

**F56-BDU**  
**D-LEVEL SPECIFICATIONS**

**CONFIDENTIAL**

E05	August	2008
E04	November	2007
E03	May	2007
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E01	May	2006

FUJITSU FRONTECH LIMITED  
 Tokyo, Japan

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## Update History

ED.	DATE	DESCRIPTION
E01	2006.05.20	First edition created from D-level of F56-BDU (Rohs).
E02	2007.01.20	USB support.
E03	2007.05.20	<ul style="list-style-type: none"> <li>▪ "Demand for bill diagnosis" and "Demand for device information read/write" addition.</li> <li>▪ Option(Bill Check Sensor(BCS)/LED) addition for spray type.</li> </ul>
E04	2007.11.20	<ul style="list-style-type: none"> <li>▪ The parameter of the bill transportation command is changed.</li> </ul>
E05	2008.08.25	<ul style="list-style-type: none"> <li>▪ "Reject Option" addition.(P57,P65)</li> <li>▪ "Reject Option" and "RBST" are added to the sensor register.(P73,P80)</li> <li>▪ "11.10 PCB Setting" addition.</li> </ul>
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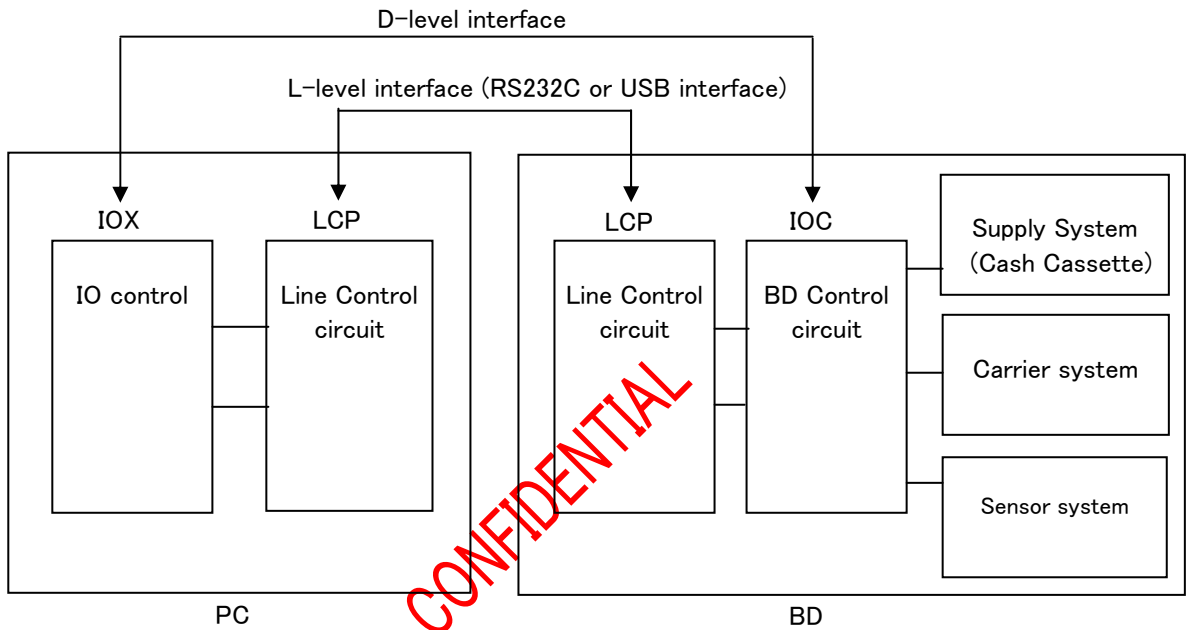
# 1. OUTLINE

The specifications define the D-level interface between IOX and IOC concerning the F56 Bill Dispenser.

Here, the information exchanged between IOX and IOC is called frame.

The specifications concern regulating the frame.

Hereafter, the bill dispenser is called BD in brief.

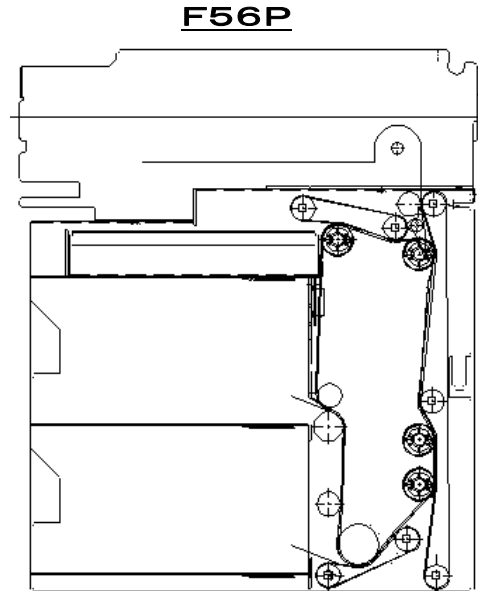
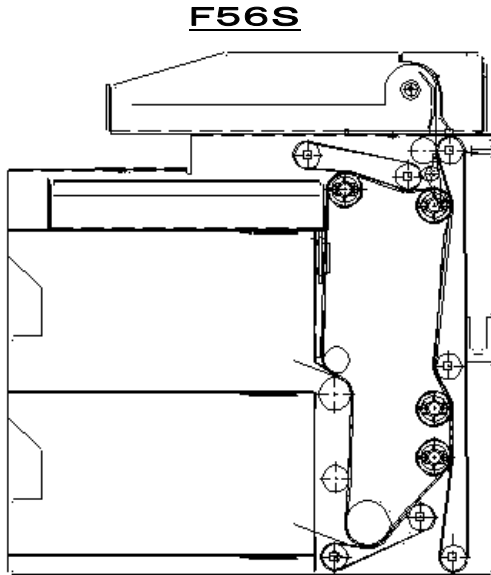


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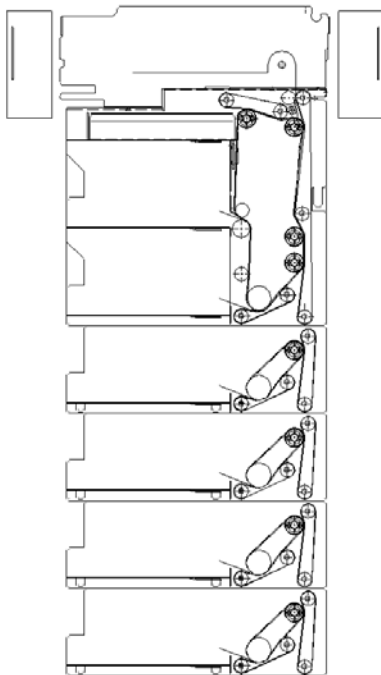
**Device Configuration (Block Diagram)**

① Standard configuration

F56 Bill Dispenser has two cassettes and supports two transport methods, Spray transport “F56S” and Bunch transport “F56P”.



② Option



The drawing on the left shows the configuration with optional features.

F56S and F56P can support up to 6 cassettes optionally.

F56P can dispense notes either from the front side and from the rear side of the device and can support two additional shutters in the exit.

Captured notes can be stored by adding a Capture box.  
Note) A Capture box cannot be installed on the same side as Shutter.

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## 2. FRAME FORMAT

Frame supports the following two formats:

### 2.1 Basic frame format

DH0 1byte	DH1 1byte	DH2 1byte	Data Region	FS 1byte
--------------	--------------	--------------	-------------	-------------

Features:

- Frame length 255 bytes at maximum
- Support up to 4 cassettes

### 2.2 Enhanced frame format

DH0 1byte	DH1 1byte	DH2 1byte	RSV 1byte	DH3 2byte	Data Region	FS 1byte
--------------	--------------	--------------	--------------	--------------	-------------	-------------

Features:

- Frame length 1405 bytes at maximum
- Support up to 8 cassettes

### 2.3 DH0

DH0 indicates the type and meaning of the following part of the frame.

Bit No.	Name	Meaning	
7	REQ	0: Request	1: Response
6	TYP	0: No DH2	1: DH2 exists
5	DAT	0: No Data	1: Data exists
4	ACK	0: Positive response	1: Negative response
3	PRO	Always 0	
2	CNT	Always 0	
1		Always 0	
0		Always 0	

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## 2.4 DH1

DH1 shows a code corresponding to a command.

- In case of the request frame, set the one in which an indication for processing has been contained as a code.
- In case of the response frame, use the DH1 in the request frame.
- In case of the response frame of cancelled termination, set the DH1 of cancel request.

## 2.5 DH2

DH2 shows the data byte length of the data region.

- DH2 is omitted when DH0's TYP byte is 0.
- When the TYP-bit of DH0 is 0, DH2 is omitted.
- When "FFh" is set in DH2, DH3 is made effective.

## 2.6 DH3/RSV (Reserve)

DH3 shows the data byte length of the data region.

- DH3 is omitted, except when DH2 is "FFh".

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## 2.7 Data Region

The data region exists to set information which cannot be expressed by DH1.

## 2.8 FS

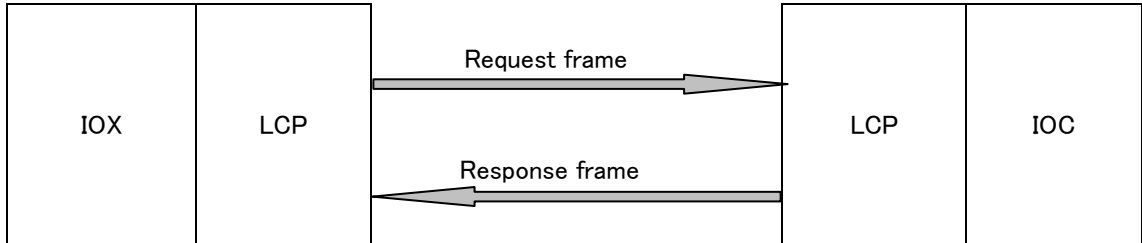
FS stands for Frame Separator.

- Shows the end of a frame. Its code is 1CH.

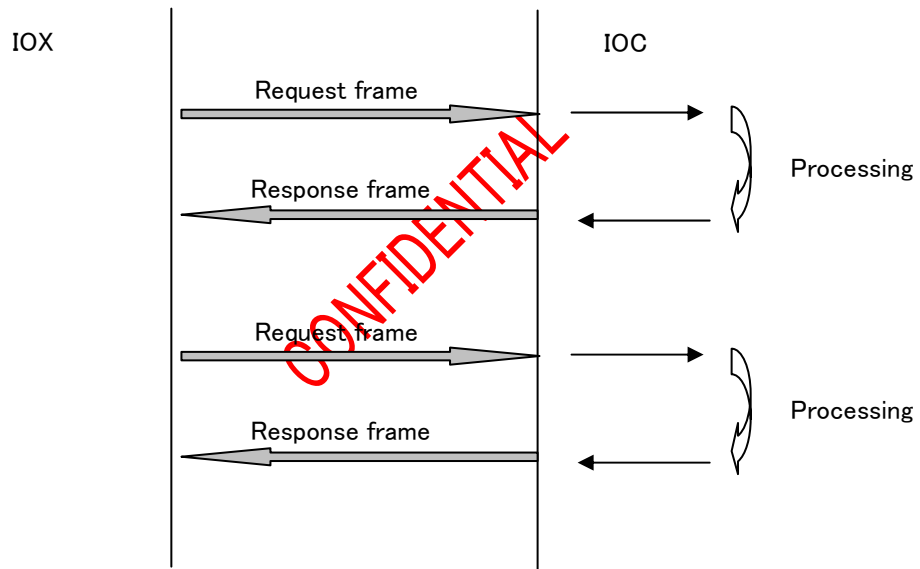
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### 3. TYPES OF FRAME

A frame sent from IOX to IOC is called a request frame, and a frame sent from IOC to IOX is called a response frame.



IOC, receiving a Request Frame, makes processing according to the content of the frame, and sends a Response Frame when it terminates.



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#### 4. REQUEST FRAME

According to the content of DH1, Request Frames can be classified as follows:

##### 4.1 Basic request frame

DH0	DH1	DH2	Meaning
00	01	-	Demand for the device's status information
60	02	0D	Demand for the device's initialization (Bill information setting)
60	03	15	Demand for bill count
60	05	01	Demand for bill transportation
60	06	01	Demand for bill retrieval
60	09	15	Demand for bill count + bill transportation to the front side
60	0A	15	Demand for bill count + bill transportation to the rear side
60	0E	01	Demand for device information read
		29	Demand for device information write
60	0F	01	Demand for bill diagnosis
00	10	-	Demand for cancel
60	11	15	Demand for automatically rejected bill count
60	12	01	Demand for log data read/initialization (No msg.)
		29	Demand for log data read/initialization (With msg.)
60	14	05	Demand for sensor transition detection

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#### 4.2 Enhanced request frame

DH0	DH1	DH2	DH3	Meaning
60	01	FF	0001	Demand for the device's status information
60	02	FF	001A	Demand for the device's initialization (Bill information setting)
60	03	FF	002C	Demand for bill count
60	05	FF	0001	Demand for bill transportation
60	06	FF	0001	Demand for bill retrieval
60	09	FF	002C	Demand for bill count + bill transportation to the front side
60	0A	FF	002C	Demand for bill count + bill transportation to the rear side
60	0E	FF	0001	Demand for device information read
			0029	Demand for device information write
60	0F	FF	0001	Demand for bill diagnosis
60	10	FF	0001	Demand for cancel
60	11	FF	002C	Demand for automatically rejected bill count
60	12	FF	0001	Demand for log data read/initialization (No msg.)
			0029	Demand for log data read/initialization (With msg.)
60	13	FF	0002	Demand for operational log data read
60	14	FF	000A	Demand for sensor transition detection
60	D1	FF	****	Demand for program load
60	D2	FF	001C	Demand for program load end
60	D4	FF	001A	Demand for program reset

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## 5. RESPONSE FRAME

Response frames are divided into positive response and negative response.  
Each format is mentioned as follows:

### 5.1 Positive Response Frame

#### 5.1.1 Basic positive response frame

DH0	DH1	DH2	Meaning
E0	01	24	The Device's status information
E0	02	34	Normal termination of the device's initialization
E0	03	99	Normal termination of bill count
E0	05	25	Normal termination of bill transportation
E0	06	25	Normal termination of bill retrieval
E0	09	99	Normal termination of bill count + bill transportation to the front side
E0	0A	99	Normal termination of bill count + bill transportation to the rear side
E0	0E	81	Device information
E0	0F	35	Normal termination of bill diagnosis
E0	10	**	Normal termination of cancel (DH2 depends on what command was cancelled)
E0	11	99	Normal termination of automatically rejected bill count
E0	12	CD	Information of log data read/initialization
E0	14	24	Normal response of status change

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### 5.1.2 Enhanced positive response frame

DH0	DH1	DH2	DH3	Meaning
E0	01	FF	0054	The Device's status information
E0	02	FF	0064	Normal termination of the device's initialization
E0	03	FF	0132	Normal termination of bill count
E0	05	FF	0055	Normal termination of bill transportation
E0	06	FF	0055	Normal termination of bill retrieval
E0	09	FF	0132	Normal termination of bill count + bill transportation to the front side
E0	0A	FF	0132	Normal termination of bill count + bill transportation to the rear side
E0	0E	FF	00B1	Device information
E0	0F	FF	0075	Normal termination of bill diagnosis
E0	10	FF	****	Normal termination of cancel (DH3 depends on what command was cancelled)
E0	11	FF	0132	Normal termination of automatically rejected bill count
E0	12	FF	017D	Information of log data read/initialization
E0	13	FF	0454	Normal response of operational log data read
E0	14	FF	0054	Normal response of status change
E0	D1	FF	0054	Normal termination of program load
E0	D2	FF	0054	Normal termination of program load end
E0	D4	FF	0054	Normal termination of program reset

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## 5.2 Negative Response Frame

### 5.2.1 Basic negative response frame

DH0	DH1	DH2	Meaning
F0	00	02	Undefined DH* Request-Frame received
F0	01	24	Device's status information incapable
F0	02	34	Abnormal termination of the device's initialization
F0	03	99	Abnormal termination of bill count
F0	05	25	Abnormal termination of bill transportation
F0	06	25	Abnormal termination of bill retrieval
F0	09	99	Abnormal termination of bill count + bill transportation to the front side
F0	0A	99	Abnormal termination of bill count + bill transportation to the rear side
F0	0E	81	Device information
F0	0F	35	Abnormal termination of bill diagnosis
F0	10	**	Abnormal termination of cancel (DH2 depends on what command was cancelled)
F0	11	99	Abnormal termination of automatically rejected bill count
F0	12	CD	Information of log data read/initialization
F0	14	24	Abnormal termination of sensor transition detection

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### 5.2.2 Enhanced negative response frame

DH0	DH1	DH2	DH3	Meaning
F0	01	FF	0054	Device's status information incapable
F0	02	FF	0064	Abnormal termination of the device's initialization
F0	03	FF	0132	Abnormal termination of bill count
F0	05	FF	0055	Abnormal termination of bill transportation
F0	06	FF	0055	Abnormal termination of bill retrieval
F0	09	FF	0132	Abnormal termination of bill count + bill transport to the front side
F0	0A	FF	0132	Abnormal termination of bill count + bill transport to the rear side
F0	0E	FF	00B1	Device information
F0	0F	FF	0075	Abnormal termination of bill diagnosis
F0	10	FF	****	Abnormal termination of cancel (DH3 depends on what command was cancelled)
F0	11	FF	0132	Abnormal termination of automatically rejected bill count
F0	12	FF	017D	Information of log data read/initialization
F0	13	FF	0454	Abnormal termination of operational log data read
F0	14	FF	0054	Abnormal termination of sensor transition detection
F0	D1	FF	0054	Abnormal termination of program load
F0	D2	FF	0054	Abnormal termination of program load end
F0	D4	FF	0054	Abnormal termination of program reset

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## 6. STATUS CHANGE DETECTION

Cassette set status is checked during command processing and watched by Sensor Transition Detection command.

During command processing, number of cassette set status changes is counted and reported.

In Sensor Transition Detection command, a normal response will be sent when a change is detected of a sensor which is specified by the parameter.

Cassette status change from its last reported status is detected as a change.

Process in each command when a cassette set status change is detected is listed below.

COMMAND	PROCESS
Device's Status Information Device's Initialization Bill Count Bill Transportation Bill Retrieval Bill Count + Bill transportation to the front side Bill Count + Bill transportation to the rear side Device Information Bill Diagnosis Cancel Automatically Rejected Bill Count Log Data Read/Initialization Operational Log data read	Report number of changes at end
Sensor Transition Detection	Send an normal response when specified sensor changed
Program Load Program Load end Program Reset	Ignored.

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## 7. EXPLANATION OF REQUEST FRAME

### 7.1 Demand for the Device's Status Information

This command reports the status of sensors, cassettes and so on for F56-BDU.

#### a. Request frame

##### ① Basic request frame

DH0	DH1	FS
00	01	1C

##### ② Enhanced request frame

DH0	DH1	DH2	RSV	DH3	RSV	FS
60	01	FF		0001		1C

#### b. Action

- Check received frame format (FS).
- IOC investigates the status of the device according to information from each sensor and others.
- Set in the Response Register concerning denomination setting of cassettes, bill information, and sensor information.

