TCP300 Series
Programmer's Manual

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Star Micronics Co., Ltd.

Special Products Operating Division

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Trademark acknowledgments

TCP300: Star Micronics Co., Ltd.

Notice

1. APPLICATION

This manual describes the commands relating to the TCP300 and TCM300 series visual card reader/writer.

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 visual card reader/writer. 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).

3.   SPECIFICATIONS

3-1   Communication Procedures

This device communicates with its host using block transmissions that can request a resend.

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 (Block Check Character), 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

Resend Sequence

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

DLE Sequence

Host		Reader/writer
Command sent	→	Command received
DLE received	←	DLE sent

See section **2-5. Transmission Control Characters** for details regarding DLE transmissions, 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, the command is executed 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/discarded → 1	Read/discarded → 1	Read/discarded → 1	Read/discarded → 1	→ 1
2 Command rcvd.	Buffering → 2	Buffering → 3	If data error DLE sent → 1 If data error buffering → 2	If data error DLE sent → 1 If data error 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/discarded → 4	Read/discarded → 4	Read/discarded → 4	→ 1	Response resend → 4	→ 4

When a priority command, such as Reset command or Card removal wait status cancel 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 Format

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 Transmission 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 waits in the device, 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**.

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 initial values 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 command 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 without transporting a card by using the buffer read command.   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 when the read/write operation has not been performed before executing the buffer read command.

This buffer read command is a similar operation to the read cache.

3-9 Commands and Status Lists

(1) Command List

Code	Content of Command		Model	Class
21h	First track read command		310	Magnetic stripe commands
22h	Second track read command		300/310	
23h	Third track read command		310	
25h	First track read (Status with no card) command		310	
26h	Second track read (Status with no card) command		300/310	
27h	Third track read (Status with no card) command		310	
29h	First track buffer read command		310	
2Ah	Second track buffer read command		300/310	
2Bh	Third track buffer read command		310	
38h	7 bit format first track data setting command		310	
39h	7 bit format second track data setting command		300/310	
3Ah	7 bit format third track data setting command		310	
3Bh	First track data setting command	*1 Data format set by EEPROM.	310	
3Ch	Second track data setting command		300/310	
3Dh	Third track data setting command		310	
31h	Magnetic strip write → idle command		300/310	
32h	Magnetic strip write → idle (status with no card) command		300/310	
40h	Print buffer clear command			Print, delete commands
49h	Image buffer clear command			
41h	Print data setting command			
42h	Internal 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			
47h	Print → discharge command			
48h	Delete → discharge command			
4Ah	Embedded image data 2 expand command		FROM 2 Model	
4Bh	BMP file register command to internal image data 2		FROM 2 Model	
4Dh	External data expand command (block mode)			
50h	Card discharge command			Card commands
53h	Card front idle command			
51h	Card back idle command			
54h	Card insertion wait status cancel command			
55h	Card removal wait status cancel command			
5Ch	Card ticketing command		Mechanism part	

Code	Content of Command	Model	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		
52h	Cleaning command		Cleaning commands
5Fh	Reset command		
90h	Communication setting command	Mechanism part	Other commands
91h	Model setting command		
9Bh	Media setting		

Model Details

300: 1 Track magnetic head model (TCP300**)

310: 3 Track magnetic head model (TCP310**)

FROM 2 Model: Model has optional second FROM mounted on main PCB.

Ask our sales staff or our sales representative for details when purchasing.

Mechanism part: Mechanism parts sold separately (TCM3** models)

* 1 EEPROM initial values for magnetic strips per country of destination are listed below.

3 Track magnetic head model (TCP310**)

3Bh: 6 bit + 1 parity ISO7811/2 First track recording model

3Ch: 4 bit + 1 parity ISO7811/2 Second track recording model

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

1 Track magnetic head model (TCP310**)

3Bh: Not supported

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

3Dh: Not supported

(2) Status List

The following shows the content of status.

Everything other than code 20h is **notified as an error.**

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: TCP310)

General Description

This command waits 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

• 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 and third tracks

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

Note that this command cannot be used with on models with one magnetic stripe (TCP300).

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, then begin 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	(00h 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).

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 (Model: TCP300/310)

General Description

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

• 7-bit format conforming to JISX6302

• 6-bit format conforming to ISO 7811/2 first track

• 4-bit format conforming to ISO 7811/2 second and third tracks

Note that this command can be used with on models with one magnetic stripe (TCP300).

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

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: TCP310)

General Description

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

• 7-bit format conforming to JISX6302

• 6-bit format conforming to ISO 7811/2 first track

• 4-bit format conforming to ISO 7811/2 second and third tracks

This command cannot be used with on models with one magnetic stripe (TCP300).

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

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: TCP310)

General Description

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

• 7-bit format conforming to JISX6302

• 6-bit format conforming to ISO 7811/2 first track

• 4-bit format conforming to ISO 7811/2 second and third tracks

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

Note that this command cannot be used with on models with one magnetic stripe (TCP300).

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	(00h 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 (Model: TCP300/310)

General Description

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

• 7-bit format conforming to JISX6302
• 6-bit format conforming to ISO 7811/2 first track
• 4-bit format conforming to ISO 7811/2 second and third tracks

Note that this command can be used with models with one magnetic stripe (TCP300).

