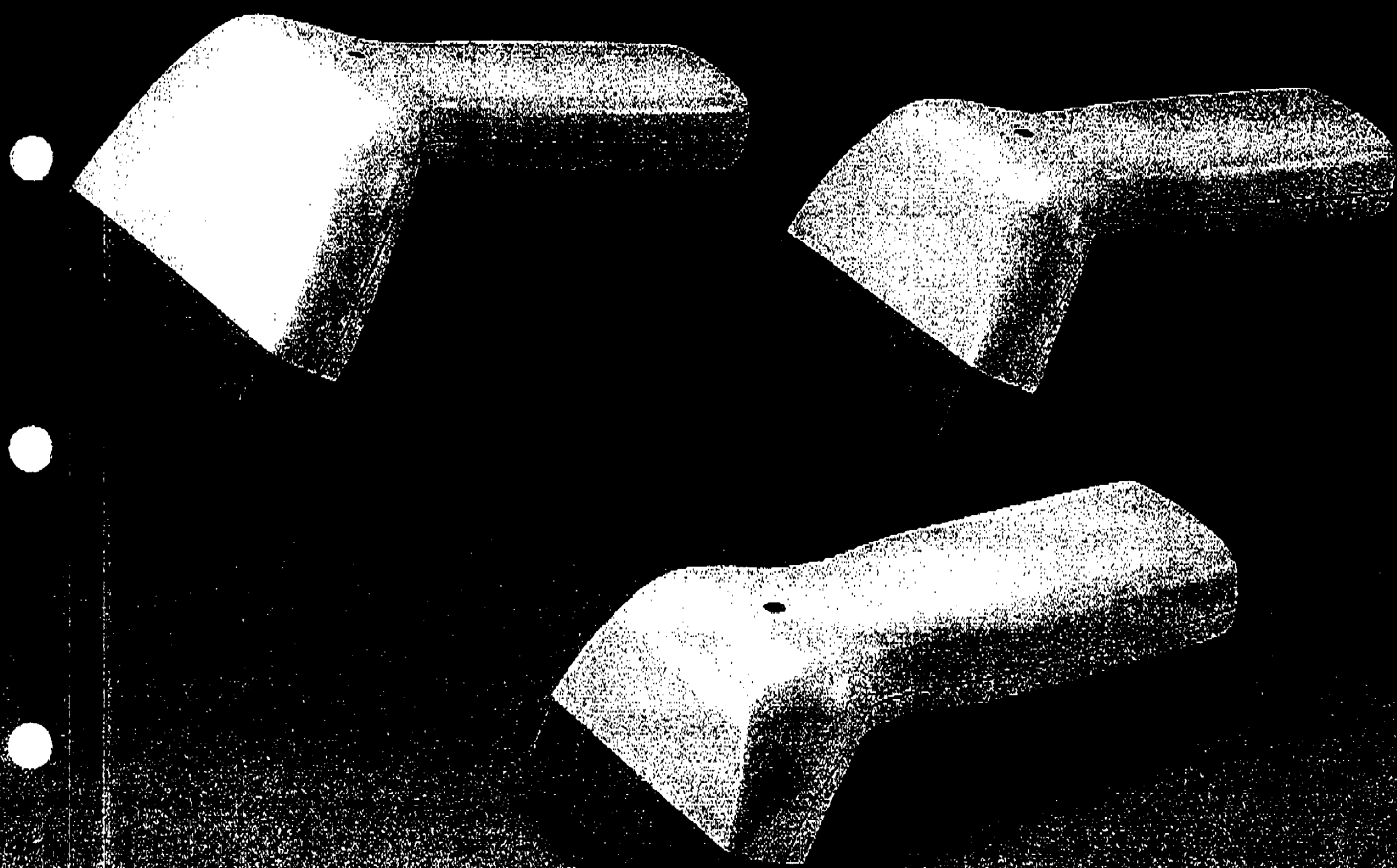# CAT# ECS-84

Panasonic®
Bar Code Reader

CCD scanner
ZE-84 MARK-M Series
For more Accurate and Timely Information.

