**Revision History**

| Rev. | Date | Author | Page | Description |
|---|---|---|---|---|
| A | Jan.29.2008 | T.Watanabe | - | New (preliminary) |
| B | Nov.19.2008 | J.Tanaka | - | Full-scale revision |
| C | Jan.05.2009 | J. Takeuchi | 14,15 | Postscript of FCC declaration of conformity |
| D | Jan.14.2009 | J. Takeuchi | 9,10,12,15 | Correction and postscript of specifications |
| E | Dec.24.2009 | J. Takeuchi | 9,15 | Correction and postscript of specifications |

# Contents

1. Product

Contactless IC card dispenser

2. Model

SCT0M0-0130
This product is compliant to "RoHS" Instruction.

3. General Description

The unit (hereinafter called as SCT) issues Contactless IC cards under the control of user's HOST.
SCT receives a card from Hopper unit, then writes a HOST data on the card and verifies the written data.
SCT controls an interface between the HOST computer and a Contactless IC chip in the card.
After these functions, SCT sends the card from a front gate. Also, SCT is able to take the card into the unit again.

4. Configuration

SCT is configured per the following block diagram.
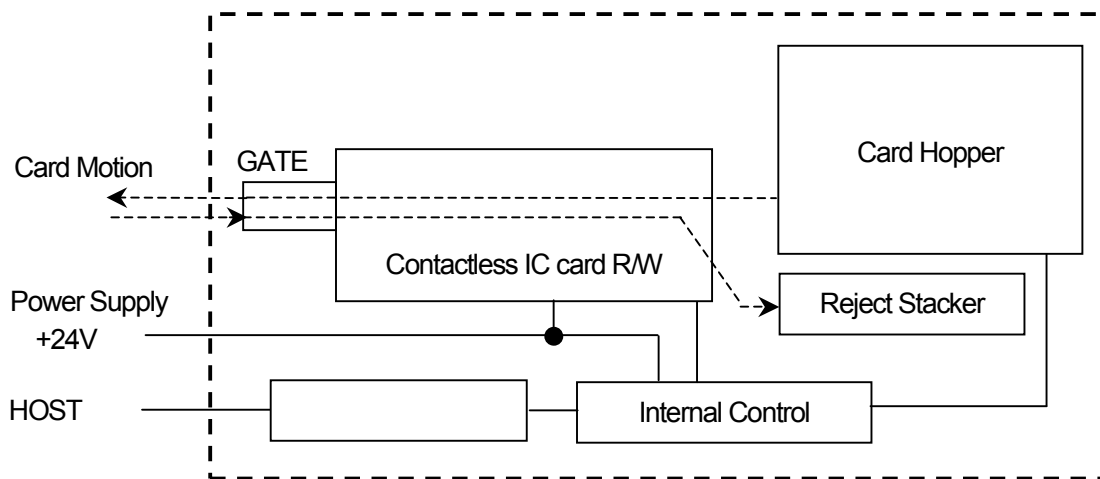


4.1   RS232C Interface

RS232C Interface circuit administrates a data transfer between a HOST computer and a SCT Unit.
Interface specifications: ASL-NP-14836-01

4.2   Internal Control

Internal control administrates movement control, data transaction and information transaction
with an outside device.

4.3   Card Hopper

Virgin Contactless IC cards are stocked here.

A pick-up hook divides the cards, and the divided card is moved forward.

(1) Stackable cards

Normal setting

Flat card (without emboss)   : Up to 45 pieces maximum

(\*In the case of card thickness ; Max 0.84mm)

(\*Effective stacker height ; 38mm)

In installing the CARD CABINET (option,)

P / N :  S34A213A01

Flat card (without emboss)   : Up to 150 pieces maximum

(\*In the case of card thickness ; Max 0.84mm)

(\*Effective stacker height ; 130mm)

P / N :  S34A214A01

Flat card (without emboss)   : Up to 200 pieces maximum

(\*In the case of card thickness ; Max 0.84mm)

(\*Effective stacker height ; 180mm)

P / N :  S34A237A01

Flat card (without emboss)   : Up to 300 pieces maximum

(\*In the case of card thickness ; Max 0.84mm)

(\*Effective stacker height ; 255mm)

P / N :  S34A215A01

Flat card (without emboss)   : Up to 500 pieces maximum

(\*In the case of card thickness ; Max 0.84mm)

(\*Effective stacker height ; 420mm)

\* Please order a necessary CARD CABINET separately from SCT.