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

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: TCP310)

General Description

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

- 7-bit format conforming to JISX6302
- 6-bit format conforming to ISO 7811/2 first track
- 4-bit format conforming to ISO 7811/2 second and third tracks

This command cannot be used with on models with one magnetic stripe (TCP300).

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

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: TCP310)

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

- 7-bit format conforming to JISX6302
- 6-bit format conforming to ISO 7811/2 first track
- 4-bit format conforming to ISO 7811/2 second and third tracks

See the first track read command for details.

This command cannot be used with on models with one magnetic stripe (TCP300).

Command Transfer Formats

STX	29h	ETX	BCC

Response Transfer Formats

STX	29h	Status	Read Data String	ETX	BCC

(8)   Second track buffer read command (Model: TCP300/310)

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

- 7-bit format conforming to JISX6302
- 6-bit format conforming to ISO 7811/2 first track
- 4-bit format conforming to ISO 7811/2 second and third tracks

See the second track read command for details.

Note that this command can be used with on models with one magnetic stripe (TCP300).

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: TCP310)

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

- 7-bit format conforming to JISX6302
- 6-bit format conforming to ISO 7811/2 first track
- 4-bit format conforming to ISO 7811/2 second and third tracks

See the third track read command for details.

This command cannot be used with on models with one magnetic stripe (TCP300).

Command Transfer Formats

STX	2Bh	ETX	BCC

Response Transfer Formats

STX	2Bh	Status	Read Data String	ETX	BCC

(10) 7 bit format first track data setting command (Model: TCP300)

This command sets the write data to the first 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.

This command cannot be used with on models with one magnetic stripe (TCP300).

Command Transfer Formats

STX	38h	Write data string	ETX	BCC

Response Transfer Formats

STX	38h	Status	ETX	BCC

(11) 7 bit format second track data setting command (Model: TCP300/310)

This command sets the write data to the second 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 can be used with on models with one magnetic stripe (TCP300).

Command Transfer Formats

STX	39h	Write data string	ETX	BCC

Response Transfer Formats

STX	39h	Status	ETX	BCC

(12) 7 bit format third track data setting command (Model: TCP310)

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 00h 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 cannot be used with on models with one magnetic stripe (TCP300).

Command Transfer Formats

STX	3Ah	Write data string	ETX	BCC

Response Transfer Formats

STX	3Ah	Status	ETX	BCC

(13) First track data setting command (Model: TCP310)

This command sets the first 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

• 6-bit format conforming to ISO 7811/2 first track

• 4-bit format conforming to ISO 7811/2 second and third tracks

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	3Bh	Write data string	ETX	BCC

Response Transfer Formats

STX	3Bh	Status	ETX	BCC

(14) ISO type second track data setting command (Model: TCP300/310)

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

• 6-bit format conforming to ISO 7811/2 first track

• 4-bit format conforming to ISO 7811/2 second and third tracks

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: TCP310)

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

• 6-bit format conforming to ISO 7811/2 first track

• 4-bit format conforming to ISO 7811/2 second and third tracks

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 (Model: TCP300/310)

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 all 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

'1': Enable magnetic writing to track 1

'2': Enable magnetic writing to track 2

'3: Enable magnetic writing to tracks 1 and 2

'4': Enable magnetic writing to track 3

'5': Enable magnetic writing to tracks 1 and 3

'6': Enable magnetic writing to tracks 2 and 3

'7': Enable magnetic writing to tracks 1, 2 and 3

Only parameter 2 is enabled with a 1-track model (TCP300**) for the number of tracks of magnetic stripes.

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).

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 (Model: TCP300/310)

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

'1':   Enable magnetic writing to track 1

'2':   Enable magnetic writing to track 2

'3:   Enable magnetic writing to tracks 1 and 2

'4':   Enable magnetic writing to track 3

'5':   Enable magnetic writing to tracks 1 and 3

'6':   Enable magnetic writing to tracks 2 and 3

'7':   Enable magnetic writing to tracks 1, 2 and 3

    Only parameter 2 is enabled with a 1-track model (TCP300**) for the number of tracks of magnetic stripes.

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.

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) or by turning the power off and on again.

Command Transfer Formats

STX	40h	ETX	43h

Response Transfer Formats

STX	40h	Status	ETX	BCC

(2)   Rasterized image register buffer clear command

This command clears the rasterized image register 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 the rasterized image register 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 commands.

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 command.

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

Parameter ',' (comma) Y coordinate specification parameter ',' (comma)

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': Horizontal 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 <u>left edge</u> 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 "479"

• Y coordinate specification parameter

Specifies whether to expand the Y coordinate of the bottom <u>left edge</u> of the text data to expand to each print expansion buffer.

When the card arrangement direction specification is '0,' '2':   '0' to "479"

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

Notes:

The Y coordinate specification parameter indicates the bottom <u>left edge</u> 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.

Japanese, Taiwanese and Hong Kong 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 command 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 ANK characters are specified as two byte characters with the ESC control statement) and two byte Chinese characters (Japanese specifications: Shift JIS code; Taiwanese specifications BIG5; Chinese specifications: GB).

