



# **International Currency Technologies Banknote Communication Protocol (ICT-BC)**

Communication Specification

**Version 1.0**

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## **Revision History**

<b>Title</b>		ICT Banknote Communication Protocol	
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# **1. Chapter 1 - General Information**

This specification describes the operation of ICT-BC Interface Protocol.

It is regarding to the data for the interface between Controller and ICT product.

## **1.1. What is ICT-BC**

**ICT-BC** is the International Currency Technologies Corp. serial communication protocol for self-checkout. The interface is a Master-Slave model.

## **2. Chapter 2 - Communication Format**

### **2.1. Frame Format**

Transmission Method	Full Duplex Transmission	
Transmission Speed	9600 Baud Rate	
Synchronizing Method	Asynchronous Mode	
Connection Control Method	Master/Slave Method	
Data Format	Start bit	1
	Data bit	8
	Parity bit	Even
	Stop bit	1

### **2.2. Message Structure**

<b>DA</b>	<b>LNG</b>	<b>SA</b>	<b>RC</b>	<b>CMD</b>	<b>DATA</b>	<b>FCC</b>
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<b><u>DA</u></b>	1 byte	Destination Address
<b><u>LNG</u></b>	1 byte	Data Length ( The length of data bytes depends on what kind of command )
<b><u>SA</u></b>	1 byte	Source Address
<b><u>RC</u></b>	1 byte	Reserve Code ( <u>00</u> H )
<b><u>CMD</u></b>	1 byte	Command
<b><u>DATA</u></b>	0 to 249 bytes	Required by command
<b><u>FCC</u></b>	1 byte	Exclusive or Checksum
$FCC = DA \wedge LNG \wedge SA \wedge RC \wedge CMD \wedge DATA$		



## 2.3. Example Of Message Sequence

Host send command of request manufacturer code to control board ---

**DA** : 03H ( Bill Recycler Address )  
**LNG** : 00H ( No data byte )  
**SA** : 01H ( Controller Address )  
**RC** : 00H ( Reserve Code )  
**CMD** : 0BH ( Request Manufacturer Code )  
**FCC** : 09H ( Checksum )

Host receives response of command from control board ---

**DA** : 01H ( Controller Address )  
**LNG** : 03H ( No data byte )  
**SA** : 03H ( Bill Recycler Address )  
**RC** : 00H ( Reserve Code )  
**CMD** : 00H ( Response Message )  
**DATA** : 49H 43H 54H ( Response data of “ICT” )  
**FCC** : 5FH ( Checksum )





