

Operating Manual

[Bus Validator]

C&C Enterprise Co., LTD

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Chapter 1. Summary of Equipment

This manual is made for describing the appearance, function, usage, precaution and general notice of Bus validator (Model Name : CCBV – 320) in order for bus driver to facilitate the operation of it.

According to this manual, bus driver can use bus validator before, on and after bus operation and must read carefully this manual to make assurance secure of operating bus before using bus validator.

“Note: The manufacturer is not responsible for any Radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user’s authority to operate the equipment.”

Chapter 2. Appearance and Function

2.1 Main Features

C & C's Bus Validator is composed of two main parts; Main Unit and Driver's Control Unit.

[Main Board]



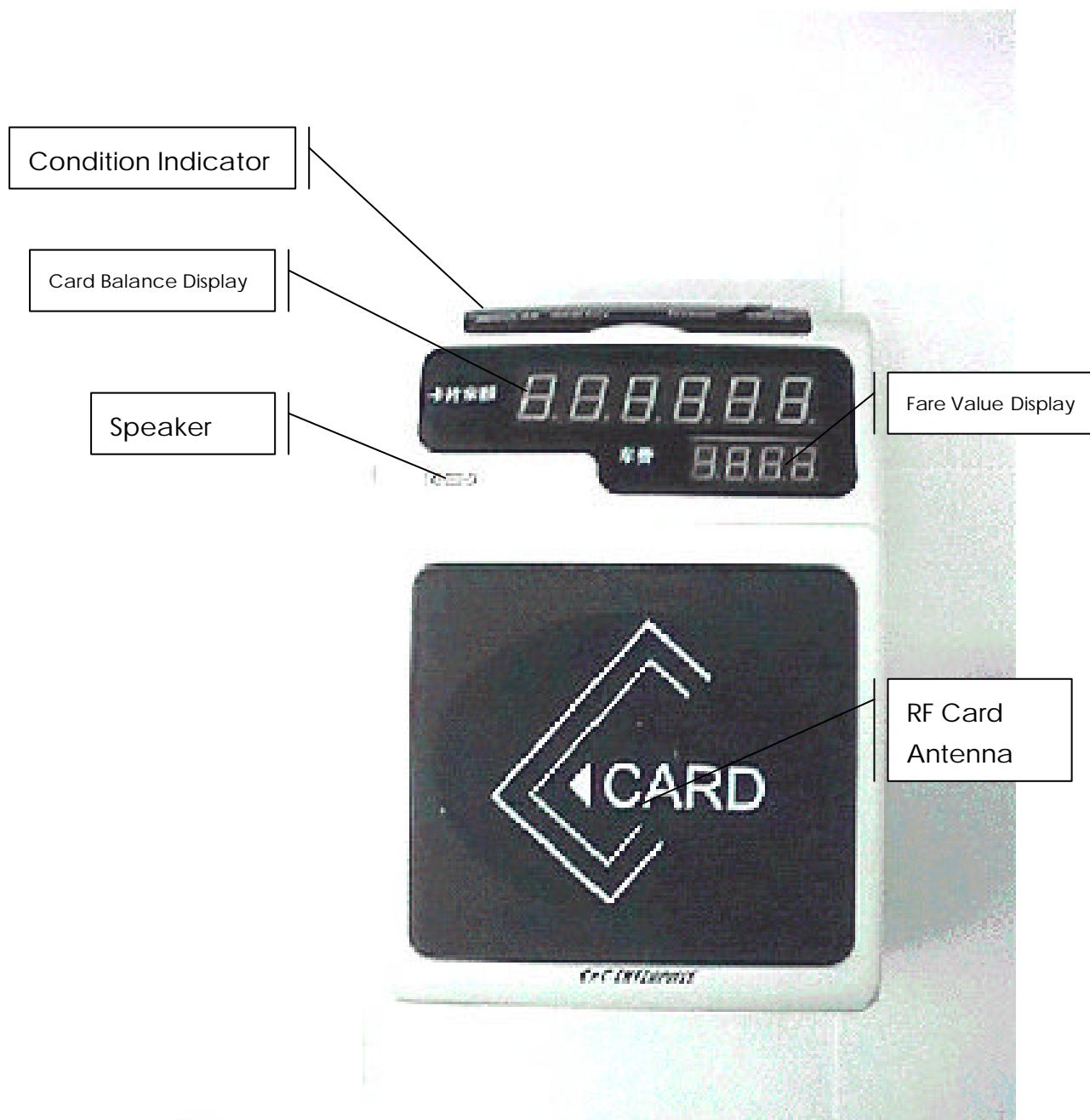
[Driver's Control Unit]