Applications
- Retail Stores POS.
- Data Collection Terminals.
- Time and Attendance Terminals.
- Inventory Control Terminals.
- Library.

FEATURES
- Low Power Consumption
- Detachable Cable Conector.
- Light Weight and Compact ergonomic Design.

SPECIFICATIONS

HANDY BAR CODE READER

FOR

CONTROL DATA

MODEL

ZE - 8 4 TWM1 FD

JUL., 1991

1. Outline

This instant automatic scanner is a handy bar code reader incorporating a decoder for reading JAN, UPC codes as WPC symbols, and NW-7, CODE 39, ITF, and CODE 128 codes as industrial symbols.
WPC with supplemental code is available as optional specification.

This scanner has a asynchronous serial communication interface which outputs signals with 5VDC level, and is enable to connect with a circuit designed with transistors, C-MOS devices or TTL devices.
(This interface is not the RS-232C.)

The bar code is read automatically when the scanner is brought closer and stopped on the bar code, and a bar code of up to 3 inches (75 mm) in width can be read.
The state of reading can be confirmed by the LED indicator and buzzer.

This scanner is operated by a single power source . (input voltage: +5VDC ± 5 %) and the flashing of LED in normal mode is controlled in order to save energy.

2. Electrical characteristics

2.1 Input supply voltage : 5VDC ± 5%

2.2 Power consumption
     Operating state : Max. 1.0 W
                          (at +5 V DC)

2.2 Rush current at power on
     Rush current : Max. 1.0 A

3. Environmental conditions

3.1 Operating temperature : 0 to 40℃

3.2 Storing temperature : -20 to 60℃

3.3 Operating humidity : 10 to 90% RH
                          (not to condense dew)

3.4 Storing humidity : 5 to 95% RH
                          (not to condense dew)

3.5 Ambient light level : 1500 lux or less

3.6 Resistance to static : 8 kV not to malfunction
     electricity   10 kV not to be broken
     (250PF. 500Ω)

4. Optical devices

4.1 Emitter : LED (λ = 660 nm)

4.2 Detector : CCD image sensor

5. Weight & Color

5.1 Main body : Approx. 165 g
                 Shiney Black(Main body)

5.2 Cable : Approx. 10 g
     (Including strain reliof) Black

6. Overall dimensions, appearance
     Overal.dimensions : 90 wide × 172 long × 59 high mm
     The appearance is shown in Fig.1.

7. Reading specification
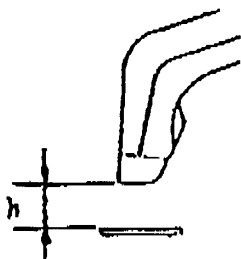
7.1 Reading width and resolution

Reading width   : 75 mm

Resolution   : ≥ 0.19 mm (NW-7. ITF. CODE39)

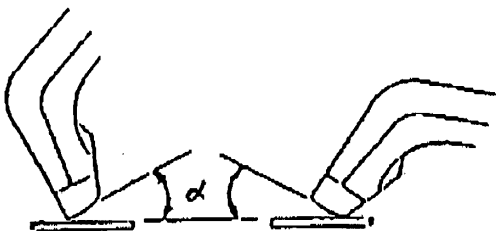 ≥ 0.26 mm (CODE128)

7.2 PCS value

: 0.45 or more

(wavelength 660 nm)

(white bar reflectivity $\geq$ 85%)

7.3 Contact-free distance

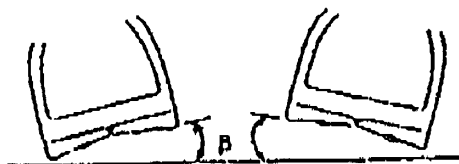
h = 0 to 10 mm

provided:

module dimension 1.0 times (JAN code)

PCS value= 0.9 or more. ambient

               illumination 400 lux

α (longitudinal slope) = 0°

β (lateral slope)   = 0°

θ (rotation)   = 0°

R (curvature)   = ∞ mm

7.4 Longitudinal slope

α = 0 to 20°

provided:

module dimension 1.0 times

(JAN code)

