

**Color Print Module
External I/F (RS232C)
Specification**

Rev. 1.10

2015.04.17

Canon Finetech Inc.

Revision history

Rev. No.	Date of issue	Chapter	Description
1.00	'11.10.12'		Initial release
1.01	'12.08.28'		Corrected errors, Added explanation for sequences
1.02	'12.10.16		Added Pause command
1.03	'13.03.01		Added: Corresponding firmware version for each command. Added: Cleaning command (strong, medium, light)
1.04	'13.10.04		Minor corrections
1.05	'13.10.04		Added: External control setting request command
1.06	'13.10.29		Added: Definitions for each model. Added: below operation command - Head Down command - Auto Cleaning command Added: Corresponding models for all commands Edited: Operator call errors, warnings to cover 2inzh printer series Edited: Transferring sequence for each model
1.07	'13.12.09		Added command: Request number of pages finish receiving Added command: Sleep Added command: Power Off Added command: Wake Up
			Combined : Immediate Stop into Reset command Combined: Immediate Stop2 into Reset command
	'14.01.31		Added command: Request fatal error detail2 Added command: Request operator call detail2 Added command: Request warning detail2 Added command: Request pass-through data Added command: Maintenance Added command: Model Select Added command: Manual Cleaning (before print A) Added command: Manual Cleaning (before print B) Corrected: Communicating sequences Added: Sample configuration of an operation panel

1.08	'14.03.10		Deleted command: ManualCleaning (before print A) Deleted command: ManualCleaning (before print B) Deleted command; ManualCleaning (Medium) Deleted command: Passthrough
1.09	'14.03.31		Deleted command: ModeSelect Deleted command: PowerOff Deleted: Detail status [While Print Pause] Edited: HeadUp command send condition Edited: Sleep command send condition Added command: UnlockFunction
1.10	'14.04.25		Edited: Detail status require command transition chart

1 Outline

This print module only contains printing related functions, and is designed to be controlled from an external control device, which should includes paper transport function separately prepared, so that the module can be implemented into print systems corresponding to various applications.

The print module is designed to be controlled from the external control device through serial communication with RS232C, encoder input signals, and TOF detecting sensor.

This document will provide how to control the print module from the external control device.

1-1. Applicable Models

Functions described in this document will support following models.

Model	Description
PM-200A	Dye ink model
PM-200Z	Pigment ink model

1-2. Basic Operation

Following are the basic operations for controlling the print module.

■ **Print Operation**

Print operation will be performed by receiving print data from the host computer.

On receiving print data, print module will inform its status to the external control device.

An external control device will print on the media by controlling the print module and transport unit according to the received status.

Positional control between print heads and transport unit will be done by encoder signals and TOF detecting sensor signals.

■ **Cleaning Operation**

Cleaning operations are essential to maintain the stable performance of the print head, and it is necessary to interrupt printing to perform the cleaning operation at the required timing.

There are 2 modes available for the print module. One is to automatically interrupt printing at the necessary timing of the cleaning operation, the other is not to interrupt printing but only inform to the external control device that it is the timing to perform cleaning operation. In this case, it will continue to print until it receives the cleaning command from the external control device.

■ **Error Control Operation**

Print module detects errors on certain conditions, and informs error codes to the external control device.

Errors can be categorized into below 3 kinds.

① Fatal Error

- The error is not recoverable by normal operation. It is necessary to power cycle.
- Print module will automatically stop its operation and shuts down.

② Operator Call

- The error can be recovered by releasing its cause.
- When an operator call is issued, print module will interrupt or stop its printing operation.

③ Warning

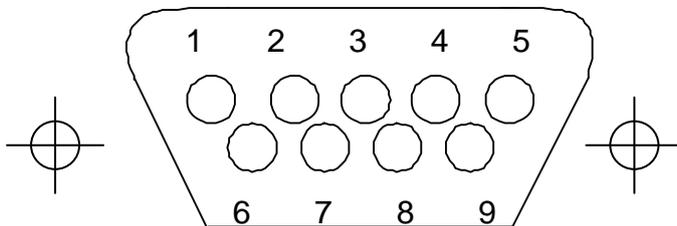
- There is no influence to the print operation, but there are some treatments necessary.
- Continue to use without any treatment may cause an operator call.

2. Connection

D-SUB 9pin male connector is implemented for the RS232C connector equipped with the printer. It is connected to the host using the cross cable.

Described below is the pin configuration.

Pin No	Signal Name	I/O	Function
1	DCD	-	Detect carrier (Not used)
2	RxD	I	Received data
3	TxD	O	Transmit data
4	DTR	-	Data terminal ready (Not used)
5	GND	G	GND
6	DSR	-	Data set ready (Not used)
7	RTS	O	Request to send (Not used)
8	CTS	I	Clear to send (Not used)
9	RI	-	Call (Not used)



Connector: D-SUB 9pin (male)

Screw: Inch screw thread

There are 3 effective signal lines for this interface, RxD, TxD, and GND.
Other signal lines are not used.

3 Communication Specification

3.1 Communication Specification

Described below are settable items for RS232C.

Set Item	Value
Baud rate(bps)	19200
Character length	8bit
Parity	None
Stop bit	1
Flow control	None

3.2 External Control Command basic format

STX(02h) and ETX(03h) are added to the ASCII text of command code which will be explained later, and this is a basic format for this command

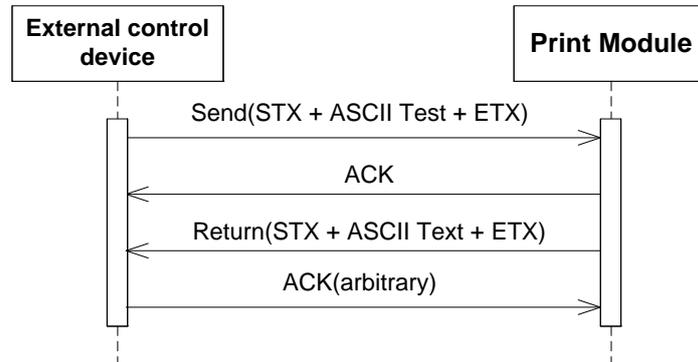
STX Series of commands(ASCII Text) ETX

3.3 Communication Flow

Printer will analyze a command when it is received from the external control device, and return "ACK" to the external control device when it is judged that the command is received correctly.

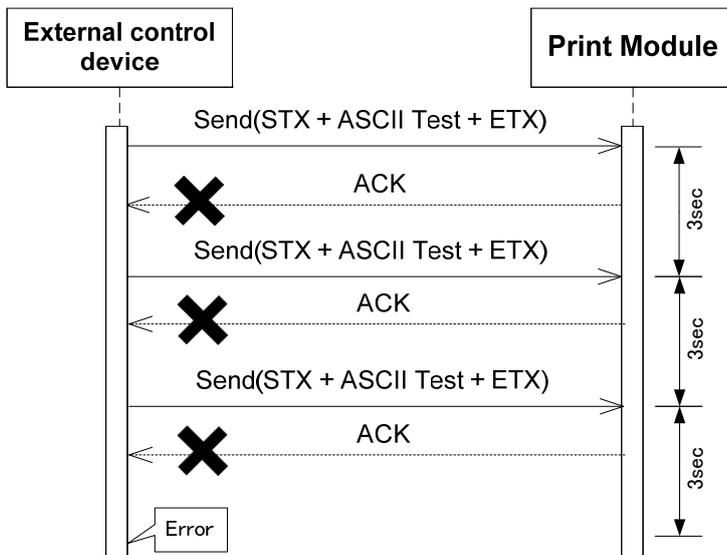
It is possible for the external control device to check if the printer received the command correctly by confirming the "ACK".

