

**MOTORIZED INSERTION TYPE
MAG./ IC CARD READER/ WRITER
SLIM KDR-5XXX**

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1. INTRODUCTION

This model is a motorized insertion slim type magnetic stripe and IC card reader with TTL interface that is to decode data on triple (dual, single) track of magnetic stripe card and IC card in accordance with ISO 7811/7816. (Please refer to model Information table about each functional option.)

2. MODEL INFORMATION

KDR -

5	X	X	X
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interface Type	Function	Input Voltage&Capture	Track Position	Option
R : TTL	5 : Read	3:12V Without Capture 4:12V With Capture 6:24V Without Capture 8:24V With Capture 9:Customized Model	0 : Without Magnetic Head 1 : ISO 1 2 : ISO 2 3 : ISO 3 5 : ISO1/ISO2 6 : ISO2/ISO3 8 : ISO1/ISO2/ISO3	0 : Without Shutter 1 : With Shutter 6 : With IC Contact (8pins) 7 : With IC Contact (8pins), Shutter 8 : With IC Contact (16pins) 9 : With IC Contact (16pins), Shutter

3. STRUCTURE

KDR-5XXX is mainly composed of the mechanical part and electronic part.

3.1 Mechanical part

The mechanical part is mainly composed of the following parts.

- 3.1.1 Body
- 3.1.2 Card feeding rollers
- 3.1.3 DC motor
- 3.1.4 Magnetic head
- 3.1.5 IC contact module (option)
- 3.1.6 Shutter (option)

3.2 Electronic part

- 3.2.1 Read amplifier circuit for all tracks.
- 3.2.2 Motor Drive circuit for card feeding.
- 3.2.3 IC card control circuit. (option)

4. SPECIFICATIONS

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4.1 Model Information

MODEL	KDR-5X1X	KDR-5X2X	KDR-5X3X
	KDR-5X5X		
		KDR-5X6X	
	KDR-5X8X		
	Track used	ISO 1	ISO 2
Card Standard	ISO – 7811 /7816		
Reading method	F2F (FM)		
Reading density	210 BPI	75 BPI	210 BPI
Reading capacity	79 characters (7bit code)	40 characters (5bit code)	107 characters (5bit code)

NOTE

- * IATA — International Air Transportation Association (ISO 1)
 - * ABA — American Banks Association (ISO 2)
 - * MNTS — Mutual Institutions National Transfer Systems (ISO 3)
- Materials and dimensions of the card should comply with ISO standard but defined spec in this specification is prior to these standards.

4.2 Function

- 4.2.1 Card feed : Bi-directional card movement
- 4.2.2 Reading : Forward
- 4.2.3 Card feeding control : External control
- 4.2.4 Compatibility : Cards and installation
- 4.2.5 Installation of the transport : Horizontal direction
- 4.2.6 Card feeding speed : 380mm / sec \pm 20 %
- 4.2.7 Magnetic Head :
Track width : Reading — 1.4mm

4.3 For machine compatible with IC card (optional)

- 4.3.1 Applicable IC cards :
Card size : ISO 7816 eD - 1e type
Contact location : one of two locations shown in figures 1 of ISO 7816/2
- 4.3.2 Ability to add IC card : By adding assembly unit and changing main PCB.

4.4 Environment Requirements

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4.4.1	Operation Temperature Humidity	+5°_50°, .0%_90% RH	In 0°_5°.range, all specifications but "warped capability" to be satisfied.
4.4.2	Storage	-20°_70°, .0%_95% RH	After 12 hours since returning to ordinary environments, no functional error to be found.
4.4.3	Vibration Durability	Amplitude 1mm with in 2G or less 10_50Hz X,Y,Z each direction 30min	No functional error to be found after vibration test.
4.4.4	Shock Durability	30G, 11msec in X,Y,Z each direction one time	No functional error to be found after shock durability test. (Direct shock to MSRW, without packing.)