2.2 Appearance and Denomination

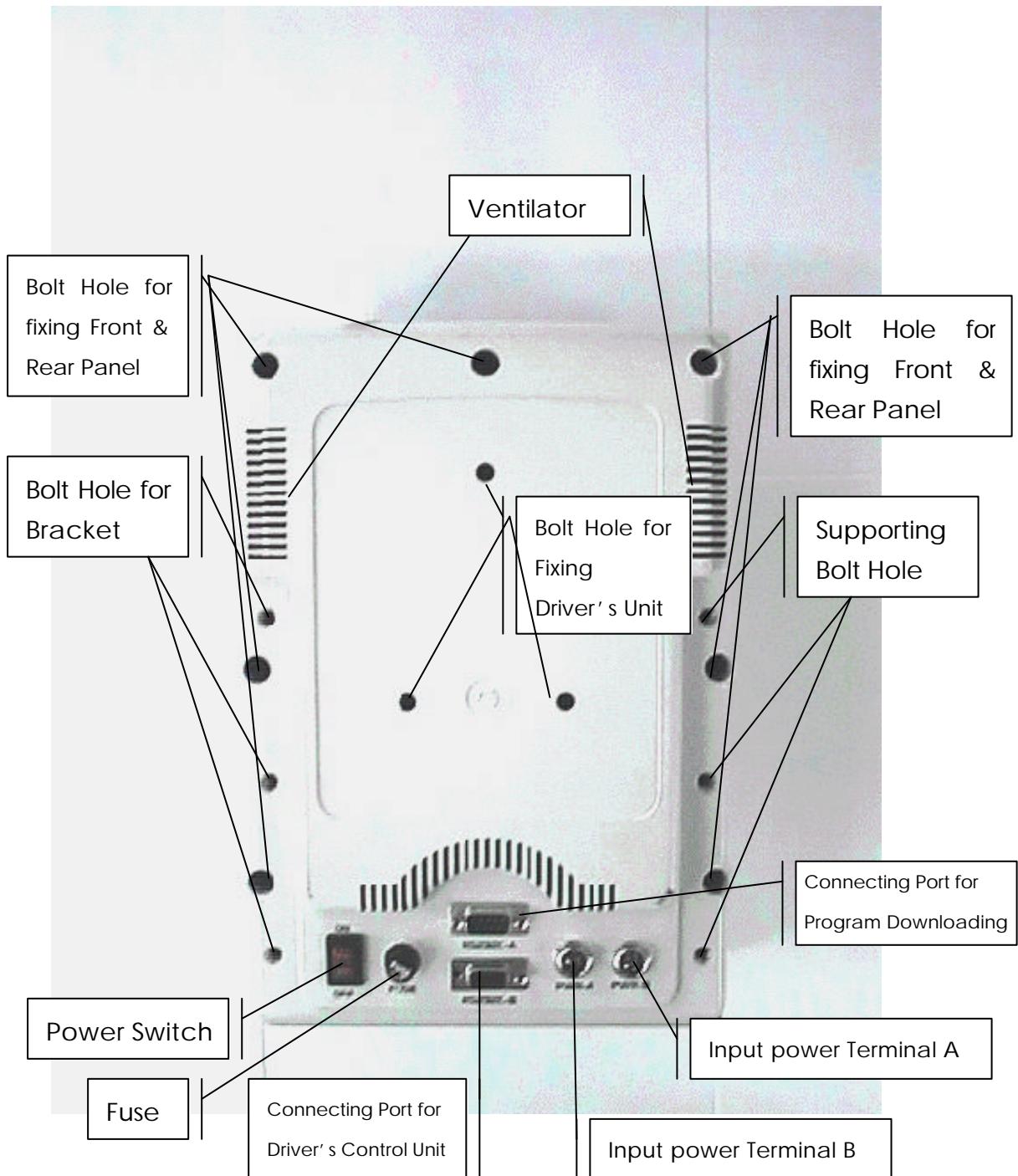
1) Main Body

(1) Front Side

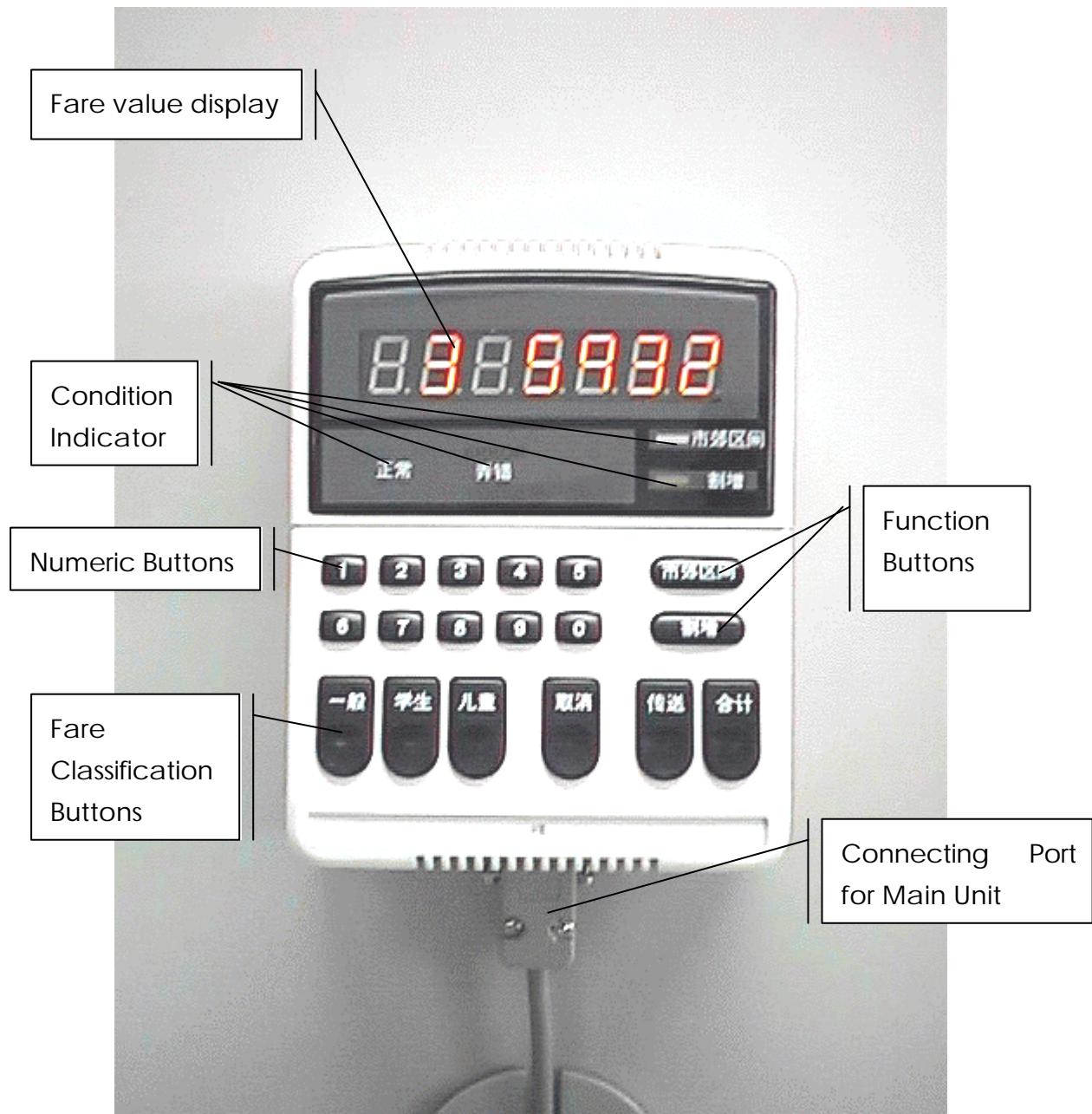


(2) Rear Side

Fixing Bolt hole for Front and Rear side, Ventilator, Supporting bolt hole, Program Down Load Port, Power switch, Fuse, Driver Keypad connecting Port, Power Terminal A, Power Terminal B.



2) Driver's Control Unit



2,3 Description of Function

1) Selection of Passenger type and number of passenger

- (1) In case more than 1 passenger : Should select both type & number of passengers. (Passenger type : Adults, Student, Children, or Cancellation)
- (2) In case on passenger : Automatically recognized by system, no need to operate any buttons.

2) Fare Value Display

- (1) Card balance : Display card balance as tagging the card.
- (2) Fare Value : Display fare value as tagging the card.

3) Function Display

- (1) Regular : light on in case regular value applied.
