

TCP400 Series Product Specifications Manual Commands

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1. APPLICATION

This manual describes the commands relating to the TCP400 series printers.

2. PRECAUTIONS FOR PROGRAMMING AND FOR HANDLING

- **The volatile memory writing life is approximately one million times.** The expected life will be reached by frequent use, which can cause problems in the operation of the printer. Therefore, only use the model set command (91h) and the cleaning yes/no command (5Bh) when starting up the system.
Note that the parameters that can be set by the model setting command (91h), describe the font size and character spacing with the escape sequence in the print data setting command (41h).
- **The print head and erase head are hot.** To prevent a dangerous situation, do not carelessly open the transport path.
- A warning buzzer is installed to ring when the cover is opened. It is possible to send and receive commands, and to process cards in this state, but to prevent a dangerous situation, close the cover quickly.
- The buzzer will ring and the LED will flash when the transport path is opened. In this state, commands cannot be received and cards cannot be processed.
- **Closing the transport path after opening it will reset the device.** Always reset the magnetic data and print data because the memory expanded on the memory is destroyed.
- **Magnetic reading and writing can experience errors by damaged magnetic data** caused by dirty magnetic cards and external magnetic fields. Carefully handle those errors. Particularly, you should develop a system for recovering erroneous cards when writing errors occur.
- Printing times can vary depending on the ambient temperature and temperature of the thermal head. In particularly low temperature locations, processing of cards may take more time than usual, but this is not a system failure. Rewriting to magnetic cards will be repeated several times (when the device is set to rewrite several times) when they are dirty from repeated magnetic reading and writing, or if magnetic data is damaged by an external magnetic field. Therefore, the timeout setting to the response after sending a command should be set to a value higher than the one recommended.
- Turn off the power before switching the interface cartridge or changing settings.
- To maintain print quality and magnetic reading and writing performance, **clean the device once a day.** If possible, consider such a warning system to operate when starting up the device every day.
- Dirt adhering to the magnetic card will cause the magnetic head and transport rollers to wear out. Avoid using dirty cards.
- Magnetic reading and writing performance will drop if the magnetic head and magnetic card cannot be brought close together. **Do not place adhesive tape on or bend magnetic cards.**
- When the cleaning lamp flashes, clean the device. (This is when the cleaning warning setting is enabled.)

3. COMMUNICATION SPECIFICATIONS

3-1. Communication Procedures

This device communicates with its host using block transmissions of resend requests. When communications are started from the host, the host will transmit a command block to the reader/writer.

When the reader/writer receives the command block, it will respond with either of the characters of ACK (normal), NAK (resend request) or DLE (reject).

If the reader/writer responds with the ACK characters, the device will execute the command that was sent by the host.

When the command has been executed, the reader/writer returns a response block to the host.

The host needs to respond either the ACK or NAK characters in response to the returned response block.

If the host responds with the ACK characters, the command is completed, and it is ready to send the next command.

When the reader/writer receives a command block, it calculates the command block BCC, and compares it with the BCC sent by the host.

If the calculated BCC and the received BCC do not match, the reader/writer responds with the NAK characters. When the reader/writer has responded with the NAK characters, the host resends that command block.

In the same way, the reader/writer should calculate on the host side the BCC of the response block that is sent.

If the BCC values sent by the reader/writer do not match the results that are compared, the host must respond with the NAK characters.

When the host responds with the NAK characters, the reader/writer resends the response block.

There is no limit to the number of times to resend requests or sequences. Therefore, the host side must be controlled.

If the reader/writer detects an error in the command block sent by the host, it will respond with the DLE characters. When the reader/writer responds to the command block sent by the host with the DLE characters, the command that was sent becomes invalid and no response block is subsequently sent.

Normal sequence		
Host		Reader/writer
Command Sent	→	Command received
ACK received	←	ACK sent
		Command processed
Response received	←	Response sent
ACK sent	→	ACK received

Sequence resent		
Host		Reader/writer
Command Sent	→	Command received
NAK received	←	NAK sent
Command resent	→	Command received
ACK received	←	ACK sent
		Command processed
Response received	←	Response sent
NAK sent	→	NAK received
Response received	←	Response resent
ACK sent	→	ACK received

Host	DLE Sequence	Reader/writer
Command Sent	→	Command received
DLE received	←	DLE Sent

See section **2-5. Transmission Control Characters** for details regarding, ACK, NAK and DLE character codes.

3-2. Transmission Control Matrix

Event / Host status	ACK received	NAK received	DLE received	Response received	No response
Idling	Read and discarded	Read and discarded	Read and discarded	Read and discarded	Nothing occurs
After command is sent waiting to receive ACK	ACK received	Resend command block or process as communication error	Command withdrawn	Reset TCP	If timeout error, process timeout error
After ACK received Waiting to receive response	Reset TCP	Reset TCP	Reset TCP	Receive response block, respond with ACK or NAK	Do nothing or process timeout error
After response received ACK sent	Reset TCP	Reset TCP	Reset TCP	Reset TCP	Send next command
After response received NAK sent	Reset TCP	Reset TCP	Reset TCP	Receive response block, send ACK or NAK	If timeout error, process timeout error

Notes:

1. There is no time limit to send ACK after receiving a command block. Responses can be up to three seconds.
2. There is no limit to the number of times to resend for transmission errors of command blocks or response blocks. Therefore, the host side must be controlled.
3. There is no time limit from sending ACK to starting to send the response block. When issuing a command while inserting a card, execute the command after inserting the card. Therefore, when not inserting a card, the execution of the command stops, and the response block transmission stops. Commands can be deleted using the reset command (5Fh), or the card insertion wait status cancel command (54h).
4. The reset command (5Fh) can be executed even while another command is being executed. If the reset command (5Fh) is issued while another command is being executed, that command will be terminated. Therefore, there is no response block for that command that was executed before the reset command (5Fh). To execute the reset command (5Fh), wait approximately 3 seconds for the visual card reader/writer to initialize.

3-3. Transmission Control Matrix (Reader Type)

Event TCP status	STX received	ETX received	Other receptions	ACK received	NAK received	No response
1 Idling	→2	Read and discarded→1	Read and discarded→1	Read and discarded→1	Read and discarded→1	→1
2 Command received	Buffering → 2	Buffering → 3	If data error DLE sent → 1 If data normal buffering → 2	If data error DLE sent → 1 If data normal buffering → 2	If data error DLE sent → 1 If data normal Buffering → 2	→2
3 BCC received	If BCC matched → 4 If BCC does not match NAK sent→ 1	If BCC matched → 4 If BCC does not match NAK sent→ 1	If BCC matched → 4 If BCC does not match NAK sent→ 1	If BCC matched → 4 If BCC does not match NAK sent→ 1	If BCC matched → 4 If BCC does not match NAK sent→ 1	→3
4 Wait for ACK after response sent	Read and discarded→ 4	Read and discarded→ 4	Read and discarded→ 4	→1	Response resend → 4	→4

When a priority command, such as a reset command is sent while another command is being executed, that command is canceled, and a priority command response is returned.

3-4. Command and Response Transfer Formats

Command Transfer Formats

STX	[Commands]	Data String	ETX	BCC
-----	------------	-------------	-----	-----

Response Transfer Formats

STX	[Commands]	Status	Data String	ETX	BCC
-----	------------	--------	-------------	-----	-----

Data string must be within 1024 bytes.

BCC is an exclusive logic sum from the command to ETX.

3-5. Transfer Control Characters

The following shows the transmission control character codes and functions.

Character	[Code]	Function
STX	02h	Text start symbol
ETX	03h	Text end symbol
ACK	06h	Normal response
NAK	15h	Resent request
DLE	10h	Reject response
LF	0Ah	Line feed of printed line
ESC	1Bh	Start escape sequence
BCC		Block check character

BCC is an exclusive logic sum from the command to ETX.

3-6. Cards for Processing

The cards that can be processed are called **readable and writable cards**.

When the card is inserted into the inlet, it is a process targeted card.

When the process is completed, the card idles in the machine, and is a process targeted card.

When idling in the device, the idling card is a process targeted card regardless of whether there is a card at the inlet.

Cards discharged from the device are **removal waiting cards** and are no longer process target cards.

To process these cards, they must be removed from the device once, and then reinserted, or they can be processed by employing the **removal wait cancel command** (55h).

3-7. Retrying and Verifying

The visual card reader/writer will retry to read or to write to a card when it fails to read or write data to the magnetic stripe. (This is when a retry count is set.)

When the set number of failures to read or to write is reached, reading or writing is canceled.

The device rereads the magnetic stripe after writing thereto. If the data that it reads does not match the data that was written, it detects a writing error.

This reading of the data is called 'verifying' and is performed automatically.

The default value for retries is set to two times (total of three).

3-8. Reading the Buffer

It is possible to read the buffer when a card that has been read/written is idling. The buffer read commands (29h, 2Ah, 2Bh) obtains the read data stored in the read buffer on the visual card reader/writer.

It is possible to get the read data on the track by using the buffer read commands (29h, 2Ah, 2Bh) without transporting a card. The result is high speed reading of the card.

The card will be transported and read if the card is not idling or by using the buffer read command (29h, 2Ah, 2Bh) when the read/write operation has not been performed before executing the buffer read command (29h, 2Ah, 2Bh).

This buffer read commands (29h, 2Ah, 2Bh) is a similar operation to the read cache.

3-9. Commands and Status Lists

(1) Command List

Code	Content of Command	Applicable Models	Class
21h	First track read command	410	Magnetic stripe commands
22h	Second track read command	400/410	
23h	Third track read command	410	
25h	First track read (status with no card) command	410	
26h	Second track read (status with no card) command	400/410	
27h	Third track read (status with no card) command	410	
29h	First track buffer read command	410	
2Ah	Second track buffer read command	400/410	
2Bh	Third track buffer read command	410	
36h	Reverse 7 bit format second track data setting command	400	
37h	Reverse 7 bit format third track data setting command	410	
39h	7 bit format second track data setting command	400	
3Ah	7 bit format third track data setting command	410	
3Ch	Second track data setting command	*1 Data format set by EEPROM. 400	
3Dh	Third track data setting command		
31h	Magnetic strip write → idle command	400/410	
32h	Magnetic strip write → idle (status with no card) command	400/410	
40h	Print expansion buffer clear command		Print, delete commands
49h	Buffer clear command		
41h	Print data setting command		
42h	Embedded image data 1 expand command		
43h	External image data expand command (line mode)		
44h	Two-byte external character font register command		
45h	Single-byte external character font register command		
46h	Delete + print → discharge command		
4Dh	External data expand command (block mode)		
4Eh	Bar code data setting command		Card commands
50h	Card discharge command		
53h	Card front idle command		
51h	Card back idle command		
54h	Card insertion wait status cancel command		
55h	Card removal wait status cancel command		

Code	Content of Command		Class
59h	Status Request Command		Information display commands
58h	ROM version request command		
5Ah	LED, buzzer control command		
95h	Card transport count request command		
96h	Print count request command		
5Bh	Cleaning button enable/disable command		Cleaning commands
52h	Cleaning command		
5Fh	Reset command		Other commands
90h	Communication setting command		
91h	Model setting command		

Model Details

400: 1 Track magnetic head model (TCP400**)

410: 3 Track magnetic head model (TCP410**)

* 1 EEPROM default values are listed below.

3 Track magnetic head model (TCP410**)

3Dh: 4 bit + 1 parity ISO7811/2 Third track recording model

1 Track magnetic head model (TCP400**)

3Bh: Not supported

3Ch: 6 bit + 1 parity ISO7811/2 Second track recording model

3Dh: Not supported

(2) Status List

The following shows the content of status.

When there is the status code 20h there is no error. Anything other than 20h, it is recommended to branch the error and processing.

Error notification codes may change or be added to without prior notice.

Undefined statuses are reserved for the system.