#### c. Others

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## 7.2 Demand for the Device's Initialization

This command initializes F56-BDU and is therefore required immediately after power-on or to recover from an error state. It also specifies bill information setting for each cassette.

### a. Request frame

#### ① Basic request frame

DH0	DH1	DH2	ODR	L1		L2		L3		L4		T1	T2	T3	T4	FS	
60	02	0D															1C

#### ② Enhanced request frame

DH0	DH1	DH2	RSV	DH3	ODR		L1		L2		L3		L4	
60	02	FF		001A										

T1	T2	T3	T4	L5		L6		L7		L8		T5	T6	T7	T8	FS	
																	1C

L1: 1st cassette bill length information

L2: 2nd cassette bill length information

L3: 3rd cassette bill length information

L4: 4th cassette bill length information

T1: 1st cassette bill thickness information

T2: 2nd cassette bill thickness information

T3: 3rd cassette bill thickness information

T4: 4th cassette bill thickness information

L5: 5th cassette bill length information

L6: 6th cassette bill length information

L7: 7th cassette bill length information

L8: 8th cassette bill length information

T5: 5th cassette bill thickness information

T6: 6th cassette bill thickness information

T7: 7th cassette bill thickness information

T8: 8th cassette bill thickness information

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ODR	b15	b8	b7					b0							
Basic command								*4	*3					*2	*1
Enhanced command								*4	*3					*2	*1

\*1 Front Shutter action 0: Shutter open/close  
1: No shutter action

\*2 Rear Shutter action 0: Shutter open/close  
1: No shutter action

**\*3, \*4 Special specification**

b7	b6	Specification
0	0	Normal Specification
0	1	Australia and New Zealand dollar Specification
1	0	Reserved
1	1	Reserved

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b. Action

- Check format of received frame (DH2, FS).
- If checksum error of log data is detected, initialize log data
- Check if bill length information is assigned zero for each cassette. Treat as absent for the cassette with zero assigned.
- Check if bill length information is assigned "0xff" for each cassette. Bill information on the cassette for which "0xff" is specified is set from the bill diagnosis data.
- Check if bill length/thickness information is valid.
- Close the shutter if it is open. (With option shutter)
- Initialize the pool section.
- If any bill is left at exit, retrieve it into the device and set RTVBL bit (bit0) of Status Register 1 in the response frame.
- Run the transport motor in the reject any bill remaining in the device. Check thickness sensor while running the motor. If any bill is detected by Reject sensor, set REJBL bit (bit1) of Status Register 1 in the response frame.
- Set the bill pool section to its home position.
- Check if any bill is left in the device.
- Check photo sensors operation by checking the photo sensor levels.

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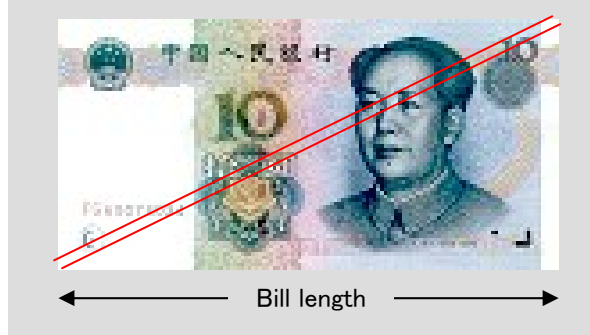
						TITLE		F56-BDU D-LEVEL SPECIFICATIONS	
						DRAW. NO.		A3KD03234-0001	
								CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION				
DESIG.			CHECK			APPR.	FUJITSU FRONTECH LTD.		S H E E T
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c. Others

- Parameters

Bill information:

Cassette bill length information in 2-byte HEX-code



Cassette bill thickness information in 1-byte HEX-code

The content of bill length information (2-byte) is bill length long (1-byte) + bill length short (1-byte) and specified in "mm".

Bill length parameter L1-L8 (2-bytes field).

1st byte = Maximum length.

2nd byte = Minimum length.

Bill-length-long means maximum length in measuring, and bill-length-short means minimum length in measuring. Bill thickness information is used in order to make thickness-sensing level changeable. It is specified in 0.01 mm unit.

Valid range of bill information is:

**【F56P】**

1st Cassette ~ 6th Cassette (Settings for card not supported)

Bill length information: 110 to 175 (mm) (6E to AF in HEX)

Bill thickness information: 9 to 20 (x0.01mm) (09 to 14 in HEX)

**【F56S】**

1st Cassette, 3rd Cassette ~ 6th Cassette (Settings for card not supported)

Bill length information: 110 to 187 (mm) (6E to BB in HEX)

Bill thickness information: 9 to 20 (x0.01mm) (09 to 14 in HEX)

**2nd Cassette**

Bill length information: 76 to 180 (mm) (4C to B4 in HEX)

Bill thickness information: 9 to 30 (x0.01mm) (09 to 1E in HEX)

- Before this command is issued, commands which require the parameter (Bill count and Automatically rejected bill count) will not work.

Note: If bill information parameter is invalid, the last value set is effective.

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DESIG.			CHECK		APPR.	FUJITSU FRONTTECH LTD.		SHEET	22 / 102

### 7.3 Demand for Bill Count

This command feeds a bill one by one from a specified cassette and transports it to the pool section (For F56S, this will be the tray section). It terminates successfully when the count of a specified number of bills completes.

#### a. Request frame

##### ① Basic request frame

DH0	DH1	DH2	ODR	N1	N2	N3	N4	R1	R2	R3	R4	P1	P2	P3	P4	FS
60	03	15														1C

##### ② Enhanced request frame

DH0	DH1	DH2	RSV	DH3	ODR	N1	N2	N3	N4	R1	R2	R3	R4
60	03	FF		002C									

P1	P2	P3	P4	N5	N6	N7	N8	R5	R6	R7	R8	P5	P6	P7	P8	FS
																1C

ODR: Counting order assignment

N1: 1st the number of bills to count

N2: 2nd the number of bills to count

N3: 3rd the number of bills to count

N4: 4th the number of bills to count

R1: 1st max number of count reject

R2: 2nd max number of count reject

R3: 3rd max number of count reject

R4: 4th max number of count reject

P1: Pick retries of 1st count

P2: Pick retries of 2nd count

P3: Pick retries of 3rd count

P4: Pick retries of 4th count

N5: 5th the number of bills to count

N6: 6th the number of bills to count

N7: 7th the number of bills to count

N8: 8th the number of bills to count

R5: 5th max number of count reject

R6: 6th max number of count reject

R7: 7th max number of count reject

R8: 8th max number of count reject

P5: Pick retries of 5th count

P6: Pick retries of 6th count

P7: Pick retries of 7th count

P8: Pick retries of 8th count

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DESIG.			CHECK		APPR.	
					FUJITSU FRONTECH LTD.	
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b. Action

- Check format of received frame (DH2, FS).
- Check counting parameter.
- Verify that the shutter is closed. (With option shutter)
- Verify that the pool section is at home position.
- Drive the main motor and check for normal revolving. At this time the gate is set toward reject. If any bill is detected by Reject sensor, set REJBL bit (bit1) of Status Register in the response frame.
- Check if any bill is left in the device.
- Check the photo sensors operation by checking the photo sensor levels.
- Send bills out of the cassette to pool section according to the parameter.
- Check a bill and if any fault (length, spacing, thickness) is found, reject the bill.
- If counting has not been completed, terminate this command with counted bills remain in pool section.
- If requested bills have been counted successfully, terminate this command with counted bills remain in pool section.

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DESIG.			CHECK			APPR.	FUJITSU FRONTECH LTD.		S H E E T
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c. Others

- Parameters

(1) Count order assignment

① Basic command

b7

1st counting assignment	2nd counting assignment	3rd counting assignment	4th counting assignment
-------------------------------	-------------------------------	-------------------------------	-------------------------------

b0

- 00: 4th cassette
- 01: 3rd cassette
- 10: 2nd cassette
- 11: 1st cassette

② Enhanced command

b31

1st counting assignment	2nd counting assignment	3rd counting assignment	4th counting assignment	5th counting assignment	6th counting assignment	7th counting assignment	8th counting assignment
-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------

b0

The cassette which does not count is set '00' to the number of bills to count.

- 1000: 8th cassette
- 1001: 7th cassette
- 1010: 6th cassette
- 1011: 5th cassette
- 1100: 4th cassette
- 1101: 3rd cassette
- 1110: 2nd cassette
- 1111: 1st cassette

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- The cassette which does not count is set '00' to the number of bills to count.
- The BDU does not count when this area is not this specification.

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(2) Number of bills to count

In ISO code with even parity, two-digit decimal (Maximum 20 sheets)

Number	0	1	2	3	4	5	6	7	8	9
Code (HEX)	30	B1	B2	33	B4	35	36	B7	B8	39

(3) Maximum number of count rejects

In ISO code with even parity, two-digit decimal (Maximum 20 retries)

(4) Pick retries of a count

In HEX code, maximum 15 (0FH) (If out of valid range, assume 2 retries)

- If 'max number of count reject' is exceeded during counting, terminate counting and send negative response after rejecting the error bill.
- If 'max number of count reject' "0" is specified, terminate without any retry upon detecting any count error.
- Number of retries on error is 'Pick retries of a count' (per each cassette) for pick failures and max number of count reject' (per each cassette) for count errors. For auto-reject on jam, it is fixed to be 2.

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**The high-level side will verify if there are any bills remaining in the bill pool section before the Bill Count Request is issued at the start of a transaction.**

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DESIG.			CHECK		APPR.	FUJITSU FRONTECH LTD.	
						SHEET	26 / 102

## 7.4 Demand for Bill Transportation

This command transports bills stored in the pool section and waits for them to be removed by a user.  
Available for F56P only.

### a. Request Frame

#### ① Basic request frame

DH0	DH1	DH2	OPR	FS
60	05	01		1C

#### ② Enhanced request frame

DH0	DH1	DH2	RSV	DH3	OPR	FS
60	05	FF		0001		1C

OPR: Operation Type:

b7	b6	b5	b4	b3	b2	b1	b0
Action	Discharged amount			Operation			
0: Front 1: Rear	0: Standard 1: Standard + 5mm 2: Standard + 10mm 3: Standard + 15mm 4: Standard + 20mm 5~6: Standard 7: Push out(for test)			0: Deliver 1: Watch bills to be removed 2: Unconditionally close shutter 3: Unconditionally open shutter			

Please specify the discharged amount by the user responsibility.

### b. Action

- Check format of received frame (DH2, FS).
- Check validity of operation type.

#### In case of deliver (Operation type = X0h):

- Check if medium exists pool section. (If no, report no bill error.)
- Move pool section to its up position.
- Open shutter if it is closed. (With option shutter)
- Deliver bills to the customer.

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**In case of watching bills to be removed (Operation type = X1h):**

- Watch until bills are removed or cancel command is received.
- If bills are removed, close shutter. (With option shutter)
- Return pool section to its home position.

**In case of unconditional shutter closing (Operation type = 02h, 82h):**

- Close shutter regardless of existence of bills at exit.

**In case of unconditional shutter opening (Operation type = 03h, 83h):**

- Open shutter regardless of existence of bills at exit.

c. Others

- After delivering bills, cancel command is checked first before watching bills to be removed.

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DESIG.			CHECK		APPR.				

## 7.5 Demand for Bill Retrieval

This command stores transported bills into the pool section or Capture box (option)  
Available for F56P only.

### a. Request Frame

#### ① Basic request frame

DH0	DH1	DH2	OPR	FS
60	06	01		1C

#### ② Enhanced request frame

DH0	DH1	DH2	RSV	DH3	OPR	FS
60	06	FF		0001		1C

OPR: Operation Type:

00H: (Front) Retrieve bills at EJSF sensor to pool section.

01H: (Front) Store into rear Capture BOX (Option)

80H: (Rear) Retrieve bills at EJSR sensor to pool section.

81H: (Rear) Store into front Capture BOX (Option)

### b. Action

- Check format of received frame (DH2, FS).
- Check validity of operation type.

#### In case of retrieve to pool section:

- Take in bills to just pool section.
- Set the pool section to home position.

#### In case of store into Capture BOX (Option):

- Take in bills and reject them.
- Set the pool section to home position.

### c. Others

						TITLE		F56-BDU D-LEVEL SPECIFICATIONS	
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						CUST			
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DESIG.			CHECK		APPR.	FUJITSU FRONTECH LTD.		SHEET	29 / 102

## 7.6 Demand for Bill Count + Bill transportation to the front side

This command is a combination of bill count command and bill transport command (parameter: 00). Available for F56P only.

### a. Request frame

#### ① Basic request frame

DH0	DH1	DH2	ODR	N1	N2	N3	N4	R1	R2	R3	R4	P1	P2	P3	P4	FS
60	09	15														1C

#### ② Enhanced request frame

DH0	DH1	DH2	RSV	DH3	ODR	N1	N2	N3	N4	R1	R2	R3	R4
60	09	FF		002C									

P1	P2	P3	P4	N5	N6	N7	N8	R5	R6	R7	R8	P5	P6	P7	P8	FS
																1C

The parameters for “Demand for Bill Count + Bill transport to the front side” are the same as those for “Demand for Bill Count”.

### b. Action

- Check format of received frame (DH2, FS).
- Check counting parameter.
- Verify that the shutter is closed. (With option shutter)
- Verify that the pool section is at home position.
- Drive the main motor and check for normal revolving. At this time the gate is set toward reject. If any bill is detected by Reject sensor, set REJBL bit (bit1) of Status Register in the response frame.
- Check if any bill is left in the device.
- Check the photo sensors operation by checking the photo sensor levels.
- Send bills out of the cassette to pool section according to the parameter.
- Check a bill and if any fault (length, spacing, thickness) is found, reject the bill.

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						CUST	
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DESIG.			CHECK		APPR.	FUJITSU FRONTECH LTD.	
							SHEET
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- If counting has not been completed, terminate this command with counted bills remain in pool section.
- Move pool section to its up position.
- Deliver bills to the customer (Front).

c. Others

- Even if a cancel command is issued during bill counting, the device completes the counting and then check the command before transporting bills. Counted bills will then be in the pool section.

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						TITLE		F56-BDU D-LEVEL SPECIFICATIONS			
						DRAW. NO.			CUST		
						A3KD03234-0001					
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DESIG.			CHECK			APPR.	FUJITSU FRONTTECH LTD.				

## 7.7 Demand for Bill Count + Bill transportation to the rear side

This command is a combination of bill count command and bill transport command (parameter:80). Available for F56P only.

### a. Request frame

#### ① Basic request frame

DH0	DH1	DH2	ODR	N1	N2	N3	N4	R1	R2	R3	R4	P1	P2	P3	P4	FS
60	0A	15														1C

#### ② Enhanced request frame

DH0	DH1	DH2	RSV	DH3	ODR	N1	N2	N3	N4	R1	R2	R3	R4
60	0A	FF		002C									

P1	P2	P3	P4	N5	N6	N7	N8	R5	R6	R7	R8	P5	P6	P7	P8	FS
																1C

The parameters for “Demand for Bill Count + Bill transport to the rear side” are the same as those for “Demand for Bill Count”.

### b. Action

- Check format of received frame (DH2, FS).
- Check counting parameter.
- Verify that the shutter is closed. (With option shutter)
- Verify that the pool section is at home position.
- Drive the main motor and check for normal revolving. At this time the gate is set toward reject. If any bill is detected by Reject sensor, set REJBL bit (bit1) of Status Register in the response frame.
- Check if any bill is left in the device.
- Check the photo sensors operation by checking the photo sensor levels.
- Send bills out of the cassette to pool section according to the parameter.
- Check a bill and if any fault (length, spacing, thickness) is found, reject the bill.

						TITLE		F56-BDU D-LEVEL SPECIFICATIONS	
						DRAW. NO.		A3KD03234-0001	
						CUST			
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION				
DESIG.			CHECK		APPR.	FUJITSU FRONTECH LTD.			
						SHEET		32 / 102	



- If counting has not been completed, terminate this command with counted bills remain in pool section.
- Move pool section to its up position.
- Deliver bills to the customer (Rear).

c. Others

- Even if a cancel command is issued during bill counting, the device completes the counting and then check the command before transporting bills. Counted bills will then be in the pool section.

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						TITLE		F56-BDU D-LEVEL SPECIFICATIONS	
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								CUST	
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DESIG.			CHECK			FUJITSU FRONTTECH LTD.		SHEET	33 / 102

## 7.8 Demand for Device Information Read/Write

This command is used to know device information.

### a. Request frame

#### ① Basic request frame

(Read)

DH0	DH1	DH2	OPR	FS
60	0E	01	00	1C

(Write)

DH0	DH1	DH2	OPR	MSG	FS
60	0E	29	01	User setting data (40 bytes)	1C

#### ② Enhanced request frame

(Read)

DH0	DH1	DH2	RSV	DH3	OPR	FS
60	0E	FF		0001	00	1C

(Write)

DH0	DH1	DH2	RSV	DH3	OPR	MSG	FS
60	0E	FF		0029	01	User setting data (40 bytes)	1C

### b. Action

- Check format of received frame (DH2, FS)
- Check if operation type is valid.
- Send device information data response.

### c. Others

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## 7.9 Demand for Bill Diagnosis

This command is used to diagnose the bill.

The length of the bill and the thickness of the bill of each cassette are calculated by this command.

### a. Request frame

#### ① Basic request frame

DH0	DH1	DH2	OPR	FS
60	0F	01		1C

#### ② Enhanced request frame

DH0	DH1	DH2	RSV	DH3	OPR	FS
60	0F	FF		0001		1C

OPR: Operation Type:

00H: Diagnosis of set cassette

01H: Diagnosis of the 1st cassette

02H: Diagnosis of the 2nd cassette

03H: Diagnosis of the 3rd cassette

04H: Diagnosis of the 4th cassette

05H: Diagnosis of the 5th cassette

06H: Diagnosis of the 6th cassette

07H: Diagnosis of the 7th cassette

08H: Diagnosis of the 8th cassette

09H: The diagnosis data is read

10H: Initialization of diagnosis data

20H: Denomination registration

### b. Action

- Check format of received frame (DH2, FS)
- Check if operation type is valid.

#### In case of OPR = 0x00 (Diagnosis of set cassette):

- The set cassette is checked.
- 20 bills are count from the set cassette. (The count bill is transported to the reject box.)
- The diagnosis data (bill length/bill thickness) is notified.

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**In case of OPR = 0x01(Diagnosis of the 1st cassette)~0x08(Diagnosis of the 8th cassette):**

- 20 bills are count from the specified cassette. (The count bill is transported to the reject box.)
- The diagnosis data (bill length/bill thickness) is notified.

**In case of OPR = 0x10 (The diagnosis data is read):**

- Send diagnosis data response.

**In case of OPR = 0x11 (Initialization of diagnosis data):**

- The diagnosis data that BDU maintains is cleared.

