SPECIFICATION

FOR

MAGNETIC CARD READER

(Manual type)

MODEL

ＺＵ‐９Ａ３６Ｂ１１

JUL. 2004

Date : _____

Signature for approval
Read and agreed by _____

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.

MATSUSHITA INDUSTRIAL INFORMATION EQUIPMENT CO., LTD.
OSAKA   JAPAN

Revised Record

Date	Document No.	Contents of revision	Page

2001.10.15	MES-DG60C133A	2. Constructions
		    /CLD signal was added.
		4.2 Pin configuration
		    /CLD signal (13pin) and Note were added.
		5.1 Explanation of input/output signal
		    (4) /CLD was added.
		5.2 Output signal timing chart
		    /CLD signal was added.
		6. Input / output signals
		    /CLD signal was added.
		6.1 Signals for card sensing
		    /CLD signal was added.
			1
			
			2
			
			3
			
			3
			
			4
			
			4

2004. 07.01	MIS-DG60C133B	· Added a Note
		
		· 3.5 Specification of Magnetic reading
		    Reading speed
		    15 cm/s ~ 120 cm/s→15 cm/s ~ 70 cm/s
		    (Recording level :more than 90%,
		        Jitter: less than 5 %)
		    The reason for changing:
		        Improvement for noise-proof
		        Changed two resistance in magnetic
		        decording circuit. 2.2 k ohm → 12 k ohm
			ì
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In case there is any contradiction appeared based on technical standard change or update etc., ourspecifications shall take precedence over such change/update.

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Magnetic Card Reader

1. Abstract

Magnetic Card Reader (ZU-9A36B11) consists as follows.

(1) Decoding circuit for magnetic stripes.
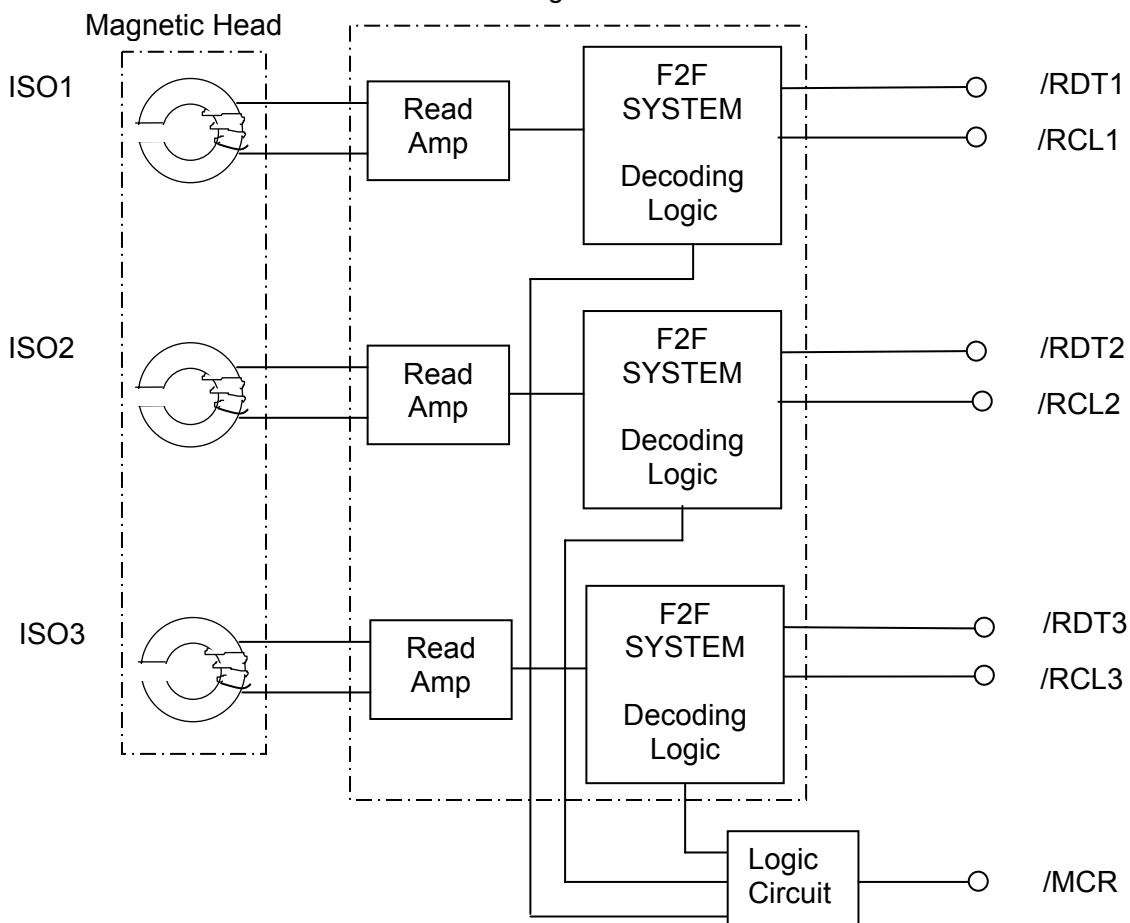(2) Magnetic card stripe based on ISO 7810, 7811.