PCS value = 0.9 or more. ambient

               illumination 400 lux

h = 0 mm

β = 0°

θ = 0°

R = ∞ mm

7.5 Lateral slope

β = 0 to 6°

provided:

module dimension 1.0 times (JAN code)

PCS value = 0.9 or more. ambient

               illumination 400 lux

h = 0 mm. α = 0°. θ = 0°. R = ∞ mm

7.6   Rotation

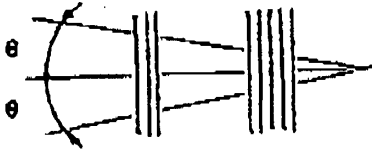$\theta = \pm 20°$
provided:
module dimension 1.0 times (JAN code)
PCS value = 0.9 or more. ambient
           illumination 400 lux
$h = 0$ mm. $\alpha = 0°$, $\beta = 0°$, $R = \infty$ mm

.7.7   Curvature
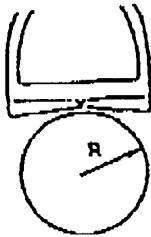
If JAN-13, then R = 30 mm or more.
If JAN- 8, then R = 20 mm or more.
provided:
module dimension 1.0 times
PCS value = 0.9 or more. ambient
           illumination 400 lux
$h = 0$ mm. $\alpha = 0°$, $\beta = 0°$, $\theta = 0°$

7.8   Bar code reading position
The bar code and specified start/stop margin should be settled within
the 82 mm space of scanner opening.

7.9   Reading direction
It is possible to read if the scanner opening is set reversely in
lateral configuration with respect to the bar code label.

7.10 Duplicate reading prevention
After reading a bar code correctly. the same bar code is not read again
unless the reading opening is set apart at least 70 mm for more than
0.3 second.

8. Bar code to be read.

8.1 Standard specification.

The following five types are automatically distinguished and read.

8.1.1 WPC

(A) JAN : JAN-13 . JAN-8 (JIS X0501)
(B) EAN : EAN-13 . EAN-8
(C) UPC : UPC-A . UPC-E

8.1.2 NW-7

3 to 25 digits including start. stop codes(abcd/abcd).

8.1.3 CODE39

3 to 20 digits including start. stop codes(*/*).

8.1.4 ITF (Interleaved 2 of 5)

4 to 34 digits.

8.1.5 CODE128

4 to 33 digits including start. stop codos and check digit.

Function codes(FNC1~4) are ignored. If there are function codes in the bar code.

【NOTE】 Maximum number of digits in industrial symbol.the assurance value is above-mentioned.
But it may be possible to read more than the above-mentioned assurance value.in accordance with bar code label condition(narrow bar dimension narrow/wide bar ratio).

8.2 Optional specification.

Following two items are available as optional specification. in addition to standard specificatrion.

8.2.1 WPC with supplemental code.

2 add on and 5 add on code to be read.

8.2.2 Restriction number of digit in ITF code.

Only for systems using ITF. The scanner will utilize two reference values. The first reference value (I) will be determined by the number of digits in the code that is read after initially powering-up the scanner. The second ITF code that is read will determine the second reference value (II).
Only codes matching either (I) or (II) will be transmitted as a correct value.