4.5 Physical Characteristics

4.5.1 Dimension

Model No.	Dimensions (mm)			Remark
	W	D	H	
KDR-5XX0	80	116	35	Without shutter
KDR-5XX1	80	135	35	With shutter

4.5.2 Weight

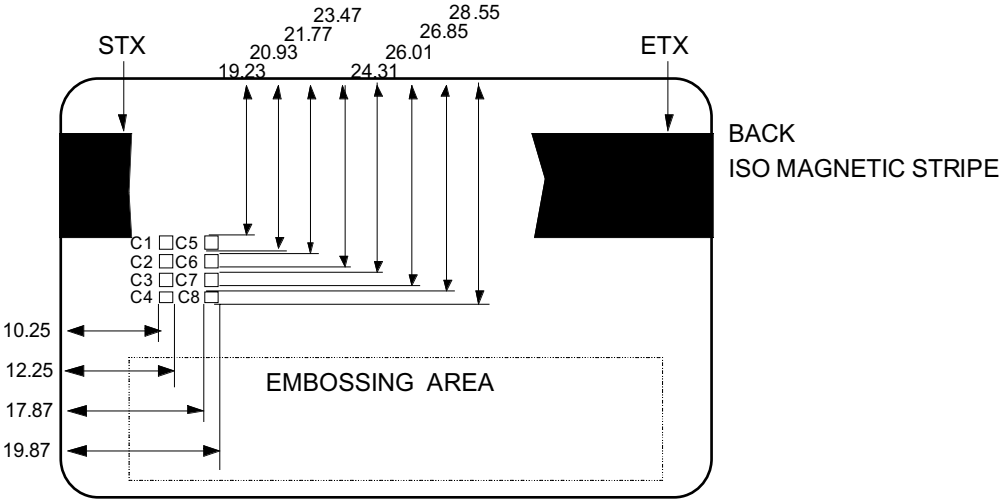
Model	Weight	Remark
KDR-5XXX	0.5Kg	Main Body+Contact Module+IC contact Module

4.5.3	Reading method	By F2F modulation, to ISO 7811/2 €Two frequency coherent phase recording€
4.5.4	Contact location of applicable IC card	One of following two locations. ISO-7816 STD type card contact location : see fig 1 of ISO 7816/2 CP-8 type card contact location : see fig 1 of ISO 7816/2

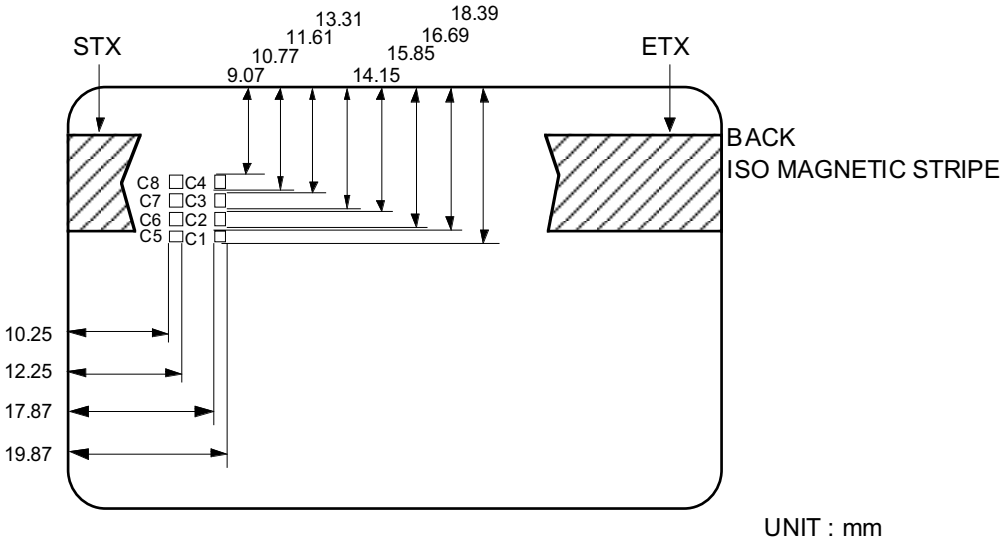
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STANDARD TYPE MAGNETIC STRIPE & IC CARD

ISO-7816 STD TYPE IC CARD



CP-8 TYPE IC CARD



UNIT : mm

Figure-1 IC CARD FIGURE

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- 4.5.5 Power Requirement
- 4.5.5.1 Input Voltage : 24V DC \pm 5%, 5V DC \pm 5%
- 4.5.5.2 Power Consumption.
Motor Starting or Reversing. : Less than 600mA (24V DC, 50msec)
- Card Feeding. : Less than 200mA (24V DC)
Card Reading : less than 50mA (5V DC)
- 4.5.5.3 Ripple : Less than 200m Vp-p (24V DC)
Less than 50m Vp-p (5V DC)

- 4.6 Life and Error Rate (at indoor conditions)
- 4.6.1 Lifetime of the head 1,000,000 passes One pass stands for one direction movement in forward or backward
- 4.6.2 Magnetic card Endurable more than 1,000 passes
- 4.6.3 Magnetic card Error rate Less than 1/200 times per each track
- 4.6.4 IC card Error rate Less than 1/200 cycles
1 cycle : including repetitions of card insertion, contacting, data sending/receiving and card ejection.

