EPSON Perfection 1200 / GT-7600

Command Specification, Rev. A

Change Document List

Rev.	Sheet	Item	Description	Reason
A	1 to 56	First issue	---	---

*Page number is enabled only for the latest revision

*** CONTENTS ***

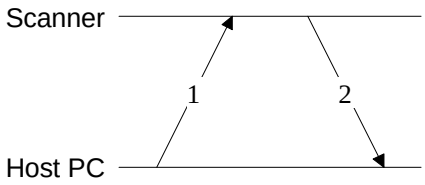
1. Scope

This specification is applied to control command of color image scanner "Perfection 1200 / GT-7600".

2. Procedure of Command handshaking

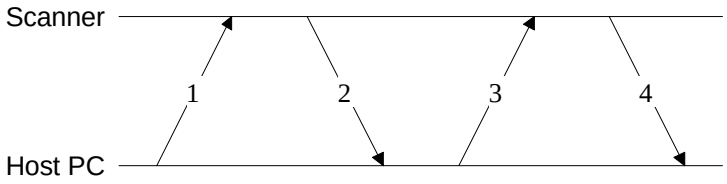
2.1. Procedure of Control code handshaking

2.1.1. Control codes without Parameters



1. Control code from the host computer
2. Response from the scanner
   ACK (06H) Legal control code is received. (The scanner accepts the control code)
   NACK (15H) Illegal control code is received. (The scanner does not accept the control code.)

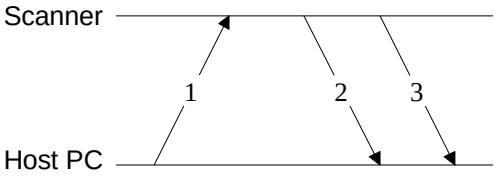
2.1.2. Control code with parameters



1. Control code from the host computer
2. Response from the scanner
   ACK (06H) Legal control code is received. (The scanner accepts the control code)
   NACK (15H) Illegal control code is received. (The scanner does not accept the control code.)
3. If the host receives ACK ,it sends the parameters.
4. Response from the scanner
   ACK (06H) Legal parameters is received. (The scanner accepts the parameters.)
   NACK (15H) Illegal parameters is received. (The scanner does not accept the parameters.)

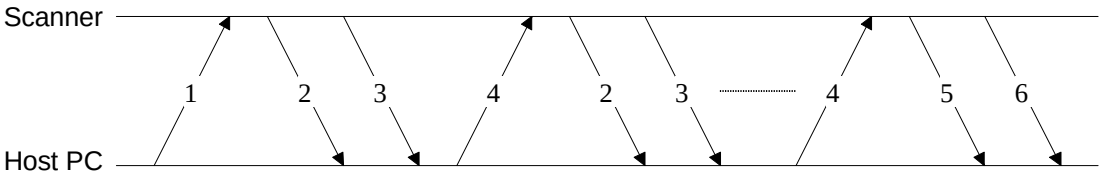
2.2. Procedure of Data-block handshaking

2.2.1. Control code of Data request



1. Control code from the host computer
2. Data block from the scanner (information block)
3. Data block from the scanner (image data)

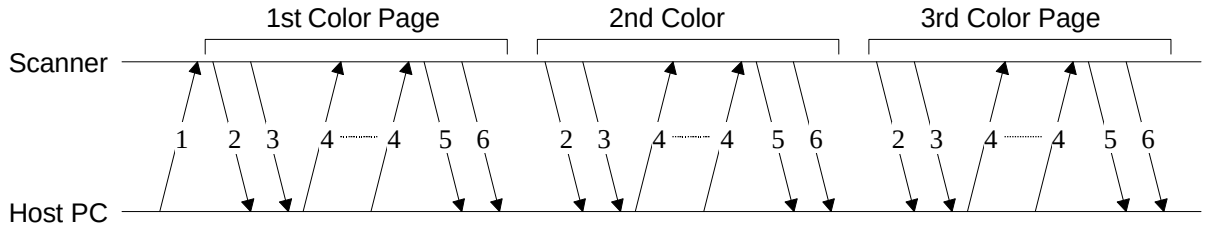
2.2.2. Image data transfer : Monochrome scanning.



1. Control code from the host computer
2. Data block from the scanner (information block)
3. Data block from the scanner (image data)
4. Response from the host computer.
   ACK (06H) : Continue and send the next data.
   CAN (18H) : Abort
5. The last Data-block (information block)
6. The last Data-block (image data)

The host computer should not send ACK (06H) after receiving the last Data -Block.
In image data of each data block ,Just one line image data is send.
And, In case of Data-block transfer, • n• line image aresend . • n• is line number that is set by[ESC d] code.

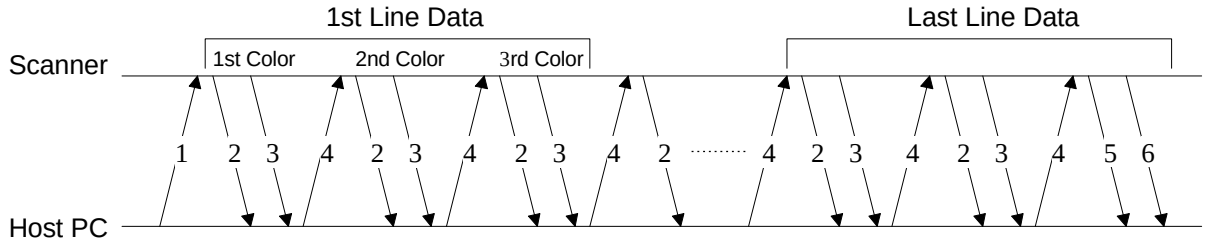
2.2.3. Color scanning (Page sequence mode)



1. Control code from the host computer
2. The Data-Block from the scanner (information block)
3. The Date-Block from the scanner (image data)
4. Response from the host computer.
   ACK (06H) : Continue and send the next data.
   CAN (18H) : Abort
5. The last Data-block (information block)
6. The last Data-block (image data)

The host computer should not send ACK (06H) after receiving the last Data -Block.
In image data of each data block ,in the case of line transfer, the image data of one line per one color is send.
And in the case of block transfer ,the image data of • n • lines per one color are send.
• n• is the line number that is set by • ESC d• code.

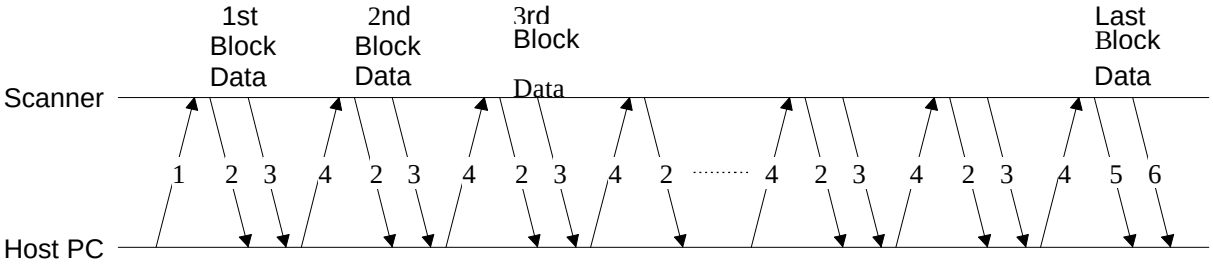
2.2.4. Image data transfer : Line sequence mode



1. Control code from the host computer
2. Data-Block from the scanner (information block)
3. Data-Block from the scanner (image data)
4. Response from the host computer
   ACK (06H) Continued and send the next data
   CAN (18H) Abort
5. The last Data- Block (information block)
6. The last Date-Block (image data)

The host computer should not send (ACK) after receiving the last Data-Block.
In image data of each data block , in the case of each three colors image data on same line of sub scan is as one line, one line image data is send.

2.2.5. Image data transfer : line sequence mode (Block transfer mode)



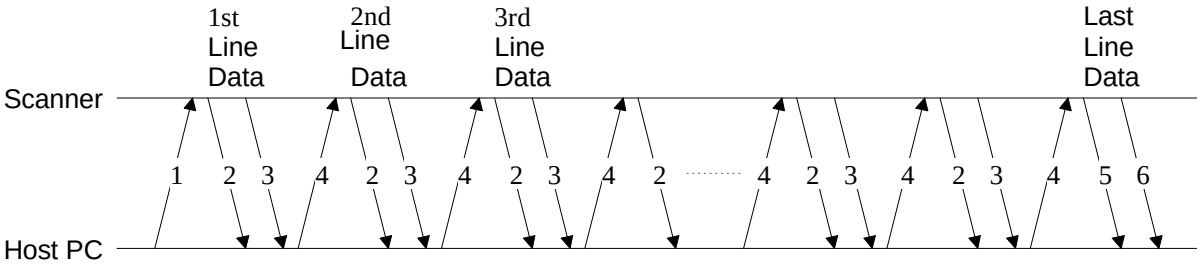
1. Control code from the host computer
2. Data-Block from the scanner (information block)
3. Data-Block from the scanner (image data)
4. Response from the host computer
   ACK (06H) Continued and send the next data
   CAN (18H) Abort
5. The last Data-Block (information block)
6. The last Data-Block (image data)

The host computer should not send (ACK) after receiving the last Data-Block.
In each data block of image data , in the case of each three color image data on same line of sub scan is as one line , for one line image data is send. • n• is linenumber that is set by [ESC d] code.

A form of an Image data (Example : n = 18)

1st Line 1st Color	1st Line 2nd Color	1st Line 3rd Color	2nd Line 1st Color	-	6th Line 1st Color	6th Line 2nd Color	6th Line 3rd Color

2.2.6. Image data transfer : Byte sequence mode (Line transfer mode)



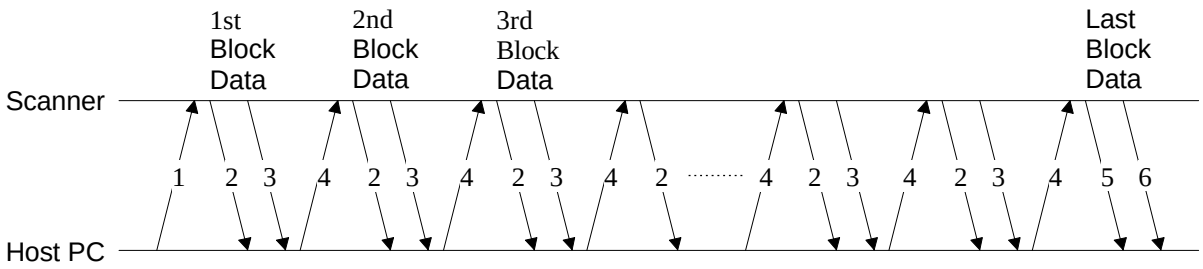
1. Control code from the host computer
2. Data-Block from the scanner (information block)
3. Data-Block from the scanner (image data)
4. Response from the host computer
   ACK (06H) Continued and send the next data
   CAN (18H) Abort
5. The last Data-Block (information block)
6. The last Data-Block (image data)

The host computer should not send (ACK) after receiving the last Data-Block.
In image data of each data block , for three color image data on same line of sub scan are send.