**In case of OPR = 0x20 (Denomination registration):**

- The denomination of the set cassette is registered.
- The registered denomination is checked with the denomination of the cassette set at the initialization command.

c. Others

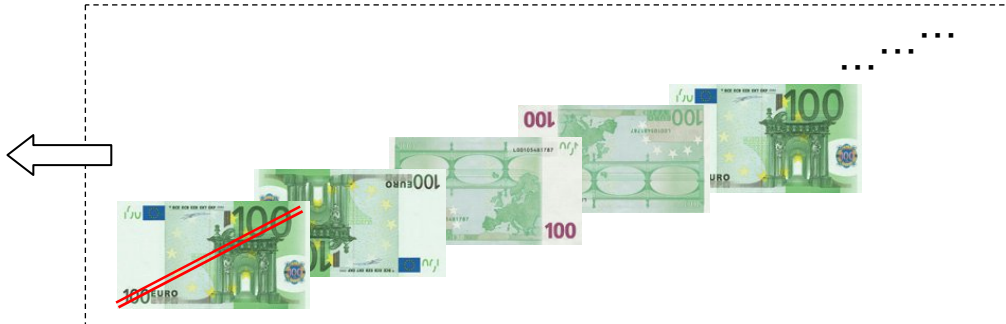
- The size of the bill that can be diagnosed is as follows.  
Thickness : 0.10mm ~ 0.15mm

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**Attention !**

- When RAS"31", RAS"33" and L-RAS"B" is executed, the diagnosis data is cleared.
- Execute RAS"31"/bill diagnosis again when you exchange the control board.
- Set the bill as follows, and diagnose the bill.



- When the reject bill is generated by the diagnosis data
  - (1) Re-execution of RAS"31"/bill diagnosis
  - (2) Bill information is specified without using the diagnosis data.

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DESIG.			CHECK		APPR.	FUJITSU FRONTECH LTD.	
						SHEET	37 / 102

## 7.10 Demand for Cancel

This command is used mainly to cancel the status of the device waiting for bills to be removed by a user.

### a. Request Frame

#### ① Basic request frame

DH0	DH1	FS
00	10	1C

#### ② Enhanced request frame

DH0	DH1	DH2	RSV	DH3	RSV	FS
60	10	FF		0001		1C

### b. Action

- Terminate processing of a request frame.

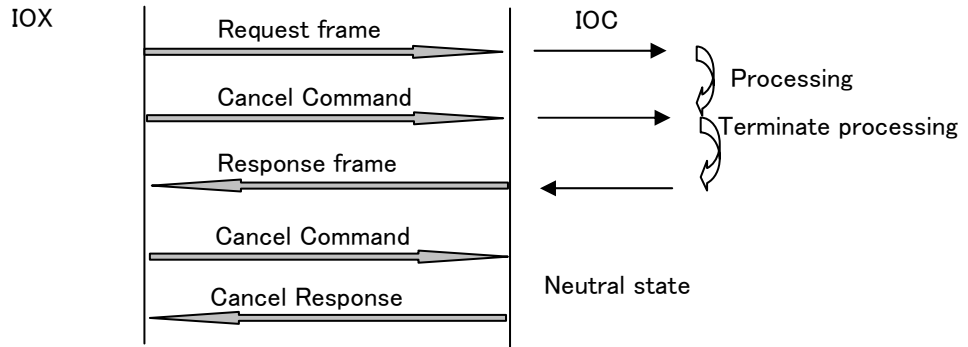
### c. Others

- Upon receiving cancel command during processing a received request frame, IOC performs following process.

COMMAND	PROCESS
Demand for the Device's Status Information Demand for the Device's Initialization Demand for Bill Count Demand for Bill Transportation Demand for Bill Retrieval Demand for Bill Count + Bill transport to the front side Demand for Bill Count + Bill transport to the rear side Demand for Automatically Rejected Bill Count Demand for Device Information read/write Demand for Bill Diagnosis Demand for Operational Log data read	Complete processing and return response with cancel command DH1.
Demand for Bill Transportation (parameter 01,81)	Terminate the command and return response with cancel command DH1. If delivering bills to the customer complete delivering then terminate.
Demand for Sensor Transition Detection	Terminate the command and return response with cancel command DH1.

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- Accept cancel command during processing any request frame.
- The response frame format is the one of the command which was being processed and with DH1 of cancel code (10H).
- Return cancel response if cancel command is received in neutral state.



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## 7.11 Demand for Automatically Rejected Bill Count

This command feeds bills from cassettes and transports them to Reject tray. This is a command used for maintenance.

### a. Request frame

#### ① Basic request frame

DH0	DH1	DH2	ODR	N1	N2	N3	N4	R1	R2	R3	R4	P1	P2	P3	P4	FS
60	11	15														1C

#### ② Enhanced request frame

DH0	DH1	DH2	RSV	DH3	ODR	N1	N2	N3	N4	R1	R2	R3	R4
60	11	FF		002C									

P1	P2	P3	P4	N5	N6	N7	N8	R5	R6	R7	R8	P5	P6	P7	P8	FS
																1C

• The parameter is the same as with the demand for bill count command.

### b. Action

- Check format of received frame (DH2, FS).
- Check counting parameter.
- Verify that shutter is closed. (With option shutter)
- Verify that the pool section is at home position.
- Drive the main motor and check for normal revolving. At this time the gate is set toward reject. If any bill was detected by Reject sensor, set REJBL bit (bit1) of Status Register 1 in response frame.
- Check if any bill is left in the device.
- Check the photo sensors operation by checking the photo sensor levels.
- Send bills out of the cassette according to the parameter.
- Check a bill (length, spacing, thickness), and reject the bill regardless of the result.

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						CUST			
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DESIG.			CHECK		APPR.	FUJITSU FRONTECH LTD.			
								SHEET	40 / 102



c. Others

- If a jam occurred, terminate this command without auto-reject operation.

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## 7.12 Demand for Log Data Read/Initialization

This command reads/initializes statistic information which F56-BDU holds. Recommended to use for maintenance.

### a. Request frame

#### ① Basic request frame

(Without message data)

DH0	DH1	DH2	OPR	FS
60	12	01		1C

(With message data)

DH0	DH1	DH2	OPR	MSG	FS
60	12	29		Message data (40 bytes)	1C

#### ② Enhanced request frame

(Without message data)

DH0	DH1	DH2	RSV	DH3	OPR	FS
60	12	FF		0001		1C

(With message data)

DH0	DH1	DH2	RSV	DH3	OPR	MSG	FS
60	12	FF		0029		Message data (40 bytes)	1C

OPR: Operation Type:

00H: Read only

01H: Clear error counter and retry counter

02H: Clear pick counter

03H: Clear all counters (error, retry, pick)

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b. Action

- Check format of received frame (DH2, FS)
- Check if operation type is valid.
- Send log data response.
- If message data is given, replace the log message data.
- Clear specified log data (error counter, retry counter, pick counter).

c. Others

- Any binary or text data can be given as message data. To be used for counter operation history etc.
- If log data checksum error is detected, return negative response. Checksum error is cleared by initialization command.

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### 7.13 Demand for Operational Log data read

This command acquires information to analyze the cause of the error which BDU detected. (Acquire this information immediately after generation of the error.)

The frame is only Enhanced request frame.

a. Request Frame

Enhanced request frame

DH0	DH1	DH2	RSV	DH3	P1	P2	FS
60	13	FF		0002			1C

P1: Data type

- 0x00: Measured information
- 0x01: Operational log
- 0x02: Command/ Response log
- 0x03: Thickness information
- 0xFF: All information deletion

P2: Block No.

- 0x00~0x07: Measured information
- 0x00~0x07: Operational log
- 0x00~0x03: Command/ Response log
- 0x00~0x01: Thickness information
- 0xFF: Information deletion specified with P1.

b. Action

- Check format of received frame (DH2, FS).
- Check validity of P1 and P2.
- The data specified with P1 is delimited every 1024 bytes depending on the number specified with P2 and transmitted.

c. Others

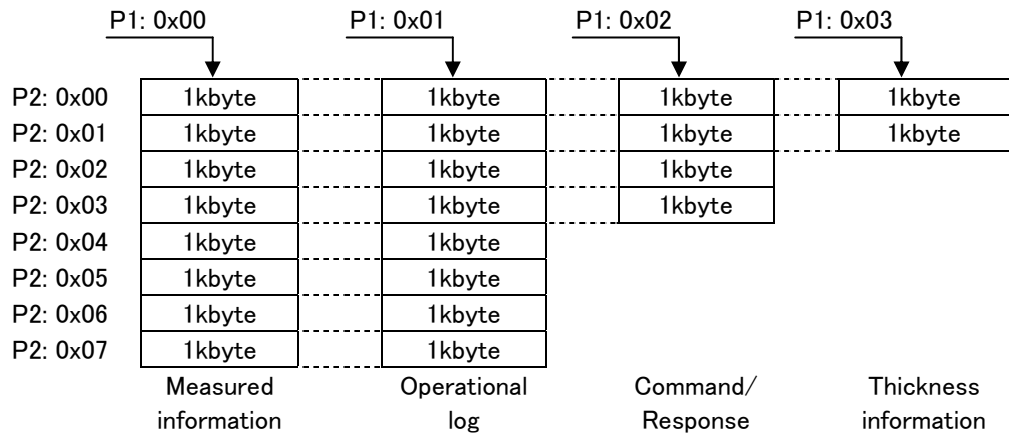
The size of each data is as follows.

Data type	Data size	All data reception frequency	P1	P2
Measured information	8 Kbyte	8 times	0x00	0x00~0x07
Operational log	8 Kbyte	8 times	0x01	0x00~0x07
Command/ Response log	4 Kbyte	4 times	0x02	0x00~0x03
Thickness information	2 Kbyte	2 times	0x03	0x00~0x01

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Data organization



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DESIG.			CHECK	APPR.					

## 7.14 Demand for Sensor Transition Detection

This command monitors sensor status and sends a response when detecting a change in the status. This contributes to a reduction in PC's responsibility and is used for monitoring sensor status while waiting for a customer for instance.

### a. Request frame

#### ① Basic request frame

DH0	DH1	DH2	Sensor Mask					FS
60	14	05	(1)	(2)	(3)	(4)	(9)	1C

#### ② Enhanced request frame

DH0	DH1	DH2	RSV	DH3	Sensor Mask						RSV	FS			
60	14	FF		000A	(1)	(2)	(3)	(4)	(5)	(6)	RSV	RSV	(9)		1C

(0: Ignore 1: Effective)

#### Sensor Mask (1)

b7	b6	b5	b4	b3	b2	b1	b0
—	—	—	NES1	BS1A	BS1B	BS1C	BS1D

#### Sensor Mask (2)

b7	b6	b5	b4	b3	b2	b1	b0
—	—	—	NES2	BS2A	BS2B	BS2C	BS2D

#### Sensor Mask (3)

b7	b6	b5	b4	b3	b2	b1	b0
—	—	—	NES3	BS3A	BS3B	BS3C	BS3D

#### Sensor Mask (4)

b7	b6	b5	b4	b3	b2	b1	b0
—	—	—	NES4	BS4A	BS4B	BS4C	BS4D

#### Sensor Mask (5)

b7	b6	b5	b4	b3	b2	b1	b0
—	—	—	NES5	BS5A	BS5B	BS5C	BS5D

#### Sensor Mask (6)

b7	b6	b5	b4	b3	b2	b1	b0
—	—	—	NES6	BS6A	BS6B	BS6C	BS6D

#### Sensor Mask (9)

b7	b6	b5	b4	b3	b2	b1	b0
EJSR	—	SOSR	SCSR	EJSF	—	SOSF	SCSF

\*1 SCSF, SOSF: Front option shutter

\*2 SCSR, SOSR: Rear option shutter

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b. Action

- If a change is detected of specified sensor, send normal response.

c. Others

- This command terminates by cancel command.

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DESIG.			CHECK		APPR.				

## 7.15 Demand for Program Load

This command is used to download the firmware for F56-BDU. For details, see the instructions on how to download the firmware on page 53.

### a. Request frame

This command is only supported by Enhanced request frame.

#### ① Enhanced request frame

DH0	DH1	DH2	RSV	DH3	Load Header	Download program	FS
60	D1	FF		****		(Max 1214Byte)	1C

FC : Function Code

C-Code: Continuance Code

D-Code: Discrimination Code

#### - Load Header (28byte)

FC	C-Code	RSV	D-Code	Data Length	Block No.	File name
2byte	2byte	2byte	2byte	ASCII HEX 4byte	ASCII DEC 4byte	ASCII 12byte
'0' '1'	'L' 'D'	'0' '0'	'H' '0'	* * * *	'0001-9999'	*****.PRG

Note1: Block No. is counted every one. ('0001-9999')

Note2: The file name uses the file name stored in download program.

(0x0020 (NO.03) (file name is RF56MAIN.PRG or UF56MAIN.PRG)

Note3: When the data length of the program file (NO.07:0x0034) is 00000000, the 'LD' code is not issued.

### b. Action

- Check format of received frame (DH2, FS).
- The program is stored, and the response of each frame is returned.

### c. Others

- It is necessary to issue end-code-LE to complete the download.  
(It is necessary to transmit the end-header.)
- When the downloaded program begins, it is necessary to transmit the start-header.

EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION	TITLE	DRAW. NO.	CUST
						F56-BDU D-LEVEL SPECIFICATIONS	A3KD03234-0001	
DESIG.			CHECK		APPR.	FUJITSU FRONTECH LTD.		48 / 102



Note)

1. When the downloading program receives the loading-header, the downloading processing of the continuing program is done.
2. When the downloading program receives the end-header, a negative response is returned.
3. A negative response is returned when block No. is wrong.
4. Down-loading program is sent each even number byte.
5. When the end-code 'LE' is received, the downloaded program is checked the sum. If sum value is correct, start-code 'RT' is waited.
6. The download program starts when the start-code RT is received.
7. When the start-code is received in the downloading processing, the downloading processing is interrupted.

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DESIG.			CHECK			APPR.	FUJITSU FRONTECH LTD.		S H E E T
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## 7.16 Demand for Program Load end

This command is used when the downloading of firmware is complete. For details, see the instructions on how to download the firmware on page 53.

### a. Request frame

This command is only supported by Enhanced request frame.

#### ① Enhanced request frame

DH0	DH1	DH2	RSV	DH3	Load End Header	FS
60	D2	FF		001C		1C

FC : Function Code

E-Code: End Code

D-Code: Discrimination Code

#### - Load End Header (28 byte)

FC	E-Code	RSV	D-Code	Data Length	Block No.	File name
2byte	2byte	2byte	2byte	ASCII HEX 4byte	ASCII DEC 4byte	ASCII 12byte
'0' '1'	'L' 'E'	'0' '0'	'H' '0'	0 0 1 0	'0001-9999'	*****.PRG

Note1: Block No. is counted every one. ('0001-9999')

Note2: The file name uses the file name stored in download program.

(0x0020 (NO.03) (file name is RF56MAIN.PRG or UF56MAIN.PRG)

Note3: When the data length of the program file (NO.07:0x0034) is 00000000, the 'LD' code is not issued.

### b. Action

- Check format of received frame (DH2, FS).

- Store download program to flash-ROM.

### c. Others

1) Issue this command after downloading ends.

2) The loading program is not started until the start code is received.

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					CUST			
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DESIG.			CHECK		APPR.	FUJITSU FRONTTECH LTD.		SHEET
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## 7.17 Demand for Program Reset

This command executes the downloaded firmware.

For details, see the instructions on how to download the firmware on page 53.

### a. Request frame

This command is only supported by Enhanced request frame.

#### ① Enhanced request frame

DH0	DH1	DH2	RSV	DH3	Start Header	FS
60	D4	FF		001A		1C

FC : Function Code

E-Code: End Code

D-Code: Discrimination Code

#### - Start Header

FC	E-Code	RSV	D-Code	Data Length	YY MM DD	Time
2byte	2byte	2byte	2byte	ASCII HEX 4byte	ASCII DEC. 8byte	ASCII DEC. 6byte
'0' '1'	'R' 'T'	'0' '0'	'1' '2'	0 0 0 E	'YYYYMMDD'	'HHMMSS'

### b. Action

- Check format of received frame (DH2, FS).
- Start the download program.

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### c. Others

- When download program is a loss, a negative response is returned. Version number information on the response sets ALL "0" as a number of loss versions.
- Issue the D4 command after executing download command D1/D2.

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					CUST	
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- The construct of download program

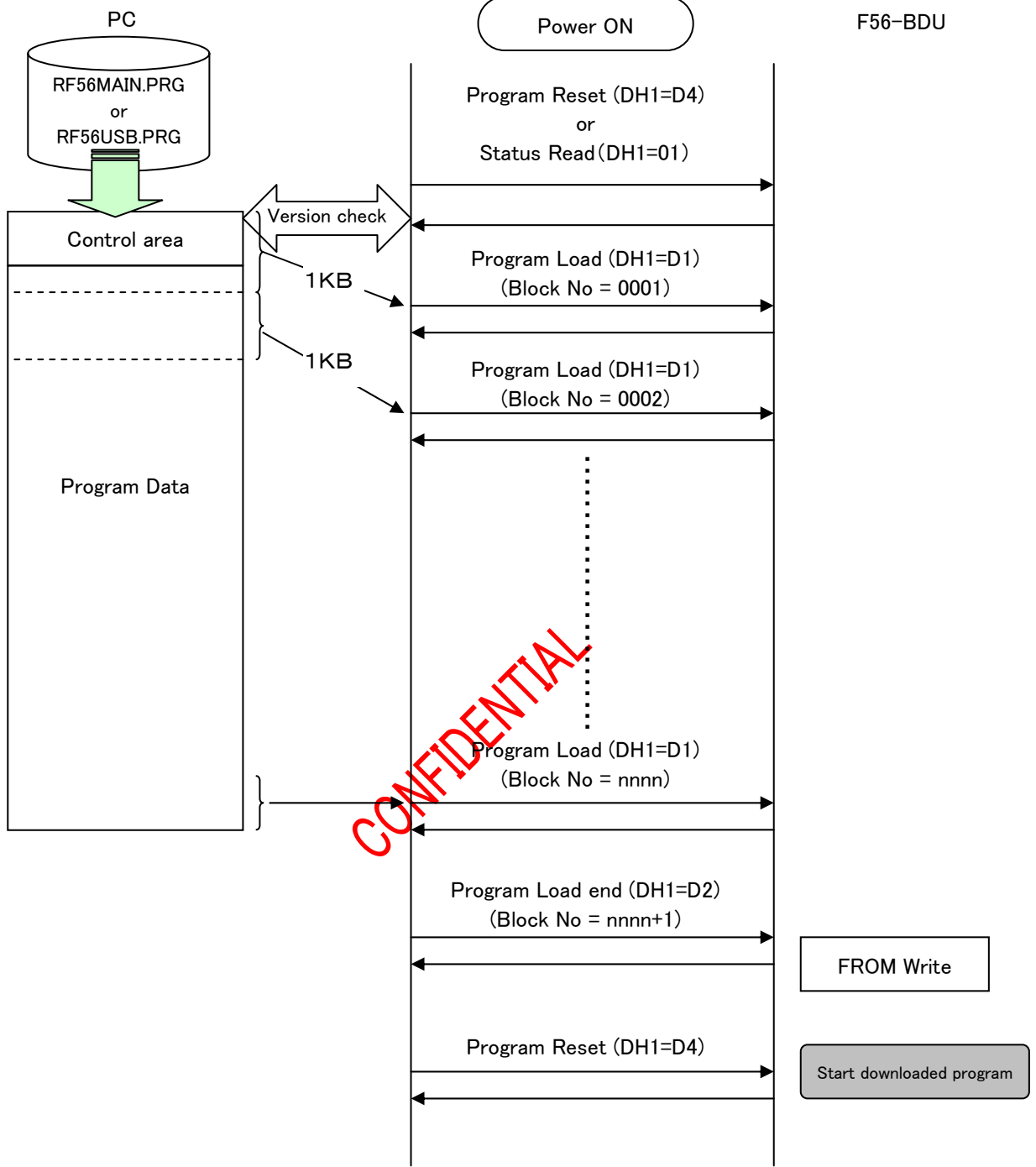


- Control area format

Offset	Content		Size	Note
0x0000	Date information	ASCII	6	YYMMDD
0x0006	Version information	ASCII	6	AAxxxx
0x000C	Option	ASCII	8	00000000
0x0014	(Reserve)	ASCII	12	000000000000
0x0020	File name	ASCII	12	RF56MAIN.PRG or UF56MAIN.PRG
0x002C	(Reserve)	ASCII	4	0000
0x0030	File kind	ASCII	2	00:Data 1x:MAIN 2x:SUB
0x0032	File attribute	ASCII	2	00:Fix
0x0034	Data size	ASCII	8	All byte number of download file (8digit:Decimal)
0x003C	(Reserve)	ASCII	4	0000
0x0040	Version-information	ASCII	128	All Rights Reserved, Copyright(c) FUJITSU FRONTECH LIMITED. 2005
0x00C0	(Reserve)	ASCII	16	0000000000000000
0x00D0	Check sum value	HEX	4	Complementary number of added long word size.
0x00D4	Start address	HEX	4	
0x00D8	(Reserve)	HEX	40	NULL code

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How to download the firmware



RF56MAIN.PRG: This download program doesn't support USB. (Only the RS232C interface)

RF56USB.PRG: This download program supports USB.