It is not necessary for the external control device to return the "ACK" toward the returned command from the printer (it is arbitrarily).



When there is no ACK return from the print module, it may be an issue with communication, it will wait for 3seconds and try the same command again. Even after repeating above transaction for 3times and still no ACK return from the print module, handle it as an communication error and check below possible causes.

- Communication setting mismatch
- Defective RS232C cable
- Defective RS232C terminal



4. List of Commands

External control command consists of two kinds of command, request command to obtain printer information and operation command to execute operation. Following is the list of each command.

4-1 Request Commands

Command Name	Code	Function
Request status	0x10	Request printer status
Request detailed status	0x11	Request details of printer status
Request fatal error details	0x12	Request details of fatal error
Request operator call details	0x13	Request details of operator call
Request warning details	0x14	Request details of warning
Request number of printed sheet	0x15	Request number of printed sheet
Request number of pages finish receiving	0x17	Request number of pages finish receiving
Request fatal error detail 2	0x18	Request fatal error detail listed in CFT SDK
Request operator call detail 2	0x19	Request operator call detail listed in CFT SDK
Request warning detail 2	0x1A	Request warning detail listed in CFT SDK
Request pass-through data	0x1B	Request pass-through command received from host PC

*Command code is in hex number

4-2 Operation Instruction Command

Command name	Code	Function
Print Start	0x83	Instruct number of copies and start printing
Reset	0x86	Instruct to reset print data
Pause	0x87	Instruct to pause printing
Head Down	0x88	Instruct to move the print head downward
Head Up	0x89	Instruct to move the print head upward
Error Clear	0x8A	Instruct to clear the error
Sleep	0x8B	Instruct to put the print module into sleep mode

Power Off	0x8C	Instruct print module to shut down
Wake Up	0x8D	Instruct print module to wake up from sleep mode
Maintenance	0x8E	Inform to perform print module maintenance
Mode Select	0x8F	Select the start up mode of the print module
Manual Cleaning (Strong) (*1)	0xE4	Instruct to perform strong cleaning
Manual Cleaning (Light) (*1)	0xE6	Instruct to perform light cleaning
Auto Cleaning (*2)	0xE7	Instruct to perform auto cleaning
Manual Cleaning (before print A)	0xEA	T.B.D
Manual Cleaning (before print B)	0xEB	T.B.D

*Command code is in hex number

*1 Cleaning sequence performed on ordered basis (user arbitrary timing).

*2 Cleaning sequence performed automatically at the necessary timing.

This cleaning will be performed when detail status is [waiting for the auto cleaning command] but it will not be performed until user sends [auto cleaning command].

However, it is not applicable when auto cleaning mode was selected.

5. Command Details

5-1. Detail Status

Type of command

Request command

Command description

Obtain detailed printer status information required for external control.

Command code

11

Command details

Request command:

STX

1

1

ETX

(0x02, 0x31, 0x31, 0x03)

Reply command:

STX

1

1

*

*

ETX

 * Return data
(0x02, 0x31, 0x31, 0x**, 0x**, 0x03)

1.1.1 Return data

Return Data	Function
0x01	Initializing
0x02	Ready status
0x03	Receiving data
0x04	Printing
0x05	Print suspended status
0x06	Off line status
0x07	Canceling job
0x08	Cleaning
0x09	Shutting down
0x0A	Sleep status

0x0B	Fatal error
0x0C	Waiting for print instruction (Print Start)
0x0F	Operator call error
0x10	Waiting for command to move head downward
0x40	Waiting for cleaning command (Auto Cleaning) (*)
0x80	Warning (*1)

*1) 0x40(waiting for cleaning command) and 0x80(warning) may arise with other status simultaneously.

There is a possibility that the other status will occur together while the warning is occurring.

In that case, return data will be a logical sum of "0x80" which is warning and the other status.

Ex) When the warning occurred during printing → Return data: 0.84

Send condition

Detailed status request command can be executed in every status.

It will automatically return this command without executing whenever the status changed..

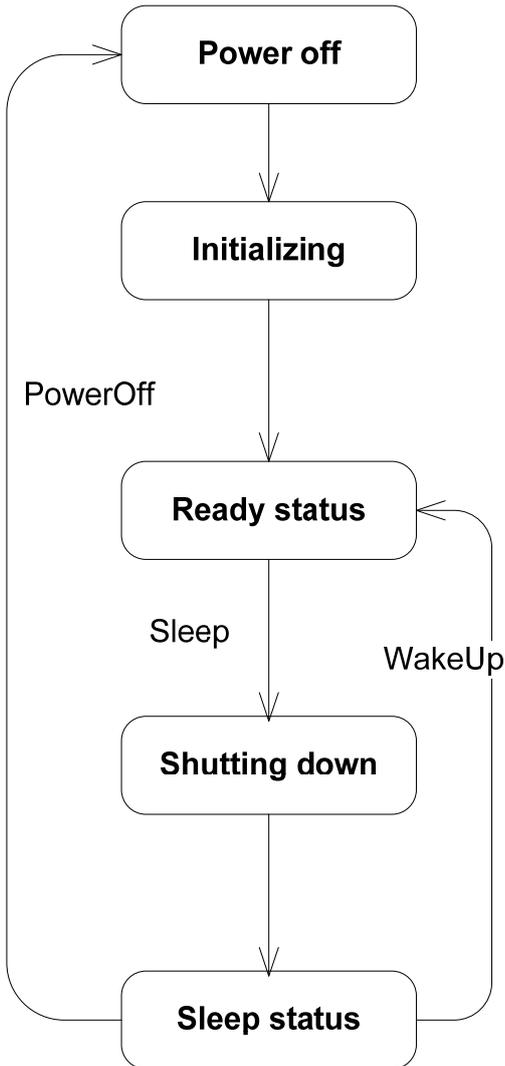
Described below are status charts for main detail status transitions.

-Basic status

Status to indicate the basic condition.

When the print module is powered ON, its status transits to Ready status after initializing state.