A form of a image data

1st Color 1st Pixel	2ndColor 1st Pixel	3rd Color 1st Pixel	1st Color 2nd Pixel	-	1st Color Last Pixel	2nd Color Last Pixel	3rd Color Last Pixel

2.2.7. Image data transfer : Byte sequence mode (block transfer mode)



1. Control code from the host computer
2. Data-Block from the scanner (information block)
3. Data-Block from the scanner (image data)
4. Response from the host computer
   ACK (06H) Continued and send the next data
   CAN (18H) Abort
5. The last Data-Block (information block)
6. The last Data-Block (image data)

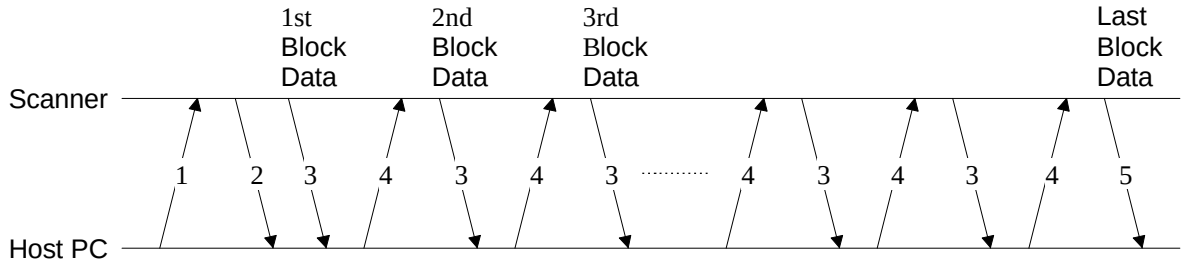
The host computer should not send (ACK) after receiving the last Data-Block.
In image data of each data block, in the case of each three color image data on same line of sub scan is as one line, for •• n• lines are send . • n• is line number that is set by [ESC d] code.

A form of a image data (Example : n = 17)

1st Line 1st Color 1st Pixel	1st Line 2nd color 1st Pixel	1st Line 3rd Color 1st Pixel	1st Line 1st Color 2nd Pixel	-	17th Line 1stColor Last Pixel	17th Line 2nd Color Last Pixel	17th Line 3rd Color Last Pixel

2.3. Procedure of new Data-Block transfer

New Data-Block transfer is mode when execute image scanning by[FS G]code as extension command.



1. Control code from the host computer
2. Data-Block from the scanner (information block)
3. Data-Block from the scanner (image data + status)
4. Response from the host computer
   ACK (06H) Continued and send the next data
   CAN (18H) Abort
5. The last Data-Block (information block)
6. The last Data-Block (image data)

The host computer should not send back (ACK) after receiving the last Data-Block.

2.3.1. Image Data transfer : Monochrome scanning

In image data of each Data-Block, • n• lines image data are send. • n• is line number that is set by [FS W]code as block line number parameter (offset 28) .

2.3.2. Image Data transfer : line sequence mode

In image data of each data block , in the case of each three color image data on same line of sub scan is as one line , for •n• lines are send. • n• is line number that is set by [ESC d] code. (offset 28)

A form of a image data (Example : n = 17)

1st Line 1st Color	1st Line 2nd Color	1st Line 3rd Color	2nd Line 1st Color	-	5th Line 3rd Color	6th Line 1st Color	6th Line 2nd Color

2.3.3. Image Data transfer : Byte sequence mode

In image data of each data block , in the case of each three color image data on same line of sub scan is as one line, for •n• * 3 lines are send, • n• is line number that is set by [FS W] code as block line number parameter. (offset 28)

A form of a image data 1 (Example : n = 17)

1st Line 1st Color 1st Pixel	1st Line 2nd Color 1st Pixel	1st Line 3rd Color 1st Pixel	1st Line 1st Color 2nd Pixel	-	17th Line 1st Color Last Pixel	17th Line 2nd Color Last Pixel	17th Line 3rd Color Last Pixel

3. Structure of Data-Block

There are three types of the structure of the Data-Block shown below.

(1) Line data structure : Includes 4 bytes of the information block and 1 line of the image data.
(2) Block data structure : Includes 6 bytes of the information block and •n• line of the image data where •n• is indicated in the Line counter of the information block.
(3) New block data structure : 14 bytes of the information block and image data.

A form of the ordinary data block takes line data structure. Only image data when block line number was set by [ESC d]code is block data structure .And scanning image by [FS G]code, it is new block data structure.
The byte counter and the line counter is set 000H ,when no data available.

Line data structure

offset			Information Block
0	STX	Header	
1	ST	Status	
2	BC_L	Byte Counter	
3	BC_H		
0	DATA	Data	
-	-	or	
BC-1	DATA	Image Data	

Block data structure

offset			Information Block
0	STX	Header	
1	ST	Status	
2	BC_L	Byte Counter	
3	BC_H		
4	LC_L	Line Counter	
5	LC_H		
0	IM	Image Data	
-	-		
BC*LC-1	IM		

New block data structure

offset			Information Block
0	STX	Header	
1	ST	Status	
2	BC0	Byte Counter	
3	BC1		
4	BC2		
5	BC3		
6	BN0	Block Number	
7	BN1		
8	BN2		
9	BN3		
10	LBC0	Last Block	
11	LBC1	Byte Counter	
12	LBC2		
13	LBC3		

3.1. Line data Structure

A) Information block

(1) Header (STX (02H))

The header indicates that it is beginning of a Data block.

(2) Status

(Refer to the section 3.4.)

(3) Byte counter

It means all bytes number of transferred data at data or image data. The bytes counter consists of 2 bytes positive number, and lower bytes precedes the higher bytes.

The value of byte counter is solved by the following expression.

$$BC = \frac{\textit{the}\text{legth of main scan}}{\text{int}\left(\frac{8}{\text{the value of data format}}\right)}$$

But, byte sequence scanning, the value of BC is three times.

The value of byte counter per one line should be checked, before receiving data.

B) Data

The data corresponds to the image data or [ESC I] or [ESC S] and the others.

The data length is size that is indicated by the byte counter.

In case of the color image scanning, the output color sequence is decided by[ESC C].

3.2. Block data structure

The block data structure is available for only image data when is set except for •0• on [ESC C] and when starts scanning by [ESC G].

A) Information block

(1) Header (STX (02H))

The header indicates that is the beginning of a Data block.

(2) Status

(refer to the section status byte)

(3) Byte counter

The [Byte counter] indicates the number of bytes of the image data where transferred on data line In the main scanning direction. The bytes Counter consists of 2 bytes positive number, and the lower bytes precedes the higher bytes.

The value of the bytes counter is solved as the line data structure .

(4) Line Counter

The Line Counter indicates the number of the line of the image data that transferred on the image data.

The bytes Counter consists of 2 bytes positive number, and the lower bytes precedes the higher bytes.

The bytes Counter indicates the value set by [ESC d].

The [byte counter/ line]and the [Line Counter]should be checked, before receiving data.

B) Data

The data part corresponds to the image data block.

The data length is [the Byte Counter * the Line Counter].

In case of the color image scanning, the output color sequence is decided by[ESC C].

3.3. New Block Data Structure

The new block data structure is available for only image data started scanning by [FS G].
The information block is transferred once immediately [FS G], and after that the image data transferred.

A) Information block

(1) header (STX (02H))

The header indicates that is the beginning of a Data block.

(2) Status

(refer to3.4 a format of status byte) but Area flag (bit 5) and Color Attributes flag (bit3,2) do not mean, always 0.

(3) Byte counter

The Byte counter indicates the number of the bytes of image data that is transferred in one block.
The value of byte counter is solved by the following expression.

$$A = \frac{\text{the length of main scan}}{\text{int}\left(\frac{8}{\text{the value of data format}}\right)}$$

But, byte sequence scanning, the value of A is three times.

$$BC = A \times \text{the number of block line}$$

(4) Block Number

The block number is the value that subtracts 1 from the number of all image data block.
The value of block number is solved by the following expression.

$$BN = \frac{\text{thelength of sub scan}(\times 3)}{\text{number of block line}} - 1$$

But on the above expression, The length value of sub scanning is three times, in the case of line sequence scanning only. After calculation, value of BN raise the decimal by a unit.

(5) The last block byte counter

It indicates the byte number of the last block image data.
The last block byte counter is solved by the following.

$$B = \text{mod}\left(\frac{\text{thelenght of sub scan reading}(\times 3)}{\text{number of block line}}\right)$$

mod is the rest by division. In above expression , in the same way (4) ,
the length value of sub scanning is three times, in the case of line sequence scanning only.
And in the case of B=0 ,B is the number of block line.

$$LBC = A \times B$$

The value of the byte counter, the block number and the last block byte counter should be checked, before receiving data.