- (2) Out of City : light on in case of out of city.
- (3) Premium : light on in case for premium bus or additional fare needed.
- (4) Error : light on in case of malfunction.

Chapter 3. Operation

3.1 Procedure of Operation

1) Starting Operation

- (1) Starting the Engine – Ignition on
- (2) Turning on Validator S/W
- (3) Checking out conditions of Validator

2) Operation while driving

- (1) Checking the normal state of Driver's Control Unit as passenger tag the card.
- (2) In case one card being used for numbers of people, driver should select buttons for both passenger type and number of passengers.
(In case incorrect data was input, select the cancellation button and repeat the above.)
- (3) In case of balance shortage for fare, reject that passenger.
- (4) In case of out of city and additional fare needed, select for proper buttons.

3) Operating procedure at closing time of operation

- (1) Push the button of sum and transmission and check total number of passengers and amount.
- (2) Once the bus is entered into the garage, collected data is automatically collected into data collector.
- (3) Turn off the power switch after checking the transmission of data.
- (4) Turn off the engine.

3.2 Precaution

- (1) Turn on the power switch of bus validator after starting engine.
- (2) Bus validator must be protected from outside impact.
- (3) Never put the bus validator near fire.
- (4) Make the passengers keep their mind on tagging their card on bus validator within 10 cm.
- (5) Don't bring excessive strength to function button in pushing it.
- (6) Pay attention not to pour water, drink and rain on bus validator.
- (7) Don't open the case of validator without permission and make the expert open it.
- (8) Don't bring excessive strength to connecting cable and protect it.