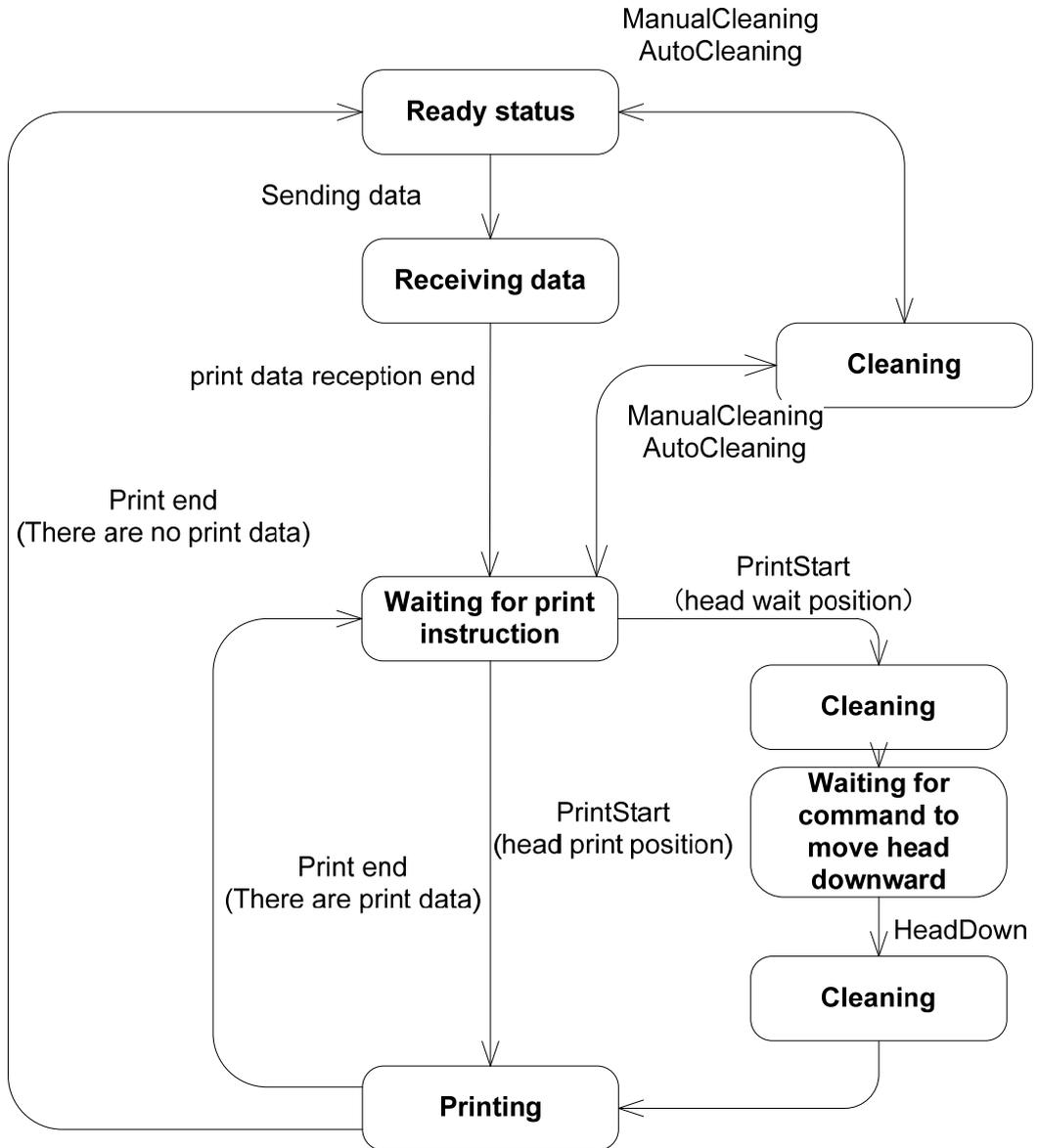
Print module is in standby state while Ready status and printing operation is available by sending a command to the print module.



-Derived status from Ready status (Printing)

Described below is a chart indicating the status transition while printing.

It is able to print by following the transition status when receiving print data.



5-2. Fatal Error Details

(Deleted due to an old command for previous model)

5-3. Operator Call

(Deleted due to an old command for previous model)

5-4. Warning Details

(Deleted due to an old command for previous model)

5-5. Number of Printed Sheet

Type of command

Request command

Command description

Notify the number of printed sheet.

It shows the number of printed sheet within the specified number of copies in the "Print Start command".

Available range of the number of copies: 1-65, 535 sheets (2Byte: 4Byte after ASCII adjustment)

Command code

14

Command details

Request command:

STX	1	5	ETX
-----	---	---	-----

(0x02, 0x31, 0x35, 0x03)

Reply command:

STX	1	5	*	*	*	*	ETX
-----	---	---	---	---	---	---	-----

(0x02, 0x31, 0x35, 0x**, 0x**, 0x**, 0x**, 0x03)

Return data

Number of printed sheet (4Byte)

Send condition

Number of printed sheet is counted from the last Print Start command executed to the Number of printed sheet request command is executed.

It will automatically return after printing 1st page without executing this command.

When this command was sent while printing, there is a case that more than 1 return was sent including the return for the sent command, and the automatic return.

After starting external control, a reply will be returned automatically without executing this command when completing print one page.

This command can be executed after starting external control, however, there will be multiple replies since both replies toward the sent command and the automatic return will be received.

5-6. Number of Pages Finish Receiving

Type of Command

Request Command

Command Description

Request for number of pages that print module has received for print.

Possible number of pages will b65,535 (2bytes: 4bytes after converted into ASCII)

Command Code

17

Command Detail

Request command:

STX	1	7	ETX
-----	---	---	-----

(0x02, 0x31, 0x37, 0x03)

Reply command:

STX	1	7	*	*	*	*	ETX
-----	---	---	---	---	---	---	-----

(0x02, 0x31, 0x37, 0x**, 0x**, 0x**, 0x**, 0x03)

Return Data:

Number of printable pages received (4bytes)

Send Condition

Execute this command when the status is as follows;

Waiting for print order (Detail status 0x0C)

Return data for this command will always [0] when the status is not as above.

Return data will include number of copies.

Ex1) Specified 5copies with 1 page data: return data [5]

Ex2) Specified 5copies with 2 pages data: return data [10]

5-7. Fatal Error Detail 2

Type of Command

Request Command

Command Description

Request for detail information of the fatal error issued on the print module.

If there is no fatal error, it will reply with no return data.

Command Code 18h

Command Detail

Request command:

STX	1	8	ETX
-----	---	---	-----

(0x02, 0x31, 0x38, 0x03)

Reply Command:

With Fatal Error:

STX	1	8	*	*	*	*	ETX
-----	---	---	---	---	---	---	-----

(0x02, 0x31, 0x38, 0x**, 0x**, 0x**, 0x**, 0x03)

Without Fatal Error:

STX	1	8	ETX
-----	---	---	-----

(0x02, 0x31, 0x38, 0x03)

*: Return Data

Return Data:

Return data will be the status code described in the [CFT SDK API description document]

Refer to the document for the detail description.

Send Condition This command can be sent on any status.

5-9. Warning Detail 2

Type of Command Request Command

Command Description

Request for detail information of the warning issued on the print module.

If there is no warning, it will reply with no return data.

Return data will be within 10codes at maximum (20bytes: 40Bytes after converted into ASCII)

Command Code 1Ah

Command Detail

Request Command:

STX	1	A	ETX
-----	---	---	-----

(0x02, 0x31, 0x41, 0x03)

Reply Command:

With 1 warning:

STX	1	A	*	*	ETX
-----	---	---	---	---	-----

(0x02, 0x31, 0x41, 0x**, 0x**, 0x03)

With 2 warnings:

STX	1	A	*	*	*	*	ETX
-----	---	---	---	---	---	---	-----

(0x02, 0x31, 0x41, 0x**, 0x**, 0x**, 0x**, 0x03)

Without warning:

STX	1	A	ETX
-----	---	---	-----

(0x02, 0x31, 0x41, 0x03)

Return Data:

Return data will be the status code described in the [CFT SDK API description document]

Refer to the document for the detail description.

5-10. Pass-Through Data

(Deleted: Unnecessary command)

5-11. Print Start

Type of command

Operation instruction command

Command description

Instruct to start printing and a number of copies.

Available range of the number of copies: 1 - 65,535 sheets (2Byte: 4Byte after ASCII adjustment)

Printing will be stopped in the following conditions even if the instructed number of copies has not been printed out.

It will react the same as specifying [65,535] when specifying [0] to the number of copies.