## 2.4. ACK Message

DA	LNG	SA	CMD	RC	FCC
----	-----	----	-----	----	-----

**DA** : 01H ( Controller Address )

**LNG** : 00H ( No data byte )

**SA** : 03H (Bill Recycler Address)

**RC** : 00H ( Reserve Code )

**CMD** : 01H ( ACK Message)

**FCC** : 02H ( Checksum )

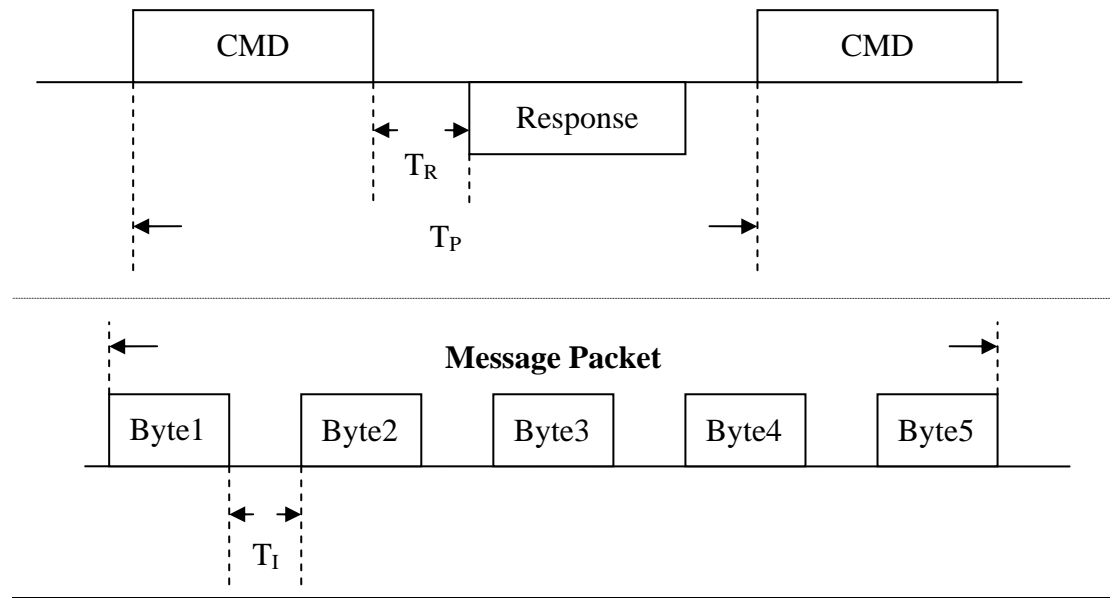
## 2.5. ICT-BC Peripheral Addresses

Peripheral Category	Default Address
Controller	1 ( <u>01H</u> )
Bill Validator	2 ( <u>02H</u> )
Bill Recycler	3 ( <u>03H</u> )
Reserved for future peripherals	4 ~ 200 ( <u>04H</u> ~ <u>C8H</u> )
Reserved for other purposes	201 ~ 255 ( <u>C9H</u> ~ <u>FFH</u> )

## 3. Chapter 3 - Timing Specification

The following are recommendations for the timing requirements of ICT-BC.

### 3.1. Timing Diagram



#### Definition:

- $T_P$  - Polling Time Interval
- $T_R$  - Response Time (maximum)
- $T_I$  - Inter-byte Time (maximum)

#### The limit of timing:

- $T_{P(min)}$  = 200 ms
- $T_R$  = 50 ms
- $T_I$  = 3 ms

#### Note :

- If peripheral receives no support command or mistake checksum .The peripheral doesn't send the response to controller and wait for next command.

## **4. Chapter 4 - Command**

### **4.1. Command List**

<b>Command Name</b>	<b>Command Code ( hex )</b>
Reply Command	0 ( <u>00</u> H )
ACK Message	1 ( <u>01</u> H )
NAK Message	2 ( <u>02</u> H )
Reset	10 ( <u>0A</u> H )
Request Manufacturer Code	11 ( <u>0B</u> H )
Request Serial Number	12 ( <u>0C</u> H )
Request Product Code	13 ( <u>0D</u> H )
Request Country Code	14 ( <u>0E</u> H )
Request Firmware Information	15 ( <u>0F</u> H )
Request Modification Date	16 ( <u>10</u> H )
Set Escrow Parameter	17 ( <u>11</u> H )
Get Escrow Parameter	18 ( <u>12</u> H )
Get Decimal places	19 ( <u>13</u> H )
Get Bill Type Credit	20 ( <u>14</u> H )
Set Bill Type Enable Parameter	21 ( <u>15</u> H )
Get Bill Type Enable Parameter	22 ( <u>16</u> H )
*Set Recycling Bill Type	23 ( <u>17</u> H )
*Get Recycling Bill Type	24 ( <u>18</u> H )
Poll Status	25 ( <u>19</u> H )
Decision of Escrow Action	26 ( <u>1A</u> H )
*Get the number of recycling bill	27 ( <u>1B</u> H )
*Dispense the number of bills	28 ( <u>1C</u> H )



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*Dispense Monitor Status	29 ( <u>1D</u> H )
*Transfer the number of bills	30 ( <u>1E</u> H )
*Transfer All of bills	31 ( <u>1F</u> H )
*Transfer Monitor Status	32 ( <u>20</u> H )
*Set Recycling Module Capacity	33 ( <u>21</u> H )
*Get Recycling Module Capacity	34 ( <u>22</u> H )
*Set the number of recycling bill	35 ( <u>23</u> H )

### **Note :**

- \* It means the command only for bill recycler.



## 4.2. Command Explanation

- It Introduces the ICT-BC command that how to use.

### 4.2.1. Command (0) – Reply Command

Command Code	Response Data
00H	Depend on Command

- The response data length depends on the command.

### 4.2.2. Command (1) – ACK Message

Command Code	Response Data
00H	No data bytes

- The slave device sends ACK message to Controller after receiving the controller's command. The master device confirms the slave device that received command already.

### 4.2.3. Command (2) – NAK Message

Command Code	Response Data
02H	No data bytes

- The slave device sends NAK message to Controller after receiving the controller's command. It means the slave device doesn't perform the operation.