8.2.3 Reading flow

```
                            ┌─────────────┐
                            │    Start    │
                            └──────┬──────┘
                                   │
        ┌──────────────────────────────────────────┐
        │            Turn on power.                 │          LED : Emitter
        │            LED blinking.                  │
        └──────────────────┬───────────────────────┘
                           │
  ┌────────────────────────┴──────────────────────────────────────┐
  │ ┌────────────────────────────────────────────────────────────┐
  │ │ There are 3 modes on LED(Emitter), which can be selected    │
  │ │ by receiving a command.(Refer to section 9.3 ------page 9)  │
  │ │ When the turn on mode or the blinking mode, BCR can read     │
  │ │ bar code. except in case of the turn off mode.  [Note.1]     │
  │ └──────────────────────────┬─────────────────────────────────┘
  │                            │
  │              ┌─────────────┴─────────────┐
  │              │         Scanning          │
  │              └─────────────┬─────────────┘
  │                            │
  │                        ╱───┴───╲
  │              N       ╱  Decoding  ╲
  │  ◄───────────────────    over ?    
  │                        ╲         ╱
  │                          ╲──┬──╱
  │                             │ Y  [Note.2]
  │                        ╱────┴────╲
  │              Y       ╱  Duplicate  ╲
  │  ◄───────────────────  reading being
  │                        ╲ prevented ?╱
  │                          ╲───┬───╱
  │                              │ N  [Note.3]
  │              ┌───────────────┴───────────────┐
  │              │    Transmit bar code data.    │
  │              └───────────────┬───────────────┘
  │                              │ N
  └──────────────────────────────┘
```
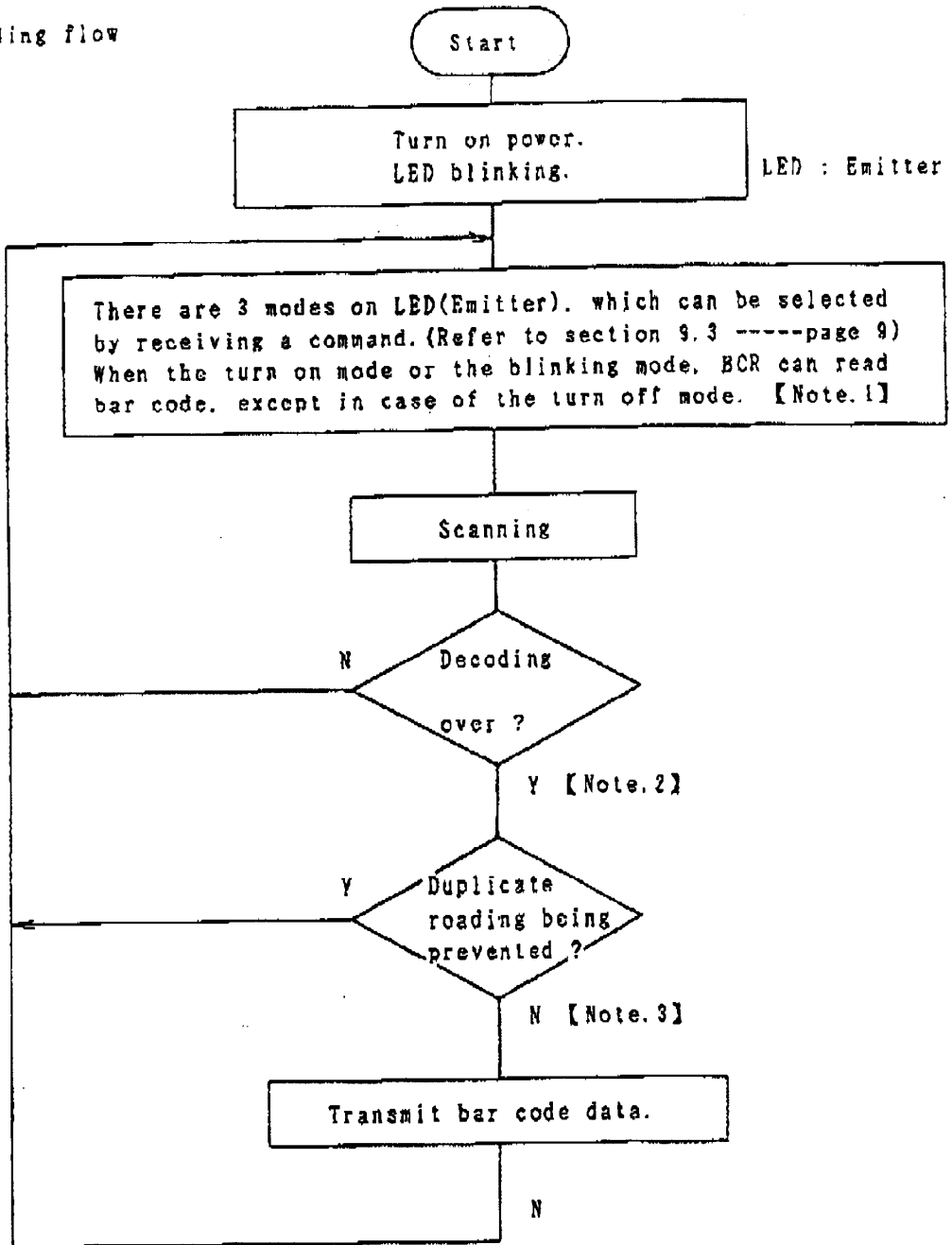
[Note.1] After power on, emitter LED will blink.
[Note.2] After decoded over successfully. LED(Emitter) turns on
         for 10 seconds without "ESC,N,<CR>" command, due to
         reading next bar code easily.
[Note.3] Within duplicate reading prevention. if the bar code is as same
         as just before reading bar code, the scanner does not transmit
         reading data, unless the reading openning is set apart at least
         70mm for more than 0.3 second.