4.7 Warped card

This condition refers to the roundly warped card with a height ($\epsilon H \epsilon$) (from the top of the convex surface to the base of the warped edge)

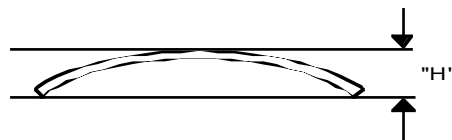


Figure - 2

- * "H" = 3.0mm maximum for without card jamming.
2.0mm maximum for availability to read.

5 . BLOCK DIAGRAM

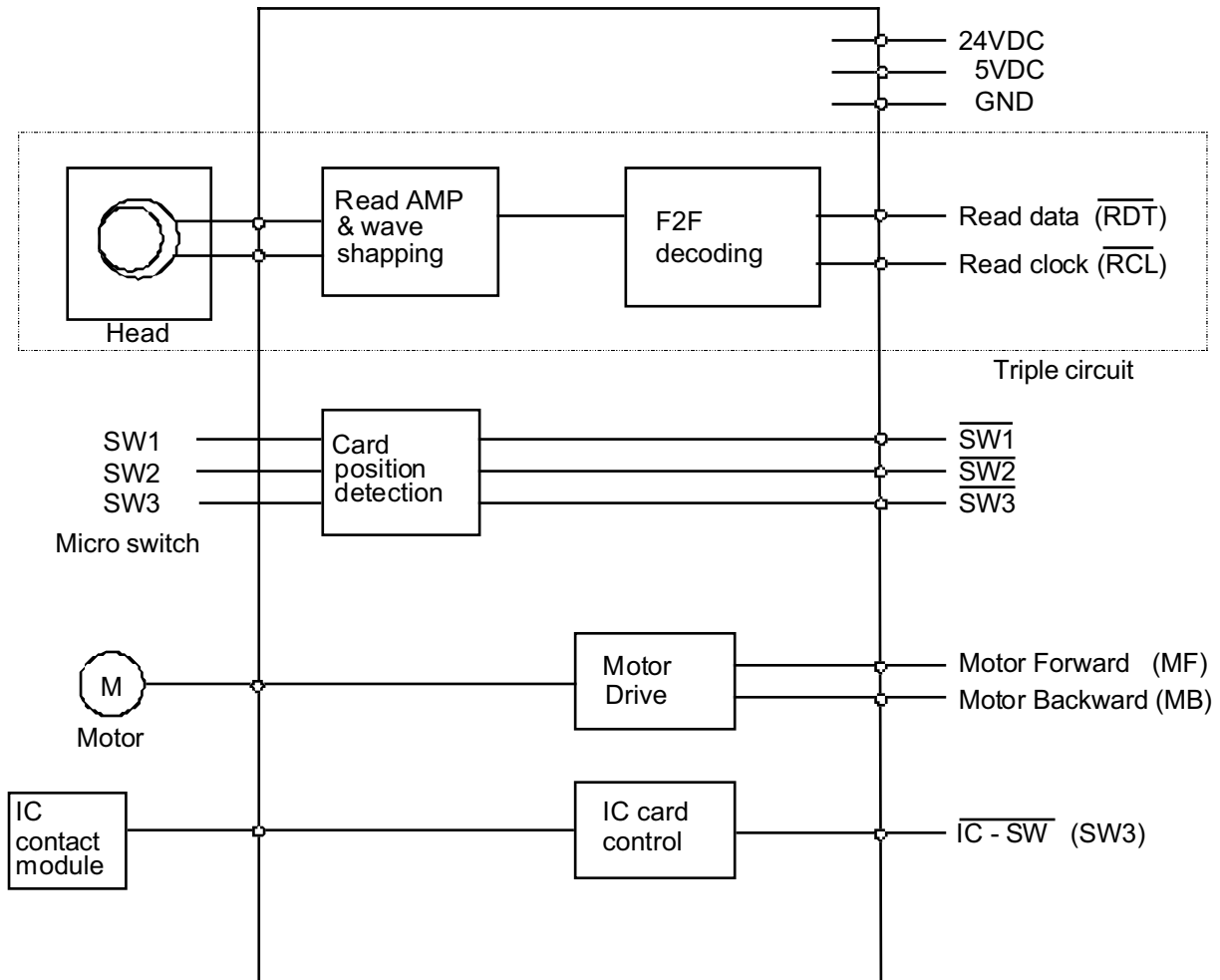


Figure-3

6. PIN CONNECTION

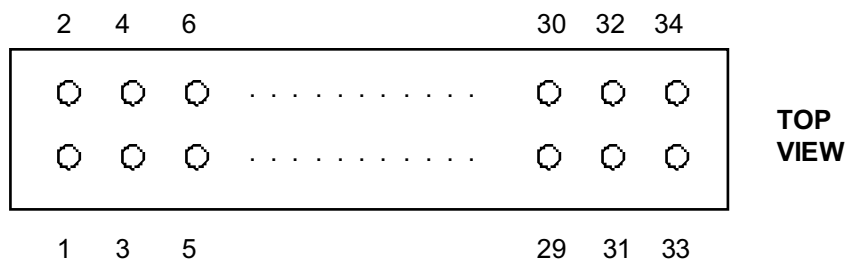
6.1 Pin Assignments (KDR - 5XXX)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O	Remark
1	VDD	I	2	VDD	I	RDT n
3	S-GND	I	4	S-GND	I	RCL n

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5	PRE	O	6	SH-SW1	O	n = 1 : ISO-1 2 : ISO-2 3 : ISO-3 * Applicable signal is subject to each model spec SH-SW1 :Shutter Photo Sensor SH-SW2 :Shutter Micro Switch PRE : Shutter head signal SH-SOL : Shutter solenoid signal * Only VDD(24V or 12V) used Without VCC (option) BUSY:Card sensing signal
7	SW1	O	8	SW2	O	
9	SW3	O	10	BUSY	O	
11	MB	I	12	MF	I	
13	-	-	14	-	-	
15	-	-	16	-	-	
17	-	-	18	RDT2	O	