• 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'   <u>1 digit configuration</u>

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'   <u>1 digit configuration</u>

• 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'   <u>1 digit configuration</u>

• 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"   <u>2 digit configuration</u>

• 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 one byte.

ESC 's' next parameter range: "01" to "59"   <u>2 digit configuration</u>

• 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"   <u>2 digit configuration</u>

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• ESC M/m

Sets the dot spaces between lines

ESC 'M'/"m" next parameter range: "0" to "F"   <u>1 digit configuration</u>

• ESC X/x

Sets the X coordinate to expand characters.

ESC 'X'/'x' next parameter range:

For vertical cards: "000"' to "319"   <u>3 digit configuration</u>

For horizontal cards: "000" to "479"   <u>3 digit configuration</u>

• ESC Y/y

Sets the Y coordinate to expand characters.

ESC 'Y'/"y" next parameter range:

For vertical cards: "000" to "479"   <u>3 digit configuration</u>

For horizontal cards: "000" to "319"   <u>3 digit configuration</u>

• 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'   <u>1 digit configuration</u>

• ESC d

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

ESC 'd' next parameter range: '0' to 'F'   <u>1 digit configuration</u>

• ESC W/w

Sets the width size of characters to expand.

ESC 'W'/"w" next parameter range: '1' to '2'   <u>1 digit configuration</u>

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'   <u>1 digit configuration</u>

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 AN 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.

16 dot fonts cannot be used on Japanese, Taiwanese or Hong Kong specification models.

(4)   Internal image data 1 expand command

(Contact our sales representative for destination country.)

This command expands images specified by an expansion image number 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 files.

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

Command Transfer Formats

STX	42h	Data arrangement specification	','	Data arrangement X coordinate	','	Data arrangement Y coordinate	','	Expansion image specification number	ETX	BCC

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.

• ','

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 "479"

• 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 "479"

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 files, 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 (Line Mode)

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 Format

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 "479"

• ',' (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 "3A."

- ● Bit 0   '3' (33h)
- ● Bit 1
- O Bit 2
- O Bit 3
- O Bit 4   'A' (41h)
- ● Bit 5
- O Bit 6
- ● Bit 7

(6) External image data expand command (Block Mode)

This command sets the image data to <u>the rasterized image register buffer (volatile memory)</u>.
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 <u>the rasterized image register</u>
<u>buffer</u>.
'0' to "479"

• ',' (Commas)

Required to separate parameters.

• Expansion starting Y address parameter

Specifies whether to expand the registered image Y address to <u>the rasterized image register</u> <u>buffer</u>. 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 "3A."   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)
- ●   Bit 1
- O   Bit 2
- O   Bit 3
- O   Bit 4   'A' (41h)
- ●   Bit 5
- O   Bit 6
- ●   Bit 7

If using a card in the vertical direction (portrait), you should rotate the original print data beforehand.
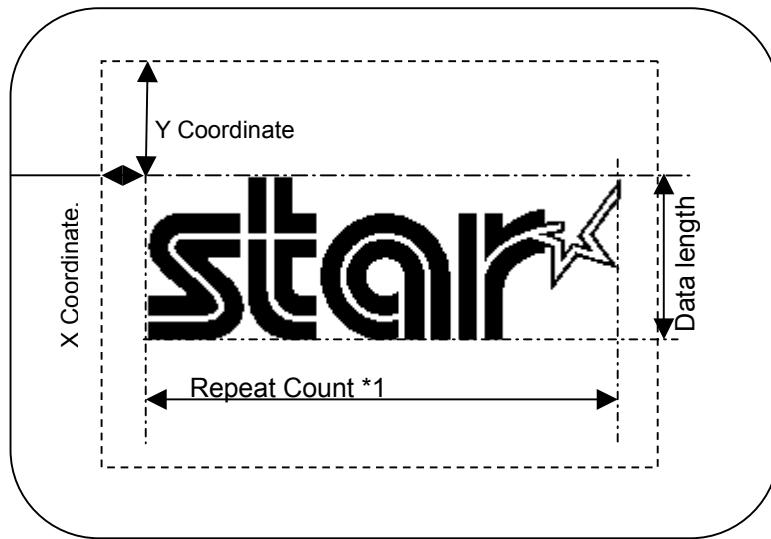
*1: The following equation is for the number of times to repeat the command (when the image data count is an integer magnification of the data length).

Repeat count = X direction dot count/(image data count/data length)

(7)   Two-byte external character font register command

This command registers 24 dot or 16 dot two-byte fonts to <u>the external character buffer</u> 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 Format

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,"	Font number
"001000001000081020101010"	A to D string
"20000840380400FE0000FF01"	E to H string
"80FF0380FF03C0FF07DEFFF7"	I to L string
"C0FF0780FF0380FF0300FF01"	M to P string
"00FE00003100400004201008"	Q to T string
"101010081020001000000000"	U to X string

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(8)   Single-byte external character font register command

This command registers 24 dot or 16 dot single-byte fonts to <u>the external character buffer</u> of 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 Format

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 prints while executing the erase operation on the print surface.

If there is a card idling in the device, it executes the erase + print operations.

If there is no targeted card, it will wait until one is inserted into the device, then perform the erase + print operations.

After erasing and printing, the device will either discharge the card according to the discharge method specification parameter or it will stop while idling and hold the card.