## 4.2.4. Command (10) – Reset

Command Code	Controller data	Response Data
<u>0AH</u>	No data bytes	ACK Message

- Command for reset the device.
- Controller should wait one second delay to next command after reset.

## 4.2.5. Command (11) – Request Manufacturer Code

Command Code	Controller data	Response Data
<u>0BH</u>	No data bytes	3 bytes : Z1 – Z3

Z1 - Z20 : Manufacturer Code – 3 bytes ( ASCII )

- It indicates the equipment supplier's identification code.

## 4.2.6. Command (12) – Request Serial Number

Command Code	Controller data	Response Data
<u>0CH</u>	No data bytes	12 bytes : Z1 – Z12

Z1 - Z12 : Serial Number – 12 bytes

- It indicates the product serial number.

## 4.2.7. Command (13) – Request Product Code

Command Code	Controller data	Response Data
<u>0DH</u>	No data bytes	12 bytes : Z1 – Z12

Z1 – Z12 : Product Code – 12 bytes ( ASCII )

- It indicates the product code. Unsent bytes are assumed to be unused.

#### **4.2.8. Command (14) – Request Country Code**

Command Code	Controller data	Response Data
<u>0EH</u>	No data bytes	3 bytes : Z1 – Z3

Z1 - Z3 : Country Code – 3 bytes ( ASCII )

- It depends on ISO 4217 alphabetic currency codes.(e.g. “TWD”)

#### **4.2.9. Command (15) – Request Firmware Information**

Command Code	Controller data	Response Data
<u>0FH</u>	No data bytes	24 bytes : Z1 – Z24

Z1 - Z20 : Firmware Code – 20 bytes ( ASCII )

- It indicates the program firmware code. Unsent bytes are assumed to be unused.

Z21 - Z22 : Firmware Version– 2 bytes ( BCD )

- It indicates the firmware checksum. ( e.g. 01.01 )

Z23 - Z24 : Firmware CheckSum– 2 bytes ( Hex )

- It indicates the firmware checksum. ( e.g. 5A5A )
- Z1 、 Z21 、 Z23 equal to MSB.

**4.2.10. Command (16) – Request Modification Date**

Command Code	Controller data	Response Data
<u>10H</u>	No data bytes	3 bytes : Z1 – Z3

Z1 : Day – 1 byte

- Range : 1 ~ 31

Z2 : Month – 1 byte

- Range : 1 ~ 12

Z3 : Year – 1 byte

- Range : 00 ~ 99

**4.2.11. Command (17) – Set Escrow Parameter**

Command Code	Controller data	Response Data
<u>11H</u>	1 bytes : Y1	ACK Message

Y1 : Escrow Capability – 1 bytes

- The escrow capability of the bill Validator. ( **Default setting** is Escrow On )
- FFH – Escrow On      Other – Escrow Off





#### 4.2.12. Command (18) – Get Escrow Parameter

Command Code	Controller data	Response Data
<u>12H</u>	No data bytes	1 bytes : Z1

Z1 : Escrow Capability – 1 byte

- The escrow capability of the bill Validator.
- Refer to Command(17) for detail information.

#### 4.2.13. Command (19) – Get Decimal Places

Command Code	Controller data	Response Data
<u>13H</u>	No data bytes	1 bytes : Z1

Z1 : Decimal Place – 1 byte

- It means the number of decimal places.
- e.g. 0 to 3

#### 4.2.14. Command (20) – Get Bill Type Credit

Command Code	Controller data	Response Data
<u>14H</u>	1 bytes : Y1	3 bytes : Z1 – Z3

Y1 : Request Bill Type – 1 bytes

- Get each bill type value.
- e.g. 1 to 16

Z1 - Z3 : Bill Type Credit – 3 bytes

- It means the value of bill type.( Z1-- MSB Z--LSB )
- e.g. Decimal places is 2. Bill type credit is 500. The currency is \$5.00

## 4.2.15. Command (21) – Set Bill Type Enable Parameter

Command Code	Controller data	Response Data
<u>15H</u>	2 bytes : Y1 - Y2	ACK Message

Y1 - Y2 : Bill Type Enable Parameter – 2 bytes

Byte Y1 bits								Byte Y2 bits							
b16	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1

- Indicates the bill enables for bill types 1 to 16.
- A bit is set to indicate acceptance of bill type.
- **Default setting** is All bill types that are disabled.