19	RCL2	O	20	-	-	
21	-	-	22	-	-	
23	RDT1	O	24	RCL1	O	
25	-	-	26	-	-	
27	-	-	28	RDT3	O	
29	RCL3	O	30	VCC	I	
31	VCC	I	32	SH-SW2	O	
33	SH-SOL	I	34	CA-SOL	I	

6.2 Connector pin assignment



Pin Configuration

Figure-4

6.3 CONNECTOR

Model Number : 2.54X 2.54mm PIN HEADER CONNECTOR

7. SIGNALS & TIMMING CHART

The input/output signals for KDR-5XXX consist of : RDT, RCL, SW1, SW2, SW3, MF, MB, CA-SOL, and BUSY

7.1 Input/Output Circuits

7.1.1 Input circuit

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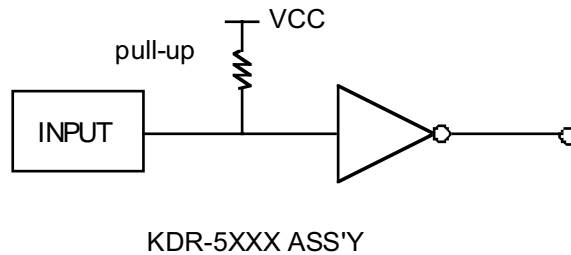


Figure-5

- . C-MOS gate
- . TTL level input buffer with pull-up
- . Input signals

7.1.2 Output circuit

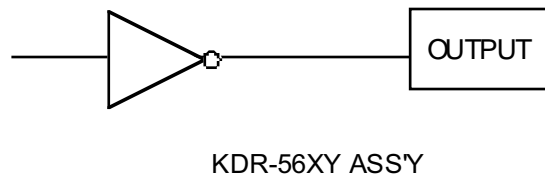


Figure-6

- . C-MOS gate
- . Tristate output buffer (8mA)
- . Output signals

7.2 Signal Level

	High Level	Low Level
Input	2.0V min.	0.5V max.
Output	2.4V min. ($I_{OH} = -8Ma$)	0.4V max. ($I_{OL} = 8mA \text{ max.}$)

7.3 Input / Output Cable

- For Signal Cable length : Less than 0.5m
- For +24V : Less than 0.2B Ξ
- For Gnd : Less than 0.1B Ξ