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

The device stops at the front idling position, and the card being held is a process target card.

The print expansion buffer and rasterized image register buffer are not cleared with the execution of the erase + print command.

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).

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

Command Transfer Formats

STX	46h	Discharge method specification	ETX	BCC

Response Transfer Format

STX	46h	Status	ETX	BCC

Parameter Explanation

• Discharge method specification parameter

'0':   Card after erase + print is stopped at front idling position and held.
       Card becomes a process target card.

'1':   Card after erase + print is discharged.
       Card waits to be pulled out and is not a process target card.

'2':   Card after erase + print is discharged to back side.
       Cannot be used with case accessory parts.   Reject response is issued.

(10) Print → discharge command

This command prints only to the print surface.

If there is a card idling in the device, it prints to the card.

If there is no targeted card, it will wait until one is inserted into the device, then starts printing.

After printing, the device will either discharge the card according to the discharge method specification parameter or it will stop while idling and hold the card.

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

The device stops at the front idling position, and the card being held is a process target card.

The print expansion buffer and rasterized image register buffer are not cleared with the execution of the print command.

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).

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

Command Transfer Formats

STX	47h	Discharge method specification	ETX	BCC

Response Transfer Format

STX	47h	Status	ETX	BCC

Parameter Explanation

• Discharge method specification parameter

'0': Card after print is stopped at front idling position and held

Card becomes a process target card.

'1': Card after print is discharged.

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

'2' Card after print is discharged to back side.

Cannot be used with case accessory parts.   Reject response is issued.

(11) Erase → discharge command

This command erases the print surface.

If there is a card idling in the device, it erases to the card.

If there is no targeted card, it will wait until one is inserted into the device, then starts erasing.

After erasing, the device will either discharge the card according to the discharge method specification parameter or it will stop while idling and hold the card.

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

The device stops at the front idling position, and the card being held is a process target 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).

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

Command Transfer Formats

STX	48h	Discharge method specification	ETX	BCC

Response Transfer Format

STX	48h	Status	ETX	BCC

Parameter Explanation

• Discharge method specification parameter

'0': Card after erase + print is stopped at front idling position and held

   Card becomes a process target card.

'1': Card after erase + print is discharged.

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

'2' Card after print is discharged to back side.

   Cannot be used with case accessory parts.   Reject response is issued.

(12)   Internal image data 2 expand command (EU/UK/US)

(Contact our sales representative for destination country.)

This command expands images specified by an expansion image number from among the image data stored in the reader/writer flash ROM2.

Image data is a maximum of 16 image data expanded to the flash ROM2 image area (0X100000-0X1FFFFF).   This is data of a BMP file (bit map file) on a Windows system, that is registered by **the BMP file register command (4Bh) to the internal image data**.   When expanding to the print expansion buffer, it is possible to print with a progress bar shown in the figure below, by specifying the X direction expansion starting dot and expansion ending dot for the image.

Command Transfer Formats

STX	4Ah	Data arrangement specification	','	Data arrangement X coordinate	','	Data arrangement Y coordinate		
	','	Expansion image specification number	','	Expansion starting dot	','	Expansion ending dot	ETX	BCC

Response Transfer Format

STX	4Ah	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

'3':   Horizontal card + added writing

These four parameters specify how to write.

• ',' (Comma)

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 "479"

• 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 "479"

When the data arrangement specification is '1,' '3':   '0' to "319"

• Expansion image specification number parameter

The data count can be up to 16 types and can be specified using the characters of '0' to "15."

However, a reject response is issued if an image data that corresponds to the reader/writer flash ROM2 cannot be found.

• Expansion starting dot specification parameter

The expansion starting dot is <u>the BMP file height </u>that corresponds from '0,' minus 1.   When it is not less than the expansion ending dot specification parameter, an error will occur.

• Expansion ending dot specification parameter

The expansion ending dot is <u>the BMP file height</u> that corresponds from '0,' minus 1.   When it is not more than the expansion starting dot specification parameter, an error will occur.

Note that to print a progress bar, two images that extend the progress in the Y direction, as shown below for the BMP file to register with the command (4Bh), must be registered.
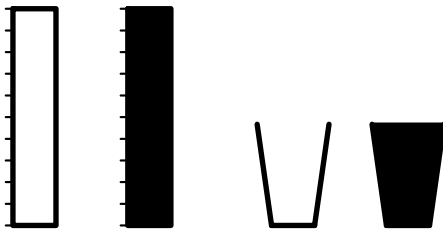
As an example, the following will register three empty progress bars, and four full progress bars. The height of the BMP is 100 dots.

1. 4Ah 1, 100, 25, 3, 0, 99

    This arranges an empty progress bar from the 0 dot to the 99th dot on a horizontally arranged card.

2. 4Ah 1, 100, 25, 4, 0, 39

    This arranges an empty progress bar from the 0 dot to the 39th dot on a horizontally arranged card.

    The result is that image 4 overlaps image 3, and 40% of the progress bar is image expanded.