Condition to stop printing

1. When there is no available continuous print data
2. When automatic cleaning is necessary during continuous printing
3. When canceled printing
4. When an operator call or a service call has been occurred

When the print head is located at the capping position, print sequence will flow as below;

- ① Head temperature adjustment
- ② Before print cleaning
- ③ Head goes down to the printing position
- ④ Start printing

It will start step #1 when receiving print start command, and go on to steps #2~3 when receiving head down command.

It can start step #4 when print head is at the print position, and it receives both encoder input signal and the TOF detection signal of the media from the transport unit.

When print head is located at the print position, it will go into the waiting state of the encoder signals and TOF detecting signals as soon as it receives the print start command.

Refer to [Chapter 6 Communicating Sequence] for detail

Command code

83

Command details

Request command:

STX	8	3	*	*	*	*
-----	---	---	---	---	---	---

ETX

(0x02, 0x38, 0x33, 0x**, 0x**, 0x**, 0x**, 0x03)

Reply command: N/A

Send data

Specify the number of copies (4Byte)

Send condition

Print Start command is effective only in the external control mode.

Print Start command can be executed in the following status.

- Waiting for a print order (Detail status: 0x0C)

In case the printer is printing (Print Start is in execution), Print Start command will not be executed and the command will be disregarded in the printer. Replied number toward the number of printed sheet request command"0x15" will be cleared at the point of transmission of this command.

5-12. Reset

Type of command

Operation instruction command

Command description

Instruct to reset the received print data in the printer.

Clear the received print job and the receiving print Job.

Print operation will be immediately stopped when instructed during print operation.

Print job will not be cleared if it has not started to be sent from the spooler.

Command code

86

Command details

Request command:

STX

8

6

ETX

(0x02, 0x38, 0x36, 0x03)

Reply command: N/A

Send condition

This command can be executed in any status.

5-13. Pause

Type of command

Operation instruction command

Command description

Instruct to pause printing.

Pause printing operation instructed by Print Start command.

When the Pause instruction is sent, Print operation will stop after finishing printing and ejecting the page which was in process

Follow the detailed status instruction to resume printing. (Wait for back feed instruction, Wait for printing instruction etc.)

Command code

87

Command details

Request command:

STX

8

7

ETX

(0x02, 0x38, 0x37, 0x03)

Reply command: N/A

Send condition

Execute Pause command in the following status.

- Printing (Detailed status 0x04)

5-14. Head Down

Type of Command Operation Instruction Command

Command Description

Instruct to move the head down to the print position in combination with the system status.

Sending this command will be the end of preparing for print.

Leaving the print head for 30seconds at the print position will instruct to move the head back to the capping position automatically to avoid head damage.

Command Code 88h

Command Detail

Request command:

STX

8

8

ETX

(0x02, 0x38, 0x38, 0x03)

Reply command: N/A

Send Condition

Execute this command in the following status.

- Waiting for order to move head down (Detail status: 0x10)

5-15. Head Up

Type of Command Operation Instruction Command

Command Description

Instruct to move the head up to the capping position in combination with the system status.
Sending this command will be the end of preparing for capping.

Command Code 89h

Command Detail

Request command:

STX

8

9

ETX

(0x02, 0x38, 0x39, 0x03)

Reply command: N/A

Send Condition

Execute this command in the following status.

- Ready (Detail status: 0x02)
- Printing (Detailed status 0x04)

5-16. Error Clear

Type of Command Operation Instruction Command

Command Description

Instruct to clear any errors caused by external control device.

Refer to the [operator call detail] request command for detail.

Command Code 8Ah

Command Detail

Request command:

STX

8

A

ETX

(0x02, 0x38, 0x41, 0x03)

Reply command: N/A

Send Condition

Execute this command in the following status.

- While operator call(s) are happening (Detail status: 0x0F)

5-17. Sleep

Type of Command Operation Instruction Command

Command Description

Instruct print module to go into sleep mode.

To wake up, send wake up command, or receiving print data will wake up the print module as well.

Command Code 8Bh

Command Detail

Request command:

STX

8

B

ETX

(0x02, 0x38, 0x42, 0x03)

Reply command: N/A

Send Condition

Execute this command in the following status.

- Ready (Detail status: 0x02)

5-18. Power Off

(Deleted: Unnecessary command)

5-19. Wake Up

Type of Command Operation Instruction Command

Command Description

Instruct print module to wake up from the sleep mode.

When print module receives the wake up command, status of the print module will change from sleep to ready.

Command Code 8Dh

Command Detail

Request command:

STX

8

D

ETX

(0x02, 0x38, 0x44, 0x03)

Reply command: N/A

Send Condition

Execute this command in the following status.

- Sleep (Detail status: 0x0A)

5-20. Maintenance

Type of Command Operation Instruction Command

Command Description

Inform to the print module that maintenance will be performed.

In case to replace ink tanks or a maintenance cartridge, be sure to send this command to stop power supply. Sending this command will issue an operator call for maintenance. After finish replacement, send Error Clear to clear the operator call.

Command Code 8Eh

Command Detail

Request command:

STX

8

E

ETX

(0x02, 0x38, 0x45, 0x03)

Reply command: N/A

Send Condition

This command can be executed in any status.

5-21. UnlockFunction

Type of Command Operation Instruction Command

Command Description

Cancel print module special function.

Followings are functions to be canceled.

Command Code 91h

Command Detail

Request command:

STX	9	1	*	*	ETX
-----	---	---	---	---	-----

(0x02, 0x39, 0x31, 0x**, 0x**, 0x03)

Specify the function to be canceled in *.

0x00: Ink remaining amount detection error

Reply command: N/A

Send Condition

This command can be executed in any status.

5-22. Mode Select

(Deleted: Unnecessary command)

5-23. Manual Cleaning (Strong)

Type of Command Operation Instruction Command

Command Description

Instruct to execute manual cleaning (Strong).

Command Code E4h

Command Detail

Request command:

STX

E

4

ETX

(0x02, 0x45, 0x34, 0x03)

Reply command: N/A

Send Condition

Execute this command in the following status.

- Ready (Detail status: 0x02)
- Waiting for print order (Detail status: 0x0C)

5-24. Manual Cleaning (Medium)

Type of Command Operation Instruction Command

Command Description

Instruct to execute manual cleaning (Medium).

Command Code E5h

Command Detail

Request command:

STX

E

5

ETX

(0x02, 0x45, 0x35, 0x03)

Reply command: N/A

Send Condition

Execute this command in the following status.

- Ready (Detail status: 0x02)
- Waiting for print order (Detail status: 0x0C)

5-25. Manual Cleaning (Light)

Type of Command Operation Instruction Command

Command Description

Instruct to execute manual cleaning (Light).

Command Code E6h

Command Detail

Request command:

STX

E

6

ETX

(0x02, 0x45, 0x36, 0x03)

Reply command: N/A

Send Condition

Execute this command in the following status.

- Ready (Detail status: 0x02)
- Waiting for print order (Detail status: 0x0C)

5-26. Auto Cleaning

Type of Command Operation Instruction Command

Command Description

Inform print module to pause print and perform cleaning in combination with the system status.

Sending this command will pause printing, and perform cleaning.

On receiving this command, print module will continue to complete the current printing page, and stop after discharging the page.

Refer to the detail status, such as “waiting for print order”, for how to resume printing.

Since the count for number of pages finish printing will be reset after print resume (goes back to 1), it is necessary to remember how many pages were finished before and after print pause.

Command Code E7h

Command Detail

Request command:

STX	E	7	ETX
-----	---	---	-----

(0x02, 0x45, 0x37, 0x03)

Reply command: N/A

Send Condition

Execute this command in the following status.