## 4.2.16. Command (22) – Get Bill Type Enable Parameter

Command Code	Controller data	Response Data
<u>16H</u>	No data bytes	2 bytes : Z1 – Z2

Z1 - Z2 : Bill Type Enable Paramete – 2 bytes

- It means what type of bill are accepted.
- Refer to Command(21) for detail information.

## 4.2.17. Command (23) – Set Recycling Bill Type

Command Code	Controller data	Response Data
<u>17H</u>	1 bytes : Y1	ACK Message

Y1 : Recycling Bill Type – 1 bytes

- Indicate what bill type can be routed to the recycling module.
- 01H ~ 10H – Recycled Bill Type      Other – No Recycled Bill Type
- **Default setting** is no recycled bill.

#### 4.2.18. Command (24) – Get Recycling Bill Type

Command Code	Controller data	Response Data
<u>18H</u>	No data bytes	1 bytes : Z1

Z1 : Recycling Bill Type – 1 bytes

- Indicate what bill type can be routed to the recycling module.
- Refer to Command(23) for detail information.

#### 4.2.19. Command (25) – Poll Status

Command Code	Controller data	Response Data
<u>19H</u>	No data bytes	13 bytes : Z1 – Z13

Z1 : Status Register – 1 bytes

- Indicate the new records and this must be compared at each poll to the last known value
- Range : 1 to 255. 0 means power up or reset

Z2 - Z13 : Status Buffer – 12 bytes

<u>Status Buffer</u>											
Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10	Z11	Z12	Z13

- Two byte represents a new record. 12 bytes can store the last 6 records. The records are lost if More than buffer limit range.
- Z2 、 Z3 – The last record                      Z12 、 13 – The oldest record

<u>Status Register</u>	<u>The last record stored in buffer.</u>
0	<u>No Record</u>
1	<u>Record1</u>
2	<u>Record2</u> 、 Record1
5	<u>Record5</u> 、 <u>Record4</u> 、 <u>Record3</u> 、 Record2 、 Record1
8	<u>Record8</u> 、 <u>Record7</u> 、 <u>Record6</u> 、 Record5 、 Record4 、 Record3 、 older data are lost

- Refer to “Appendix 1” for credit and error detail

**4.2.20. Command (26) – Decision of Escrow Action**

Command Code	Controller data	Response Data
<u>1AH</u>	1 bytes : Y1	ACK Message

Y1 : Escrow Action Parameter – 1 bytes

- The controller decides to stack or reject the bill that in the escrow position.
- The slave device will send the NAK message to the controller when no bill in escrow position.

<u>Parameter Code (Hex)</u>	<u>Status Detail information</u>
<u>11H</u>	Stack the Bill
<u>22H</u>	Reject the Bill from escrow position
<u>Other code</u>	

**4.2.21. Command (27) – Get the number of recycling bill**

Command Code	Controller data	Response Data
<u>1BH</u>	No data bytes	1 bytes : Z1

Z1 : The number of recycling bill – 1 bytes

- Indicate how many bills that are stored in the recycling module.
- The stored capacity that depend on the bill recycler module.
- e.g. NE77-BR 30 stored bill in the recycling module.

**4.2.22. Command (28) – Dispense the number of bills**

Command Code	Controller data	Response Data
<u>1CH</u>	1 bytes : Y1	ACK Message

Y1 : Number of bills to be paid out – 1 bytes

- Controller decides how many bills can be paid out.



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- The parameter can't be assigned to 0 or more than number of stored bill. The response is NAK Message.
- The dispense operation can't be executed at other operation is executed. Like Accepting bill , transfer bill or Disable mode. The response is NAK Message.
- Controller need to send the **Dispense Monitor Status** command to monitor the dispense operation that is finish or fail.
  - If the Bill module occurs error status. It means the dispense operation is stopped. The rest of bills can't be paid out from recycling module.

### 4.2.23. **Command (29) – Dispense Monitor Status**

Command Code	Controller data	Response Data
<u>1DH</u>	No data bytes	7 bytes : Z1 – Z7

Z1 : Dispense Monitor Register – 1 bytes

- The function like Command (25) Status Register.
- Range : 1 to 255.            0 means power up or reset

Z2 - Z7 : Dispense Monitor Status – 6 bytes

- To check the dispense operation that is accomplished or not.