7.4 Input / Output Signals

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Name of Signal	Explanation	Option or Standard	Remarks
RDTn	This is used to sample the data line by its falling edges. n = 1 : ISO 1 n = 2 : ISO 2 n = 3 : ISO 3	Provided differently for each model	RCLn \uparrow x RDTn \downarrow = Data 0 RCLn \uparrow x RDTn \downarrow = Data 1
MF	Instruction to cause forward rotation of card transfer motor	Provided as standard	
MB	Instruction to cause reverse rotation of card transfer motor		
	Truth table for transfer motor control		
	Mode	MB	MF
	Forward transfer	H	L
	Backward transfer	L	H
	Brake	L	L
	Brake	H	H
RCLn	Clock signal for reading corresponding to track of magnetic card n = 1 : ISO 1 n = 2 : ISO 2 n = 3 : ISO 3	Provided differently for each model	
SW1	-Micro switch to check card inserted. -Located in front of card reader	Provided as standard	
SW2	-Micro switch to check presence of card -Located in the middle of card reader	Provided as standard	
SW3	-Micro switch to check card is fully inserted -To check ic card contact -Located in rear of card reader	Provided as standard	L : Contact H : Non-Contact
CA-SOL	This signal is used to drive the card capture solenoid	Option	L : solenoid On H : solenoid Off

7.5 For IC card signal

Following signals are provided as standard when machine is compatible

Name of signal	Explanation	Option or standard	Input or output	Remarks
VCC	Extension line from IC card VCC terminal. * IC card location : C1	Standard	•••••	ISO-7816 /2 /3

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RST	Extension line from IC card's RESET terminal. Location : C2	Standard	Input
IO	Extension line from IC card's INPUT/OUTPUT terminal. Location : C7	Standard	Output
GND	Extension line from IC card's GROUND terminal. Location : C5	Standard	•••••
VPP	Extension line from IC card's PROGRAM terminal. Location : C6	Standard	Input
CLK	Extension line from IC card's CLOCK terminal. Location : C3	Standard	Input
RES1	Extension line from IC card's RESERVE terminal. Location : C4	Standard	Reserve
RES2	Extension line from IC card's RESERVE terminal. Location : C8	Standard	Reserve

7.5.1 Ic contact connector : MOLEX-53015-08

Pin no.	Signal	I/O	Remark
1	VCC	-	IC VCC
2	RST	I	IC RESET
3	CLK	I	IC CLOCK
4	RES1	-	RESERVE
5	GND	-	GROUND
6	VPP	I	IC VPP
7	I/O	O	IN/OUTPUT
8	RES2	-	RESERVE