(2) Near-end detection

Flat card (without emboss)  : About 15 pieces

(\*In the case of card thickness ; 0.76mm)

(3) End detection

SCT has a sensor which detect empty.

4.4   Gate

(1)  Insertion detection

SCT has a card insertion detection sensor.

(2)  Card eject length          More than 20 mm

(3)  Shutter             1peace, Normal closed

4.5   Reject card stacker

Verify error cards are stocked here.

(1)   Stackable cards

Flat cards (without emboss): Up to 20 pieces maximum

(*In the case of card thickness ; 0.76mm)

(2)   Rejected card detection

SCT has a sensor for rejected card detection.


4.6   Contactless IC card Reader / Writer

The wireless communication with the contactless IC card is performed here.

Contactless IC card Read / Write
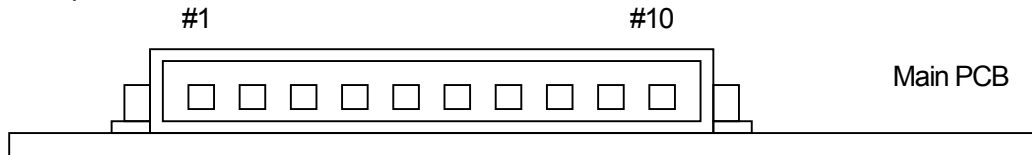
ISO/IEC 14443   Type A   and   Type B

Philips mifare   (standard 1K / 4K, ultralight, DESFire, ProX)


*Please ask our company the Contactless IC card of the schedule for use.

According to circumstances ,it is necessary to confirm the communication.


4.7   Function for extension

(1) Security and Spare Port

#1                                                    #10

Main PCB

53261-1071(MOLEX) or equivalent

| PIN | DESCRIPTION |
|---|---|
| 1 | Ground |
| 2 | External Output (OUT1). Transistor's open collector output. Voh: 30Vmax Iol: 20mAmax |
| 3 | External Output (OUT2). Transistor's open collector output. Voh: 30Vmax Iol: 20mAmax |
| 4 | External Output (OUT3). Transistor's open collector output. Voh: 30Vmax Iol: 20mAmax |
| 5 | External Output (OUT4). Transistor's open collector output. Voh: 30Vmax Iol: 20mAmax |
| 6 | External Input (IN1). |
| 7 | External Input (IN2). |
| 8 | External Input (IN3). |
| 9 | External Input (IN4). |
| 10 | +5V$\pm$10% Output. 100mAmax |

(2)   Security modules

Communication with the SAM is enabled by connecting ICT0Q0-1010[*] to SCT.

*PCB that 4 SAM sockets were assembled. (sold separately)

#11                                                    #1

Main PCB
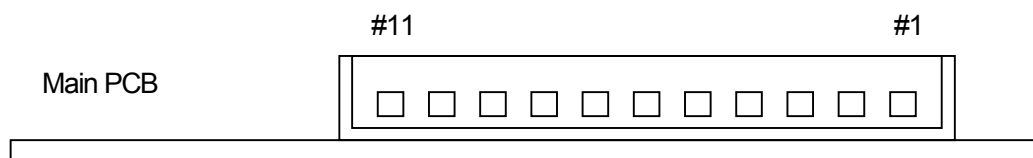
S11B-EH(LF)(SN)   (JST) or equivalent

5. Usable card

    (1) Contactless IC card

        ISO/IEC 14443   Type A   and   Type B

        Philips mifare   (standard 1K / 4K, ultralight, DESFire, ProX)

        *Please ask our company the Contactless IC card of the schedule for use.
         According to circumstances, it is necessary to confirm the communication.

    (2) Cleaning card

        Specification   : #68-76-02-51-4 (Standard type)
               or   #68-76-02-51-8 (With mag-stripe type.   P/N. EGCMC01881)

    (3) Emboss card, Transformed card confirm to the following.

      1) Emboss card

        Emboss card is available only when emboss location, standard written below.

        1)-1 Card hopping :            Embossed card is not hopped.