Card standard	ISO7810, ISO7811		
Track used	Track 1st	Track 2nd	Track 3rd
Recording method	F2F	F2F	F2F
Recording density	210 BPI	75 BPI	210 BPI
Recording capacity	79 characters (7 bit code)	40 characters (5 bit code)	107 characters (5 bit code)

2. Constructions

Card detect switch

Decoding circuit

Magnetic Head
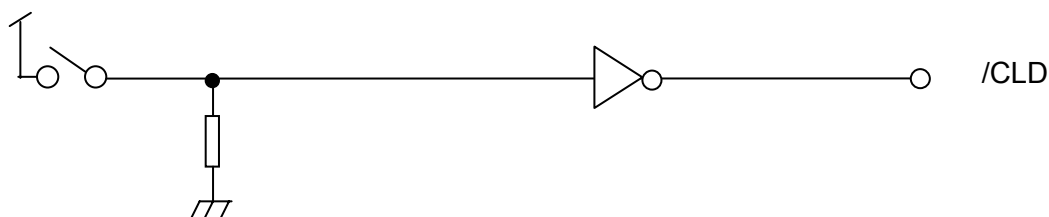
3. Specifications

3.1 Physical dimensions
Dimensions   : (W) 73 mm $\times$ (H) 12.6 mm $\times$(D) 108.5 mm
Mass   : Approx. 50 g

3.2 Power source
Voltage   : DC 5.0 V (tolerance ±10%), Ripple 250 mV p-p
Current   : Max. 15 mA

3.3 Interface
Magnetic card   : Direct output of decoder IC (/RCL, /RDT)

3.4 Environments
Operating temperature   : 0 °C ~ +55 °C
Storage temperature   : -20 °C ~ +60 °C
Operating humidity   : 10 % ~ 90 % RH (non condensing)
Storage humidity   : 5 % ~ 95 % RH (non condensing)

3.5 Specification of Magnetic reading
Reading direction   : Insertion / Ejection
Life of magnetic head : 300,000 operations
   Condition: In a clean office room. In dump or dusty atmosphere, the life may be 1/3 to 1/5 of the above figure.
Core width   : 1.4 mm
Reading speed   : 15 cm/s ~ 70 cm/s
                        (Recording level: more than 90%, Jitter: less than 5%)

4. Connector and signals

4.1 Connector : Molex 52745-1590 (15 pin)

4.2 Pin configuration

| No	Signal name	Contents	Direction
1	FGND	Frame Ground	
2	SGND	Signal Ground	
3	SGND	Signal Ground	
4	/RDT1	Magnetic read data 1	Out
5	/RCL1	Magnetic read clock 1	Out
6	/RDT2	Magnetic read data 2	Out
7	/RCL2	Magnetic read clock 2	Out
8	/RDT3	Magnetic read data 3	Out
9	/RCL3	Magnetic read clock 3	Out
10	/MCR	Magnetic Card Running	Out
11	N.C.	No connected	
12	N.C.	No connected	
13	/CLD	Card Loaded	Out
14	VCC	Power, 5 VDC	
15	VCC	Power, 5 VDC	

Note: The /CLD line will be low when a card is seated in the card reader and high otherwise.

