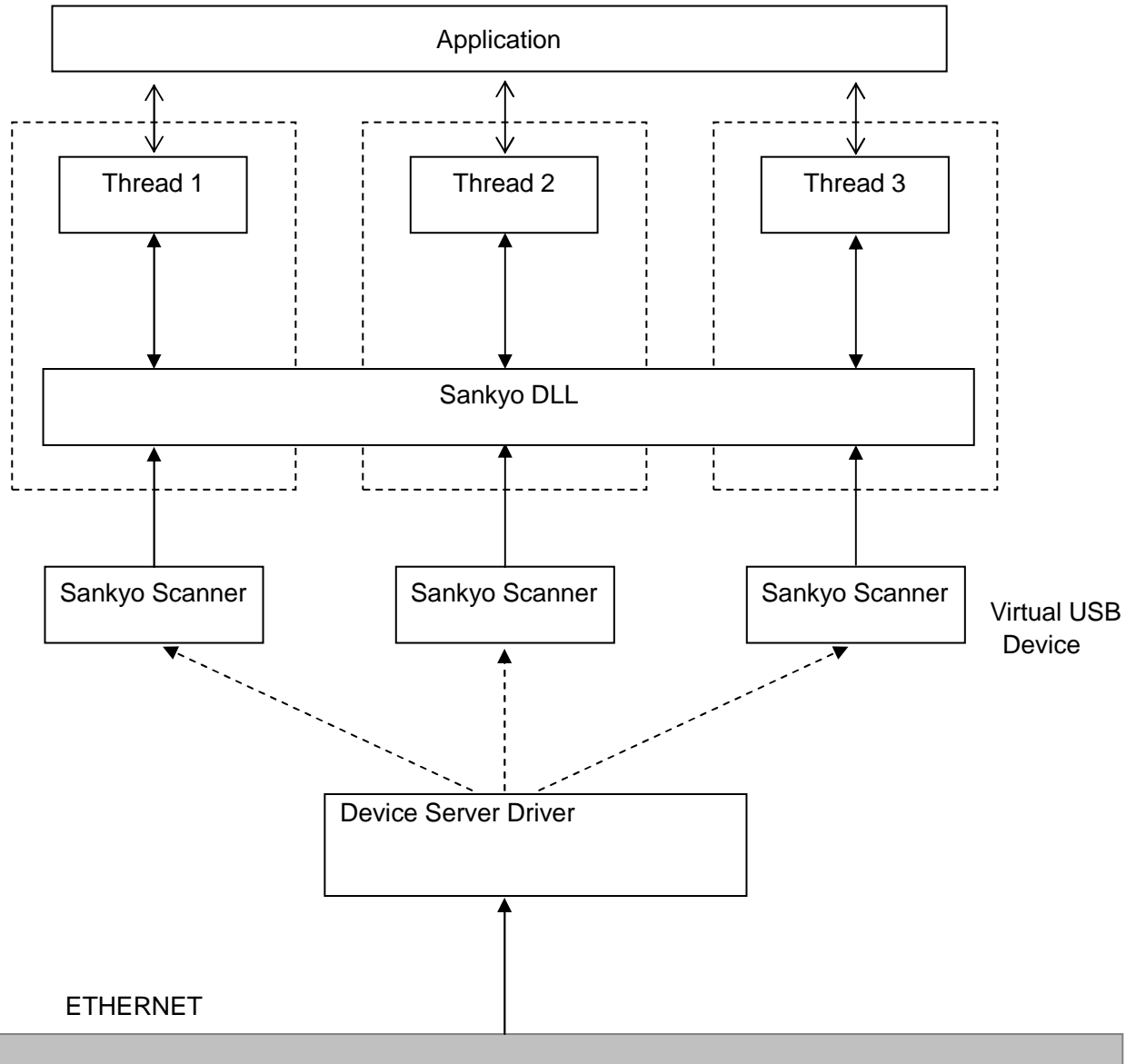
## 16-3-2 Documents

Scanner driver specification : ASL-NP-26819-54  
 USB device server Instruction manual : AMO-NP-26819-21

16-4 Correspond to THIN CLIENT model

Linking Model: Thin Client Model

The scanner driver controls several scanners by single process.



16-5 Exclusive device control

Many DS(s) are connectable with one PC through a network.

If it considers that this connection is one group, many groups can be existed on the same network.

By the mutual authentication of SSL, the connection with DS of another combination is prevented.

(e.g. Not connectable with DS of Shop-B from the PC of the Shop-A. [Refer to the following figure.]