- Waiting for cleaning order (Detail status: 0x40)

5-27. Manual Cleaning (before print A)

(Deleted: Unnecessary command)

5-28. Manual Cleaning (before print B)

(Deleted: Unnecessary command)

6. Document

6-1. Printing Sequence

Below is the basic print sequence for the print module.

- ① Send the print data created by the application from the host PC to the print module using CFTSDK
- ② On receiving print data, print module will let the external control device (contains transport unit) know that it has received the print data.
- ③ On receiving such notice, the external control device will send Print Start command to the print module.
- ④ On receiving Print Start command, and if print head is in capping position, print module inform external control device that head needs to go down.

If print head is already in the print position, it will simply return the printing status to the external control device.

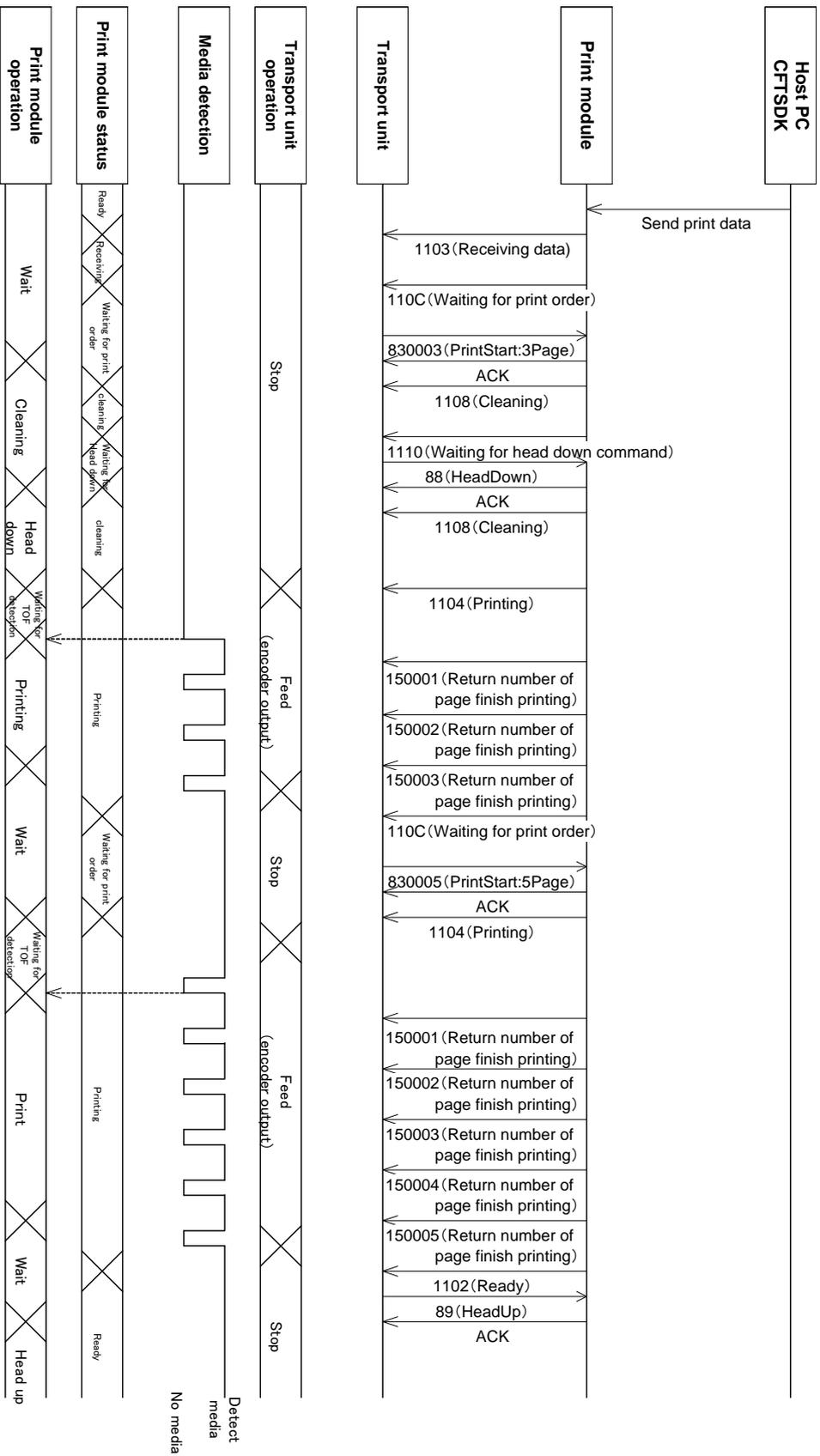
- ⑤ On receiving such notice, the external control device will send Head Down command to the print module.
- ⑥ On receiving Head Down command, print module will move the print head to the print position, and return the printing status to the external control device.
- ⑦ While print module is in the printing status, and receives the encoder output (transport unit movement) and TOF detecting signals for media transport, print module will start to print.
- ⑧ After finish printing the number of copies specified by the Print Start command, print module will return ready status to the external control device. External control device will stop the media transport, and send Head Up command to the print module to move up the print head to the capping position.

Following pages will describe sample sequences for printing cut sheets and roll media.

It is necessary to retract the media in case to print several print jobs on roll media to avoid blank pages in between.

Example of the printing sequence with cut sheet:

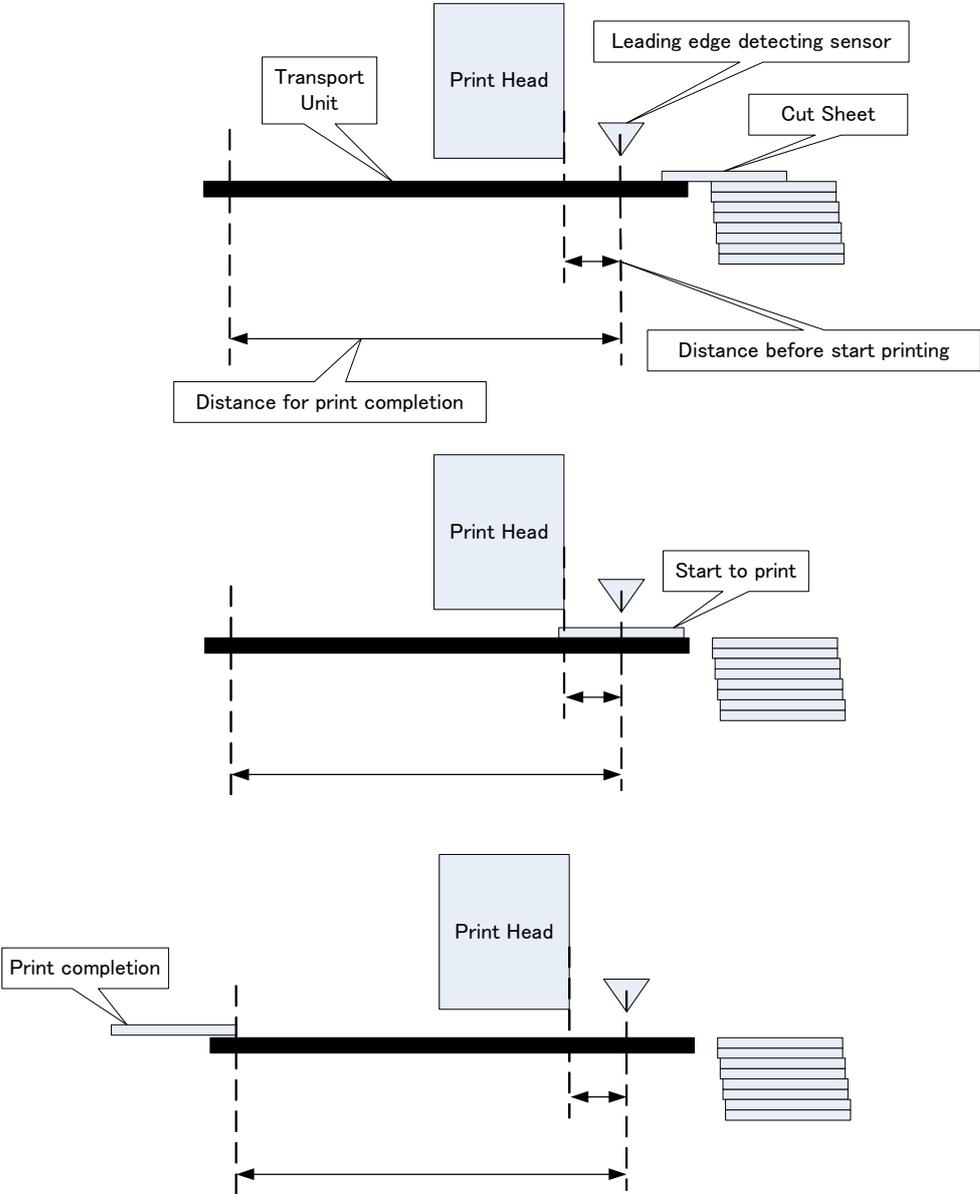
Below is the print sequence with sending 8pages from the host PC, but print operation was divided into 3 pages and 5pages to cut sheets.
 Basic flows is [send print data send Print Start command send Head Down command move transport unit (encoder output) detect paper print send Head Up command after finish printing].
 At the 1st print start, print head is at the capping position, thus it requires Head Down command after the status turns to "waiting for head down" by sending print start.
 However at the 2nd and later print start, since the print head is already at the printing position, the status turns to "printing" by sending Print Start, and starts to move the transport unit. After finish printing all print data, to protect the print head, send Head Up command to move the print head to capping position.