5. Timing chart

5.1 Explanation of input/output signal (Magnetic reading)

(1) /MCR : The /MCR line will be Low when a magnetic card is running in the card reader and High otherwise.

(2) /RCL(READ CLOCK) : This is used to sample the data line by it's falling edges. The time relationship of the clock with respect to the order signals is shown in Figure 5.2.

(3) /RDT(READ DATA) : The moment /RCL change from High to Low ; /RDT is "1" when the /RDT line is Low , and / RDT is "0" when the /RDT line is High. (Negative logic)

(4) /CLD : The /CLD line will be low when a card is seated in the reader and high otherwise.

5.2 Output signal timing chart
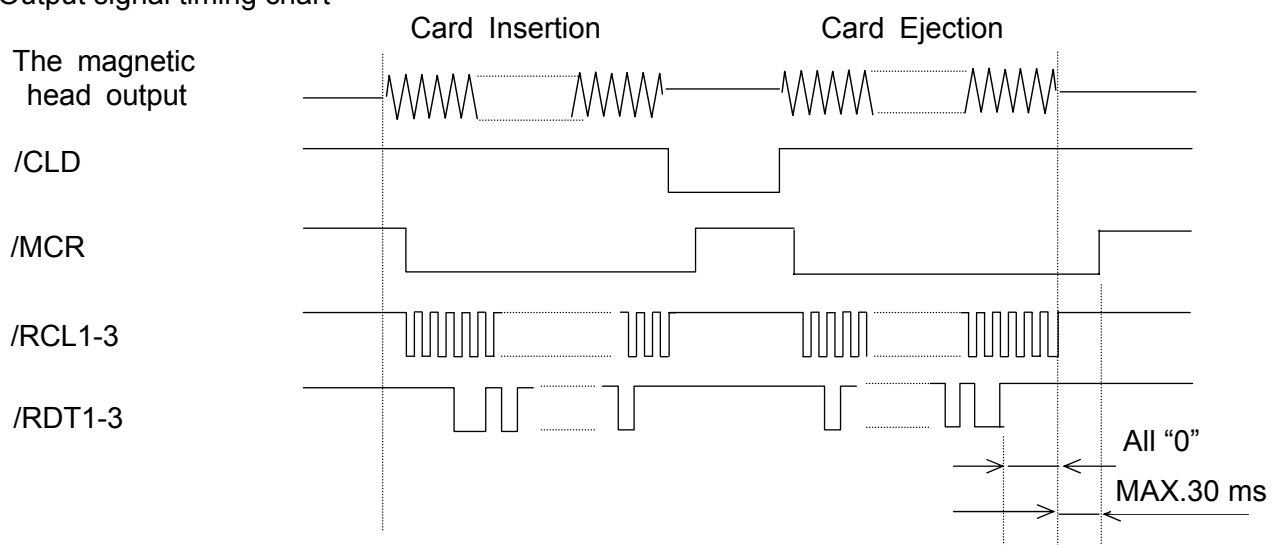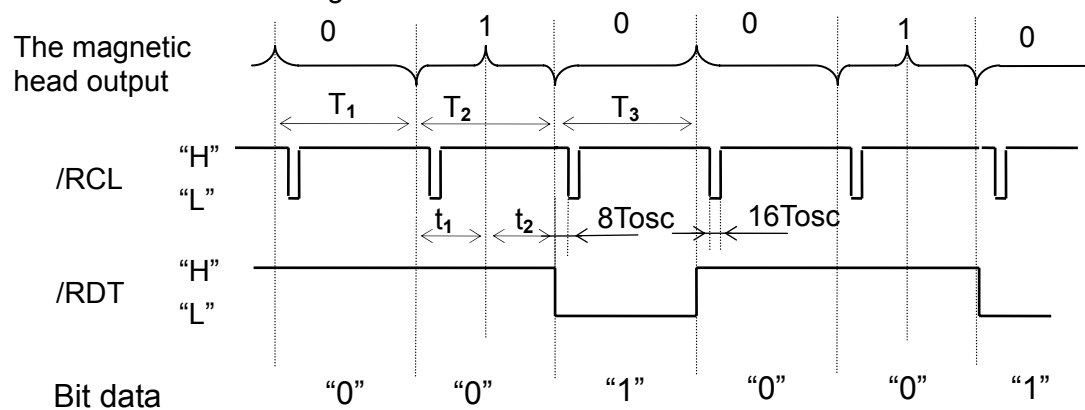

/RCL & /RDT Detail timing chart

Fig 5.2 Timing sequence (Detail)