Code	Status Content	Rank
20h	Normal	
22h	No target card (only when using a no card status command)	C
23h	No magnetic stripe (when inserted backward) or other error	C
31h	Parity Error	B
32h	No start code/end code	B
33h	LRC Error	B
34h	Erroneous character	B
37h	Magnetic stripe writing error	B
38h	Card jam	B
40h	Cover open	B
41h	Invalid command	C
42h	Cam motor error	A
43h	Erase head temperature error	A
45h	EEPROM error	A
4Ch	Non-compatible BMP file data	C
51h	Expand buffer overflow	C

Rank A: Reader/writer hard error; inspection and repair are required.

Rank B: Device cleaning and card reissuing requiring operator. Depending on the frequency of the error, it may be necessary to inspect and repair the reader/writer.

Rank C: Minor error or errors that can be easily recovered from that do not occur except when debugging software. If these repeatedly occur, it may be necessary to inspect and repair the reader/writer.

These ranks have been established based upon their potential to occur under normal operating conditions.

4. COMMAND DETAILS

4-1. Magnetic Stripe Commands

(1) First track read command (Model: 410)

General Description

This command idles the first track read of a magnetic strip encoded in the following formats.

- 7-bit + 1 parity (called 7-bit format below) Conforming to JISX6302*
 - Reverse 7-bit Reverse direction writing format of the format above*
 - 6-bit + 1 parity (called 6-bit format below) conforming to ISO 7811/2 first track
 - 4-bit + 1 parity (called 4-bit format below) conforming to ISO 7811/2 second/third tracks
- However, the second track is in 70 bpi format.

The starting symbol in the magnetic stripe automatically determines what format to use to read the card.

Note that this command cannot be used with on models with one magnetic stripe (TCP400).

*: The reading direction of JISX6302 conforming magnetic formats follows the preset memory switch setting. See Model Setting Commands (91h) for details.

Details of Operation

If a card is idling in the machine, this will read the magnetic stripe on the idling card.

If there is no idling card, it will wait until one is inserted into the device, the being to read the card. If a card is waiting to be removed from the device, it will wait until the card is discharged.

If reading of the card fails, the device will automatically reread the card according to the number of times that were set.

If still the card cannot be read with that set number of rereads, the values of 23h, 31h to 34h are set to the response block status field.

After this command is issued, it is possible to read the buffer while the card is idling.

The results of the command are stored in the response block status field.

The following shows the read data string.

Format	Data Length	Character Code
7-bit format:	0 to 69 bytes of variable length data Excluding 02h and 03h	(01h to 7Eh)
7-bit format:	0 to 69 bytes of variable length data Excluding 02h and 03h	(01h to 7Eh)
6-bit format:	0 to 76 bytes of variable length data	(20h to 5Eh)
4-bit format:	0 to 104 bytes of variable length data	(30h to 3Eh)

The magnetic stripe starting and ending symbols, LRC and parity bit are not included in the read data string.

If a card is not inserted after this command is issued, or to cancel the command, issue the card insertion wait status cancel command (54h) after canceling the state of communication.

Command Transfer Formats

STX	21h	ETX	BCC
-----	-----	-----	-----

BCC = 22h

Response Transfer Formats

STX	21h	Status	Read Data String	ETX	BCC
-----	-----	--------	------------------	-----	-----

(2) Second track read command (Models: TCP400/410)

General Description

This command idles the second track read of a magnetic strip encoded in the following formats.

- 7-bit format conforming to JISX6302*
 - Reverse 7-bit Reverse direction writing format of the format above*
 - 6-bit format conforming to ISO 7811/2 first track
 - 4-bit format conforming to ISO 7811/2 second and third tracks
- However, the second track is in 70 bpi format.

See the first track read command for details on other descriptions and operations.

*: The reading direction of JISX6302 conforming magnetic formats follows the preset memory switch setting. See Model Setting Commands (91h) for details.

Command Transfer Formats

STX	22h	ETX	BCC
-----	-----	-----	-----

BCC = 21h

Response Transfer Formats

STX	22h	Status	Read Data String	ETX	BCC
-----	-----	--------	------------------	-----	-----

(3) Third track read command (Model: 410)

General Description

This command idles the third track read of a magnetic strip encoded in the following formats.

- Reverse 7-bit format conforming to JISX6302*
 - 7-bit + 1 parity Reverse direction writing format of the format above*
 - 6-bit format conforming to ISO 7811/2 first track
 - 4-bit format conforming to ISO 7811/2 second and third tracks
- However, the second track is in 70 bpi format.

Note that this command cannot be used with on models with one magnetic stripe (TCP400). See the first track read command for details on other descriptions and operations.

*: The reading direction of JISX6302 conforming magnetic formats follows the preset memory switch setting. See Model Setting Commands (91h) for details.

Command Transfer Formats

STX	23h	ETX	BCC
-----	-----	-----	-----

BCC = 20h

Response Transfer Formats

STX	23h	Status	Read Data String	ETX	BCC
-----	-----	--------	------------------	-----	-----

(4) First track read (status with no card) command (Model: 410)

General Description

This command idles the first track read of a magnetic strip encoded in the following formats.

- 7-bit format conforming to JISX6302*
- Reverse 7-bit format Reverse direction writing format of the format above*
- 6-bit format conforming to ISO 7811/2 first track
- 4-bit format conforming to ISO 7811/2 second and third tracks

However, the second track is in 70 bpi format.

The starting symbol in the magnetic stripe automatically determines what format to use to read the card.

Note that this command cannot be used with on models with one magnetic stripe (TCP400).

*: The reading direction of JISX6302 conforming magnetic formats follows the preset memory switch setting. See Model Setting Commands (91h) for details.

Details of Operation

If a card is idling in the machine, this will read the magnetic stripe on the idling card.

If there is no targeted card, set the no card status (22h) to the response block status field and quit the command. In that case, the read data string field does not exist. If there is a card waiting to be removed from the device when issuing this command, discharge it.

The results of the command are stored in the response block status field.

If reading of the card fails, the device will automatically reread the card according to the number of times that were set. If still the card cannot be read with that set number of rereads, the values of 23h, 31h to 34h are set to the response block status field.

The following shows the read data string.

Format	Data Length	Character Code
7-bit format:	0 to 69 bytes of variable length data Excluding 02h and 03h	(01h to 7Eh)
Reverse 7-bit format:	0 to 69 bytes of variable length data Excluding 02h and 03h	(01h to 7Eh)
6-bit format:	0 to 76 bytes of variable length data	(20h to 5Eh)
4-bit format:	0 to 104 bytes of variable length data	(30h to 3Eh)

The magnetic stripe starting and ending symbols, LRC and parity bit are not included in the read data string.

After this command is issued, it is possible to read the buffer while the card is idling.

Command Transfer Formats

STX	25h	ETX	BCC
-----	-----	-----	-----

Response Transfer Formats

STX	25h	Status	Read Data String	ETX	BCC
-----	-----	--------	------------------	-----	-----

(5) Second track read (status with no card) command (Models: 400/410)

General Description

This command idles the second track read of a magnetic strip encoded in the following formats.

- 7-bit format conforming to JISX6302*
 - Reverse 7-bit format Reverse direction writing format of the format above*
 - 6-bit format conforming to ISO 7811/2 first track
 - 4-bit format conforming to ISO 7811/2 second and third tracks
- However, the second track is in 70 bpi format.

See the first track read (status with no card) command for details on other descriptions and operations

*: The reading direction of JISX6302 **conforming magnetic formats follows the preset memory** switch setting. See Model Setting Commands (91h) for details.

Command Transfer Formats

STX	26h	ETX	BCC
-----	-----	-----	-----

Response Transfer Formats

STX	26h	Status	Read Data String	ETX	BCC
-----	-----	--------	------------------	-----	-----

(6) Third track read (status with no card) command (Model: 410)

General Description

This command idles the third track read of a magnetic strip encoded in the following formats.

- 7-bit format conforming to JISX6302*
 - Reverse 7-bit format Reverse direction writing format of the format above*
 - 6-bit format conforming to ISO 7811/2 first track
 - 4-bit format conforming to ISO 7811/2 second and third tracks
- However, the second track is in 70 bpi format.

Note that this command cannot be used with on models with one magnetic stripe (TCP400). See the first track read (status with no card) command for details on other descriptions and operations.

*: The reading direction of JISX6302 conforming magnetic formats follows the preset memory switch setting. See Model Setting Commands (91h) for details.

Command Transfer Formats

STX	27h	ETX	BCC
-----	-----	-----	-----

Response Transfer Formats

STX	27h	Status	Read Data String	ETX	BCC
-----	-----	--------	------------------	-----	-----

(7) First track buffer read command (Model: 410)

This command acquires the first track buffer data of the following formats.

- 7-bit format conforming to JISX6302*
 - Reverse 7-bit format Reverse direction writing format of the format above*
 - 6-bit format conforming to ISO 7811/2 first track
 - 4-bit format conforming to ISO 7811/2 second and third tracks
- However, the second track is in 70 bpi format.

See the first track read command for details.

Note that this command cannot be used with on models with one magnetic stripe (TCP400).

*: The reading direction of JISX6302 conforming magnetic formats follows the preset memory switch setting. See Model Setting Commands (91h) for details.

Command Transfer Formats

STX	29h	ETX	BCC
-----	-----	-----	-----

Response Transfer Formats

STX	29h	Status	Read Data String	ETX	BCC
-----	-----	--------	------------------	-----	-----

(8) Second track buffer read command (400/410)

This command acquires the second track buffer data of the following formats.

- 7-bit format conforming to JISX6302*
 - Reverse 7-bit format Reverse direction writing format of the format above*
 - 6-bit format conforming to ISO 7811/2 first track
 - 4-bit format conforming to ISO 7811/2 second and third tracks
- However, the second track is in 70 bpi format.

See the second track read command for details.

*: The reading direction of JISX6302 conforming magnetic formats follows the preset memory switch setting. See Model Setting Commands (91h) for details.

Command Transfer Formats

STX	2Ah	ETX	29h
-----	-----	-----	-----

Response Transfer Formats

STX	2Ah	Status	Read Data String	ETX	BCC
-----	-----	--------	------------------	-----	-----

(9) Third track buffer read command (Model: 410)

This command acquires the third track buffer data of the following formats.

- 7-bit format conforming to JISX6302*
 - Reverse 7-bit format Reverse direction writing format of the format above*
 - 6-bit format conforming to ISO 7811/2 first track
 - 4-bit format conforming to ISO 7811/2 second and third tracks
- However, the second track is in 70 bpi format.

See the third track read command for details.

Note that this command cannot be used with on models with one magnetic stripe (TCP400).

*: The reading direction of JISX6302 conforming magnetic formats follows the preset memory switch setting. See Model Setting Commands (91h) for details.

Command Transfer Formats

STX	2Bh	ETX	BCC
-----	-----	-----	-----

Response Transfer Formats

STX	2Bh	Status	Read Data String	ETX	BCC
-----	-----	--------	------------------	-----	-----

(10) Reverse 7 bit format second track data setting command (Model: 400)

This command sets the write data to the second track with a reverse 7-bit format.

Excluding 02h (STX) and 03h (ETX), the write data string must be data from 01h to 7Eh in 0 to 69 bytes.

The starting and ending symbols, LRC and parity bit on the magnetic stripe are all automatically applied. A reject response is issued when an error is detected in the write data.

* This command generates magnetic strip data that is in the direction opposite to the 7 bit format second track data setting command 39h.

Command Transfer Formats

STX	36h	Write data string	ETX	BCC
-----	-----	-------------------	-----	-----

Response Transfer Formats

STX	36h	Status	ETX	BCC
-----	-----	--------	-----	-----

(11) Reverse 7 bit format third track data setting command (Model: 410)

This command sets the write data to the third track with a reverse 7-bit format. Excluding 02h (STX) and 03h (ETX), the write data string must be data from 01h to 7Eh in 0 to 69 bytes.

The starting and ending symbols, LRC and parity bit on the magnetic stripe are all automatically applied. A reject response is issued when an error is detected in the write data. Note that this command cannot be used with on models with one magnetic stripe (TCP400).