        1)-2 Card Insertion from front gate:    ISO 7810,7811/1-5

      2) Transformed card

        Transformed card drawing an arc evenly in long side direction or short side direction as the
        below figures show are available only when warped height, "H" is under the condition of the
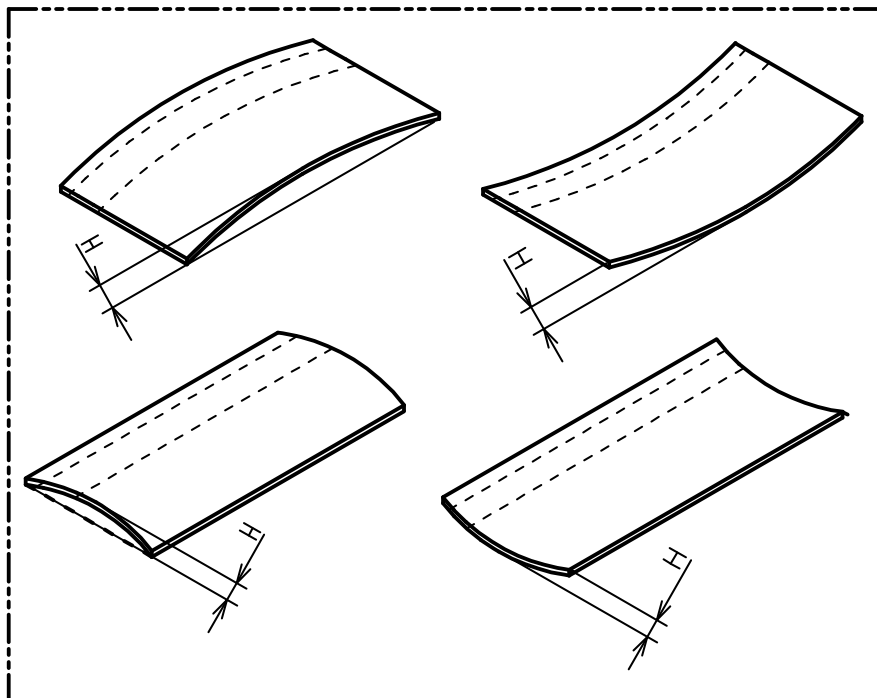        following 2)-1 and 2)-2.

        2)-1 Card hopping:       "H" <= 1.0mm
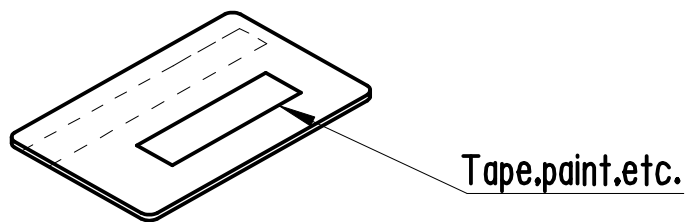
        2)-2 Card insertion from front gate
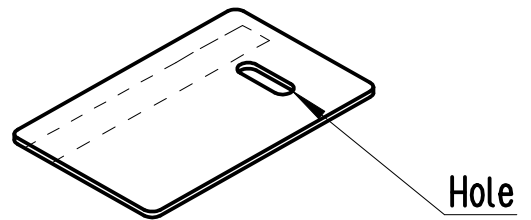
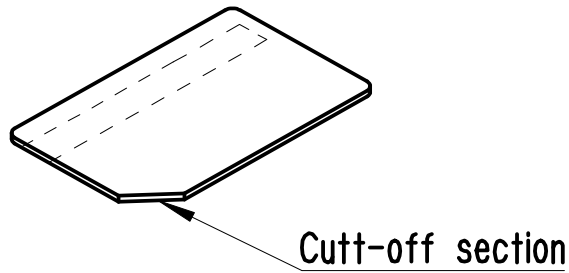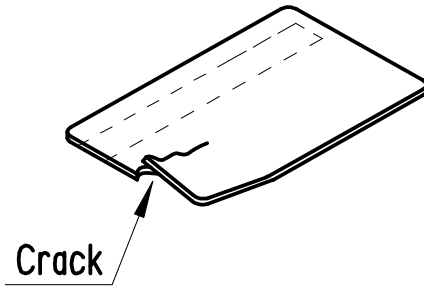            Contactless IC card read/write:    "H" <= 2.0mm
            Eject and reject:             "H" <= 3.0mm*
            *This value is not a thing guaranteeing the number of stackable rejected cards.