<b><u>Status Code (Hex)</u></b>	<b><u>Status Detail information</u></b>
<u>00H</u>	No dispense operation
<u>11H</u>	The dispense operation is busy
<u>22H</u>	The dispense operation is finished
<u>33H</u>	The dispense operation is failed

- One byte represents a new record. 6 bytes can store the last 6 records. The records are lost if More than buffer limit range.
- Z2 – The last record            Z7 – The oldest record

**4.2.24. Command (30) – Transfer the number of bills**

Command Code	Controller data	Response Data
<u>1EH</u>	1 bytes : Y1	ACK Message

Y1 : Number of bills to be transferred – 1 bytes

- Controller decides how many bills can be transferred.
- The parameter can't be assigned to 0 or more than number of stored bill.  
The response is NAK Message.
- The transfer operation can't be executed at other operation is executed. Like Accepting bill 、 dispense bill or Disable mode. The response is NAK Message.
- Controller need to send the **Transfer Monitor Status** command to monitor the transfer operation that is finish or fail.
  - If the Bill module occurs error status. It means the transfer operation is stopped. The rest of bills can't be transferred to cashbox from recycling module.

**4.2.25. Command (31) – Transfer All of bills**

Command Code	Controller data	Response Data
<u>1FH</u>	No data bytes	ACK Message

- All of bills are transferred to cashbox from the recycling module.
- The transfer operation can't be executed at other operation is executed. Like Accepting bill 、 dispense bill or Disable mode. The response is NAK Message.
- Controller need to send the **Transfer Monitor Status** command to monitor the transfer operation that is finish or fail.
  - If the Bill module occurs error status. It means the transfer operation is stopped. The rest of bills can't be transferred to cashbox from recycling module.

**4.2.26. Command (32) – Transfer Monitor Status**

Command Code	Controller data	Response Data
<u>20H</u>	No data bytes	7 bytes : Z1 – Z7

Z1 : Transfer Monitor Register – 1 bytes

- The function like Command (25) Status Register.
- Range : 1 to 255. 0 means power up or reset

Z2 - Z7 : Transfer Monitor Status – 6 bytes

- To check the transfer operation that is accomplished or not.

<u>Status Code (Hex)</u>	<u>Status Detail information</u>
<u>00H</u>	No transfer operation
<u>11H</u>	The transfer operation is busy
<u>22H</u>	The transfer operation is finished
<u>33H</u>	The transfer operation is failed

- One byte represents a new record. 6 bytes can store the last 6 records. The records are lost if More than buffer limit range.
- Z2 – The last record                      Z7 – The oldest record

**4.2.27. Command (33) – Set Recycling Module Capacity**

Command Code	Controller data	Response Data
<u>21H</u>	1 bytes : Y1	ACK Message

Y1 : Recycling Module Capacity – 1 bytes

- Indicate how many bills can be routed to the recycling module.
- The maximum capacity depends on Bill recycler.
- If the setting parameter is more than the structure capacity. The response is NAK Message.
- The recycling module capacity change is valid until the next power on.

**4.2.28. Command (34) – Get Recycling Module Capacity**

Command Code	Controller data	Response Data
<u>22H</u>	No data bytes	1 bytes : Z1

Z1 : Recycling Module Capacity – 1 bytes

- Indicate how many bills can be routed to the recycling module.
- Refer to Command(33) for detail information.

**4.2.29. Command (35) – Set the number of recycling bill**

Command Code	Controller data	Response Data
<u>23H</u>	1 bytes : Y1	ACK Message

Y1 : The number of recycling bill – 1 bytes

- Indicate how many bills that are stored in the recycling module.
- Refer to Command(27) for detail information.
- The number of recycling bill is not correct after the unknown mistake is occurred. The administrator can use this command to correct the number of recycling bill.
- To verify the number of recycling bill in recycling module before correcting the value.



## **Appendix 1 – ICT-BC Record Codes**

<b>Record(Two bytes)</b>		<b>Record detail information</b>
<b><u>Byte1</u></b>	<b><u>Byte2</u></b>	
0	1 to 16	Bill type 1 to 16 hold on escrow
1	1 to 16	Bill type 1 to 16 stacked in cashbox
2	1 to 16	Bill type 1 to 16 stored in recycling module
3	0	A banknote is transferred to escrow position from recycling module.*
4	0	A banknote is return to customer from escrow position.*
5	0	A banknote is transferred to cashbox from escrow position.*
255	0	The issue is solved
255	1	Motor problem
255	2	Sensor problem
255	3	Bill Jam
255	4	Bill Remove
255	5	Bill Reject
255	6	Stacker remove
255	7	Stacker faulty
255	8	Recycled module sensor problem.*
255	9	Recycled module motor problem.*
255	10	Recycled module jam problem.*
255	11	Recycled module is disconnected.*
xxx	xxx	Reserved

### **Note :**

- \* It means the command only for bill recycler.