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DESIG.			CHECK		APPR.				

## 8. EXPLANATION OF RESPONSE FRAME

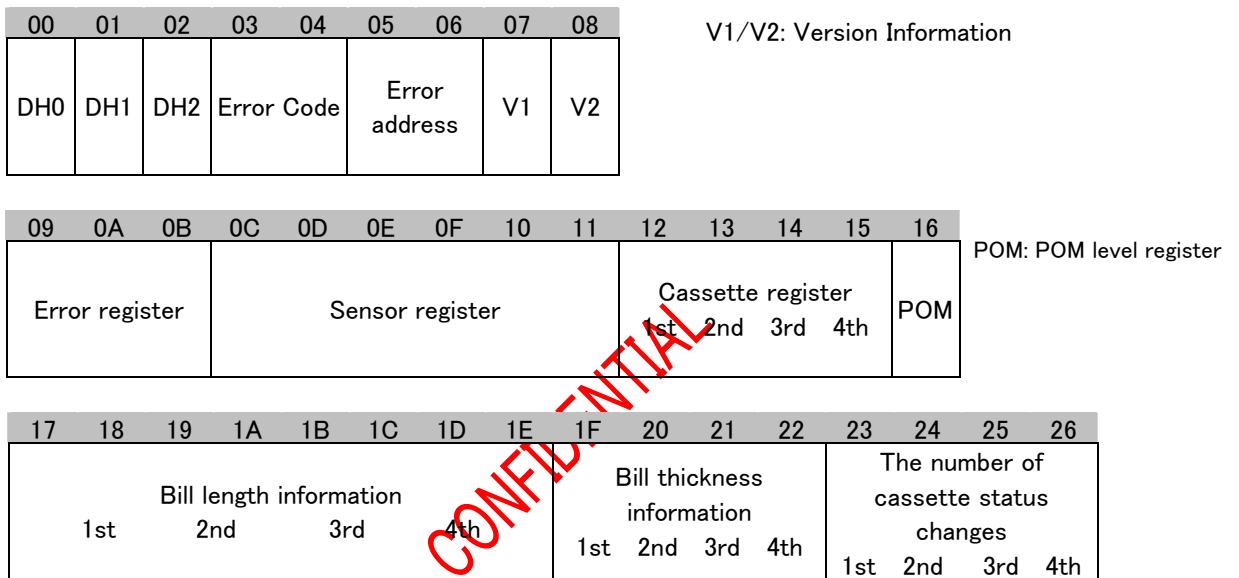
Concerning response frames, positive one and negative one are same in format but negative one contains error code and error address while those of positive response frame are all "00".

Concerning information contained by response frames, there are common part for all response frames and specific part for each command.

### 8.1 Basic response frame

#### 8.1.1 Common part of response frame

Common part of response frame is shown below. The HEX number above the figure shows the byte offset in the frame.



- Error code is listed in Section 12. It is X'0000' when no error.
- Error address identifies FW code address where the error was detected.
- The information of date and version are answered with the contents which the program load command informed to BDU.
- Error register, sensor register and cassette register are status registers which contain sensor information and status flags.
- POM level register shows the potentiometer output level of thickness sensor.
- Bill length information and bill thickness information are information given by initialization command.
- The number of cassette status changes is a 1-byte binary counter for each cassette.  
See Section 6 (STATUS CHANGE DETECTION) for detail.

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### 8.1.2 Command specific part of response frame

DH0 of positive response, DH1, DH2 and specific part of each command response is shown below. In case of negative response, DH0 is X'F0'.

- Device's status information (DH1 = 01)
- Cancel (DH1 = 10)
- Sensor transition detection (DH1 = 14)

00	01	02	03	26	27
E0 or F0	DH1	24	Common part		1C

- Bill transportation (DH1 = 05)
- Bill retrieval (DH1 = 06)

00	01	02	03	26	27	28
E0 or F0	DH1	25	Common part		OPR	1C

OPR: Operation type parameter of the request frame

- Devices initialization (DH1 = 02)

00	01	02	03	26
E0 or F0	02	34	Common part	

27	28	29	2A	2B	2C	2D	2E	2F	30	31	32	33	34	35	36	37
Sensor level information																1C
FDLS1	FDLS3	FDLS5	DFSS	BPS	BRS2	EJSR	BCS									
FDLS2	FDLS4	FDLS6	REJS	BRS1	BRS3	EJSF	(RSV)									

\*The sensor level information indicates light emission intensity sorted as follows:

- 2 ~ 8 : Normal
- 9 ~ 12 : Maintenance necessary (Cleaning)
- 13 ~ 14 : Error (Requires replacement)

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- Bill Diagnosis (DH1 = 0F)

00	01	02	03	26	27
E0 or F0	0F	35	Common part		OPR

↳ Operation type (Command parameter)

28	2B	2C	2F	30	33	34	37	38
Cassette 1 Diagnosis data		Cassette 2 Diagnosis data		Cassette 3 Diagnosis data		Cassette 4 Diagnosis data		1C

- The content of the bill diagnosis data is as follows.

	Meaning	
1st byte	Denomination	BSnA ~ BSnD
2nd byte	Length of average	Hex ex. 66mm⇒0x42
3rd byte	Thickness of average	Hex ex. 0.12mm⇒0x0C
4th byte	Reservation	

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- Device information read/write (DH1 = 0E)

00	01	02	03	26	27	28	4F
E0 or F0	0E	81	Common part			OPR	User setting data (40byte)

↳ Operation type (Command parameter)

50	5F	60	6F	70	83	84
Device information (16 byte)		Device setting information (16 byte)		Reservation(for serial #) (20 byte)		1C

- Operation type is the parameter given for the request frame.

Device information																
offset	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Meaning	Model name							Identification code				Reservation				
Content (ASCII)	F	5	3	SP	SP	SP	SP	SP	0	0	0	1	0	0	0	0
	F	5	6	SP	SP	SP	SP	SP	0	0	0	1	0	0	0	0

Device setting information		
offset	Meaning	Content (ASCII)
0		
1	Maximum number of sheets	"020"
2		
3	Machine setting	'0':Front , '1':Rear , '2':Dual service machine
4	Front option	'0':Not available, '1':Shutter, '2': Capture BOX
5	Rear option	'0':Not available, '1':Shutter, '2': Capture BOX
6	Jam retry control setting (RAS 46)	'0':Not available, '1':Available
7	BCS sensor	'0':Not available, '1':Available
8	Thickness adjustment value (RAS 31)	"-5"~"+5"
9		
10	ROM version	Ex. "01A"
11		
12		
13	Reject option	'0':Not available(Tray), '1':Available(Box)
14	Reserve	'0'
15	Reserve	'0'

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- Bill count (DH1 = 03)
- Bill count + Transport to the front side (DH1 = 09)
- Bill count + Transport to the rear side (DH1 = 0A)
- Automatically rejected bill count (DH1 = 11)

00	01	02	03	26
E0 or F0	DH1	99	Common part	

27	28	29	2A	2B	2C	2D	2E	2F	30	31	32	33	34	35	36
The number of counted bills								The number of bill rejections							
1st		2nd		3rd		4th		1st		2nd		3rd		4th	

37	46	47	56	57	66	67	76
Cassette 1 Statistical information		Cassette 2 Statistical information		Cassette 3 Statistical information		Cassette 4 Statistical information	

77	78	79	7A	7B	7C	7D	7E	7F	80	81	82	83	84	85	86	87
The number of bills to be counted (Command parameter)								Maximum number of count reject (Command parameter)								
1st		2nd		3rd		4th		1st		2nd		3rd		4th		

↳ Count order assignment (command parameter)

88	89	8A	8B
Max number of pick retries (Command parameter)			

8C	8D	8E	8F	90	91	92	93	94	95	96	97	98	99	9A	9B	9C
Sensor level information																
FDLS1	FDLS3	FDLS5	DFSS	BPS	BRS2	EJSR	BCS									1C
FDLS2	FDLS4	FDLS6	REJS	BRS1	BRS3	EJSF	(RSV)									

						TITLE F56-BDU D-LEVEL SPECIFICATIONS	
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DESIG.			CHECK		APPR.	FUJITSU FRONTECH LTD.	
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- The number of counted bills and the number of bill rejections are 2-digit decimal number in ISO code with even parity.
- Statistical information is binary counters of the command performance result including number of errors detected and number of retries taken.
- Count order assignment, the number of bills to be counted, maximum number of count reject and max number of pick retries are the parameters given for the request frame.
- Each statistical information contains following counters. The counters are cleared at the beginning of command processing.

Byte offset	00H	: Number of length long errors
	01H	: Number of length short errors
	02H	: (Reserved: 0FFH)
	03H	: Number of thickness errors
	04H	: Number of spacing errors
	05H	: Number of pick from wrong cassette errors
	06H	: Number of pick errors while bills not low
	07H	: Number of count unmatched errors
	08H	: Number of pick retries
	09H	: Number of count retries by count error
	0AH	: Number of retries after auto-reject
	0BH	: Number of jam errors
	0CH	: (Reserved: 0FFH)
	0DH	: (Reserved: 0FFH)
	0EH	: (Reserved: 0FFH)
	0FH	: (Reserved: 0FFH)

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DESIG.			CHECK		APPR.		

- Log data read/initialization

00	01	02	03	26	27	28	4F
E0 or F0	12	CD	Common part	OPR	Message data (40byte)		

↳ Operation type (Command parameter)

50	6F	70	8F	90	AF	B0	CF	D0
Total counters for cassette 1		Total counters for cassette 2		Total counters for cassette 3		Total counters for cassette 4		1C

- Operation type is the parameter given for the request frame.
- Message data is the log message data stored in BD.
- Total counters contain following binary counters. Byte order is most significant byte first.

(Byte offset)

- 00-03H (32 bits) : Total number of pick operations
- 04-05H (16 bits) : Total number of length long errors
- 06-07H (16 bits) : Total number of length short errors
- 08-09H (16 bits) : (Reserved: All 0FFH)
- 0A-0BH (16 bits) : Total number of thickness errors
- 0C-0DH (16 bits) : Total number of spacing errors
- 0E-0FH (16 bits) : Total number of pick from wrong cassette errors
- 10-11H (16 bits) : Total number of pick errors while bills not low
- 12-13H (16 bits) : Total number of count unmatched errors
- 14-15H (16 bits) : Total number of pick retries
- 16-17H (16 bits) : Total number of count retries by count error
- 18-19H (16 bits) : Total number of retries after auto-reject
- 1A-1BH (16 bits) : Total number of jam errors
- 1C-1DH (16 bits) : (Reserved: All 0FFH)
- 1E-1FH (16 bits) : (Reserved: All 0FFH)

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DESIG.			CHECK		APPR.			

## 8.2 Enhanced response frame

### 8.2.1 Common part of response frame

Common part of response frame is shown below. The HEX number above the figure shows the byte offset in the frame.

00	01	02	03	04	05	06	07	08	09	0A	0B
DH0	DH1	DH2	RSV	DH3	Error Code		Version E1 E2 V1 V2				

0C	0D	0E	0F	10	11	12	13	14	15	16	17	18	19
Error register			Sensor register						Cassette register 1st 2nd 3rd 4th				POM

1A	1B	1C	1D	1E	1F	20	21	22	23	24	25	26	27	28	29
Bill length information 1st 2nd 3rd 4th						Bill thickness information 1st 2nd 3rd 4th				The number of cassette status changes 1st 2nd 3rd 4th					

2A	2B	2C	2D	2E	2F	30	31	32	33	34	35	36	37	38	39	3A	3B
Date information Y1 Y2 M1 M2 D1 D2						Version Information E1 E2 V1 V2 Z1 Z2						Error address			RSV		

3C	3D	3E	3F	40	41	42	43	44	45	46	47	48	49
Error Register2		Sensor register2						Cassette register2 5th 6th 7th 8th				RSV	

4A	4B	4C	4D	4E	4F	50	51	52	53	54	55	56	57	58	59
Bill length information 5th 6th 7th 8th						Bill thickness information 5th 6th 7th 8th				The number of cassette status changes 5th 6th 7th 8th					

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- Error code is listed in Section 12. It is X'0000' when no error.
- Error address identifies FW code address where the error was detected.
- The information of date and version are answered with the contents which the program load command informed to BDU.
- Error register, sensor register and cassette register are status registers which contain sensor information and status flags.
- POM level register shows the potentiometer output level of thickness sensor.
- Bill length information and bill thickness information are information given by initialization command.
- The number of cassette status changes is 1-byte binary counters for each cassette.  
See Section 6 (STATUS CHANGE DETECTION) for detail.

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### 8.2.2 Command specific part of response frame

DH0 of positive response, DH1, DH2 and specific part of each command response is shown below. In case of negative response, DH0 is X'F0'.

- Device's status information (DH1 = 01)
- Cancel (DH1 = 10)
- Sensor transition detection (DH1 = 14)
- Program Load (DH1 = D1)
- Program Load end (DH1 = D2)
- Program Reset (DH1 = D4)

00	01	02	03	04	05	06	59	5A
E0 or F0	DH1	FF		0054	Common part			1C

Note)

In case of DH1=D1 and D2

At the normal termination: Common part becomes all 00h.

At abnormal termination : The error code and the error address are returned.

In case of DH1=D4

At the normal termination: Version number information is returned.

At abnormal termination : The error code and the error address are returned.

- Bill transportation (DH1 = 05)
- Bill retrieval (DH1 = 06)

00	01	02	03	04	05	06	59	5A	5B
E0 or F0	DH1	FF		0055	Common part			OPR	1C

OPR: Operation type parameter of the request frame

- Operational Log data read (DH1 = 13)

00	01	02	03	04	05	06	59	5A	459	45A
E0 or F0	13	FF		0454	Common part			Log data (1024byte)		1C

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- Devices initialization (DH1 = 02)

00	01	02	03	04	05	06	59
E0 or F0	02	FF		0064	Common part		

5A	5B	5C	5D	5E	5F	60	61	62	63	64	65	66	67	68	69	6A
Sensor level information																
FDLS1	FDLS3	FDLS5	DFSS	BPS	BRS2	EJSR	BCS									1C
	FDLS2	FDLS4	FDLS6	REJS	BRS1	BRS3	EJSF	(RSV)								

- Bill Diagnosis (DH1 = 0F)

00	01	02	03	04	05	06	59	5A
E0 or F0	0F	FF		0075	Common part			OPR

Operation type (command parameter) ←

5B	5E	5F	62	63	66	67	6A
Cassette 1 Diagnosis data	Cassette 2 Diagnosis data	Cassette 3 Diagnosis data	Cassette 4 Diagnosis data				

6B	6E	6F	72	73	76	77	7A	7B
Cassette 5 Diagnosis data	Cassette 6 Diagnosis data	Cassette 7 Diagnosis data	Cassette 8 Diagnosis data	1C				

- The content of the bill diagnosis data is as follows.

	Meaning	
1st byte	Denomination	BSnA ~ BSnD
2nd byte	Length of average	Hex ex. 66mm⇒0x42
3rd byte	Thickness of average	Hex ex. 0.12mm⇒0x0C
4th byte	Reservation	

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- Device information read/write (DH1 = 0E)

00	01	02	03	04	05	06	59	5A	5B	82	
E0 or F0	0E	FF		00B1	Common part			OPR	User setting data (40 byte)		

↳ Operation type (command parameter)

83	92	93	A2	A3	B6	B7	
Device information (16 byte)		Device setting information (16 byte)			Reservation(for serial #) (20 byte)		1C

- Operation type is the parameter given for the request frame.