*Following card is not acceptable.

Folding

Crack

Cutt-off section

Hole

Tape.paint.etc.
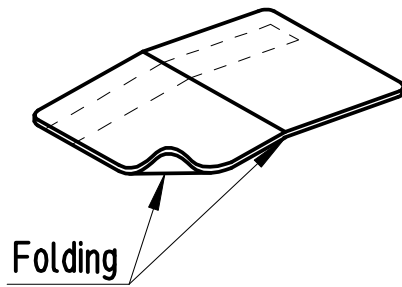
*The following besides the above figure cannot be allowed.
・ The integrated circuit chip is broken.
・ Connecting wires in the card cuts.
・ Card that doesn't apply to ISO/IEC14443 standards.

6. Physical function

  6.1 Appearance

Appearance drawing No.   : T07A814A01

  6.2 Mass

Approximately                  : 3.6±0.3Kg   (without CARD CABINET)

  6.3 Power supply requirement

Voltage                           : +24V ±1.5V DC
Ripple                             : Less than 200 mVp-p
Current consumption
    Surge current                        : 10.0A or less (10μs or less)
    Card Hopping                        : 7.0A or less
    Eject, Reject, Insertion: 5.0A or less
    Contactless R/W                    : 1.2A or less
    Waiting                               : 0.8A or less

  6.4 Dielectric strength

DC 250V, 1 min
        Measured between PCB ground & frame.
         *Divided PCB ground & frame electrically and measured it.

  6.5 Insulation resistance

More than 10Mohm at DC 250V
        Measured between PCB ground & frame.
         *Divided PCB ground & frame electrically and measured it.

  6.6 Noise

72dBA or less
(Measured at intervals of 1 meter. The momentary noise equal to or less than 1 second is not included.)

7. Environmental condition

7.1 Operating temperature/humidity
   0 ~ +50 degrees C, 10% ~ 85% RH
   No abnormality is found in the card.
   In 0 ~ +5 degrees C range, (except "warped capability")
   Wet bulb temperature : Less than 30 degrees C.

7.2 Storage temperature/humidity
   -5 ~ +50 degrees C, 8% ~ 95% RH
   Conditions:
   Storing SCT for 12 hours at the normal conditions (refer to 9.1 Note1) without any operation
   after keeping it at the above storage temperature and humidity for 96 hours without operation,
   no functional error is found.

7.3 Vibration durability
   Operating:
   Range of frequency       : 5 ~ 50Hz
   Acceleration             : 2 m/s$^2$ (0.2G)
   Sweep method             : Logarithmic sweep, 2 min/1 octave
                               X.Y.Z. each direction 20 minutes.
   No functional error is found after vibration test.
   Non-Operating:
   Range of frequency       : 5 ~ 50Hz
   Acceleration             : 2.5 m/s$^2$ (0.25G)
   Sweep method             : Logarithmic sweep, 2 min/1 octave
                               X.Y.Z. each direction 20 minutes.
   No functional error is found after vibration test.

7.4 Shock durability (within package)
   294 m/s$^2$ (30G), 11 msec
   X.Y.Z. each direction one time.
   No functional error is found after shock durability test.

7.5 EMC Capability
   FCC Part 15
   The module corresponding to FCC Part 15 is included in this model.
   The module name is ICM0M0.

7.6 Mounting posture
   Horizontal    +/- 3 degrees

8. Reliability

  8.1 Life of SCT

        300,000 transactions

        1 transaction : "Hopping → Data write/read → Eject ".

        In the following condition

        (1) Environment: In indoor standard condition (+20 $\pm$ 5 degrees C / 35 ~ 60% RH)

        (2) Mounting: Horizontal (Mounting plate on horizontal surface)

        (3) Card: Flat (No emboss, No warp, No crack)

           The test card is negotiated under separate agreement.

        (4) Cleaning: Subject to periodical cleaning made on the rollers magnetic head, and the card path at

           the cycle of once per 1,000 transactions.