## **Appendix 2 – Example Sequence Codes**

### **I. Initial procedure**

<b><u>Controller</u></b>		<b><u>Bill Recycler</u></b>	<b><u>Explanation</u></b>
Reset( <u>0A</u> H)	→		Reset command for Device
	←	Ack Message	
Manufacturer Code( <u>0B</u> H)	→		e.g. “ICT”
	←	Identification code	
Serial Number( <u>0C</u> H)	→		e.g. “123456789012”
	←	Identification code	
Product Code( <u>0D</u> H)	→		e.g. “NE77B2B-TWD4”
	←	Product code	
Country Code( <u>0E</u> H)	→		e.g. “TWD”
	←	Country code	
Firmware Info( <u>0F</u> H)	→		e.g. NKRX013BV01000TW403
	←	Firmware Info	1.01(5A5A)
Modification Date( <u>10</u> H)	→		e.g. “28/02/16”
	←	Modification date	It means 2016/02/28
Decimal Places( <u>13</u> H)	→		e.g. “1”
	←	Decimal Places	The value displays “xxx.0”
Bill Type Credit( <u>14</u> H)	→		e.g. Type1 is “100”
	←	Bill Type Credit	Controller need to get the type by ordering 16 times.



## II. Escrow ON procedure

<u>Controller</u>		<u>Bill Recycler</u>	<u>Explanation</u>
Set Escrow( <u>11H</u> )	→		The data is <u>FFH</u>
	←	Ack Message	Ack means setting successful
Get Escrow( <u>12H</u> )	→		The response is <u>FFH</u>
	←	Escrow parameter	<u>FFH</u> – Escrow ON

## III. Escrow OFF procedure

<u>Controller</u>		<u>Bill Recycler</u>	<u>Explanation</u>
Set Escrow( <u>11H</u> )	→		The data is <u>00H</u>
	←	Ack Message	Ack means setting successful
Get Escrow( <u>12H</u> )	→		The response is <u>00H</u>
	←	Escrow parameter	<u>00H</u> – Escrow OFF

## IV. Enable bill procedure

<u>Controller</u>		<u>Bill Recycler</u>	<u>Explanation</u>
Set Bill Enable( <u>15H</u> )	→		e.g. The data is <u>00FFH</u>
	←	Ack Message	Ack means setting successful
Get Bill Enable( <u>15H</u> )	→		e.g. The response is <u>00FFH</u>
	←	Enable parameter	<u>00FFH</u> – Device enable

**V. Disable bill procedure**

<u>Controller</u>		<u>Bill Recycler</u>	<u>Explanation</u>
Set Bill Enable( <u>15H</u> )	→		e.g. The data is <u>0000H</u>
	←	Ack Message	Ack means setting successful
Get Bill Enable( <u>15H</u> )	→		e.g. The response is <u>0000H</u>
	←	Enable parameter	<u>0000H</u> – Device disable

**VI. Set recycling bill type procedure**

<u>Controller</u>		<u>Bill Recycler</u>	<u>Explanation</u>
Set recycling type( <u>17H</u> )	→		e.g. The data is <u>01H</u>
	←	Ack Message	Ack means setting successful
Get recycling type ( <u>18H</u> )	→		e.g. The response is <u>01H</u>
	←	Recycling type	<u>01H</u> – Recycling type is type1

**VII. Set recycling capacity procedure**

<u>Controller</u>		<u>Bill Recycler</u>	<u>Explanation</u>
Set recycling capacity( <u>21H</u> )	→		e.g. The data is <u>32H</u>
	←	Ack Message	Ack means setting successful
Get recycling capacity ( <u>22H</u> )	→		e.g. The response is <u>32H</u>
	←	Recycling capacity	<u>32H</u> – The capacity is 50