Device information																
offset	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Meaning	Model name								Identification code				Reservation			
Content (ASCII)	F	5	3	SP	SP	SP	SP	SP	0	0	0	1	0	0	0	0
	F	5	6	SP	SP	SP	SP	SP	0	0	0	1	0	0	0	0

Device setting information		
offset	Meaning	Content (ASCII)
0	Maximum number of sheets	"020"
1		
2		
3	Machine setting	'0':Front , '1':Rear , '2':Dual service machine
4	Front option	'0':Not available, '1':Shutter, '2': Capture BOX
5	Rear option	'0':Not available, '1':Shutter, '2': Capture BOX
6	Jam retry control setting (RAS 46)	'0':Not available, '1':Available
7	BCS sensor	'0':Not available, '1':Available
8	Thickness adjustment value (RAS 31)	"-5" ~ "+5"
9		
10	ROM version	Ex. "01A"
11		
12		
13	Reject option	'0':Not available(Tray), '1':Available(Box)
14	Reserve	'0'
15	Reserve	'0'

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- Bill count (DH1 = 03)
- Bill count + Transport to the front side (DH1 = 09)
- Bill count + Transport to the rear side (DH1 = 0A)
- Automatically rejected bill count (DH1 = 11)

00	01	02	03	04	05	06	59	
E0 or F0	DH1	FF		0132	Common part			

5A	5B	5C	5D	5E	5F	60	61	62	63	64	65	66	67	68	69
The number of counted bills								The number of bill rejections							
1st		2nd		3rd		4th		1st		2nd		3rd		4th	

6A	79	7A	89	8A	99	9A	A9
Cassette 1 Statistical information		Cassette 2 Statistical information		Cassette 3 Statistical information		Cassette 4 Statistical information	

AA	AB	AC	AD	AE	AF	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	BA
	The number of bills to be counted (Command parameter)								Maximum number of count reject (Command parameter)							
1st		2nd		3rd		4th		1st		2nd		3rd		4th		

BB	BC	BD	BE
Max number of pick retries (Command parameter)			

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BF	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE
Sensor level information															
FDLS1	FDLS3	FDLS5	DFSS	BPS	BRS2	EJSR	BCS								
FDLS2	FDLS4	FDLS6	REJS	BRS1	BRS3	EJSF	(RSV)								

CF	D0	D1	D2	D3	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD	DE
The number of counted bills								The number of bill rejections							
5th		6th		7th		8th		5th		6th		7th		8th	

DF	EE	EF	FE	FF	10E	10F	11E
Cassette 5 Statistical information	Cassette 6 Statistical information		Cassette 7 Statistical information		Cassette 8 Statistical information		

11F	120	121	122	123	124	125	126	127	128	129	12A	12B	12C	12D	12E	12F
	The number of bills to be counted (Command parameter)								Maximum number of count reject (Command parameter)							
	5th		6th		7th		8th		5th		6th		7th		8th	

130	131	132	133	134	135	136	137	138
Max number of pick retries (Command parameter)				Count order assignment				IC

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- The number of counted bills and the number of bill rejections are 2-digit decimal number in ISO code with even parity.
- Statistical information is binary counters of the command performance result including number of errors detected and number of retries taken.
- Count order assignment, the number of bills to be counted, maximum number of count reject and max number of pick retries are the parameters given for the request frame.

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- Each statistical information contains following counters. The counters are cleared at the beginning of command processing.

- Byte offset 00H : Number of length long errors
- 01H : Number of length short errors
- 02H : (Reserved: 0FFH)
- 03H : Number of thickness errors
- 04H : Number of spacing errors
- 05H : Number of pick from wrong cassette errors
- 06H : Number of pick errors while bills not low
- 07H : Number of count unmatch errors
- 08H : Number of pick retries
- 09H : Number of count retries by count error
- 0AH : Number of retries after auto-reject
- 0BH : Number of jam errors
- 0CH : (Reserved: 0FFH)
- 0DH : (Reserved: 0FFH)
- 0EH : (Reserved: 0FFH)
- 0FH : (Reserved: 0FFH)

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- Log data read/initialization

00	01	02	03	04	05	06	59	5A	5B	82	
E0 or F0	12	FF		017D	Common part			OPR	Message data (40byte)		

↳ Operation type (command parameter)

83	A2	A3	C2	C3	E2	E3	102
Total counters for cassette 1		Total counters for cassette 2		Total counters for cassette 3		Total counters for cassette 4	

103	122	123	142	143	162	163	182	183
Total counters for cassette 5		Total counters for cassette 6		Total counters for cassette 7		Total counters for cassette 8		1C

- Operation type is the parameter given for the request frame.
- Message data is the log message data stored in BD.
- Total counters contain following binary counters. Byte order is most significant byte first.

(Byte offset)

- 00-03H (32 bits) : Total number of pick operations
- 04-05H (16 bits) : Total number of length long errors
- 06-07H (16 bits) : Total number of length short errors
- 08-09H (16 bits) : (Reserved: All 0FFH)
- 0A-0BH (16 bits) : Total number of thickness errors
- 0C-0DH (16 bits) : Total number of spacing errors
- 0E-0FH (16 bits) : Total number of pick from wrong cassette errors
- 10-11H (16 bits) : Total number of pick errors while bills not low
- 12-13H (16 bits) : Total number of count unmatched errors
- 14-15H (16 bits) : Total number of pick retries
- 16-17H (16 bits) : Total number of count retries by count error
- 18-19H (16 bits) : Total number of retries after auto-reject
- 1A-1BH (16 bits) : Total number of jam errors
- 1C-1DH (16 bits) : (Reserved: All 0FFH)
- 1E-1FH (16 bits) : (Reserved: All 0FFH)

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## 9. RECEIVING OF UNDEFINED REQUEST FRAME

When a request frame with undefined DH0/DH1 pair is received, send a response frame with DH1="X"00". The format is as follows:

DH0	DH1	DH2			FS
F0	00	02	Undefined DH0	Undefined DH1	1C

- Move the received DH0 and DH1 to the 1st and 2nd byte of the data region respectively.
- When undefined request frame is received, BD will not operate.
- After returning the response frame, BD waits for the next request frame.

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## 10. DEVICE'S STATUS REGISTER

### 10.1 Basic response frame

The device status in the response frame consists of 3-byte error register, 6-byte sensor register, 4-byte cassette register, 1-byte POM register, 12-byte initialization parameters, and 4 1-byte counters of number of cassette status changes detected from the last response time.

Error register, sensor register and cassette register are explained in this section. See the section 7.2 (Demand for device's Initialization) for initialization parameter and section 6 (STATUS CHANGE DETECTION) for number of cassette status changes.

1)	Error classification register	(ERCLAS) 1st byte	Error register
2)	Error detailed register	(ERDTAL) 2nd byte	
3)	Count error detailed register	(BCEDTL) 3rd byte	
4)	Sensor output register 1	(SENSO1) 4th byte	Sensor register
5)	Sensor output register 2	(SENSO2) 5th byte	
6)	Sensor output register 3	(SENSO3) 6th byte	
7)	Sensor output register 4	(SENSO4) 7th byte	
8)	Sensor output register 5	(SENSO5) 8th byte	
9)	Status bit register 1	(SBRG1) 9th byte	Cassette register
10)	1st cassette register	(CASHC1) 10th byte	
11)	2nd cassette register	(CASHC2) 11th byte	
12)	3rd cassette register	(CASHC3) 12th byte	
13)	4th cassette register	(CASHC4) 13th byte	POM register
14)	Potentiometer level register	(POMLVL) 14th byte	
15)	Bill length information (1st)	(CASHPA) 15th byte	Bill length information
16)	Bill length information (1st)	(CASHPB) 16th byte	
17)	Bill length information (2nd)	(CASHPC) 17th byte	
18)	Bill length information (2nd)	(CASHPD) 18th byte	
19)	Bill length information (3rd)	(CASHPE) 19th byte	
20)	Bill length information (3rd)	(CASHPF) 20th byte	
21)	Bill length information (4th)	(CASHPG) 21st byte	
22)	Bill length information (4th)	(CASHPH) 22nd byte	
23)	Bill thickness information (1st)	(CASHPI) 23rd byte	Bill thickness information
24)	Bill thickness information (2nd)	(CASHPJ) 24th byte	
25)	Bill thickness information (3rd)	(CASHPK) 25th byte	
26)	Bill thickness information (4th)	(CASHPL) 26th byte	
27)	Cassette status change count (1st)	(CASCH1) 27th byte	Number of cassette status changes
28)	Cassette status change count (2nd)	(CASCH2) 28th byte	
29)	Cassette status change count (3rd)	(CASCH3) 29th byte	
30)	Cassette status change count (4th)	(CASCH4) 30th byte	

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### 10.1.1 Error Register

Bit No.	(Offset 09H; 1st status byte)		(Offset 0AH; 2nd status byte)	
	ERCLAS (Error classification register)		ERDTAL (Error detailed register)	
	Name	Meaning	Name	Meaning
7	CPERR	Calling parameter error	PULER	Pool section trouble
6	MDIVP	The medium position abnormal	MHDTR	Main hardware trouble
5	NMASP	No medium at assumed position	SNSRA	Sensor alarm or medium remained
4	INCND	Inconsistency detected	SHTTR	Shutter trouble (With option shutter)
3	HRDTR	Hardware trouble	FRSRD	Number of counted bills unmatched
2	CNTNC	Count not complete	RBXOV	Reject box overflow
1	JAMER	Jam		
0	EQPNR	Device not ready	CCNTR	The cash cassette not ready

Bit No.	(Offset 0BH; 3rd status byte)	
	BCEDTL (Count error detailed register)	
	Name	Meaning
7	LNGBL	Bill length long
6	SHTBL	Bill length short
5		
4	THKBL	Bill thickness error (Multi-feed)
3	CLSBL	Bill to bill space too short
2	OTRBL	Drawing bills from wrong cassette
1	ECST1	Count abnormality occurrence cassette code
0	ECST2	1st 2nd 3rd 4th ECST1: 1 1 0 0 ECST2: 1 0 1 0

Note: This register contains ORed error information of the cassette which ended in error.

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### 10.1.2 Sensor Register

Bit No.	(Offset 0CH; 4th status byte)		(Offset 0DH; 5th status byte)	
	SENSO1 (Sensor output register 1)		SENSO2 (Sensor output register 2)	
	Name	Meaning	Name	Meaning
7			BRS1	1: Media exist at pool section
6			BRS2	1: Media exist at pool section
5	FDLS6	1: Media exist at 6th cassette pick sensor	BRS3	1: Media exist at pool section
4	FDLS5	1: Media exist at 5th cassette pick sensor	EJSF	1: Media exist at front exit to be removed by customer
3	FDLS4	1: Media exist at 4th cassette pick sensor	EJSR	1: Media exist at rear exit to be removed by customer
2	FDLS3	1: Media exist at 3rd cassette pick sensor	REJS	1: Media exist at reject path sensor
1	FDLS2	1: Media exist at 2nd cassette pick sensor	BPS	1: Media exist at count path sensor
0	FDLS1	1: Media exist at 1st cassette pick sensor	DFSS	1: Media exist at path sensor

Bit No.	(Offset 0EH; 6th status byte)		(Offset 0FH; 7th status byte)	
	SENSO3 (Sensor output register 3)		SENSO4 (Sensor output register 4)	
	Name	Meaning	Name	Meaning
7			UnitKind	0:F56P 1:F56S
6	Reject Option	0: Not available(Reject tray) 1: Available(Reject box)	F56SDir	0:Front Spray transport 1:Rear Spray transport
5	RBST	1: Reject box (option) not set	ROption	0:Not available 1:Available
4	BCS	1: Media exist at Bill check sensor	ROptionKind	0:Shutter 1:Capture BOX
3	BCS Sensor	0: Not available 1: Available	RJBR	1: Rear Capture BOX not specified
2			FOption	0:Not available 1:Available
1	TUS	1: Pool section is at upper position	FOptionKind	0:Shutter 1: Capture BOX
0	THS	1: Pool section is at home position	RJBF	1: Front Capture BOX not specified

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	(Offset 10H; 8th status byte)		(Offset 11H; 9th status byte)	
Bit No.	SENSO5 (Sensor output register 5)		SBRG1 (Status bit register 1)	
	Name	Meaning	Name	Meaning
7	SHTOPNR	1: Shutter has opened. (With option shutter)	Spb7	Special specification (Parameter of initialization command)
6	SHTMGONR	1: Shutter Magnet has be pulled. (With option shutter)	Spb6	
5	SOSR	1: Shutter open (With option shutter)	ALARM	Sensor level down
4	SCSR	1: Shutter close (With option shutter)	DFCSALM	DFCS changed greatly.
3	SHTOPNF	1: Shutter has opened. (With option shutter)	UNNOTE	0 : No data
2	SHTMGONF	1: Shutter Magnet has be pulled. (With option shutter)	INIBL	Set when any bill was ejected by initialization command.
1	SOSF	1: Shutter open (With option shutter)	REJBL	Set when any bill was rejected by initialization or count commands
0	SCSF	1: Shutter close (With option shutter)	RTVBL	Set when any bill was retrieved by initialization Command

- SENSO5 (Sensor output register 5) bit-2, 3, 6, 7

It is parameter "00" and "80" of bill-transportation commands (DH1=05) that this content is returned.  
This information is cleared by transmitting the response.

< Usage >

The following states are understood to add this state bit.

When any bills are discharged,

- 1) Did BDU become an error before the shutter is opened ?
- 2) After the shutter magnet had been pulled, did BDU become an error?
- 3) After the shutter had been opened, did BDU become an error?

In case of 1):

The customer dealings are not passed.

(There is no possibility that the bill is at the position which the customer can take)

In case of 2):

It depends on the judgment of the application.

(There is no possibility that the bill is at the position which the customer can take. But there is a possibility that the customer is deliberately pressing the shutter by the mischief.)

In case of 3):

The customer dealings are passed. (There is possibility that the bill is at the position which the customer can take)

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### 10.1.3 Cassette Register

Bit No.	(Offset 12H; 10th status byte)		(Offset 13H; 11th status byte)	
	CASHC1 (1st cassette register)		CASHC2 (2nd cassette register)	
	Name	Meaning	Name	Meaning
7	C1BLL	1st cassette bills low	C2BLL	2nd cassette bills low
6				
5	C1PDZ	1st cassette is not set/denomination is all zero.	C2PDZ	2nd cassette is not set/denomination is all zero.
4	C1OUT	1st cassette is not set in place (Same C1PDZ)	C2OUT	2nd cassette is not set in place (Same C2PDZ)
3	C1DN1 (BS1A)	1st cassette denomination  *If the cassette is drawn out, "0000".	C2DN1 (BS2A)	2nd cassette denomination  *If the cassette is drawn out, "0000".
2	C1DN2 (BS1B)		C2DN2 (BS2B)	
1	C1DN3 (BS1C)		C2DN3 (BS2C)	
0	C1DN4 (BS1D)		C2DN4 (BS2D)	

Bit No.	(Offset 14H; 12th status byte)		(Offset 15H; 13th status byte)	
	CASHC3 (3rd cassette register)		CASHC4 (4th cassette register)	
	Name	Meaning	Name	Meaning
7	C3BLL	3rd cassette bills low	C4BLL	4th cassette bills low
6				
5	C3PDZ	3rd cassette is not set/denomination is all zero.	C4PDZ	4th cassette is not set/denomination is all zero.
4	C3OUT	3rd cassette is not set in place (Same C3PDZ)	C4OUT	4th cassette is not set in place (Same C4PDZ)
3	C3DN1 (BS3A)	3rd cassette denomination  *If the cassette is drawn out, "0000".	C4DN1 (BS4A)	4th cassette denomination  *If the cassette is drawn out, "0000".
2	C3DN2 (BS3B)		C4DN2 (BS4B)	
1	C3DN3 (BS3C)		C4DN3 (BS4C)	
0	C3DN4 (BS3D)		C4DN4 (BS4D)	

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## 10.2 Enhanced response frame

The device status in the response frame consists of 3-byte error register, 6-byte sensor register, 4-byte cassette register, 1-byte POM register, 12-byte initialization parameters, and 4 1-byte counters of number of cassette status changes detected from the last response time.

Error register, sensor register and cassette register are explained in this section. See the section 7.2 (Demand for device's Initialization) for initialization parameter and section 6 (STATUS CHANGE DETECTION) for number of cassette status changes.

1)	Error classification register	(ERCLAS) 1st byte	Error register
2)	Error detailed register	(ERDTAL) 2nd byte	
3)	Count error detailed register	(BCEDTL) 3rd byte	
4)	Sensor output register 1	(SENSO1) 4th byte	Sensor register
5)	Sensor output register 2	(SENSO2) 5th byte	
6)	Sensor output register 3	(SENSO3) 6th byte	
7)	Sensor output register 4	(SENSO4) 7th byte	
8)	Sensor output register 5	(SENSO5) 8th byte	
9)	Status bit register 1	(SBRG1) 9th byte	Cassette register
10)	1st cassette register	(CASHC1) 10th byte	
11)	2nd cassette register	(CASHC2) 11th byte	
12)	3rd cassette register	(CASHC3) 12th byte	
13)	4th cassette register	(CASHC4) 13th byte	POM register
14)	Potentiometer level register	(POMLVL) 14th byte	
15)	Bill length information (1st)	(CASHRA) 15th byte	Bill length information
16)	Bill length information (1st)	(CASHRB) 16th byte	
17)	Bill length information (2nd)	(CASHPC) 17th byte	
18)	Bill length information (2nd)	(CASHPD) 18th byte	
19)	Bill length information (3rd)	(CASHPE) 19th byte	
20)	Bill length information (3rd)	(CASHPF) 20th byte	
21)	Bill length information (4th)	(CASHPG) 21st byte	
22)	Bill length information (4th)	(CASHPH) 22nd byte	Bill thickness information
23)	Bill thickness information (1st)	(CASHPI) 23rd byte	
24)	Bill thickness information (2nd)	(CASHPJ) 24th byte	
25)	Bill thickness information (3rd)	(CASHPK) 25th byte	
26)	Bill thickness information (4th)	(CASHPL) 26th byte	Number of cassette status changes
27)	Cassette status change count (1st)	(CASCH1) 27th byte	
28)	Cassette status change count (2nd)	(CASCH2) 28th byte	
29)	Cassette status change count (3rd)	(CASCH3) 29th byte	
30)	Cassette status change count (4th)	(CASCH4) 30th byte	

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31)	Date information Y1	(DAYEY1) 31st byte	Date information
32)	Date information Y2	(DAYEY2) 32nd byte	
33)	Date information M1	(DAYEM1) 33rd byte	
34)	Date information M2	(DAYEM2) 34th byte	
35)	Date information D1	(DAYED1) 35th byte	
36)	Date information D2	(DAYED2) 36th byte	Version information
37)	Version information E1	(VERSE1) 37th byte	
38)	Version information E2	(VERSE2) 38th byte	
39)	Version information V1	(VERSV1) 39th byte	
40)	Version information V2	(VERSV2) 40th byte	
41)	Version information Z1	(VERSZ1) 41st byte	Error address
42)	Version information Z2	(VERSZ2) 42nd byte	
43)	Error Address 1	(ERRAD1) 43rd byte	
44)	Error Address 2	(ERRAD2) 44th byte	
45)	Error Address 3	(ERRAD3) 45th byte	Reserve
46)	Error Address 4	(ERRAD4) 46th byte	
47)	Reserve	(RSERV1) 47th byte	Error register
48)	Reserve	(RSERV2) 48th byte	
49)	Error classification register2	(ERCLAS) 49th byte	Sensor register
50)	Error detailed register2	(ERDTAL) 50th byte	
51)	Count error detailed register2	(BCEDTL) 51st byte	
52)	Sensor output register 6	(SENSO6) 52nd byte	
53)	Sensor output register 7	(SENSO7) 53rd byte	Cassette register
54)	Sensor output register 8	(SENSO8) 54th byte	
55)	Sensor output register 9	(SENSO9) 55th byte	
56)	Sensor output register 10	(SENSOA) 56th byte	
57)	Status bit register 2	(SBRG2) 57th byte	Reserve
58)	5th cassette register	(CASHC5) 58th byte	
59)	6th cassette register	(CASHC6) 59th byte	
60)	7th cassette register	(CASHC7) 60th byte	
61)	8th cassette register	(CASHC8) 61st byte	Bill length information
62)	Reserve	(RSERV3) 62nd byte	
63)	Bill length information (5th)	(CASHPM) 63rd byte	
64)	Bill length information (5th)	(CASHPN) 64th byte	
65)	Bill length information (6th)	(CASHPO) 65th byte	
66)	Bill length information (6th)	(CASHPP) 66th byte	
67)	Bill length information (7th)	(CASHPQ) 67th byte	
68)	Bill length information (7th)	(CASHPR) 68th byte	
69)	Bill length information (8th)	(CASHPS) 69th byte	Bill thickness information
70)	Bill length information (8th)	(CASHPT) 70th byte	
71)	Bill thickness information (5th)	(CASHPU) 71st byte	
72)	Bill thickness information (6th)	(CASHPV) 72nd byte	
73)	Bill thickness information (7th)	(CASHPW) 73rd byte	Number of cassette status changes
74)	Bill thickness information (8th)	(CASHPX) 74th byte	
75)	Cassette status change count (5th)	(CASCH5) 75th byte	
76)	Cassette status change count (6th)	(CASCH6) 76th byte	
77)	Cassette status change count (7th)	(CASCH7) 77th byte	
78)	Cassette status change count (8th)	(CASCH8) 78th byte	

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### 10.2.1 Error Register

Bit No.	(Offset 0CH; 1st status byte)		(Offset 0DH; 2nd status byte)	
	ERCLAS (Error classification register)		ERDTAL (Error detailed register)	
	Name	Meaning	Name	Meaning
7	CPERR	Calling parameter error	PULER	Pool section trouble
6	MDIVP	The medium position abnormal	MHDTR	Main hardware trouble
5	NMASP	No medium at assumed position	SNSRA	Sensor alarm or medium remained
4	INCND	Inconsistency detected	SHTTR	Shutter trouble (With option shutter)
3	HRDTR	Hardware trouble	FRSRD	Number of counted bills unmatch
2	CNTNC	Count not complete	RBXOV	Reject box overflow
1	JAMER	Jam		
0	EQPNR	Device not ready	CCNTR	The cash cassette not ready

Bit No.	(Offset 0EH; 3rd status byte)	
	BCEDTL (Count error detailed register)	
	Name	Meaning
7	LNGBL	Bill length long
6	SHTBL	Bill length short
5		
4	THKBL	Bill thickness error (Multi-feed)
3	CLSBL	Bill to bill space too short
2	OTRBL	Drawing bills from wrong cassette
1		
0		

Note: This register contains ORed error information of the cassette which ended in error.