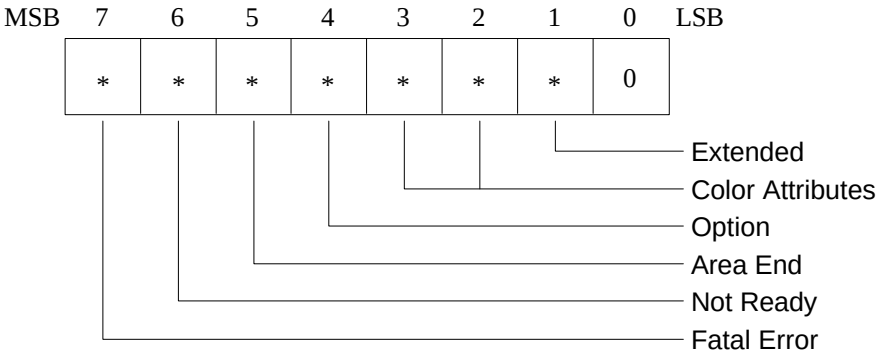
B) Data

The data corresponds to the new image data block which is made of image data bytes and a status byte.
Data length is size that is indicated on the byte counter or the last block byte counter plus 1.
In case of color scanning, color data order is depend on [FS W] code (offset : 24) .
In the status byte, Fatal error flag (bit7) and Not ready flag (bit6) are available. The other bits are always set to zero.
In case of data format is 9 - 12, image date of 1 pixel is transferred by 2 byte.
How to transfer the image data of new block data structure is the following. Image data block as size on the byte counter is transferred the number of times on block number, after image data block as size on the last block byte counter is transferred once. This is all. In short, all bytes number of all image data is solved on this expression. (Byte counter * block number + the last block byte counter)

3.4. The format of status bytes

The status byte should have the format shown below.

Status indicates the current condition and error of the scanner.
Status accompanies the information block of the data block.
Command which confirms only status uses[ESC F]



[Detail of the status bits]

Bit7 : Fatal Error — Fatal error flag. Set to • 1• when system error occurred.

Bit6 : Not Ready — It is set, when the scanner is using on the other system .

Bit5 : Area End — It is set, when it scans the last image data.
In the case of the color page mode scanning, set to • 1• in the last Data-Block of each page color.
In case of the monochrome mode ,color line mode scanning, set to • 1• in the last Data-Block.

Bit4 : Option — When a option equipment is installed, set to • 1• .

Bit3 : Color Attributes — (See table below)

Bit2 : Color Attributes — (See table below)

Bit1 : Extended Commands — Always it is set to• 1• . Because it is possible to use extension command.

Bit0 : (Reserved) — Always 0

	ESC C	scanning color		Bit3	Bit2
monochrome mode	00H	-		0	0
dropout color mode	10H		green (G)	0	1
	20H		red (R)	1	0
	30H		blue (B)	1	1
page sequence mode	01H,11H		green (G)	0	1
			red (R)	1	0
			blue (B)	1	1
Line sequence mode	02H,12H	Line transfer	green (G)	0	1
			red (R)	1	0
			blue (B)	1	1
		block transfer	GRB	0	1
			RGB	1	0
Bytes sequence mode	03H,13H		GRB	0	1
			RGB	1	0

4. Control code
4.1. Request Identity

(1) Code : ESC I

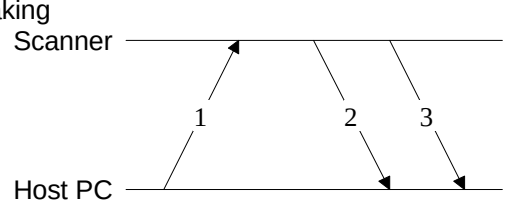
ASCII :	ESC	I
decimal :	27	73
hexadecimal :	1B	49

(2) Function

Request the information of the scanner function.

The scanner sends back a Data-Block that consists of properties of the scanner such as the identification, resolution, and number of data in the maximum reading area, in the format shown below.

(3) Handshaking



1) ESC I code
2) Information block
3) Identity data

(4) Identity data structure

Identity Data-Block format is shown below. The byte counter of the information block is 103 (67H) .

•B•, •7•	: The command level identification
•R•, 50, •R•, 60, •R•, 72,	: Available resolution description (each numerical value is 2 bytes)
•R•, 75, •R•, 80, •R•, 90,	
•R•, 100, •R•, 120, •R•, 133,	
•R•, 144, •R•, 150, •R•, 160,	
•R•, 175, •R•, 180, •R•, 200,	
•R•, 216, •R•, 240, •R•, 300,	
•R•, 320, •R•, 360, •R•, 400,	
•R•, 480, •R•, 600, •R•, 720,	
•R•, 800, •R•, 900, •R•, 1200,	
•R•, 1600, •R•, 1800, •R•, 2400,	
•A•, 20400, 28080	: the direction of main and sub scanning maximum scanning area at the maximum resolution.

The letters which bound by quotation mark means 1 byte ASCII character.

Each numerical data should be 2 bytes positive number, and the lower bytes precedes the higher bytes.

The maximum resolution that is possible to set by using [ESC R] command is 9600dpi ,but the maximum value returned by this code is 2400dpi.

4.2. Request Command Parameters

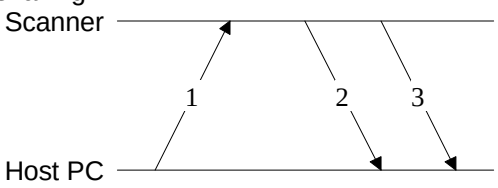
(1) Code : ESC S

ASCII :	ESC	S
decimal :	27	83
hexadecimal :	1B	53

(2) Function

The scanner sends back the Data-Block listing the current parameter values set in the scanner.

(3) Handshaking



1) ESC S code
2) information block
3) command, parameter information data

(4) Structure of command , parameter information data

Command and parameter information Data-Block format is shown below.
The bytes counter of the information block is 45 (2DH)

Offset	Data	Description
0	•C•	color data (Ref. ESC C) (ASCII)
1	i	set data
2	•R•	resolution data (Ref. ESC R) (ASCII)
3	$n1_L$	main scan data
4	$n1_H$	
5	$n2_L$	sub scan data
6	$n2_H$	
7	•A•	Sets the scanning area (Ref. ESC A) (ASCII)
8	$n1_L$	main scan offset data
9	$n1_H$	
10	$n2_L$	sub scan offset data
11	$n2_H$	
12	$n3_L$	main scan area
13	$n3_H$	
14	$n4_L$	sub scan area
15	$n4_H$	
16	•D•	sets of data format (Ref. ESC D) (ASCII)
17	i	set data
18	•B•	set digital halftone (Ref. ESC B) (ASCII)
19	i	set data
20	•L•	set brightness correction (Ref. ESC L) (ASCII)
21	i	set data
22	•Z•	set gamma correction (Ref. ESC Z) (ASCII)
23	i	set data
24	•H•	set zooming (Ref. ESC H) (ASCII)
25	i1	set main scan data
26	i2	set sub scan data

27	•M•	set color correction (Ref. ESC M) (ASCII)
28	i	set data
29	•Q•	set sharpness (Ref. ESC Q) (ASCII)
30	i	set data
31	•g•	set scanning mode (Ref. ESC g) (ASCII)
32	i	set data
33	•K•	set mirroring (Ref. ESC K) (ASCII)
34	i	set data
35	•s•	set auto area segmentation (Ref. ESC s) (ASCII)
36	i	set data
37	•t•	set threshold (Ref. ESC t) (ASCII)
38	i	set data
39	•d•	set line counter (Ref. ESC d) (ASCII)
40	i	set data
41	•e•	control option (Ref. ESC e) (ASCII)
42	i	set data
43	•N•	set negative (Ref. ESC N) (ASCII)
44	i	set data

4.3. Control Option Unit

(1) Code : ESC e

ASCII :	ESC	e	i
decimal :	27	101	i
hexadecimal :	1B	65	i

(2) Function

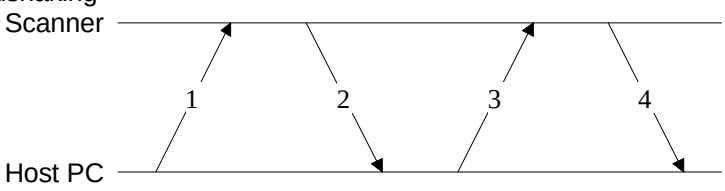
Control enable or disable of the option equipment.

i = 00H Disable the option equipment.
i = 01H Enable the option equipment.

This code can be received always. But if the option equipment is not installed (when option flag (bit 4) of the status byte is 0) , the scanner sends NACK code after receiving parameter 01H.
This code should be set before [ESC A],[ESC R],[ESC H], because these command setting are reset when this code is received.

Default value i = 00H

(3) Handshaking



1) e code
2) ACK (06H)
3) parameter i
4) ACK (06H) / NACK (15H)

4.4. Start Scanning

(1) Code : ESC G

ASCII :	ESC	G
decimal :	27	71
hexadecimal :	1B	47

(2) Function

Starts a scanning operation (image reading) , and the reading data is sent to the host computer.
When scanning the image under the setting used by [FS W] command , [FS G] command should be used, do not have to use this command.

(3) Handshaking

Handshaking changes by each setting to scan.
The description is referent to • 2.2 **Procedure of Data-block handshaking•**
After accepting the last scanning Data-Block, the host should not send ACK to the scanner.
The area end flag (bit 5) is set in the last reading Data-Block.

(4) Note

When the scanner receives this command and the scanner is in lamp warming up, it return fatal error status in the information block. So in this case, you should check whether it is in warming up by sending • ESC f• command. If it is in warming up, wait to finish the warming up , then send this command again.

4.5. Abort Scanning

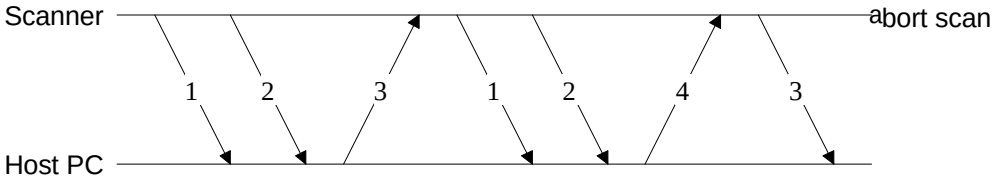
(1) Code : CAN

ASCII :	CAN
decimal :	24
hexadecimal :	18

(2) Function

Terminates a scanning operation, and the scanner returns to the command waiting mode.
The[CAN]code is available only when the scanner is waiting for an ACK code during a scanning operation.
As the ACK code is returned from the scanner after receiving the[CAN]code, the Host should receive.
When this command is input during the command waiting mode, The scanner deal with the command error.