        (5) Hopping Duty : 1Hoppinng/10sec

  8.2 Error rate

        (1) Card hopping

           Less than "1/1,000 transactions"

           1 transaction   : "Hopping → Reject"

           Card            : SANACARD-T5, flat

           Card hopping  : 1 cycle /10 sec.

           Environment   : In indoor standard condition

        (2) Contactless IC card Read / Write

           Less than "1/5,000 cycles"

           1 cycle        : "One communication" (and retry if needed)

           Card            : Sankyo Contactless IC card (EGC217701)

           Card feed     : 1 cycle /10 sec.

           Environment   : In indoor standard condition

△D

  8.3 M.T.B.F

        100,000 hours (Circuit board)

9. Physical level

9.1 Explanation for signals and PIN assignments

a.   RS232C Interface connector   CD5509PA1F0 (CviLux)   or equivalent

| Pin No. | Signal name | I/O | Function |
|---|---|---|---|
| 1 | NC | -- | |
| 2 | RXD(RD) | I | Receive Data |
| 3 | TXD(SD) | O | Transmit Data |
| 4 | DTR(ER) | O | Data Terminal Ready |
| 5 | SG | O | Signal Ground   (0V) |
| 6 | DSR(DR) | I | Data Set Ready |
| 7 | RTS(RS) | O | Request To Send |
| 8 | CTS(CS) | I | Clear To Send |
| 9 | NC | -- | |

The shell portion of connector is connected to the frame of SCT.
SG and FG are connected inside SCT.

b.   Power connector    22-05-1042   (MOLEX)
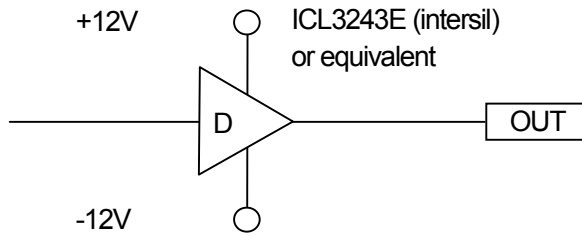
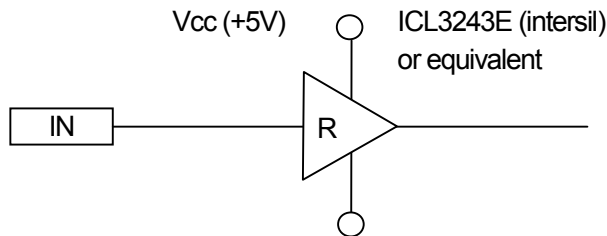| Pin No. | Signal name | I/O | Function |
|---|---|---|---|
| 1 | +24V | I | +24V DC   (main power supply) |
| 2 | PG | O | Power Ground   (0V) |
| 3 | PG | O | Power Ground   (0V) |
| 4 | +24V | I | +24V DC   (main power supply) |

SG and PG are connected inside SCT.
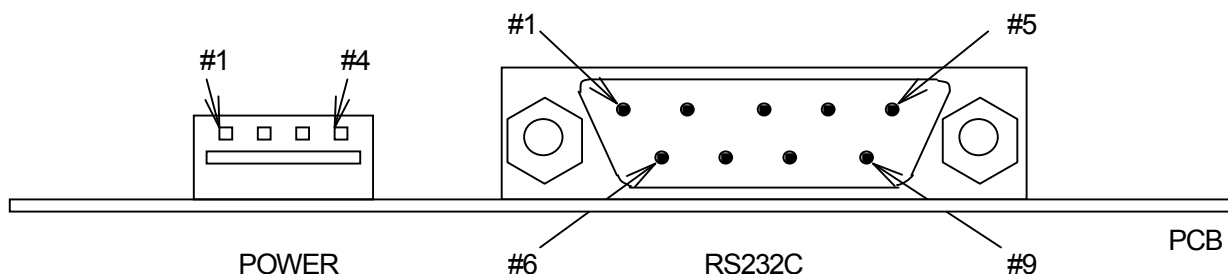
9.2 Electrical characteristics
 1) Output condition (TXD, RTS, DTR)



