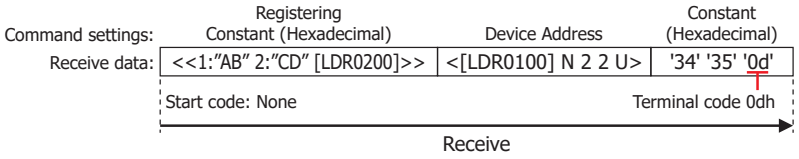
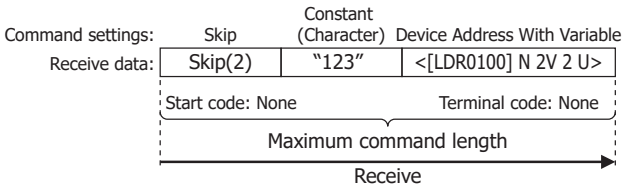
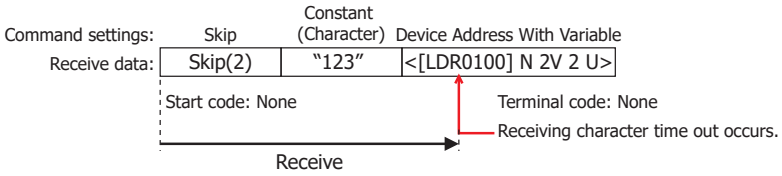
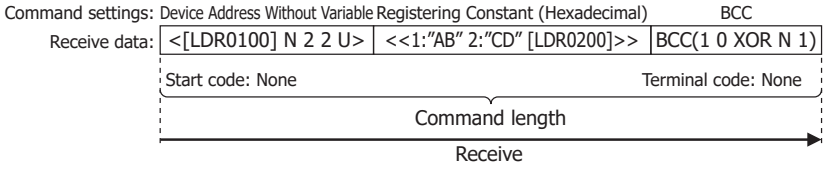
<table>
<tr><th>Start code</th><th>Terminal code</th><th>Variable</th><th>Description of the procedure for terminal of data reception</th></tr>
<tr><td>Not set</td><td>Set</td><td>Set
Not set</td><td>Reception is started from the beginning and terminated with the terminal code.
 
</td></tr>
<tr><td rowspan="2">Not set</td><td rowspan="2">Not set</td><td>Set</td><td>Reception is started from the beginning and the data is received according to the maximum command length.
 

Reception is terminated when the Receiving Character Time Out occurs.
 
</td></tr>
<tr><td>Not set</td><td>Reception is started from the beginning and terminated when the data is received according to the length of the command.
 
</td></tr>
</table>

- When trigger conditions are satisfied for two or more receive commands for which both start code and terminal code are set, all commands are analyzed and processed for receive processing. Since commands with and without errors may be mixed depending on the results of data reception analysis of each command, take extra caution regarding error handling.
- While the trigger condition is satisfied for a receive command for which either a start code or terminal code is not set, only this command is processed for data reception when the trigger condition of another command is being satisfied. When two or more commands exist for which either start code or terminal code is not set, the command with the biggest number for managing the protocol is processed.
- When a start code of the receive command for which a start code is set cannot be received, all of the receive data is ignored and abandoned. No error occurs.
- When start code is received with a receive command for which start code and terminal code are set, the data reception is completed after the maximum number of bytes received in case of continuous reception of data that does not match the terminal code of all receive command in which the trigger conditions is satisfied.

5.4 Example of User Communication Settings

This section describes examples of user communication settings and command operations.

● Example 1

This section describes an example of user communication protocol settings for creating the following commands and command operations.

- Transmission command for transmitting data using Constant (Hexadecimal), Constant (Character), Device Address, Constant (Hexadecimal) command settings when the trigger condition device address changes to 1
- Receive command for receiving, processing, and storing data in device addresses, using Constant (Hexadecimal), Constant (Character), Device Address, Constant (Hexadecimal) command settings, for data transmitted from an external device, when the trigger condition device address is 1

■ Settings in the User Communication tab on the Project Settings dialog box

Item	Setting
Protocol Name	Sample 1
Receiving Character Time Out	30 (×100 msec)