* This command generates magnetic strip data that is in the direction opposite to the 7 bit format third track data setting command 3Ah.

Command Transfer Formats

STX	37h	Write data string	ETX	BCC
-----	-----	-------------------	-----	-----

Response Transfer Formats

STX	37h	Status	ETX	BCC
-----	-----	--------	-----	-----

(12) Reverse 7 bit format second track data setting command (Model: 400)

This command sets the write data to the second track with a reverse 7-bit format. Excluding 02h (STX) and 03h (ETX), the write data string must be data from 01h to 7Eh in 0 to 69 bytes.

The starting and ending symbols, LRC and parity bit on the magnetic stripe are all automatically applied. A reject response is issued when an error is detected in the write data.

Command Transfer Formats

STX	39h	Write data string	ETX	BCC
-----	-----	-------------------	-----	-----

Response Transfer Formats

STX	39h	Status	ETX	BCC
-----	-----	--------	-----	-----

(13) 7 bit format third track data setting command (Model: 410)

This command sets the write data to the third track with a 7-bit format. Excluding 02h (STX) and 03h (ETX), the write data string must be data from 01h to 7Eh in 0 to 69 bytes.

The starting and ending symbols, LRC and parity bit on the magnetic stripe are all automatically applied. A reject response is issued when an error is detected in the write data. Note that this command cannot be used with on models with one magnetic stripe (TCP400).

Command Transfer Formats

STX	3Ah	Write data string	ETX	BCC
-----	-----	-------------------	-----	-----

Response Transfer Formats

STX	3Ah	Status	ETX	BCC
-----	-----	--------	-----	-----

(14) Second track data setting command (Model: 400)

This command sets the second track write data.

The magnetic format of the write data corresponds to the following formats, but the format that is set abides by the content of the preset memory switches. See Model Setting Commands (91h) for details.

- 7-bit format conforming to JISX6302
- Reverse 7-bit format Reverse direction writing format of the format above
- 6-bit format conforming to ISO 7811/2 first track
- 4-bit format conforming to ISO 7811/2 second and third tracks

However, the second track is in 70 bpi format.

The starting and ending symbols, LRC and parity bit on the magnetic stripe are all automatically applied. A reject response is issued when an error is detected in the write data.

Command Transfer Formats

STX	3Ch	Write data string	ETX	BCC
-----	-----	-------------------	-----	-----

Response Transfer Formats

STX	3Ch	Status	ETX	BCC
-----	-----	--------	-----	-----

(15) Third track data setting command (Model: 410)

This command sets the third track write data.

The magnetic format of the write data corresponds to the following formats, but the format that is set abides by the content of the preset memory switches. See Model Setting Commands (91h) for details.

- 7-bit format conforming to JISX6302
- 7-bit format + 1 parity Reverse direction writing format of the format above
- 6-bit format conforming to ISO 7811/2 first track
- 4-bit format conforming to ISO 7811/2 second and third tracks

However, the second track is in 70 bpi format.

The starting and ending symbols, LRC and parity bit on the magnetic stripe are all automatically applied. A reject response is issued when an error is detected in the write data.

Command Transfer Formats

STX	3Dh	Write data string	ETX	BCC
-----	-----	-------------------	-----	-----

Response Transfer Formats

STX	3Dh	Status	ETX	BCC
-----	-----	--------	-----	-----

(16) Magnetic stripe write → idle command (Models: 400/410)

General Description

This command writes magnetic data set by the data setting command.

Details of Operation

This writing operation starts only when normal write data is set for the specified write tracks. If there is no targeted card, it will wait until one is inserted into the device, then begin to write to the card.

If normal write data is not set to the specified write track, the reader/writer will respond with the DLE characters to reject the command.

The device automatically verifies the data after magnetically writing.

When the magnetic writing fails, the device will retry to write the data the number of times set by the write retry count setting command (91h, W). The initial value for the retry count is two times (initial time, plus 2 times).

- Write track specifying parameters

Note that this command cannot be used with on models with three magnetic stripes (TCP410).

Note that this command cannot be used with on models with one magnetic stripe (TCP400).

'2': Enable magnetic writing to track 2

If a card is not inserted after this command is issued, or to cancel the command, issue the card insertion wait status cancel command (54h) after canceling the state of communication.

Command Transfer Formats

STX	31h	Write track specification	ETX	BCC
-----	-----	---------------------------	-----	-----

Response Transfer Formats

STX	31h	Status	ETX	BCC
-----	-----	--------	-----	-----

(17) Magnetic stripe write → idle (status with no card) command (Models: 400/410)

General Description

This command writes magnetic data set by the data setting command.

This writes to the magnetic stripe of the targeted card, if one is inserted in the reader/writer. If no target card is inserted in the device, this sets the no card status (22h) to the response block status field and quits the command.

Details of Operation

This writes to the magnetic stripe of the targeted card only when normal data is set for all tracks specified as write tracks in the command parameters, if one is inserted in the reader/writer. If no target card is inserted in the device, this sets the no card status (22h) to the response block status field and quits the command. If normal write data is not set to the specified write track, the reader/writer will respond with the DLE characters to reject the command.

The device automatically verifies the data after magnetically writing.

When the magnetic writing fails, the device will retry to write the data the number of times set by the write retry count setting command (91h, W). The initial value for the retry count is two times (initial time, plus 2 times).

- Write track specifying parameters

Note that this command cannot be used with on models with three magnetic stripes (TCP410).

'4': Enable magnetic writing to track 3

Note that this command cannot be used with on models with one magnetic stripe (TCP400).

'2': Enable magnetic writing to track 2

Command Transfer Formats

STX	32h	Write track specification	ETX	BCC
-----	-----	---------------------------	-----	-----

Response Transfer Formats

STX	32h	Status	ETX	BCC
-----	-----	--------	-----	-----

4-2. Print and Erase Commands

The speed to write and erase switches according to the ambient environment and card media. To perform a timeout, set the timeout value according to the environment of use.

(1) Print expansion buffer clear command

This command clears the print expansion buffer only.

Image data is expanded in the print expansion buffer by the character (including external characters) by the print character data setting command (41h), and the internal image data expansion command (42h). The reader/writer prints the contents of the rasterized image register buffer with the print expansion buffer by the erase + print command (46h), but data remains in both buffers, so if the erase + print command (46h) is executed again, the same print results will be attained.

The print expansion buffer is cleared only by executing the print expansion buffer clear command (40h), executing the buffer clear command (49h) or by turning the power off and on again. This command clears the rasterized image register buffer.

Command Transfer Formats

STX	40h	ETX	43h
-----	-----	-----	-----

Response Transfer Formats

STX	40h	Status	ETX	BCC
-----	-----	--------	-----	-----

(2) Buffer clear command

This command clears the rasterized image register buffer and print expansion buffer. The rasterized image data transmitted from the host is expanded in the rasterized image register buffer. The reader/writer prints the contents of the rasterized image register buffer with the print expansion buffer by the erase + print command (46h), but data remains in both buffers, so if the erase + print command (46h) is executed again, the same print results will be attained.

The rasterized image register buffer is cleared only by executing buffer clear command (49h) or by turning the power off and on again.

Command Transfer Formats

STX	49h	ETX	4Ah
-----	-----	-----	-----

Response Transfer Formats

STX	49h	Status	ETX	BCC
-----	-----	--------	-----	-----

(3) Print character data setting command

This command expands character data to be printed (including external fonts) in the print expansion buffer.

The print data string is composed of the print control header string and the print text data string.

The print control header string is composed of the card arrangement direction parameter, the X coordinate specification parameter string, the Y coordinate specification parameter string, and a comma for separating each parameter.

The print control header string can be omitted altogether.

The print text data string is composed of the print text data, ESC control data and the line feed control data.

This command is not limited to a number of transmissions. After clearing the print expansion buffer, data can be separated into a multiple of times for sending until the print command (46h) is executed.

Expanded data is maintained in the reader/writer unless the print expansion buffer is cleared, so the same printing can be performed as many times as required.

If print data expanded in the print expansion buffer exceeds the printable range of a card, an expansion buffer overflow error (51h) response is transmitted.

The command length can be a maximum of 1024 bytes. If it should exceed that, separate the length into a plurality of electronic statements.

Command Transfer Formats

STX	41h	Print data string	ETX	BCC
-----	-----	-------------------	-----	-----

Response Transfer Formats

STX	41h	Status	ETX	BCC
-----	-----	--------	-----	-----

Parameter Explanation

Print control header string

The print control header string is composed of the card arrangement direction parameter, the X coordinate specification parameter string, the Y coordinate specification parameter string, and a comma for separating each parameter.

The print control header string can be omitted altogether.

If omitted, the device expands the memory from the next character position after the previous electronic statement.

Print control header string = card arrangement direction specification parameter ',' (comma)
X coordinate specification

Print control header string and print text data description example

VISUAL CARD1.COMMUNICATION (&H41, "2,0,23, STAR Micronics (Corp.)", 0, FALSE);
This expands "STAR Micronics (Corp.)" by additional writing to a vertical card at the (X coordinate and Y coordinate) = (0, 23).

- **Card arrangement direction specification parameter**

- '0': Vertical card + overwrite
 - '1': Horizontal card + overwrite
 - '2': Vertical card + added writing
 - '3': Vertical card + added writing
- These four parameters specify how to write.

- ',' (Commas)

Required to separate parameters.

- **X coordinate specification parameter**

Specifies whether to expand the X coordinate of the bottom left edge of the text data to expand to each print expansion buffer.

When the card arrangement direction specification is '0,' '2': '0' to '319'

When the card arrangement direction specification is '1,' '3': '0' to '503'

- **Y coordinate specification parameter**

Specifies whether to expand the Y coordinate of the upper left edge of the text data to expand to each print expansion buffer.

When the card arrangement direction specification is '0,' '2': '0' to '503'

When the card arrangement direction specification is '1,' '3': '0' to '319'

Notes:

The Y coordinate specification parameter indicates the bottom left edge of the text data to expand, so when the set font is 24 dots, the minimum value of the Y coordinate specification value is 23. If the set font is 16 dots, the minimum value of the Y coordinate specification value is 15.

JP, GP2312 or GB18030, BIG5 and KR models do not use 16 dot fonts.

Remarks:

If the print characters are set with overwriting settings of '0,' '1' with the card arrangement direction specification parameter, the device will write to the same print region. Therefore, the characters set first with this electronic statement will be invalid, and subsequent set data will become valid and printed. Spaces between characters are skipped, but when there is a background image, the image data remains between the characters.

Text data string

- **Print text**

Print text prints 1-byte characters (single-byte characters) (prints two-byte characters even with 1 byte data when two-byte ANK characters are specified with the ESC control, only in Japanese specifications.) and two byte Chinese characters (Japanese specifications: Shift JIS code; Taiwanese specifications: BIG5; Chinese specifications: GB2312 or GB18030; and Korean specifications: Hangul).

The two-byte code area of the GB18030 characters can be printed in the GB18030 mode, but USER AREAs 1, 2 and 3 cannot be printed.

- **Line feed control data**

This print line feed control LF (0Ah) command line feeds the print coordinate pointer 1 character space, including spaces between lines, in reverse. The reverse X coordinate is the X coordinate origin point.

- **ESC Sequence**

If there is an ESC (1Bh) in the print text data string, this sets the characters size specification, combined with the next character.

• ESC E/e

Specifies character size.

ESC 'E'/e' next parameter range: "11," "12," "21," "22" 2 digit configuration

ESC "E11" Normal size

ESC "E12" Horizontal double size

ESC "E21" Vertical double size

ESC "E22" Vertical/horizontal double size

• ESC G

This expands a specified 24 dot 2-byte external characters font in the print expansion buffer memory.

ESC 'G' next parameter range: '0' to 'F' 1 digit configuration

ESC "G0" Expands the 0th 24 dot two-byte external character font

ESC "G1" Expands the 1st 24 dot two-byte external character font

:

ESC "G9" Expands the 9th 24 dot two-byte external character font

ESC "GA" Expands the 10th 24 dot two-byte external character font

:

ESC "GE" Expands the 14th 24 dot two-byte external character font

ESC "GF" Expands the 15th 24 dot two-byte external character font

• ESC I

This expands a specified 16 dot 2-byte external characters font in the print expansion buffer memory.