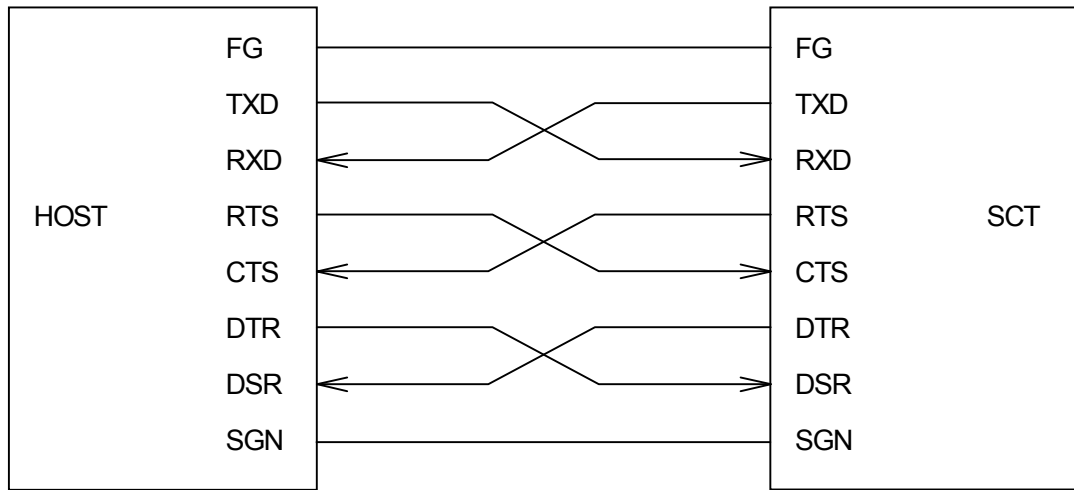 2) Input condition (RXD, CTS, DSR)



9.3 Voltage level

| Name | Space | Mark | Condition |
|---|---|---|---|
| Meaning | 0/on | 1/off | |
| Output condition | +5V ~ +15V (+9.7Vtyp) | -15V ~ -5V (-9.7Vtyp) | RL=3 K ~ 7 K ohm |
| Input condition | >=+3V | <= -3V | Rin=3 K ~ 7 K ohm |

Notes
    1) Input condition is average figure of voltage, to identify a given signal as Mark or Space.
    2) Difference between Output & Input condition is due to taking account of signal to noise efficiency during
        transmission.

9.4 Connection Example

```
┌──────────┐                              ┌──────────┐
│      FG  │──────────────────────────────│ FG       │
│      TXD │───────────╲    ╱─────────────│ TXD      │
│      RXD │◄──────────╳────╳────────────►│ RXD      │
│ HOST RTS │───────────╲    ╱─────────────│ RTS  SCT │
│      CTS │◄──────────╳────╳────────────►│ CTS      │
│      DTR │───────────╲    ╱─────────────│ DTR      │
│      DSR │◄──────────╳────╳────────────►│ DSR      │
│      SGN │──────────────────────────────│ SGN      │
└──────────┘                              └──────────┘
```

9.5 Protocol level

1) Synchronous method :    Asynchronous
2) Transmission method :    Half duplex
3) Baud rate :    9,600, 19,200, 38,400, 115,200 bps (automatic recognition)
4) Data length :    8bit + 1 parity

| ST | b0 | b1 | b2 | b3 | b4 | b5 | b6 | b7 | P | SP |
|----|----|----|----|----|----|----|----|----|---|----|

5) Stop bit :    1 bit
6) Character Code :    ASCII 8 bit code
7) Parity check method :    Vertical (Even) parity check

## 10. Notes

10.1 Note1.　Normal Conditions

Temperature　20 degrees C $\pm$ 5 degrees C

Humidity　　35%~60% RH

Mounting　　Horizontal (Mounting plate on horizontal surface)

10.2 Note2.

Details of specific evaluation method for each characteristic are described in this document,

and details of quality assurance program are negotiated under separate agreement.

10.3 Note3.

For location of the sensors, refer to the appearance drawing.

10.4 Note4.

Galvanized steel plate used in this product may show rust at its cut edges but will not interfere the functions.

10.5 Note5.

Please do not install SCT the place where temperature suddenly changes.

Ex.) The place that condensing. The neighborhood of the heater. The place where gets direct rays of the

sun. etc.

10.6 Note6.

Please connect FG of SCT to host FG or earth ground by all means.