Tosc:210BPI → 0.48 μ S
75BPI → 1.2 μ S

Bit data of magnetic head output appear as one bit delayed.
When the jitter of the magnetic head output is 0 % , the following equation is satisfied.

$$T=T_1=T_2=T_3 , \quad t_1=t_2$$

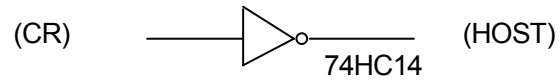$$T(s) = \frac{2.54 \text{ (cm/inch)}}{\text{Recording density (BPI)}} \times \frac{1}{\text{Card speed(cm/s)}}$$

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6. Input / output signals

The input/output signals for this magnetic card reader consist of /RDT1, /RCL1, /RDT2, /RCL2, /RDT3, /RCL3, /MCR, /CLD.

6.1 Signals for card sensing
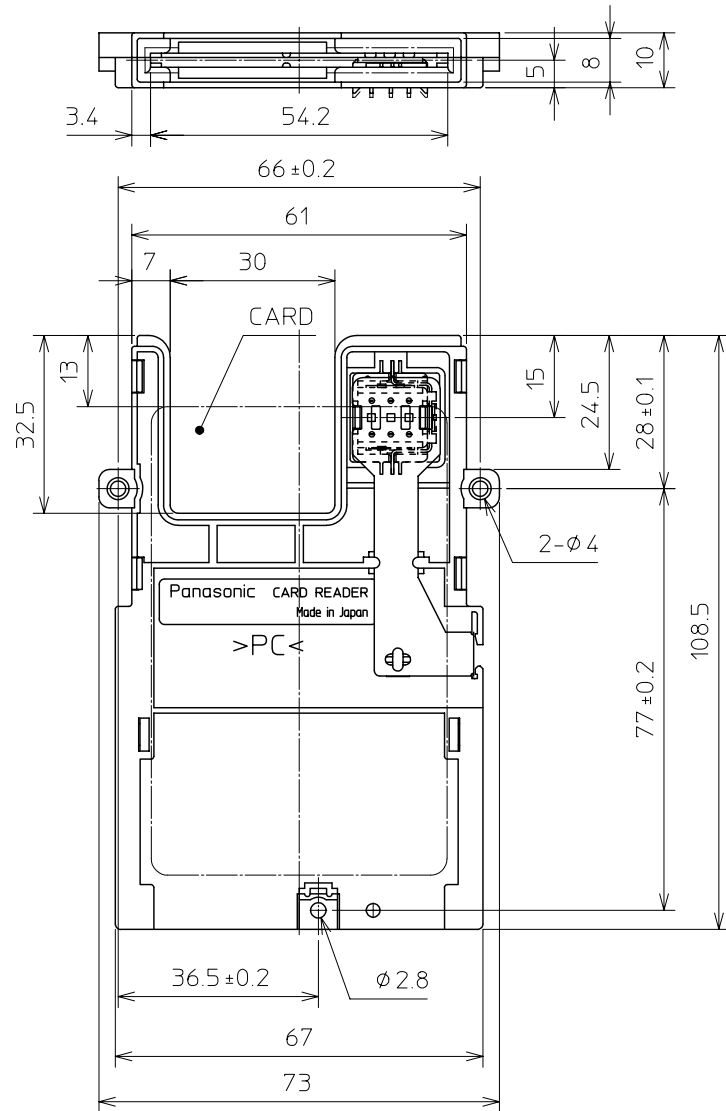