ESC 'I' next parameter range: '0' to 'F' 1 digit configuration

ESC "I0"

ESC "I1"

:

:

ESC "I9"

ESC "IA"

:

ESC "IE"

ESC "IF"

• ESC g

This expands a specified 24 dot 1-byte external characters font in the print expansion buffer memory.

ESC 'g' next parameter range: '0' to 'F' 1 digit configuration

• ESC i

This expands a specified 16 dot 1-byte external characters font in the print expansion buffer memory.

ESC 'i' next parameter range: '0' to 'F' 1 digit configuration

• ESC S

Moves the next print character to the right an n character amount (including spaces for two-byte characters) by calculating the position to expand the expansion buffer memory in two bytes.

ESC 'S' next parameter range: '01' to '29' 2 digit configuration

• ESC s

Moves the next print character to the right an n character amount (including spaces for two-byte characters) by calculating the position to expand the expansion buffer memory in single-byte.

ESC 's' next parameter range: "0" to "59" 2 digit configuration

• ESC L/l

Moves the next print character to below the n line (including line spaces) by calculating the position to expand the expansion buffer memory.

ESC 'L'/l' next parameter range: "01" to "19" 2 digit configuration

• ESC M/m

Sets the dot spaces between lines

ESC 'M'/m next parameter range: '0' to 'F' 1 digit configuration

• ESC X/x

Sets the X coordinate to expand characters.

ESC 'X'/x next parameter range:

For vertical cards: '000' to "319" 3 digit configuration

For horizontal cards: '000' to "503" 3 digit configuration

• ESC Y/y

Sets the Y coordinate to expand characters.

ESC 'Y'/y next parameter range:

For vertical cards: "000" to "503" 3 digit configuration

For horizontal cards: "000" to "319" 3 digit configuration

• ESC D

Sets the dot space for gaps in two-byte characters. Dot spaces are applied to the right side of characters.

ESC 'D' next parameter range: '0' to 'F' 1 digit configuration

• ESC d

Sets the dot space for gaps in single-byte characters. Dot spaces are applied to the right side of characters.

ESC 'd' next parameter range: '0' to 'F' 1 digit configuration

• ESC W/w

Sets the width size of characters to expand.

ESC 'W'/w next parameter range: '1' to '2' 1 digit configuration

ESC "W1" Specifies normal width fonts.

ESC "W2" Specifies double width fonts.

• ESC V/v

Sets the vertical size of characters to expand.

ESC 'V'/v next parameter range: '1' to '2' 1 digit configuration

ESC "V1" Specifies normal height fonts.

ESC "V2" Specifies double tall fonts.

• ESC B/b

Specifies the line width of ANK characters.

ESC 'B'/b next parameter range: '0' to '2' 1 digit configuration

ESC "B0" Specifies normal narrow gothic fonts.

ESC "B1" Specifies enhanced gothic fonts.

ESC "B2" Specifies double-enhanced gothic fonts.

• ESC J/j

Sets double/single byte fonts as ANK characters.

ESC 'J'/j next parameter range: '0' to '1' 1 digit configuration

ESC "J0" Specifies two-byte gothic fonts.

ESC "J1" Specifies single-byte gothic fonts.

ANK character double-byte specifications are valid only on Japanese models.

• ESC F/f

Sets 24/16 dot fonts for ANK characters.

ESC 'F'/f next parameter range: '0' to '1' 1 digit configuration

ESC "F0" Specifies 24 dot fonts.

ESC "F1" Specifies 16 dot fonts.

JP, GP2312 or GB18030, BIG5 and KR models do not use 16 dot fonts.

(4) Internal image data 1 expand command
 (Contact our sales representative for destination country.)

This command expands images specified by an expansion image number to the print expansion buffer from among the image data stored in the reader/writer flash ROM1.

Image data is that which is expanded to the ROM1 image area. If within a capacity range, this is data of a BMP file (bit map file) on a Windows system, that stores up to 2000 types.

A dedicated tool is required to store image data to the flash ROM1 memory. Contact our sales representative.

Command Transfer Formats

S		Data		Data		Data		Expansion image	ETX	BCC
T	42h	arrangement	','	arrangement X	','	arrangement	','	specification		
X		specification		coordinate		X coordinate		number		

Response Transfer Formats

STX	42h	Status	ETX	BCC
-----	-----	--------	-----	-----

Parameter Explanation

- Data arrangement specification parameter
 To specify whether to use the internal vertically or horizontally, select '0' to '3.'
 '0': Vertical card + overwrite
 '1': Horizontal card + overwrite
 '2': Vertical card + added writing (recommended)
 '3': Horizontal card + added writing (recommended) These four parameters specify how to write.
- ',' (Commas)
 Required to separate parameters.
- Data arrangement X coordinate parameter
 Specifies the X coordinate on the upper left edge of the image to expand.
 When the data arrangement specification is '0,' '2': '0' to '319'
 When the data arrangement specification is '1,' '3': '0' to '503'
- Data arrangement Y coordinate parameter
 Specifies the Y coordinate on the upper left edge of the image to expand.
 When the data arrangement specification is '0,' '2': '0' to '503'
 When the data arrangement specification is '1,' '3': '0' to '319'
- Expansion image specification number parameter
 Data count can be set to a maximum of 2000 types, so specify with characters from '0' to '1999'. However, a reject response is issued if an image data that corresponds to the reader/writer flash ROM1 cannot be found.

(5) External image data expand command

This command sets the image data to the rasterized image register buffer (volatile memory). Assuming that the card is horizontally oriented, this registers a maximum of 320 vertical dot image expansion data to the position specified with the X coordinate on the buffer for one page. Turns the image data on the host to text formats, and expands the 320 dot image data as 80 character text format. If registering the image part way in a Y direction, this sets the parameter expansion starting Y address. With the total for the expansion starting address and the expansion image data exceed 320 dots, a reject response is issued.

Command Transfer Formats

STX	43h	Expansion start X coordinate	','	Expansion start Y address	','	Expansion image data	ETX	BCC
-----	-----	------------------------------	-----	---------------------------	-----	----------------------	-----	-----

Response Transfer Formats

STX	43h	Status	ETX	BCC
-----	-----	--------	-----	-----

Parameter Explanation

- Expansion starting X coordinate parameter
Specifies whether to expand the registered image X coordinate to the rasterized image register buffer.
'0' to "503"
- ',' (Commas)
Required to separate parameters.
- Expansion starting Y address parameter
Specifies whether to expand the registered image Y address to the rasterized image register buffer. Becomes 0 when omitted.
'0' to "39"
- Expansion image data parameter
Expresses each 8 dots using two characters of text.
Composed of 80 byte data over the entire vertical area. LSB specifies the upper side bits; MSB specifies the lower side bits. In the example below, this is "A3."
 - bit0 '3' (33h)
 - bit1
 - bit2
 - bit3
 - bit4 'A' (41h)
 - bit5
 - bit6
 - bit7

(6) External image data expand command

This command sets the image data to the rasterized image register buffer (volatile memory). Image data is expanded from the expansion starting X coordinate and the expansion starting Y coordinate (byte: 8 dot units) with the range specified by the image data length. If image data with a number larger than the data specified in the image data length, this automatically increments the X coordinate and expands to the next dot string. If the image data length is 10 bytes, and 20 bytes of image data (which becomes 40 bytes after characters disintegrate into 4-bit pieces), it is possible to specify 2 dot strings at the same time. The maximum length of image data is 1024 bytes. If all data to be transmitted with one command cannot all be specified, execute the command a multiple of times.

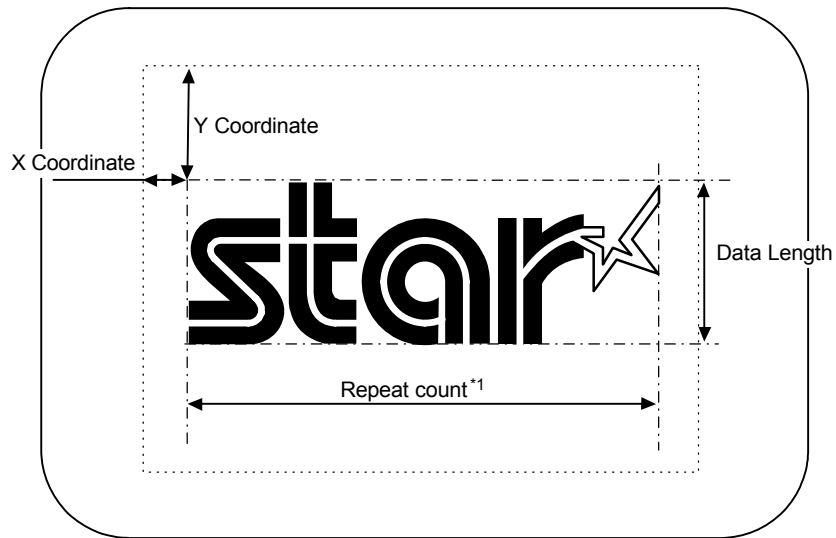
Command Transfer Formats

STX	4Dh	Expansion start X coordinate	','	Expansion start Y coordinate	','	Image data length	','	Expansion image data
ETX	BCC							

Parameter Explanation

- Expansion starting X coordinate parameter
Specifies whether to expand the registered image X coordinate to the rasterized image register buffer.
'0' to "503"
- ',' (Commas)
Required to separate parameters.
- Expansion starting Y address parameter
Specifies whether to expand the registered image Y address to the rasterized image register buffer. Becomes 0 when omitted. Specify in bytes (8 dot units). When making minute adjustments to the image print position in the Y direction, adjust the top and bottom margins on the image data.
'0' to "39"
- Expansion image data parameter
Expresses each 8 dots using two characters of text.
LSB specifies the upper side bits; MSB specifies the lower side bits. In the example below, this is "A3." The maximum value that can be specified for image data is 1024 bytes (512 x 8 dots).
The number of image data should be an integer magnification of the image length.
 - bit 0 '3' (33h)
 - bit1
 - bit2
 - bit3
 - bit4 'A' (41h)
 - bit5
 - bit6
 - bit7

If using a card in the vertical direction (portrait), you should rotate the original print data beforehand.



*1: The following equation is for the number of times to repeat the command (when the image data count is an integer magnification of the data length).

$$\text{Repeat count} = \text{X direction dot count} / (\text{image data count} / \text{data length})$$

(7) Two-byte external character font register command

This command registers 24 dot or 16 dot two-byte fonts to the external character buffer to the volatile memory as external fonts.
Along with sizes, 16 fonts can be registered.
Reregistering set fonts overwrites the existing ones.

Command Transfer Formats

STX	44h	Font size specification	','	External character registration number	','	External font data	ETX	BCC
-----	-----	-------------------------	-----	--	-----	--------------------	-----	-----

Response Transfer Formats

STX	44h	Status	ETX	BCC
-----	-----	--------	-----	-----

Parameter Explanation

- Font size specification data
This specifies the font size to register.
'0': Vertical/horizontal: 24 dot x 24 dot fonts
'1': Vertical/horizontal: 16 dot x 16 dot fonts
- ',' (Commas)
Required to separate parameters.
- External character registration number parameter
This specifies the external character number to register. To set print data, any external print font can be printed by specifying this external character register number.
'0' to 'F' can be specified.
- External character font data parameter
Specifies external font data in hexadecimal character strings of 144 bytes (64 bytes) because 72 byte (32 byte) font data characters disintegrate.
Specify data from the left to the right.
Each string is shown as 6 bytes (4 bytes) and the top is the LSB.
Data in parentheses is 16 dot by 16 dot fonts.
Below is shown an example of setting the user font to the external character registration number 0.