Example of cut sheet transport operation

Below are the positional relation of the print head, transport unit, and the TOF detecting sensor of the print module. When it receives the encoder input for the distance before start printing after it detects the leading edge of the paper, it will start to print.

When it receives the encoder input for the distance for print completion after it detects the leading edge of the paper, it is determined as print completion.

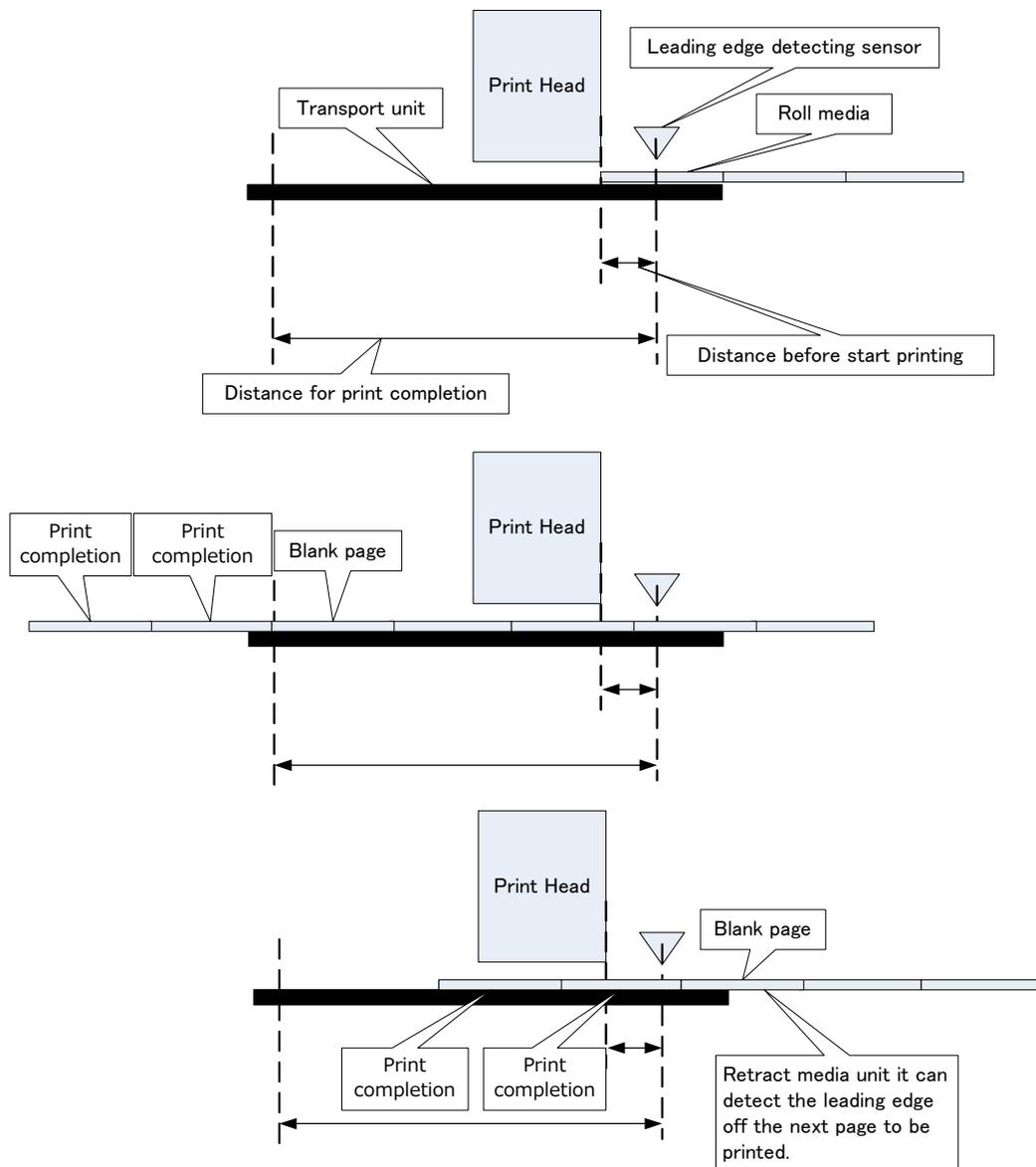


Example of roll media transport operation

When using roll media, it needs to retract when print pauses. Below is the sample sequence when print 2pages-pause-print 2pages.

To start print, as is the same with cut sheet print, it starts to print when receiving an encoder input for the distance to start print after detecting the leading edge.

After finish printing, it will be determined as print completion when receiving the encoder input for the distance for print completion after it detects the leading edge of the paper, however, when starting next print, if the succeeding page is already passing the sensor position, it will be a blank page if there is no retracting paper. To avoid this, retract the paper so that the leading edge of the succeeding page is at the location before the sensor.



6-2. Auto Cleaning Sequence (Auto Cleaning)

To maintain the print head in a fine condition, print module will let the external control device know that it is waiting for the auto cleaning command while it is printing.

After receiving a return from print module that it is waiting for the auto cleaning command, the external control device will then send the Auto Cleaning command to the print module to prepare for print pause.

It is still possible to continue printing while receiving the sign that print module is waiting for the auto cleaning command, there is a case that printed result is not satisfying.

Be sure to check it won't cause any trouble in the actual use condition when not performing the auto cleaning at the necessary timing.

Below is the basic auto cleaning sequence for the print module.