7.6 Input / output signal time chart

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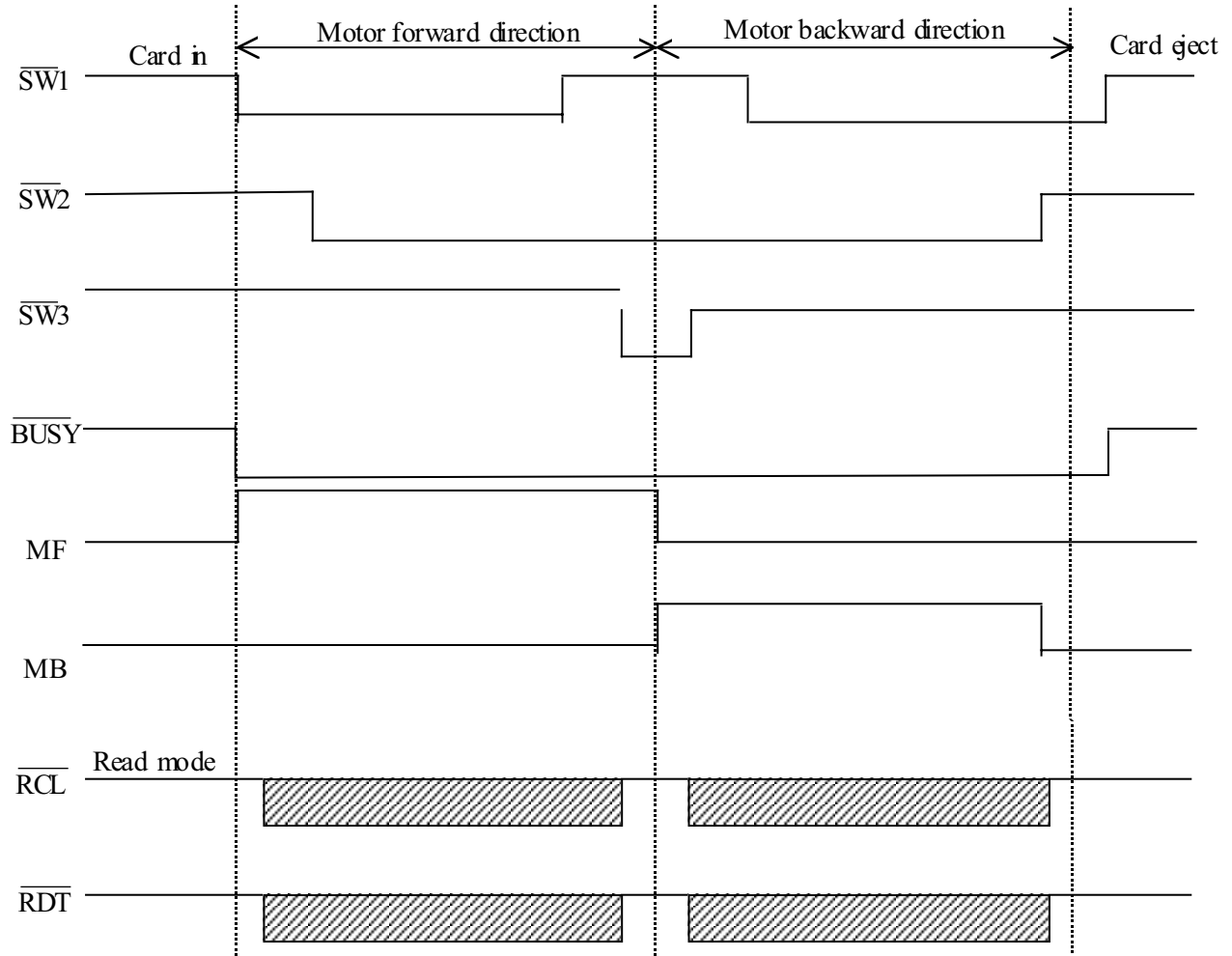
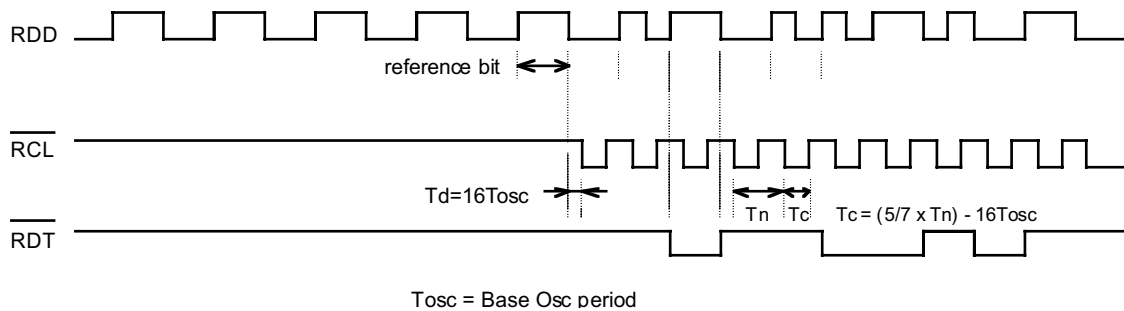


Figure 7

7.7 Read timing



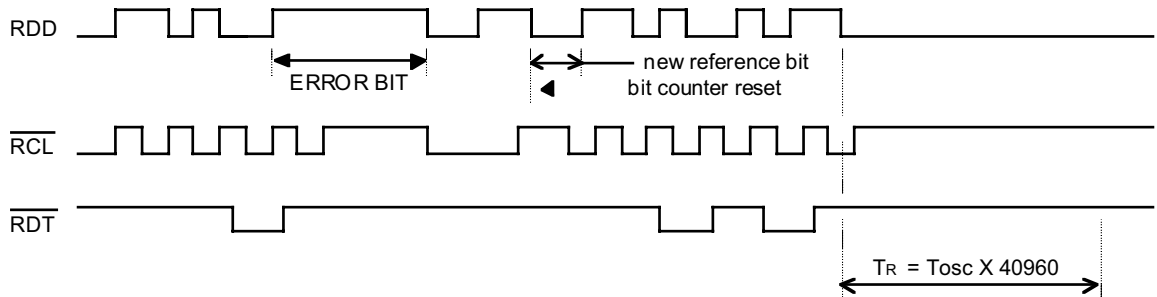


Figure-8

DETAIL TIMING (RCL)