Example Setting

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1																								
2												•												
3												•												
4		•										•										•		
5			•									•										•		
6				•																	•			
7					•						•	•	•							•				
8									•	•	•	•	•	•	•									
9								•	•	•	•	•	•	•	•	•								
10							•	•	•	•	•	•	•	•	•	•	•							
11							•	•	•	•	•	•	•	•	•	•	•							
12						•	•	•	•	•	•	•	•	•	•	•	•	•						
13	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
14						•	•	•	•	•	•	•	•	•	•	•	•	•	•					
15						•	•	•	•	•	•	•	•	•	•	•	•	•	•					
16						•	•	•	•	•	•	•	•	•	•	•	•	•	•					
17								•	•	•	•	•	•	•	•	•								
18								•	•	•	•	•	•	•	•									
19						•					•	•	•							•				
20					•																•			
21			•									•										•		
22		•										•											•	
23												•												
24												•												

Data

"0,"
 "001000001000081020101010"
 "20000840380400FE0000FF01"
 "80FF0380FF03C0FF07DEFFF7"
 "C0FF0780FF0380FF0300FF01"
 "00FE00003100400004201008"
 "101010081020001000000000"

Font number
 A to D string
 E to H string
 I to L string
 M to P string
 Q to T string
 U to X string

(8) Single-byte external character font register command

This command registers 24 dot or 16 dot single-byte fonts to the external character buffer (the volatile memory) as external fonts. Along with sizes, 16 fonts can be registered.

Command Transfer Formats

STX	45h	Font size specification	','	External character registration number	','	External font data	ETX	BCC
-----	-----	-------------------------	-----	--	-----	--------------------	-----	-----

Response Transfer Formats

STX	45h	Status	ETX	BCC
-----	-----	--------	-----	-----

Parameter Explanation

- Font size specification data

This specifies the font size to register.

'0': Vertical/horizontal: 24 dot x 12 dot fonts

'1': Vertical/horizontal: 16 dot x 8 dot fonts

- ',' (Commas)

Required to separate parameters.

- External character registration number parameter

This specifies the external character number to register. To set print data, any external print font can be printed by specifying this external character register number.

'0' to 'F' can be specified.

- External character font data parameter

Specifies external font data in hexadecimal character strings of 72 bytes (32 bytes) because 36 byte (16 byte) font data text disintegrates.

Specify data from the left to the right.

Each string is shown as 6 bytes (4 bytes) and the top is the LSB.

Data in parentheses is 16 dot by 8 dot fonts.

(9) Erase + print → discharge command

This command performs the operations specifying the control methods for deleting, printing and discharging.

If there is a card idling in the device, it operates immediately.

If there is no targeted card, the system will wait until one is inserted into the device, then perform the operation after a card is inserted.

After the operation is completed, the print expansion buffer and rasterized image register buffer are not cleared.

If a card is not inserted after this command is issued, or to cancel the command, issue the card insertion wait status cancel command (54h) after canceling the state of communication.

The processing time can vary depending on the card type, ambient temperature and head heat.

Particularly, if the thermal head is hot, it may be necessary to allow some time to cool. At that time, if the temperature does not drop to a fixed temperature within 20 seconds, the printing process will not occur and the error 23h will be returned as a response.

Command Transfer Formats

STX	46h	Discharge control method	,	Erasing control method	,	Print control method	ETX	BCC
-----	-----	--------------------------	---	------------------------	---	----------------------	-----	-----

Response Transfer Formats

STX	46h	Status	ETX	BCC
-----	-----	--------	-----	-----

Parameter Explanation

• Discharge control method

'0' (30h): Cards after erase/print is stopped at front idling position and held
Card becomes a process target card.

'1' (31h): Cards after erase/print is discharged Card waits to be pulled out and is not a process target card.

• Separating characters

',' (2Ch): Used to separate parameters.

• Erase control method

'0' (30h): Does not erase

'1' (31h): Erases If printing was instructed by the print method control parameter, erasing and printing are performed in the same conveyance cycle (one pass erasing and printing).

'2' (32h): Erases If printing was instructed by the print method control parameter, erasing and printing are performed in separate conveyance cycles (two pass erasing and printing).

• Separating characters

',' (2Ch): Used to separate parameters.

• Print control method

'0' (30h): Does not print

'1' (31h): Print

- Parameter specification example 1

STX	46h	ETX	BCC
-----	-----	-----	-----

Cards after discharged to the front after erasing/printing by omitting all parameters.

- Parameter specification example 2

STX	46h	31h	ETX	BCC
-----	-----	-----	-----	-----

Cards after discharged to the front after erasing/printing in the same way as parameter specification 1.

This parameter specification method (specifying only the discharge control method) is completely compatible with the conventional erase + discharge command (46h).

- Parameter specification example 3

STX	46h	31h	,	30h	ETX	BCC
-----	-----	-----	---	-----	-----	-----

After printing, the card is discharged to front.
For example, this applies to one-time media.

- Parameter specification example 4

STX	46h	31h	,	32h	ETX	BCC
-----	-----	-----	---	-----	-----	-----

Cards after discharged to the front after erasing/printing in two passes.
Because erasing and printing are performed on separate conveyance cycles, there is no disturbance of the printing.

- Parameter specification example 5

STX	46h	31h	,	31h	,	30h	ETX	BCC
-----	-----	-----	---	-----	---	-----	-----	-----

After erasing, the card is discharged to front.
For example, this applies to invalidating the rewrite media surface (printing surface).

(14) Bar Code Data Setting Commands

These commands expand bar code strip patterns and subscript to the print expansion buffer. The print data string is composed of the bar code control header string and the bar code data string.

Command Transfer Formats

STX	4Eh	Bar Code Control Header String	Bar Code Data String	ETX	BCC
-----	-----	--------------------------------	----------------------	-----	-----

Response Transfer Formats

STX	4Eh	Status	ETX	BCC
-----	-----	--------	-----	-----

Parameter Explanation

Bar Code Control Header String

The bar code control header string is composed of the starting Y coordinate parameter string, the ending Y coordinate specification parameter string, the bar code type parameter, the bar code start stop code parameter string, and a comma for separating each parameter.

The bar code control header string = starting Y coordinate parameter string, (,) (comma) ending Y coordinate specification parameter string, (,) (comma) bar code type parameter, (,) (comma) the bar code start stop code parameter string, (,) (comma)

Bar code control header string and bar code data string description example

VISUAL CARD1.COMMUNICATION (&h4E, "100,170,1,A,111213141516", 0, True);

With the card stood vertically, this expands the Code 128 bar code data "123456" with subscript at the Y coordinates 100 to 170 positions.

- Starting Y coordinate parameter example

Specifies the starting Y coordinate for expansion of the bar code with the card stood vertically. '0' to "503"

- Ending Y coordinate parameter example

Specifies the ending Y coordinate for expansion of the bar code with the card stood vertically. '0' to "503"

- Bar Code Type Parameter

'0': CODE 128

'1': CODE 128 With Subscript

'2': CODE 39 (3 of 9)

'3': CODE 39 (3 of 9) With Subscript

'4': ITF (Interleaved 2 of 5)

'5': ITF (Interleaved 2 of 5) With Subscript

'6': CODABAR (NW-7)

'7': CODABAR (NW-7) With Subscript

- ',' (Commas)

Required to separate parameters.

- Bar code status stop code parameter

This is necessary only when the bar code type parameters are '0,' '1,' '6' and '7.'

When the bar code type parameters are '0,' '1'

'A': Sets CODE 128 bar code to code set A.

'B': Sets CODE 128 bar code to code set B.

'C': Sets CODE 128 bar code to code set C.

When the bar code type parameters are '6,' '7'

'AA,' 'AB,' 'AC,' 'AD,' 'BA,' 'BB,' 'BC,' 'BD,'

'CA,' 'CB,' 'CC,' 'CD,' 'DA,' 'DB,' 'DC,' 'DD'

[Ex.:]

'AB': Sets the CODABAR (NW-7) start and stop characters to 'A' and 'B.'

Caution

When bar codes have subscript, that subscript is arranged in a position 24 dots below the ending Y coordinate specified parameter. If the subscript exceeds the printable range of a card, it is rejected.

Bar Code Data String

When the bar code type parameters are '0,' '1' (CODE 128)

102 characters from chr (&H00) to chr (&H66) are expressed with bar code CODE128. The table below shows an example of the two characters of a bar code (ASCII).

[Ex.:]

VISUAL CARD1.COMMUNICATION (&h4E, "100,170,1,A,111213141516", 0, True);

Expands bar codes of chr (&H11), chr (&H12), chr (&H13), chr (&H14), chr (&H15), chr (&H16) of the CODE128 code set A with subscript.

Bar Code Data	Bar Code Data String	Suffixes by Code Set		
	ASCII	CODESET A	CODESET B	CODESET C
chr(&H00)	"0 0"	" "(SP)	" "(SP)	00
chr(&H01)	"0 1"	!	!	01
chr(&H02)	"0 2"	"	"	02
chr(&H03)	"0 3"	#	#	03
chr(&H04)	"0 4"	\$	\$	04
chr(&H05)	"0 5"	%	%	05
chr(&H06)	"0 6"	&	&	06
chr(&H07)	"0 7"	.	.	07
chr(&H08)	"0 8"	((08
chr(&H09)	"0 9"))	09
chr(&H0A)	"0 A"	*	*	10
chr(&H0B)	"0 B"	+	+	11
chr(&H0C)	"0 C"	,	,	12
chr(&H0D)	"0 D"	—	—	13
chr(&H0E)	"0 E"	.	.	14
chr(&H0F)	"0 F"	/	/	15

Bar Code Data	Bar Code Data String	Suffixes by Code Set		
	ASCII	CODESET A	CODESET B	CODESET C
chr(&H10)	"1 0"	0	0	16
chr(&H11)	"1 1"	1	1	17
chr(&H12)	"1 2"	2	2	18
chr(&H13)	"1 3"	3	3	19
chr(&H14)	"1 4"	4	4	20
chr(&H15)	"1 5"	5	5	21
chr(&H16)	"1 6"	6	6	22
chr(&H17)	"1 7"	7	7	23
chr(&H18)	"1 8"	8	8	24
chr(&H19)	"1 9"	9	9	25
chr(&H1A)	"1 A"	:	:	26
chr(&H1B)	"1 B"	;	;	27
chr(&H1C)	"1 C"	<	<	28
chr(&H1D)	"1 D"	=	=	29
chr(&H1E)	"1 E"	>	>	30
chr(&H1F)	"1 F"	?	?	31
chr(&H20)	"2 0"	@	@	32
chr(&H21)	"2 1"	A	A	33
chr(&H22)	"2 2"	B	B	34
chr(&H23)	"2 3"	C	C	35
chr(&H24)	"2 4"	D	D	36
chr(&H25)	"2 5"	E	E	37
chr(&H26)	"2 6"	F	F	38
chr(&H27)	"2 7"	G	G	39
chr(&H28)	"2 8"	H	H	40
chr(&H29)	"2 9"	I	I	41
chr(&H2A)	"2 A"	J	J	42
chr(&H2B)	"2 B"	K	K	43
chr(&H2C)	"2 C"	L	L	44
chr(&H2D)	"2 D"	M	M	45
chr(&H2E)	"2 E"	N	N	46
chr(&H2F)	"2 F"	O	O	47
chr(&H30)	"3 0"	P	P	48
chr(&H31)	"3 1"	Q	Q	49
chr(&H32)	"3 2"	R	R	50
chr(&H33)	"3 3"	S	S	51
chr(&H34)	"3 4"	T	T	52
chr(&H35)	"3 5"	U	U	53
chr(&H36)	"3 6"	V	V	54
chr(&H37)	"3 7"	W	W	55
chr(&H38)	"3 8"	X	X	56
chr(&H39)	"3 9"	Y	Y	57
chr(&H3A)	"3 A"	Z	Z	58
chr(&H3B)	"3 B"	[[59
chr(&H3C)	"3 C"	\	\	60
chr(&H3D)	"3 D"]]	61
chr(&H3E)	"3 D"	^	^	62
chr(&H3F)	"3 F"	-	-	63