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### 10.2.2 Error Register2

Bit No.	(Offset 3CH; 49th status byte)		(Offset 3DH; 50th status byte)	
	ERCLAS (Error classification register2)			
	Name	Meaning	Name	Meaning
7				
6				
5				
4				
3				
2				
1				
0				

Bit No.	(Offset 3EH; 51st status byte)																																														
	BCEDTL (Count error detailed register2)																																														
	Name	Meaning																																													
7																																															
6																																															
5																																															
4																																															
3	ECST1	<p style="text-align: center; color: red; font-size: 2em; opacity: 0.5;">CONFIDENTIAL</p> <p>Note1) Count abnormality occurrence cassette code.</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>1st</td> <td>2nd</td> <td>3rd</td> <td>4th</td> <td>5th</td> <td>6th</td> <td>7th</td> <td>8th</td> </tr> <tr> <td>ECST1:</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>ECST2:</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>ECST3:</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>ECST4:</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> </table>		1st	2nd	3rd	4th	5th	6th	7th	8th	ECST1:	1	0	1	0	1	0	1	0	ECST2:	1	1	0	0	1	1	0	0	ECST3:	1	1	1	1	0	0	0	0	ECST4:	1	1	1	1	1	1	1	1
	1st		2nd	3rd	4th	5th	6th	7th	8th																																						
ECST1:	1		0	1	0	1	0	1	0																																						
ECST2:	1		1	0	0	1	1	0	0																																						
ECST3:	1		1	1	1	0	0	0	0																																						
ECST4:	1	1	1	1	1	1	1	1																																							
2	ECST2																																														
1	ECST3																																														
0	ECST4																																														

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### 10.2.3 Sensor Register

Bit No.	(Offset 0FH; 4th status byte)		(Offset 10H; 5th status byte)	
	SENSO1 (Sensor output register 1)		SENSO2 (Sensor output register 2)	
	Name	Meaning	Name	Meaning
7			BRS1	1: Media exist at pool section
6			BRS2	1: Media exist at pool section
5	FDLS6	1: Media exist at 6th cassette pick sensor	BRS3	1: Media exist at pool section
4	FDLS5	1: Media exist at 5th cassette pick sensor	EJSF	1: Media exist at front exit to be removed by customer
3	FDLS4	1: Media exist at 4th cassette pick sensor	EJSR	1: Media exist at rear exit to be removed by customer
2	FDLS3	1: Media exist at 3rd cassette pick sensor	REJS	1: Media exist at reject path sensor
1	FDLS2	1: Media exist at 2nd cassette pick sensor	BPS	1: Media exist at count path sensor
0	FDLS1	1: Media exist at 1st cassette pick sensor	DFSS	1: Media exist at path sensor

Bit No.	(Offset 11H; 6th status byte)		(Offset 12H; 7th status byte)	
	SENSO3 (Sensor output register 3)		SENSO4 (Sensor output register 4)	
	Name	Meaning	Name	Meaning
7			UnitKind	0:F56P 1:F56S
6	Reject Option	0: Not available(Reject tray) 1: Available(Reject box)	F56SDir	0:Front Spray transport 1:Rear Spray transport
5	RBST	1: Reject box (option) not set	ROption	0:Not available 1:Available
4	BCS	1: Media exist at Bill check sensor	ROptionKind	0:Shutter 1:Capture BOX
3	BCS Sensor	0: Not available 1: Available	RJBR	1: Rear Capture BOX not specified
2			FOption	0:Not available 1:Available
1	TUS	1: Pool section is at upper position	FOptionKind	0:Shutter 1: Capture BOX
0	THS	1: Pool section is at home position	RJBF	1: Front Capture BOX not specified

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Bit No.	(Offset 13H; 8th status byte)		(Offset 14H; 9th status byte)	
	SENSO5 (Sensor output register 5)		SBRG1 (Status bit register 1)	
	Name	Meaning	Name	Meaning
7	SHTOPNR	1: Shutter has opened. (With option shutter)	Spb7	Special specification (Parameter of initialization command)
6	SHTMGONR	1: Shutter Magnet has be pulled. (With option shutter)	Spb6	
5	SOSR	1: Shutter open (With option shutter)	ALARM	Sensor level down
4	SCSR	1: Shutter close (With option shutter)	DFCSALM	DFCS changed greatly.
3	SHTOPNF	1: Shutter has opened. (With option shutter)	UNNOTE	0 : No data
2	SHTMGONF	1: Shutter Magnet has be pulled. (With option shutter)	INIBL	Set when any bill was ejected by initialization command.
1	SOSF	1: Shutter open (With option shutter)	REJBL	Set when any bill was rejected by initialization or count commands
0	SCSF	1: Shutter close (With option shutter)	RTVBL	Set when any bill was retrieved by initialization Command

- SENSO5 (Sensor output register 5) bit-2, 3, 6, 7

It is parameter "00" and "80" of bill-transportation commands (DH1=05) that this content is returned.  
This information is cleared by transmitting the response.

< Usage >

The following states are understood to add this state bit.

When any bills are discharged,

- 1) Did BDU become an error before the shutter is opened ?
- 2) After the shutter magnet had been pulled, did BDU become an error?
- 3) After the shutter had been opened, did BDU become an error?

In case of 1):

The customer dealings are not passed.

(There is no possibility that the bill is at the position which the customer can take)

In case of 2):

It depends on the judgment of the application.

(There is no possibility that the bill is at the position which the customer can take. But there is a possibility that the customer is deliberately pressing the shutter by the mischief.)

In case of 3):

The customer dealings are passed. (There is possibility that the bill is at the position which the customer can take)

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### 10.2.4 Sensor Register2

Bit No.	(Offset 3FH; 52nd status byte)		(Offset 40H; 53rd status byte)	
	SENSO6 (Sensor output register 6)		SENSO7 (Sensor output register 7)	
	Name	Meaning	Name	Meaning
7				
6				
5				
4				
3				
2				
1				
0				

Bit No.	(Offset 41H; 54th status byte)		(Offset 42H; 55th status byte)	
	SENSO8 (Sensor output register 8)		SENSO9 (Sensor output register 9)	
	Name	Meaning	Name	Meaning
7				
6				
5				
4				
3				
2				
1				
0				

Bit No.	(Offset 43H; 56th status byte)		(Offset 44H; 57th status byte)	
	SENSOA (Sensor output register 10)		SBRG2 (Status bit register 2)	
	Name	Meaning	Name	Meaning
7				
6				
5				
4				
3				
2				
1				
0				

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### 10.2.5 Cassette Register

Bit No.	(Offset 15H; 10th status byte)		(Offset 16H; 11th status byte)	
	CASHC1 (1st cassette register)		CASHC2 (2nd cassette register)	
	Name	Meaning	Name	Meaning
7	C1BLL	1st cassette bills low	C2BLL	2nd cassette bills low
6				
5	C1PDZ	1st cassette is not set/denomination is all zero.	C2PDZ	2nd cassette is not set/denomination is all zero.
4	C1OUT	1st cassette is not set in place (Same C1PDZ)	C2OUT	2nd cassette is not set in place (Same C2PDZ)
3	C1DN1 (BS1A)	1st cassette denomination  *If the cassette is drawn out, "0000".	C2DN1 (BS2A)	2nd cassette denomination  *If the cassette is drawn out, "0000".
2	C1DN2 (BS1B)		C2DN2 (BS2B)	
1	C1DN3 (BS1C)		C2DN3 (BS2C)	
0	C1DN4 (BS1D)		C2DN4 (BS2D)	

Bit No.	(Offset 17H; 12th status byte)		(Offset 18H; 13th status byte)	
	CASHC3 (3rd cassette register)		CASHC4 (4th cassette register)	
	Name	Meaning	Name	Meaning
7	C3BLL	3rd cassette bills low	C4BLL	4th cassette bills low
6				
5	C3PDZ	3rd cassette is not set/denomination is all zero.	C4PDZ	4th cassette is not set/denomination is all zero.
4	C3OUT	3rd cassette is not set in place (Same C3PDZ)	C4OUT	4th cassette is not set in place (Same C4PDZ)
3	C3DN1 (BS3A)	3rd cassette denomination  *If the cassette is drawn out, "0000".	C4DN1 (BS4A)	4th cassette denomination  *If the cassette is drawn out, "0000".
2	C3DN2 (BS3B)		C4DN2 (BS4B)	
1	C3DN3 (BS3C)		C4DN3 (BS4C)	
0	C3DN4 (BS3D)		C4DN4 (BS4D)	

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### 10.2.6 Cassette Register2

Bit No.	(Offset 45H; 58th status byte)		(Offset 46H; 59th status byte)	
	CASHC5 (5th cassette register)		CASHC6 (6th cassette register)	
	Name	Meaning	Name	Meaning
7	C5BLL	5th cassette bills low	C6BLL	6th cassette bills low
6				
5	C5PDZ	5th cassette is not set/denomination is all zero.	C6PDZ	6th cassette is not set/denomination is all zero.
4	C5OUT	5th cassette is not set in place (Same C5PDZ)	C6OUT	6th cassette is not set in place (Same C6PDZ)
3	C5DN1 (BS5A)	5th cassette denomination  * If the cassette is drawn out, "0000".	C6DN1 (BS6A)	6th cassette denomination  * If the cassette is drawn out, "0000".
2	C5DN2 (BS5B)		C6DN2 (BS6B)	
1	C5DN3 (BS5C)		C6DN3 (BS6C)	
0	C5DN4 (BS5D)		C6DN4 (BS6D)	

Bit No.	(Offset 47H; 60th status byte)		(Offset 48H; 61st status byte)	
	CASHC7 (7th cassette register)		CASHC8 (8th cassette register)	
	Name	Meaning	Name	Meaning
7	C7BLL	7th cassette bills low	C8BLL	8th cassette bills low
6				
5	C7PDZ	7th cassette is not set/denomination is all zero.	C8PDZ	8th cassette is not set/denomination is all zero.
4	C7OUT	7th cassette is not set in place (Same C7PDZ)	C8OUT	8th cassette is not set in place (Same C8PDZ)
3	C7DN1 (BS7A)	7th cassette denomination  * If the cassette is drawn out, "0000".	C8DN1 (BS8A)	8th cassette denomination  * If the cassette is drawn out, "0000".
2	C7DN2 (BS7B)		C8DN2 (BS8B)	
1	C7DN3 (BS7C)		C8DN3 (BS8C)	
0	C7DN4 (BS7D)		C8DN4 (BS8D)	

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## 11. Usage note

### 11.1 Power off during bill counting operation (F56S)

#### 1. How to inform “number of notes dispensed”

“Number of notes dispensed” on a first “the Demand for Bill Count” command after there is a power recovery. At this time error code is “FD” (there is a power loss during a dispense (Bill Count)).

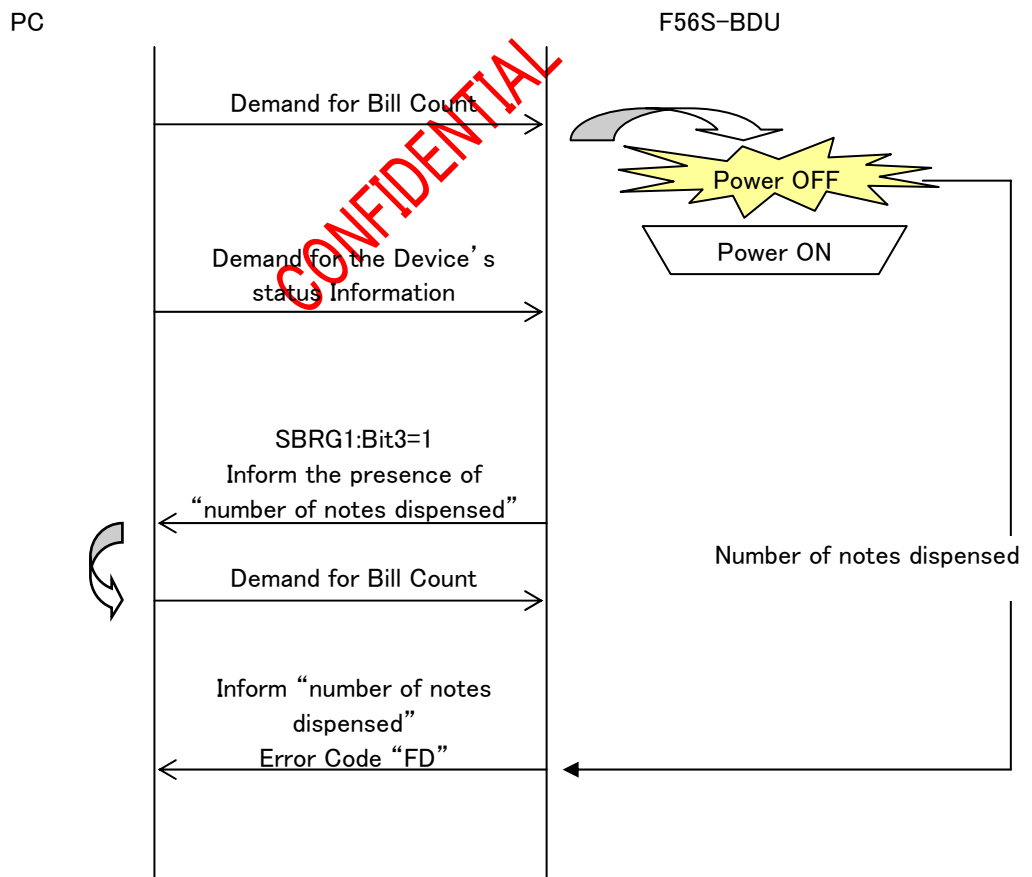
#### 2. The presence or absence of “number of notes dispensed”.

Except “the Demand for the Bill Count” when there is the presence of “number of notes dispensed”, SBRG1 bit (bit3) of Status Register in the response frame is set.

Incidentally On “the Demand for Device’s Initialization and Automatically Rejected Bill Count” when there is the presence of “number of notes dispensed” error code is “FC” (Can’t be executed for the presence of the not-yet-informed number of counted bills).

Notice) The Demand for Program Loading is executed on the presence of “number of notes dispensed”, they are reset.

Sample of Command Flow:



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## 11.2 Bill count in case of a jam error in the vicinity of BPS sensor

F56-BDU reports the number of notes detected by BPS sensor as "Number of notes dispensed".

As for F56S however, the number of notes detected by BPS sensor would differ from that actually transported to the exit tray if a jam error happens just before or at BPS sensor. This happens because F56S cannot bring a bill back to the path for reject once it has passed through the divert gate. As F56S has the exit tray after BPS sensor, executing a mechanical reset command to recover from a jam error may lead to transporting a jammed note that has passed through the divert gate into the exit tray.

In the case of a jam error just before or at BPS sensor followed by a mechanical reset command, F56S is designed to inform of the number of notes that have passed through the divert gate. This reconciles the number of notes reported by the device with that actually dispensed to the exit tray.

Note that there is no need to configure F56P as above because F56P has a pool section after BPS sensor and bills can be stored into Capture box by the device's initialization command.