9. communication specification

9.1 Transmission data format

The following four types (a) to (d) can be selected by internal DIP switch.

(a) : STX — DATA — ETX	Type codes are as follows.
(b) : STX — Type code — DATA — ETX	JAN-13
(c) : DATA — CR	EAN-13 [A] NW-7 [N]
(d) : Type code — DATA — CR	UPC-A
	JAN-8 [B] CODE39 [C]
	EAN-8
	UPC-E [E] ITF [I]
	CODE128 [K]

Transmission data   Transmission code : ASCII

Format	Object code	Data description

(a)
and
(c)
	JAN-13
	EAN-13
	UPC-A
	UPC-E
		DATA (13 characters)
		
		However,
		  UPC-A : To make up 13 characters by attaching 0
		       at the beginning. ———————————— NOTE 1
		  UPC-E : To make up 13 characters by inserting 0
		       according to the rules of UPC-E code.
		       To make up 6 characters at no check digit.
		       (When DIP switch #2 was set "ON".) ——— NOTE 2

	JAN-8 EAN-8	DATA (8 characters)
	NW-7 CODE39 ITF25 CODE128	DATA However asterisk "*" is not transmitted in CODE39. ———— NOTE 3 Start, stop codes and check digit are not transmitted in CODE 128. Function codes (FNC1~4) are ignored, if there are function codes in the var code. ———————————— NOTE 4
(b) and (d)	JAN-13 EAN-13 UPC-A	DATA (13 characters) However, conforming to NOTE 1 of UPC-A.
	JAN-8 EAN-8	DATA (8 characters)
	UPC-E	DATA (6/7 characters) (The final one of 7 characters is a check digit.)
	NW-7 CODE39 ITF CODE128	DATA However, conforming to NOTE 3 of CODE39, NOTE 4 of CODE128.

9.2 Communication commands

This scanner can be controlled by commands transmitted by the terminal.

9.2.1 Control commands (terminal to scanner)

Command	Description
ESC. N. <CR> (0X1b. 0X4e. 0X0d)	This command keeps on the LED(Emitter), and enables scanning.
ESC. B. <CR> (0X1b. 0X42. 0X0d)	This command blinks the LED(emitter). and enables scanning.
ESC. F. <CR> (0X1b. 0X46. 0X0d)	This command turns off the LED(emitter) and disables scanning.
ESC. T. <CR> (0X1b. 0X54. 0X0d)	This command turns on the indicator LED and the buzzer for 150 msec.

【Note】
When "ESC, F. <CR>" command is received during the "duplicate reading prevention". the proceeding "duplicate reading prevention" will be cancelled. Detail flow charts are shown in Apendix A.

9.2.2 Engineering revision number requisition command

(1) Requisition command (terminal to scanner).
      ESC. ?. <CR>
      (0X1b. 0X3f. 0X0d)

(2) Response message (scanner to terminal)
      ESC. P. 0. <CR>
      (0X1b. 0X50. 0X30. 0X0d)
The engineering revision number of this scanner is "P0".

9.2.3 Remarks

When there occurrs an interrupt of receiving command during reading a bar code. BCR will be neglect the on-going data reading and re-start to read bar code. Therefore. reading speed will be slow-down if such interruption occurrs so frequently. Detail flow charts are shown in Apendix A.