Bar Code Data	Bar Code Data String	Suffixes by Code Set		
	ASCII	CODESET A	CODESET B	CODESET C
chr(&H40)	"4 0"	(NUL)	'	64
chr(&H41)	"4 1"	(SOH)	a	65
chr(&H42)	"4 2"	(STX)	b	66
chr(&H43)	"4 3"	(EXT)	c	67
chr(&H44)	"4 4"	(EOT)	d	68
chr(&H45)	"4 5"	(ENQ)	e	69
chr(&H46)	"4 6"	(ACK)	f	70
chr(&H47)	"4 7"	(BEL)	g	71
chr(&H48)	"4 8"	(BS)	h	72
chr(&H49)	"4 9"	(HT)	i	73
chr(&H4A)	"4 A"	(LF)	j	74
chr(&H4B)	"4 B"	(VT)	k	75
chr(&H4C)	"4 C"	(FF)	l	76
chr(&H4D)	"4 D"	(CR)	m	77
chr(&H4E)	"4 E"	(SO)	n	78
chr(&H4F)	"4 F"	(SI)	o	79
chr(&H50)	"5 0"	(DEL)	p	80
chr(&H51)	"5 1"	(DC1)	q	81
chr(&H52)	"5 2"	(DC2)	r	82
chr(&H53)	"5 3"	(DC3)	s	83
chr(&H54)	"5 4"	(DC4)	t	84
chr(&H55)	"5 5"	(NAK)	u	85
chr(&H56)	"5 6"	(SYN)	v	86
chr(&H57)	"5 7"	(ETB)	w	87
chr(&H58)	"5 8"	(CAN)	x	88
chr(&H59)	"5 9"	(EM)	y	89
chr(&H5A)	"5 A"	(SUB)	z	90
chr(&H5B)	"5 B"	(ESC)	{	91
chr(&H5C)	"5 C"	(FS)		92
chr(&H5D)	"5 D"	(GS)	}	93
chr(&H5E)	"5 E"	(RS)	~	94
chr(&H5F)	"5 F"	(US)	(DEL)	95
chr(&H60)	"6 0"	" " (FNC 3)	" " (FNC 3)	96
chr(&H61)	"6 1"	" " (FNC 2)	" " (FNC 2)	97
chr(&H62)	"6 2"	(SHIFT)	(SHIFT)	98
chr(&H63)	"6 3"	(CODE C)	(CODE C)	99
chr(&H64)	"6 4"	(CODE B)	" " (FNC 4)	(CODE B)
chr(&H65)	"6 5"	" " (FNC 4)	(CODE A)	(CODE A)
chr(&H66)	"6 6"	" " (FNC 1)	" " (FNC 1)	" " (FNC 1)

- Specifying the bar code start stop code parameters of 'A,' 'B,' and 'C,' selects the code set in CODE128.
- A stop code is automatically applied, to enable expansion of bar codes for a maximum of 11 characters in one electronic statement.
- When the bar code type parameters are '2,' '3' (CODE39)

The symbols of "-", ".", ",", "\$", "/", "+", "%", and numbers "0" to "9" and letters of the alphabet from "A" to "Z" are expressed with bar code CODE39. • With the bar code of this mode, it is possible to expand bar code fonts by transmitting the character to use as an ASCII character. An asterisk (*) which is the start and stop code is automatically applied. It is possible to expand bar codes for a maximum of 10 characters with one electronic statement.

[Ex.:]

For VisualCard1.Communication (&h4E, "100, 170, 3, ABC123%+", 0, True);
 Expands bar codes of "ABC123%+" the CODE39 with subscript.

- When the bar code type parameters are '4,' '5' (ITF)
 Expresses "0" to "9" numbers with the bar code ITF. With the bar code of this mode, it is

possible to expand bar code fonts by transmitting the character to use as an ASCII character. A start and stop code is automatically applied. It is possible to expand bar codes for a maximum of 20 characters with one electronic statement.

- Example

For VisualCard1.Communication (&h4E, "100,170,5,125628", 0, True);

Expands bar codes of "125629" of the ITF with subscript.

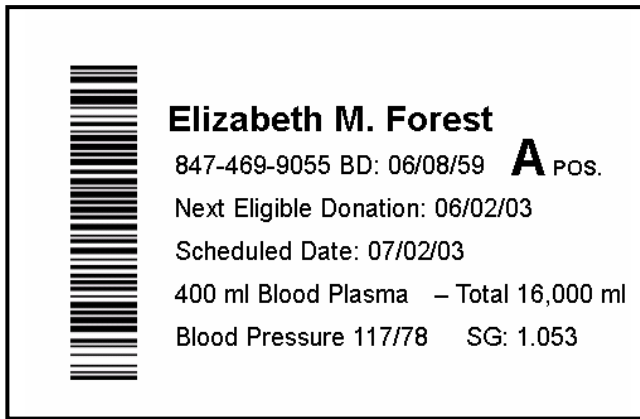
- When the bar code type parameters are '6,' '7' (CODABAR NW-7)

The symbols of "-", ".", ":", "\$", "/", "+", and numbers "0" to "9" are expressed with bar code CODABAR NW-7. • With the bar code of this mode, it is possible to expand bar code fonts by transmitting the character to use as an ASCII character. Specifying the bar code start stop code specifying parameters of "AA" to "DD" the start and stop code is specified. It is possible to expand bar codes for a maximum of 13 characters with one electronic statement.

- Example

For VisualCard1.Communication (&h4E, "100,170,7,AD,125628" , 0, True);

Expands bar codes of "A125629D" the CODABAR NW-7 with subscript.



Bar code printing example

For CODE128

4-3. Card Commands

(1) Card discharge command

This command discharges a card.

If there is a card in the device, this will discharge that card.

The card follows the discharge method specification parameter and is either discharged to a position where it can be reused, or completely discharged.

Cards that are discharged to the reuse position and cards completely discharged are both set to await being removed, and are not process targeted cards.

When a discharge command is issued to discharge a card discharged to the reuse position, the card is completely discharged.

Command Transfer Formats

STX	50h	Discharge method specification	ETX	BCC
-----	-----	--------------------------------	-----	-----

Response Transfer Formats

STX	50h	Status	ETX	BCC
-----	-----	--------	-----	-----

Parameter Explanation

- Discharge method specification parameter
'0': Discharge card to reuse position

Discharged cards wait to be pulled out and are no longer process target cards.

When either the command to take the discharged card into the device (the card rear side idle command or the card front side idle command) or the removal wait status cancel command is executed, the card becomes a process targeted card.

If there is a card waiting removal in the device, and the magnetic reading or printing command is received, this card is not a process target card, so the card discharge process is executed once to prompt the user to remove the card.

Note that once the card discharge command is applied to a card discharged to the reuse position the card is completely discharged according to the discharge method that was specified.

'1': Card is completely discharged.

Card waits to be pulled out and is not a process target card.

(2) Card front side idle command

This command transports and idles cards to the idling position on the front side. Regardless of whether the card in the device is waiting to be removed or is a process targeted card, it is transported to the idling position on the front side of the device and is idled there. If there is no card in the device, the device waits until a card is inserted, then transports it to the front side where it is idled.

Idled cards are process targeted card.

If a card is not inserted after this command is issued, or to cancel the command, issue the card insertion wait status cancel command (54h) after canceling the state of communication.

Command Transfer Formats

STX	53h	ETX	50h
-----	-----	-----	-----

Response Transfer Formats

STX	53h	Status	ETX	BCC
-----	-----	--------	-----	-----

(3) Card rear side idle command

This command transports and idles cards to the idling position on the rear side. Regardless of whether the card in the device is waiting to be removed or is a process targeted card, it is transported to the idling position on the rear side of the device and is idled there. If there is no card in the device, the device waits until a card is inserted, then transports it to the rear side where it is idled.

Idled cards are process targeted card.

If a card is not inserted after this command is issued, or to cancel the command, issue the card insertion wait status cancel command (54h) after canceling the state of communication.

Command Transfer Formats

STX	51h	ETX	52h
-----	-----	-----	-----

Response Transfer Formats

STX	51h	Status	ETX	BCC
-----	-----	--------	-----	-----

(4) Card insertion wait status cancel command

This command cancels the card insertion wait status.

The state in which the device waits for a card to be inserted to the inlet, by the execution of the magnetic stripe read command, magnetic stripe write command, the erase + print command, the erase command or the card front/rear idle command is called the card insertion wait state, but this command cancels the card insertion wait status.

This command can be executed while executing a command (special command). When this command is executed, the prior, executing command is cancelled.

Command Transfer Formats

STX	54h	ETX	57h
-----	-----	-----	-----

Response Transfer Formats

STX	54h	Status	ETX	BCC
-----	-----	--------	-----	-----

(5) Card removal wait status cancel command

This command makes a card in the device that are waiting removal a process targeted card. A card that is executing the erase + print command, the erase command or the discharge command becomes a card waiting removal by the user.

To reread the magnetic stripe data or to print again, either execute this command, or execute the card rear side idle command or the card front side idle command to make it a process targeted card.

Command Transfer Formats

STX	55h	ETX	56h
-----	-----	-----	-----

Response Transfer Formats

STX	55h	Status	ETX	BCC
-----	-----	--------	-----	-----

4-4. Information Display Commands

(1) Status request command

This command gets the status of the four card sensors in the device and the cover open sensor.

The following shows the sensor status string for each character composed of six characters.

Command Transfer Formats

STX	59h	ETX	5Ah
-----	-----	-----	-----

Response Transfer Formats

STX	59h	Status	Sensor status data string	ETX	BCC
-----	-----	--------	---------------------------	-----	-----

The following shows the response block sensor status data string.

• Sensor status data example

First: Sensor 1 status

- '0': No card in card inlet
- '1': Process targeted card in card inlet
- '2': Card waiting for removal

Second: Sensor 2 status

- '0': No Card
- '1': Card present

Third: Sensor 3 status

- '0': No Card
- '1': Card present

Fourth: Sensor 4 status

- '0': No Card
- '1': Card present

Fifth: Cover status

- '0': Cover closed
- '1': Cover open

Sixth: Fixed at 0

(2) ROM version request command

This command acquires the ROM version information (model name and version) of the reader/writer.

Command Transfer Formats

STX	58h	ETX	5Bh
-----	-----	-----	-----

Response Transfer Formats

STX	58h	Status	ROM information	ETX	BCC
-----	-----	--------	-----------------	-----	-----

The following shows the response block ROM information data string.

"TCP400 v 1.00 X"
 (1) (2) (3) (4) (5)

- (1) Series name (6 characters)
- (2) Blank
- (3) Fixed at v
- (4) Version number (integer field 1, decimal points, two decimal points)
- (5) Expanded Chinese characters (3 characters: Normally “.00”).

(3) LED, buzzer control command

This controls the STATUS LED and buzzer.
 This does not control the CLEANING LED.

Command Transfer Formats

STX	5Ah	Control data string	ETX	BCC
-----	-----	---------------------	-----	-----

Response Transfer Formats

STX	5Ah	Status	ETX	BCC
-----	-----	--------	-----	-----

Parameter Explanation

- Control data string parameter

The control data string is fixed to three bytes. The contents are outlined below.

Data String	Contents
First byte	Buzzer setting data
Second byte	LED color setting data
Third byte	LED operation setting data

Use the following codes for the LED color setting data.

[Code]	Function
Either of 47h ('G')/67h ('g')/31h ('1')	Sets to green.
Either of 4Fh ('O')/6Fh ('o')/33h ('3')	Sets to orange.
Either of 52h ('R')/72h ('r')/32h ('2')	Sets to red.

Use the following codes for LED operation and buzzer setting data.

[Code]		Function
20h	' '	Continues current operation
30h	'0'	Turns OFF
31h	'1'	Turns ON
32h	'2'	Starts blinking
33h	'3'	Blinks once
34h	'4'	Blinks three times

(4) Card transport count request command

This command request the number of times cards have been transported in the device, as a reference.