(3) Handshaking



1) information block
2) image data
3) ACK (06H)
4) CAN (18H)

4.6. Set Scanning Mode

(1) Code : ESC g

ASCII :	ESC	g	i
decimal :	27	103	i
hexadecimal :	1B	67	i

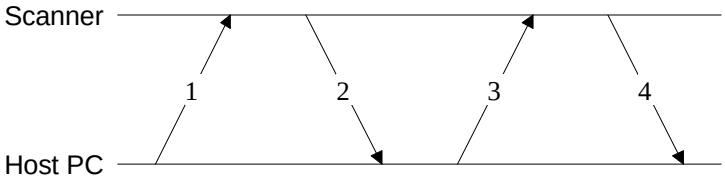
(2) Function

This command sets the scanning mode.

i = 00h Normal mode
i = 01h High speed scan

Default value i = 00H

(3) Handshaking



1) ESC g code
2) ACK (06H)
3) Parameter i
4•j ACK (06H) / NACK (15H)

4.7. Request Status

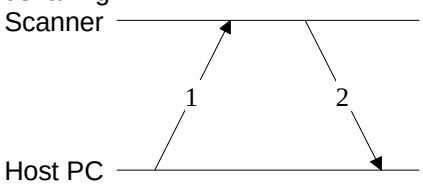
(1) Code : ESC F

ASCII :	ESC	F
decimal :	27	70
hexadecimal :	1B	46

(2) Function

Requests the scanner to send the Data-Block that identifies the status of the scanner.

(3) Handshaking



1) ESC F code
2) information block

(4) Contents of Data-Block

Only information block is transferred in this code, and is not transferred data block that correspond to it.
The byte counter in information block is always 0.

4.8. Request Extended Status

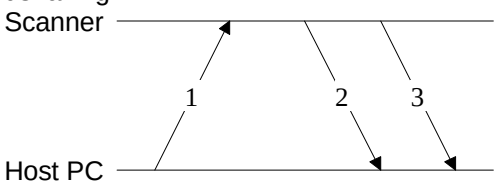
(1) Code : ESC f

ASCII :	ESC	f
decimal :	27	102
hexadecimal :	1B	66

(2) Function

Request a status of the scanner and the equipment.

(3) Handshaking



1) ESC f Code
2) information block
3) extended status data

(4) Contents of Data-Block

Extended status data takes the following structure. The byte counter of information block is 42 (2AH) .

Offset	bit								Description
	7	6	5	4	3	2	1	0	
0	FER	/FBF	0	0	Rvd	Rvd	WU	PB	Status
1	IST	EN	ERR	Rvd	PE	PJ	OPN	0	ADF status
2	X_L (B0H)								ADF maximum scanning area of main scan
3	X_H (4FH)								
4	Y_L (40H)								ADF maximum scanning area of sub scan
5	Y_H (83H)								
6	IST	EN	ERR	Rvd	Rvd	Rvd	Rvd	Rvd	Paper size
7	X_L (80H)								TPU maximum scanning area of main scan
8	X_H (25H)								
9	Y_L (E0H)								TPU maximum scanning area of sub scan
10	Y_H (2EH)								
11-25	Rvd								Reserved
26-41	Product Name								Model name (ASCII)

Rvd : Reserved (always 0)
FER : In Fatal error, indicated 1. Always 0
/FBF : This is Flatbed type ,so always 0
WU : During the lamp is warming up, it indicate 1.
PB : This type has push bottom, because always 1

X_L,X_H,Y_L,Y_H :
Only when ADF or TPU are attached to the scanner , it reply value in parenthesis.
Else it reply value 0.
IST : When the scanner equips ADF or TPU, it indicates 1
EN : When ADF or TPU option is available by [ESC e]or [FS W]code, indicates 1.
ERR : When the something error happens on ADF or TPU , it indicates 1.
PE : In case of paper empty , it indicates 1.
PJ : In case of paper jam, it indicates 1.
OPN : In case of cover open, it indicates 1.

When the option is unavailable by [ESC e] or[FS W]code , ERR, PE, Pj and OPN flag is set clear all.
.

Product Name : Each product name is shown by ASCII. 20 is used for space.
GT-7600 : Japan
Perfection1200 : Other countries

4.9. Initialize

(1) Code : ESC @

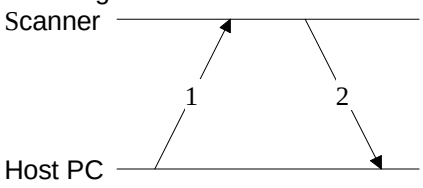
ASCII :	ESC	@
decimal :	27	64
hexadecimal :	1B	40

(2) Function

Initializes the scanner.

All parameters except down loaded data are initialized to the default value. Down loaded data is remained.

(3) Handshaking



1) ESC @code

2) ACK (06H)

4.10. Set Resolution

(1) Code : ESC R

ASCII :	ESC	R	$n1_L$	$n1_H$	$n2_L$	$n2_H$
decimal :	27	82	$n1_L$	$n1_H$	$n2_L$	$n2_H$
hexadecimal :	1B	52	$n1_L$	$n1_H$	$n2_L$	$n2_H$

(2) Function

Sets the scanning resolution of main scan and sub scan.

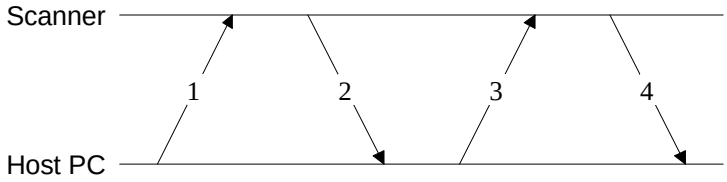
n1 : Main scan resolution data (in dpi)
n2 : Sub scan resolution data (in dpi)

The possible setting resolution value of the range is
50<= n1, n2 <= 9600

When the scanner accepts this control code , the scanning area is reset to the maximum value allowed in the current resolution and zoom setting. Therefor, resolution should be set before setting the scanning area.(refer : ESC A)

Default value : n1 = 100, n2 = 100

(3) Handshaking



1) ESC R code
2) ACK (06H)
3) parameter n1,n2
4) ACK (06H) / NACK (15H)

4.11. Set Zooming

(1) Code : ESC H

ASCII :	ESC	H	i1	i2
decimal :	27	72	i1	i2
hexadecimal :	1B	48	i1	i2

(2) Function

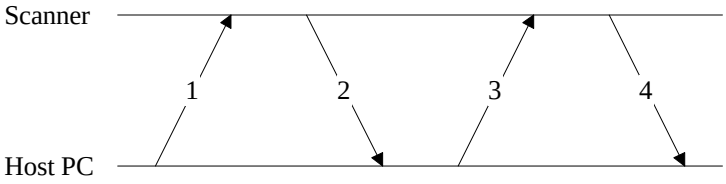
Sets zooming values of each of main scan and sub scan.

i1 : Main scan zooming data (in %)
i2 : Sub scan zooming data (in %)
(50% <= i1, i2 <= 200%)

The zooming value is possible to set in 1% step in the range of the above mentioned.
When the scanner accepts this control code, the scanning area is reset to the maximum value allowed in the current resolution and zoom settings. Therefore, zoom should be set before setting the scanning area.
(refer : ESC A)

Default value i1 = 100,i2 = 100

(3) Handshaking



1) ESC H Code
2) ACK (06H)
3) Parameter i1,i2
4) ACK (06H) / NACK (15H)

4.12. Set Scanning Area

(1) Code : ESC A

ASCII :	ESC	A	$n1_L$	$n1_H$	$n2_L$	$n2_H$	$n3_L$	$n3_H$	$n4_L$	$n4_H$
decimal :	27	65	$n1_L$	$n1_H$	$n2_L$	$n2_H$	$n3_L$	$n3_H$	$n4_L$	$n4_H$
hexadecimal :	1B	41	$n1_L$	$n1_H$	$n2_L$	$n2_H$	$n3_L$	$n3_H$	$n4_L$	$n4_H$

(2) Function

Sets the scanning area of main scan and sub scan from the origin, in the number of the current resolution pixels.

n1	main scan offset data
n2	sub scan offset data
n3	main scan area
n4	sub scan area

(0 <= n1,0 <= n2,8 <= n3,1 <= n4)

In the case of Each value is the following. The maximum value is calculated from following expression.

$$\text{the maximum value of main scan} = 11.7 * \frac{\text{the value of main scan resolution} * \text{the value of main scan zooming}}{100}$$

$$\text{the maximum value of sub scan} = 17 * \frac{\text{the value of sub scan resolution} * \text{the value of sub scan zooming}}{100}$$

And the each value of parameter should be set in the following range.

n1,n3,n1+n3 <= the maximum value of main scan
n2,n4,n2+n4 <= the minimum value of sub scan
n1,n2,n3,n4 <= 65,535

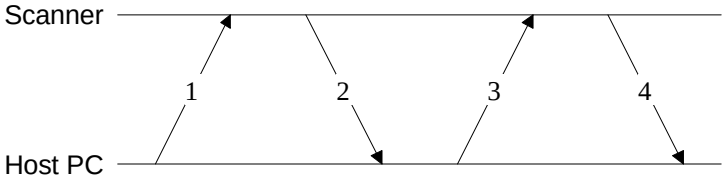
And the range of n3 is the following by[ESC D],[ESC C].