9.3　　Method of communication

　　　　Asynchrnous

9.3.1 Communication speed

　　　　1200, 2400, 4800, 9600 bps (selectable by internal DIP switch)

9.3.2 Word length

　　　　Start bit -------- 1 bit

　　　　Data bit ------- 8 bits, no parity ⌐
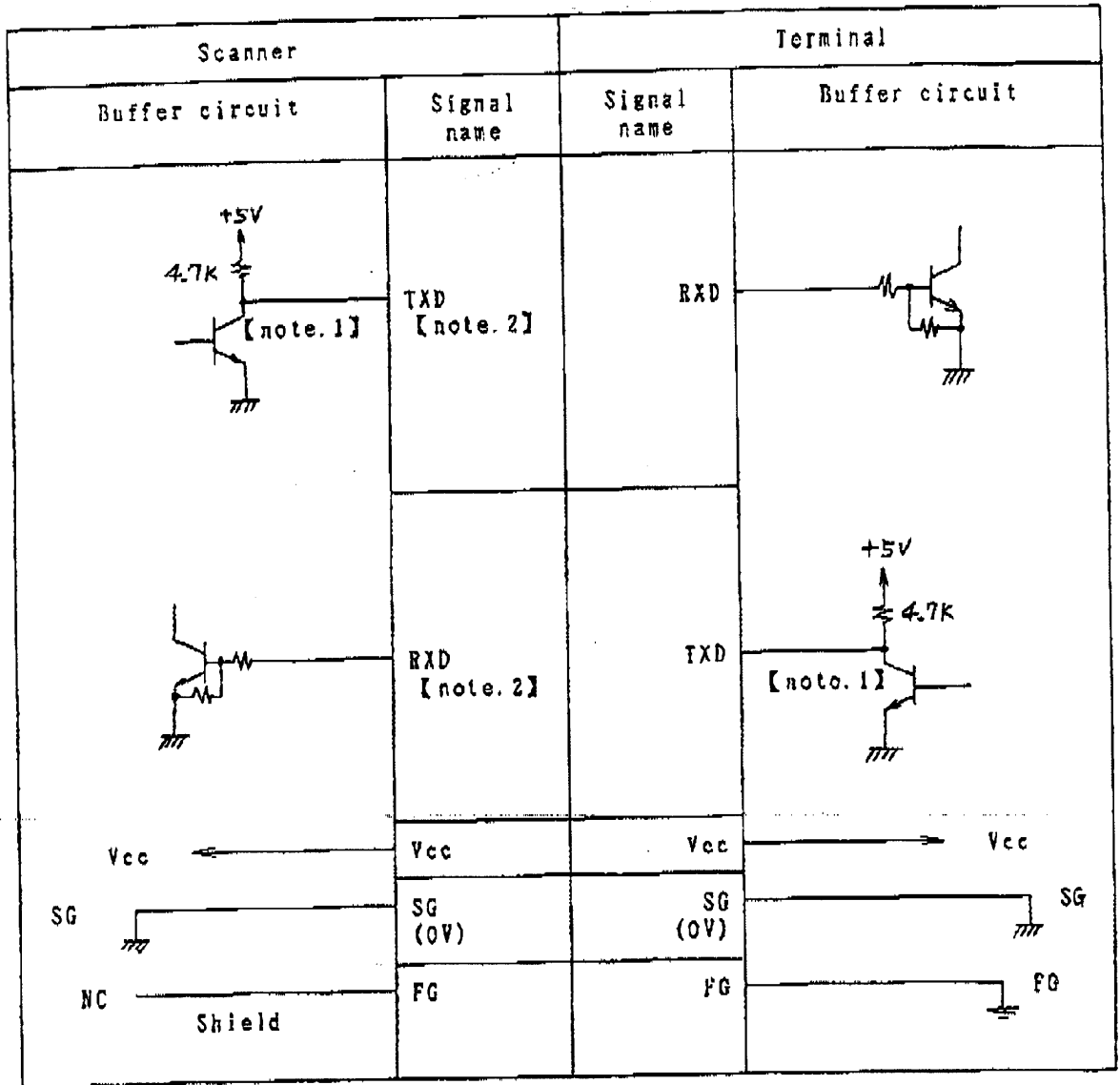　　　　Parity bit   7 bits, no parity   ├─ (Selectable by
　　　　　　　　　　　　 7 bits, even parity │   internal DIP switch)
　　　　　　　　　　　　 7 bits, odd parity ⌐