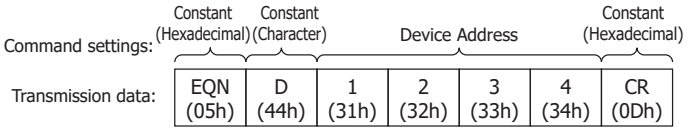
Transmission command: Command Settings dialog box settings

Item	Setting	
Type	TXD	
Trigger Condition	Rising-edge, Device Address: LM100	
Completed Device Address	LM101	
Status Device Address	LDR110	
Transmission Wait	50 (×100 msec)	
Comment	TXD command	
Command Data Settings dialog box settings	Constant (Hexadecimal)	'05'
	Constant (Character)	"D"
	Device Address	Conversion Type: Decimal to ASCII, Number of bytes: 4, Words: 1 Device Address: LDR100
	Constant (Hexadecimal)	'0D'

Operation for transmission command

When a value of LDR100 of transmission command data **Device Address** is 1234 (DEC), change the trigger condition LM100 from 0 to 1 to start command transmission.

After the transmission wait duration (five seconds), the transmission data is sent. The transmission data is as follows.



- When data transmission is successfully completed, the Completed Device Address LM101 changes to 1.
- When the value of each bit of address number+0 for Status Device Address LDR110 is 0, transmission is completed without an error.

Receive command: Command Settings dialog box settings

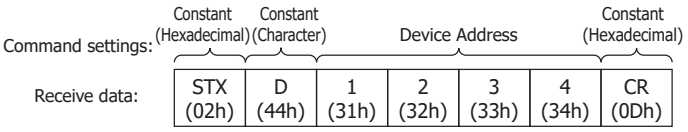
Item	Setting	
Type	RXD	
Trigger Condition	While ON, Device Address: LM101	
Completed Device Address	LM102	
Not Clear Completed Device Address automatically	No	
Status Device Address	LDR130	
Receiving Time Out	0 (No Receive Time Out)	
Comment	RXD command	
Command Data Settings dialog box settings	Constant (Hexadecimal)	'02'
	Constant (Character)	"D"
	Device Address	Conversion Type: ASCII to Hexadecimal, Number of bytes: 4, Words: 1 Device Address: LDR120, Reference Device Address: LDR100
	Constant (Hexadecimal)	'0D'

Operation for receive command

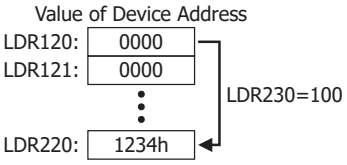
1 When data transmission of the transmission command is completed, the value of LM101 changes to 1, and since the same device address is specified for the trigger condition user communication becomes ready for receiving.

2 Data is transmitted from the external device and the transmitted data is received and processed.

The receive data is as follows.



Since a value of 100 is written to LDR100 at the time of transmission, the data is stored in device address LDR220, which corresponds to an offset of +100 from LDR120.



- When data reception is successfully completed, the Completed Device Address LM102 changes to 1.
- When the value of each bit of address+0 of Status Device Address LDR130 is 0, reception is completed without an error.

● Example 2

This section describes an example of user communication protocol settings for creating the following commands and command operations.

- Transmission command for transmitting data using Constant (Hexadecimal), Registering Constant (Character), Device Address, BCC, Constant (Hexadecimal) command settings when the trigger condition device address changes to 1
- Receive command for receiving, processing, and storing data in device addresses, using Constant (Hexadecimal), Registering Constant (Character), Skip, Device Address, BCC, Constant (Hexadecimal) command settings, for data transmitted from an external device, when the trigger condition device address is 1

■ Settings in the User Communication tab on the Project Settings dialog box

Item	Setting
Protocol Name	Sample 2
Receiving Character Time Out	30 (×100 msec)