**VIII. Accept Bill( Escrow ON ) procedure**

<b><u>Controller</u></b>		<b><u>Bill Recycler</u></b>	<b><u>Explanation</u></b>
Set Escrow( <u>11</u> H)	→		The data is <u>FF</u> H
	←	Ack Message	Ack means setting successful
Get Escrow( <u>12</u> H)	→		The response is <u>FF</u> H
	←	Escrow parameter	<u>FF</u> H – Escrow ON
Set Bill Enable( <u>15</u> H)	→		e.g. The data is <u>000F</u> H
	←	Ack Message	Ack means setting successful
Get Bill Enable( <u>15</u> H)	→		e.g. The response is <u>000F</u> H
	←	Enable parameter	<u>000F</u> H – Device enable
Poll Status( <u>19</u> H)	→		No event occur.
	←	No record	
Poll Status( <u>19</u> H)	→		e.g. Bill type 1 hold on escrow position.
	←	Add record1	
Decision of Escrow Action( <u>1A</u> H)	→		e.g. The data is <u>11</u> H
	←	Ack Message	Stack the bill
Poll Status( <u>19</u> H)	→		Bill type 1 hold on escrow position.
	←	Only record1	
Poll Status( <u>19</u> H)	→		e.g. Bill type 1 is stacked in cashbox.
	←	Add record2	

**IX. Reject Bill( Escrow ON ) procedure**

<b><u>Controller</u></b>		<b><u>Bill Recycler</u></b>	<b><u>Explanation</u></b>
Set Escrow( <u>11H</u> )	→		The data is <u>FFH</u>
	←	Ack Message	Ack means setting successful
Get Escrow( <u>12H</u> )	→		The response is <u>FFH</u>
	←	Escrow parameter	<u>FFH</u> – Escrow ON
Set Bill Enable( <u>15H</u> )	→		e.g. The data is <u>000FH</u>
	←	Ack Message	Ack means setting successful
Get Bill Enable( <u>15H</u> )	→		e.g. The response is <u>000FH</u>
	←	Enable parameter	<u>000FH</u> – Device enable
Poll Status( <u>19H</u> )	→		No event occur.
	←	No record	
Poll Status( <u>19H</u> )	→		e.g. Bill type 1 hold on escrow position.
	←	Add record1	
Decision of Escrow Action( <u>1AH</u> )	→		e.g. The data is <u>22H</u>
	←	Ack Message	Reject the bill from escrow
Poll Status( <u>19H</u> )	→		Bill type 1 hold on escrow position.
	←	Only record1	
Poll Status( <u>19H</u> )	→		e.g. Bill reject
	←	Add record2	
Poll Status( <u>19H</u> )	→		e.g. The issue is solved.
	←	Add record3	

**X. Recycling Bill( Escrow ON) procedure**

<b><u>Controller</u></b>		<b><u>Bill Recycler</u></b>	<b><u>Explanation</u></b>
Set recycling type( <u>17H</u> )	→		e.g. The data is <u>01H</u>
	←	Ack Message	Ack means setting successful
Get recycling type ( <u>18H</u> )	→		e.g. The response is <u>01H</u>
	←	Recycling type	<u>01H</u> – Recycling type is type1
Set Bill Enable( <u>15H</u> )	→		e.g. The data is <u>000FH</u>
	←	Ack Message	Ack means setting successful
Get Bill Enable( <u>15H</u> )	→		e.g. The response is <u>000FH</u>
	←	Enable parameter	<u>000FH</u> – Device enable
Poll Status( <u>19H</u> )	→		No event occur.
	←	No record	
Poll Status( <u>19H</u> )	→		e.g. Bill type 1 hold on escrow position.
	←	Add record1	
Decision of Escrow Action( <u>1AH</u> )	→		e.g. The data is <u>11H</u>
	←	Ack Message	Stack the bill
Poll Status( <u>19H</u> )	→		Bill type 1 hold on escrow position.
	←	Only record1	
Poll Status( <u>19H</u> )	→		e.g. Bill type 1 is Stored in recycling module
	←	Add record2	
Get the number of recycling bill( <u>11H</u> )	→		e.g. The response is <u>01H</u>
	←	Number of bill	<u>01H</u> – number of recycling bill