10.7 Note7.

Please stop use in the environment that picks up the noise from the outside.

There is a possibility to influence the communication.

10.8 Note8.

With a planned Contactless IC card to use, please examine it enough.

10.9 Note9.

Our company cannot guarantee the characteristic change of the Contactless IC cards.

Ex.) Trouble of IC, Heat

10.10 Note10.

About the FCC declaration of conformity

FCC WARNING

Changes or modifications not expressly approved by the party responsible for compliance could

void the user's authority to operate the equipment.

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.

$\triangle$C

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.

$\triangle$E

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.
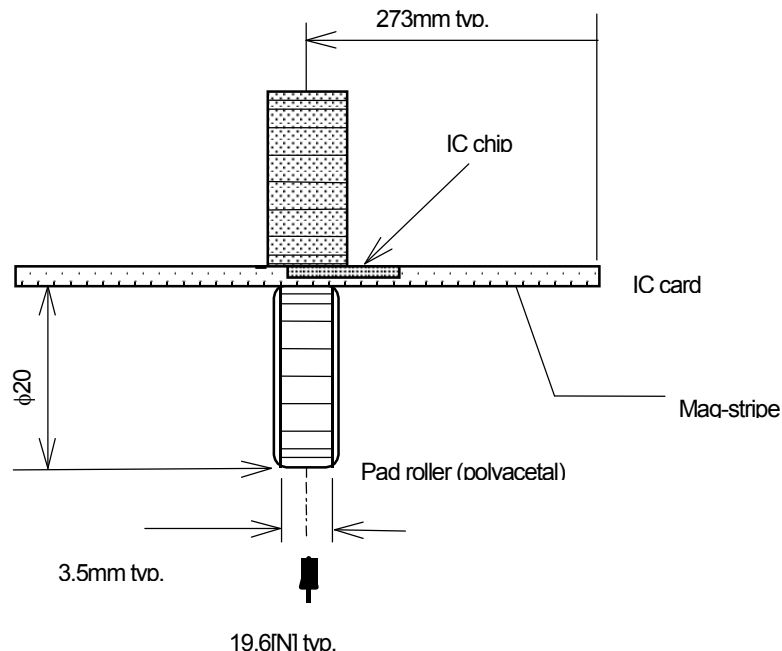
10.11 Note11.

The area of IC chip may overlap the card-driving roller in SCT.
The card driving mechanism gives pad roller pressure onto IC card chip.
The pad roller is located in the opposing side of the card driving roller.
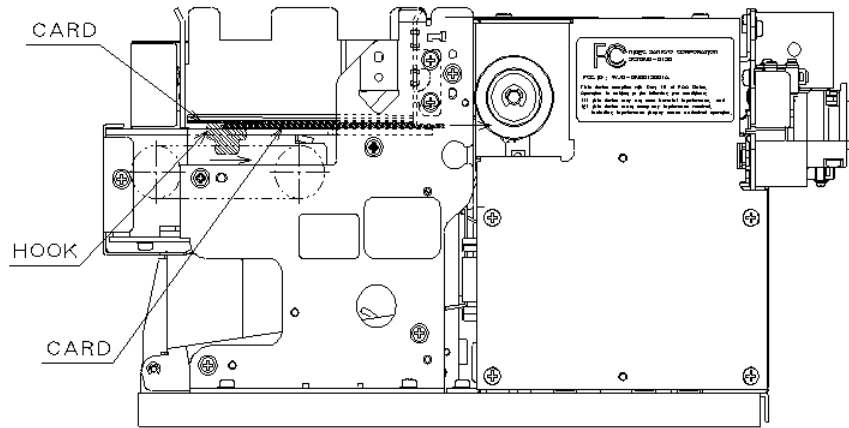The IC cards must be endurable against the aforementioned pressure.

The pressure given onto the IC cards are as follows;



10.12 Note12.  $\triangle$D

Because a hook of SCT passes the backside of the card, there is the case that a slight scratch is added
to the backside of the card by the hook.

CARD

HOOK

CARD

ANNEX 1    Sensor location

Near End Sensor

Hopping Sensor (End Sensor)

LS-3

LS-2

LS-1

LS-0

SW2

SW1

Hopping Kicker Sensor          Stacker Sensor