- color bytes sequence 5-8 bit/pixel : maximum 21,840
- except for above mentioned : maximum 32,752

The width of main scanning (n3) is set in 8 pixel step.
The scanning area is reset when resolution or zooming is set. Therefore, those setting should be made before setting the scanning area.
In the case of scanning image by ADF option, take care to set this parameter, because the original position of scanning moves automatically by a manuscript size. (refer to[ESC f] code)

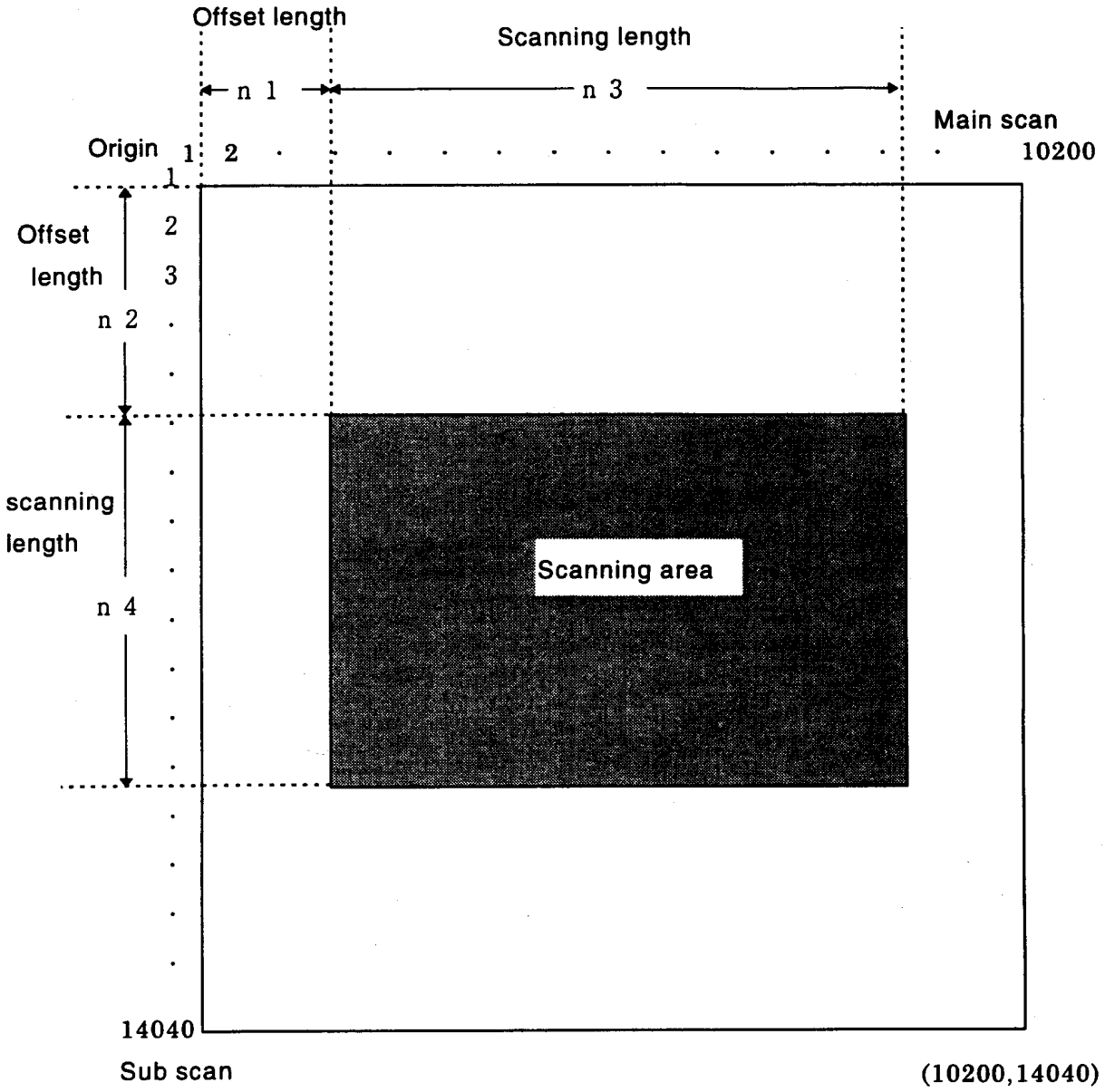
Default value n1 = 0,n2 = 0,n3 =1168,n4 = 1700

(3) handshaking



1) ESC A Code
2) ACK (06H)
3) Parameter n1,n2,n3,n4
4) ACK (06H) / NACK (15H)

(4) Scanning area (in case of 1200dpi)



4.13. Set Data Format

(1) Code : ESC D

ASCII :	ESC	D	i
decimal :	27	68	i
hexadecimal :	1B	44	i

(2) Function

Specifies the number of bits per one color of a pixel as the data format in the range from 1 to 8 bits.

1 <= i <= 8

The output format of image data is the following

i = 08H : 8 bit/pixel (1 pixel/byte)

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

i = 07H : 7 bit/pixel (1 pixel/byte)

D6	D5	D4	D3	D2	D1	D0	0

i = 06H : 6 bit/pixel (1 pixel/byte)

D5	D4	D3	D2	D1	D0	0	0

i = 05H : 5 bit/pixel (1 pixel/byte)

D4	D3	D2	D1	D0	0	0	0

i = 04H : 4 bit/pixel (2 pixel/byte)

D3	D2	D1	D0	D3	D2	D1	D0
n				n+1			

i = 03H : 3 bit/pixel (2 pixel/byte)

D2	D1	D0	0	D2	D1	D0	0
n				n+1			

i = 02H : 2 bit/pixel (4 pixel/byte)

D1	D0	D1	D0	D1	D0	D1	D0
n		n+1		n+2		n+3	

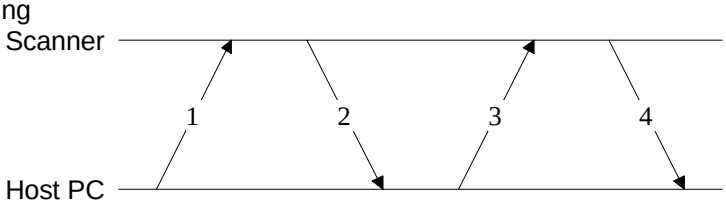
i = 01H : 1 bit/pixel (8 pixel/byte)

D	D	D	D	D	D	D	D
n	n+1	n+2	n+3	n+4	n+5	n+6	n+7

** n is sequence of pixel

Default value i = 01H

(3) Handshaking



1) ESC D code
2) ACK (06H)
3) parameter i
4) ACK (06H) / NACK (15H)

4.14. Set Color

(1) Code : ESC C

ASCII :	ESC	C	i
decimal :	27	67	i
hexadecimal :	1B	43	i

(2) Function

Sets scanning color

i = 00H monochrome scanning (drop-out without colors)
i = 10H monochrome scanning (drop- out color is red.)
i = 20H monochrome scanning (drop- out color is green.)
i = 30H monochrome scanning (drop- out color is blue.)

i = 01H Color page sequence mode (G->R->B order)
i = 11H Color page sequence mode (R->G->B order)

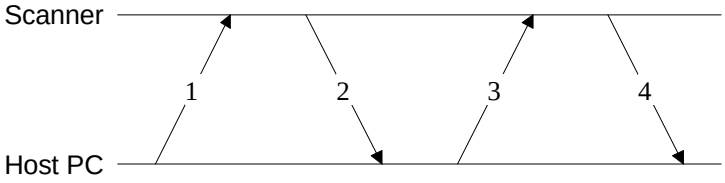
i = 02H Color line sequence mode (G->R->B order)
i = 12H Color line sequence mode (R->G->B order)

i = 03H Color byte sequence mode (G->R->B order)
i = 13H Color byte sequence mode (R->G->B order)

refer to**[2.2 Procedure of Data-block handshaking]**

Default value i = 00H

(3) Handshaking



1) ESC C code
2) ACK (06H)
3) parameter i
4) ACK (06H) / NACK (15H)

4.15. Set Mirroring

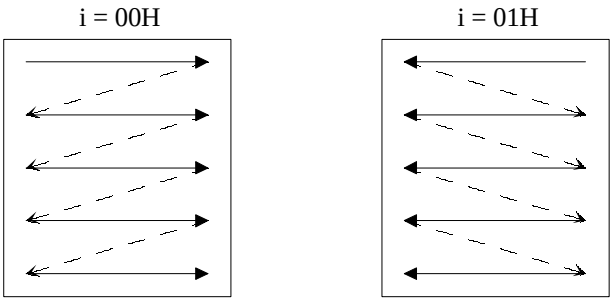
(1) Code : ESC K

ASCII :	ESC	K	i
decimal :	27	75	i
hexadecimal :	1B	4B	i

(2) Function

Output image data is turned right side and left side.

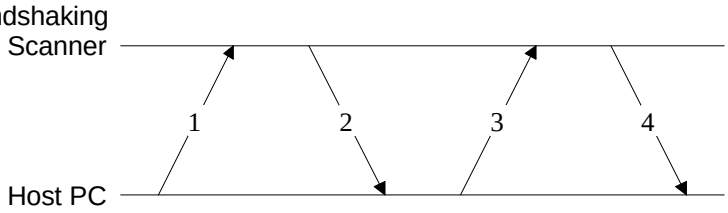
i = 00H left top first (normal image)
i = 01H right top first (right and left side turned image)



This code is the command which the direction of only output data changes .
Whether parameter " i " =1, or 0, the position of origin is not change in [ESC A] code.

Default value i = 00H

(3) handshaking



1) ESC K code
2) ACK (06H)
3) parameter i
4) ACK (06H) / NACK (15H)

4.16. Set Sharpness Control

(1) Code : ESC Q

ASCII :	ESC	Q	i
decimal :	27	81	i
hexadecimal :	1B	51	i

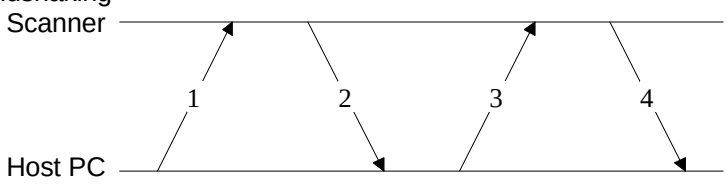
(2) Function

This command sets the sharpness of the image data.

i = FEH Defocus
i = FFH Defocus weakly
i = 00H Normal
i = 01H Sharpness weakly
i = 02H Sharpness

Default value i = 00H

(3) Handshaking



1) ESC Q code
2) ACK (06H)
3) parameter i
4) ACK (06H) / NACK (15H)

4.17. Set Brightness

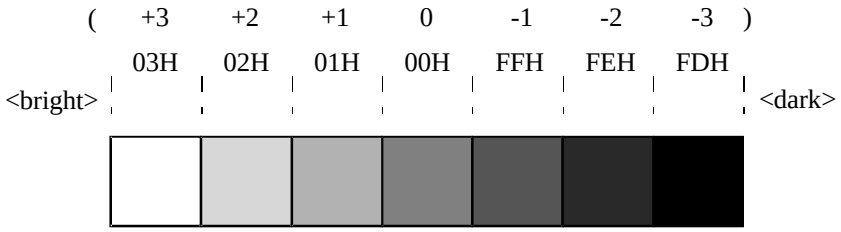
(1) Code : ESC L

ASCII :	ESC	L	i
decimal :	27	76	i
hexadecimal :	1B	4C	i

(2) Function

This command sets the brightness of the scanning data.
Seven values for i are available.