　　　　Stop bit ------- 1 bit

9.4　Interface circuit

Scanner		Terminal	
Buffer circuit	Signal name	Signal name	Buffer circuit
+5V 4.7K [note.1]	TXD [note.2]	RXD	
	RXD [note.2]	TXD	+5V 4.7K [note.1]
Vcc ←	Vcc	Vcc	→ Vcc
SG	SG (0V)	SG (0V)	SG
NC Shield	FG	FG	FG

[Note.1] : Capability of the driver transitor
On state (output : "L") - V_{CE} less than or equal to 0.2V
Off state (output : "H")= I_{CE} less than or equal to 10 μA

[Note.2] : Logic level of BCR side
TXD, RXD - Start bit = "H" , stop bits = "L"

10. Internal DIP switch

Switch name	Pin No.	Description		Setting before shipping
		ON	OFF	
DIP switch	1	Test mode	Operation mode	OFF
	2	UPC-E check digit additional transmission : Absent	Present	OFF
	3			OFF
	4			OFF
	5			ON
	6			ON
	7			ON
	8			ON

Pin 3 / 4:

3	4	Transmission data
OFF	OFF	Data — CR
ON	OFF	Type code — DATA — CR
OFF	ON	STX — DATA — ETX
ON	ON	STX — Type code — DATA — ETX

Pin 5 / 6:

5	6	Data length, parity
OFF	OFF	7 bits, odd
ON	OFF	7 bits, even
OFF	ON	7 bits, none
ON	ON	8 bits, none

Pin 7 / 8:

7	8	Communication speed (bps)
OFF	OFF	9600
ON	OFF	4800
OFF	ON	2400
ON	ON	1200

NOTES
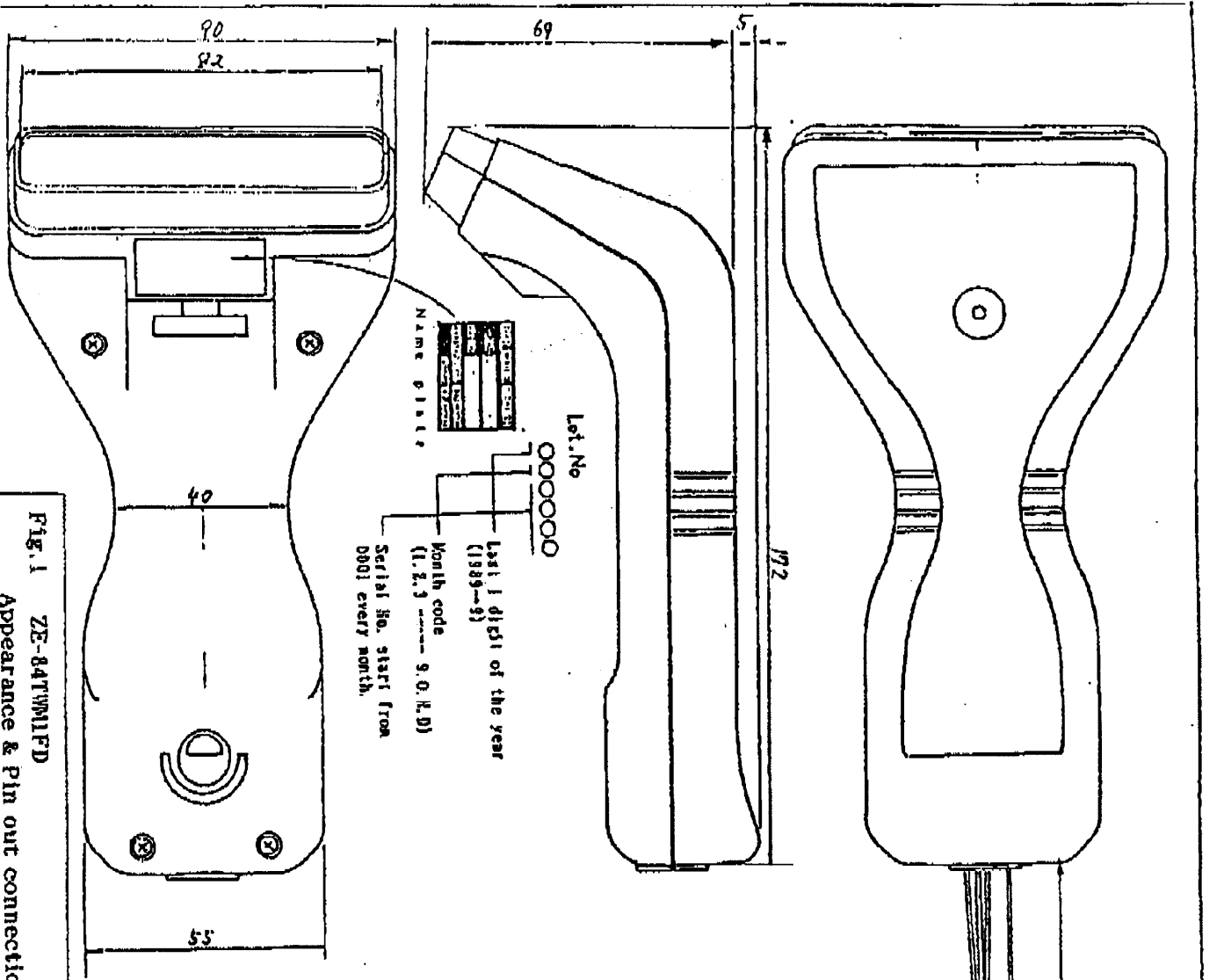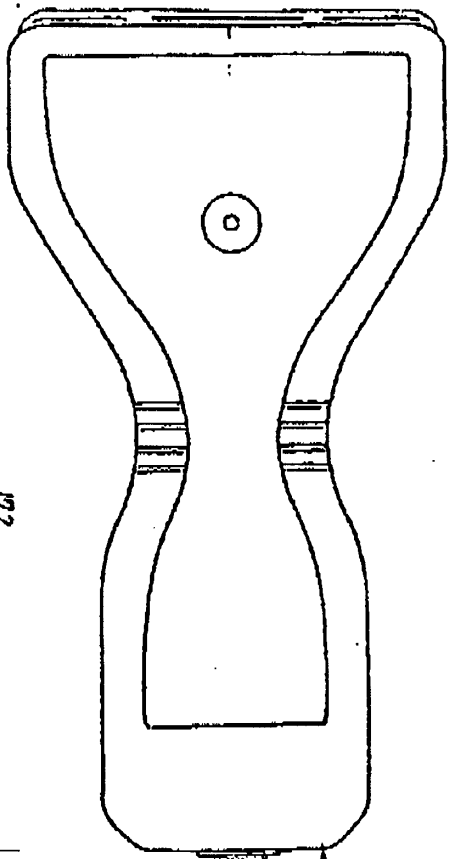1. The set data. is read in when turning on the power.
2. There is 1 stop bits.

Fig.1 ZE-84TWM1FD
Appearance & Pin out connection

Name plate

Lot.No

Last 1 digit of the year
(1989→9)

Month code
(1,2,..9,0,N,D)

Serial No. start from
D001 every month.

Style 1007
AWG 26 Wire

CN5 : MOLEX
5264-04
& 5263-PBT

$\triangle 165^{+20}_{-10}$
$\#50$

PIN NO	SIGNAL	INPUT OUTPUT	Description
4	S G	—	Signal ground
3	T X D	OUTPUT	Transfer read data (transmission data)
2	R X D	INPUT	Data transfer from terminal (reception data)
1	V c c	INPUT	Power source (5VDC±5%)

90
82
40
55
69
5
172