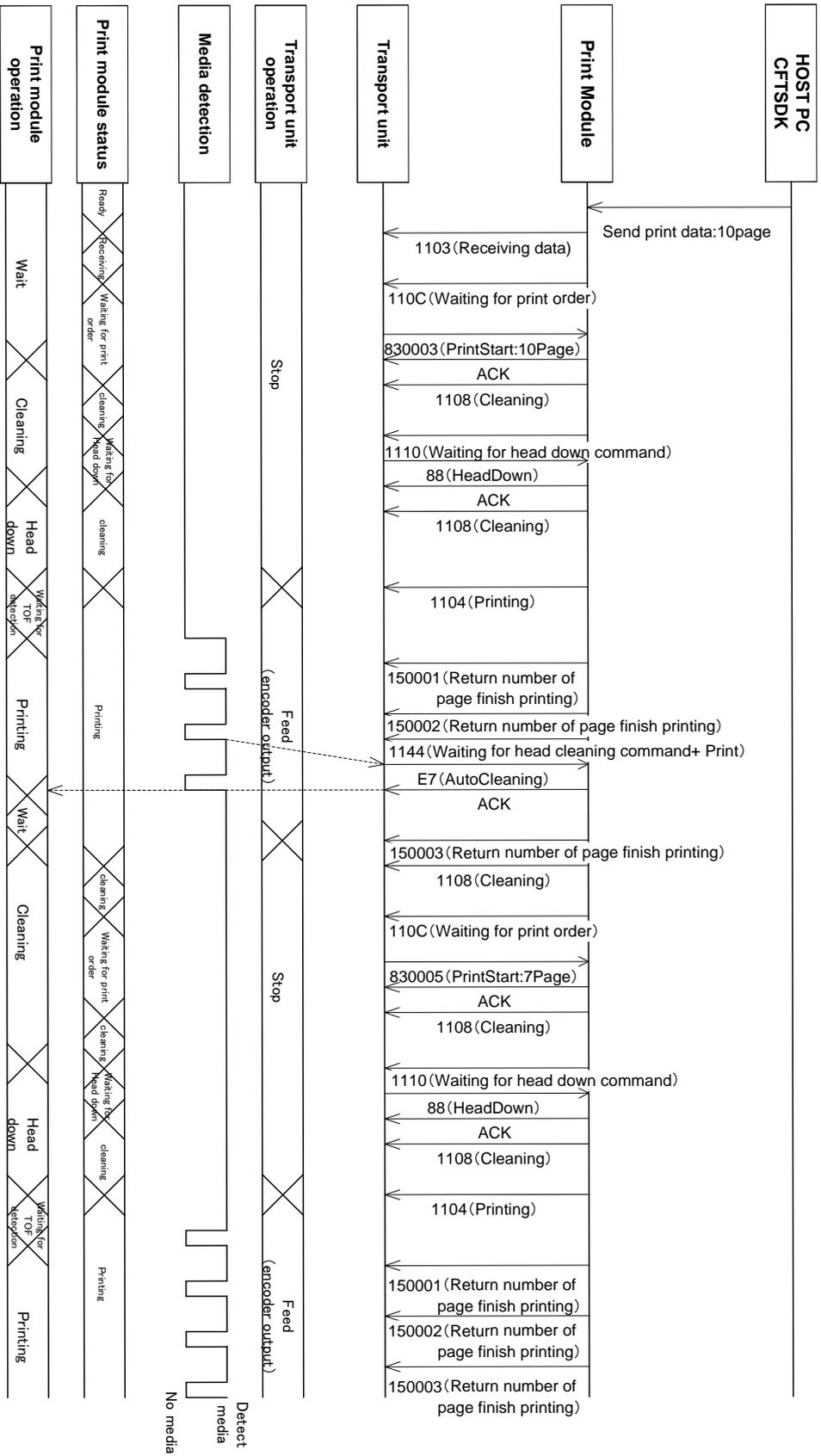
- ① While printing, when it reaches a certain condition, print module will inform the external control device that it is waiting for the auto cleaning command.
- ② On receiving such notice, the external control device will send the Auto Cleaning command to the print module.
- ③ When print module receives Auto Cleaning command, it will continue printing the current detected page, and prepare to pause by moving the print head up to the capping position, and return cleaning status to the external control device.
- ④ When cleaning sequence is completed, print module will return waiting for print order to the external control device.
- ⑤ On receiving such status, the external control device will send Print Start command to the print module.
- ⑥ When print module receives Print Start command, since the print head is in the capping position, return the waiting for head down status to the print module.
- ⑦ On receiving such status, the external control device will send Head Down command to the print module.
- ⑧ On receiving Head Down command, print module will move down the print head to the print position, and return the printing status to the external control device.
- ⑨ While print module is in the printing status, and receives the encoder output (transport unit movement) and TOF detecting signals for media transport, print module will resume printing.

*Retract the media if necessary while performing cleaning.

Next page will describe a sample sequence for auto cleaning.

Example of the cleaning sequence (auto cleaning):

- To maintain the print head condition, print module will inform to the external control device that it is waiting for the cleaning command. When the external control device receives it, continue to print the already started pages (already detected by the sensor), and stop the transport unit. In below example, there are already 3pages detected when the print module informed the waiting status, thus it continues to print until those 3pages are finished printing.



6-3. Reset Sequence

In case to reset printing while print module is printing, send Reset command to the print module.

On receiving Reset command, print module will promptly stop printing, and move up the print head to the capping position. Also, it will delete all received print data.

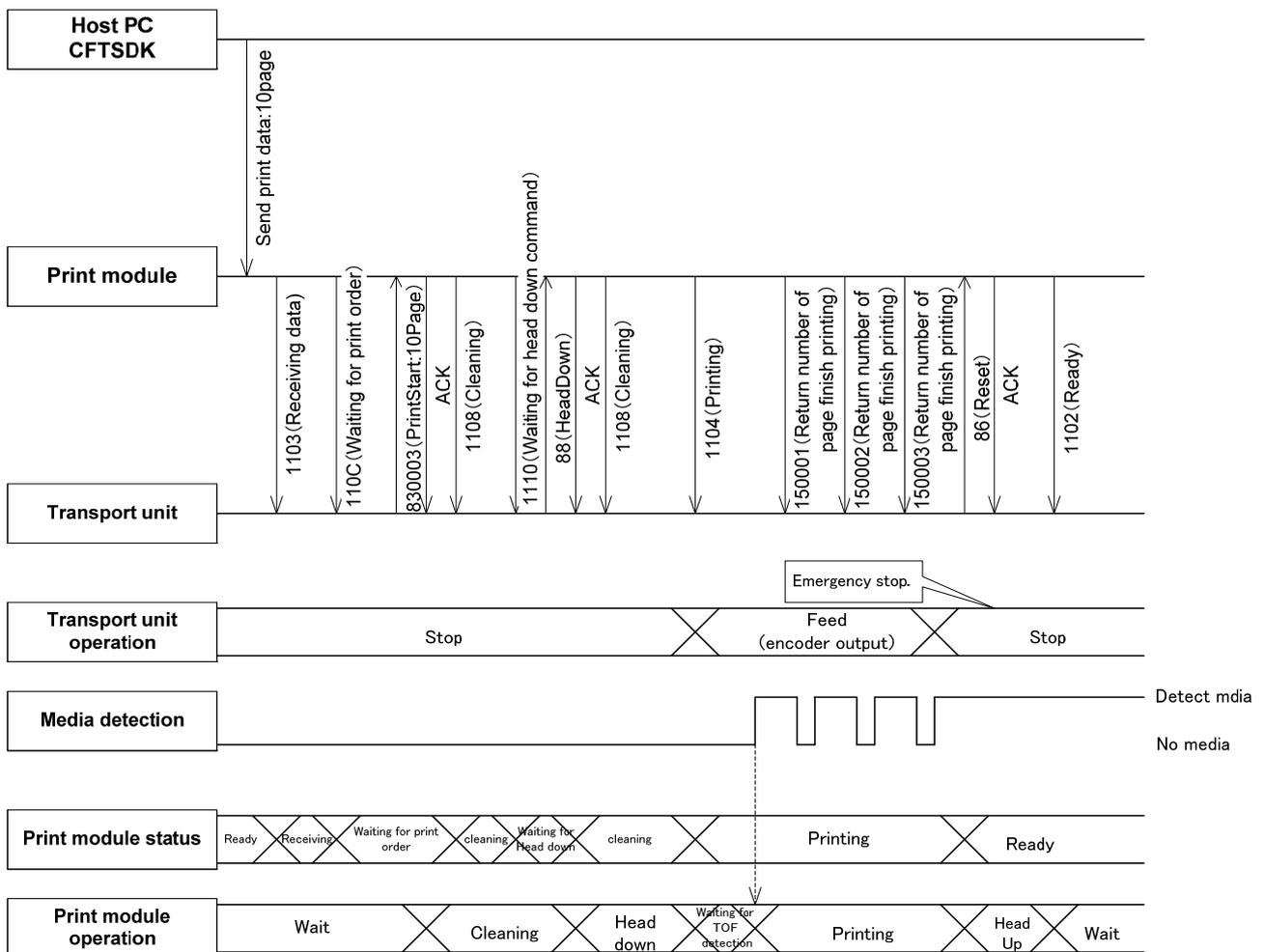
It will be in ready status after completing reset sequence.