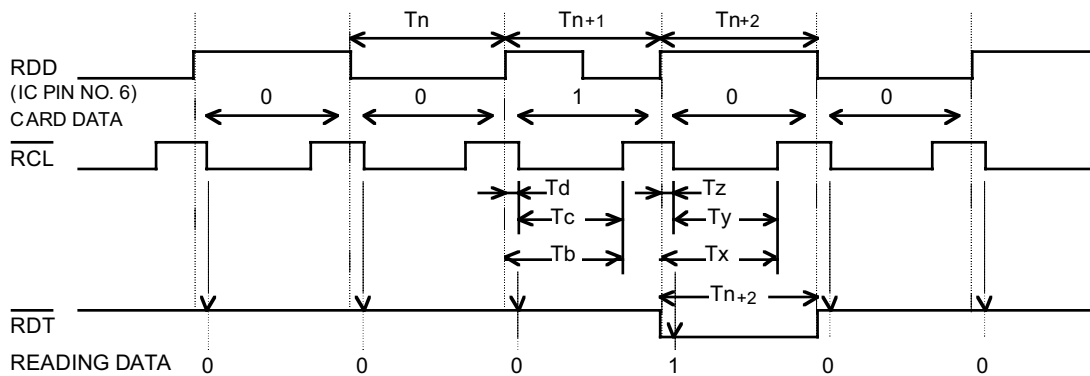


Figure-9

T _{n+1}		T _{n+2}	
T _d	16 T _{osc}	T _z	16 T _{osc}
T _c	(5/7 x T _n) - T _d	T _y	(5/7 x T _{n+1}) - T _z
T _b	5/7 x T _n	T _x	5/7 x T _{n+1}

CLS generation (SELECT input voltage is low)

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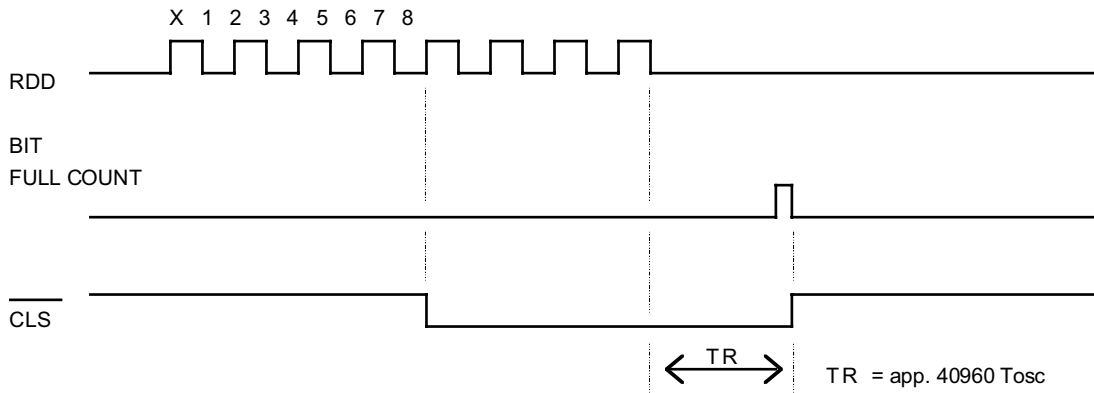