The transport count data string reads out the count that cards have passed over the magnetic head up to 10 digits.

Reciprocal transports are counted as two times.

When the power is cut, the transport count less than 10 times is rounded down.

Command Transfer Formats

STX	95h	Data String	ETX	BCC
-----	-----	-------------	-----	-----

Response Transfer Formats

STX	95h	Status	Transport count data	ETX	BCC
-----	-----	--------	----------------------	-----	-----

(5) Print count request command

This command requests the number printings, as a reference.

The print count data string is 10 digits long.

When the power is cut, the transport count less than 10 times is rounded down.

Command Transfer Formats

STX	96h	Data String	ETX	BCC
-----	-----	-------------	-----	-----

Response Transfer Formats

STX	96h	Status	Print count data	ETX	BCC
-----	-----	--------	------------------	-----	-----

4-5. Cleaning Command

(1) Cleaning button enable/disable command

This command enables and disables the cleaning button on the front panel. The setting is saved in the non-volatile memory.

Command Transfer Formats

STX	5Bh	Enable/disable parameter	ETX	BCC
-----	-----	--------------------------	-----	-----

Response Transfer Formats

STX	5Bh	Status	ETX	BCC
-----	-----	--------	-----	-----

Parameter Explanation

Enable/disable parameter

'0': Disables the panel cleaning button.

Device will not enter cleaning mode even when the button is pressed.

'1': Enables the panel cleaning button.

(2) Cleaning Command

This command uses a cleaning card to clean the magnetic head, thermal head and erase head.

If there is a card inside of the device, the device will discharge it and wait for the cleaning card to be inserted. After it is inserted, the device will clean the magnetic head, erase head and thermal head the set number of times, then discharge the cleaning card and idle.

If the head is hot, delay the cleaning until it has cooled.

If a card is not inserted after this command is issued, or to cancel the command, issue the card insertion wait status cancel command (54h).

Remarks:

Use of the cleaning card

Idle the reader/writer using the cleaning command.

Apply head cleaning solution to both sides of the cleaning card.

Insert the cleaning card into the card inlet on the device.

Allow the device to stand for one minute to allow it to dry.

Precautions in using the cleaning card

Do not use bent cleaning cards.

They will jam in the device.

Use only the accessory head cleaning solution, or head cleaning solutions regularly sold at audio/video dealers. Do not use any other solutions.

Command Transfer Formats

STX	52h	ETX	51h
-----	-----	-----	-----

Response Transfer Formats

STX	52h	Status	ETX	BCC
-----	-----	--------	-----	-----

4-6. Other Commands

(1) Reset command

This command resets the device.

The reset command is a priority command that resets the device even when another command is being executed. When the reset command is received while executing another command, the device quits the execution of that command.

Command Transfer Formats

STX	5Fh	ETX	5Ch
-----	-----	-----	-----

Response Transfer Formats

STX	5Fh	Status	ETX	BCC
-----	-----	--------	-----	-----

Resetting the device clears the print buffer area, and the magnetic read/write buffer and initializes the mechanism. Initializing the mechanism causes the device to discharge cards residing therein.

(2) Communication setting command

This command makes the default settings relating to communications.

The setting is stored internally with the non-volatile memory, even when the power is cut.

When the power is turned on again, the stored contents are handled as the default parameters.

Important

Be careful that settings are not different from the system side communication conditions.

There is a limit to the number of times the non-volatile memory can be used.

Issuing this command is limited to when starting up the system, and frequent use should be avoided.

Command Transfer Formats

ETX	90h	Setting type	Setting parameter	ETX	BCC
-----	-----	--------------	-------------------	-----	-----

Response Transfer Formats

STX	90h	Status	ETX	BCC
-----	-----	--------	-----	-----

Setting Type and Parameter List (Types are set alphabetic characters and parameter are set by numerical values)

Contents	Type	Parameters	Functions	Initial Value
USB Serial Number	'U' 'u'	'0' to '9'	Serial number for USB interface	'1'

Specifying USB Serial Number

This command sets the terminal individual number when using a USB interface. If the serial number is a value between 0 and 9, the host COM number can be value unique to that terminal.

The COM port varies with the port to use when the serial number is 0.

STX, 90h, 'U'/'u', 1 to 1 digit parameters, ETX, BCC

Parameters are described in three digit decimal values. The default serial number is '1.'

(3) Various setting commands

This command sets each of the default settings.

The setting is stored internally with the non-volatile memory, even when the power is cut.

When the power is turned on again, the stored contents are handled as the default parameters.

Important

There is a limit to the number of times the non-volatile memory can be used.

Issuing this command is limited to when starting up the system, and frequent use should be avoided.

Command Transfer Formats

ETX	91h	Setting type	Setting parameter	ETX	BCC
-----	-----	--------------	-------------------	-----	-----

Response Transfer Formats

STX	91h	Status	ETX	BCC
-----	-----	--------	-----	-----

Setting Type and Parameter List (Types are set alphabetic characters and parameter are set by numerical values)

Contents	Type	Parameters	Functions	Initial Value
ANK fonts Sizes	'J'/j'	'0'	Two-byte font specification	'1'
		'1'	Single-byte font specification	
24/16 dot font types	'F'/f'	'0'	24 dot font specification	'0'
		'1'	16 dot font specification	
ANK character thickness	'B'/b'	'0'	Narrow gothic specification	'0'
		'1'	Enhanced gothic specification	
Enable magnetic writing track	'C'/c'	'0' to '7'	See explanation	'4'(410) '2'(400)
Enable magnetic reading track	'R'/r'	'0' to '7'	See explanation	'2'
Card arrangement	'P'/p'	'0'	Vertical	'0'
		'1'	Horizontal	
Magnetic stripe retry count	'W'/w'	'0' to '7'	Specifies number of retries.	'2'
Cleaning	'U'/u'	'0' to '7'	Print head cleaning count	'3'
Two-byte character space	'D'	'0' to 'F'	Character space dot count	'2'
Single-byte character space	'd'	'0' to 'F'	Character space dot count	'2'
Character space	'M'/m'	'0' to 'F'	Line space dot count	'2'
LED control	'L'/l'	'0' to '3'	LED control method specification	'0'
Initialize	'Z'/z'	'0'	Returns device to ex-factory default settings.	—
Magnetic format reading direction conforming to JISX6302	'K'/k'	'0'	Reading direction conforming to JISX6302	'0'
		'1'	Opposite direction conforming to JISX6302	
Magnetic stripe format	'E'/e'	'20' to '24'	Second track writing data format setting	'22'
		'30' to '34'	Third track writing data format setting	'33'

- **ANK character font size specification (JP)**

This command sets the two-byte and single-byte fonts for ANK characters. Settings using the ESC sequence (ESC, J/j) in the print text data string are enabled only in one electronic statement, but settings using this command function as default settings in the print character data setting command 41h.

STX, 91h, 'J'/j', ANK font settings, ETX, BCC

ANK font setting parameter

'0': Prints ANK characters as two-byte fonts.
'1': Prints ANK characters as single-byte fonts.

ANK fonts when the device is sent from the factory are set to be single-byte fonts. This setting does not function on models other than Japanese specifications.

- **24/16 dot font type specification (US/EU)**

This command sets the US, and EU destined 24/16 dot fonts for AN characters. Settings using the ESC sequence (ESC, F/f) in the print text data string are enabled only in one electronic statement, but settings using this command function as default settings in the print character data setting command 41h.

STX, 91h, 'F'/f', 24/16 font font settings, ETX, BCC

24/16 font setting parameter

'0': Prints as 24 dot fonts
'1': Prints as 16 dot fonts

Ex-factory default settings are for 24 dot fonts. This setting does not function on models other than Japanese specifications, GB2312 or GB18030, and KR models.

- **ANK character thickness specification**

This command sets the narrow gothic/thick gothic settings for ANK characters. Settings using the ESC sequence (ESC, B/b) in the print text data string are enabled only in one electronic statement, but settings using this command function as default settings in the print character data setting command 41h.

STX, 91h, 'B'/b', character width setting, ETX, BCC

Character width setting parameter

'0': Sets ANK characters to narrow gothic.
'1': Sets ANK characters to enhanced gothic.

Default settings are for narrow gothic fonts.

- **Magnetic writing enabled track setting**

This command sets the track to write magnetically. Settings using this command function as default settings in the magnetic stripe write → idle command 31h and magnetic stripe write → idle (status with no card) command 32h.

STX, 91h, 'C'/c', magnetic writing enable track setting, ETX, BCC

Magnetic write enable track setting parameter

The following shows settings for a version (Model: 410) having three tracks of magnetic heads.

'0': Prohibits magnetic writing

'4': Enables magnetic writing to track 3.

The ex-factory default setting is for '4,' to enable magnetic writing to track 3.

The following shows settings for a version (400) having one track of a magnetic head.

'0': Prohibits magnetic writing

'2': Enables magnetic writing to track 2.

The ex-factory default setting is for '2,' to enable magnetic writing to track 2.

• Card arrangement direction setting

This command sets the direction for card arrangement.

In the print character data setting command (41h), the settings made using this command are enabled for the card arrangement direction if not setting the card arrangement direction and data arrangement coordinate printing control header string. In the print character data setting command (41h), if the print control header string is not set, the subsequent print character data is enabled with card arrangement direction set by the printing control header string having priority. The card arrangement direction set by this command is enabled again for each printing on cards.

STX, 91h, 'P'/'p', card arrangement direction setting, ETX, BCC

Card arrangement direction setting parameter

'0': Sets vertical card direction as the initial direction.

'1': Sets horizontal card direction as the initial direction.

The card arrangement direction when the device is shipped from the factory is set to the vertical position.

• Magnetic stripe read retry count setting

This command sets the number of times the device will retry to read the magnetic stripe. Settings using this command function as default settings in the first, second, and third track read commands 21h, 22h, 23h, the first, second and third track read (status with no card) commands 25h, 26h, 27h, and the first, second, and third track buffer read commands 29h, 2Ah and 2Bh.

STX, 91h, 'R'/'r', magnetic read retry count setting, ETX, BCC

Magnetic read retry count setting parameters

'0': No retry

'1': Sets the magnetic read retry count to 1 times.

'2': Sets the magnetic read retry count to 2 times.

'3': Sets the magnetic read retry count to 3 times.

'4': Sets the magnetic read retry count to 4 times.

'5': Sets the magnetic read retry count to 5 times.

'6': Sets the magnetic read retry count to 6 times.

'7': Sets the magnetic read retry count to 7 times.

The ex-factory magnetic read retry count setting is 2 times.

- **Magnetic stripe write retry count setting**

This command sets the number of times the device will retry to read the magnetic stripe. Settings using this command function as default settings in the magnetic stripe write → idle command 31h and magnetic stripe write → idle (status with no card) command 32h.

STX, 91h, 'W'/'w', magnetic write retry count setting, ETX, BCC

Magnetic write retry count setting parameters

- '0': No retry
 - '1': Sets the magnetic write retry count to 1 times.
 - '2': Sets the magnetic write retry count to 2 times.
 - '3': Sets the magnetic write retry count to 3 times.
 - '4': Sets the magnetic write retry count to 4 times.
 - '5': Sets the magnetic write retry count to 5 times.
 - '6': Sets the magnetic write retry count to 6 times.
 - '7': Sets the magnetic write retry count to 7 times.
- The ex-factory magnetic write retry count setting is 2 times.

- **Cleaning operation repeat count setting**

This command sets the number of times to repeat the cleaning of the thermal head. Settings using this command function as default settings in the cleaning operation by the command 52h, and the cleaning operation by pressing the cleaning switch.

STX, 91h, 'U'/'u', cleaning count setting, ETX, BCC

Cleaning count setting parameters

- '1': Sets cleaning count to 1 times.
- '2': Sets cleaning count to 2 times.
- '3': Sets cleaning count to 3 times.
- '4': Sets cleaning count to 4 times.
- '5': Sets cleaning count to 5 times.
- '6': Sets cleaning count to 6 times.
- '7': Sets cleaning count to 7 times.