# **XI. Dispense bill( Successful ) procedure**

<b><u>Controller</u></b>		<b><u>Bill Recycler</u></b>	<b><u>Explanation</u></b>
Get the number of recycling bill( <u>11H</u> )	→ ←	Number of bill	e.g. The response is <u>03H</u> <u>03H</u> – number of recycling bill
Set Bill Enable( <u>15H</u> )	→ ←	Ack Message	e.g. The data is <u>000FH</u> Ack means setting successful
Get Bill Enable( <u>15H</u> )	→ ←	Enable parameter	e.g. The response is <u>000FH</u> <u>000FH</u> – Device enable
Dispense bill( <u>1CH</u> )	→ ←	Ack Message	e.g. The data is <u>01H</u> <u>01H</u> – Dispense one bill
Poll Status( <u>19H</u> )	→ ←	No record	No event occur.
Dispense Monitor Status( <u>1DH</u> )	→ ←	Add record1	e.g. The response is <u>11H</u> <u>11H</u> – Dispensing busy
Poll Status( <u>19H</u> )	→ ←	Add record1	A banknote is transferred to escrow position form recycler
Dispense Monitor Status( <u>1DH</u> )	→ ←	only record1	e.g. The response is <u>11H</u> <u>11H</u> – Dispensing busy
Poll Status( <u>19H</u> )	→ ←	Add record2	A banknote is return to customer from escrow position
Dispense Monitor Status( <u>1DH</u> )	→ ←	Add record2	e.g. The response is <u>22H</u> <u>22H</u> – Dispensed Finish
Get the number of recycling bill( <u>11H</u> )	→ ←	Number of bill	e.g. The response is <u>02H</u> <u>02H</u> – number of recycling bill





## XII. Dispense bill( Failed ) procedure

<u>Controller</u>		<u>Bill Recycler</u>	<u>Explanation</u>
Get the number of recycling bill( <u>11H</u> )	→ ←	Number of bill	e.g. The response is <u>03H</u> <u>03H</u> – number of recycling bill
Set Bill Enable( <u>15H</u> )	→ ←	Ack Message	e.g. The data is <u>000FH</u> Ack means setting successful
Get Bill Enable( <u>15H</u> )	→ ←	Enable parameter	e.g. The response is <u>000FH</u> <u>000FH</u> – Device enable
Dispense bill( <u>1CH</u> )	→ ←	Ack Message	e.g. The data is <u>01H</u> <u>01H</u> – Dispense one bill
Poll Status( <u>19H</u> )	→ ←	No record	No event occur.
Dispense Monitor Status( <u>1DH</u> )	→ ←	Add record1	e.g. The response is <u>11H</u> <u>11H</u> – Dispensing busy
Poll Status( <u>19H</u> )	→ ←	Add record1	Recycled module jam problem
Dispense Monitor Status( <u>1DH</u> )	→ ←	Add record2	e.g. The response is <u>33H</u> <u>33H</u> – Dispensed Failed
Poll Status( <u>19H</u> )	→ ←	only record1	Recycled module jam problem
The administrator solved the bill recycler problem.			
Poll Status( <u>19H</u> )	→ ←	Add record2	e.g. The issue is solved.



**XIII. Transfer bill( Successful ) procedure**

<u>Controller</u>		<u>Bill Recycler</u>	<u>Explanation</u>
Get the number of recycling bill( <u>11H</u> )	→ ←	Number of bill	e.g. The response is <u>03H</u> <u>03H</u> – number of recycling bill
Set Bill Enable( <u>15H</u> )	→ ←	Ack Message	e.g. The data is <u>000FH</u> Ack means setting successful
Get Bill Enable( <u>15H</u> )	→ ←	Enable parameter	e.g. The response is <u>000FH</u> <u>000FH</u> – Device enable
Transfer bill( <u>1EH</u> )	→ ←	Ack Message	e.g. The data is <u>01H</u> <u>01H</u> –Transfer one bill
Poll Status( <u>19H</u> )	→ ←	No record	No event occur.
Transfer Monitor Status( <u>20H</u> )	→ ←	Add record1	e.g. The response is <u>11H</u> <u>11H</u> –Transfer busy
Poll Status( <u>19H</u> )	→ ←	Add record1	A banknote is transferred to escrow position form recycler
Transfer Monitor Status( <u>20H</u> )	→ ←	only record1	e.g. The response is <u>11H</u> <u>11H</u> –Transfer busy
Poll Status( <u>19H</u> )	→ ←	Add record2	A banknote is transferred to cashbox from escrow position
Transfer Monitor Status( <u>20H</u> )	→ ←	Add record2	e.g. The response is <u>22H</u> <u>22H</u> –Transfer Finish
Get the number of recycling bill( <u>11H</u> )	→ ←	Number of bill	e.g. The response is <u>02H</u> <u>02H</u> – number of recycling bill

**END**