Figure-10

7.8 IC CARD Timing

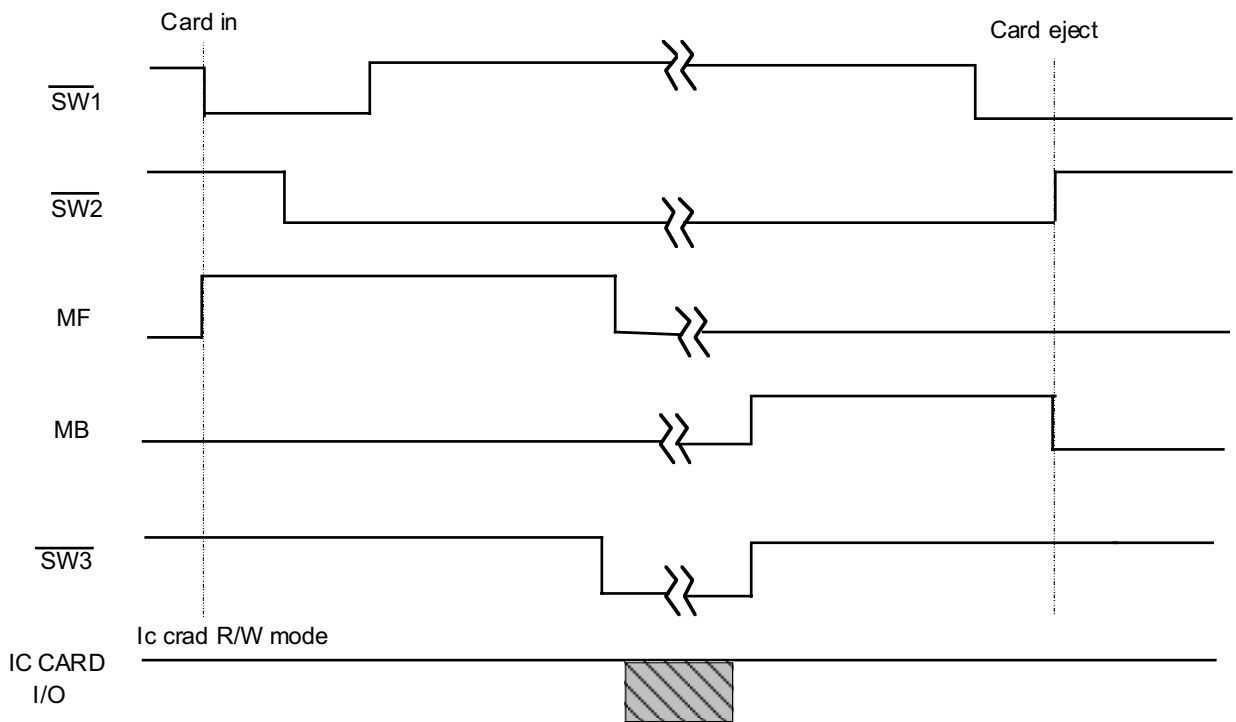


Figure-11

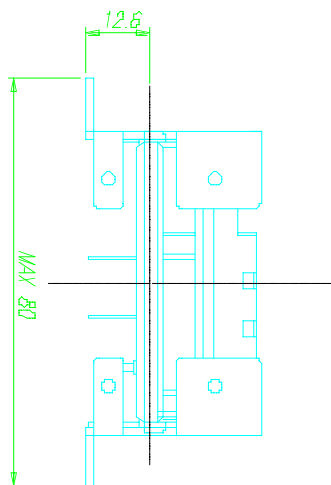
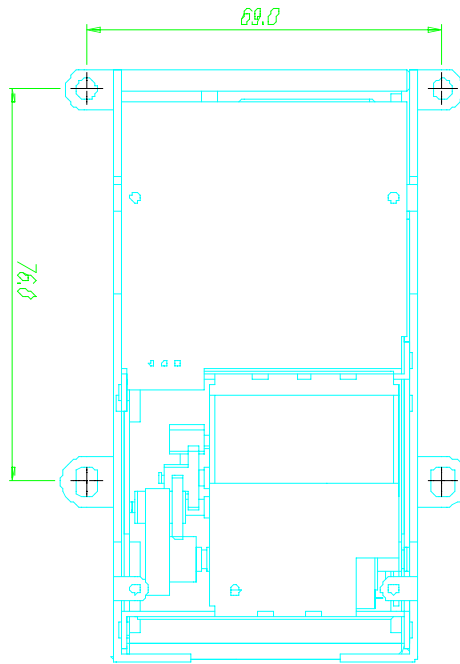
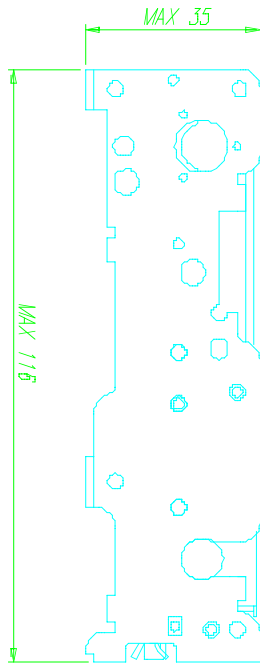
8. NOTES

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- 8.1 A card should be inserted in the direction specified.
- 8.2 A standard card should be used.
- 8.3 A dirty, scratched or deformed card should not be used.

9. MECHANICAL DIMENSION.
< WITHOUT SHUTTER MODEL >

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< WITH SHUTTER MODEL >

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