3. This can be printed to the card by executing the 46h command.
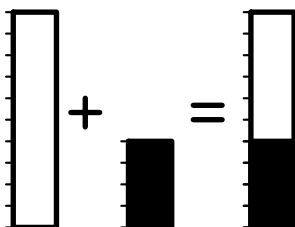
Notes:
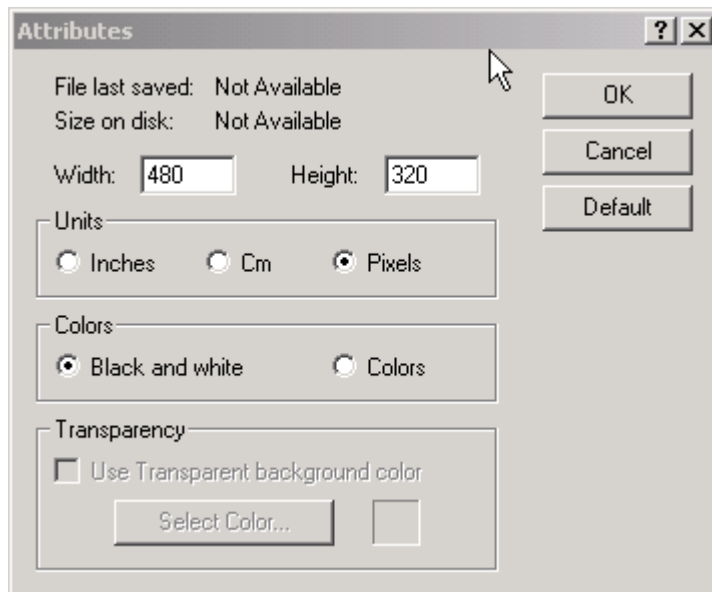
BMP files that can be registered:

Using Microsoft Windows Paintbrush program canvas colors and sizes (Attributes):

Must not exceed 320 for width and height simultaneously

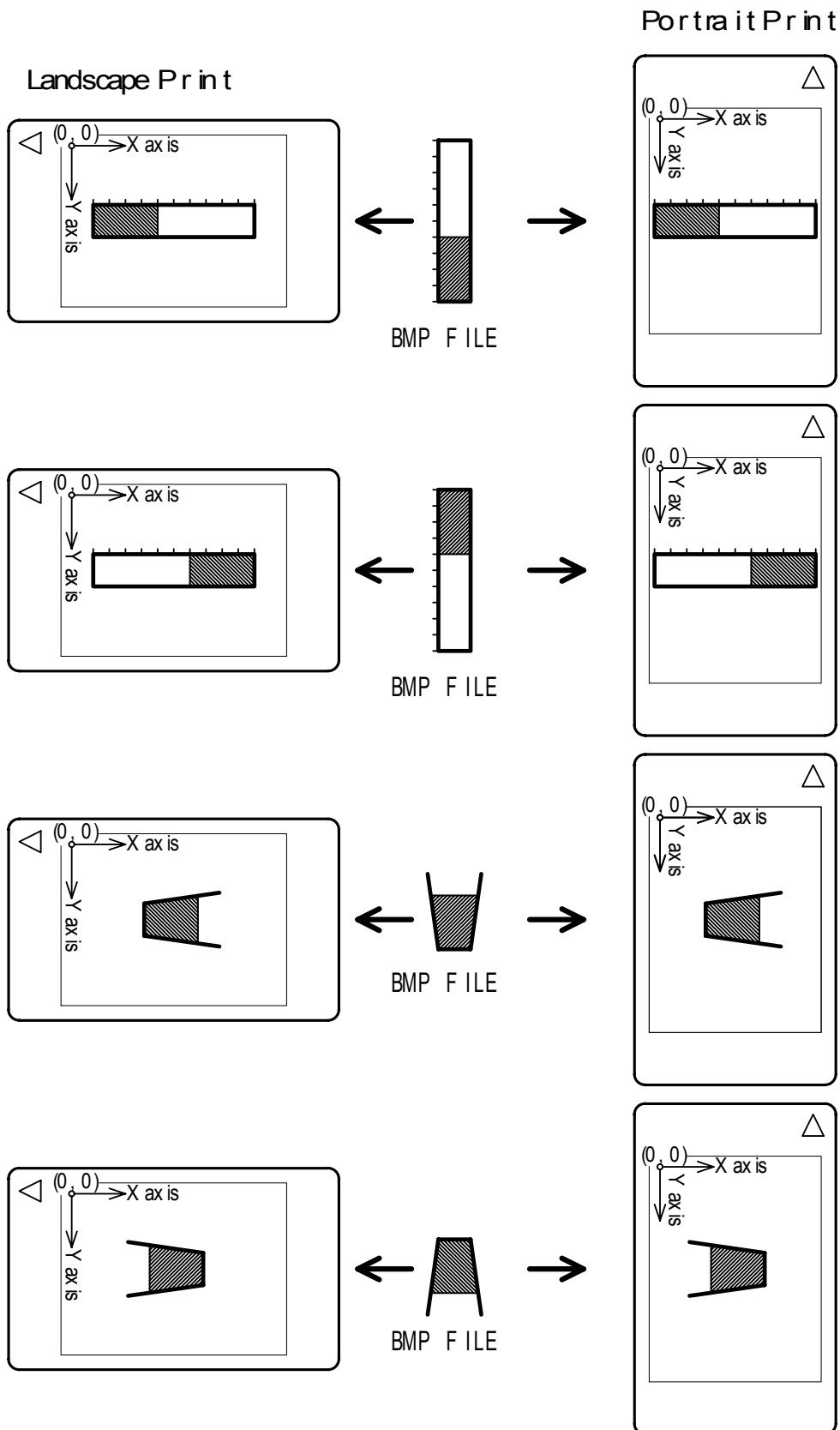Must not exceed 480 for width and height

Units are pixels .