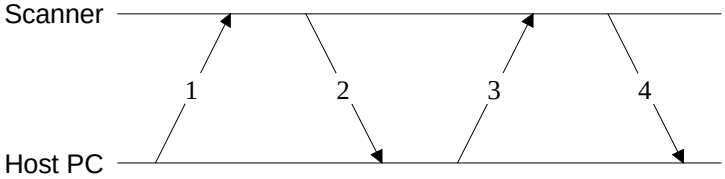
i = 03H,02H,01H,00H,FFH,FEH,FDH



If a user defined table in the setting Gamma table code [ESC Z] is selected, the setting Brightness parameter is disable.

Default value i = 00H

(3) Handshaking



1) ESC L code
2) ACK (06H)
3) parameter i
4) ACK (06H) / NACK (15H)

4.18. Set Gamma Correction

(1) code : ESC Z

ASCII :	ESC	Z	i
decimal :	27	90	i
hexadecimal :	1B	5A	i

(2) Function

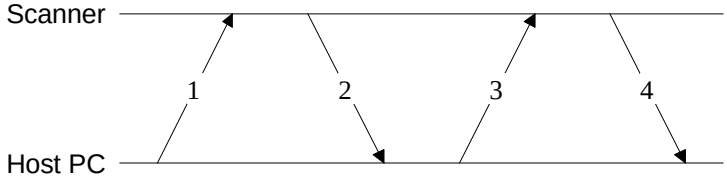
This command specifies the gamma correction tables according to the output devices.

i = 01H CRTA / for bi-level data (Gamma=1.0)
i = 02H CRTB / for multi-level (8-bit) data (Gamma=1.8)
i = 03H User defined table (Ref. ESC z) (for Gamma=1.0)
i = 04H User defined table (Ref. ESC z) (for Gamma=1.8)
i = 00H Printer A / high density printing
i = 10H Printer B / Low density printing
i = 20H Printer C / High contrast printing (Image and characters mixed)

If a User-Defined Table is selected, the Brightness parameter is not available.
If setting the parameter i= 03h or i=04h without having downloaded a table, Scanner sets the default table.

Default value i = 01H

(3) Handshaking



1) ESC Z code
2) ACK (06H)
3) parameter i
4) ACK (06H) / NACK (15H)

4.19. Set Color Correction

(1) Code : ESC M

ASCII :	ESC	M	i
decimal :	27	77	i
hexadecimal :	1B	4D	i

(2) Function

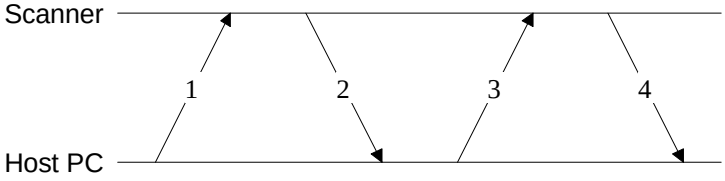
Sets the color correction table for the selected output device.

i = 00H No correction
i = 01H User defined
i = 10H Impact-dot printer
i = 20H Thermal printers
i = 40H Ink-jet printers
i = 80H CRT monitors

This code is available for only line / byte sequence mode .

Default value i = 80H (CRT monitor)

(3) Handshaking



1) ESC M code
2) ACK (06H)
3) parameter i
4) ACK (06H) / NACK (15H)

4.20. Down load Color Correction Coefficients

(1) Code : ESC m

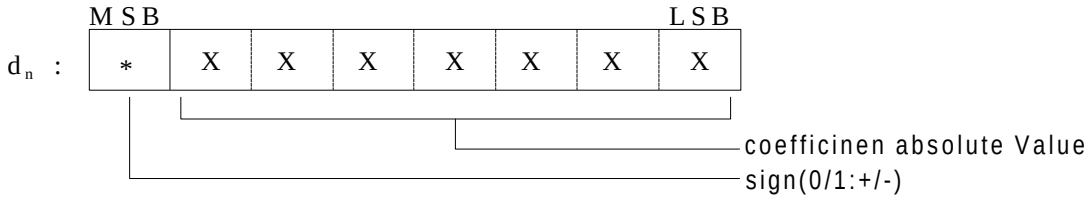
ASCII :	ESC	m	d[9]
decimal :	27	109	d[9]
hexadecimal :	1B	6D	d[9]

(2) Function

Down load 9 coefficient data for color correction.

$$\begin{bmatrix} G' \\ R' \\ B' \end{bmatrix} = \frac{1}{32} \begin{bmatrix} d1 & d4 & d7 \\ d2 & d5 & d8 \\ d3 & d6 & d9 \end{bmatrix} \times \begin{bmatrix} G \\ R \\ B \end{bmatrix}$$

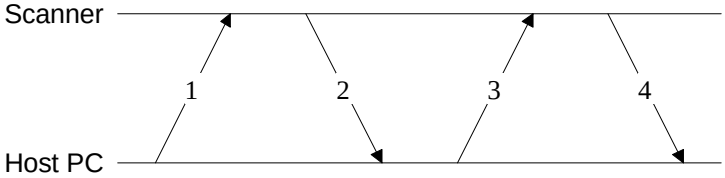
G',R',B' : Corrected data
G,R,B : Original data
d[9] : Coefficient values



ex) +7 = 07h,+127 = 7Fh,-7 = 87h,-127 = FFh

Default value d[9] : i=80H (CRT monitor) This table value is not reset by [ESC @] code.

(3) Handshaking



1) ESC m code
2) ACK (06H)
3) parameter d
4) ACK (06H)

4.21. Down load Gamma Table

(1) Code : ESC z

ASCII :	ESC	z	i	d[256]
decimal :	27	122	i	d[256]
hexadecimal :	1B	7A	i	d[256]

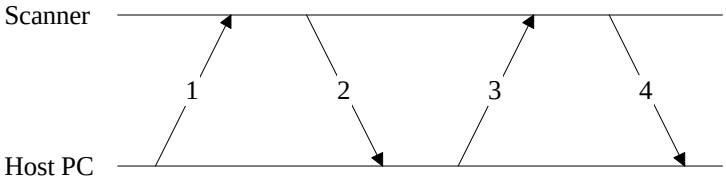
(2) Function

Down load the gamma data to the scanner in user gamma table.
It is possible to correct each colors. And color setting is the following.
i is set on ASCII, large characters and small characters can be used. When i is except for the following. The scanner returns NACK after receiving data, the data received is not set.

i = 'm' or 'M'	Monochrome
i = 'r' or 'R'	Red (R)
i = 'g' or 'G'	Green (G)
i = 'b' or 'B'	Blue (B)

Default value d[256] : CRT A Gamma
**This table is not reset by [ESC @] command.

(3) Handshaking



1) ESC z code
2) ACK (06H)
3) color setting i and Gamma table data
4) ACK (06H) / NACK (15H)

4.22. Set Line Counter

(1) Code : ESC d

ASCII :	ESC	d	i
decimal :	27	100	i
hexadecimal :	1B	64	i

(2) Function

This command sets the number of the Line Counter in the Block data structure, and the parameter i indicates the number. The Block data transfer mode is available only when setting this code.

0 <= i <= 255

0 means to execute line data transfer without block data transfer.

This setting is not remained once executing a scanning start [ESC G]. It means that the data transfer mode is always the Line data mode without setting this code. Therefore this code should be set whenever using the Block data structure.

In case of the color line scanning mode, the number of the line for image data should be counted separately for each color R,G and B.

The number of the Line counter in the last data block may not be i because it is calculated by the following expression. Therefore the Line Counter should be refereed in order to receive the image data.

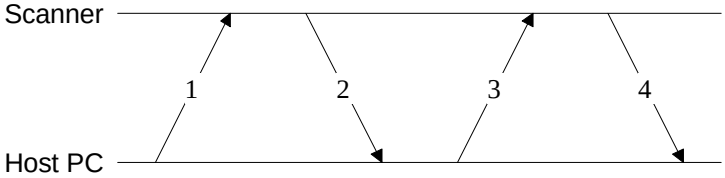
The line number of last block is solved by the following expression.

$$\text{the number of the last block line counter} = \mathrm{mod}\left(\frac{\text{the length of subscan reading}}{i}\right)$$

$\mathrm{mod}\left(\frac{n}{i}\right)$ is indicated the remainder that n divided by i .

Default value i = 00H

(3) Handshaking



1) ESC d code
2) ACK (06H)
3) parameter i
4) ACK (06H)

4.23. Set Half-Tone Processing

(1) Code : ESC B

ASCII :	ESC	B	i
decimal :	27	66	i
hexadecimal :	1B	42	i

(2) Function

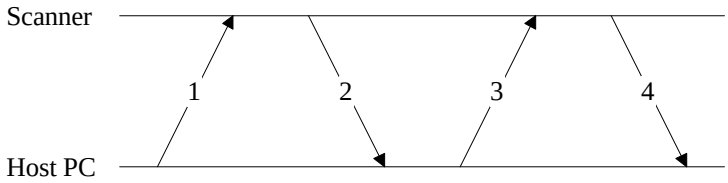
This command specifies the mode of the half-tone of bi-level and quad-level data.

i = 01H Fixed the threshold. (Disable digital half-toning)
i = 03H TET (Text Enhanced Technology) monochrome scanning only
i = 00H Error diffusion mode A. (Hard)
i = 10H Error diffusion mode B. (Soft)
i = 20H Error diffusion mode C (Net-screen)
i = 80H Dither mode A
i = 90H Dither mode B
i = A0H Dither mode C
i = B0H Dither mode D
i = C0H Down load dither pattern A
i = D0H Down load dither pattern B

This setting is available only when ESC D = 01H or 02H is specified.
TET is available only when monochrome scanning and AAS[ESC s = 00H].
In the case of except it, the image is scanned on simple bi-level or half-tone A (AAS)

Default value i = 00H

(3) Handshaking



1) ESC B code
2) ACK (06H)
3) parameter i
4) ACK (06H) / NACK (15H)

Resident Dither pattern

[A]4*4Bayer

Dither Pattern

15	7	13	10
3	11	1	6
12	4	14	9
0	8	2	5

Threshold Value

248	120	216	88
56	184	24	152
200	72	232	104
8	136	40	168

[B]4*4Spiral

2	9	8	1
10	15	14	7
11	12	13	6
3	4	5	0

40	152	136	24
168	248	232	120
184	200	216	104
56	72	88	8

[C]4*4Net screen

1	2	9	6
3	15	14	8
10	12	13	5
7	11	4	0

24	40	152	104
56	248	232	136
168	200	216	88
120	184	72	8

[D]8*8Net screen

Dither Pattern

29	23	6	0	8	12	20	28
22	5	1	17	16	11	13	21
4	2	18	26	25	15	10	9
3	19	27	31	30	24	14	7
8	12	20	28	29	23	6	0
16	11	13	21	22	5	1	17
25	15	10	9	4	2	18	26
30	24	14	7	3	19	27	31

Threshold Value

236	188	52	4	68	100	164	228
180	44	12	140	132	92	108	172
36	20	148	212	204	124	84	76
28	156	220	252	244	196	116	60
68	100	164	228	236	188	52	4
132	92	108	172	180	44	12	140
204	124	84	76	36	20	148	212
244	196	116	60	28	156	220	252

How to decide a bi-level image data.