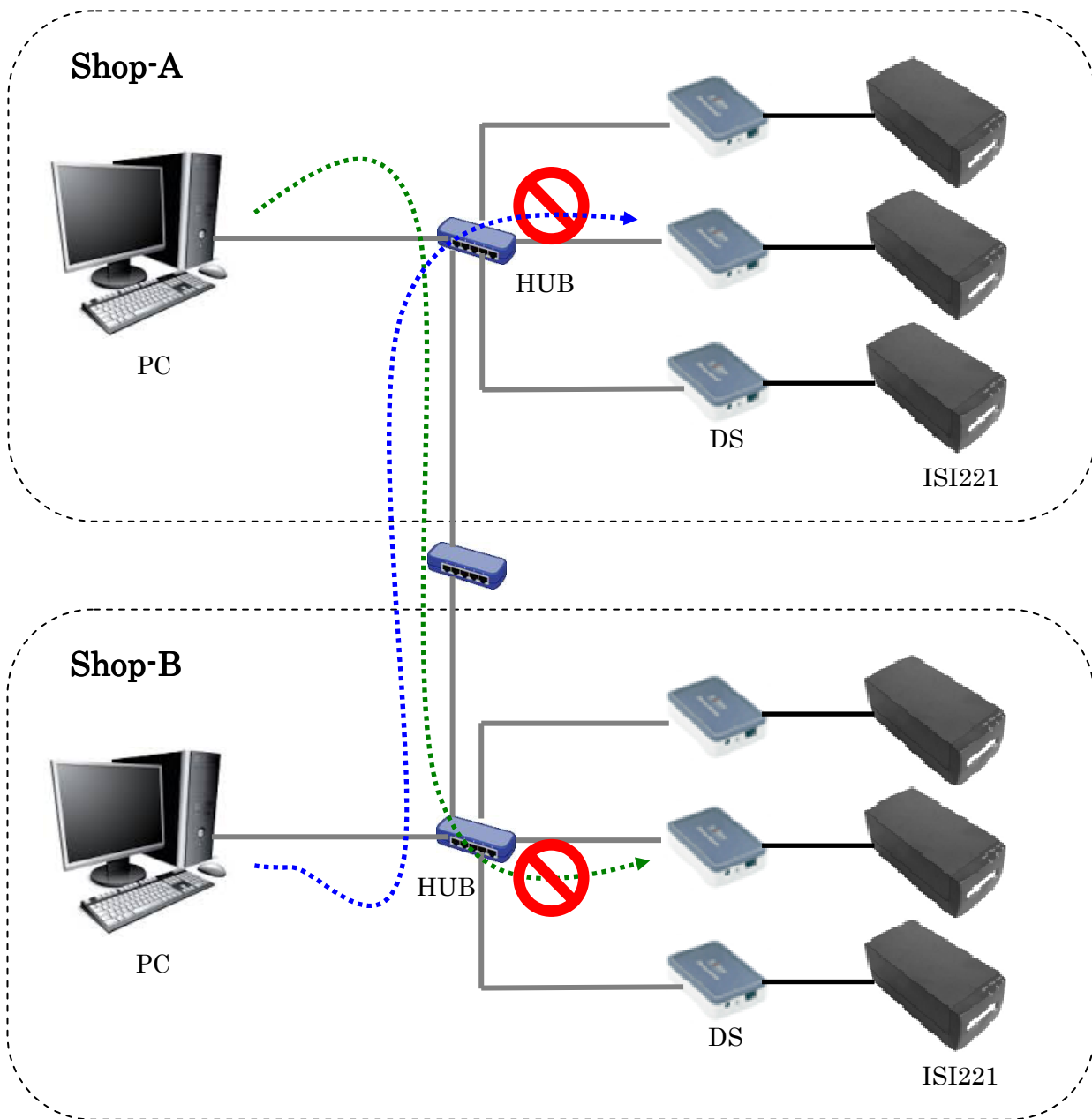


Fig.16-5-1 Network connection figure

#### 16-6 EHERNET Host interface

Transmission Method: ETHERNET \* Converted by USB Device Server

UDP/IP original protocol and TCP/IP protocol mixed

Device server control: UDP/IP

USB transaction data: TCP/IP and UDP/IP mixed

Security: Public key exchange as like as SSL for symmetric-key

Data encryption is AES256

#### 16-7 Base on SSL security design

After exchanging symmetric keys by SSL (TLS1.0), TCP/IP connection is started.

It communicates by encrypting USB data using the exchanged symmetric key.