Chapter 4. Technical Specifications

4.1. Bus Validator

(1) Summary

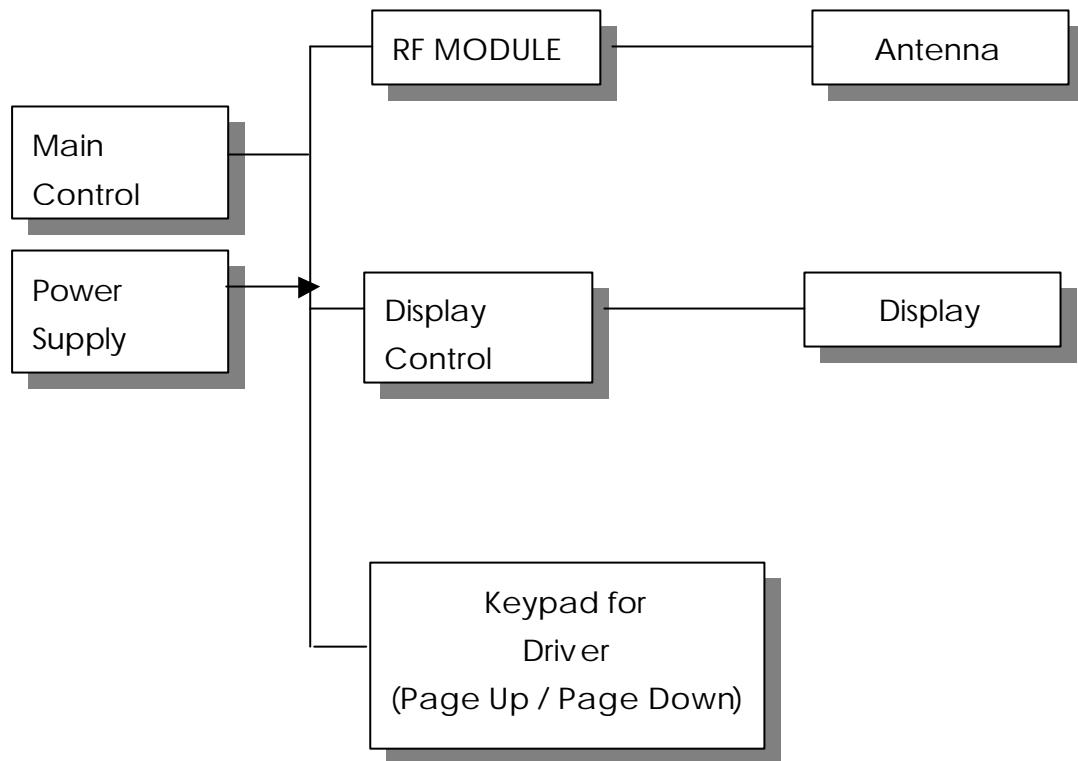
Bus Validator, which is installed in the entrance of Bus, reads and validates the RF card and deducts the amount of RF card automatically.

The main characteristics of Bus Validator are as follows.

- . RF card reading and recording by Contactless RF card.
- . Fast reading / Recording process speed: within 0.2 sec.
- . Strong structure against vibration, shock.
- . Action capability in power alteration.
- . Storing of collecting data over 7 days.
- . Searching of Black List in off-line.
- . Anti sparkling.

Block diagram of Bus Validator is shown in figure 1-1.

<Figure 1-1> Block diagram of Bus Validator



(2) Technical Specifications

A. General Specifications

1) Power

- Input Power : DC 6 ~ 60V (with surge & over voltage protection)
- Input Port : 2ea

2) Environment Condition

- Temperature : - 40 °C ~ +125 °C
- Relative humidity : 20 ~ 90%

3) Size

- Case
 - Height : 277mm
 - Width : 195mm
 - Depth : 80mm
- Driver's Keypad

- Height : 155mm
- Width : 128mm
- Depth : 60mm

4) Weight : 2.5Kg

B. Performances

1) RF Card Validating

- Validating Type : Contactless reading and writing
- Validating Speed : Within 0.2 Sec.