Dij < Tij then Bij = 0 (Dij : Input image data, Bij : bi-level image)

Dij > Tij then Bij = 1 (Tij : Threshold, ij : Position of pixel)

4.24. Down load Dither Pattern

(1) Code : ESC b

ASCII :	ESC	b	i	j	d[j^2]
decimal :	27	98	i	j	d[j^2]
hexadecimal :	1B	62	i	j	d[j^2]

(2) Function

Down loads the threshold values of the dither pattern.

i = 00H Pattern A
i = 01H Pattern B
j = 4 4 * 4 Matrix
j = 8 8 * 8 Matrix
j = 16 16 * 16 Matrix

2 patterns can be set to the scanner , and the parameter • i• indicates their identity.
The parameter • j• has the value of 4,8,or 16,and it indicates the number of the pixel for a side of the square which is a basic element of the dither pattern. The data followed • j• are the threshold values which shall be arranged in the square for Dither pattern. The data is arranged in the order shown Fig 1.

d_1	d_2	...	d_{j-1}	d_j
d_{j+1}	d_{j+2}	...	d_{j*2-1}	d_{j*2}
...	...	...	...	...
$d_{j*(j-2)+1}$	$d_{j*(j-2)+2}$	...	$d_{j*(j-1)-1}$	$d_{j*(j-1)}$
$d_{j*(j-1)+1}$	$d_{j*(j-1)+2}$	...	d_{j*j-1}	d_{j*j}

table 1 The order of the arrangement of the data

The number of parameter d is j ^ 2 for j = 4,8,16 16, 64,256 . The threshold value is possible to be set from 0 to 255.
In the matrix setting which is the value of the range from 0 to 15 like table 2 (a) , the value is the table 2 (b) .In this case, the table parameter is solved by the calculation as times 16 and adding 8.

13	6	7	14
5	0	1	8
4	3	2	9
12	11	10	15

table (a) spiral pattern

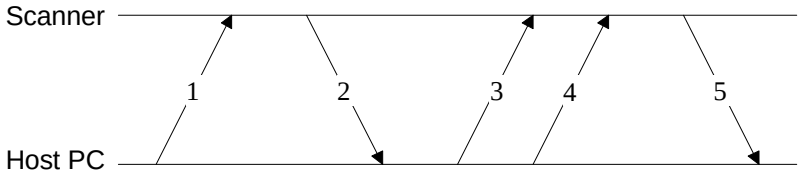
216	104	120	232
88	8	24	136
72	56	40	152
200	184	168	248

table (b) the threshold value of left pattern

The pattern can be choice on ESC B C0H or D0H
The parameter i , j and the threshold value is send severally.
When the value of parameter i or j is unusual , the scanner receives parameter d with size which indicated by j, after returns to the host computer NACK, the value set by parameter d is not set.

Default value The pattern A and the pattern B is set the pattern on Dither B
The pattern value is not set by [ESC @] code.

(3) Handshaking



1) ESC b code
2) ACK (06H)
3) Parameter i, j
4) Parameter d[j^2]
5) ACK (06H) / NACK (15H)

4.25. Set film type

(1) Code : ESC N

ASCII :	ESC	N	i
decimal :	27	78	i
hexadecimal :	1B	4E	i

(2) Function

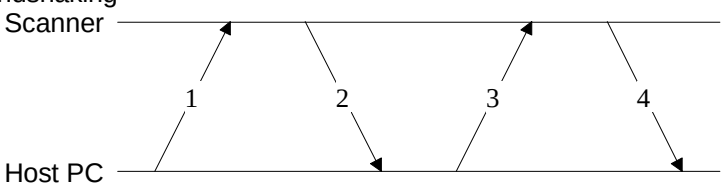
This function is used in scanning negative film. The purpose is to adjust the color balance.

i = 00H : Positive film
I = 01H : Negative film

Default value i = 00H

If TPU is not available and parameter is set to 1, the scanner send NACK.

(3) Handshaking



1) ESC N code
2) ACK (06H)
3) parameter i
4) ACK (06H)

4.26. Set Auto Area Segmentation

(1) Code : ESC s

ASCII :	ESC	s	i
decimal :	27	115	i
hexadecimal :	1B	73	i

(2) Function

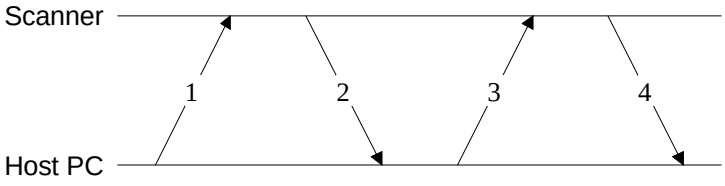
Control auto area set segmentation (AAS : auto area segmentation)

i = 00H Disable AAS
i = 01H Enable AAS

This is enable to do , just in the case of ESC D = 01H.
In the case of enable AAS, in text area, it does simple 2 bytes by fixed the threshold .
In photo area, it does half-toning set by [ESC B] code.
But, when TET (i = 03H) is set by [ESC B] code, this is disable, it is output by half-toning A (i=00H) .

Default value i = 00H

(3) Handshaking



1) ESC s code
2) ACK (06H)
3) parameter i
4) ACK (06H) / NACK (15H)

4.27. Set Threshold

(1) Code : ESC t

ASCII :	ESC	t	i
decimal :	27	116	i
hexadecimal :	1B	74	i

(2) Function

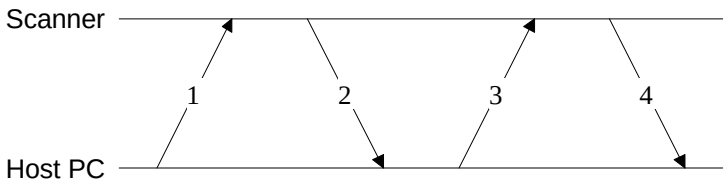
It controls threshold value of text area on simple 2value or AAS.

00H <= i <= FFH

This is available to ESC D= 01H.

Default value i = 80H

(3) Handshaking



1) ESC t code
2) ACK (06H)
3) parameter i
4) ACK (06H)

4.28. Request Push Button Status

(1) Code : ESC !

ASCII :	ESC	!
decimal :	27	33
hexadecimal :	1B	21

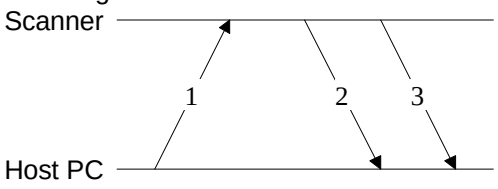
(2) Function

It requests the status of the Push Button.

This code is the extended command, and it is enable in case of PB flag (bit 0) is 0 or PB flag (offset 44byte, bit0) is 1. Other case the scanner returns NACK code.

The scanner resets the EN bit, after the scanner receives [ESC !], [ESC G], [FS G], [ESC @] command.

(3) Handshaking



1) ESC ! code
2) information block
3) Push Button status

(4) The structure of Push Button status

The structure of Push Button status is following. The byte counter of information block is 1 (01H) .

Offset	bit								description
	7	6	5	4	3	2	1	0	
0	-	-	-	-	-	-	-	EN	Push Button status

EN : Set to • 1• , when Push Button is pushed. Set to • 0• , when Push Button is not pushed.

4.29. Eject paper

(1) Code : FF

ASCII :	FF
decimal :	12
hexadecimal :	0C

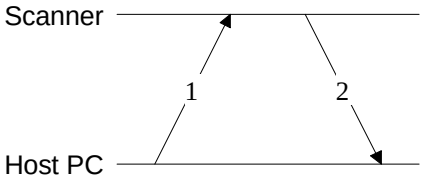
(2) Function

Eject a loaded paper in ADF option.
If there is no paper in the path of the ADF, scanner loads a paper from a document tray then eject it.

This code shall be executed after receiving final image data.

When ADF is not installed or any error is detected, scanner sends NACK (15H) code. Therefore, if a host received NACK code, it should check the scanner status to send extended status code[ESC f].

(3) Handshaking



1) FF code
2) ACK (06H) / NACK (15H)

4.30. Request Extended Identity

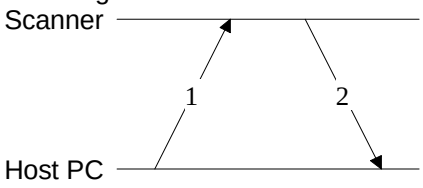
(1) Code : FS I

ASCII :	FS	I
decimal :	28	73
hexadecimal :	1C	49

(2) Function

It requests the information of the scanner extended function.
The customary information block do not attach to this data.
This data size is 80 bytes fixed length.
This code is available when extended command bit is 1.

(3) Handshaking



1) FS I code
2) extended ID data

(4) structure of extended ID data

Extended ID data is the following structure.