Color is black and white.

Notes:

To print a progress bar, the print results will vary depending on the arrangement of the card.

The following shows the expansion direction and actual printing results.

Landscape Print

Portrait Print

BMP FILE

(13) BMP file registering command to internal image data 2 (EU/UK/US)

(Contact our sales representative for destination country.)

This command registers BMP files to the internal flash memory ROM2 image data area on the reader/writer.   A maximum of 16 images can be registered.

Command Transfer Formats

STX	4Bh	Register image specification number or continuation mark (+)	','	Text of BMP data	ETX	BCC

Response Transfer Format

STX	4Bh	Status	ETX	BCC

Parameter Explanation

• Registered image specification number data/continuation mark '+'

Applies a number to the number to register.   16 types: '0' to '15'

'0':   Registers image as image number 0.

  :

  :

'10':   Registers image as image number 10.

'15':   Registers image as image number 15.

'+':   When the text of the BMP data exceeds 1024, a large BMP file can be registered by specifying a '+' mark instead of a register specification number.   There is no restriction to the number of continued registrations of BMP files using the + mark on the reader/writer, so you can continue registering as long as the print area is not exceeded.

• ','

Required to separate parameters.

• Text of BMP data

Normally, BMP files are in binary format, but each 1 byte of binary data is converted to data represented by two characters of text in ASCII format for transmission.

Ex.)   Converting binary format data into text format data

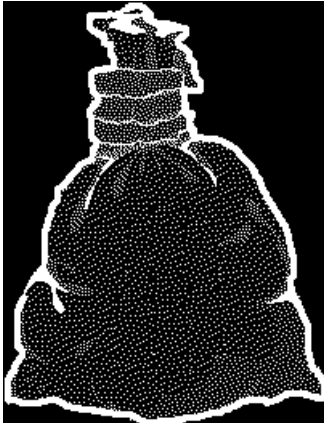Binary   1   2   3   4   5   6   7   8   9   10   11   12

           42   4D   0E   21   00   00   00   00   00   00   3E   00

Text Straight Hex

                1   2   3   4   5   6

           34 32   34 44   30 45   30 30   30 30   30 30

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(Space Page)

Example Image Sample

Contents of File

Example of Data Transmission to Flash 2

Data is separated for transmission because BMP images are large.   A '+' mark is necessary to indicate that the command continues into a second packet, and beyond.

First Packet

"0,424D1E1D0000000000003E00000028000000CB0000000801000001000100000000000E01C0000C40E0000C40E000000000000000000FFFFFF000000000000000000000000000000007FFFFFF0000000000000000000000000000000000000000000000001FFFFFFFC00000000000000000000000000000000000000000000000017FFFFFFFFFE00000000000000000000000000000000000000000000000001FF80FFFFFFFC0000000000000000000000000000000000000000FFFFC10801FFFFFC000000000000000000000000000000000007FFFFF8442420FFFFFF80000000000000000000000000000000001FFFFFFE2000100017FFFC00000000000000000000000000000001FFFFFFFF801244121007FFFC000000000000000000000000000003FFFFFFA80048000408490FFFE000000000000000000000000000003FF"

Second Packet

"+,FFFF140240089204000485FFC00000000000000000000000007FFFFC840900000004048402 0FFF00000000000000000000003FFF001FFF8001140011010108090212012FF8001C00000000000001 0FFFFF07FE002000001002021001000480BFF803F800000000000003FFFFFFFFFF49200451100008 004882420042FFFFFFFF00000000000007FFFFFFFFE00009000004400440000104107FFFFFFFC00003F0000007FF003FFF8000400000040100011244800102 1FFFFFFFE0001FF8000007F84089FE0222024924000441000100890489 5FFF8FFC01FFFC0000078408001100000000000110010490812204000051243FFFFFFFC000007D000010020002400010040010041000208 49280008FFFFFFBC000007810110000089201111004090000002240410001208 13FFFF03C000007D048204800000800004000241008 0008081"

Third Packet

"+,09208101FFFC43C00000780000402420040000400800104024822010204420440840 13C000007D000400000220884800811100100020090202088410200903C0000782081408080010202080000010400088020401001010010 04BC0000079082010080800000000200420011100240412421020504803C000007A0000040000842010820420081000420041000444040401 0FC000007801090042202108802001010080001089102451008111204 7C000007D2440200002000004004000000248000002000208104004 0F8000007C010002100001000004081020000201212042004244045 10F8000003F0028800100482420800008409200048080410880000810 03F0000003E080008804800010021000000084000404100229424104 43F0000001F800400080200800800200100000800040822000080840 13E0000001F81"

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 Format

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 is discharged to rear side.

Cannot be used with case accessory parts.　Reject response is issued.

(2)　Card front side idle command

This command transports and waits 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).

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 waits 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).

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 state.