The ex-factory cleaning count setting is 3 times.

• **Two-byte characters gap dot space setting (JP/GP2312 or GB18030, BIG5, KR)**

This command sets the two-byte characters gap dot space. Settings using the ESC sequence (ESC, D) in the print text data string are enabled only in one electronic statement, but settings using this command function as default settings in the print character data setting command 41h.

STX, 91h, 'D', two-byte character gap dot space setting, ETX, BCC

Two-byte character gap dot space setting parameters

'0':	Sets the two-byte character gap dot space setting to 0.
'1':	Sets the two-byte character gap dot space setting to 1.
:	
:	
'9':	Sets the two-byte character gap dot space setting to 9.
'A':	Sets the two-byte character gap dot space setting to 10.
'B':	Sets the two-byte character gap dot space setting to 11.
'C':	Sets the two-byte character gap dot space setting to 12.
'D':	Sets the two-byte character gap dot space setting to 13.
'E':	Sets the two-byte character gap dot space setting to 14.
'F':	Sets the two-byte character gap dot space setting to 15.

The ex-factory two-byte character gap dot space setting is 2 dots. This setting does not function on models other than JP, GB2312 or GB38030, BIG5, or KR.

• **Single-byte character gap dot space setting**

This command sets the single-byte characters gap dot space. Settings using the ESC sequence (ESC, d) in the print text data string are enabled only in one electronic statement, but settings using this command function as default settings in the print character data setting command 41h.

STX, 91h, 'd', single-byte character gap dot space setting, ETX, BCC

Single-byte character gap dot space setting parameters

'0':	Sets the single-byte character gap dot space setting to 0.
'1':	Sets the single-byte character gap dot space setting to 1.
:	
:	
'9':	Sets the single-byte character gap dot space setting to 9.
'A':	Sets the single-byte character gap dot space setting to 10.
'B':	Sets the single-byte character gap dot space setting to 11.
'C':	Sets the single-byte character gap dot space setting to 12.
'D':	Sets the single-byte character gap dot space setting to 13.
'E':	Sets the single-byte character gap dot space setting to 14.
'F':	Sets the single-byte character gap dot space setting to 15.

The ex-factory single-byte character gap dot space setting is 2 dots.

• **Line gap dot space setting**

This command sets the line gap dot space. Settings using the ESC sequence (ESC, M/m) in the print text data string are enabled only in one electronic statement, but settings using this command function as default settings in the print character data setting command 41h.

STX, 91h, 'M'/m', line gap dot space setting, ETX, BCC

Line gap dot space setting parameters

'0':	Sets the line gap dot space setting to 0 dots.
'1':	Sets the line gap dot space setting to 1 dots.
:	
:	
'9':	Sets the line gap dot space setting to 9 dots.
'A':	Sets the line gap dot space setting to 10 dots.
'B':	Sets the line gap dot space setting to 11 dots.
'C':	Sets the line gap dot space setting to 12 dots.
'D':	Sets the line gap dot space setting to 13 dots.
'E':	Sets the line gap dot space setting to 14 dots.
'F':	Sets the line gap dot space setting to 15 dots.

The ex-factory line gap dot space setting is 2 dots.

• **LED control method setting**

This command sets the method to control the LED.

When setting the LED control method, the LED automatically lights and the buzzer rings when the device has entered a card insertion wait state or card removal wait state.

STX, 91h, 'L'/l', operation setting, ETX, BCC

Operation setting parameters

'0':	LED does not light and buzzer does not ring when there is a card inserting request or removal request.
'1':	Buzzer rings when there is a card removal request. LED displays an insertion request.
'2':	LED lights to display there is a card removal request. LED displays an insertion request.
'3':	LED lights and buzzer rings to display that there is a card removal request. LED displays an insertion request.

• **Setting for the ex-factory defaults**

This command returns settings that users can make to their ex-factory, default status. This does not initialize TPH rank, EHD rank, country model, and manufacturer model.

STX, 91h, 'Z'/z, '0', ETX, BCC
Alphabet Number

- **Magnetic format reading direction conforming to JISX6302**

This command sets the magnetic format reading direction conforming to JISX6302 Settings using this command function as default settings in the first, second, and third track read commands 21h, 22h, 23h, the first, second and third track read (status with no card) commands 25h, 26h, 27h, and the first, second, and third track buffer read commands 29h, 2Ah and 2Bh.

STX, 91h, 'K'/'k', reading direction setting, ETX, BCC

Reading direction setting parameters

'0': Sets to conform to JISX6302.

'1': Sets to the opposite direction of JISX6302.

Ex-factory default settings are the magnetic format setting conforming to JISX6302.

- **Magnetic format settings**

Users can use this command to freely set the magnetic stripe writing format. Settings using this command function as default settings in the second and third track data setting commands 3Ch, 3Dh.

STX, 91h, 'E'/'e', magnetic format settings, ETX, BCC

Magnetic format setting parameters

The following shows settings for a version (Model: 410) having three tracks of magnetic heads.

'30': Sets track 3 to JISX6302 recording method.

'31': Sets track 3 to ISO7811/2 first track recording method.

'32': Sets track 3 to ISO7811/2 second track recording method.

'33': Sets track 3 to ISO7811/2 third track recording method.

'34': Sets track 3 to the opposite direction data format of the JISX6302 recording method.

The ex-factory default setting for track 3 is '33.'

The following shows settings for a version (400) having one track of a magnetic head.

'20': Sets to the JISX6302 recording method.

'21': Sets to ISO7811/2 first track recording method.

'22': Sets to ISO7811/2 second track recording method.

'23': Sets to ISO7811/2 third track recording method.

'24': Sets to the opposite direction recording method of JISX6302.

The ex-factory default setting for track 2 is '22.'

5. MATERIALS

5-1. Switching Firmware

Use the following steps to switch the firmware of the device.

1. Install the flash memory loading program into your PC.
2. Copy the firmware to any folder.
3. Turn off the power to the device, then mount either of the applicable interfaces of serial, USB, or LAN.
4. Turn the device's DIP switch #1 to OFF (right side).
The #1 DIP switch is on the side of the me on the insertion side, when looking from the top fo the device.
5. Connect the interface cable, then turn the power on again.
6. The LEDs flash several times alternately and STATUS lights. The buzzer will beep three times.
7. Startup the flash memory loading program. Use Port! to set the communication conditions. Set the IP address for the LAN interface. When settings are completed, click OK.
8. Use Write! in the flash memory loading program to select the firmware.
9. Loading of the files starts.
Do not turn the power off or unplug the cable until completed.
10. When completed, turn off the power and return the DIP switch #1 (left side) and interface to their normal status.

5-2. Error Display

A self-diagnosis test is performed when the LED light sequentially at power on.

A self-diagnosis test is performed only, without lighting the LED when recovering from a transport path open state, when the reset command is executed.

The result of the test is displayed by the LED and buzzer.

Test Results	Display	Remarks
Normal	STATUS and buzzer flash one time	
SRAM error	STATUS and buzzer flash two times while CLEANING lights.	
EEPROM error	STATUS and buzzer flash three times while CLEANING lights.	
Print head lifter motor error	STATUS and buzzer flash four times while CLEANING lights.	
Erase head/thermistor error	CLEANING and buzzer flash two times while STATUS lights.	
Other errors	CLEANING and buzzer flash four times while STATUS lights.	Ambient temperature sensor operation error, etc.
Cover open	Buzzer intermittent ringing	
Transport path open	Buzzer intermittent ringing and STATUS flashing	

5-3. Loading Setting Cards

The setting card loading operation is performed by turning on the power while holding down the cleaning switch.

When the setting card is then inserted, the information on the card changes the operating mode of the device.

If the changes are successful, success is printed at the bottom of the card. If an error occurs, unsuccessful is printed.

Refer to the setting card application manual for details regarding the creation of a setting card.

5-4. Self-test Operation

After setting the setting card reading operation, click on the CLEANING switch again to cause the LED to flash in orange. This will enter the self-test mode.

In the self-test mode, the device waits for a card to be inserted, then writes test data to the magnetic stripe after the card is inserted. Prints the results of the test data print the internal EEPROM setting status and the device version onto two cards, and discharges the cards.

(On LAN models, NIC REPORT plus the normal test print is printed to two cards.)

If a setting card is inserted during a self-test, the card will be discharged and the self-test operation will be canceled.

When performing a self-test, magnetic data for the test is written to the card. Use a card whose magnetic stripe can be overwritten without causing a problem.

After setting the setting card reading operation, a print patter is printed one card that is different from the one above if you continue pressing the CLEANING switch until the buzzer stops ringing.

5-5. Recommended Timeout

Command	Name	Function	Recommended Timeout Value Setting Minimum Value in ms Units
21	First track read command	After card insertion, track 1 read, data request (format automatic judgment)	6000+α *1
22	Second track read command	After card insertion, track 2 read, data request (format automatic judgment)	6000+α *1
23	Third track read command	After card insertion, track 3 read, data request (format automatic judgment)	6000+α *1
25	First track read command (status with no card)	After card presence check, track 1 read, data request (format automatic judgment)	6000+α *1
26	Second track read command (status with no card)	After card presence check, track 2 read, data request (format automatic judgment)	6000+α *1
27	Third track read command (status with no card)	After card presence check, track 3 read, data request (format automatic judgment)	6000+α *1
29	First track buffer read command	Track 1 read data request, if not read, read operation starts	6000+α *1
2A	Second track buffer read command	Track 2 read data request, if not read, read operation starts	6000+α *1
2B	Third track buffer read command	Track 3 read data request, if not read, read operation starts	6000+α *1
31	Magnetic stripe write -Idle command	After waiting card insertion, executes magnetic write/read/verify	6000+α *1
32	Magnetic stripe write -Idle command (status with no card)	After card check, executes magnetic write/read/verify	6000+α *1
37	Reverse 7 bit format third track data setting command	JISII track 3 write data setting 210BPI	1000
3A	7 bit format third track data setting command	JISII track 3 write data setting 210BPI	1000
3D	Third track data setting command	ISO track 3 write data setting BCD 210BPI	1000
40	Print expansion buffer clear command	Print memory clear	1000
41	Print character data setting command	Print data setting (details in separate table)	3000+α
42	Built-in image data 1 expansion command	Expansion to buffer of built-in image data 1 Data settings downloaded from BMP file by separately	3000
43	External image data expansion command (line)	External image data setting (for each one line)	α
44	Two-byte external character font register command	24 x 24 two-byte external character font registration 16 characters/16 x 16 two-byte external character font registration 16 characters	2000
45	Single-byte external character font register command	24 x 12 single-byte external character font registration 16 characters/16 x 8 single-byte external character font registration 16 characters	1000
46	Erase + print a discharge command	Card insertion wait, parameter specification executes erase and print operations	10000+α
49	Buffer clear command	Clear of external image data	2000
4D	External image data expansion command (block)	External image data setting (block)	α
4E	Bar code data setting command		1000
50	Card discharge command	Card discharge	2000
51	Card backside idle command	Card backside idling	2000
52	Cleaning command	Magnetic head, thermal head, erase head cleaning	60000
53	Card front side idle command	Card frontside idle	2000
54	Card insertion wait status cancel command	Card insertion wait status cancel	1000
55	Card pull-out wait status cancel command	Card pull-out wait status cancel	1000
58	ROM version request command	ROM version request	1000
59	Status request command	Detects status of each sensor	1000
5A	LED, buzzer control command	LED, buzzer control	1000
5B	Cleaning button enable/disable command	Cleaning button enable/disable	1000
5F	Reset command	Sets to initial status, performs initialize operation	3000
90	Communication setting command	Communication setting (details in separate table)	1000
91	Various settings command	Various settings (details in separate table)	1000
95	Card conveyance count request command	Card reciprocation, path movement operation count	1000
96	Print count request command	TPH print operation count	1000

*1 When magnetic read write command timeout value is to retry 3 times

*2 α: Set for operation on host system.



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Please access the following URL
<http://www.star-m.jp/eng/dl/dl03.htm>
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