Transmission command: Command Settings dialog box settings

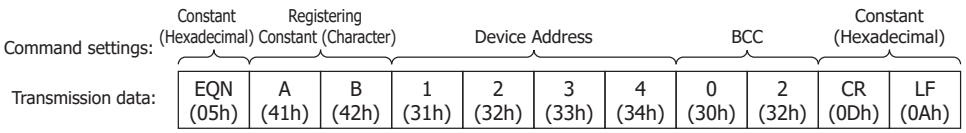
Item		Setting
Type		TXD
Trigger Condition		Rising-edge, LM200
Completed Device Address		LM201
Status Device Address		LDR220
Transmission Wait		0 (×100 msec)
Comment		TXD command
Command Data Settings dialog box settings	Constant (Hexadecimal)	'05'
	Registering Constant (Character)	10: "AB", 20: "CD", Index Device Address: LDR200
	Device Address	No conversion, from Upper byte, Number of bytes: 2, Words: 2, Device Address: LDR210
	BCC	Start Calculation Position: 1, End Calculation Position: 0, XOR, Hexadecimal to ASCII, 2 bytes
	Constant (Hexadecimal)	'0D"0A'

Operation for transmission command

1 Write a value of 10 (Dec) to LDR200 for **Registering Constant (Character)** for transmission command data. **AB** is selected.

2 Write a value of 3132h to LDR210 and 3334h to LDR211 for **Device Address** for transmission command data.

3 Change the value of the trigger condition LM200 from 0 to 1 to send the command.
The transmission data is as follows.



- When data transmission is successfully completed, the Completed Device Address LM201 changes to 1.
- When the value of each bit of address number+0 for Status Device Address LDR220 is 0, transmission is completed without an error.

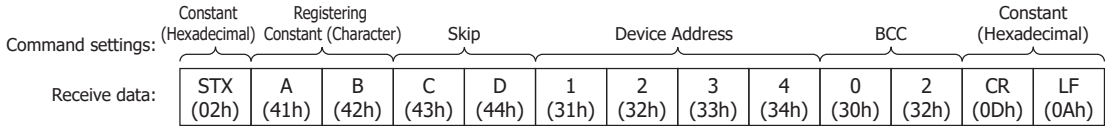
Receive command: Command Settings dialog box settings

Item	Setting	
Type	RXD	
Trigger Condition	While ON, Device Address: LM202	
Completed Device Address	LM203	
Not Clear Completed Device Address automatically	No	
Status Device Address	LDR260	
Receiving Time Out	0 (No Receive Time Out)	
Comment	RXD command	
Command Data Settings dialog box settings	Constant (Hexadecimal)	'02'
	Registering Constant (Character)	10: "AB", 20: "CD", Index Device Address: LDR230
	Skip	2 bytes
	Device Address	Conversion Type: No conversion, from Upper byte, Number of bytes: 2, Words: 2 Device Address: LDR240, Reference Device Address: LDR230
	BCC	Calculation Start Position: 1 Calculation End Position: 0, XOR Hexadecimal to ASCII, 2 bytes
	Constant (Hexadecimal)	'0D''0A'

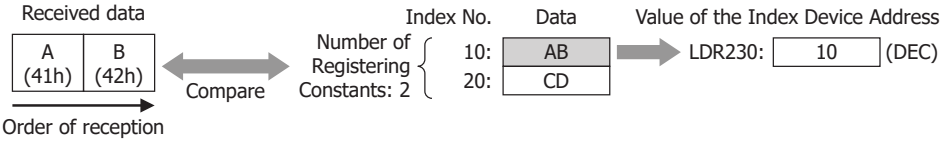
Operation for receive command

1 Change the trigger condition LM202 from 0 to 1 to be ready for receiving user communication.

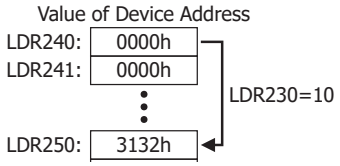
2 Data is transmitted from the external device and the transmitted data is received and processed.
The receive data is as follows.



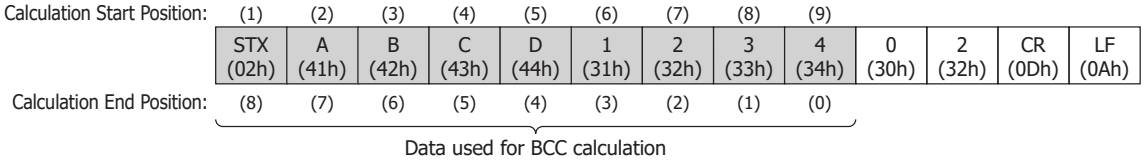
- The receive data is compared with the character data, and the value of the matching Index No. (10 (Dec)) is stored in Index Device Address LDR230.