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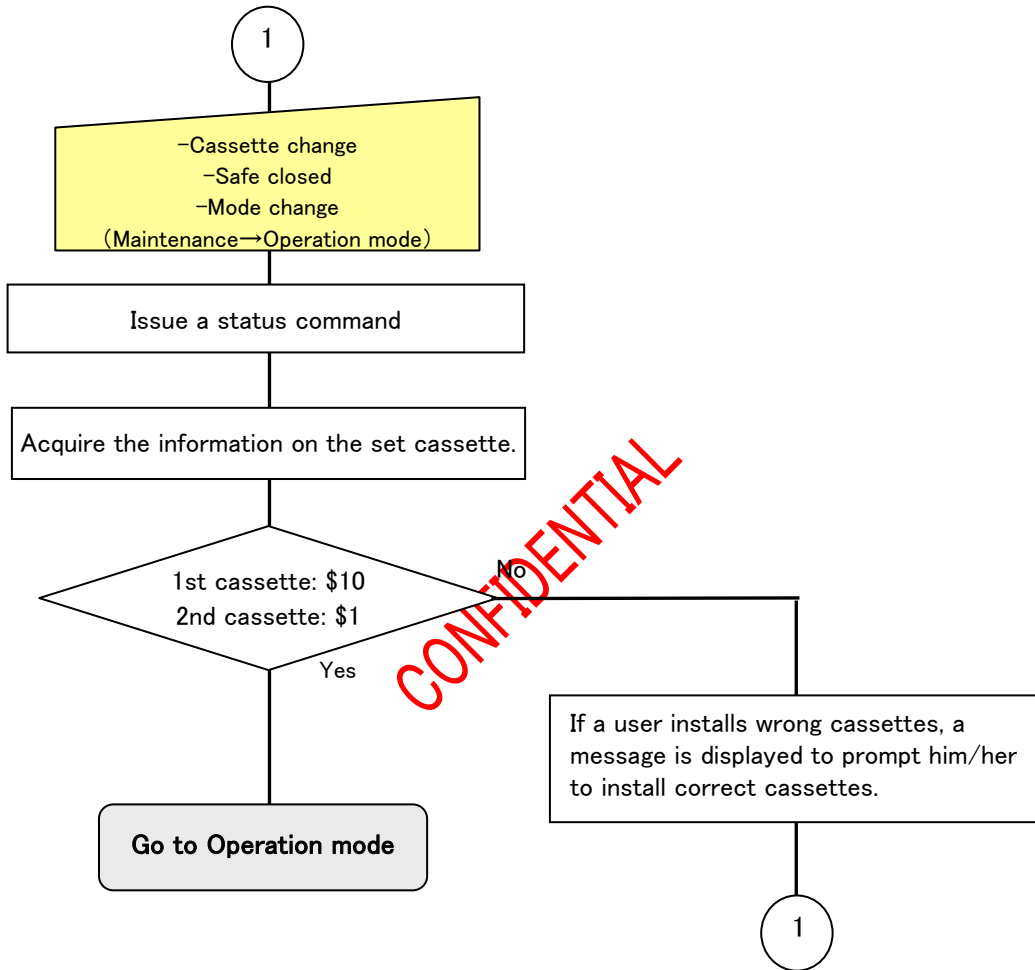
						TITLE F56-BDU D-LEVEL SPECIFICATIONS	
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EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION	FUJITSU FRONTTECH LTD.	
DESIG.			CHECK		APPR.	S H E E T	86 / 102

### 11.3 Cassette control

BDU has no control over note denominations. Note are dispensed from a cassette specified by a PC. Note dispensing order setting can be set but not changed once specified.

(1) When cassette denomination settings are fixed:

Eg. First cassette: \$10  
Second cassette: \$1



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(2) When cassette denomination settings can be changed:

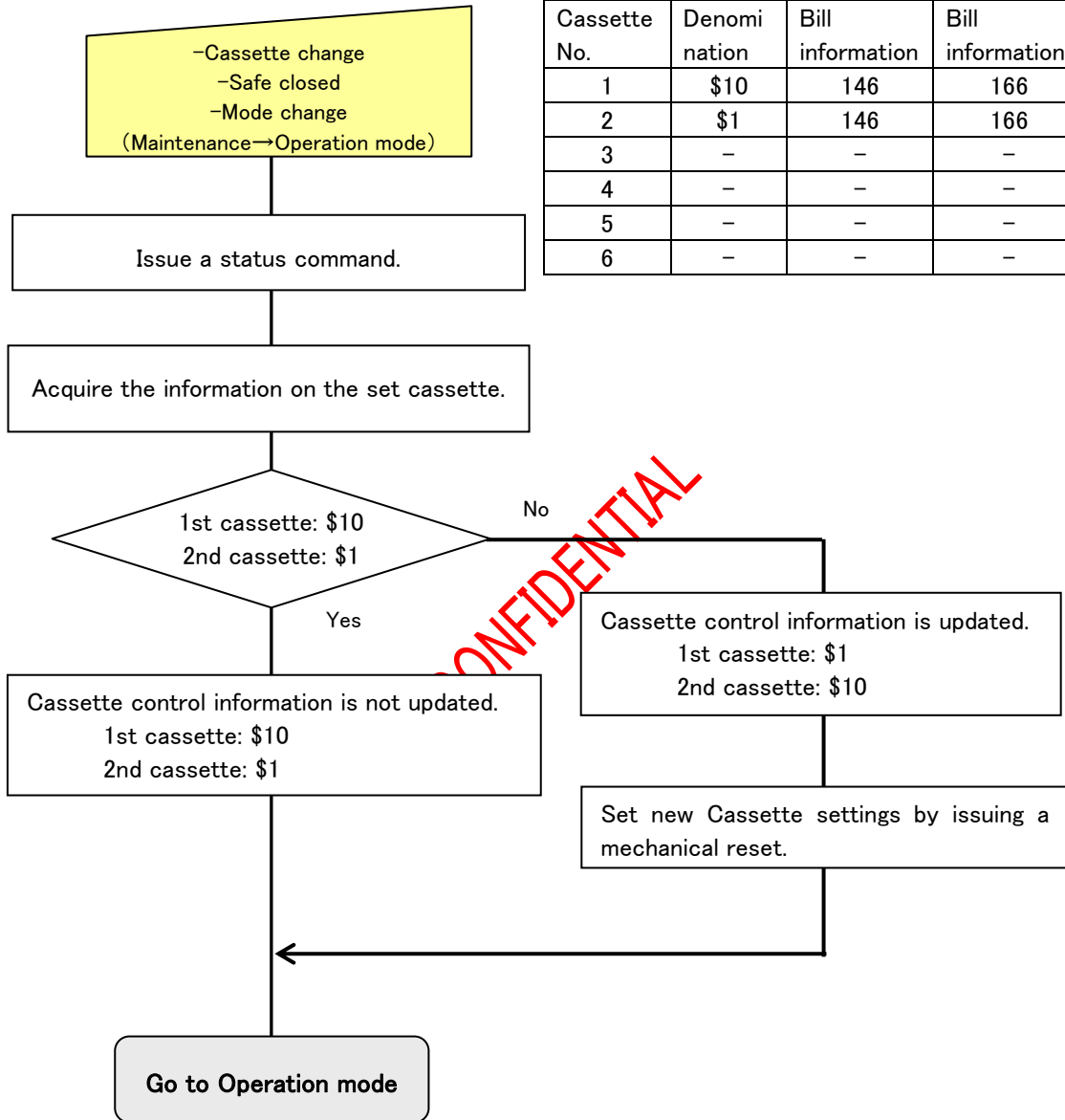
Cassette settings shall be obtained and stored in Cassette control information.

Eg. When the following Cassette settings are obtained and stored:

First cassette: \$10  
Second cassette: \$1

- Example of cassette management information

Cassette No.	Denomination	Bill information	Bill information	Thickness
1	\$10	146	166	0.13
2	\$1	146	166	0.13
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	-	-



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[Consideration on Note dispensing order settings]

The change of Cassette settings affects note dispensing.

In the above example, one-dollar bills would be dispensed from 1st cassette at first followed by ten-dollar bills from 2nd cassette. This means ten-dollar bills would be placed over one-dollar when presented to a customer.

-Before the change of Cassette control information, notes are dispensed from 1st cassette at first followed by 2nd cassette.

① Basic command

DH0	DH1	DH2	ODR	N1	N2	N3	N4	R1	R2	R3	R4	P1	P2	P3	P4	FS
60	03	15	E0													1C



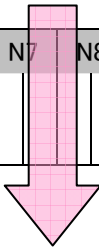
b7							b0
1	1	1	0	0	0	0	0

- 00: 4th cassette
- 01: 3rd cassette
- 10: 2nd cassette
- 11: 1st cassette

1st cassette 2nd cassette

② Enhanced command

DH0	DH1	DH2	RSV	DH3	ODR	N1	N2	N3	N4	R1	R2	R3	R4
60	03	FF		002C	FE000000								



P1	P2	P3	P4	N5	N6	N7	N8	R5	R6	R7	R8	P5	P6	P7	P8	FS
																1C

b31							b0
F	E	0	0	0	0	0	0

1st cassette 2nd cassette

- 1000: 8th cassette
- 1001: 7th cassette
- 1010: 6th cassette
- 1011: 5th cassette
- 1100: 4th cassette
- 1101: 3rd cassette
- 1110: 2nd cassette
- 1111: 1st cassette

						TITLE F56-BDU D-LEVEL SPECIFICATIONS	
						DRAW. NO. A3KD03234-0001	
						CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION	FUJITSU FRONTECH LTD.	
DESIG.			CHECK		APPR.	SHEET 89 / 102	

-After the change of Cassette control information, notes are dispensed from 2nd cassette at first followed by 1st cassette.

① Basic command

DH0	DH1	DH2	ODR	N1	N2	N3	N4	R1	R2	R3	R4	P1	P2	P3	P4	FS
60	03	15	B0													1C



b7							b0
1	0	1	1	0	0	0	0

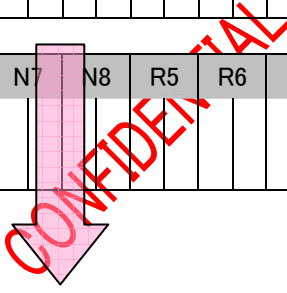
00: 4th cassette  
 01: 3rd cassette  
 10: 2nd cassette  
 11: 1st cassette

2nd cassette 1st cassette

② Enhanced command

DH0	DH1	DH2	RSV	DH3	ODR	N1	N2	N3	N4	R1	R2	R3	R4
60	03	FF		002C	EF000000								

P1	P2	P3	P4	N5	N6	N7	N8	R5	R6	R7	R8	P5	P6	P7	P8	FS
																1C



b31							b0
E	F	0	0	0	0	0	0

2nd cassette 1st cassette

1000: 8th cassette    1100: 4th cassette  
 1001: 7th cassette    1101: 3rd cassette  
 1010: 6th cassette    1110: 2nd cassette  
 1011: 5th cassette    1111: 1st cassette

						TITLE F56-BDU D-LEVEL SPECIFICATIONS	
						DRAW. NO. A3KD03234-0001	
						CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION	FUJITSU FRONTECH LTD.	
DESIG.			CHECK		APPR.	90 / 102	

## 11.4 Cassette settings

### ① Denomination settings

F56-BDU dispenses bills from cassettes specified by the PC and does not control denomination settings by itself.

Each cassette has 4bit sensor (BSnA~BSnD) for denomination settings and users should define a sensor for each denomination respectively.

Denomination sensor information is reported by a cassette register in a response.

#### Recommended settings

- Up to 4 denominations: Use 1 bit sensor

	BSnA	BSnB	BSnC	BSnD
\$ 1	On	Off	Off	Off
\$ 5	Off	On	Off	Off
\$ 10	Off	Off	On	Off
\$ 20	Off	Off	Off	On

- More than 5 denominations: Use the combination of 2 bit sensors

	BSnA	BSnB	BSnC	BSnD
\$ 1	On	On	Off	Off
\$ 5	On	Off	On	Off
\$ 10	On	Off	Off	On
\$ 20	Off	On	On	Off
\$ 50	Off	On	Off	On
\$ 100	Off	Off	On	On
Card	On	On	On	On

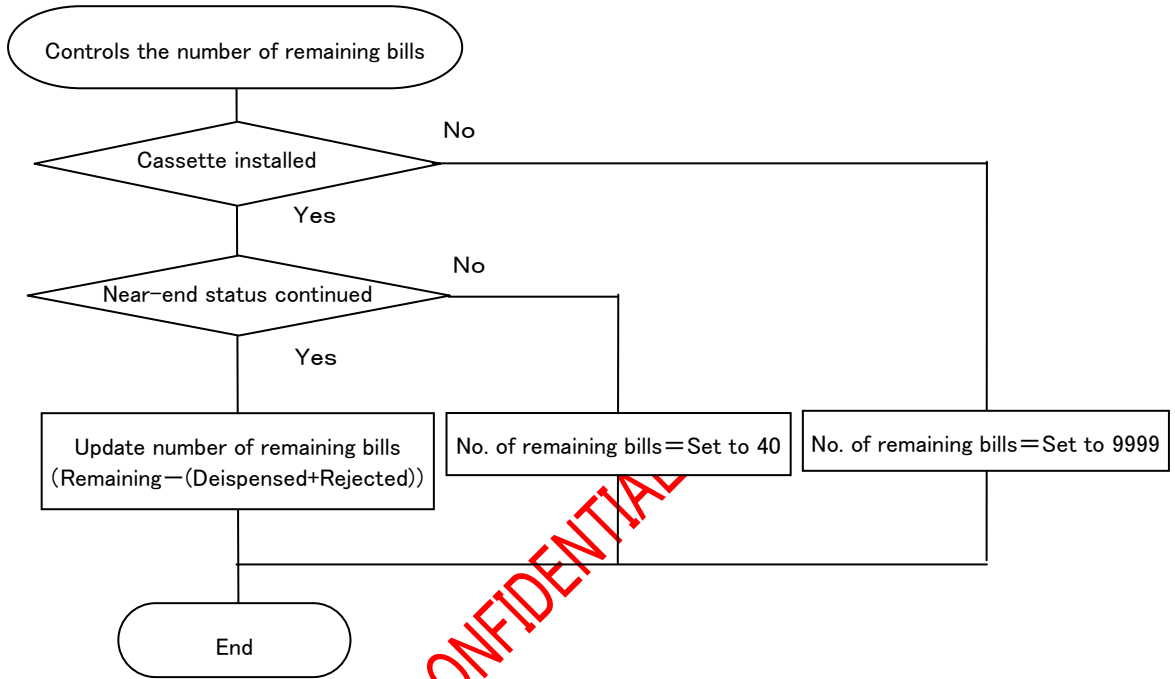
						TITLE	F56-BDU D-LEVEL SPECIFICATIONS		
						DRAW. NO.	A3KD03234-0001		CUST
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DESIG.			CHECK		APPR.				91 / 102

②Notes regarding Near-end sensor

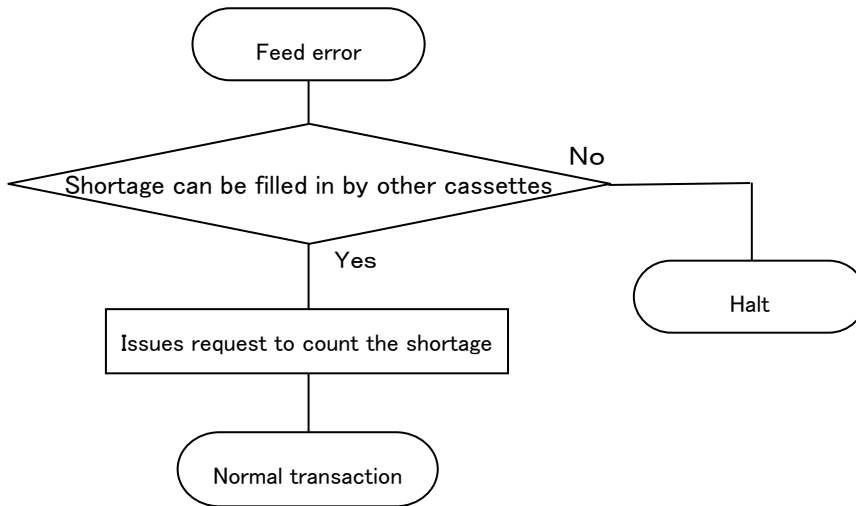
Each of F56-BDU cassettes has a near-end sensor and its status is reported by a cassette register in a response. Users should be prompted to replenish bills at near-end status.

Since F56-BDU only informs of the status of near-end sensor, the PC shall be responsible for controlling the number of remaining bills. Some examples are shown below:

Example 1: Controls the number of remaining bills using near-end detection and compares before dispensing.



Example 2: Feeds bills until a cassette becomes empty and then supply a need from other cassettes.



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						CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION		
DESIG.			CHECK		APPR.	FUJITSU FRONTECH LTD.	
						SHEET	92 / 102

### 11.5 Checking bills remained in the pool section with bill count command (**important**)

As F56-BDU supports additional counting feature (see the previous section), it does not check the remaining bills in the pool section on starting bill counting. Therefore, it is PC's responsibility to check bills in the pool section when a new bill count command is issued.

### 11.6 Collecting log data of Command request and Response frame

It is recommended that a user logs command requests and response frames to help analyze any events happened during operation.

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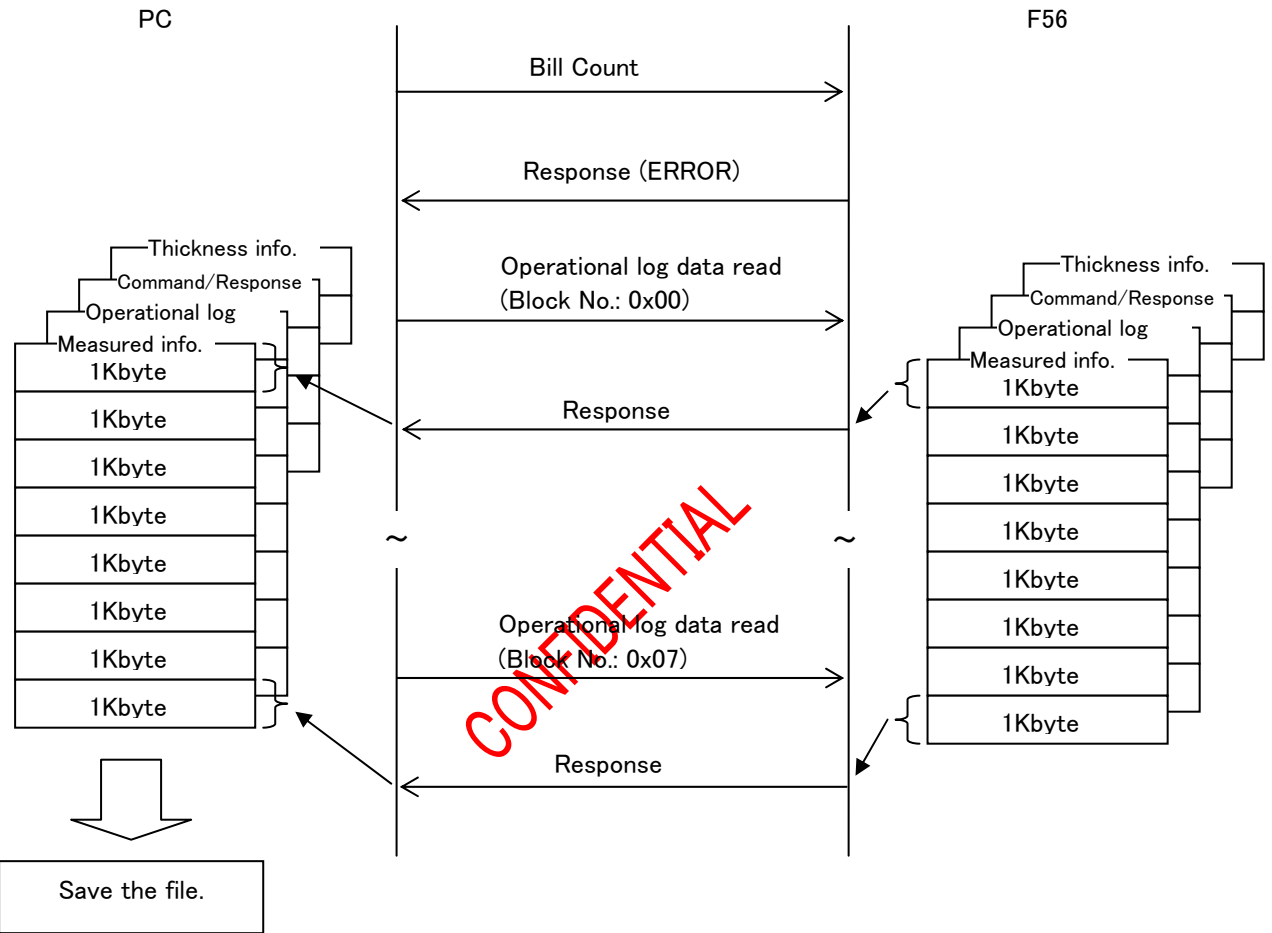
						TITLE	F56-BDU D-LEVEL SPECIFICATIONS	
						DRAW. NO.	A3KD03234-0001	CUST
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION	FUJITSU FRONTTECH LTD.		SHEET
DESIG.			CHECK		APPR.		93 / 102	

### 11.7 Method of BDU error analysis collection of log data to collect in operational log data read command

Please acquire information in the operation collection of operational log data read command immediately after generation of the error.