This command can be executed while executing a command (priority 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 is 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

(6)   Card ticketing command (mechanism part)

This command uses the ticketing device to issue a card ticket, then waits.   If a card is idling, the reject response is issued.   Also, if a card waiting for removal is at the inlet, the device waits for that card to be removed, and then starts the ticketing operation after its removal.   If there is no card in the ticketing device, a no card status 22h is responded.

Command Transfer Formats

STX	5Ch	ETX	56h

Response Transfer Formats

STX	5Ch	Status	ETX	BCC

4-4   Information and Display Commands

(1)   Status request command

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

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 string

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

Seventh: Dispenser card status (only on the mechanism part)

'0':   Card inside dispenser

'1':   No card inside dispenser

(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.

TCP300	XX	V	1.00	X
1	2	3	4 5	6

1. Series name (Six characters: Mechanism part and TCP)
2. Specifications code (Two characters)
3. Blank
4. Fixed at V
5. Version number (integer field 1, decimal points, two decimal points)
6. Expansion code

(3)   LED, buzzer control command

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

This command is enabled even when there is a command (,) inserted between parameters.

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 (to five bytes when there is a comma (,)).   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 commands for LED operation setting data and LED color setting data.

Code	Function
Either 47h ('G')/67h ('g')/31h ('1')	Sets to green.
Either 47h ('O')/67h ('o')/31h ('3')	Sets to orange.
Either 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 it off.
31h	'1'	Turns it 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.

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

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

Contents	Type	Parameters	Function	Initial Value
USB Serial Number	'U' 'u'	'0' to '127'	Serial number for USB interface	'0'
Serial port baud rate setting	'B' 'b'	'0' to '4'	CMOS interface baud rate setting	'0'
Initialize	'O' 'o'	'0'	Returns device to ex-factory default settings.	-

USB serial number specification

This command sets the terminal individual number when using a USB interface. If the serial number is a value between 1 and 127, 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 3 digit parameters, ETX, BCC

Parameters are described in three digit decimal values.   0 can be omitted.

The ex-factory default serial number is 0.

Baud rate setting

This command sets the baud rate when using a CMOS interface.

STX, 90H, 'B'/'b', parameter, ETX, BCC

Baud rate setting parameter

'0':   Sets the baud rate to 9600 bps.

'1':   Sets the baud rate to 4800 bps.

'2':   Sets the baud rate to 19200 bps.

'3':   Sets the baud rate to 38400 bps.

'4':   Sets the baud rate to 2400 BPS.

The ex-factory default setting is '0' (9600 bps).

(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	Function	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'	'1' to '7'	See explanation	'7'
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'
Line space	'M'/'m'	'0' to 'F'	Line space dot count	'2'
Speed to take card in from rear	'S'/'s'	'1' to 'F'	See explanation	'D'
LED control	'L'/'l'	'0' to '3'	LED control method specification	'0'
Initialize	'O'/'o'	'0'	Returns device to ex-factory default settings.	-
Magnetic stripe format	'E'/'e'	'10' to '13'	First track writing data format setting	'11'
		'20' to '23'	Second track writing data format setting	'22'
		'30' to '33'	Third track writing data format setting	'33'

• ANK character font size specification

This command sets the ANK characters to two-byte or single-byte fonts. Settings using the ESC sequence (ESC, J/j) in the print text data string are enabled only in the command, but settings using this command function as default settings.

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.

- **24/16 dot font type specifications**

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

    STX, 91h, 'F'/'f', 24/16 font setting parameter, 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.

    16 dot font settings are not possible on reader/writer going to Japan, Taiwan and Hong Kong.

- **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 the command, but settings using this command function as default settings.

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

    Character width setting parameter

    '0':   Sets ANK characters to narrow gothic.

    '1':   Sets ANK fonts to enhanced gothic.

    '2':   Disable or double-enhanced gothic fonts are not possible with default settings.

    Ex-factory default settings are for narrow gothic fonts.

- **Magnetic writing enabled track setting**

    This command sets the track to write magnetically.

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

    Magnetic write enable track setting parameter

    '1':   Enables magnetic writing to track 1.

    '2':   Enables magnetic writing to track 2.

    '3':   Enables magnetic writing to track 1 and 2.

    '4':   Enables magnetic writing to track 3.

    '5':   Enables magnetic writing to track 1 and 3.

    '6':   Enables magnetic writing to track 2 and 3.

'7':   Enables magnetic writing to track 1, 2 and 3.

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 the card arrangement direction and data arrangement coordinate printing control header string are not set. 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 reading the magnetic stripe.

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

Magnetic read retry count setting parameters

'0':   No retry
'1':   Sets the magnetic read retry count to 1 time.
'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 write to the magnetic stripe.

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

Magnetic write retry count setting parameters

'0': No retry
'1': Sets the magnetic write retry count to 1 time.
'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.

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

Cleaning count setting parameters

'1': Sets cleaning count to 1 time.
'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/HK/TW)

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 the command, but settings using this command function as default settings.

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.

• 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 the command, but settings using this command function as default settings.

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

Single-byte character gap dot space setting parameters

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

The ex-factory singe-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 the command, but settings using this command function as default settings.

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 dot.
'1':   Sets the line gap dot space setting to 1 dot.
     :
     :
'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.