2) Display

- Fare Display : 7 Segment LED Display x 4digits
- Balance and passenger Display : 7 Segment LED Display x 6digits
- Operation Status Display : 2 Lamps (OK, Error,)

3) Main Control Board

- Control Type : Program Control
- CPU : 32Bit Microprocessor (XC68307CFG16)
- Memory Capacity
 - Booting Memory: 32KB
 - Application Program Memory : 224KB
 - Data Memory : 64KB
 - Transaction Record : 128KB
 - Transaction Data Back-up Memory : 8Mbit
- Model : KM29W32000AT
- Data Retention : 10Year
- SAM : 68S711E9CFN2
- Communication Interface
 - Communication Type : RS-232C Serial
 - Transaction Speed : 9600bps
- RTC : Real Time Clock
- Software language : C (Borland C++)

(3) Functions

A. Bus Validator has many functions as follows.

1) RF card Validating

It reads key value in RF card in case of passing the RF card within 10cm to the antenna. After verifying for the efficiency of the card, it reads and records within 0.2 sec.

2) Passenger Fare Display

The balance of RF card and statuses of validation is displayed maximum 6 digits and the passenger is able to confirm the balance and each message easily.

3) Collecting function for statistical and audit data

The statistical and audit data relating to the RF card use is stored into a internal memory.

4) Self Diagnosis

A main control unit of Bus Validator has the program for self diagnosis function and monitor periodically. In case of occurring any disturbance such as reading error of RF card and out of order, the unit indicates the details and the alarm sounds in order to give rapid action by the driver.

5) Test

The equipment is able to be tested by maintenance staff's card and accounting data is not damaged by this test.

(4) Configuration

Bus Validator is composed of following 6 different kinds of related units.

- Case
- Main Control Unit
- Display Unit
- RF Card Validating Unit

A. Case

- Main Case
 - Height : 277mm
 - Width : 195mm
 - Depth : 80mm
- Materials : Plastic(ABS)
- Model name : AF345
- Impact resistance
- Heat resistance : 60 ~ 120°C

B. Main Control Unit

Main Control Unit controls all related units and stores the collecting data from all related units. All accounting and statistical data stored in the memory is transmitted through data communication with upper computer system. This control unit is composed of following components and the specifications is as follows.

1) CPU

Central Processing Unit is 32Bit Microprocessor and controls all related units.

2) Memory

Memory is composed of RAM, ROM and Flash Memory and installed all necessary program for operating the equipment.

- Memory Capacity

- Booting Memory: 32KB
 - Application Program Memory : 224KB
 - Data Memory : 64KB
 - Transaction Record : 128KB
 - Transaction Data Back-up Memory : 8Mbit
- Model : KM29W32000AT
 - Data Retention : 10Year

3) Security Module

- Type : SAM
- Chip type : 68S711E9CFN2

4) I/O

- RS 232C port : 1ports

C. Display

1) Bus Validator

- Display elements
 - Amount : 7 Segment LED Display (Balance/message : 6digits), 7 Segment LED Display (Fare : 4digits),
 - Status : Lamp x 2ea
- Display Characters : Number and English
- Display method : streaming from right to left

D. Selection Button

- Function Selection Button(Page Up / Page Down / Reset)

E. RF Card Validating Unit

1) RF Module

RF Module reads the RF card through contactless wireless type and processes RF signal change/modification, Communication anti-collision, Data encryption and Read /Write the information.

- Radio Frequency : 13.56 MHz
- Transmission Speed : 106 Kbps
- Reading Distance : Within 10cm
- Communication Protocol : Handshake, half duplex
- Data Process
 - Anti-collision
 - 16 bit CRC/block
 - 16 bit parity/block
 - Bit count checking
 - Bit coding
- Channel monitoring (protocol sequence/ bit stream analysis)
- 16 byte FIFO data, Transmission/ Reception buffer
- Power Supply : 5V, 12V DC
- Size
 - Length : 100mm
 - Width : 54mm

- Attached status : Plug-in-module, 52pin
- Connecting Cable
 - Type : Coaxial cable
 - Length limit : Within 2 m

2) Antenna

- Antenna Size : 45mm x 88mm (Width x Length)
- Antenna material : Copper plate PCB (Size 75mm x 145mm ; Width x Length)