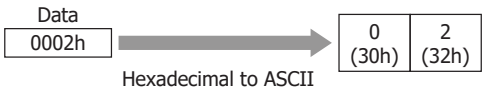
- The 2 bytes (specified with **Skip**) of the receive command data 43h and 44h are ignored.
- Since the Reference Device Address LDR 230 of **Device Address** of the receive command data is 10 (Dec), the data is stored in the device address LDR250 and LDR251, which is offset by +10.



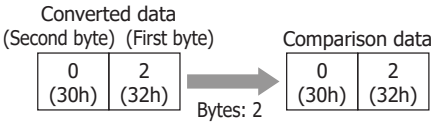
- **[STX] ABCD1234** is calculated with **BCC** of receive command data and compared with 3032h.
  - When Calculation Start Position is 1 and Calculation End Position is 0: Calculates the range **STX ABCD1234**.



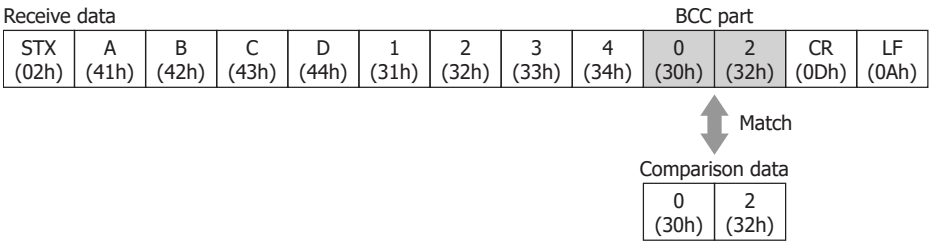
- The BCC calculation type is **XOR**.
  02h^41h^42h^43h^44h^31h^32h^33h^34h^=02h
- When the BCC calculation result is **0002h**, the converted data will be **3032h**.



- When the converted data is **3032h**, the data for comparison with the BCC part of the receive data will be **3032h**.



- The comparison data is compared with the BCC part of the receive data.
  In the following receive data, when the comparison data is the 2-byte 3032h, there is a match since the BCC part data is 3032h.
  When there is no match, the BCC Error (address number+0, bit 0) of Status Device Address changes to 1.



- When data reception is successfully completed, the Completed Device Address LM203 changes to 1.
- When the value of each bit of address number+0 for Status Device Address LDR300 is 0, transmission is completed without an error.

● Example 3

This section describes an example of user communication protocol settings for creating the following commands and command operations.

Transmission command for transmitting data using Constant (Hexadecimal), Constant (Character), Constant (Hexadecimal), BCC, Constant (Hexadecimal) command settings when the value of the trigger condition device address is 1

■ Settings in the User Communication tab on the Project Settings dialog box

Item	Setting
Protocol Name	Sample 3
Receiving Character Time Out	- (Cannot be configured)
Inching Function	Enable
Execution Interval	10 (x10 msec)

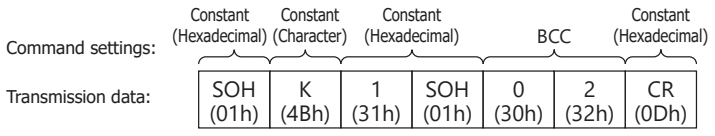
Transmission command: Command Settings dialog box settings

Item	Setting	
Type	Inching	
Function Key	F7	
Trigger Condition	While satisfying the condition, LSD31==5	
Completed Device Address	LM301	
Status Device Address	LDR330	
Transmission Wait	- (Cannot be configured)	
Comment	TXD Inching command	
Command Data Settings dialog box settings	Constant (Hexadecimal)	'01'
	Constant (Character)	"K"
	Constant (Hexadecimal)	'31"01'
	BCC	Calculation Start Position: 1, Calculation End Position: 0, XOR, Hexadecimal to ASCII, 2 bytes
	Constant (Hexadecimal)	'0D'

Operation for transmission command

When the value of Trigger Condition LSD31 is 5, press the Function Key F7 and command is transmitted in one hundred milliseconds intervals.

The transmission data is as follows.



- When data transmission is successfully completed, the Completed Device Address LM301 changes to 1.
- When the value of each bit of address number+0 for Status Device Address LDR330 is 0, transmission is completed without an error.