Output signals: /CLD, /MCR
Equivalent to

(CR) ———————▷◦——————— (HOST)
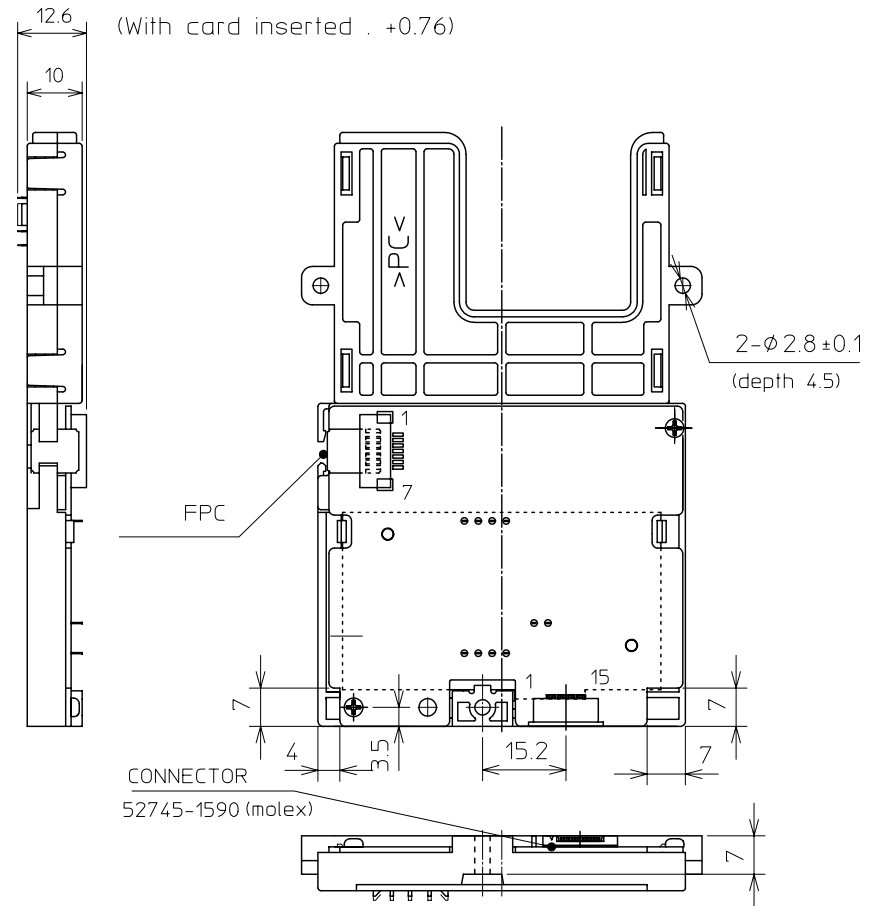74HC14

6.2 Signals for magnetic reading

Signal Name	High Level ("0")	Low Level ("1")
/RCL1, /RDT1 /RCL2, /RDT2 /RCL3, /RDT3	4.0 V min. (I_{OH} = - 1.0 mA)	0.4 V max. (I_{OL} = 5.0 mA)

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7. Appearance

General Tolerance:±0.3

Unit:mm

(With card inserted . +0.76)

CARD

Panasonic CARD READER
Made in Japan

>PC<

2-Φ4

2-Φ2.8±0.1
(depth 4.5)

>PC<

FPC

CONNECTOR
52745-1590 (molex)
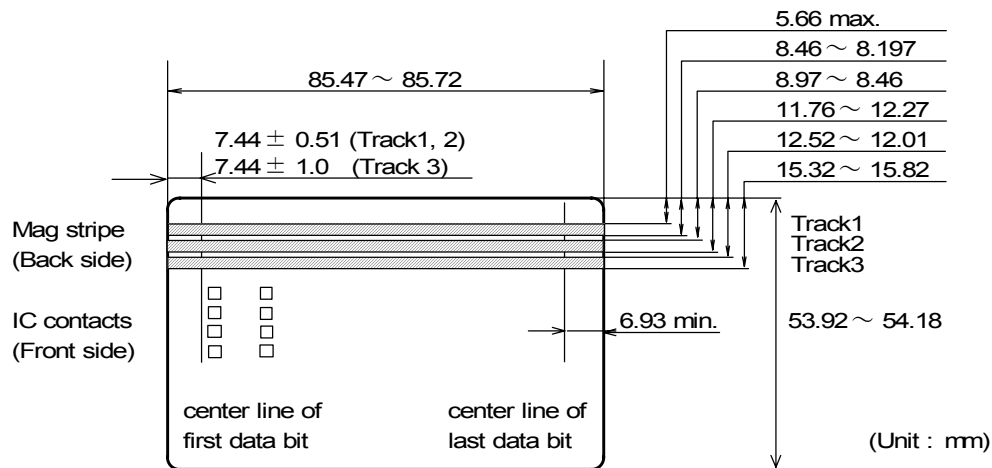
8. Card specification