In a key exchange phase, mutual authentication is executed using a server certificate and a client certificate.

A symmetric key is generated by every connection of the USB. This key cannot be changed during encryption communication. The same key is used until communication of a TCP session is completed.

It's necessary to disconnect of the USB connection and reconnect it for exchanging of the encrypting key at periodical interval. API for the virtual connection/disconnection of the USB is available.



## Appendix A

### Normal condition

Temperature: +20 +/- 5 degrees C

Humidity: 35 % ~ 60% R.H

Attitude: Horizontal

### Appendix B

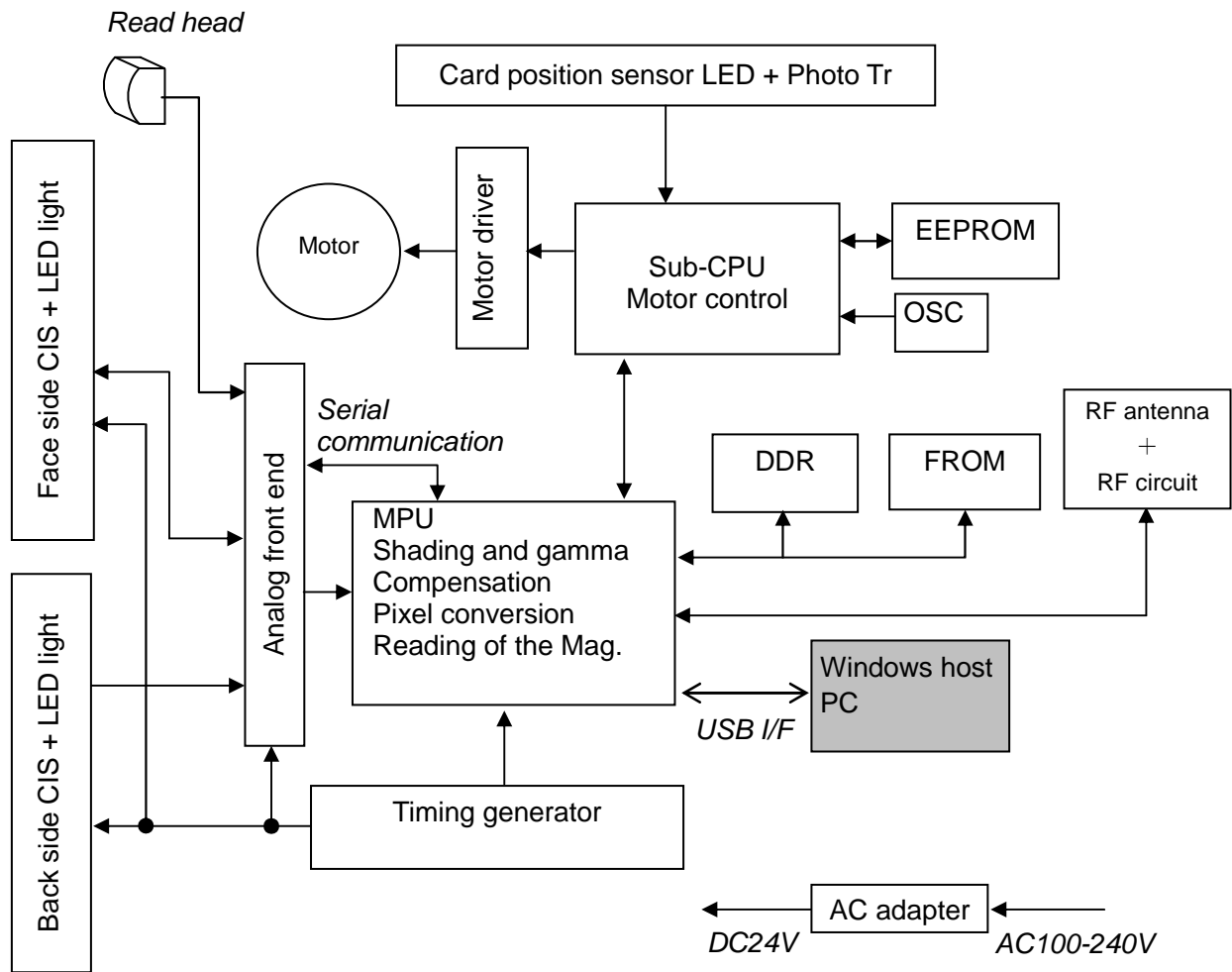


Figure B-1. Block diagram of design structure

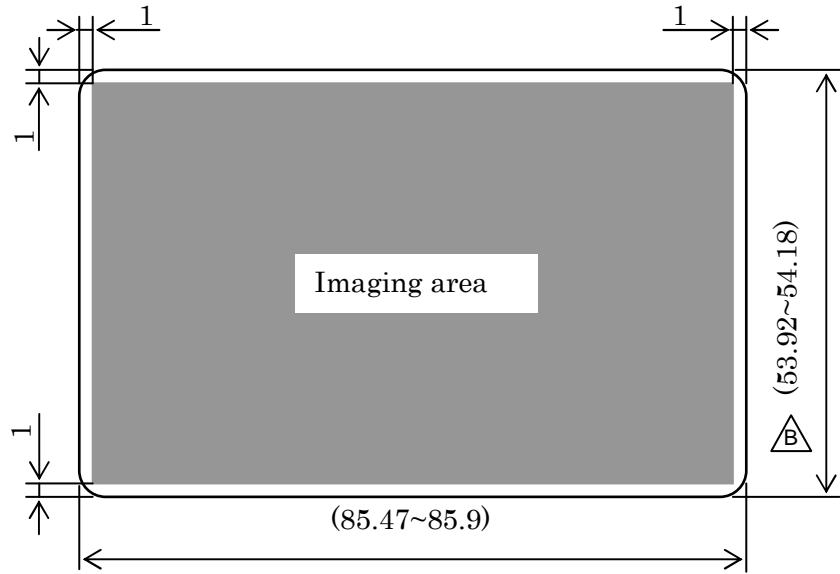


Figure B-2. Imaging area

Skew =  $A * \tan(A/B)$ : B dimension is 50.8mm (1200pixels)

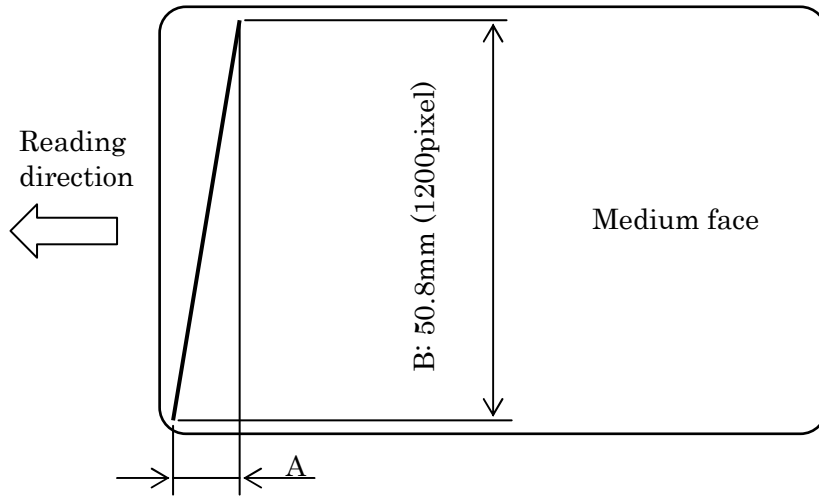


Figure 3-1 Image skew

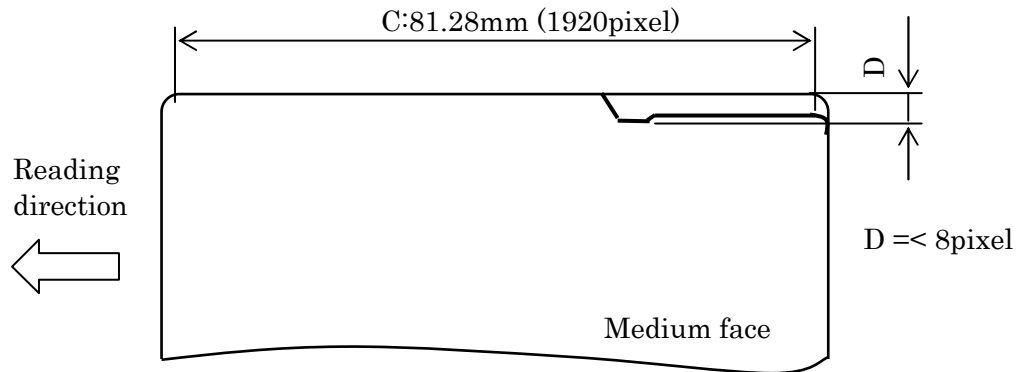


Figure 3-2 Image deformation

Figure3. Distortion

## **NOTICE**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## **FCC WARNING**

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

---- End of Document ----