If this information is not acquired immediately after generation of the error, information is overwritten.

The method of acquiring the log is as follows.



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						DRAW. NO. A3KD03234-0001	
						CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION		
DESIG.			CHECK		APPR.	FUJITSU FRONTECH LTD.	
						SHEET	94 / 102

### 11.8 Example of method of recovery when error occurs

Command	Error	Pick Fail Cassette Empty	Retract No Media Exit	Bill Jam	Shutter Open	Shutter Close	No Cassette (bill & reject)	Cassette	Mecha	Bill Remained	Long Short Short Space	Pick From Wrong Cassette	Counted Value is Wrong	Thickness Sensor	Reject Cassette Over Flow	PCB. Hardware
		1800 1C00 2800 2C00 3800 3C00 1100 1500 2100 2500 3100 4100	7600 7601 A800 AC00	78xx 7Axx 7Bxx 7Cxx 7Dxx	A1xx A9xx	A2xx AAxx	1000 1400 2000 2400 3000 3400 4000 4400	12xx 16xx 22xx 26xx 32xx 36xx 42xx 46xx	5xxx F8xx	70xx	8200 8300 8400 8600	85xx	88xx	89xx	B5xx BE00	F1xx F6xx
Initialization (RESET)		—	—	Reset	—	—	Error	Error	Reset	—	—	—	Reset	Error	Error	Error
Bill Count (DISPENSE)		Error Backup	—	Reset	—	—	Error	—	Reset	Reset	Reset	Reset	Reset	Error	Error	Error
Bill Transportation (PRESENT)		—	—	Reset	Reset	Reset	—	—	Reset	—	—	—	—	—	—	—
Automatically Bill Reject (REJECT)		Error	—	Reset	—	—	Error	—	Reset	—	—	—	—	Reset	Error	Error
Bill Retrieval (RETRACT)		—	Error	Reset	—	Reset	Error	—	Reset	—	—	—	—	—	Error	Error
SHUT_OPEN		—	—	—	Retry	—	—	—	—	—	—	—	—	—	—	—
SHUT_CLOSE		—	—	—	—	Retry	—	—	—	—	—	—	—	—	—	—

The meaning of the method of recovery

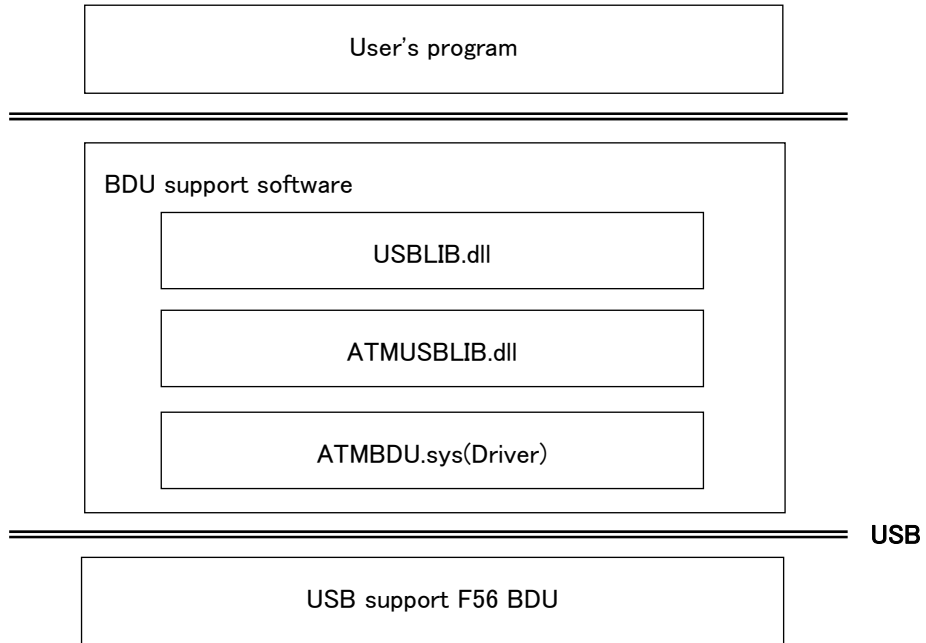
Reset: Device's initialization OK; Retry, NG: halt

Error: halt. Error (Backup): The number of bills of lack is paid from other cassettes.

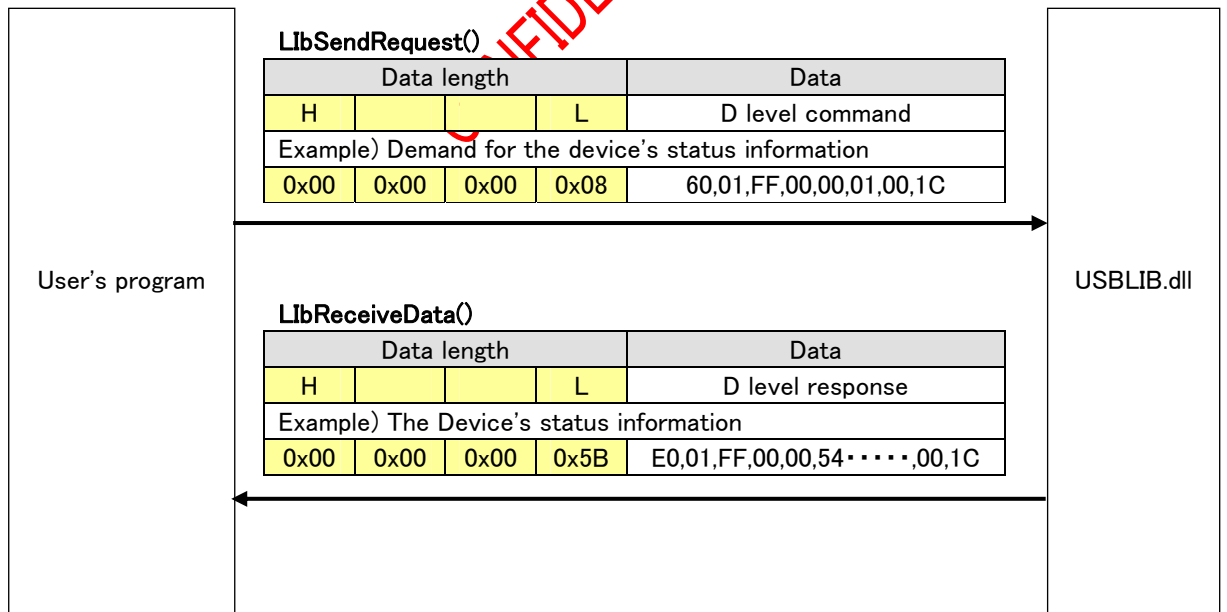
						TITLE		F56-BDU D-LEVEL SPECIFICATIONS	
						DRAW. NO.		A3KD03234-0001	
								CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION				
DESIG.			CHECK		APPR.	FUJITSU FRONTECH LTD.			
								95	102

## 11.9 Notes of USB connection

### Module composition



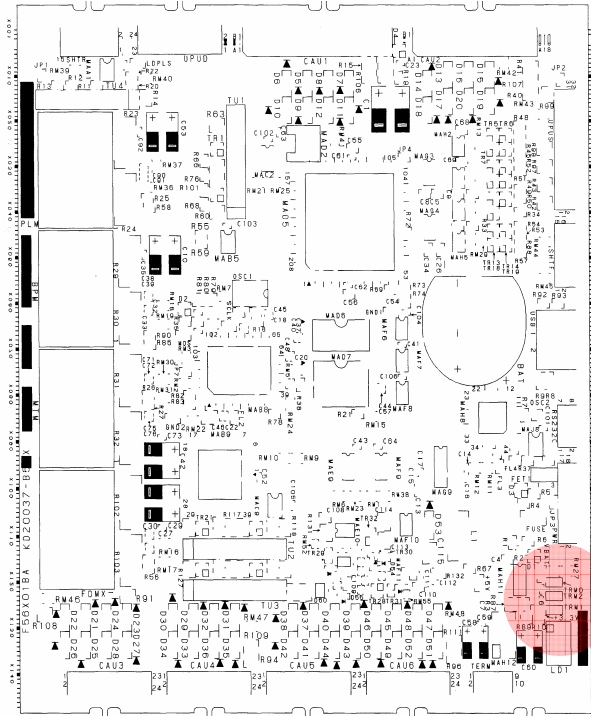
### The data length (4bytes) is necessary at the USB connection



						TITLE F56-BDU D-LEVEL SPECIFICATIONS	
						DRAW. NO. A3KD03234-0001	
						CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION	FUJITSU FRONTECH LTD.	
DESIG.			CHECK		APPR.	SHEET 96 / 102	



## 11.10 PCB Setting



PCB

\*TRM0, TRM1 and TRM2 is jumper.

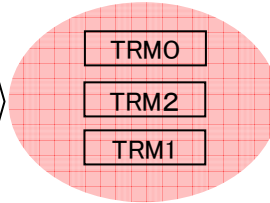
Jumper setting:



ON (1)



OFF (0)



Name	Meaning	ON	OFF
TRM0	Interface(*1)	USB Interface	RS232C Interface
TRM1	Reject Option	Reject box (RBST Sensor Available)	Reject Tray (RBST Sensor Not available)
TRM2	Local RAS	Used to activate Local RAS mode	

\*1: RF56USB.PRГ: This download program supports USB.

					TITLE F56-BDU D-LEVEL SPECIFICATIONS	
					DRAW. NO. A3KD03234-0001	
					CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION	
DESIG.			CHECK		FUJITSU FRONTECH LTD.	
					SH	97 / 102

## 12. ERROR CODE

Error code which are set in the negative response are classified as follows:

Error Code	1st byte		2nd byte
	Position an error occurred	Detailed information	Additional information

(1) Upper 4 bits of 1st byte show a position in which an error occurred.

Lower 4 bits show detailed information of the error.

(2) 2nd byte shows additional information for the error code.

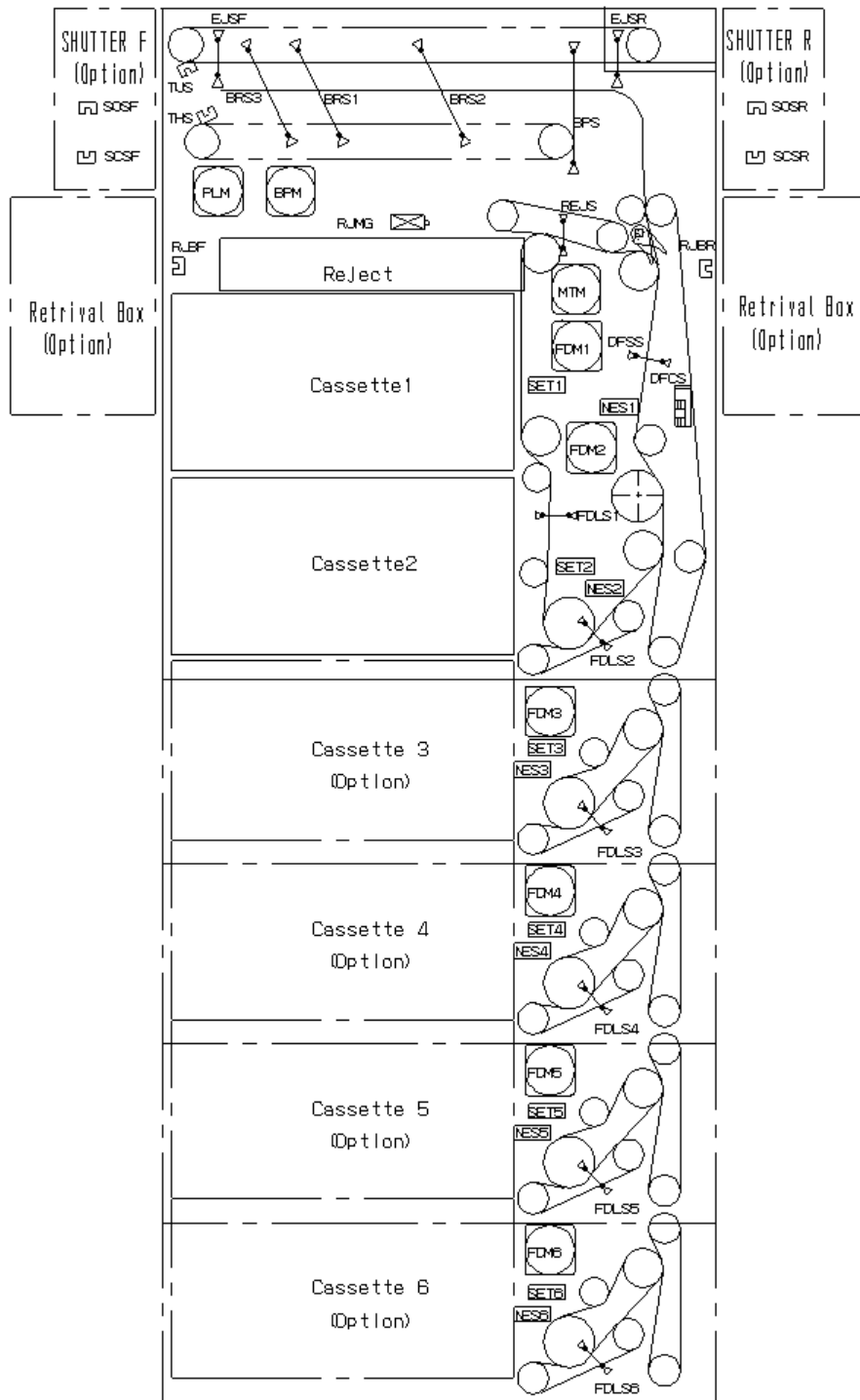
For the outline and details of the error code, refer to F56-BDU ERROR CODE LIST.

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						TITLE	F56-BDU D-LEVEL SPECIFICATIONS		
						DRAW. NO.	A3KD03234-0001		CUST
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION				
DESIG.			CHECK			APPR.			
FUJITSU FRONTTECH LTD.							SHEET	98	102

### 13. Appendixes

#### 13.1. Transport/Sensor Diagram



						TITLE		F56-BDU D-LEVEL SPECIFICATIONS	
						DRAW. NO.		A3KD03234-0001	
								CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION	FUJITSU FRONTECH LTD.		SHEET	99 / 102
DESIG.			CHECK		APPR.				

### 13.2. Application Setup

(1) Bill Length parameter

$$L_{\max} = [\text{standard length}] + 10$$

$$L_{\min} = [\text{standard length}] - 10$$

Please refer to section 13.3.

(2) Bill Thickness parameter

Please refer to section 13.3.

(3) Number of pick retries

2 to 15 (Recommended value is 2)

(4) Maximum number of count rejects

10 or more (Recommended value is 10)

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						TITLE		F56-BDU D-LEVEL SPECIFICATIONS	
						DRAW. NO.		A3KD03234-0001	
								CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION				
DESIG.			CHECK					FUJITSU FRONTTECH LTD.	
							SHEET	100 / 102	

### 13.3. Bills of foreign currencies and recommended setup

August 25, 2008

Bill Type	Size (mm)	Thickness (mm)	Recommended setup (hex.)		
			Maximum Length	Minimum Length	Thickness
<b>Japan</b>					
1000 Yen	150 × 77		A0 (150+10)	8C (150-10)	0B (0.11)
5000 Yen	155 × 77		A5 (155+10)	91 (155-10)	
10000 Yen	160 × 77		AA (160+10)	96 (160-10)	
<b>USA</b>					
1 Dollar	156 × 66		A6 (156+10)	92 (156-10)	0D (0.13)
5 Dollars					
10 Dollars					
20 Dollars					
50 Dollars					
100 Dollars					
<b>China</b>					
1 Yuan	130 × 63		8C (130+10)	78 (130-10)	0C (0.12)
5 Yuan	135 × 63		91 (135+10)	7D (135-10)	
10 Yuan	140 × 70		96 (140+10)	82 (140-10)	
20 Yuan	145 × 70		9B (145+10)	87 (145-10)	
50 Yuan	150 × 70		A0 (150+10)	8C (150-10)	
100 Yuan	155 × 77		A5 (155+10)	91 (155-10)	
<b>Euro</b>					
5 Euro	120 × 62		82 (120+10)	6E (120-10)	0C (0.12)
10 Euro	127 × 67		89 (127+10)	75 (127-10)	
20 Euro	133 × 72		8F (133+10)	7B (133-10)	
50 Euro	140 × 77		96 (140+10)	82 (140-10)	
100 Euro	147 × 82		9D (147+10)	89 (147-10)	
200 Euro	153 × 82		A3 (153+10)	8F (153-10)	
500 Euro	160 × 82		AA (160+10)	96 (160-10)	
<b>England</b>					
5 Pounds	135 × 70		91 (135+10)	7D (135-10)	0D (0.13)
10 Pounds	142 × 75		98 (142+10)	84 (142-10)	
20 Pounds	150 × 80		A0 (150+10)	8C (150-10)	
<b>Australia Special specification &lt;01&gt; Please refer to "Demand for the Device's Initialization"</b>					
5 Dollars	130 × 65		8C (130+10)	78 (130-10)	0E (0.14)
10 Dollars	137 × 65		93 (137+10)	7F (137-10)	
20 Dollars	144 × 65		9A (144+10)	86 (144-10)	
50 Dollars	151 × 65		A1 (151+10)	8D (151-10)	
100 Dollars	158 × 65		A8 (158+10)	94 (158-10)	

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						TITLE F56-BDU D-LEVEL SPECIFICATIONS	
						DRAW. NO. A3KD03234-0001	
						CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION	FUJITSU FRONTECH LTD.	
DESIG.			CHECK		APPR.		

Bill Type	Size (mm)	Thickness (mm)	Recommended setup (hex.)		
			Maximum Length	Minimum Length	Thickness
<b>Canada</b>					
5 Dollars 10 Dollars 20 Dollars 50 Dollars 100 Dollars	152 × 69		A2 (152+10)	8E (152-10)	0D (0.13)

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					TITLE F56-BDU D-LEVEL SPECIFICATIONS	
					DRAW. NO. A3KD03234-0001	
					CUST	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION	
DESIG.			CHECK		FUJITSU FRONTECH LTD.	
					S H E E T	102 / 102