Materials and dimensions of the card should be submitted to ISO standards.
But defined items in this specification are prior to these standards.

[unit : mm]

8.1 Physical characteristics

(1) Thickness   : 0.76 mm (tolerance $\pm$ 0.08 mm)
(2) Transformation   : 2.5 mm max.
                           (Include relief height of embossed characters)

8.2 Magnetic characteristics

(1) Coercive force (Hc)   : 2.4 x 10^4 A/m ~ 2.4 x 10^5 A/m
(2) Residual flux (ϕ r) : 1.25 x 10^{-8} Wb/cm (tolerance $\pm$ 0.15 x 10^{-8} Wb/cm)
(3) Square ratio (ϕ r/ϕ m) : More than 0.70

9. Precautions

Keep the following precautions when using this unit.

9.1   Handling
   (1) Do not drop or give excessive shocks to this unit.
        (There are a few cases that card lock mechanism will be released when the excessive shock is given.)
   (2) Do not disassemble this unit.

9.2   Cautions

   9.2.1   Card

   (1) Use specified card (ISO).
   (2) Store the card carefully so as not to soil, injure or deform it.
        In particular, solid deposit on the magnetic stripe surface may result in a trouble.

   9.2.2   Cleaning

   (1) Clean the magnetic head by periodically passing a cleaning card.
        For example, in a clean office room, pass the cleaning card about once a week. If the magnetic head is heavily stained, clean the head by soaking the felt part of the cleaning card in alcohol properly and pass the card. For example, in the case that the card readers are used in the environment full of dust, please make a cleaning of the card reader with a cleaning card with alcohol everyday.

        Example of cleaning card: C-90M of Dainihon Printing
                                    (life: 100 to 200 passes)

   (2) If some kind of oil adheres to the parts for transferring cards, card transfer will be unstable. Please remove the oil with a cleaning card with alcohol.

   9.2.3   Installation

   (1) Do not install the card reader in dusty, hot or damp place, or near magnetic field or object generating inductive noise (printer, LED display unit, CRT, etc.).
        Do not use the unit in a dusty place, otherwise the reading and writing accuracy may be deteriorated.
        Keep the unit away from objects generating magnetism, which may cause read errors and may damage the magnetic card data.
   (2) Do not touch the printed circuit board with bare hand.
        Note particularly static electricity.
   (3) Do not supply power from other outlet than connector terminal. Pay special attention to the polarity of power source and wrong connection of connector.
   (4) Do not use the unit in a place where it is exposed to sunlight directly or it is splashed by water.

   9.2.4   Others

   (1) Check the noise, static electricity, etc., with the card reader being incorporated in the equipment.
        Noise from the power supply may cause the reading errors. Measures to reduce the noise from power supply should be made for the equipment the card reader is built in. It is especially efficient to put a noise-filter in the AC input line.

(2) The guaranteed temperature for operation range is 0 °C ~ 55 °C, and humidity range is 10 % ~ 90 % RH.
   Do not use the unit if condensation gathers on it.
   We recommend you to use the card reader under the environmental condition of temperature 10 °C ~ 40 °C which is the best for transferring cards and reading data.
   Especially, in the condition of low temperature, provide heating system separately to warm up card reader.

(3) A shutter is not built in this card reader. In the case that the card readers are used in the environment full of dust, the lifetime of the magnetic head, IC contacts and mechanism for transferring cards will decrease.
   So in such a hard environment we recommend you to use shutter types.

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