• Rear side card handling transport speed setting (mechanism part)

This command sets the transport speed when handling cards from the rear side.   In the system, it is possible to synchronize the transport speed of the transport unit mounted on the rear side of the device.

STX, 91h, 'S'/'s', transport speed setting, ETX, BCC

Transport speed setting parameters

'1':   Sets the transport speed to 45 mm/s.
'2':   Sets the transport speed to 75 mm/s.
'3':   Sets the transport speed to 105 mm/s.
'4':   Sets the transport speed to 135 mm/s.
'5':   Sets the transport speed to 165 mm/s.
'6':   Sets the transport speed to 195 mm/s.
'7':   Sets the transport speed to 225 mm/s.

'8': Sets the transport speed to 255 mm/s.

'9': Sets the transport speed to 285 mm/s.

'A': Sets the transport speed to 315 mm/s.

'B': Sets the transport speed to 345 mm/s.

'C': Sets the transport speed to 375 mm/s.

'D': Sets the transport speed to 405 mm/s.

'E': Sets the transport speed to 435 mm/s.

'F': Sets the transport speed to 450 mm/s.

The ex-factory transport speed setting is 405 mm/s.

• 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, media type or energy changes.

STX, 91h, <u>'O'/'o'</u>, <u>'0'</u>, ETX, BCC
      <u>Alphabet</u>   <u>Number</u>

• Magnetic format Settings

Users can use this command to freely set the magnetic stripe writing format.

Magnetic format setting parameters

The following shows settings for a version (TCP310) having three tracks of magnetic heads.

'10' : Sets track 1 to JISX6302 recording method.

'11' : Sets track 1 to ISO781 1/2 first track recording method.

'12' : Sets track 1 to ISO781 1/2 second track recording method.

'13' : Sets track 1 to ISO781 1/2 third track recording method.

'20' : Sets track 2 to JISX6302 recording method.

'21' : Sets track 2 to ISO781 1/2 first track recording method.

'22' : Sets track 2 to ISO781 1/2 second track recording method.

'23' : Sets track 2 to ISO781 1/2 third track recording method.

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

'31' : Sets track 3 to ISO781 1/2 first track recording method.

'32' : Sets track 3 to ISO781 1/2 second track recording method.

'33' : Sets track 3 to ISO781 1/2 third track recording method.

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

The following shows settings for a version (TCP300) having one track of a magnetic head.

'20' : Sets track 2 to JISX6302 recording method.

'21' : Sets track 2 to ISO781 1/2 first track recording method.

'22' : Sets track 2 to ISO781 1/2 second track recording method.

'23' : Sets track 2 to ISO781 1/2 third track recording method.

The ex-factory default setting for track 2 is '21.'

Also, for a 1 track version (TCP300), the first and third tracks cannot be set.

(4)   Media setting command

This command sets the media to be used.   The setting made with this command remains in effect until the power is turned off or the device is reset.   After being reset, the EEPROM setting value is initialized.

Important

If the media set for use does not correspond to the setting, it is possible that erasing or printing will not work, or that problems such as writing to the magnetic stripe will not work.   Also, even if there is no problem in erasing, printing or writing to the magnetic stripe, the life of the card will be shortened and the quality to magnetically write to the card will decrease.   Therefore, when using this command, check the characteristics of the media to be used.

Command Transfer Formats

ETX	9Bh	Media type	','	Non-magnetic force	ETX	BCC

Response Transfer Formats

STX	9Bh	Status	ETX	BCC

• Media types

Specify a value for the media code expressed in hexadecimal. '0' to '3F' can be specified for media codes, including those for conventional extensions. Refer to the TCP300 series media specifications manual for details relating to the media codes for use.

• ',' (Commas)

Required to separate parameters.

• Non-magnetic force

Sets the non-magnetic force of the magnetic stripe to '0' to '3.'

0: 300   Oe (23.9 KA/m)

1: 650   Oe (51.7 KA/m)

2: 1750   Oe (139 KA/m)

3: 2750   Oe (219 KA/m)

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 the serial, USB or LAN interface.
4. Turn the device's DIP switch #1 and #2 to OFF (the right side).
   The DIP switch is on the side of the magnetic head, when looking from the top of the device and on the inlet side is #1.
5. Connect the interface cable, then turn the power on again.
6. The LEDs will flash alternately several times and STATUS will light.   The buzzer will beep twice.
7. Startup the flash memory loading program.   Use PORT! to set the communication conditions. When using a LAN interface, set the IP address.   When settings are completed, click OK.
8. Use flash memory loading program WRITE! to select the firmware.
9. Loading starts.
   Do not turn the power off or unplug the cable until completed.
10. When completed, turn off the power and return the DIP switches #1 and #2 (left side) and interface to their normal statuses.

Caution

• The communication speed when loading the mechanism part for the device is fixed at 19200 bps, 8 bits, non-parity.

5-2 Error displays

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.	
Print head thermistor error	CLEANING and buzzer flash three 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.　The results of the test data of the internal EEPROM setting status and the device version are printed onto the card, and then the card is discharged. (When using a LAN model, there are two cards of an NIC REPORT and a test print.)　If a setting card is inserted during a self-test, the card will be discharged and the self-test operation will be cancelled.

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.

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