Offset	Bit								description
	7	6	5	4	3	2	1	0	
0	•B•								Command level (ASCII)
1	•7•								
2	00H								reserve
3	00H								
4	B0H								basic resolution (1200dpi)
5	04H								
6	00H								
7	00H								
8	19H								the minimum resolution of scanning (25dpi)
9	00H								
10	00H								
11	00H								
12	80H								the maximum resolution of scanning (9600dpi)
13	25H								
14	00H								
15	00H								
16	F0H								limited pixel number of main scan (32752 pixel)
17	7FH								
18	00H								
19	00H								
20	D8H								main scan pixel number in basic resolution (10200 pixel)
21	27H								
22	00H								

23	00H								
24	D8H								sub scan pixel number in basic resolution (14040 pixel)
25	36H								
26	00H								
27	00H								
28	D8H								main scan pixel number in basic resolution of ADF (10200 pixel)
29	27H								
30	00H								
31	00H								
32	A0H								sub scan pixel number in basic resolution of ADF (16800 pixel)
33	41H								
34	00H								
35	00H								
36	C0H								main scan pixel number in basic resolution of TPU (4800 pixel)
37	12H								
38	00H								
39	00H								
40	70H								sub scan pixel number in basic resolution of TPU (6000 pixel)
41	17H								
42	00H								
43	00H								
44	Rvd	/FBF	ADFT	ADFS	Rvd	Rvd	Rvd	PB	
45	00H								reserve
46 - 61	Product Name								Product Name (ASCII)
62 - 65	ROM Version								ROM Version (ASCII)
66 - 79	00H								reserve

Rvd : reserve (always 0)
/FBF : This is flatbed type, so always 0.
ADFT : ADF of this scanner is page type, so when it equips ADF, it indicates 1. ordinary 0.
ADFS : ADF of this scanner is possible to scan both side, when it equips ADF, it indicates 1. ordinary 0.
PB : This scanner has push button., so always 1.

Product Name : Each product name is shown by ASCII. 20H is used for space.

- SCANNER GT-7600• : Japan
- Perfection1200• : Other country

ROM Version : The version information of firmware is shown by ASCII.

The resolution , the value of pixel is indicated with 4 bytes positive number,. the lower bytes precedes the higher bytes. Main and sub scan pixel number in ADF basic resolution changes automatically to match the document size, when the document is fed [PF] code. And it is without ADF option, all 0.

4.31. Request Scanner Status

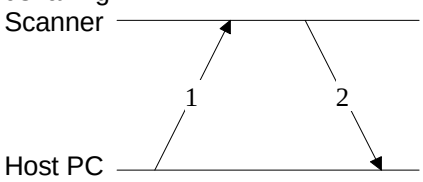
(1) Code : FS F

ASCII :	FS	F
decimal :	28	70
hexadecimal :	1C	46

(2) Function

It requests sorts of status.
The customary information block do not attach to this data.
This data size is 16 bytes fixed length.
This code is available, when extended command bit (bit 1) is 1.

(3) Handshaking



1) FS F code
2) the scanner status data

(4) The structure of scanner status data

The structure of scanner status data is the following.

Offset	Bit								
	7	6	5	4	3	2	1	0	
0	FER	Rvd	Rvd	Rvd	Rvd	Rvd	WU	Rvd	scanner status
1	IST	EN	ERR	Rvd	PE	PJ	OPN	0	ADF status
2	IST	EN	ERR	Rvd	Rvd	Rvd	Rvd	Rvd	TPU status
3 - 15	Rvd								

Rvd : reserve (always 0)
FER : fatal error = 1 ordinary 0
WU : Set to • 1• , when the scanner is warming up.

IST =1 : equip with ADF or TPU
EN=1 : option is enable ([ESC e]or [FS W])
ERR=1 : something error
PE=1 : paper empty no paper
PJ=1 : jamming paper
OPN =1 : cover open

ERR, PE, PJ and OPN flag is all clear, when option is invalid by option control parameter [ESC e] or [FS W].

4.32. Set Scanning Parameter

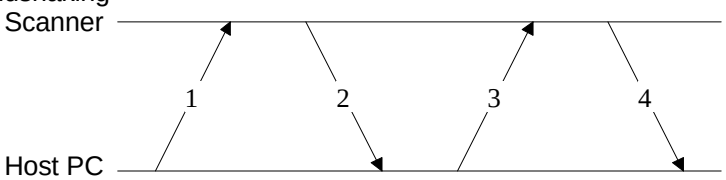
(1) Code : FS W

ASCII :	FS	W	d[64]
decimal :	28	87	d[64]
hexadecimal :	1C	57	d[64]

(2) Function

It sets each command parameter collectively.
This parameter size is 64 byte fixed length.
This code is available, when Extended command bit (bit 1) is 1.
When the some error occurs to parameter which was set by [FS W], it returns NACK, the parameter is invalid.
The parameter set by this code should start to scan by[FS G]code.
The other parameter uses each command customary.
When the right parameter is set by this code, the value of [ESC H] parameter is reset.

(3) Handshaking



1) FS W code
2) ACK (06H)
3) parameter d[64]
4) ACK (06H) / NACK (15H)

(4) structure of setting parameter

Offset	parameter	description
0	$n1_0$	the main scan resolution (ESC R)
1	$n1_1$	
2	$n1_2$	
3	$n1_3$	
4	$n2_0$	the sub scan resolution (ESC R)
5	$n2_1$	
6	$n2_2$	
7	$n2_3$	
8	$n1_0$	skipping length of main scan (ESC A)
9	$n1_1$	
10	$n1_2$	
11	$n1_3$	
12	$n2_0$	skipping length of sub scan (ESC A)
13	$n2_1$	
14	$n2_2$	
15	$n2_3$	
16	$n3_0$	the length of main scanning (ESC A)
17	$n3_1$	
18	$n3_2$	
19	$n3_3$	

20	$n4_0$	the length of sub scanning (ESC A)
21	$n4_1$	
22	$n4_2$	
23	$n4_3$	
24	i	scanning color (ESC C)
25	i	data format (ESC D)
26	i	option control (ESC e)
27	i	scanning mode (ESC g)
28	i	the number of block line (ESC d)
29	i	gamma (ESC Z)
30	i	brightness (ESC L)
31	i	color collection (ESC M)
32	i	half toning processing (ESC B)
33	i	threshold (ESC t)
34	i	separate of area (ESC s)
35	i	sharpness control (ESC Q)
36	i	mirroring (ESC K)
37	i	set film type (ESC N)
38 - 63	00H	reserve

If each parameter is possible to use each parameter of command , without note especially the following.

- The resolution, parameter of scanning area is indicated with 4byte positive number, the lower byte precedes the higher byte.
- The resolution and the setting range of scanning area is the value of [FS I]code.
- The skipping length and scanning length (n1, n2, n4) is under 4,294, 967,295.
- The maximum limit of parameter of main scanning length (n3) is always 32752.
- n3 parameter is possible to set by 1 pixel step, when the value of data format is 5-8 bit/pixel. Except for this, it is set by 8 pixel step.
- The following is added to parameter of scanning color.
  i = 22H : color line sequence B->G->R order
  i = 23H : color byte sequence B->G->R order

And this parameter must not use by [ESC C] as single command., if the scanner receives there ,and returns NACK.

- It should not be used page sequence scanning.
- When the number of the block line parameter is set to 0, it works the same as set to1. And always it is possible to set 1 line step.

4.33. Request Scanning Parameter

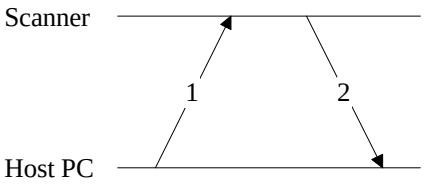
(1) code : FS S

ASCII :	FS	S
decimal :	28	83
hexadecimal :	1C	53

(2) Function

It requests each command parameter which was set by FS W code collectively.
The customary information block do not attach to this data.
This data size is 16 bytes fixed length.
This code is available, when extended command bit (bit 1) is 1.

(3) handshaking



1) FS S code
2) scanning parameter

(4) the structure of scanning parameter

The structure of scanning parameter is same the structure of [FS W] code parameter.

4.34. Start High Speed Scanning

(1) code : FS G

ASCII :	FS	G
decimal :	28	71
hexadecimal :	1C	47

(2) function

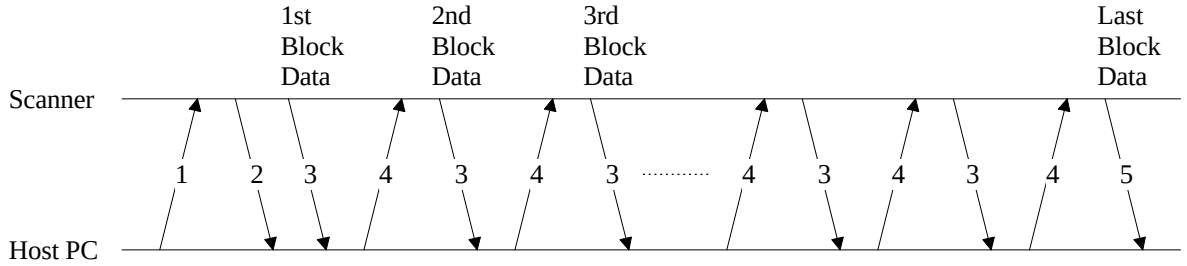
The scanner starts to scan image, and sends image data to the host.
It scans image by parameter on FS W code.

The image data composes of new information block and image data block , new information block is transferred once from the scanner to the host computer after this code, and after that only image data block is transferred.

The form of new information block is refer to• 3.3 New Block Data Structure •

During image scanning, when some error occurs to the scanner, it transfers invalid image data until it finishes to scan and it makes to finish scanning movement normally. After that it does fatal error disposal and so on.

(3) handshaking



1) FS G code
2) new information block
3) image data block
4) ACK (06H) / CAN (18H)
5) last image data block

refer to [2.3 Procedure of new Data-Block transfer]

After accepting the last scanning data , the host should not send ACK to the scanner.

5. List of Control code

classification	name	code
command	ID request	ESC I
	status request	ESC F
	extended status request	ESC f
	request command parameters	ESC S
	start scanning	ESC G
	Push Button status request	ESC !
	extended ID request	FS I
	scanner status request	FS F
	scanning parameter request	FS S
	start new scanning	FS G
set data form	set data format	ESC D i
	set resolution	ESC R n1 n2
	set zooming	ESC H i1 i2
	set scanning area	ESC A n1 n2 n3 n4
	set color	ESC C i
	set mirroring	ESC K i
	set scanning parameter	FS W
correction	set brightness	ESC L i
	set gamma correction	ESC Z i
	down load gamma table	ESC z i d[256]
	set sharpness control	ESC Q i
image disposition	set half-tone processing	ESC B i
	set auto area segmentation	ESC s i
	down load dither pattern	ESC b i j d[j^2]
	set color correction	ESC M i
	down load color correction coefficients	ESC m d[9]
	set threshold	ESC t i
support, and others	set scanning mode	ESC g i
	initialize	ESC @
	set line counter	ESC d i
	option control	ESC e i
	set film type	ESC N i
	eject paper	FF
control	normal response	ACK
	abnormal response	NACK
	stop scanning	CAN
	header	STX