Below is a sample sequence for reset.

Example of the Reset sequence while printing:

This is an example of the emergency stop sequence while printing.

As soon as it receives the Reset command, print head move up to the capping position, and print data will be delete. Thus it will not be in “waiting for print order” status, but in “ready” status after reset sequence.



6-4. Error Clear

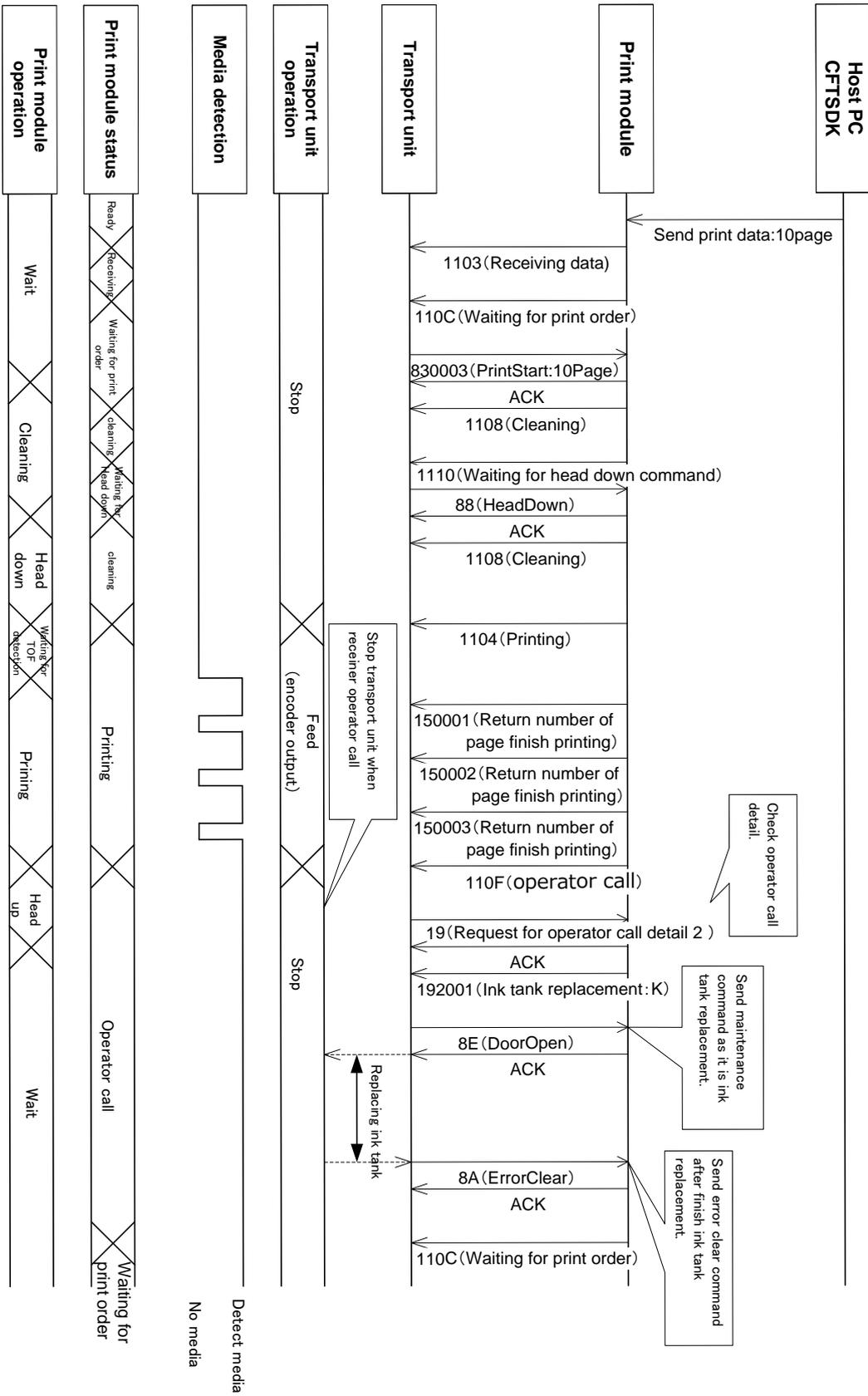
When an operator call was raised, after the necessary treatment to solve the cause of the call, the operator call can be cleared by sending Error Clear command.

Detail of the raised operator call can be acquired by sending Operator Call Detail 2 command.

Below is the sample sequence for error clear.

Example of the Error Clear sequence while printing (ink tank replacement):

This is an example of the black ink tank replacement sequence. When replacing ink tanks or a maintenance cartridge, send Maintenance command prior to the physical replacement to shut off the power supply to the tanks. After finish replacement, send Error Clear command to clear the operator call.



7. Configuration Examples

7-1. Operation Panel

To add an operation panel to monitor or operate the whole system including the print module as well as the external control devices, use below commands.

- Request command for fatal error detail 2
- Request command for operator call detail 2
- Request command for warning detail 2

Send one of above command using below detail status as a trigger.

- Send Fatal Error Detail 2 command to display the result when detail status 0x0B (fatal error) was observed.
- Send Operator Call Detail 2 command to display the result when detail status 0x0F (operator call) was observed. There is a case that more than 1 operator calls are raised simultaneously, keep sending this command at regular interval while detail status 0x0F is observed (every 1second recommended).
- Send Warning Detail 2 command to display the result when detail status 0x80 (warning) is observed. There is a case that more than 1 warnings are raised simultaneously, keep sending this command at regular interval while detail status 0x80 is observed (every 1second recommended)

Next page is a sample configuration of the operation panel.

